



**Lloyd Shoals Hydroelectric Project  
FERC Project Number 2336-094**

**Volume 3**

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Exhibit E

Exhibit G

Prepared by

Southern Company Generation Hydro Services

December 2021



# EXHIBIT E

## LLOYD SHOALS HYDROELECTRIC PROJECT (FERC No. 2336)

*Prepared with:*

Southern Company Generation Hydro Services

*and*

**Kleinschmidt**

December 2021

## **EXECUTIVE SUMMARY**

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This document is Georgia Power Company's (Georgia Power's) Exhibit E, the Environmental Report, of the application for Federal Energy Regulatory Commission (FERC) relicensing of the existing Lloyd Shoals Hydroelectric Project (Lloyd Shoals Project, the Project) (FERC No. 2336). Georgia Power used the Integrated Licensing Process to develop the license application and is filing Exhibit E in the format of an applicant-prepared environmental assessment following FERC regulations at 18 Code of Federal Regulations (CFR) § 5.18(b). This Exhibit E incorporates by reference supporting data and analyses, including eight resource studies; the applicant's Initial Statement; and Exhibits A, B, C, D, F, Supporting Design Report, G, and H; all collectively comprising Georgia Power's license application.

The 18-megawatt (MW) Lloyd Shoals Project consists of a dam, powerhouse, and 4,750-acre reservoir (Lake Jackson, or Jackson Lake) on the Ocmulgee River in Butts, Henry, Jasper, and Newton Counties, Georgia. Georgia Power operates the Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand. Georgia Power is not proposing to add capacity or make any major modifications to the Project under the new license. The Project does not occupy federal lands. The current license expires December 31, 2023.

This Exhibit E provides an environmental analysis, by resource area, of the continuing and incremental impacts of Georgia Power's proposed action to continue operating the Lloyd Shoals Project. Georgia Power developed this exhibit based on input gained from consultation with state and federal resource agencies, local governments, Tribes, and members of the public, and by using information generated from the resource studies conducted under 18 CFR Part 5, consistent with the FERC-approved Study Plan.

### **Project Setting**

The Lloyd Shoals Project is located on the Ocmulgee River at river mile 250.2 in the Piedmont physiographic province of north-central Georgia. The Project is situated in the upper Ocmulgee River basin of the greater Altamaha River basin. The headwater streams of the Ocmulgee River, including the South, Yellow, and Alcovy Rivers drain the southeastern and eastern portions of

metropolitan Atlanta and converge at Lake Jackson to form the Ocmulgee River. Tussahaw Creek, a large tributary stream, also enters Lake Jackson from the west. Lloyd Shoals Dam is about 7 air miles east-northeast of the City of Jackson in Butts County, 9 air miles northwest of the City of Monticello in Jasper County, 19 air miles south of the City of Covington in Newton County, and 19 air miles east-southeast of the City of McDonough in Henry County. Lloyd Shoals Dam is about 35 air miles north-northwest of the City of Macon and 40 air miles southeast of the City of Atlanta.

The watershed upstream of Lloyd Shoals Dam covers an area of 1,400 square miles, comprising about 23 percent of the Ocmulgee River basin. Lake Jackson has a surface area of 4,750 acres at the normal full-pool elevation of 530 feet (ft) plant datum (PD)<sup>1</sup> and has 135 miles of shoreline. The full-reservoir gross storage capacity is approximately 107,000 acre-feet. Lake Jackson extends upstream from the dam about 13 river miles into the South and Yellow Rivers each, 11 miles into the Alcovy River, and 8 miles into Tussahaw Creek.

### **Current Operation**

Georgia Power operates the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand with low cost, carbon-free hydroelectric power. There are no large dams reregulating streamflow upstream of the Project. Thus, project inflows depend primarily on the timing, duration, and volume of precipitation. Inflows are stored for short periods of time, generally no longer than 24 hours, and then released through the generating turbines during peak power demand periods.

Georgia Power normally operates the Lloyd Shoals Project to maintain reservoir elevations between 530 and 527 ft PD year-round, excluding drawdowns, high inflows, and drought. Lloyd Shoals Dam discharges directly into the Ocmulgee River. When the plant is not operating to generate peaking energy, the Project releases a continuous minimum flow of 400 cubic feet per second (cfs), or inflow, whichever is less, through the turbines into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other

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<sup>1</sup> Plant datum = mean sea level elevation (NAVD88) + 0.45 ft.

downstream uses. During low-flow periods when calculated project inflow is less than 250 cfs, the Project releases a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses.

### **Proposed Action and Environmental Measures**

For the new license term, Georgia Power proposes to continue operating the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours.

Georgia Power proposes the following environmental measures for the continued operation of the Project. These proposed measures are based on Georgia Power's environmental analysis and consultation with resource agencies and relicensing stakeholders.

- Continue to operate the Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand with low-cost, carbon-free power.
- Continue to operate the Project to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. This would optimize habitat availability across multiple species and life stages of riverine fish and support operation of downstream public water supply intakes.
- When calculated project inflow is less than 250 cfs, operate the Project to release a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses.
- Continue to operate the passive draft tube aeration system on Units 2, 3, and 4 to enhance warm-season DO concentrations in the tailrace area from May 15 through September 30. This would benefit downstream water quality, fisheries, aquatic resources, and recreation opportunities by supporting applicable water quality standards.
- Implement an operational procedure for the passive draft tube aeration system that assigns proportional use of aerating units to optimize the DO-enhancing performance of the aeration system.
- Continuously monitor and report tailrace DO concentrations and water temperature in the tailrace area during the period May 1 through September 30 in one year to verify the DO-enhancing performance of the passive draft tube aeration system with implementation of the proposed operational procedure.
- Every three years, monitor invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier and treat invasive exotic plant populations as necessary to support public access and utilization of these sites.

- Enhance recreation amenities at Lloyd Shoals Park by relocating the existing boat ramp to Jane Lofton Public Access Area (renamed as Lloyd Shoals Boat Ramp) and constructing a non-motorized boat (canoe/kayak) step-down ramp in its place, replacing the existing courtesy dock with an accessible fishing pier, constructing accessible parking next to the new fishing pier, restriping existing parking areas for vehicle-only spaces, and updating the existing restroom and bathhouse. These improvements would enhance access for canoeing, kayaking, and bank fishing, alleviate parking congestion on peak-use weekends, and continue to support quality recreation opportunities.
- Enhance recreation amenities at Lloyd Shoals Boat Ramp (formerly Jane Lofton Public Access Area) by constructing a new two-lane, motorized-boat ramp with associated accessible parking, a wharf-style accessible fishing pier with associated accessible parking, a restroom with a flush toilet, and expanded parking. These improvements would enhance access for boating and bank fishing and improve the quality of recreation opportunities at this site.
- Enhance recreation amenities at Ocmulgee River Park by rehabilitating the existing boat ramp, redefining and paving the existing parking area, landscaping with boulders to discourage parking near the shoreline, installing a restroom with a concrete-lined vault toilet, and relocating picnic tables closer to the existing parking area. These improvements would enhance day-use, bank fishing, and boating experiences at this site.
- Enhance recreational access to Lake Jackson by developing formal access on Georgia Power land at the Highway 36 Bridge at Tussahaw Creek (renamed as Tussahaw Creek Public Recreation Area). New amenities would be constructed to include an access road off of Winding Way, a small, paved parking area, one picnic table and one trash can, and a paved path leading to bank fishing areas and a step-down ramp for canoeing/kayaking access. The new project recreation facility would enhance bank fishing access and provide paddling access to the Tussahaw Creek embayment.
- Develop and implement a Shoreline Management Plan in accordance with the existing Shoreline Management Guidelines for Georgia Power Lakes and promote the maintenance of vegetative buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources.
- Implement a Historic Properties Management Plan through a Programmatic Agreement to assure the preservation and long-term management of archaeological sites and historic buildings and structures within the project boundary.

**EXHIBIT E**  
**LLOYD SHOALS HYDROELECTRIC PROJECT**  
**(FERC No. 2336)**

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## ACRONYMS AND ABBREVIATIONS

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AIR	additional information request
APP	Avian Protection Program
ARC	Atlanta Regional Commission
ASMFC	Atlantic States Marine Fisheries Commission
BGEPA	Bald and Golden Eagle Protection Act
BMPs	best manage practices
CCA	Candidate Conservation Agreement
CCAA	Candidate Conservation Agreement with Assurances
CFR	Code of Federal Regulations
cfs	cubic feet per second
CRD	Georgia Department of Natural Resources – Coastal Resources Division
CT	combustion turbine
DO	dissolved oxygen
EFH	Essential Fish Habitat
ENR	Environmental and Natural Resources
EPA	U.S. Environmental Protection Agency
FCCLA	Family, Career, and Community Leaders of America
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
ft	Feet
FS	U.S. Forest Service
FWS	U.S. Fish and Wildlife Service
GDNR	Georgia Department of Natural Resources
Georgia Power	Georgia Power Company
GEPD	Georgia Department of Natural Resources – Environmental Protection Division
GSWCC	Georgia Soil and Water Conservation Commission
HCWA	Henry County Water Authority
hp	horsepower
HPMP	Historic Properties Management Plan
HUC	Hydrologic Unit Code
Hwy	Highway
IFIM	Instream Flow Incremental Methodology
ILP	Integrated Licensing Process
kV	kilovolt

## ACRONYMS AND ABBREVIATIONS (CONT'D)

kW	kilowatt
lbs	pounds
m	meter
MBTA	Migratory Bird Treaty Act
Metro Water District	Metropolitan North Georgia Water Planning District
mg/L	milligrams per liter
MGD	million gallons per day
mm	millimeters
MVA	megavolt-ampere
MW	megawatt
MWA	Macon Water Authority
MWH	megawatt-hours
NEGRC	Northeast Georgia Regional Commission
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NF	National Forest
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
O&M	operation and maintenance
PA	Programmatic Agreement
PAD	Pre-Application Document
PCBs	polychlorinated biphenyls
PD	plant datum
PHABSIM	Physical Habitat Simulation
PLP	Preliminary Licensing Proposal
PSP	Proposed Study Plan
RIR	Regionally important resource
rpm	revolutions per minute
RSP	Revised Study Plan
RTE	rare, threatened, and endangered
SAFMC	South Atlantic Fishery Management Council
SD1	Scoping Document 1
SD2	Scoping Document 2
SERC	SERC Reliability Corporation
SHPO	State Historic Preservation Officer
SMP	Shoreline Management Plan

## ACRONYMS AND ABBREVIATIONS (CONT'D)

SP	State Park
sq mi	square miles
TMDL	Total Maximum Daily Load
TRRC	Three Rivers Regional Commission
USGS	U.S. Geological Survey
WMA	Wildlife Management Area
WRD	Georgia Department of Natural Resources – Wildlife Resources Division
WSA	Water and Sewer Authority

**EXHIBIT E**  
**LLOYD SHOALS HYDROELECTRIC PROJECT**  
**(FERC No. 2336)**

## **1.0 INTRODUCTION**

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### **1.1 APPLICATION**

Georgia Power Company (Georgia Power) is filing an application for a new license for the existing Lloyd Shoals Hydroelectric Project (Lloyd Shoals Project, the Project) (FERC No. 2336) with the Federal Energy Regulatory Commission (FERC, the Commission). This document is Exhibit E, the Environmental Report, of the license application. Georgia Power used the Integrated Licensing Process (ILP) to develop the license application following FERC regulations at 18 Code of Federal Regulations (CFR) Part 5. As provided for in 18 CFR § 5.18(b), Georgia Power prepared Exhibit E in the format of an applicant-prepared environmental assessment. This Exhibit E incorporates by reference supporting data and analyses, including eight resource studies; the applicant's Initial Statement; and Exhibits A, B, C, D, F, Supporting Design Report, G, and H; all collectively comprising Georgia Power's license application.

The Lloyd Shoals Project consists of a dam, a powerhouse, and a 4,750-acre reservoir (Lake Jackson, or Jackson Lake) on the Ocmulgee River in Butts, Henry, Jasper, and Newton Counties, Georgia Figure 1). The Project has a nameplate generating capacity of 18 megawatts (MW).<sup>2</sup> Georgia Power operates the Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand. Georgia Power is not proposing to add capacity or make any major modifications to the Project under the new license. The Project does not occupy federal lands. The current license expires December 31, 2023.

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<sup>2</sup> Lloyd Shoals was newly described in Georgia Power's August 3, 2021 Preliminary Licensing Proposal as a 19-MW project. Although the nameplate capacity of Unit 2 was increased by 1 MW in 1998, further discussion with plant management revealed that the nameplate increase was representative of Unit 2's maximum capacity. A rated capacity of 18 MW correctly aligns Unit 2's capacity with the remainder of the units as its capacity at most efficient gage.

## **1.2 PURPOSE OF ACTION AND NEED FOR POWER**

### **1.2.1 PURPOSE OF ACTION**

Issuing a new license for the Lloyd Shoals Project would allow Georgia Power to continue generating electricity at the Project for the term of a new license, making electric power from a low-cost, carbon-free resource available to its customers. This Exhibit E analyzes the environmental and economic effects associated with the proposed continued operation of the Project.

Under Section 10(a)(1) of the Federal Power Act (FPA), in deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which a license is issued, the Commission must give equal consideration to the purposes of energy conservation; the protection of, mitigation of adverse impacts to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. The analysis provided herein reflects those considerations.

### **1.2.2 NEED FOR POWER**

The Lloyd Shoals Project would provide low-cost, carbon-free hydroelectric generation to assist in meeting regional power demand, generation diversity needs, and capacity needs. The Project would have a nameplate capacity of 18 MW and generate approximately 70,600 megawatt-hours (MWH) per year.

The North American Electric Reliability Corporation (NERC) annually forecasts electrical supply and demand nationally and regionally for a 10-year period. The Lloyd Shoals Project is located in the SERC Reliability Corporation (SERC) region of NERC. The SERC region includes all or portions of 16 southeastern and central states. SERC is divided geographically into four assessment areas that are identified as SERC-E, SERC-C, SERC-FP, and SERC-SE. The Lloyd Shoals Project is in assessment area SERC-SE, which covers portions of Georgia, Alabama, Florida, and Mississippi.

NERC's 2020 Long-Term Reliability Assessment shows the projected growth in capacity demand for the period 2021 to 2030. The summer period is typically the heaviest demand period

for Southern Company and Georgia Power, although increasingly, winter capacity is needed. The capacity growth trends for the SERC-SE assessment area for the period of 2021 to 2030 for the summer peak season demand show that the SERC-SE region will need to add 14 MW of capacity. Even though this capacity projection is relatively flat, there are changes underway in both NERC's and Georgia Power's bulk power system. NERC's Long Term Reliability Assessment shows a planned addition of 9,544 MW of solar in the SERC-SE subregion through 2030, and specifically Georgia Power's 2019 Integrated Resource Plan specifies a plan for Georgia Power to procure an additional 1,000 MW of renewable resources, primarily solar. Solar resources are intermittent and need firm generating capacity to deploy in case variable resources are shed due to changes in sun or wind. Hydroelectric capacity provides the firm capacity needed for quick dispatch during both variable resources load shed and for system emergencies.

Based on the present and future use of the Project's power, its low cost, the future addition of variable energy sources (primarily wind and solar), the retirement of conventional generation, and flexible resources needed to offset variability of wind and solar to maintain operating reliability and provide bulk power system support, Georgia Power concludes that power from the Lloyd Shoals Project will help meet a need for reliable and affordable power in the Southern Company service territory as well as in the SERC-SE region during the short and long term.

### **1.3 STATUTORY AND REGULATORY REQUIREMENTS**

#### **1.3.1 CLEAN WATER ACT**

In accordance with FERC regulations, Georgia Power will coordinate with the Georgia Department of Natural Resources (GDNR) Environmental Protection Division (GEPD) no later than 60 days after notice by FERC of its acceptance of the license application as being ready for environmental analysis (18 CFR § 5.23(b)) to obtain Clean Water Act Section 401 water quality certification for the Project. Georgia Power has been consulting with GEPD throughout this licensing proceeding concerning their information needs for water quality certification.

#### **1.3.2 ENDANGERED SPECIES ACT**

As FERC's non-federal designee for informal consultation under the Endangered Species Act (ESA), Georgia Power consulted with the U.S. Fish and Wildlife Service (FWS) in developing the FERC-approved Study Plan for rare, threatened, and endangered (RTE) species, and in



implementing and reporting on the study. Georgia Power filed the RTE Species Study Report for review and comment by FWS and other state and federal resource agencies.

The RTE species study found that five species federally listed as threatened and endangered (four plants and one bird) potentially occur within the project vicinity but none are presently known to occur within the Lloyd Shoals project boundary. Little Amphianthus (*Gratiola amphiantha*), a threatened species, and Black-spored Quillwort (*Isoetes melanospora*), an endangered species, both inhabit shallow depressions on granite outcrops where vernal pools form after rainfall. No granite-outcrop habitats are available for these species within the project boundary. The field surveys also did not detect potentially suitable habitat for the endangered Michaux's Sumac (*Rhus michauxii*) or the endangered Relict Trillium (*Trillium reliquum*). The federally endangered Red-cockaded Woodpecker (*Dryobates borealis*) inhabits large tracts of open, mature and old-growth pine forests; however, stands of large pines are small within the project boundary, such that no potentially suitable habitat exists for the species within the project boundary. No other federally listed species and no designated critical habitats are known to occur within the project boundary.

One federal candidate species, Monarch Butterfly (*Danaus plexippus*), potentially occurs within the project vicinity. Monarch Butterfly occurs across the continental U.S., depends on the presence of milkweed species as host plants for reproduction, and migrates south in the fall to overwinter in central Mexico. A variety of milkweed species naturally occur throughout most of Georgia and four common species used by Monarch Butterfly grow in nearly every region of the state. Continued project operation would not be expected to result in the loss of milkweed or nectar sources available for use by Monarch Butterfly.

Continued project operation would not be expected to adversely affect any species listed as federally endangered or threatened under the ESA, or any candidate species. FWS concurs that the proposed relicensing of the Lloyd Shoals Project is not likely to adversely affect federally listed species or critical habitat (P. Maholland, FWS, December 8, 2021 letter to K.D. Bose, FERC).

### **1.3.3 COASTAL ZONE MANAGEMENT ACT**

The Coastal Zone Management Act (CZMA) of 1972, as amended, requires that federally licensed and permitted activities affecting any land or water use or natural resource of any

coastal zone be consistent with applicable state Coastal Zone Management Programs. The Department of Commerce National Oceanic and Atmospheric Administration's (NOAA's) CZMA federal consistency regulations are found at 15 CFR Part 930.

The state of Georgia's coastal zone includes the counties of Brantley, Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, and Wayne.<sup>3</sup> The Lloyd Shoals Project is not located within the coastal zone of Georgia. The Project is located 387 river miles upstream of the Atlantic Ocean and 43 miles upstream of the Fall Line in the Piedmont physiographic province. Continued project operation as proposed by Georgia Power would not affect the land or water uses or natural resources of the coastal zone.

On November 9, 2021, Georgia Power sent a request for consistency certification to GDNR's Coastal Resources Division (CRD). On December 20, 2021, CRD notified Georgia Power of its determination that continued operation of the Project would not result in reasonably foreseeable impacts to coastal uses and resources and, therefore, federal consistency certification is not required. Documentation of the email correspondence between Georgia Power and CRD, including CRD's determination, is provided in Appendix A.

#### **1.3.4 NATIONAL HISTORIC PRESERVATION ACT**

Section 106 of the National Historic Preservation Act (NHPA) requires that every federal agency take into account how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (NRHP).

As the Commission's non-federal representative for conducting consultation pursuant to Section 106 of NHPA, Georgia Power has developed a draft Historic Properties Management Plan (HPMP) for the Lloyd Shoals Project. The HPMP will provide for the preservation and long-term management of the dam and powerhouse, which are considered eligible for inclusion in the NRHP, and five archaeological sites that are either eligible or potentially eligible and recommended for monitoring under the new license. Georgia Power distributed a draft HPMP to the Georgia State Historic Preservation Officer (SHPO) and the Tribes from November 23-29,

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<sup>3</sup> O.C.G.A. § 12-5-322(4).

2021, for a 30-day review period. Based on the Commission's March 1, 2018 tribal coordination letter, these Tribes included Alabama-Quassarte Tribal Town, Alabama-Coushatta Tribe of Texas, Coushatta Tribe of Louisiana, Kialegee Tribal Town, Muscogee (Creek) Nation, Poarch Band of Creek Indians, and Thlopthlocco Tribal Town. Georgia Power has received comments to date from the Muscogee (Creek) Nation and SHPO. Upon completion of the review period, Georgia Power will revise the draft HPMP and file it with the Commission, along with documentation of the comments and recommendations received.

To meet the requirements of Section 106, FERC intends to execute a Programmatic Agreement (PA) between FERC, SHPO, and the Advisory Council on Historic Preservation (Advisory Council) for the protection of historic properties from the effects of the operation of the Lloyd Shoals Project. Georgia Power will be invited to participate in consultations to develop the PA and to sign as a concurring party. Tribes also will be invited to comment on the agreement. The terms of the PA would ensure that Georgia Power addresses and develops treatment measures for any adverse effects to historic properties identified within the Project's area of potential effects under the final HPMP.

### **1.3.5 WILD AND SCENIC RIVERS ACT**

Section 7(a) of the Wild and Scenic Rivers Act requires federal agencies to make a determination as to whether the operation of a project under a new license would invade the area or unreasonably diminish the scenic, recreational, and fish and wildlife values present in a designated river corridor. There are no rivers within or in the vicinity of the Lloyd Shoals project boundary that are designated for inclusion, or are being considered or studied for inclusion, in the National Wild and Scenic Rivers System (<https://www.rivers.gov/index.php>).

### **1.3.6 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT**

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with National Oceanic and Atmospheric Administration Fisheries on all actions that may adversely affect Essential Fish Habitat (EFH). The Lloyd Shoals Project, located upstream of the Fall Line in the Piedmont province, does not affect any EFH for the maintenance of suitable marine fishery habitat quality and quantity under the Magnuson-Stevens Fishery Conservation and Management Act. The South Atlantic Fishery Management Council (SAFMC) has not designated EFH for any species of fish or shellfish found in the vicinity of the Lloyd Shoals

Project (SAFMC 2021). The Project is located approximately 387 river miles upstream of the Atlantic Ocean, above one other existing major dam on the Ocmulgee River (Juliette Dam).

#### 1.4 PUBLIC REVIEW AND COMMENTS

The Commission’s ILP regulations require that applicants consult with appropriate resource agencies, Tribes, and other entities before filing an application for a license. This consultation is necessary for compliance with the National Environmental Policy Act (NEPA), Fish and Wildlife Coordination Act, ESA, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission’s regulations.

##### 1.4.1 SCOPING PROCESS

Prior to the development of Georgia Power’s license application, FERC conducted scoping pursuant to NEPA to determine what issues and alternatives should be addressed. FERC (2018a) issued Scoping Document 1 (SD1) on August 20, 2018, to federal, state, and local agencies, Tribes, non-governmental organizations, and the public to solicit comments on the scope of FERC’s environmental assessment. FERC staff held two scoping meetings and a site visit on October 9-10, 2018. A court reporter documented all comments and statements made at the scoping meetings, and these are part of the Commission’s public record for the Project.

In addition to comments provided at the scoping meetings, the following entities provided written comments on SD1 and the Pre-Application Document (PAD), as well as study requests:

<u>Commenting Entities</u>	<u>Date Filed</u>
Julia Haar	September 26, 2018
Josh Williford	October 11, 2018
Georgia Department of Natural Resources Environmental Protection Division (GEPD)	November 2, 2018
U.S. Environmental Protection Agency (EPA)	November 2, 2018
U.S. Fish and Wildlife Service (FWS)	November 5, 2018
Georgia Department of Natural Resources Wildlife Resources Division (WRD)	November 5, 2018
Altamaha Riverkeeper	November 6, 2018
Cherokee Nation <sup>4</sup>	November 14, 2018
National Marine Fisheries Service (NMFS)	November 15, 2018

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<sup>4</sup> In its letter, the Cherokee Nation commented that the counties occupied by the Project are outside the Cherokee Nation’s Area of Interest; thus, the Nation respectfully deferred to federally recognized Tribes that have an interest in this landbase.

On November 5, 2018, FERC issued a letter with staff comments on the PAD, including an additional information request (AIR). Georgia Power filed its responses to the AIR on December 18, 2018. Based on written comments filed during the scoping comment period, FERC (2018b) issued Scoping Document 2 (SD2) on December 20, 2018. SD2 presents FERC staff's view of issues and alternatives to be considered in the environmental assessment and supersedes SD1.

#### **1.4.2 COMMENTS ON THE PRELIMINARY LICENSING PROPOSAL**

Georgia Power (2021) filed its Preliminary Licensing Proposal (PLP) with the Commission on August 3, 2021. The PLP provided a draft environmental analysis by resource area of the continuing and incremental impacts of Georgia Power's proposal to continue operating the Lloyd Shoals Project. Georgia Power developed the PLP in consultation with state and federal resource agencies, local governments, Tribes, various stakeholders, and other members of the public, and by using the information generated by eight resource studies conducted under the FERC-approved Study Plan. The PLP provides a pre-filing consultation summary of the stakeholders consulted, the study plan development process, the resource study reports and Study Results Meetings, and the numerous other stakeholder meetings.

The following entities provided written comments on the PLP:

<u>Commenting Entities</u>	<u>Date Filed</u>
FERC	October 29, 2021
WRD	October 29, 2021
NMFS	October 29, 2021
FWS	October 29, 2021
EPA	November 2, 2021

Georgia Power considered all comments on the PLP in preparing this Exhibit E. Appendix A provides each comment letter (brackets and numbering in margin added to agency letters by Georgia Power), followed by Georgia Power's responses to the comments.

FWS provided a letter dated December 8, 2021 concurring that project operations are not likely to adversely affect federally-listed species or critical habitat. On December 20, 2021, CRD determined that continued project operations would not result in reasonably foreseeable impacts to coastal uses and resources and that a federal CZMA consistency certification is not required. Appendix A includes the FWS concurrence letter and copies of the email correspondence between Georgia Power and CRD regarding CZMA consistency certification.

## **2.0 PROPOSED ACTION AND ALTERNATIVES**

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This section sets out Georgia Power’s licensing proposal for continuing to operate the Lloyd Shoals Project under the new license. The section first describes the no-action alternative, which is the baseline from which to compare the proposed action and includes the existing project facilities and current project operations. Next, the section describes the applicant’s proposal, including Georgia Power’s proposed operation and proposed environmental measures. The section concludes with a description of the alternatives considered but eliminated from detailed study.

### **2.1 NO-ACTION ALTERNATIVE**

The Lloyd Shoals Project is located on the Ocmulgee River in central Georgia (Figure 1). Lloyd Shoals Dam is located at river mile 250.2, just south of the confluence of the Alcovy, Yellow, and South Rivers (Figure 2). Lloyd Shoals Dam is about 7 air miles east-northeast of the City of Jackson in Butts County, 9 air miles northwest of the City of Monticello in Jasper County, 19 air miles south of the City of Covington in Newton County, and 19 air miles east-southeast of the City of McDonough in Henry County. Lloyd Shoals Dam is about 35 air miles north-northwest of the City of Macon and 40 air miles southeast of the City of Atlanta. The Lloyd Shoals powerhouse is on the west side of the river in Butts County. The spillway portion of the dam is on the east side of the river, mostly in Jasper County. Lloyd Shoals Dam discharges directly into the Ocmulgee River. The dam is about 1.1 river miles upstream of the Georgia Highway (Hwy) 16 bridge and about 19 river miles upstream of Juliette Dam.

The watershed upstream of Lloyd Shoals Dam covers an area of 1,400 square miles (sq mi), comprising about 23 percent of the Ocmulgee River basin (Figure 1). The Lloyd Shoals project reservoir, referred to herein as Lake Jackson (also known as Jackson Lake), has a surface area of 4,750 acres at the normal full-pool elevation of 530 feet (ft) plant datum (PD)<sup>5</sup> and has 135 miles of shoreline (Figure 2). The full-reservoir gross storage capacity is approximately 107,000 acre-ft. The usable storage capacity of the reservoir is approximately 74,750 acre-ft. Usable storage is the volume available for operations between elevation 530 and 506 ft PD (506 ft PD is the top of the intake, below which cavitation of turbine units would occur). Lake Jackson extends upstream

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<sup>5</sup> Plant datum = mean sea level elevation (NAVD88) + 0.45 ft.

from the dam about 13 river miles into the South and Yellow Rivers each, 11 miles into the Alcovy River, and 8 miles into Tussahaw Creek.

## **2.1.1 EXISTING PROJECT FACILITIES**

### **2.1.1.1 PROJECT FACILITIES**

The Lloyd Shoals Project began operation in 1911. The Project consists of a reservoir (Lake Jackson), a concrete gravity dam founded on rock, a powerhouse integral with the dam, a spillway section with Obermeyer gates and a trash gate, an approximately 2,000-ft-long tailrace, voltage transformation with connection directly to the primary transmission system, appurtenant structures, and recreation facilities (Figure 2 and Figure 3).

Lloyd Shoals Dam has a spillway crest elevation of 525.2 ft PD (elevation at bottom of the Obermeyer gates), a maximum height from riverbed to spillway crest of about 105 ft, and a length of 1,599.5 ft.

The project works across the main dam consist of the following components (and their length) from west to east (Figure 3):

- West concrete non-overflow section (143 ft);
- Powerhouse intake section (198 ft);
- Concrete spillway section with Obermeyer gates and one trash gate (728.5 ft); and
- East earth embankment tie-in to bank (530 ft).

The west non-overflow section and powerhouse have a crest elevation of 540 ft PD. There are twelve 7-ft, 9-in by 11-ft intake openings at the entrance of each unit's penstock, each having a designated headgate. The intake section contains six, 12-ft by 12-ft octagonal, cast-in-place concrete water passages (penstocks) that supply water to the turbines. The invert elevation of the intake is 495 ft PD, which is 35 ft below the normal full-pool elevation of Lake Jackson.

Further design specifications of the trash racks (which were requested by FERC staff in an additional information request for the PAD) are as follows. The upstream face of the dam has 12 inlet openings, each covered by four steel trash racks. The inlet openings are 10.5-ft wide and 19.4-ft in height. The trash racks rest on a 6-inch-high sill that is integral to the powerhouse and are supported laterally by a guide structure. The guide structure is composed of three 12-inch #50

steel horizontal I-beam members and three 1.75-inch vertical guides. The trash racks are 21-ft long and 2-ft 4.625-inches wide. Each trash rack has seventeen 3-inch by 0.25-inch flat-bar vertical members, two 3-inch by 0.375-inch on-vertical members on each end, and nine horizontal 2.5-inch rod members. Steel trash racks in front of the inlet opening consist of vertical bars with clear spacing between bars of 1.3125 inches. The calculated intake approach velocity is 1.56 ft per second at full gate/full pool and 1.03 ft per second at best gate/full pool.<sup>6</sup>

The concrete-and-brick powerhouse contains six turbine-generator units, numbered 1 through 6 from east to west (Table 1). Table 2 summarizes the turbine design characteristics. The turbines are horizontal, Francis-type, double-runner units, each rated at a maximum output of 5,650 horsepower (hp) under 96.8 ft of head. The turbines are directly connected to six horizontal generators, with all units rated at a best gate output of 3,000 kilowatts (kW) at 300 revolutions per minute (rpm). The total nameplate capacity of the powerhouse is 18,000 kW, based on the most efficient or best gate setting of the turbines.

The maximum hydraulic capacity of each turbine unit is 620 cubic feet per second (cfs), for a total powerhouse maximum hydraulic capacity of 3,720 cfs. The best gate hydraulic capacity of each turbine unit is 410 cfs. The minimum hydraulic capacity of each turbine unit is unknown but the turbines operate at 250 cfs when supplementing flows in the river downstream during low-flow operation (Section 2.1.3).

Actual maximum capacity output can differ from the theoretical, design, or nameplate rated capacity. The 18-MW nameplate rated capacity corresponds with the current output at most efficient wicket gate setting on the turbines and a 2,460-cfs flow rate at full pool. At a maximum wicket gate setting at full pool, Georgia Power produces a maximum of 22.5 MW with a 3,720-cfs flow. The nameplate capacity will be exceeded during times when all six turbine units are operating at a full wicket gate setting and a close to full-pool elevation. These conditions are likely to exclusively occur during a high-flow condition, and not during normal flow ranges or when less than six turbines are running.

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<sup>6</sup> Approach velocities specified are based on the hydraulic capacity of single unit operation at the full pool elevation 530 ft (620 cfs full gate/410 cfs best gate). Single unit generation results in the absolute maximum best gate and full gate flows. The hydraulic capacity through units decreases in generating scenarios in which more than one unit is generating.



The spillway section contains from west to east a 30-ft-wide trash bay with a bottom-hinged, 19-ft by 12-ft trash gate; a 98.5-ft-wide section of 2-ft-high Obermeyer gates; a 420-ft-wide section of 5-ft-high Obermeyer gates; and a 180-ft-wide section of 2-ft-high Obermeyer gates. The top of the spillway gates is elevation 530 ft PD. The crest of the concrete spillway is elevation 525.2 ft PD at the bottom of the 5-ft-high Obermeyer gates, elevation 528.2 ft PD at the bottom of the 2-ft-high Obermeyer gates, and elevation 518.0 ft PD at the trash gate. The east earth embankment has a crest elevation of 542.0 ft PD.

A 2,100-ft-long saddle dike with a crest elevation of 545.0 ft PD is located adjacent to and east of Jackson Lake Road (County Road 364) about 3,000 ft upstream of the east end of the main dam.

A 500-ft-long auxiliary spillway is located about 900 ft southwest of the main dam (Figure 3). The auxiliary spillway has a crest elevation of 526.0 ft PD and contains 10-ft-high flashboards maintained in the dry by a 6-ft-high 560-ft-long sacrificial earth embankment.

Lake Jackson covers a surface area of 4,750 acres at the normal full-pool elevation of 530 ft PD. The full-reservoir gross storage capacity is approximately 107,000 acre-ft. The upstream drainage area of the Ocmulgee River basin at Lloyd Shoals Dam is about 1,400 sq mi.

The nameplate rating generating capacity of the Lloyd Shoals Project is 18 MW. The dependable capacity of the Project is 22.5 MW in the summertime, the most critical power-demand season. Dependable capacity is defined as average simulated capacity available for 8 hours each day for 5 consecutive days using a 20-year average summer inflow. Average annual generation for the years 2013 through 2020 was 70,600 megawatt-hours.

There are no transmission lines included in the Lloyd Shoals Project. Two 2.3-kilovolt (kV) project generator leads exit the powerhouse to two, three-phase outdoor step-up transformers rated 10/12-megavoltampere (MVA) and 10-MVA, located in the substation at the west dam abutment. Connection to existing 69-kV and 115-kV transmission lines is made within the substation.

#### **2.1.1.2 FERC PROJECT BOUNDARY**

Lands and waters within the FERC project boundary are located within Butts, Henry, Jasper, and Newton Counties (Figure 2). The FERC project boundary around Lake Jackson generally

follows the full-pool elevation contour of 530 ft, PD except in some areas where it follows metes-and-bounds property lines, including areas for public recreation and around the powerhouse. In areas where Georgia Power-owned residential lease lots and privately owned residential lots abut the project reservoir, the project boundary is the 530-ft PD contour. Only three percent of the project boundary is marked by metes-and-bounds property lines (Georgia Power 2017a).

Georgia Power maintains four project recreation facilities within the project boundary, including Lloyd Shoals Park, the Tailrace Fishing Pier, Ocmulgee River Park, and the Jane Lofton Public Access Area (Figure 2 and Figure 3) (see Section 3.3.6). The project boundary extends downstream of Lloyd Shoal Dam approximately 0.4 mile to encompass Ocmulgee River Park.

Project lands provide a buffer for aesthetics, wildlife habitat, water quality protection, and recreation. Through fee-simple ownership, Georgia Power controls approximately 1,138 acres of lands within the Lloyd Shoals project boundary, including approximately 106 miles of the 135 mile of shoreline. Included in these numbers are 606 leased lots and 1,351 lots on which Georgia Power owns a strip of land between the shoreline and the privately owned residential property. Georgia Power possesses flood rights beyond the project boundary on 326 additional lots, including the remaining 29 miles of shoreline within the Project. Georgia Power manages the shoreline of Lake Jackson under its Shoreline Management Guidelines to ensure compliance with the Lloyd Shoals FERC license and other applicable federal and state laws and regulations (Georgia Power 2015a).

### **2.1.2 PROJECT SAFETY**

The Lloyd Shoals Project has been operating for more than 28 years under the existing license. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, modifications of structures, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the Project has been inspected and evaluated every 5 years by an independent consultant and a consultant's safety report has been submitted for Commission review.

Under a new license, Commission staff would continue to inspect the Project during the new license term to assure continued adherence to Commission-approved plans and specifications,

special license articles relating to safety, operation and maintenance (O&M), and accepted engineering practices and procedures.

### **2.1.3 EXISTING PROJECT OPERATION**

Georgia Power operates the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand with low-cost, carbon-free power. Water for generation at Lloyd Shoals Dam comes from precipitation in the Ocmulgee River basin upstream. There are no large dams reregulating streamflow upstream of the Project. Thus, project inflows depend primarily on the timing, duration, and volume of precipitation. Inflows are stored for short periods of time, generally no longer than 24 hours, and then released through the generating turbines during peak power demand periods.

#### **2.1.3.1 NORMAL OPERATION**

Under normal conditions, Georgia Power operates the Lloyd Shoals Project to maintain reservoir elevations between 530 and 527 ft PD year-round. Normal conditions exclude drawdowns, high inflows, and drought. The reservoir rises slightly as inflow is temporarily stored during periods outside of peak power demand (i.e., off-peak hours). As power demand increases into the peak power demand period, Lloyd Shoals is operated to release water through the powerhouse turbines to produce energy from the plant generators. This cycle repeats daily and varies seasonally with peak power demands.

Generation typically is highest during late winter and early spring (February-April), when project inflow is also the highest. During the summer, Georgia Power usually operates Lloyd Shoals generating units throughout the afternoon peak demand period, which is about seven to eight hours. During fall and winter, peak demand typically lasts five to six hours split between a morning and evening peak.

For the years 2013 through 2020 (since installation of the Obermeyer gates in 2012), daily reservoir fluctuations were 2.0 ft or less 99.8-percent of the days.

Lloyd Shoals Dam discharges directly into the Ocmulgee River. When the plant is not operating to generate peaking energy, the Project releases a continuous minimum flow of 400 cfs, or inflow, whichever is less, through the turbines into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources, as required by Article 402 of the

current license. An instream flow study conducted in 1990 for the previous Lloyd Shoals relicensing showed that a minimum flow of 400 cfs (increased from 100 cfs) would optimize aquatic habitat across multiple fish species life stages (EA Engineering, Science, and Technology, Inc. [EA] 1990a) (see Section 3.3.3). The 400 cfs also provides adequate flow for downstream water supply and recreation.

Georgia Power operates a passive draft tube aeration system that was installed on Units 2, 3, and 4 (two aeration ports per unit) in 2006 to improve tailrace dissolved oxygen (DO) concentrations in downstream releases during the summer critical period. Georgia Power opens the aeration system valves from May 15 through September 30 each year, unless dry conditions extend into October, when they may remain open until mid-October.

Georgia Power conducts periodic fall drawdowns of Lake Jackson for homeowner and shoreline maintenance. In recent years, planned drawdowns have occurred about every three years.

#### **2.1.3.2 HIGH-FLOW OPERATION**

During high-flow events at the Lloyd Shoals Project, flows are first run through the turbine/generator units, where electricity is generated. Plant operators monitor stream gages upstream of Lake Jackson. As inflow to the Project exceeds the maximum hydraulic capacity of the turbines, spillway gates are opened incrementally to approximate inflow. Water is not released in advance of a storm because predicted storms often do not materialize. Water is only released as an increase in inflows is evident at the upstream gages and the dam. The Obermeyer gate system provides Georgia Power the ability to make incremental adjustments to flows released from the spillway, enhancing control of the reservoir level during the course of high-flow operations. These gates allow the plant discharges to be closely matched with inflows into the Project.

#### **2.1.3.3 LOW-FLOW OPERATION**

During low-flow periods at Lloyd Shoals Dam, calculated inflows may drop below the 400-cfs minimum flow requirement. Although not required by the current license, when calculated inflow is less than 250 cfs, Georgia Power releases a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement stream flow for downstream uses, including aquatic life and water supply. During the refill period after a low-flow period, Georgia Power continues

to release 250-cfs supplemental flow to raise the elevation of Lake Jackson prior to increasing discharges from the Project.

During a recent drought in summer/fall 2016, the lowest recorded elevation of Lake Jackson was 525.34 ft PD (by comparison, the target low-level elevation during the homeowner drawdown in 2015 was 523 ft). During this time, Lloyd Shoals supplemented flows in the river downstream of the Project with a 250-cfs minimum release for approximately 64 days, causing the reservoir elevations to decline. In 2016, calculated daily inflows were less than 400 cfs on 28.1 percent of the days and less than 250 cfs on 20.5 percent of the days (Georgia Power 2018).

For the period 2001-2020, daily average discharge from the Project to the Ocmulgee River downstream exceeded 250 cfs on 99 percent of the days, 400 cfs on 86 percent of the days, and 1,000 cfs on 54 percent of the days.

#### **2.1.4 EXISTING ENVIRONMENTAL MEASURES**

Georgia Power operates the Lloyd Shoals Project to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, through the turbines into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources, as required by Article 402 of the current license. Although not required by the current license, when calculated inflow is less than 250 cfs, Georgia Power releases a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses. From May 15 through September 30 each year, Georgia Power operates a passive draft tube aeration system on Units 2, 3, and 4 to improve DO concentrations in the tailrace area.

Georgia Power owns and operates four project recreation facilities, which provide for a variety of recreational opportunities and access to project waters. All four facilities include a day-use area; two provide boat ramps and picnic tables, and one provides a swimming beach, a bathhouse, and a restroom. The facilities are listed below and described in Section 3.3.6.1:

- Lloyd Shoals Park, Lloyd Shoals Tailrace Fishing Pier, and Jane Lofton Public Access Area in Butts County
- Ocmulgee River Park in Jasper County

Georgia Power manages the project shoreline on Lake Jackson in accordance with its Shoreline Management Guidelines. The guidelines list specific Lake Jackson requirements and restrictions

for constructing seawalls, docks, wharves, boat slips, boat lifts, and personal watercraft lifts. The requirements minimize shoreline disturbance from tree removal, mechanical clearing, and other activities to protect the vegetative buffer zone surrounding the lake. The guidelines also include information about protecting and enhancing the scenic, recreational, and environmental values of the project reservoir.

## **2.2 APPLICANT'S PROPOSAL**

### **2.2.1 PROPOSED PROJECT FACILITIES**

Georgia Power is not proposing to add capacity or make any major modifications to the Project under the new license.

### **2.2.2 PROPOSED PROJECT OPERATION**

Georgia Power proposes to continue operating the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours. During normal operation, the Project would continue to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the river downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. During low-flow periods when calculated inflow is less than 250 cfs, the Project would release a continuous flow of 250 cfs to supplement stream flow for downstream uses. The 250-cfs supplemental flow release is not required by the current license, but Georgia Power proposes to include this as a requirement in the new license.

Georgia Power is not proposing to add capacity or make any major modifications to the Project under the new license.

### **2.2.3 PROPOSED ENVIRONMENTAL MEASURES**

Georgia Power proposes the following measures to protect, mitigate adverse impacts to, or enhance environmental resources at the Lloyd Shoals Project.

These proposed environmental measures are based on Georgia Power's assessment of the Project, the findings of the resource studies conducted under the FERC-approved Study Plan, and discussions with resource agencies and stakeholders and comments on Georgia Power's PLP.

- Continue to operate the Project in a modified run-of-river mode for generation during peak power demand hours to meet electrical system demand with low-cost, carbon-free power.
- Continue to operate the Project to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. This would optimize habitat availability across multiple species and life stages of riverine fish and support operation of downstream public water supply intakes.
- When calculated project inflow is less than 250 cfs, operate the Project to release a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses.
- Continue to operate the passive draft tube aeration system on Units 2, 3, and 4 to enhance warm-season DO concentrations in the tailrace area from May 15 through September 30. This would benefit downstream water quality, fisheries, aquatic resources, and recreation opportunities by supporting applicable water quality standards.
- Implement an operational procedure for the passive draft tube aeration system that assigns proportional use of aerating units to optimize the DO-enhancing performance of the aeration system.
- Continuously monitor and report tailrace DO concentrations and water temperature in the tailrace area during the period May 1 through September 30 in one year to verify the DO-enhancing performance of the passive draft tube aeration system with implementation of the proposed operational procedure.
- Every three years, monitor invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier and treat invasive exotic plant populations as necessary to support public access and utilization of these sites.
- Enhance recreation amenities at Lloyd Shoals Park by relocating the existing boat ramp to Jane Lofton Public Access Area (renamed as Lloyd Shoals Boat Ramp) and constructing a non-motorized boat (canoe/kayak) step-down ramp in its place, replacing the existing courtesy dock with an accessible fishing pier, constructing accessible parking next to the new fishing pier, restriping existing parking areas for vehicle-only spaces, and updating the existing restroom and bathhouse. These improvements would enhance access for canoeing, kayaking, and bank fishing, alleviate parking congestion on peak-use weekends, and continue to support quality recreation opportunities.
- Enhance recreation amenities at Lloyd Shoals Boat Ramp (formerly Jane Lofton Public Access Area) by constructing a new two-lane, motorized-boat ramp with associated accessible parking, a wharf-style accessible fishing pier with associated accessible parking, a restroom with a flush toilet, and expanded parking. These improvements would enhance access for boating and bank fishing and improve the quality of recreation opportunities at this site.

- Enhance recreation amenities at Ocmulgee River Park by rehabilitating the existing boat ramp, redefining and paving the existing parking area, landscaping with boulders to discourage parking near the shoreline, installing a restroom with a concrete-lined vault toilet, and relocating picnic tables closer to the existing parking area. These improvements would enhance day-use, bank fishing, and boating experiences at this site.
- Enhance recreational access to Lake Jackson by developing formal access on Georgia Power land at the Highway 36 Bridge at Tussahaw Creek (renamed as Tussahaw Creek Public Recreation Area). New amenities would be constructed to include an access road off of Winding Way, a small, paved parking area, one picnic table and one trash can, and a paved path leading to bank fishing areas and a step-down ramp for canoeing/kayaking access. The new project recreation facility would enhance bank fishing access and provide paddling access to the Tussahaw Creek embayment.
- Develop and implement a Shoreline Management Plan in accordance with the existing Shoreline Management Guidelines for Georgia Power Lakes and promote the maintenance of vegetative buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources.
- Implement a Historic Properties Management Plan through a Programmatic Agreement to assure the preservation and long-term management of archaeological sites and historic buildings and structures within the project boundary.

## **2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY**

Georgia Power considered three other alternatives but eliminated them from detailed study because none are reasonable under the circumstances of this relicensing. These alternatives are described below.

### **2.3.1 ISSUING A NON-POWER LICENSE**

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

### **2.3.2 FEDERAL GOVERNMENT TAKEOVER OF THE PROJECT**

Federal takeover and operation of the Project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested



federal takeover would be appropriate, and no federal agency has expressed an interest in operating the Project. Therefore, federal takeover is not a reasonable alternative and has been eliminated from further investigation.

### **2.3.3 RETIRING THE PROJECT**

Project retirement is not a reasonable alternative to relicensing the Project. Among its benefits, the Lloyd Shoals Project generates substantial power, supports healthy fish and wildlife populations, provides numerous and diverse recreational opportunities, releases a continuous minimum flow into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources, and during low-flow periods provides a continuous release to supplement stream flows for downstream uses. Project retirement could be accomplished with or without dam removal. Either alternative would involve surrender or termination of the existing license.

## **3.0 ENVIRONMENTAL ANALYSIS**

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### **3.1 GENERAL DESCRIPTION OF THE RIVER BASIN**

The Lloyd Shoals Project is located on the Ocmulgee River at river mile 250.2 in the upper Ocmulgee River basin of the greater Altamaha River basin (Figure 4). The Altamaha River basin includes the Ocmulgee, Oconee, and Altamaha Rivers. The headwater streams of the Ocmulgee River, including the South, Yellow, and Alcovy Rivers, originate in the Piedmont physiographic province, drain the southeastern and eastern portions of metropolitan Atlanta, and converge at Lake Jackson to form the Ocmulgee River. Tussahaw Creek, a large tributary stream, also enters Lake Jackson from the west. From Lloyd Shoals Dam, the Ocmulgee River flows south and then east-southeast for 250 miles to its confluence with the Oconee River in the Coastal Plain physiographic province to form the Altamaha River. The Altamaha River flows 137 miles southeast to the Atlantic Ocean. The Altamaha River basin drains an area of 14,000 sq mi and is located entirely within Georgia.

The Ocmulgee River basin drains a watershed area of 6,085 sq mi in central Georgia (Georgia Environmental Protection Division [GEPD] 2003). The watershed upstream of Lloyd Shoals Dam covers an area of 1,400 sq mi., comprising about 23 percent of the Ocmulgee River basin (Figure 1). From Lloyd Shoals Dam, the river flows south toward Macon. The Towaliga River, a larger tributary, enters the Ocmulgee River from the west, about 17 river miles downstream of Lloyd Shoals Dam. As it approaches Macon, the Ocmulgee River enters the Fall Line area, the transition zone between the Piedmont and Coastal Plain physiographic provinces. Downstream of Macon, the river meanders through the Coastal Plain in wide floodplains for 198 miles to its confluence with the Oconee River, forming the Altamaha River, which continues through the Coastal Plain for 137 miles to the Atlantic Ocean.

#### **3.1.1 DAMS IN THE BASIN**

Two dams are located on the Ocmulgee River: Lloyd Shoals Dam and Juliette Dam. No other dams are on the main stems of either the Ocmulgee or Altamaha Rivers. Juliette Dam, located about 19 miles downstream of Lloyd Shoals Dam, is a 20-ft-high concrete gravity dam built in 1921 (Figure 1). It creates a 78-acre impoundment. Juliette Dam poses a barrier to the upstream passage of diadromous and highly migratory fish migrating upstream into the upper Ocmulgee

River basin. Formerly operated by Eastern Hydroelectric Corporation as the East Juliette Hydroelectric Project (FERC No. 7019), FERC revoked the license in October 2014 because the licensee failed to comply with the terms of the license pertaining to an approved fishway that was never constructed (FERC 2015). In July 2016, Thomas Hydropower, JV LLC, filed a draft application for exemption from licensing for the East Juliette Project. In September 2016, FWS and NMFS commented on the applicant's proposal, questioning the technical feasibility of the upstream fish passage plan and recommending studies. No final application for exemption has been filed for the project.

Two small hydroelectric dams are on the Yellow River upstream of the Lloyd Shoals Project. Porterdale Dam is located 11 river miles upstream of Lake Jackson in Newton County. The dam is 12-ft high and forms a 5-acre impoundment. The Porterdale Hydroelectric Project previously operated under a FERC exemption from licensing (FERC No. 2568) but the exemption was surrendered effective June 2016. The project's gated intake was sealed and the dam remains in-place. The Milstead Hydroelectric Project (FERC No. 7141), with a capacity of 1 MW and currently authorized under a licensing exemption, is located 15 miles farther upstream on the Yellow River in Rockdale County. The project includes a low-head dam, headrace canal, and powerhouse.

Several reservoirs are in tributary systems upstream of the Lloyd Shoals Project, including water supply reservoirs. Tussahaw Reservoir, a 1,466-acre water supply reservoir of the Henry County Water Authority (HCWA), is located on Tussahaw Creek about 3.5 miles upstream of Lake Jackson in Butts and Henry Counties (Figure 2). Other reservoirs upstream of the Project include 850-acre Lake Varner in the Alcovy River system (Newton County); 650-acre Randy Poynter Lake in the Yellow River system (Rockdale County); 600-acre Lake Spivey in the South River system (Henry and Clayton Counties); 260-acre Blalock Reservoir in the South River system (Henry County); and others.

Reservoirs on tributaries to the Ocmulgee River downstream of the Project include a network of water supply reservoirs operated by HCWA in the Towaliga River system: Cole Reservoir (1,100 acres), Rowland Reservoir (277 acres), Gardner Reservoir (209 acres), and Strickland Reservoir (121 acres). High Falls Lake (650 acres) impounds the Towaliga River at High Falls State Park (SP) (Figure 1). Lake Juliette, a 3,600-acre reservoir constructed to provide cooling

water for Georgia Power's Plant Scherer, is located on Rum Creek, which enters the Ocmulgee River about 10 river miles downstream of Juliette Dam.<sup>7</sup>

### **3.1.2 MAJOR LAND USES**

The Ocmulgee River basin drains all or portions of 30 counties in central Georgia. More than 100 cities and towns are located within the basin. The Ocmulgee River basin drains southeastern and eastern metropolitan Atlanta. Cities upstream of the Project include Covington, Conyers, and McDonough, with populations of 13,977, 15,919, and 23,964, respectively (U.S. Census Bureau 2016). Their land uses comprise significant portions of the watershed upstream of Lake Jackson. The closest cities to the Project are Jackson to the west and Monticello to the east, with populations of 5,071 and 2,618, respectively (U.S. Census Bureau 2016). These small cities are within tributary watersheds that drain downstream of the Project.

The upper Ocmulgee River basin in the vicinity of the Lloyd Shoals Project includes portions of two water management planning regions in Georgia: the Metropolitan North Georgia Water Planning District (Metro Water District) and the Middle Ocmulgee Water Planning Region. The 15-county Metro Water District, centered on metro Atlanta, includes 982 sq mi of the upper Ocmulgee River basin upstream of Lake Jackson in Clayton, DeKalb, Fulton, Gwinnett, Henry, and Rockdale Counties (CH2M and Black & Veatch 2017). The northern basin in Gwinnett and DeKalb Counties is predominantly suburban in character. More densely developed urban areas occur in headwaters of the South River in the cities of Atlanta and Decatur. Overall, land use is predominantly residential, with 36 percent remaining undeveloped as agricultural or forest lands, open space, water, or wetlands. About 100 miles of interstate highway corridors traverse this upper portion of the basin. Watershed imperviousness is high throughout much of the upper basin and exceeds thresholds considered detrimental to stream stability, water quality, aquatic habitat, and biotic integrity (CH2M and Black & Veatch 2017).

The Middle Ocmulgee Water Planning Region includes Lake Jackson; surrounding Butts, Newton, and Jasper Counties; and nine counties extending downstream past Macon to the upper Coastal Plain (GEPD 2017a). The Lloyd Shoals Project is in the upstream end of the planning

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<sup>7</sup> Lake Juliette is an impoundment of Rum Creek and is distinct from Juliette Dam on the Ocmulgee River.

region. Land use in the region transitions from suburban in northern areas near metro Atlanta to rural in the south. Approximately 54 percent of the region's land area is covered by forested land, 19 percent by agriculture, 10 percent by wetlands, and 9 percent by urban development (GEPD 2017a).

Land uses adjacent to the Project include the 500-acre Georgia FFA-FCCLA Center in Newton County, a premier camp facility and conference center for the National FFA Organization and Family, Career, and Community Leaders of America (FCCLA). The facility is open year-round and serves 30,000 campers annually.

The 116,731-acre Oconee National Forest (NF), part of the overall Chattahoochee-Oconee NF, lies generally east of the Lloyd Shoals Project in eight central Georgia counties (U.S. Forest Service [FS] 2012). The southern section of Oconee NF extends west to the Ocmulgee River beginning about 1 mile downstream of Lloyd Shoals Dam, on the east side of the river and south of Georgia Hwy 16 (Figure 1). Oconee NF includes 30,312 acres in Jasper County (FS 2012), the majority being within the Ocmulgee River basin downstream of the Project. No NF lands are located within the Lloyd Shoals project boundary.

Piedmont National Wildlife Refuge (NWR) adjoins Oconee NF to the south and lies east of the Ocmulgee River (Figure 1). FWS manages Piedmont NWR to conserve land for fish, wildlife, botanical resources, and their habitats (FWS 2010). The refuge covers 34,955 acres, including 28,552 acres in Jones County and 6,403 acres in Jasper County.

Rum Creek Wildlife Management Area (WMA) is located south of the Project on the west side of the Ocmulgee River in Monroe County. The WMA consists of 5,739 acres surrounding Lake Juliette. WRD manages Rum Creek WMA to offer hunting opportunities for deer, turkey, dove, waterfowl, and small game. Charlie Elliott Wildlife Center/Clybel WMA, located east of Lake Jackson, is in the adjacent Oconee River basin.

Parks in the upper Ocmulgee River basin include Panola Mountain SP and Stone Mountain Park upstream of the Project, and Indian Springs SP, High Falls SP, Jarrell Plantation Historic Site, and Amerson River Park downstream of the Project.

### 3.1.3 MAJOR WATER USES

Public water supply is a major water use in the upper Ocmulgee River basin upstream of Lake Jackson. In the Metro Water District, the upper Ocmulgee River basin is the primary drinking water supply source for all or parts of three counties, including Clayton, Henry, and Rockdale Counties (CH2M and Black & Veatch 2017). Surface water from storage reservoirs serves as the main source of water supply. Drinking water supply watersheds upstream of the Project include headwaters and tributaries of the Alcovy River, Yellow River, South River, and Tussahaw Creek. Existing permitted surface water supply withdrawals in the upper Ocmulgee River basin within the Metro Water District total a monthly average daily withdrawal of 121.5 million gallons per day (MGD); actual annual average withdrawals are about 46.7 MGD (CH2M and Black & Veatch 2017).

Public water supply is also a primary use of the Ocmulgee River basin downstream of Lake Jackson. Butts County, et al. Water and Sewer Authority (WSA) (partnership with the cities of Jackson and Jenkinsburg) operates a water supply intake on the river just downstream of Lloyd Shoals Dam outside of the project boundary. The City of Macon has a water supply intake on the river about 38 river miles downstream of Lloyd Shoals Dam.

As estimated by the U.S. Geological Survey (USGS), the principal uses of water withdrawals (surface water and groundwater) in the Middle Ocmulgee planning region (in descending order of magnitude) are public supply, thermo-electric generation<sup>8</sup>, irrigation use, industrial use, domestic use, mining, livestock and aquaculture, and commercial use (Lawrence 2016). Counties upstream of the Fall Line (Piedmont) rely mainly on surface water sources, while counties downstream (Coastal Plain) withdraw more water from principal aquifers.

The upper Ocmulgee River also serves as a primary receiving water for assimilating treated sanitary effluent in the basin. In the Metro Water District, the upper Ocmulgee River basin has 18 municipal wastewater treatment facilities with a permitted capacity of 132 MGD average daily flow for maximum-month flow (CH2M and Black & Veatch 2017). Surface-water returns

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<sup>8</sup> Georgia Power's Plant Scherer is located in Monroe County, just north of Macon, and uses Lake Juliette as part of a closed-cycle recirculating cooling water system.

in the Middle Ocmulgee planning region total about 59 MGD and include public wastewater (85 percent), industrial (8 percent), and surface mining (7 percent) returns (Lawrence 2016).

The water and wastewater systems of the Metro Water District upstream of the Project are interconnected. With interbasin transfers being common within counties that straddle two or more river basins, the upper Ocmulgee River receives a net estimated water gain of about 54.6 MGD (CH2M and Black & Veatch 2017).

The Middle Ocmulgee Regional Water Plan (GEPD 2017a), developed as part of Georgia's state-wide water planning process, assesses current and future water and wastewater needs in the 12-county region that includes the Lloyd Shoals Project. The plan recommends appropriate water management practices to be employed by local governments/water utilities and other permitted water users through 2050. A surface water availability resource assessment presented in the plan indicated that surface water sources in the region are generally adequate to meet future water demands. An Alternative Flow Regimes Pilot Study conducted by GEPD for the Ocmulgee River in 2018 modeled alternative flow regimes to the low-flow threshold used in the surface water availability resource assessment as an indicator of potential impacts (GEPD 2018a) of alternative flow regimes. The model outputs provide the Middle Ocmulgee Regional Water Planning Council with additional tools to assess potential impacts of future water demands to flow-related services.

#### **3.1.4 TRIBUTARY STREAMS**

Four tributaries converge at Lake Jackson to form the Ocmulgee River. They include the following streams in descending order of watershed area (Figure 1 and Figure 2):

- South River – originates in southeast metro Atlanta in DeKalb, Fulton, and Clayton Counties; flows southeast through Rockdale, Henry, and Newton Counties; becomes the South River arm of Lake Jackson; drainage area of 553 sq mi.
- Yellow River – originates in Gwinnett County; flows south through DeKalb, Rockdale, and Newton Counties; becomes the Yellow River arm of Lake Jackson; drainage area of 448 sq mi.
- Alcovy River – originates in Gwinnett County, flows southeast then south through Walton and Newton Counties; becomes the Alcovy River arm of Lake Jackson; drainage area of 255 sq mi.

- Tussahaw Creek – originates in Henry County; flows east into Butts County; becomes impounded by Tussahaw Reservoir before continuing to flow east into the Tussahaw Creek arm of Lake Jackson; drainage area of 72 sq mi.

### **3.1.5 CLIMATE**

The Ocmulgee River basin is characterized by mild winters and hot summers. Average daily temperatures vary from 31-55°F in January to 67-90°F in July (Weather Channel 2017). Winter low temperatures fall below freezing for only short periods. Average annual precipitation is 40 to 52 inches per year. Rainfall occurs throughout the year. The wettest month is March and the driest month is October (GEPD 2003).

## **3.2 CUMULATIVE EFFECTS**

### **3.2.1 GEOGRAPHIC SCOPE**

The geographic scope of analysis for cumulatively affected resources is defined by the physical limits or boundaries of the proposed action's effect on the resources and contributing effects from other hydropower and non-hydropower activities within the Ocmulgee River basin (FERC 2018b). Because the proposed actions would affect the resources differently, the geographic scope may vary by resource area.

Georgia Power has analyzed water resources and fishery resources as cumulatively affected resources in this Exhibit E. The geographic scope for cumulative effects on water quality includes the upper Ocmulgee River basin from its headwaters in the Metro Water District, the Lloyd Shoals Project, and the Ocmulgee River downstream to Juliette Dam, a distance of approximately 19 river miles downstream of the Project. This scope of analysis includes those lands and activities upstream in the basin that contribute to water quality conditions in Lake Jackson and the Ocmulgee River tailrace area.

The geographic scope of analysis for cumulative effects on fisheries focuses on resident and diadromous fish and includes the Ocmulgee River from the headwaters of Lake Jackson (within the project boundary) downstream to the confluence of the Ocmulgee and Oconee Rivers. The presence and operation of the Lloyd Shoals Project, along with the downstream Juliette Dam, could affect the movements of fish and fish populations in the Ocmulgee River.



### **3.2.2 TEMPORAL SCOPE**

The temporal scope of Georgia Power's cumulative effects analysis includes a discussion of the past, present, and reasonably foreseeable future actions and their effects on each resource that could be cumulatively affected. The temporal scope considered the potential for actions occurring 30 to 50 years into the future, concentrating on the effect on the resources from reasonably foreseeable future actions. This historical discussion is limited, by necessity, to the amount of available information for each resource. Georgia Power has identified the present resource conditions in this Exhibit E based on the best information available.

### **3.3 PROPOSED ACTION**

This section analyzes the continuing and incremental environmental impacts, by resource area, of Georgia Power's proposal to continue operating the Lloyd Shoals Project. Appendices B through E present Georgia Power's proposed resource management plans for project operations and environmental measures pertaining to recreation enhancements and shoreline management. Appendix F contains Georgia Power's proposed draft license articles for the new license.

#### **3.3.1 GEOLOGY AND SOILS**

##### **3.3.1.1 AFFECTED ENVIRONMENT**

The Lloyd Shoals Project lies in the Washington Slope District of the Piedmont physiographic province (Clark and Zisa 1976). The Piedmont is a hilly, gently rolling upland province underlain by crystalline metamorphic and igneous rocks. Streams in the Washington Slope District occupy broad, shallow valleys separated by broad, rounded divides. Local relief typically varies from 50 to 100 ft, except near the Ocmulgee River, which flows in a steep-walled valley 150-200 ft below the adjacent area (Clark and Zisa 1976).

The Washington Slope District is bordered to the south by the Fall Line Hills District, a dissected transitional zone between the Piedmont and Coastal Plain provinces (Griffith et al. 2001). The Fall Line Hills begin about 43 river miles downstream of the Project near the City of Macon.

The Project is in the Southern Outer Piedmont ecoregion. This ecoregion has 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 (Griffith et al. 2001; Edwards et al. 2013).

The Lake Jackson shoreline is characterized by gently sloping topography in most areas. Much of the shoreline in the southern and central portions of the reservoir has been developed for residential and commercial use. Significant stretches of undeveloped, forested shoreline occur along the South River and Yellow River arms of the reservoir north of Hwy 36 and along the Tussahaw Creek arm west of Georgia Hwy 36.

### **Shoreline Erosion and Sedimentation**

Georgia Power (2020c) conducted a shoreline reconnaissance survey of Lake Jackson and the Lloyd Shoals tailrace area in August 2019. The survey inventoried existing shoreline conditions and potential sources of erosion and sedimentation within the project boundary and characterized physical aquatic habitat available as fish cover in the littoral zone. A total of 107 shoreline segments (sites), each 500 ft long, were surveyed, including 101 sites distributed approximately evenly among four sections of the reservoir (South River, Alcovy River, Tussahaw Creek, Mainstem Reservoir) and six sites in the tailrace area. All four project recreation facilities were represented. The remaining survey sites were randomly selected in each section. Each site was visually assessed and rated for vegetative buffer zone condition, adjacent land uses, bank stability and vegetative protection, shoreline structural stabilization practices (e.g., seawalls, riprap), potential causes of shoreline erosion (project related and non-project related) and sources of littoral-zone fish cover.

The shoreline survey found the vast majority of sites (94 percent) to have stable or moderately stable banks, either due to a high degree of bank vegetative protection or the use of shoreline structural stabilization practices, including seawalls, seawalls with riprap at the base, and riprap. Thirty-three percent of the surveyed sites had natural vegetative buffer zone conditions. Their buffer zones were heavily vegetated with less than 20 percent of the natural vegetation removed. Forty-one percent of the sites had landscaped buffer zones; they were cleared of more than 50 percent of the natural vegetation or had the underbrush completely removed. Twenty-six percent of the sites had a mix of landscaped and natural vegetative buffer zone conditions; they were cleared up to 50 percent but with some trees and understory remaining.

Sites with natural vegetative buffer zone conditions were most concentrated in the South River section, which included the Yellow River embayment. Many of these sites had forested riparian zones. Sites with landscaped riparian zones were widespread but were most numerous in the

Tussahaw Creek and Mainstem Reservoir sections, reflecting the predominance of shoreline residential lots in these sections. The landscaped-natural sites typically included some residential land uses and were most numerous in the Alcovy River section. The tailrace area had both natural and landscaped-natural shoreline buffer zone conditions.

The most common potential sources of shoreline erosion observed on Lake Jackson were residential landscaping and wave action from watercraft/wind, at 53 percent and 26 percent of the reservoir sites, respectively. Neither of these sources are related to project operations. Reservoir fluctuations, which are related to project operations, were identified as a potential source of erosion at 12 sites in three sections of the reservoir. However, wave action from watercraft and wind was also a factor at half of these sites. All but one of the sites where reservoir fluctuation was a potential source of erosion had stable or moderately stable banks, and none of these sites were associated with project recreation facilities or the project works.

Sixty-four percent of the surveyed sites had shoreline structural stabilization practices in place. The distribution of these sites corresponded with those areas of the reservoir having the most residential lots, including the Mainstem Reservoir, Alcovy River, and Tussahaw Creek. Forty-six percent of the shoreline length surveyed had structural stabilization in approximate proportions of 50 percent seawall, 28 percent seawalls with riprap at the base, and 21 percent riprap only. Forty-nine percent of the length of observed stabilization practices included the use of riprap.

The most commonly observed sources of littoral zone fish cover, in descending frequency of observation, were overhanging vegetation, docks/piers/boatslips/boathouses, large woody debris, riprap, and bedrock/boulders. Shorelines with larger proportions of overhanging vegetation were most common in the upper reaches of the South River and Tussahaw Creek embayments and in the tailrace area, where natural shoreline vegetative buffer zone conditions were most common. Docks, piers, and boatslips/boathouses were widespread in association with residential lots. Emergent vegetation was most commonly observed in the South River embayment, where sediment deposition has been greater than other areas of the reservoir.

### **Sediment Transport and Deposition Characteristics**

Georgia Power (2020c) analyzed sediment transport and patterns of sediment deposition with Lake Jackson based on review of existing watershed information and data, minor dredging activities authorized under the Small Dredging Permit Program for the Project, and temporal

comparison of available aerial photography for representative areas of the project shoreline, as summarized below. No bathymetry data are available for Lake Jackson.

The upper Ocmulgee River basin upstream of Lloyd Shoals Dam covers an area of 1,400 sq mi. About 70 percent of this area (982 sq mi) drains southeastern and eastern metropolitan Atlanta, including portions of Clayton, DeKalb, Fulton, Gwinnett, Henry, and Rockdale Counties within the highly developed Metro Water District (Section 3.1.2). Larger cities within the river basin upstream of the Project include Atlanta, Conyers, Lawrenceville, Snellville, Stockbridge, and McDonough. The South River, Yellow River, Alcovy River, and Tussahaw Creek are the main tributaries draining the Metro Water District (Section 3.1.4). The South River watershed is the largest tributary, covering approximately 553 sq mi (BC/DHA 2019).

Lake Jackson is downstream of the Metro Water District. The main tributaries converge at Lake Jackson to form the Ocmulgee River. As such, land use and watershed conditions within the Metro Water District substantially affect sediment transport and deposition within Lake Jackson. Within the Metro Water District, 406 stream miles or 80 percent of the 506 stream miles assessed in the upper Ocmulgee River basin are not supporting their designated uses for one or more parameters (CH2M and Black & Veatch 2017). Seventy percent (354 miles) do not meet water quality standards for fecal coliform bacteria as a result of nonpoint source pollution and urban runoff, which carries sediment into streams and increases stream-bank erosion. Twenty-nine percent (146 miles) do not meet water quality standards for biota, indicative of high sediment loads degrading aquatic habitat for benthic macroinvertebrates and fish. Increased imperviousness from urbanization increases the volume of runoff entering streams, which in turn causes stream erosion and downstream transport of sediment.

The watershed upstream of the Project also drains about 418 sq mi of the upper end of the Middle Ocmulgee Water Planning Region (Section 3.1.2), including portions of Butts, Newton, and Jasper Counties around Lake Jackson. The lower reaches of the South River and Yellow River before they enter Lake Jackson are not supporting water quality standards due to fecal coliform bacteria from nonpoint sources and urban runoff (GEPD 2020). The lower reach of the Alcovy River before it enters Lake Jackson is not supporting water quality standards due to *Escherichia coli* (*E. coli*) bacteria from nonpoint sources. The lower reach of Tussahaw Creek before it enters the reservoir is impaired for biota due to sedimentation.

### *Sediment Sources*

Sediment sources upstream of Lake Jackson include nonpoint source runoff, soil erosion from construction sites, other regulated stormwater discharges, and streambank erosion due to accelerated streamflow velocities from impervious cover associated with urbanization. GEPD (2007, 2017b) completed Total Maximum Daily Load (TMDL) evaluations for 81 stream segments in the Ocmulgee River basin listed as not meeting water quality standards for biota (fish or macroinvertebrates) due to sedimentation. The segments included 23 stream segments totaling 145 miles in the watershed upstream of Lake Jackson (GEPD 2002a, 2007, 2017b). Sediment-impaired segments of the South River and three direct tributaries total 50 miles. Most of the other segments are in headwaters of the South River, Yellow River, and Tussahaw Creek.

GEPD (2007, 2017b) assessed known and suspected sources of sediment in the watershed upstream of Lake Jackson, including point and nonpoint sources. Stormwater runoff from roads and developed urban areas were identified as major sources of erosion and sedimentation. Increased imperviousness from urbanization increases the volume of runoff entering the streams, which in turn causes stream erosion (widening and down-cutting), loss of riparian vegetative cover, and the transport of sediment downstream. Based on small differences in modeled sediment yields between biologically impaired (due to sedimentation) and least-impacted watersheds, GEPD (2007, 2017b) concluded that most of the sediment found in Ocmulgee River basin streams may be legacy sediment resulting from past land use practices. Thus, maintaining sediment loads at or below current levels may allow habitat to recover in many streams over time as sediment is transported downstream.

GEPD (2017b) recommends management practices to help maintain or reduce sediment loads in the Ocmulgee River basin upstream of the Project that include:

- Complying with National Pollutant Discharge Elimination System (NPDES) permit levels and requirements for regulated stormwater and wastewater discharges;
- Implementing water quality management practices recommended in regional water plans, such as low impact development, reducing runoff from impervious surfaces, and watershed improvement/restoration projects; applicable regional plans include the Metro Water District's Water Resource Management Plan (CH2M and Black & Veatch 2017), the City of Atlanta's South River Watershed Improvement Plan (BC/DHA 2019), and the Middle Ocmulgee Regional Water Plan (GEPD 2017a);

- Implementing best manage practices (BMPs) for forestry (Georgia Forestry Commission 2009) and agriculture (Georgia Soil and Water Conservation Commission [GSWCC] 2013);
- Implementing individual Erosion and Sedimentation Control Plans for land-disturbing activities and applying the Manual for Erosion and Sediment Control in Georgia (Green Book) (GSWCC 2016); and
- Implementing the Georgia Stormwater Management Manual (Blue Book) (Atlanta Regional Commission [ARC] 2016) to facilitate prevention and mitigation of stream bank erosion due to increased stream flow and velocities caused by urban runoff through structural stormwater BMP installation.

### *Sediment Contaminants*

Four segments of the South River (51 stream miles) upstream of Lake Jackson in the Metro Water District do not support their designated use due to elevated concentrations of legacy polychlorinated biphenyls (PCBs) detected in fish tissue (Fish Consumption Guidelines) (GEPD 2020). The PCB contamination has been attributed to urban runoff and combined sewer overflows (GEPD 2002b). The use of PCBs was banned in the U.S. in the late 1970s, loadings have been removed or reduced to zero, and levels are decreasing in the water column, sediments, and fish tissues over time. The current fish consumption guidelines (GDNR 2020a) for the South River upstream of the Project (DeKalb/Rockdale County, Henry County) recommend limiting consumption of three sport-fish species tested (Bluegill, Snail Bullhead, Black Crappie) to one meal per week due to PCBs. Fish consumption guidelines for the South River at Georgia Hwy 36 (within the project boundary) recommend limiting consumption of Channel Catfish to one meal per week due to PCBs.

Lake Jackson currently supports its designated Recreation and Fishing uses (GEPD 2020). Previously, the reservoir had been listed as not supporting due to elevated concentrations of legacy PCBs in fish tissue, attributed to urban runoff and nonpoint source pollution. A TMDL was completed for PCBs in Lake Jackson to address the impairment (U.S. Environmental Protection Agency [EPA] 1998a). Nevertheless, even without the TMDL, PCBs have been banned in the U.S. and their levels in the environment are declining and will continue to decline. Their detection in fish tissue at Lake Jackson was unrelated to project operations. There is no longer a fish consumption advisory for Lake Jackson due to PCBs (GDNR 2020a), reflecting the declining trend.

Fish consumption guidelines remain for Lake Jackson due to mercury for limiting consumption of certain size classes of Largemouth Bass to one meal per week (GDNR 2020a). EPA (2002) developed a TMDL for mercury in Lake Jackson. The predominant source of mercury loading to the lake is air deposition, which is unrelated to project operations. Fish consumption advisories for Largemouth Bass and other sport fishes due to mercury are widespread in Georgia public reservoirs (GDNR 2020a).

EPA (1998b) also completed a TMDL for chlordane (a pesticide) in Lake Jackson. Similar to PCBs, chlordane use has been banned, its levels in water and sediment have been declining, and its detection in fish tissue was unrelated to Lloyd Shoals project operations. There is no longer any fish consumption advisory for Lake Jackson due to chlordane.

#### *Dredging Activities within the Project Boundary*

Under the current license, Georgia Power implements a Small Dredging Permit Program to authorize minor dredging activities within the project boundary involving quantities ranging up to 500 cubic yards of sediment per lot (Georgia Power 2020c). The sole purpose for dredging is to remove silt or sedimentation that has accumulated over time. Georgia Power files annual reports listing the small dredging permits issued and the estimated quantities of sediment proposed for removal.

Twenty-nine permits were issued for small dredging activities from 2006 through 2018, authorizing the removal of a total of 3,690 cubic yards of sediment (Georgia Power 2020c). The majority of permits and the greatest quantities authorized were in the South River and the Tussahaw Creek embayments of the reservoir. Eleven permits totaling 1,885 cubic yards were issued to property owners in the South River embayment, mainly in the area from just upstream of the Hwy 36 bridge downstream to the confluence with the Alcovy River. Ten permits totaling 921 cubic yards were issued to property owners in the Tussahaw Creek section, mostly in the upper reach. Five permits totaling 784 cubic yards were issued in the Mainstem Reservoir section and three permits totaling 100 cubic yards were issued in the Alcovy River section.

Location information for small dredging permits issued prior to 2006 was not as detailed. For the period 1997-2005, a total of 20 permits were issued for minor dredging activities totaling about 7,100 cubic yards.

## **Shoreline Temporal Change**

Six representative areas of the Lloyd Shoals Project were evaluated for temporal change in shoreline and sedimentation conditions (Georgia Power 2020c). Based on aerial photography comparisons over the period 1993 to 2019, there has been little overall change in the predominant land uses surrounding the Project. Comparison of aerial imagery revealed that the primary changes to land use along the reservoir shoreline were related to residential construction. Primary changes to land use in upland areas outside of the project boundary were residential construction and logging. Shoreline change within the reservoir has been most common in the more natural upper reaches of the South River/Yellow River, Alcovy River, and Tussahaw Creek sections. Sediment deposition and the formation and reshaping of sandbars and islands were most apparent in these transition areas from a riverine to a lacustrine system. Changes in shoreline conditions in the Mainstem Reservoir section and other more residential areas of the reservoir were less common, likely due to the widespread use of shoreline structural stabilization practices. The higher rates of sedimentation observed from aerial imagery in the South River embayment, including the Yellow River, can be attributed to high rates of sediment transport and deposition from the highly urbanized watershed upstream of the Project.

### **3.3.1.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

Georgia Power proposes to continue operating the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours. The Project would continue to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources. During low-flow periods, when calculated inflow falls below 250 cfs, the Project would release a continuous flow of 250 cfs to supplement stream flows for downstream uses. In addition, Georgia Power proposes to continue implementing the Small Dredging Permit Program to authorize minor dredging activities by property owners within the project boundary.

### **Reservoir and Tailrace Shoreline Erosion and Sedimentation**

Georgia Power's proposed operation would not adversely affect shorelines within the project boundary as a result of erosion and sedimentation. For normal operation, Lake Jackson would continue to be operated year-round to maintain reservoir elevations between approximately 530 and 527 ft PD. Since installation of the Obermeyer gate system in 2012, the operators have the ability to incrementally adjust flows released from the spillway, which enhances control over the



water levels in the reservoir during and following high-inflows periods. Within the 3-ft operating band, daily reservoir fluctuations would be 2.0 ft or less the vast majority of days (Section 2.1.3.1). Once the Obermeyer gate system began operation, the prior practice of conducting annual seasonal drawdowns of Lake Jackson to prevent spilling water during high inflows ended. These gates allow the plant discharges to be more closely matched with inflows to the Project.

During low-flow periods there may be a sustained drawdown of the project reservoir as Georgia Power supplements river flows downstream; however, there would typically be only minor daily elevation fluctuations because there would be diminished daily peaks in inflow during low-flow periods. During maintenance drawdowns, daily fluctuations would still occur, but at a lower elevation level. For both types of drawdowns, the lake elevation would be lowered at a rate of no more than 0.5 ft per day (see Section 3.3.2.2, Project Operations, Lake Elevations), which would not contribute to additional sedimentation. During the most recent drought in 2016, when downstream flows were supplemented continuously at 250 cfs for a period of approximately 42 days, the lake elevation was lowered slowly from 527 ft PD to a low-level elevation of 525.34 ft PD, reflecting an approximate drawdown rate of 0.04 ft per day. Previous drought conditions exhibited similarly slow rates of drawdown. During recent maintenance drawdowns, drawdown rates were no more than 0.5 ft per day below 527 ft PD.

Reservoir fluctuations were identified during the shoreline reconnaissance survey as a potential source of erosion at 12 sites on Lake Jackson but wave action from wind and watercraft was also observed to be a contributing source at six of the sites. All but one of the sites had stable or moderately stable banks and none exhibited severe erosion or bank failure.

Georgia Power's operations proposal would not adversely affect shoreline conditions in the Lloyd Shoals tailrace area. The potential for shoreline erosion would be moderated by the prevalence of bedrock and boulders, the armoring provided by riprap closer to the dam, and the stream-bank and riparian-zone protection provided by forested vegetation along both sides of the river. Generation releases to the Ocmulgee River downstream would vary between the minimum flow requirement of 400 cfs and the maximum powerhouse hydraulic capacity of 3,720 cfs. Average annual inflow to Lake Jackson is about 1,747 cfs. When calculated project inflow falls below 250 cfs, the Project would release a continuous flow of 250 cfs continuous to supplement stream flows for downstream uses. The 250-cfs release would occur at a steady rate without pronounced daily fluctuations. For the period 2001-2020, daily average discharge from the

Project to the river downstream exceeded 250 cfs on 99 percent of the days, 400 cfs on 86 percent of the days, and 1,000 cfs on 54 percent of the days.

### **Sediment Transport and Accumulation within Lake Jackson**

Continued operation of the Project as proposed would not significantly affect sediment transport and accumulation within Lake Jackson. The major sources of sediment transport and accumulation in Lake Jackson are the highly developed urban watersheds of metropolitan Atlanta upstream of the Project. Watershed imperviousness is high in much of the upstream Ocmulgee River basin, which increases the volume of stormwater runoff entering streams, which in turn accelerates streamflow velocities and causes stream erosion (widening and down-cutting), loss of riparian vegetative cover, and the transport of sediment downstream. Stormwater runoff from roads and developed urban areas, soil erosion from construction sites, other regulated stormwater discharges, nonpoint source runoff, and streambank erosion are major sources of erosion and sedimentation upstream of the Project (GEPD 2007, 2017b).

The South River is the largest tributary to Lake Jackson and the most widely impaired by sedimentation. As a result of the historically high sediment load from the upstream watershed, sediment deposition is most evident in the South River embayment of Lake Jackson. The temporal change analysis detected sediment accumulation along points, islands, and sandbars as the South River enters the reservoir and transitions to a lacustrine system. However, the overall shoreline configuration throughout the South River embayment has remained relatively stable due to the prevalence of natural vegetative buffer zone conditions, especially in the upper reaches, and the use of seawalls and/or riprap along residential lots. Implementation of regional water plans and best practices by local governments in the South River watershed upstream of the Project under the existing TMDLs will help to maintain or reduce sediment loads into the South River embayment over time.

Continued implementation of Georgia Power's Small Dredging Permit Program would facilitate property-owner removal of small quantities of accumulated sediment next to seawalls and boat docks. In addition, operation of the Obermeyer gate system, which eliminated the practice of annual drawdowns, would maintain higher water levels year-round, which in turn would maintain more consistent boating access to shallow coves and upstream reaches of the South River/Yellow River, Tussahaw Creek, and Alcovy River embayments.

Continued operation of the Project would not contribute to sediment contamination of Lake Jackson. Legacy PCB and chlordane contamination of sediments in the Lake Jackson, as detected in fish tissue, has been attributed to urban stormwater runoff, nonpoint source pollution, and combined sewer overflows. The use of PCBs and chlordane has been banned in the U.S., loadings have been removed or reduced to zero, and levels are decreasing and will continue to decrease over time. There are no longer fish consumption advisories in effect for PCBs or chlordane in Lake Jackson, reflecting the declining trend. Although fish consumption guidelines remain for Lake Jackson due to mercury, the predominant source of mercury loading to Georgia reservoirs is air deposition, which is also unrelated to project operations.

### **Construction of Proposed Enhancement Measures**

Construction of the proposed recreational enhancements (Section 3.3.6.2) would cause temporary shoreline disturbances in local areas. Georgia Power proposes to perform all construction associated with these enhancements in such a manner as to minimize impacts on shoreline vegetation, bank stability, and water quality. Proper erosion control and restoration practices during and immediately following all construction activities would minimize impacts.

### **Unavoidable Adverse Impacts**

Unavoidable adverse impacts would include temporary effects of shoreline disturbance from construction of proposed recreation enhancements. Impacts would be minimized through the implementation of BMPs for minimizing soil disturbance, controlling erosion, restoring natural contours, and revegetating disturbed areas, as recommended in the Manual for Erosion and Sediment Control in Georgia (Green Book) (GSWCC 2016).

## **3.3.2 WATER RESOURCES**

### **3.3.2.1 AFFECTED ENVIRONMENT**

#### **Water Quantity**

USGS divides the Ocmulgee River into three sub-basins with corresponding 8-digit Hydrologic Unit Codes (HUCs). The Lloyd Shoals Project, with an upstream drainage area of 1,400 sq mi, is located within HUC 03070103 (upper Ocmulgee River basin) (Figure 4). The upper Ocmulgee River basin extends from the headwaters in southeastern and eastern metro Atlanta counties downstream through the Piedmont province to the City of Macon at the Fall Line.

### *Stream Flow*

USGS maintains a stream gage on the Ocmulgee River about 0.7 mile downstream of Lloyd Shoals Dam and about 0.4 mile upstream of the Georgia Hwy 16 bridge (USGS No. 02210500, Ocmulgee River near Jackson, Georgia) (Figure 2). The gage represents a watershed area of 1,420 sq mi. Drainage area accretion between the dam and the USGS gage is negligible. Monthly minimum, average, and maximum flows at this gage for the 20-year period from January 1999 through December 2018 are listed for each month in Table 3. Average monthly flows ranged from a low of 953 cfs in August and October to a high of 2,578 cfs in March. The minimum flows usually occurred in late summer/early fall, and high flows tended to occur in winter/early spring. Average annual inflow to Lake Jackson is about 1,747 cfs.

### *Water Withdrawals*

Surface-water withdrawals for public supply comprise the majority of water uses in the Ocmulgee River basin upstream of the Project (Lawrence 2016). Of 19 permitted surface water withdrawals upstream of the Project, the largest withdrawals for consumptive uses are in Henry and Newton Counties (GEPD 2021a). Several water supply reservoirs are in the South, Yellow, and Alcovy River and Tussahaw Creek systems upstream in the river basin (Section 3.1.1). There are no existing permitted withdrawals for public water supply on Lake Jackson.

Butts County et al. WSA operates a public water supply intake on the Ocmulgee River 0.7 mile downstream of Lloyd Shoals Dam, just beyond the project boundary. The permitted monthly average daily withdrawal is 9.7 MGD (GEPD 2021a). Other permitted surface-water withdrawals on the mainstem Ocmulgee River downstream of the Project to Macon include (GEPD 2021a):

- Georgia Power, Plant Scherer – intake about 25 river miles downstream of the Project in Monroe County; permitted monthly average withdrawal of 231 MGD; water is pumped to Lake Juliette for use in a closed-cycle recirculating cooling water system.
- Macon Water Authority (MWA) – public water supply intake about 38 river miles downstream of the Project in Bibb County; permitted monthly average withdrawal of 110 MGD; water is pumped to MWA’s Javors Lucas Lake water storage reservoir.

Water demand in the Metro Water District upstream of the Project is projected to increase by approximately 50 percent by the year 2050 (CH2M and Black & Veatch 2017), while water demand in the Middle Ocmulgee Water Planning District is projected to increase by

approximately 35 percent by 2050 (GEPD 2017a). Surface water resources within the project region are considered adequate to meet future water demands (GEPD 2017b).

#### *Treated Wastewater Discharges*

Permitted discharges within the Ocmulgee River basin upstream of the Project include 5 water treatment plants, 7 subsurface systems, 17 land application systems, 8 NPDES permitted discharges, 6 mining and processing facilities, 1 general cooling water, and 1 animal feed operation (GEPD 2021a). GEPD's 2017 assessment for the Middle Ocmulgee Water Planning District indicates that the current and future (2050) assimilative capacity of waters in the project vicinity is very good (GEPD 2017b).

### **Water Quality**

#### *Water Use Classifications and Attainment Status*

GEPD (2018b) classifies the water use of Lake Jackson as Recreation. This area extends from the dam upstream to Georgia Hwy 36 on the South River, Yellow River, and Tussahaw Creek, and upstream to Newton Factory Road bridge on the Alcovy River (Figure 2). The South and Yellow River arms of the reservoir upstream of Georgia Hwy 36 are designated for Fishing use. The Ocmulgee River from Lloyd Shoals Dam downstream to Wise Creek, a distance of about 6.2 river miles, is classified for Drinking Water. In addition to general criteria applicable to all waters, specific criteria apply to these water uses, including numeric criteria for bacteria (fecal coliform, *E. coli*), DO concentration, pH, and temperature (GEPD 2018b). The applicable DO numeric criteria for the project waters, which support warm-water species of fish, are a daily average of at least 5.0 milligrams per liter (mg/L) and no less than 4.0 mg/L at all times.

GEPD (2020) currently lists Lake Jackson as supporting its designated Recreation and Fishing uses. Previously, TMDLs were completed for Lake Jackson due to legacy PCBs (EPA 1998a), chlordane (EPA 1998b), and mercury (EPA 2002) detected in fish tissue (see Section 3.3.1.1). The use of PCBs and chlordane has been banned in the U.S., their levels in water and sediment have been declining, and their detection in fish tissue has been attributed to urban runoff and nonpoint source pollution, not project operations. There are no longer fish consumption guidelines for the main pool of Lake Jackson due to PCBs or chlordane, but there are guidelines for the South River arm of the reservoir at Georgia Hwy 36, which recommend limiting the consumption of Channel Catfish due to PCBs (GDNR 2020a).

Fish consumption guidelines remain for Lake Jackson due to mercury for certain size classes of Largemouth Bass (GDNR 2020a). However, the predominant source of mercury loading to the reservoir is air deposition (EPA 2002), which is unrelated to project operations. Fish consumption advisories for Largemouth Bass and other sport fishes due to mercury are widespread in Georgia public reservoirs (GDNR 2020a).

Numerous tributary streams to Lake Jackson upstream of the Project do not support their designated uses due to one or more parameters, including fecal coliform or *E. coli* bacteria, PCBs in fish tissue, and impaired biota due to sediment (CH2M and Black & Veatch 2017; GEPD 2020) (see Section 3.3.1.1). The lower reaches of the South River and Yellow River before they enter Lake Jackson are not supporting water quality standards due to fecal coliform bacteria from nonpoint sources and urban runoff (GEPD 2020). The lower reach of the Alcovy River before it enters Lake Jackson is not supporting its Recreation use due to *E. coli* bacteria from nonpoint sources. The lower reach of Tussahaw Creek upstream of the reservoir is not supporting its Fishing use due to fish community impairment from sedimentation.

GEPD (2020) lists the Ocmulgee River downstream of Lloyd Shoals Dam for the first 17 miles, to its confluence with the Towaliga River, as supporting its designated Drinking Water and Fishing uses. The next 10-mile segment of the Ocmulgee River downstream to Georgia Hwy 18 has not been assessed. The 9-mile segment from Hwy 18 downstream to Beaverdam Creek is supporting its Fishing use but data are unavailable to assess its Drinking Water use. The next 10-mile segment of the river downstream to Walnut Creek in Macon is supporting its Drinking Water and Fishing uses.

#### *Water Quality of Lake Jackson*

At the normal full-pool elevation of 530 ft PD, Lake Jackson covers 4,750 acres and has 135 miles of shoreline. The full-reservoir gross storage capacity is approximately 107,000 acre-ft. Mean depth is 22.5 ft and the retention time (i.e., residence time of lake water) is 32 days. The 12-ft-high intake openings for the powerhouse have an invert elevation of 495 ft PD, which is approximately 35 ft below the normal full-pool elevation.

Lake Jackson historically exhibited accelerating eutrophication caused by excessive inputs of nutrients, mainly from point-source discharges upstream of the Project (EPA 1975). As major improvements were made to wastewater treatment systems through the 1980s, primarily through

phosphorus reduction and diversions of treated wastewater, Lake Jackson water quality made a remarkable recovery (Kamps 1989). However, continued nutrient loading from upstream point and non-point sources led GEPD in 1997 to implement site-specific criteria for chlorophyll-*a*, total nitrogen, and total phosphorus. For chlorophyll-*a*, the average of monthly mid-channel photic zone composite samples taken at a location 2 miles downstream of the confluence of the South and Yellow Rivers is not to exceed 20 micrograms per liter ( $\mu\text{g/L}$ ) for April-October more than once in a five-year period (GEPD 2018). Total nitrogen is not to exceed 4.0 mg/L in the photic zone, and total phosphorus lake loading is not to exceed 5.5 pounds (lbs) per acre-ft of lake volume per year. These site-specific standards have helped to further control nutrient loading and reduce associated seasonal problems with water quality and algal blooms. Subsequent reservoir monitoring results have indicated compliance with the site-specific water quality standards for Lake Jackson (GEPD 2003, 2020).

Georgia Power has monitored the seasonal water quality of Lake Jackson annually since the 1980s (Georgia Power 2018, 2019, 2021a). In recent decades, monitoring typically occurred three or four times per year at up to six representative stations. Stations included the forebay area of the dam, two main-pool stations upstream of the dam, and three stations in the South River/Yellow River, Alcovy River, and Tussahaw Creek embayments. Monitoring included vertical profile measurements of water temperature, DO concentration, pH, specific conductance (conductivity), and turbidity at 1-meter (m) intervals from the surface to the bottom. In addition, surface grab samples were collected at a subset of stations for laboratory analysis of a range of water chemistry parameters, including alkalinity, hardness, nutrients, metals, chlorophyll-*a*, turbidity, and fecal coliform bacteria.

GEPD has collected vertical profile and water chemistry data from forebay and mid-lake stations in Lake Jackson since 2000-2001, typically from April to October (GEPD 2021b). Vertical profile measurements have included water temperature and DO concentration, while water chemistry analyses have included total suspended solids, chlorophyll-*a*, total nitrogen, total phosphorus, fecal coliform, *E. coli*, and other parameters (Georgia Power 2018, 2021a).

The Jackson Lake Homeowners Association has also collected water quality data in the lake since 2014 (Georgia Adopt-A-Stream 2021). Available data include surface water temperature, DO concentration, pH, conductivity, Secchi depth, and *E. coli* density (Georgia Power 2021a).

Analysis of this substantial amount of water quality data indicates that the overall water quality of Lake Jackson is good and that the site-specific criteria for chlorophyll-*a* and total nitrogen are consistently being met (Georgia Power 2018, 2021a). Elevated concentrations of fecal coliform bacteria and chlorophyll-*a* occasionally occur in the reservoir related to nutrient inputs and nonpoint-source runoff from the upstream watershed.

The Lake Jackson forebay exhibits a clear pattern of summertime thermal stratification, with warmer temperatures near the surface, pronounced decline in temperature with increasing depth (thermocline), a sharp decline in DO concentration with increasing depth, and cooler, low-DO water below 10-m depth. Vertical stratification develops from late spring through the summer. Composite vertical profiles of the forebay in the months June-September show average DO values declining below 4.0 mg/L within the intake zone, corresponding with depths 23 to 35 ft below the full-pool surface (495 to 507 ft PD). As the surface water decreases in temperature through the fall and winter, increase in density, and sinks, mixing of the water column occurs, with cooler temperatures and higher DO concentrations becoming more uniformly distributed through the water column. Lake Jackson's seasonal pattern of summertime vertical stratification and fall-winter mixing is typical of southeastern Piedmont reservoirs.

#### *Algal Blooms in Lake Jackson*

Algal blooms occur naturally in reservoirs, but their frequency, duration, and intensity can be increased by nutrient enrichment from point and non-point sources, combined with elevated water temperatures, sunlight, and low flows (Pearl et al. 2001; Anderson et al. 2002; EPA 2016). Cyanobacteria (blue-green algae) blooms were reported for Lake Jackson in several years from 2007 to 2018 (Georgia Power 2021a); no algal blooms were reported in 2019-2021. Blooms assessed by Georgia Power contained the cyanobacterium *Microcystis aeruginosa*, a species that can produce the toxin microcystin. When released into the water and ingested, microcystin can produce adverse effects in humans, pets, livestock, and wildlife, depending on the concentration and individual sensitivities. However, samples assessed from these blooms had cell densities below World Health Organization guidelines. The blooms were associated with drought, prolonged water temperatures above 30°C, low reservoir inflows, and increased retention time.



Georgia Power (2021a) applied a predictive model for blooms of cyanobacterial toxins in the southeastern U.S. (Wilson et al. 2020), which indicated a low overall risk for toxic cyanobacteria blooms in Lake Jackson, although drought conditions during summer likely increase the risk.

#### *Water Quality of Lloyd Shoals Tailrace Area*

Georgia Power (2021a) continuously monitored water temperature and DO concentration in the Ocmulgee River below Lloyd Shoals Dam from July 24, 2019 through July 31, 2020 to characterize the effects of continued project operation on tailrace water quality. Measurements were recorded hourly in the tailrace area. Monthly water chemistry samples also were collected from the tailrace area over the same period and analyzed for 5-day biochemical oxygen demand, ammonia, inorganic nitrogen, total Kjeldahl nitrogen, ortho-phosphate, and total phosphorus.

Throughout the 1-year monitoring period, tailrace DO concentrations met the Georgia instantaneous criterion of no less than 4.0 mg/L 99.84 percent of the hours and met the daily average criterion of 5.0 mg/L 99.2 percent of the days (Georgia Power 2021a). Figure 5 shows the daily averages of water temperature and DO concentration over the monitoring period. The average water temperature was 19.88°C and the average DO concentration was 7.66 mg/L.

Summer tailrace DO values dropped below 4.0 mg/L on two separate days in July 2020 for a total of 13 hours, which represented 0.15 percent of the monitoring period (Georgia Power 2021a). The first excursion occurred on July 27, lasted 10 hours (interrupted by 1 hour of DO concentrations above 4.0 mg/L), and reached a low of 3.6 mg/L before recovering (Figure 6). In analyzing the excursion for the Water Resources Updated Study Report, Georgia Power (2021a) determined that the event began shortly after two non-aerating units and one aerating unit were brought online and added to one aerating unit that was already operating, for a total of two aerating and two non-aerating operating units. Based on examination of similar summertime generating scenarios that occurred during the monitoring period, this excursion could have been avoided by adding two aerating units and only one non-aerating unit, for a total of three aerating and one non-aerating units. The second excursion occurred on July 31, lasted 3 hours, and reached a low of 3.8 mg/L before recovering (Figure 7). The event began a few hours after two aerating units and two non-aerating units were brought online at the same time and added to one

aerating unit already operating, for a total of three aerating and two non-aerating units. This shorter event likely was minimized in duration and magnitude by operating all three aerating units.

Each of the July instantaneous DO excursions was preceded by a combination of elevated surface water temperatures (28.8 to 29.0°C) and a storm event upstream of the Project. As indicated by USGS discharge records, the July 27 excursion followed a storm event on July 26 in the Alcovy River basin (USGS No. 02209000, Alcovy River near Covington, Georgia), and the July 31 excursion followed a storm event on July 30 in the South River basin (USGS No. 02204520, South River at Georgia Hwy 81, at Snapping Shoals, Georgia). The available evidence indicates that naturally occurring runoff from storm events and associated oxygen-demanding constituents, when combined with high water temperature, temporarily depresses DO concentrations as those constituents assimilate in the reservoir. The passing DO depressions are measurable in the tailrace as the water moves through the system but are mitigated completely, or nearly so, by operation of the draft tube aeration system. The July 31 excursion in particular showed a temporary decline and recovery of DO values during a 3-hour window without any change in dam unit operations while all three aerating units were operating (Figure 7).

Tailrace daily average DO concentrations below 5.0 mg/L occurred on three days during the monitoring period (Figure 5). The daily average DO concentration for October 23, 2019 was 4.95 mg/L. The daily average DO concentrations for June 10 and July 27, 2020, were 4.89 and 4.86 mg/L, respectively, and were likely due to the operation of two of the three aerating units along with two non-aerating units. Preferential operation of a third aerating unit over a second non-aerating may have avoided the excursions.

Overall, the summer continuous DO monitoring in 2019-2020 showed that DO levels were maintained above the applicable criteria nearly 100 percent of the time. This demonstrates the continuing effective performance of the passive draft tube aeration system in improving and maintaining DO levels. The operational patterns surrounding the few excursions of the instantaneous and daily average DO criteria indicate the importance of prioritizing the use of aerating units over non-aerating units when adding units for peaking generation during the summer critical conditions period.

The analysis of monthly water chemistry samples collected in the tailrace area in 2019-2020, and review of other existing water quality data, was also indicative of good overall water quality conditions in the Ocmulgee River downstream of the Project (Georgia Power 2021a).

### **3.3.2.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

#### **Project Operations**

Georgia Power proposes to continue operating the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours. The Project would be operated to maintain the reservoir elevation between 527 and 530 ft PD, excluding periods of planned and emergency drawdowns. The Project would release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. During low-flow periods, when calculated project inflow is less than 250 cfs, the Project would release a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses. The existing passive draft tube aeration system would continue to be operated during the summer critical conditions period of May 15 through September 30 to enhance DO concentrations in downstream releases; however, a new operational procedure is proposed to prioritize the dispatch of aerating turbines over non-aerating turbines to optimize the DO-enhancing performance of the aeration system.

#### *Lake Elevations*

For normal operations, Lake Jackson is maintained between elevations 530 ft PD, which is the full pool elevation, and 527 ft PD year-round, excluding emergency and planned drawdowns and drought. Georgia Power's operations proposal includes continuing to operate Lake Jackson within a 3.0-ft range to support modified run-of-river operations. Operating within this range enables Georgia Power to temporarily store inflow during hours not in its peak power demand period (off-peak hours) and to release water through the powerhouse turbines to generate power during the peak power demand period. Maintaining this range also allows for water to be stored for short periods to account for project inflow that varies seasonally. It also allows for consistent public access to the reservoir for recreation. Within the 3-ft operating band, daily reservoir fluctuations would continue to be 2.0 ft or less the vast majority of days (Section 2.1.3.1).

Since installation of the Obermeyer gate system in 2012, the operators have the ability to incrementally adjust flows released from the spillway, which enhances control over the water levels in the reservoir during and following high-inflow periods. The Obermeyer gates allow the project discharges to be more closely matched with inflows to the Project.

During extended low-flow periods there would be a sustained drawdown of Lake Jackson as Georgia Power supplements river flows downstream; however, there would typically be only minor daily elevation fluctuations because there would be diminished daily peaks in inflow during low-flow periods. During maintenance drawdowns, daily fluctuations would still occur, but at a lower elevation level. For both types of drawdowns, the lake elevation would be lowered at a rate of no more than 0.5 ft per day, to avoid or minimize stranding of fish and rare or state threatened mussel species that occur in Lake Jackson.

Once the Obermeyer gate system began operation, the prior practice of conducting annual seasonal drawdowns of Lake Jackson to prevent spilling water during high inflows ended. However, there would continue to be the need for periodic fall drawdowns of the reservoir for homeowner and shoreline maintenance. In the event of a planned, non-emergency drawdown that would reduce the lake elevation below the 3.0-ft normal operating range (elevation 527 ft PD), Georgia Power proposes to consult with WRD and GEPD and to report the schedule to FWS, FERC, and FERC's Atlanta Regional Office at least 10 days prior to the non-emergency drawdown. Under emergency operating conditions, the same agencies would be notified within 10 days after the incident.

#### *Downstream Minimum Flow*

Georgia Power's proposal to operate the Project to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream would continue to protect and enhance downstream riverine habitat for fish and freshwater mussels (see Section 3.3.3.2). An instream flow study conducted for the previous Lloyd Shoals relicensing using the Instream Flow Incremental Methodology (IFIM) modeled the relationship between habitat and discharge for representative fish species and life stages in the Ocmulgee River downstream (EA 1990a). The IFIM study results show that a minimum flow of 400 cfs would optimize habitat across multiple species and life stages, providing an estimated 91 percent of the maximum weighted usable area on average. A review of available sources of information and data on river

channel stability in the study area detected little change to the river and adjacent floodplains since the IFIM study was conducted and concluded that the habitat-discharge relationships from the study remain applicable today for characterizing the effects of project operations.

In addition, a continuous minimum flow release of 400 cfs would continue to support the operation of the Butts County et al. WSA water supply intake and the MWA water supply intake (in Macon) downstream of the Project.

During low-flow periods when calculated project inflow is less than 250 cfs, Georgia Power's proposal to release a continuous flow of 250 cfs into the Ocmulgee River downstream would supplement stream flows for downstream uses, including aquatic life. In discussions at the scoping meeting, GEPD expressed support for including this supplemental flow release in the new license. The IFIM study results show that a flow of 250 cfs would provide an estimated 87 percent of the maximum weighted usable area on average for the riverine fish community (Section 3.3.3.2). Releases of 250 cfs would be most likely to occur in summer or fall. For the period 2001-2020, daily average discharge from the Project exceeded 250 cfs 99 percent of the days.

#### *Project Operations License Articles*

Based on the analysis above, Georgia Power proposes four project operations license articles for the Lloyd Shoals Project, as provided in Appendix F:

- Project Operation and Reservoir Levels (Article 401)
- Minimum Flow (Article 402)
- Supplemental Flow (Article 403)
- Project Operations Compliance and Monitoring Plan (Article 404), as provided in Appendix B

#### **Cyanobacteria Blooms in Lake Jackson**

During NEPA scoping, the Altamaha Riverkeeper and Ms. Julia Haar expressed concern about harmful blooms of cyanobacteria in Lake Jackson and the potential for adverse effects on the aquatic food chain (FERC 2018b). Analysis of the substantial amount of water quality data available for Lake Jackson indicates that the overall water quality of the reservoir is good and that the site-specific criteria for chlorophyll-*a* and total nitrogen are consistently being met

(Georgia Power 2018, 2021a). Cyanobacteria blooms were reported for Lake Jackson in several years from 2007 to 2018 and blooms assessed by Georgia Power contained the cyanobacterium *Microcystis aeruginosa*, a toxin-producing species. However, the species' presence does not necessarily mean that cyanotoxins are being produced. The samples assessed from these blooms had cell densities below World Health Organization guidelines (Georgia Power 2021a). A predictive model for cyanobacteria blooms applied to Lake Jackson indicated a low overall risk for toxic cyanobacteria blooms, although drought conditions during summer likely increase the risk. Moreover, there is no evidence indicating any adverse effects of harmful algal blooms on the aquatic food chain at the Project or the one known Bald Eagle nesting territory at Lake Jackson (Breinlinger et al. 2021).

Continued operation of the Project in a modified run-of-river mode would not contribute directly to increased risk for harmful algal blooms, which are influenced primarily by nutrient inputs from the upstream watershed, low reservoir inflows, prolonged periods of elevated water temperature, and increased retention time, factors which are beyond the control of Georgia Power's project operations.

GEPD initiated a Harmful Algal Blooms Working Group in 2019, which grew out of increasing awareness and reports of potentially harmful algal blooms from on lakes and ponds across the nation and Georgia. As part of this initiative, GEPD is developing a means to better detect blooms, assess whether toxins are present, and better inform the public on this issue, including through education and awareness information on its website (GEPD 2021c).

## **Water Quality in the Tailrace Area**

### *Passive Draft Tube Aeration System*

Georgia Power proposes to continue operating the passive draft tube aeration system on Units 2-4 from May 15 through September 30 to enhance warm-season DO concentrations in the tailrace area and benefit downstream water quality, fisheries, aquatic resources, and recreation opportunities by supporting applicable water quality standards. After the draft tube aeration system was installed in 2006, DO monitoring data collected by Georgia Power in 2006 and 2007, and presented in the PAD (Georgia Power 2018), showed the aeration system to be effective in increasing and stabilizing summer DO levels in the tailrace area above 4 mg/L. Georgia Power's continuous DO monitoring of the tailrace area from July 2019 to July 2020 demonstrated the

continued effective performance of the draft tube aeration system. The hourly tailrace DO readings for the monitoring period exceeded 4.0 mg/L 99.84 percent of the time and the daily average values exceeded 5.0 mg/L 99.2 percent of the days (Georgia Power 2021a).

Georgia Power’s analysis of the operational patterns surrounding two excursions of the instantaneous criterion and three excursions of the daily average DO criterion determined that the excursions likely would have been avoided or minimized had the use of aerating units been prioritized over the use of non-aerating units when adding units for peak generation. Therefore, Georgia Power proposes to implement an operational procedure for the passive draft tube aeration system, provided in Appendix C, that incorporates the following operating rule to prioritize the use of aerating units during the warm-season period May 15 to September 30:

<u>Number of Units Required for Generation</u>	<u>Use the Following Aerating Units</u>
1	Use 1 aerating unit
2	Use 2 aerating units
3	Use at least 2 aerating units <sup>a</sup>
4	Use 3 aerating units <sup>a</sup>
5	Use 3 aerating units <sup>a</sup>
6	Use 3 aerating units <sup>a</sup>

<sup>a</sup> Load all aerating units prior to loading non-aerating units, if possible.

In addition, the proposed operational procedure (Appendix C) includes a provision for continuing the use of aerating units in October when the Project is operating under drought conditions (sustained downstream supplemental flow release of 250 cfs), as defined by Georgia Power’s proposed Project Operation Compliance Monitoring Plan (Appendix B). Operating the draft tube aeration system in this manner will minimize excursions of the daily average DO criterion, such as occurred on October 23, 2019 (4.95 mg/L) (Section 3.3.2.1).

Georgia Power calculated the energy losses associated with continued operation of the passive draft tube aeration system. An operational test of MW output with aeration valves closed (non-aerating) and aeration valves opened (aerating) found an average reduction of 0.74 MW capacity loss when units are aerating. An analysis of hourly generation records determined the percent of time 1, 2, 3, 4, 5, and 6-unit generation scenarios were in use during the critical summer period at Lloyd Shoals, prioritized the loading of all aerating units prior to loading non-aerating units

during the critical summer period May 15 to September 30, and then applied a capacity loss to monthly energy production for the portion of each operational scenario that would be met with aerating units. The analysis found a generation loss of approximately 5,184 MWH per year due to the operation of aerating units.

Table 4 provides an estimate of the monthly energy loss associated with operating the passive draft tube aeration system in accordance with the proposed operational procedure.

Implementing this passive draft tube aeration system operational procedure would further improve the DO-enhancing performance of the existing passive draft tube aeration system, which currently contributes to project releases achieving the applicable DO criteria nearly 100 percent of the time. Implementation of the operational procedure would further reduce the likelihood and extent of infrequent excursions.

In its comments on the PLP, EPA suggested developing procedures that also consider upstream storm events, since DO excursions in the tailrace were primarily caused by upstream storm events. As described in Section 3.3.2.1 (Water Quality of Lloyd Shoals Tailrace Area), each of two July 2020 instantaneous DO excursions was preceded by a combination of elevated water temperatures and a storm event upstream of the Project. Georgia Power's proposed operational procedure would prioritize the use of aerating turbines during the summer critical period and account for the biological oxygen-demanding conditions that develop in the reservoir, and in the higher inflows traveling through the reservoir, as a result of upstream storm events.

#### *Proposed Tailrace Monitoring*

In its comments on the PLP, WRD requested that Georgia Power monitor DO in the tailrace to ensure that the procedural changes proposed for the passive draft tube aeration system are adequate for maintaining DO levels. Therefore, Georgia Power proposes to conduct continuous DO and water temperature monitoring in the project tailrace area during the period May 15-September 30 in one year to verify improved performance of the draft tube aeration system.



### *American Shad*

In its comments on the PLP, NMFS requested that Georgia Power consider that a minimum DO concentration of 4.0 mg/L does not meet the goal of 5.0 mg/L or greater outlined in the American Shad Habitat Plan (GDNR 2020b). One goal of the plan is to ensure water quality remains adequate to support all life stages of American Shad and other aquatic organisms in the Altamaha River.

The applicable DO criteria for the project waters, which support warm-water species of fish, are a daily average of at least 5.0 mg/L and no less than 4.0 mg/L at all times (Section 3.3.2.1). The project releases already support the goal of 5.0 mg/L in the American Shad Habitat Plan, even though it is not a state water quality standard applicable to the Project. Georgia Power's DO monitoring in 2019-2020 shows that DO concentrations in the Lloyd Shoals tailrace did not drop below 5.0 mg/L for prolonged periods during the seasons associated with critical life stages of American Shad and many other organisms that spawn in the spring. Hourly tailrace DO readings during the 2019-2020 monitoring period equaled or exceeded 5.0 mg/L 97.8 percent of the time. Instantaneous values below 5.0 mg/L occurred between June and October, which were entirely or predominantly outside the spawning, hatching, and larval development life-stage periods for American Shad. In the Ocmulgee River, American Shad spawning occurs below Juliette Dam, located approximately 19 miles downstream of Lloyd Shoals Dam, from March to May and peaks in April (GDNR 2021). Eggs are broadcast into the water column, where they are carried downstream by currents and hatch in about 3 to 12 days, depending on water temperature, and newly hatched larvae also drift with the current (Weiss-Glanz et al. 1986). During the Lloyd Shoals tailrace monitoring in 2019-2020, daily average DO concentrations in April-May ranged between about 6.5 and 9.5 mg/L (Figure 5). Moreover, drifting eggs would be transported in currents downstream for several days before hatching, where DO concentrations would be further attenuated by natural aeration and tributary inflow.

### *Passive Draft Tube Aeration System License Articles*

Based on the analysis above, Georgia Power proposes two license articles pertaining to Lloyd Shoals tailrace DO enhancement and monitoring, as provided in Appendix F:

- Operation Monitoring of Dissolved Oxygen Enhancement System (Article 405), which incorporates use of the proposed operational procedure in Appendix C
- Verification Monitoring of Dissolved Oxygen Enhancement System (Article 406)

## **Cumulative Effects**

Georgia Power operates the Lloyd Shoals Project as a modified run-of-river facility. Reservoir elevations are generally maintained within a 3.0-ft range throughout the year and daily reservoir fluctuations are 2.0 ft or less the vast majority of days. By consistently operating Lake Jackson within a relatively narrow and highly predictable range of reservoir elevations, Lloyd Shoals operation also benefits the reservoir's sport fishery and designated Recreational use. Georgia Power's proposal to continue operating the Project with a continuous minimum flow release of 400 cfs, or inflow, whichever is less, would continue to protect and enhance downstream riverine habitat for fish and freshwater mussels, including three state protected aquatic species, and support the operation of public water supply intakes downstream of the Project to Macon. Releasing a continuous flow of 250 cfs when calculated inflow is less than 250 cfs would supplement stream flows for downstream uses, including aquatic life. In addition, Georgia Power's continued operation of the passive draft tube aeration system would continue to enhance summer DO concentrations in the tailrace area and benefit downstream water quality, fisheries, aquatic resources, and recreation opportunities.

For these reasons, continued operation of the Lloyd Shoals Project would have a highly beneficial cumulative effect on the Ocmulgee River in providing a popular sport fishery and recreation destination, as well as protecting the river's designated uses within the project reservoir and downstream of the Project in the free-flowing Ocmulgee River.

## **Unavoidable Adverse Impacts**

Construction of the proposed recreation enhancements (Section 3.3.6.2) would comply with applicable sediment and erosion control BMPs such that temporary water quality disturbance, if any, would be localized and minimal.

### **3.3.3 FISH AND AQUATIC RESOURCES**

#### **3.3.3.1 AFFECTED ENVIRONMENT**

The Lloyd Shoals Project is located in the upper Ocmulgee River basin within the larger Altamaha River basin. The Altamaha River basin drains south and east from the Project for 387 mainstem river miles to the Atlantic Ocean. Lake Jackson and its tributaries are located entirely within the Piedmont physiographic province. The upper Ocmulgee River basin principally supports warm-water fishes. The impounded waters of Lake Jackson dominate aquatic habitats

within the project boundary and support reservoir fisheries. Lloyd Shoals Dam discharges into the Ocmulgee River, which supports a riverine fishery downstream of the Project. The project boundary extends downstream of the dam approximately 0.4 mile to encompass Ocmulgee River Park on the east side of the river.

Juliette Dam, located about 19 river miles downstream of the Project, is the first dam encountered by diadromous and highly migratory fish migrating upstream from the Altamaha and lower Ocmulgee Rivers. Juliette Dam poses an impassable barrier to the upstream passage of all fish species except American Eel.

The upper Ocmulgee River basin upstream of Juliette Dam, which includes Lake Jackson, supports a diverse fish fauna consisting of about 60 species in 12 families (Table 5) (Straight et al. 2009). Lake Jackson supports over 30 species of fish. The principal sport fishes inhabiting the reservoir include Largemouth Bass, Spotted Bass, Bluegill, Black Crappie, Striped Bass, White Bass-Striped Bass hybrids (hybrid bass), Channel Catfish, Blue Catfish, and other sunfishes and catfishes (GDNR 2021a; Georgia Power 2020d). The South, Yellow, and Alcovy Rivers and Tussahaw Creek upstream of the Project support a total of about 47 species of fish. At least 60 species of fish are known to inhabit the Ocmulgee River and its tributaries downstream of the Project to Juliette Dam. Additional species occur downstream of Juliette Dam in the Ocmulgee River, including species associated with lower-gradient stream habitats of the Coastal Plain province.

No federally listed threatened or endangered fish species are known to occur within the Lloyd Shoals project boundary, in tributaries to Lake Jackson upstream of the Project, or in the Ocmulgee River downstream of the Project to Juliette Dam. Altamaha Shiner (*Cyprinella xaenura*), a Georgia threatened species, inhabits tributary systems upstream of Lake Jackson and is common in the Ocmulgee River downstream of the Project. The species is endemic to the Piedmont of the upper Altamaha River basin. Robust Redhorse (*Moxostoma robustum*), a Georgia endangered species, occurs in the mainstem Ocmulgee River downstream of the Project, having been stocked in 2002 and 2005 to establish a refugial population (see below).

About 12 fish species believed to be introduced (non-native) to the Ocmulgee River basin have been reported in the project vicinity (Table 5). Nine of these species occur in Lake Jackson and include Blue Catfish and Flathead Catfish, which have become part of the recreational fishery.

## **Lake Jackson**

Lake Jackson covers 4,750 acres and has 135 miles of shoreline (Figure 2). Bottom substrates vary from soft and silty to rocky, and include sand, sand with a top layer of silt, silt, silty mud with sticks and logs, and bedrock/boulders on sand and gravel (GDNR 2019).

Based on a shoreline survey of Lake Jackson conducted in August 2019 (Georgia Power 2020d), the most frequently observed sources of littoral zone fish cover, in descending order, were overhanging vegetation, docks/piers/boatslips, large woody debris, riprap, and bedrock/boulders. On the basis of proportional length, overhanging vegetation was the predominant source of shoreline fish cover, followed by riprap, large woody debris, and docks/piers/boatslips. Riprap was the predominant fish cover type by length in the Mainstem Reservoir, Tussahaw Creek, and Alcovy River sections of Lake Jackson, where residential lots are widespread and riprap is commonly used to stabilize shorelines. Overhanging vegetation was the predominant fish cover by length in the South River section, followed by large woody debris and emergent vegetation.

Lake Jackson supports a popular fishery for Largemouth Bass, Spotted Bass, Striped Bass and hybrid bass, Channel Catfish, Blue Catfish, Black Crappie, and other sunfishes (GDNR 2021a; Georgia Power 2020d). Tournament fishing is popular and primarily targets black bass, both Largemouth Bass and Spotted Bass. For the years 1996 to 2015, the average tournament bass weight ranged from 1.35 to 1.77 lbs (Georgia Bass Chapter Federation 1996-2015). The average largest bass reported in Lake Jackson tournaments ranged from 3.12 to 4.38 lbs.

WRD annually stocks Striped Bass and hybrid bass into Lake Jackson to provide an additional sportfish option. Current stocking rates are about 9 hybrid bass fingerlings and 5 Striped Bass fingerlings per acre. The annual stockings have produced the potential for a quality fishery. Striped Bass caught in Lake Jackson average about 4 to 5 lbs. Largemouth Bass have also been stocked in the past few years at rates of 8 to 83 fingerlings per acre.

WRD conducts annual standardized fisheries surveys of Lake Jackson to assess the sport fishery and make management decisions. Georgia Power's analysis of the WRD fishery database for the years 2000-2019, for the primary sport fish species targeted by the surveys, indicates an overall healthy and balanced sport-fish community typical of southeastern Piedmont reservoirs (Georgia Power 2020d).

## **Downstream Ocmulgee River**

The Ocmulgee River downstream of Lloyd Shoals Dam flows freely for about 19 miles to the pool created by Juliette Dam. Sport fishes in this reach include Largemouth Bass, Shoal Bass, Spotted Bass, Striped Bass, hybrid bass, Channel Catfish, Redbreast Sunfish, Bluegill, and Redear Sunfish (GDNR 2021a). Shoal Bass introduced into the upper Ocmulgee River from the Apalachicola River basin have spread throughout the Piedmont portion of the river. Striped Bass and hybrid bass stocked into Lake Jackson occasionally pass through the Lloyd Shoals turbines and add to the downstream fishery (GDNR 2021a). Introduced Flathead Catfish are also present in the river and pose a risk of direct predation and potentially negative population effects on some native fishes (Bart et al. 1994).

Fisheries investigations for the previous Lloyd Shoals relicensing in 1988 included quarterly backpack and boat electrofishing of the Ocmulgee River at four stations within a 27-mile reach (EA 1990b). Three stations were between Lloyd Shoals Dam and Juliette Dam, and one was downstream of Juliette Dam. The surveys documented the occurrence of 45 species. The top ten numerically abundant species across all stations, in descending order of abundance, were Redbreast Sunfish, Threadfin Shad, Ocmulgee Shiner, Altamaha Shiner, Bluegill, Spottail Shiner, Snail Bullhead, American Eel, Largemouth Bass, and Blackbanded Darter. These species comprised 86 percent of the total catch. Sport fish made up 43 percent of the total catch by number and 33 percent by weight.

Robust Redhorse, a state endangered, migratory riverine sucker species, also inhabits the Ocmulgee River downstream of Lloyd Shoals Dam. Through the Ocmulgee Candidate Conservation Agreement with Assurances for Robust Redhorse (Ocmulgee CCAA for Robust Redhorse), Georgia Power has participated in a multi-stakeholder partnership to advance conservation of the species in the Ocmulgee River downstream of the Project since 2002 (Georgia Power 2016). Studies funded by Georgia Power have documented the movements and habitat use of hatchery-reared Robust Redhorse stocked downstream of Lloyd Shoals Dam to establish a refugial population. Jennings and Shepard (2003) released and monitored fish via radio telemetry and found that tagged fish moved gradually downstream. Sixty-six percent of the fish remained in the reach upstream of Juliette Dam, while 34 percent moved downstream beyond the dam. Grabowski and Jennings (2009) released radio-tagged fish into the river below Lloyd Shoals Dam in 2006 and monitored their movements over the course of a year. The radio-

tagged fish exhibited an initial exploratory pattern of movement, mostly in the downstream direction, and consistently remained in the main channel associated with current, deep water, and woody debris. Two-thirds remained in the reach upstream of Juliette Dam; however, relatively few of the fish seemed to locate suitable spawning habitat and participate in spawning activities.

Surveys conducted in 2010-2011 showed that stocked Robust Redhorse had survived and were participating in spawning activities in the Lloyd Shoals tailrace, but evidence of successful recruitment was not confirmed (Georgia Power 2016). In 2014, WRD survey efforts in downstream reaches in the Coastal Plain resulted in the capture of a juvenile Robust Redhorse, indicating successful natural recruitment in the river. WRD collected, tagged, and released four adults from a shoal below Juliette Dam in May 2018 (GDNR 2018a).

Georgia Power is currently working with its partners, FWS Region 4 and WRD's Wildlife Conservation Section, to renew the Ocmulgee CCA for Robust Redhorse beyond its current term, which expires at the end of the current FERC license term in December 2023.

## **Freshwater Mollusks**

### *Mussels*

WRD conducted freshwater mussel surveys in Lake Jackson and the Ocmulgee River downstream to Juliette Dam in fall 2019 and summer 2020 under the Altamaha Mollusk Candidate Conservation Agreement (Altamaha Mollusk CCA)<sup>9</sup> (GDNR 2019, Rowe 2021). The surveys reported the occurrence of seven native freshwater mussel species and found a relict (dead) shell of an eighth species (Table 6). None of the species are federally listed as threatened or endangered but two of the species detected in Lake Jackson are state threatened in Georgia. The eight species include, in descending order of overall relative abundance:

- Altamaha Slabshell (*Elliptio hopetonensis*) – widespread and locally abundant in the Altamaha River basin, found in sand/mud and sand substrates (NatureServe 2021).
- Inflated Floater (*Pyganodon gibbosa*) – endemic to the Altamaha River basin, inhabits large rivers, oxbows, and reservoirs in sandy, silty, or muddy substrate (Rowe 2021).
- Paper Pondshell (*Utterbackia imbecillis*) – widely distributed from the Great Lakes and Mississippi River to Gulf Coast and Atlantic Coast; inhabits slow water of creeks, rivers, and reservoirs, usually in mud or sand (Williams et al. 2008).

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<sup>9</sup> The Altamaha Mollusk CCA is a collaborative and cooperative agreement between Georgia Power, GDNR WRD, and FWS to implement conservation measures for mollusk species in the Altamaha River basin, which includes the Ocmulgee River basin.

- Eastern Floater (*Pyganodon cataracta*) – wide ranging in Atlantic Coast drainages from the St. Lawrence River to the Altamaha River; occurs in a wide variety of habitats, usually in sand or mud with little or no current (Williams et al. 2008).
- Variable Spike (*Elliptio icterina*) – ranges along Atlantic Coast from North Carolina to northeast Florida; occurs in lakes, ponds, reservoirs, and streams with slight to moderate current (NatureServe 2021).
- Savannah Lilliput (*Toxolasma pullus*) – Georgia threatened; occurs in Atlantic Coast drainages from Georgia to North Carolina; inhabits very shallow water at the edges of streams, rivers, and lakes in mud or silty sand (Wisniewski 2018a, NatureServe 2021).
- Rayed Pink Fatmucket (*Lampsilis splendida*) – ranges in Atlantic Coast rivers from the Altamaha River north to the Cape Fear River in North Carolina; considered stable in the Altamaha River basin but uncommon in the Ocmulgee River (NatureServe 2021).
- Altamaha Arcmussel (*Alasmidonta arcula*) – Georgia threatened; range includes the Altamaha, Savannah, and Ogeechee River basins in Georgia; inhabits sloughs, oxbows, or depositional areas of large creeks, rivers, and reservoirs in silt, mud, or sand; primarily known from riverine habitats in the Coastal Plain physiographic province but recently collected in reservoir habitats of Lake Jackson and in the Ocmulgee River and Alcovy River in the Piedmont province (Wisniewski 2018b; Georgia Power 2017b, 2018).

The Lake Jackson surveys yielded live specimens of five native mussel species and one relict shell of Altamaha Arcmussel (Table 6). Altamaha Slabshell, Inflated Floater, and Paper Pondshell comprised 99 percent of all live mussels found. The single live specimen of Savannah Lilliput, a Georgia threatened species, was the first record of the species from Lake Jackson and the upper Ocmulgee River basin (GDNR 2019). Nearly all previous collection records have been from the Coastal Plain (GDNR 2021b). The relict shell of Altamaha Arcmussel was noteworthy in that the species, which was first reported from Lake Jackson in 2012, was not found in previous collection areas, indicating limited suitability of habitat in the reservoir (GDNR 2019, Rowe 2021). The species is primarily known from sandy riverine habitats in the Coastal Plain, farther downstream in the Altamaha River basin (Wisniewski 2018a).

Surveys in the Lloyd Shoals tailrace area yielded live specimens of six native mussel species (Table 6). The four most abundant species comprised 99 percent of all live mussels found; all four also occurred in Lake Jackson. The single specimen of Rayed Pink Fatmucket, relatively uncommon in the Ocmulgee River, was found in the shoal complex downstream of Georgia Hwy 16. Surveys conducted farther downstream of Hwy 16 to Juliette Dam yielded four native species, the same ones that were most abundant in the Lloyd Shoals tailrace area.

### *Reverse Pebblesnail*

The Alcovy River upstream of the Project supports the Reverse Pebblesnail (*Somatogyrus alcoviensis*), a rare aquatic snail not currently federally or state protected but under review for federal listing (see Section 3.3.5). The species is restricted to boulders, gravel, and vegetation in rapidly flowing water and is absent from silt substrates (NatureServe 2021). No suitable habitat for the species occurs within the project boundary. Under the Altamaha Mollusk CCA, WRD's plan to survey for the snail in the Alcovy River upstream of the Project in 2020 was postponed by high water levels during the months considered best for species identification (Rowe 2021). A survey date has yet to be determined.

### **Migratory Fishes**

The Lloyd Shoals Project is about 387 river miles upstream of the Atlantic Ocean and 43 river miles upstream of the Fall Line Hills District. Juliette Dam, located approximately 19 river miles downstream, and situated above the Fall Line, blocks diadromous<sup>10</sup> and other migratory riverine fishes, with the exception of American Eel, from migrating upstream into the project area.

Eight highly migratory and/or diadromous species seasonally inhabit portions of the Altamaha River basin, including six anadromous<sup>11</sup> species, one catadromous species<sup>12</sup>, and one migratory riverine species:

- Shortnose Sturgeon (*Acipenser brevirostrum*) – anadromous; federally endangered;
- Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) – anadromous; federally endangered;
- American Shad (*Alosa sapidissima*) – anadromous;
- Blueback Herring (*Alosa aestivalis*) – anadromous;
- Hickory Shad (*Alosa mediocris*) – anadromous;
- Striped Bass (*Morone saxatilis*) – anadromous or highly migratory;
- American Eel – catadromous; and
- Robust Redhorse – highly migratory riverine.

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<sup>10</sup> Diadromous species migrate between freshwater and marine/estuarine environments to complete their life cycles.

<sup>11</sup> Anadromous species migrate from marine/estuarine to freshwater environments to spawn.

<sup>12</sup> Catadromous species migrate from freshwater to marine environments to spawn.



Striped Bass, Robust Redhorse, and American Eel are the only species presently known to occur within or just downstream of the project boundary. Striped Bass occur in Lake Jackson and in the Ocmulgee River downstream to Juliette Dam as a result of WRD's stocking efforts in Lake Jackson. Some stocked fish occasionally pass through the turbines into the downstream river. There is no evidence from WRD annual fisheries surveys of Lake Jackson that Striped Bass successfully reproduce in the project area. Juliette Dam blocks the upstream migration of spawning runs from estuarine/ marine environments.

Robust Redhorse inhabits the Ocmulgee River downstream of the Project as a result of its reintroduction in 2002-2005 under the Ocmulgee CCAA for Robust Redhorse. Surveys in 2010-2011 showed that stocked redhorse had survived and were participating in spawning activities in the Lloyd Shoals tailrace area, but evidence of successful recruitment had not been confirmed in the reach of river upstream of Juliette Dam (Georgia Power 2016). The population extends downstream of Juliette Dam into the lower Ocmulgee River.

American Eels presently range upstream in the Ocmulgee River to Lloyd Shoals Dam, and there is also a relatively recent record of the species in Big Cotton Indian Creek, a tributary of the South River upstream of the Project<sup>13</sup> (GDNR 2021b). Young, upstream-migrant eels successfully navigate Juliette Dam. Eels were collected at all three stations between Lloyd Shoals Dam and Juliette Dam during the previous fisheries survey (EA 1990b). Georgia Power (2021b) conducted a study of American Eel Abundance and Upstream Movements in 2019-2021 and documented the continued presence of a healthy, stable population of American Eel in the tailrace area below Lloyd Shoals Dam (see below).

WRD experimentally stocked American Shad in Lake Jackson in 2016-2019 as part of basin-wide efforts to help conserve the Altamaha River stock (Atlantic States Marine Fisheries Commission [ASMFC] 2013). Historical evidence suggests the species formerly occurred upstream of the present-day Project (GDNR 2020b). The Priority Restoration and Management Actions Plan for American Shad in the Altamaha River Basin (GDNR, FWS, and NMFS 2013) provides a preliminary estimate of 398 acres of potential American Shad spawning habitat

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<sup>13</sup> It is unlikely that young eels ascend 100-ft-tall Lloyd Shoals Dam, although it is possible some could have followed flashboard leakage up the face of the dam before the Obermeyer gates were installed. Another more plausible explanation may be bait-bucket introduction upstream of the dam, as eels are often purchased or captured by recreational anglers as bait for larger sport fish such as Striped Bass (ASMFC 2017).

upstream of Lloyd Shoals Dam to the next obstruction or headwaters. However, this estimate is based on stream surface area without considering existing instream habitat and water quality conditions in the highly developed watershed upstream of the Project. Existing information characterizing sediment transport and contaminants (Section 3.3.1.1) and water quality (Section 3.3.2.1) in the Ocmulgee River basin upstream of the Project indicate that present-day hydrologic alteration, water quality impairments, and sedimentation from the highly developed, densely populated watershed have substantially modified riverine habitat conditions upstream of the Project compared to historical conditions. Downstream in the Ocmulgee River, American Shad migrate upstream as far as Juliette Dam and spawn in the river downstream of that dam.

The federally endangered Shortnose Sturgeon and Atlantic Sturgeon may seasonally inhabit the lower Ocmulgee River during spawning runs. NMFS designated critical habitat for Atlantic Sturgeon to include the Ocmulgee River upstream to Juliette Dam (National Oceanic and Atmospheric Administration 2017). However, neither sturgeon has been documented in recent years as far upstream as Juliette Dam (GDNR 2021b). A telemetry study of Atlantic Sturgeon movements in the Ocmulgee River documented the maximum extent of upriver migrations to a point about 98 river miles downstream of Juliette Dam (Ingram and Peterson 2016). Shortnose Sturgeon have been reported as occurring no farther upstream than the lower Ocmulgee River in the Coastal Plain, downstream of Macon (Straight et al. 2009).

Blueback Herring has been documented as occurring as far upstream in the Ocmulgee River as Juliette Dam, while Hickory Shad has been documented as migrating upstream no farther than the lower Ocmulgee River in the Coastal Plain (Straight et al. 2009).

### **State Protected Aquatic Species**

Georgia Power (2020d, 2020e) identified and evaluated federally and state protected species, and other species of conservation concern, with known records of occurrence in the project vicinity. No federally protected aquatic species are presently known to occur within the project boundary. Two aquatic species are under review for federal listing (Robust Redhorse [Georgia endangered] and Reverse Pebblesnail), as evaluated in Section 3.3.5 (Threatened and Endangered Species).

Five other Georgia protected aquatic species potentially occur in the project vicinity (Table 7). State protected species in Georgia are listed as endangered, threatened, rare, or unusual, in descending order of rarity. The six species are:

- Altamaha Arcmussel – Georgia threatened;
- Savannah Lilliput – Georgia threatened;
- Chattahoochee Crayfish (*Cambarus howardi*) – Georgia threatened;
- Altamaha Shiner – Georgia threatened; and
- Goldstripe Darter (*Etheostoma parvipinne*) – Georgia rare.

Four of the species – Altamaha Arcmussel, Savannah Lilliput, Altamaha Shiner, and Robust Redhorse – are presently known to occur within the project boundary or in the Ocmulgee River downstream of the Project (Georgia Power 2020d, 2020e).

Altamaha Arcmussel is known to occur in the Ocmulgee River downstream of Lloyd Shoals Dam, in Lake Jackson, and in the Alcovy River upstream of the Project (Wisniewski 2018a; Georgia Power 2017b, 2018). The 2019-2020 mussel surveys in Lake Jackson and the Lloyd Shoals tailrace area did not detect any live individuals of the species.

The reported occurrence of Savannah Lilliput in Lake Jackson in fall 2019 was the first record of the species from Lake Jackson and the upper Ocmulgee River basin in the Piedmont (GDNR 2019). The species' presence in Lake Jackson extends its known range about 235 miles upstream within the Altamaha River basin.

Altamaha Shiner occurs in tributary stream systems upstream of Lake Jackson and in the mainstem Ocmulgee River downstream of the Project (GDNR 2021b). Electrofishing surveys found the shiner to be among the most abundant species in the downstream riverine community, including the Lloyd Shoals tailrace area (EA 1990b). The species does not tolerate impounded conditions and is not known to reside in Lake Jackson.

Chattahoochee Crayfish and Goldstripe Darter are unlikely to occur within the project boundary (Georgia Power 2020e). Chattahoochee Crayfish is primarily known from the Chattahoochee River basin, where it inhabits clear, swift-flowing riffles in streams ranging in size from small creeks to the mainstem Chattahoochee River. There are no known records of the species in Lake Jackson or the Ocmulgee River downstream of the Project. Goldstripe Darter occupies spring-fed headwater creeks in the Coastal Plain and is not expected to occur within the project boundary.

### 3.3.3.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS

#### **Project Operations**

Georgia Power proposes to continue operating the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours. The Project would be operated to maintain the reservoir elevation between 527 and 530 ft PD, excluding periods of planned and emergency drawdowns. The Project would continue to release a continuous minimum flow of 400 cfs, or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. During low-flow periods when inflow falls below 250 cfs, the Project would release a continuous flow of 250 cfs into the river downstream to supplement stream flows for downstream uses.

#### *Lake Jackson*

Georgia Power's proposed operation would not adversely affect fish and aquatic resources in Lake Jackson because reservoir elevations would continue to be maintained between 530 and 527 ft PD year-round, excluding drawdowns and drought. Since installation of the Obermeyer gate system in 2012, the operators have the ability to incrementally adjust flows released from the spillway, which enhances control over the water levels in the reservoir during and following high-inflows periods by allowing plant discharges to closely match inflows to the Project. Annual WRD fishery survey data for Lake Jackson indicate an overall healthy and balanced fish community typical of southeastern Piedmont reservoirs, with no evidence of any changes in sport-fish population abundance or growth characteristics that may be related to operation of the Obermeyer gate system. In addition, recent and historic water quality monitoring data show that water temperature and DO concentrations within the upper layer of water (epilimnion) during conditions of summer vertical stratification in deeper areas of the reservoir remain within acceptable ranges for most of the resident sport fish species, as analyzed below.

During low-flow periods there would be a sustained drawdown of Lake Jackson as Georgia Power supplements river flows downstream with storage from Lake Jackson; however, there would typically be only minor daily elevation fluctuations because there would be diminished daily peaks in inflow during low-flow periods. During maintenance drawdowns, daily fluctuations would still occur, but at a lower elevation level. For both types of drawdowns, the lake elevation would be lowered slowly, at a rate of no more than 0.5 ft per day, to avoid or minimize stranding of fish and rare or state-protected mussel species in shallow coves. The

lowered elevations would occur during the drier months of drought years, usually from mid-summer to fall, after the spring and early summer spawning seasons of many resident sport fishes. The low-flow drawdowns would reduce the area of available littoral-zone habitat for the rearing of young fish. Continued low-flow operations in this manner would not be expected to result in significant adverse effects to fisheries resources in Lake Jackson.

#### *Downstream Riverine Habitat*

Operating the Project to provide a continuous minimum flow release of 400 cfs, or inflow, whichever is less, would continue to protect and enhance downstream riverine habitat for fish and freshwater mussels. An instream flow study conducted for the previous Lloyd Shoals relicensing applied an IFIM approach in modeling the relationship between stream flow and area of suitable habitat for fish species and life stages representing a range of riverine habitat use (EA 1990a; Georgia Power 2020d). The study was conducted in consultation with WRD and FWS. The study area extended from Lloyd Shoals Dam downstream about 17 river miles to the Georgia Hwy 83 bridge. Habitat suitability criteria were developed from site-specific studies of fish habitat use in the upper Ocmulgee River and the Chattooga River (Savannah River basin) for six species and multiple life stages of interest:

- Altamaha Shiner (juveniles and adults);
- Redeye Bass (young-of-year [YOY], juveniles, and adults);
- Shoal Bass (YOY and adults);
- Redbreast Sunfish (spawning and adults);
- Striped Jumprock (juveniles and adults); and
- Silver Redhorse<sup>14</sup> (adults).

Physical Habitat Simulation (PHABSIM) modeling integrated the results of hydraulic simulations over a range of flows and the habitat suitability criteria to produce discharge versus weighted usable area relationships for each species and life stage. Figure 8 shows discharge versus average percentage of maximum weighted usable area for all species and life stages combined. A matrix analysis was used to identify a minimum flow that would optimize habitat across multiple species and life stages (Table 8). The IFIM study results showed that a minimum

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<sup>14</sup> Previously considered a form of Silver Redhorse, this species in the Altamaha River basin now considered to be Notchlip Redhorse (Straight et al. 2009).

flow of 400 cfs provides an estimated 91 percent of the maximum weighted usable area on average for the spawning and non-spawning seasons combined (EA 1990a).

Available information indicates that the river channel in the IFIM study area has not changed appreciably in dimensions or stability over the past 30 years. A geomorphic analysis of stream-gage data for streams within the Piedmont physiographic province of Georgia conducted by USGS (Riley and Jacobson 2009) found that the Ocmulgee River near Jackson exhibited long-term channel stability. In addition, review of habitat mapping for the IFIM study revealed the study reach to be dominated by bedrock and gravel substrates, and inspection of aerial imagery spanning 1988-2019 detected little change to the river and adjacent floodplains since the IFIM study was conducted (Georgia Power 2020d). Hence, the habitat-discharge relationships from the IFIM study remain applicable for characterizing the effects of project operations.

Georgia Power's proposal to release a continuous flow of 250 cfs when calculated project inflow falls below 250 cfs would provide protection of downstream riverine habitat, and at a level greater than inflow during these periods. The matrix of IFIM study results shows that a flow of 250 cfs provides 87 percent of the maximum weighted usable area on average, while lower flows produce lower average habitat values (Table 8; Figure 8). Releases of 250 cfs would occur during low-flow periods, which would be most likely to occur in summer or fall, after the peak spawning and rearing seasons of most fishes in the Ocmulgee River. For the period 2001-2020, daily average discharge from the Project to the river downstream exceeded 250 cfs on 99 percent of the days.

#### *Draft Tube Aeration System to Enhance Summer DO*

Georgia Power's proposed continued operation of the existing passive draft tube aeration system on Units 2, 3, and 4 would continue to enhance summer DO concentrations in the tailrace area and benefit downstream water quality, fisheries, aquatic resources, and recreation opportunities by supporting applicable water quality standards. Habitat in the tailrace area would be enhanced for the fish community, including sport fishes, freshwater mussels, and other aquatic species by reducing the potential for chronic stress from low DO during the summer critical period, which otherwise could result in avoidance of the tailrace area and/or reduced feeding, growth, and survival. Water temperatures of the project releases would not be affected.

## **Summer Habitat for Sport Fishes in Lake Jackson**

Continued operation of the project in a modified run-or-river mode would not adversely affect summer habitat for sport fishes in Lake Jackson. Georgia Power (2020d) assessed the availability of suitable summer habitat for sport fish species, including Largemouth Bass and Striped Bass, using reservoir water quality data previously collected by Georgia Power, WRD standardized fisheries survey data for 2007-2019, and water temperature and DO preference criteria reported in the scientific literature. Based on analysis of vertical profile data for the warmest months of the year, most sport-fish species residing in Lake Jackson are capable of tolerating seasonally high water temperatures and occasionally lower DO levels in summer. Analysis of standardized fishery survey data for seven sport fish species and hybrid bass in Lake Jackson, including catch rates, relative condition, length-frequency distribution, and other statistics, indicate the presence of an overall healthy reservoir fishery (Georgia Power 2020d). Recent and historic seasonal vertical profile data show that summer water temperature and DO conditions remain within acceptable ranges for most of the resident sport fish species, with the exception of Striped Bass.

Habitat in Lake Jackson is generally suitable for Striped Bass with regard to water temperature and DO concentration through the fall, winter, and spring. However, during summer, naturally high water temperature in the surface waters and low DO concentrations in deeper waters where temperatures are cooler limit the availability of suitable habitat. Summer water temperatures exceeding 28°C (82°F) begin to exceed the thermal tolerance limit of adult Striped Bass.

Although juvenile Striped Bass have a higher thermal tolerance, up to 32°C (90°F), adult Striped Bass prefer temperatures around 25°C (77°F) or less and begin to experience mortality above 28 or 29°C (82-84°F) (Crance 1984; Coutant 1985, 2013). During summer vertical stratification, deeper portions of the water column (greater than 5-m depth) exhibit naturally lower DO concentrations below 4 mg/L. Summer temperature and DO profiles for Lake Jackson explain the limiting nature of habitat suitability for Striped Bass, as reflected in low catch rates and low relative condition of the population (Georgia Power 2020d). Hybrid bass on the other hand, which are stocked in Lake Jackson in larger numbers than Striped Bass, exhibit a wider tolerance range to temperature. Hybrid bass can tolerate temperatures up to 33°C (91°F), although optimal growth is between 25 and 27°C (77-81°F) (Hodson 1989).

In its comments on the PLP, FERC staff requested that Georgia Power provide a quantitative assessment of how water temperature and DO levels limit Striped Bass habitat in Lake Jackson.

Georgia Power compared average annual precipitation data to precipitation totals from the years 1992-2017 to classify each year as wet, average, or dry. These classifications were then applied to vertical lake profile data collected by Georgia Power from 1992-2017. The vertical profile data were then aggregated by season and examined to determine when suitable water temperature (less than 82° F/27.8° C) and DO (4 mg/L or higher) criteria were met.

Based on this analysis, there is suitable habitat in the entire reservoir during fall, winter,<sup>15</sup> and spring in wet, average, and dry years. In summer, 44 percent of the reservoir surface area contains suitable habitat in average and dry years and 85 percent contains suitable habitat during wet years. Areas of Lake Jackson with suitable summer habitat in average and dry years included the South/Yellow River embayment and the Alcovy River embayment. Areas of the reservoir with suitable summer habitat in wet years included all but the Tussahaw Creek embayment. Assuming a reservoir surface area of 4,750 acres, this equates to 2,080 acres of suitable habitat in the summer of average and dry years, and 4,035 acres in the summer of wet years. These estimates are based on surface area and do not take reservoir bathymetry into account; that is, the relationship of decreasing area with increasing depth in the reservoir.

### **State Protected Aquatic Species**

Georgia Power's proposed operation would not adversely affect any state protected aquatic species known to occur within the project boundary or downstream Ocmulgee River. Habitat availability for the mussels Savannah Lilliput and Altamaha Arcmussel in Lake Jackson would not be affected because reservoir levels would continue to be maintained between 530 and 527 ft PD year-round and daily fluctuations would continue to be 2.0 ft or less 99.8 percent of the time. Riverine habitats occupied by Altamaha Shiner, Robust Redhorse, and Altamaha Arcmussel downstream of the Project would not be adversely affected because the Project would continue to release a minimum flow of 400 cfs, or inflow, whichever is less, during normal operations. The IFIM study results indicate that a flow of 400 cfs optimizes habitat area for a range of riverine fish species and life stages, which included Altamaha Shiner and a representative sucker species

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<sup>15</sup> For this analysis, it should be noted that winter profile data were not available for one vertical profile station during a wet winter period; data was also not available for a dry winter period for two vertical profile stations. However, it is reasonable to assume that criteria were likely acceptable at these stations, as winter is not a critical period for DO and water temperatures would not be expected to exceed the high threshold during the cold months.



(Figure 8; Table 8). Riverine habitats would also be substantially protected by the proposed continuous release of 250 cfs when inflow falls below 250 cfs.

### **Fish Passage**

Georgia Power's continued operation of the Project as proposed would have little or no additional effect on upstream passage of highly migratory or diadromous fish species. The Project is located 387 river miles upstream of the Atlantic Ocean and 43 miles upstream of the Fall Line. Juliette Dam impedes the upstream migration of highly migratory and diadromous fish species into the project area from the lower Ocmulgee River with the exception of the catadromous American Eel (see below).

#### *Migratory Riverine Species and Anadromous Species*

Striped Bass and remaining American Shad stocked into Lake Jackson would continue to occasionally pass downstream through the Lloyd Shoals powerhouse into the Ocmulgee River, and most of these fish would be expected to survive turbine passage (see below). However, there have been no reports of either species successfully reproducing upstream of the Project as a result of the stocking programs. The refugial population of Robust Redhorse in the Ocmulgee River downstream of the Project has persisted since its re-introduction in 2002-2005 but evidence of successful natural recruitment has been lacking upstream of Juliette Dam. Although main-channel riverine habitats upstream of the Project have not been specifically assessed for spawning habitat suitability for Striped Bass, American Shad, or Robust Redhorse, high sediment loads and water quality impairments have modified these streams to a significant degree, and likely limit their habitat suitability for these species, compared to historical conditions.

Coastal runs of Shortnose Sturgeon, Atlantic Sturgeon, American Shad, Blueback Herring, Hickory Shad, and Striped Bass are all currently limited in the upstream extent of their natural migrations by Juliette Dam. However, even if they could pass upstream of Juliette Dam, there are no available studies assessing the potential spawning habitat suitability for these species in rivers upstream of the Project in the highly developed watersheds of the upper Ocmulgee River basin.

### *American Eel Abundance and Upstream Movements*

Georgia Power (2021b) conducted a two-year study of American Eel Abundance and Upstream Movements in 2019-2021 following the approved Study Plan, as amended, and in consultation with NMFS and FWS. The objectives of the study were to identify the life stage and size range of American Eel migrating to Lloyd Shoals Dam; identify the seasonal timing of upstream movements of eels to Lloyd Shoals Dam and evaluate any correlation with the environmental variables, water temperature, and percent of moon illumination; and calculate indices of abundance of eels migrating to the Project. The study area was the Ocmulgee River from Lloyd Shoals Dam downstream about 1.4 river miles to the shoal complex just downstream of the Georgia Hwy 16 bridge (Figure 2).

Eel sampling was conducted monthly from September 2019 through June 2021, with a few exceptions due to high river flow, COVID-19 restrictions, and vandalism of traps (Georgia Power 2021b). Sampling methods included daytime backpack electrofishing, daytime and nighttime boat electrofishing, overnight trapping using baited traps and a ramp trap, and nighttime flashlight surveys to detect eels migrating to the base of the dam. All captured eels greater than 250 millimeters (mm) total length were implanted with passive integrated responder tags and released to the study area as part of a mark-recapture procedure to estimate the population size of American Eel in the study area.

A total of 259 American Eels were captured or observed by all methods during the study and 109 individuals were tagged (Table 9). Of the 148 American Eels captured during the study, 84 percent were caught via backpack electrofishing, 15 percent via boat electrofishing, and 1 percent via trapping. There were no correlations between eel catch and water temperature, discharge, or moon illumination, although this was likely affected by reduced electrofishing accessibility at higher river flows. The captured eels ranged in length from 127 to 635 mm and included juveniles and adults ranging in age up to 9+ years (Table 10). Based on five recaptures, the Schnabel index yielded a population estimate of 1,398 American Eels in the study area, with upper and lower 95-percent confidence limits of 3,548 and 625, respectively.

The electrofishing catch data indicated that eels were most abundant or active below Lloyd Shoals Dam from April to July (Table 9 and Table 10). Seasonal trends in abundance were similar to the previous relicensing study in 1988 using similar methods (EA 1990b). In both

studies, the majority of eels were captured by backpack electrofishing, with catch rates highest in May or June. Backpack electrofishing catch rates, although slightly higher in the previous study, were hampered in spring 2020 by high flows and increased markedly in the second year after the study area was extended downstream to the shoals below Hwy 16. Habitats were more accessible to backpack methods in the shoals, and this was the same area where backpack electrofishing was conducted in the previous study. Boat electrofishing catch rates were slightly higher in the current study.

A total of 38 eels were detected in flashlight surveys in pools at the base of the spillway in the months December and March-July; most were observed in April-June. They were young eels ranging in length from about 130 to 250 mm, and the vast majority were encountered in the eastern-most pools along the base of the spillway.

The results of the American Eel Abundance and Upstream Movements Study demonstrate the continuing presence of a stable and healthy population of American Eel downstream of Lloyd Shoals Dam over decades, as indicated by the similarity in seasonal catch rates and size ranges representing multiple age classes between the 1988 and 2019-2021 studies (Georgia Power 2021b; EA 1990b). American Eel occupies a large range in the Altamaha River basin, with upstream migrant eels having access to 137 miles of the Altamaha River, 250 miles of the Ocmulgee River, and 143 miles of the Oconee River, for a total of 530 miles of mainstem-river migratory pathways. Numerous tributaries to these rivers are inhabited by American Eel based on collections documented within the past two decades by WRD (GDNR 2021b), indicating the ongoing success of the population in utilizing a large area of available habitat.

The Altamaha River currently has more watershed area potentially available to American Eels than any other Atlantic Coast river in Georgia and the Carolinas. The watershed area potentially available to American Eels in the Altamaha River basin before the first mainstem barriers to upstream migration (Lloyd Shoals Dam on the Ocmulgee River and Sinclair Dam on the Oconee River) totals about 10,113 sq mi. This watershed area is over twice the watershed area potentially available to American Eels in any other Georgia coastal river (Table 9). In addition, this watershed area before the first barrier is greater than that in the eight largest coastal rivers in South Carolina and North Carolina, over twice the watershed area in six of these basins.

The vast majority of available potential habitat for American Eels in the Altamaha River basin is located downstream of Lloyd Shoals Dam. The watershed area upstream of Lloyd Shoals Dam represents only 10 percent of the total watershed area of the Altamaha River basin, and many miles of these streams are impaired by fecal coliform bacteria, sediment, and legacy PCBs attributed to urban runoff and nonpoint sources in southeastern metropolitan Atlanta. Within the Metro Water District upstream of the Project, 406 stream miles or 80 percent of the 506 stream miles assessed in the upper Ocmulgee River basin are not supporting their designated uses for one or more parameters (CH2M and Black & Veatch 2017) (see Section 3.3.1).

In summary, the Ocmulgee River downstream of Lloyd Shoals Dam supports a stable and healthy population of American Eel, the currently available watershed area in the Altamaha River basin for the species is substantially larger than most other southeastern coastal rivers, and many miles of streams upstream of the Project are impaired by urban stressors and may not be habitable by American Eels. In addition, there is no indication from available studies or data that the area of habitat available to American Eels downstream of the Project is limiting the growth, survival, maturation, or outmigration (for spawning) of the Altamaha River basin population.

### **Fish Entrainment and Turbine-Induced Mortality**

Fish approaching the powerhouse intake in Lake Jackson during generation may become entrained and subjected to the risks of turbine-induced injury or mortality. Georgia Power (2020d) analyzed the potential for fish entrainment and turbine-induced mortality at the Lloyd Shoals Project using an approved desktop approach, drawing upon the entrainment field studies completed at numerous other hydroelectric projects.

Common trends and data from other studied hydroelectric sites, including several in Atlantic Coast drainages of South Carolina and Georgia, indicate that small and/or young fish likely comprise the majority of fish entrained by the Lloyd Shoals Project. Entrainment is likely to be numerically dominated by species of sunfishes, shads, catfishes, minnows, perch, and suckers (Georgia Power 2020d). Peak entrainment rates likely occur in spring and summer for most species, when young fish are most abundant and tend to be dispersing between habitats. A substantial portion of entrainment likely consists of juvenile sport-fishes, but Largemouth Bass, Striped Bass, and Hybrid Bass probably represent relatively small proportions of entrainment.

The vast majority of entrained fish are small and likely to survive turbine passage. Trends in turbine passage survival at numerous studied hydroelectric sites predict average immediate survival rates at Lloyd Shoals on the order of 86 percent for small fish and 82 percent for moderate-sized and large fish (Georgia Power 2020d). Based on extrapolating monthly entrainment rates from a representative site on an Atlantic Coast river in the Piedmont of South Carolina (Ninety-Nine Islands) to Lloyd Shoals monthly generation data, total annual entrainment at Lloyd Shoals is estimated to be on the order of 130,377 fish, and total annual entrainment mortality is estimated to be about 19,577 fish (Georgia Power 2020d).

WRD annually expends resources stocking Striped Bass and hybrid bass fingerlings into Lake Jackson. Fingerlings and small juveniles may be the size classes of Striped Bass and hybrid bass most susceptible to entrainment at Lloyd Shoals because young fish are likely to school in open waters and may exhibit downstream migratory behavior. They become vulnerable to entrainment as they approach the dam; however, because of their small body size, the vast majority would be expected to survive turbine passage into the downstream river. Adult Striped Bass and hybrid bass, while large and potentially subject to higher turbine mortality rates if entrained, are facultative in their downstream migratory behavior and may be less inclined to migrate downstream, as evidenced by low numbers of Striped Bass in entrainment samples at other sites. Moreover, adult Striped Bass have strong swimming capabilities and would be much more capable of escaping intake velocities.

WRD recently began stocking American Shad in Lake Jackson as part of basin-wide efforts to help conserve the Altamaha River stock. Although successful natural reproduction of American Shad may not occur upstream of Lake Jackson, turbine-passage survival of stocked fish could contribute to the downstream population in the Ocmulgee River. Survival tests with American Shad at sites with Francis turbines are limited, but the available testing suggests that a majority of American Shad entrained at Lloyd Shoals would survive turbine passage into the downstream river (Georgia Power 2020d).

Overall, Lake Jackson supports a healthy fishery and evidence is lacking to suggest that current levels of fish entrainment and turbine-induced mortality may be adversely affecting the fish community of the Ocmulgee River. Continued operation of the Lloyd Shoals Project is likely to result in only minor impacts to fish populations and recreational fishing opportunities as a result of entrainment and turbine-induced mortality.

## **Cumulative Effects**

Continued operation of the Lloyd Shoals Project would likely contribute to cumulative effects on fisheries and aquatic resources to a relatively small extent due to the Project's location and physical attributes. The project dam is located upstream of the Fall Line Hills District that posed a natural obstacle to the upstream migration of some diadromous and other migratory fishes. The Fall Line area delimits the historic distribution of many species or life stages of fish and mussels preferring either upland Piedmont or lowland Coastal Plain habitats. Juliette Dam would continue to limit upstream fish migration irrespective of the continued operation of the Project.

Georgia Power's proposal to continue providing a continuous minimum flow release of 400 cfs, or inflow, whichever is less, and to supplement flows with a release of 250 cfs when inflow falls below 250 cfs would continue to protect and enhance fish and aquatic resources in the Ocmulgee River downstream, including native species of riverine fish and mussels. The Ocmulgee River downstream supports a refugial population of Georgia endangered Robust Redhorse and also provides habitat for the Georgia threatened Altamaha Shiner and Altamaha Arcmussel.

The cumulative effects of Georgia Power's licensing proposal on diadromous fish migrations would be minor. There are no fish passage facilities at Juliette Dam, although young American Eels are able to ascend the dam. The Ocmulgee River downstream of Lloyd Shoals Dam would continue to support a healthy population of American Eel having access to a large watershed area as potentially suitable habitat downstream in the river basin. The Striped Bass and American Shad stocked in Lake Jackson would continue to support restoration efforts for each species, although neither species would be expected to establish reproducing populations upstream of the Project for lack of sufficient length of free-flowing river upstream for drifting early life stages.

Cumulative entrainment mortality effects for the fish species inhabiting the Ocmulgee River are likely to be relatively minor. Only a small proportion of the fish entrained during generation would likely be killed by turbine passage, and the losses of these mostly small and young fish would be of minor significance to the existing fisheries resources. Moreover, Lake Jackson sustains a healthy and highly popular recreational fishery that would not exist without the Project. In this regard, the Project contributes beneficially to cumulative effects in the Ocmulgee River basin. These benefits far outweigh the mostly minor effects of entrainment mortality.

## **Unavoidable Adverse Impacts**

Unavoidable fish losses resulting from entrainment mortality would continue to occur with continued project operation. These losses, however, would not significantly affect fish populations and recreational fishing opportunities in the Ocmulgee River.

### **3.3.4 TERRESTRIAL RESOURCES**

#### **3.3.4.1 AFFECTED ENVIRONMENT**

Georgia Power (2020f) conducted a terrestrial resources study to describe terrestrial wildlife and botanical resources occurring in the project area that use representative upland habitats and to describe floodplain, wetlands, and riparian habitats occurring in the project area. Field reconnaissance surveys were conducted in August 2019 and February and April 2020 to observe representative terrestrial communities and associated wildlife habitat, to characterize wetland, riparian, and littoral habitats, and to search potentially suitable habitat for rare, threatened, and endangered (RTE) species of plants and wildlife. The survey areas included the project recreation facilities.

#### **Terrestrial Vegetative Communities**

The dominant terrestrial vegetative community type in the project area<sup>16</sup> is mixed pine-hardwood forest, which covers about 52 percent of the lands within project area (excluding Lake Jackson and other open water) (Georgia Power 2020f). Developed land (anthropogenic disturbances) covers 21 percent of the project area, pine forest/pine plantation covers 9 percent, and deciduous/mesic slope forest covers 9 percent. The remaining terrestrial habitats in the project area include clear-cut/sparse lands, agriculture/row crop, utility easement, floodplain and riparian forest, dry oak/ pine forest, as well as forested, scrub-shrub, and emergent wetland types.

Developed land (anthropogenic disturbances) is the most common community type within the project boundary, covering about 30 percent of the project lands (excluding Lake Jackson and other open water) (Georgia Power 2020f). These lands include residential areas, project recreation facilities, marinas, and the project works. Many of these areas are landscaped and maintained by mowing and other vegetative control measures. Flora include native canopy

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<sup>16</sup> For the purposes of the Terrestrial Resources Study, the project area (or study area) was defined to include a zone extending 2,000 ft beyond the project boundary to encompass a conservatively large area for characterizing the existing environment.

species intermixed with horticultural varieties of trees and shrubs, and lawns of common turfgrasses. Invasive species are common in this community type.

Mixed pine-hardwood forest occupies about 27 percent of the lands within the project boundary. This community type is distributed across uplands that are not developed or cleared. The canopy is dominated by Loblolly Pine, Mockernut Hickory and Pignut Hickory, Southern Red Oak, Water Oak, Sweetgum, and Tulip Poplar. Midstory species include Blackgum, Flowering Dogwood, maple species, Persimmon, Eastern Redbud, Eastern Red Cedar, American Holly, hawthorn species, Sparkleberry, Elliott's Blueberry, Wild Indigo, Winged Elm, and Black Cherry. Dominant herbaceous species include Christmas Fern, woodoats species, Partridge Berry, violet species, Pipsissewa, Trumpet Creeper, and greenbriers.

Deciduous/Mesic Slope Forest occurs in scattered locations along steeper slopes above floodplains or riparian corridors and occupies about 21 percent of the lands within the project boundary. Canopy vegetation includes American Beech, Southern Magnolia, Northern Red Oak, Southern Red Oak, White Oak, Shagbark Hickory, Mockernut Hickory, Blackgum, Tulip Poplar, and Sweetgum. Subcanopy species include Southern Sugar Maple, Sourwood, Red Maple, Red Mulberry, Elm, Ironwood, Hop Hornbeam, and American Holly. Herbaceous vegetation is generally sparse but includes Pipsissewa, Poison Ivy, and Muscadine.

Floodplain and riparian forest occur along streams and rivers, occupying about 9 percent of lands within the project boundary. This vegetative community is associated with streams and rivers, with alluvial soils/sediment deposition, periodic flooding, and mesic conditions influencing the species composition. Canopy species include Sweetgum, American Sycamore, Sugarberry, Red Maple, River Birch, Black Willow, Box Elder, Green Ash, and Water Oak, and scattered occurrences of Loblolly Pine and Cherrybark Oak. Midstory species include Ironwood, Hop Hornbeam, and American Holly. Herbaceous vegetation includes various greenbriers, Christmas Fern, violets, False Nettle, and Butterweed.

Pine plantations and pine forests occupy only 1 percent of the land within the project boundary but occupy 9 percent within 2,000 ft of the project boundary. This community type is dominated by Loblolly Pine in the overstory, with scattered occurrences of Shortleaf Pine, Slash Pine, and Longleaf Pine, and various oaks, hickories, Sweetgum, and Tulip Poplar in the sparse understory.



Utility easements, dry oak/pine forest, and agriculture/row crop communities together comprise about 0.5 percent of the land within the project boundary.

### **Vegetated Wetlands and Aquatic Plants**

Forested, herbaceous/emergent, and scrub-shrub wetlands cover approximately 79 acres, or 12 percent, of the lands within the project boundary (Georgia Power 2020f).

Emergent/herbaceous wetlands and forested wetlands are the dominant vegetated wetland types, occupying 35.2 and 33.2 acres, respectively. Scrub-shrub wetlands occupy 10.2 acres.

Emergent/herbaceous wetlands occur in scattered areas around Lake Jackson, particularly in shallow coves and where sediment deposits have formed shallow flats in the upper reaches of tributary embayments. Additional locations include seasonal to permanently flooded wetlands formed from beaver activity. Common vegetation in these areas include Knotweed, Rice Cutgrass, Lizard's Tail, Water Primrose, False Nettle, Joe Pye Weed, Maidencane, Rosemallow, sedges, and Soft Rush.

Forested wetlands are found in poorly drained areas within floodplains, riparian corridors, long the edges of Lake Jackson, and in other locations with sufficient hydrology and hydric soils. Forested wetlands are most common along the rivers and tributaries to Lake Jackson and also occur near confluences of tributaries and the reservoir. Dominant canopy vegetation includes Green Ash, Blackgum, Tupelo, Red Maple, Box Elder, and American Sycamore. Midstory species include Switchcane, Black Willow, Buttonbush, Wax Myrtle, Alder, Virginia Willow, Silky Dogwood, and Ironwood. Herbaceous vegetation includes Netted Chainfern, Sensitive Fern, Cardinal Flower, Bulrush, and various sedges.

Scrub-shrub wetlands occur in seasonally inundated areas between forested wetlands and emergent wetlands or open water. The majority occur along rivers and large creeks in the upstream portions of Lake Jackson. Dominant early successional and scrub-shrub vegetation includes Buttonbush, Alder, Silky Dogwood, and Black Willow. Other common species include immature Box Elder, Marshpepper, and Swamp Knotweed, sedges, and rushes.

Georgia Power's field reconnaissance survey of wetland and riparian resources did not identify any significant areas of submergent/submersed aquatic vegetation in Lake Jackson. Aquatic plants previously documented in Lake Jackson have included Alligatorweed, with duckweeds

intermixed, and Floating Primrose-willow, primarily along the South and Yellow Rivers in the South River embayment (Georgia Power 2020f; Gaddy 1989). There has been no evidence to date of the occurrence of Hydrilla, a highly invasive exotic aquatic plant species, in the reservoir.

### **Exotic Invasive Plant Species**

Scattered occurrences of terrestrial exotic invasive plant species are present throughout the project boundary (Georgia Power 2020f). Field investigators identified 11 species within the project boundary and 16 within the larger study area. Several of these are introduced species commonly used as landscape plants within established lawns and maintained landscapes on residential lots surrounding Lake Jackson. Most observations were limited to small areas where populations did not exceed 10 percent coverage of a particular area. Three invasive species, Autumn Olive, Chinese Privet, and Japanese Honeysuckle, were observed exceeding 10 percent coverage within project operation and project recreation facilities. Chinese privet and Japanese Honeysuckle occur together in the project operations area between Dam Road and the access road leading to the Tailrace Fishing Pier. An isolated patch of Autumn Olive was observed in Ocmulgee River Park between the boat launch road and the Ocmulgee River.

Mimosa was observed in scattered locations along the shoreline but rarely was found in clusters that dominated the midstory stratum (Georgia Power 2020f). Giant Reed was observed in isolated locations near residential homes (potentially escaped) on shaded slopes within upland coves. Lespedeza was primarily observed near roadsides, such as the road providing access to Lloyd Shoals Park. Although present, this species did not dominate the herbaceous layer where found. Scattered populations of Chinese Privet were observed along the shoreline. Despite this species' tendency to aggressively invade a variety of habitats, only small clusters or single occurrences were observed within the project boundary. Japanese Honeysuckle is also known to aggressively displace native vegetation; however, observations of this species were limited to occasional individuals in forested areas.

Georgia Power monitors the occurrence of, and periodically treats, invasive terrestrial and aquatic plants within the project boundary. Visual observations are made by shoreline management specialists during their routine reservoir inspections. Depending on the plant species and conditions observed, licensed herbicide specialists have chemically treated small areas within the project boundary to manage nuisance conditions or help prevent further

infestation, as warranted. Taxa identified for treatment have included the cyanobacteria *Lyngbya* spp., and the aquatic plants Alligatorweed and Floating Primrose-willow. Alligatorweed can pose serious problems by extensively invading native plant communities and displacing native species (Georgia Exotic Pest Plant Council 2018).

In recent years, herbicide treatments in Lake Jackson have been infrequent and limited in total area from 2.0 to 8.5 acres. Five treatments between 2012 and 2016 targeted invasive species, including Alligatorweed and Floating Primrose-willow. All but one of these treatments were along shorelines and in shallow coves in the South River embayment. One treatment occurred at the head of a small cove on the east side of the reservoir in Jasper County.

Georgia Power administers a shoreline residential aquatic vegetation management program through its Lake Jackson website (<http://georgiapowerlakes.com/lakejackson/>). This program allows property owners to apply for an Individual Aquatic Herbicide Treatment Permit for controlling aquatic nuisance vegetation near their lake lots. If approved by Georgia Power, the permit allows the homeowner to contract the work using a Georgia state-certified aquatic pesticide commercial applicator.

### **Georgia Power Pollinator Habitat Conservation Practices**

In 2019, Georgia Power implemented a pollinator habitat management plan at the Lloyd Shoals Project that included replacing the landscaping at the office building entranceway (next to Lloyd Shoals Park) and planting native meadow mixes in the office front yard and along each side of Dam Road in areas that had previously been part of the standard vegetation management mowing regime for turfgrass areas. This effort is certified as a Connect to Protect pollinator garden by the Georgia Botanical Garden. All of these plantings feature native milkweeds to benefit Monarch Butterflies (see Section 3.3.5.1, Candidate Species). Georgia Power also removed invasive exotic vegetation, such as Chinese and Japanese privet, conducted a prescribed burn, and installed blueberry bushes at the recreation area to benefit native bees and to provide food for people and wildlife.

Georgia Power widely engages in pollinator habitat management, with particular attention to Monarch Butterflies, on project lands and rights-of-way. Georgia Power has partnered with FWS, National Park Service, Chattahoochee Nature Center, Blue Heron Nature Center,

Environment Sandy Springs, National Wild Turkey Federation, and WRD on pollinator habitat projects in Georgia. With the Electric Power Research Institute, Georgia Power is investigating best practices for establishing native pollinator habitat within photo-voltaic generation construction, and with the University of Georgia, is researching methods for identifying and mapping best opportunities for managing existing meadow habitat diversity on transmission rights-of-way. Additionally, Georgia Power is working with the Natural Resources Conservation Service and a private consulting company to identify best practices for establishing and managing native pollinator habitat on rights-of-way and at new construction sites. The company has been active with the Georgia Plant Conservation Alliance, a consortium of state and federal natural resource conservation agencies, non-governmental organizations, botanic gardens, research facilities, and private individuals, since its inception more than 20 years ago.

### **Wildlife Resources**

The Lloyd Shoals project area provides habitat for a diverse wildlife community. Total species richness observed for wildlife within the study area was 92, with eight mammal species, 70 birds, eight amphibians, and six reptiles (Georgia Power 2020f). The mammals most commonly observed included White-tailed Deer and Eastern Gray Squirrel. Other species included Coyote, Eastern Chipmunk, Nine-banded Armadillo, American Beaver, Raccoon, and Virginia Opossum. Other mammal species not observed but expected to occur in the ecoregion include: Southern Flying Squirrel, Northern River Otter, Least Shrew, Bobcat, Striped Skunk, Woodland Vole, Long-tailed Weasel, Eastern Woodrat, American Mink, Golden Mouse, Common Muskrat, Marsh Rice Rat, Deermouse, Eastern Harvest Mouse, Eastern Mole, Eastern Fox Squirrel, Hispid Cotton Rat, Southeastern Shrew, Swamp Rabbit, Eastern Cottontail, Gray Fox, Red Fox, and several species of bats.

Amphibian and reptile species were observed during field surveys in a variety of habitats, including mixed pine/ hardwood, floodplain and riparian forests, wetlands, and mesic slope forests (Georgia Power 2020f). Amphibians observed included Bird-voiced Treefrog, Cope's Gray Treefrog, a cricket frog, Green Frog, Southern Leopard Frog, Spring Peeper, Upland Chorus Frog, and an unidentified salamander (Plethodontidae). Reptiles observed included Eastern Box Turtle, Five-linked Skink, Green Anole, Ground Skink, Plain-bellied watersnake, and Yellow-bellied Slider.

A wide variety of birds use diverse wetland, upland, and open-water habitats in the project area, including neotropical migrant songbirds, raptors, waterfowl, and shorebirds (Georgia Power 2018). Field investigators identified 70 bird species during the field surveys (Georgia Power 2020f). Common species included Eastern Phoebe, Carolina Wren, American Crow, Fish Crow, Tufted Titmouse, Turkey Vulture, Eastern Blue Jay, and American Robin. Raptors included Bald Eagle, Osprey, Red-tailed Hawk, Red-shouldered Hawk, and American Kestrel. Although populations are increasing, Bald Eagle remains protected under the Bald and Golden Eagle Protection Act and is considered a high-priority species under the Georgia State Wildlife Action Plan (GDNR 2015). Osprey also depends on large bodies of water and healthy fisheries to flourish and has been observed nesting at Lloyd Shoals Dam.

Waterfowl observed in the Lloyd Shoals project boundary included Mallard, Canada Goose, Wood Duck, and Muscovy Duck (Georgia Power 2020f). Wading bird observations included Great Blue Heron and Black-crowned Night Heron. No wading bird rookeries were observed during the course of the field surveys.

### **State Protected Plant Species**

Georgia Power (2020e, 2020f) identified and evaluated federally and state protected species, and other species of conservation concern, with known records of occurrence in the project vicinity. Four federally threatened and endangered plant species, and one plant species under review for federal listing, potentially occur within the project vicinity, as evaluated in Section 3.3.5 (Threatened and Endangered Species). However, none of the species are presently known to occur within the Lloyd Shoals project boundary.

Four other Georgia protected plant species potentially occur in the project vicinity (Georgia Power 2020e). State protected species in Georgia are listed as endangered, threatened, rare, or unusual, in descending order of rarity. The four species are:

- Oglethorpe Oak (*Quercus oglethorpensis*) – Georgia threatened; grows up to 80 ft tall and inhabits wet, clayey soils, particularly along seepages, stream terraces, and moist hardwood forests (Chafin 2007, 2020a).
- Granite Stonecrop (*Sedum pusillum*) – Georgia threatened; an annual herb with succulent stems that inhabits Piedmont granite outcrops (Chafin 2007, 2020b)

- Mountain Catchfly (*Silene ovata*) – Georgia rare; a tall perennial herb that occurs in rich, deciduous forests over limestone or amphibolite in the Coastal Plain and in Fall Line ravines (Chafin 2007, 2020c).
- Silky Camelia (*Stewartia malacodendron*) – Georgia rare; a shrub or small tree that inhabits rich ravine and slope forests and lower slopes of sandhills above bogs and creek swamps (Chafin 2007, 2020d).

None of these Georgia protected plant species were observed within the project boundary during the field reconnaissance surveys (Georgia Power 2020f) (Table 7). Only marginally suitable habitat was identified for Oglethorpe Oak, no granite outcrops were encountered for Granite Stonecrop, and no potentially suitable habitat was encountered for Mountain Catchfly or Silky Camelia.

### **State Protected Wildlife Species**

One federally endangered terrestrial wildlife species, the Red-cockaded Woodpecker (*Dryobates borealis*, formerly genus *Picoides*), is known to occur in the project vicinity. It is evaluated in Section 3.3.5 (Threatened and Endangered Species).

Two other Georgia protected terrestrial wildlife species occur or potentially occur in the project vicinity (Table 7) (Georgia Power 2020e):

- Bald Eagle (*Haliaeetus leucocephalus*) – Georgia threatened; eagles currently reside year-round within the project area and there is one known nesting territory on Lake Jackson. The original nest site on Georgia Power land within the project boundary was used for several years. In 2020, the eagle pair established a new nest site nearby on the property of another landowner outside of the project boundary. WRD reported two eaglets in the nest in March 2020. One eagle was observed in flight over Lake Jackson during the field surveys in 2019 (Georgia Power 2020f).
- Southern Hognose Snake (*Heterodon simus*) – Georgia threatened; primarily found in the Coastal Plain and most often associated with well-drained, xeric, sandy soils where longleaf pine and/or scrub oaks are the characteristic woody vegetation and wiregrass is a significant component of the groundcover (Jensen 2018). Such habitats are fire-maintained. A single specimen from near Lake Jackson represents the only Piedmont record of the species in Georgia; however, this occurrence is historical, and the species may be extirpated from the area (Jensen 2018). The Southern Hognose Snake is unlikely to occur within the Lloyd Shoals project boundary, as no suitable habitat for the species was observed during the field surveys (Georgia Power 2020f).

## **Avian Protection Program**

Georgia Power implements an Avian Protection Program (APP) in accordance with an agreement between the FWS, Edison Electric Institute, and Avian Power Line Interaction Committee. The APP specifies procedures to be followed by all Georgia Power employees to maintain compliance with the Migratory Bird Treaty Act (MBTA), the Bald and Golden Eagle Protection Act (BGEPA), and the Endangered Species Act, as it applies to avian species. The APP establishes a company policy of not disturbing wildlife and includes guidance pertaining to: (1) active nests; (2) injured birds; (3) handling live or dead birds or their nests only in accordance with permits issued by FWS; (4) not disturbing live or dead birds, or nests of threatened and endangered avian species; (5) appropriate remedial actions for avian interactions; (6) reporting to Georgia Power Environmental and Natural Resources (ENR) any protected, threatened, endangered, or migratory species (including eggs or chicks) suspected to be in an area that company operations will impact; and (7) reporting immediately to ENR any woodpecker nest cavities found in live pine trees that are subject to company operations.

In addition, Georgia Power's Forestry Policy Manual covers the protection and management of RTE species. With respect to Bald Eagles, Georgia Power forest managers communicate regularly with ENR and WRD personnel regarding eagle nest locations on Georgia Power lands within and adjacent to the Lloyd Shoals project boundary. Georgia Power conducts an annual mid-winter eagle survey at Lake Jackson each January. WRD conducts monitoring of Bald Eagles at Lake Jackson every other year as part of its statewide monitoring program. Georgia Power forest managers and ENR biologists document any sightings of new potential Bald Eagle nests and coordinate those through ENR biologists, who check their records and contact WRD for confirmation as appropriate.

### **3.3.4.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

#### **Bald Eagle**

Although no longer federally listed as a threatened species, Bald Eagle remains protected under the MBTA and BGEPA. To conserve and protect habitat for Bald eagles within the project boundary in compliance with these laws, Georgia Power would continue to implement its existing APP and Forestry Policy Manual. Because nesting Bald Eagles are known to occur within the project boundary, protection and management activities would continue to be focused on land management activities that avoid disturbance to active nest sites. Under the APP,

Georgia Power implements current FWS national guidance (FWS 2007) pertaining to prescribed distance buffers, natural or landscape buffers, and activity-specific guidelines where applicable. In addition, Georgia Power natural resource specialists would continue to communicate regularly with WRD personnel regarding eagle nest locations within and adjacent to the project boundary and cooperate with WRD's annual monitoring of Bald Eagles at Lake Jackson.

### **Exotic Invasive Plant Species**

Observed occurrences of invasive plant species were limited across the majority of the study area. Most occurrences were observed in the southern portion of Lake Jackson and associated with residential landscaping. Elsewhere, scattered colonies of bamboo, Chinese Privet, Japanese Honeysuckle, Autumn Olive, and Elephant Ear were noted, particularly in proximity to residential lots around the shoreline. Invasive plant species exceed 10 percent coverage of a particular stratum at two locations at project facilities, including an isolated patch of Autumn Olive (0.01 acre) in mixed pine/hardwood forest at Ocmulgee River Park and an area containing a concentration of Chinese Privet and Japanese Honeysuckle (1.88 acres) in mixed pine/hardwood forest on land next to the project works (Georgia Power 2020f).

Operation and maintenance of the Lloyd Shoals Project has not been a major factor contributing to the occurrence or spread of these species. The occurrence of exotic invasive plant species has resulted mainly from surrounding residential development and anthropogenic disturbance along roadways and in riparian habitats in watersheds upstream of the Project. Exotic invasive species such as Chinese Privet, Japanese Stiltgrass, and Japanese Honeysuckle are now widespread and common throughout Georgia and the eastern and southern U.S., typically in floodplains (Merriam and Feil 2002, Loewenstein and Loewenstein 2005), and irrespective of the location of impoundments.

Public use of the project recreation facilities and lands adjacent to the project works between Dam Road and the access road to the Tailrace Fishing Pier is not being adversely impacted by exotic invasive plant species. Where invasive plant species occur along the shoreline, they often extend onto neighboring lands outside of the project boundary. Control of invasive plant species throughout the project boundary would not be feasible given the adjoining residential lots and other upstream sources of propagules (seeds, rhizomes, etc.). The spread of invasive plants is often linked to urbanization, residential development, and anthropogenic disturbance of riparian



habitats (Loewenstein and Loewenstein 2005, Burton et al. 2005). However, Georgia Power will monitor the patch of Autumn Olive at Ocmulgee River Park and the area of Chinese Privet and Japanese Honeysuckle adjacent to the project works, and if necessary, contract the treatment of these areas to reduce spread that could affect public access and recreation (see below).

Georgia Power would continue to monitor invasive aquatic plants within Lake Jackson during routine reservoir inspections. Nuisance invasive aquatic plants would be treated periodically within the project boundary, as warranted, to reduce infestations that could affect public access to the reservoir or hydropower operations. In addition, Georgia Power would continue to administer its existing shoreline residential aquatic vegetation management program through its website. Property owners could apply for an Individual Aquatic Herbicide Treatment Permit, and if approved by Georgia Power, contract the treatment of nuisance aquatic vegetation using a Georgia state-certified aquatic pesticide commercial applicator.

#### *Terrestrial Invasive Vegetation Management License Article*

Based on the analysis provided above, Georgia Power proposes a license article for Terrestrial Invasive Vegetation Management (Article 407), as provided in Appendix F, for monitoring invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier and treating populations as necessary to eliminate any interference with public access and utilization at these sites.

#### **Construction of Proposed Enhancement Measures**

Construction of the proposed recreation enhancements at Lloyd Shoals Boat Ramp (formerly referred to as Jane Lofton Public Access Area) (Section 3.3.6.2) and relocation of the access road to existing lease lots would permanently remove or alter approximately 3.75 acres of mixed pine/hardwood forest next to Dam Road in Butts County. No wetlands or streams would be directly impacted. The known active Bald Eagle nesting territory at the Project is 2 miles away from this site, beyond the distance buffers prescribed by FWS (2007) for avoiding nesting disturbance during construction. Wildlife would be displaced from the construction area and immediately adjacent lands during construction; however, the animals would move into adjacent forest that would remain contiguous to the impact area. Displaced animals would be able to relocate to suitable habitat in surrounding forested areas. Sufficient suitable habitat is expected to

be available for assimilation of displaced animals, and therefore, secondary impacts to populations would likely be negligible.

Construction of the proposed new formal recreation access at the Hwy 36 Bridge at Tussahaw Creek (Tussahaw Creek Public Access Area<sup>17</sup>) (see Section 3.3.6.2) would permanently remove or alter approximately 0.85 acre of mixed pine/hardwood forest just west of the intersection of Hwy 16 and Winding Way in Butts County. No wetlands or streams would be directly impacted, and the known Bald Eagle nesting territory is located over 3.5 miles away. Wildlife would be displaced during construction but would relocate to suitable habitat in the surrounding forest. Secondary impacts to animal populations would be negligible.

Construction of the proposed recreation enhancements at Lloyd Shoals Park and Ocmulgee River Park (Section 3.3.6.2) would occur in previously developed areas of these parks, so disturbance would be minimal. The construction would temporarily disturb upland and riparian vegetation and associated wildlife in the vicinity of the construction sites. However, these disturbances would be short in duration and the sites would be restored, including reseeded as necessary following construction.

In its comments on the PLP, FERC staff requested information on Georgia Power's vegetation management practices at the project recreation facilities, including existing management practices and those to be used to minimize vegetation removal and disturbance during construction of the proposed recreation improvements and through the term of the license. Georgia Power's standard vegetation management practices at project recreation facilities consist of mowing of turfgrass areas (which was reduced by pollinator habitat installation at Lloyd Shoals Park), targeted herbicide application to reduce competition from invasive exotics, and individual tree removal or trimming to help ensure safety and access. Georgia Power intends to continue this approach at the new and enhanced recreation facilities. Turfgrass will be planted where necessary to control erosion; otherwise, native vegetation will be used. Georgia Power proposes not to dispose of trees removed during construction of the proposed recreation enhancement measures in a landfill and will make efforts to find alternative uses, such as mulching and/or donating timber.

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<sup>17</sup> The new park name was initially proposed to be Hendricks Mill Public Access Area in the PLP but is now proposed as Tussahaw Creek Public Access Area to indicate more clearly to the public its geographic location.

## Unavoidable Adverse Impacts

Construction of the new recreation facilities at Lloyd Shoals Boat Ramp (formerly Jane Lofton Public Access Area) and the new formal access at the Hwy 36 Bridge at Tussahaw Creek (Tussahaw Creek Public Access Area) would result in the permanent removal or alteration of approximately 4.6 acres of upland, mixed pine/hardwood forest and displacement of associated wildlife to adjacent forested habitats.

Some minor land disturbances would occur in upland and riparian areas during construction of the new and improved recreation facilities. These disturbances would be temporary, and the sites would be revegetated following construction.

### 3.3.5 THREATENED AND ENDANGERED SPECIES

#### 3.3.5.1 AFFECTED ENVIRONMENT

Georgia Power (2020e) identified and evaluated federally listed species and species under review for federal listing with known records of occurrence in the project vicinity. Five federally protected species of plants and wildlife and four species of plants and wildlife under federal status review potentially occur in the project vicinity. In addition, FWS (2020) has determined that one species of butterfly, which may occur within the project boundary, is a candidate species for federal listing.

#### Federally Protected Species

Five species listed as threatened and endangered under the federal Endangered Species Act potentially occur within the project vicinity (Table 7). They include four plant species and one bird species:

- Little Amphianthus (*Gratiola amphiantha*<sup>18</sup>) – threatened;
- Black-spored Quillwort (*Isoetes melanospora*) – endangered;
- Michaux’s Sumac (*Rhus michauxii*) – endangered;
- Relict Trillium (*Trillium reliquum*) – endangered; and
- Red-cockaded Woodpecker (*Dryobates borealis*<sup>19</sup>) – endangered.

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<sup>18</sup> Formerly referred to as *Amphianthus pusillus*, before being transferred to the genus *Gratiola*.

<sup>19</sup> Formerly referred to as *Picoides borealis*, before being transferred to the genus *Dryobates*.

None of these federally protected species are presently known to occur within the Lloyd Shoals project boundary. All five of the species are described below.

#### *Little Amphianthus*

Little Amphianthus (or Pool Sprite) is a diminutive, annual herb that occurs in the Piedmont exclusively in shallow, flat bottomed depressions on granite outcrops, where vernal pools form after rainfall (GDNR 2021b, Chafin 2007). The numbers of individual plants in pools range from a dozen to several thousand (FWS 2019a). Little Amphianthus begins flowering in February or March and continues until the habitat becomes desiccated later in the spring. The seeds remain dormant until suitable moisture and light conditions for germination occur in late autumn. Of the 56 known extant populations, 50 occur in Georgia (FWS 2019a). Of the 14 populations considered to be extensive (with 15 or more occupied pools), 13 are in Georgia but none are in counties occupied by the Project. A small population in poor condition occurs in Henry County at the northern border, and two small populations in Butts County are threatened by exotic species, disturbance from a nearby highway, and off-road vehicles. Populations historically known from Newton County have been lost to stone quarrying activities. No granite-outcrop habitats were observed within the project boundary during the field surveys (Georgia Power 2020f), and therefore, no suitable habitat is present for Little Amphianthus.

#### *Black-spored Quillwort*

Black-spored Quillwort is an inconspicuous perennial herb that is restricted to shallow, seasonally flooded, flat bottomed pools on granite outcrops (Chafin 2007, Chafin and Brunton 2020). These vernal pools are entirely rock-rimmed, generally occur near the summit, and typically have a depth less than 1 ft. The plants produce spores in early May to June. The species is endemic to the Piedmont of Georgia and South Carolina. Historically known from 16 populations in central Georgia, Black-spored Quillwort currently exists at 11 populations sites in Georgia, including two small populations of unknown condition in Butts County (FWS 2019a). The species co-occurs in pools with Little Amphianthus at all extant populations. No granite outcrops were detected during the field surveys (Georgia Power 2020f), and therefore, no suitable habitat is present.

### *Michaux's Sumac*

Michaux's Sumac (or Dwarf Sumac) is a low-growing, colonial shrub that occurs on dry, open rock, or sandy woodlands over bedrock rich in calcium, magnesium, or iron (Chafin 2007). The species requires some form of periodic disturbance, such as fire, to maintain the open quality of its habitat and plants are often found in areas that are artificially disturbed, such as highway and railroad rights-of-way, pine plantations, edges of cultivated fields, and other cleared lands (FWS 1989, NatureServe 2021). Michaux's Sumac flowers from April to June and fruits from August to October. Of the 43 known extant populations in North Carolina, Virginia, and Georgia, 4 are in Georgia, including one in Newton County near the City of Covington and one in Henry County at its northern border (FWS 2014). Field investigators actively looked for this species where open areas occurred in rocky and/or sandy forests having an open canopy or disturbed areas such as roadsides and utility easements (Georgia Power 2020f). While marginal habitat occurs in scattered locations within the project boundary, the species was not detected.

### *Relict Trillium*

Relict Trillium is a perennial herb that inhabits mature mesic hardwood forests in deep soils having high organic matter content, typically in rich ravines or on floodplain terraces over calcium-rich bedrock close to creeks or rivers (Chafin 2007, 2020e; NatureServe 2021). The species flowers from mid-March through April and fruits from May to June. Populations vary widely in size from as few as 20 individual plants to tens of thousands of plants. Urbanization and road improvement projects are two factors that destroy or degrade available habitat. Approximately 40 populations of Relict Trillium are currently known in 18 Georgia counties, including one in Jasper County in Oconee NF with over 100,000 reproductive stems (FWS 2015). Oconee NF occupies 30,120 acres on the east side of the Ocmulgee River beginning one mile downstream of the Project. No Relict Trillium or suitable habitat for the species were observed during the field surveys (Georgia Power 2020f).

### *Red-cockaded Woodpecker*

The Red-cockaded Woodpecker is a small woodpecker endemic to open, mature and old-growth pine ecosystems in the southeastern U.S. (Ozier et al. 2019, FWS 2003). Red-cockaded Woodpeckers excavate roosting and nesting cavities almost exclusively in old, living pines. Cavity trees are usually infected with red-heart disease, which softens the heartwood. The birds typically nest and roost in Longleaf, Slash, or Loblolly Pine trees. Red-cockaded Woodpeckers

are cooperative breeders that live in family groups consisting of a breeding pair and often one to three helper male offspring from previous years. Typically, about 150 acres of suitable habitat are required by each family group. Georgia has five remaining population centers. One of these is the Piedmont Recovery Unit, which contains one population on Piedmont NWR and Oconee NF in Jones and Jasper Counties south of the Project (FWS 2003; FS 2011). FWS manages 22,500 acres of upland pine and 3,000 acres of upland hardwood to create conditions suitable for red-cockaded woodpeckers (FWS 2010). The species is not presently known to inhabit pine forests within the Lloyd Shoals project boundary, where stands of large pine trees are relatively small. No Red-cockaded Woodpeckers or potentially suitable nesting habitat for the species were observed during the field surveys (Georgia Power 2020f).

### **Candidate Species**

FWS (2020) added Monarch Butterfly (*Danaus plexippus plexippus*) to the candidate species list, meaning that listing as a threatened or endangered species is warranted but precluded by higher priority actions. The species is not yet proposed for listing.

#### *Monarch Butterfly*

Monarch Butterfly is a large and conspicuous species that occurs across North America. Adults feed on nectar from a wide variety of flowers, while reproduction depends on the presence of milkweed species as host plants, which are the sole food source for the larvae. Caterpillars develop and feed on the milkweed plant, sequestering chemicals as a defense against predators. Adults live six to nine months, and multiple generations are produced over the course of the breeding season, each moving northward before reproducing and dying. The final generation of adults emerge in late summer and early fall and migrate south to overwinter in either central Mexico for eastern populations or California for western populations. Essentially the entire Monarch Butterfly population concentrates at these very few wintering sites, making the species extremely vulnerable at this time. Populations have been declining over the past several decades, and the species is no longer considered secure (FWS 2020; NatureServe 2021). Primary threats include the loss and degradation of habitat from conversion of grasslands to agriculture, widespread use of herbicides, exposure to insecticides, land-clearing activities in overwintering sites, urban development, and general loss of milkweed and nectar sources across the species' range from various land development activities (FWS 2020).

Monarch Butterflies likely occur in the project area from spring to early fall. NatureServe (2021) ranks the species' conservation status in Georgia as apparently secure (S4). A variety of milkweed species naturally occur throughout most of Georgia and four common species frequently used by Monarch Butterfly grow in nearly every region of the state in dry to moist sunny areas, woodland edges, and roadsides (State Botanical Garden of Georgia 2018). Six milkweeds are species of conservation concern in Georgia (one is listed as state rare) but none of these species are known to occur in the 4-county project vicinity (GDNR 2021b). Georgia Power provides pollinator habitat within the project boundary at its office next to Lloyd Shoals Park (see Section 3.3.4.1, Georgia Power Pollinator Habitat Conservation Practices). Elsewhere in the Piedmont, Georgia Power partners with the Georgia Plant Conservation Alliance and other organizations to create pollinator habitat in transmission line rights-of-way to attract butterflies, bees, and other pollinators. Continued project operation would not be expected to result in the loss of milkweed or nectar sources available for use by Monarch Butterfly.

### **Species Under Review**

Four species are currently undergoing status review by FWS to determine if their listing as federally threatened or endangered is warranted (FWS 2011, 2017, 2019b) (Table 7). They include one plant, one snail, one fish, and one bat:

- Small-headed Pipewort (*Eriocaulon koernickianum*) – Georgia endangered;
- Reverse Pebblesnail (*Somatogyus alcoviensis*) – no state or federal protection;
- Robust Redhorse (*Moxostoma robustum*) – Georgia endangered; and
- Tricolored bat (*Perimyotis subflavus*) – no state or federal protection.

Two of the species are presently known to occupy riverine habitats either within the project boundary below Lloyd Shoals Dam (Robust Redhorse) or in larger tributaries to Lake Jackson upstream of the project boundary (Reverse Pebblesnail). Tricolored Bat has a widespread distribution and potentially occurs in the project area. Small-headed Pipewort is unlikely to occur in the project area due to the lack of granite-outcrop habitat to which it is restricted. The following sections provide brief accounts of each species.

#### *Small-headed Pipewort*

Small-headed Pipewort (or Dwarf Hatpins), a Georgia endangered species, is an annual or short-lived, diminutive perennial herb that occurs on Piedmont granite outcrops (Chafin 2007, 2020f).

The species is found in seepage areas and wet depressions on granite flatrocks. Small-headed Pipewort flowers in late May and June. The number of plants in a population fluctuates annually depending on rainfall and the frequency of disturbance, such as fire, which reduces competition from other plants. Threats to the species include destruction of habitat by quarrying, trash dumping, off-road vehicle use, development, exotic pest plant species, and fire suppression. About 20 populations have been documented in Georgia. No granite outcrops were detected during the field surveys, and therefore, no suitable habitat is present (Georgia Power 2020f).

#### *Reverse Pebblesnail*

Reverse Pebblesnail, which has no Georgia or federal protected status, is a freshwater snail species that inhabits shoals with rapidly flowing water. The species is restricted to two known localities on medium-sized rivers in Newton County, one on the Alcovy River and one on the Yellow River (Georgia Power 2017b). Both localities are on tributaries to Lake Jackson upstream of the project boundary. The snail inhabits boulders, gravel, and vegetation growing on rocks in rapidly flowing water but is absent from silty substrates (NatureServe 2021). Under the Altamaha Mollusk CCA, WRD plans to conduct a survey for this species in 2021 in the Alcovy River upstream of Lake Jackson (Rowe 2021).

#### *Robust Redhorse*

Robust Redhorse, a Georgia endangered species, is a migratory riverine sucker species that occurs in large rivers of the Atlantic slope in Georgia, South Carolina, and North Carolina (Freeman and Straight 2009, Rohde et al. 2009). The species occurs in the mainstem Ocmulgee and Oconee Rivers in the Altamaha River basin. Robust Redhorse typically inhabit main-channel, free-flowing rivers in riffles, runs, and pools. Adults reside in deep waters in moderate to swift current, often on the outside of river bends in association with woody debris. Spawning occurs in rivers over coarse gravel.

As part of the Ocmulgee CCAA for Robust Redhorse, the species was reintroduced to the Ocmulgee River downstream of Lloyd Shoals Dam through stocking in 2002-2005 to establish a refugial population (Jennings and Shepard 2003, Grabowski and Jennings 2009). Georgia Power has been participating in ongoing visual and field-sampling surveys to assess whether successful spawning and recruitment is occurring in the Ocmulgee River population. The population



extends many miles downstream of Lloyd Shoals Dam, beyond Juliette Dam, and into the lower Ocmulgee River in the Coastal Plain.

Surveys conducted in 2010-2011 showed that stocked redhorse had survived and were participating in spawning activities in the Lloyd Shoals tailrace, but evidence of successful recruitment was not confirmed (Pruitt 2013, Georgia Power 2016). In 2014, WRD survey efforts in downstream reaches in the Coastal Plain (near Hawkinsville) resulted in the capture of a juvenile Robust Redhorse, indicating successful natural recruitment in the river.

Georgia Power is currently working on the Ocmulgee CCAA for Robust Redhorse with its partners, FWS Region 4 and WRD, to renew the agreement beyond its current term, which expires at the end of the current FERC license term in December 2023.

#### *Tricolored Bat*

Tricolored Bat, which has no Georgia or federal protected status, is a small species of bat that occupies a wide range across eastern and central North America (NatureServe 2021). Tricolored Bats can be found anywhere in Georgia and are one of the most commonly encountered cave-dwelling species seen in winter (Ferrall 2019). They inhabit open forests with large trees and woodland edges, roost in tree foliage, and hibernate in caves or mines with high humidity. Despite population declines across the species' range due to white-nose syndrome, Tricolored Bats are the most common cave-dwelling species found during winter surveys in Georgia (Ferrall 2019). Although no targeted surveys were conducted for Tricolored Bat and no individuals or hibernacula were observed within the project area during the field surveys (Georgia Power 2020f), Tricolored Bats are assumed to occur in the project area due to their wide distribution, use of forested and riparian areas, and occasional use of human-made structures by maternity colonies (NatureServe 2021).

### **3.3.5.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

Georgia Power proposes to continue to operate the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power demand hours. Georgia Power is not proposing to make any major modifications to the Project under the new license. Continued project operation as proposed would not be expected to adversely affect any federally or state listed species, federal candidate species, or federal status-review species of plants and wildlife. There is no

designated critical habitat for federally protected species within the project boundary or in the 19-mile reach of the Ocmulgee River extending downstream to Juliette Dam.

### **3.3.6 RECREATION AND LAND USE**

#### **3.3.6.1 AFFECTED ENVIRONMENT**

Georgia Power (2021c) conducted a Recreation and Land Use Study according to the approved Study Plan, as amended, to characterize existing recreation and land use at the Project, evaluate the adequacy of existing recreational facilities to meet current and future recreational demand, and evaluate the adequacy of the existing Shoreline Management Program.

#### **Project Recreation Facilities**

Georgia Power owns and operates four project recreation facilities at the Lloyd Shoals Project that provide for a variety of recreational opportunities (Table 11). Two of the facilities are located on Lake Jackson and two facilities are located downstream of Lloyd Shoals Dam in the tailrace area. Amenities at each of these four recreation facilities are summarized below.

##### *Lloyd Shoals Park*

Lloyd Shoals Park is a 5-acre facility located on Lake Jackson in Butts County on the western side of the project dam. The park includes a large, paved parking area with space for 50 vehicles with trailers. Amenities at the site include a swimming beach; a picnic/day use area with picnic tables; a pavilion; a playground; one barrier-free fishing pier; a two-lane barrier-free paved boat ramp with courtesy dock; restrooms; and bank fishing areas. The boat ramp at Lloyd Shoals Park provides public boating access to Lake Jackson.

##### *Lloyd Shoals Tailrace Fishing Pier*

The Lloyd Shoals Tailrace Fishing Pier is a 0.6-acre facility located downstream of Lloyd Shoals Dam on the western bank of the Ocmulgee River in Butts County. The Tailrace Fishing Pier includes a paved parking area with space for 10 vehicles; a barrier-free switchback boardwalk to the fishing pier with seats for fishing and a separate seating area for viewing; and trash cans.

##### *Ocmulgee River Park*

Ocmulgee River Park is a 4-acre facility located downstream of Lloyd Shoals Dam on the eastern bank of the Ocmulgee River in Jasper County. Ocmulgee River Park includes a gravel

parking area with space for 15 vehicles with trailers; a 1-lane boat ramp; a paved parking area next to the boat ramp; a picnic/day use area; and bank fishing access along the river.

#### *Jane Lofton Public Access Area*

The Jane Lofton Public Access Area opened in 2017 and is a 0.7-acre facility located just south of Lloyd Shoals Park at the south end of the auxiliary spillway in Butts County. Jane Lofton Public Access Area provides bank fishing access to Lake Jackson. The recreation area also includes a gravel parking area and a trash can.

#### **Non-Project Recreation Facilities on Lake Jackson**

Nine publicly or privately owned and operated, non-project facilities provide recreational access to Lake Jackson (Table 11). All of the facilities except Factory Shoals Park border the project boundary at the shoreline, which is defined by the full pool elevation of 530 ft PD in these areas. Factory Shoals Park is located just upstream of the project boundary.

Six of the facilities are privately operated marinas distributed around the reservoir. They include Martin's Marina northeast of the dam, Reasor's Landing in the Tussahaw Creek embayment, Walker Marina and Sandy's Highway 36 Marina in the South River embayment, and Berry's Boat Dock and Bear Creek Marina in the Alcovy River embayment. The marinas provide boat ramps, fuel, and various other amenities that support fishing, fishing tournaments, bank fishing, boating, water skiing, swimming, picnicking, camping, and other recreation.

Factory Shoals Park is operated by Newton County on about 450 acres immediately upstream of the project boundary next to a shoals complex on the Alcovy River. The park features granite shoals, a preserved river corridor, and opportunities for kayaking, canoeing, hiking, picnicking, and fishing.

The Georgia FFA-FCCLA Center on the Alcovy River embayment is a 500-acre recreational youth camp and conference center owned by the State of Georgia. Although the majority of recreation occurs on facility lands, the facility fronts over 1.5 miles of Lake Jackson shoreline and canoeing and kayaking take place on the lake.

The Hwy 36 Bridge at Tussahaw Creek is an informal, undeveloped area that the public accesses for bank fishing and other shoreline activities. Georgia Power owns land at the site but does not operate recreational facilities.

## **Project Recreational Use**

Georgia Power (2021c) assessed recreational use at the Project using a combination of existing and new information and data to identify recreational usage trends and recreation demand.

Existing recreation use at the project was described based on review of existing information sources; analysis of the most recent recreational use information gathered by Georgia Power (2015b) in 2014 for the 2015 Form 80; and review of available fishing tournament information. In addition, recreation field surveys were conducted on five days in 2019 and 2021. This data was used to supplement and refine the existing recreation use data from the 2015 Form 80.

Recreation surveys were conducted at the four Georgia Power recreation facilities on three days in the summer of 2019 and two days in the spring of 2021, including Lloyd Shoals Park, Jane Lofton Public Access Area, Tailrace Fishing Pier, and Ocmulgee River Park. The purpose of these on-site surveys was to assess recreational user satisfaction and to further characterize user trends, carrying capacity, competing uses, and the adequacy of existing recreation facilities. Roving user counts and recreation surveys also were administered at the informal bank fishing area at the Georgia Hwy 36 Bridge at Tussahaw Creek.

Of the 129 recreation users surveyed at the five access areas, 51 percent were from Lloyd Shoals Park, 14 percent were from Lloyd Shoals Tailrace Fishing Pier, 33 percent were from Ocmulgee River Park, and 2 percent were from the informal recreation area. Although no user surveys were collected at Jane Lofton Public Access Area, bank fishing use was observed there during the surveys. Over 55 percent of those surveyed came from one of the four counties in which the Project is located (Butts, Henry, Jasper, and Newton counties). Of the users surveyed, the highest percentages came from Henry County (18 percent), Butts County (16 percent), Spalding County (15 percent), Jasper County (12 percent), and Newton County (10 percent). Spalding County borders Henry and Butts counties west of the Project. The most common reasons reported for visiting the Lloyd Shoals Project were bank fishing (24.4 percent) and swimming/wading (17.1 percent). The overall average party size was 2.9 between the five recreation sites with an average length of visit of 2.8 hours. Frequently noted improvements desired included additional/improved restrooms, additional parking, improved access to the shoreline, general cleaning at the parks, additional trash cans, and additional camping opportunities. Other improvements were suggested including additional picnic areas, additional lighting, and additional fishing access.

Bank fishing is a popular activity at Lake Jackson and comprised 24 percent of the primary activity reported during user surveys. Bank fishing is particularly popular at Lloyd Shoals Tailrace Fishing Pier and Ocmulgee River Park, where user surveys indicated bank fishing as the most popular activity at each site. Bank fishing also occurs at informal areas around the lake, including the Hwy 36 Bridge at Tussahaw Creek. Improved access to the shoreline was an improvement requested at Lake Jackson, specifically at Ocmulgee River Park.

The 2019 recreation use estimates were based on the 2014 estimates adjusted to account for data collected during the 2019 and 2021 recreation study<sup>20</sup> and population increases in the Project's four surrounding counties. The 2019 annual use estimate for the Lloyd Shoals Project is 68,393 daytime visits and 1,396 nighttime visits with a peak weekend average of 3,420 daytime visits and 23 nighttime visits (Table 12). The reduction in nighttime visits can be attributed to the closing of Riverside Park in 2017 to address public safety concerns; it accounted for a large portion of the nighttime use numbers in previous estimates<sup>21</sup>.

Attendance records from Lloyd Shoals Park show that there were approximately 37,682 visits to the park in 2019, a slight decrease from the previous year's attendance of 39,665. Data collected during user counts at Lloyd Shoals Park in 2019 and 2021 provided an estimate of around 33,579 visits. Lloyd Shoals Park saw approximately 58 percent of all recreation visits to Lake Jackson in 2019.

### **Regional Recreation Opportunities**

Lake Jackson is located in central Georgia and is close to two other lakes operated by Georgia Power, Lake Sinclair and Lake Oconee. Lake Juliette is owned by Georgia Power and most recreation opportunities there are operated by the State of Georgia. In addition, the southern section of the Oconee Ranger District of Oconee NF extends west to the Ocmulgee River, beginning about 1 mile downstream of Lloyd Shoals Dam in Jasper County. These four recreation areas are described in further detail below.

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<sup>20</sup> Data collected during 2021 was used in conjunction with 2019 data when estimating group size and visit duration. This information was used to determine the annual use estimate for 2019.

<sup>21</sup> On November 15, 2016, FERC approved Georgia Power's request to close Riverside Park and to add the Jane Lofton Public Access Area to mitigate the loss of bank fishing access at Riverside Park.

### *Lake Sinclair*

Lake Sinclair is part of Georgia Power's Sinclair Hydroelectric Project (FERC No. 1951) located near Milledgeville, approximately 35 miles east-southeast of Lake Jackson and covers 15,330 acres with 417 miles of shoreline (Georgia Power 2016b). Lake Sinclair is a popular regional destination for fishing, boating, camping, and other recreational activities. The lake offers 20 recreation facilities, including day-use parks, marinas, and campgrounds. While boating and camping are popular activities at these facilities, many other amenities are offered, including fishing piers, fish attractors, hiking trails, swimming beaches, and picnic shelters (Georgia Power 2016b).

### *Lake Oconee*

Lake Oconee is part of Georgia Power's Wallace Dam Hydroelectric Project (FERC No. 2413) located in Hancock, Putnam, Greene, and Morgan counties, approximately 30 miles east-northeast of Lake Jackson and comprises 19,050 acres with 374 miles of shoreline (Georgia Power 2016b). Lake Oconee is a popular regional destination for fishing, boating, camping and other recreational activities. There are many recreation facilities around the lake, including FS recreation areas and commercially operated marinas and boat ramps. Amenities offered around the lake include day-use areas, boat ramps, picnic tables, restrooms, campgrounds, swimming beaches, and shoreline fishing access (Georgia Power 2016b).

### *Lake Juliette*

Lake Juliette<sup>22</sup> is a 3,600-acre reservoir located on a tributary of the Ocmulgee River in Monroe County, approximately 20 miles south of Lake Jackson (Georgia Power 2016b). Recreation opportunities at the lake include fishing, picnicking, boating with 25-hp or less engines, and viewing natural scenery and wildlife (Georgia Power 2016b).

### *Oconee National Forest*

The southern portion of the Oconee Ranger District of Oconee NF extends west to the Ocmulgee River beginning approximately 1 mile south of the dam (Georgia Power 2018). This section of the forest near the river includes the Ocmulgee River Horse, Bike, and Hiking Trail, part of the

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<sup>22</sup> Lake Juliette is an impoundment of Rum Creek and is distinct from Juliette Dam on the Ocmulgee River.

Ocmulgee Bluff Trail System. The 30-mile trail generally follows the Ocmulgee River and includes numerous horse-back riding, biking, and hiking opportunities (Georgia Power 2018).

## **Land Use and Relevant Resource Management Plans**

### *FERC-Approved Comprehensive Waterway Plans*

Section 10(a)(2)(A) of the Federal Power Act, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with Federal or State comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the Project. The Commission grants Section 10(a)(2)(A) comprehensive plan status to any Federal or State plan that: (1) is a comprehensive study of one or more of the beneficial uses of a waterway or waterways; (2) specifies the standards, the data, and the methodology used; and (3) is filed with the Secretary of the Commission.

FERC (2021) currently lists 41 comprehensive plans for the state of Georgia. Table 13 lists 23 of those plans potentially relevant to the Lloyd Shoals Project. The most recent and directly relevant comprehensive plan pertaining to recreation is the Georgia SCORP, discussed below.

### *Statewide Comprehensive Outdoor Recreation Plan*

The Georgia SCORP for 2017-2021 (Georgia State Parks 2016) reports on the state of parks and greenspaces and offers guidance to state and local decision-makers and citizens on ways to promote healthy communities, enhance economic vitality, and conserve natural resources. A public parks inventory shows that less-populated Jasper County has about 18 percent of its area available for outdoor recreation (including Oconee NF), while Butts, Henry, and Newton counties have less than 3 percent available. For many recreators, the quality of their experience depends in large part on the quality of the facilities they use. In recognition of this importance, about 60 percent of Land and Water Conservation Fund awards to local governments between 2006 and 2015 were targeted toward the rehabilitation of existing facilities.

A public survey was conducted by telephone to assess demand and preferences for outdoor recreation. About 63 percent of survey respondents self-identified as being outdoor recreators, enjoying such activities as walking, jogging, running, picnicking, swimming, and observing wildlife and nature. Reasons to recreate included having fun, being with family and friends, relaxing, being healthy and exercising, and enjoying nature. Seventy percent of respondents had visited a park in the past year, and the vast majority of these recreators had visited parks at least

several times. About 20 to 30 percent of recreators indicate that physical limitations can be a barrier, indicating the continuing importance of addressing this challenge in the planning, development, and rehabilitation of parks.

#### *ARC Regional Resource Plan*

The Atlanta Region's Plan (ARC 2020), applicable to Henry County and counties northwest of the Project, identifies the South River as a "protected river corridor," meaning that planning efforts are to focus on preserving land adjacent to the river to support a diversity of wildlife, recreational interests, and water quality. The Arabia Mountain National Heritage Area, located in DeKalb, Rockdale, and Henry counties, offers a unique combination of natural, cultural, and historic resources. The Heritage Area includes a concentration of granite outcrops, limited to Georgia's Piedmont physiographic province and which provide unique habitats for a variety of native plant species. Unique resources within the Heritage Area include Panola Mountain SP, Davidson-Arabia Mountain Nature Preserve, and the Monastery of the Holy Spirit.

#### *Three Rivers RC Regional Plan 2019-2039*

The Three Rivers Regional Plan (TRRC 2019), applicable to Butts County on the west side of the Project, identifies the Ocmulgee River as a Regionally Important Resource (RIR) due to its environmentally sensitive resources, although it is not among areas identified as requiring special attention. TRRC (2012) has also identified Lake Jackson as a RIR for its boating, fishing, water sports, natural beauty, and wildlife habitat. Regionally important conservation areas within the Ocmulgee River basin include Indian Springs SP and High Falls SP (a portion), located 10 miles and 18 miles southwest of the Project, respectively (TRRC 2019). These parks provide recreational opportunities that include camping, picnicking, a museum, hiking, and scenic views.

#### *Northeast Georgia Regional Plan*

The Northeast Georgia Regional Plan and Resource Management Plan (NEGRC 2018a, 2018b) apply to Jasper and Newton counties on the northern and eastern sides of the Project. The following RIRs categorized as natural and recreational resources are located in Newton and Jasper Counties:



- Alcovy River Greenway – the river and floodplain upstream of Lake Jackson providing a recreational resource to hunters, hikers, and campers.
- Factory Shoals Park – a county park on the Alcovy River just upstream of Lake Jackson featuring granite shoals, a preserved river corridor, and opportunities for kayaking, canoeing, hiking, picnicking, and fishing.
- Georgia FFA-FCCLA Center – a 500-acre recreational youth camp on the Alcovy River embayment of Lake Jackson, owned by the State of Georgia, and which is a nationally recognized educational center.
- Big Haynes Creek and Little Haynes Creek – tributaries of the Yellow River upstream of Lake Jackson providing important wildlife habitat and containing wetland and groundwater recharge areas important to drinking water supply.
- South River – the river corridor upstream of Lake Jackson providing natural habitat in a developed area and an important resource for fishing, boating, space for trails, and greenspace.
- Yellow River – the river corridor upstream of Lake Jackson providing natural habitat in a developed area, including habitat for rare plant species found on granite outcrops, and an important resource for fishing, boating, trails, white-water rapids, and greenspace.

### 3.3.6.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS

#### Recreation Improvements

Georgia Power identified potential recreation enhancements throughout the relicensing process in agency and stakeholder meetings during scoping, study planning, study results meetings, and recreation user surveys at project recreation areas in 2019 and 2021. Georgia Power proposes to improve recreational access and facilities by working with WRD and local stakeholders to implement the following measures, which are illustrated conceptually in Figures 10 through 13:

- Lloyd Shoals Park – relocate the existing boat ramp to Jane Lofton Public Access Area (renamed as Lloyd Shoals Boat Ramp, see below). The existing boat ramp at Lloyd Shoals Park will be converted to a non-motorized boat (canoe/kayak) step-down ramp (Figure 10). The existing courtesy dock will be replaced with a barrier-free fishing pier that extends approximately 20 ft farther into the reservoir than the existing pier. Existing parking will be restriped to accommodate vehicle-only spaces. Three new accessible (i.e., barrier-free) parking spaces will be constructed adjacent to the new fishing pier and non-motorized boat step-down ramp. An accessible sidewalk will also be constructed, leading from the new parking spaces to the non-motorized boat step-down ramp. The new parking spaces and sidewalk will be paved. The existing restroom and bath house will be updated with new facilities. Approximately 0.3 acres of existing park land will be disturbed for the new accessible parking lot.

- Lloyd Shoals Boat Ramp – Jane Lofton Public Access Area will be expanded in area from 0.7 acre to approximately 6 acres and renamed as Lloyd Shoals Boat Ramp (Figure 11). The proposed motorized-boat ramp will be constructed in the cove, southwest of the auxiliary spillway. The existing gravel parking area will be expanded, paved, and delineated to accommodate approximately 20 vehicles with trailers. Trees will be cleared to accommodate the expanded parking area. In addition, two accessible parking spaces for vehicles with trailers will be constructed near the new boat ramp. The new boat ramp will be paved and approximately 30 ft wide with two lanes and will include a paved turn-around. A proposed wharf-style, accessible fishing pier will also be constructed to the northwest of the proposed boat ramp. Approximately three new accessible parking spaces and a paved turn-around will be constructed to access the new fishing pier. A new restroom with a flush toilet will be installed. Utilities including electricity, lighting, and water will also be added. A new road will be constructed to access existing lease lots separately from the park. All improvements will be constructed within the existing project boundary. To accommodate new enhancements and relocate the access road to lease lots, approximately 3.75 acres of land within the project boundary will be disturbed. Protection and enhancement measures for the existing archaeological site associated with the Lloyd Shoals Construction and Operator’s Village (see Section 3.3.8) will be installed on the southwest side of the existing gravel parking area.
- Ocmulgee River Park – existing picnic tables will be relocated closer to the existing parking area (Figure 12). The existing parking area will be redefined and paved. A new restroom with a concrete-lined vault toilet will be installed. The existing boat ramp will be rehabilitated. Landscaping with boulders will be installed along the road to discourage parking in this area. All improvements will be constructed within the existing project boundary.
- Tailrace Fishing Pier – no new enhancements are proposed; however, maintenance on the existing pier will be conducted and additional trash cans will be installed.
- Tussahaw Creek Public Access Area – the Hwy 36 Bridge at Tussahaw Creek site will be formalized and named Tussahaw Creek Public Access Area (Figure 13). A paved access road and parking area will be constructed off of Winding Way, located adjacent to Hwy 36. The parking area will include 10 parking spaces of which two will be accessible. One picnic table and one trash can will be installed. A paved sidewalk leading to a step-down ramp for paddling access will be constructed at the shoreline west of the Hwy 36 Bridge. Bank fishing access will continue to be available at the site. Georgia Power land containing the access road, parking, and path will be added to the project boundary. Approximately 3 acres will be added to the project boundary to account for this site. In addition, approximately 0.85 acres of land will be disturbed to accommodate the new recreation facilities.

### *Recreation Management Plan License Article*

Based on the analysis provided above, Georgia Power proposes the Recreation Management Plan in Appendix D, which specifies the measures and schedule for enhancing recreation access, routine operational maintenance, and periodic recreational use monitoring. Georgia Power proposes a license article for implementing the Recreation Management Plan (Article 408), as provided in Appendix F.

### **Reservoir Shoreline Management**

Georgia Power proposes to develop a Shoreline Management Plan (SMP) in accordance with its current Shoreline Management Guidelines for Georgia Power Lakes to manage the Lake Jackson shoreline. The proposed SMP would include the Small Dredging Permit Program, as described in Section 3.3.1.1. The proposed SMP would continue to promote the maintenance of vegetative buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources. The SMP would provide guidance to adjacent residents on permitting and constructing shoreline structures in a manner that preserves and enhances the scenic, recreational, and environmental values of the reservoir, as well as maintaining compatibility with overall recreational uses of the reservoir.

The SMP would list specific Lake Jackson requirements and restrictions for constructing seawalls, docks, wharves, boat slips, boat lifts and personal watercraft lifts. The requirements, which are currently included in Georgia Power's Shoreline Management Guidelines for Georgia Power Lakes, minimize shoreline disturbance from tree removal, mechanical clearing, and other activities to protect the 25-ft vegetative buffer surrounding the lake. Georgia Power currently manages and proposes to continue managing the shoreline according to the applicable license articles, U.S. Army Corps of Engineers programmatic general permits, and state and local regulations.

### *Shoreline Management Plan License Article*

Based on the analysis provided above, Georgia Power proposes the Shoreline Management Plan in Appendix E and a license article for implementing the Shoreline Management Plan (Article 409), as provided in Appendix F.

## **Construction of Proposed Enhancement Measures**

Construction of the proposed recreation enhancements and construction of the proposed shoreline stabilization measures (Section 3.3.6.2) could cause temporary disturbances due to noise and limited recreation access at the project recreation facilities; however, to the extent practical, construction would occur during the fall and winter when recreation use is lowest. Georgia Power proposes to perform all construction work in accordance with its proposed SMP, described above, to minimize impacts to environmental resources, including water quality and historic properties, near the construction projects. These minor, temporary disturbances, particularly the infrastructure improvements, installation of new restrooms, and relocation of the motorized-boat ramp to the newly expanded Lloyd Shoals Boat Ramp (formerly Jane Lofton Public Access Area), could affect existing vegetation and local water quality; however, implementation of proper sedimentation and erosion control BMPs and restoration practices during and immediately following construction would minimize these impacts.

In its comments on the PLP, EPA recommended including plans for the disposal of the cut trees and vegetation to be removed, avoiding the use of landfills to dispose of trees and finding alternative uses for them. Georgia Power proposes not to dispose of trees removed during construction of the proposed recreation enhancement measures in a landfill and will make efforts to find alternative uses, such as mulching and/or donating timber.

EPA also recommends that Georgia Power consider and implement recycling at project recreation facilities, including posting signs next to recycling bins to encourage visitors to recycle. However, there are currently no recycling pick-up services available in Bibb and Jasper Counties, where the project recreation facilities are located. Georgia Power will consider recycling opportunities in the future, should these services become available at the Project.

## **Unavoidable Adverse Impacts**

Formalization, including associated construction, of the Hwy 36 Bridge at Tussahaw Creek into the Tussahaw Creek Public Access Area would permanently remove approximately 0.85 acre of mixed pine/hardwood forest within the project boundary but approximately 3 acres of land, including forest, would be added to the project boundary.

Construction of the new boat ramp and fishing pier, and relocation of the access road to existing lease lots, at Lloyd Shoals Boat Ramp (formerly Jane Lofton Public Access Area) would result in

permanent clearing of approximately 3 acres of trees in a mixed pine/hardwood forest community. BMPs, consultation with FWS, and consultation with the Georgia State Historic Preservation Officer (SHPO) through the HPMP would minimize impacts to water quality, wildlife habitat, and cultural resources.

### **3.3.7 AESTHETIC RESOURCES**

#### **3.3.7.1 AFFECTED ENVIRONMENT**

The Project's public access points offer diverse views of the project impoundment, shorelines, and tailrace areas. Georgia Power's Shoreline Management Guidelines help to protect the vegetative buffer surrounding Lake Jackson and preserve and enhance the aesthetic value of the Project.

Generally, the central and southern portions of Lake Jackson downstream of Hwy 36 and Hwy 212 provide the most developed views, including low-density residential, marinas, commercial areas, and various public and private recreation access areas. The shoreline vegetative buffer zone in these parts of the reservoir includes a mix of landscaped, landscaped-natural, and natural conditions. Isolated stretches of undeveloped, forested shoreline occur along Tussahaw Creek and the South and Yellow River embayments. Viewsheds include Lloyd Shoals Dam, low-density residential beyond the shoreline, boat ramps, public marinas, commercial areas, and private and public recreational access areas, and roadway crossings.

The portions of Lake Jackson along Tussahaw Creek and the South and Yellow Rivers upstream of Hwys 36 and 212 provide the most rural and undeveloped views, including significant stretches of undeveloped shoreline. The shoreline vegetative buffer zone in these parts of the reservoir include a mix of landscaped-natural and natural conditions. Viewsheds in these parts include forested, agricultural, silvicultural, and low-density residential land uses beyond the shoreline.

There are numerous public access points around Lake Jackson that show various degrees of development. Viewsheds from throughout the reservoir show a variety of development from undeveloped at the shoreline to residential areas and public access points such as picnic areas and boat ramps. Viewsheds from various locations around the reservoir are shown in Figures 14 through 16.

### **3.3.7.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

Georgia Power's proposed operation and proposed shoreline protection would not adversely affect aesthetic resources within the project boundary. Georgia Power is proposing to modify some existing recreation sites and construct new recreation sites causing short-term, localized impacts to aesthetic resources. Adverse impacts should only last during the active construction period. Aesthetics will be considered during design and landscaping of new recreation sites.

#### **Unavoidable Adverse Impacts**

No unavoidable adverse impacts are anticipated.

### **3.3.8 CULTURAL RESOURCES**

#### **3.3.8.1 AFFECTED ENVIRONMENT**

Georgia Power assessed the historic hydro-engineering resources of the Lloyd Shoals Project to document the existing conditions of the hydropower facility and its support buildings (TRC 2020a). The purpose of this assessment was to survey the Project works to evaluate their eligibility for listing on the National Register of Historic Places (NRHP) and assess the potential for effects on them by continued operation under the new license.

The assessment, conducted by TRC through background research and field survey, found that the Project retains good integrity. TRC recommends that the Project is eligible for listing in the NRHP under Criterion A for its significance in the history of hydroelectric development in Georgia and under Criterion C as a distinctive example of an early-twentieth century hydroelectric dam. Georgia Power is not planning any rehabilitations, alterations, or demolitions of structures or buildings within the Lloyd Shoals project boundary as part of relicensing. Therefore, TRC found there will be no effect to historic properties as a result of the issuance of a new FERC license for the Project (TRC 2020a).

Georgia Power also conducted an archaeological assessment at six previously recorded sites at the Lloyd Shoals Project (Table 14). All sites are historic and associated with the construction and operation of the Project and were occupied from ca. 1910 to ca. 1967 (TRC 2020b). Four sites are located at the Lloyd Shoals Park on Lake Jackson and two other sites were inundated when Lake Jackson was created. These two sites were inundated when the study was conducted

and thus could not be reevaluated. All six sites were recommended eligible for the NRHP in 1989 and are currently being monitored by Georgia Power.

Based on the results of the field work, TRC recommends continuation of preservation and monitoring for Sites 9BS17, 9BS18, and 9BS20. Site 9BS19 has lost integrity and is therefore recommended as not eligible for the NRHP. The site was documented in 1989 as a construction area of unknown function and was graded down to subsoil prior to the 1989 assessment. The site holds little information potential and is recommended for removal from the Georgia Power monitoring list. Sites 9BS23 and 9JA223 were inundated at the time of survey and are recommended for evaluation during a lake drawdown period (TRC 2020b).

### **3.3.8.2 ENVIRONMENTAL IMPACTS AND RECOMMENDATIONS**

Georgia Power proposes to implement a Historic Properties Management Plan (HPMP) through a Programmatic Agreement to assure the preservation and long-term management of archaeological sites and historic buildings and structures within the project boundary. The HPMP would be implemented through a Programmatic Agreement between FERC, the SHPO, the Advisory Council on Historic Preservation, and the Tribes and would provide specific protocols and procedures for monitoring recorded resources, as well as dealing with any future discoveries on project lands. The HPMP would also provide a list of categorical exclusions for certain safety and maintenance procedures that are a necessary component of operating a power generating facility.

In addition, Georgia Power is proposing to relocate the existing motorized-boat ramp at Lloyd Shoals Park to the existing Jane Lofton Public Access Area, which will be developed and renamed as Lloyd Shoals Boat Ramp. Several of the NRHP-eligible archaeological sites associated with the construction village are located in this area. Georgia Power will avoid and/or mitigate for any disruption of these sites in accordance with the HPMP developed for the Project. In addition, Georgia Power is proposing to install cultural resources interpretive signage along Dam Road in the vicinity of Lloyd Shoals Boat Ramp. This signage would provide public education on the Lloyd Shoals Construction and Operator's Village.

## **4.0 DEVELOPMENTAL ANALYSIS**

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This section describes the electric power benefits of the Lloyd Shoals Project, compares the economic costs of the Project to the economic costs of the most likely alternative generating source, and provides the estimated cost for each of the environmental measures under Georgia Power's proposed action.

### **4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT**

Under a new license, the Lloyd Shoals Project would continue to provide low-cost, carbon free hydroelectric generation to assist in meeting regional power demands, generation diversity needs, and capacity needs. The Project would have a nameplate capacity of 18 MW and generate approximately 70,600 MWH per year. With the addition of variable energy sources (primarily wind and solar) into the energy mix for Georgia Power and Southern Company, along with the retirement of conventional generating sources such as fossil-fueled power plants, flexible resources such as the Lloyd Shoals Project become even more critical in helping to offset the variability inherent to wind and solar energy sources. The Project would continue to help meet a need for reliable and affordable power in the Southern Company service territory as well as in the SERC-SE region during the short and long term.

### **4.2 COMPARISON OF ALTERNATIVES**

Georgia Power analyzed the Project's use of the river's water resources to generate hydropower by estimating the economic costs of the Project for the proposed action, which includes the existing Lloyd Shoals Project plus the proposed enhancement measures, and compared those costs to the economic cost of a new combustion turbine (CT) station, which is the only other generating source that also offers firm capacity and that can be dispatched quickly, like hydroelectric, during system emergencies and thus help support bulk power system stability.

Georgia Power based its economic studies on electric power conditions for the first year of the new license, 2024, with no inflation or escalation.<sup>23</sup> Georgia Power analyzed costs over a 40-

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<sup>23</sup> See Mead Corporation Publishing Paper Division, 72 FERC 61,027 July 13, 1995.



year license term and a 50-year license term. The most likely alternative source of generating power for the Lloyd Shoals Project would be a new combustion turbine station.

A simple cycle CT represents the lowest cost of capital to replace the capacity at the Lloyd Shoals Project. Cost estimates for capital and O&M for the CT option are developed internally based on proprietary sources of information and recent market information. However, the cost estimates developed fall within the ranges of technology cost estimates that have been produced recently from a variety of sources. The natural gas prices used are based on the U.S. Energy Information Administration's Annual Energy Outlook for 2020.

The analysis used levelized annual costs to determine a net present value of costs for: 1) the proposed action, which includes the existing Lloyd Shoals Project, and with proposed enhancements; and 2) a CT station. The details of this analysis are based on privileged and confidential commercial and financial information, the release of which would cause substantial harm to Georgia Power. Accordingly, these details are protected from public disclosure pursuant to 18 CFR § 388.112, but are included in the Privileged Information Volume of this license application (see Appendix G for further explanation), for use by FERC staff.

The analysis shows that power produced from the Lloyd Shoals Project under the proposed action is 1.5 times more economical than power produced from the most likely alternative power source (i.e., building a new CT station).

#### **4.3 COST OF ENVIRONMENTAL MEASURES**

Georgia Power has proposed a number of environmental enhancement measures for this license application, as described in Section 3.3. These enhancements and the projected capital and O&M costs of the enhancements are listed in Tables 15 and 16. These capital and O&M costs are also included in the levelized costs provided in the Privileged Information Volume of this license application.

## **5.0 CONCLUSIONS AND RECOMMENDATIONS**

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### **5.1 COMPARISON OF ALTERNATIVES**

In addition to the power and economic benefits of the Lloyd Shoals Project, Georgia Power's proposal to continue operating the Project includes numerous measures that would provide substantial environmental benefits in the Ocmulgee River basin. Table 17 summarizes the environmental effects of the no-action alternative and Georgia Power's proposed action.

### **5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE**

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation, the protection, mitigation of adverse impacts to, and enhancement of fish and wildlife, the protection of recreational opportunities, and the preservation of other aspects of environmental quality. Any license must be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. In determining whether, and under what conditions, a hydropower license should be issued, the Commission will weigh the costs and benefits of its recommended alternative against other proposed measures.

Based on review of the environmental and economic effects of the proposed project and its alternatives, Georgia Power recommends the proposed project with the various enhancement measures below as the preferred alternative. Georgia Power recommends this alternative because:

- Issuance of a new hydropower license would allow Georgia Power to operate the Project as an economically beneficial and dependable source of electrical energy for its customers.
- The 18-MW Project provides electric capacity as a firm generating resource that can be dispatched quickly during system emergencies and thus help support bulk power system stability. This attribute pairs well with intermittent solar sources that are currently being added to the Georgia Power fleet and through distributed generation.
- The approximately 70,000 MWH per year of electric energy generated is from a low-cost, carbon-free resource that would continue to help offset the use of other sources, including fossil-fueled generating plants.

- The public benefits of this alternative would well exceed those of the no-action alternative.
- The recommended measures would protect and enhance water quality, enhance fish and wildlife resources, and would provide improved recreation opportunities at the Project.

Moreover, continued operation of the Lloyd Shoals Project would have a highly beneficial cumulative effect on the Ocmulgee River in providing a popular fishery and recreation destination, as well as protecting the river's designated uses within the project reservoir and downstream of the Project in the free-flowing Ocmulgee River.

### **5.3 UNAVOIDABLE ADVERSE EFFECTS**

Unavoidable adverse impacts of Georgia Power's proposal to continue operating the Lloyd Shoals Project would include temporary effects of shoreline disturbance from construction of the proposed recreation enhancements. Some minor land disturbances would occur in upland and riparian areas during construction. However, these disturbances and impacts would be temporary. Impacts would be minimized through the implementation of BMPs for minimizing soil disturbance, controlling erosion, restoring natural contours, and re-vegetating disturbed areas following construction. Construction of Lloyd Shoals Boat Ramp and Tussahaw Creek Public Access Area would result in the permanent removal of approximately 4.6 acres of upland forest; however, adjacent forested habitat would be suitable for assimilating displaced wildlife.

Unavoidable fish losses resulting from turbine entrainment mortality would continue to occur with continued project operation. These losses, however, would not significantly affect fish populations and recreational fishing opportunities in the Ocmulgee River.

### **5.4 RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES**

Under the provisions of Section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or

other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

The Commission staff will request recommendations and preliminary license terms and conditions from the resource agencies, including Section 10(j) recommendations, in the public notice issued upon Commission determination that the application is ready for environmental analysis (18 CFR § 5.22).

## **5.5 CONSISTENCY WITH COMPREHENSIVE PLANS**

Section 10(a)(2)(A) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with Federal or State comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the Project. FERC (2021) currently lists 41 comprehensive plans for the state of Georgia.

Table 13, discussed in the Land Use and Relevant Resource Management Plans subsection of Section 3.3.6.1, lists 23 of those plans potentially relevant to the Lloyd Shoals Project. Based on a review of the agency and public comments filed on the Project, and on an independent analysis pursuant to Sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, Commission staff will determine whether the issuance of a new license for the Lloyd Shoals Project, with the recommended enhancement measures, would permit the best comprehensive development of the Ocmulgee River.

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## 7.0 CONSULTATION DOCUMENTATION

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Georgia Power identified and contacted numerous stakeholders during the pre-application activities leading up to the preparation of Exhibit E. In addition to FERC, the following agencies, governments, and non-governmental organizations were consulted via telephone, e-mail, mail, website distribution of information, face-to-face meetings, and/or virtual meetings in accordance with the distribution protocol established in the PAD (Georgia Power 2018):

- American Rivers
- Altamaha Riverkeeper
- Butts County
- Butts County Water and Sewer Authority
- City of Covington
- City of Jackson
- City of Locust Grove
- City of McDonough
- Georgia Bass Federation
- Georgia Department of Community Affairs – Historic Preservation Division (formerly of Georgia Department of Natural Resources)
- Georgia Department of Natural Resources – Environmental Protection Division
- Georgia Department of Natural Resources – Wildlife Resources Division
- Henry County
- Homeowners on Lake Jackson who requested to participate
- Jackson Lake Homeowners Association
- Jasper County
- Macon Water Authority
- Muscogee (Creek) Nation
- National Oceanic and Atmospheric Administration – National Marine Fisheries Service
- Newton County
- South River Water Alliance
- U.S. Department of Agriculture, Forest Service – Chattahoochee-Oconee National Forests
- U.S. Environmental Protection Agency, Region 4
- U.S. Fish and Wildlife Service

Table 18 lists the names and addresses of the federal, state, and interstate resource agencies, Tribes, and members of the public with which Georgia Power consulted in the development of this Exhibit E. Stakeholders consulted also included many lake residents, homeowners, and other members of the public.



## **TABLES**

**TABLE 1 NAMEPLATE GENERATING CAPACITY AND HYDRAULIC CAPACITY OF THE LLOYD SHOALS TURBINE UNITS**

<b>Unit</b>	<b>Nameplate Rating of Turbines<sup>a</sup> (hp)</b>	<b>Nameplate Capacity of Generators (MW)</b>	<b>Maximum Hydraulic Capacity<sup>b</sup> (cfs)</b>	<b>Efficient/Best-Gate Hydraulic Capacity<sup>b</sup> (cfs)</b>
1	5,650	3	620	410
2	5,650	3	620	410
3	5,650	3	620	410
4	5,650	3	620	410
5	5,650	3	620	410
6	5,650	3	620	410
<b>Total</b>	<b>33,900</b>	<b>18</b>	<b>3,720</b>	<b>2,460</b>

Source: Southern Company Generation Hydro Services

<sup>a</sup> At 96.8 ft net head during unit rating.

<sup>b</sup> At estimated 105 ft net head with full pool and normal tailrace conditions.

**TABLE 2 TURBINE CHARACTERISTICS OF THE LLOYD SHOALS POWERHOUSE**

Unit	Turbine Type	Turbine Arrangement	Unit Hydraulic Capacity (cfs)	Net Head (ft)	Number of Runners	Turbine Operating Speed (rpm)	Runner Diameter (inches)	Number of Blades per Runner	Runner Diameter at Inlet (inches)	Blade Spacing at Inlet (inches)	Runner Diameter at Discharge (inches)	Peripheral Runner Velocity (fps)
1	Francis	Horizontal double runner	600	96.8	2	300	52.38	17	44.82	8.28	50.28	68.62
2	Francis	Horizontal double runner	600	96.8	2	300	52.38	17	44.82	8.28	50.28	68.62
3	Francis	Horizontal double runner	600	96.8	2	300	52.38	17	44.82	8.28	50.28	68.62
4	Francis	Horizontal double runner	600	96.8	2	300	52.38	17	44.82	8.28	50.28	68.62
5	Francis	Horizontal double runner	600	96.8	2	300	54.5	17	49.16	9.09	52.28	71.40
6	Francis	Horizontal double runner	600	96.8	2	300	54.5	17	49.12	9.08	52.28	71.40

Source: Southern Company Generation Hydro Services

**TABLE 3      MINIMUM, AVERAGE, AND MAXIMUM MONTHLY FLOWS IN THE OCMULGEE RIVER BELOW LLOYD SHOALS DAM FROM 1999 - 2018**

<b>MONTH</b>	<b>MINIMUM FLOW (CFS)</b>	<b>AVERAGE FLOW (CFS)</b>	<b>MAXIMUM FLOW (CFS)</b>
January	888	2,001	5,688
February	951	2,437	4,635
March	944	2,578	5,586
April	632	2,108	4,642
May	443	1,608	7,038
June	275	1,356	3,628
July	339	1,450	6,677
August	321	953	2,925
September	241	1,120	4,899
October	277	953	3,329
November	259	1,481	4,925
December	513	2,291	8,188

Source: USGS (2020)

**TABLE 4 MONTHLY ENERGY LOSS ASSOCIATED WITH OPERATING PASSIVE DRAFT TUBE AERATION SYSTEM ACCORDING TO PROPOSED OPERATIONAL PROCEDURE**

Generating Scenario		Generation Loss (MWH)					
Number of Units Running	Number of Aerating Units Needed	May	Jun	Jul	Aug	Sep	Oct <sup>a</sup>
1	1	498	794	698	615	407	267
2	2	84	133	117	103	68	45
3	2	92	146	129	113	75	49
4	3	60	96	84	74	49	32
5	3	53	85	75	66	44	29
6	3	0	1	1	0	0	0
<b>Total Monthly MWH Lost</b>		<b>788</b>	<b>1,255</b>	<b>1,103</b>	<b>972</b>	<b>644</b>	<b>422</b>

<sup>a</sup> Cost of generation loss in October assumes the aeration system is operated 50 percent of the time in October based on historical occurrence of drought periods/flow supplementation.

**TABLE 5 FISHES KNOWN TO OCCUR IN THE VICINITY OF THE LLOYD SHOALS PROJECT BASED ON HISTORICAL AND RECENT RECORDS**

Family/Scientific Name	Common Name	Lake Jackson	Tributaries to Lake Jackson				Ocmulgee River to Juliette Dam
			South River	Yellow River	Alcovy River	Tusahaw Creek	
<b>GARS:</b>							
<i>Lepisosteus osseus</i>	Longnose Gar	X		X	X	X	X
<b>FRESHWATER EELS:</b>							
<i>Anguilla rostrata</i>	American Eel		X		X	X	X
<b>HERRINGS AND SHADS:</b>							
<i>Alosa sapidissima</i>	American Shad						X
<i>Dorosoma cepedianum</i>	Gizzard Shad	X	X	X	X	X	X
<i>Dorosoma petenense</i>	Threadfin Shad <sup>a</sup>	X	X	X	X	X	X
<b>MINNOWS:</b>							
<i>Campostoma pauciradii</i>	Bluefin Stoneroller						X
<i>Cyprinella callisema</i>	Ocmulgee Shiner		X	X	X	X	X
<i>Cyprinella lutrensis</i>	Red Shiner <sup>a</sup>		X				
<i>Cyprinella xaenura</i>	Altamaha Shiner <sup>b</sup>		X	X	X	X	X
<i>Cyprinus carpio</i>	Common Carp <sup>a</sup>	X	X		X	X	X
<i>Hybognathus regius</i>	Eastern Silvery Minnow						X
<i>Hybopsis rubrifrons</i>	Rosyface Chub		X	X	X	X	X
<i>Nocomis leptcephalus</i>	Bluehead Chub		X	X	X	X	X
<i>Notemigonus crysoleucas</i>	Golden Shiner	X	X	X	X	X	X
<i>Notropis amplamalma</i>	Longjaw Minnow		X		X	X	X
<i>Notropis hudsonius</i>	Spottail Shiner	X	X	X	X	X	X
<i>Notropis longirostrus</i>	Longnose Shiner					X	
<i>Notropis lutipinnis</i>	Yellowfin Shiner		X	X	X	X	X
<i>Notropis petersoni</i>	Coastal Shiner				X		X
<i>Notropis texanus</i>	Weed Shiner					X	
<i>Opsoeodus emiliae</i>	Pugnose Minnow						X

Family/Scientific Name	Common Name	Lake Jackson	Tributaries to Lake Jackson				Ocmulgee River to Juliette Dam
			South River	Yellow River	Alcovy River	Tussahaw Creek	
<b>SUCKERS:</b>							
<i>Carpiodes sp. cf. cyprinus</i>	Quillback	X					X
<i>Carpiodes sp. cf. velifer</i>	Highfin Carpsucker						X
<i>Erimyzon oblongus</i>	Creek Chubsucker		X			X	X
<i>Minytrema melanops</i>	Spotted Sucker	X				X	X
<i>Moxostoma collapsum</i>	Notchlip Redhorse		X	X	X	X	X
<i>Moxostoma robustum</i>	Robust Redhorse <sup>c</sup>						X
<i>Moxostoma rupiscartes</i>	Striped Jumprock		X	X	X	X	X
<i>Moxostoma sp. cf. lachneri</i>	Brassy Jumprock		X	X			X
<b>CATFISHES:</b>							
<i>Ameiurus brunneus</i>	Snail Bullhead	X	X	X	X	X	X
<i>Ameiurus catus</i>	White Catfish	X	X	X	X	X	X
<i>Ameiurus natalis</i>	Yellow Bullhead	X	X	X	X	X	X
<i>Ameiurus nebulosus</i>	Brown Bullhead	X	X	X	X	X	X
<i>Ameiurus platycephalus</i>	Flat Bullhead	X					X
<i>Ictalurus furcatus</i>	Blue Catfish <sup>a</sup>	X			X	X	
<i>Ictalurus punctatus</i>	Channel Catfish	X	X	X	X	X	X
<i>Noturus insignis</i>	Margined Madtom		X	X	X	X	X
<i>Noturus leptacanthus</i>	Speckled Madtom		X			X	X
<i>Pylodictus olivaris</i>	Flathead Catfish <sup>a</sup>	X					X
<b>PIKES:</b>							
<i>Esox americanus</i>	Redfin Pickerel					X	X
<i>Esox niger</i>	Chain Pickerel	X	X	X	X	X	X
<b>LIVEBEARERS:</b>							
<i>Gambusia holbrooki</i>	Eastern Mosquitofish	X	X	X	X	X	X
<b>TEMPERATE BASSES:</b>							
<i>Morone chrysops</i>	White Bass <sup>a</sup>	X			X	X	X
<i>Morone saxatilis</i>	Striped Bass	X					X
<i>Morone chrysops</i> x <i>M. saxatilis</i>	hybrid bass	X	X	X	X	X	X

Family/Scientific Name	Common Name	Lake Jackson	Tributaries to Lake Jackson				Ocmulgee River to Juliette Dam
			South River	Yellow River	Alcovy River	Tussehaw Creek	
<b>SILVERSIDES:</b>							
<i>Labidesthes sicculus</i>	Brook Silverside	X					
<b>SUNFISHES:</b>							
<i>Centrarchus macropterus</i>	Flier						X
<i>Lepomis auritus</i>	Redbreast Sunfish	X	X	X	X	X	X
<i>Lepomis cyanellus</i>	Green Sunfish <sup>a</sup>	X	X	X	X	X	X
<i>Lepomis gulosus</i>	Warmouth	X	X	X	X	X	X
<i>Lepomis macrochirus</i>	Bluegill	X	X	X	X	X	X
<i>Lepomis marginatus</i>	Dollar Sunfish	X					X
<i>Lepomis megalotis</i>	Longear Sunfish <sup>a</sup>	X				X	X
<i>Lepomis microlophus</i>	Redear Sunfish	X	X	X	X	X	X
<i>Micropterus cataractae</i>	Shoal Bass <sup>a</sup>						X
<i>Micropterus punctulatus</i>	Spotted Bass <sup>a</sup>	X					X
<i>Micropterus salmoides</i>	Largemouth Bass	X	X	X	X	X	X
<i>Micropterus sp. cf. coosae</i>	Redeye Bass					X	X
<i>Micropterus sp.</i>	Altamaha Bass						X
<i>Pomoxis annularis</i>	White Crappie <sup>a</sup>	X	X	X			X
<i>Pomoxis nigromaculatus</i>	Black Crappie	X	X	X	X	X	X
<b>PERCHES:</b>							
<i>Perca flavescens</i>	Yellow Perch <sup>a</sup>	X	X	X	X	X	X
<i>Percina nigrofasciata</i>	Blackbanded Darter						X
<i>Etheostoma hopkinsi</i>	Christmas Darter						X
<i>Etheostoma inscriptum</i>	Turquoise Darter		X		X	X	X
<i>Etheostoma olmstedi</i>	Tessellated Darter						X
<i>Etheostoma parvipinne</i>	Goldstripe Darter						X
<b>Estimated Number of Taxa</b>		34	37	31	36	43	61

Data sources: EA (1990a, 1990b, 1990c); Straight et al. (2009); GDNR (2018a, 2018b); Bart et al. (1994); Grabowski and Jennings (2009); Nuckols and Roghair (2004); Pruitt (2013); Lee et al. (1980).

<sup>a</sup> Introduced, non-native to the Altamaha River basin (GEPD 2003; Bart et al. 1994; Lee et al. 1980).

<sup>b</sup> Altamaha Shiner is Georgia state-listed as threatened.

<sup>c</sup> Robust Redhorse is Georgia state-listed as endangered and is under review for federal listing.



**TABLE 6 SUMMARY OF 2019-2020 FRESHWATER MUSSEL SURVEY RESULTS FOR LAKE JACKSON AND THE OCMULGEE RIVER DOWNSTREAM**

Scientific Name	Common Name	Number of Mussels	Relative Abundance (Percent)	Frequency of Occurrence (Percent) <sup>a</sup>
<b>Lake Jackson:</b>				
<i>Elliptio hopetonensis</i>	Altamaha Slabshell	205	45.9	46.7
<i>Pyganodon gibbosa</i>	Inflated Floater	175	39.1	81.8
<i>Utterbackia imbecillis</i>	Paper Pondshell	63	14.1	70.0
<i>Pyganodon cataracta</i>	Eastern Floater	2	0.4	6.7
<i>Toxolasma pullus</i>	Savannah Lilliput <sup>b</sup>	1	0.2	3.3
<i>Alasmidonta arcula</i>	Altamaha Arcmussel <sup>b</sup>	1 <sup>c</sup>	0.2	3.3
		<b>447</b>		
<b>Ocmulgee River, Lloyd Shoals Tailrace Area:</b>				
<i>Elliptio hopetonensis</i>	Altamaha Slabshell	335	63.4	95.0
<i>Pyganodon cataracta</i>	Eastern Floater	96	18.2	75.0
<i>Utterbackia imbecillis</i>	Paper Pondshell	61	11.6	65.0
<i>Pyganodon gibbosa</i>	Inflated Floater	29	5.5	25.0
<i>Elliptio icterina</i>	Variable Spike	6	1.1	20.0
<i>Lampsilis splendida</i>	Rayed Pink Fatmucket	1	0.2	5.0
		<b>528</b>		
<b>Ocmulgee River, Hwy 16 Bridge to Juliette Dam:</b>				
<i>Elliptio hopetonensis</i>	Altamaha Slabshell	398	85.0	100.0
<i>Utterbackia imbecillis</i>	Paper Pondshell	47	10.0	20.0
<i>Elliptio icterina</i>	Variable Spike	12	2.7	30.0
<i>Pyganodon gibbosa</i>	Inflated Floater	11	2.4	20.0
		<b>468</b>		

Sources: GDNR (2019), Rowe (2021)

<sup>a</sup> Frequency of occurrence is the proportion of surveyed sites where the species was found.

<sup>b</sup> Georgia threatened species.

<sup>c</sup> Relict (dead) shell only.

**TABLE 7 RARE, THREATENED, AND ENDANGERED SPECIES POTENTIALLY OCCURRING IN THE LLOYDS SHOALS PROJECT VICINITY**

Scientific Name	Common Name	Federal Status <sup>b</sup>	Georgia Status <sup>c</sup>	Global Rank <sup>d</sup>	Habitat	County
<b>PLANTS:</b>						
<i>Anemone caroliniana</i>	Carolina Windflower			G5	Upland seepage swamp openings over Iredell soils; wet meadows.	Jasper
<i>Carex seorsa</i>	Weak Stellate Sedge			G5	Moist depressions in forests and deciduous swamps; water tupelo swamps.	Newton
<i>Cyperus lupulinus ssp. macilentus</i>	Meagre Hop Flatsedge			G5T5	Open sandy or coarse soil habitats along roadsides, sandy shores of lakes or rivers, rock outcrops in forests, and disturbed soils.	Jasper
<i>Cypripedium acaule</i>	Pink Ladyslipper			G5	Upland pine and mixed pine-hardwood forests with acidic soils; in the mountains, near edges of rhododendron thickets and mountain bogs.	Henry, Jasper
<i>Dryopteris celsa</i>	Log Fern			G4	Wet slopes, hammocks, and swamps with calcareous soils.	Jasper
<i>Eriocaulon koernickianum</i>	Small-headed Pipewort (Dwarf Hatpins)	UR	E	G2	Seepage areas and wet depressions on Piedmont granite outcrops, often with Horned Bladderwort.	Newton
<i>Eurybia avita</i>	Alexander Rock Aster			G3	Granite outcrops; rooted in shallow soils of moist depressions in light shade.	Newton
<i>Eurybia jonesiae</i>	Piedmont Bigleaf Aster			G3?	Rich deciduous forests bordering rivers and streams; moist ravines	Butts
<i>Glyceria septentrionalis</i>	Floating Manna-grass			G5	Swamps and marshes, either in shallow water or very wet soil; alluvial forests, borders of streams, and shores of ponds or lakes.	Newton
<i>Gratiola amphiantha</i> (= <i>Amphianthus pusillus</i> )	Little Amphianthus (Pool Sprite)	LT	T	G2	Shallow, flat-bottomed depressions (solution pits, vernal pools) on granite outcrops, with thin gravelly soils and winter-spring inundation.	Butts, Henry, Newton
<i>Gratiola graniticola</i>	Granite Hedge-hyssop			G3	Restricted to ephemeral vernal pools on granite outcrops.	Butts, Newton

Scientific Name	Common Name	Federal Status <sup>b</sup>	Georgia Status <sup>c</sup>	Global Rank <sup>d</sup>	Habitat	County
<i>Isoetes melanospora</i>	Black-spored Quillwort	LE	E	G1	Shallow, temporarily flooded, flat-bottomed pools formed by natural erosion on granite outcrops.	Butts, Newton
<i>Listera australis</i>	Southern Twayblade			G4	Low, moist woods with rich humus and a shady understory.	Jasper
<i>Panax quinquefolius</i>	American Ginseng			G3G4	Rich, cool, moist but not extremely wet woods under a closed canopy.	Jasper
<i>Pilularia americana</i>	American Pillwort			G5	Granite outcrops, seasonally exposed muddy shores.	Butts
<i>Ptilimnium costatum</i>	Eastern Bishopweed			G4	Remnant wet prairies, bottomland hardwood forests.	Jasper
<i>Portulaca umbraticola</i> ssp. <i>coronata</i>	Wingpod Purslane			G5T2	Sandy soils of granite and sandstone outcrops	Newton
<i>Quercus oglethorpensis</i>	Oglethorpe Oak		T	G3	Wet clay soils of seepage swamps, stream terraces, and moist hardwood forests.	Jasper
<i>Quercus prinoides</i>	Dwarf Chinquapin Oak			G5	Roadsides, hillside pastures, and barren slopes with dry rocky or sandy soils.	Newton
<i>Quercus similis</i>	Swamp Post Oak			G4	Rich, moist bottom lands; pine woods, gulf prairies, and marshes.	Jasper
<i>Rhus michauxii</i>	Michaux's Sumac (Dwarf Sumac)	LE	E	G2G3	Sandy or rocky open woods in areas where disturbance has provided open areas.	Newton
<i>Sedum pusillum</i>	Granite Stonecrop		T	G3	Granite outcrops, usually in mats of moss beneath cedar trees	Henry, Newton
<i>Silene ovata</i>	Mountain Catchfly		R	G3	Rich, deciduous forests over limestone or amphibolite in the Coastal Plain and in Fall Line Ravines.	Jasper
<i>Solidago porteri</i>	Porter's Goldenrod			G1	Dry woods and barrens; mix of native grasslands and oak savannah).	Jasper
<i>Stewartia malacodendron</i>	Silky Camellia		R	G4	Rich ravine and slope forests; lower slopes of sandhills above bogs and creek swamps.	Butts
<i>Trillium reliquum</i>	Relict Trillium	LE	E	G3	Mature hardwood forests in rich ravines and on stream terraces on amphibolite or limestone.	Jasper

Scientific Name	Common Name	Federal Status <sup>b</sup>	Georgia Status <sup>c</sup>	Global Rank <sup>d</sup>	Habitat	County
<i>Verbesina helianthoides</i>	Hairy Wingstem			G5	Prairies, dry woods.	Jasper
<i>Zanthoxylum americanum</i>	Northern Prickly-ash			G5	Along riverbanks and in moist ravines, thickets, and woods; upland rocky hillsides, bluffs, and open woods.	Newton
<b>INSECTS:</b>						
<i>Danaus plexippus plexippus</i>	Monarch Butterfly	C		?	Lays eggs on milkweed as obligate host plant; adults in eastern U.S. migrate south in fall to overwinter in central Mexico	Statewide
<b>FRESHWATER MUSSELS:</b>						
<i>Alasmidonta arcuata</i>	Altamaha Arcmussel		T	G2	Sloughs, oxbows, or depression areas in large creeks to large rivers with silt, mud, and/or sand substrates.	Jasper, Newton
<i>Pyganodon gibbosa</i>	Inflated Floater			G3Q	Rivers with soft substrates of mud, silts, or fine sands; pool and slack-water habitats of rivers.	Jasper, Newton
<i>Toxolasma pullus</i>	Savannah Lilliput		T	G2	Rivers to small creeks, lakes, and backwaters with mud or silty sand, often in very shallow water along banks	Newton
<b>FRESHWATER SNAILS:</b>						
<i>Elimia mutabilis</i>	Oak Elimia			G2Q	Medium-sized rivers on shoals in clear silt-free areas; downstream sides of boulders and outcrops in moderate to swift current.	Henry, Newton
<i>Somatogyus alcoviensis</i>	Reverse Pebblesnail	UR		G1Q	Medium to small rivers in rapidly flowing water, on surfaces of gravel, cobble, boulder, bedrock, and vegetation.	Newton
<b>CRAYFISH:</b>						
<i>Cambarus howardi</i>	Chattahoochee Crayfish		T	G3Q	Clear, free-flowing waters in riffle habitat in small tributaries to large rivers.	Newton
<b>FISH:</b>						
<i>Cyprinella xaenura</i>	Altamaha Shiner		T	G2G3	Medium-sized streams and rivers in runs or pools with rocky to sandy substrates.	Butts, Henry, Jasper, Newton

Scientific Name	Common Name	Federal Status <sup>b</sup>	Georgia Status <sup>c</sup>	Global Rank <sup>d</sup>	Habitat	County
<i>Etheostoma parvipinne</i>	Goldstripe Darter		R	G4G5	Small streams, spring seeps, and runs with aquatic vegetation; occurs below the Fall Line.	Butts, Jasper
<i>Micropterus catarractae</i>	Shoal Bass			G3	Rocky riffles and pools of creeks and small to medium rivers; shoal areas of rivers and creeks.	Butts, Henry, Jasper
<i>Micropterus sp.</i>	Altamaha Bass			GNR	Upland streams, headwaters above Fall Line in Altamaha River basin.	Butts
<i>Moxostoma robustum</i>	Robust Redhorse	UR	E	G1	Medium to large rivers, shallow riffles to deep flowing water; moderately swift current.	Butts, Jasper
<i>Moxostoma sp. 4</i>	Brassy Jumprock			G4	Silty to rocky pools and slow runs of large creeks; small to medium rivers; impoundments.	Butts, Newton
<i>Notropis chalybaeus</i>	Ironcolor Shiner			G4	Coastal Plain streams and floodplain swamps with sandy substrate in clear well-vegetated water.	Jasper
<b>AMPHIBIANS:</b>						
<i>Hemidactylium scutatum</i>	Four-toed Salamander			G5	Under objects or among mosses in swamps, boggy streams, and wet areas near quiet pools.	Butts, Jasper, Newton
<b>REPTILE:</b>						
<i>Heterodon simus</i>	Southern Hognose Snake		T	G2	Long leaf pine and/or scrub oak areas with well drained, xeric, sandy soils; wiregrass understory.	Butts
<i>Lampropeltis rhombomaculata</i>	Mole Kingsnake			G5	Areas of soft soil, including abandoned or cultivated fields; adept burrowers and rarely encountered aboveground.	Henry, Jasper
<b>BIRDS:</b>						
<i>Dryobates borealis</i> (= <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.	Jasper

Scientific Name	Common Name	Federal Status <sup>b</sup>	Georgia Status <sup>c</sup>	Global Rank <sup>d</sup>	Habitat	County
<i>Haliaeetus leucocephalus</i>	Bald Eagle		T	G5	Almost always nest near open waters (rivers, lakes, coastal waters, wetlands). Usually found in large, open-topped pines near open water.	Butts, Henry, Jasper, Newton
<i>Tyto alba</i>	Barn Owl			G5	Nests in large hollow trees or old barns in areas with pasture, grassland, or open marsh.	Henry, Newton
<b>MAMMAL:</b>						
<i>Perimyotis subflavus</i>	Tricolored Bat	UR		G2G3	Open forests with large trees and woodland edges; roost in tree foliage; hibernate in caves or mines with high humidity.	Jasper

Sources: GDNR (2015, 2021b); FWS (2019b, 2020); NatureServe (2021).

<sup>a</sup> This list is for rare species with known element of occurrence records in Butts, Henry, Newton and Jasper Counties, Georgia; for rare aquatic species, the known element of occurrence records are from the Altamaha River basin within these four counties.

<sup>b</sup> Federal status: LE = listed endangered; LT = listed threatened; C = candidate for listing; UR = under review to determine if listing may be warranted.

<sup>c</sup> Georgia state status: E = Georgia endangered; T = Georgia threatened; R = Georgia Rare.

<sup>d</sup> 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, and abundant; ? = inexact numeric rank; GNR = unranked – global rank not yet assessed.

**TABLE 8 PERCENT MAXIMUM WEIGHTED USEABLE AREA BY SPECIES\LIFE-STAGE**

Discharge (cfs)	Percent Maximum Weighted Useable Area by Species/Life-Stage												
	Altamaha Shiner – YOY	Altamaha Shiner – adult	Redeye Bass – YOY	Redeye Bass – juvenile	Redeye Bass – adult	Redbreast Sunfish – spawn	Redbreast Sunfish – adult	Shoal bass – YOY	Shoal Bass – adult	Striped Jumprock – YOY	Striped Jumprock – adult	Silver Redhorse – adult	Overall Average
<b>50</b>	52	48	90	65	39	84	67	93	41	98	45	39	<b>63.4</b>
<b>75</b>	65	57	94	70	46	90	74	98	47	99	53	47	<b>70.0</b>
<b>100</b>	71	64	97	73	53	93	77	98	54	99	61	52	<b>74.3</b>
<b>125</b>	77	70	98	77	58	96	82	100	58	100	66	57	<b>78.3</b>
<b>150</b>	81	76	99	80	63	98	84	99	62	99	71	60	<b>81.0</b>
<b>175</b>	84	80	100	83	67	99	87	98	67	98	75	64	<b>83.5</b>
<b>200</b>	86	83	100	84	71	100	89	96	70	96	79	67	<b>85.1</b>
<b>250</b>	91	88	99	87	75	100	92	92	76	90	85	72	<b>87.3</b>
<b>300</b>	95	92	98	90	77	100	93	88	82	84	90	77	<b>88.8</b>
<b>350</b>	97	96	96	94	82	98	95	86	87	81	92	80	<b>90.3</b>
<b>400</b>	99	98	94	95	86	97	97	82	91	75	95	83	<b>91.0</b>
<b>450</b>	100	97	91	96	89	96	98	77	93	69	97	85	<b>90.7</b>
<b>600</b>	97	100	83	100	94	87	100	65	97	54	99	91	<b>88.9</b>
<b>800</b>	93	97	74	100	98	78	100	52	100	39	100	99	<b>85.8</b>
<b>1,000</b>	83	92	66	98	100	69	98	42	97	27	97	99	<b>80.7</b>
<b>1,300</b>	72	82	56	93	96	59	90	31	90	20	91	100	<b>73.3</b>
<b>1,500</b>	64	75	51	87	93	54	85	26	86	17	87	99	<b>68.7</b>
<b>2,000</b>	43	60	40	71	83	45	68	19	74	14	74	89	<b>56.7</b>
<b>2,500</b>	31	49	32	57	74	40	49	15	59	11	62	74	<b>46.1</b>
<b>3,500</b>	20	33	21	34	55	31	29	11	41	8	39	50	<b>31.0</b>

Source: EA 1990a

Note: Highlighting indicates the current Lloyd Shoals minimum flow target of 400 cfs (or inflow whichever is less).

YOY = young-of-year.

**TABLE 9 AMERICAN EEL CAPTURE DATA BY SAMPLING EVENT, SEPTEMBER 2019-JUNE 2021**

Date	Moon (% visible)	Discharge (cfs)	Water Temp. (°C)	Total Eels Captured or Observed			
				Boat Electrofishing	Backpack Electrofishing	Traps	Flashlight Survey
9/27/2019	1.9	299	27.4	0	0	0 <sup>3</sup>	NA
10/25/2019	9.3	493	20.8	1	1	0 <sup>3</sup>	NA
11/26/2019	0.1	1,288	13.7	1	0	0 <sup>3</sup>	NA
12/17/2019	69.9	2,870	10.2	0	NSF <sup>1</sup>	0 <sup>3</sup>	NA
1/21/2020	11	3,565	13.6	7	NSF	0 <sup>3</sup>	NA
3/12/2020	89.9	3,020	13.9	1	NSF	0	NA
4/10/2020	81.1	2,230	20.2	NSC <sup>2</sup>	NSC	0	NA
5/29/2020	48.4	2,440	22.3	10	NSF	0	NA
6/24/2020	14.5	1,640	26.5	3	NSF	0	3
7/22/2020	5.7	658	28.2	7	26	1	1
8/12/2020	42.4	1,710	28.3	2	NSF	0	0
9/23/2020	49.0	2,640	22.8	2	0	0	0
10/2/2020	99.7	1,040	22.2	3	8	0	0
11/6/2020	71.8	1,070	19.7	NA	6	0	0
12/12/2020	5.9	1,110	14.3	NA	1	0	1
1/23/2021	78.6	1,150	11.8	NA	3	0	0
2/11/2021	0.2	1,930	12.9	3	3	0	0
3/12/2021	0.7	1,490	15.9	NA	3	0	1
4/20/2021	57.6	1,190	17.7	NA	24	0 <sup>3</sup>	5
5/12/2021	0.8	2,290	20.3	NA	NA	0	8
5/26/2021	99.9	917	20.8	6	51	1	15
6/16/2021	37.1	783	23.4	NA	47	0	4
<b>Total Eels Captured or Observed</b>				<b>46</b>	<b>173</b>	<b>2</b>	<b>38</b>
<b>Total Eels Captured</b>				<b>22</b>	<b>124</b>	<b>2</b>	<b>0</b>
<b>Recaptures</b>				<b>2</b>	<b>3</b>	<b>0</b>	<b>NA</b>

Sources: Georgia Power (2021b); sampling results for May-June 2021 to be presented in August 2021 study report addendum.

<sup>1</sup>NSF = not sampled due to high flows; <sup>2</sup>NSC = not sampled due to COVID-19; <sup>3</sup>Traps vandalized.



**TABLE 10      COMPARISON OF AMERICAN EEL CAPTURE DATA TO PREVIOUS STUDY**

Study Year(s)	Catch per Unit Effort (eels per hour)	
	1988 <sup>a</sup>	2019-2021 <sup>b</sup>
<b>Backpack Electrofishing</b>		
Spring	14.6	14.7
Summer	37.4	23.0
Fall	5.4	3.0
Winter	1.4	2.3
<b>Boat Electrofishing</b>		
Spring	--	2.3
Summer	1.4	2.0
Fall	--	0.5
Winter	0.6	1.5
<b>Total Length (mm)</b>		
Minimum	168	127
Maximum	825	635
Mean	343	327
Standard Deviation	95	102
<b>Life Stages Present</b>	Juveniles, adults	Juveniles, adults

<sup>a</sup>Source: EA (1990b)

<sup>b</sup>Source: Georgia Power (2021b); sampling results for May-June 2021.

**TABLE 11 RECREATION FACILITIES PROVIDING ACCESS TO THE LLOYD SHOALS PROJECT**

RECREATION SITE	COUNTY	ACREAGE	ADDRESS	AMENITIES
<b>Georgia Power Owned and Operated Facilities (located within the project boundary):</b>				
Lloyd Shoals Park	Butts	5 acres	155 Dam Rd, Jackson, GA 30233	50 parking spaces (with trailer slots), picnic/day use area, swimming beach, playground, pavilion, barrier-free fishing pier, restrooms, 2-lane barrier-free boat ramp, courtesy dock, extensive shoreline fishing
Lloyd Shoals Tailrace Fishing Pier	Butts	0.6 acre	155A Dam Rd, Jackson, GA 30233	10 parking spaces, trash can, barrier-free boardwalk path to fishing pier with seats for fishing as well as a secluded seated area for viewing
Ocmulgee River Park	Jasper	4 acres	8484 Jackson Lake Rd, Monticello, GA 31064	15 parking spaces, 1-lane boat ramp, picnic/day use area, bank fishing
Jane Lofton Public Access Area <sup>a</sup>	Butts	0.7 acre	Hendricks Road near Dam Road/Power Plant Road, Jackson, GA 30233	Bank fishing, gravel parking area, trash can
<b>Other Publicly or Privately Owned and Operated Facilities:</b>				
Bear Creek Marina	Jasper		60 Bear Creek Marina Rd, Mansfield, GA 30055	50 parking spaces (with trailer slots), boat ramp, swimming, store, and restrooms with full service campground. Privately operated.
Berry's Boat Dock	Newton		330 Waters Bridge Cir, Covington, GA 30014	75 parking spaces (with trailer slots), boat ramp, restrooms, store, marina. Privately operated.
Factory Shoals Park	Newton		450 Newton Factory Bridge Road, Covington, 30014	200 parking spaces (without trailers), Alcovy River access. 450 acres, open area (signage limiting horses, etc.) picnicking, playground,

RECREATION SITE	COUNTY	ACREAGE	ADDRESS	AMENITIES
				swimming, hiking, fishing, restrooms. Operated by Newton County.
Georgia FFA-FCCLA Center	Newton		720 FFA FHA Camp Road, Covington, GA 30014	Canoeing & kayaking, swimming. 500-acre recreational youth camp and conference center owned by State of Georgia.
Martin's Marina (Lakeview Restaurant)	Jasper		8726 Jackson Lake Rd, Monticello, GA 31064	35 parking spaces (with trailer slots), full service campground, restrooms, boat ramps, marina, gas, food, store. Privately operated.
Reasor's Landing	Butts		278 Marina Cir, Jackson, GA 30233	50 estimated parking spaces (with trailer slots), Boat ramp, boat storage, gas, tackle, food, restaurant, restrooms, and mechanic. Privately operated.
Sandy's Highway 36 Marina	Butts		2571 GA-36, Jackson, GA 30233	Boat ramp. Privately operated.
Tussahaw Creek/Highway 36 Bridge	Butts		2088 GA-36, Jackson, GA 30233	Informal bank fishing, public access; undeveloped. Owned by Georgia Power.
Walker Marina	Newton		440 Lang Rd, Covington, GA 30014	Boat ramp, bank fishing. Privately operated.

<sup>a</sup> Previously referred to as the Emergency Spillway South End Fishing Access.

**TABLE 12 2019 LAKE JACKSON RECREATION USE VISITOR ASSESSMENT**

FACILITIES	METHOD	TOTAL VISITORS
Lloyd Shoals Park	User Counts	33,579
Ocmulgee River Park	User Counts	5,982
Lloyd Shoals Tailrace Fishing Pier	User Counts	936
Non-Project Recreation Use	Estimates/Escalation	29,292
<b>Annual Use Total</b>		<b>69,789</b>
Annual Total – Daytime		68,393
Annual Total – Nighttime		1,396
Peak Weekend Average – Daytime		3,420
Peak Weekend Average - Nighttime		23

**TABLE 13 FEDERAL OR STATE COMPREHENSIVE PLANS POTENTIALLY APPLICABLE TO PROJECT RECREATION OR LAND USE**

COMPREHENSIVE PLAN	POTENTIALLY APPLICABLE (YES OR NO)
Atlantic States Marine Fisheries Commission. 1998. Amendment 1 to the Interstate Fishery Management Plan for Atlantic sturgeon ( <i>Acipenser oxyrhynchus oxyrhynchus</i> ). (Report No. 31). July 1998.	Yes
Atlantic States Marine Fisheries Commission. 1998. Interstate fishery management plan for Atlantic striped bass. (Report No. 34). January 1998.	Yes
Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.	Yes
Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.	Yes
Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.	Yes
Atlantic States Marine Fisheries Commission. 2010. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.	Yes
Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for American eel ( <i>Anguilla rostrata</i> ). (Report No. 36). April 2000.	Yes
Atlantic States Marine Fisheries Commission. 2008. Amendment 2 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2008.	Yes

COMPREHENSIVE PLAN	POTENTIALLY APPLICABLE (YES OR NO)
Atlantic States Marine Fisheries Commission. 2013. Amendment 3 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. August 2013.	Yes
Atlantic States Marine Fisheries Commission. 2014. Amendment 4 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2014.	Yes
Department of the Army, Corps of Engineers. Savannah District. 1985. South metropolitan Atlanta region: Georgia water resources management study. Savannah, Georgia. January 1985.	Yes
Department of the Army, Corps of Engineers. Savannah District. 1985. Water resources development by the U.S. Army Corps of Engineers in Georgia. Savannah, Georgia. January 1985.	Yes
Georgia Department of Natural Resources. 1985. Water availability and use - Ocmulgee River Basin. Atlanta, Georgia.	Yes
Georgia Department of Natural Resources. 1986. Water availability and use report - Altamaha River Basin. Atlanta	Yes
Georgia Department of Natural Resources. 2008. Georgia Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2013. Atlanta	Yes
Metropolitan North Georgia Water Planning District. 2003. Water supply and water conservation management plan. Atlanta, Georgia. September 2003.	Yes
Metropolitan North Georgia Water Planning District. 2003. Long-term wastewater management plan. Atlanta, Georgia. September 2003.	Yes
Metropolitan North Georgia Water Planning District. 2003. District-wide watershed management plan. Atlanta, Georgia. September 2003.	Yes
National Marine Fisheries Service. 1998. Final Recovery Plan for the shortnose sturgeon ( <i>Acipenser brevirostrum</i> ). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. December 1998.	Yes
National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.	Yes
State of Georgia. Office of the Governor. 1987. Water resources management strategy-summary document. Atlanta, Georgia. January 12, 1987.	Yes
U.S. Fish and Wildlife Service. National Marine Fisheries Service. Georgia Department of Natural Resources. 2013. Priority restoration and management actions for the American Shad in the Altamaha River Basin, Georgia. Athens, Georgia. 2013.	Yes
U.S. Fish and Wildlife Service. No date. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.	Yes

Source: FERC (2021)

**TABLE 14 NRHP ELIGIBLE SITES AT THE LLOYD SHOALS PROJECT**

<b>SITE</b>	<b>AREA</b>	<b>DESCRIPTION</b>	<b>1989 CONDITION</b>	<b>2019 CONDITION</b>
9BS17	Lloyd Shoals Construction and Operator's Village	African American Housing area	Disturbed, foundations may be present	Little change in condition from 1989
9BS18	Lloyd Shoals Construction and Operator's Village	Construction Village, Numerous Features	Disturbed, foundations may be present	Little change in condition from 1989
9BS19 <sup>a</sup>	Lloyd Shoals Construction and Operator's Village	Landscape Feature, Construction Staging Pad	Disturbed to subsurface	Area covered by parking lot
9BS20	Lloyd Shoals Construction and Operator's Village	Plant Supervisor's Home Site	Disturbed, foundations may be present	Little change in condition from 1989
9BS23	Hendrick's Mill	Circa 1830-1910 Grist Mill	Partially submerged	Unknown
9JA223	Dempsey Ferry	Circa 1859 River Ferry	Submerged	Unknown

<sup>a</sup> The cultural study recommended that this site be discontinued from Georgia Power monitoring (TRC 2020b).  
Source: TRC 2020b

**TABLE 15 COST OF ENVIRONMENTAL MEASURES PROPOSED BY GEORGIA POWER FOR THE LLOYD SHOALS PROJECT FOR A 40-YEAR LICENSE**

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 40-year license term</b>	<b>Capital \$</b>
<b>1</b>	<b>Operational Measures to Enhance Summer DO</b>				
1.1		Prepare an operational procedure for the draft tube aeration system that specifies priority for the use of aerating units under different generation scenarios.			\$1,000
1.2		Seasonal DO and temperature monitoring in one season to verify the DO-enhancing performance of the passive draft tube aeration system with implementation of the Passive Draft Tube Aeration System Operational Procedure.	\$50,000	\$50,000	\$20,000
1.3		Generation Loss – reduced efficiency due to operation of aeration system according to new plan.	\$148,000	\$5,920,000	
<b>2</b>	<b>Terrestrial Invasive Vegetation Monitoring and Treatment</b>				
2.1		Every three years, monitor invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier and treat invasive exotic plant populations as necessary to support public access and utilization of these sites.	\$8,000	\$104,000	
<b>3</b>	<b>Recreation Improvements</b>				
3.1	Recreation Management Plan	Revision of the Recreation Management Plan to match FERC final order language.			\$1,000

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 40-year license term</b>	<b>Capital \$</b>
3.2	Lloyd Shoals Boat Ramp (former Jane Lofton Public Access Area)	Enhance recreation amenities by constructing a new two-lane boat ramp, a barrier-free fishing pier, barrier-free parking next to the fishing pier, a restroom with a flush toilet, and expanded parking.  O&M Costs include Georgia Power personnel to monitor and maintain park.	\$35,000	\$1,400,000	\$1,100,000
3.3	Lloyd Shoals Park	Demolish existing boat ramp and construct a non-motorized boat (canoe/kayak) step-down ramp in its place, replacing the existing courtesy dock with a barrier-free fishing pier, construct barrier-free parking next to the new fishing pier, restripe existing parking areas for vehicle-only spaces, and update the existing restroom and bathhouse. These improvements would enhance access for canoeing, kayaking, and bank fishing, alleviate parking congestion on peak-use weekends, and continue to support quality recreation opportunities.  O&M costs include Georgia Power personnel to monitor and maintain park.	\$35,000	\$1,400,000	\$800,000
		Additional O&M costs include contract personnel responsible for cleaning, trash pick-up, landscaping, and park management.	\$10,000	\$400,000	
3.4	Ocmulgee River Park	Enhance recreation amenities at Ocmulgee River Park by rehabilitating the existing boat ramp, redefining and paving the existing parking area, landscaping with boulders to discourage parking near the shoreline, installing one concrete-lined vault			\$350,000



Item	Major Category	Components	O&M \$	Total O&M \$ for 40-year license term	Capital \$
		toilet, and relocating picnic tables closer to the existing parking area. O&M Costs include Georgia Power personnel to monitor and maintain park.	\$25,000	\$1,000,000	
		Additional O&M costs include personnel responsible for cleaning, trash pick-up, landscaping, and park management costs.	\$10,000	\$400,000	
3.5	Tussehaw Creek Public Access Area	Enhance recreational access to Lake Jackson by developing formal access on Georgia Power land at the Highway 36 Bridge at Tussehaw Creek. New amenities would be constructed to include a paved access road off of Winding Way, a paved parking area with 10 parking spaces of which two will be accessible, one picnic table and one trash can, and a paved sidewalk leading to bank fishing areas and a step-down ramp for canoeing/kayaking access. O&M costs include Georgia Power personnel to monitor and maintain park.	\$30,000	\$1,200,000	\$500,000
		Additional O& M costs include personnel responsible for cleaning, trash pick-up, landscaping, and park management costs.	\$10,000	\$400,000	
<b>4</b>	<b>Cultural Resources Education</b>				
4.1		Implement a Historic Properties Management Plan through a Programmatic Agreement to assure the preservation and long-term management of archaeological sites and historic buildings and structures within the project boundary.	\$1,000	\$40,000	\$50,000

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 40-year license term</b>	<b>Capital \$</b>
<b>5</b>	<b>Shoreline Management</b>				
5.1	Shoreline Management Plan	Revision of the Shoreline Management Plan (SMP) in accordance with the existing Shoreline Management Guidelines for Georgia Power Lakes. Implementation of the SMP to promote the maintenance of vegetative buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources.	\$10,000	\$400,000	\$1,000
5.2	Shoreline Maintenance Personnel	One dedicated shoreline specialist responsible for the permitting, compliance, and inspection of shoreline facilities on Lake Jackson.	\$75,000	\$3,000,000	
<b>Total All Environmental Measures</b>				<b>\$15,714,000</b>	<b>\$2,823,000</b>

**TABLE 16 COST OF ENVIRONMENTAL MEASURES PROPOSED BY GEORGIA POWER FOR THE LLOYD SHOALS PROJECT FOR A 50-YEAR LICENSE**

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 50-year license term</b>	<b>Capital \$</b>
<b>1</b>	<b>Operational Measures to Enhance Summer DO</b>				
1.1		Prepare an operational procedure for the draft tube aeration system that specifies priority for the use of aerating units under different generation scenarios.			\$1,000
1.2		Seasonal DO and temperature monitoring in one season to verify the DO-enhancing performance of the passive draft tube aeration system with implementation of the Passive Draft Tube Aeration System Operational Procedure	\$50,000	\$50,000	\$20,000
1.3		Generation Loss – reduced efficiency due to operation of aeration system according to new plan.	\$148,000	\$7,400,000	
<b>2</b>	<b>Terrestrial Invasive Vegetation Monitoring and Treatment</b>				
2.1		Every three years, monitor invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier and treat invasive exotic plant populations as necessary to support public access and utilization of these sites.	\$8,000	\$128,000	
<b>3</b>	<b>Recreation Improvements</b>				
3.1	Recreation Management Plan	Revision of the Recreation Management Plan to match final FERC order language.			\$1,000

Item	Major Category	Components	O&M \$	Total O&M \$ for 50-year license term	Capital \$
3.2	Lloyd Shoals Boat Ramp (former Jane Lofton Public Access Area)	<p>Capital costs are to enhance recreation amenities by constructing a new two-lane boat ramp, a barrier-free fishing pier, barrier-free parking next to the fishing pier, a restroom with a flush toilet, and expanded parking.</p> <p>O&amp;M costs include Georgia Power personnel to monitor and maintain park.</p>	\$35,000	\$1,750,000	\$1,100,000
3.3	Lloyd Shoals Park	<p>Demolish existing boat ramp to and construct a non-motorized boat (canoe/kayak) step-down ramp in its place, replacing the existing courtesy dock with a barrier-free fishing pier, construct barrier-free parking next to the new fishing pier, restripe existing parking areas for vehicle-only spaces, and update the existing restroom and bathhouse. These improvements would enhance access for canoeing, kayaking, and bank fishing, alleviate parking congestion on peak-use weekends, and continue to support quality recreation opportunities.</p> <p>O&amp;M Costs include Georgia Power personnel to monitor and maintain park.</p>	\$35,000	\$1,750,000	\$800,000
		<p>Additional O&amp;M costs are contract personnel responsible for cleaning, trash pick-up, landscaping, and park management.</p>	\$10,000	\$500,000	
3.4	Ocmulgee River Park	<p>Enhance recreation amenities at Ocmulgee River Park by rehabilitating the existing boat ramp, redefining and paving the existing parking area, landscaping with boulders to discourage parking near the shoreline, installing one concrete-lined vault</p>			\$350,000

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 50-year license term</b>	<b>Capital \$</b>
		toilet, and relocating picnic tables closer to the existing parking area. O&M Costs include Georgia Power personnel to monitor and maintain park.	\$25,000	\$1,250,000	
		Additional O& M costs include personnel responsible for cleaning, trash pick-up, landscaping, and park management costs.	\$10,000	\$500,000	
3.5	Tussahaw Creek Public Access Area	Enhance recreational access to Lake Jackson by developing formal access on Georgia Power land at the Highway 36 Bridge at Tussahaw Creek. New amenities would be constructed to include a paved access road off of Winding Way, a paved parking area with 10 parking spaces of which two will be accessible, one picnic table and one trash can, and a paved sidewalk leading to bank fishing areas and a step-down ramp for canoeing/kayaking access. O&M costs include Georgia Power personnel to monitor and maintain park.	\$30,000	\$1,500,000	\$500,000
		Additional O& M costs include personnel responsible for cleaning, trash pick-up, landscaping, and park management costs.	\$10,000	\$500,000	
<b>4</b>	<b>Cultural Resources Education</b>				
4.1		Implement a Historic Properties Management Plan through a Programmatic Agreement to assure the preservation and long-term management of archaeological sites and historic buildings and structures within the project boundary.	\$1,000	\$50,000	\$50,000

<b>Item</b>	<b>Major Category</b>	<b>Components</b>	<b>O&amp;M \$</b>	<b>Total O&amp;M \$ for 50-year license term</b>	<b>Capital \$</b>
<b>5</b>	<b>Shoreline Management</b>				
5.1	Shoreline Management Plan	Revision of the SMP in accordance with the existing Shoreline Management Guidelines for Georgia Power Lakes. Implementation of SMP to promote the maintenance of vegetative buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources.	\$10,000	\$500,000	\$1,000
5.2	Shoreline Maintenance Personnel	One dedicated shoreline specialist responsible for the permitting, compliance, and inspection of shoreline facilities on Lake Jackson	\$75,000	\$3,750,000	
<b>Total All Environmental Measures</b>				<b>\$19,628,000</b>	<b>\$2,823,000</b>

**TABLE 17 COMPARISON OF ALTERNATIVES FOR THE LLOYD SHOALS PROJECT**

<b>Resource</b>	<b>No-Action Alternative</b>	<b>Proposed Action</b>
Generation	70,600 MWH	70,600 MWH
Geologic and Soil Resources	Stable or moderately stable banks around most of reservoir and tailrace shoreline; sediment transport into reservoir from nonpoint sources and urban runoff in highly developed watersheds upstream of the Project.	Continued reservoir operating band between 530 ft and 527 ft PD with normal daily fluctuations of 2.0 ft or less; SMP to promote maintenance of vegetative buffers around reservoir, including Small Dredging Permit Program to authorize minor dredging activities for shoreline sediment removal.
Water Resources	Good overall water quality in the reservoir and tailrace area supporting designated uses; continuous minimum flow of 400 cfs, or inflow, whichever less, protects and enhances downstream uses, including public water supply intakes; existing passive draft tube aeration system maintains tailrace DO concentrations above applicable criteria nearly 100 percent of the time.	Continued operation with minimum flow of 400 cfs, or inflow, protecting downstream public water supply; continuous flow release of 250 cfs during low-inflow conditions supplementing stream flows for downstream uses; operational procedure for draft tube aeration system, optimizing DO-enhancing performance of aeration system in support of water quality standards.
Fish and Aquatic Resources	Healthy and balanced warm-water reservoir fishery typical of southeastern reservoirs; downstream river supporting diverse communities of native riverine fish and mussels; continuous minimum flow of 400 cfs, or inflow, whichever less, protects and enhances downstream fish and wildlife resources.	Continued reservoir operating band with normal daily fluctuations of 2.0 ft or less, providing consistency of littoral zone habitat; continued operation with minimum flow release of 400 cfs, or inflow, whichever less, protecting and enhancing downstream fish and wildlife resources; supplemental flow release of 250 cfs during low-inflow conditions, protecting aquatic life downstream.
Terrestrial Resources	Forested, herbaceous/emergent, and scrub-shrub wetlands totaling 79 acres within project boundary; mostly scattered, minor occurrences of exotic invasive terrestrial plants and occasional limited treatment of invasive aquatic plants, project recreation facilities not being adversely impacted; one active Bald Eagle nesting territory on the reservoir	Continued implementation of APP, pollinator habitat management, routine reservoir inspections, and shoreline residential aquatic vegetation management program; terrestrial invasive vegetation management consisting of monitoring every 3 years and treatment as necessary at known populations within or adjacent to recreation facilities; removal or alteration of 4.6 acres of upland habitat for recreation improvements; however, displaced wildlife would relocate to suitable habitat in surrounding forest, and thus, impacts would be negligible.
Threatened and Endangered Species	No federally listed threatened or endangered species known to occur within project boundary; one candidate species, Monarch Butterfly, likely occurs within the project area.	Continued pollinator habitat management within project boundary; a variety of milkweed species used by Monarch Butterfly occur naturally in Georgia; continued project operation not expected to adversely affect milkweed habitat or nectar sources available for butterfly.

Resource	No-Action Alternative	Proposed Action
Recreation	Operation and maintenance of four project recreation facilities providing a variety of recreational opportunities, including boating, bank fishing, picnicking, swimming, and other day-use activities.	Enhancement to recreational access and amenities at four locations, including one new project recreation facility, under a Recreation Management Plan; measures to include: relocating existing boat ramp, rehabilitating and replacing aging facilities, new accessible fishing piers with accessible parking; new non-motorized boat (canoe/kayak) step-down ramps, new restrooms, paved parking, and enhanced bank fishing access.
Land Use	Reservoir shoreline management under Shoreline Management Guidelines requiring valid lease agreement or access lease agreement and permit prior to any construction, renovation, clearing, tree removal, grading, or dredging; protecting vegetative buffers and enhancing scenic, recreational, and environmental values of the Project.	Implementation of Shoreline Management Guidelines under a Shoreline Management Plan, to include a Small Dredging Permit Program, and providing continued guidance to shoreline residents for preserving and enhancing the scenic, recreational, and environmental values of the Project.
Aesthetic Resources	Shoreline Management Guidelines helping to protect the vegetative buffer and preserve and enhance the aesthetic values of the Project.	Continued preservation of aesthetic values through implementation of Shoreline Management Plan; aesthetics considered during design and landscaping of recreation improvements' no adverse impacts expected.
Cultural Resources	Annual monitoring of six archaeological sites within area of potential effects and management of resources under a Cultural Resources Management Plan	PA and HPMP providing for preservation and long-term management of historic properties, including NRHP-eligible powerhouse; continued annual monitoring of five archaeological sites.

Note: The Proposed Action (Georgia Power's proposal) is summarized in Section 2.2 and evaluated by resource area in detail in Section 3.3.



**TABLE 18 LIST OF STAKEHOLDERS CONSULTED DURING DEVELOPMENT OF THE LLOYD SHOALS PROJECT EXHIBIT E**

<b>Stakeholder</b>	<b>Contact Name</b>	<b>Title</b>	<b>Street Address</b>	<b>City</b>	<b>State</b>	<b>Zip Code</b>
Alabama-Coushatta Tribe of Texas	Ms. Nita Battise	Chairperson	571 State Park Rd.	Livingston	TX	77351
Alabama-Quassarte Tribal Town	Mr. Wilson Yargee	Chief	P.O. Box 187	Wetumka	OK	74883
Altamaha Riverkeeper	Mr. Brian Lucy	CEO/Riverkeeper	P.O. Box 2642	Darien	GA	31305
American Rivers	Mr. Ben Emanuel	Associate Director Southeast Region	108 East Ponce de Leon Ave. Suite 212	Decatur	GA	30030
Bembry & Bembry Farms, LP	Mr. John Bembry	General Partner	485 Eastman Highway P.O. Box 248	Hawkinsville	GA	31036
Butts County	Mr. Brad Johnson	Chief Administrative Officer	625 West 3rd Street	Jackson	GA	30233
Butts County Water Authority	Ms. Alyssa Hopson	Deputy General Manager	100 W 2nd St.	Jackson	GA	30233
Cherokee Nation of Oklahoma	Mr. Chuck Hoskin, Jr.	Principal Chief	P.O. Box 948	Tahlequah	OK	74465
City of Covington	Mr. Ronnie Johnston	Mayor	PO Box 1527	Covington	GA	30015
City of Flovilla	Ms. Beth Burns Ogletree	Mayor	308 Heard Street	Flovilla	GA	30216
City of Jackson	Ms. Kay Pippin	Mayor	P.O. Box 838	Jackson	GA	30233
City of Jackson	Mr. Don Cook	District 4 Councilman	P.O. Box 838	Jackson	GA	30233
City of Jackson	Mr. Ricky Johnson	District 3 Councilman	P.O. Box 838	Jackson	GA	30233
City of Jackson	Ms. Beth Weaver	District 5 Councilwoman	P.O. Box 838	Jackson	GA	30233
City of Jackson	Mr. Theodore Patterson	District 1 Councilman	P.O. Box 838	Jackson	GA	30233
City of Jackson	Mr. Guerry Garrison	Supervisor, Electric Department	P.O. Box 838	Jackson	GA	30233
City of Jenkinsburg	Mr. Eddie Ford	Mayor	211 Maple Drive	Jenkinsburg	GA	30234
City of Locust Grove	Mr. Robert Price	Mayor	3644 Highway 42	Locust Grove	GA	30248
City of McDonough	Mr. Billy Copeland	Mayor	136 Keys Ferry Street	McDonough	GA	30253
City of Monticello	Mr. Bryan Standifer	Mayor	P. O. Box 269	Monticello	GA	31064

<b>Stakeholder</b>	<b>Contact Name</b>	<b>Title</b>	<b>Street Address</b>	<b>City</b>	<b>State</b>	<b>Zip Code</b>
City of Monticello	Mr. Doug White	City Manager	P. O. Box 269	Monticello	GA	31064
Coushatta Tribe of Louisiana	Mr. David Sickey	Chairman	P.O. Box 818	Elton	LA	70532
Eastern Band of Cherokee Indians	Mr. Richard Townsend	THPO	P.O. Box 455	Cherokee	NC	28719
Georgia Bass Federation	Mr. Robert Phillips	Conservation Director				
Georgia Department of Community Affairs - Historic Preservation Division	Ms. Jennifer Dixon	Environmental Review and Preservation Planning Program Manager	60 Executive Park South, NE	Atlanta	GA	30329
Georgia Department of Community Affairs- Historic Preservation Division	Mr. Santiago Martinez	Environmental Review Historian	60 Executive Park South, NE	Atlanta	GA	30329
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Keith Weaver	Fisheries Biologist	2123 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources - Wildlife Resources Division	Ms. Paula Marcinek	Aquatic Biologist	2070 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Steve Schleiger	Regional Supervisor	1014 Martin Luther King Jr. Dr.	Fort Valley	GA	31030
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Scott Robinson	Chief, Fisheries Management Section	2070 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Brett Albanese	Program Manager	2065 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources - Wildlife Resources Division	Dr. Jon Ambrose, Ph.D.	Chief, Wildlife Conservation Section	2070 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Don McGowan	Region Operations Manager - Game Management Section	2070 U.S. Highway 278, S.E.	Social Circle	GA	30025
Georgia Department of Natural Resources -	Ms. Victoria Adams	Water Quality Standards Coordinator	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30334

Stakeholder	Contact Name	Title	Street Address	City	State	Zip Code
Environmental Protection Division						
Georgia Department of Natural Resources - Environmental Protection Division	Dr. Elizabeth Booth	Watershed Planning and Monitoring Program	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30334
Georgia Department of Natural Resources - Environmental Protection Division	Ms. Jennifer Welte	Environmental Program Manager	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30334
Georgia Department of Natural Resources - Environmental Protection Division	Dr. Wei Zeng	Hydrology Unit	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30334
Georgia Department of Natural Resources - Environmental Protection Division	Ms. Veronica Crow	Nonpoint Source Program Manager	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30354
Georgia Department of Natural Resources - Wildlife Resources Division	Mr. Chris Nelson	Fisheries Biologist				
Henry County	Ms. Carlotta Harrell	Chairwomen of the Board of Commissioners	140 Henry Parkway	McDonough	GA	30253
Jackson Lake Association	Mr. Jared Godin					
Jackson Lake Association	Ms. Debbie J. Singley					
Jackson Lake Realty	Ms. Carolyn Perry					
Jackson Lake Sun	Mr. Pat Allen	Editor				
Jacobs	Ms. Michelle Vincent	Environmental Scientist	10 10th Street, Suite 1400	Atlanta	GA	30309
Jasper County	Mr. Bruce Henry	Chairman of the Board of Commissioners	126 W. Greene St. Ste. 18	Monticello	GA	31064
Kialegee Tribal Town	Mr. Brian Givens	Town King	P.O. Box 332	Wetumka	OK	74883-0332

Stakeholder	Contact Name	Title	Street Address	City	State	Zip Code
Macon Water Authority	Mr. Tony Rojas	Executive Director	790 Second St. P.O. Box 108	Macon	GA	31202
Macon Water Authority	Mr. Mark Wyzalek	Director Lab/Environmental Compliance	918 MLK Jr. Blvd. P.O. Box 108	Macon	GA	31202
Metropolitan North Georgia Water Planning District (Metro Water District)	Mr. Daniel Johnson, P.E.	Manager	229 Peachtree Street NE, Ste 100	Atlanta	GA	30303
Middle Ocmulgee Water Planning Region	Mr. James Capp	Branch Chief	2 MLK, Jr. Dr. S.W., Suite 1152	Atlanta	GA	30334
Muskogee (Creek) Nation	Ms. Corain Lowe- Zepeda	THPO				
Muskogee (Creek) Nation	Ms. Raelynn Butler	Manager of Historic and Cultural Preservation Department	P.O. Box 580 Highway 75 and Loop 56	Okmulgee	OK	74447
Muskogee (Creek) Nation	Ms. LeeAnne Wendt	Tribal Archeologist	P.O. Box 580	Okmulgee	OK	74447
Muskogee (Creek) Nation	Mr. David Hill	Principal Chief	P.O. Box 580	Okmulgee	OK	74447
Muskogee (Creek) Nation	Mr. Turner Hunt	Tribal Archeologist	P.O. Box 580	Okmulgee	OK	74447
National Marine Fisheries Service	Ms. Twyla Cheatwood		101 Pivers Island Road	Beaufort	NC	28516- 9722
National Marine Fisheries Service	Mr. Pace Wilbur	Branch Chief	263 13th Avenue South	St. Petersburg	FL	33701
Newton County	Mr. Marcello Banes	Chairman of the Board of Commissioners	1124 Clark Street	Covington	GA	30014
Ocmulgee Outdoor Expeditions	Ms. Kathleen O'Neal	Director	P.O. Box 887	Macon	GA	31202
Poarch Band of Creek Indians	Ms. Stephanie A. Bryan	Tribal Chair	5811 Jack Springs Rd.	Atmore	AL	36502
South River Water Alliance	Ms. Jacqueline M. Echols, Ph.D.	President of the SRWA Board	P.O. Box 1341	Decatur	GA	30031
Thlopthlocco Tribal Town	Mr. Ryan Morrow	Town King	P.O. Box 188	Okemah	OK	74859
U.S. Department of Agriculture Forest Service, Chattahoochee- Oconee Nat. Forests	Mr. Thomas Dozier	Oconee District Ranger	1199 Madison Rd.	Eatonton	GA	31024

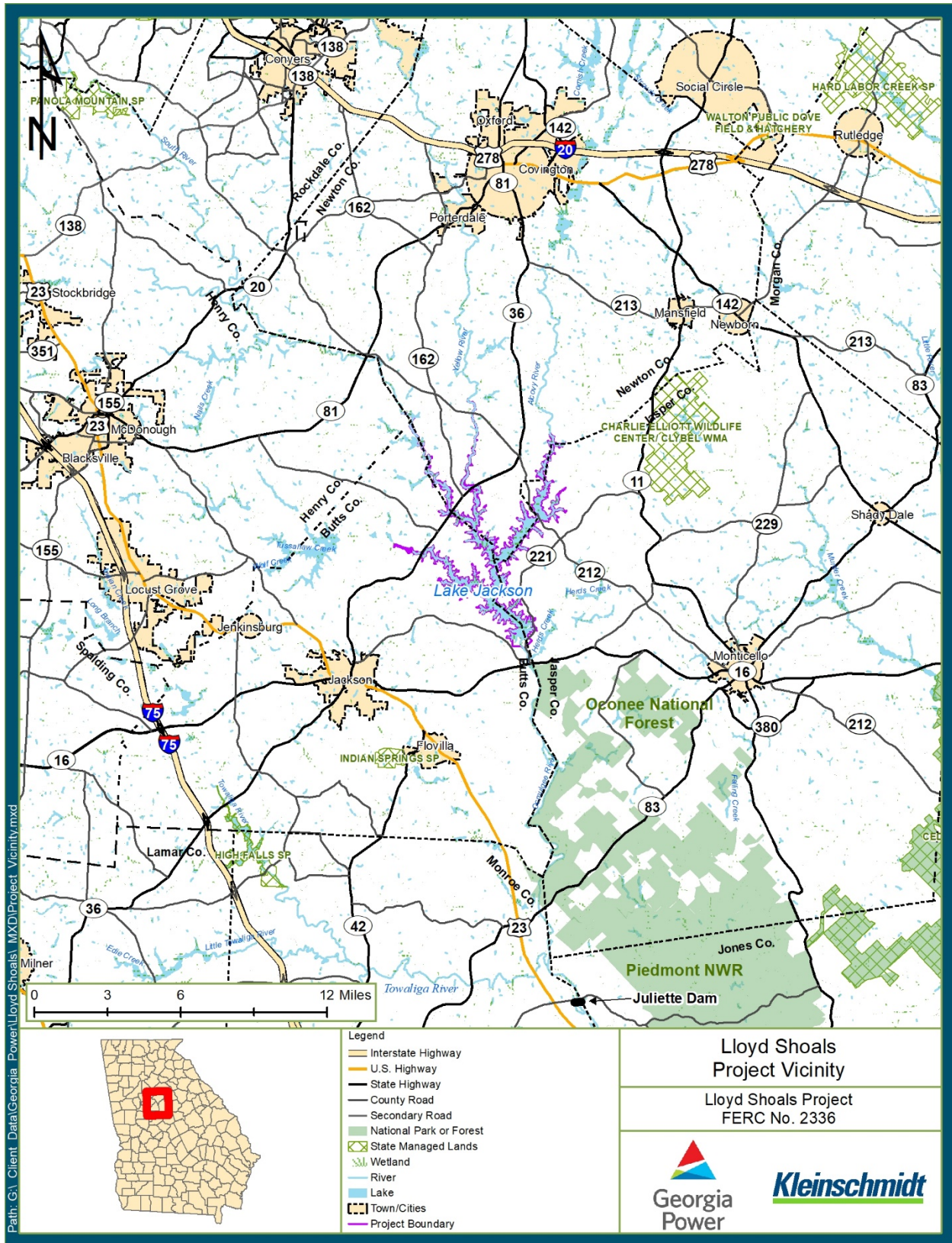
Stakeholder	Contact Name	Title	Street Address	City	State	Zip Code
United Keetoowah Band of Cherokee	Mr. Joe Bunch	Chief	P.O. Box 746	Tahlequah	OK	74465
USEPA Region 4	Ms. Maria Clark	NEPA Program Office	61 Forsyth St., SW	Atlanta	GA	30303
USFWS - Georgia Ecological Services	Mr. Eric Bauer	Fish and Wildlife Biologist	355 East Hancock Avenue, Room 320, Box 7	Athens	GA	30601
USFWS - Georgia Ecological Services	Ms. Martha J. Zapata	Biologist	RG Stephens, Jr Federal Building, 355 East Hancock Avenue Room 320 Box 7	Athens	GA	30601
USFWS - Georgia Ecological Services Region 4	Mr. Scott T. Glassmeyer	Biologist	RG Stephens, Jr Federal Building, 355 East Hancock Avenue Room 320 Box 7	Athens	GA	30601
Wells Engineering	Mr. and Mrs. Jeremy Wells					
Individual Stakeholder	Mr. Roger Armistead					
Individual Stakeholder	Ms. Patricia Black		141A Lake Pines Rd.	Jackson	GA	30233
Individual Stakeholder	Ms. Emily Blue					
Individual Stakeholder	Mr. Danny Blue					
Individual Stakeholder	Sepi Browning		480 Friar Tuck Circle	Covington	GA	30014
Individual Stakeholder	Mr. Vance Burgess		331 Lake Claire Ct.	Atlanta	GA	30307
Individual Stakeholder	Ms. Toni Campbell		631 Alcovy North Dr.	Mansfield	GA	30055
Individual Stakeholder	Gerry Cash		424 Haley Rd.	Jackson	GA	30233
Individual Stakeholder	Mr. Joe Champion		2104 Fellowship Rd.	Tucker	GA	30084
Individual Stakeholder	David and Zhanna Cooper		149 Lake Shore Dr.	Jackson	GA	30233
Individual Stakeholder	Mr. Alan W. Cox		867 Bear Creek Point	Mansfield	GA	30055
Individual Stakeholder	Mr. Mike Daniel		150 Turbo Dr.	Monticello	GA	30214

Stakeholder	Contact Name	Title	Street Address	City	State	Zip Code
Individual Stakeholder	Mr. Ronnie Daniel					
Individual Stakeholder	Ms. Lou Dufresne					
Individual Stakeholder	George and Courtenay Dusenbury		1177 Commerce Dr.	Decatur	GA	30030
Individual Stakeholder	Mr. Mike Emanuele		758 Raven Rd.	Monticello	GA	31064
Individual Stakeholder	Mr. David Engle		146 Mabry Rd.	Jackson	GA	30248
Individual Stakeholder	Mr. James R. Filson		148 Summit View Rd.	Jackson	GA	30233
Individual Stakeholder	Mr. Ralph Gardner		5410 Heyward Square Place	Marietta	GA	30068
Individual Stakeholder	Mr. Howard Garrison					
Individual Stakeholder	Frederic C. and Marilou Grimes					
Individual Stakeholder	Ms. Julia M. Haar		470 Lakeshore Dr.	Jackson	GA	30233
Individual Stakeholder	Harold and Carol Hoffman		145 Hoffman Dr.	Monticello	GA	31064
Individual Stakeholder	Mr. Ronald Hooten					
Individual Stakeholder	Ms. Sharon Huff		235 Rocky Creek Cove	Mansfield	GA	30055
Individual Stakeholder	Mr. David W. Jackson		590 Dallas Trail	Covington	GA	30014
Individual Stakeholder	Ms. Rita Johnston		136 Mabry Rd.	Jackson	GA	30233
Individual Stakeholder	Catherine and Arland Jones		294 Roberts Point Rd.	Jackson	GA	30233
Individual Stakeholder	Mr. John Jordan		380 Haley Rd.	Jackson	GA	30233
Individual Stakeholder	Mr. Robert W. Kaylor		277 Harbour Shores Dr.	Jackson	GA	30233
Individual Stakeholder	Mr. Philip Leggett		303 Rainbow Dr.	Mansfield	GA	30355
Individual Stakeholder	Mr. Pete Malone					
Individual Stakeholder	Mr. Robert S. McGrath					
Individual Stakeholder	Ms. Ginny D. McGrath					
Individual Stakeholder	Ron and Wanda Ordyna					

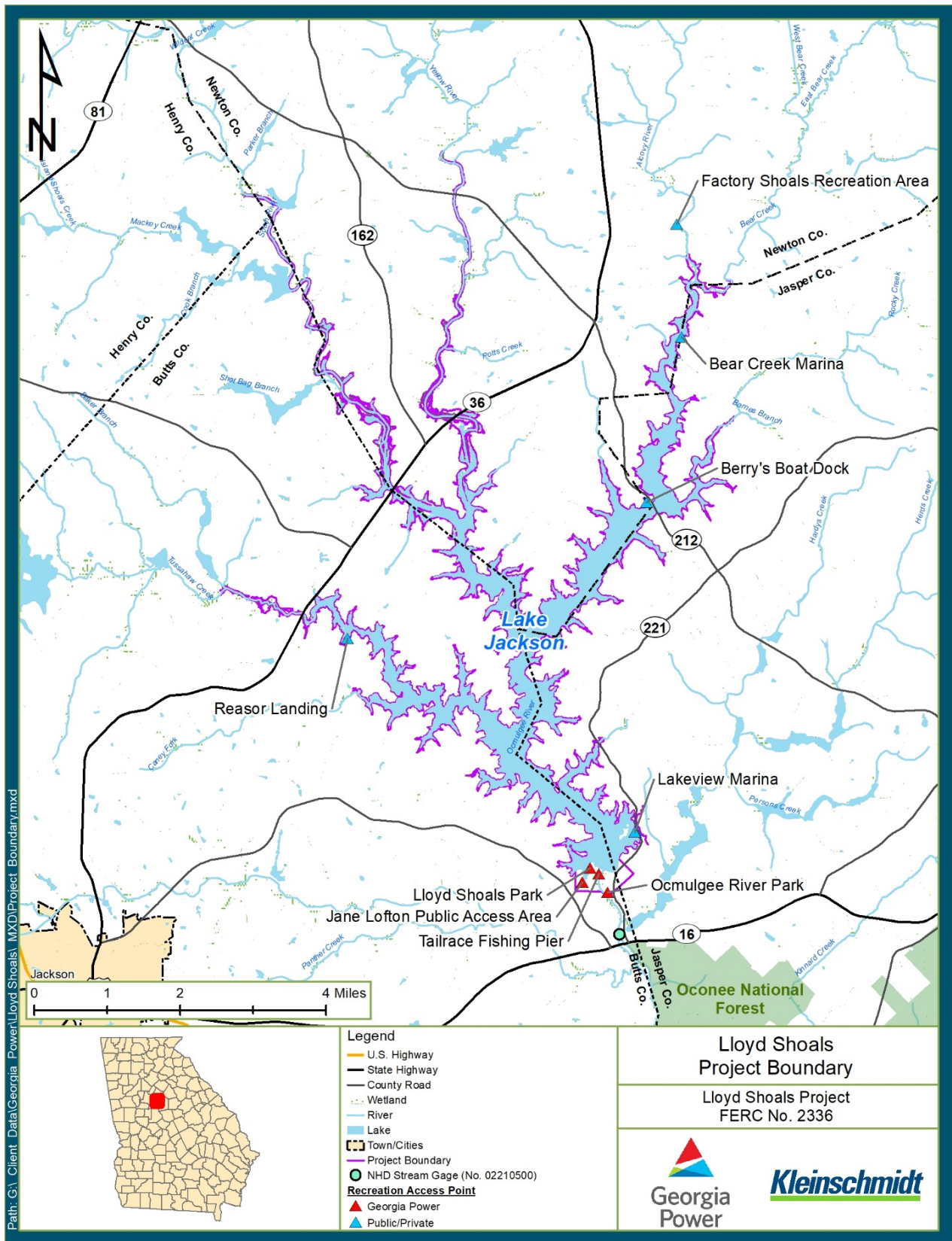
Stakeholder	Contact Name	Title	Street Address	City	State	Zip Code
Individual Stakeholder	Janice and Perry Phillips		6867 Tyree Rd.	Winston	GA	30187
Individual Stakeholder	Thomas H. and Brenda Raines		686 Doe Lane	Mansfield	GA	30055
Individual Stakeholder	Mr. Clay Ryals		2158 Impala Dr.	Atlanta	GA	30345
Individual Stakeholder	Mr. Patrick Samsel		18 East Nuthatch Dr.	Monticello	GA	31064
Individual Stakeholder	Mr. David Seago		222 Haynes Point	Mansfield	GA	30055
Individual Stakeholder	Mr. Ronnie Shaw					
Individual Stakeholder	David and Chris Thornton		374 Starling Dr.	Monticello	GA	31064
Individual Stakeholder	Mr. Preston Williams		921 Yancey Rd.	Covington	GA	30014
Individual Stakeholder	Ms. Barbara Willingham		240 Willingham Cove Rd.	Mansfield	GA	30055
Individual Stakeholder	Mr. Jon Wismer		306 Cochran Rd.	Jackson	GA	30233
Individual Stakeholder	Danny and Teresa Butler					
Individual Stakeholder	Mr. Billy Nalls					
Individual Stakeholder	Blawtow Welch					
Individual Stakeholder	John and Lucy Byce					
Individual Stakeholder	Silvey Jacobson					
Individual Stakeholder	Bobby and Stephanie Moore					
Individual Stakeholder	Ms. Geleta Fenton					
Individual Stakeholder	Ms. Carol Webb					
Individual Stakeholder	Mr. Don Ruffezl					
Individual Stakeholder	Mr. Mark Schubert		112 Garner Road	Jackson	GA	30233-4025

## FIGURES

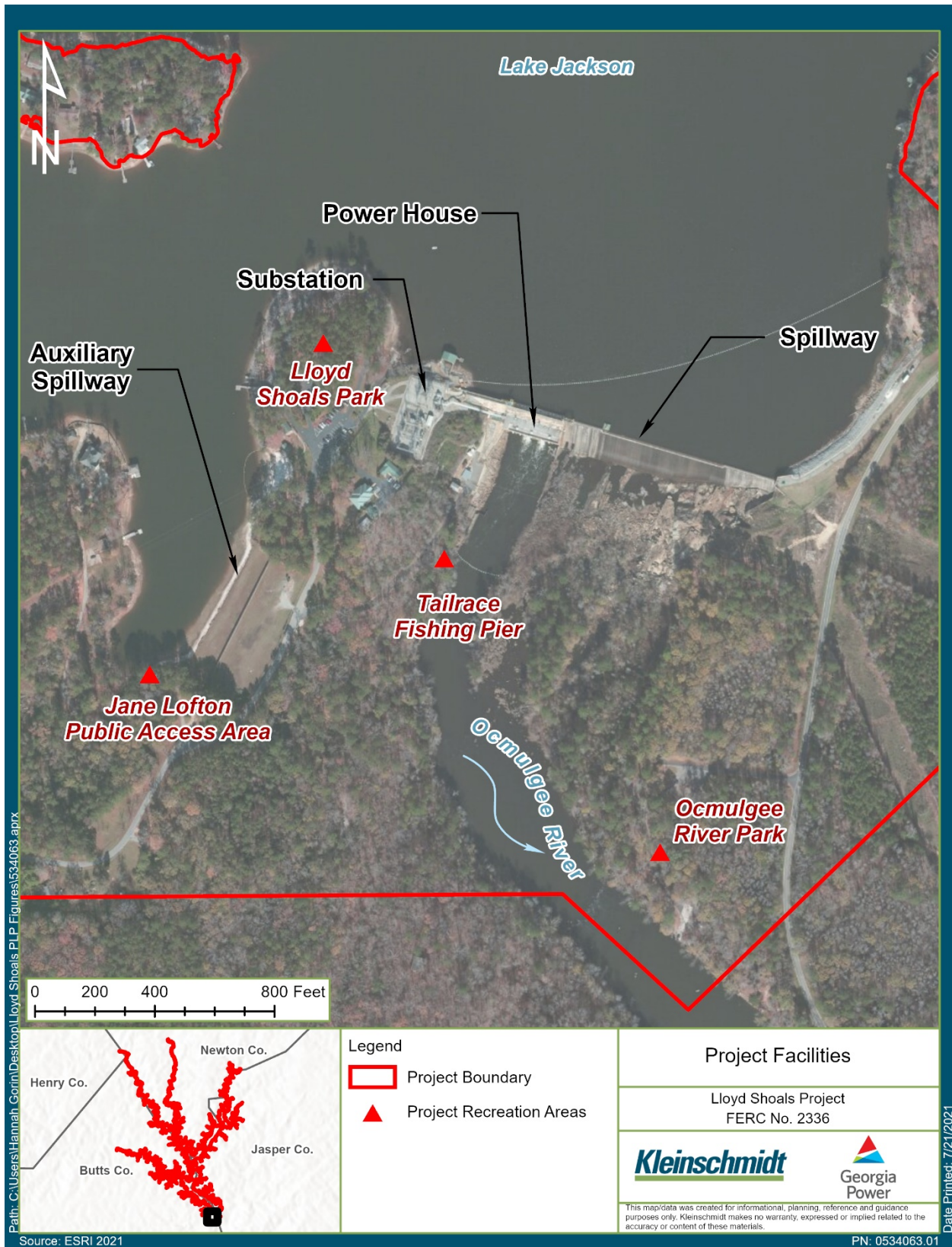




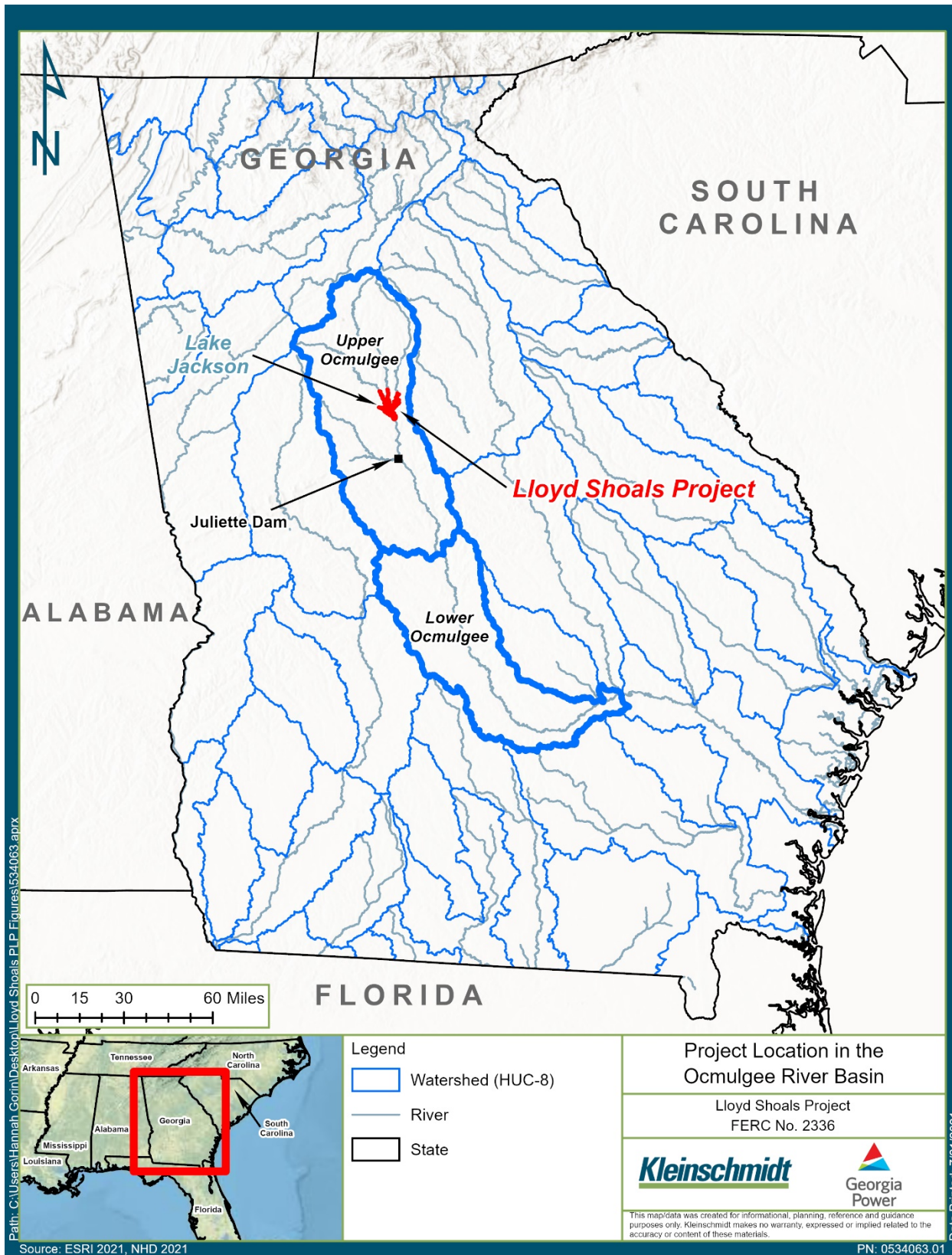
**FIGURE 1 LLOYD SHOALS PROJECT VICINITY**



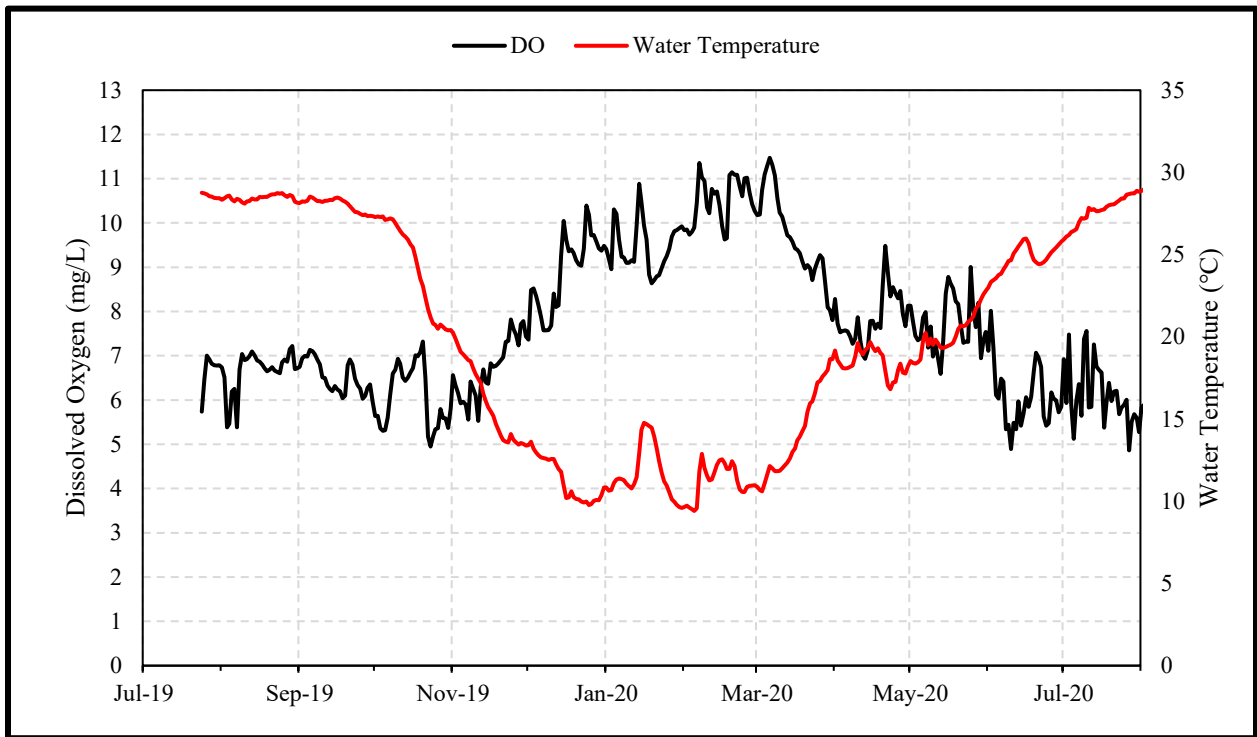
**FIGURE 2 LLOYD SHOALS PROJECT BOUNDARY**



**FIGURE 3 LLOYD SHOALS PROJECT FACILITIES**

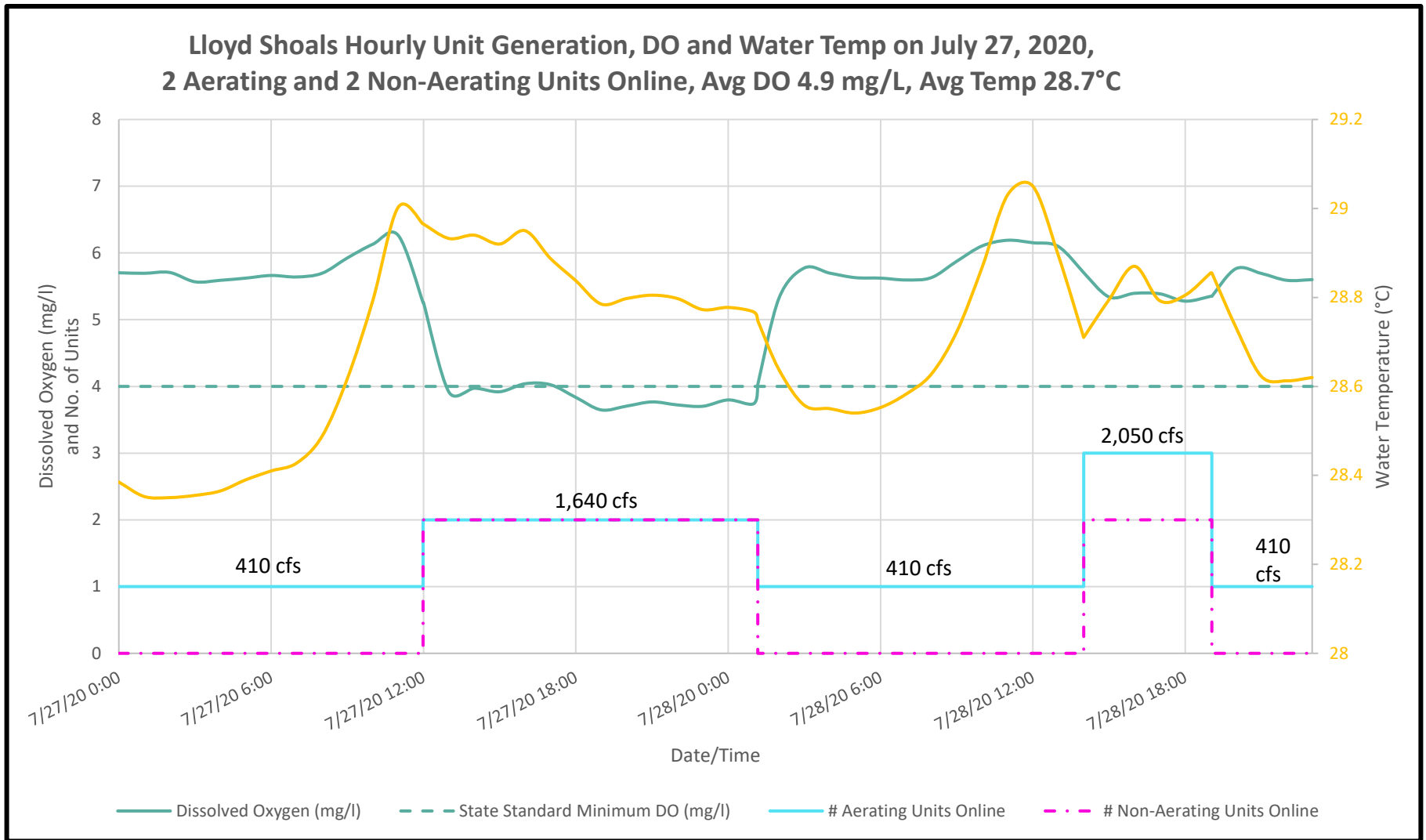


**FIGURE 4 PROJECT LOCATION IN THE OCMULGEE RIVER BASIN**



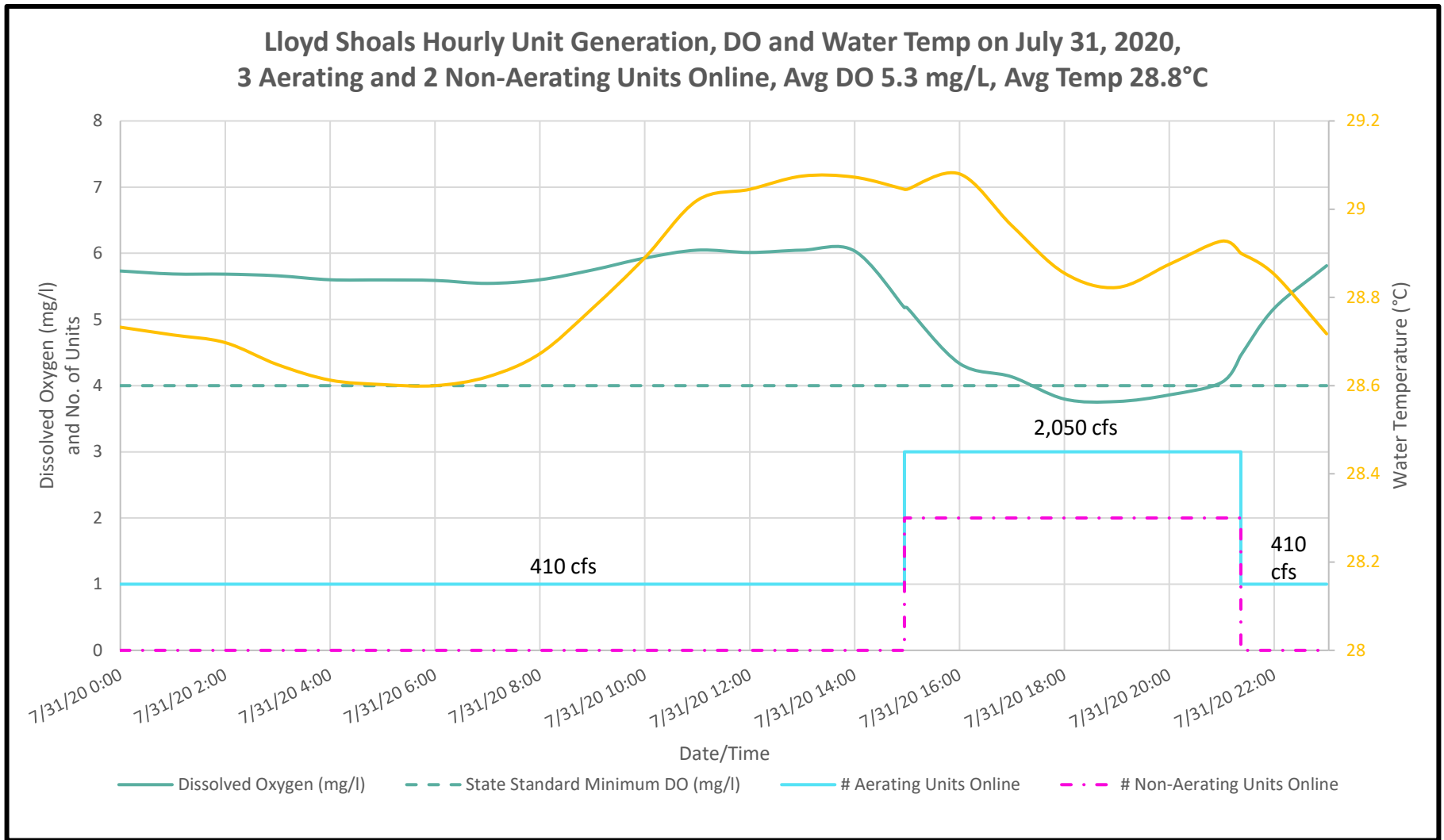
Source: Georgia Power

**FIGURE 5** LINE PLOT OF DAILY AVERAGE DO AND WATER TEMPERATURE FROM TAILRACE MONITOR



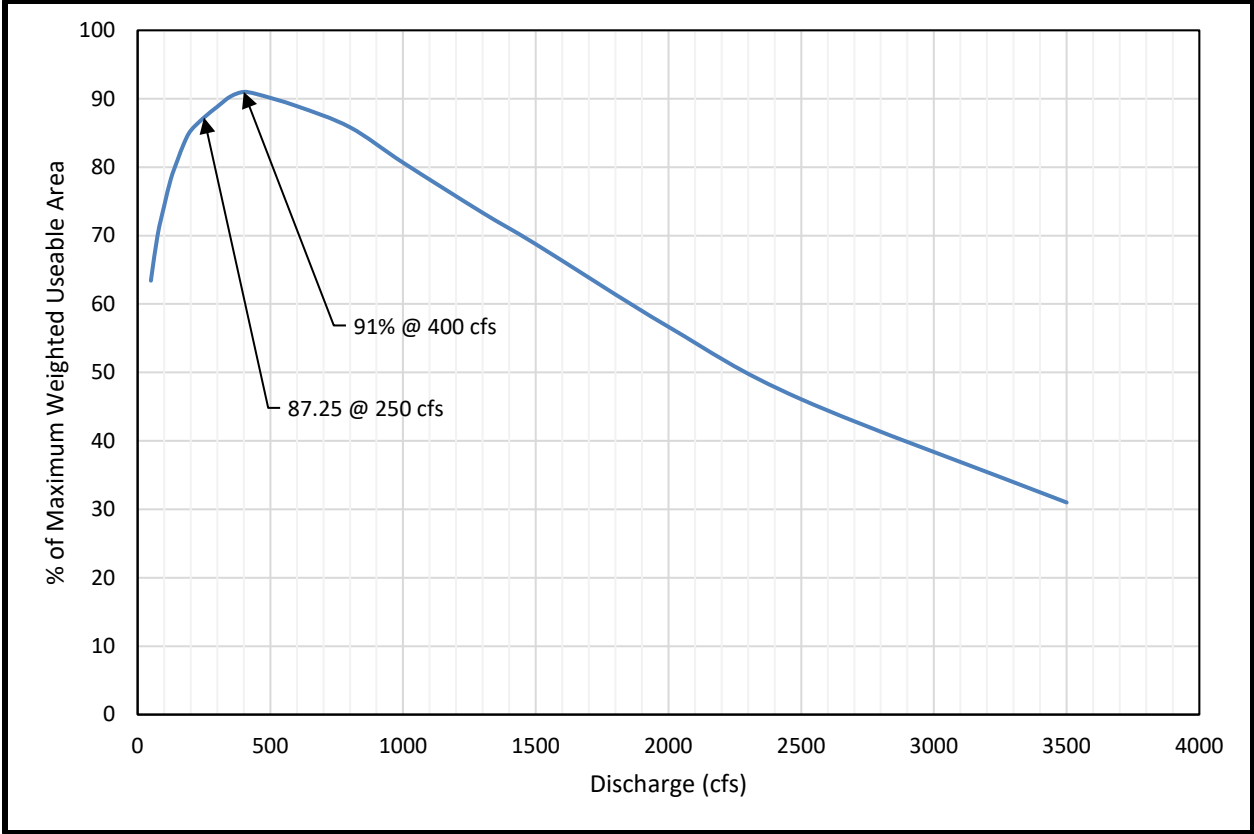
Note: The flows on the graph are the best gate/full pool hydraulic capacities of the generating scenario and not measured flows.

**FIGURE 6** CONDITIONS OF TAILRACE INSTANTANEOUS DISSOLVED OXYGEN EXCURSION ON JULY 27, 2020



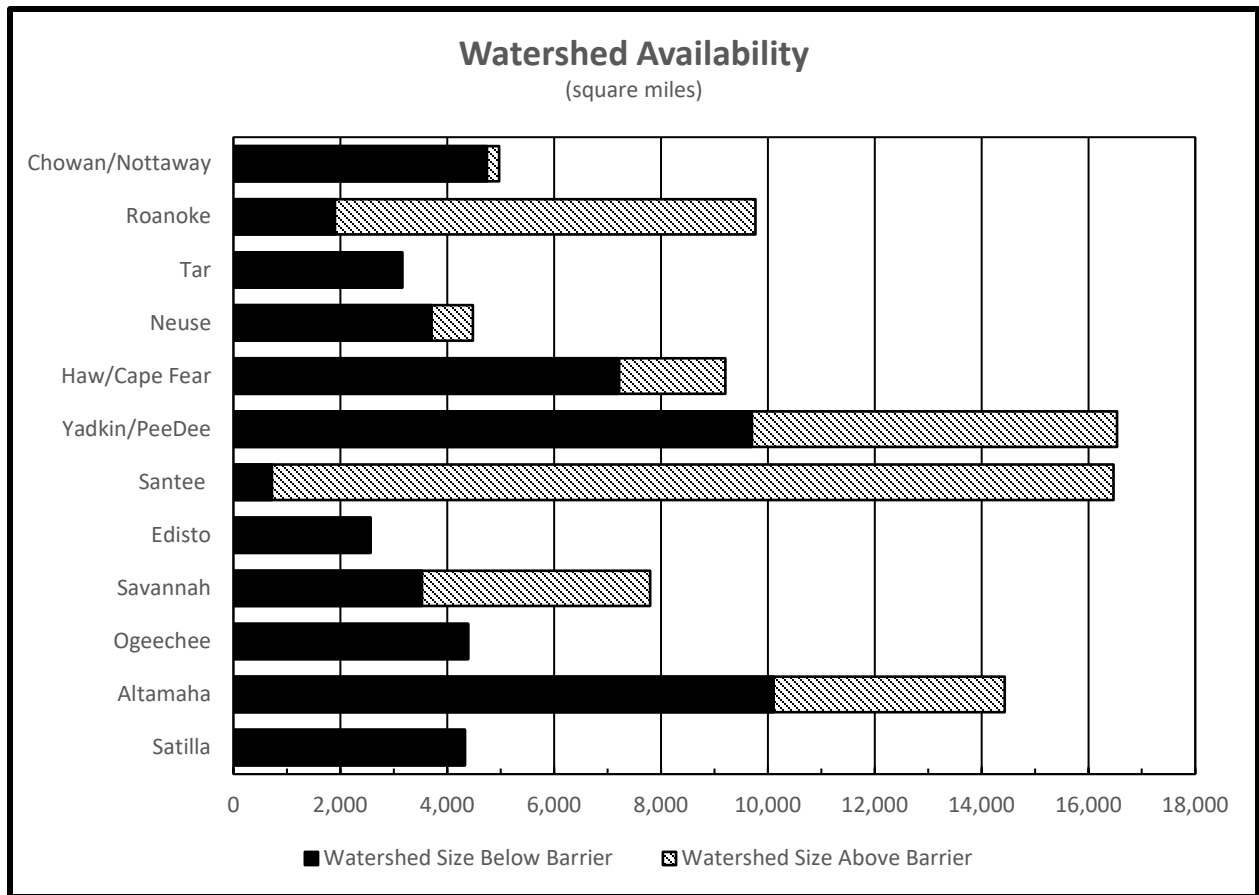
Note: The flows on the graph are the best gate/full pool hydraulic capacities of the generating scenario and not measured flows.

**FIGURE 7      CONDITIONS OF TAILRACE INSTANTANEOUS DISSOLVED OXYGEN EXCURSION ON JULY 31, 2020**

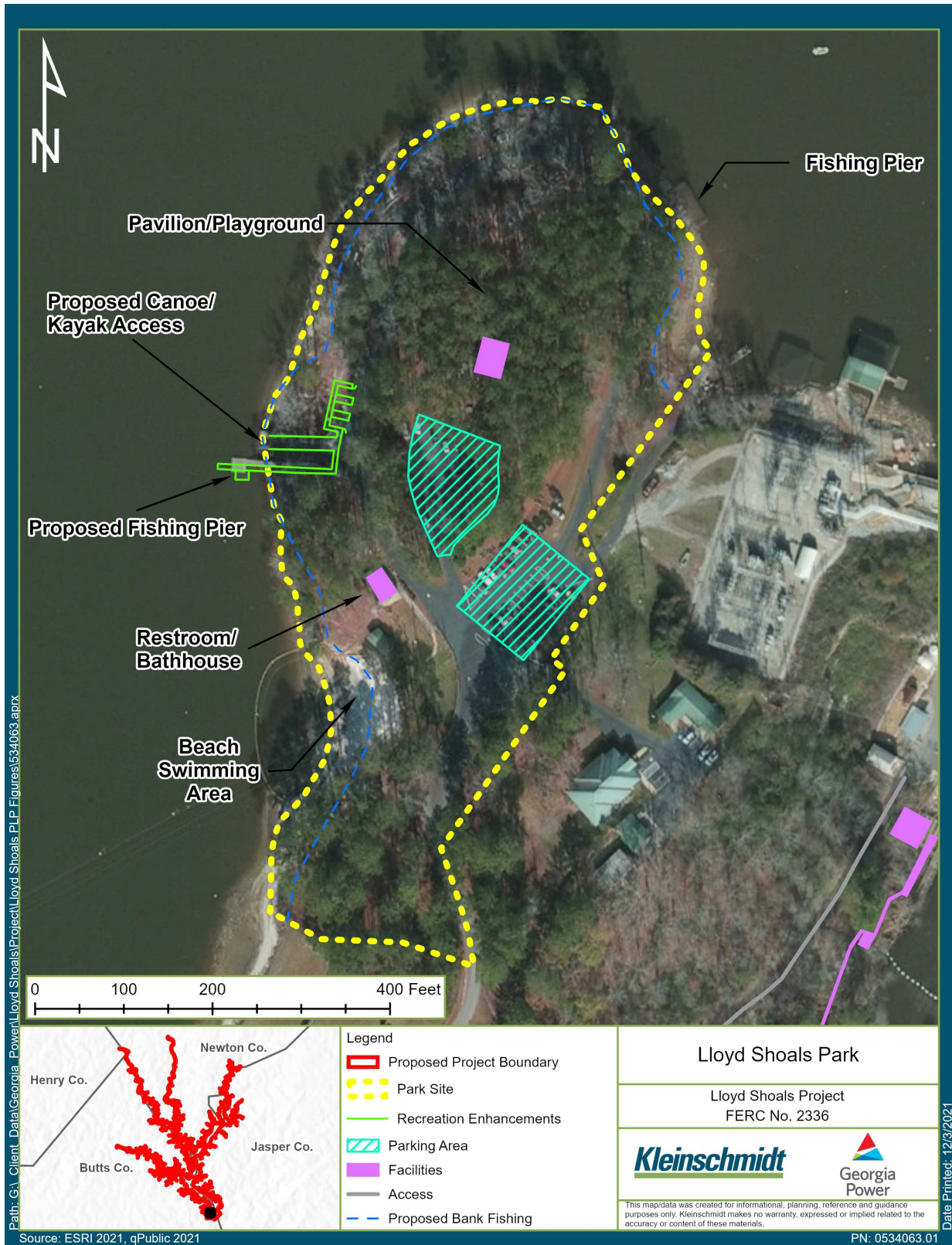


**FIGURE 8 DISCHARGE AND PERCENTAGE OF MAXIMUM WEIGHTED USABLE AREA**

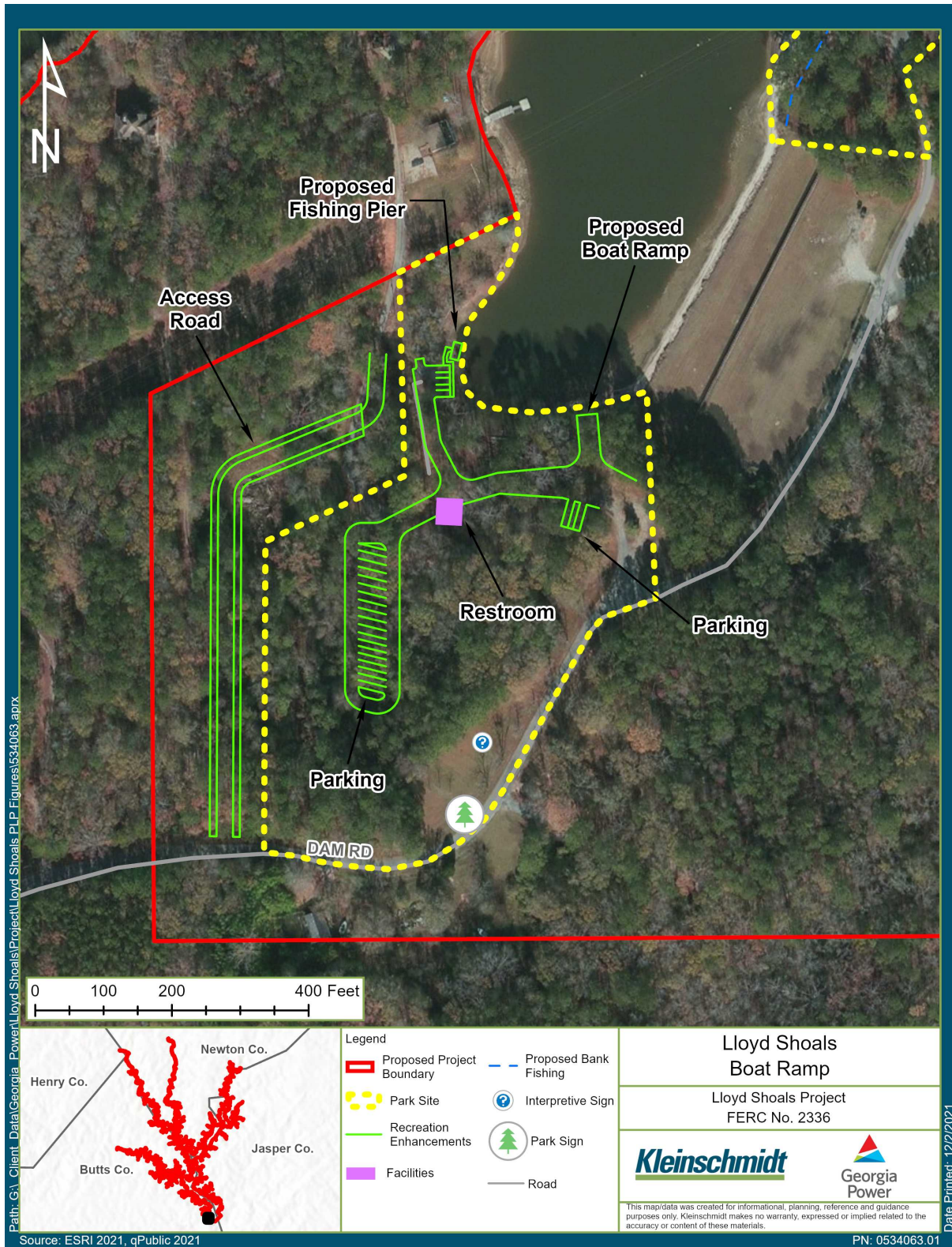




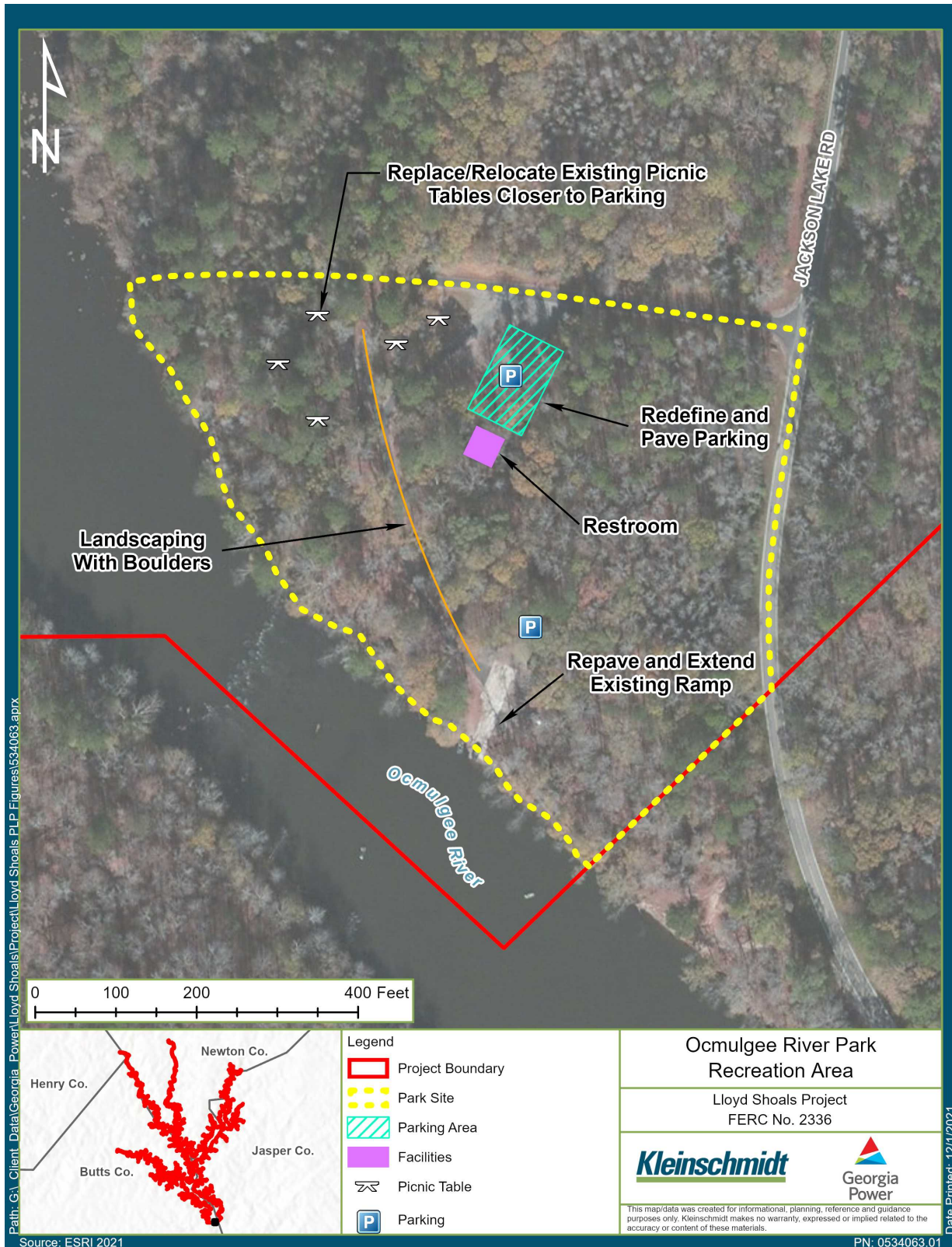
**FIGURE 9 ESTIMATED WATERSHED AREA BEFORE THE FIRST UPSTREAM BARRIER IN ATLANTIC COAST RIVERS OF GEORGIA AND THE CAROLINAS**



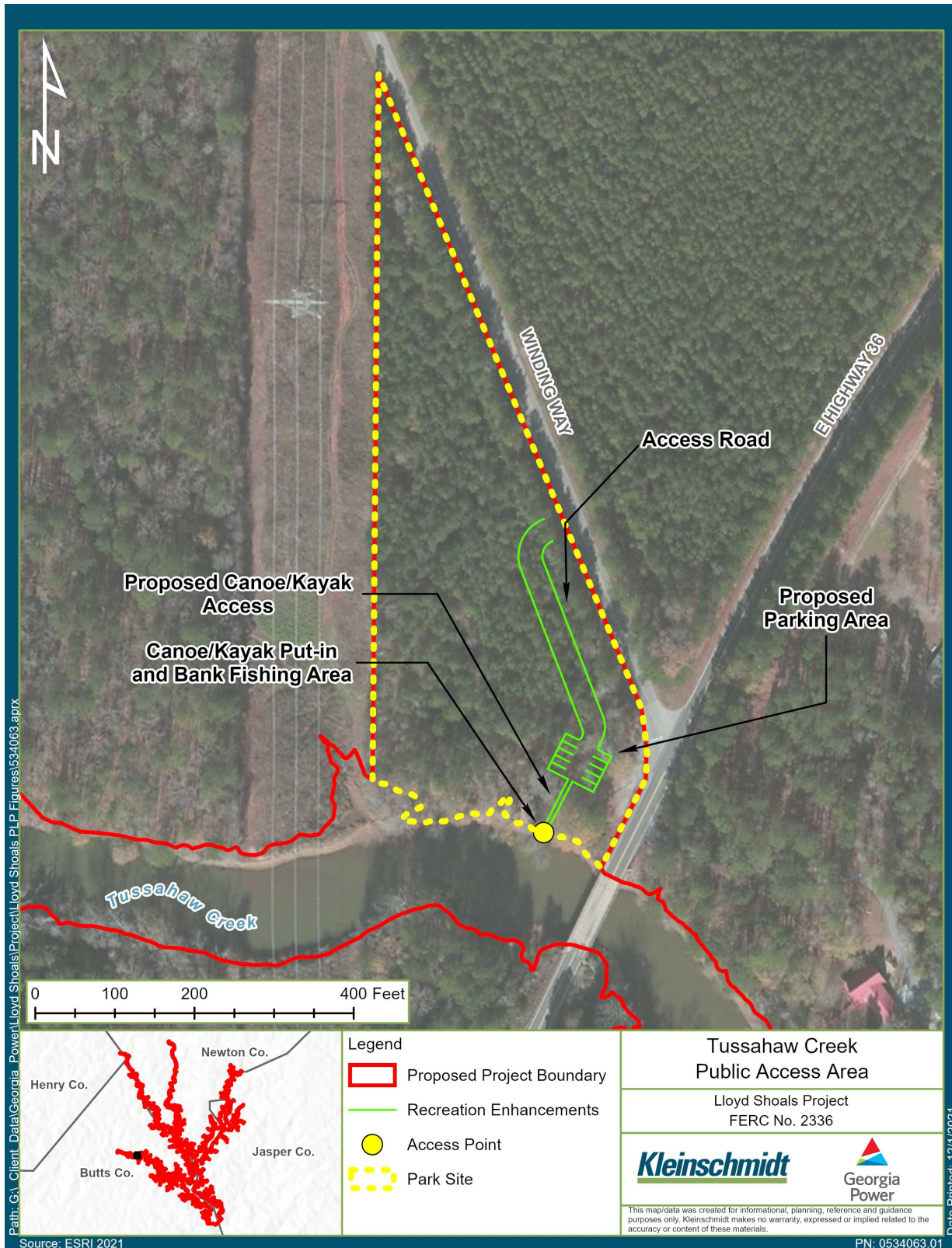
**FIGURE 10 CONCEPTUAL DRAWING OF LLOYD SHOALS PARK RECREATION PROPOSAL**



**FIGURE 11 CONCEPTUAL DRAWING OF LLOYD SHOALS BOAT RAMP RECREATION PROPOSAL (FORMERLY JANE LOFTON PUBLIC ACCESS AREA)**



**FIGURE 12 CONCEPTUAL DRAWING OF OCMULGEE RIVER PARK RECREATION PROPOSAL**



**FIGURE 13 CONCEPTUAL DRAWING OF TUSSAHAW CREEK PUBLIC ACCESS AREA RECREATION PROPOSAL**



**FIGURE 14 LLOYD SHOALS TAILRACE AREA PUBLIC ACCESS VIEWSHEDS**



**FIGURE 15 OCMULGEE RIVER PARK PUBLIC ACCESS VIEWSHEDS**



**FIGURE 16** LLOYD SHOALS PARK PUBLIC ACCESS VIEWSHEDS



**APPENDIX A**

**GEORGIA POWER RESPONSES TO COMMENTS ON THE PRELIMINARY LICENSING  
PROPOSAL**



MARK WILLIAMS  
COMMISSIONER

TED WILL  
DIRECTOR

October 28, 2021

Kimberly D. Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E., Room 1A  
Washington, DC 20426

RE: Comments on Preliminary License Proposal for the Lloyd Shoals Hydropower Lloyd  
Shoals Hydropower Project (FERC No. P-2336)

Dear Secretary Bose:

We appreciate the opportunity to review and provide input on the Preliminary License Proposal (PLP) for the Lloyd Shoals Hydropower Project (LSHP). Georgia Department of Natural Resources – Wildlife Resources Division (WRD) recognizes that this project has impacts to the water quality, aquatic habitat, fisheries resources, and recreational opportunities within, upstream and downstream of the project area. WRD has participated in the Integrated Licensing Process for the LSHP.

WRD would like to acknowledge and thank GPC for their efforts regarding the Preliminary Licensing Proposal and looks forward to continuing working with GPC through the candidate conservation agreements and management of aquatic and recreational resources. Attached are our comments on the Preliminary Licensing Proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Ted Will". The signature is fluid and cursive, written over a light blue horizontal line.

Ted Will

cc:  
Scott Robinson  
Jon Ambrose

## **Preliminary Licensing Proposal Comments**

### **Water Resources**

#### Affected Environment (4.3.2.1) – Water Quality of Lloyd Shoals Tailrace Area

Water quality monitoring in the tailrace indicated that dissolved oxygen (DO) levels dropped below the state standard of 4mg/L only 0.16% of the hours. Though levels were maintained most of the time, one such instance of low DO was maintained for the duration of 10 hours. A prolonged drop in DO below 5 mg/L can be detrimental to aquatic organisms, such as Robust Redhorse and shad, during critical life stages. Georgia Power Company (GPC) has proposed procedural actions to reduce the chance that DO will fall below state standards. Wildlife Resources Division (WRD) requests that GPC continue to monitor DO in the tailrace to ensure that procedural changes are adequate in maintaining DO levels, and if not, further measures be taken to maintain DO levels at or above 5 mg/L.

1

### **Fish & Aquatic Resources**

#### Affected Environment (4.3.3.1) – Downstream Ocmulgee River

Georgia Department of Natural Resources – Wildlife Resources Division (WRD) commends Georgia Power Company (GPC) for their commitment to the conservation of the state endangered Robust Redhorse and state protected mollusks in the Altamaha Basin through their participation in two Candidate Conservation Agreements with WRD and the U.S. Fish and Wildlife Service.

#### Environmental Impacts & Recommendations (4.3.3.2) - Fish Passage

Georgia Department of Natural Resources – Wildlife Resources Division (WRD) concurs that the downstream Juliette Dam currently blocks migratory fish from reaching the Lloyd Shoals Hydropower Project (LSHP). However, Georgia Power Company (GPC) states that there is no evidence of adequate riverine nor spawning and rearing habitat for migratory species such as Robust Redhorse, shad, and Striped Bass in the rivers upstream of Lake Jackson. WRD is not aware of any habitat suitability studies that would indicate these statements have been verified. When fish passage is achieved at Juliette Dam, WRD believes that an adequate review of conditions upstream of LSHP will be necessary.

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### **Recreation & Land Use**

#### Environmental Impacts & Recommendations (4.3.6.2) – Recreation Improvements

*Boating Access* – Georgia Department of Natural Resources – Wildlife Resources Division (WRD) greatly appreciates Georgia Power Company (GPC) proposed recreational improvements to the project area and anticipates that once fully implemented, the proposal will enhance boating access

opportunities for anglers and recreationalists. WRD also commends GPC for further development of non-motorized boat (canoe/kayak) access areas.

*Bank Fishing Access* – Georgia Department of Natural Resources – Wildlife Resources Division (WRD) also greatly appreciates Georgia Power Company (GPC) proposed recreational improvements to the project area and anticipates that once fully implemented, the proposal will not only enhance bank fishing opportunities but will also provide additional access. WRD does however, recommend that all proposed fishing piers be fabricated to house fish attractor lighting to further enhance these opportunities. Furthermore, WRD suggests that consideration should be taken to further enhance bank fishing opportunities where possible.

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# **Response to Letter from Georgia Department of Natural Resources Wildlife Resources Division Dated October 28, 2021**

## **Response 1**

As described in Section 3.3.2.1 of Exhibit E (Water Quality), the applicable dissolved oxygen (DO) criteria for the project waters, which support warm-water species of fish, are a daily average of at least 5.0 milligrams per liter (mg/L) and no less than 4.0 mg/L at all times. Georgia Power Company's (Georgia Power's) analysis of the operational patterns surrounding the few excursions of the instantaneous and daily average DO criteria that occurred in 2019-2020 indicates that implementing the proposed operational procedure for prioritizing the use of aerating units over non-aerating units will further improve the performance of the draft tube aeration system, which currently achieves the applicable criteria nearly 100 percent of the time (Section 3.3.2.2, Water Quality in the Tailrace Area).

As described in Section 3.3.2.2, Georgia Power proposes to conduct continuous DO and water temperature monitoring in the project tailrace area during the period June 1-September 30 in one year to verify improved performance of the existing passive draft tube aeration system with implementation of the operational procedure.

Regarding instantaneous DO values below 5.0 mg/L, Georgia Power's DO monitoring in 2019-2020 shows that DO concentrations in the Lloyd Shoals tailrace did not drop below 5.0 mg/L for prolonged periods during the seasons associated with critical life stages of American Shad, Robust Redhorse, and many other species that spawn in the spring. Hourly tailrace DO readings during the 2019-2020 monitoring period equaled or exceeded 5.0 mg/L 97.8 percent of the time. Instantaneous values below 5.0 mg/L, which is not a threshold criterion applicable to the project waters, occurred between June and October, predominantly after the spawning, hatching, and larval development life-stage periods for American Shad and Robust Redhorse.

American Shad migrate up coastal rivers in late winter and spring and begin spawning when water temperatures reach about 12 to 20°C (Weiss-Glanz et al. 1986). In the Ocmulgee River, spawning occurs below Juliette Dam from March to May and peaks in April (Georgia Department of Natural Resources [GDNR] 2021). Eggs are broadcast into the water column, where they are carried downstream by currents and hatch in about 3 to 12 days, depending on water temperature (Weiss-Glanz et al. 1986); larval shad also drift with the current. During the Lloyd Shoals tailrace monitoring in 2019-2020, daily average DO concentrations in April-May ranged between about 6.5 and 9.5 mg/L (Exhibit E, Figure 5).

As described in Section 3.3.3.1 of Exhibit E (Downstream Ocmulgee River), surveys conducted to date of the refugial population of Robust Redhorse introduced downstream of the Project have not confirmed successful recruitment in the 19-mile reach between Lloyd Shoals Dam and Juliette Dam. However, no evidence has been found that lack of recruitment success is due to existing DO conditions. Freeman and Freeman (2001) observed spawning activities by Robust Redhorse in the Oconee River (also in the Altamaha River basin) from late April through May at

temperatures ranging from 17 to 26.7°C. Spawning, egg, and larval life stages would be expected to occur during a similar period in the upper Ocmulgee River (April-May), when daily average DO concentrations in releases from Lloyd Shoals Dam are between about 6.5 and 9.5 mg/L. Moreover, drifting eggs would be transported in currents downstream for several days before hatching, where DO concentrations would be further attenuated by natural aeration and tributary inflow.

## **Response 2**

Regarding the statement in the PLP about there being no evidence of adequate spawning and rearing habitat for migratory species upstream of the Project, Section 3.3.3.2 of Exhibit E (Fish Passage) has been revised to clarify that there have been no reports of either Striped Bass or American Shad successfully reproducing upstream of the Project, and that although main-channel riverine habitats upstream of the Project have not been specifically assessed for spawning habitat suitability for Striped Bass, American Shad, or Robust Redhorse, high sediment loads and water quality impairments have modified these streams to a significant degree and likely limit their habitat suitability compared to historical conditions.

Although a review of habitat suitability specific to American Shad, Robust Redhorse, and Striped Bass in the rivers upstream of the Project has not been conducted, and was not part of the FERC-approved Study Plan, Sections 3.1 (General Description of the River Basin, 3.3.1.1 (Geology and Soils), and 3.3.2.1 (Water Resources) of Exhibit E analyze a substantial amount of existing resource information characterizing present-day watershed and stream conditions in the upper Ocmulgee River basin upstream of the Project, and this information is relevant to evaluating potential spawning habitat for these species upstream of the Project.

The existing resource information analyzed by Georgia Power in Exhibit E, and in supporting resource studies and documentation, indicate that present-day hydrologic alteration, water quality impairments, and sedimentation from the highly urbanized, densely populated watershed upstream of the Project, which drains southeastern and eastern metropolitan Atlanta, have substantially modified riverine habitat conditions compared to historical conditions. Striped Bass have been stocked in Lake Jackson since 2005 but there have been no reports of successful reproduction and recruitment from WRD annual fisheries surveys of the reservoir.

Section 3.1.2 of Exhibit E describes the major land uses upstream of the Project, including that watershed imperviousness is high throughout much of the upper basin and exceeds thresholds considered detrimental to stream stability, water quality, aquatic habitat, and biotic integrity. As described in Section 3.3.1.1 of Exhibit E (Geology and Soils), about 80 percent of the stream miles assessed in the upper Ocmulgee River basin within the Metropolitan North Georgia Water Planning District (Metro Water District) are not supporting their designated uses for one or more parameters. Sediment-impaired segments of the South River system, the largest river upstream of Lake Jackson, total 50 miles, and stormwater runoff from roads and developed urban areas were identified as major sources of erosion and sedimentation. As described in Section 3.3.2.1 (Water Resources), the lower reaches of the South River and Yellow River before they enter Lake Jackson are not supporting water quality standards due to fecal coliform bacteria from point and nonpoint sources, and the lower reach of the Alcovy River is not supporting water quality standards due to *E. coli* bacteria from nonpoint sources.

High sediment loads and water quality impairments reduce substrate complexity and modify instream habitat for benthic macroinvertebrates and fish. Urbanization is linked consistently to stream degradation, reduced species richness, and shifts in dominance of fish assemblages to habitat-generalist species. Walter et al. (2005) studied urbanization effects on fishes and habitat quality in the Etowah River basin, Georgia, just north of Atlanta in the Piedmont province, and found that urban effects on fishes accrue rapidly, are detectable at low levels, lower species richness and density, and result in the decline of endemic species and a transition to a sunfish-dominated stream community.

When fish passage is achieved at Juliette Dam, Georgia Power will work with WRD, U.S. Fish and Wildlife Service (FWS), and National Marine Fisheries Service (NMFS) to evaluate the potential suitability of habitat in rivers upstream of the Project for diadromous and migratory fish species of interest.

### **Response 3**

Regarding proposed fishing piers, although Georgia Power's proposal does not include installing fish attractor lighting on the new piers, Georgia Power will consult with WRD prior to fabricating the piers so they can be designed to accommodate fish attractor lighting in the future, as appropriate, where providing electric service is feasible and after balancing stakeholder interests, boat traffic, safety, and law enforcement considerations.

### **Response 4**

Georgia Power recognizes WRD's interest in enhancing bank fishing opportunities where possible and has proposed a variety of measures that will significantly enhance bank fishing access within the project boundary. As described in Section 3.3.6.2 of Exhibit E, Georgia Power proposes to install a second barrier-free fishing pier and associated parking at Lloyd Shoals Park, a barrier-free fishing pier and associated parking at newly developed Lloyd Shoals Boat Ramp (formerly referred to as Jane Lofton Public Access Area), and barrier-free parking and a paved access trail for bank fishing at newly developed Tussahaw Creek Public Access Area. Relocating the existing motorized-boat ramp from Lloyd Shoals Park to the newly developed Lloyd Shoals Boat Ramp will also alleviate parking congestion on peak-use weekends at Lloyd Shoals Park, which will further enhance bank fishing access in this park. In addition, proposed new toilet facilities, improved parking, and other improvements at Ocmulgee River Park and Lloyd Shoals Boat Ramp will further enhance the bank fishing experience at these facilities.

### **References**

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- Georgia Department of Natural Resources (GDNR). 2021. Fishing forecasts, lakes and rivers. Wildlife Resources Division. <https://georgiawildlife.com/fishing-forecasts>.

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UNITED STATES DEPARTMENT OF COMMERCE  
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October 29, 2021

F/SER47:TC/pw

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

RE: NMFS comments on Lloyd Shoals Hydroelectric Project Preliminary Licensing Proposal

Dear Secretary Bose:

NOAA's National Marine Fisheries Service (NMFS) reviewed the Preliminary Licensing Proposal (PLP) prepared by Southern Company, on behalf of Georgia Power Company (GPC), for the proposed relicensing of the Lloyd Shoals Hydroelectric Project, FERC Project No. 2336 (hereafter referred to as "Lloyd Shoals Project" or "Project"). The current license for the Lloyd Shoals Project expires on December 31, 2023. In compliance with the Integrated Licensing Process (ILP) used by the Federal Energy Regulatory Commission (FERC), comments from resource agencies and stakeholders are due within 90 days of PLP filing, which was on August 3, 2021. The NMFS provides the following comments in accordance with the provisions of the Federal Power Act, the Fish and Wildlife Coordination Act, National Environmental Policy Act, and Magnuson-Stevens Fishery Conservation and Management Act.

The Lloyd Shoals Project is within in Butts, Henry, Jasper, and Newton counties, Georgia, on the Ocmulgee River at river mile 250.2, just south of the confluence of the Alcovy, Yellow, and South rivers in the Altamaha River Basin. The Project's dam is approximately 19 miles upstream of East Juliette Dam, making the Project the second functioning dam in the upstream direction from the Atlantic Ocean. The Lloyd Shoals Project consists of a 1,599.5-foot-long concrete-gravity dam founded on rock; a non-overflow concrete section; a powerhouse structure integral with the dam; a 728.5-foot spillway section with Obermeyer gates and a trash gate; an approximately 2,000-foot-long tailrace; an earthen embankment tie-in to the bank; a reservoir with a surface area of approximately 4,700 acres; appurtenant structures; recreation facilities; and a 500-foot-long auxiliary spillway. The reservoir's gross storage capacity is approximately 107,000 acre-feet. Reservoir levels normally fluctuate between the elevations of 527 feet and 530 feet as the Project supports a modified run-of-river operation. The Lloyd Shoals Project has a total rated capacity of 19 megawatts with a dependable capacity of 22.5 megawatts during peak demand hours. The six Francis style turbines have a maximum rated capacity of 620 cubic feet per second (cfs), for a total powerhouse maximum hydraulic capacity of 3,720 cfs.

GPC proposes to continue to operate the Lloyd Shoals Project in a modified run-of-river mode for generation during peak power-demand hours for the term of the new license. Environmental measures related to downstream habitat quality proposed by GPC include release of a continuous minimum flow of 400 cfs, or inflow, whichever is less from the Ocmulgee River. During low



flow conditions, when calculated project inflow is less than 250 cfs, the Project will supplement flows in the Ocmulgee River downstream by releasing a continuous flow of 250 cfs. Additional measures related to improving the concentration of dissolved oxygen during summer months in the tailrace include operating passive draft-tube aeration systems on Units 2, 3, and 4 from May 15 through September 30 and optimizing their operation under different generation scenarios. The NMFS supports these environmental measures for the benefit of downstream fisheries, aquatic resources, and water quality.

During the current relicensing process, the NMFS has worked with GPC to develop and refine studies of American eel abundance and upstream movements. Seasonal catch rates and size ranges of American eel present in the study area downstream of the Project were similar in the 1988 and the 2019-2021 studies (EA 1990; GPC 2021). Results from the 2021 study support results from previous studies indicating the American eel population in the basin extends above East Juliette Dam. The historical range of the American eel further extends into the Upper Ocmulgee Basin with present day conditions limiting their movement in the system. A relatively recent record of the species in Big Cotton Creek, a tributary of the South River upstream of the Project, indicates further investigations are necessary to thoroughly describe the population (GDNR 2021). The largely unchanged structure of the American eel population below Lloyd Shoals Project since 1988 and the continued presence of a fish passage barrier below the Project lessen the priority for fish passage at the Lloyd Shoals Project.

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The NMFS believes potential changes to downstream conditions and passage opportunities at East Juliette Hydroelectric Project could result in the need to pass diadromous species upstream of the Project during the new license term. Accordingly, more examination is needed of habitat availability above the Lloyd Shoals Dam and of fisheries populations in Lake Jackson and the creeks and tributaries connecting to the Upper Ocmulgee Basin. The U.S. Fish and Wildlife Service filed a comprehensive plan with FERC in 2013 (GDNR, USFWS and NMFS 2013) outlining priority restoration and management actions for American shad in the Altamaha Basin. The long-term restoration goal in this plan is reestablishing self-sustaining spawning populations of American shad to their historical range in the basin. To address this goal, the NMFS recommends the Final Application Proposal include a thorough review of relevant work in the Upper Ocmulgee Basin, including habitat suitability, fish assemblages, and water quality.

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Additionally, the NMFS asks GPC to consider a minimum concentration of dissolved oxygen of 4.0 mg/L does not meet the goal of 5.0 mg/L or greater outlined in American Shad Habitat Plan (GDNR 2020). The Georgia Department of Natural Resources submitted the American Shad Habitat Plan to the Atlantic States Marine Fisheries Commission (ASMFC) in 2014 and updated the plan in 2020 as a requirement of Amendment 3 to the Interstate Management Plan for Shad and River Herring (ASMFC 2010). One goal of the plan is to ensure water quality remains adequate to support all life stages of American shad and other aquatic organisms in the Altamaha River. The American Shad Stock Assessment and Peer Review Report (ASMFC 2020) further supports this water quality improvement. The report specifically highlights the ineffectiveness of previous approaches to maintain a suitable minimum concentration of dissolved oxygen and notes those approaches cannot achieve management and restoration goals without significant change.

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Thank you for the opportunity to provide these comments. Please direct related questions or comments to the attention of Ms. Twyla Cheatwood at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722, or at (252) 728-8758.

Sincerely,

/ for

Rusty Swafford  
Acting Assistant Regional Administrator  
Habitat Conservation Division

cc: GDNR, Thom.Litts@dnr.state.ga.us  
GDNR, Chris.Nelson@dnr.state.ga.us  
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#### References

- Atlantic States Marine Fisheries Commission (ASMFC). 2010. Amendment 3 of the American Shad Fishery Management Plan. Arlington, VA. 158 pages.
- Atlantic States Marine Fisheries Commission (ASMFC). 2020. American Shad Stock Assessment and Peer Review Report. Prepared by the ASMFC American Shad Benchmark Stock Assessment Review Panel. Arlington, VA. 1067 pages.
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- Georgia Department of Natural Resources, U.S. Fish and Wildlife Service, and National Marine Fisheries Service (GDNR, USFWS and NMFS). 2013. Priority Restoration and Management Actions for the American Shad in the Altamaha River Basin, Georgia. Social Circle, Georgia. 29 pages.

# **Response to Letter from National Marine Fisheries Service Dated October 29, 2021**

## **Response 1**

Regarding the relatively recent record of American Eel from Big Cotton Indian Creek, as described in Section 3.3.3.1 of Exhibit E (Migratory Fishes), it is unlikely that young eels currently ascend 100-ft-tall Lloyd Shoals Dam, although it is possible some could have followed flashboard leakage up the face of the dam before the Obermeyer gates were installed in 2012. Another more plausible explanation may be bait-bucket introduction upstream of the dam. According to the Atlantic States Marine Fisheries Commission (2017), eels are often purchased or captured by recreational anglers as bait for larger sportfish such as Striped Bass. Striped Bass have been stocked in Lake Jackson since 2005 as an added sport fishery. As indicated by Georgia Power's American Eel Abundance and Upstream Movements Study, young eels are seasonally available for capture in pools below the Lloyd Shoals spillway.

## **Response 2**

When fish passage is achieved at Juliette Dam, Georgia Power will work with NMFS, FWS, and WRD to evaluate the potential suitability of habitat in rivers upstream of the Project for American Shad and other diadromous and migratory species of interest.

Although a review of habitat suitability specific to American Shad in the rivers upstream of the Project has not been conducted, and was not part of the FERC-approved Study Plan, Exhibit E analyzes a substantial amount of existing resource information characterizing present-day watershed and stream conditions in the upper Ocmulgee River basin upstream of the Project that is relevant to evaluating potential spawning habitat for American Shad. The Priority Restoration and Management Actions Plan for American Shad in the Altamaha River Basin prepared by GDNR, FWS, and NMFS (2013) provides a preliminary estimate of 398 acres of potential American Shad spawning habitat upstream of Lloyd Shoals Dam to the next obstruction or headwaters. However, this estimate is based only on the length of stream segments greater than 30 feet wide without considering existing instream habitat and water quality conditions in the highly developed watershed upstream of the Project. The plan specifies that Clean Water Act Section 303(d)-listed streams and additional water quality data should be considered in decision-making about restoration priorities and management actions.

The existing resource information analyzed by Georgia Power in Exhibit E, and in supporting resource studies and documentation, indicate that present-day hydrologic alteration, water quality impairments, and sedimentation from the highly urbanized, densely populated watershed upstream of the Project, which drains southeastern and eastern portions of metropolitan Atlanta, have substantially modified riverine habitat conditions compared to historical conditions.

Section 3.1.2 of Exhibit E describes the major land uses upstream of the Project, including that watershed imperviousness is high throughout much of the upper basin and exceeds

thresholds considered detrimental to stream stability, water quality, aquatic habitat, and biotic integrity. About 100 miles of interstate highway corridors traverse this upper portion of the basin. As described in Section 3.3.1.1 of Exhibit E (Geology and Soils), about 80 percent of the stream miles assessed in the upper Ocmulgee River basin within the Metro Water District are 303(d)-listed for not supporting their designated uses for one or more parameters. Sediment-impaired segments total 50 miles in the South River system, the largest river upstream of Lake Jackson and hence the largest area of potential shad spawning habitat. Stormwater runoff from roads and developed urban areas were identified as major sources of erosion and sedimentation. As described in Section 3.3.2.1 (Water Resources), the lower reaches of the South River and Yellow River before they enter Lake Jackson are not supporting water quality standards due to fecal coliform bacteria from point and nonpoint sources, and the lower reach of the Alcovy River is not supporting water quality standards due to *E. coli* bacteria from nonpoint sources.

High sediment loads and water quality impairments reduce habitat complexity and modify instream habitat for benthic macroinvertebrates and fish. Urbanization is linked consistently to stream degradation, reduced species richness, and shifts in dominance of fish assemblages to habitat-generalist species. Walter et al. (2005) studied urbanization effects on fishes and habitat quality in the Etowah River basin, Georgia, just north of Atlanta in the Piedmont province, and found that urban effects on fishes accrue rapidly, are detectable at low levels, lower species richness and density, and result in the decline of endemic species and a transition to a sunfish-dominated stream community.

Demand on available water supplies created by population growth in the metropolitan Atlanta region will continue to impact instream flows, habitat, and water quality in the upper Ocmulgee River basin into the future. The total population of the five counties contributing the greatest watershed area to the upper Ocmulgee River basin within the Metropolitan North Georgia Water Planning District (Metro Water District) (Clayton, DeKalb, Gwinnett, Henry, and Rockdale Counties) is projected to increase from 2,289,700 in 2020 to 3,213,500 in 2050, an increase of 40 percent (CH2M and Black & Veatch 2017).

### **Response 3**

As described in Section 3.3.2.1 of Exhibit E (Water Quality), the applicable DO criteria for the project waters, which support warm-water species of fish, are a daily average of at least 5.0 mg/L and no less than 4.0 mg/L at all times.

Regarding the goal of 5.0 mg/L outlined in the American Shad Habitat Plan (GDNR 2020), project releases already support this goal, even though it is not a state water quality standard applicable to the Project. Georgia Power's DO monitoring in 2019-2020 shows that DO concentrations in the Lloyd Shoals tailrace did not drop below 5.0 mg/L for prolonged periods during the seasons associated with critical life stages of American Shad and many other organisms that spawn in the spring. Hourly tailrace DO readings during the 2019-2020 monitoring period equaled or exceeded 5.0 mg/L 97.8 percent of the time. Instantaneous values below 5.0 mg/L occurred between June and October, entirely or predominantly after the spawning, hatching, and larval development life-stage periods for American Shad. In the Ocmulgee River, American Shad spawning occurs below Juliette Dam from March to May

and peaks in April (GDNR 2021). Eggs are broadcast into the water column, where they are carried downstream by currents and hatch in about 3 to 12 days, depending on water temperature, and newly hatched larvae also drift with the current (Weiss-Glanz et al. 1986). During the Lloyd Shoals tailrace monitoring in 2019-2020, daily average DO concentrations in April-May ranged between about 6.5 and 9.5 mg/L (Exhibit E, Figure 5). Moreover, drifting eggs would be transported in currents downstream for several days before hatching, where DO concentrations would be further attenuated by natural aeration and tributary inflow.

## References

- Atlantic States Marine Fisheries Commission (ASMFC). 2017. 2017 American Eel Stock Assessment Update. October 2017. <https://www.asmfc.org/uploads/file/59fb5847AmericanEelStockAssessmentUpdateOct2017.pdf>.
- CH2M and Black & Veatch. 2017. Water resource management plan, Metropolitan North Georgia Water Planning District. June 2017. <http://northgeorgiawater.org/plans-manuals/>.
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- Walters, D.M., M.C. Freeman, D.S. Leigh, B.J. Freeman, and C.M. Pringle. 2005. Urbanization effects on fishes and habitat quality in a southern Piedmont River basin. *American Fisheries Society Symposium* 47:69-85.
- Weiss-Glanz, L.S., J.G. Stanley, and J.R. Moring. 1986. Species profiles: life histories and environmental requirements of coastal fishes and invertebrates (North Atlantic) – American shad. U.S. Fish and Wildlife Service Biological Report 82(11.59). U.S. Army Corps of Engineers TR EL-82-4.



# United States Department of the Interior

**Fish and Wildlife Service**  
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November 1, 2021

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

Subject: Comments on Preliminary Licensing Proposal for the Lloyd Shoals Hydroelectric Project, FERC Project Number P-2336-094

Dear Ms. Bose:

The U.S. Fish and Wildlife Service (Service) has reviewed the Preliminary Licensing Proposal (PLP; FERC Project Number P-2336-094) for the relicensing of the Lloyd Shoals Hydroelectric Project (LSHP) prepared by Southern Company on behalf of Georgia Power Company (GPC). The current Federal Energy Regulatory Commission (FERC) license for this facility expires on December 31, 2023. This facility, operated by GPC, is located on the Ocmulgee River at river mile 250.2 in east-central Georgia, within Butts, Henry, Jasper, and Newton Counties. There is only one other dam between this project and the Atlantic Ocean, the East Juliette Dam which is approximately 19 miles downstream of the LSHP. The LSHP consists of: (1) a 4,700-acre reservoir (Lake Jackson) with a gross storage capacity of 107,000 acre-feet; (2) a 1,599.5-foot-long concrete gravity dam founded on rock; (3) a powerhouse integral with the dam; (4) a spillway section with Obermeyer gates and a trash gate; (5) an approximately 2,000-ft-long tailrace; (6) voltage transformation with connection directly to the primary transmission system; (7) appurtenant structures; and (8) recreation facilities. The nameplate rating generating capacity of the LSHP is 19 megawatts (MW) and its dependable capacity is 22.5 MW in the summertime. The project has six Francis-style turbines with a maximum rated capacity of 620 cubic feet per second (cfs), for a total powerhouse maximum hydraulic capacity of 3,720 cfs.

In the PLP, Georgia Power proposes to continue operating the LSHP in a modified run-of-river mode for generation during peak power demand hours. During normal operation, the LSHP would continue to release a minimum flow of 400 cfs — or inflow, whichever is less — into the river downstream for the protection and enhancement of fish and wildlife resources. During low-flow periods when calculated inflow is less than 250 cfs, the LSHP would release some of the reservoir's storage to supplement downstream flows to reach a 250-cfs minimum flow to protect aquatic life and other downstream uses. GPC proposes to continue to operate the passive draft tube aeration system on Units 2, 3, and 4 to improve summer dissolved oxygen (DO) concentrations in the tailrace area from May 15 through September 30. GPC will also prepare an

operational procedure for the draft tube aeration system that specifies priority for the use of aerating units under different generation scenarios in response to recorded instances of DO dropping below 4.0 mg/L during their 1-year water quality study. GPC is not proposing to add capacity or make any major modifications to the LSHP under the new license.

In compliance with FERC’s Integrated Licensing Process (ILP), comments are required to be submitted within 90 days of the PLP filing, which GPC provided to FERC on August 3, 2021. We submit the following comments pursuant to the authorities of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. § 1531 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), and the Federal Power Act (16 U.S.C. § 791a, et seq.).

On page vi of the PLP, GPC proposes several environmental [protection] measures. The Service recommends that GPC clarify the 5th bullet point or environmental protection measure in this section by providing the purpose of “[preparing] an operational procedure for the draft tube aeration system that specifies priority for the use of aerating units under different generation scenarios.” The reasoning is provided later in the document, but it would add clarity to specify the purpose in this section, as has been done for other environmental protection measures listed in this section.

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In section 4.3.3.2 Environmental Impacts and Recommendations subsection Project Operations, GPC states that “for both types of drawdowns [low flow and maintenance], the lake [Jackson] elevation would be lowered slowly, which would avoid or minimize stranding of fish in shallow coves.” In addition to addressing concerns of fish stranding, the Service requests that GPC provide specifics about the rate of drawdowns in both of these cases and that these rates, if possible, should not exceed to movement capacity of rare or state threatened mussels (e.g. *Pyganodon gibbose*, Inflated Floater and *Toxolasma pullus*, Savannah Lilliput) that occur in Lake Jackson.

2

In section 4.3.3.2 Environmental Impacts and Recommendations subsection Fish Passage, GPC makes several claims regarding migratory riverine species and anadromous species. On page 61 and in reference to American Shad (*Alosa sapidissima*) and Striped Bass (*Morone saxatilis*), GPC states that “there is no evidence that either species can successfully reproduce upstream of the Project or that spawning and rearing habitats are available under present-day conditions.” However, the Service is unaware of any studies of spawning habitat suitability for these species above Lake Jackson that would support this claim. Rather, historical evidence suggests that American Shad migrated at least as far as Covington, Georgia which is more than 13 river miles north of the LSHP up the Yellow River, a tributary to Jackson Lake. Experimental stocking of American Shad by Georgia Department of Natural Resources (GADNR) only began in 2016 and the Service is unaware of study results that have determined the success or failure of this effort. In contrast to GPC’s claim that “successful natural reproduction of American Shad stocked into Lake Jackson may not be expected to occur upstream of the reservoir”, the GADNR states in the ASMFC American Shad Sustainable Fishing Plan for Georgia (updated in 2020) that “this 5-year stocking program, which ceased in 2019, resulted in American shad being annually stocked above migration barriers *in an attempt to re-establish shad in section of the Oconee and*

3



*Ocmulgee rivers.*” This statement by the GADNR suggests that there is at least a reasonable expectation that suitable spawning habitat may be found above LSHP.

Similarly, GPC claims that “there is no evidence that suitable main-channel habitat for the species [Robust Redhorse, *Moxostoma robustum*] would be available upstream of the Project.” The Service is unaware of any habitat suitability studies conducted for this species above Lake Jackson that would support this claim. The current absence of migratory species above the project should not be assumed to be evidence of the lack of habitat above the project or “no evidence of habitat availability”. LSHP was constructed in 1911 which would have isolated any remaining upstream populations of migratory fishes. Land use changes, environmental pollution, and lack of water quality standards before the implementation of the Clean Water Act in 1972 could have impacted these isolated populations until they were extirpated without the potential for recolonization because of fish passage barriers such as the East Juliette Dam and LSHP. Therefore, without further habitat suitability studies, it is unknown whether suitable habitat exists for migratory fishes above the project.

Based on the information provided and the continued existence of the East Juliette Dam approximately 19 miles downstream of the LSHP, the Service agrees with GPC’s claim that “upstream passage at Lloyd Shoals Dam currently is not a factor in the ability of Striped Bass, American Shad, or Robust Redhorse to complete their life cycles in the Altamaha River basin.” However, the Service believes that downstream conditions at East Juliette Dam are likely to change during the next license period and provide opportunities for fish passage. At such time, an assessment of upstream habitat suitability would be required to determine if fish passage is needed because habitat suitability in tributaries of Lake Jackson have not been adequately studied. GPC and FERC should be aware that the Service’s “Priority Restoration and Management Actions for the American Shad in the Altamaha River Basin, Georgia” (2013) includes the goal of restoring American Shad to its historical range in the Altamaha River Basin, which would include areas upstream of the project and may require fish passage if studies confirm habitat suitability above the LSHP.

GPC conducted a 2-year eel abundance and movement study during the current relicensing process that compared current abundances to historical abundances immediately downstream of the project. The results of these studies presented by GPC suggest that eel populations below the project are stable. Based on the information provided, the Service supports GPC’s decision not to propose eel passage at this time. Changes in the condition of the East Juliette Dam during the project’s next license may also afford opportunities for fish passage for this species.

We appreciate the opportunity to review and provide comments on this Preliminary Licensing Proposal for the LSHP. Please contact staff biologist Eric Bauer ([eric\\_bauer@fws.gov](mailto:eric_bauer@fws.gov)) with the Service’s Georgia Ecological Services office for additional information or if you require further assistance.

Sincerely,

Peter Maholland  
Acting Field Supervisor

## References

Georgia Department of Natural Resources (GADNR). 2020. ASMFC American Shad Sustainable Fishing Plan for Georgia. [http://www.asmfc.org/files/Shad%20SFMPs/GA\\_AmShad\\_SFMP\\_2020.pdf](http://www.asmfc.org/files/Shad%20SFMPs/GA_AmShad_SFMP_2020.pdf) Accessed October 2021.

Georgia Department of Natural Resources (GADNR). 2020. American Shad Habitat Plan. December 2020. [http://www.asmfc.org/files/ShadHabitatPlans/AmShadHabitatPlan\\_GA.pdf](http://www.asmfc.org/files/ShadHabitatPlans/AmShadHabitatPlan_GA.pdf) Accessed October 2021

Georgia Power Company (Georgia Power). 2021. American Eel Abundance and Upstream Movements Updated Study Report. Lloyd Shoals Hydroelectric Project, FERC No. 2336. Prepared with Kleinschmidt. May 2021.

U.S. Fish and Wildlife Service (USFWS). National Marine Fisheries Service. Georgia Department of Natural Resources. 2013. Priority Restoration and Management Actions for the American Shad in the Altamaha River Basin, Georgia. Athens, Georgia. 2013.

# **Response to Letter from U.S. Fish and Wildlife Service Dated October 29, 2021**

## **Response 1**

Georgia Power agrees with FWS' recommendation and has revised the summary bullet point for implementing the proposed operational procedure in Exhibit E to more clearly state that its purpose is to further improve the dissolved oxygen-enhancing performance of the existing passive draft tube aeration system.

## **Response 2**

Georgia Power has revised the analysis in Section 3.3.3.2 of Exhibit E (Project Operations) to specify that for both low-flow and maintenance drawdowns, the lake elevation would be lowered at a rate of no more than 0.5 ft per day, to avoid or minimize stranding of fish and rare or state threatened mussel species that occur in Lake Jackson. Georgia Power has established this drawdown rate in consultation with FWS on previous relicensing projects for the purpose of protecting mussels. In addition, Georgia Power proposes to consult with FWS, WRD, and GEPD in advance of planned drawdowns.

## **Response 3**

When fish passage is achieved at Juliette Dam, Georgia Power will work with FWS, NMFS, and WRD to evaluate the potential suitability of habitat in rivers upstream of the Project for American Shad and other diadromous and migratory species of interest.

Regarding statements in the PLP about there being no evidence of adequate spawning and rearing habitat for migratory species upstream of the Project, Section 3.3.3.2 of Exhibit E (Fish Passage) has been revised to clarify that there have been no reports of either Striped Bass or American Shad successfully reproducing upstream of the Project, and that although main-channel riverine habitats upstream of the Project have not been specifically assessed for spawning habitat suitability for Striped Bass, American Shad, or Robust Redhorse, high sediment loads and water quality impairments have modified these streams to a significant degree and likely limit their habitat suitability compared to historical conditions.

Although a review of habitat suitability specific to American Shad, Robust Redhorse, and Striped Bass in the rivers upstream of the Project has not been conducted, and was not part of the FERC-approved Study Plan, Exhibit E analyzes a substantial amount of existing resource information characterizing present-day watershed and stream conditions in the upper Ocmulgee River basin upstream of the Project that is relevant to evaluating potential spawning habitat for these species upstream of the Project.

The Priority Restoration and Management Actions Plan for American Shad in the Altamaha River Basin prepared by GDNR, FWS, and NMFS (2013) provides a preliminary estimate of 398 acres of potential American Shad spawning habitat upstream of Lloyd Shoals Dam to the next obstruction or headwaters. However, that estimate is based only on the length of stream segments greater than 30 feet wide without considering present-day instream habitat and water quality

conditions in the highly developed watershed upstream of the Project. The plan also identifies that Clean Water Act Section 303(d)-listed streams and additional water quality data should be considered in decision-making about restoration priorities and management actions.

The existing resource information analyzed by Georgia Power in Exhibit E, and in supporting resource studies and documentation, indicate that present-day hydrologic alteration, water quality impairments, and sedimentation from the highly urbanized, densely populated watershed upstream of the Project, which drains southeastern and eastern metropolitan Atlanta, have substantially modified riverine habitat conditions compared to historical conditions.

Section 3.1.2 of Exhibit E describes the major land uses upstream of the Project, including that watershed imperviousness is high throughout much of the upper basin and exceeds thresholds considered detrimental to stream stability, water quality, aquatic habitat, and biotic integrity. As described in Section 3.3.1.1 of Exhibit E (Geology and Soils), about 80 percent of the stream miles assessed in the upper Ocmulgee River basin within the Metropolitan North Georgia Water Planning District (Metro Water District) are not supporting their designated uses for one or more parameters. Sediment-impaired segments of the South River system, the largest river upstream of Lake Jackson, total 50 miles, and stormwater runoff from roads and developed urban areas were identified as major sources of erosion and sedimentation. As described in Section 3.3.2.1 (Water Resources), the lower reaches of the South River and Yellow River before they enter Lake Jackson are not supporting water quality standards due to fecal coliform bacteria from point and nonpoint sources, and the lower reach of the Alcovy River is not supporting water quality standards due to *E. coli* bacteria from nonpoint sources.

High sediment loads and water quality impairments reduce substrate complexity and modify instream habitat for benthic macroinvertebrates and fish. Urbanization is linked consistently to stream degradation, reduced species richness, and shifts in dominance of fish assemblages to habitat-generalist species. Walter et al. (2005) studied urbanization effects on fishes and habitat quality in the Etowah River basin, Georgia, just north of Atlanta in the Piedmont province, and found that urban effects on fishes accrue rapidly, are detectable at low levels, lower species richness and density, and result in the decline of endemic species and a transition to a sunfish-dominated stream community.

Demand on available water supplies created by population growth in the metropolitan Atlanta region will continue to impact instream flows, habitat, and water quality in the upper Ocmulgee River basin into the future. The total population of the five counties contributing the greatest watershed area to the upper Ocmulgee River basin within the Metropolitan North Georgia Water Planning District (Metro Water District) (Clayton, DeKalb, Gwinnett, Henry, and Rockdale Counties) is projected to increase from 2,289,700 in 2020 to 3,213,500 in 2050, an increase of 40 percent (CH2M and Black & Veatch 2017).

## References

- CH2M and Black & Veatch. 2017. Water resource management plan, Metropolitan North Georgia Water Planning District. June 2017. <http://northgeorgiawater.org/plans-manuals/>.
- Georgia Department of Natural Resources (GDNR), U.S. Fish and Wildlife Service (FWS), and National Marine Fisheries Service (NMFS). 2013. Priority Restoration and Management Actions for the American Shad in the Altamaha River Basin, Georgia.
- Walters, D.M., M.C. Freeman, D.S. Leigh, B.J. Freeman, and C.M. Pringle. 2005. Urbanization effects on fishes and habitat quality in a southern Piedmont River basin. *American Fisheries Society Symposium* 47:69-85.

Courtenay O'Mara, P.E.  
Hydro Licensing and Compliance Supervisor  
Southern Company Generation

**Re: EPA Comments on Lloyd Shoals Hydroelectric Project Preliminary Licensing Proposal (PLP) P-2336-094**

Dear Ms. O'Mara:

The U.S. Environmental Protection Agency (EPA) has reviewed the Lloyd Shoals Hydroelectric PLP consistent with our responsibilities under Section 102(2)(C) of the National Environmental Policy Act (NEPA). The Federal Energy Regulatory Commission (FERC) proposes to issue a new license for the Lloyd Shoals Hydroelectric Project (P-2336-094). The proposed project is located on the Ocmulgee River just south of the confluence of the Alcovy, Yellow and South rivers in Butts, Henry, Jasper, and Newton Counties, Georgia. Summertime capacity of the project is 22.5 megawatts (MW), and its reservoir storage capacity is about 107,000 acre-feet. The operator, Georgia Power, proposes to continue current operations. No new additions or structures to the dam are planned.

**Technical Issues and Recommendations:**

**Water Quality:**

The *Water Quality of Loyd Shoals Area* section described instances when dissolved oxygen (DO) values dropped below the 4.0 mg/L in 2020. The PLP described and examined these DO scenarios appropriately and provided conclusions and some remedies.

Recommendation: The EPA appreciates the well-presented information, and we recommend an additional step to avoid low DO scenarios in the future. It is our understanding that low DO instances were primarily caused by upstream storm events. We believe that with these findings Georgia Power will be able to forecast the possibility of DO levels dropping after upstream storm events and measures (already explained in the PLP) to prevent low DO events from happening again. We suggest developing procedures that also consider upstream storm events.

1

**Recreational and Land Use:**

The PLP proposed additional recreational areas and enhancements to the existing ones. Several wooded acres and lower vegetation are proposed to be removed.

Recommendation: The EPA recommends including plans for the disposal of the cut trees and vegetation to be removed. We recommend avoiding the use of landfills to dispose of trees and finding alternatives uses for them.

2

Also, we would like to recommend the consideration and implementation of recycling in addition to the purchase of new trash cans. The posting of educational signs next to fun recycling bins would encourage visitors to recycle.

3

The EPA appreciates the opportunity to be a part of the early stages of the NEPA process during the FERC relicensing process. Please feel free to contact me if you have any questions at [clark.maria@epa.gov](mailto:clark.maria@epa.gov) or 404-562-9513.

Sincerely,

*Maria R. Clark*

NEPA Program Office - Region 4

U.S. Environmental Protection Agency

61 Forsyth, Street South West

Atlanta, GA 30303

# **Response to Letter from U.S. Environmental Protection Agency Dated November 2, 2021**

## **Response 1**

Georgia Power appreciates EPA's comments. As previously described, instances of instantaneous DO values dropping below 4.0 mg/L occurred during the critical period of the year (May-September) and after storm events due to biological oxygen-demanding conditions in both the reservoir and in the higher inflows travelling through the reservoir from runoff upstream in the basin. Georgia Power has developed the Passive Draft Tube Aeration System Operational Procedure to formalize the use of the aerating turbine units and prioritize their operation during the critical period. This procedure accounts for aeration operations when inflows are increasing in storm events. The procedure is included as Appendix C of Exhibit E.

Operators have used aerating turbines in the past during the critical period but lacked a formal procedure to guide them in how many units to operate under various generating scenarios. This procedure prioritizes the aerating turbines over non aerating turbines during the critical season and also will ensure that the proper number of aerating turbines are operating for a given number of units, favoring more aerating turbines or equal aerating turbines to the non-aerating turbines. Following this new procedure would have most likely eliminated the low DO instances that occurred in June and July of 2020. Your comment also prompted us to take a closer look at the October 2019 low DO event.

The October 23, 2019 event met the instantaneous 4.0 mg/L requirement but just barely missed the 5.0 mg/L daily average target, with a daily average of 4.95 mg/L. At that time, the Lloyd Shoals Hydro Plant had been releasing the supplemental flow of 250 cfs for several weeks into October. It was the plant practice to continue aeration if they were still releasing at the 250 cfs rate until mid-October. On October 21, 2019 inflows increased such that four units were operating and three of those were aerating units. The lower DO event that did not achieve the 5.0 mg/L daily average target occurred two days after the higher flow event when the plant had returned to low flows again. The October provision was added to the procedure to account for the low-flow days that occur in October.

## **Response 2**

EPA's recommendation has been incorporated into Section 3.3.6.2 of Exhibit E (Construction of Proposed Enhancement Measures). Georgia Power proposes not to dispose of trees removed during construction of the proposed recreation enhancement measures in a landfill and will make efforts to find alternative uses, such as mulching and/or donating timber.

## **Response 3**

Georgia Power acknowledges EPA's interests in the importance of recycling for reducing and recapturing waste as a resource to manufacture new materials and products. However, there are currently no recycling pick-up services available in Bibb and Jasper Counties, where the project recreation facilities are located. Georgia Power will consider recycling opportunities, should these services become available in the future.



FEDERAL ENERGY REGULATORY COMMISSION  
WASHINGTON, D.C. 20426  
October 29, 2021

OFFICE OF ENERGY PROJECTS

Project No. 2336-094 – Georgia  
Lloyd Shoals Hydroelectric  
Project  
Georgia Power Company

VIA Electronic Mail

Courtenay O'Mara, P.E.  
Hydro Licensing and Compliance Supervisor  
Southern Company Generation  
Cromara@southernco.com

**Subject: Comments on Preliminary Licensing Proposal for the Lloyd Shoals  
Hydroelectric Project**

Dear Ms. O'Mara:

Pursuant to section 5.16(e) of the Commission's regulations, this letter contains Commission staff's comments on Georgia Power Company's Preliminary Licensing Proposal for the Lloyd Shoals Hydroelectric Project filed on August 3, 2021.

Staff comments are provided in Schedule A and should be addressed in the final license application.

If you have any questions, please contact Navreet Deo at (202) 502-6304 or [navreet.deo@ferc.gov](mailto:navreet.deo@ferc.gov).

Sincerely,

Stephen Bowler, Chief  
South Branch  
Division of Hydropower Licensing

Enclosure: Schedule A

## **Schedule A: Staff Comments on Preliminary Licensing Proposal**

### **General**

1. Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), the Commission cannot issue a license for a project within or affecting a state's coastal zone, unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 6 months of its receipt of the applicant's certification. To demonstrate compliance with the CZMA, please provide documentation of the following:
  - a. the date Georgia Power sent its request for consistency certification to the Georgia DNR, Coastal Resources Division (Georgia CRD), together with a copy of the consistency certification;
  - b. documentation of the date the Georgia CRD received the certification, any action taken by the state, and the date of that action; and
  - c. copies of any correspondence between Georgia Power and the Georgia CRD regarding the CZMA consistency certification.

### **Protection, Mitigation, and Enhancement (PM&E) Measures**

2. As part of the Preliminary Licensing Proposal (PLP), Georgia Power proposes to "prepare an operational procedure for the draft tube aeration system that specifies priority for the use of aerating units under different generation scenarios." Section 5.18(b)(5)(iii)(B) of the Commission's regulations requires that the final license application describe all "operation and maintenance procedures for any existing or proposed measures or facilities." As described in section 5.16(b)(2) of the Commission's regulations, this requirement includes "protection, mitigation, and enhancement measures with respect to each resource affected by the project proposal." Therefore, in order for us to evaluate the proposed operation, please include the draft tube aeration operational procedure(s).
3. The PLP does not include proposed measures for monitoring compliance with project operation, including lake levels and downstream minimum flows. Section 5.18(b)(5)(iii)(B) of the Commission's regulations requires that the final license application describe all "operation and maintenance procedures for any existing or proposed measures or facilities." As described in section 5.16(b)(2) of the Commission's regulations, this includes "protection, mitigation, and enhancement measures with respect to each resource affected by the project proposal." Therefore, please include a proposed Project Operation and Flow Monitoring Plan, or a draft plan.

At a minimum, the (draft) plan should include:

- a. the (draft) plan's goals and objectives;
- b. monitoring protocols and sampling methodologies, including the schedules for monitoring/sampling and the methods for calibrating equipment;
- c. reporting provisions; and
- d. an implementation schedule.

### **Project Description and Operation**

4. Section 2.1.1, *Project Facilities*, of the PLP, indicates that the maximum hydraulic capacity of each turbine unit is 620 cubic feet per second (cfs). Section 2.1.1 also states that the "efficient/best gate hydraulic capacity" of each turbine unit is 410 cfs. Please clarify the difference between the maximum hydraulic capacity and the "efficient/best gate hydraulic capacity," and provide the minimum hydraulic capacity of each unit.

5. Section 2.1.1, *Project Facilities*, of the PLP, states that the gross storage capacity of Lake Jackson at the normal full-pool elevation of 530 feet plant datum. Please provide the usable storage capacity of the reservoir.

### **Developmental Resources**

6. In order for staff to calculate the capacity benefit<sup>1</sup> (megawatts) of the project, please provide monthly flow duration curves in tabular form for a period of record of at least one average flow year, or a representative set of years, and identify: (a) the median monthly inflow, and (b) the order of operation of the turbine-generator units at each median monthly inflow.

### **Fisheries and Aquatic Resources**

7. Section 4.3.3.2, *Environmental Impacts and Recommendations*, of the PLP, includes an assessment of project effects on summer habitat for sport fishes (including striped bass) in Lake Jackson. The analysis indicates that habitat in Lake Jackson is generally suitable for striped bass with regard to water temperature and dissolved oxygen (DO) concentrations in the fall, winter, and spring. However, during the summer, high water temperature in the surface waters (i.e., temperatures exceeding

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<sup>1</sup> We use the term capacity benefit to describe the benefit a project receives for providing a capacity to the grid, which may be in the form of a dependable capacity credit or credit for monthly capacity provided.

82 °F) and low DO in deeper waters (i.e., DO lower than 4.0 milligrams per liter (mg/L)), where temperatures are cooler, limit the availability of suitable habitat for striped bass. This analysis does not quantify the volume of water (or acres of habitat) affected. To allow us assess the project's effect on suitable habitat for striped bass in Lake Jackson, please update this analysis to include an estimate of the amount of suitable habitat (either in water volume or acres of habitat) that is available for striped bass during the critical summer period (for dry, average, and wet years) compared to the amount of suitable habitat that is available in the fall, winter, and spring.

## **Terrestrial Resources**

8. Section 4.3.4.2, *Environmental Impacts and Recommendations*, of the PLP describes the potential impacts on terrestrial resources from the proposed permanent clearing of a total of about 2.5 acres of upland, mixed pine/hardwood forest habitat for the new recreation facilities at the Jane Lofton Public Access Area and the new formal access at the Hwy 36 Bridge at Tussahaw Creek. In addition, the construction of the proposed recreation enhancements at Lloyd Shoals Park and Ocmulgee River Park would temporarily disturb upland and riparian vegetation and associated wildlife in the vicinity of those construction sites. However, the PLP does not describe vegetation management practices at these recreation facilities. Please include any vegetation management practices: (1) currently used at these sites, (2) proposed to be used to minimize vegetation removal and disturbance during the construction of the recreation improvements, and (3) proposed to be used routinely through the term of the license. Also, please include the: (1) methods of vegetation management (e.g., mowing, herbicide applications, tree trimming and/or removal); (2) frequency and timing of management activities; and (3) location (including maps and or images, if available) of each type of vegetation management.

9. In section 4.3.4.2, *Environmental Impacts and Recommendations*, of the PLP, Georgia Power proposes to continue to monitor for the occurrence of, and periodically treat, infestations of specific invasive terrestrial and aquatic plants within the project boundary. However, section 2.4 does not include the monitoring and treatment of invasive species as a proposed environmental measure for the continued operation of the project. Please include any proposed measures for the monitoring and treatment of invasive terrestrial and aquatic plant species, and details on how this would be accomplished (e.g., frequency of monitoring and treatment, type of treatment used, proposed measures to prevent invasive species from establishing). Please give particular attention to areas where upland and riparian vegetation would be disturbed for the construction of the proposed recreation improvements.

10. In section 4.3.6.2, *Environmental Impacts and Recommendations*, of the PLP, Georgia Power proposes to develop and implement a Shoreline Management Plan (SMP) in accordance with the existing Shoreline Management Guidelines for Georgia

Power Lakes, and to promote the maintenance of vegetated buffers around the reservoir to protect water quality, aquatic habitat, and cultural and aesthetic resources. Please include, in the license application and the SMP, a description of any proposed best management practices (BMPs) that would be used to protect vegetated buffers, native shoreline vegetation, aquatic habitat, and water quality from ground disturbing activities, vegetation clearing, and the spread of invasive vegetation.

### **Threatened and Endangered Species**

11. Section 4.3.5, *Threatened Endangered Species*, of the PLP, provides natural history information on the federally listed species included on the U.S. Fish and Wildlife Service's (FWS) official species list that may occur within the project boundary or be affected by the project, and discussion of the potential project effects on these species. On October 19, 2021, Commission staff filed an updated official species list for the project area.<sup>2</sup> The updated species list includes the monarch butterfly, a candidate species that may occur within the project boundary or be affected by the project. Please include natural history information, discussion of potential project effects, and proposed protection, mitigation, and enhancement measures (if any) for the monarch butterfly.

### **Recreation and Land Use**

12. The PLP does not provide the size of each of the project's recreation facilities. To facilitate our review of recreation resources, please provide the acreage for each of the three existing project recreation facilities (Lloyd Shoals Park, Jane Lofton Public Access Area, Ocmulgee River Park and Tailrace Fishing Pier), and the proposed project recreation facility (Hendricks Mill Public Access Area).

13. Section 4.3.6.2, *Environmental Impacts and Recommendations*, of the PLP, proposes the development of new barrier-free parking adjacent to a proposed new fishing pier at Lloyd Shoals Park. However, the size of the associated parking area is not specified. To facilitate our review of the proposed enhancements, please provide the number of spaces to be constructed, as well as the proposed surface composition of the parking area (e.g., concrete, gravel, natural, etc.).

14. Section 4.3.6.2, *Environmental Impacts and Recommendations*, of the PLP, proposes to formalize the Highway 36 Bridge at Tussahaw Creek recreation site and rename it as the Hendricks Mill Public Access Area. Several enhancements to this site are proposed, including a new access road, small, gravel parking area, and formal path

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<sup>2</sup> The original species list was generated on FWS's ECOS-IPaC website (<https://ecos.fws.gov/ipac/>) on August 3, 2018 and filed on August 6, 2018. The updated species list was generated and filed on October 19, 2021.

leading to a step-down paddling access ramp. However, information on the surface composition of the proposed access road and path is not provided. To facilitate our review of the proposed enhancements, please provide the surface composition of the access road and path (e.g., concrete, gravel, natural, etc.).

15. Section 4.3.6.2, *Environmental Impacts and Recommendations*, of the PLP, proposes the development and implementation a Shoreline Management Plan (SMP) to protect water quality, aquatic habitat, cultural and aesthetic resources, as discussed above. Please file a copy of the draft SMP with the license application.

### **Cultural Resources**

16. Section 2.4, *Proposed Environmental Measures*, of the PLP, proposes the implementation of a Historic Properties Management Plan (HPMP) to preserve and manage archaeological sites and historic structures. Please file a copy of the draft HPMP as Privileged, along with any comments from the Georgia State Historic Preservation Office and/or the Tribes.

# **Response to Letter from Federal Energy Regulatory Commission Dated October 29, 2021**

## **Response 1**

Section 1.3.3 of Exhibit E (Coastal Zone Management Act) describes Georgia Power's compliance with the CZMA. On November 9, 2021, Georgia Power requested consistency certification of the Georgia Department of Natural Resources Coastal Resources Division (CRD). Georgia Power subsequently provided additional information about the Project requested by CRD, including the PLP. On December 20, 2021, CRD notified Georgia Power of its determination that continued operation of the Project would not result in reasonably foreseeable impacts to coastal uses and resources and, therefore, federal consistency certification is not required. Documentation of Georgia Power's email correspondence with CRD, including CRD's determination, is attached herein.

## **Response 2**

Section 3.3.2.2 of Exhibit E (Water Quality in the Tailrace) describes Georgia Power's proposed passive draft tube aeration system operational procedure, which is provided as Appendix C in Exhibit E.

## **Response 3**

Section 3.3.2.2 of Exhibit E (Project Operations) describes Georgia Power's proposed project operation compliance monitoring plan, which is provided as Appendix B in Exhibit E.

## **Response 4**

The best gate hydraulic capacity of the turbines corresponds with the most efficient wicket gate settings, while maximum hydraulic capacity is the flow through the turbines with the wicket gates fully open.

Section 2.1.1 of Exhibit E (Project Facilities) describes that the minimum hydraulic capacity of each turbine unit is unknown but the turbines operate smoothly at 250 cfs to supplement flows in the river downstream during low-flow operation.

## **Response 5**

Section 2.1 of Exhibit E (No-Action Alternative) identifies the usable storage of the reservoir as 74,750 acre-feet. This is the volume available for operations between elevation 530 ft and 506 ft plant datum (PD) (506 ft PD is the top of the intake, below which cavitation of turbine units would occur). An area-capacity curve is provided in Exhibit B of the license application.

## **Response 6**

The attached tables (Response 6, Tables 1 and 2) provide monthly flow duration curves in tabular form and the median monthly inflow for 2018, as an average inflow year at the Lloyd Shoals Project.

The only order of operation of the turbine-generator units that will be specified is that for the period May 15-September 30 as proposed in the Passive Draft Tube Aeration Operational Procedure in Appendix C of Exhibit E.

### **Response 7**

Section 3.3.3.2 of Exhibit E (Summer Habitat for Sport Fishes in Lake Jackson) provides an updated analysis to include an estimate of the area of habitat in Lake Jackson that is available for Striped Bass during the summer critical period for dry, average, and wet years. Based on this analysis, there is suitable habitat in the entire reservoir during fall, winter, and spring in wet, average, and dry years. In summer, 44 percent of the reservoir surface area contains suitable habitat in average and dry years and 85 percent contains suitable habitat during wet years.

### **Response 8**

Georgia Power's analysis of the potential impacts on terrestrial resources from construction of the proposed recreation measures has been updated in Section 3.3.4.2 of Exhibit E (Construction of Proposed Enhancement Measures) to describe Georgia Power's standard vegetation management practices at project recreation facilities and those to be used to minimize vegetation removal and disturbance during construction of the proposed recreation improvements and through the term of the license.

### **Response 9**

Section 3.3.4.2 of Exhibit E (Exotic Invasive Plant Species) and Appendix F (Draft License Articles for Lloyd Shoals Project) describe Georgia Power's proposed measure for monitoring and treating invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier with respect to public access and utilization. The proposed measure specifies the frequency of monitoring and treatment methods, as necessary, to eliminate interference with public access and utilization at these sites.

### **Response 10**

Section 3.3.6.2 of Exhibit E (Reservoir Shoreline Management) describes Georgia Power's proposed shoreline management plan (SMP), which is provided as Appendix E in Exhibit E. The SMP incorporates Georgia Power's current Shoreline Management Guidelines for Georgia Power Lakes, which provides information and guidance on the proper management of the shoreline to protect and enhance the scenic, recreational, and environmental values of the Project.

The Shoreline Management Guidelines list the requirements for landowners building residential structures along reservoir shorelines. The guidelines include general permitting steps applicable to all Georgia Power lakes as well as specific requirements for Lake Jackson. Landowners must first obtain a valid lease agreement (Georgia Power lots) or access lease agreement (deeded lots) and a Georgia Power permit before beginning any construction, renovation, clearing, tree removal, or grading on Georgia Power land as well as dredging activities. The guidelines specify that all new construction (dwellings and additions) should be above the project boundary. If this is not feasible, new construction shall meet setback requirements in the guidelines and satisfy county guidelines. The Shoreline Management Guidelines also provide specifications for



constructing outbuildings, gazebos/picnic shelters/decks, seawalls, ramps (only maintenance and renovation), wharves, boat slips, boat houses, docks, and combinations of these features.

### **Response 11**

Section 3.3.5.1 of Exhibit E (Candidate Species) provides a species account for Monarch Butterfly that includes natural history information, primary known threats to the species, a discussion of the distribution of milkweed species in Georgia, pollinator habitat currently provided by Georgia Power within the Lloyd Shoals project boundary and elsewhere in the Piedmont of Georgia, and potential project effects. Because a variety of milkweed species naturally occur throughout most of Georgia and four common species used by Monarch Butterfly grow in nearly every region of the state, continued project operation would not be expected to result in the loss of milkweed or nectar sources available for use by Monarch Butterfly.

In addition, Section 3.3.4.1 of Exhibit E (Georgia Power Pollinator Habitat Conservation Practices) describes Georgia Power's pollinator habitat management at Lloyd Shoals Park as well as the company's wider engagement in pollinator habitat management across Georgia, which seeks to establish native pollinator habitat and native milkweeds to benefit Monarch Butterflies.

### **Response 12**

Section 3.3.6.1 and Table 10 of Exhibit E (Project Recreation Facilities) provide the acreage for each of the four existing project recreation facilities. Section 3.3.6.2 (Recreation Improvements) provides the acreage of the proposed new Tussahaw Creek Public Access Area (previously referred to in the PLP as Hendricks Mill Public Access Area) and the newly expanded Lloyd Shoals Boat Ramp (previously referred to in the PLP as Jane Lofton Public Access Area).

### **Response 13**

Section 3.3.6.2 of Exhibit E (Recreation Improvements) updates the description of the proposed new barrier-free fishing pier at Lloyd Shoals Park to include the number of parking spaces to be constructed in association with the pier and the proposed surface of the parking area.

### **Response 14**

Section 3.3.6.2 of Exhibit E (Recreation Improvements) updates the description of the proposed formalized project recreation facility at the Highway 36 Bridge at Tussahaw Creek, to be named Tussahaw Creek Public Access Area (previously referred to in the PLP as Hendricks Mill Public Access Area), to include the surface composition of the proposed access road and path.

### **Response 15**

Georgia Power's proposed SMP is provided as Appendix E in Exhibit E.

**Response 16**

Georgia Power has prepared the draft HPMP and submitted it to the Georgia State Historic Preservation Office and Tribes for a 30-day review period ending December 29, 2021. Upon completion of the review period, Georgia Power will file the draft HPMP with the Commission, along with any comments and recommendations received and reasons why a recommendation may not have been adopted based on project-specific information.

**Response 6, Table 1      Flow Duration Statistics of Daily Calculated Inflow (cfs) in an Average Inflow Year (2018) at the Lloyd Shoals Project**

<b>% Time Less Than</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>0.0%</b>	651	1030	1028	992	708	980	571	585	342	219	686	1907
<b>0.1%</b>	654	1031	1030	993	710	981	572	585	342	220	687	1916
<b>0.2%</b>	657	1033	1031	994	712	981	573	585	343	220	688	1926
<b>0.3%</b>	660	1034	1033	996	714	981	574	585	343	221	689	1936
<b>0.4%</b>	663	1035	1034	997	716	981	575	585	343	222	690	1946
<b>0.5%</b>	666	1036	1036	998	718	981	577	585	343	222	690	1956
<b>0.6%</b>	669	1037	1037	999	720	981	578	585	343	223	691	1965
<b>0.7%</b>	672	1038	1039	1000	722	981	579	585	344	223	692	1975
<b>0.8%</b>	675	1039	1040	1001	724	981	580	585	344	224	693	1985
<b>0.9%</b>	678	1040	1042	1002	726	981	581	585	344	224	694	1995
<b>1.0%</b>	681	1041	1043	1003	728	981	582	585	344	225	695	2005
<b>2.0%</b>	711	1052	1058	1014	747	983	592	585	346	230	703	2103
<b>3.0%</b>	741	1063	1072	1024	767	984	602	585	348	236	712	2201
<b>4.0%</b>	754	1073	1118	1039	775	991	611	597	349	238	722	2235
<b>5.0%</b>	760	1081	1179	1056	778	1004	620	616	349	240	735	2236
<b>6.0%</b>	765	1089	1240	1073	780	1016	630	634	349	241	747	2238
<b>7.0%</b>	770	1097	1282	1089	789	1030	642	648	349	242	762	2259
<b>8.0%</b>	774	1103	1283	1095	810	1048	659	655	350	244	793	2319
<b>9.0%</b>	777	1109	1285	1100	832	1067	677	661	350	247	824	2379
<b>10.0%</b>	781	1114	1286	1105	853	1086	695	667	351	249	855	2438
<b>11.0%</b>	785	1120	1293	1113	862	1104	700	671	361	252	878	2499
<b>12.0%</b>	789	1129	1300	1123	872	1121	706	676	375	255	896	2560
<b>13.0%</b>	793	1139	1308	1133	881	1139	711	680	390	257	915	2621
<b>14.0%</b>	797	1149	1311	1143	890	1155	718	685	402	261	932	2659

<b>% Time Less Than</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>15.0%</b>	801	1164	1314	1155	898	1166	726	690	403	264	944	2684
<b>16.0%</b>	805	1204	1316	1167	907	1177	734	695	404	268	956	2710
<b>17.0%</b>	810	1244	1318	1180	917	1188	741	703	405	277	969	2756
<b>18.0%</b>	820	1284	1322	1186	933	1194	743	715	412	300	989	2844
<b>19.0%</b>	829	1306	1326	1190	948	1198	746	728	420	322	1013	2932
<b>20.0%</b>	839	1309	1330	1195	963	1202	749	741	428	344	1036	3019
<b>21.0%</b>	843	1312	1348	1199	978	1225	756	751	434	356	1053	3047
<b>22.0%</b>	846	1315	1366	1204	994	1289	764	760	435	368	1057	3075
<b>23.0%</b>	850	1317	1385	1209	1009	1353	771	770	435	380	1060	3102
<b>24.0%</b>	852	1318	1392	1214	1020	1417	774	783	436	384	1063	3154
<b>25.0%</b>	853	1320	1395	1216	1028	1436	774	797	441	384	1098	3218
<b>26.0%</b>	853	1324	1397	1218	1036	1448	774	810	446	384	1138	3282
<b>27.0%</b>	855	1366	1401	1219	1048	1461	782	824	451	387	1178	3336
<b>28.0%</b>	860	1407	1407	1223	1067	1469	806	837	455	399	1202	3370
<b>29.0%</b>	865	1449	1414	1229	1085	1471	830	850	458	411	1202	3404
<b>30.0%</b>	870	1478	1420	1236	1104	1474	854	864	461	422	1202	3438
<b>31.0%</b>	873	1486	1434	1243	1105	1476	854	877	463	424	1203	3513
<b>32.0%</b>	877	1494	1449	1248	1106	1480	855	890	464	425	1226	3588
<b>33.0%</b>	880	1502	1463	1252	1108	1483	856	903	465	427	1251	3663
<b>34.0%</b>	887	1510	1479	1256	1112	1487	868	911	467	434	1276	3719
<b>35.0%</b>	897	1518	1495	1263	1117	1498	887	916	468	443	1288	3765
<b>36.0%</b>	906	1525	1511	1272	1123	1515	905	921	470	453	1290	3812
<b>37.0%</b>	915	1533	1522	1281	1127	1532	919	934	472	460	1291	3862
<b>38.0%</b>	923	1560	1523	1290	1127	1549	924	964	474	460	1293	3916
<b>39.0%</b>	931	1587	1523	1299	1127	1567	929	993	474	460	1305	3970
<b>40.0%</b>	939	1614	1523	1307	1127	1584	933	1022	475	461	1317	4024

<b>% Time Less Than</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>41.0%</b>	939	1643	1524	1315	1133	1602	943	1076	475	463	1329	4072
<b>42.0%</b>	939	1674	1525	1337	1139	1611	952	1130	479	466	1349	4120
<b>43.0%</b>	939	1705	1525	1366	1145	1613	962	1184	485	468	1373	4168
<b>44.0%</b>	943	1736	1527	1395	1168	1615	976	1208	491	470	1398	4185
<b>45.0%</b>	949	1751	1529	1420	1201	1621	993	1216	496	471	1421	4185
<b>46.0%</b>	955	1751	1532	1423	1233	1643	1010	1225	496	472	1437	4186
<b>47.0%</b>	964	1752	1534	1425	1258	1664	1041	1234	496	476	1454	4200
<b>48.0%</b>	977	1752	1535	1428	1265	1686	1100	1240	496	486	1470	4241
<b>49.0%</b>	990	1830	1537	1436	1272	1705	1160	1247	498	497	1507	4281
<b>50.0%</b>	1003	1922	1538	1445	1280	1722	1219	1254	500	507	1552	4322
<b>51.0%</b>	1015	2014	1541	1454	1299	1740	1226	1266	503	514	1597	4704
<b>52.0%</b>	1027	2095	1545	1468	1319	1754	1233	1278	505	520	1631	5085
<b>53.0%</b>	1040	2111	1548	1498	1339	1760	1239	1290	506	526	1638	5467
<b>54.0%</b>	1046	2127	1564	1527	1367	1766	1255	1306	507	534	1645	5655
<b>55.0%</b>	1049	2143	1586	1557	1400	1772	1274	1324	508	542	1652	5745
<b>56.0%</b>	1052	2160	1609	1579	1433	1775	1293	1342	509	550	1677	5836
<b>57.0%</b>	1057	2179	1636	1599	1470	1778	1307	1379	511	558	1706	5938
<b>58.0%</b>	1069	2197	1673	1619	1516	1781	1309	1451	513	568	1735	6063
<b>59.0%</b>	1080	2216	1710	1648	1562	1819	1311	1524	515	577	1765	6189
<b>60.0%</b>	1091	2335	1747	1693	1609	1914	1313	1596	516	586	1797	6314
<b>61.0%</b>	1095	2490	1772	1739	1654	2009	1315	1603	518	610	1830	6357
<b>62.0%</b>	1098	2645	1797	1784	1699	2104	1317	1610	520	633	1863	6400
<b>63.0%</b>	1102	2799	1821	1816	1745	2114	1319	1616	521	656	1876	6442
<b>64.0%</b>	1126	2903	1838	1848	1764	2117	1356	1622	522	666	1888	6515
<b>65.0%</b>	1160	3008	1852	1880	1770	2120	1410	1627	522	670	1899	6602
<b>66.0%</b>	1194	3113	1865	1899	1776	2122	1464	1632	529	673	1928	6689

<b>% Time Less Than</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>67.0%</b>	1230	3234	1892	1904	1784	2122	1501	1645	541	679	1974	6815
<b>68.0%</b>	1268	3387	1948	1908	1796	2123	1506	1673	553	687	2021	7020
<b>69.0%</b>	1307	3540	2004	1918	1809	2126	1511	1702	565	696	2070	7224
<b>70.0%</b>	1345	3693	2059	2081	1821	2206	1516	1730	572	704	2188	7428
<b>71.0%</b>	1374	3760	2064	2244	1898	2287	1517	1735	578	724	2306	7672
<b>72.0%</b>	1402	3777	2068	2406	1975	2367	1518	1741	585	743	2424	7916
<b>73.0%</b>	1431	3794	2073	2494	2051	2425	1518	1746	599	763	2482	8160
<b>74.0%</b>	1450	3810	2116	2530	2166	2467	1536	1757	618	799	2499	8427
<b>75.0%</b>	1465	3954	2179	2566	2301	2509	1562	1771	637	843	2516	8707
<b>76.0%</b>	1480	4107	2242	2602	2435	2552	1588	1785	655	887	2552	8987
<b>77.0%</b>	1515	4260	2294	2636	2601	2601	1608	1815	667	917	2708	9264
<b>78.0%</b>	1589	4383	2326	2670	2829	2650	1615	1876	679	919	2865	9536
<b>79.0%</b>	1664	4400	2357	2704	3058	2699	1622	1937	691	920	3021	9809
<b>80.0%</b>	1738	4416	2389	2884	3286	2756	1628	1997	711	921	3086	10081
<b>81.0%</b>	1781	4432	2418	3128	3337	2817	1674	2007	734	1011	3109	10134
<b>82.0%</b>	1825	4468	2447	3373	3388	2878	1720	2016	757	1101	3132	10187
<b>83.0%</b>	1868	4520	2476	3591	3439	2927	1765	2026	775	1191	3292	10240
<b>84.0%</b>	1895	4573	2526	3726	3516	2934	1780	2209	782	1240	3882	10457
<b>85.0%</b>	1915	4626	2585	3862	3607	2942	1780	2479	788	1270	4472	10756
<b>86.0%</b>	1934	4829	2645	3998	3697	2950	1781	2749	794	1299	5062	11055
<b>87.0%</b>	1991	5065	2695	4028	3760	2964	1787	3093	797	1353	5790	11264
<b>88.0%</b>	2121	5302	2728	4031	3767	2979	1807	3588	799	1456	6553	11293
<b>89.0%</b>	2251	5521	2760	4034	3774	2994	1826	4083	802	1559	7317	11323
<b>90.0%</b>	2381	5597	2793	4164	3781	3041	1846	4578	810	1662	7984	11353
<b>91.0%</b>	2494	5673	2806	4536	3831	3148	1931	4765	829	1847	8468	11445
<b>92.0%</b>	2607	5750	2820	4909	3881	3255	2016	4951	848	2032	8951	11538

<b>% Time Less Than</b>	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sept</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>93.0%</b>	2720	5866	2833	5281	3931	3362	2101	5138	867	2217	9435	11630
<b>94.0%</b>	3095	6042	3087	6116	3993	3516	2164	5698	922	3023	9571	12031
<b>95.0%</b>	3600	6217	3461	7005	4062	3676	2215	6444	982	4140	9666	12586
<b>96.0%</b>	4105	6392	3836	7893	4130	3836	2266	7190	1041	5257	9761	13142
<b>97.0%</b>	4775	7063	4118	8574	4196	4024	2365	7828	1085	6048	9962	13685
<b>98.0%</b>	5772	7943	4217	8999	4260	4248	2558	8247	1109	6186	10292	14204
<b>99.0%</b>	6770	8823	4315	9424	4323	4473	2752	8667	1134	6324	10622	14723
<b>100.0%</b>	7767	9703	4414	9849	4387	4697	2946	9087	1158	6462	10952	15242

**Response 6, Table 2 Median Monthly Calculated Inflow for an Average Flow Year (2018) at the Lloyd Shoals Project**

<b>Month</b>	<b>Median Inflow (cfs)</b>
January	1494
February	2857
March	1893
April	2378
May	1846
June	2005
July	1250
August	1932
September	565
October	1002
November	2720
December	6146

**From:** [O'Rourke, Patrick Michael](#)  
**To:** [Steven Layman](#)  
**Subject:** FW: CZMA Concurrence for Lloyd Shoals Hydroelectric Project  
**Date:** Wednesday, December 22, 2021 10:08:33 AM

---

**From:** Moore, Kelie <Kelie.Moore@dnr.ga.gov>  
**Sent:** Monday, December 20, 2021 3:08 PM  
**To:** O'Rourke, Patrick Michael <PMOROUKE@southernco.com>  
**Subject:** RE: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

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Thank you for this information. This is sufficient for us to determine that there will not be reasonably foreseeable impacts to coastal uses and resources and a federal consistency certification/determination from the Georgia Coastal Management Program is not required for this project.

**Kelie Moore**

Federal Consistency Coordinator

**Coastal Resources Division** [[gcc02.safelinks.protection.outlook.com](mailto:gcc02.safelinks.protection.outlook.com)]

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**From:** Moore, Kelie  
**Sent:** Wednesday, December 1, 2021 8:41 AM  
**To:** O'Rourke, Patrick Michael <PMOROUKE@southernco.com>  
**Subject:** RE: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

This is perfect.

**Kelie Moore**

Federal Consistency Coordinator

**Coastal Resources Division** [[gcc02.safelinks.protection.outlook.com](mailto:gcc02.safelinks.protection.outlook.com)]

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**From:** O'Rourke, Patrick Michael <PMOROUKE@southernco.com>  
**Sent:** Wednesday, December 1, 2021 8:13 AM  
**To:** Moore, Kelie <[Kelie.Moore@dnr.ga.gov](mailto:Kelie.Moore@dnr.ga.gov)>



**Subject:** RE: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

**CAUTION:** This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Sure thing. We have a [full relicensing site](#) with all of our FERC submittals as part of the ILP process.

Here's a briefing card on the project location:  
<https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/lloyd-shoals-dam/LS-Project-Location.pdf>

This one is about operations: <https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/lloyd-shoals-dam/LS-Operations.pdf>

The Preliminary Licensing Proposal that we filed in August has a lot more detail:  
[https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/Georgia\\_Power\\_Preliminary\\_Licensing\\_Proposal\\_August\\_2021.pdf](https://www.georgiapower.com/content/dam/georgia-power/pdfs/company-pdfs/Georgia_Power_Preliminary_Licensing_Proposal_August_2021.pdf)

Hopefully that gets you what you need, but if you have any questions let me know and I can point you in the right direction.

Patrick

---

**From:** Moore, Kelie <[Kelie.Moore@dnr.ga.gov](mailto:Kelie.Moore@dnr.ga.gov)>  
**Sent:** Tuesday, November 30, 2021 3:28 PM  
**To:** O'Rourke, Patrick Michael <[PMOROUKE@southernco.com](mailto:PMOROUKE@southernco.com)>  
**Subject:** RE: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

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Can you send me a project description and location (vicinity map, etc.) – something you already have prepared is fine, like what you have submitted to FERC

Kelie Moore  
Federal Consistency Coordinator  
[Coastal Resources Division \[gcc02.safelinks.protection.outlook.com\]](#)  
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**From:** O'Rourke, Patrick Michael <[PMOROUKE@southernco.com](mailto:PMOROUKE@southernco.com)>  
**Sent:** Tuesday, November 30, 2021 3:00 PM  
**To:** Moore, Kelie <[Kelie.Moore@dnr.ga.gov](mailto:Kelie.Moore@dnr.ga.gov)>  
**Subject:** FW: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

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Kelie, here is our last correspondence on Lloyd Shoals prior to our phone call today that I mentioned in the other email. Please let me know if you need anything else on this.

Patrick

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**From:** Moore, Kelie <[Kelie.Moore@dnr.ga.gov](mailto:Kelie.Moore@dnr.ga.gov)>  
**Sent:** Tuesday, November 09, 2021 11:17 AM  
**To:** O'Rourke, Patrick Michael <[PMOROUKE@southernco.com](mailto:PMOROUKE@southernco.com)>  
**Cc:** Andrews, Jill <[Jill.Andrews@dnr.ga.gov](mailto:Jill.Andrews@dnr.ga.gov)>; Slaughter, Joe Ernest <[JESLAUGH@southernco.com](mailto:JESLAUGH@southernco.com)>; Crabbe, Melissa C. <[MCCRABBE@SOUTHERNCO.COM](mailto:MCCRABBE@SOUTHERNCO.COM)>; Barrett, Tim <[Tim.Barrett@dnr.ga.gov](mailto:Tim.Barrett@dnr.ga.gov)>  
**Subject:** RE: CZMA Concurrence for Lloyd Shoals Hydroelectric Project

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Mr. O'Rourke:

The State of Georgia's coastal zone boundary is limited to the counties of Effingham, Chatham, Wayne, Bryan, Liberty, Long, McIntosh, Wayne, Glynn, Brantley, Camden, and Charlton. However, burden is placed on the licensing agency (FERC) to determine if a proposed activity outside of the boundary could foreseeably affect coastal uses or resources inside the boundary [15 CFR 930.11(g)]. A hydroelectric project on the Ocmulgee River, which converges with the Oconee River to form the Altamaha River in coastal counties, could have reasonably foreseeable impacts to coastal resources if the timing or volume of freshwater river flows reaching the coast is altered, especially since both rivers are now classified as NMFS Sturgeon Critical Habitat. Has DNR Fisheries been consulted in the FERC reauthorization process to date?

Tim:

Please let me know if you have any fisheries concerns. Thank you.

Kelie Moore

Federal Consistency Coordinator

[Coastal Resources Division](http://CoastalResourcesDivision.gcc02.safelinks.protection.outlook.com) [[gcc02.safelinks.protection.outlook.com](http://gcc02.safelinks.protection.outlook.com)]

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*A division of the*

GEORGIA DEPARTMENT OF NATURAL RESOURCES

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**From:** O'Rourke, Patrick Michael <[PMOROUKE@southernco.com](mailto:PMOROUKE@southernco.com)>  
**Sent:** Tuesday, November 9, 2021 10:11 AM  
**To:** Andrews, Jill <[Jill.Andrews@dnr.ga.gov](mailto:Jill.Andrews@dnr.ga.gov)>  
**Cc:** Slaughter, Joe Ernest <[JESLAUGH@southernco.com](mailto:JESLAUGH@southernco.com)>; Crabbe, Melissa C. <[MCCRABBE@SOUTHERNCO.COM](mailto:MCCRABBE@SOUTHERNCO.COM)>  
**Subject:** CZMA Concurrence for Lloyd Shoals Hydroelectric Project

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Ms. Andrews,

I'm writing to notify you that Georgia Power will file an application to relicense the Lloyd Shoals Hydroelectric Project, FERC Project No. 2336 at the end of the year. We have been going through the relicensing process with FERC and pertinent resource agencies since filing notice of intent to relicense the project on July 3, 2018.

The Lloyd Shoals Dam Hydroelectric Project is located on the Ocmulgee River, in Butts, Henry, Jasper, and Newton Counties, Georgia. The project is located approximately 250 river miles upstream of the Atlantic Ocean and 19 river miles upstream of Juliette Dam.

As part of the relicensing process and FERC's Coastal Zone Management Act requirements, Georgia Power is requesting that CRD confirm the following:

The State of Georgia's coastal zone includes the counties of Effingham, Chatham, Wayne, Bryan, Liberty, Long, McIntosh, Wayne, Glynn, Brantley, Camden, and Charlton. The Lloyd Shoals Hydroelectric Project is not located within and does not affect Georgia's coastal zone.

Georgia Power will provide CRD's response to FERC.

Please let me know if you have questions or would like to discuss. This is similar to what we did for the Wallace Dam (Lake Oconee) project a couple of years ago in which you corresponded with Joey Slaughter.

Thank you,  
Patrick O'Rourke

Patrick O'Rourke  
Fisheries Biologist  
Georgia Power

[pmorourke@southernco.com](mailto:pmorourke@southernco.com)

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# United States Department of the Interior

**Fish and Wildlife Service**  
RG Stephens, Jr. Federal Building  
355 East Hancock Avenue, Room 320  
Athens, Georgia 30601

West Georgia Sub Office  
P.O. Box 52560  
Ft. Benning, Georgia 31995-2560

Coastal Sub Office  
4980 Wildlife Drive  
Townsend, Georgia 31331



December 8, 2021

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

Subject: Endangered Species Act concurrence for the Lloyd Shoals Hydroelectric Project, FERC Project Number P-2336-094

Dear Ms. Bose:

On August 25, 2021 Georgia Power Company (GPC) filed an updated study report addendum for the American Eel Abundance and Upstream Movements Study, in compliance with the FERC's Integrated Licensing Process (ILP) regulations at 18 CFR 5.15(c)(1), to provide the results from the remainder of the second season of study completed in May-June 2021, and thus marking the end of requested studies. We, the Fish and Wildlife Service (Service), submit the following comments pursuant to the authorities of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 et seq.), the Fish and Wildlife Coordination Act (16 U.S.C. § 661 et seq.), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), and the Federal Power Act (16 U.S.C. § 791a, et seq.).

Based on the information provided in the Preliminary Licensing Plan, results of the ILP studies, and the updated IPaC Official Species list – submitted by GPC to FERC on October 19, 2021 – there are no federally listed species or critical habitat that will be impacted by the operation and the Service has no concerns with the currently proposed operations of Lloyd Shoals. However, if new information or changes in the project involve federally listed species as a result of future operational changes or enhancement measures made through the relicensing process, further consultation with the Service will be required.

We appreciate the opportunity to review and provide comments during relicensing process for the Lloyd Shoals Hydropower Project. Please contact staff biologist Eric Bauer ([eric\\_bauer@fws.gov](mailto:eric_bauer@fws.gov)) with the Service's Georgia Ecological Services Field Office in Athens, Georgia for additional information or if you require further assistance.

Sincerely,

Peter Maholland  
Acting Field Supervisor

## **APPENDIX B**

### **PROPOSED PROJECT OPERATION COMPLIANCE MONITORING PLAN**

**GEORGIA POWER COMPANY'S  
LLOYD SHOALS PROJECT (FERC No. 2336)**

**PROJECT OPERATIONS COMPLIANCE AND MONITORING PLAN  
AS REQUIRED BY DRAFT LICENSE ARTICLE 404  
December 2021**

**I. Purpose**

The purpose of this document is to outline a project operations and compliance monitoring plan for the Lloyd Shoals Project (Project) for complying with draft license Article 401 – *Project Operation and Reservoir Levels*, draft license Article 402 – *Minimum Flow*, and draft license Article 403 – *Supplemental Flow*. Implementation of this plan is proposed in the Lloyd Shoals Exhibit E as draft Article 404.

**II. Draft License Articles**

**Exhibit E of the license application proposes the following draft license articles. This plan will be modified based upon final FERC license issuance to reflect final FERC language.**

***Draft Article 401 - Project Operation and Reservoir Levels***

The licensee must operate the Lloyd Shoals Project to maintain the reservoir elevation between 527 and 530 feet (ft) plant datum (PD) during normal operations, excluding periods of drawdowns. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 402 – Minimum Flow***

The licensee must operate the Lloyd Shoals Project to release a continuous minimum flow of 400 cubic feet per second (cfs), or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 403 – Supplemental Flow***

When calculated project inflow is less than 250 cfs, the licensee must operate the Project to release a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 404 – Project Operations Compliance and Monitoring Plan***

The licensee shall implement the Lloyd Shoals Project Operations Compliance and Monitoring Plan, filed on December 31, 2021. The Project Operations Compliance and Monitoring Plan must not be amended without prior Commission approval.

The plan includes the following provisions:

### **III. Normal Project Operations**

The Lloyd Shoals Project is manned from 7:00 A.M. until 3:00 P.M. Monday through Friday. When the Project is unmanned, its generating units are controlled, and flows are monitored by, an operator in the control room (manned 24/7) at nearby Wallace Dam. The Project is operated manually with some remote capabilities.

Georgia Power operates the Lloyd Shoals Project in a modified run-of-river mode. During normal operations, the reservoir (Lake Jackson) is operated to maintain reservoir elevations between 530 and 527 ft PD year-round. The reservoir rises slightly as inflow is temporarily stored during periods outside of peak power demand (i.e., off-peak hours). As power demand increases into the peak power demand period, Lloyd Shoals is operated to release water through the powerhouse turbines to produce energy from the Project generators. This cycle repeats daily and varies seasonally with peak power demands.

Lloyd Shoals discharges directly into the Ocmulgee River. When not operating to generate peaking energy, the Project releases a continuous minimum flow of 400 cfs, or inflow, whichever is less, through the turbines into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and for other downstream uses.

### **IV. Reservoir Elevation Monitoring**

There is a transducer mounted on the upstream face of the Lloyd Shoals powerhouse near the abutment of the west non-overflow with the western side of the powerhouse in the location shown on Figure 1. The transducer detects the forebay elevation of Lake Jackson and sends a signal to the powerhouse. The measured reservoir elevation is displayed through Georgia Power's operating program, which also electronically records a reservoir elevation reading at least once an hour.

In addition to the transducer that measures reservoir elevations in the forebay of Lake Jackson, there is a staff gage mounted on the upstream face of the powerhouse directly adjacent to the reservoir elevation transducer. Operators can view the staff gage from a monitor in the control room. The staff gage serves as a quality assurance measure and as a backup instrument for performing maintenance on the transducer. Forebay elevation readings from the staff gage should be approximately equal to the forebay elevation reading measured by the transducer. A persistent discrepancy between the two instruments will result in Project personnel scheduling a transducer calibration or otherwise evaluating the condition of the transducer.

The operator on duty monitors the elevation of Lake Jackson in real-time to ensure compliance with draft Article 401 through the operating program data supplemented with staff gage data as needed.



**Figure 1: Reservoir Elevation Transducer and Staff Gage**

Reservoir elevations are maintained in long-term compliance records.

#### **V. Ocmulgee River Monitoring at the USGS Ocmulgee River Near Jackson, GA Gage**

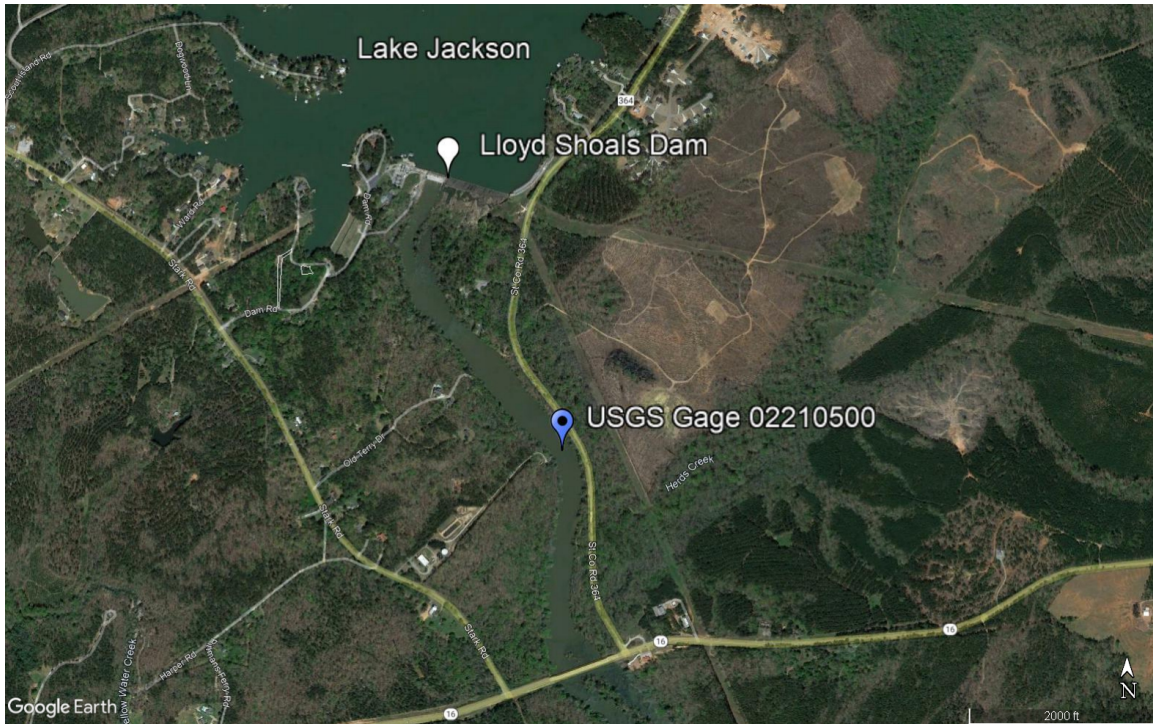
U.S. Geological Survey (USGS) gage, Ocmulgee River Near Jackson, GA (USGS Gage 02210500) (Jackson gage) is funded by Georgia Power. The Jackson gage is located approximately 0.7 mile downstream of the Lloyd Shoals Project<sup>1</sup>, as shown on Figure 2 and measures 15-minute readings of Ocmulgee River streamflow and stage information real-time on the USGS website. The Jackson gage is a source of information for determining the calculated inflow to the Lloyd Shoals Project and serves as the compliance monitor for ensuring the Project is releasing the flows required by the license.

USGS streamgages are managed and operated in accordance with a USGS Streamgage Operation and Maintenance program, following rigorous national standards and including periodic transducer field calibrations. Physical measurements of streamflow are made at streamgages multiple times a year, depending on flow conditions, to ensure the highest level of accuracy possible. In addition, multiple reviews and quality assurance checks are performed before the data is finalized. (Norris 2010)

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<sup>1</sup> The Jackson gage is located at Latitude 33°18'45.4", Longitude 83°50'14.5".





**Figure 2: USGS Gage 02210500 Ocmulgee River Near Jackson, GA**

#### **VI. Calculated Daily Inflow**

The daily calculated inflow to Lake Jackson is determined by adding the daily change in storage volume of Lake Jackson to the daily average flow measured at the Jackson gage. The following procedure is used to calculate the daily inflow into the reservoir.

- Obtain daily average flow at the USGS Ocmulgee River Near Jackson, GA Gage (USGS Gage 02210500) (Gage  $Q_{D1}$ )
- Obtain the midnight elevations of Lake Jackson on Day 1 ( $e_{D1}$ ) and Day 2 ( $e_{D2}$ )
- Use Lake Jackson's storage / volume curve to determine the storage volume associated with  $e_{D1}$  and  $e_{D2}$
- Calculate the Change in Storage Volume ( $\Delta V$ ) =  $V @ e_{D2} - V @ e_{D1}$
- Convert the storage volume into a flow (Storage  $Q_{D1}$ ) =  $\Delta V * (0.504)^2$
- Daily Calculated Inflow $_{D1}$  = Gage  $Q_{D1}$  + Storage  $Q_{D1}$

The Project may use additional upstream gage data and may calculate the inflow more than once a day as needed during periods of rapidly changing conditions in the basin.

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<sup>2</sup> 0.504 = conversion factor for converting  $\Delta V$  in acre-ft to a daily cfs associated with  $\Delta V$

### **Using Estimates of Inflow to Determine Minimum and Supplemental Flow Monitoring**

When not operating to generate peaking energy, the Project releases minimum flow in accordance with draft Articles 402. If the Project is providing supplemental flow as described in Article 403, no peaking typically occurs. The previous day's calculated inflow is used to determine the daily target minimum or supplemental flow release. The Jackson gage is monitored by the operator on duty via the USGS website to ensure the day's target flow is met.

When minimum flow cannot be met with the turbine units, the trash gate and Obermeyer gates are secondary release mechanisms.

## **VII. Hydrologic Conditions and Emergency Electrical System Conditions**

### **High Flow Conditions**

Operators monitor USGS stream gages upstream of the Project (South River, Honey Creek, Yellow River, Big Haynes Creek, and Alcovy River) during high inflow conditions. The inflow calculator may be updated more than once a day during high flow conditions to adjust operations to changing basin conditions. During high-flow conditions at the Lloyd Shoals Project, flows are first run through all available turbine/generator units. When Lake Jackson is near the full pool elevation and the sum of the discharge readings from the upstream tributaries show flows exceeding the hydraulic capacity of the turbines, the operators increase generation to utilize the available inflow up to the maximum turbine flow of approximately 3,720 cfs. Once this inflow is exceeded, Lloyd Shoals is operating outside of normal conditions to manage high flow conditions. As inflow to the Project exceeds the maximum hydraulic capacity of the turbines, flows will be released from the spillway. Obermeyer spillway zones are opened incrementally to approximate inflow. The first spillway zone opened must be operated onsite from the Lloyd Shoals powerhouse. When the Project is being operated remotely and a spillway zone needs to be opened, a team will be dispatched to operate the Obermeyer spillway zone. High flow conditions may cause reservoir levels to exceed elevation 530 ft PD temporarily when opening the trash gage and spillway gates.

The spillway section contains from west to east a 30-ft-wide trash bay with a bottom-hinged 19-ft by 12-ft trash gate; a 98.5-ft-wide section of 2-ft-high Obermeyer gates (Zone 1); a 420-ft-wide section of 5-ft-high Obermeyer gates (Zone 2); and a 180-ft-wide section of 2-ft-high Obermeyer gates (Zone 3). The top of the spillway gates is elevation 530 ft PD. The crest of the concrete spillway is elevation 525.2 ft at the bottom of Zone 2, elevation 528.2 ft at the bottom of Zones 1 and 3, and 518 ft at the bottom of the trash gate.

Hydraulic capacities of trash gate and Obermeyer spillway Zones 1-3 at reservoir elevation 530 ft are 2,130 cfs, 900 cfs, 16,000 cfs and 1,750 cfs, respectively. Once inflow exceeds approximately 24,000 cfs, Georgia Power is utilizing all available mechanisms to manage flows, and the headwater will stage above 530 ft.

### **Drought Conditions**

Operators monitor USGS stream gages upstream of the Project (South River, Honey Creek, Yellow River, Big Haynes Creek, and Alcovy River) during low flow conditions. The inflow calculator may be updated more than once a day during low flow conditions to adjust operations to changing basin conditions.

During periods of drought, Georgia Power provides a supplemental flow when Lake Jackson's calculated inflow drops below 250 cfs. If Lake Jackson is lowered below its normal elevation range due to supplemental flow releases, Lloyd Shoals is operating in drought conditions. When the inflows increase above 250 cfs, the minimum release from Lake Jackson is held at 250 cfs long enough to refill to full pool elevation. Utilization of greater inflows to raise reservoir elevations provides enhanced protection of both reservoir and downstream resources.

It is highly likely that drought conditions will occur at the Project over the next license term. Under drought conditions, Georgia Power may not be able to meet both the supplemental flow conditions mandated by draft Article 403 and the reservoir elevation conditions mandated by draft Article 401. When this occurs, Georgia Power will continue to release the supplemental flows required by draft Article 403, as Lake Jackson elevation falls below 527 ft PD, the low-level of the normal elevation range.

### **Emergency Electrical System Conditions**

In the event of a transmission-related power outage at Lloyd Shoals, the onsite emergency generator will be used to start a unit back up to provide station service and/or operate Obermeyer spillway gates, as needed.

While Lloyd Shoals is not designated as a blackstart capability generating plant for the Georgia Power transmission system, in the event a major generating plant(s) has an emergency outage, Lloyd Shoals may be used to generate for the purpose of supporting the grid. If generation to support the grid continues for an extended period, it could result in drawing down Lake Jackson below 527 ft PD. If this occurs, Georgia Power will file a report with the Commission in accordance with draft Article 401.

## **VIII. Reporting Protocols**

### **Reporting Protocols for Draft Article 401 - Project Operation and Lake Levels**

#### **Planned Drawdowns for Project Operations and Homeowner Shoreline Maintenance Activities**

Reservoir elevations may be temporarily modified for a drawdown for short periods, up to three weeks, after mutual agreement among the licensee, Georgia Department of Natural Resources (GDNR) (Environmental Protection Division [GEPD] and Wildlife Resources Division [WRD]), and U.S. Fish and Wildlife Service (FWS). After concurrence from GDNR (GEPD and WRD) and FWS, the licensee must file a report with the Commission as soon as possible, but no later than 14 calendar days after the onset of the planned drawdown. Each report must include: (1) the

reasons for the drawdown and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of consultation with GDNR (GEDP and WRD) and FWS. For planned deviations exceeding three weeks, the licensee must file an application for a temporary variance from Article 401 and receive Commission approval prior to implementation.

*Emergency Drawdown or Unplanned Deviation, More than 3 Hours or with Environmental Effects:*

If the licensee deviates from the reservoir elevation requirements for longer than 3 hours or resulting in environmental effects, the licensee must file a report as soon as possible, but no later than 14 calendar days after each such incident. The report must include: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from GDNR (GEDP and WRD) and FWS; (6) documentation of any observed environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

*Drought Reporting*

Because drought conditions are an extended condition of unknown duration, Georgia Power will also file a notice with the Commission and GDNR (GEDP and WRD) and FWS within 14 days of lake levels dropping below 527 ft PD and a summary report within 14 days of the reservoir returning to the normal elevation range at the conclusion of the drought. The summary report following the drought will contain the same contents as described under "Emergency Drawdown or Unplanned Deviation" above.

*Flood Reporting*

The Lloyd Shoals Emergency Action Plan (EAP) defines a High Flow Event<sup>3</sup> as when discharges from the reservoir exceed or are forecasted to exceed the "bank full" stage of 30,200 cfs as measured at the Jackson gage. This event is associated with an event that causes Lake Jackson's elevation to rise to or exceed 531.3 ft PD. After each High Flow Event, Georgia Power files a safety-related incident report with FERC's Regional Engineer at the Division of Dam Safety and Inspections, Atlanta Regional Office in accordance with the Commission's regulations.

*Emergency Drawdown or Unplanned Deviation, Less than 3 Hours and With No Environmental Effects:*

Reports of deviations of reservoir elevation requirement lasting less than 3 hours with no environmental effects can be made available within 30 days of a request by the Commission or consulting agency.

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<sup>3</sup> High flow event, as defined by the Lloyd Shoals EAP, should not be confused with high flow conditions. High flow conditions occur anytime inflow exceeds the hydraulic capacity of the powerhouse turbine/generator units.

## **Reporting Protocols for Draft Article 402 and 403 – Minimum and Supplemental Flows**

### Planned Deviations from Minimum Flows:

Minimum flow may be temporarily modified for short periods, after mutual agreement among the licensee, GDNR (GEPD and WRD), and FWS. After concurrence from GDNR (GEPD and WRD) and FWS, the licensee must file a report with the Commission as soon as possible, but no later than 14 calendar days after the conclusion of the planned deviation. Each report must include: (1) the reasons for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of consultation with GDNR (GEPD and WRD) and FWS. For planned deviations exceeding three weeks, the licensee must file an application for a temporary amendment of the minimum flow requirement, and receive Commission approval prior to implementation.

### Unplanned Deviation, More than 3 hours or with Environmental Effects:

For any deviation of the minimum flow requirement that lasts longer than 3 hours or results in environmental effects, the licensee must file a report with the Commission as soon as possible, but no later than 14 calendar days after each such incident. The report must include: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from Georgia DNR (GEPD and WRD) and FWS; (6) documentation of any observed environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

Reports of unplanned deviations of the minimum flow requirement lasting less than 3 hours with no environmental effects can be made available within 30 days of a request by the Commission or consulting agency.

## **IX. Making the Data Available to the Commission**

Records of reservoir elevations described in this document will be maintained at the Georgia Power Central Georgia Hydro Group Headquarters at Lloyd Shoals and Wallace Dam Pumped Storage Projects, and can be made available to FERC and resource agencies upon request. In addition, real time and historical USGS flow data downstream of the Project is available at the USGS website.

**References**

Norris, J.M., 2010, U.S. Geological Survey streamgage operation and maintenance cost evaluation: U.S. Geological Survey Fact Sheet 2010-3025, 2 p. (Also available at [https://pubs.usgs.gov/fs/2010/3025/.](https://pubs.usgs.gov/fs/2010/3025/))

## **APPENDIX C**

### **PROPOSED PASSIVE DRAFT TUBE AERATION OPERATIONAL PROCEDURE**

**GEORGIA POWER COMPANY'S  
LLOYD SHOALS PROJECT (FERC No. 2336)  
PASSIVE DRAFT TUBE AERATION SYSTEM OPERATIONAL PROCEDURE  
December 2021**

**Purpose**

The purpose of this document is to outline procedures for operating the passive draft tube aeration system at Georgia Power's Lloyd Shoals Project. The passive draft tube aeration system was installed on Units 2, 3, and 4 (two aeration ports per unit) in 2006 to improve tailrace dissolved oxygen concentrations in downstream releases during the summer critical period. This document is intended to be used by Project operators and will be on display at all times in the operations booth. It provides guidance to the operators on prioritizing the use of aerating units over non-aerating units when there are low dissolved oxygen conditions in the tailrace. Units 2, 3 and 4 are the aerating units.

Operators at Lloyd Shoals will close all aeration valves only after consulting with Southern Company Hydro Services.

If operating requirements require any change from this procedure, Project operators will notify Southern Company Hydro Services immediately.

Southern Company Hydro Services will record aeration system operation dates in internal files and the record will be made available upon request.

**Operational Procedures – May 15th to September 30th**

Project personnel at Lloyd Shoals will open all aeration valves before May 15 and notify Southern Company Hydro Services upon opening. Use of aerating units will be prioritized as outlined in the following table:

<b>Number of Units Required for Generation</b>	<b>Use the Following Aerating Units</b>
1	Use 1 aerating unit
2	Use 2 aerating units
3	Use at least 2 aerating units*
4	Use 3 aerating units*
5	Use 3 aerating units*
6	Use 3 aerating units*

\*Load all required aerating units prior to loading non-aerating units, to the extent possible.

**Operational Procedures during Sustained Supplemental 250-cfs Release –October 1<sup>st</sup> to October 31<sup>st</sup>**

Operators and plant superintendent will coordinate with Southern Company Hydro Services prior to September 30 to discuss the need for continued aeration. If Georgia Power is operating under Drought Conditions, as defined by the Lloyd Shoals Project Operation Compliance Monitoring Plan, Georgia Power will continue aeration until one week after inflows exceed the 400-cfs release requirement. If the Project is not operating under Drought Conditions at the end of September, no aeration is necessary in October. If the aeration system is still operating in October, operators shall notify Southern Company Hydro Services before the aeration system is turned off.



**APPENDIX D**

**PROPOSED RECREATION MANAGEMENT PLAN**



# **RECREATION MANAGEMENT PLAN**

## **LLOYD SHOALS HYDROELECTRIC PROJECT (FERC No. 2336)**

December 2021

**RECREATION MANAGEMENT PLAN  
LLOYD SHOALS HYDROELECTRIC PROJECT  
(FERC NO. 2336)**

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**RECREATION MANAGEMENT PLAN  
LLOYD SHOALS HYDROELECTRIC PROJECT  
(FERC No. 2336)**

**1.0 INTRODUCTION**

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Georgia Power Company (Georgia Power) proposes to implement this Recreation Management Plan (RMP) for the Lloyd Shoals Hydroelectric Project (Lloyd Shoals Project, the Project) (FERC No. 2336) under the new license issued by the Federal Energy Regulatory Commission (FERC, the Commission). The Lloyd Shoals Project is a 18-megawatt project that consists of a dam, powerhouse, and 4,750-acre reservoir (Lake Jackson or Jackson Lake) on the Ocmulgee River in Butts, Henry, Jasper, and Newton counties, Georgia. Georgia Power will implement this RMP to operate and maintain five project recreation facilities within the project boundary for the term of the new license.

This RMP describes the Project's five recreation facilities, one of which will be a new facility; the specific measures and schedule for enhancing and developing recreation access and amenities; and routine operational maintenance to be performed at all five project recreation facilities. In addition, this RMP provides for periodic recreational use monitoring to assess the need for changes to project recreation facilities, their operation and maintenance, or this RMP, in consultation with the Commission and the Georgia Department of Natural Resources Wildlife Resources Division (WRD).

## **2.0 PROJECT RECREATION FACILITIES**

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Georgia Power will operate and maintain five project recreation facilities at the Lloyd Shoals Project, including Lloyd Shoals Park, Lloyd Shoals Boat Ramp, Lloyd Shoals Tailrace Fishing Pier, Ocmulgee River Park, and Tussahaw Creek Public Access Area (Table 1; Figure 1). All five facilities are located on Georgia Power lands and will be entirely within the project boundary. The existing Jane Lofton Public Access Area will be renamed the Lloyd Shoals Boat Ramp. The Tussahaw Creek Public Access Area will be a newly developed facility located just upstream of the Georgia Highway (Hwy) 36 Bridge at Tussahaw Creek in Butts County.

### **2.1 LLOYD SHOALS PARK**

Lloyd Shoals Park is currently a 5-acre facility located on a peninsula in Lake Jackson at the western side of the main dam in Butts County (Figure 2). The park includes a large, paved parking area with space for 50 vehicles with trailers. Amenities at the site include a swimming beach; a picnic/day-use area with picnic tables; a pavilion; a playground; one accessible fishing pier; a two-lane accessible paved boat ramp with courtesy dock; restrooms; and bank fishing areas. The boat ramp at Lloyd Shoals Park provides public boating access to Lake Jackson.

Among other recreation improvements planned for this facility, the existing boat ramp on the peninsula will be converted to a non-motorized boat (canoe/kayak) step-down ramp and a new accessible fishing pier will be constructed under the new license (see Section 3.1).

### **2.2 LLOYD SHOALS BOAT RAMP**

Lloyd Shoals Boat Ramp, formerly known as the Jane Lofton Public Access Area, opened in 2017 as a 0.7-acre bank fishing area located just south of Lloyd Shoals Park at the south end of the auxiliary spillway in Butts County (Figure 3). The existing facility provides bank fishing access to Lake Jackson and includes a gravel parking area and a trash can.

Under the new license, this project recreation facility will be expanded to approximately 6 acres and developed to provide a new two-lane motorized boat ramp, a wharf-style, accessible fishing pier, and a restroom. The parking area will be expanded and paved and include several accessible parking spots (see Section 3.2).

### **2.3 LLOYD SHOALS TAILRACE FISHING PIER**

The Lloyd Shoals Tailrace Fishing Pier is a 0.6-acre park located downstream of Lloyd Shoals Dam on the western bank of the Ocmulgee River in Butts County (Figure 4). The Tailrace Fishing Pier includes a paved parking area with space for 10 vehicles; an accessible switchback boardwalk to the fishing pier with seats for fishing and a separate seating area for viewing; and trash cans.

### **2.4 OCMULGEE RIVER PARK**

Ocmulgee River Park is a 4-acre facility located downstream of Lloyd Shoals Dam on the eastern bank of the Ocmulgee River in Jasper County (Figure 5). Ocmulgee River Park includes a gravel parking area with space for 15 vehicles with trailers; a one-lane boat ramp; a paved parking area next to the boat ramp; a picnic/day use area; and bank fishing access along the river. Among other improvements planned for this facility, the boat ramp will be rehabilitated, and a new restroom with a concrete-lined vault toilet will be installed (see Section 3.4).

### **2.5 TUSSAHAW CREEK PUBLIC ACCESS AREA**

Currently an informal bank fishing area at the Hwy 36 Bridge at Tussahaw Creek (Figure 1), Georgia Power will develop this site into the new 3-acre Tussahaw Creek Public Access Area, which will be added to the project boundary. The park will provide parking, a picnic table, bank fishing access, and a step-down ramp for paddling access to Lake Jackson (see Section 3.5).

## **3.0 SPECIFIC RECREATION ENHANCEMENT MEASURES**

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Georgia Power will improve recreational access and resources at the Project by implementing the following specific measures on Georgia Power lands within the project boundary in accordance with the implementation schedule in Table 2. Georgia Power consulted GDNR in developing the enhancement measures as part of Exhibit E of the Lloyd Shoals license application. These measures are illustrated conceptually in Figures 6 through 9. Construction would occur from 2024 through 2026, with all enhancement measures to be completed by December 31, 2026.

### **3.1 LLOYD SHOALS PARK**

The existing boat ramp on the peninsula at Lloyd Shoals Park will be converted to a non-motorized boat (canoe/kayak) step-down ramp (Figure 6). The existing courtesy dock will be replaced with an accessible fishing pier that extends approximately 20 feet farther into the reservoir than the existing pier. Existing parking will be restriped to accommodate vehicle-only spaces. Three new accessible parking spaces will be constructed adjacent to the new fishing pier and non-motorized boat step-down ramp. An accessible sidewalk will also be constructed, leading from the new parking spaces to the non-motorized boat step-down ramp. The new parking spaces and sidewalk will be paved. The existing restroom and bath house will be updated with new facilities. Approximately 0.3 acre of previously developed land within the park will be temporarily disturbed for construction of the new accessible parking lot.

### **3.2 LLOYD SHOALS BOAT RAMP**

The existing Jane Lofton Public Access Area will be renamed the Lloyd Shoals Boat Ramp (Figure 7). The proposed boat ramp will be constructed in the cove, southwest of the auxiliary spillway. The existing gravel parking area will be expanded, paved, and delineated to accommodate approximately 20 vehicles with trailers. Trees will be cleared to accommodate the expanded parking area. In addition, two accessible parking spaces for vehicles with trailers will be constructed near the new boat ramp. The new boat ramp will be paved and approximately 30 ft wide with two lanes and will include a paved turn-around. A proposed wharf-style, accessible fishing pier will also be constructed to the northwest of the proposed boat ramp. Approximately three new accessible parking spaces and a paved turn-around will be constructed to access the new fishing pier. A new restroom with a flush toilet will be installed. Utilities including electricity, lighting, and water will also be added. A new road will be constructed to access

existing lease lots separately from the park. All improvements will be constructed within the existing project boundary. The Lloyd Shoals Boat Ramp will include approximately 6 acres of land within the project boundary. To accommodate new enhancements and relocate the existing access road to lease lots, approximately 3.75 acres of upland forest within the project boundary will be removed or altered. Protection and enhancement measures will be installed, including interpretive signage, for an existing archaeological site associated with the Lloyd Shoals Construction and Operator's Village.

### **3.3 LLOYD SHOALS TAILRACE FISHING PIER**

No new enhancement measures are proposed at the Lloyd Shoals Tailrace Fishing Pier; however, maintenance on the existing pier will be conducted and additional trash cans will be installed.

### **3.4 OCMULGEE RIVER PARK**

Georgia Power will enhance recreation amenities at Ocmulgee River Park by relocating the existing picnic tables closer to the existing parking area (Figure 8). The existing parking area will be redefined and paved, and one restroom with a concrete-lined vault toilet will be installed. The existing boat ramp will be rehabilitated and landscaping with boulders will be installed along the road to discourage parking in this area. All improvements will be constructed within the existing project boundary.

### **3.5 TUSSAHAW CREEK PUBLIC ACCESS AREA**

This site at the Hwy 36 Bridge at Tussahaw Creek will be formalized and named the Tussahaw Creek Public Access Area (Figure 9). A paved access road and parking area will be constructed off Winding Way, located adjacent to Hwy 36. The parking area will include 10 parking spaces of which two will be accessible. One picnic table and one trash can will be installed. A paved sidewalk leading to a step-down ramp for paddling access will be constructed at the shoreline west of the Hwy 36 Bridge. Bank fishing access will continue to be available at the site. Approximately 3 acres of Georgia Power land containing the access road, parking, and path will be added to the project boundary. Approximately 0.85 acres of upland forest on the site will be removed or altered to accommodate the new recreation facilities.



## **4.0 RECREATION MONITORING**

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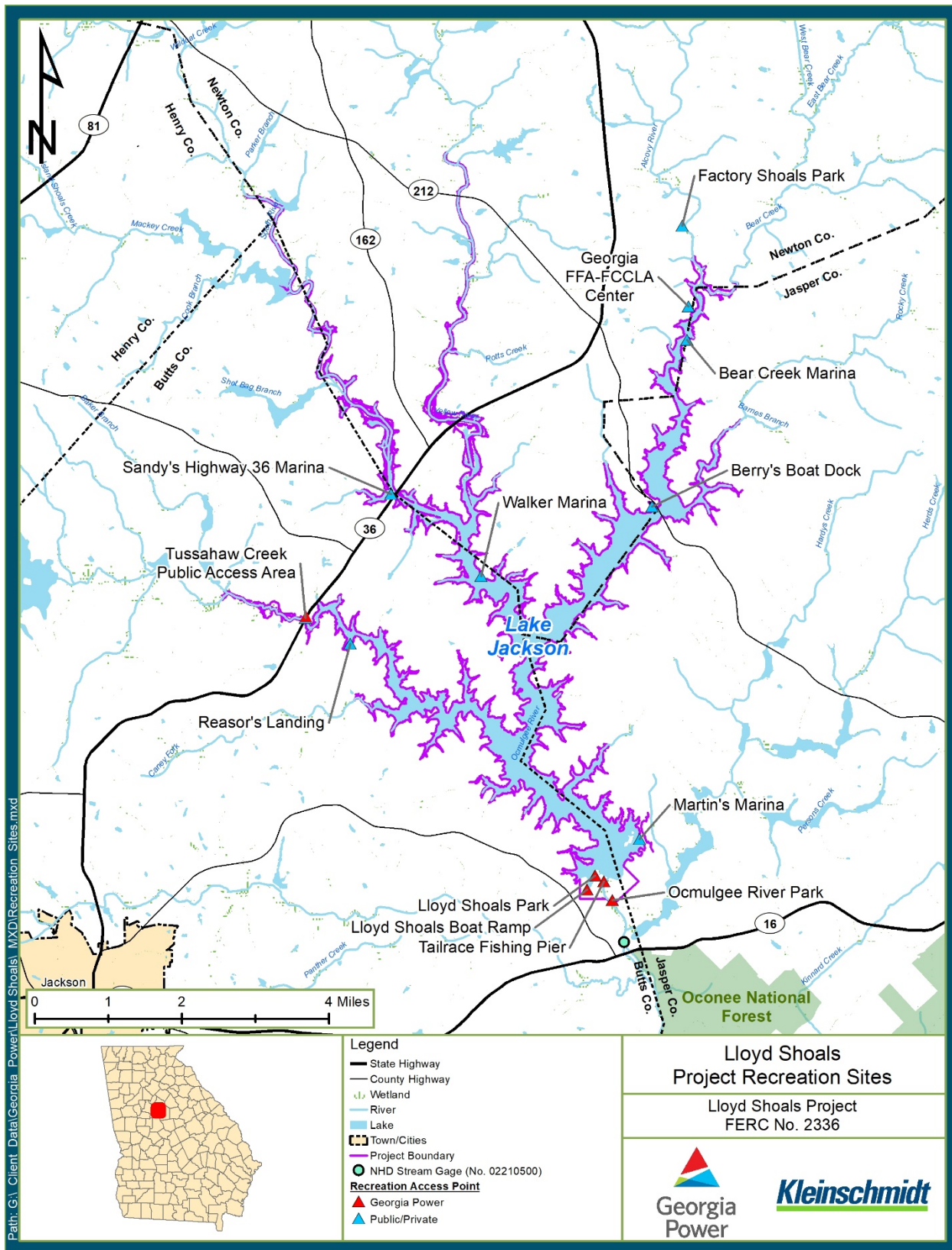
Georgia Power will monitor recreational use at the project recreation facilities based on parking fee collection at Lloyd Shoals Park, staff observations of all five facilities, and institutional knowledge. Parking fee records can be made available to the Commission and WRD upon request. Every 10 years after the issuance of the license, Georgia Power will file a report addressing whether an update to the RMP is needed. This report will be prepared in consultation with WRD and will evaluate the adequacy of existing recreation access and determine whether changes are warranted to address existing and future needs. If an update to the RMP is needed, Georgia Power will either include the updated plan in the report for Commission approval or provide a plan and schedule for filing an updated plan.

**TABLE 1 LLOYD SHOALS PROJECT RECREATION FACILITIES**

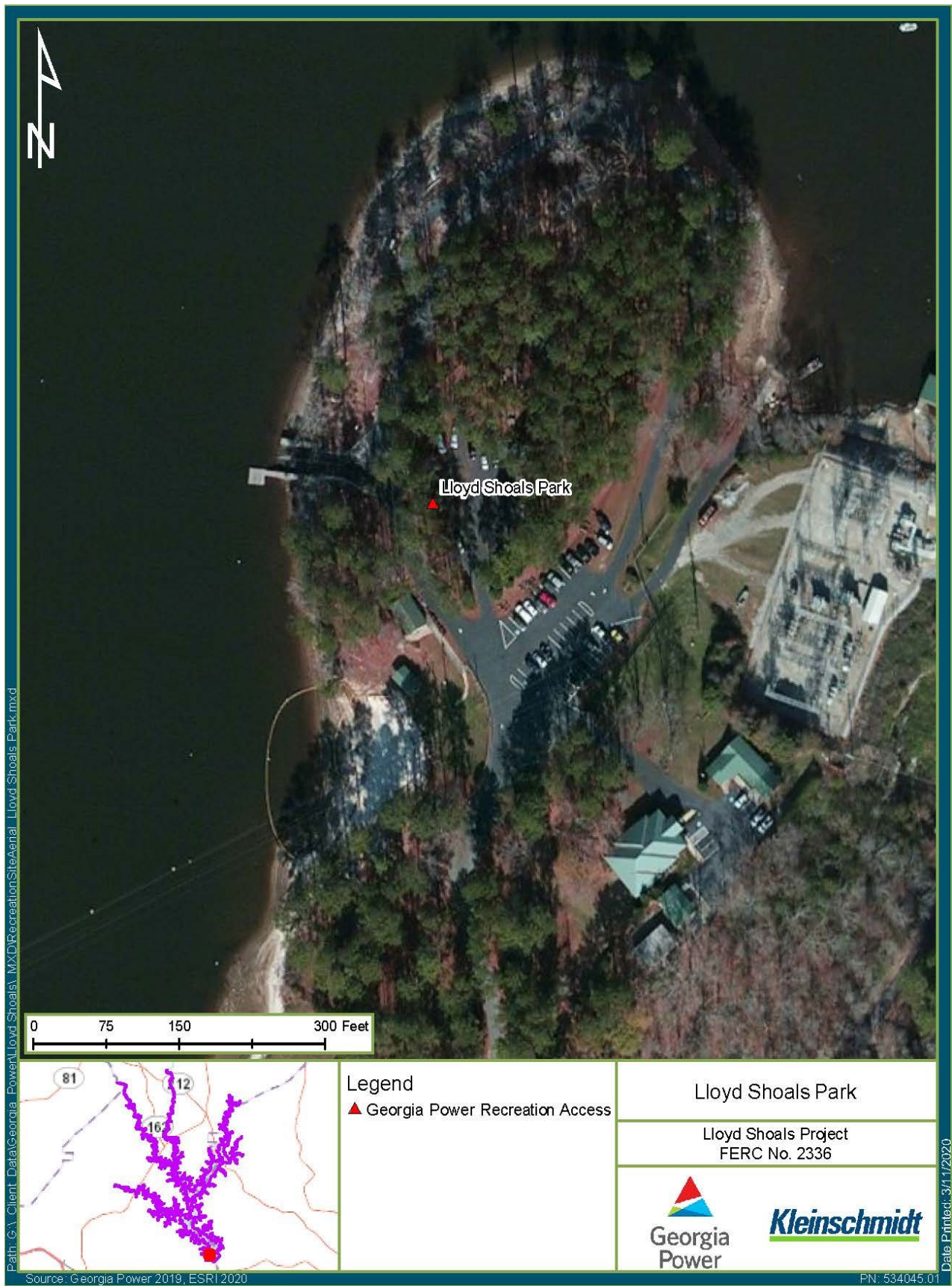
RECREATION SITE	COUNTY	ACREAGE	ADDRESS	AMENITIES
Lloyd Shoals Park	Butts	5 acres	155 Dam Rd, Jackson, GA 30233	Peninsula at west side of main dam: 50 parking spaces, picnic/day use area, swimming beach, playground, pavilion, two accessible fishing piers, restrooms, non-motorized boat step-down ramp, courtesy dock, extensive shoreline fishing.
Lloyd Shoals Boat Ramp	Butts	6 acres	Hendricks Road near Dam Road/Power Plant Road, Jackson, GA 30233	South end of auxiliary spillway: expansion to include 25 parking spaces (20 vehicle with trailer slots, 2 accessible vehicle with trailer slots, and 3 accessible vehicle only slots), 2-lane accessible boat ramp, courtesy dock, wharf-style accessible fishing pier, restroom with flush toilet.
Lloyd Shoals Tailrace Fishing Pier	Butts	0.6 acre	155A Dam Rd, Jackson, GA 30233	10 parking spaces, trash can, accessible boardwalk path to fishing pier with seats for fishing as well as a secluded seated area for viewing.
Ocmulgee River Park	Jasper	4 acres	8484 Jackson Lake Rd, Monticello, GA 31064	15 parking spaces, 1-lane boat ramp, picnic/day use area, bank fishing; improvements will include one new restroom with vault toilet, paved parking, rehabilitated boat ramp, and landscaping.
Tussahaw Creek Public Access Area	Butts	3 acres	2088 GA-36, Jackson, GA 30233	New facility, to provide 10 parking spaces (8 vehicle-only slots and 2 accessible vehicle-only slots), picnic table, bank fishing, step-down ramp for paddling access to Lake Jackson.

**TABLE 2      SCHEDULE FOR IMPLEMENTATION OF RECREATION ENHANCEMENT MEASURES**

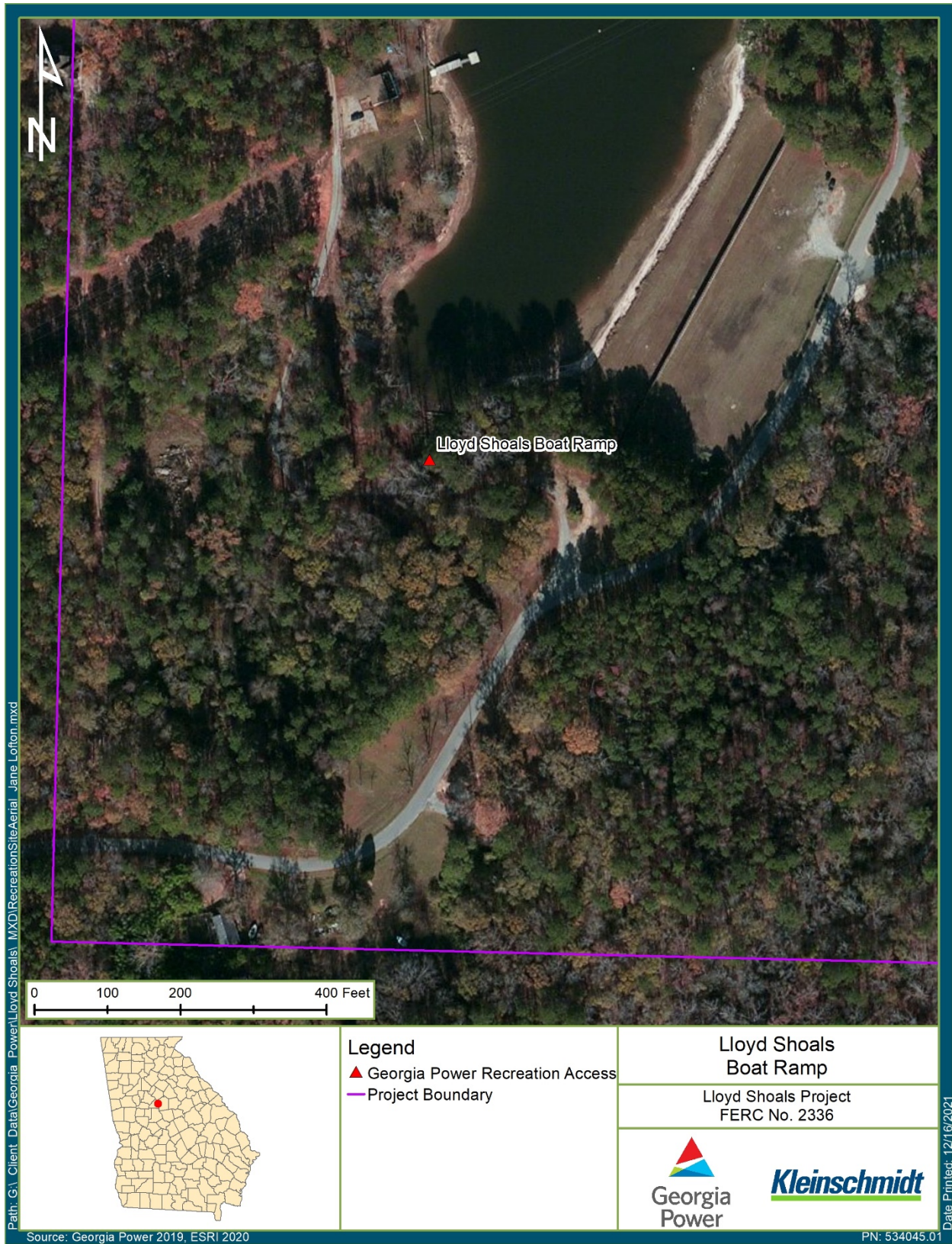
<b>FACILITY</b>	<b>COMPLETION DATE OR DEADLINE</b>
Lloyd Shoals Park	December 31, 2026
Lloyd Shoals Boat Ramp	December 31, 2026
Ocmulgee River Park	December 31, 2026
Tusahaw Creek Public Access Area	December 31, 2026



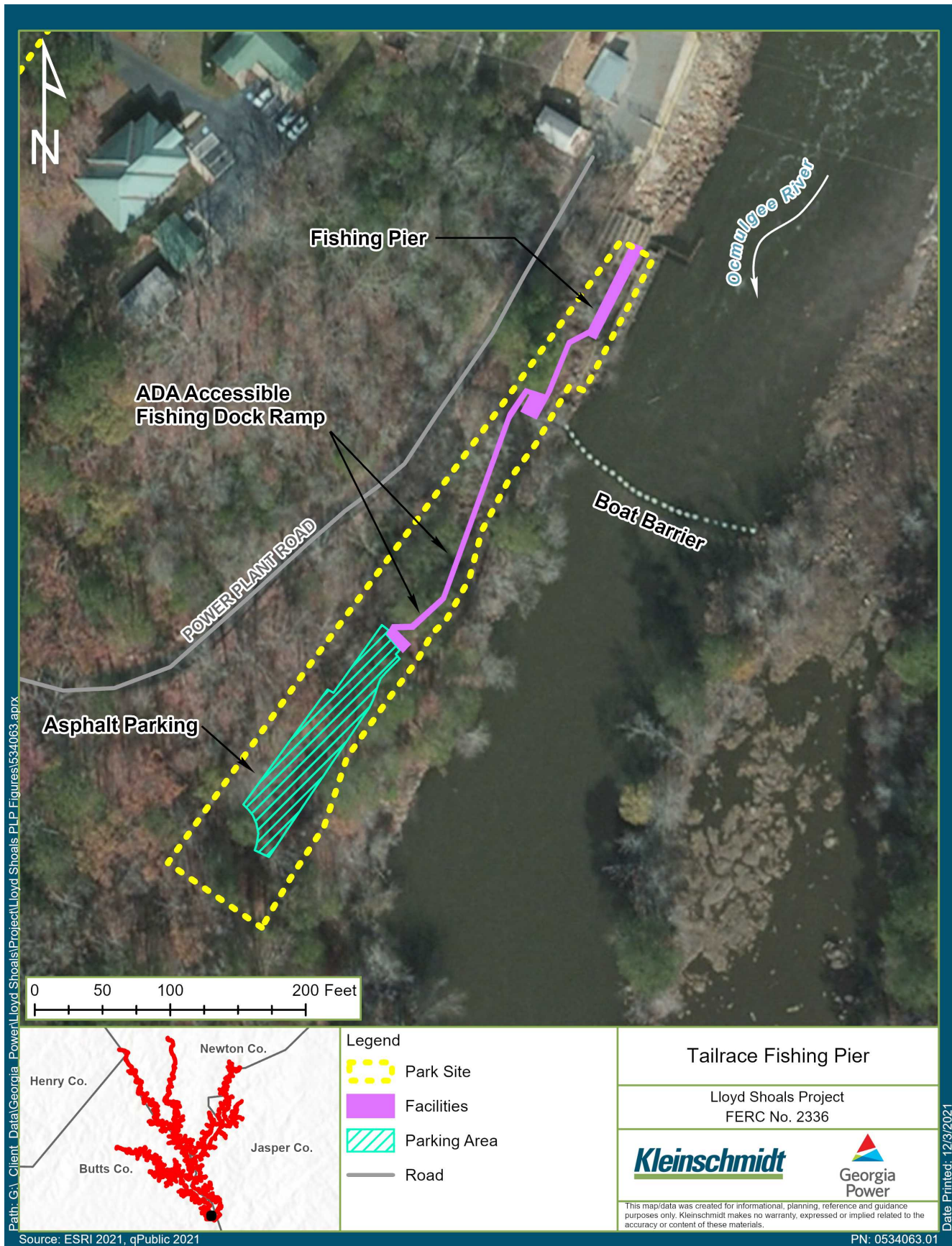
**FIGURE 1 LLOYD SHOALS PROJECT BOUNDARY AND PROJECT RECREATION SITES**



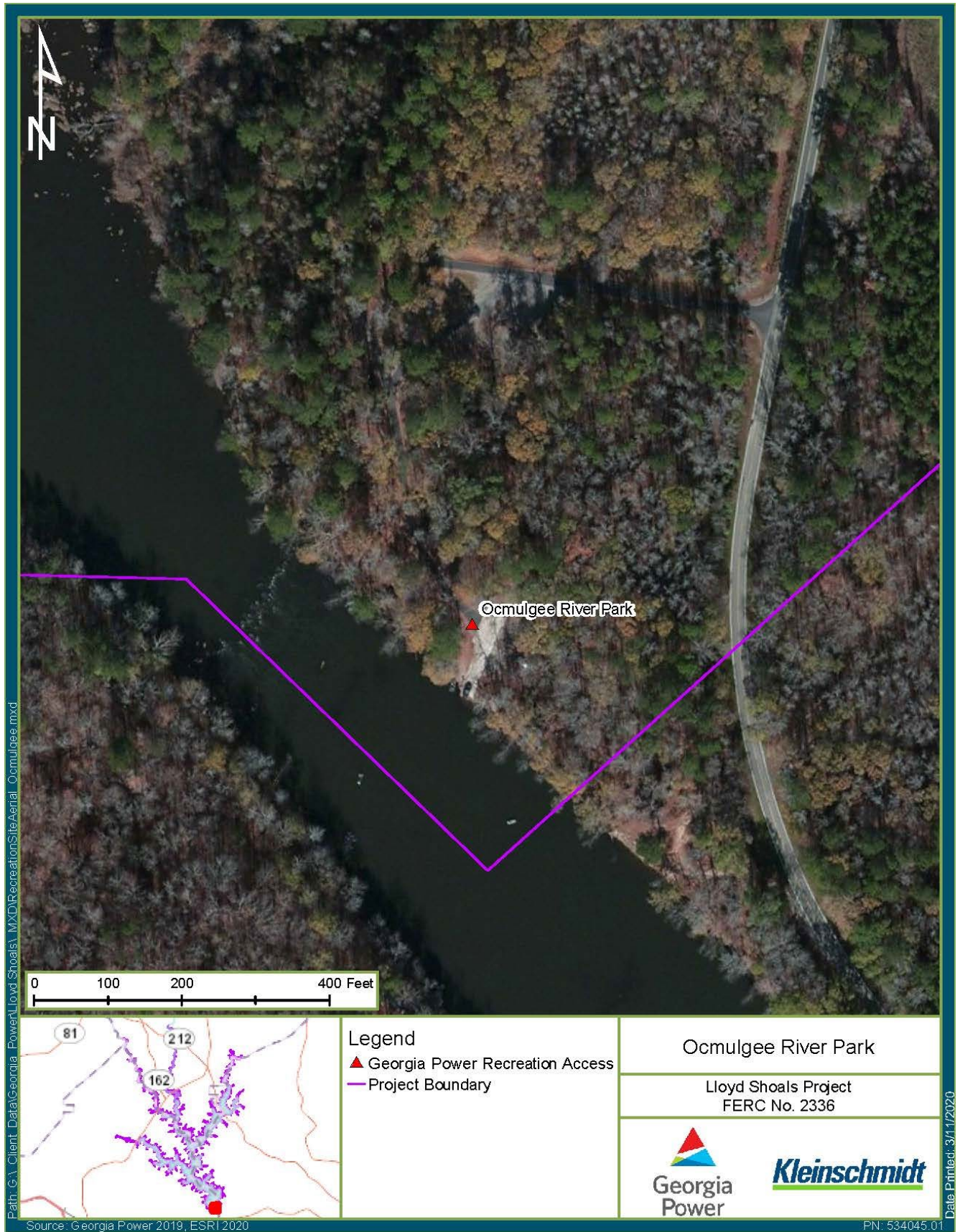
**FIGURE 2 AREA OF LLOYD SHOALS PARK ON PENINSULA AT WEST SIDE OF MAIN DAM**



**FIGURE 3 LLOYD SHOALS BOAT RAMP (FORMERLY JANE LOFTON PUBLIC ACCESS AREA)**

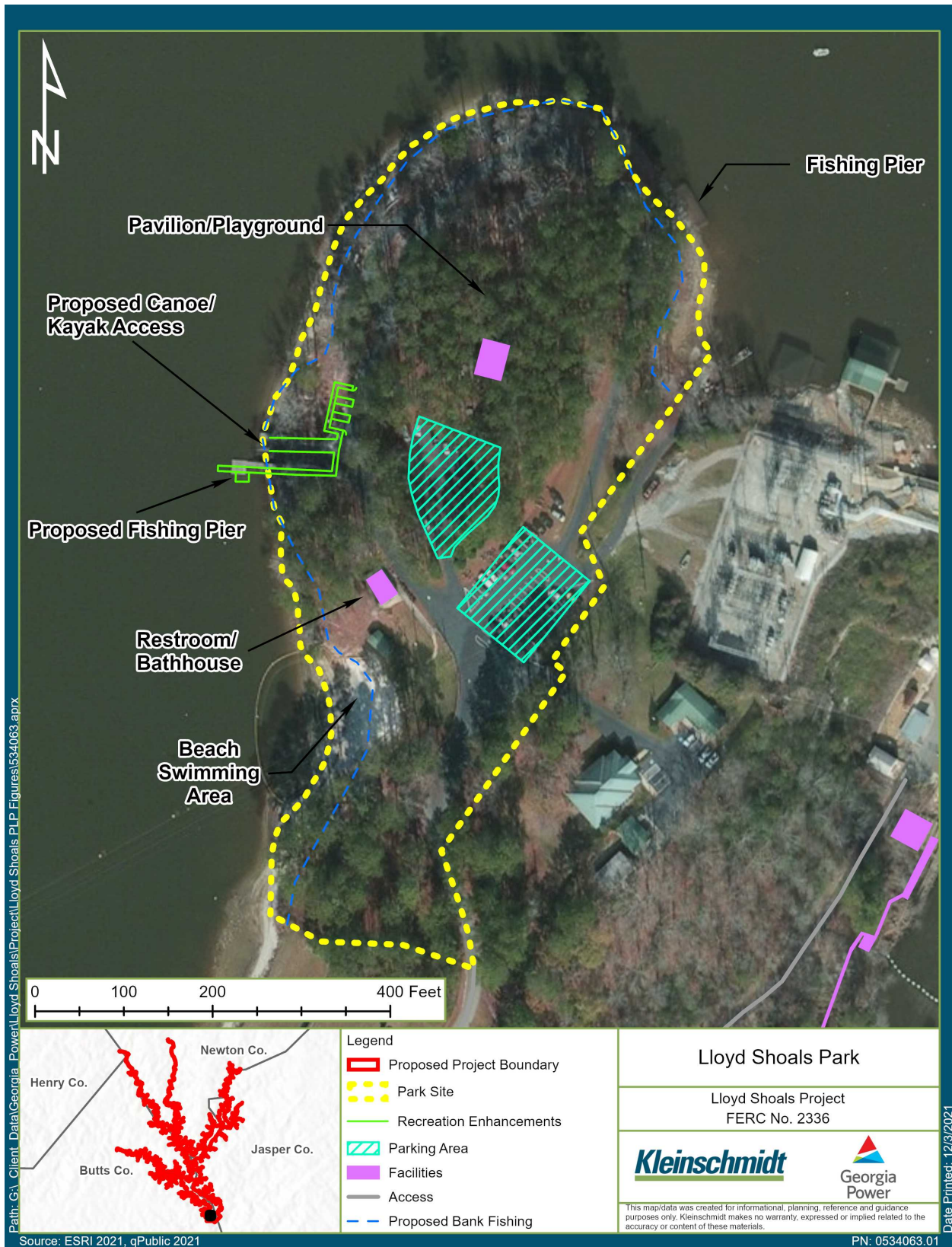


**FIGURE 4 LLOYD SHOALS TAILRACE FISHING PIER**

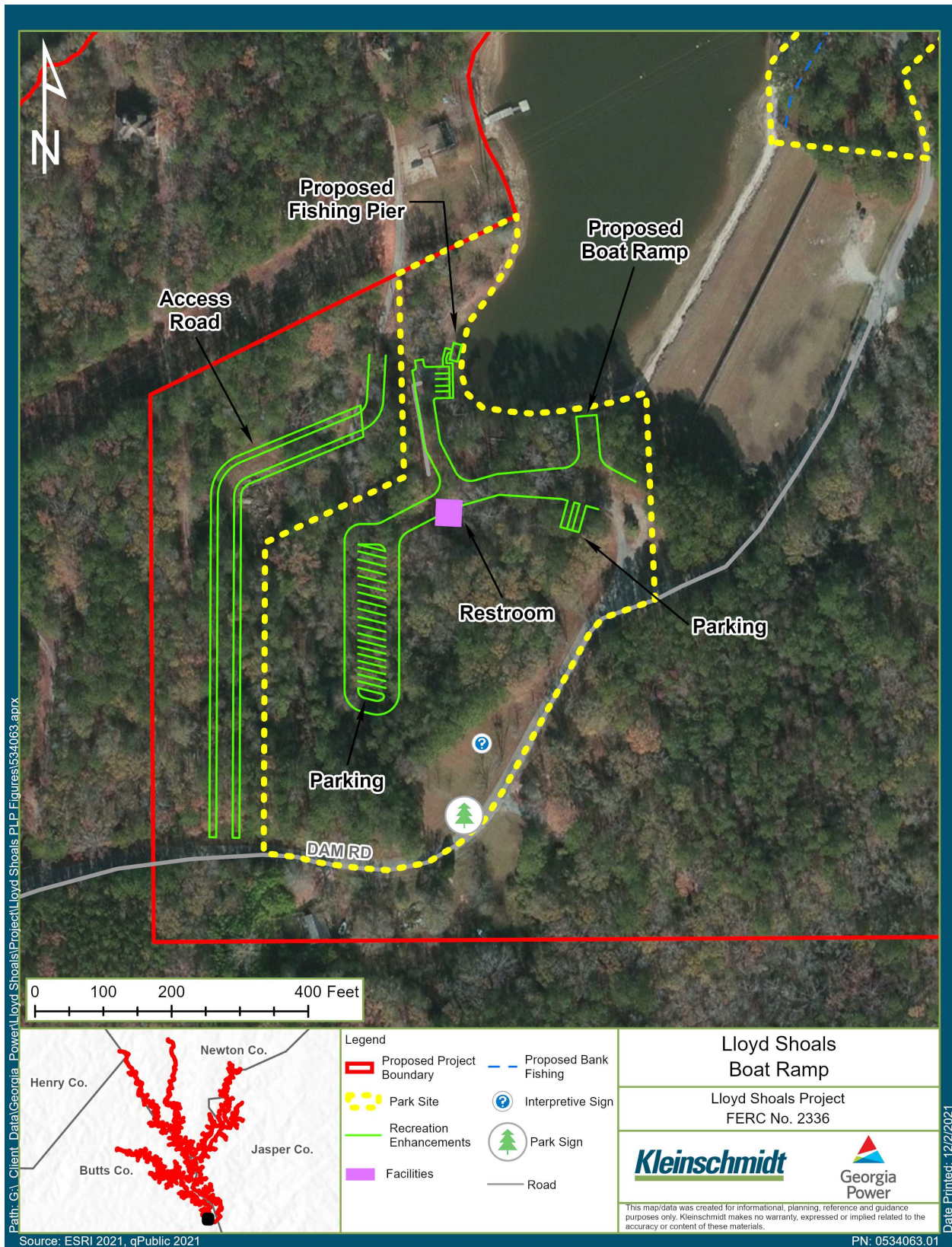


**FIGURE 5 OCMULGEE RIVER PARK**

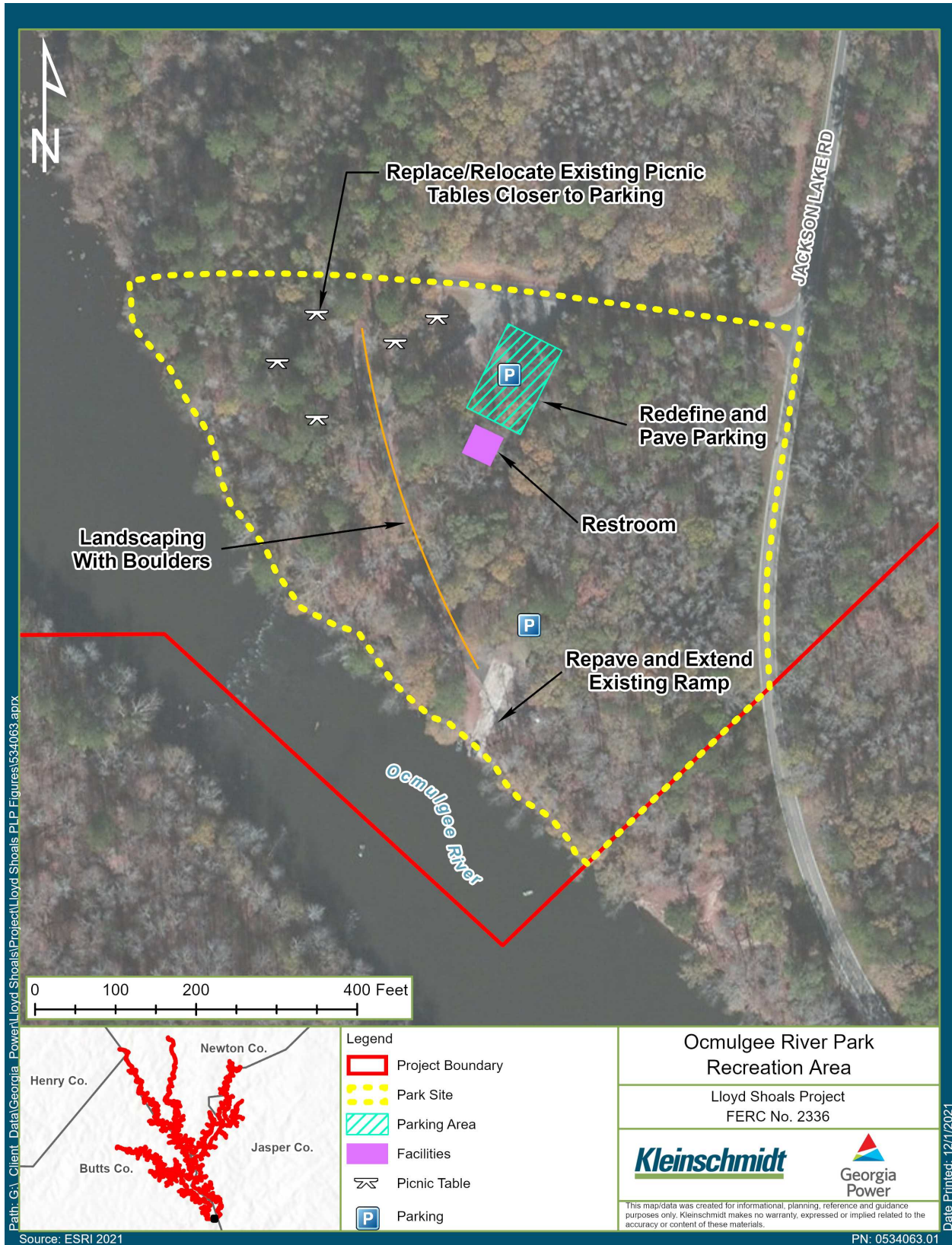




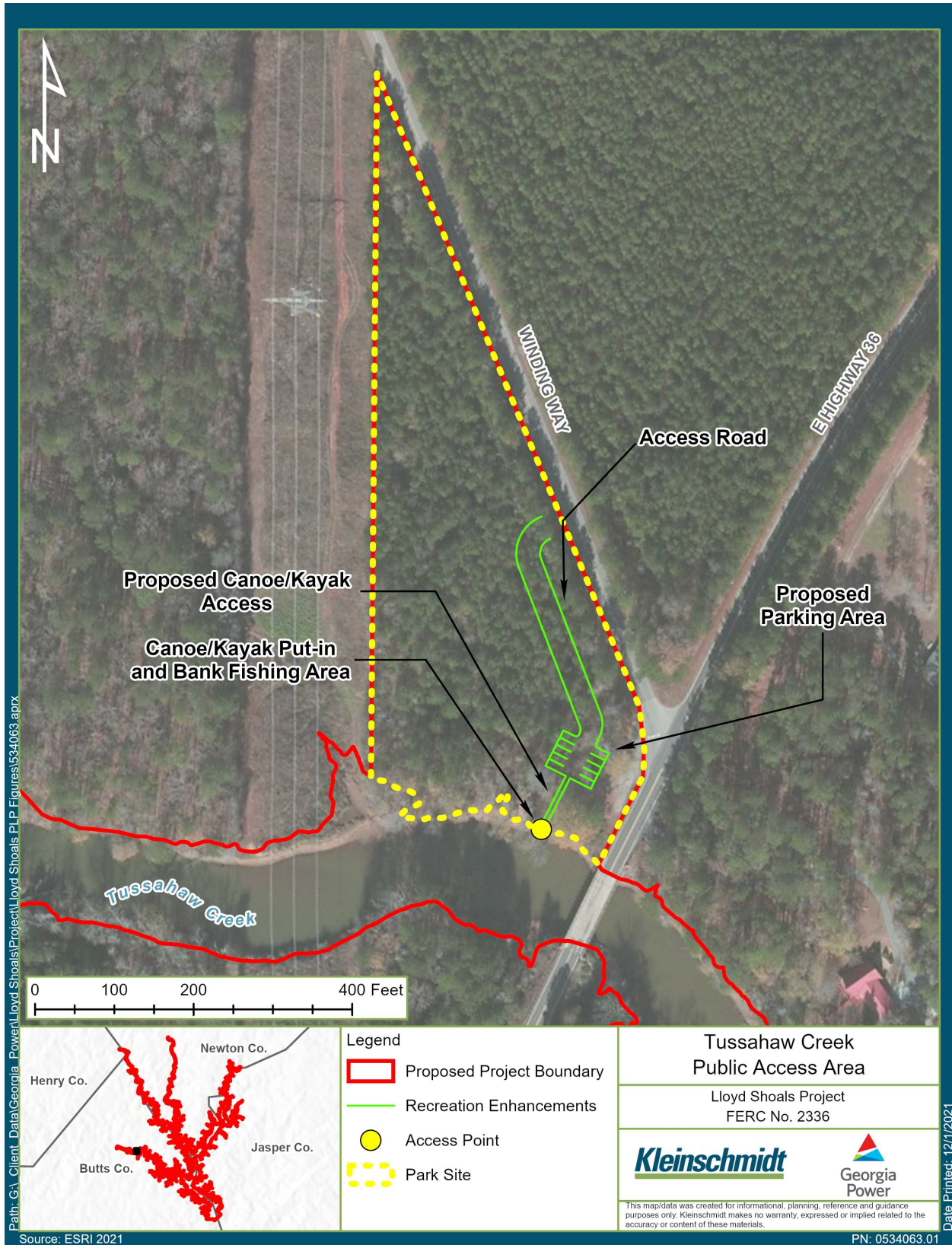
**FIGURE 6 CONCEPTUAL DRAWING OF LLOYD SHOALS PARK PROPOSAL**



**FIGURE 7 CONCEPTUAL DRAWING OF LLOYD SHOALS BOAT RAMP PROPOSAL**



**FIGURE 8 CONCEPTUAL DRAWING OF OCMULGEE RIVER PARK PROPOSAL**



**FIGURE 9 CONCEPTUAL DRAWING OF TUSSAHAW CREEK PUBLIC ACCESS AREA PROPOSAL**

**APPENDIX E**

**PROPOSED SHORELINE MANAGEMENT PLAN**

# Shoreline Management Plan for the Lloyd Shoals Hydroelectric Project (FERC #2336)



# **SHORELINE MANAGEMENT PLAN, LLOYD SHOALS PROJECT (FERC NO. 2336)**

## **Introduction**

Georgia Power Company (Georgia Power) has developed this Shoreline Management Plan for the Lloyd Shoals Project to incorporate its well-established shoreline management program for the purpose of protecting the scenic, environmental, and recreational values of the Project. This plan provides requirements for activities such as shoreline construction (e.g., docks, boat slips, seawalls) as well as dredging and tree removal, on Lloyd Shoals Project lands. Georgia Power uses this document for permitting and regulating these activities and reviews the plan every ten years, in accordance with the Federal Energy Regulatory Commission (FERC, or the Commission) Guidance for Shoreline Management Planning at Hydropower Projects (FERC 2012), to determine any need for modifications or updates to ensure its adequacy in meeting its objectives.

The Lloyd Shoals Project is located on the Ocmulgee River in north-central Georgia at river mile 250.2, about 7 miles east of the city of Jackson in Butts County (Figure 1). The Lloyd Shoals project reservoir, known as Lake Jackson, covers 4,750 acres at full-pool (530 ft plant datum) and has 135 miles of shoreline. Lands and waters within the FERC project boundary are located within Henry, Butts, Newton, and Jasper Counties. The project boundary is the 530-ft contour around much of the reservoir, except for areas around project works and recreation facilities, where it follows metes and bounds (Figure 2).

## **Background**

Georgia Power's management of the project shoreline was first formalized in January 1985, when its shoreline management policy was adopted. The shoreline management policy governs erosion control, facility construction along shorelines, shoreline clearing, excavations, effluent control, public landings and marinas, shoreline and reservoir hazards, and miscellaneous uses of the reservoir. In addition to the policy, a shoreline permitting program was established that outlines procedures for obtaining permits from Georgia Power for construction on leased properties within the project boundary and project lands over which Georgia Power has flood rights. The program outlines guidelines for construction and procedures for obtaining permits for structures, grading and clearing, seawalls, boat slips, boat lifts, and docks.

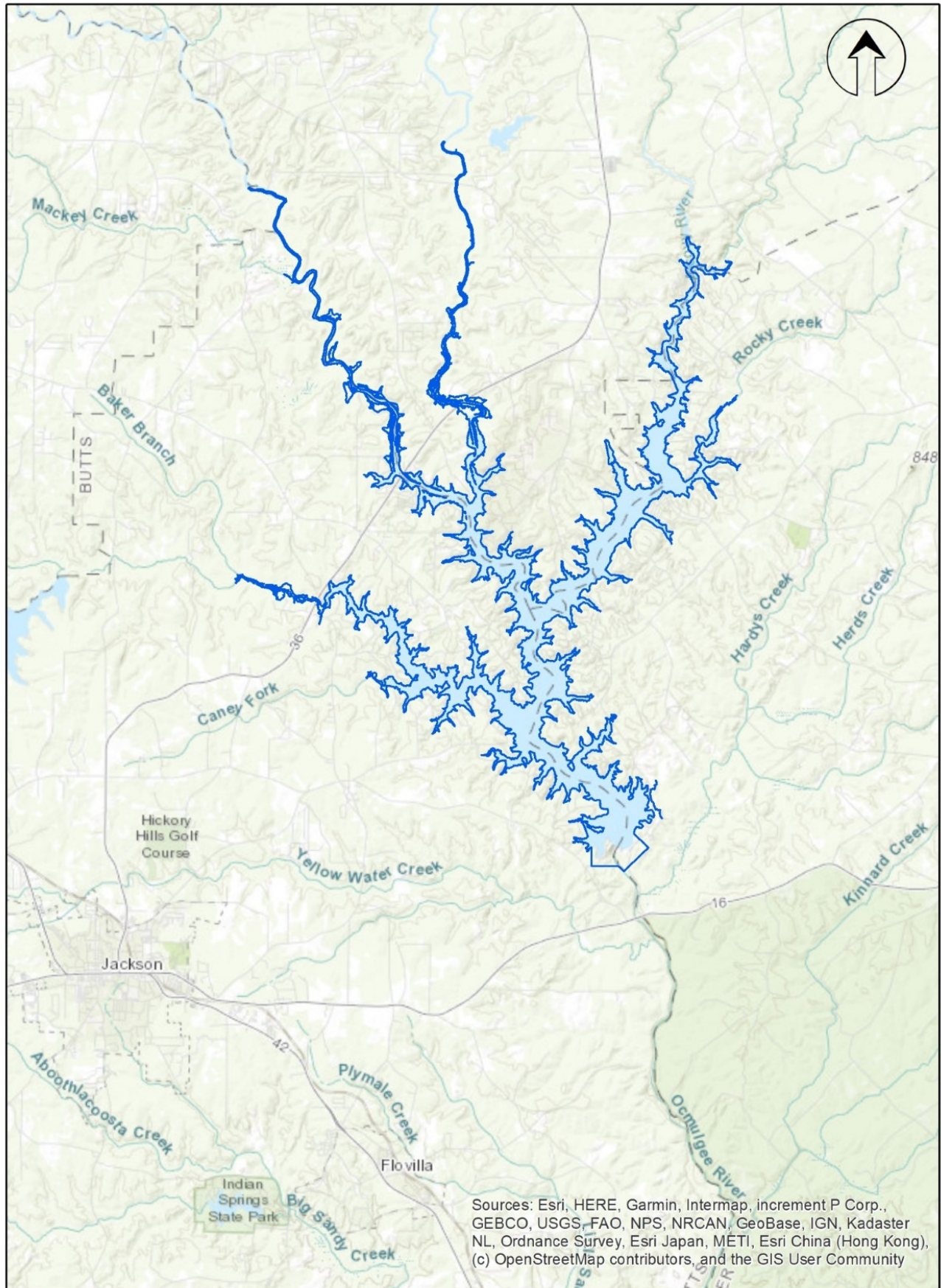
In addition, Georgia Power continues to implement its current Shoreline Management Guidelines, which derive from the Use and Occupancy article in FERC licenses. They provide procedures and specifications for supervising and controlling development activities within the FERC project boundary and on residential lease lots at Georgia Power reservoirs. A copy of the current Shoreline Management Guidelines for the Lloyd Shoals Project is included in Appendix A and may be found at <http://georgiapowerlakes.com/lakejackson/shoreline-management/>.

This Shoreline Management Plan adopts previous management and permitting practices into a formal plan document to be FERC-approved in the December 31, 2021 license application. Shoreline Management Guidelines and future revisions and updates are specifically included within this Shoreline Management Plan.

## **Shoreline Management**

### ***General Guidelines***

A valid lease agreement (Georgia Power lots and access lots) or license (deeded lots) is required in order to receive permits for construction on Georgia Power lakes and property.



**Figure 1.** Map showing location of the Lloyd Shoals Project and its surroundings.



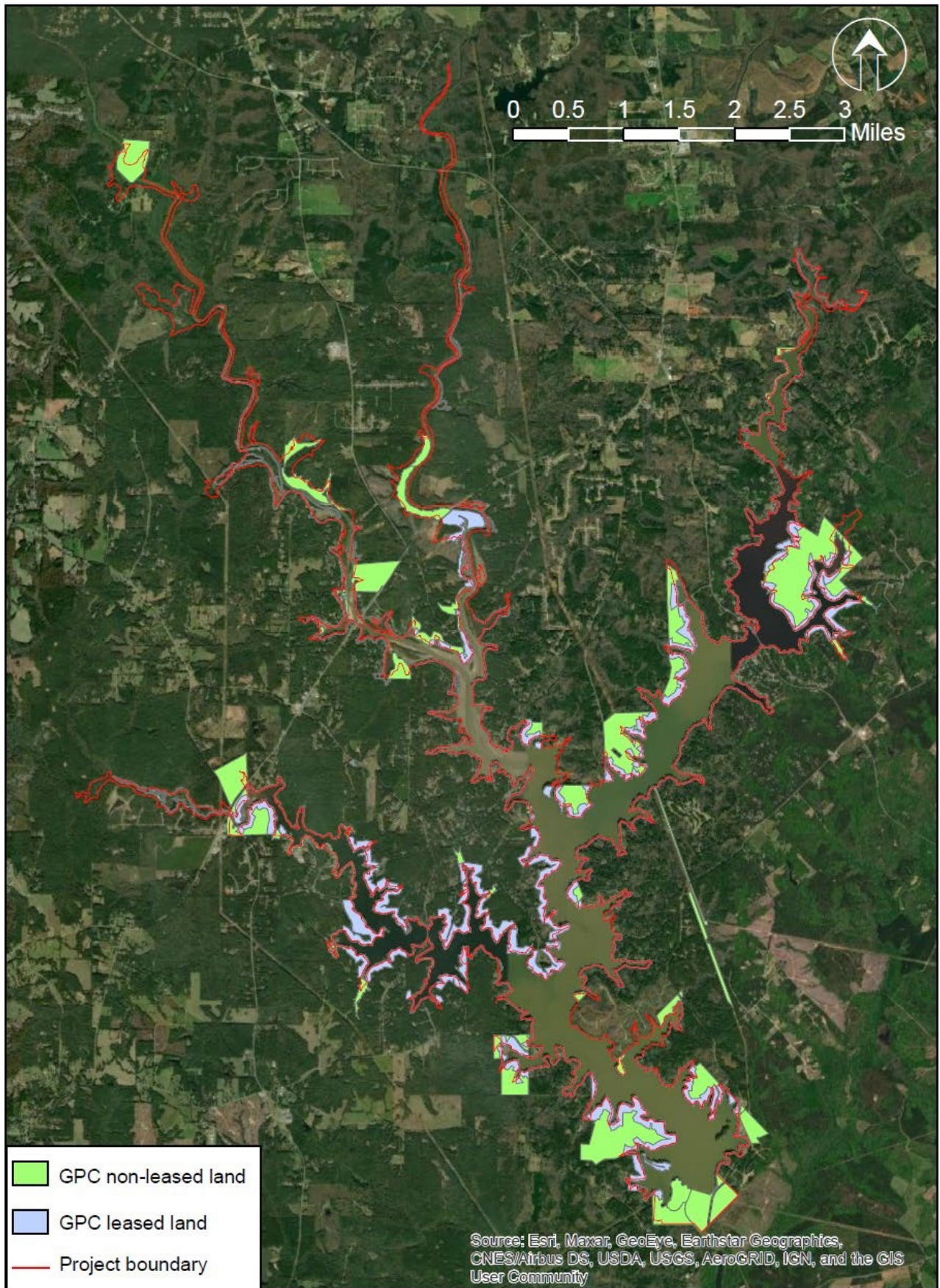


Figure 2. Aerial photograph showing Georgia Power lands in and adjacent to the project boundary.

A permit must be applied for and issued by Georgia Power before landowners may begin any construction, renovation, clearing, tree removal, grading, etc., on Georgia Power land. Each permit request is handled on a case-by-case basis at the discretion of the Georgia Power Lake Resources Office.

All permits will have an approval date and a completion date. These dates are recognized as the starting date of the project and the expiration date of the permit. If construction is to continue past the permitted completion date, Georgia Power must review and approve any extension requests. Any change in plans, after initial approval of construction, must be reviewed and approved by Georgia Power before the change is executed.

To protect the vegetative buffer surrounding the lake, no clearing shall be permitted within 25 ft of the shoreline or county setbacks, whichever is greater, without prior consent. Any ground disturbing activities shall require the proper installation of silt screen at least 26 ft from the shoreline or as determined by the Georgia Power Lake Resources Office and local county ordinances.

Generally, older structures that do not conform to current policies or guidelines may be maintained, but not expanded or replaced. Georgia Power may require modification of these older structures to conform with current policies or guidelines if they are expanded or replaced or prior to transfer or renewal of a lease/license agreement or approval of other construction activities.

It is the responsibility of the homeowner to properly dispose of any shoreline structure(s) that have been replaced or removed.

All construction adjacent to or within Georgia Power lakes shall be maintained in a good state of repair and shall comply with all current and future federal, state, and local health, environmental, and safety regulations.

Dumping, burying, or otherwise disposing of any portion of a downed tree on Georgia Power property or into the lake is prohibited. The disposal of leaves and lawn clippings into the lake is also prohibited.

### ***Unauthorized Construction/Activities***

Unauthorized construction activities or failure to comply with Georgia Power's permitting process may result in construction delays, removal of the unauthorized project, removal of all shoreline structures associated with the property, termination of the lease/license, and/or legal action.

### ***Dredging***

Under Georgia Power's Small Dredging Permit Program for minor dredging activities, which was approved by the Commission on June 28, 1993 and amended on May 11, 2000 (Appendix B), Georgia Power is authorized to permit dredging of up to 500 cubic yards of sediment per lot. The focus of the program is to issue permits for minor activities, including the installation and repair of bulkheads and boat docks, in accordance with U.S. Army Corps of Engineers (USACE) programmatic general permits and state and local regulations. Greater amounts require approval from USACE, FERC, and additional agencies. Dredging plans must be submitted to and approved by Georgia Power before work begins. Applicants must estimate the

volume of material to be removed, which should be determined by a qualified engineer or surveyor. An estimate sheet is to be attached to the permit request.

By obtaining a dredging permit from Georgia Power, the permittee agrees to abide by all governmental rules, laws, regulations, directives, and statutes. Removal of original lake/river bottom is prohibited. In addition, any dredging or filling of wetlands or any dredging that would impact threatened and endangered species or historic properties is prohibited. All material removed will be disposed of in an upland area to prevent reentry into the reservoir.

### ***Tree Removal***

Tree removal is prohibited without a written permit from Georgia Power. Additional local permits may be required for tree removal and associated land disturbance.

### ***Commercial Structures***

Any commercial buildings or structures in the Project (excluding those permitted under Use and Occupancy article, Paragraph d (5)), will be submitted to the Commission as a non-project use of project lands for approval.

### ***Shoreline Structures***

Use and Occupancy article Paragraph b allows Georgia Power to permit landscape plantings, non-commercial piers, landings, boat docks, or similar structures that can accommodate no more than 10 watercraft and that are intended to serve single-family type dwellings, as well as embankments, bulkheads, and retaining walls, without prior Commission approval. Paragraph d (5) of Use and Occupancy article states that Georgia Power can permit private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina, provided all necessary approvals have been obtained and that Georgia Power notifies the Commission in writing at least 60 days prior to construction.

Georgia Power has developed a robust set of Shoreline Management Guidelines, including specifications on materials, setbacks, and dimensions, for permitting docks, boathouses, seawalls, and dredging.

### ***Docks***

Docks may be floating or stationary or a combination of both. Only approved encapsulated flotation will be permitted for use with floating docks. Metal drums, plastic barrels, modified pontoon boats and other such items or materials are prohibited. Plumbing other than water spigots and pumps is not permitted.

### ***Seawalls***

Georgia Power must first inspect the site of the proposed construction. Georgia Power will determine whether the proposed construction is needed, ensure the proposed construction would not change the basic contour of the reservoir shoreline, and consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site.

All applicable federal, state, and local permits and variances must be obtained before constructing a new seawall. Seawall construction will require proper erosion and sedimentation controls.

Prior to receiving a permit from Georgia Power, the applicant must submit a plan including the length of shoreline to be fronted, the type and depth of foundation, materials to be used for construction, and a landscape plan for revegetating impacted shoreline.

The distance between the proposed seawall and the existing shoreline shall not exceed 2 ft (measured horizontally from existing shoreline). Riprap must be placed at the base of the seawall to reduce undermining and enhance shoreline habitat.

### ***Boathouses***

A residential structure must be erected on the lot for a boathouse to be permitted. No plumbing (other than water spigot) is allowed, and the boathouse structure must be open-sided (no enclosure). Boathouse/dock combination structures are encouraged to minimize maintenance and shoreline impacts. All boat/personal watercraft (PWC) lifts must be within the overall footprint of the structure, behind the structure or under the roof line.

### **Review and Revision**

A Hydro License Coordinator and Administrative Assistant administer the permitting program and monitor the shoreline of Lake Jackson. Additionally, Georgia Power maintains an active Shoreline Committee, comprised of shoreline specialists from each of its FERC-licensed projects. This group meets periodically to review the shoreline management program and discuss best practices at all Georgia Power reservoirs.

Lloyd Shoals shoreline staff and management, in consultation with the Georgia Department of Natural Resources (DNR), will review the plan within ten years of the anniversary date of the license and every ten years thereafter for the term of the license, to determine any need for modifications or updates that may be necessary to ensure its adequacy in meeting its objectives. After each review period, Georgia Power will file a report with the Commission documenting consultation with DNR, including specific descriptions of how their comments are accommodated in any proposed plan revisions. This report will be filed by the anniversary date of the license, after DNR has had a minimum of 30 days to comment on the report.

**APPENDIX A:**  
**SHORELINE MANAGEMENT GUIDELINES FOR THE**  
**LLOYD SHOALS PROJECT**  
**December 2021**

# **GEORGIA POWER**

## **SHORELINE MANAGEMENT GUIDELINES**

Georgia Power's current Shoreline Management Guidelines applicable to the Lloyd Shoals Project, as available at <http://georgiapowerlakes.com/lakejackson/shoreline-management/>, are provided below.

### **STATEWIDE SHORELINE GUIDELINES**

- No permit of any kind will be issued if the property owner/applicant is not a party to a current, valid agreement with Georgia Power Company (GPC) or is not up to date on associated fees.
- No permit of any kind will be issued if there are existing compliance issues on the lot or shoreline.
- No work can be conducted on GPC property or within the GPC project boundary without prior written approval by GPC through issuance of a permit.
- A licensee/lessee who engages in shoreline construction or activities involving GPC land/lakes without first obtaining approval and a permit from GPC (e.g., unauthorized construction, unauthorized removal of trees, etc.) will be subject to cancellation of their agreement, removal of shoreline structures and the loss of ability to obtain any lake use permit for a time period determined by GPC in its sole discretion, up to five years.
- A contractor who engages in shoreline construction or activities involving GPC land/lakes without first obtaining approval and a permit from GPC (e.g., unauthorized construction, unauthorized removal of trees, etc.) will be subject to the loss of the ability to obtain any lake use permit and the loss of authorization to work at any GPC lake for a time period determined by GPC in its sole discretion, up to five years.
- GPC requires a residential structure to be present on GPC-owned lease lots and privately owned lots prior to approving any shoreline structures other than a dock and/or seawall.
- In instances where a GPC license or lease agreement has been applied for in connection with a deeded or privately owned lot, no shoreline structures will be permitted, other than a dock and/or seawall, unless there is a residential structure present on the lot.
- Any unapproved structures or installations located on GPC property are the sole responsibility of the licensee/lessee to remove within a timeframe acceptable to GPC.
- To protect the 25' vegetative buffer and GPC project lands, no mechanical clearing (e.g., grubbing or changing the existing land contour) will be permitted without prior written approval from GPC. To ensure compliance with the GA EPD state waters buffer (25' for warm waters, 50' for cold waters), a permittee is responsible for obtaining all applicable permits prior to commencement of any work inside the 25' vegetative buffer or GPC land. The permittee is responsible to contact the Local Issuing Authority (LIA) for the county in which the work is proposed.

- Older/existing structures: Previously permitted structures that no longer conform with current GPC guidelines can be maintained with minor repairs only. For example, replacement of rotten/damaged deck boards is a minor repair, whereas repair work on joists or posts does not constitute a minor repair. Dry storage boathouses or similar inside the Project Boundary or inside the 25' state waters buffer will require removal prior to GPC considering a request to install a wet storage boathouse/dock. GPC may identify these structures and require their removal in connection with a renewal, transfer or permit request.
- No portion of a downed tree may be disposed of on GPC property or lakes.
- GPC does encourage the installation of fish habitat by utilizing natural vegetation or man-made structures. Contact your appropriate GPC Lake Resources representative for further info.
- GPC only allows one shoreline structure per lot (e.g., a dock, boathouse, boat slip or combination thereof).
- A combination structure must be built so that a single walkway provides access between the dock/boathouse/boat slip and the shoreline. Previous permitting for multiple structures will only be honored until that point in time when the structure(s) require more than minor repairs, at which point they will need to be brought into compliance with current GPC guidelines.
- On Residential Lease lots, any additional roofed structures (existing or requested) located on the lake side of a residential dwelling, other than a boathouse, must be outside of the Project Boundary for the specific lake or a minimum of 50' from the closest point of the shoreline, whichever is greater.
- If a single owner controls two adjoining lakefront lots (whether by lake leases with GPC or private ownership), the lots cannot be combined without first contacting GPC to determine if a combination is acceptable. In cases where shoreline structures other than seawalls exist on both lots, the lots may not be combined unless all but one of the structures are removed prior to combining the lots. Combining adjoining lots will also require county approval.

## **LAKE JACKSON SHORELINE GUIDELINES**

### **SEAWALLS**

- New seawall requests are only permitted on shorelines with evident cut bank erosion.
- New seawall requests must provide applicable county and state permits as required.
- Where wetlands are present on shoreline, no wall of any type will be approved.
- A landscape or mitigation plan may be required for any newly constructed seawall. Consult with your GPC Lake Resources representative.
- Rip rap seawalls are highly effective at stabilizing shoreline and providing aquatic habitat. They typically require less maintenance compared to other options.

- Prior to completion, every new wall must be backfilled and stabilized with silt fence, straw and other relevant best management practices. Silt fence should be removed after re-establishment of vegetation.
- Constructed seawalls can be wood, concrete, block (filled with concrete), bio-engineered or vinyl and must be constructed as close to existing shoreline as reasonably possible – not in a way to reclaim any “lost frontage”. Any of the above options will require rip rap on the lake side of the wall. Installation of filter fabric material behind most seawall types is required.
- In instances where a new seawall is requested to replace an existing seawall, the new wall should be in the footprint of the existing wall being removed or in a location acceptable to GPC. Location and placement of turbidity and or silt screen must be noted in the permit application.
- Seawall construction should minimize disturbance within the state waters buffer to maximum extent practicable.
- Turbidity barrier is required to be put in place before the removing of an existing seawall. This barrier must remain in place until the new seawall is completed.

## **DOCKS**

- Any residential lot platted after the year 2000 must have a minimum of 100' straight line (pin to pin) shoreline, along with 100' width at the GPC project boundary to have any shoreline structure other than a seawall.
- Lots platted prior to the year 2000:
  - Must have a minimum of 50' straight-line shoreline to be considered for a dock only with dimensions not to exceed 16'x20'.
  - Max dock (platform) dimensions may not exceed 320 square feet or 16'x20'.
  - In most instances, the nearest point of a dock to the property line projection, both at shoreline and out into water, should remain 15'.
  - Maximum distance of dock outreach from shoreline should not exceed 50'.
  - Primary walkway from shoreline to dock should be no more than 6' wide.
  - The flag dock is the GPC standard configuration for new dock construction.
  - It is encouraged that docks be placed in the center one-third of lot for possible future combination enhancement.



## **BOATHOUSES**

- Any lot platted after the year 2000 must have at minimum 100' straight line shoreline (pin to pin) for any boathouse consideration.
- Lots with 100' of shoreline or greater may qualify for a double stall boathouse (see diagram).
- Lots platted BEFORE the year 2000 must have a minimum of 75' straight line shoreline (pin to pin) along with 75' width at the GPC project boundary before being considered by GPC for a single stall boathouse (see diagram).
- A residential structure must be erected on lot (regardless of ownership type) for a boathouse to be permitted.
- New construction (including boathouse/dock combos) must be built so that a single walkway from shoreline leads to the combination structure.
- Metal/aluminum carport covers are not allowed for use as a boathouse shelters.
- Free standing boatlifts are not permitted on any GPC lake except for Lake Oconee.
- Roof pitch should be no less than 3/12 and no greater than 5/12 and should be hip or gable roof style.
- A storage room, no greater than 5' x 12' is allowed under roof line of boathouse.
- Roofs must only be shingle, nonglare baked enamel or other nonglare surfaces.
- Rooftop sundecks are prohibited on GPC lakes.
- Any accessory item (such as PWC lifts) must fit inside the overall footprint of the existing building envelope, behind structure or under roof line.
- GPC requires open-sided boathouses on all lakes except for North Georgia lakes.
- Other than water spigots, no plumbing is allowed.
- Boathouses are not permitted on Lake Oconee except to original property owners and only if they or their heirs still retain ownership.

## **DREDGING**

- Georgia Power is authorized to permit dredging of up to 500 cubic yards per property. Greater amounts will require further approval from the U.S. Army Corps of Engineers, FERC and additional agencies.
- Dredging plans must be submitted and approved before work can commence.
  - Georgia Power may exercise the option to require a certified engineer or surveyor verify the scope of the project at our sole discretion.
  - Removal of original lakebed/river bottom is prohibited. The sole purpose of dredging is to remove sedimentation/organic materials that have accumulated over time.
  - A turbidity barrier must be installed within the lake area for containment and equipment being used must work inside this barrier.

- Silt must be either transported from site or pumped to a location off GPC property and/or project lands, or a minimum of 25' from lake, whichever is greater. Material cannot be used to backfill seawalls or to "level up" land.
  - Silt/sediment removed must be stabilized in a way to avoid re-entry into the lake and to not to impact GPC property.
  - At Lake Jackson, it may be necessary to execute a property line agreement prior to dredging activity to establish pre- and post-dredging property rights.
  - Dredging of wetland areas or for the purpose of removing upland materials via "channeling" to create additional shoreline is strictly prohibited.
- Upon receiving a dredging permit from GPC, the permittee agrees to:
    1. Abide by all government rules, laws, regulations, directives and statutes.
    2. Acquire all necessary governmental permits or licenses, which may include, but not be limited to, a land disturbance permit.

#### **TREE REMOVAL/LANDSCAPING**

- Unauthorized clearing of GPC project lands or within 25' of the shoreline (whichever is greater) on undeveloped lots is prohibited. In instances where existing shoreline structures (dock, boathouse) are present, GPC reserves the right to require the complete removal of these structures at owner's expense should unauthorized clearing occur. Further, a detailed revegetation/restoration plan must be provided and loss of consideration for lake use permitting activities for a time determined by GPC or dependent on re-vegetation efforts and success.
- Unauthorized clearing of GPC project lands or within 25' of the shoreline (or whichever is greater) on undeveloped lots is prohibited. In instances where no shoreline structures are present, GPC reserves the right to require a detailed re-vegetation/restoration plan, along with the potential loss of consideration for lake use permitting activities for a time determined by GPC or dependent on re-vegetation efforts and success.
- Tree removal is the responsibility of license/lessee – GPC is not responsible for damaged, diseased or dead trees on our property. You must have GPC permission to remove any tree from GPC property or project lands.
- Permit applications must include:
  - Accurate number of trees to be removed.
  - Size (diameter) and species of trees requested for removal.
  - The reason for requested removal.
  - Photos of the shoreline from lake along with photos of project boundary if applicable.
  - Proposed replanting or mitigation measures and any other information relevant to review of the request (including any additional information GPC may require).
  - Incomplete applications will not be considered.

- GPC considers tree removal requests under the following conditions:
  1. Dead or damaged tree(s) that pose a hazard.
  2. Facilitation of construction, i.e. home, seawall, septic installation, etc.
  3. To enhance conservation value.
- When tree cutting is allowed, GPC requires replanting at a 1:1 ratio. Larger trees subject to removal will require larger caliper replacement requirements or multiple trees to replace tree removed. GPC reserves the right to require specific sizes and species of trees to be replanted. Examples of acceptable native trees can be found at [www.gnps.org](http://www.gnps.org).
- GPC, at our sole discretion, will require a landscaping plan if trees on GPC property are permitted for removal or if property owner intends to do any land disturbance inside GPC property or the 25' buffer – whichever is greater.
- Added or replaced trees/shrubs should be native to the area species. Visit [www.gnps.org](http://www.gnps.org) for examples.
- Irrigation pumps for single family residential homes directly adjacent to GPC land are allowed so long as pumps are placed on land (centrifugal), do not exceed a 2.5 HP maximum, and are installed and wired by a licensed electrician.
- A single walkway path is allowed on GPC land to shoreline structures and should not exceed 4' in width.
- Recirculating water features are not permissible on GPC property and will be subject to removal upon discovery.
- No structures are permissible inside of the GPC project boundary other than permitted and approved shoreline structures.
- GPC discourages the planting of turfgrass within the project boundary or 25' state vegetative buffer as a measure to help protect/enhance water quality. Where turfgrass is desired and permissible, GPC may allow up to 30% coverage of approved turf grass. There are some locations where no percentage of turf grass on GPC land is permissible. Contact your appropriate GPC Lake Resources Office for clarification.
- Leaves, lawn clippings and the like should not be disposed of in GPC lakes – licensees/lessees utilizing landscaping/maintenance services are ultimately responsible for the actions of these hired services.
- Fences: Fences are not permitted inside the project boundary.
  - On full residential lease lots (company owns entirety of lot), fence requests must be submitted to GPC for review. An updated survey will be required. Any fence installed without a permit is subject to removal at the lessee's expense.
  - On Access lots where fee simple land terminates at GPC land (project boundary) the fence must terminate at this intersection. A survey will be required if GPC land is not clearly identifiable on lot.
  - On private/deeded lots, fences will not be permitted within the Project Boundary or within Georgia Power's land rights.

- Under no circumstance may a fence run adjacent to or into the lake.
- If GPC permits a fence, it may only be constructed of decorative wrought iron, aluminum or black chain link and cannot exceed 4' in height.

## **DWELLINGS AND ADDITIONS**

- Only one residential dwelling is permitted per lot and mobile homes are prohibited.
- Residential dwellings are limited to two stories above ground.
- New residential dwellings must meet county square footage minimums.
- All construction must be outside the project boundary of the property and at least 50' from the shoreline. This includes elevated decks or other features, which cannot extend over project boundary line or be less than 50' from the nearest point of shoreline. If the county setback is greater, then GPC will default to the county.
- If a residential lease lot has land available to construct a new dwelling greater than 50' from the shoreline, GPC retains sole discretion to determine new dwellings proximity to shoreline.
- Proposed new dwellings that cannot be located outside of the project boundary must be at least 75' from shoreline and would require FERC approval.
- All septic systems must be appropriately sized to handle the proposed dwelling occupancy per county health department guidelines. The required septic system (including repair area), along with the dwelling, must be sited so that no disturbance to the project boundary occurs.
- GPC reserves the right to reject proposals even if approved by the county or other parties if the request is deemed to be detrimental to the lake or our property.
- The following information should be provided to GPC via PDF or other digital format prior to issuing a permit for residential construction:
  1. Architectural drawings, including total footprint and dimensions of dwelling, front and side elevations of dwelling, etc.
  2. Owner's name, address, phone number, lot number and subdivision or area number.
  3. Name and phone number of contractor/builder performing work.
  4. Anticipated start and ending date.
  5. Site plan showing proposed location of county-approved septic tank, drain field lines and well plans.
  6. All pertinent state and local permits (via PDF or other digital format) including but not limited to:
    - a. Septic tank permit (if applicable)
    - b. Building permit
    - c. Land disturbing permit (if greater than 1 acre)
    - d. Local county buffer variance (if applicable)

7. Site plan/landscaping plan depicting approximate number and size of trees (4" diameter or greater) to be removed within the building perimeter including driveway

### **BOATLIFTS AND PWC LIFTS**

PWC lifts must be located inside the building envelope of the structure (i.e. behind dock, boathouse) and may not be separate from the dock/boathouse.

### **OUTBUILDING CONSTRUCTION**

- Outbuilding installation request typically apply to company-owned lease lots.
- Plans must be submitted to GPC, including building dimensions, prior to approval.
- Outbuildings include, but are not limited to, detached garages, storage buildings, pavilions, greenhouses, etc.
- Outbuildings are limited to one story.
- Roof pitch should be no greater than 5/12.
- There is a maximum of two outbuildings per lot. This does not include an attached garage, integral to the primary residential dwelling.
- Outbuildings may not include living space, interior plumbing, and/or heating and air.
- Floor level to top of roof height should not exceed 21'.
- Maximum of two structures not to exceed 1,156 square feet total.
- Outbuildings must be located behind the residential dwelling (or non-lake side of property).
- Should match the primary residential dwelling in color and design.

### **MARINAS**

#### Group Dock Criteria

- Consultation with GPC is required beforehand to determine what will be considered by GPC (case-by-case basis).
- Group docks are only considered for common areas, multi-family and commercial applications (marinas, restaurants, etc.)
- Up to a 10-slip structure max may be permitted out of Lake Resources Office without FERC approval for multi-family request.
- FERC submittals will be charged a fee to be determined by GPC subject to the nature of request.
- Minimum required shoreline – 35' per slip (ex. 350' for a 10-slip dock)
- For multiple docks, minimum spacing of 100' between structures required.
- Side lot line setback, minimum 50' if adjacent property IS NOT owned by permit applicant.
- Side lot line setback, minimum 20' if adjacent property IS owned by permit applicant.

- Boatlifts, jet ports, PWC lifts or any other similar type installations are not allowed on these structures.
- Total width of a single 10-slip dock should not exceed 113' and no greater than 50' outreach (case-by-case basis).
- Interior slip width should not exceed 22' wide, interior slip depth should not exceed 24' wide.
- Main walkway off shoreline cannot exceed 6' wide.
- Slip walkways should not exceed 5' wide.
- Irrigation is not allowed at these dock locations other than for common area property (no individual homes, off water properties, etc.)

#### Commercial Dock Criteria

- Commercial applications require FERC submittal, regardless of number of slips requested.
- Property must be commercially zoned by county.
- FERC submittals will be charged a fee to be determined by GPC subject to nature of request.
- Minimum required shoreline – 35' per slip (case-by-case basis)
- Side lot line setback minimum of 50'.
- Boatlifts, jet ports, PWC lifts or any other similar installation are not allowed on these structures.
- Main walkway off shoreline cannot exceed 6' wide.
- Slip walkways should not exceed 5' wide.
- Interior slip width should not exceed 22' wide.
- Interior slip depth should not exceed 24' wide.
- No additional platform/surface area is allowed.

**APPENDIX B:**  
**SMALL DREDGING PERMIT PROGRAM**

UNITED STATES OF AMERICA 63 FERC • 62, 325  
FEDERAL ENERGY REGULATORY COMMISSION

Georgia Power Company

Project Nos.:  
485-025, 1218-009, 1951-030,  
2177-019, 2237-008, 2336-018,  
2341-006, 2350-007, 2354-025,  
2413-024  
Georgia

ORDER APPROVING AND MODIFYING DREDGING PERMIT PROGRAM  
(ISSUED JUNE 28, 1993)

On February 26, 1993, Georgia Power Company, licensee for the ten projects listed above,<sup>1</sup> filed an application for a small dredging permit program. Approval of the application would give the licensee permission to issue permits for small dredging activities at the ten projects listed in this order.

Permit Program

Permits would be issued for dredging activities involving 1 to 500 cubic yards of material. All proposals to remove more than 500 cubic yards would be outside the scope of the program and would require individual Commission approval. The focus of the program is to issue permits for minor activities, including the installation and repair of bulkheads and boat docks. Permits would not be issued for the following activities:

- è any dredging of firm lakebed areas;
- è any dredging of natural bottom to accommodate boating activities;
- è any dredging of shoreline and upland areas for the purpose of channeling to create additional shoreline;
- è any dredging or filling of wetlands;
- è any dredging that would impact threatened or endangered species or historic properties.

Permit applications will be reviewed by the licensee to ensure that they are in compliance with the program. As part of the review, site inspections will be used to verify the application and determine any impacts of the proposed dredging.

<sup>1</sup> Projects: 485 Bartletts Ferry, 1218 Flint River, 1951 Sinclair, 2177 Middle Chattahoochee, 2237 Morgan Falls, 2336 Lloyd Shoals, 2341 Langdale, 2350 Riverview, 2354 North Georgia, and 2413 Wallace.



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If wetlands, threatened or endangered species, historic properties or other sensitive resources exist near the proposed dredging, the permit will be denied. Permits will contain conditions to protect adjoining areas if necessary.

The licensee will file an annual report with the Commission, which will list by project any dredging permit issued for between 25 and 500 cubic yards of material. Permits or actions for less than 25 cubic yards will not be listed due to their small size.

#### Other Regulatory Requirements

The licensee's program will not circumvent the necessity for obtaining other required approvals from the U.S. Army Corps of Engineers (COE) and state or local governments. The licensee will obtain permits as necessary to comply with Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Further, the licensee will deny a permit to any applicant who wishes to dredge or excavate in wetlands, an action which is not regulated by the COE under Section 404.2

#### Consultation

The licensee solicited comments from the following agencies: the COE, the U.S. Fish and Wildlife Service, and the Georgia Department of Natural Resources (DNR). None of the agencies objected to the program. The DNR stated that individual counties and municipalities have regulatory authority over land-disturbing activities. The licensee's program states that all state and local regulations will be followed when issuing permits.

#### Modifications

We recommend two modifications to the licensee's program. First, the program requires permittees to notify the licensee when work has begun and ended; however, permits do not have expiration dates. Consequently, a permit could be held indefinitely. Protracted delays could allow conditions at the site to change from the time the site was originally reviewed. Therefore, permits should have an expiration date to ensure that work is completed within a reasonable time. An expiration date of one year is reasonable given the nature of these small dredging activities.

2 The COE has authority to regulate the discharge of dredged or fill materials into wetlands under Section 404, but does not yet have the authority to regulate the excavation of wetlands. This distinction is stated in the COE's comment letter dated February 22, 1993.

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Second, the licensee has not retained stop-work authority under the program. This is necessary should the permittee deviate from any conditions imposed or otherwise conduct work in a hazardous or environmentally damaging manner. Stop-work authority and a recommended expiration date will be added to the permit program by this order.

The licensee's small dredging permit program with the above modifications should be adequate to protect resources while allowing dredging activities within project boundaries. This program should be approved.

The Director orders:

(A) The Small Dredging Permit Program, filed February 26, 1993, is approved as modified in paragraph (B) below.

(B) The licensee shall establish an expiration date of one year for permits issued under this program. All work authorized under a permit is to be completed within this one-year period. Further, the licensee shall retain stop-work authority and shall use this authority as necessary to prevent hazardous or environmentally damaging activities associated with permit actions.

(C) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. •385.713.

J. Mark Robinson  
Director, Division of Project  
Compliance and Administration

**91 FERC ¶ 62,098**  
UNITED STATES OF AMERICA  
FEDERAL ENERGY REGULATORY COMMISSION

Georgia Power Company

Project Nos. 1218-017, 1951-072,  
2336-042, 2341-021, 2350-013 &  
2354-070

## ORDER AMENDING LICENSES

(Issued May 11, 2000)

On February 14, 2000, Georgia Power Company (GPC), licensee for the projects listed below,<sup>1</sup> filed an application requesting their small dredging permit program be included in the six licenses. Approval of the application would give the licensee permission to issue permits for small dredging activities at the six projects listed in this order.

## BACKGROUND

In an order issued on June 28, 1993, the Commission staff approved a small dredging permit program for 10 projects licensed to GPC.<sup>2</sup> In the seven years since the filing and approval of this program, six relicenses have been issued for the above-listed projects. There was no opposition to continuing the existing dredging permit program, but it was not included in the relicense orders as GPC had expected. In the February 14 application, GPC requested this program be included in these relicenses so the licensee

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<sup>1</sup> Projects included in this filing are: the Flint River Project (P-1218) located on the Flint River, near the City of Albany, in Lee and Dougherty Counties, Georgia, the Sinclair Dam Project (P-1951) located on the Oconee River in Baldwin County, Georgia, the Lloyd Shoals Project (P-2336) located on the Ocumulgee River and its tributaries (i.e. South and Yellow Rivers) in Henry, Butts, Jasper, and Newton Counties Georgia, the Langdale (P-2341) and Riverview (P-2350) Projects located on the Chattahoochee River in Harris County, Georgia and Chambers County, Alabama, and the North Georgia Project (P-2354) consisting of six developments located in the Savannah River Basin on the Tallulah, Chattooga, and Tugalo Rivers, in Rabun, Habersham, and Stephens Counties, Georgia and Oconee County, South Carolina.

<sup>2</sup> See 63 FERC ¶ 62,325. In addition to the above-listed projects, the license order included the following projects: Bartletts Ferry (P-485), Middle Chattahoochee (P-2177), Morgan Falls (P-2237), and Wallace (P-2413).

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Project Nos. 1218-017 et.al.

-2-

can continue to issue permits for small dredging activities without separate Commission approval.

## PERMIT PROGRAM

Permits would be issued for dredging activities involving 1 to 500 cubic yards of material. All proposals to remove more than 500 cubic yards would be outside the scope of the program and would require individual Commission approval. The focus of the program is to issue permits for minor activities, including the installation and repair of bulkheads and boat docks. Permits would not be issued for the following activities:

- any dredging of firm lakebed areas;
- any dredging of natural bottom to accommodate boating activities;
- any dredging of shoreline and upland areas for the purpose of channeling to create additional shoreline;
- any dredging or filling of wetlands; and
- any dredging that would impact threatened or endangered species or historic properties.

Permit applications will be reviewed by the licensee to ensure that they are in compliance with the program. As part of the review, site inspections will be used to verify the application and determine any impacts of the proposed dredging. If wetlands, threatened or endangered species, historic properties or other sensitive resources exist near the proposed dredging, the permit will be denied. Permits will contain conditions to protect adjoining areas if necessary.

The licensee will file an annual report with the Commission, which will list by project any dredging permit issued for between 25 and 500 cubic yards of material. Permits or actions for less than 25 cubic yards will not be listed due to their small size.

The licensee's program will not eliminate the need for obtaining other required approvals from the U.S. Army Corps of Engineers (COE) and state or local governments. The licensee will obtain permits as necessary to comply with Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Further, the licensee will deny a permit to any applicant who wishes to dredge or excavate in wetlands.

Project Nos. 1218-017 et.al.

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The June 1993 order modified the program to require the licensee to issue a permit with a one year expiration date. The program was also modified so that the licensee would have stop-work authority should the permittee deviate from any conditions imposed or otherwise conduct work in a hazardous or environmentally damaging manner.

#### CONSULTATION

The licensee consulted with the COE and the Georgia Department of Natural Resources. Both agencies support the inclusion of the program in the relicenses.

#### DISCUSSION AND CONCLUSION

Commission staff reviewed the relicenses for each project and did not find any requirements or conditions in these documents which conflict with the provisions in the dredging permit program.

The licensee's small dredging permit program with the above modifications has proven to be adequate to protect resources while allowing dredging activities within project boundaries. In addition, this program has reduced the administrative burden on the Commission and licensee. This program should be approved and included in the relicenses for the six projects.

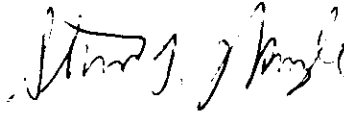
#### The Director orders:

(A) The licenses for the Flint River Project (P-1218), the Sinclair Dam Project, (P-1951), the Lloyd Shoals Project (P-2336), the Langdale Project (P-2341), the Riverview Project (P-2350), and the North Georgia Project (P-2354) are amended to include the Small Dredging Permit Program, filed February 26, 1993 and approved with modifications on June 28, 1993.

Project Nos. 1218-017 et.al.

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(B) This order constitutes final agency action. Requests for rehearing by the Commission may be filed within 30 days of the date of issuance of this order, pursuant to 18 C.F.R. §385.713.



for Fred E. Springer  
Director  
Division of Hydropower Administration  
and Compliance

**APPENDIX F**

**DRAFT LICENSE ARTICLES FOR LLOYD SHOALS PROJECT**

**GEORGIA POWER COMPANY'S  
LLOYD SHOALS PROJECT (FERC No. 2336)**

**DRAFT LICENSE ARTICLES**

***Draft Article 401 - Project Operation and Reservoir Levels***

The licensee must operate the Lloyd Shoals Project to maintain the reservoir elevation between 527 and 530 feet plant datum during normal operations, excluding periods of drawdowns. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 402 – Minimum Flow***

The licensee must operate the Lloyd Shoals Project to release a continuous minimum flow of 400 cubic feet per second (cfs), or inflow, whichever is less, into the Ocmulgee River downstream for the protection and enhancement of fish and wildlife resources and other downstream uses. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 403 – Supplemental Flow***

When calculated project inflow is less than 250 cfs, the licensee must operate the Project to release a continuous flow of 250 cfs into the Ocmulgee River downstream to supplement flow for downstream uses. For any deviations, the licensee must implement the Consultation and Reporting Protocols of the Lloyd Shoals Project Operations Compliance and Monitoring Plan.

***Draft Article 404 – Project Operations Compliance and Monitoring Plan***

The licensee shall implement the Lloyd Shoals Project Operations Compliance and Monitoring Plan, filed on December 31, 2021. The Project Operations Compliance and Monitoring Plan must not be amended without prior Commission approval.

***Draft Article 405 – Operation Monitoring of Dissolved Oxygen Enhancement System***

The licensee will operate the passive draft tube aeration system on Units 2, 3, and 4 to improve dissolved oxygen (DO) concentrations in the tailrace area annually from May 15 through September 30. During this period, plant personnel will operate the aeration system according to the Passive Draft Tube Aeration System Operational Procedure filed on December 31, 2021. The Passive Draft Tube Aeration System Operational Procedure must not be amended without prior Commission approval.

***Planned Deviation***

The use of passive draft tube aeration systems in Units 2, 3, and 4 may be temporarily modified, for short periods (3 weeks or less) upon mutual agreement among the licensee, the Georgia Department of Natural Resources' (GDNR) Environmental Protection Division (GEPD) and Wildlife Resources Division (WRD), and FWS. In the event of a planned modification, the licensee must notify the Commission as soon as possible, but no later than 14 calendar days



after the onset of the planned deviation. Each report must include: (1) the reasons for the deviation and whether operations were modified; (2) the duration and magnitude of the deviation; (3) any environmental effects; and (4) documentation of consultation with the GDNR (GEPD and WRD) and FWS.

*Deviation Due to Emergency*

In the event of an emergency modification to the use of passive draft tube aeration systems in Units 2, 3, and 4, the licensee must notify the Commission, GDNR (GEPD and WRD), and FWS as soon as possible, but no later than 14 calendar days after each such incident. The licensee must include as part of its emergency notification to the Commission an incident report. The report must include: (1) the cause of the event; (2) the duration and magnitude of the deviation; (3) any pertinent operational and/or monitoring data; (4) a timeline of the incident and the licensee's response; (5) any comments or correspondence received from GDNR (GEPD and WRD) and FWS; (6) documentation of any observed environmental effects; and (7) a description of measures implemented to prevent similar deviations in the future.

**Draft Article 406 – Verification Monitoring of Dissolved Oxygen Enhancement System**

The licensee shall monitor DO and water temperature in the Lloyd Shoals tailrace area during the period May 15-September 30 in one calendar year to verify the DO-enhancing performance of the passive draft tube aeration system with implementation of the Passive Draft Tube Aeration System Operational Procedure, which prioritizes the use of aerating units according to the number of units required for generation. Monitoring shall be conducted using an automatic probe recording measurements at 60-minute intervals at Station LSTR, defined as the water quality buoy location used in the Water Resources Study<sup>1</sup>, or other representative location.

The licensee shall prepare a monitoring report by March 31 of the following year. The report must include: (1) the DO data collected during the monitoring effort; (2) a discussion of the effectiveness of the passive draft tube aeration system following the operational procedure; and (3) documentation of consultation with GDNR (GEPD and WRD) after providing a draft or the report to the agency for a 30-day review period. Documentation of consultation will be provided in the report filed with the Commission, including copies of comments and recommendations received and any reasons why a recommendation may not have been adopted.

**Draft Article 407 – Terrestrial Invasive Vegetation Management**

Every three years following license issuance, Georgia Power will monitor invasive exotic plant occurrences at Ocmulgee River Park and in the area of the project works/Tailrace Fishing Pier. Invasive exotic plant populations will be treated as necessary to minimize any interference with public access and utilization at these sites. Acceptable treatment methods include careful herbicide application, pulling, hand-cutting, and any other means considered to be effective against undesirable plants while presenting no significant risk to other components of the environment.

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<sup>1</sup> The water quality buoy location is shown in the Water Resources Study Report filed on May 19, 2020, and in the Updated Water Resources Study Report filed on May 19, 2021.

**Draft Article 408 – Recreation Management Plan**

The Recreation Management Plan, filed on December 31, 2021, is approved and must be implemented according to the schedule included in the plan.

Within 180 days of completing all the recreation facility improvements required by the plan, the licensee must file, for Commission approval, as-built drawings that show the location, type, and layout of all constructed recreation facilities in relation to the Lloyd Shoals project boundary. The approved Recreation Management Plan must not be amended without prior Commission approval.

**Draft Article 409 – Shoreline Management Plan**

The Shoreline Management Plan, filed December 31, 2021, is approved. The approved Shoreline Management Plan must not be amended without prior Commission approval.

## **APPENDIX G**

### **OVERVIEW OF EXHIBIT E PRIVILEGED INFORMATION**

Exhibit E, Appendix G contains Documents that include privileged and confidential commercial, financial, and economic information that should not be released in accordance with Federal Energy Regulatory Commission regulations found at 18 C.F.R. § 388.112.

The privileged and confidential information derives economic value from not being generally known to, and not being readily ascertainable by proper means by, other persons who can obtain economic value from their disclosure or use. Additionally, the Documents that contain this privileged and confidential information are subject to extensive efforts by Georgia Power Company (Georgia Power) and Southern Company to maintain their secrecy.

The privileged and confidential information contains pricing information specific to Georgia Power and Southern Company. If revealed to the public, the information would provide valuable insights to the Companies' practices, allowing suppliers and competitors to price products in a manner which would negatively impact the Company's competitive position in a substantial way. This would ultimately cause severe economic harm to Georgia Power and Southern Company and, significantly, their customers. The information is therefore exempt from disclosure pursuant to Section (b)(4) of the Freedom of Information Act, 5 U.S.C. § 552(b)(4).

Only select Georgia Power and Southern Company personnel and their legal counsel are granted access to these Documents that contain privileged and confidential information. Those personnel receive access only on a "need to know" basis. If a party outside Georgia Power and Southern Company and their legal counsel is granted access to the Documents, the party is required to sign a confidentiality agreement with respect to the Documents. Additionally, access to Georgia Power and Southern Company buildings and files is restricted.

See Volume 7  
Exhibit E, Appendix G



**Lloyd Shoals Hydroelectric Project  
FERC Project Number 2336-094**

**Exhibit G**

**Public**

Prepared by  
Southern Company Generation Hydro Services

December 2021

**Georgia Power Company**  
**Lloyd Shoals Project P-2336**  
**Exhibit G**

On March 14, 2019, FERC issued an Order Approving Revised Exhibit G for the Lloyd Shoals Project, assigning the revised drawings FERC Drawing Numbers 2336-62 through 2336-78. The March 14, 2019, approved drawings have undergone thorough review and Georgia Power is resubmitting the Exhibit G Drawings with the following changes:

1. On FERC Drawing Number 2336-62 (Exhibit G Sheet 1)

a. Exhibit G Project Boundary Mapping Correction:

On July 27, 2017, Georgia Power filed with FERC a request to amend the Lloyd Shoals project boundary. On May 22, 2018, FERC issued an Order Amending Project Boundary, approving Georgia Power's request and requiring the submission of a Revised Exhibit G. Georgia Power filed a Revised Exhibit G on December 20, 2018, and FERC issued an Order Approving Exhibit G on March 14, 2019. Exhibit G Sheet 1 filed with this license application intends to correct a drawing error Georgia Power inadvertently made on the December 20, 2018, Revised Exhibit G submission. The attached Figure 14 is one of 15 figures that were included in Georgia Power's 2017 license amendment request. The area outlined in red on Figure 14 totals 2.6 acres and was included in the total acreage and building encroachment removal count in FERC's 2018 Order Amending Project Boundary. However, Georgia Power's 2018 Revised Exhibit G was not updated properly and these acres remained within the project boundary on the Exhibit G maps approved by FERC on March 14, 2019. This mapping error is corrected on the proposed Exhibit G Sheet 1 and removal of the 2.6 acres outline in red on attached Figure 14 adheres to the 2018 FERC Order Amending Project Boundary.

b. Proposed Removal of 3.06 acres from the Project Boundary:

Exhibit G Sheet 1 filed with this license application includes removal of an additional acreage from the project boundary. The area shown outlined in blue on attached Figure 14 is the new 3.06 acres Georgia Power is proposing to remove from the project boundary; this acreage is contiguous with the previously removed property and includes the remaining property within the same parcels and the transmission easement up to the property boundary.

This land proposed for removal does not contain any rare, threatened or endangered species, public access or recreation, preserved natural areas or cultural resources being managed under the current or proposed license compliance plans and is not needed for project purposes. This change will allow Georgia Power to manage these parcels entirely outside the FERC project boundary. Removal of the 3.06 acres will allow Georgia Power to implement its Shoreline Management Program more efficiently consistent with the lands removed from the Project by FERC's 2018 Order Amending Project Boundary. The transmission lines within the transmission easement where land removal is proposed is not currently and has never been part of the FERC project.

2. On FERC Drawing Number 2336-67 (Exhibit G Sheet 6)

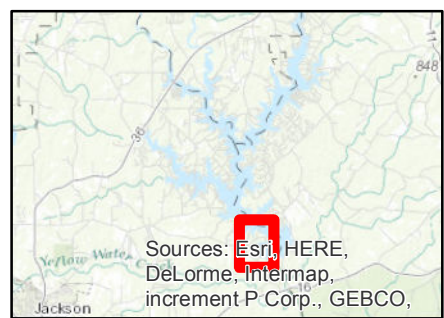
a. Georgia Power includes an addition of the Tussahaw Creek Public Recreation Area on Exhibit G Sheet 6. The increase in project area is approximately 3.0 acres.



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Image courtesy of USGS © 2017 Microsoft Corporation © 2010 NAVTEQ © AND



# Building Encroachments

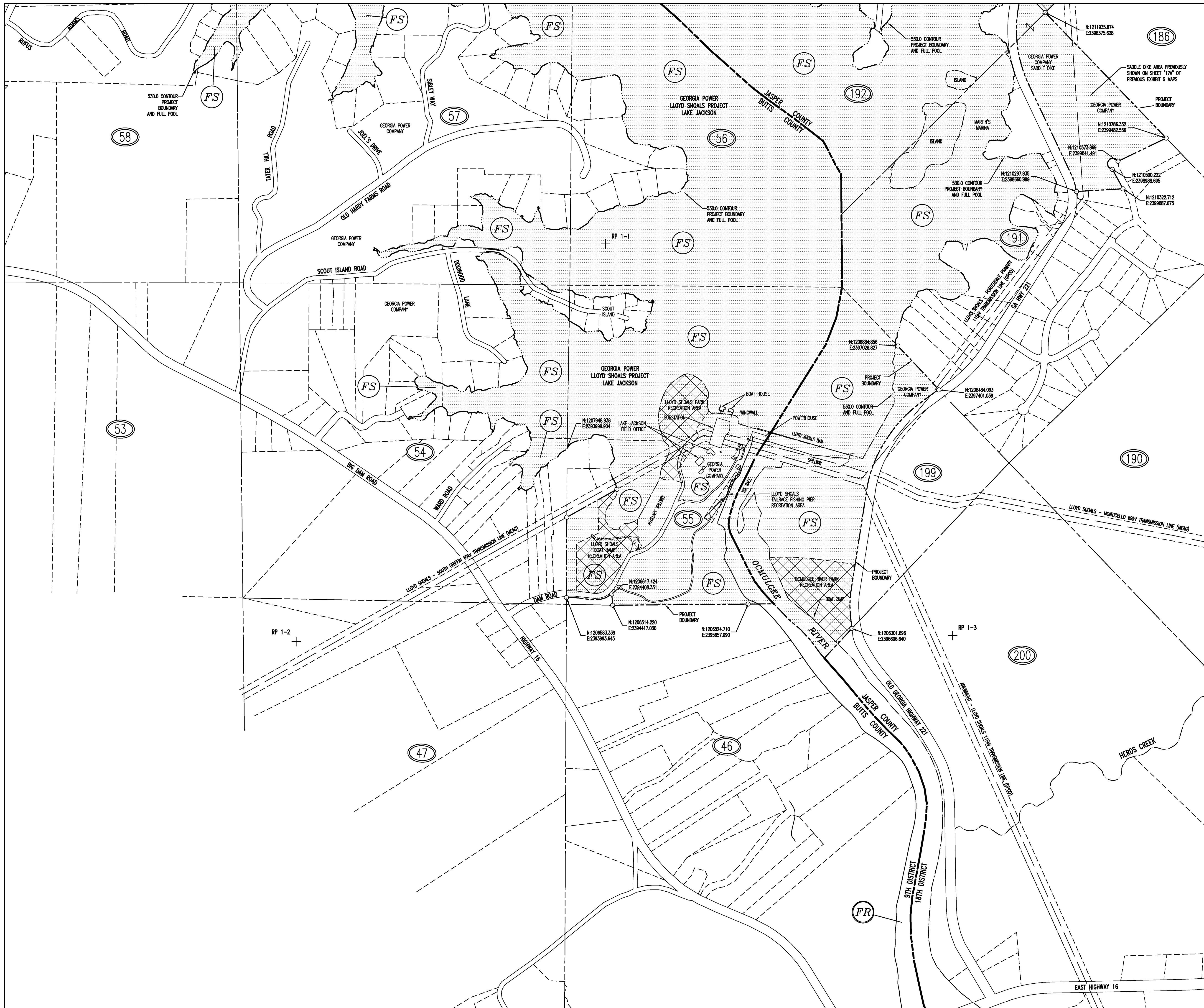
## Lake Jackson

**MAP NOT BASED ON SURVEY DATA  
LIDAR WAS FLOWN TO CAPTURE DOWN TO THE 525 CONTOUR**



- Building
- 530-545ft Contour

Projection  
 NAD, 1983 State Plane Georgia West  
 FIPS 1002 (US Feet)  
 Issued Date: 02/23/2017  
 Created By: Land TGIS



### LEGEND

GPC	GEORGIA POWER COMPANY	↔	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	⊂	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
- - -	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	⊂	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	⊂	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
①	LAND LOT NUMBER		
---	PAVED ROAD		

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN

GRAPHIC SCALE  
 400 0 200 400  
 1 INCH = 400 FEET

### SHEET INDEX

### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 1-1	1209818.74	2394351.60
RP 1-2	1206180.38	2391520.60
RP 1-3	1206236.42	2397528.17

### DECLINATION & CONVERGENCE

5°39' -0°10'33"

- ### NOTES AND REFERENCES:
- GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
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### SURVEYORS STATEMENT

I HEREBY STATE THAT THE PROJECT BOUNDARY DELINEATION FOR THE WALLACE DAM PROJECT AS SHOWN ON THIS EXHIBIT IS DEVELOPED WITHIN REASONABLE ACCURACIES AS REQUIRED IN TITLE 16, PART 4, SECTION 4.1. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES ARE BASED ON SURVEYS AND RECORDED SURVEYS AND DEEDS OF RECORD. THE CONTOUR LINES HAVE BEEN PROCESSED UTILIZING A COMBINATION OF FIELD SURVEY AND STEREOSCOPIC MODELING TECHNIQUES.

THESE EXHIBIT G MAPS ARE POSITIONALLY ACCURATE TO ±40 FEET AND COMPLY WITH NATIONAL MAP ACCURACY STANDARDS FOR MAPS AT 1:24,000 SCALE.

SURVEYOR: WILLIAM H. BECHTLER  
 241 RALPH MACCL. BLVD., NE  
 BLDG. - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

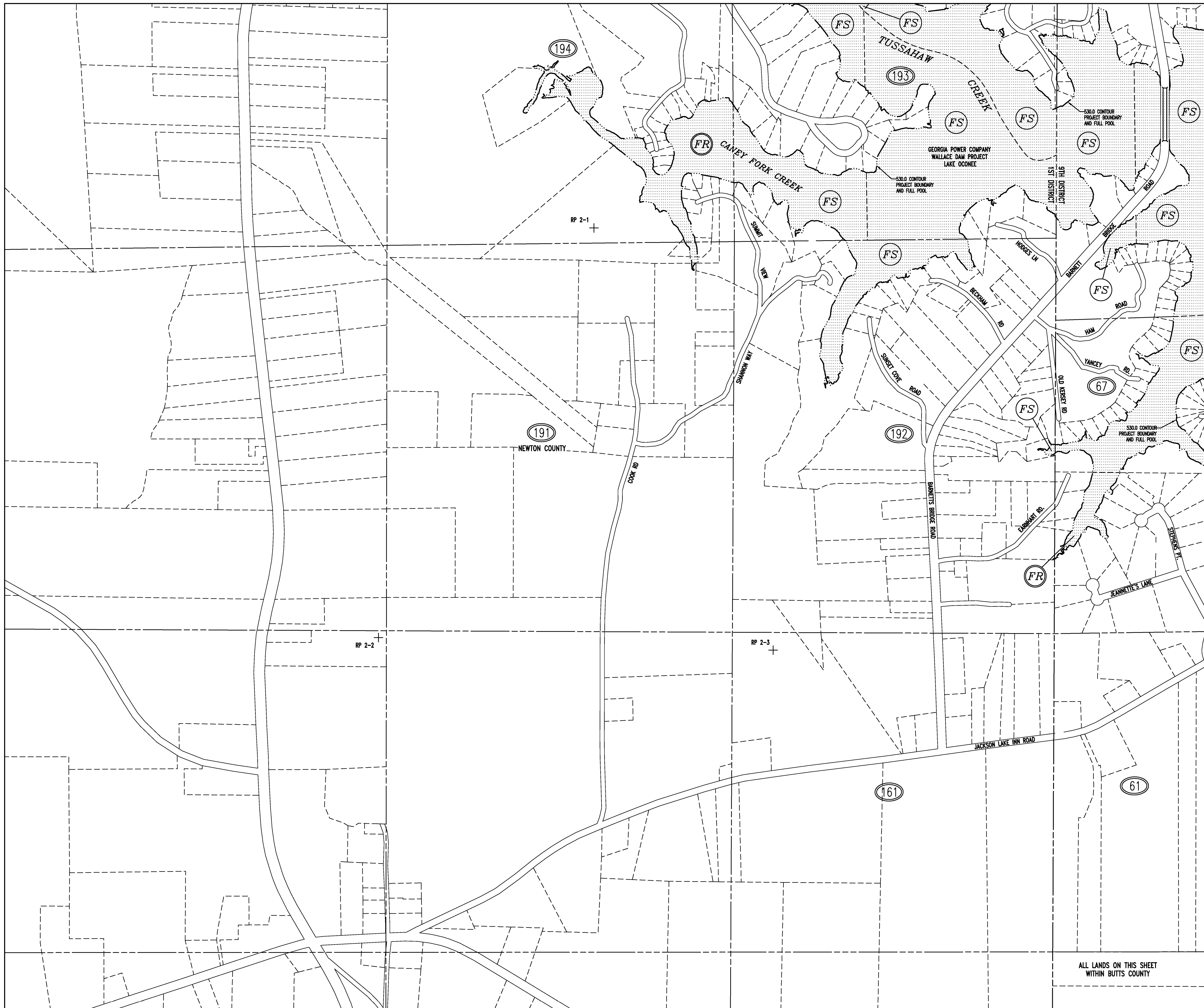
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**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 1 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB





### LEGEND

GPC	GEORGIA POWER COMPANY	↔	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	—	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
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---	PROPERTY LINE	□	GPC RECREATIONAL AREA
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GRAPHIC SCALE  
400 0 200 400  
1 INCH = 400 FEET

### SHEET INDEX

### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 2-1	1219164.31	2377946.95
RP 2-2	1215418.74	2375974.94
RP 2-3	1215303.19	2379586.72

### DECLINATION & CONVERGENCE

5°39' - 0°08'48"

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BIN - 10151  
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*William H. Bechtler* DATE 11-27-2021

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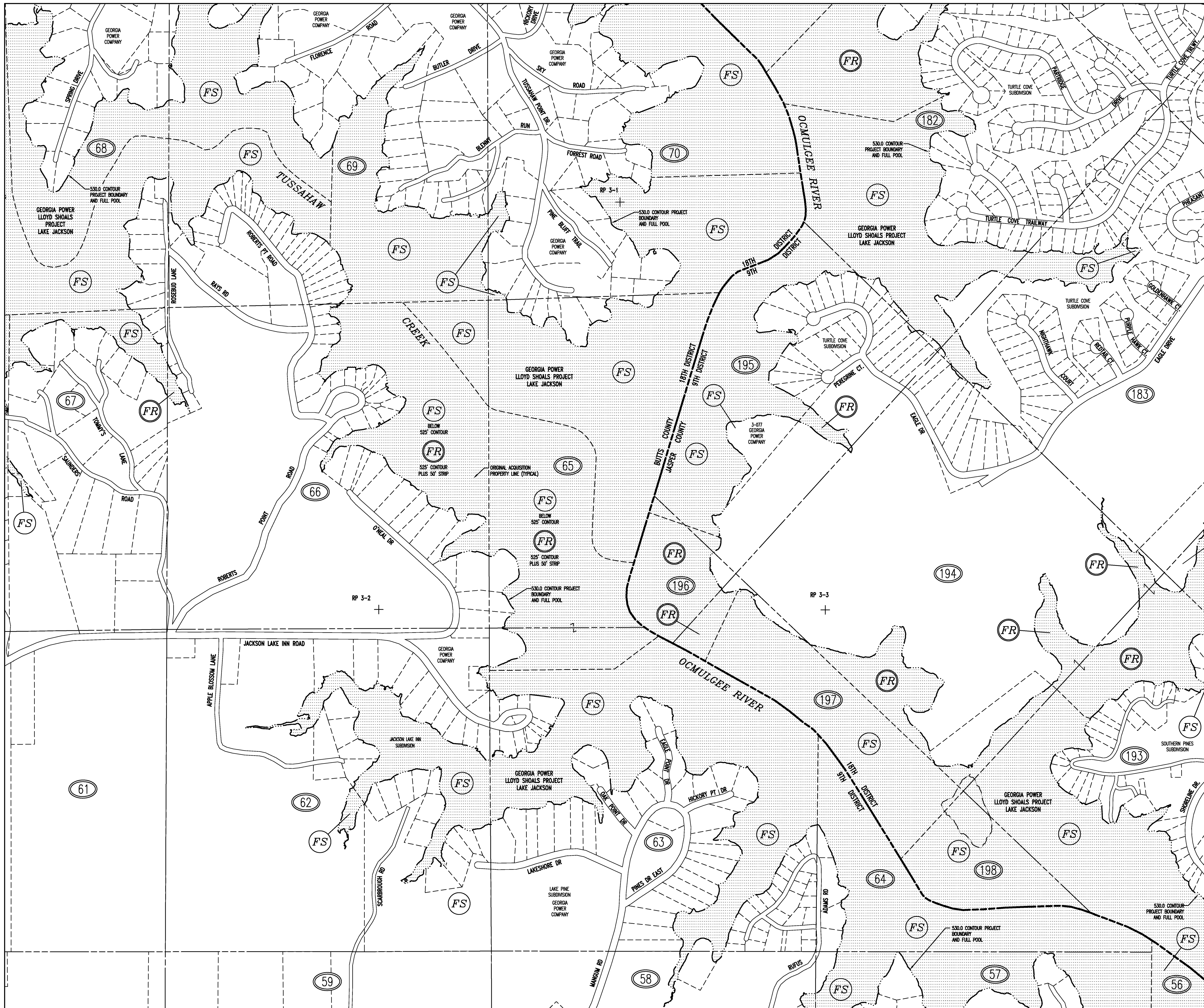
**GEORGIA POWER CO., ATLANTA, GA.**  
Land Department

**LLOYD SHOALS DAM - LAKE JACKSON**  
PROJECT BOUNDARY - EXHIBIT G MAPS  
SHEET 2 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB

ALL LANDS ON THIS SHEET WITHIN BUTTS COUNTY

FERC DRAWING NUMBER: P-2336-63      GPC MF#: P473



### LEGEND

GPC	GEORGIA POWER COMPANY	CONTIGUOUS TRACT & OWNERSHIP	
○	PROJECT BOUNDARY CORNER	GPC FEE SIMPLE PROPERTY LINE	
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
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GRAPHIC SCALE  
400 0 200 400  
1 INCH = 400 FEET

### SHEET INDEX

### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 3-1	1219400.40	2389185.84
RP 3-2	1215675.30	2386977.48
RP 3-3	1215672.07	2391063.48

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PHONE (404) 506-2450

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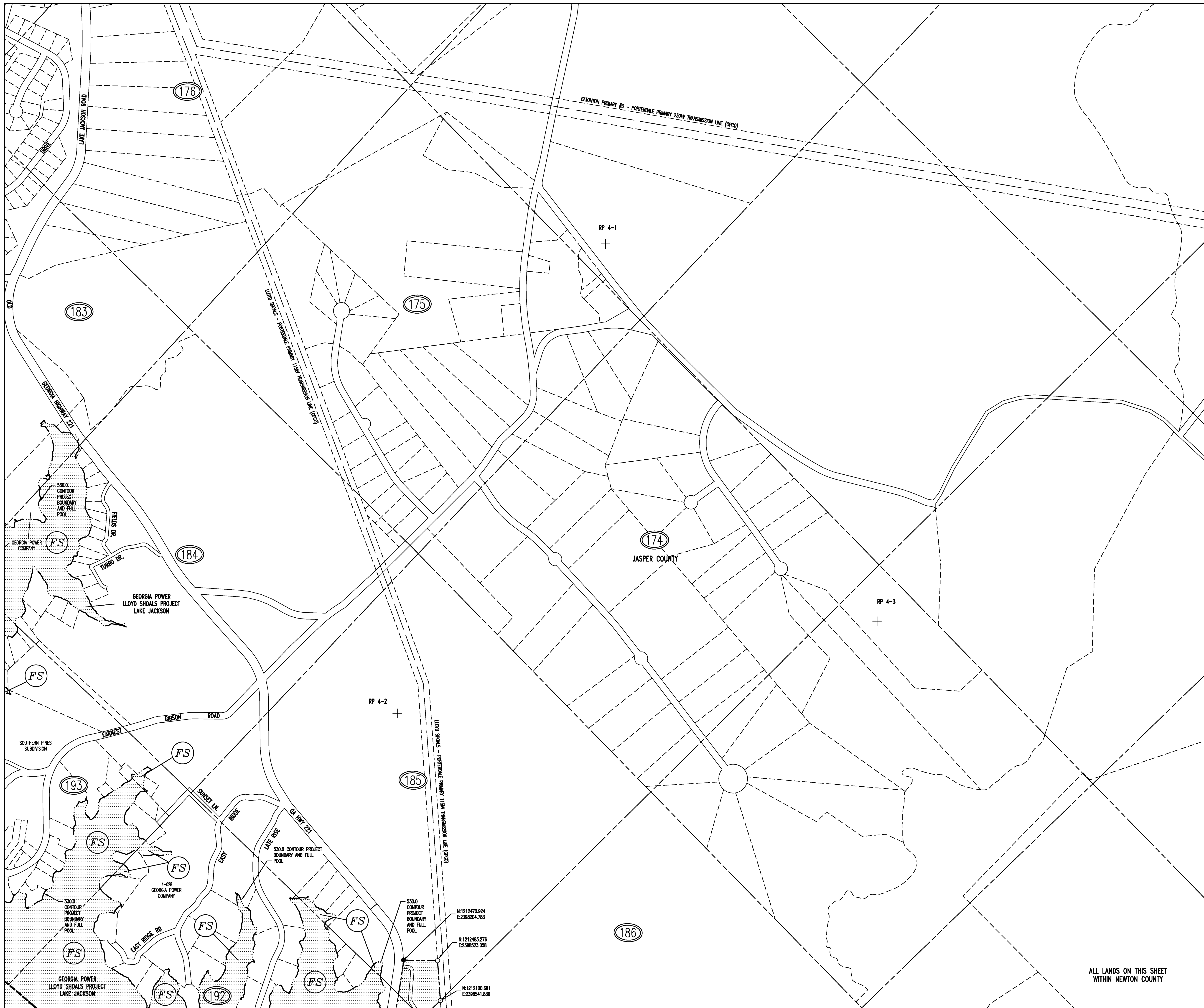
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## GEORGIA POWER CO., ATLANTA, GA. Land Department

### LLOYD SHOALS DAM - LAKE JACKSON PROJECT BOUNDARY - EXHIBIT G MAPS

SHEET 3 of 17

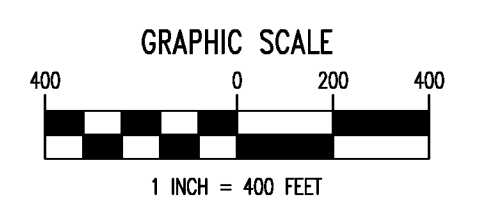
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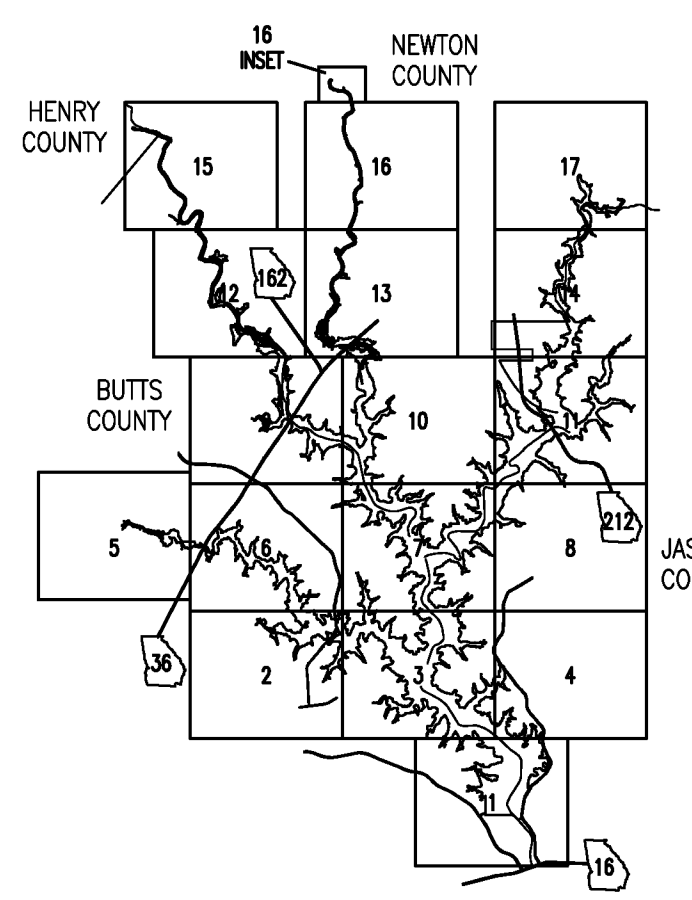
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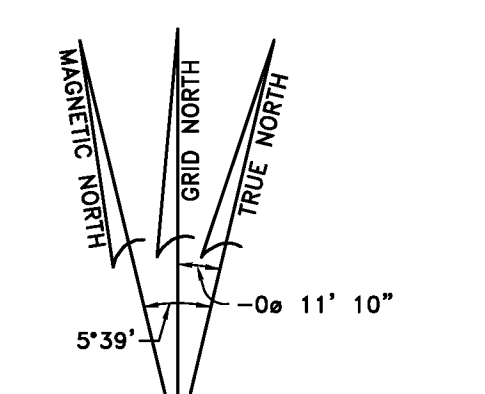
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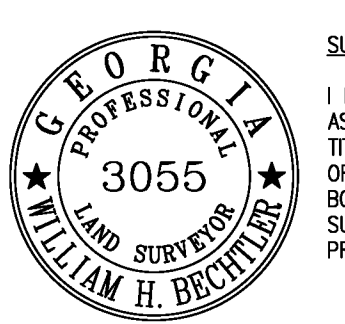
### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 4-1	1219018.74	2400053.40
RP 4-2	1214727.27	2398147.38
RP 4-3	1215569.16	2402537.42

### DECLINATION & CONVERGENCE



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 241 RALPH MACCL BLVD, NE  
 SUITE 10151  
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 PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

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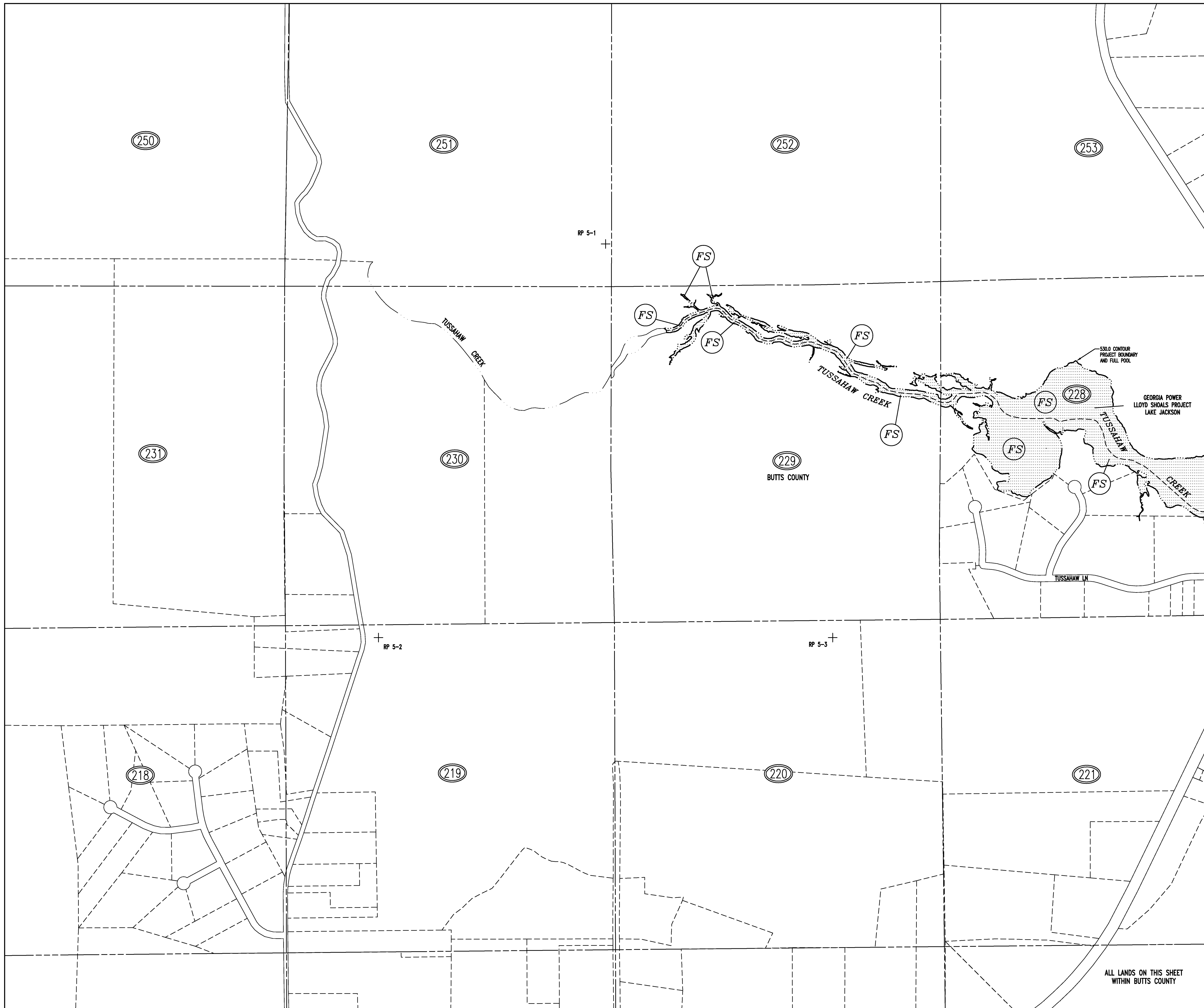
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**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 4 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB

FERC DRAWING NUMBER: P-2336-65 GPC MF#: P473

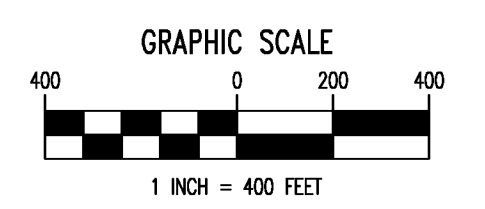
ALL LANDS ON THIS SHEET WITHIN NEWTON COUNTY



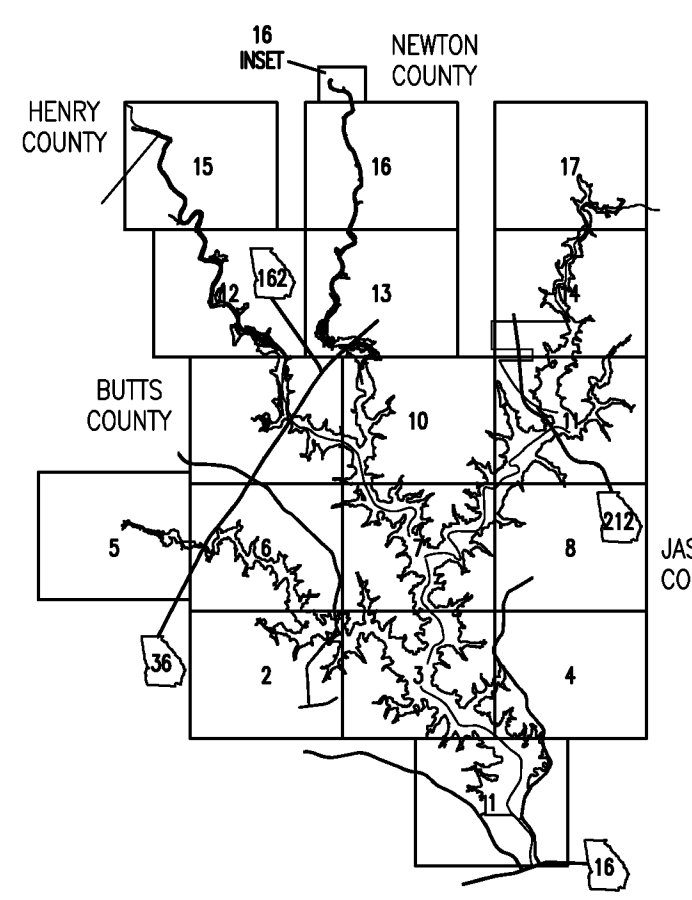
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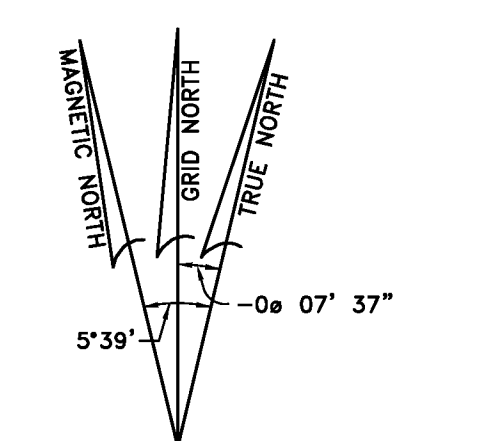
### SHEET INDEX



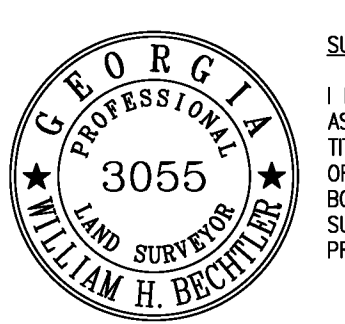
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NAME	NORTHING	EASTING
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RP 5-2	1224618.74	2364974.94
RP 5-3	1224618.74	2369131.86

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 William H. Bechtler DATE 11-27-2021

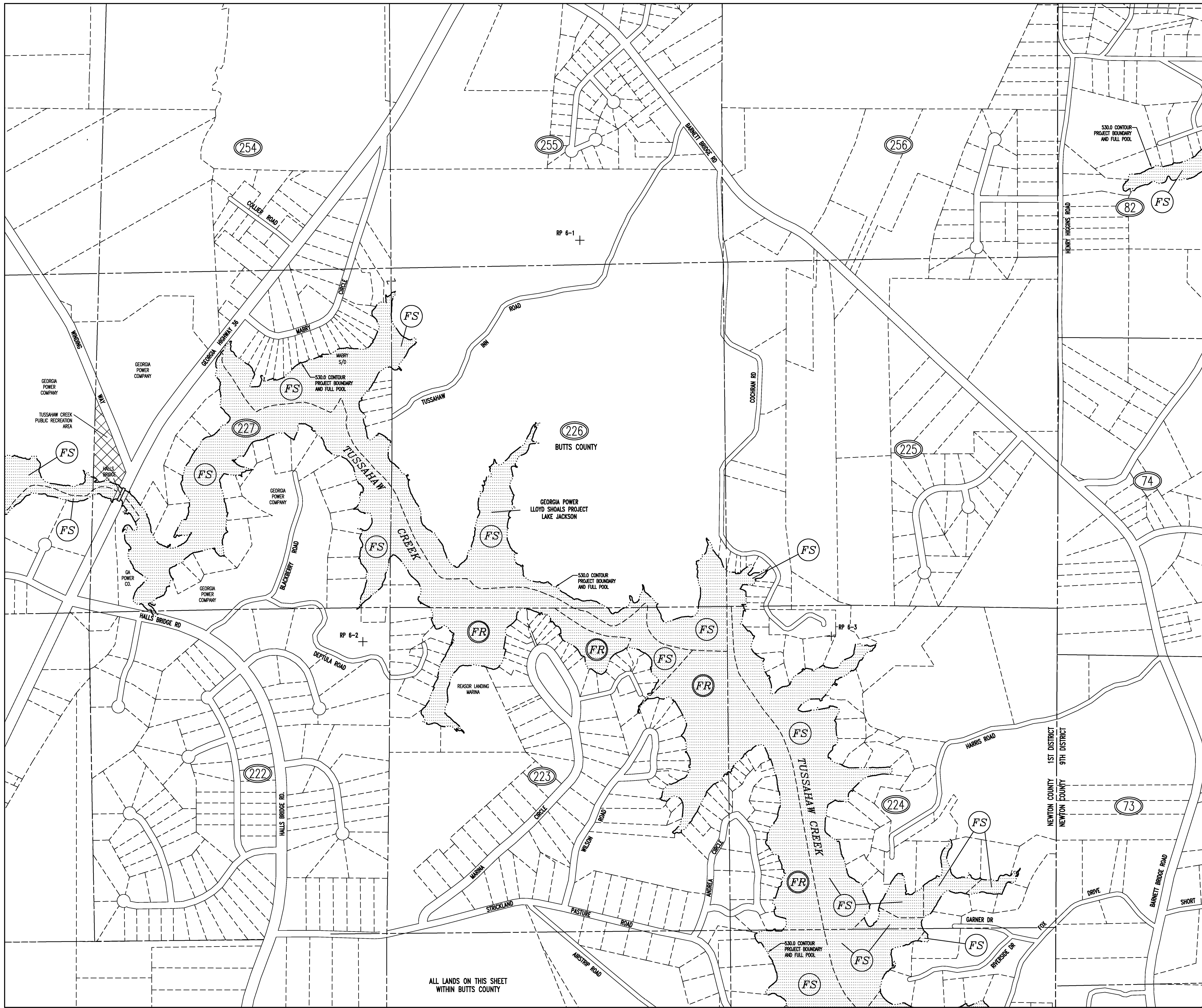
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**GEORGIA POWER CO., ATLANTA, GA.**  
 Land Department

**LLOYD SHOALS DAM - LAKE JACKSON**  
 PROJECT BOUNDARY - EXHIBIT G MAPS  
 SHEET 5 of 17

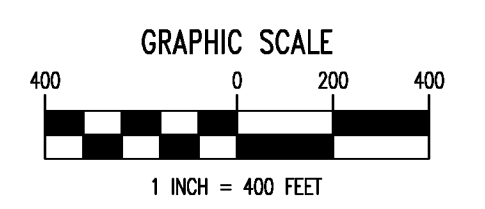
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1" = 400'	11/21/2021	WHB	WHB

FERC DRAWING NUMBER: P-2336-66 GPC MF#: P473



### LEGEND

GPC	GEORGIA POWER COMPANY	↔	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	⊘	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	▨	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	▩	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
①	LAND LOT NUMBER		
---	PAVED ROAD		

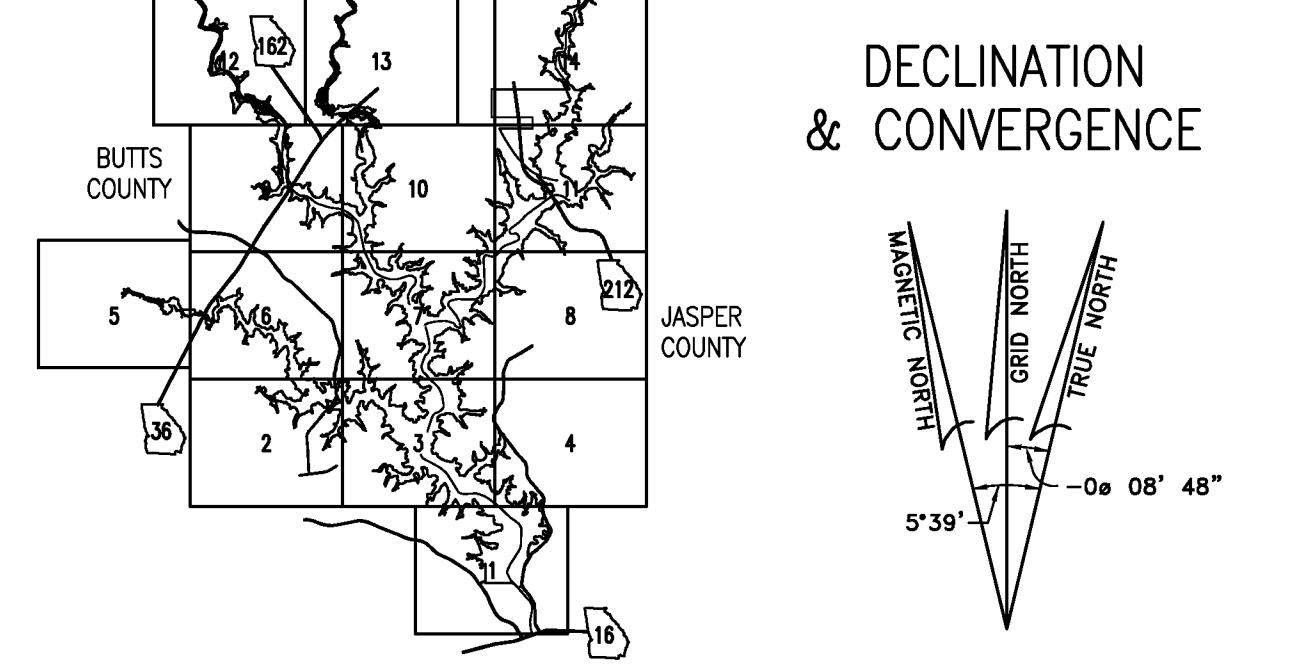


WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN

### SHEET INDEX

### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 6-1	1228248.09	2377826.47
RP 6-2	1224568.92	2375837.00
RP 6-3	1224618.74	2380131.86



- ### NOTES AND REFERENCES:
- GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
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### SURVEYOR'S STATEMENT

I HEREBY STATE THAT THE PROJECT BOUNDARY DELINEATION FOR THE WALLACE DAM PROJECT AS SHOWN ON THIS EXHIBIT IS DEVELOPED WITH REASONABLE ACCURACIES AS REQUIRED IN TITLE 16, PART 4, SECTION 4.39 AND SECTION 4.41. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES ARE BASED ON SURVEYS AND RECORDED SURVEYS AND DEEDS OF RECORD. THE CONTOUR LINES HAVE BEEN PROCESSED UTILIZING A COMBINATION OF FIELD SURVEY AND STEREOSCOPIC MODELING TECHNIQUES.

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SURVEYOR: WILLIAM H. BECHTLER  
 241 RALPH MACILL BLVD, NE  
 APT. 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

*William H. Bechtler*  
 DATE 11-27-2021

DRAWING FILE PATH: T:\Working2\landmg(Lake Jackson)\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping

## GEORGIA POWER CO., ATLANTA, GA.

### Land Department

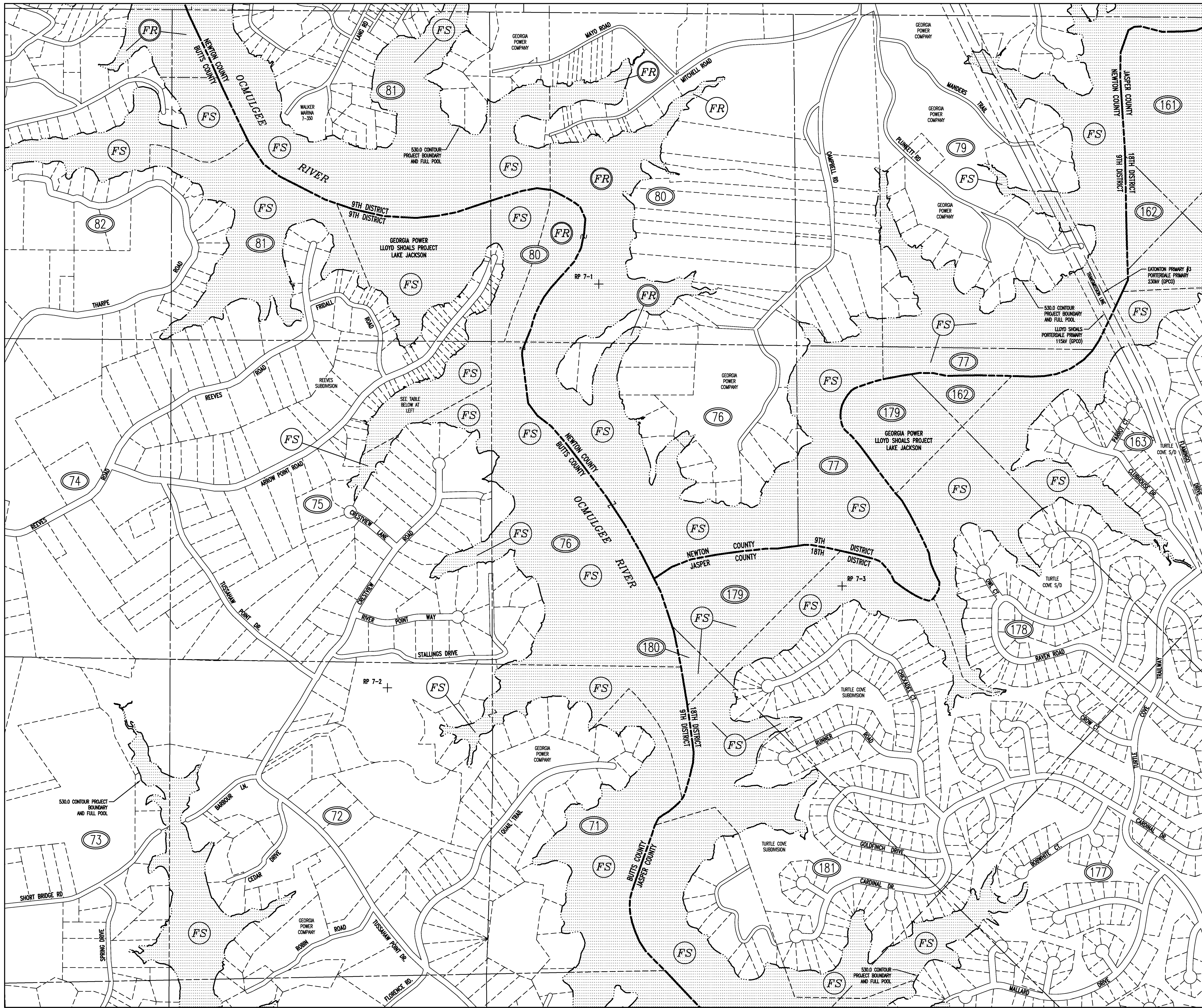
# LLOYD SHOALS DAM - LAKE JACKSON

## PROJECT BOUNDARY - EXHIBIT G MAPS

SHEET 6 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB

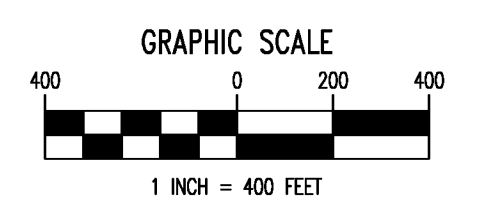
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WITHIN BUTTS COUNTY



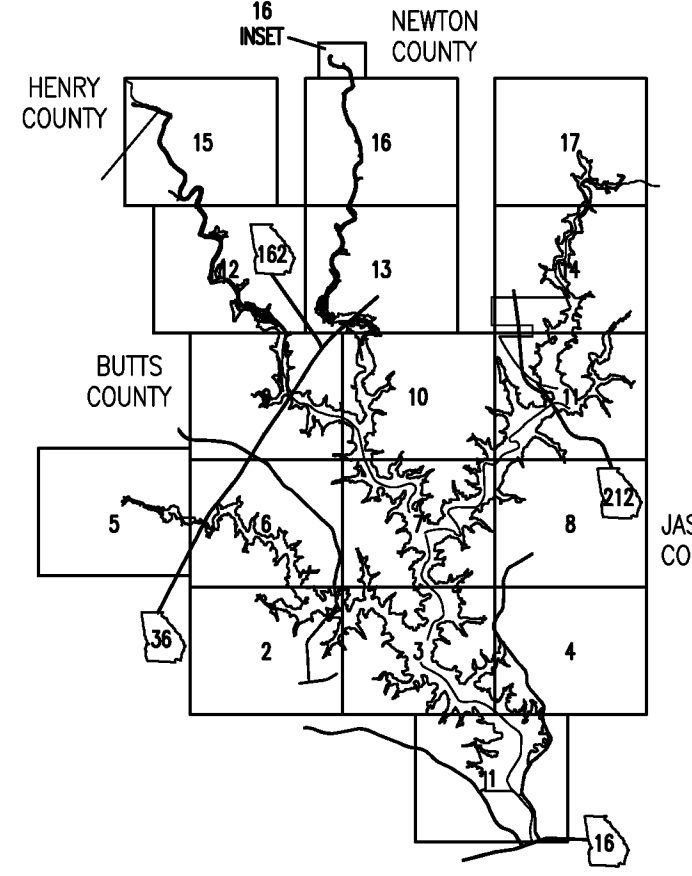
**LEGEND**

- GPC GEORGIA POWER COMPANY
- PROJECT BOUNDARY CORNER
- FULL POOL (530' CONTOUR)
- FULL POOL PROJECT BOUNDARY
- OTHER PROJECT BOUNDARY
- PROPERTY LINE
- ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)
- + REFERENCE POINT
- N/F NOW OR FORMERLY
- LAND LOT LINE
- LAND LOT NUMBER
- PAVED ROAD
- CONTIGUOUS TRACT & OWNERSHIP
- GPC FEE SIMPLE PROPERTY LINE
- FS GPC FEE SIMPLE PROPERTY
- FR GPC FLOOD RIGHTS
- GPC LANDS WITHIN PROJECT BOUNDARY
- GPC RECREATIONAL AREA

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN



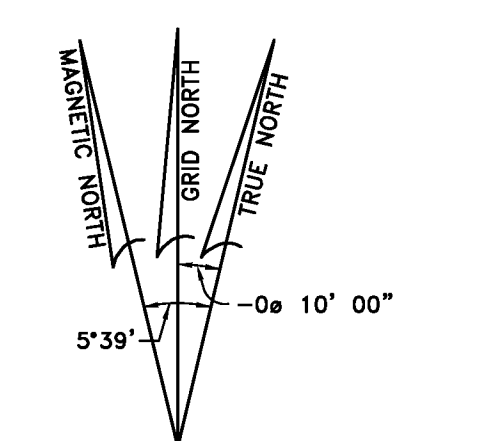
**SHEET INDEX**



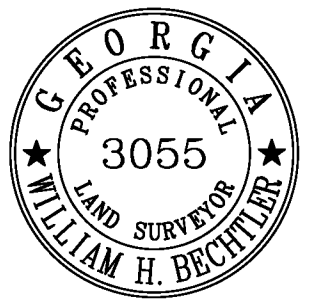
**REFERENCE POINTS**

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RP 7-1	1227846.47	2388899.70
RP 7-2	1224148.08	2387062.53
RP 7-3	1225079.23	2391230.61

**DECLINATION & CONVERGENCE**



- NOTES AND REFERENCES:**
- GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
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**SURVEYOR'S STATEMENT**

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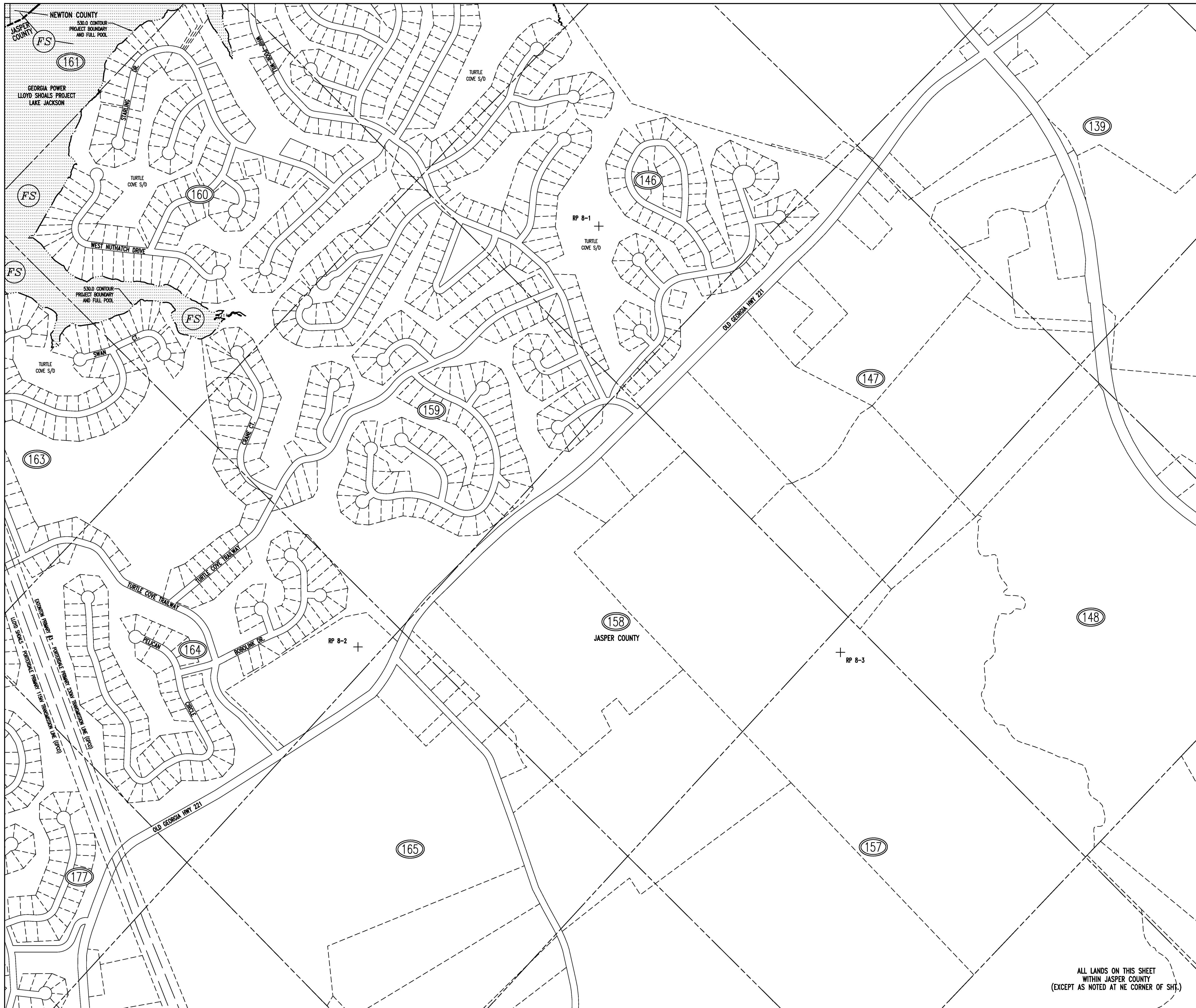
SURVEYOR: WILLIAM H. BECHTLER  
241 RALPH MACCL. BLVD., NE  
BIN - 10151  
ATLANTA, GA. 30308-3374  
PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

DRAWING FILE PATH: T:\Working\landmgp\Lake Jackson\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping  
**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
SHEET 7 of 17

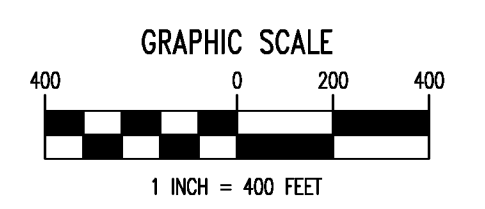
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1" = 400'	11/21/2021	WHB	WHB



### LEGEND

GPC	GEORGIA POWER COMPANY	↔	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	—	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	■	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	▨	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
○	LAND LOT LINE		
○	LAND LOT NUMBER		
—	PAVED ROAD		

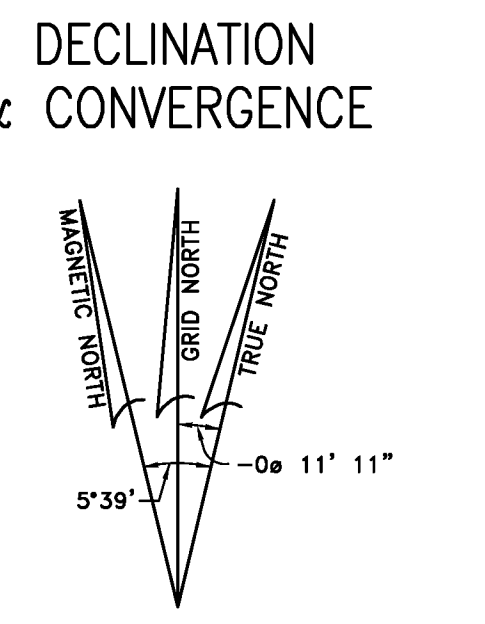
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### SHEET INDEX

### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 8-1	1228381.19	2399990.47
RP 8-2	1224532.64	2397786.95
RP 8-3	1224483.29	2402201.97



- NOTES AND REFERENCES:
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**GEORGIA PROFESSIONAL LAND SURVEYORS**  
 3055  
 WILLIAM H. BECHTLER

SURVEYOR: WILLIAM H. BECHTLER  
 241 RALPH MACCL BLVD, NE  
 BIN - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

DATE 11-27-2021

Signature: *William H. Bechtler*

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**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 8 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
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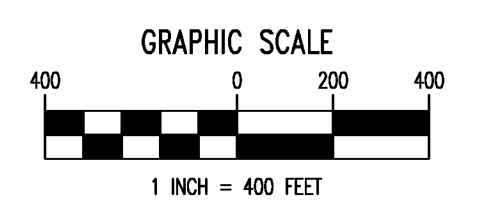
ALL LANDS ON THIS SHEET  
 WITHIN JASPER COUNTY  
 (EXCEPT AS NOTED AT NE CORNER OF SH.)



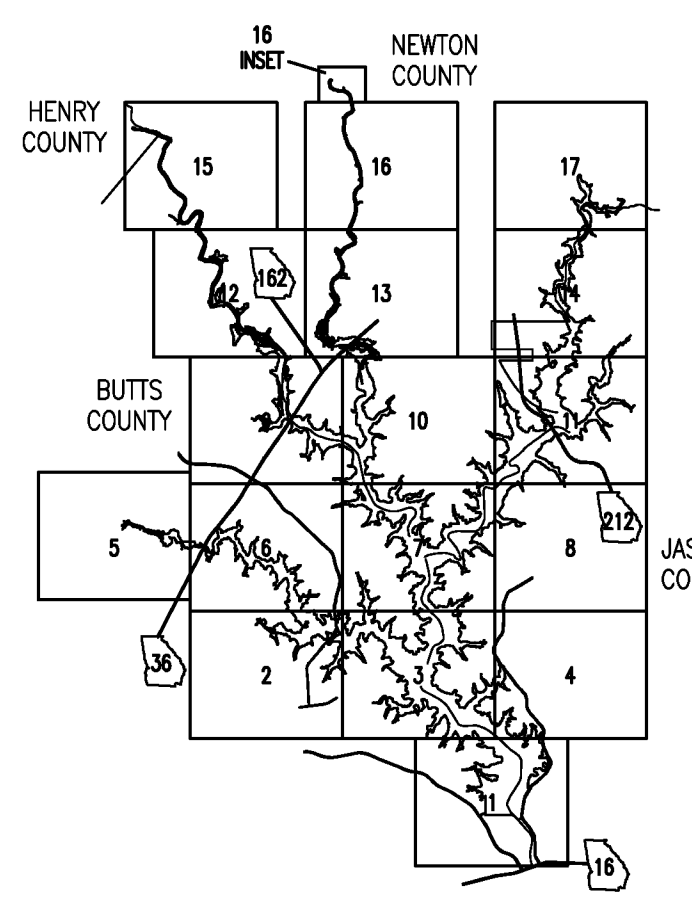
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GPC	GEORGIA POWER COMPANY	CONTIGUOUS TRACT & OWNERSHIP	
○	PROJECT BOUNDARY CORNER	GPC FEE SIMPLE PROPERTY LINE	
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
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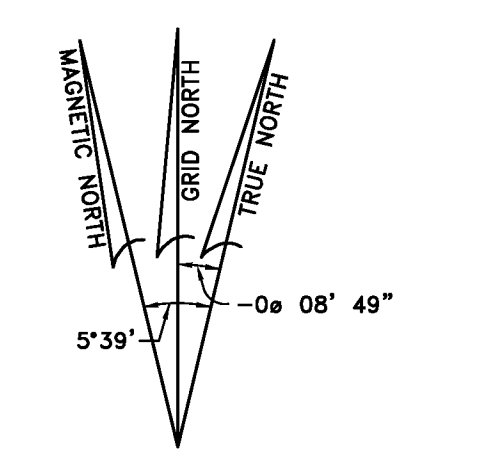
### SHEET INDEX



### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 9-1	1238182.40	2380091.37
RP 9-2	1233481.12	2375486.03
RP 9-3	1231673.32	2381189.80

### DECLINATION & CONVERGENCE



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 241 RALPH MACCL BLVD, NE  
 BIN - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

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## GEORGIA POWER CO., ATLANTA, GA. Land Department

### LLOYD SHOALS DAM - LAKE JACKSON PROJECT BOUNDARY - EXHIBIT G MAPS SHEET 9 of 17

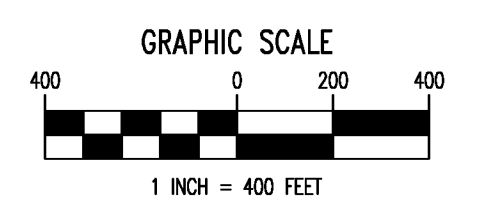
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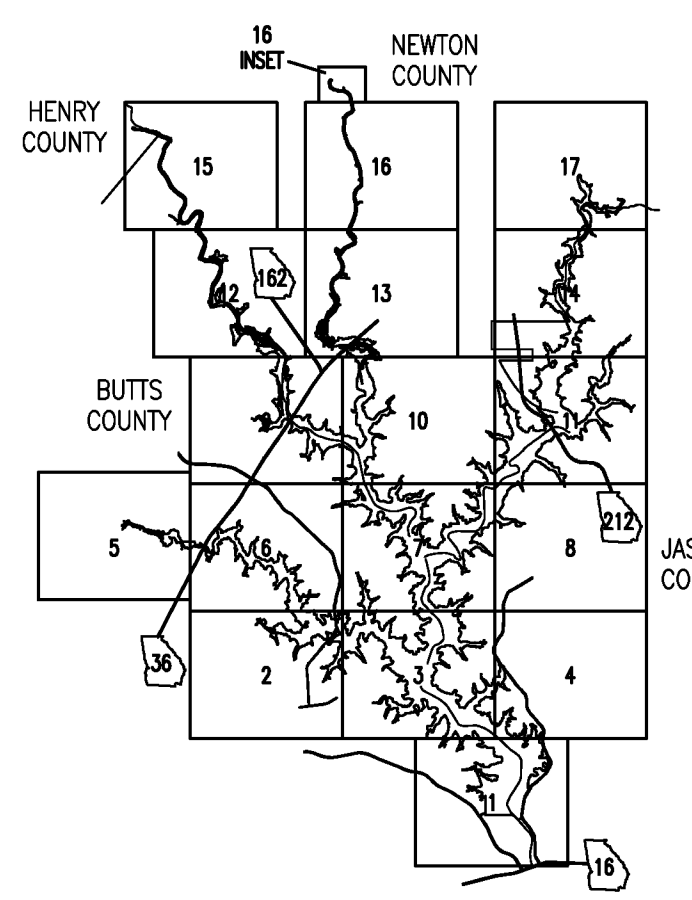


### LEGEND

GPC	GEORGIA POWER COMPANY	→	CONTIGUOUS TRACT & OWNERSHIP
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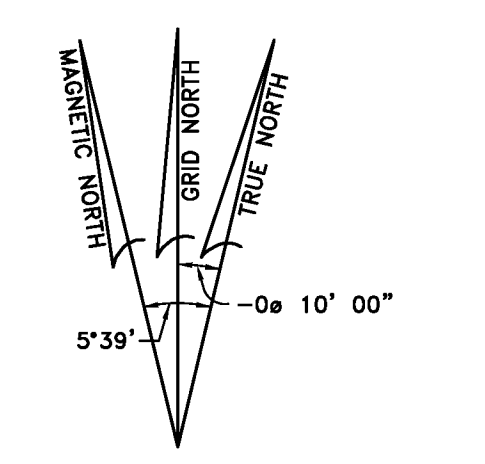
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### REFERENCE POINTS

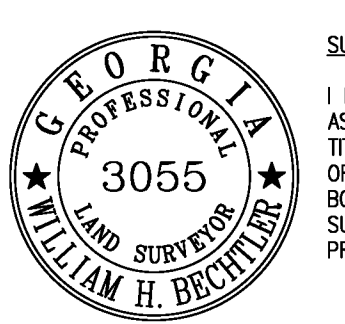
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RP 10-1	1237413.41	2389882.35
RP 10-2	1233866.86	2387421.80
RP 10-3	1233689.97	2391135.39

### DECLINATION & CONVERGENCE



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*William H. Bechtler* DATE 11-27-2021

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## GEORGIA POWER CO., ATLANTA, GA. Land Department

### LLOYD SHOALS DAM - LAKE JACKSON PROJECT BOUNDARY - EXHIBIT G MAPS SHEET 10 of 17

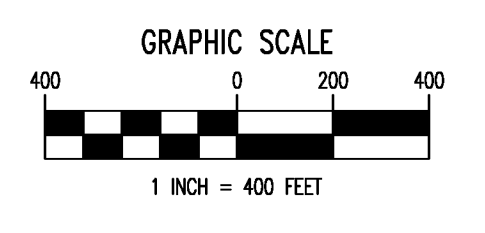
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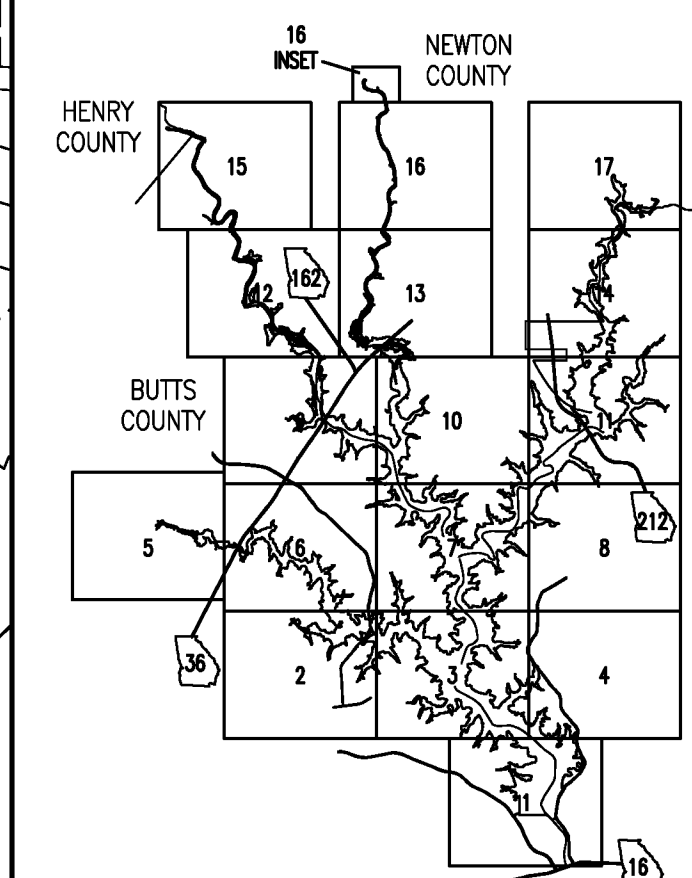
**LEGEND**

- GPC GEORGIA POWER COMPANY
- PROJECT BOUNDARY CORNER
- - - FULL POOL (530' CONTOUR)
- - - FULL POOL PROJECT BOUNDARY
- - - OTHER PROJECT BOUNDARY
- - - PROPERTY LINE
- - - ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)
- + REFERENCE POINT
- N/F NOW OR FORMERLY
- - - LAND LOT LINE
- LAND LOT NUMBER
- - - PAVED ROAD
- ↔ CONTIGUOUS TRACT & OWNERSHIP
- FL GPC FEE SIMPLE PROPERTY LINE
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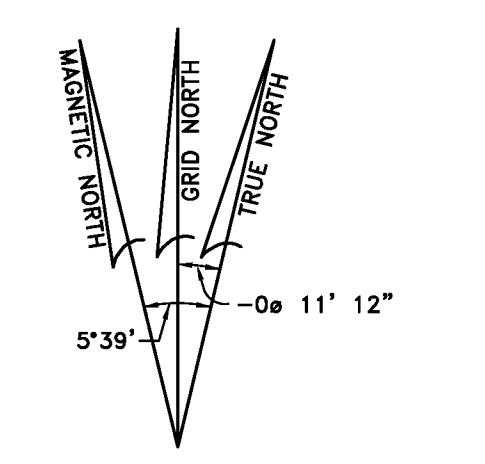
**SHEET INDEX**



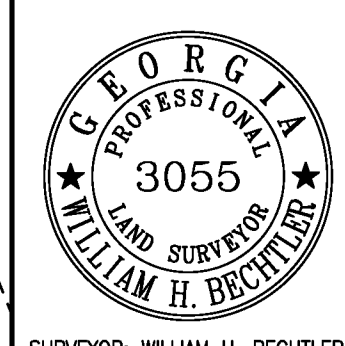
**REFERENCE POINTS**

NAME	NORTHING	EASTING
RP 11-1	1237418.74	2400053.40
RP 11-2	1233794.77	2397010.38
RP 11-3	1233818.74	2402131.86

**DECLINATION & CONVERGENCE**



- NOTES AND REFERENCES:**
- GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
  - GPC LLOYD SHOALS PROJECT - PROJECT (EXHIBIT G) MAPS (GPC MAP FILE NO. L518).
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    - NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88) EQUALS LLOYD SHOALS DAM VERTICAL DATUM MINUS 0.45 FEET.
    - DISTANCE UNITS ARE THE U.S. SURVEY FOOT.



**SURVEYORS STATEMENT**  
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 SURVEYOR: WILLIAM H. BECHTLER  
 241 RALPH MACCL BLVD, NE  
 BLDG - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450  
*William H. Bechtler* DATE 11-27-2021

DRAWING FILE PATH: T:\Working2\landmg(Lake Jackson)\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping

**GEORGIA POWER CO., ATLANTA, GA.  
 Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON  
 PROJECT BOUNDARY - EXHIBIT G MAPS  
 SHEET 11 of 17**

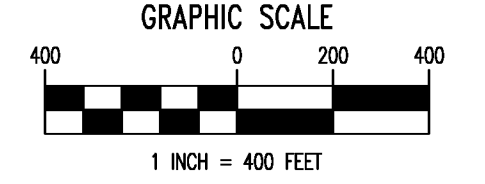
SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB



**LEGEND**

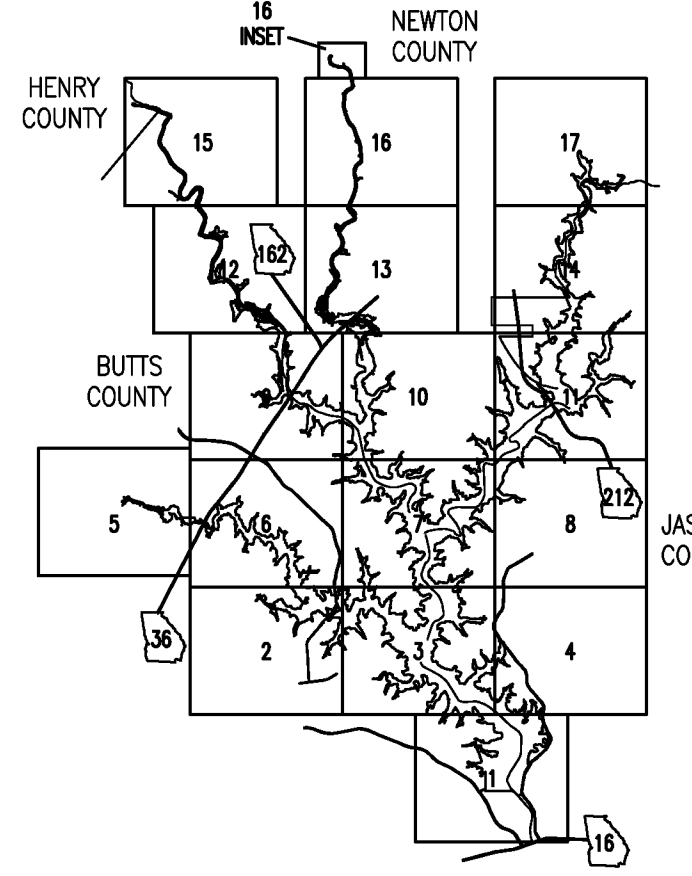
- GPC GEORGIA POWER COMPANY
- PROJECT BOUNDARY CORNER
- FULL POOL (530' CONTOUR)
- FULL POOL PROJECT BOUNDARY
- OTHER PROJECT BOUNDARY
- PROPERTY LINE
- ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)
- + REFERENCE POINT
- N/F NOW OR FORMERLY
- LAND LOT LINE
- LAND LOT NUMBER
- PAVED ROAD
- CONTIGUOUS TRACT & OWNERSHIP
- GPC FEE SIMPLE PROPERTY LINE
- FS GPC FEE SIMPLE PROPERTY
- FR GPC FLOOD RIGHTS
- GPC LANDS WITHIN PROJECT BOUNDARY
- GPC RECREATIONAL AREA

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN



GRID NORTH - NAD83 (2011) GEORGIA EAST ZONE

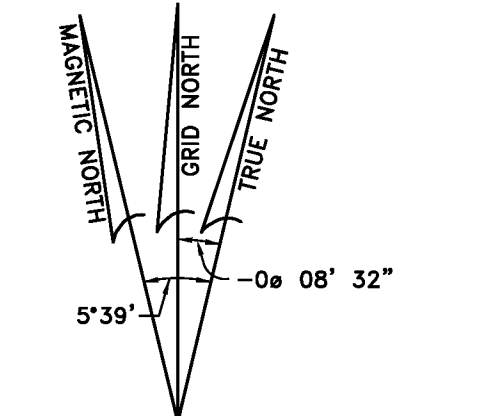
**SHEET INDEX**



**REFERENCE POINTS**

NAME	NORTHING	EASTING
RP 12-1	1246618.74	2375386.89
RP 12-2	1242074.19	2371846.53
RP 12-3	1242613.99	2378097.51

**DECLINATION & CONVERGENCE**



**NOTES AND REFERENCES:**

1. GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
2. GPC LLOYD SHOALS PROJECT - PROJECT (EXHIBIT G) MAPS (GPC MAP FILE NO. L518).
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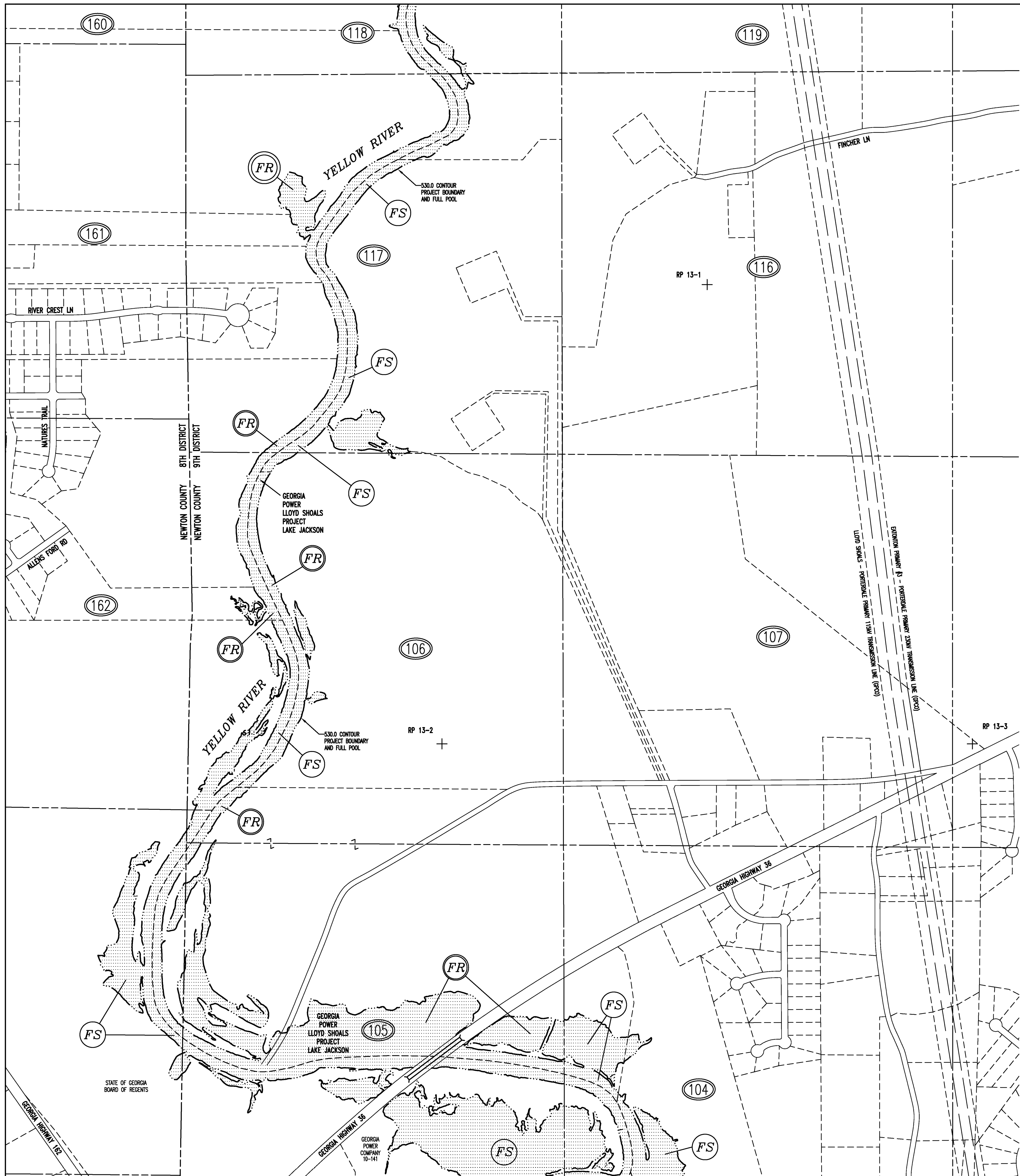
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 Surveyor: *William H. Bechtel* DATE 11-27-2021

DRAWING FILE PATH: T:\Working2\landmgf\Lake Jackson\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping

**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 12 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB

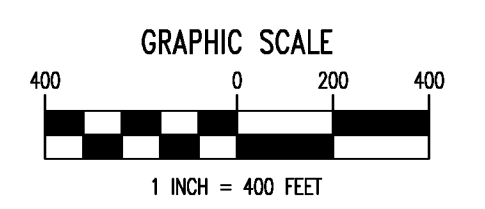


ALL LANDS ON THIS SHEET WITHIN NEWTON COUNTY

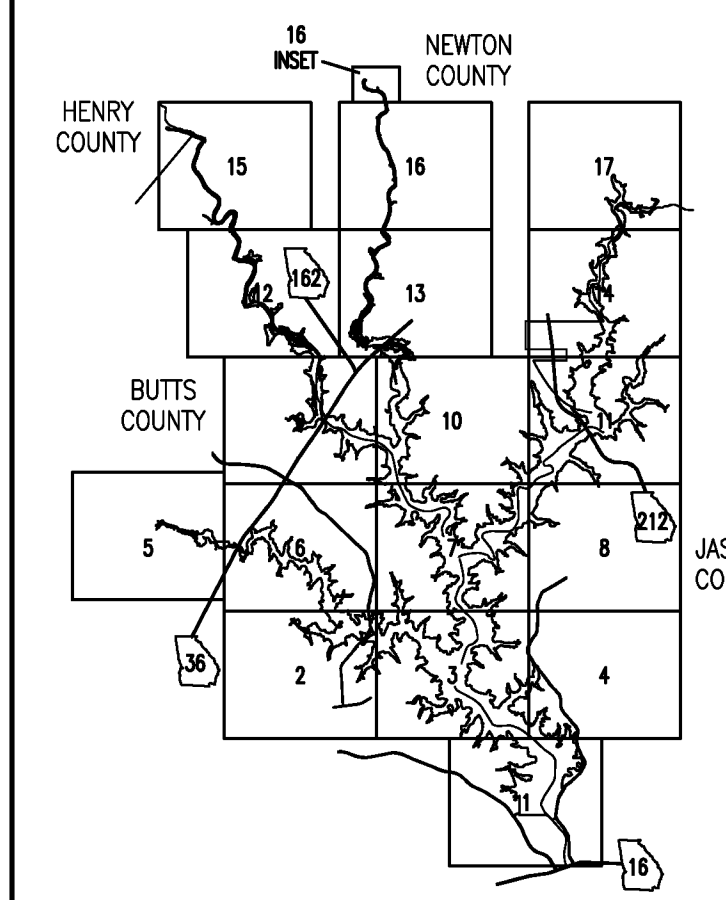
**LEGEND**

GPC	GEORGIA POWER COMPANY	→	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	—	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	■	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	▨	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
①	LAND LOT NUMBER		
---	PAVED ROAD		

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN



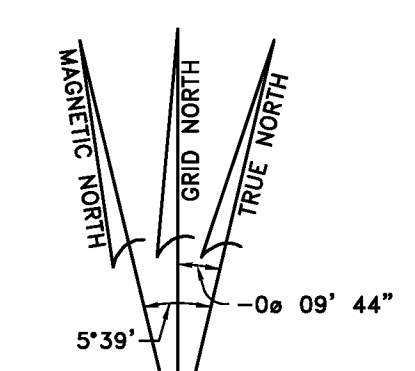
**SHEET INDEX**



**REFERENCE POINTS**

NAME	NORTHING	EASTING
RP 13-1	1246618.74	2386386.89
RP 13-2	1243018.74	2384308.43
RP 13-3	1243018.74	2388465.36

**DECLINATION & CONVERGENCE**



**NOTES AND REFERENCES:**

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SURVEYOR: WILLIAM H. BECHTEL  
 241 RALPH MACCL. BLVD. NE  
 BLDG - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

*William H. Bechtel* DATE 11-27-2021

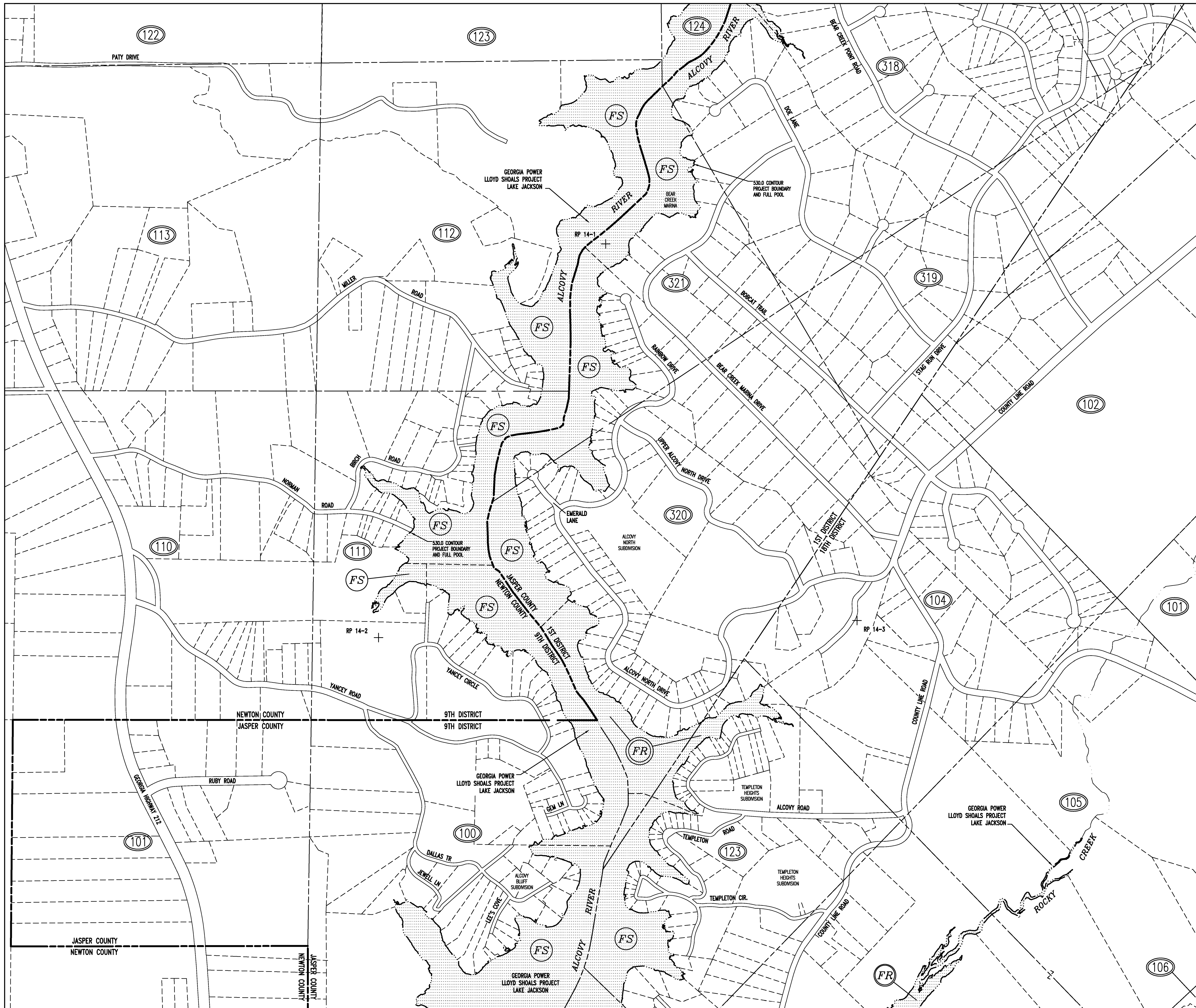
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**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 13 of 17

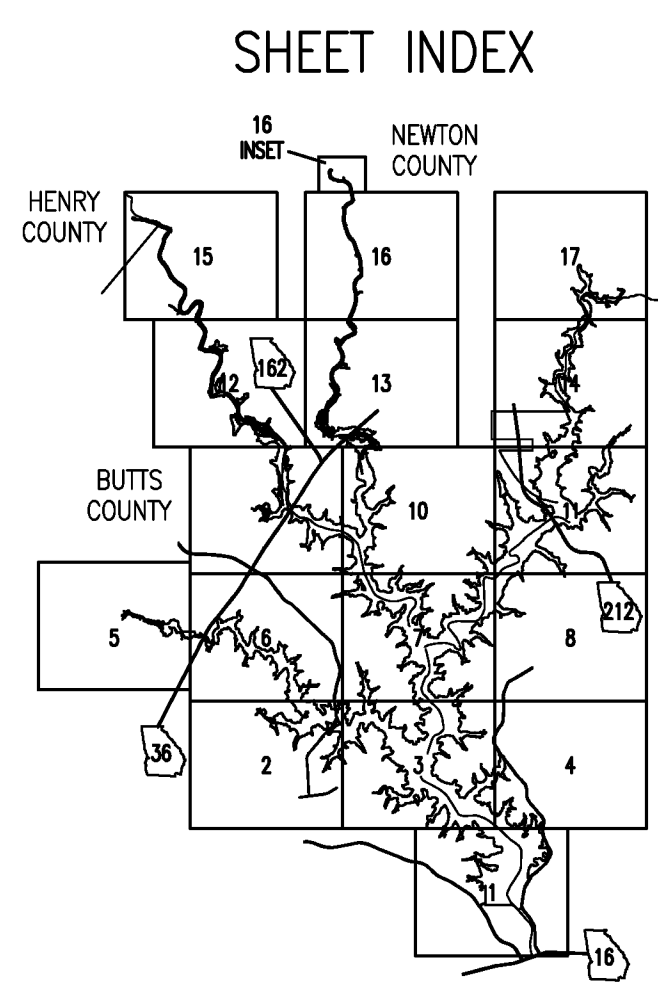
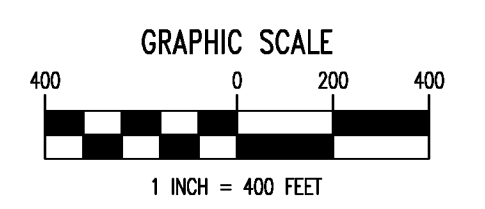
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FERC DRAWING NUMBER: P-2336-74 GPC MF#: P473



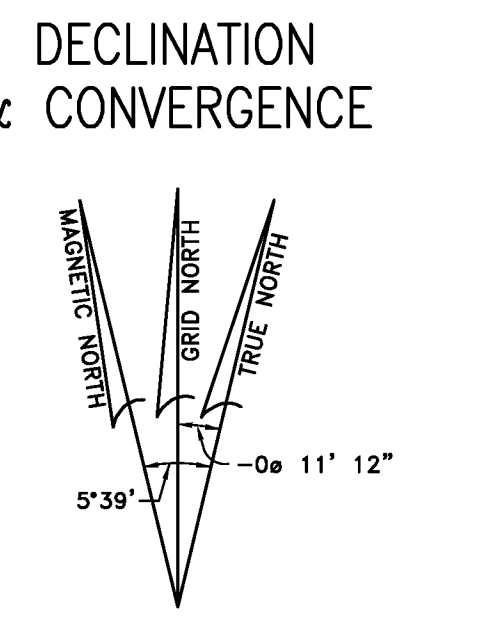
### LEGEND

GPC	GEORGIA POWER COMPANY	CONTIGUOUS TRACT & OWNERSHIP	
○	PROJECT BOUNDARY CORNER	GPC FEE SIMPLE PROPERTY LINE	
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	□	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	□	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
○	LAND LOT NUMBER		
---	PAVED ROAD		



### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 14-1	1246618.74	2400053.40
RP 14-2	1243018.74	2397974.94
RP 14-3	1243174.98	2402353.03



- ### NOTES AND REFERENCES:
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SURVEYOR: WILLIAM H. BECHTLER  
 241 RALPH MACCL BLVD, NE  
 BIN - 10151  
 ATLANTA, GA. 30308-3374  
 PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

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**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

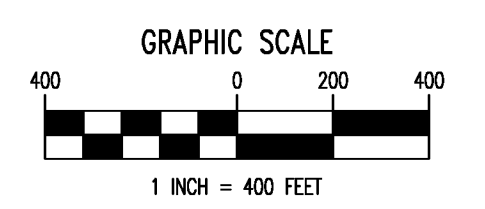
**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 14 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
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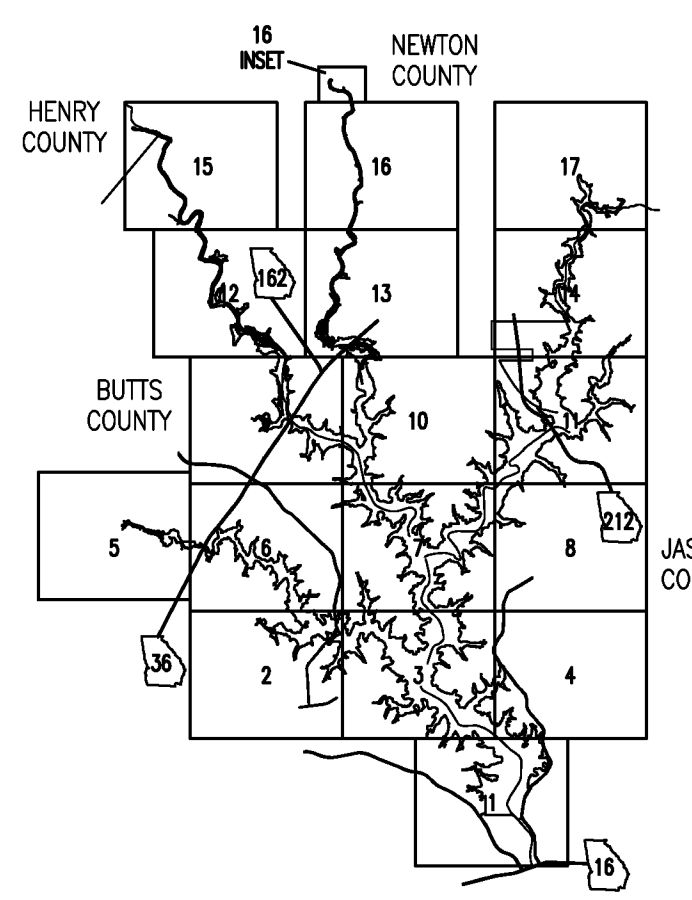


### LEGEND

GPC	GEORGIA POWER COMPANY	↔	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	⊘	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	⊞	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	⊞	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
①	LAND LOT NUMBER		
---	PAVED ROAD		



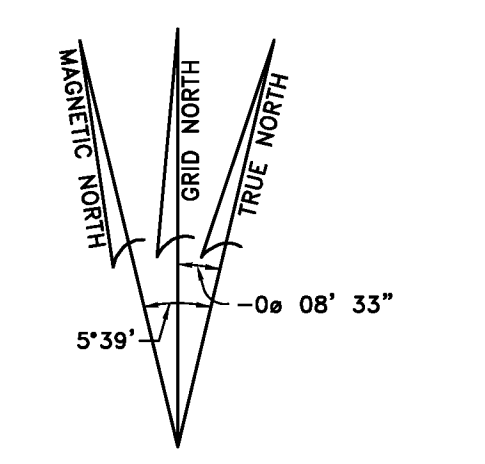
### SHEET INDEX



### REFERENCE POINTS

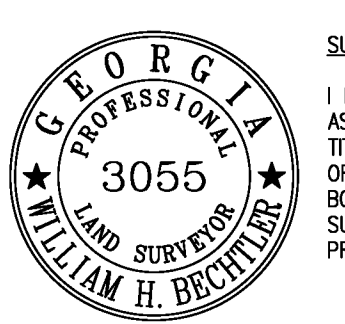
NAME	NORTHING	EASTING
RP 15-1	1255577.50	2374823.60
RP 15-2	1252218.74	2373308.43
RP 15-3	1252218.74	2377465.36

### DECLINATION & CONVERGENCE



### NOTES AND REFERENCES:

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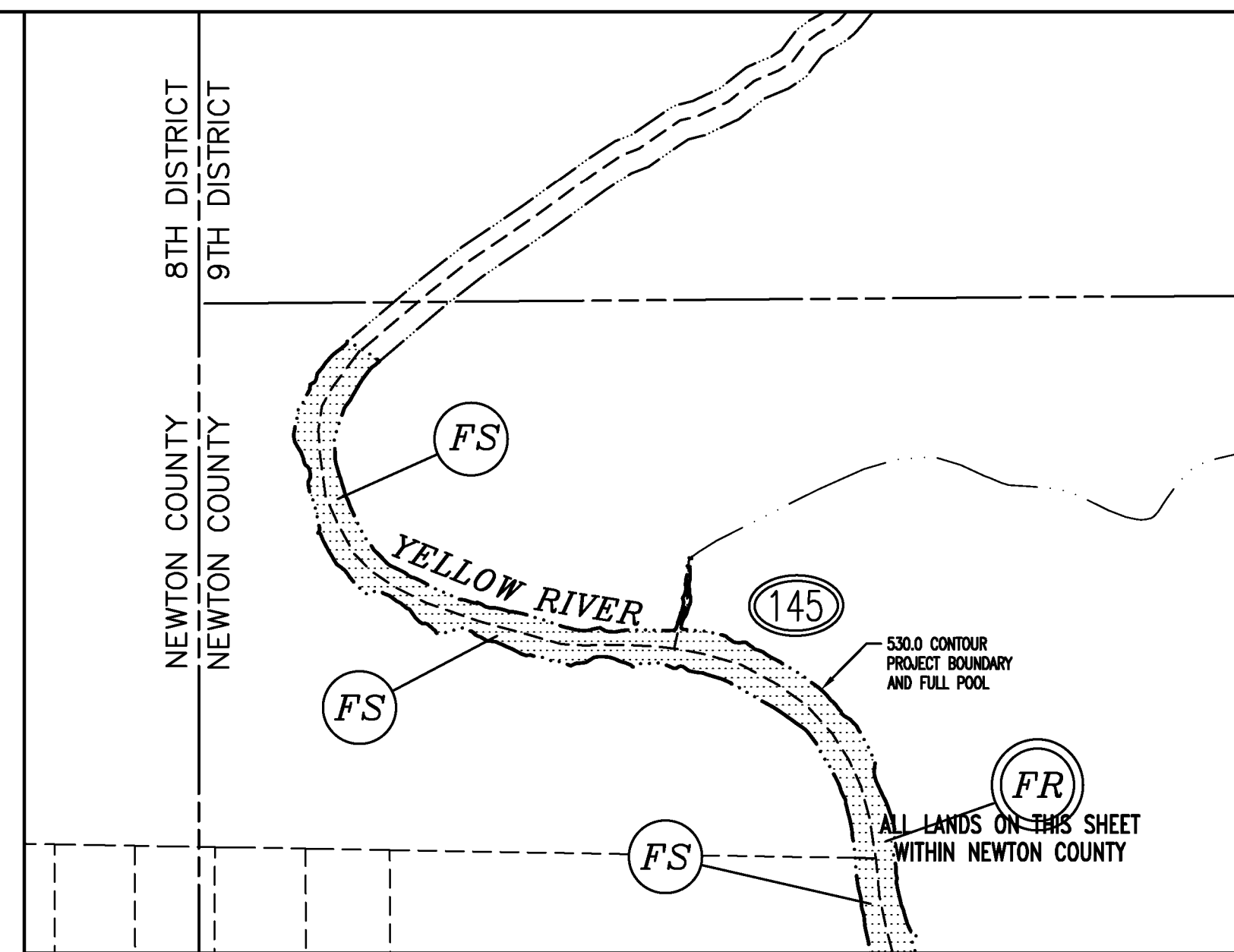
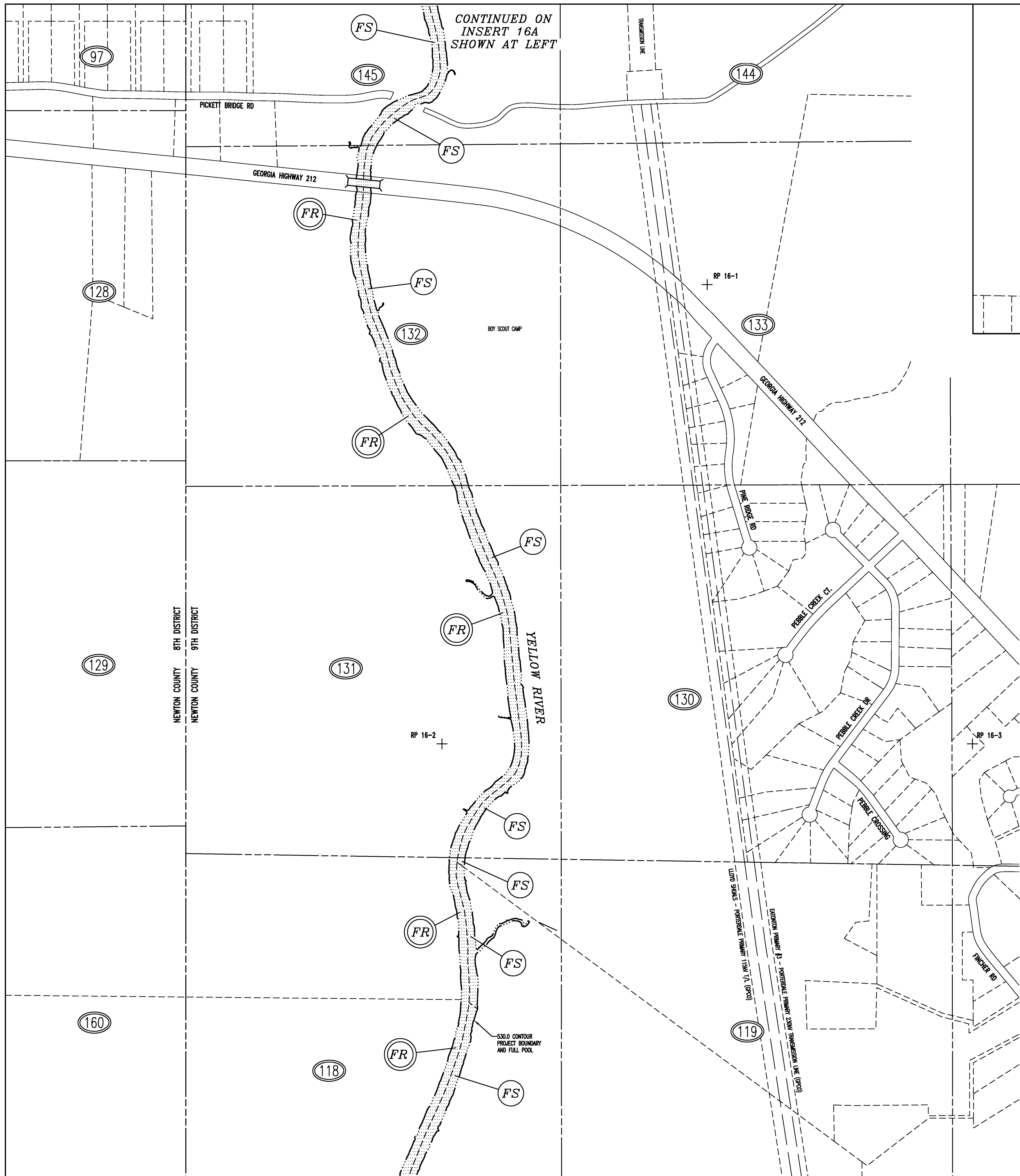
*William H. Bechtler* DATE 11-27-2021

DRAWING FILE PATH: T:\Working2\landmg(Lake Jackson)\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping

**GEORGIA POWER CO., ATLANTA, GA.**  
**Land Department**

**LLOYD SHOALS DAM - LAKE JACKSON**  
**PROJECT BOUNDARY - EXHIBIT G MAPS**  
 SHEET 15 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB



**LEGEND**

GPC	GEORGIA POWER COMPANY	CONTIGUOUS TRACT & OWNERSHIP	
○	PROJECT BOUNDARY CORNER	GPC FEE SIMPLE PROPERTY LINE	
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	+	REFERENCE POINT
---	PROPERTY LINE	N/F	NOW OR FORMERLY
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)	---	LAND LOT LINE
+	REFERENCE POINT	---	PAVED ROAD
N/F	NOW OR FORMERLY	---	GPC LANDS WITHIN PROJECT BOUNDARY
---	LAND LOT LINE	---	GPC RECREATIONAL AREA
---	LAND LOT NUMBER		
---	PAVED ROAD		

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN

**GRAPHIC SCALE**  
400 0 200 400  
1 INCH = 400 FEET

**SHEET INDEX**

**REFERENCE POINTS**

NAME	NORTHING	EASTING
RP 16-1	1255818.74	2386386.89
RP 16-2	1252218.74	2384308.43
RP 16-3	1252218.74	2388465.36

**DECLINATION & CONVERGENCE**

**NOTES AND REFERENCES:**

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**SURVEYOR'S STATEMENT**

I HEREBY STATE THAT THE PROJECT BOUNDARY DELINEATION FOR THE WALLACE DAM PROJECT AS SHOWN ON THIS EXHIBIT IS DEVELOPED WITHIN REASONABLE ACCURACIES AS REQUIRED IN TITLE 16, PART 4, SECTION 4.41. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES ARE BASED ON SURVEYS AND RECORDED SURVEYS AND DEEDS OF RECORD. THE CONTOUR LINES HAVE BEEN PROCESSED UTILIZING A COMBINATION OF FIELD SURVEY AND STEREOSCOPIC MODELING TECHNIQUES.

THESE EXHIBIT G MAPS ARE POSITIONALLY ACCURATE TO ±40 FEET AND COMPLY WITH NATIONAL MAP ACCURACY STANDARDS FOR MAPS AT 1:24,000 SCALE.

SURVEYOR: WILLIAM H. BECHTLER  
241 RALPH MCCLURE BLVD, NE  
ATLANTA, GA. 30308-3374  
PHONE (404) 506-2450

*William H. Bechtler* DATE 11-27-2021

DRAWING FILE PATH: T:\Working2\landmgf(Lake Jackson)\20170219 Lloyd Shoals (Lake Jackson) - Exhibit G Mapping

**GEORGIA POWER CO., ATLANTA, GA.**  
Land Department

**LLOYD SHOALS DAM - LAKE JACKSON**  
PROJECT BOUNDARY - EXHIBIT G MAPS  
SHEET 16 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB

FERC DRAWING NUMBER: P-2336-77      GPC MF#: P473

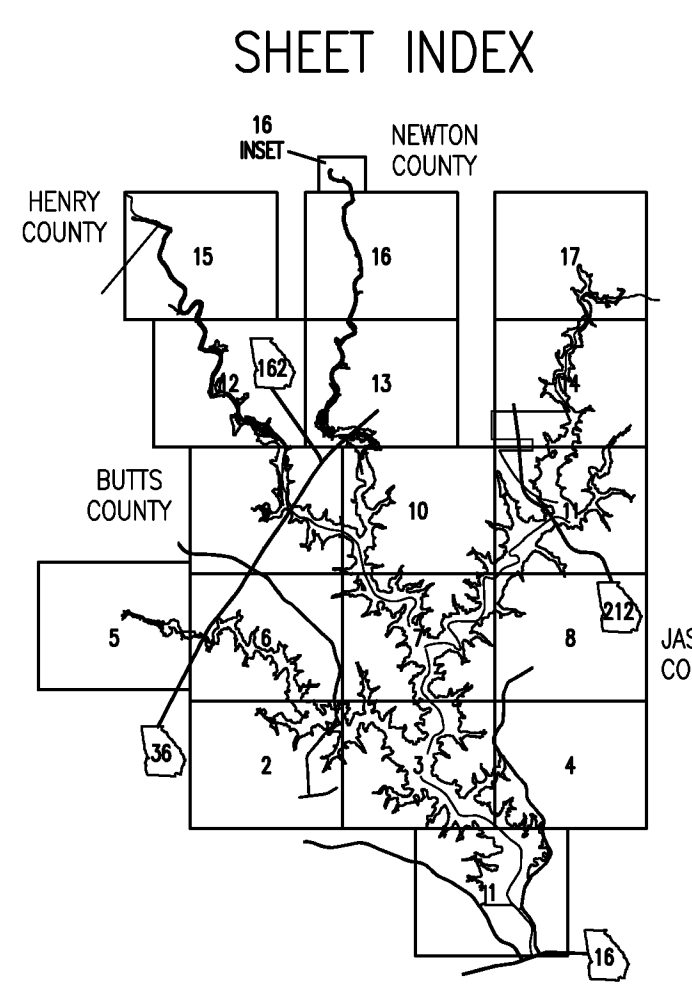
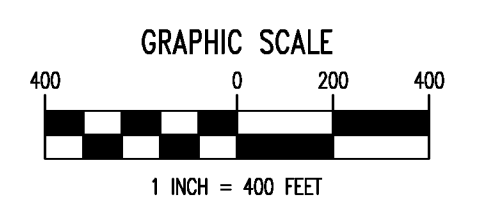
ALL LANDS ON THIS SHEET WITHIN NEWTON COUNTY



### LEGEND

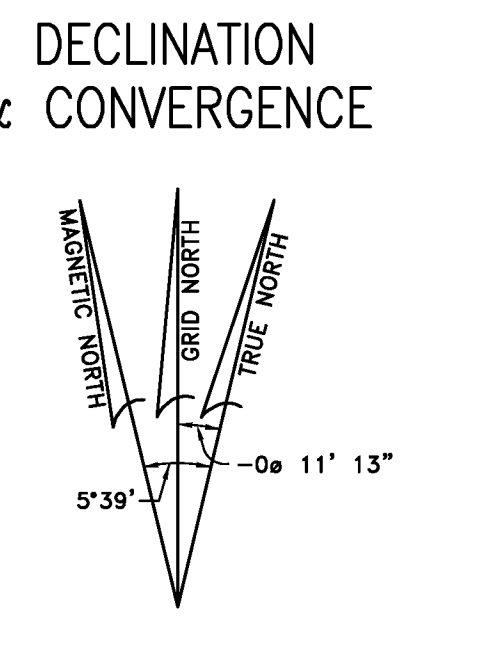
GPC	GEORGIA POWER COMPANY	→	CONTIGUOUS TRACT & OWNERSHIP
○	PROJECT BOUNDARY CORNER	○	GPC FEE SIMPLE PROPERTY LINE
---	FULL POOL (530' CONTOUR)	FS	GPC FEE SIMPLE PROPERTY
---	FULL POOL PROJECT BOUNDARY	FR	GPC FLOOD RIGHTS
---	OTHER PROJECT BOUNDARY	□	GPC LANDS WITHIN PROJECT BOUNDARY
---	PROPERTY LINE	□	GPC RECREATIONAL AREA
---	ORIGINAL GPC TRACT LINE (WITHIN PROJECT BOUNDARY)		
+	REFERENCE POINT		
N/F	NOW OR FORMERLY		
---	LAND LOT LINE		
○	LAND LOT NUMBER		
---	PAVED ROAD		

WHERE PROPERTY LINES COINCIDE WITH LAND LOT, DISTRICT OR COUNTY LINES, ONLY LAND LOT, DISTRICT OR COUNTY LINE IS SHOWN



### REFERENCE POINTS

NAME	NORTHING	EASTING
RP 17-1	1255818.74	2400053.40
RP 17-2	1252218.74	2397974.94
RP 17-3	1252218.74	2402131.86



- ### NOTES AND REFERENCES:
- GPC LLOYD SHOALS PROJECT - PROPERTY DETAIL (EXHIBIT K) MAPS (GPC MAP FILE NOS. L495, L496 & L497).
  - GPC LLOYD SHOALS PROJECT - PROJECT (EXHIBIT G) MAPS (GPC MAP FILE NO. L518).
  - GPC TRANSMISSION LINE RIGHT OF WAY AND SUBSTATIONS ARE TO BE EXCLUDED FROM PROJECT BOUNDARY.
  - STATE AND COUNTY ROAD RIGHT-OF-WAYS AND BRIDGES ARE TO BE EXCLUDED FROM PROJECT BOUNDARY.
  - FULL POOL ELEVATION = 530' (LLOYD SHOALS DAM DATUM)
  - REFERENCE COORDINATE SYSTEM METADATA IS AS FOLLOWS:
    - HORIZONTAL DATUM OF COORDINATES SHOWN HEREON IS THE NORTH AMERICAN DATUM OF 1983 (NAD83(2011)) GEORGIA STATE PLANE COORDINATE SYSTEM WEST ZONE.
    - VERTICAL DATUM OF ALL ELEVATIONS SHOWN HEREON IS LLOYD SHOALS DAM PROJECT DATUM AS DEFINED AND SHOWN ON LLOYD SHOALS PROJECT - GENERAL PLAN, ELEVATION AND TYPICAL SECTION OF DAM DRAWINGS (GPC MAP FILE NO. M-97-13).
    - NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88) EQUALS LLOYD SHOALS DAM VERTICAL DATUM MINUS 0.45 FEET.
    - DISTANCE UNITS ARE THE U.S. SURVEY FOOT.

### SURVEYORS STATEMENT

I HEREBY STATE THAT THE PROJECT BOUNDARY DELINEATION FOR THE WALLACE DAM PROJECT AS SHOWN ON THIS EXHIBIT IS DEVELOPED WITHIN REASONABLE ACCURACIES AS REQUIRED IN TITLE 16, PART 4, SECTION 4.1. THE LICENSEE EITHER OWNS IN FEE SIMPLE OR POSSESSES EASEMENTS OVER ALL LANDS SHOWN ON THIS MAP THAT ARE INSIDE THE PROJECT BOUNDARY. THE PROJECT BOUNDARY LINES THAT ARE NOT CONTOUR LINES ARE BASED ON SURVEYS AND RECORDED SURVEYS AND DEEDS OF RECORD. THE CONTOUR LINES HAVE BEEN PROCESSED UTILIZING A COMBINATION OF FIELD SURVEY AND STEREOSCOPIC MODELING TECHNIQUES.

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*William H. Bechtler* DATE 11-27-2021

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## GEORGIA POWER CO., ATLANTA, GA. Land Department

### LLOYD SHOALS DAM - LAKE JACKSON PROJECT BOUNDARY - EXHIBIT G MAPS

SHEET 17 of 17

SCALE	DATE	DRAWN BY	APPROVED BY
1" = 400'	11/21/2021	WHB	WHB