Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
Tel 404.506.7219

SOUTHERN COMPANY
Energy to Serve Your World®

February 18, 2015

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

Wallace Dam Hydroelectric Project, FERC Project Number 2413
Notification of Intent to Relicense Wallace Dam, Preliminary Application Document, Request for Designation under Section 7 of the Endangered Species Act, and Request for Authorization to Initiate Consultation under Section 106 of the National Historic Preservation Act

Dear Ms. Bose:

On behalf of Georgia Power Company, Southern Company is filing this letter to indicate our intent to relicense the Wallace Dam Hydroelectric Project (FERC Project Number 2413). We will file a complete application for a new power license for Wallace Dam utilizing the Integrated Licensing Process (ILP) in accordance with the Federal Energy Regulatory Commission's (Commission) regulations found at 18 CFR Part 5. The proposed Process, Plan and Schedule for the ILP proceeding may be found in Table 1 of the Preliminary Application Document included with this filing.

We are also requesting through this filing designation as the Commission's non-federal representative for consultation under Section 7 of the Endangered Species Act and authorization to initiate consultation under Section 106 of the National Historic Preservation Act.

There are four components to this filing:

1) Cover Letter (Public)
2) Notification of Intent (Public)
3) Preliminary Application Document (Public)
4) Preliminary Application Document – Appendix C (CEII)

Ms. Kimberly D. Bose
February 18, 2015

If you require further information, please contact me at 404.506.7219.

Sincerely,

Courtenay R. O'Mara, P.E.
Wallace Dam Hydro Relicensing Manager

cc: FERC/OEP – Allan Creamer

Geosyntec – Steven Layman, Ph.D.

Troutman Sanders – Fitzgerald Veira
Hallie Meushaw

Notification of Intent
submitted by
Georgia Power Company
for a
New License for the Wallace Dam Project
FERC Project Number 2413
February 18, 2015

18 CFR 5.5 (b)(1) The licensees name and address.

Georgia Power Company
c/o Herbie N. Johnson
Hydro General Manager
Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
ATTN: Courtenay R. O'Mara
Hydro Relicensing Project Manager

18 CFR 5.5 (b)(2) The project number.

The FERC Project Number is 2413.

18 CFR 5.5 (b)(3) The license expiration date.

The license expiration date is May 31, 2020.

18 CFR 5.5 (b)(4) An unequivocal statement of the licensee's intention to file or not to file an application for a new license.

Georgia Power Company intends to file an application for a new power license for the Wallace Dam Project (FERC # 2413) (Project) utilizing the Commission's Integrated Licensing Process in accordance with 18 CFR Part 5.

18 CFR 5.5 (b)(5) The type of principal project works licensed, such as dam and reservoir, powerhouse or transmission lines.

The Project consists of a reservoir (Lake Oconee), an earth and concrete gravity dam, a semi-outdoor type powerhouse integral with the dam, a five-gate spillway, a 20,000-ft-long excavated tailrace (into Lake Sinclair) , a 230-kilovolt (kV) substation, a 15.67-mile-long transmission line, and appurtenant facilities.

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

- West earth embankment (347 ft)
- West concrete non-overflow section (300 ft)
- Concrete spillway (266 ft)
- Powerhouse (intake) (531 ft)
- East concrete non-overflow section (226 ft)
- East earth embankment (725 ft)

18 CFR 5.5 (b)(6) The location of the project by state, county, and stream, and, when appropriate, by city or nearby city.

The Wallace Dam Project is located on the Oconee River in east-central Georgia. Wallace Dam is located at river mile 172.7, about 13.4 air miles east of the city of Eatonton in Putnam County and about 15.4 air miles south of the city of Greensboro in Greene County. Wallace Dam is located about 19 air miles north of the city of Milledgeville in Baldwin County and about 25 air miles southeast of the city Madison in Morgan County. The Hancock County-Putnam County line, which follows the Oconee River channel in the area of the project works, bisects the project dam. The Wallace Dam powerhouse is situated on the east side of the river, mostly within Hancock County. The spillway portion of the dam is located on the west side of the river within Putnam County.

18 CFR 5.5 (b)(7) The installed plant capacity.

The nameplate generating capacity of the Wallace Dam Project is 321.3 MW.

18 CFR 5.5 (b)(8) The names and addresses of:

18 CFR 5.5 (b)(8)(i) Every county in which any part of the project is located, and in which any Federal facility that is used or to be used by the project is located:

County	Contact Name	Mailing Address
Greene County	Chairman Ed Bullard	1034 Silver Drive, Suite 201 Greensboro, GA 30642 Phone: 706-453-7716, x205 edbullard@greenecountyga.gov
Hancock County	Chairwoman Helen G. "Sistie" Hudson	12630 Broad Street Sparta, GA 31087 Phone: 706-444-6221 sistiehudson@aol.com
Morgan County	Chairman Andy Ainslie	Board of Commissioners (BOC) 150 E. Washington Street Madison, GA 30650 Phone: 706-342-0725 aainslie@morganga.org
Putnam County	Chairman Stephen J. Hersey	117 Putnam Drive, Suite A Eatonton, GA 31024 Phone: 706-485-5826 shersey@putnamcountyga.us

18 CFR 5.5 (b)(8)(ii)(A) Every city, town, or similar political subdivision in which any part of the project is or is to be and any Federal facility that is or is to be used by the project is located:

The Wallace Dam Project is not located within any city or town limits.

18 CFR 5.5 (b)(8)(ii)(B) Every city, town, or similar political subdivision that has a population of 5,000 or more people and is located within 15 miles of the existing or proposed project dam:

City/Town	Contact Name	Mailing Address
Eatonton	Mayor John Reid	103 Beech Avenue Eatonton, GA 31024 Phone: 706-485-9240 jreid755@bellsouth.net
Greensboro	Mayor Glenn Wright	PO Box 362 Greensboro, GA 30642 Phone: 706-453-2413 gwright@greensboroga.gov
Madison	Mayor Fred Perriman	1196 Martin Luther King Drive Madison, GA 30650 Phone: 706-342-1251, x318 fperriman@madisonga.com

18 CFR 5.5 (b)(8)(iii)(A) Every irrigation district, drainage district, or similar special purpose political subdivision in which any part of the project is or is proposed to be located and any Federal facility that is or is proposed to he used by the project is located:

Political Subdivision	**Contact Name**	**Mailing Address**
Georgia Soil and Water Conservation District Region IV	Mr. Andy Dyar	3014 Heritage Road, Suite 1 Milledgeville, GA 31061 Phone: 478-445-5766 region4@gaswcc.org
Upper Oconee Water Planning District	Mr. Jeff Larson Assistant Branch Chief	Georgia Environmental Protection Division 4420 International Parkway Suite 101 Atlanta, GA 30354 Phone: 404-232-1562 jeff.larson@dnr.state.ga.us

18 CFR 5.5 (b)(8)(iii)(B) Every irrigation district, drainage district, or similar special purpose political subdivision that owns, operates, maintains, or uses any project facility or any Federal facility that is proposed to be used by the project:

None

18 CFR 5.5 (b)(8)(iv) Every other political subdivision in the general area of the project that there is reason to believe would be likely to be interested in, or affected by, the notification:

Other Political Subdivisions	**Contact Name**	**Mailing Address**
Baldwin County	Chairman Sammy Hall	220 County Line Church Road, SW Milledgeville, GA 31601 Phone: 478-932-5662 shall@baldwincountyga.com
City of Milledgeville	Mayor Richard Bentley	119 E. Hancock Street Milledgeville, GA 31061 Phone: 478-414-4092
City of Sparta	Mayor William Evans	12630 Broad Street Sparta, GA 31087 Phone: 706-444-6221 mayorevans@bellsouth.net
Oconee River Resource Conservation & Development Office	Mr. Tim Savelle savelle.orrcd@att.net	P.O. Box 247 Watkinsville, Georgia 30677 Phone: 706-769-7922

18 CFR 5.5 (b)(8)(v) Potentially Affected Indian Tribes

Note: There are no extant federally recognized tribal lands in the State of Georgia. (U.S. Department of the Interior, 1993). There are. however, a number of federally recognized tribes that occupied the project region historically. (Federal Register. Vol. 73, No. 66, April 4, 2008). The following list includes Indian tribes that may have an interest in the relicensing of the Wallace Dam Project. At this time it is unclear whether and to what extent these Indian tribes will be affected by the notification.

Tribe	Contact Name	Mailing Address
Cherokee Nation	Mr. Chad Smith	Cherokee Nation P.O. Box 948 Tahlequah, OK 74465
Eastern Band of Cherokee Indians	Mr. Tyler Howe	Eastern Band of Cherokee Indians Qualla Boundary P.O. Box 455 Cherokee, NC 28719
Muskogee (Creek) Nation	Ms. Joyce Bear	Muskogee (Creek) Nation P.O. Box 580 Highway 75 and Loop 56 Okmulgee, OK 74447
United Keetoowah Band of Cherokee Indians	Ms. Lisa Stopp	Acting Tribal Historic Preservation Officer United Keetoowah Band of Cherokee Indians P.O. Box 746 20525 S. Jules Valdez. Road Tahlequah, OK 74464

Potentially Interested Agencies

Interested Agency	Contact Name	Mailing Address
U.S. Forest Service, Chattahoochee-Oconee National Forest	Ms. Betty Jewett	1755 Cleveland Highway Gainesville, GA 30501 Phone: 770-297-3000 bettymjewett@fs.fed.us
U.S. Fish and Wildlife Service	Ms. Alice Lawrence	105 Westpark Drive Athens, GA 30606 Phone: 706-613-9493 x222 alice_lawrence@fws.gov

U.S. Environmental Protection Agency Region 4	Mr. Dan Holliman	61 Forsyth Street, S.W. Atlanta, GA 30303 Phone: 404-562-9531 holliman.daniel@epa.gov
Georgia Department of Natural Resources - Environmental Protection Division	Dr. Elizabeth Booth	2 MLK, Jr. Drive, S.W., Suite 1152 Atlanta, GA 30334 Phone: 404-675-6232 elizabeth.booth@dnr.state.ga.us
Georgia Department of Natural Reources - Wildlife Resources Division	Mr. John Biagi	2070 U.S. Highway 278, S.E. Social Circle, GA 30025 Phone: 770-918-6406 john.biagi@dnr.state.ga.us
Georgia Department of Natural Resources - Historic Preservation Division	Dr. David Crass	254 Washington Street, SW Ground Level Atlanta, GA 30334 Phone: 404-656-2840 david.crass@dnr.state.ga.us

GEORGIA POWER
A SOUTHERN COMPANY

WALLACE DAM

Lake Oconee

Pre-Application Document

Wallace Dam Hydroelectric Project
FERC Project Number 2413

Prepared with:

Southern Company Generation Hydro Services

Geosyntec consultants

and

CH2MHILL.

February 2015

Geosyntec
consultants

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ACRONYMS AND ABBREVIATIONS

BBS	breeding bird surveys
BOD	biological oxygen demand
CBC	Christmas Bird Count
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulations
cfs	cubic feet per second
COD	chemical oxygen demand
Commission	Federal Energy Regulatory Commission
CSRA RC	Central Savannah River Area Regional Commission
DO	dissolved oxygen
EDDMapS	Early Detection and Distribution Mapping System
EFH	Essential Fish Habitat
EPA	U.S. Environmental Protection Agency
EPPC	Exotic Pest Plant Council
FC	fecal coliform
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FS	U.S. Forest Service
ft	feet
FWS	U.S. Fish and Wildlife Service
GBCF	Georgia Bass Chapter Federation
GCCC	Greene County Chamber of Commerce
GDL	Georgia Department of Labor
GDNR	Georgia Department of Natural Resource
Georgia Power	Georgia Power Company
GEPD	Georgia Environmental Protection Division
GFC	Georgia Forestry Commission
GIS	geographic information system
GMNH	Georgia Museum of Natural History
GORP	Georgia Outdoor Recreation Pass
H	horizontal
hp	horsepower
HUC	Hydrologic Unit Code

I-20	Interstate 20
ILP	Integrated Licensing Process
K_n	relative condition factor
kV	kilovolt
lb	pound
mg/L	milligrams per liter
MGRC	Middle Georgia Regional Commission
MW	megawatt
MWh	megawatt hours
NEGRC	Northeast Georgia Regional Commission
NEPA	National Environmental Policy Act
NF	National Forest
NFHP	National Fish Habitat Partnership
NOI	Notification of Intent
National Register	National Register of Historic Places
PAD	Pre-Application Document
PD	plant datum
PLP	Preliminary Licensing Proposal
PM&E	protection, mitigation, and enhancement
PSP	Proposed Study Plan
RIR	Regionally Important Resource
ROW	right-of-way
rpm	revolutions per minute
RTE	rare, threatened, and endangered
RWP	Regional Water Plan
SAFMC	South Atlantic Fishery Management Council
SAS	Southeastern Archaeological Services, Inc.
SCORP	State Comprehensive Outdoor Recreation Plan
sq mi	square miles
SUDIA	Southeast United Dairy Industry Association, Inc.
TMDL	total maximum daily load
TSI	Trophic State Index
TSS	total suspended solids
USGS	U.S. Geological Survey

V	vertical
WMA	Wildlife Management Area
WRD	Wildlife Resources Division

1.0 INTRODUCTION

Georgia Power Company (Georgia Power) is filing with the Federal Energy Regulatory Commission (FERC, the Commission) its Notification of Intent (NOI) to file an application for a new license for its existing 321.3-megawatt (MW) Wallace Dam Hydroelectric Project (FERC No. 2413) (Wallace Dam Project, the Project). The Wallace Dam Project is a pumped storage project consisting of Wallace Dam, a powerhouse, and Lake Oconee and is located on the Oconee River in Hancock, Putnam, Greene, and Morgan Counties, Georgia. Pumped storage projects move water between two reservoirs located at different elevations. The Wallace Dam Project operates using Lake Oconee as the upper reservoir. Lake Sinclair, located immediately downstream, serves as the lower reservoir and is operated by Georgia Power as the separately licensed Sinclair Hydroelectric Project (Sinclair Project) (FERC No. 1951). Georgia Power is not proposing to add capacity or make any major modifications to the Wallace Dam Project under the new license. The Project currently occupies about 370 acres of U.S. Forest Service (FS) lands within the Oconee National Forest (NF), which abuts Lake Oconee's northernmost reaches. The current license expires May 31, 2020.

Georgia Power is using FERC's Integrated Licensing Process (ILP) for all pre-application activities leading up to filing of the Wallace Dam license application by May 31, 2018. The ILP is designed to create an efficient and timely licensing process by integrating the applicant's pre-filing consultation with FERC's scoping pursuant to the National Environmental Policy Act (NEPA). The ILP also establishes firm time frames for all pre-application activities and stakeholder participation (Section 2).

In accordance with the ILP regulations (18 Code of Federal Regulations [CFR] Part 5), this Pre-Application Document (PAD) is being filed simultaneously with the NOI and distributed to Federal and state resource agencies, local governments, Indian tribes, members of the public, and others likely to be interested in the proceeding.

1.1 Purposes

The purposes of this PAD are to:

- Describe the existing facilities and the current and proposed operations of the Wallace Dam Project.

- Provide existing, reasonably available information characterizing the affected environment and potential resource impacts of continued project operation.

- Serve as a precursor to the environmental analysis section of Georgia Power's Preliminary Licensing Proposal (PLP) and Exhibit E of the final license application.

The information provided herein will enable resource agencies and other entities interested in the relicensing proceeding to identify potential resource issues and any related information needs during the NEPA scoping process to be conducted by FERC staff. Section 2 provides the detailed schedule for all pre-application activities in the proceeding.

Georgia Power exercised due diligence in preparing this PAD by contacting appropriate agencies and other stakeholders potentially having existing, relevant, and reasonably available information characterizing the affected environment and potential resource impacts of continued project operation and describing or summarizing that information herein. Georgia Power also identified and took into consideration potentially applicable Federal and state comprehensive plans filed with the Commission. To facilitate the gathering of relevant information, Georgia Power distributed a PAD Questionnaire to agencies and is making the questionnaire available on the project website (Section 2.3) for continuing input from stakeholders. In addition, Georgia Power held two informational sessions on November 19 and 20, 2014, near the Wallace Dam Project. These meetings included ILP orientation provided by a FERC staff member and dissemination of information on the Project by members of the Georgia Power relicensing team who were available for one-on-one discussions with stakeholders.

Appendix A documents the contacts made and meetings held by Georgia Power in connection with preparing this PAD. Appendix B provides the completed PAD Questionnaires received from several agencies.

1.2 Document Organization

This PAD follows the form and content requirements at 18 CFR § 5.6(c) and (d) and includes the following sections:

- **Section 2** – Process plan and schedule for all pre-application activity, 18 CFR § 5.6(d)(1), including a protocol for distributing information in this proceeding.

- **Section 3** – Description of the project location, facilities, and operations of the Project, 18 CFR § 5.6(d)(2).

- **Section 4** – Description of the existing environment and resource impacts, including: a general description of the river basin (18 CFR § 5.6(d)(3)(xiii)); and for each of 11 resource areas, a description of the existing environment, summaries of existing data or studies regarding the resource, a description of any known or potential adverse impacts and issues, and a description of any existing or proposed project facilities, operations, or management activities undertaken for the purpose of protecting, mitigating impacts to, or enhancing resources affected by the Project (18 CFR § 5.6(d)(3)(i)-(xii)).

- **Section 5** – Preliminary resource issues and potential studies or information gathering needs associated with the issues, 18 CFR § 5.6(d)(4).

- **Section 6** – Literature and information sources cited in the descriptions and summaries of existing resource data, 18 CFR § 5.6(c)(2).

- **Appendices** – Summary of contacts made in preparing this document (18 CFR § 5.6(d)(5)); and completed PAD Questionnaires, diagrams, current license requirements, flow duration curves, and related information supporting the sections above.

2.0 PROCESS PLAN AND SCHEDULE

On February 18, 2015, Georgia Power is filing this PAD and its NOI to file a license application seeking a new license for the Wallace Dam Project. Pursuant to 18 CFR Part 5, the filing of the NOI is the first step in the relicensing process, and it initiates scheduling for the subsequent pre-application activities.

Table 1 provides a detailed Process Plan and Schedule outlining the responsibilities, time frames, and deadlines for all pre-application activities in the Wallace Dam proceeding. The Process Plan and Schedule incorporates the time frames set forth in 18 CFR Part 5. It is important that all relicensing participants familiarize themselves with the Process Plan and Schedule milestones and adhere to the time frames required by the ILP regulations. The Commission and Georgia Power will provide additional information regarding scheduling in subsequent notifications and communications in accordance with 18 CFR Part 5 as appropriate.

2.1 Tribal Consultation

The Commission's Policy Statement on Consultation with Indian Tribes in Commission Proceedings (18 CFR Part 2) recognizes the sovereignty of tribal nations and the Commission's trust responsibility to Indian tribes. Federally recognized tribes potentially having an interest in the Wallace Dam relicensing proceeding are listed in Section 4.12. No later than 30 days following the filing of the NOI and PAD, a tribal consultation meeting will be held between each Indian tribe likely to be affected by the license application and Commission staff, if the affected Indian tribe agrees to such a meeting (18 CFR § 5.7). The deadline for the tribal consultation meeting is March 20, 2015 (Table 1). The date and location of the meeting will be determined by the Commission.

2.2 Scoping Meeting and Site Visit

As set forth at 18 CFR § 5.8, the Commission will issue a notice of commencement of the Wallace Dam relicensing proceeding and Scoping Document 1 (SD1) within 60 days of the filing of the NOI and PAD, or by April 20, 2015 (Table 1). The Commission will hold a public scoping meeting and site visit within 30 days of issuing the notice of commencement. The scoping meeting(s) and site visit will be held on May 19 and 20, 2015. The scoping meeting locations and times have yet to be determined by the Commission and will be provided to all interested parties by the Commission as set forth at 18 CFR § 5.8(e).

2.3 Distribution Protocol

Georgia Power proposes the following protocol for distributions and communications for relicensing participants. All participants, including Georgia Power, will communicate with other participants by telephone, e-mail, mail, or any other available electronic means to distribute information and communicate as necessary in a timely and efficient manner. Participants will distribute their respective input consistent with the time frames established in the Process Plan and Schedule (Table 1).

In addition, Georgia Power will share information on its Wallace Dam Relicensing Website. The project website will be maintained as a readily accessible repository of Georgia Power's relicensing documents and information, including the PAD, Process Plan and Schedule, study plans, progress reports, preliminary licensing proposal, license application, and other relevant pre-filing information.

The internet address for Georgia Power's Wallace Dam Relicensing Website is:

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

All relicensing documents issued and received by FERC, including all filings by relicensing participants, will be available on the Internet using the eLibrary feature of FERC's website. The quick reference guide (eLibrary – Quick Help) and Detailed Online Help available on the FERC website describe the information needed to navigate eLibrary. Georgia Power encourages all relicensing participants to sign up to utilize FERC's eLibrary resources, not only to monitor the relicensing proceeding but to file their documents and to track all relicensing filings by receiving ongoing e-mail filing notices from FERC.

The internet addresses for FERC's hydropower website and the eLibrary feature are:

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

3.0 PROJECT LOCATION, FACILITIES, AND OPERATION

3.1 Applicant's Authorized Agent

The exact name, business address, and telephone number of the person authorized to act as agent for Georgia Power as the applicant in this proceeding are:

Herbie N. Johnson
Hydro General Manager
Southern Company Generation
Bin 10193
241 Ralph McGill Boulevard NE
Atlanta, Georgia 30308-3374
404-506-7716

ATTN: Courtenay R. O'Mara
Hydro Relicensing Project Manager
404-506-7219
cromara@southernco.com

3.2 Project Location

The Wallace Dam Project is located on the Oconee River in east-central Georgia (Figure 1). Wallace Dam is located at river mile 172.7, about 13.4 air miles east of the city of Eatonton in Putnam County and about 15.4 air miles south of the city of Greensboro in Greene County (Figure 2). Wallace Dam is located about 12 air miles northwest of the city of Sparta in Hancock County, 19 air miles north of the city of Milledgeville in Baldwin County, and about 25 air miles southeast of the city of Madison in Morgan County. The Hancock County-Putnam County line, which follows the Oconee River channel in the area of the project works, bisects the project dam. The Wallace Dam powerhouse is situated on the east side of the river, mostly within Hancock County. The spillway portion of the dam is located on the west side of the river within Putnam County. Wallace Dam is situated 29.7 river miles upstream of Georgia Power's Sinclair Dam (river mile 143) and immediately upstream of Lake Sinclair, with no intervening riverine reach. Releases from Wallace Dam flow directly into Lake Sinclair.

The Wallace Dam project reservoir, known as Lake Oconee, covers 19,050 acres, has 374 miles of shoreline, and extends about 39 river miles upstream on the Oconee River. Lands and waters within the FERC project boundary are located within Hancock, Putnam, Greene, and Morgan Counties (Figure 3). The majority of the project reservoir

is located in Greene County. The normal full pool elevation of Lake Oconee is 435 feet (ft) plant datum (PD)[1]. The project boundary extends around the reservoir upstream of the dam. It encompasses the normal full pool elevation and a fee-simple strip of land owned by Georgia Power around the entire shoreline. The shoreline strip is generally 25-ft wide, with the exception of lands comprising the Oconee NF, and expands to widths of 100 or 200 ft across the reservoir from certain recreation areas (Georgia Power, 1971). The project boundary is measured as metes and bounds or elevation contour, depending on location around the reservoir. Larger land parcels define the project boundary in the areas of the project works, Georgia Power's public recreation facilities, and other areas reserved for recreation development. The project boundary extends downstream of Wallace Dam about 4.0 river miles as thin strips of land along each side of the narrow upper reach of Lake Sinclair (Figure 3). It also encompasses a small waterfowl impoundment on the west side of Lake Sinclair within the Oconee Wildlife Management Area (WMA).

There are approximately 4,442 acres of project lands inside the project boundary between the normal full pool elevation of 435 ft PD and the project boundary. These project lands include about 370 acres of FS lands within the Oconee NF along the Oconee River and Apalachee River embayments upstream of Interstate 20 (I-20) (Figure 3). Project lands provide a buffer for aesthetics, wildlife habitat, water quality protection, and recreation.

Georgia Power owns and manages approximately 7,685 acres of non-project lands generally adjacent to the project lands. The topography on this acreage offers excellent views of the reservoir and shoreline areas. These non-project lands are managed by Georgia Power as forests in compliance with the Georgia Forestry Commission (GFC) Best Management Practices. Georgia Power foresters and wildlife biologists work cooperatively to manage these lands for wildlife habitat, prescribed burning, identification of rare, threatened, and endangered species, cultural resources, and control of invasive plant species.

Georgia Power leases, at no cost, 5,375 acres in and adjacent to project lands to the Georgia Department of Natural Resources (GDNR) for use as the Oconee WMA (Figure 3). The Oconee WMA is managed for waterfowl habitat, hunting, and other recreational purposes.

There are 3,734 parcels of land adjacent to the shoreline of Lake Oconee leased by residents for lake access. No residences, residential outbuildings, or permanent structures, other than permitted shoreline structures, are allowed within the project

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

boundary. Georgia Power manages the shoreline of Lake Oconee under its Shoreline Management Guidelines (Georgia Power, 2015) to ensure compliance with the Wallace Dam FERC license and other applicable federal and state laws and regulations.

3.3 Project Facilities

The Wallace Dam Project was built and the reservoir completely filled by 1979. Commercial operation began in December 1979. The Project consists of a reservoir (Lake Oconee), an earth and concrete gravity dam, a semi-outdoor type powerhouse integral with the dam, a five-gate spillway, a 20,000-ft-long excavated tailrace (into Lake Sinclair) , a 230-kilovolt (kV) substation, a 15.67-mile-long transmission line, and appurtenant facilities (Figure 4).

The main dam has a crest elevation of 445 ft PD, a crest length of 2,395 ft, and height above streambed of 120 ft. The project works across the main dam consist of the following components (and their length) from west to east (Figure 4):

- West earth embankment (347 ft)
- West concrete non-overflow section (300 ft)
- Concrete spillway (266 ft)
- Powerhouse (intake) (531 ft)
- East concrete non-overflow section (226 ft)
- East earth embankment (725 ft)

The west and east earth embankments are homogenous earth sections with chimney drains (Figure 4). The embankments are constructed of residual soils developed by weathering of the gneiss and granites of the site area. The crests are at elevation 445 ft PD. Crest width is 35 ft except where the embankments wrap around the concrete non-overflow sections; the crests widen in these areas to 45 ft. The earth embankments slope upstream at a ratio of 3 horizontal (H) to 1 vertical (V) and downstream at a ratio of 2.5H to 1V. Riprap (3-ft thick over 12 inches of bedding) extending from elevation 425 ft to the crest of the dam protects the upstream slopes against wave action. The toe of the west earth embankment is protected against wave action by coffer cells with tops at elevation 355 ft, and then to elevation 370 ft by riprap 2.25-ft thick over 12 inches of bedding. The east earth embankment terminates on the powerhouse yard at elevation 373 ft. Sod protects the downstream slopes of the earth embankments.

The east and west non-overflow sections are concrete structures (Figure 4). The crest elevation of each structure is 445 ft PD.

The concrete spillway has a crest elevation of 391.0 ft PD. The spillway contains five taintor gates, each 48-ft high by 42-ft wide (Figure 4). The discharge capacity of each gate is 35,000 cubic feet per second (cfs) at the normal full pool elevation of 435 ft.

The powerhouse is integral with and located immediately downstream of the dam on the east side of the river (Figure 4). The intake is integral with the powerhouse and has an invert elevation of 343.0 ft PD. The powerhouse contains six turbine-generator units, including two conventional units and four pumped storage units (Table 2). The units are numbered 1 through 6 from west to east. Units 1, 2, 5, and 6 are reversible. There are six penstocks with a maximum diameter of 25.5 ft. Steel trash racks in front of the intake in the dam forebay consist of vertical bars with clear spacing between bars ranging from 1 ft 2.5 inches to 1 ft 3.5 inches.

In addition, there are two small saddle dikes located east of the main dam. These have a total length of about 900 ft and a maximum height of 20 ft. The original ground grade at each location was at or slightly above elevation 435 ft PD.

Lake Oconee covers 19,050 acres at the normal full pool elevation of 435 ft PD. At normal full pool the total reservoir storage is approximately 370,000 acre-feet (120.5 billion gallons). The maximum pool for spillway design flood is elevation 441 ft. The normal maximum tailwater elevation is 340 ft. The upstream drainage area of the Oconee River at Wallace Dam is about 1,830 square miles (sq mi).

The nameplate generating capacity of the Wallace Dam Project is 321.3 MW, and the total turbine hydraulic capacity is 50,545 cfs at full gate operations. Table 2 lists nameplate capacity, maximum hydraulic capacity, and commercial operation dates for each of the six turbines. Units 1, 2, 5, and 6 are vertical shaft, Francis type, reversible pump turbines each rated 73,000 horsepower (hp) at 89 ft net head generating and 83,000 hp at 103 ft total dynamic head pumping, and rated speed of 85.8 revolutions per minute (rpm). Units 3 and 4 are vertical shaft, modified propeller type turbines each rated 78,000 hp at 89 ft net head and with rated speed of 120 rpm. Normal operation is to operate at best gate unless there is a need for more hydraulic or power capacity.

The maximum generating capacity of the Wallace Dam Project is 333.8 MW (generator limited). The dependable capacity of the Project is 328.1 MW in the summertime, the most critical power demand season. Dependable capacity is defined as the maximum average capacity available for 8 hours each day for 5 consecutive days using average summer inflows. Average annual generation for the period 1994 through 2013 was 383,038 megawatt-hours (MWh) distributed by month as shown in Table 3.

The transmission facilities at the Wallace Dam Project consist of the 13.8-kV generator leads, two 13.8/230-kV step-up transformers with transformer capacity of 420,000 kV-amps, a 230-kV substation, and a 230-kV transmission line 15.67 miles long beginning at Wallace Dam, extending west, and terminating at a switching station in the vicinity of Eatonton, Georgia (Figure 2).

Appendix C provides a single-line diagram depicting the transfer of electricity from the Wallace Dam Project to the transmission grid and a map showing the transmission line.

3.4 Current Operation

The Wallace Dam Project is Georgia Power's largest hydroelectric development. In the period 2009-2013, the Project contributed an average of 22 percent of Georgia Power's total hydropower generation. Wallace Dam is a pumped storage project with Lake Sinclair serving as the lower reservoir. The following description of how Georgia Power operates the Wallace Dam Project is excerpted from the Wallace Dam Operations Primer. The Wallace Dam Operations Primer contains additional information, including numerous figures illustrating operation, and can be found in Appendix D of this PAD.

Water for generation at Wallace Dam comes from inflow plus storage in Lake Oconee. Wallace Dam generates during peak power demand hours to meet the electrical system demand. Some of this water subsequently passes downstream for hydropower generation at Sinclair Dam to meet both electrical system demand and river flow requirements in the Oconee River downstream of Sinclair Dam.[2] The remaining volume of water from Wallace Dam remains in Lake Sinclair for a few hours before being pumped back up and into Lake Oconee by the reversible units for reuse in the next day's generation cycle. Pumpback operations occur at night, when electrical system demand is low (i.e., off-peak electrical hours) and therefore the cost of power is lower.

3.4.1 Normal Operation

For normal operations on a day-to-day basis, Lake Oconee fluctuates between elevation 435 ft PD, which is full pond, and elevation 433.5 ft PD. Lake Oconee typically starts near elevation 435 ft before the Wallace Dam generation cycle, and ends near elevation 433.5 ft. During the night-time pumping cycle, Lake Oconee typically refills up to elevation 435 ft. Depending on power demand, the reservoir may not fluctuate the full amount on a daily basis. The average daily fluctuation of Lake Oconee is approximately 1.5 ft.

[2] The river flow requirements are included as articles in the separate FERC license for the Sinclair Project.

Wallace Dam discharges directly into Lake Sinclair, with no intervening riverine reach or bypassed reach. Although there is no instantaneous discharge requirement, for the period 1997-2013, daily average discharges exceeded 0 cfs 85 percent of the time and 1,000 cfs 64 percent of the time.

Total generating capacity with all units operating is 321.3 MW. Table 4 summarizes Wallace Dam project generation and outflow records for the past 5 years (2009-2013). The most recent data shown are for 2013 because U.S. Geological Survey (USGS) gage data for 2014 are provisional at this time. The majority of the total annual generation at Wallace Dam comes from the reuse of water pumped back into Lake Oconee at night, indicating the critical importance of the pumpback operations to the power benefits of the Project (see Table 1 of Appendix D). Generation typically is highest during the summer months, when electricity demand is the highest (Table 4). During the summer, Wallace Dam usually generates about 7 to 8 hours across the afternoon peak demand period. During fall and winter, peak generation typically lasts 5 to 6 hours. Discharge in Table 4 was calculated using USGS gage data adjusted for daily volume change and evaporation. Monthly and annual inflow duration curves for the period 1997-2013 are included in Section 4.3.

Because of its large generating capacity, Wallace Dam is also a black-start facility for Georgia Power, meaning that it is capable of assisting in restoring electricity to the nearby system if another major generation facility goes off-line.

3.4.2 Drought Operation

The Wallace Dam Project supports the minimum flow requirements of the Sinclair Project during drought. When Sinclair's calculated inflow drops below 250 cfs, water is released from Lake Oconee to maintain Lake Sinclair at the minimum level necessary for safe pumpback operation at Wallace Dam. If Lake Sinclair was lowered below its normal elevation range, the pump units at Wallace Dam would cavitate and could become damaged. The normal minimum pond level at Lake Sinclair is 338.2 ft PD, and the pump units begin to cavitate at elevation 337.2 ft PD. During recent drought years, the Wallace Dam Project supplemented river flow in the Oconee River downstream of the Sinclair Project for several months, resulting in sustained periods when the elevation of Lake Oconee was below its normal operating range (Appendix D).

3.5 Proposed Operation

Georgia Power proposes to continue operating the Wallace Dam Project as it is currently operated. No capacity addition or major modifications are proposed under the new license.

3.6 Other Project Information

This section provides other project information required at 18 CFR § 5.6(d)(2).

3.6.1 Current License Requirements

A complete description of the current license requirements for the Wallace Dam Project as amended during the license term is provided in Appendix E. The current license for the Project has an effective date of June 1, 1970.

3.6.2 Compliance History

A review of readily available electronic Georgia Power correspondence and FERC compliance documentation shows that the Wallace Dam Project has been, and continues to be, in compliance with the terms and conditions of the current license.

3.6.3 Current Net Investment

Georgia Power's net investment (book value) at the Wallace Dam Project is $121,130,206 as of December 31, 2014. The original project investment at Wallace Dam was $202,121,268, with an additional $19,097,061 incurred since the Project was built. The total project assets are depreciated each year, so that the total net book value of the asset decreases over the life of the asset. Applying these standard accounting practices, the net book value of the asset at the end of its useful life will approach zero. Georgia Power has depreciated a total of $100,088,123 of assets at the Wallace Dam Project.

4.0 DESCRIPTION OF EXISTING ENVIRONMENT AND RESOURCE IMPACTS

4.1 General Description of the River Basin

The Wallace Dam Project is located on the Oconee River at river mile 172.7 in the upper Oconee River basin of the greater Altamaha River basin (Figure 1). The Altamaha River basin includes the Oconee, Ocmulgee, and Altamaha Rivers. The headwater tributaries of the Oconee River, including the Middle Oconee River and the North Oconee River, originate in the northern end of the Oconee River basin in the Piedmont physiographic province (Georgia Environmental Protection Division [GEPD], 1998). These streams flow 55 to 65 miles before joining to form the Oconee River at the southern border of Athens-Clarke County. The Oconee River flows south for 220 miles to its confluence with the Ocmulgee 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 Oconee River basin drains a total watershed area of 5,330 sq mi in east-central Georgia (GEPD, 1998). The watershed upstream of Wallace Dam covers an area of 1,830 sq mi., comprising about 34 percent of the Oconee River basin (Figure 1). The Oconee River flows south about 20 miles before entering Lake Oconee (GEPD, 1998) (Figure 2). From Wallace Dam, the river flows immediately into Lake Sinclair, a 15,330-acre impoundment formed by Sinclair Dam. Downstream of Sinclair Dam, the Oconee River flows 143 miles to its confluence with the Ocmulgee River. About 5 miles downstream of Sinclair Dam, the Oconee River enters the Fall Line area, the transition zone between the Piedmont and Coastal Plain physiographic provinces.

4.1.1 Dams in the Basin

Two major dams are located on the mainstem Oconee River: Wallace Dam and Sinclair Dam (Figure 2). They are operated by Georgia Power as separate FERC-licensed hydroelectric projects. Wallace Dam is part of the Wallace Dam Project (the subject of this PAD) and is described in Section 3. Sinclair Dam is part of the Sinclair Project (FERC No. 1951) and has a generating capacity of 45 MW. Lake Sinclair also serves as the lower reservoir for the pump-back operations at Wallace Dam. Releases from Wallace Dam flow directly into Lake Sinclair. There is no intervening reach or bypassed reach of river between Wallace Dam and Lake Sinclair. The two dams impound about 69 river miles of the mainstem Oconee River in the Piedmont physiographic province.

There are no other major mainstem dams on the Oconee and Altamaha Rivers downstream of Sinclair Dam. A small, remnant, wood-and-rock diversion dam is

located on the Oconee River at Buzzard Island about 4 river miles downstream of Sinclair Dam in Milledgeville (Figure 2).

Barnett Shoals Dam is located on the mainstem Oconee River about 16 river miles upstream of Lake Oconee. Built in 1908, it includes a low-head dam and powerhouse with 2.8 MW of capacity. Barnett Shoals Dam was previously leased for hydropower operations by Georgia Power from a private owner, but the lease expired in 2010 and the dam does not currently produce electricity (Oconee Enterprise, 2010). The Tallassee Shoals Hydroelectric Project (FERC No. 6951), with a capacity of 2.3 MW, is located farther upstream on the Middle Oconee River.

Several reservoirs are located in tributary systems upstream of Lake Oconee. The larger ones include Bear Creek Regional Reservoir, a 505-acre water supply reservoir on a tributary to the Middle Oconee River, and Hard Labor Creek Regional Reservoir, a 1,370-acre water supply reservoir that is currently under construction in the Apalachee River system.

4.1.2 Major Land Uses

The Oconee River basin upstream of Wallace Dam drains portions of 14 counties in northeastern and central Georgia (Figure 1). Over 40 cities and towns are located upstream of the Project. The consolidated government of Athens-Clarke County, with an estimated 119,980 residents in 2013, has the largest upstream population (U.S. Census Bureau, 2014a). The city of Greensboro, located on the eastern side of Lake Oconee, has an estimated population of 3,461 (U.S. Census Bureau, 2014a). Although located in watersheds draining downstream of the Project, the city of Eatonton with 6,530 residents, and the city of Milledgeville with 19,256 residents (U.S. Census Bureau, 2014a), are the other closest populated areas (17-mile and 30-mile drives, respectively). These cities and other smaller nearby communities around Lake Oconee provide a variety of shopping and dining amenities.

The 116,731-acre Oconee NF, part of the overall Chattahoochee-Oconee NF, is comprised of two major areas, one north of I-20 around the upper end of Lake Oconee and one approximately 45 miles to the southwest (Figure 2). About 370 acres of lands in the northern area of Oconee NF are located within the FERC project boundary. Four WMAs are located in the project vicinity. The Redlands WMA is on Oconee NF lands north of I-20. The Oconee WMA is located near Wallace Dam at the intersection of Greene, Hancock, and Putnam counties. Both the Redlands and Oconee WMAs have lands within the project boundary. The Cedar Creek WMA is located on Oconee NF lands southwest of the Project and the City of Eatonton, while the B.F. Grant WMA is located directly west of the Project in Putnam County. Other major public land uses in the project vicinity include the 1,500-acre Rock Eagle 4H Center, located west of the

Project, which includes the Rock Eagle Mound, a stone effigy shaped like a prone bird and similar to the Rock Hawk effigy located adjacent to the Project (University of Georgia Cooperative Extension, 2014) (Section 4.8.1).

There is a diverse mix of land uses within the Oconee River basin. Athens-Clarke County and the central portion of Barrow County, both upstream of the Project, are the most urbanized lands in the basin (CH2M HILL, 2011). Land use in the balance of the northern counties is generally a suburban or rural residential mix composed of low-intensity urban, forested lands, and row crop/pasture lands. With the exception of limited pockets of urban land around Eatonton and Milledgeville, most of the lands in the central portion of the basin, around the Project, contain forest, row crop/pasture, or clearcut/sparse vegetation. Lake Oconee is also known for its private residential and golf developments. Located between the Oconee River and Richland Creek arms of Lake Oconee, there are four marinas and six golf courses (Figure 3).

Livestock and poultry production and dairy operations are relatively intensive in the upper Oconee River basin (GEPD, 1998). Morgan County, which ranks among the top beef-producing counties in Georgia, had an estimated 21,000 head of cattle and calves in 2013; Putnam and Greene Counties had 11,600 and 10,100 head, respectively (USDA, 2013). Putnam, Morgan, and Greene Counties were among the top four dairy counties in Georgia in 2011 based on the number of licensed dairy farms (Southeast United Dairy Industry Association, Inc. [SUDIA], 2012). Putnam County ranked second and Greene County ranked sixth among the top milk-producing counties in the state in 2013 (SUDIA, 2014).

Timber production and related businesses such as saw mills are also common in the upper Oconee River basin. In 2011, a Forest Inventory Analysis compiled by the GFC (2011a) estimated there were 783,553 acres of forest land in the four counties occupied by the Project, representing approximately three quarters of their total area. The majority, 87 percent, of these forestlands are privately owned. NF lands represent 9 percent, mostly in Greene and Putnam counties, while the remaining 4 percent is in state or local government ownership. There are multiple mills in the region, including a Georgia-Pacific mill in Morgan County and a Rayonier mill in Putnam County, which allow timber to be milled locally (GFC, 2011b)

4.1.3 Major Water Uses

The Upper Oconee Regional Water Plan (CH2M HILL, 2011), developed as part of Georgia's state-wide water planning process, assesses current and future water and wastewater needs and management practices in a 13-county region. The regional plan was adopted by GEPD in November 2011. The planning region spans the Oconee River basin from its headwaters in the Piedmont of northeast Georgia to its lower reaches in

the Coastal Plain of south-central Georgia. The Wallace Dam Project is located in the middle of the planning region. Information compiled in the plan shows that surface water provides 94-percent of the water supply used by the municipal, industrial, energy, and agricultural water-use sectors in the Oconee River basin. Sustainable groundwater yields are limited in the crystalline-rock aquifer system that underlies the upper Oconee River basin in the Piedmont province.

Significant portions of the Oconee River watershed both upstream and downstream of the Wallace Dam Project are classified for drinking water supply, including Lake Oconee and Lake Sinclair. Other primary uses of the Oconee River in the vicinity of the Wallace Dam Project include fishing, aquatic life, recreation, multiple resorts, hydropower generation, once-through cooling for Georgia Power's Plant Harllee Branch[3], and municipal/industrial water supply.

The Oconee River also serves as a primary receiving water for assimilating treated sanitary effluent in the basin. The majority of wastewater (97 percent) is treated by facilities with point source discharges (CH2M HILL, 2011). Excluding energy production returns, about 45 percent of the municipal wastewater generated in the region is treated by onsite treatment systems, such as septic tanks, in areas where public collection systems are unavailable.

4.1.4 Tributary Streams

The Oconee River near Greensboro, in the upstream end of Lake Oconee, has a drainage area of 1,090 sq mi (Dyar and Alhadeff, 1997), about 60 percent of the drainage area upstream of Wallace Dam. Tributary watersheds and Lake Oconee comprise the remaining 40 percent of the drainage area upstream of Wallace Dam. The larger tributaries entering Lake Oconee include the following streams in approximate descending order of watershed area (Figures 2 and 3):

- Apalachee River – originates in Gwinnett, Barrow, Walton, and Oconee Counties, flows southeast through Morgan and Greene Counties, borders parts of Oconee NF, and enters the northwestern (Apalachee River) embayment of Lake Oconee; watershed area of about 233 sq mi upstream of Lake Oconee.

- Hard Labor Creek – originates in Walton County, flows east through Morgan County, including Hard Labor Creek State Park, and enters the Apalachee River embayment of Lake Oconee; it has a drainage area of approximately 86 sq mi.

[3] Plant Branch is located on Lake Sinclair about 17 river miles downstream of Wallace Dam. Two units have already been retired and the remaining two units will be retired in 2015. Negligible water level changes are expected since the plant uses a once-through cooling system.

- Sugar Creek – drains portions of southeastern Morgan County and enters the western side of Lake Oconee south of I-20; it has a drainage area of approximately 49 sq mi.

- Greenbriar Creek – originates in Oconee County, flows southeast through Greene County, including parts of Oconee NF, and enters the Oconee River embayment near the upstream end of Lake Oconee; it has a drainage area of approximately 30 sq mi.

- Richland Creek – drains portions of central Greene County north and west of Greensboro, flows south, and enters the major eastern embayment (Richland Creek) of Lake Oconee south of I-20; it has a drainage area of approximately 53 sq mi.

- Beaverdam Creek – drains portions of central Greene County east and south of Greensboro, flows south, and enters the Richland Creek embayment of Lake Oconee south of I-20; it has a drainage area of approximately 30 sq mi.

- Town Creek – drains portions of northern Greene County, flows west-southwest through Oconee NF, and enters the eastern side of the Oconee River embayment south of I-20; it has a drainage area of approximately 30 sq mi.

- Fishing Creek – originates in southwestern Oglethorpe County, drains portions of northern Greene County, flows west, and enters the eastern upstream end of the Oconee River embayment; it has a drainage area of approximately 39 sq mi.

4.1.5 Climate

The Oconee River basin is characterized by a moist and temperate climate. Summers are long and hot, and winters are mild and short. Average annual air temperature ranges from 60 to 65°F (GEPD, 1998). Average daily temperatures vary from 40 to 45°F in January to 75 to 80°F in July. Winter low temperatures fall below freezing for only short periods. Average annual precipitation ranges from 47 inches in the lower basin to 56 inches in the upper basin. The wettest months are February and March. The driest months are August and September (USGS, 2014).

4.2 Geology and Soils

4.2.1 Existing Environment

The Wallace Dam Project lies in the Washington Slope District of the Piedmont physiographic province (Clark and Zisa, 1976) (Figure 5). The Piedmont province is underlain by Precambrian and Paleozoic crystalline metamorphic and igneous rocks,

including gneiss, schists, metamorphosed volcanic rocks, metamorphosed sedimentary rocks, and granites (GEPD, 1998). Numerous inactive fault zones within the rocks play a role in surface stream patterns and ground water resources of the region. The Washington Slope District is characterized by a gently undulating surface that descends from around 700-ft elevation near its northern limits to about 500-ft elevation at its southern margin. Streams in the Washington Slope District occupy broad, shallow valleys characterized by gentle side slopes separated by broad, rounded divides, and local relief of 50 to 100 ft (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 where unconsolidated Coastal Plain sediments are deposited over Piedmont metamorphic and igneous rocks (Griffith et al., 2001). The Fall Line Hills District begins about 35 river miles downstream of the Wallace Dam Project.

The Wallace Dam Project is located in the Southern Outer Piedmont ecoregion (Figure 5). This ecoregion is characterized by low hills, major forest types of loblolly-shortleaf pine, underlying rocks of gneiss, schist and granite, fine sandy loam soils, and a deep, red clayey subsoil (Griffith et al., 2001; Edwards et al., 2013). The majority of soils in the ecoregion are Kanhapludults (Griffith et al., 2001; U.S. Department of Agriculture, Natural Resources Conservation Service, 2013).

The Lake Oconee shoreline is characterized by gently sloping topography in most areas. Rock outcroppings occur along the shoreline in several areas, particularly in the lower end of the reservoir around the confluence of the Oconee River and Richland Creek. Significant stretches of undeveloped, forested shoreline occur in the lower end of the reservoir in association with Georgia Power's Lawrence Shoals Park, which includes an area with a moderately sloping granite outcrop above the shoreline, Oconee WMA, and other areas reserved as natural areas or future recreation development. Natural vegetative shoreline cover is prevalent in many areas throughout the reservoir, including adjacent tracts of the Oconee NF in the upper end of the reservoir. Much of the shoreline in the more developed central and southern portions of Lake Oconee has shoreline stabilization structures in place, which may include riprap, a seawall, or a seawall with riprap at the base.

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

along main-stem islands within Lake Oconee to stabilize banks and improve fish and wildlife habitat.

The 15.67-mile transmission line included as part of the Wallace Dam Project (Section 3.3; Appendix C) is also located entirely within the Piedmont province and Southern Outer Piedmont ecoregion. Relief along the right-of-way (ROW) is gently sloping.

4.2.2 Potential Resource Impacts

Potential impacts of continued operation of the Wallace Dam Project to geology and soils resources would be limited mainly to Lake Oconee and the tailrace area immediately downstream of Wallace Dam. Georgia Power will evaluate the effects of project operations on reservoir shoreline erosion and sedimentation as part of the license application.

No specific protection, mitigation, and enhancement (PM&E) measures are proposed at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address geology and soil resources as part of its PLP (Table 1).

4.3 Water Resources

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

- Georgia Power seasonal water quality data collected in Lake Oconee at multiple reservoir locations, typically on a quarterly basis, from 1979 to the present. These data include vertical profile measurements and water chemistry analyses of grab samples.

- Oconee River basin management plans developed as part of the Georgia State-wide Water Management Plan (CH2M HILL, 2011) and by GEPD (1998).

- Georgia 305(b)/303(d) list documents (GEPD, 2014), which assess whether surface water bodies in the project area and upstream are supporting their designated uses.

- Scientific literature and technical papers assessing nutrient loading sources and land use practices upstream of Lake Oconee and their potential influences on nutrient concentrations and algal abundance in the reservoir.

4.3.1 Existing Environment

USGS divides the Oconee River into two sub-basins with corresponding 8-digit Hydrologic Unit Codes (HUCs). The Wallace Dam Project, with an upstream drainage area of 1,830 sq mi (GEPD, 1998), is located within HUC 03070101 (Upper Oconee Watershed – above Sinclair Dam). This sub-basin covers the headwaters of the Oconee River, including the Middle and North Oconee Rivers, to Lake Oconee and Lake Sinclair.

Water Quantity

Stream Flow

This section characterizes stream flow at the project dam. Because Wallace Dam discharges directly into Lake Sinclair, there is no USGS stream gage measuring this discharge. Therefore, daily inflow cannot be calculated from daily discharge and change in storage. The nearest USGS stream gages that measure stream flow are:

- Apalachee River near Bostwick, Georgia (No. 02209000) – about 13 miles upstream of the project boundary; 176-square mile drainage area; period of record July 1944 to present.

- Oconee River near Penfield, Georgia (No. 02218300) – at the bridge on Athens Highway about 1.5 miles upstream from the project boundary; 940-square mile drainage area; period of record August 1977 to present.

- Oconee River at Milledgeville, Georgia (No. 02223000) – at Sinclair Dam; 2,950-square mile drainage area; period of record September 1903 to present.

Georgia Power calculated daily inflow duration statistics by month and year for the project by adding the flows from the Oconee River at Penfield to the Apalachee River at Bostwick and applying a ratio of the remainder of the ungaged drainage area to estimate the total Lake Oconee inflow. Monthly minimum, average, and maximum inflows at Wallace Dam for the period January 1997 through September 2013 are provided in Table 5 for each month of the year. Appendix F provides daily inflow duration curves by month and annually for the period January 1997 through September 2013. Average flows range from 1,024 cfs in August to 3,749 cfs in March. Minimum, average, and high flows are all highest in late winter (February/March) and lowest in late summer (August/September).

Water Withdrawals

Surface withdrawals for water supply comprise the vast majority of water uses in the project vicinity and include the cities of Greensboro, Sparta, and Madison. Annual average demand for surface water is 79 million gallons per day; these withdrawals support municipal (62 percent), industrial (20 percent), and agricultural (18 percent) needs. Non-consumptive uses, such as withdrawals for thermoelectric or hydropower production, where the water is immediately returned are not included in these numbers. Groundwater withdrawals account for only 6 percent of annual average demand for industrial (59 percent), municipal (24 percent), and agricultural (17 percent) uses from the underlying Cretaceous and fractured Crystalline rock aquifers (CH2M HILL, 2011).

Figure 6 shows the active GEPD permitted withdrawals for groundwater and surface water near the Wallace Dam Project (Georgia Soil and Water Conservation Commission, 2014). Permitted water sources on Lake Oconee include the City of Greensboro, the City of Madison, and Piedmont Water Resources (GEPD, 2014b).

Treated Wastewater Discharges

In 2014, there were four water treat plants, 18 land application permits, and 16 National Pollutant Discharge Elimination System permitted discharges in the four county area surrounding Lake Oconee. These discharges are primary sources of phosphorus to the reservoir. The addition of nutrients to the reservoir contributes to Lake Oconee's trophic status of mesotrophic to nearly eutrophic conditions (Figure 7) (University of Georgia, 2006).

Water Quality

Water Use Classifications

GEPD (2014a) classifies the water use of Lake Oconee within the Wallace Dam project boundary as Drinking Water and Recreation. In addition, all waters are classified as Fishable. In addition to general criteria applicable to all waters, specific criteria apply to these classified water uses, including criteria for bacteria (fecal coliform), dissolved oxygen (DO), pH, and temperature, as set forth in the Rules and Regulations for Water Quality Control, Chapter 391-3-6 (GEPD, 2012a). Based on historical data and GEPD's Water Quality in Georgia report (GEPD, 2012b), Lake Oconee supports its designated uses and meets water quality standards.

Although Lake Oconee and the Wallace Dam tailrace area are meeting designated uses, several tributary streams to Lake Oconee are included on the 2012 303(d) list for being impaired (Table 6; Figure 8). All the creeks listed in Table 6 do not meet their water

use classification due to fecal coliform or fish community impacts. Non-point sources and urban runoff are the likely cause of impairment for each of these creeks.

Consistent with the 303(d) listings, many tributaries to Lake Oconee often exceed regulatory standards for fecal coliform. Studies have indicated that the source of the contamination is bovine and not human; consistent with the heavy agricultural uses in the tributary areas (Bachoon et al, 2009). Increased use of adequate riparian buffers has been shown as one way to minimize the impacts of cattle farms (Fisher, 2001).

In 2002, in response to historical levels of mercury in fish tissue, the U.S. Environmental Protection Agency (EPA) developed a total maximum daily load (TMDL) for mercury for Lake Oconee. The TMDL was in response to Lake Oconee having largemouth bass exceeding Georgia's fish consumption guideline due to atmospheric deposition of mercury (EPA, 2002a). Mercury levels in Lake Oconee fish have decreased and there have been no restrictions since 2003 (GDNR, 2003).

GEPD is currently conducting a study that could result in a regulatory standard being placed on Lake Oconee chlorophyll-*a* concentrations. Chlorophyll-*a* is a green pigment found in algae and green plants that is vital for photosynthesis and serves as an indicator of nutrient levels in a waterbody. When the standard is developed, the regulation would also limit nutrient concentrations in Lake Oconee. Thus far, GEPD has developed chlorophyll-*a* standards for only a few lakes. The 2011 Georgia water quality standards indicate a numeric criterion for six other major lakes including Lanier, Allatoona, Jackson, West Point, Carters, and George.

Existing Water Quality

Lake Oconee

At full pool elevation of 435 ft PD, Lake Oconee covers approximately 19,050 acres with 374 miles of shoreline. The pool elevation varies about 1.5 ft daily as part of the pumpback operation of Wallace Dam. The reservoir provides a total reservoir storage volume of 370,000 acre-feet. The average reservoir depth is 21 ft; the maximum depth is approximately 120 ft.

Georgia Power collects seasonal water quality data within Lake Oconee, and this monitoring will continue during the relicensing study period. Since 1979, Georgia Power has conducted field monitoring of water quality at numerous locations in Lake Oconee. Sampling typically has occurred on a quarterly basis since 1986, with some gaps and variations in the frequency of monitoring over time. Figure 9 shows the locations of Georgia Power water quality monitoring stations in Lake Oconee. Water quality data collected at these stations typically have included vertical profile measurements of water temperature, DO concentration, pH, specific conductance

(conductivity), and turbidity taken at 1-meter intervals. In addition, various water chemical parameters, including nutrients and metals, have been analyzed in surface grab samples, and in mid-depth and bottom samples at some stations. Intermittent and limited information has been collected in the tailrace area of Wallace Dam. The project generally has exhibited good water quality conditions throughout the monitoring period. The water quality data are described in more detail below.

Water quality profiles have been measured quarterly at various stations throughout Lake Oconee for most years from 1979 through the present. Figure 10 shows seasonal vertical temperature profiles collected at Station OC1 near Wallace Dam in 2007; which was chosen because the summertime lack of stratification in the forebay (OC1) can be readily observed. Many reservoirs exhibit thermal stratification with warmer temperatures at the top, a sharp decrease in temperature at mid-depths, and cooler waters at the bottom. Some stratification in Lake Oconee can be observed in the spring and summer months at many monitoring locations except in the deep pool, or forebay, immediately upstream of Wallace Dam. Figure 11 shows the vertical temperature and DO profiles for Stations OC1 (in the forebay of Wallace Dam), OC2 (Richland Creek embayment), OC5 (mainstem reservoir near Highway 44), and OC9 (Sugar Creek embayment) for the years 2003 through 2012. It should be noted that typical reservoir summer stratification with cooler waters at depth is not observed in the forebay of Lake Oconee; however, stratification does occur at many of the other locations in many years.

Lake Oconee waters, especially in the forebay of Wallace Dam, remain vertically mixed as a result of the pumpback operations at Wallace Dam. Figure 11 shows the well-mixed nature of both temperature and DO at Station OC1. Stratification, especially in DO concentration, is evident, although not every year, in other locations in the reservoir.

Georgia Power conducted a two-year in-house study in 1995-1996 to evaluate environmental factors related to DO variability in Lake Oconee and the lack of summer stratification. The field results and modeling scenarios were presented in a report by Georgia Power (1997). The intensive sampling program continuously recorded DO concentrations at multiple reservoir locations and assessed those concentrations relative to pumpback/generation operations, inflow/outflows, and nutrient loading. The study found that the mixing that occurs as a result of pumpback operations prevents the accumulation of oxygen-demanding materials in the lake bottom, which normally result in bottom waters devoid of oxygen. Instead, the oxygen demand is spread throughout the water column with relatively homogenous DO concentrations occurring from the surface to the bottom of the reservoir. The study observed that reducing tributary sources of oxygen-demanding materials and nutrient loading through the reduction of point and non-point sources in the watershed could increase DO concentrations in the reservoir. In addition, generation and pumpback were found to exert a positive effect on DO levels in the reservoir near Wallace Dam and in the tailrace area downstream.

Water quality samples for chemical (nutrient and metal) analysis have also been collected quarterly since 1979. Table 7 provides a summary of these chemical parameters. Chemical analyses indicate no unusual results for the water quality for Lake Oconee, which has exhibited good water quality conditions throughout the monitoring period. The average concentration for iron frequently exceeds 1 milligram per liter (mg/L), the nationally recommended water quality criterion, which is likely attributable to suspended solids in the water column. There was a single instance of elevated fecal coliform at location OC4 (Glade Branch embayment) in 2010. Additional water quality data collected by GEPD in Lake Oconee in 2004 is shown in Table 8.

Trophic state index (TSI) has been monitored in Lake Oconee and other Georgia reservoirs to monitor the degree of eutrophication. TSI is defined as the total weight of living biological material (biomass) in a waterbody at a specific location and time. It is a measure of eutrophication of a body of water using a combination of measures of water transparency (using Secchi disk depth recordings), chlorophyll-*a* concentrations, and total phosphorus levels. Trophic state is the biological response to nutrient additions, but the effect of nutrients can be modified by factors such as season, grazing, mixing depth, and more (Naumann, 1929). Lake Oconee currently does not have nutrient criteria, but criteria are planned for the near future (GEPD, 2013). Similar to many reservoirs in Georgia, Lake Oconee is considered to be mesotrophic but approaching eutrophic conditions. Figure 7 shows the TSI values for Lake Oconee from 1979 to 2005 (University of Georgia, 2006). Georgia Power has documented the occurrence of several blue-green algal blooms (*Microcystis aeruginosa*) in Lake Oconee in recent years, likely due to nutrient loading in the lake.

Wallace Dam Tailrace

The Wallace Dam tailrace area also exhibits overall good water quality conditions. Although no continuous DO monitoring data have been collected from the tailrace recently, continuous DO readings were recorded in the tailrace on a limited basis in 1994, 1995, 1996, and 2001. Figure 12 shows a box-and-whisker plot (i.e., data distribution) of the distribution of DO measurements observed during these periods. The majority of readings (25^{th} through 75^{th} percentiles) were between 5 and 9 mg/L. The average DO concentration in the tailrace for all available data was 6.8 mg/L. When reviewing DO distributions collected in the month of August, the values were lower. However, the summertime DO measurements in the tailrace increased over the time period shown. The average concentration for August was 3.7 mg/L in 1994, 4.9 mg/L in 1995, and 6.0 mg/L in 2001. The second graph in Figure 12 shows continuous data collected at the surface and bottom in the forebay of Wallace Dam plotted for 1995 through 1996. The two probes (WDAM1 and WDAM2) were mounted to the upstream face of the dam in Lake Oconee. Although the exact depth was not recorded, WDAM1 was at the "surface" and WDAM2 was at the "bottom" (28 meters) (Georgia Power,

1997). The data show a typical seasonal pattern of DO concentrations being highest in the winter months and lowest during the summer months. For the surface measurements, there appear to be limited depressions below the DO instantaneous criterion of 4 mg/L. Only 1.3 percent of the readings were less than the instantaneous criterion; the actual depth of surface data collections was not documented. The annual average surface DO concentration in the forebay was 8.4 mg/L, and the average surface concentration in August 1995 was 6.3 mg/L.

Transmission Line

The Wallace Dam transmission line is located entirely within the upper Oconee River basin. The headwaters and small streams crossed by the ROW, including Jenkins Branch, Crooked Creek, Turkey Creek, and Rooty Creek, all drain south to Lake Sinclair (Figure 3). The water quality of these streams is affected by non-point source runoff from rural and urban land uses. Turkey Creek and Rooty Creek are part of the TMDL for fecal coliform in the Oconee River Watershed (EPA, 2002b).

4.3.2 Potential Resource Impacts

Potential impacts of continued project operation on water resources would be limited mainly to the forebay area of Lake Oconee and the tailrace area immediately downstream of Wallace Dam. Georgia Power will evaluate the effects of project operations on water resources in the license application. Potential impacts may include:

- Effects of project operations on water quality in Lake Oconee and the tailrace area.

Georgia Power is not proposing any PM&E measures at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address water resources as part of its PLP (Table 1).

4.4 Fish and Aquatic Resources

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

- The Wildlife Resources Division (WRD) of GDNR, which has conducted over 20 years of annual standardized fishery surveys of Lake Oconee and Lake Sinclair and uses these data to understand population characteristics and

associated fishing trends, make fisheries management decisions, and characterize angler prospects.

- The Fishes of Georgia Website (Straight et al., 2009), cooperatively funded by the U.S. Fish and Wildlife Service (FWS), GDNR Nongame Conservation Section, and the Georgia Museum of Natural History (GMNH), which provides an online distributional atlas of freshwater fishes in Georgia based on historical and recent collection data.

- Online species accounts and occurrence maps by HUC 10 watershed for fish species of conservation concern, prepared by GDNR's Nongame Conservation Section.

- Fish species distribution, habitat use, and conservation information available in the scientific literature and through NatureServe Explorer, an online database providing in-depth coverage for rare and endangered species.

- The Georgia Bass Chapter Federation (GBCF), which has gathered and compiled angler catch data annually for Lake Oconee, Lake Sinclair, and numerous other Georgia reservoirs from bass tournaments, which has established a long-term dataset of catch statistics for detecting changes in the largemouth bass fishery over time.

- Research studies on the use of standing timber by fish populations in Lake Oconee (Van Den Avyle and Petering, 1988) and the rapidly expanding, introduced blue catfish population (Homer and Jennings, 2011).

- Scientific literature on the distribution of sensitive species of fish in the Oconee NF (Nuckols and Roghair, 2004), community structure of floodplain fishes in the Altamaha River basin (Garnett and Batzer, 2014), and suitable host fishes for freshwater mussels from the Altamaha River basin (Johnson et al., 2012).

- The final environmental impact statement for the FS' Land and Resource Management Plan for the Chattahoochee-Oconee National Forests (FS, 2004a,b), which provides information on fish and mussels inhabiting streams on Oconee NF.

- Georgia Power fisheries survey data from Lake Sinclair, 2003-2005.

4.4.1 Existing Environment

The Wallace Dam Project is located on the upper Oconee River within the larger Altamaha River basin. The project reservoir (Lake Oconee) and its tributaries are

located entirely within the Piedmont physiographic province. The upper Oconee River basin principally supports warm-water fisheries. The impounded waters of Lake Oconee dominate aquatic habitats within the project boundary and the principal fisheries inhabiting project waters are reservoir fisheries. Wallace Dam discharges directly into Lake Sinclair, which also supports a reservoir fishery. Free-flowing streams in the project area are limited to the Oconee River and other larger tributaries to Lake Oconee upstream of the project boundary. The Sinclair Project impounds about 30 miles of the Oconee River and separates Wallace Dam from the lower free-flowing reach of the Oconee River.

Distribution of Fishes in the Project Vicinity

This section first describes the fish fauna of the upper Oconee River basin, including rivers and tributaries in the basin upstream of Wallace Dam and Lake Oconee. Next, the fish species inhabiting the Oconee River and other larger tributaries to Lake Oconee upstream of the project boundary are characterized. The following section then describes the fisheries of Lake Oconee in greater detail.

The Oconee River basin supports a diverse fish fauna, consisting of about 79 species of warm-water fishes in 17 families (Straight et al., 2009; GEPD, 1998; Lee et al., 1980). The upper Oconee River and its tributaries in the vicinity of the Wallace Dam Project support about 57 species of fish (Table 9). The families with the most species include minnows, catfishes, sunfishes, suckers, and perches. Standardized surveys conducted by WRD for targeted sport fishes in Lake Oconee since 2002 have documented the occurrence of at least 28 species of fish within the project reservoir (GDNR, 2014a). Several other non-game species, which are not targeted by the WRD surveys, also likely reside in the reservoir. The principal sport fishes inhabiting Lake Oconee include largemouth bass, black crappie, white bass-striped bass hybrids (hybrid bass), white bass, striped bass, channel catfish, blue catfish, flathead catfish, and a variety of sunfishes (GDNR, 2014b; Dallmier, 2000).

The largest tributaries to Lake Oconee (Oconee River, Apalachee River, Hard Labor Creek, Greenbriar Creek, Sugar Creek, Richland Creek, and Town Creek) support a total of about 53 species of fish in free-flowing habitats upstream of the project boundary (Table 9) (Straight et al., 2009; Nuckols and Roghair, 2004; Garnett and Batzer, 2014). Each of five watershed management areas within the Oconee NF upstream of Wallace Dam supports from 45 to 48 fish species (FS, 2004b). Among the species occurring upstream of the project boundary are the Altamaha shiner, a Georgia threatened species endemic to the Piedmont of the upper Altamaha River basin, and the brassy jumprock, a sucker species of special concern (GDNR, 2014c) (see Section 4.7.1). FS sensitive fish species occurring in the Oconee NF upstream of Lake Oconee include the Altamaha shiner and Ocmulgee shiner (FS, 2004b). GDNR (2005)

identifies the Apalachee River watershed upstream of Lake Oconee as High Priority Waters for protecting aquatic biodiversity. No federally listed fish species occur within the Wallace Dam project boundary or in tributaries to Lake Oconee upstream of the Project; and none occur on or near the Oconee NF (FS, 2004b).

Nine fish species believed to be introduced and non-native to the Oconee River basin have been reported in the project vicinity (Table 9). Six of these species occur in Lake Oconee within the project boundary. They include blue catfish, a sport fish which has rapidly expanded in abundance since 1997 and has become an important component of the recreational and commercial fisheries in Lake Oconee, as well as flathead catfish (Homer and Jennings, 2011).

Fish and aquatic resources inhabiting the headwaters and small streams crossed by the Wallace Dam transmission line likely include several of the same fish species listed for smaller tributaries to Lake Oconee (Table 9), including minnows, catfishes, sunfishes, and other small-stream species.

Lake Oconee

Lake Oconee covers 19,050 acres and has 374 miles of shoreline (Figure 3). The bottom is mostly clay with rocky outcroppings in several areas, particularly in the lower end of the reservoir around the confluence of the Oconee River and Richland Creek. Lake Oconee's long, narrow shape produces noticeable water current throughout the reservoir during power generation and pump-back operations (GDNR, 2014b). Sport fish in Lake Oconee tend to be more active and feed more aggressively at the times when water is moving through the dam (GDNR, 2014b; Dallmier, 2000). Shorelines in the upstream, rural reaches of Lake Oconee, including Oconee NF, and in lower areas of the reservoir designated for parks and recreation areas and the Oconee WMA, support natural, densely forested shoreline vegetation. Numerous public access areas and marinas around the reservoir provide for a wide variety of boat- and bank-fishing opportunities and experiences.

Standing timber and fish plots (stands topped out below the surface) are distributed throughout Lake Oconee and provide cover for resident fish, including black crappie and other sunfishes. These areas also serve as nursery habitat for the forage species gizzard shad and threadfin shad (Van den Avyle and Petering, 1988). When Lake Oconee was constructed, about 1,250 acres of timber were left standing in flooded channels and smaller inlets as wildlife habitat. Fifty timber stands totaling about 250 acres were cut off 10 ft below the full-pool surface as submerged habitat for reservoir fish. Other important fish habitat structure in Lake Oconee includes anchored fish attractors, artificial reefs, native aquatic vegetation, sunken trees, spawning gravel, and riprap installed as cooperative projects involving Georgia Power, GDNR, Lake Oconee

Bassmasters, Southeast Aquatic Resources Partnership, National Fish and Wildlife Foundation, FS, Reynolds Plantation, Lake Oconee Anglers, and Boy Scouts of America (Morgan County Citizen, 2005; National Fish Habitat Partnership, 2008; Lake Oconee Bassmasters, 2014). In addition, the docks, boatslips, and riprap placed along seawalls, at bridge crossings, and in other areas around the reservoir provide abundant sources of cover for fish.

Lake Oconee supports a popular fishery for largemouth bass, hybrid bass, striped bass, white bass, channel catfish and blue catfish, black crappie, and a variety of other warm-water species (GDNR, 2014b). WRD has performed annual standardized fisheries surveys during fall/winter at up to 14 sampling stations throughout the reservoir since 2002 and maintains a comprehensive database of fishery population data (GDNR, 2014a). The surveys include two sampling events per year (spring and fall) using boat electrofishing and gillnetting collection methodologies. The unpublished data include fish length, weight, and relative condition by species and are used by GDNR to evaluate the overall health of the fishery and make management decisions. Georgia Power works collaboratively with GDNR to support the agency's management of the fishery.

The GDNR standardized fishery survey data indicate the presence of a relatively diverse and overall healthy reservoir fishery similar in species composition, relative abundance, and trophic structure to other southeastern Piedmont reservoirs. The sport fish targeted by electrofishing in the five most recent years of surveys (2009-2013) included largemouth bass, black crappie, and bluegill, which comprised 89 to 96 percent of the electrofishing catch (Table 10). The relative condition factors (K_n) for the species targeted by electrofishing (Table 10) indicate that sport fish populations in Lake Oconee vary in condition from just slightly below average (<1.00) to good condition (>1.00) compared to average length-weight relationships for the same species in Georgia.[4] The gill netting catch in the five most recent years of surveys (2007-2009, 2011, 2012) was numerically dominated by blue catfish, channel catfish, gizzard shad, black crappie, and either white bass or hybrid bass (Table 11). The top five most abundant species in gill nets comprised 86 to 94 percent of the catch by number each year. Blue catfish dominated the biomass of the gill netting catch in each of the past five years of surveys. Other dominant species by weight were channel catfish, hybrid bass, and black crappie.

Tournament fishing is popular on Lake Oconee and primarily targets largemouth bass. Lake Oconee is a consistent year-round producer of largemouth bass but is not known for producing large numbers of trophy-size fish (Dallmier, 2000). A newly

[4] Condition factors are indices used to compare the "fatness" or "well-being" of fish and are based on the premise that heavier fish of a given length are in better condition. Relative condition (K_n) represents the weight of each fish as a proportion of the length-specific mean weight for a fish in the reference population. Thus, average fish of all lengths and species have a K_n value of 1.00.

implemented 14-inch minimum length regulation for largemouth bass on Lake Oconee aims at improving largemouth growth and angling experiences. GBCF reports on tournament creel data submitted by bass clubs throughout Georgia. Table 12 summarizes 18 years of Lake Oconee tournament creel data for the years 1996 through 2013. The average tournament bass weight, which ranged from 1.76 to 2.08 pounds (lbs), ranked among the top five reservoirs in Georgia in 16 of the 18 years (GBCF, 1996-2013). The average largest bass reported in Lake Oconee tournaments ranged in weight from 3.51 to 4.57 lbs. Although not landed during a tournament, the largemouth bass record for Lake Oconee was a 12-lb, 14-ounce fish caught in May 2012 (Carter, 2012).

Lake Oconee is also known for spring and fall crappie fishing. Standing timber, fish plots, man-made brush piles, docks, boatslips, and riprap provide cover for crappie and other fish. The average crappie sampled by WRD biologists in the spring and fall of 2013 measured 10 inches length (GDNR, 2014b). Crappie run a close second to largemouth bass in fishing popularity at Lake Oconee, with the best fishing in winter and early spring (Dallmier, 2000).

GDNR stocks both striped bass and hybrid bass into Lake Oconee (Table 13). Stocking numbers have been transitioning from a predominance of striped bass to that of hybrid bass based on angler preferences for hybrid bass (GDNR, 2014b). Stocking rates from 2005 through 2012 were 10 hybrid bass and 10 striped bass per acre, while stocking rates from 2013 to present have been 15 hybrid bass and 5 striped bass per acre (Nelson, 2014, personal communication). Hybrid bass are available to anglers in the 5- to 10-lb range, while striped bass average 16 inches length and have been caught in the 8- to 10-lb range (GDNR, 2014b). Typically in March, hybrid bass and white bass begin to migrate up the Oconee and Apalachee Rivers upstream of Lake Oconee to spawn (Dallmier, 2000).

A substantial year-round catfish fishery has developed in Lake Oconee and continues to expand. Both blue catfish and flathead catfish were introduced into the reservoir in the mid-1990's (Homer and Jennings, 2011). Homer and Jennings (2011) evaluated annual GDNR standardized fishery survey data for the period 1989-2009 to detect trends in the catch of blue catfish in Lake Oconee. Catch data indicated that the blue catfish population expanded rapidly after 1997. Blue catfish averaged 13 inches in length and about 1 lb in weight and represented seven year classes in 2008. The largest blue catfish sampled was 29 inches long and weighed 11 lbs. While blue catfish abundance increased, native white catfish abundance decreased, indicating possible competition between these species for food and habitat (Homer and Jennings, 2011). The flathead catfish population has also been increasing but not as rapidly as blue catfish. Anglers now have the opportunity to catch trophy-size catfish in Lake Oconee, with some blue catfish and flathead catfish exceeding 40 lbs (GDNR, 2014b). Commercial and

recreational fishermen commonly use trotlines and jugs to fish for catfish on Lake Oconee.

Wallace Dam Tailrace Area

Downstream of Wallace Dam, the Oconee River flows directly into Lake Sinclair, which serves as the lower reservoir for Wallace Dam pumped storage operations (Figure 2). Shorelines in the tailrace area of Wallace Dam (Lake Sinclair) are primarily forested downstream to the end of the project boundary. The Lake Sinclair fishery is dominated by many of the same reservoir species found in Lake Oconee (Table 9). GDNR performs annual assessments of the Lake Sinclair reservoir fishery and maintains a comprehensive database of fishery population data.

Freshwater Mussels

The Altamaha River basin is inhabited by a unique freshwater mussel fauna, consisting of about 18 species, 7 of which are endemic to the basin (Johnson et al. 2012; Wisniewski et al., 2005). Most of these species typically inhabit free-flowing streams and rivers. Four species of mussels in the family Unionidae presently occur in the upper Oconee River basin in the vicinity of the Wallace Dam Project, including three endemic species (Table 14) (Wisniewski, 2014, personal communication). The Oconee River upstream of the Wallace Dam Project has confirmed occurrences of the Altamaha slabshell *(Elliptio hopetonensis*) and Altamaha lance (*Elliptio shepardiana*). Three species, including Altamaha slabshell, variable spike *(Elliptio icterina),* and Altamaha pocketbook *(Lampsilis dolobraeformis),* have been documented to occur in the Apalachee River upstream of the Project. The Altamaha slabshell has also been documented as occurring in Hard Labor Creek upstream of the Project. One mussel species listed as FS-sensitive occurs on the Oconee NF, the inflated floater (*Pyganodon gibbosa*), which is also endemic to the Altamaha River basin (FS, 2004b). There are no known records of native mussel occurrences in Lake Oconee.

None of these four unionid mussel species occurring in the vicinity of the Project are listed as federally or state protected. The Altamaha slabshell is currently widespread and locally abundant, and is the most common Altamaha River native mussel (Cummings and Cordeiro, 2011). The Altamaha lance also has a fairly wide distribution within the Altamaha River basin, living on a variety of substrates in small streams to large rivers (NatureServe, 2014). The Altamaha pocketbook is most common in the upper Altamaha River and lower Ocmulgee River but is rare in the Oconee River basin (NatureServe, 2014). The variable spike has the widest distribution, which extends to other Atlantic Coast rivers, and is considered stable throughout its range (NatureServe, 2014).

Studies of host fishes for the early life stages (glochidia) of Altamaha River mussels identified the following suitable hosts for the three endemic species (Johnson et al., 2012 [and references cited therein]):

- Altamaha slabshell – bluegill, fathead minnow, largemouth bass, eastern mosquitofish
- Altamaha lance – two species of bullheads (*Ameiurus* spp.), bluegill
- Altamaha pocketbook – bluegill, largemouth bass

All of these potential host fish species are common throughout the upper Oconee River basin (Table 9), with fathead minnow being introduced as a commonly used baitfish.

Migratory Fishes

The Wallace Dam Project is located approximately 310 river miles upstream of the Atlantic Ocean (Figure 1) and 35 river miles upstream of the Fall Line Hills District between the Piedmont and Coastal Plain provinces (Figure 5). Sinclair Dam, located 30 river miles downstream, and also situated above the Fall Line, impedes or blocks diadromous[5] and other migratory riverine fishes from migrating upstream into the project area.

Seven diadromous species presently occur in portions of the Altamaha River basin, including six anadromous[6] species and one catadromous species[7]:

- 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 – anadromous or highly migratory

[5] Diadromous species migrate between freshwater and marine/estuarine environments to complete their life cycles.
[6] Anadromous species migrate from marine/estuarine to freshwater environments to spawn.
[7] Catadromous species migrate from freshwater to marine environments to spawn.

- American eel – catadromous

Of the seven species, striped bass is the only species known to occur within the Wallace Dam project boundary, and it occurs as a land-locked population which appears to be sustained solely by stocking. There is no downstream migration of striped bass through the Wallace Dam project area to reach estuarine environments and no evidence of successful natural reproduction in the area.

American eels presently range upstream in the Oconee River basin as far as Sinclair Dam; however, a relatively recent occurrence is known from Hard Labor Creek upstream of Lake Oconee (Table 9) (GDNR, 2014e). No American eels have been reported from the numerous standardized fishery surveys of Lake Oconee conducted annually by GDNR (2014a), although these surveys primarily target sport fish.

Shortnose sturgeon and Atlantic sturgeon, both listed as federally endangered species, and American shad, use portions of the Altamaha River and lower Ocmulgee River and/or Oconee River downstream of Sinclair Dam for spawning runs. In the Oconee River, American shad currently occur as far upstream as Sinclair Dam (GDNR, 2014f). Historical evidence suggests that American shad formerly occurred as far upstream in the Oconee River as near Athens-Clarke County (references cited in GDNR, 2014f). Blueback herring and hickory shad are currently limited in distribution to the Altamaha River and Ocmulgee River (GDNR, 2014g; Straight et al., 2009).

The robust redhorse (*Moxostoma robustum*), a Georgia endangered species, is another migratory riverine species that inhabits the Oconee and Ocmulgee Rivers in the Altamaha River basin. A population currently occurs in the Oconee River downstream of Sinclair Dam. Recent occurrences of robust redhorse in Little River, a tributary to Lake Sinclair, and Lake Sinclair appear to have resulted from a dam failure at the Walton Hatchery in 1995, when 219 robust redhorse fingerlings escaped into a small tributary of Little River (Zelko, 2012). No robust redhorse had been documented from Lake Sinclair in over 20 years of standardized gillnet and electrofishing sampling. The species is not known to occur upstream of Wallace Dam.

Essential Fish Habitat

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 Wallace Dam Project, located upstream of the Fall Line in the Piedmont province (Figure 5), 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 Wallace Dam Project (SAFMC, 2014). The Wallace Dam Project is located 310 river miles upstream of the Atlantic Ocean, above one other existing major dam on the Oconee River (Sinclair Dam). Moreover, the Project does not substantially affect river flow into downstream estuarine or marine environments.

4.4.2 Potential Resource Impacts

Potential impacts of continued project operation on fish and aquatic resources would be limited mainly to Lake Oconee and the tailrace area immediately downstream of Wallace Dam within the project boundary. Georgia Power will evaluate the effects of project operations on fish and aquatic resources in the license application. Potential impacts may include:

- Effects of project operations and shoreline permitting on fish habitat and aquatic resources in Lake Oconee
- Effects of project operations on summer habitat for primary sport fish species, including largemouth bass and stocked striped bass, in Lake Oconee
- Effects of project operations on tributary riverine fish and mussel habitat
- Effects of project operations on aquatic habitat in the project tailrace area
- Fish entrainment and turbine-induced mortality
- Invasive aquatic species within the project boundary

Georgia Power is not proposing any PM&E measures at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address fish and aquatic resources as part of its PLP (Table 1.)

4.5 Wildlife and Botanical Resources

4.5.1 Existing Environment

Vegetation

Major forest types in the Southern Outer Piedmont ecoregion include loblolly-shortleaf pine, oak-hickory, and oak-pine forests (Griffith et al., 2001; FS, 2004b). Edwards et al. (2013) characterized the predominant forest type of the Georgia Piedmont as being oak-

pine-hickory forest and identified the dominant vegetation species. The dominant canopy species include varying mixtures of loblolly pine (*Pinus taeda*), shortleaf pine (*Pinus echinata*), white oak (*Quercus alba*), post oak (*Quercus stellata*), southern red oak (*Quercus falcata*), other oak species, pignut hickory (*Carya glabra*), and mockernut hickory (*Carya tomentosa*). Subcanopy species typically include winged elm (*Ulmus alata*), red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), sourwood (*Oxydendrum arboretum*), and flowering dogwood (*Cornus florida*). Loblolly and shortleaf pine are common on disturbed sites as early successional species. Shrubs and vines may include deerberry (*Vaccinium stamineum*), mountain laurel (*Kalmia latifolia),* eastern sweetshrub (*Calycanthus floridus),* blueberries (*Vaccinium* sp.), muscadine (*Vitis rotundifolia),* eastern poison ivy (*Toxicodendron radicans),* viburnums (*Viburnum* sp.), greenbriers (*Smilax* sp.), Virginia creeper (*Parthenocissus quinquefolia),* and bursting-heart (*Euonymus americanus).*

Among a variety of other natural communities in the Piedmont, this subregion also supports granite outcrops, one of Georgia's distinctive natural communities. Native vegetation on undisturbed granite outcrops may include a mosaic of successional assemblages, from soil-filled depressions, outcrop margins, and exposed rock, to temporary pools (Edwards et al., 2013). Several plant species found on granite outcrops are endemic to Georgia and rare. A 40-acre granite outcrop is located in the Oconee WMA along the edge of Lake Oconee just outside of the project boundary. The site is owned and managed by GDNR and has pools inhabited by federally threatened pool sprite (*Amphianthus pusillus*) and federally endangered mat-forming quillwort (*Isoetes tegetiformans*) (FWS, 2008; GDNR, 2010) (Section 4.7.1).

The Piedmont ecoregion has a history of intensive agriculture, primarily cotton and tobacco farming, which were important economies for the region and major determinants of the vegetative composition of the region (Edwards et al., 2013). Silvicultural activities in the region began in the late 1800's, when large areas were harvested for timber. Those areas have subsequently regenerated to hardwood-dominated woodlands and pine forests, either through natural succession or planting programs (Kramer and Elliott, 2004; Georgia Botanical Society, 2014). Population growth and subsequent urbanization have also been major determinants of the current vegetative patterns and distribution in the Piedmont ecoregion.

Invasive plant species are any species, including its seeds, spores, or other biological material capable of propagating that species, that is not native to a particular ecosystem; and that causes or is likely to cause environmental harm if introduced (Georgia Exotic Pest Plant Council [EPPC], 2006). The Georgia EPPC maintains invasive plant species lists, monitors the spread of invasive species, and works to educate the public on harmful effects of invasive species. County distribution maps for invasive plant species are available online through the Early Detection and Distribution Mapping System

(EDDMapS) developed by the University of Georgia Center for Invasive Species and Ecosystem Health (2014).

Georgia invasive plants are separated into various categories based on their abundance and potential degree of harm to native plant communities. Category 1 species pose serious problems because they extensively invade native plant communities and displace native species. Category 1 Alert species have significant potential to become serious problems but have not yet reached the level of harm of a Category 1 species. Invasive plant species were identified for Morgan, Putnam, Greene, and Hancock Counties based on the list compiled by Georgia EPPC (2006) and the EDDMapS distribution maps (Table 15).

Some of the most problematical invasive plants in the Georgia Piedmont are Chinese privet, kudzu, autumn olive, bicolor lespedeza, Chinese wisteria, Japanese stiltgrass, and Japanese honeysuckle (Edwards et al., 2013). Chinese privet, Japanese honeysuckle, and Japanese stiltgrass are especially common in the floodplains (Ward, 2002; Burton et al., 2005; Loewenstein and Loewenstein, 2005). Chinese privet has achieved a widespread distribution, occupying up to 59 percent of the floodplain of the upper Oconee River (Ward, 2002). It forms dense thickets, especially in floodplain habitats and bottomland forests, and spreads easily through the movement of its seeds by humans and wildlife and through prolific root sprouting (Miller, 2003). The spread of invasive plants is often linked to urbanization, residential development, and anthropogenic disturbance of riparian habitats.

Vegetation along the Wallace Dam transmission line is characteristic of maintained ROWs in the Southern Outer Piedmont ecoregion. Dominant canopy species adjacent to the ROW include loblolly pine, shortleaf pine, and a variety of oak, hickory, and maple species. However, the ROW is maintained as predominantly shrub and herbaceous vegetation under Georgia Power's integrated vegetation management program. This program involves mowing, cutting dangerous trees, pruning, applying herbicide, and removing trees to ensure a safe and reliable electric system.

Wildlife

Characteristic terrestrial mammal species of oak-pine-hickory forests in the Georgia Piedmont include white-tailed deer (*Odocoileus virginianus)*, gray fox (*Urocyon cinereoargenteus)*, bobcat (*Lynx rufus)*, eastern chipmunk (*Tamias striatus)*, gray squirrel (*Sciurus carolinensis)*, southern flying squirrel (*Glaucomys volans)*, northern raccoon (*Procyon lotor)*, Virginia opossum (*Didelphis virginiana)*, striped skunk (*Mephitis mephitis)*, eastern cottontail (*Sylvilagus floridanus)*, white-footed mouse (*Peromyscus leucopus)*, woodland vole (*Microtus pinetorum*), southern short-tailed shrew (*Blarina carolinensis)*, and cotton mouse (*Peromyscus gossypinus)* (Edwards et

al., 2013; FS, 2004b; GMNH, 2008). Bats occurring in these forests can include big brown bat (*Eptesicus fuscus)*, eastern pipistrelle (*Pipistrellus subflavus)*, evening bat (*Nycticeius humeralis)*, hoary bat (*Lasiurus cinereus)*, and little brown myotis (*Myotis lucifugus)* (Edwards et al., 2013 GMNH, 2008).

A wide variety of birds use diverse wetland, upland, and open water habitats in the project vicinity, including neotropical migrant songbirds, raptors, waterfowl, and shorebirds. Numerous species seasonally migrate through the area while many others reside locally and breed in the area. The USGS conducts annual breeding bird surveys (BBS) around the U.S. to monitor bird populations and trends (Sauer et al., 2014). Two routes in the Georgia Piedmont, the Siloam and Rutledge routes, each 24.5 miles long, are located in the vicinity of the Wallace Dam Project. The Siloam route crosses the middle of Lake Oconee in Greene and Putnam Counties. The Rutledge route is located west of Lake Oconee in Morgan and Jasper Counties. Competent birders have surveyed the Siloam and Rutledge routes annually (most years) since 1967 and 1975, respectively. The surveys are conducted along roadsides during the peak of the breeding season, usually in June, during daylight hours.

Table 16 summarizes the relative abundance of the bird species recorded along each BBS route in the project vicinity. The abundance estimate represents the number of birds that a competent birder would encounter in about 2.5 hours of roadside birding in the area near the BBS route (Sauer et al., 2014). Commonly observed species along the survey routes include: American crow, northern cardinal, mourning dove, blue jay, barn swallow, common grackle, northern bobwhite, northern mockingbird, indigo bunting, eastern towhee, Carolina wren, red-winged blackbird, pine warbler, yellow-breasted chat, tufted titmouse, eastern bluebird, wood thrush, chipping sparrow, eastern meadowlark, and red-bellied woodpecker. About 104 species have been documented along the Siloam and Rutledge routes.

The National Audubon Society (2014) coordinates the annual Christmas Bird Count (CBC) through the use of volunteer birders.[8] The CBC documents the avifauna that winters within North America and the extent of southward migration of many water-dependent species, such as ducks and other waterfowl. The BBS and CBC provide complementary measures of long-term trends in the health and status of bird populations. CBCs are conducted during the period December 14 to January 5. Volunteers follow specified routes through a designated 15-mile diameter circle, counting every bird they see or hear all day. A CBC circle is located on the eastern upper end of Lake Oconee. Table 16 lists 94 species of birds detected and the numbers observed there during the 2012 CBC.

In addition, the FS (2014a) has performed Land Bird Point Counts on a periodic basis since 1992, including at three locations from the Oconee NF in proximity to the Wallace Dam Project. Birds documented from these sites from April to early June in 2003-2008, including several neotropical migrants, are also listed in Table 16. The BBS, CBC, and FS bird surveys documents at least 139 bird species as seasonally occurring in the Wallace Dam vicinity.

The bald eagle, a Georgia threatened species, occurs year-round within the project area. In 2013, four active nests were located on Lake Oconee within or near the Wallace Dam project boundary, while three nests were located on Lake Sinclair downstream (GDNR, 2013a). Georgia Power timber and land management activities on undeveloped lands within and next to the Project support wildlife habitat and avoid disturbance to the active bald eagle nests on Lake Oconee.

Table 17 lists reptile and amphibian species that occur in the Georgia Piedmont, many of which may occur in the project vicinity. Common amphibian and reptile species occurring in the project vicinity include the five-lined skink, eastern fence lizard, green anole, northern cricket frog, spring peeper, bullfrog, eastern narrow-mouthed toad, barking treefrog, eastern box turtle, pond slider, common snapping turtle, marbled salamander, mud salamander, red-spotted newt, corn snake, northern watersnake, copperhead, timber rattlesnake, and pygmy rattlesnake (Edwards et al., 2013; FS, 2004b; Jensen et al., 2008; GMNH, 2008).

Georgia Power works cooperatively with GDNR in managing wildlife habitat at the Project. Wildlife management initiatives have included planting water willow and cypress along main-stem islands within Lake Oconee to stabilize banks and improve fish and wildlife habitat, planting desirable aquatic vegetation, maintaining wood duck boxes and osprey nesting platforms, and installing fish attracting structures in the reservoir. Georgia Power was selected again in 2014 as one of the Forestry for Wildlife Partners for its stewardship and conservation leadership in land management and practices benefiting Georgia's wildlife (GDNR, 2014h).

The wildlife community occurring along the Wallace Dam transmission line ROW is comprised of typical species that utilize the same types of habitat found throughout the project area.

[8] CBC data are provided by National Audubon Society and through the generous efforts of Bird Studies Canada and countless volunteers across the western hemisphere.

4.5.2 Potential Resource Impacts

Georgia Power's proposal to continue operating the Project would not involve activities directly affecting upland terrestrial habitats for wildlife and botanical resources. Georgia Power will evaluate the effects of the proposed project, if any, on upland invasive species in the license application.

Georgia Power is not proposing any PM&E measures at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address wildlife and botanical resources as part of its PLP (Table 1).

4.6 Wetlands, Riparian, and Littoral Habitat

4.6.1 Existing Environment

Wetland and Aquatic Vegetation

The wetlands surrounding the Wallace Dam Project are primarily palustrine forested, scrub-shrub, and emergent wetlands associated with Lake Oconee. These wetlands typically have shallow water, permanent or seasonally flooded hydrology, and a variety of rooted, hydrophytic vegetation. Overall, there are approximately 2,360 acres of wetlands within the project boundary, and forested/shrub wetlands are the dominant type (Table 18; Figure 13). An additional 940 acres of forested/shrub and emergent wetlands occur within 2,000 ft beyond the project boundary. These wetlands also are dominated by forested/shrub wetlands and are associated primarily with tributary streams.

Deep water habitats in the project area are classified as lake aquatic habitats (Table 18; Figure 13). About 16,170 acres of deep water habitats are present within the project boundary, all of which are located within Lake Oconee and the tailrace (within Lake Sinclair) immediately downstream of Wallace Dam. Beaver ponds may be found on smaller creeks flowing into the project reservoir outside of the project boundary.

Standing timber left within Lake Oconee and wetlands and littoral habitats surrounding the reservoir provide diverse habitat for wildlife, including birds, reptiles, amphibians, and small mammals. Georgia Power proactively monitors the occurrence of and periodically treats invasive terrestrial and aquatic plants within the project boundary. Georgia Power has occasionally treated the emergence of aquatic weeds in Lake Oconee. Identified species include cyanobacteria (*Lyngbya*), parrot feather (*Myriophyllum aquaticum*), and American lotus (*Nelumbo lutea*).

Riparian Habitat

The Oconee River in the vicinity of the Wallace Dam Project is characterized by broad floodplains with deep alluvial deposits composed of silt, sand, and clay. Lake Oconee has the largest floodplain in the Southern Outer Piedmont ecoregion and is widest in Greene County (Edwards et al., 2013). Natural shoreline vegetation and riparian habitat within the floodplains has been reduced by development around Lake Oconee, primarily from residential developments, golf courses, resorts, and other businesses. Much of the shoreline has been stabilized with seawalls, bulkheads, and riprap. Lake Oconee was selected as a "Waters to Watch" project for 2008 through a National Fish Habitat Partnership (NFHP). The partnership included the Southeast Aquatic Resources Partnership, GDNR, Georgia Power, FS, Reynolds Plantation, Lake Oconee Anglers Club, and the Boy Scouts of America (NFHP, 2008). The driving goal was to enhance fish and wildlife habitat and protect highly sensitive areas on Lake Oconee. Through the Partnership, around 3,800 linear ft of shoreline, riparian habitat on Lake Oconee islands were reinforced with over 1,000 tons of rock rip-rap. Additional fish habitat was created through the installation of fish structures, such as sunken trees and spawning gravel. Other habitat improvements performed through the partnership included the construction of wood duck boxes, nesting platforms for birds, and plantings of native vegetation on Lake Oconee islands (NFHP, 2014).

Wetland and Aquatic Wildlife

A variety of waterfowl and wading birds occur year-round in the Wallace Dam project area (Table 16). The wood duck, mallard, Canada goose, and pied-billed grebe are common waterfowl species in the region. Commonly observed wading bird species in the project vicinity include double-crested cormorant, great blue heron, great egret, green heron, and yellow-crowned night-heron. The wetlands, riparian, and littoral habitats within and adjacent to Lake Oconee provide a variety of habitats preferred by waterfowl and wading birds. The Oconee WMA, Oconee NF, Dyar Pasture Waterfowl Conservation Area, and Dan Denton Waterfowl Area provide diverse habitats for wading birds and waterfowl. Waterfowl hunting is prohibited in the waterfowl impoundments along the Oconee River between Wallace Dam and Georgia Highway 16, providing additional protected habitat.

The American beaver (*Castor canadensis*), muskrat (*Ondatra zibethicu*s), and northern river otter (*Lutra canadensis*) commonly inhabit wetland and aquatic habitats in the project area (GMNH, 2008). The long-tailed weasel (*Mustela frenata*) occurs throughout the southeastern U.S. and utilizes swamp and wetland habitats with thickets of low-growing shrubs or riparian, sparsely wooded second-growth forest (Whitaker and Hamilton, 1998). The mink (*Mustela vison*) is another mammal commonly found

around lakes and wetland habitats extending as far south as the lower Southern Piedmont (Whitaker and Hamilton, 1998).

Important wetlands and waterfowl habitat in the project area include waterfowl impoundments on Georgia Power land downstream of Wallace Dam (managed by GDNR), Oconee WMA (leased by Georgia Power to GDNR), and Dyar Pasture Waterfowl Conservation Area at the upstream end of Lake Oconee (managed by FS and partners).

The wetlands in the vicinity of the Wallace Dam transmission line are primarily palustrine forested, scrub-shrub, and emergent wetlands associated with small tributary streams that drain south to Lake Sinclair. While occasional maintenance and clearing is required within the riparian buffer of stream channels crossing the ROW, the area affected is minimal in relation to the available riparian habitat in a mostly rural setting. Avian species adapted to scrub-shrub and wetland vegetation are likely prevalent in riparian habitats that cross the ROW. Georgia Power participates in Project WINGS (Wildlife Incentives for Nongame and Game Species), a ROW management campaign encouraging the design of new wildlife habitats beneath electrical transmission lines with the goal of establishing more natural, wildlife-friendly communities.

4.6.2 Potential Resource Impacts

Potential impacts of continued project operation on wetlands, riparian, and littoral habitat would be limited to Lake Oconee and the tailrace area within the project boundary. Georgia Power will evaluate the effects of project operations on these resources in the license application. Potential impacts may include:

- Effects of project operations and shoreline development on reservoir wetland and littoral habitats and associated wildlife

- Nuisance invasive aquatic vegetation

Georgia Power is not proposing any PM&E measures at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address wetlands, riparian, and littoral habitat as part of its PLP (Table 1).

4.7 Rare, Threatened, and Endangered Species

4.7.1 Existing Environment

Information on rare, threatened, and endangered (RTE) species potentially occurring in the upper Oconee River basin of Hancock, Greene, Morgan, and Putnam Counties,

Georgia was obtained from rare species databases maintained by the GDNR Nongame Conservation Section, FWS (Environmental Conservation Online System), and NatureServe (2014). Literature review also included manuals on Georgia's rare plants (Patrick et al., 1995; Chafin, 2007) and recovery plans and recent species evaluations completed by FWS for federally listed species.

Based on known element of occurrence records (historic or present) and species range and habitat data, 19 state and/ or federally protected species of plants and wildlife potentially occur in the vicinity of the Wallace Dam Project. Table 19 briefly describes known habitat for each of the 19 species as well as 18 other species of concern being tracked by GDNR.

Federally Protected Species

Five federally threatened and endangered species potentially occur within the 4-county project vicinity (Table 19). These include 4 plant species and 1 bird species:

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

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

Pool Sprite

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 (Patrick et al., 1995; Chafin, 2007). The numbers of plants in pools range from a dozen to several thousand (FWS, 2008). Pool sprite 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. In Georgia, pool sprite is found on about seven preserves and parks, with the

pools containing the species totaling less than 1 acre (Chafin, 2007). One or two large populations (15 to 20 pools) exist in Greene and Hancock Counties (FWS, 2008). Pool sprite currently inhabits a granite outcrop located in the Oconee WMA (Eatonton Rock) near the edge of Lake Oconee just outside of the Wallace Dam project boundary in Putnam County (FWS, 2008, GDNR, 2010). The outcrop has many pools occupied by pool sprite (FWS, 2008). Acquired from Georgia Power, the property is managed by GDNR, helping to protect the site from foot traffic and recreational activity.

Black-spored quillwort

Black-spored quillwort is an inconspicuous perennial herb and fern ally that is restricted to shallow, seasonally flooded, flat-bottomed pools on granite outcrops (Patrick et al., 1995; Chafin, 2007). 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. Historically known from 15 sites in central Georgia including Greene County, black-spored quillwort currently exists at only 8 sites in Georgia, none of which are located in the counties occupied by the Wallace Dam Project (FWS, 2008).

Mat-forming quillwort

Mat-forming quillwort is an obscure perennial herb and fern ally that is restricted to shallow, flat-bottomed vernal pools on granite outcrops, where it forms dense mats (Patrick et al., 1995; Chafin, 2007). These depressions are less than 1-ft deep, are entirely rock-rimmed, and contain gravelly soil. Plants are usually visible in October to May. Historically known from 13 populations in Georgia, populations are confined to porphyritic granite outcrops in Columbia, Hancock, Putnam, and Greene Counties (FWS, 2008). The majority of these sites contain only one or two pools with mat-forming quillwort. In 2010, WRD and FWS biologists planted four plugs of mat-forming quillwort (raised off-site) in rainwater pools at a granite outcrop located in the Oconee WMA along the edge of Lake Oconee just outside of the project boundary (GDNR, 2010). This is the same granite outcrop inhabited by pool sprite. The site is owned and managed by GDNR. Signs placed in the area warn visitors to stay away from the outcrop's sensitive areas.

Harperella

Harperella is an annual herb with erect stems to 3-ft tall that occurs in wet savannas or on the edge of cypress ponds in the Coastal Plain, and in seeps on granite outcrops in the Piedmont (Patrick et al., 1995; Chafin, 2007). Plants flower in late May to early July and fruit from July to August. Only two sites with small populations of harperella are currently known in Georgia, including one in Greene County. The species is not presently known to occur within the Wallace Dam project boundary.

Red-cockaded woodpecker

The red-cockaded woodpecker is a small woodpecker that is endemic to open, mature and old-growth pine ecosystems in the southeastern U.S. (Ozier and Schneider, 2010; FWS, 2003). Unlike other woodpeckers that excavate cavities in dead wood, 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; the excavation may take several years. 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. Georgia has five remaining population centers. One of these is the Piedmont Recovery Unit (FWS, 2003), which includes a population on Oconee NF in Putnam County located west of the Wallace Dam Project. FS manages 8.3 acres in the Sugar Creek Watershed Management Area specifically for red-cockaded woodpecker habitat (FS, 2004b). The species is not currently known to inhabit forests within the Wallace Dam project boundary.

State Protected Plant Species

Seven other Georgia listed plants potentially occur in the project vicinity, including one listed as endangered, three as threatened, two as rare, and one as unusual (Table 19). Based on available information, it is unknown whether these species occur within the project boundary. Two of the state-protected plant species, dwarf hatpins (endangered) and granite stonecrop (threatened), inhabit granite outcrops and could occur on the granite outcrop in the Oconee WMA near Wallace Dam.

State Protected Wildlife Species

Seven state protected wildlife species potentially occur in the project vicinity, including one mussel, three fish, one reptile, and two birds (Table 19). The mussel species (Atlantic pigtoe), although reported for Hancock County, does not occur in the Oconee River basin; it inhabits the adjacent Ogeechee River basin. This mussel species does not occur in the project vicinity. Of the three fish species, only the Altamaha shiner presently occurs in the Oconee River basin upstream of Wallace Dam. The goldstripe darter occupies vegetated, spring-fed headwaters and creeks in the Coastal Plain downstream in the basin. The robust redhorse inhabits the Oconee River below Sinclair Dam and escaped hatchery fish have been reported from a tributary to Lake Sinclair (Zelko, 2012), but the species is not known to occur upstream of Wallace Dam. The Altamaha shiner has been reported from relatively recent collections in tributary streams upstream of Lake Oconee, including the Oconee River, Apalachee River, Hard Labor Creek, and Richland Creek (Table 9) (GDNR, 2014i; Straight et al., 2009; Nuckols and

Roghair, 2004b). Altamaha shiners inhabit small streams and rivers, where they are most often found in small pools with rocky and sandy substrates (Freeman, 2008).

Several established nesting pairs of bald eagles occur along Lake Oconee, either within or immediately adjacent to the project boundary (Section 4.5.1). Although the species has recovered in the lower 48 states and was removed from the federally threatened species list, it remains protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

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

Species of Concern

An additional 18 species tracked by GDNR as species of special concern potentially occur in the project vicinity (Table 19). These include nine plants, one mussel, one fish, two amphibians, four birds, and one bat. The mussel species (Carolina slabshell), although reported for Hancock County, does not occur in the Oconee River basin, but rather inhabits the adjacent Ogeechee River basin. This mussel species does not occur in the project vicinity. The fish species, brassy jumprock, has been reported from Lake Oconee and inhabits the Oconee River and three other tributaries to Lake Oconee upstream of the project boundary.

The bog spicebush and the creeping smallflower seedbox are both listed as species of conservation concern in Hancock County. Both species are obligate wetland plants that occur in seepage wetlands. Based on reasonably available information, it is unknown whether either of these plants is found within the Wallace Dam Project vicinity.

Transmission Line

The Wallace Dam transmission line is located almost entirely within Putnam County, with a very small portion within Hancock County at the dam. The federally protected plant species pool sprite and black-spored quillwort, which are restricted to granite outcrops, have the potential to occur in the ROW as it traverses Oconee WMA. Based on reasonably available information, there are no known occurrences of any federal or state protected species in habitats within the existing ROW.

4.7.2 Potential Resource Impacts

Presently, there are no known occurrences of federally threatened or endangered species of plants or wildlife within the Wallace Dam project boundary that would be affected by continued project operation. However, two federally listed plant species restricted to

upland, granite outcrops have been documented in the Oconee WMA just outside of the project boundary, and bald eagles presently occur and nest within the project boundary.

Georgia Power will consult with FWS and GDNR to avoid impacts to any federally or state threatened or endangered species within the project boundary; address bald eagle management pursuant to the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act; and to propose PM&E measures as appropriate for avoiding or minimizing impacts to state listed and other species of concern.

4.8 Recreation and Land Use

4.8.1 Existing Environment

Existing Recreational Facilities

This section describes the existing Georgia Power project recreation facilities and other public and private sites providing access to Lake Oconee and Wallace Dam. Figure 3 illustrates the location of these recreation facilities as well as their proximity to the project boundary. This includes the Tailrace Fishing Area providing public access to the Wallace Dam tailrace with a fishing platform and parking (Figure 4). Table 20 lists 25 sites identified in the area by ownership and operational responsibility along with the address and county in which each is located and a brief description of their general amenities. Of these sites providing direct access to the Project, the following seven are owned and operated by Georgia Power, are located within the project boundary, and are thus considered project recreation sites:

- Armour Bridge
- Lawrence Shoals Park
- Long Shoals Boat Ramp
- Old Salem Park
- Parks Ferry Park
- Sugar Creek Boat Ramp
- Tailrace Fishing Area

As detailed in Table 20, these project recreation sites provide a total of six boat ramps (12 lanes), three full-service campgrounds, three swimming beaches, approximately 375 parking slots, as well as associated amenities such as comfort stations, picnic areas, and playgrounds. Figures 14 through 16 provide maps of the campground and day use

recreation facilities provided at Lawrence Shoals, Old Salem, and Parks Ferry. Figure 17 provides representative photographs of the recreational access areas. In addition to these traditional recreation facilities, the Rock Hawk Effigy and trail system are located between Lawrence Shoals Park and the waterfowl impoundments within the Oconee WMA just downstream of Wallace Dam (Figure 18) (Haywood, 2011). In partnership with the Historic Piedmont Scenic Byway Commission and GDNR, Georgia Power maintains over 15 miles of hiking and biking trails and interpretive signage, portions of which are located inside the project boundary at Lawrence Shoals Park. The Rock Hawk Effigy is located on lands owned by the University of Georgia outside of the FERC project boundary.

Other recreation lands adjacent to the Project include portions of two WMAs. The Redlands WMA is located on FS Oconee NF lands north of I-20, while the Oconee WMA is located on pockets of land adjacent to Wallace Dam (Figure 3). The Oconee WMA, comprised of 5,375 acres, is owned by Georgia Power and leased at no cost to GDNR for hunting and other outdoor recreation, with 150 acres reserved as the Dan Denton Waterfowl Refuge. The FS Oconee Ranger District provides motorized boating access and extensive parking facilities at three sites in the Redlands WMA: Dyar Pasture and the Redlands and Swords Recreation Access Areas. These FS sites provide eight boat lanes and over 100 parking slots (FS, 2014b,c).

GDNR recently commissioned a study of the Georgia's WMAs to estimate county-level and statewide activity and to determine the contribution that select sportsman-related visitation activity makes to the economy. Drawing from license sales records of hunters with WMA privileges and Georgia Outdoor Recreation Pass (GORP) holders, it assessed use at three of the WMA units around Lake Oconee: Dyar Pasture, Oconee, and Redlands. It found that approximately 147 participants spent 1,061 visitor days at Dyar Pasture, 6,025 visitors spent 71,329 visitor days at the Oconee WMA, and 8,880 visitors spent 94,387 visitor days at the Redlands WMA (Southwick Associates, Inc. and Responsive Management, 2014).

The Wallace Dam transmission line passes along the edge of Georgia Power's Lawrence Shoals Park on the west side of Wallace Dam (Figures 3 and 4). The ROW crosses the Rock Hawk Effigy and Trails system, and a small portion of the ROW is used as an archery range (Figure 18).

Form 80 Licensed Hydropower Development Recreation Report

Georgia Power collects a variety of recreation data at the Project as part of ongoing efforts to comply with FERC Form No. 80 requirements. FERC Form No. 80, required for all FERC-licensed hydropower projects, was last due for the Wallace Dam Project in

April of 2009 and, because it is due on April 1 of every sixth year, the next Form 80 filing is due to FERC by April 1, 2015. FERC utilizes this Form No. 80 information to:

- Identify recreational facilities located at licensed projects,
- Determine whether public recreational needs are being accommodated by the facilities, and
- Determine whether additional efforts could be made to meet future needs (FERC, 2014).

The Wallace Dam Project 2009 Form No. 80 Report estimated 712,000 daytime and 315,000 nighttime recreation days annually at the Project for the summer recreation season that runs from May 1 to October 31 each year. Of these, 33,000 daytime visits and 26,500 nighttime visits were observed on an average peak weekend.

Georgia Power staff are currently collecting information to develop their 2015 Licensed Hydropower Development Recreation Report submittal for the Wallace Dam Project. These efforts include:

- Car counters
- Trail cameras set to complement car counters
- Campground and day use receipts and activity sheets

Campground Customer Satisfaction Survey

Georgia Power performed customer satisfaction surveys of its campground customers in 2011 and in 2014. The 2014 survey was distributed to all campground visitors between July 4th and September 1st and collected via a designated drop box; a total of 398 completed surveys were collected. The majority of campground users noted that the registration processes are easy, the park/restrooms are clean, park hosts are courteous and respectful, and camping facilities meet their needs. The primary recommendations from the survey related to improving the cleanliness of the restroom facilities at Lawrence Shoals and Parks Ferry and keeping the parks open later into the year (i.e. October/ November).

Customer comments from the campground surveys are tracked, evaluated for feasibility and cost, and acted upon by the Georgia Power Parks Committee and the respective office managers on an ongoing basis. Follow-up actions may include construction, maintenance, and other capital or operational improvements to enhance the quality of the experience. For example, customers at Old Salem Park responded very positively to

improvements, which have included restroom replacements, made between the 2011 and 2014 surveys. Another example of user survey follow-up actions by Georgia Power is the addition of playgrounds to Lawrence Shoals Park in 2011, and more recently to Old Salem Park.

Other improvements made by Georgia Power to the originally developed campground and boat ramp areas have included the following:

- Adding restrooms and picnic areas to boat ramp sites
- Upgrades to campground restrooms and bathhouses
- Additional campsites within campgrounds to accommodate demand
- Improved playground and beach areas
- Upgraded water and electric service at campgrounds to accommodate today's larger recreational vehicles

Georgia Power has also provided property for GDNR Law Enforcement, as well as other local fire departments and law enforcement agencies, to construct boathouses to facilitate lake patrols and fire service.

Additional information on the recreational amenities and activities available at Lake Oconee is provided on Georgia Power's Lakes and Recreation website at:

http://www.georgiapower.com/in-your-community/lakes-and-recreation/

Park Resources

The Wallace Dam project recreation facilities are managed by Georgia Power's Oconee/Sinclair Land Management Office. Park resources include three full-time staff responsible for planning, maintenance, and coordination of all park operations; two sets of couples serving as resident park hosts at each of the three campgrounds (Lawrence Shoals, Old Salem, Parks Ferry) during the recreation season; and five leased employees that help keep all campgrounds, boat access, and other public facilities clean and presentable for customers. In addition, four trucks and a variety of maintenance equipment, including mowers, tractors, trailers, and utility vehicles, are dedicated to parks management at the Wallace Dam Project.

Recreation Areas of Importance

There are a variety of important recreation resources in the vicinity of the Project providing both similar and unique recreational experiences. Directly south of the

Project, Georgia Powers' Sinclair Project provides a similar, though slightly less developed recreation experience, offering one full service campground as compared to the Wallace Dam Projects' three full service campgrounds on Lake Oconee. There are 15 public access locations on Lake Sinclair including five owned and operated by Georgia Power. The 2009 Form 80 Report estimated 1,100,000 daytime and 275,000 nighttime recreation days annually at Lake Sinclair.

Unique to the area is the Rock Eagle 4-H Center, located approximately 7 miles west of Lake Oconee. Operated by the University of Georgia as support for the state's 4-H Program, Rock Eagle provides Environmental Education and Summer Camping Programs hosting over 70,000 visitors annually at its eight conference buildings, auditorium, and cottages (over 50) as well as a 150-acre lake, pools, and hiking trails (University of Georgia Cooperative Extension, 2014).

Existing State and Regional Recreation Plans

This section describes the state and regional recreation plans reviewed to identify current and future recreation needs for the project area. These plans include the State Comprehensive Outdoor Recreation Plan (SCORP) for Georgia as well as 2035 Future Plans by two of the three regional commissions representing the four counties (Hancock, Greene, Putnam and Morgan) in the project vicinity. The three regional commissions are the Northeast Georgia Regional Commission (NEGRC), Middle Georgia Regional Commission (MGRC), and the Central Savannah River Area Regional Commission (CSRA RC). The two plans include:

- Northeast Georgia Plan 2035, applicable to Greene and Morgan counties, which describes Lake Oconee and the Apalachee River as Regionally Important Resources (RIRs) with potential for development conflicts due to their overlap with potential 'Developed' and 'Developing' Character Areas (NEGRC, 2011). The plan notes that the region's Desired Development Patterns include facilities for bicycles, including bikeways or bike lanes, parking racks as well as the preservation of environmentally sensitive areas by setting them aside as public parks, trail corridors, or greenbelts (NEGRC, 2012).

- Central Savannah River Area Plan 2035, applicable to Hancock County, describes the Oconee WMA and Lake Sinclair as RIRs with potential for development conflicts. The Plan notes that Hancock County has areas of significant disinvestment, levels of poverty, and/or unemployment substantially higher than average levels for the region as a whole. It emphasizes the importance of timber to Hancock County with forest lands representing just over 90 percent, 267,000 acres, of the County's total area (CRSA RC, 2011).

The MGRC, of which Putnam County is a member, has not developed a similar plan.

State Comprehensive Outdoor Recreation Plan

The Georgia SCORP for 2014-2016 identifies the issues facing Georgia's outdoor recreation providers, identifies trends that will help to chart a positive course forward and outlines Georgia's priority focus for the investment of federal Land and Water Conservation Funds (GDNR, 2013b). It calls for cooperative action that targets municipal and county recreation departments as well as to state and federal agencies and even quasi-public private service providers. Unlike previous SCORPS for Georgia, it covers only three years due to the relevancy of the findings from the SCORP 2008-2013 and the pending launch of the 2017-2022 SCORP assessment. The 2017-2022 SCORP assessment will include a robust public engagement process, identify key trends in outdoor recreation, and update supply data based on a geographic information system (GIS) inventory assessment tool currently being piloted in several entities, including the National Association of Outdoor Recreation State Liaison Officers, National Park Service, National Recreation and Parks Association, and National Association of State Parks.

Analysis of data from two iterations of the National Survey on Recreation and the Environment found walking for pleasure, family gatherings, gardening or landscaping, viewing/photographing natural scenery, and attending outdoor sporting events to be the five most popular recreation activities for adult Georgians. For kids, the National Kids Survey found that playing or hanging out outside, land-based sports and physical activities (biking, jogging, walking, etc.) were the primary recreation activities engaged in by children. This survey revealed that a strong majority (more than 57 percent) of children play outside more than two hours every day (GDNR, 2013b). The 2014-2016 SCORP notes that Georgia's priority for the expenditure of federal assistance funds will be to attend to the existing pressing needs of the state's current outdoor recreation facilities. Next it prioritizes the development of outdoor recreation facilities that are able to meet the needs of a changing demography, to help recreation providers generate revenue and ensure financial sustainability, and to continue to refine Georgia's priorities for the acquisition of critical outdoor recreation areas in the future.

Shoreline Buffer Zones and Management Policies

Georgia Power manages the natural resources within the project boundary and on its lands adjacent to the project boundary to benefit both human and wildlife uses. Georgia Power owns a fee simple strip of land along Lake Oconee that provides direct control of the 374 miles of shoreline. This results in approximately 4,442 acres between the project boundary and full pool which are available for public recreation and access and provide a reservoir buffer for aesthetics, wildlife habitat and water quality protection.

No residential structures are allowed on the project boundary lands and the shoreline is managed under Georgia Power's Shoreline Management Guidelines (Georgia Power, 2015).

Georgia Power owns and directly manages 7,685 acres generally adjacent to project lands as forests while it also leases an additional 5,375 acres to the Georgia Department of Natural Resources for use as the Oconee WMA, which is managed as a hunting and waterfowl refuge. There are 3,734 parcels of shoreline area leased by adjacent residents for lake access.

The Shoreline Management Guidelines for Lake Oconee provide guidance to adjacent residents on permitting and constructing shoreline structures (Georgia Power, 2015). Georgia Power requires landowners adjacent to the project boundary to sign a valid multi-use lease before applying to Georgia Power for a permit. A permit must be obtained from Georgia Power before beginning any construction, renovation, tree removal, or land disturbance on Georgia Power land, as well as dredging activities. The guidelines also list specific Lake Oconee requirements for constructing seawalls, docks, wharves, boatslips, and boat lifts and personal watercraft lifts. Finally, the guidelines include a shoreline use section with information about protecting and enhancing the scenic, recreational, and environmental values of the reservoir, as well as maintaining compatibility with the overall reservoir project recreational use.

Georgia Power's implementation of the Shoreline Management Program for the Wallace Dam Project also includes the following key elements:

Policies and Permitting

Georgia Power manages the Wallace Dam project shoreline according to the applicable License articles for shoreline management, state and local laws and regulations, and Corporate internal and external guidelines.

The Standard Land Use Article (Article 56C [Appendix E]) was incorporated into the Wallace Dam License in 1990. Under this article, Georgia Power permits seawalls, shoreline structures, non-project use of project land requests, and public infrastructure requests.

Seawalls, shoreline structures, and any other land disturbance permit requests within the project boundary are also permitted in coordination with applicable U.S. Army Corps of Engineers Programmatic General Permits, and state and local regulations.

Georgia Power has developed a set of internal guidelines for all of our projects. The internal guidelines establish our governance for the projects and provide instructions for our shoreline staff on permitting within the project boundary. A separate document, our

Shoreline Management Guidelines (described above), were developed for external permitting guidance for the public.

Resources

The Wallace Dam project boundary shoreline is managed by the Oconee/Sinclair Land Management Office. A Lake Resources Manager is responsible for the shoreline management program. There are two full-time shoreline management staff who are responsible for permitting and inspections. One and one-half administrative staff administer the legal documents required by Georgia Power in order to obtain a shoreline permit. Georgia Power undeveloped land is managed by one Georgia Power forester certified as a Professional Forester in Georgia.

Two trucks and two boats are dedicated for shoreline management at the Wallace Dam Project. Georgia Power maintains GIS maps of the shoreline and a database of all adjacent property owners.

Land Use

Project boundary shoreline adjacent to FS land, mostly in the upper reaches above I-20, is predominately natural and undisturbed. Buffers on the developed parts of the reservoir vary from 25 to 65 to 200 ft in some areas. Georgia Power undeveloped land is managed according to a Company Forestry Policy, the GFC Best Management Practices, and applicable laws and regulations.

Georgia Power does not allow residential or ancillary structures (outbuildings, gazebos, garages, etc.) within the project boundary. New shoreline structures are limited to seawalls, boatslips with soft canopy covers, or uncovered docks. Group docks or boatslips must be uncovered.

The removal of dead or dangerous trees in a developed area requires a permit from Georgia Power. The removal of these trees requires a suitable replacement tree or trees, preferably native. All shoreline structures require specified shoreline frontage and a signed legal agreement with Georgia Power. Trees that fall into the reservoir on natural areas are removed by Georgia Power if they present a safety or danger hazard. Otherwise, they are left for fish habitat.

Communication

The Oconee/Sinclair Land Management Office communicates our shoreline guidelines to stakeholders on an ongoing basis using meetings, newsletters, emails, our website, and other tools as needed.

Land Use

The land use for the project boundary, as well as a 2,000-foot zone beyond it, is illustrated in Figure 19 and summarized in Table 21 (University of Georgia, 2010). It represents approximate conditions in 2008, the most recent dataset. The project boundary includes approximately 23,914 acres, of which the majority is the open water of Lake Oconee and associated wetlands. The balance of the lands within the project boundary is primarily undeveloped and is either deciduous or evergreen forested or forested wetlands, each representing 7 percent of the total, respectively. Less than 2 percent of the project lands are being used for low or high intensity urban purposes; clusters of these urban uses are generally found along Lake Oconee Parkway and adjacent to lands associated with Reynolds Plantation.

Table 21 also includes the land use for an additional 2,000-foot zone beyond the project boundary; these acreages do not include land within the project boundary. Of the 51,599 acres adjacent to the Project, approximately 60 percent is either deciduous or evergreen forests while 12 percent is being utilized for row crops or pasture. These agricultural lands are found along the Project's western edge in the Lick Creek embayment and in larger acreages throughout the northern, upstream, in Morgan County and Green County above I-20. Low intensity urban uses represent 10 percent of adjacent acreages and are mostly related to the residential areas and amenities associated with golf developments in the middle portion of the Project generally downstream of Lake Oconee Parkway. Lands characterized as clear cut/sparse are also present and represent 8 percent of the adjacent lands as well as the region's active silviculture industry.

Land use in the vicinity of the Wallace Dam transmission line is predominantly undeveloped, forested/timberlands or agricultural land used for dairy or poultry farming. The remaining areas are occupied by aquatic or wetland features, a few residential properties, and small roads. The only urban area near the transmission line ROW is Eatonton.

4.8.2 Potential Resource Impacts

Potential impacts of continued project operation on recreation and land use would be limited mainly to Lake Oconee and the tailrace area within the project boundary. Georgia Power will evaluate the effects of continued project operations on recreation and land use in the license application. Potential impacts may include:

- Effects of daily water level changes on recreational opportunities in Lake Oconee

- Effects of project operations on downstream recreation in the project tailrace area

- Public recreational access and facilities

- Shoreline management

Georgia Power is not proposing any PM&E measures at this time. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures to address recreation and land use resources as part of its PLP (Table 1).

4.9 Aesthetic Resources

4.9.1 Existing Environment

This section describes the visual characteristics of the project facilities, lands, and waters. 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 Oconee and preserve and enhance the aesthetic value of the reservoir.

Generally, the central and southern portions of Lake Oconee provide the most developed views, including low intensity residential, golf courses, resorts, marinas, campgrounds, commercial areas along Georgia Highway 44, and various public and private recreation access areas (Figure 3). The shoreline vegetative buffer zone in these parts of the reservoir includes a mix of landscaped, landscaped-natural, and natural conditions. Significant stretches of undeveloped, forested shoreline occur in the southern end of the reservoir in association with Georgia Power's Lawrence Shoals Park, Oconee WMA, and other areas reserved as natural areas or future recreation development. Viewsheds include Wallace Dam, boat ramps, public beach areas, golf courses, and public marinas (Figure 20).

The northern portions of Lake Oconee upstream of I-20 and surrounded by tracts of the Oconee NF provide the most rural and undeveloped views. Viewsheds in these parts of the reservoir include forested, agricultural, and low intensity residential land uses beyond the shoreline, as well as public recreation access areas, highway and railroad crossings, and small undeveloped islands within the reservoir.

There are various public access points around Lake Oconee 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 (Figures 17 and 21).

The Wallace Dam transmission line traverses a mostly rural landscape. Vegetative density near the ROW is high and visibility of the line is restricted in many areas. No major highways travel near the line for most of its length. Generally, the east and west ends of the ROW provide the most open views. The east end of the line near Wallace Dam is visible where it intersects Georgia Highway 16 and Lawrence Shoals Park.

4.9.2 Potential Resource Impacts

Georgia Power's proposal to continue operating the Project would not involve activities directly affecting aesthetic resources. No potential impacts are anticipated, and therefore, Georgia Power is not proposing any PM&E measures at this time. Georgia Power will evaluate the effects of continued project operations on aesthetic resources in the license application. Depending upon the resource studies and analyses completed subsequent to NEPA scoping, and consultation with the resource agencies and other relicensing participants, Georgia Power will consider and may propose PM&E measures related to aesthetic resources as part of its PLP (Table 1).

4.10 Cultural Resources

4.10.1 Existing Environment

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

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

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

cultural resource records documented in the project area prior to the survey work that was completed for the Wallace Reservoir (Lake Oconee).

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

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

In 1995, Brockington and Associates performed a cultural resources re-verification study in order to evaluate 33 previously recorded sites within the project boundary. The information gained from the review was used to update the site monitoring component of the Georgia Power Cultural Resource Management Program. The re-verification assessment resulted in 28 of 33 sites being re-verified; three of which were recommended for continued monitoring as they are either eligible or recommended potentially eligible for the National Register (Brockington, 1996). One additional unverified site was recommended for continued monitoring due to an inability to access the mapped location to verify the site. The remaining sites of the original 33 were found to be inundated, located outside of the FERC project boundary, to have been destroyed, originally mis-located, or lacked appropriate type and affiliation to be verified; these sites were removed from the monitoring list (Brockington, 1996).

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

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

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

No historic or archaeological sites listed or recommended for inclusion in the National Register are known to occur along the Wallace Dam-Eatonton transmission line in Putnam County. An intensive archaeological survey conducted along the proposed route in 1979, prior to construction of the line, documented three historic-period archaeological sites and four isolated finds within the impact corridor (SSI Earth Systems Division, 1979). However, none of the sites were recommended for nomination to the National Register and none of the finds warranted further research.

4.10.2 Potential Resource Impacts

Presently there are no known potential impacts to historic properties that would result from Georgia Power's proposal to continue operating the Wallace Dam Project.

Georgia Power will evaluate potential impacts to archaeological and historic hydro-engineering resources in the license application, including:

- Potential eligibility of project facilities for the National Register
- Effects of project operations on archeological historic properties

Georgia Power will consult with the GDNR Historic Preservation Division, affected tribes, and Advisory Council on Historic Preservation in developing a Historic Properties Management Plan for the Project and implementing a Programmatic Agreement for the Project to avoid impacts to historic properties.

4.11 Socio-economic Resources

4.11.1 Existing Environment

This section provides information on the socioeconomic conditions within the Wallace Dam Project vicinity, including population and sources of employment, based on information developed by the U.S. Census Bureau (2014b). The population trends for the four-county area surrounding the Wallace Dam Project are summarized in Table 22. Population density is greatest in the western portion of the project area, particularly in Putnam County, with a population of 21,218 documented in the 2010 census. Another 17,781 people reside in Morgan County, which is also located on the western side of the Wallace Dam Project. According to the 2010 Census, the majority of the residents living in the eastern portion of the project area (16,321) reside in Greene County. Hancock County, the smallest in terms of population size (8,879), occupies the largest land area of the four counties at 471.8 sq mi. Between 2010 and 2013, Morgan and Hancock Counties both experienced slight population declines, with Hancock County experiencing the greatest decrease (5.6 percent). During the same period, Greene and Putnam Counties experienced a slight increase (2.0 and 0.7 percent, respectively) in population size.

The economic status of the four-county region varies considerably. Hancock County, at almost half the reported household income of the other three counties, had a median income of $22,716 in 2010 (U.S. Census Bureau, 2014b). The other three counties exhibited comparable median household income levels, with Putnam County reporting $40,115, Greene County at $40,728, and Morgan County with the highest median household income at $44,908 during the 2010 Census. An estimated average 31.4 percent of Hancock County's population lived below the poverty level for the years 2008 to 2012. The 2012 labor force for the four-county region was 315,844 individuals, with 57,467 from Greene County, 49,299 in Hancock County, 141,303 in Morgan County, and 67,775 in Putnam County (Georgia Department of Labor [GDL], 2014a-d).

Greene County employs over 1,000 skilled workers in 20 different industries. The largest portion of the county's work force is employed in the service industry, which makes up around 36.8 percent of all jobs. Situated on the shores of Lake Oconee, the Reynolds Plantation community includes multiple residential developments, a Ritz-Carlton Lodge, and six golf courses. This large development and associated facilities employ over 950 individuals (Greene County Chamber of Commerce [GCCC], 2014). The Board of Education, another top employer in the county, provides jobs for over 300 individuals in the school system. Major manufacturers in the county include NIBCO, Inc., a maker of plastic pipe fittings, and Novelis, an aluminum recycling firm (GCCC, 2014; GDL, 2014a).

Morgan County has a primarily agrarian economy with a variety of family and medium-sized, commercial farms producing meat, eggs, vegetables, fruits, and nuts (Morgan County Chamber of Commerce, 2014). The Morgan County workforce is primarily employed in the service industry working for retail stores, hospitality chains, and food service chains. The primary manufacturers located in the county include Bard Manufacturing Co., Inc., Flambeau, Inc., Georgia-Pacific Wood Products, LLC, and Pennington Seed, Inc. (GDL, 2014c).

Hancock County has the highest unemployment rate in the Wallace Dam Project vicinity with over 15 percent unemployment in 2012 (GDL, 2014b). The dominant industry in Hancock County is the service industry, primarily retail and medical and healthcare providers. The top employers in the county include the Georgia Department of Corrections, Georgia Power, Dollar General, and John Hancock Academy (GDL, 2014b).

Eatonton is the seat of Putnam County and is known as the "Dairy Capital of Georgia" in honor of its primary industry – dairy farming. Putnam County is also home to the Rock Eagle and Rock Hawk effigy mounds, the only such sites that have been discovered in Georgia. Putnam County was historically dominated by farms and agricultural until the mid-1970s. The area is still occupied by a variety of agricultural farms and has experienced a recent increase in the number of farms. The top employers in Putnam County are Cuscowilla Management and Administration, Georgia Power, Horton Homes, Inc., and Eatonton Health and Rehabilitation (GDL, 2014d).

Since the development of Reynolds Plantation began in Greene County in the late 1980's, the area surrounding Lake Oconee has experienced substantial growth. Putnam County has more than doubled in population size since then (U.S. Census Bureau, 2014b). The expansion of the area with residential and resort development on Lake Oconee is expected to continue in the coming years. The US Census Bureau (2014b) projects a 26.0 percent increase in the population of Putnam County by 2025.

4.11.2 Potential Resource Impacts

Continued operation of the Wallace Dam Project would not involve activities directly affecting socioeconomic resources, and therefore, no potential impacts are anticipated.

4.12 Tribal Resources

4.12.1 Existing Environment

There are no extant federally recognized tribal lands in the State of Georgia. There are, however, a number of federally recognized tribes that occupied the project region historically. According to the National Historic Preservation Act and implementing regulations (36 CFR 800), the agency must "make a reasonable and good faith effort to identify any Indian tribes or Native Hawaiian organizations that might attach religious or cultural significance to historic properties in the area of potential effects and invite them to be consulting parties" (36 CFR 800.3[f]). FERC will, therefore, take the lead in identifying tribes and making initial contact. Previous research and consultation efforts, as well as a review of the current list of federally recognized tribes, suggest that the following tribes should be invited to consult on the undertaking: the Muscogee (Creek) Nation of Oklahoma, the Cherokee Nation of Oklahoma, the Eastern Band of Cherokee, and the United Keetoowah Band of Cherokee.

Tribal consultation is technically to be conducted on a "government to government" basis, with FERC representing the U.S. government. After a relationship has been established with interested tribes, Georgia Power will be involved in the consultation process as FERC's non-federal designee. Georgia Power will address effects of continued project operation through consultation in a manner consistent with FERC's "Policy Statement on Consultation with Indian Tribes in Commission Proceedings" (18 CFR Part 2).

4.12.2 Potential Resource Impacts

Georgia Power will address any effects of continued project operation on tribal resources through consultation conducted in a manner consistent with the Commission's *Policy Statement on Consultation with Indian Tribes in Commission Proceedings* (18 CFR Part 2). Georgia Power is not currently aware of any potential impacts to tribal resources that would occur as a result of the proposed continued operation of the Wallace Dam Project.

5.0 PRELIMINARY ISSUES AND STUDIES LIST

5.1 Issues Pertaining to the Identified Resources

This section identifies potential resource issues pertaining to Georgia Power's continued operation of the Wallace Dam Project based on the abundant existing resource information and data summarized in Section 4, Georgia Power's contacts with resource agencies and other interested stakeholders (Appendix A), and agency responses to the PAD Questionnaire (Appendix B). During the Commission's public scoping process (see Section 2.2), Federal and state resource agencies, Indian tribes, non-governmental organizations, and individuals will be invited to participate in refining the resource issues to be analyzed in Georgia Power's license application. The preliminary list of potential issues for consideration include:

Geology and Soils

- Effects of project operations on reservoir and tailrace shoreline erosion and sedimentation

Water Resources

- Effects of project operations on water quality in Lake Oconee and the tailrace area

Fish and Aquatic Resources

- Effects of project operations and shoreline permitting on fish habitat and aquatic resources in Lake Oconee
- Effects of project operations on summer habitat for primary sport fish species, including largemouth bass and stocked striped bass, in Lake Oconee
- Effects of project operations on tributary riverine fish and mussel habitat
- Effects of project operations on aquatic habitat in the project tailrace area
- Fish entrainment and turbine-induced mortality
- Invasive aquatic species within the project boundary

Wildlife and Botanical Resources

- Upland exotic invasive plants within the project boundary

Wetlands, Riparian, and Littoral Habitat

- Effects of project operations and shoreline development on reservoir wetland and littoral habitats and associated wildlife
- Reservoir exotic invasive aquatic vegetation

Rare, Threatened, and Endangered Species

- Effects of project operations on Federal and state protected plants and wildlife
- Effects of project operations on state species of concern

Recreation and Land Use

- Effects of daily water level changes on recreational opportunities in Lake Oconee
- Effects of project operations on downstream recreation in the project tailrace area
- Public recreational access and facilities
- Shoreline management

Aesthetic Resources

- None currently known

Cultural Resources

- Potential eligibility of project facilities for the National Register
- Effects of project operations on archeological historic properties

Socio-economic Resources

- None currently known

Tribal Resources

- None currently known

5.2 Potential Studies or Information Gathering

This section identifies potential studies or information gathering that may be needed to fully analyze the potential resource issues identified in Section 5.1. Based upon the substantial amount of relevant information and data available for Lake Oconee and the project vicinity (Section 4), Georgia Power believes that existing information is sufficient for the majority of the evaluation of resource impacts of continued project operation. However, some resource studies and additional information gathering may be necessary to fully inform the development of license requirements for the Project. Accordingly, Georgia Power lists below the resource studies it believes may be necessary to meet the information needs for FERC's NEPA review. Pending the completion of NEPA scoping and further contacts with relicensing participants, Georgia Power plans to develop these preliminary studies into detailed study plans in the Proposed Study Plan (PSP). Georgia Power will distribute the PSP for review by July 27, 2015 (Table 1).

After filing the PSP, Georgia Power will consult with the resource agencies and other participants in one or more Study Plan Meetings held by August 25-27, 2015 (Table 1). The goal of these meetings will be to discuss information gathering needs and informally resolve differences between the PSP and study requests filed by the participants. After the 90-day PSP comment period, Georgia Power will file a Revised Study Plan by November 24, 2015.

5.2.1 Preliminary Studies List

This section lists the resource studies proposed by Georgia Power for further detailed development in the PSP. The preliminary objectives, study area, and key study elements are identified for each study.

Geology and Soils

- ***Objectives:*** Characterize the distribution and sources of erosion and sedimentation within the project boundary based on a shoreline field reconnaissance survey and review and analysis of existing information and aerial photography.

- ***Study area:*** Project reservoir and tailrace area within the project boundary for the shoreline survey; Oconee River tributary watersheds upstream of the project reservoir for literature review.

- ***Key study elements:*** A single shoreline reconnaissance survey of the project reservoir and tailrace area in 2016 to inventory and characterize existing sources of erosion and sedimentation within the project boundary; and literature review

and analysis of the effects of shoreline structural stabilization practices, especially seawalls, on littoral zone aquatic habitats.

Water Resources

- ***Objectives:*** Characterize water use, availability, and water quality in the project area; characterize the effects of project operations on water quality in the project reservoir and in the tailrace area immediately downstream of the dam.

- ***Study area:*** Project reservoir and tailrace area within the project boundary for water quality monitoring; watershed upstream for literature review.

- ***Key study elements:*** Seasonal water quality monitoring of the project reservoir through 2016, including vertical profiles and water chemistry; continuous DO and water temperature monitoring in the project tailrace area in 2016; literature-based analysis of water quantity and water quality.

Fish and Aquatic Resources

- ***Objectives:*** Characterize representative shoreline and littoral-zone aquatic habitats occurring throughout the reservoir; evaluate the occurrence and distribution of Altamaha shiner and native mussels within the project boundary; evaluate the effects of continued project operations on summer reservoir water quality and habitat for largemouth bass and stocked striped bass; evaluate the potential for fish entrainment and turbine-induced mortality by applying trends and data from entrainment studies completed at other hydroelectric projects, including pumped storage projects, to the physical, operational, and fisheries characteristics of the Wallace Dam Project.

- ***Study area:*** Project reservoir, tailrace area, and the lower free-flowing reaches of larger tributary streams within the project boundary.

- ***Key study elements:*** A shoreline habitat survey, conducted concurrently with the reconnaissance survey for erosion and sedimentation (Geology and Soils), to characterize physical aquatic habitat and available sources of littoral-zone cover for fish; analysis of Altamaha shiner and native mussel occurrence and habitat use within the project boundary based on existing data; analysis of GDNR standardized fisheries survey data for the project reservoir for primary sport fishes; analysis of water quality effects in the project reservoir on the growth of largemouth bass and striped bass based on existing data; literature-based analysis of fish entrainment and mortality.

Wildlife and Botanical Resources

- ***Objectives:*** Describe terrestrial wildlife and botanical resources occurring in the project area, including lists of plant and animal species that use representative habitats, and to identify invasive species.

- ***Study area:*** The project boundary around Lake Oconee and project lands adjacent to Wallace Dam and the tailrace area, the project recreation facilities, and FS recreational access to Lake Oconee.

- ***Key study elements:*** A single field reconnaissance survey in spring/early summer 2016 to observe and document representative terrestrial communities and associated wildlife habitat; this survey will be conducted concurrently with field surveys for wetlands, riparian, and littoral habitat and RTE species.

Wetlands, Riparian, and Littoral Habitat

- ***Objectives:*** Describe floodplain, wetlands, riparian habitats, and littoral habitats occurring in the Wallace Dam project area, including lists of representative plant and animal species; identify invasive species; and prepare a map delineating wetland, riparian, and littoral habitat.

- ***Study area:*** The project boundary around Lake Oconee and the tailrace area.

- ***Key study elements:*** A single field reconnaissance survey in spring/early summer 2016 to characterize wetland, riparian, and littoral habitats; this survey will be conducted concurrently with field surveys for wildlife and botanical resources and RTE species; review of existing aerial photography, wetlands mapping, and other existing information sources.

RTE Species

- ***Objectives:*** List federal and state RTE plant and animal species with known occurrence records near the Project; identify habitat requirements; and describe distributions and habitat use of RTE species presently occurring near the Project. Information compiled in the PAD will be reconsidered and updated based on the findings of field surveys, consultation with the resource agencies, and other new information.

- ***Study area:*** The project boundary around Lake Oconee, and project lands adjacent to Wallace Dam, the project recreation facilities, and FS recreational access to Lake Oconee.

- ***Key study elements:*** A field survey of the study area in 2016 to identify potentially suitable habitats for RTE species within the study area; findings will be incorporated from the concurrent field surveys for wildlife and botanical resources and wetlands, riparian, and littoral habitats; and from the analysis of Altamaha shiner and native mussel occurrence and habitat use (Fish and Aquatic Resources); literature review and consultation with federal and state agencies on known element of occurrence records in the project vicinity.

Recreation and Land Use

- ***Objectives:*** Review existing information to describe recreation, land use, and visual aesthetic qualities in the Wallace Dam project area; characterize current types and levels of recreational use on Lake Oconee and in the tailrace area; evaluate the need for additional recreational access or facilities at Lake Oconee.

- ***Study area:*** The project boundary around Lake Oconee and the Wallace Dam tailrace area within the project boundary, including the project recreation facilities and FS recreational access to Lake Oconee.

- ***Key study elements:*** Review and analysis of campground surveys and use information gathered at Lawrence Shoals Park, Old Salem Park, and Parks Ferry Park; compilation and analysis of Form 80 recreational use information gathered at project recreation facilities in 2014 based on car counters, cameras, and visual observations; review and analysis of available fishing tournament information and FS recreational use data; assess the adequacy of existing facilities, determine individual access site pressure and user conflicts, and estimate the number of recreation user days per year.

Cultural Resources

- ***Objectives***: Identify known historic resources through literature site file review; determine if any historic properties are eligible for listing on the National Register; evaluate the potential for effects upon historic resources by the continued operation of the Project or by activities conducted along the shoreline of the project reservoir.

- ***Study area:*** The area between a lower daily water pool elevation (433.5 ft PD) and the project boundary.

- ***Key study elements:*** research of existing information about the project area; further assessment of the sites being monitored by Georgia Power to determine the effectiveness of the current management plan; photographic documentation of the dam structure, powerhouses, and equipment for recordation.

5.2.2 Study Requests

Although Georgia Power will be proposing the resource studies listed above, relicensing participants have the opportunity, when filing comments on this PAD, to request information gathering and studies. Comments and study requests will be due by June 19, 2015 (Table 1). FERC requires that any information or study requests address the following criteria set forth in the ILP regulations at 18 CFR § 5.9(b):

1. Describe the goals and objectives of each study proposal and the information to be obtained

2. If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied

3. If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study

4. Describe existing information concerning the subject of the study proposal, and the need for additional information

5. Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements

6. Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge

7. Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs

5.3 Relevant Comprehensive Waterway Plans

Section 10(a)(2)(A) of the Federal Power Act (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.

On April 27, 1988, the Commission issued Order No. 481-A, revising Order no. 481, issued October 26, 1987, establishing that the Commission will accord FPA Section 10(a)(2)(A) comprehensive plan status to any Federal or state plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;

- Specifies the standards, the data, and the methodology used; and

- Is filed with the Secretary of the Commission.

The Commission currently lists 33 comprehensive plans for the state of Georgia (FERC, 2013). Table 23 lists these comprehensive plans and indicates their potential relevance to the Wallace Dam Project. Of the 33 plans listed, 17 are potentially applicable to the Project.

5.4 Relevant Resource Management Plans

5.4.1 Chattahoochee-Oconee National Forest Land and Resources Management Plan

The National Forest Management Act requires all national forest lands to be managed under a "Forest Plan" as defined and structured by the Act. The Chattahoochee Oconee NF is currently operating under a 2004 plan which guides all natural resource management activities and sets management standards as well as describes resource management practices; levels of habitat production, protection, and management; and the availability and suitability of lands for resource management (FS, 2004a). Specific to recreation, the Plan addresses a "Recreation Opportunities/Experiences Issue Statement: How should the increasing demand for recreational opportunities and experiences be addressed on the national forests while protecting forest resources? This includes considering a full range of opportunities for developed and dispersed recreation activities (including such things as nature study, hunting and fishing activities, and trail uses)". To do this, the Plan selects a range of management prescriptions for the Oconee NF including:

- Custodial Management -Small, Isolated Land Areas (to be disposed of or exchanged)

- Recommended Scenic River Segments, Outstandingly Remarkable Streams

- Management of Experimental Forests, Murder Creek Research Natural Area, Botanical - Zoological and Cultural/Heritage Areas

- Management of Administrative Sites, Dispersed Recreation Areas, Dispersed Recreation Areas with Vegetation Management

5.4.2 Georgia Comprehensive State-wide Water Management Plan

The Georgia Comprehensive State-wide Water Management Plan (State Water Plan) was adopted by the Georgia General Assembly in 2008 and provides for the development of a series of regional water planning documents. The Upper Oconee Regional Water Plan (RWP) was one of 10 Regional Water Plans developed in Georgia to define sustainable practices to meet regional water resource needs through 2050. The Upper Oconee Region contains portions of the Oconee, Ocmulgee, Ogeechee, Savannah, and Altamaha river basins as well as the four counties surrounding the Project. Based on the evaluation of the Resource Assessments and future consumption, there were only limited gaps in meeting future water demands in the Region primarily due to the storage (reservoirs) available in the basin. Table ES-2 of the Upper Oconee RWP summarizes these gaps by County.

While future water consumption in the northern portion of the basin (Athens-Clarke, Barrow, Jackson, and Oconee Counties), above the Project, will result in gaps in 2050 without implementation of additional Management Practices for water supply and conservation, Table ES-2 demonstrates there were no groundwater or surface water gaps for the Project vicinity counties. The Plan found municipal water needs in Greene and Hancock counties as well as municipal wastewater shortages in Greene County. Water quality gaps were predicted to occur in Lake Oconee due to excess nutrients in the future due to a combination of point source and nonpoint source pollutant loads from anticipated wastewater discharges and land use changes. Additional nutrient controls will be required to protect drinking water supplies, recreational activities on the reservoirs, and the associated economic benefits for the Region as well as to meet the pending numeric nutrient criteria. However, the Plan does not project the need for new facilities or actions for areas within or immediately adjacent to the Wallace Dam project boundary.

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TABLES

TABLE 1
Process Plan and Schedule for the Wallace Dam Project (FERC No. 2413)

Activity	Responsibility	Time Frame	Deadline
Applicant Files NOI and Pre-Application Document (PAD)	Georgia Power	18 CFR § 5.3, § 5.5, § 5.6	February 18, 2015
Initial Tribal Consultation Meeting (if necessary)	FERC	Within 30 days of filing NOI & PAD (up to Day 30) 18 CFR § 5.7	March 20, 2015
Commission Notices NOI/PAD and issues Scoping Document 1 (SD1)	FERC	With 60 days of filing NOI & PAD (up to Day 60) 18 CFR § 5.8	April 20, 2015
Commission Holds Scoping Meetings/Site Visit at Wallace Dam	FERC	Within 30 days of NOI & PAD Notice & Issuance of SD1 (up to Day 90) 18 CFR § 5.8	May 19-20, 2015
Comments on PAD, SD1, and Study Requests	Stakeholders	Within 60 days of NOI & PAD notice and issuance of SD1 (up to Day 120) 18 CFR § 5.9	June 19, 2015
Applicant Files Proposed Study Plan (PSP) Commission issues SD2 (if necessary)	Georgia Power (PSP) FERC (SD2)	Within 45 days of deadline for filing comments on SD1 (up to Day 165) 18 CFR § 5.11, § 5.10	July 27, 2015
Study Plan Meeting(s)	Georgia Power	Within 30 days of deadline for filing PSP (up to Day 195) 18 CFR § 5.11	August 25-27, 2015
Comments on Proposed Study Plan Filed	Stakeholders	Within 90 days after proposed study plan is filed (up to Day 255) 18 CFR § 5.12	October 26, 2015
Revised Study Plan filed for Commission approval	Georgia Power	Within 30 days of deadline for comments on PSP (up to Day 285) 18 CFR § 5.13	November 24, 2015
Comments on Revised Study Plan Filed	Stakeholders	Within 15 days following Revised Study Plan (up to Day 300) 18 CFR § 5.13	December 9, 2015
Commission issues Study Plan Determination	FERC	Within 30 days following Revised Study Plan (up to Day 315) 18 CFR § 5.13	December 24, 2015
Mandatory Conditioning Agency Formal Study Dispute Resolution (if necessary)	Stakeholders, FERC, Georgia Power	Within 20 days of Commission issuing Study Plan Determination 18 CFR § 5.14	January 13, 2016
First Season Studies			**January 2016 – December 2016**
Study Progress Report Filed	Georgia Power	18 CFR § 5.15	August 31, 2016
Initial Study Report Filed	Georgia Power	Should be filed no later than one year after Commission approval of	November 18, 2016

TABLE 1
Process Plan and Schedule for the Wallace Dam Project (FERC No. 2413)

Activity	Responsibility	Time Frame	Deadline
		study plan 18 CFR § 5.15	
Initial Study Results Meeting	Georgia Power	Within 15 days of Initial/Final Study Reports 18 CFR § 5.15	December 5-6, 2016
File Initial Study Results Meeting Summary	Georgia Power	Within 15 days of Study Results Meeting 18 CFR § 5.15	December 21, 2016
File Initial Study Results Meeting Summary Disagreements and/or Modified or New Study Requests	Stakeholders	Within 30 days of Study Results Meeting Summary Filing 18 CFR § .15	January 20, 2017
File Response to Initial Study Results Meeting Summary Disagreements and/or Modified or New Study Requests	Georgia Power	Within 30 days of filing response to Study Results Meeting Summary Disagreements and/or Modified or New Study Requests 18 CFR § 5.15	February 20, 2017
FERC Resolves Disagreements (and modifies Study Plans if necessary)	FERC	Within 30 days of filing response to Study Results Meeting Summary Disagreements and/or Modified or New Study Requests 18 CFR § 5.15	March 22, 2017
Second Season Studies (if necessary)			**January-September 2017**
Conduct Preliminary Licensing Proposal Meetings	Georgia Power	Not required	September 7-8, 2017 (2 days if needed)
Updated Study Report Filed (if second season of studies necessary)	Georgia Power	Should be filed no later than two years after Commission approval of study plan 18 CFR § 5.15 (f)	October 11, 2017
Updated Study Results Meeting (if second season of studies necessary)	Georgia Power	Within 15 days of Initial/Final Study Reports 18 CFR § 5.15	October 16-17, 2017 (2 days if needed)
File Updated Study Results Meeting Summary (if second season of studies necessary)	Georgia Power	Within 15 days of Study Results Meeting 18 CFR § 5.15	November 10, 2017
File Preliminary Licensing Proposal	Georgia Power	No later than 150 days before License Application is Filed	November 21, 2017
File Updated Study Results Meeting Summary Disagreements (if second season of studies necessary)	Stakeholders	Within 30 days of Study Results Meeting Summary Filing 18 CFR § 5.15	December 11, 2017

TABLE 1
Process Plan and Schedule for the Wallace Dam Project (FERC No. 2413)

Activity	Responsibility	Time Frame	Deadline
File Response to Updated Study Results Meeting Summary Disagreements (if second season of studies necessary)	Georgia Power	Within 30 days of filing response to Study Results Meeting Summary Disagreements	January 9, 2018
FERC Resolves Meeting Summary Disagreements (if second season of studies necessary)	FERC	Within 30 days of filing response to Study Results Meeting Summary Disagreements 18 CFR § 5.15	February 8, 2018
Comments due on Preliminary Licensing Proposal	Stakeholders	Within 90 days of Filing PLP	February 19, 2018
File License Application	Georgia Power	2 Years Prior to Current License Expiration	May 31, 2018

Table 2
Design Characteristics of the Wallace Dam Turbine Units

Unit	Nameplate Capacity (MW)	Maximum Hydraulic Capacity (cfs)	Best Gate Hydraulic Capacity (cfs)	Commercial Operation Date
1[a]	52.20	8,390	7,200	1980
2[a]	52.20	8,825	7,250	1980
3	56.25	8,600	7,900	1980
4	56.25	8,600	7,900	1980
5[a]	52.20	8,210	7,250	1980
6[a]	52.20	7,920	7,250	1979
Total	**321.3**	**50,545**		NA

[a] Pumped storage units.

Table 3
Summary of Wallace Dam Project Average Annual Generation for 1994-2013

Month	1994 through 2013 Average Generation (MWh)
January	29,304
February	27,594
March	31,655
April	28,739
May	32,573
June	34,608
July	37,438
August	39,504
September	35,265
October	31,051
November	26,759
December	28,548
Annual	**383,038**

TABLE 4
Summary of Wallace Dam Project Generation and Outflow Records for 2009-2013

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total	Monthly Min	Monthly Max
Monthly Generation (MWh):															
2009	20,888	14,967	33,477	30,565	40,983	39,651	41,906	42,673	35,380	39,083	36,656	37,217	413,446	14,967	42,673
2010	37,498	38,212	27,597	25,390	34,477	35,313	41,532	40,741	41,582	37,913	25,422	22,681	408,358	22,681	41,582
2011	21,472	21,837	32,877	29,678	28,478	29,965	30,944	34,827	34,267	30,218	27,598	26,796	348,957	21,472	34,827
2012	26,632	20,411	30,823	32,346	33,545	36,550	32,713	35,109	34,247	29,446	24,096	20,446	356,364	20,411	36,550
2013	19,595	23,019	22,204	24,571	22,612	26,895	30,728	32,411	29,605	27,126	17,672	27,538	303,976	17,672	32,411
Average	25,217	23,689	29,396	28,510	32,019	33,675	35,565	37,152	35,016	32,757	26,289	26,936	366,220	19,441	37,609
Monthly Discharge (cfs)[a]:															
2009	3,581	5,370	5,082	2,063	2,444	2,368	2,403	919	2,074	2,671	2,916	6,489		919	6,489
2010	3,614	5,098	5,206	2,016	2,688	2,317	2,346	917	1,792	2,090	3,263	6,804		917	6,804
2011	3,521	5,437	5,307	2,142	2,529	2,272	2,397	920	1,705	3,076	2,924	6,320		920	6,320
2012	3,437	5,368	5,002	2,330	2,488	2,409	2,434	918	1,720	3,034	3,089	6,196		918	6,196
2013	3,693	5,515	4,618	2,589	2,255	2,406	2,434	893	1,660	2,931	3,120	6,544		893	6,544
Average	3,569	5,358	5,043	2,228	2,481	2,354	2,403	913	1,790	2,760	3,062	6,471		913	6,471

[a] Discharge was calculated using USGS gage data adjusted for daily volume change and evaporation.

TABLE 5
Monthly Minimum, Mean, and Maximum Flow by Month at Wallace Dam, 1997-2013

Month	Minimum Flow (cfs)	Mean Flow (cfs)	Maximum Flow (cfs)
January	1,329	2,524	7,400
February	1,712	3,403	10,534
March	1,776	3,749	13,262
April	1,426	2,639	6,650
May	948	2,005	5,430
June	682	1,592	3,348
July	525	1,588	5,760
August	424	1,024	2,570
September	309	1,205	4,741
October	541	1,295	5,033
November	772	1,656	5,716
December	1,090	2,315	7,647

TABLE 6
Tributaries to Lake Oconee* Not Supporting Designated Use Classifications

Stream Name	Location Description	Criterion Violated	Potential Causes	Notes
Apalachee River	Marburg Creek to Lake Oconee	FC	NP	Completed FC (2002 & 2007), TWR (2002).
Beaverdam Creek	Oliver Creek to Lake Oconee, S. of Greensboro	FC	NP	Completed FC (2002 & 2007).
Richland Creek	Upstream Greensboro to I-20	FC	NP, UR	Completed FC (1998 & 2007).
Freeman Creek	Headwaters to Apalachee River	Bio F	NP	Completed Bio F 2007.
Big Sandy Creek	Little Sandy Creek (near Madison) to Hard Labor Creek	FC	NP	Completed FC 2007.
Briar Creek	Headwaters to Hard Labor Creek	Bio F	NP	Completed Bio F 2007.
Oconee River	Confluence of North & Middle Oconee Rivers, Athens to Barnett Shoals Dam	FC	UR	Completed for FC (2002 & 2007), TWR (2002).
Fishing Creek	McWhorter Creek to Lake Oconee	FC	NP	Completed FC (1998 & 2007).
Little Creek	Headwaters to Richland Creek	Bio F	NP	Completed Bio F 2007.
Little Sugar Creek	Headwaters to Lake Oconee	FC	NP	Completed FC (2002 & 2007).
Oconee River	Barnett Shoals to Lake Oconee	FC	UR	Completed FC (2002 & 2007), TWR (2002).
Sugar Creek	South Sugar Creek to Lake Oconee	FC	NP	Completed FC (1998 & 2007).
Town Creek	Hwy. 15 to Richland Creek, Greensboro	FC	UR	Completed FC (2002 & 2007).
Town Creek	Penfield to Lake Oconee	FC	NP	Completed FC (2007).
Richland Creek	I-20 to Little Creek (formerly I-20 to Beaverdam Creek)	FC	UR	Completed FC (1998 & 2002 & 2007).
Barrow Creek	Lake George to Big Creek	Bio F	NP	Planned for 2016.
Falling Creek	Headwaters to the Oconee River	Bio F	NP	Planned for 2016.
Harris Creek	Headwaters to the Oconee River	Bio F	NP	Planned for 2016.

Source: GEPD (2012)

Notes:

* = outside project boundary

FC = fecal coliform; Bio F = biota (fish consumption); NP = non-point source; UR = urban runoff

TABLE 7
Summary of Georgia Power Water Chemistry Data for the Wallace Dam Project, 1979-2012

			OC1				OC2				OC3			
Analyte	**Units**	**Criterion**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**
Alkalinity	mg/L	NA	382	8	21.0	69	154	14	25.8	85	55	10	24.2	40
Ammonia	mg/L	NA	305	ND	0.000709	0.1	101	ND	0.00299	0.1	86	ND	ND	ND
Ammonia as N	mg/L	NA	5	0.01	0.0300	0.05	5	ND	0.0240	0.04				
Arsenic	mg/L	0.15	178	ND	ND	ND	86	ND	ND	ND	86	ND	ND	ND
BOD	mg/L	NA	89	ND	1.34	8	43	ND	1.65	6	43	ND	1.51	4
Calcium	mg/L	NA	378	3	4.28	11	158	3	5.63	17	54	3	4.63	7
Chlorophyll-a	ug/L	NA	83	-2	3.54	30	47	ND	4.10	11	23	ND	3.43	6
COD	mg/L	NA	89	ND	10.7	35	43	ND	12.9	30	43	ND	10.0	27
Copper	mg/L	0.005	86	ND	ND	ND	42	ND	ND	ND	42	ND	ND	ND
Fecal Coliform	Col/100mL	200	38	ND	7	44	14	1	3	8	ND			
Hardness	mg/L	NA	373	11	17.6	41	158	12	22.5	70	52	11	18.7	28
Iron	mg/L	1	87	ND	**1.16**	**3**	42	ND	0.93	**4**	42	ND	**1.55**	**5**
Lead	mg/L	0.0012	356	ND	ND	ND	172	ND	ND	ND	172	ND	ND	ND
Magnesium	mg/L	NA	213	1	1.78	2.3	66	1	2.59	6	42	1	1.74	2
Manganese	mg/L	NA	86	ND	ND	ND	42	ND	0.119	2	42	ND	0.0952	1
Mercury	mg/L	0.000012	89	ND	ND	ND	43	ND	ND	ND	43	ND	ND	ND
Nickel	mg/L	0.029	86	ND	ND	ND	42	ND	ND	ND	42	ND	ND	ND
Nitrate	mg/L	10	202	ND	0.168	1	66	ND	0.082	1	43	ND	0.116	1
Nitrite	mg/L	NA	88	ND	ND	ND	22	ND	ND	ND				
Orthophosphate	mg/L	NA	89	ND	ND	ND	43	ND	ND	ND	43	ND	ND	ND
Selenium	mg/L	0.005	356	ND	ND	ND	172	ND	ND	ND	172	ND	ND	ND
Total Coliform	mg/L	NA	18	4	23.3	45					11	2	39.7	260
Total Phosphate	mg/L	NA	390	ND	0.00769	1	129	ND	ND	ND	129	ND	ND	ND
Total Phosphorus	mg/L	NA	90	ND	0.00911	0.28	24	ND	0.0498	0.56				
TSS	mg/L	NA	445	ND	10.8	55	215	ND	8.1	66	215	ND	11.9	65
Turbidity	NTU	NA	382	ND	15.6	120	157	1	8.9	64	55	1	16.9	80

TABLE 7
Summary of Georgia Power Water Chemistry Data for the Wallace Dam Project, 1979-2012

			OC4				OC5				OC6			
Analyte	**Units**	**Criterion**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**
Alkalinity	mg/L	NA	113	12	24.7	38	61	10	20.1	30	152	9	19.6	31
Ammonia	mg/L	NA	136	ND	0.00264	0.3	106	ND	ND	ND	106	ND	ND	ND
Ammonia as N	mg/L	NA	5	ND	0.0280	0.05								
Arsenic	mg/L	0.15	86	ND	ND	ND	106	ND	ND	ND	106	ND	ND	ND
BOD	mg/L	NA	43	ND	1.84	5	53	ND	1.92	16	53	ND	1.68	5
Calcium	mg/L	NA	113	3	4.73	7	60	2	4.25	6	154	2	4.44	10
Chlorophyll-a	ug/L	NA	81	ND	10.01	43	23	ND	4.52	10	23	ND	5.00	16
COD	mg/L	NA	43	ND	11.7	60	53	ND	9.9	40	53	ND	9.8	35
Copper	mg/L	0.005	42	ND	ND	ND	52	ND	ND	ND	52	ND	ND	ND
Fecal Coliform	Col/100mL	200	39	ND	20	**300**					ND			
Hardness	mg/L	NA	112	12	19.9	26	58	11	17.7	24	152	10	17.4	40
Iron	mg/L	1	42	ND	**1.24**	**6**	52	ND	**2.77**	**13**	52	ND	2.13	6
Lead	mg/L	0.0012	172	ND	ND	ND	212	ND	ND	ND	212	ND	ND	ND
Magnesium	mg/L	NA	99	1	1.97	2.5	52	1	1.77	2	52	1	1.71	2
Manganese	mg/L	NA	42	ND	0.0714	1	52	ND	0.0192	1	52	ND	0.0769	1
Mercury	mg/L	0.000012	43	ND	ND	ND	53	ND	ND	ND	53	ND	ND	ND
Nickel	mg/L	0.029	42	ND	ND	ND	52	ND	ND	ND	52	ND	ND	ND
Nitrate	mg/L	10	96	ND	0.028	1	53	ND	0.698	1	53	ND	0.509	1
Nitrite	mg/L	NA	43	ND	ND	ND								
Orthophosphate	mg/L	NA	43	ND	ND	ND	53	ND	ND	ND	53	ND	ND	ND
Selenium	mg/L	0.005	172	ND	ND	ND	212	ND	ND	ND	212	ND	ND	ND
Total Coliform	mg/L	NA	8	15	345.0	940	6	10	35.8	80	9	5	253.3	1100
Total Phosphate	mg/L	NA	171	ND	ND	ND	159	ND	ND	ND	159	ND	ND	ND
Total Phosphorus	mg/L	NA	45	ND	0.02733	0.41								
TSS	mg/L	NA	215	ND	13.3	77	265	ND	30.8	126	265	ND	20.0	60
Turbidity	NTU	NA	113	1	15.1	88	61	5	30.7	125	155	1	24.6	130

TABLE 7
Summary of Georgia Power Water Chemistry Data for the Wallace Dam Project, 1979-2012

			OC7				OC8				OC9			
Analyte	**Units**	**Criterion**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**	**Number**	**Minimum**	**Average**	**Maximum**
Alkalinity	mg/L	NA	158	8	19.2	35	90	10	21.3	38	114	11	26.0	59
Ammonia	mg/L	NA	120	ND	0.00716	0.6	120	ND	0.166	19.6	159	ND	0.00161	0.2
Ammonia as N	mg/L	NA	5	ND	0.0360	0.1	6	ND	0.0767	0.2	6	ND	0.0817	0.3
Arsenic	mg/L	0.15	106	ND	ND	ND	106	ND	ND	ND	106	ND	ND	ND
BOD	mg/L	NA	53	ND	1.55	4	53	ND	1.77	6	53	ND	1.91	5
Calcium	mg/L	NA	160	2	4.20	6.2	91	2	4.40	7.8	116	3	5.25	8
Chlorophyll-a	ug/L	NA	46	ND	5.73	19	46	ND	7.96	44	82	ND	10.29	24
COD	mg/L	NA	53	ND	9.9	50	53	ND	10.9	50	53	ND	12.9	110
Copper	mg/L	0.005	52	ND	ND	ND	52	ND	ND	ND	52	ND	ND	ND
Fecal Coliform	Col/100mL	200	21	1	19	200	20	1	17	200	34	ND	13	139
Hardness	mg/L	NA	160	9	16.6	27	91	11	18.2	30	117	13	21.8	31
Iron	mg/L	1	52	ND	1.71	4	52	1	2.52	27	53	ND	2.38	36
Lead	mg/L	0.0012	212	ND	ND	ND	212	ND	ND	ND	212	ND	ND	ND
Magnesium	mg/L	NA	76	1	1.50	3	76	1	1.85	3	110	1	2.10	3
Manganese	mg/L	NA	52	ND	ND	ND	52	ND	0.0192	1	52	ND	0.0577	2
Mercury	mg/L	0.000012	53	ND	ND	ND	53	ND	ND	ND	53	ND	ND	ND
Nickel	mg/L	0.029	52	ND	ND	ND	52	ND	ND	ND	52	ND	ND	ND
Nitrate	mg/L	10	76	ND	0.389	1	76	ND	0.299	1	106	ND	0.206	1
Nitrite	mg/L	NA	22	ND	0.00136	0.03	22	ND	0.00685	0.0749	44	ND	ND	ND
Orthophosphate	mg/L	NA	53	ND	ND	ND	53	ND	ND	ND	53	ND	ND	ND
Selenium	mg/L	0.005	212	ND	ND	ND	212	ND	ND	ND	212	ND	ND	ND
Total Coliform	mg/L	NA									2	210	217.5	225
Total Phosphate	mg/L	NA	162	ND	0.0185	1	162	ND	0.0185	1	201	ND	0.0299	1
Total Phosphorus	mg/L	NA	23	ND	0.0548	0.39	23	ND	0.0857	0.96	46	ND	0.0343	0.58
TSS	mg/L	NA	265	ND	14.5	44	265	ND	33.9	571	265	ND	33.5	850
Turbidity	NTU	NA	159	1	18.3	94	90	7	27.7	200	116	1	21.5	225

NA: No criterion available.

ND: Not detected.

Source: Georgia Power Environmental Laboratory

TABLE 8
Summary of GEPD Water Chemistry Data for Lake Oconee, 2004

Parameter	Units	Number	Minimum	Average	Maximum
Alkalinity	mg/L	8	17	19.5	24
Ammonia as NH3	mg/L	16	0	0.00	0
BOD	mg/L	16	0	0.53	2.4
Calcium carbonate	mg/L	8	17	19.5	24
Carbon, Total Organic (Toc)	mg/L	8	2.8	3.90	5.7
Fecal Coliform	MPN	8	0	0.00	0
Hardness, Ca, Mg	mg/L	7	16	20.3	36
Nitrate and nitrite as N	mg/L	16	0.04	0.29	0.52
Kjeldahl nitrogen	mg/L	12	0.29	0.44	0.63
Orthophosphate as P	mg/L	16	0	0.00	0
pH	s.u.	16	6.9	7.14	7.4
Phosphate-phosphorus as P	mg/L	12	0	0.19	0.87
Solids, Fixed	mg/L	8	3	6.26	10
Turbidity	NTU	16	2.4	5.56	13

Source: STORET (2014) from two locations in the lake (near Wallace Dam and Richland Creek embayment); data for the two stations are combined.

TABLE 9

Fishes Known to Occur in the Vicinity of the Wallace Dam Project Based on Historical and Recent Records

Family/Scientific Name	Common Name	Project Boundary	Tributaries to Lake Oconee Upstream of Project Boundary							Lake Sinclair
		Lake Oconee	Oconee River	Greenbriar Creek	Apalachee River	Hard Labor Creek	Sugar Creek	Richland Creek	Town Creek	
GARS:										
Lepisosteus osseus	longnose gar	X	X	X	X	X	X	X	X	X
BOWFIN:										
Amia calva	bowfin							X	X	
FRESHWATER EELS:										
Anguilla rostrata	American eel					X				
HERRINGS AND SHADS:										
Dorosoma cepedianum	gizzard shad	X	X	X	X	X	X	X	X	X
Dorosoma petenense	threadfin shad[a]	X	X	X	X		X	X	X	X
MINNOWS:										
Campostoma pauciradii	bluefin stoneroller		X							
Cyprinella callisema	Ocmulgee shiner		X		X	X	X			X
Cyprinella xaenura	Altamaha shiner[b]		X		X	X		X		
Cyprinus carpio	common carp[a]	X	X	X	X	X	X	X	X	X
Hybognathus regius	Eastern silvery minnow		X		X	X	X			
Hybopsis rubrifrons	rosyface chub		X	X	X	X	X	X	X	
Nocomis leptocephalus	bluehead chub		X	X	X	X	X	X	X	
Notemigonus crysoleucas	golden shiner	X	X	X	X		X	X	X	X
Notropis hudsonius	spottail shiner		X		X	X	X	X		X
Notropis longirostrus	longnose shiner					X				
Notropis lutipinnis	yellowfin shiner		X	X	X	X	X	X	X	
Opsopoeodus emiliae	pugnose minnow									X
SUCKERS:										
Erimyzon oblongus	creek chubsucker		X	X	X	X		X	X	

TABLE 9

Fishes Known to Occur in the Vicinity of the Wallace Dam Project Based on Historical and Recent Records

Family/Scientific Name	Common Name	Project Boundary	Tributaries to Lake Oconee Upstream of Project Boundary							Lake Sinclair
		Lake Oconee	Oconee River	Greenbriar Creek	Apalachee River	Hard Labor Creek	Sugar Creek	Richland Creek	Town Creek	
Minytrema melanops	spotted sucker	X			X	X	X			X
Moxostoma anisurum	silver redhorse	X								X
Moxostoma collapsum	notchlip redhorse		X		X	X	X			X
Moxostoma rupiscartes	striped jumprock	X	X	X	X	X	X	X	X	
Moxostoma sp. cf. lachneri	brassy jumprock	X	X		X	X	X			
NORTH AMERICAN CATFISHES:										
Ameiurus brunneus	snail bullhead	X	X	X	X	X	X	X	X	X
Ameiurus catus	white catfish	X	X	X	X	X	X	X	X	X
Ameiurus natalis	yellow bullhead	X	X	X	X		X	X	X	
Ameiurus nebulosus	brown bullhead	X					X	X		X
Ameiurus platycephalus	flat bullhead	X								X
Ictalurus furcatus	blue catfish[a]	X	X	X	X		X			X
Ictalurus punctatus	channel catfish	X	X	X	X	X	X	X	X	X
Noturus gyrinus	tadpole madtom		X	X		X		X	X	
Noturus insignis	margined madtom		X		X	X				
Noturus leptacanthus	speckled madtom				X	X				
Pylodictus olivaris	flathead catfish[a]	X			X		X			X
PIKES:										
Esox americanus	redfin pickerel		X	X	X	X			X	X
Esox niger	chain pickerel		X		X			X		
PIRATE PERCHES:										
Aphredoderus sayanus	pirate perch		X	X	X	X		X	X	
SILVERSIDES:										
Labidesthes sicculus	brook silverside				X	X				X

TABLE 9

Fishes Known to Occur in the Vicinity of the Wallace Dam Project Based on Historical and Recent Records

Family/Scientific Name	Common Name	Project Boundary	Tributaries to Lake Oconee Upstream of Project Boundary							Lake Sinclair
		Lake Oconee	Oconee River	Greenbriar Creek	Apalachee River	Hard Labor Creek	Sugar Creek	Richland Creek	Town Creek	
LIVEBEARERS:										
Gambusia holbrooki	eastern mosquitofish[c]		X	X	X	X		X	X	X
TEMPERATE BASSES:										
Morone chrysops	white bass[a]	X	X	X	X		X	X	X	X
Morone saxatilis	striped bass	X	X	X	X		X	X	X	X
Morone chrysops x *M. saxatilis*	hybrid bass	X	X	X	X		X	X	X	X
SUNFISHES:										
Centrarchus macropterus	flier		X	X					X	
Lepomis auritus	redbreast sunfish	X	X	X	X	X	X	X	X	X
Lepomis cyanellus	green sunfish[a]	X	X	X	X	X	X	X	X	X
Lepomis gulosus	warmouth	X	X	X	X	X	X	X	X	X
Lepomis macrochirus	bluegill	X	X	X	X	X	X	X	X	X
Lepomis microlophus	redear sunfish	X	X	X	X	X	X	X	X	X
Micropterus punctulatus	spotted bass[a]	X								
Micropterus salmoides	largemouth bass	X	X	X	X	X	X	X	X	X
Micropterus sp. cf. coosae	redeye bass		X		X	X		X		
Pomoxis annularis	white crappie[a]				X					
Pomoxis nigromaculatus	black crappie	X	X	X	X	X	X	X	X	X
PERCHES:										
Perca flavescens	yellow perch[a]	X	X	X	X	X	X	X	X	X
Percina nigrofasciata	blackbanded darter				X					
Etheostoma hopkinsi	Christmas darter		X	X		X	X	X	X	
Etheostoma inscriptum	turquoise darter		X	X	X	X			X	

TABLE 9

Fishes Known to Occur in the Vicinity of the Wallace Dam Project Based on Historical and Recent Records

Family/Scientific Name	Common Name	Project Boundary	Tributaries to Lake Oconee Upstream of Project Boundary							
		Lake Oconee	Oconee River	Greenbriar Creek	Apalachee River	Hard Labor Creek	Sugar Creek	Richland Creek	Town Creek	Lake Sinclair
Etheostoma olmstedi	tessellated darter		X	X	X	X			X	X
Estimated Number of Taxa[d]		28	43	33	45	39	33	34	33	32
Data Sources[e]		1, 2	3, 4	3	3, 5	3	3	3	3	6, 7

[a] Introduced, non-native to the Altamaha River basin (Lee et al., 1980).

[b] Altamaha shiner is Georgia state-listed as “threatened.”

[c] Western mosquitofish (*Gambusia affinis*) may also have been introduced in the basin.

[d] Total excludes hybrids.

[e] Data sources:

1 = GDNR reservoir survey unpublished data for years 2002-2013

2 = Homer and Jennings (2011) relative to catfish species occurrence

3 = Fishes of Georgia website; includes historical and recent documented occurrences (Straight et al., 2009)

4 = Garnett and Batzer (2014)

5 = Nuckols and Roghair (2004)

6 = Georgia Power unpublished reservoir survey data, 2003

7 = Georgia Power Plant Branch unpublished impingement sampling data, 2004-2005

TABLE 10
Summary of GDNR Electrofishing Data for Lake Oconee, 2009-2013

	Mean Catch per Hour (CPH)[a] and Standard Error (SE)[b]									
	2009		2010		2011		2012		2013	
Common Name	CPH	SE	CPH	SE	CPH	SE	CPH	SE	CPH	SE
Largemouth bass	80.43	13.05	59.57	7.03	59.00	6.74	61.57	6.97	80.71	9.44
Black crappie	12.71	3.97	30.00	5.55	31.54	6.93	6.86	1.69	22.29	3.89
Bluegill	1.43	0.49	10.43	3.57	17.71	2.85	5.14	1.16	9.43	2.03
Redear sunfish	0.86	0.46	1.57	0.52	4.00	1.15	3.57	0.92	4.71	1.10
Hybrid bass	0	0	1.86	1.56	2.14	1.37	0	0	0	0
Striped bass	0.71	0.34	0.14	0.14	0.29	0.19	0.43	0.23	0	0
	Mean Relative Condition Factor (K_n)[c] and Standard Error (SE)[b]									
	2009		2010		2011		2012		2013	
Common Name	K_n	SE	K_n	SE	K_n	SE	K_n	SE	K_n	SE
Largemouth bass	0.97	0.01	0.94	0.01	0.92	0.01	0.96	0.01	0.93	0.01
Black crappie	1.08	0.02	1.07	0.01	1.10	0.02	1.07	0.02	1.10	0.01
Bluegill	1.15	0.05	1.03	0.06	0.96	0.02	1.06	0.02	1.03	0.03
Redear sunfish	1.09	0.02	1.08	0.02	1.04	0.01	1.10	0.02	1.12	0.07
Hybrid bass	--	--	0.97	0.04	1.06	0.03	--	--	--	--
Striped bass	0.86	0.03	0.92	--	0.84	0.09	0.88	0.02	--	--

Source: GDNR (2014a) unpublished standardized survey data; summer electrofishing data are summarized for selected sport fish species.

[a] Calculated as the annual mean of the station catch rates (catch per hour) by species.

[b] Standard error of the mean.

[c] Calculated as the annual mean of the mean relative condition factor (K_n) by species per station.

TABLE 11
Summary of GDNR Gill Netting Data for Lake Oconee, 2007-2012

	Mean Catch per Effort (CPE)[a] and Standard Error (SE)[b]										Percent Total Weight[c]				
	2007		2008		2009		2011		2012						
Common Name	**CPE**	**SE**	**CPE**	**SE**	**CPE**	**SE**	**CPE**	**SE**	**CPE**	**SE**	**2007**	**2008**	**2009**	**2011**	**2012**
Blue catfish	13.00	2.79	10.08	1.91	12.25	2.70	28.67	4.31	17.25	2.42	29.7	27.0	60.9	40.0	35.7
Channel catfish	13.50	2.62	15.00	2.24	11.83	3.10	21.08	6.93	19.67	3.99	13.5	13.1	9.6	8.7	8.3
Black crappie	8.33	1.79	12.33	3.12	4.08	1.97	22.58	3.28	16.33	4.28	6.3	17.5	7.6	13.8	15.9
Gizzard shad	39.00	21.54	7.83	2.00	6.42	3.65	10.17	2.68	10.58	1.53	7.5	5.4	6.0	4.8	8.8
White bass	2.33	1.31	7.17	2.14	3.50	1.88	5.50	1.89	5.50	2.12	4.0	7.3	5.3	6.1	9.0
Hybrid bass	4.33	2.96	2.17	0.98	0.75	0.46	6.33	3.53	0.67	0.33	18.5	6.2	1.6	14.0	3.5
Striped bass	0.17	0.11	2.25	1.14	0.50	0.26	0.83	0.44	1.17	0.51	0.3	11.8	1.3	2.0	7.3
Flathead catfish	0.17	0.11	0.17	0.11	0	0	0.42	0.19	0.17	0.11	3.5	0.9	0	5.2	2.9
Threadfin shad	0	0	0.25	0.25	0	0	0	0	5.00	2.47	0	<0.1	0	0	0.7

Source: GDNR (2014a) unpublished standardized survey data; fall gill netting data are summarized for selected sport fish and forage species.

[a] Calculated as the annual mean of the station catch rates (catch per net night) by species.

[b] Standard error of the mean.

[c] Calculated as the total species weight in a given year divided by the total weight for all species in that year.

TABLE 12
Bass Tournament Statistics for Lake Oconee, 1996-2013

Year	Number of Tournaments Analyzed	Number of Angler Hours	Bass Weighed-in/ Angler Hour	Lbs. Weighed-in/ Angler Hour	Average Bass Weight (lbs)	Average Largest Bass (lbs)	Percent Bass as Largemouth
1996	60	NA	0.134	0.261	1.98	4.03	99.3
1997	61	8,946	0.144	0.253	1.80	4.01	97.3
1998	64	8,602	0.112	0.207	1.95	3.51	96.4
1999	69	10,202	0.122	0.221	1.87	3.76	96.2
2000	64	8,742	0.169	0.295	1.76	3.60	98.0
2001	73	11,106	0.188	0.362	1.93	3.68	100.0
2002	96	12,443	0.184	0.393	2.08	3.72	96.4
2003	90	11,656	0.203	0.386	1.94	4.08	98.6
2004	95	12,930	0.200	0.394	2.01	4.36	97.9
2005	85	10,978	0.216	0.426	2.02	4.57	98.3
2006	82	10,283	0.203	0.391	1.93	4.01	97.7
2007	69	9,161	0.213	0.416	2.02	4.41	93.3
2008	68	7,774	0.241	0.443	1.88	4.20	97.3
2009	62	6,979	0.231	0.432	1.87	4.13	94.5
2010	46	5,486	0.198	0.390	1.99	3.89	93.4
2011	42	4,392	0.185	0.358	1.96	3.81	99.3
2012	33	3,721	0.230	0.459	1.99	4.56	96.0
2013	29	2,794	0.254	0.511	2.00	3.93	100.0

Source: GBCF (1996-2013).

TABLE 13
Lake Oconee Stocking Data for Striped Bass and Hybrid Bass (Moronidae), 2005-2014

Year	Striped Bass		Hybrid White Bass X Striped Bass	
	Number Stocked	Fish per Acre	Number Stocked	Fish per Acre
2005	190,000	10	192,871	10
2006	146,315	8	197,123	10
2007	298,526	16	64,456	3
2008	264,565	14	189,243	10
2009	119,800	6	191,737	10
2010	150,033	8	165,375	9
2011	194,493	10	194,822	10
2012	35,250	2	174,265	9
2013	96,900	5	310,413	16
2014	97,560	5	268,422	14
Total	**1,593,442**		**1,948,727**	
Average	**159,344**	**8**	**194,873**	**10**

Source: GDNR (Nelson, 2014, personal communication).

TABLE 14
Freshwater Mussels of the Family Unionidae Known to Occur in the Vicinity of the Wallace Dam Project

Scientific Name	Common Name	Tributaries to Lake Oconee Upstream of the Project Boundary		
		Oconee River	Apalachee River	Hard Labor Creek
Elliptio hopetonensis	Altamaha slabshell[a]	X	X	X
Elliptio icterina	variable spike		X	
Elliptio shepardiana	Altamaha lance[a]	X		
Lampsilis dolabraeformis	Altamaha pocketbook[a]		X	

Source: Wisniewski (2014, personal communication).

[a] Endemic to the Altamaha River basin.

TABLE 15
Invasive Plant Species Identified in Morgan, Putnam, Greene, and Hancock Counties

Scientific Name	Common Name	Category	Aquatic-Wetland/Riparian
Albizia julibrissin	mimosa	1	
Alternanthera philoxeroides	alligatorweed	1	X
Arthraxon hispidus	small carpetgrass	1 Alert	
Arundo donax	giant reed	Identified by Georgia Power	X
Colocasia spp.	elephant ear	Identified by Georgia Power	X
Elaeagnus umbellata	autumn olive	1	
Hedera helix	English ivy	1	
Hydrocotyle peploides	Floating water pennywort	Identified by Georgia Power	X
Hydrilla verticillata	Hydrilla	1	X
Lespedeza bicolor	shrubby lespedeza	1	
Lespedeza cuneata	sericea lespedeza	1	
Ligustrum sinense	Chinese privet	1	X
Lonicera japonica	Japanese honeysuckle	1	X
Melia azedarach	chinaberry	1	
Microstegium vimineum	Japanese stiltgrass	1	X
Murdannia keisak	marsh dayflower	1	X
Paulownia tomentosa	princess tree	1	
Pueraria montana	kudzu	1	
Rosa multiflora	multiflora rose	1	
Wisteria sinensis	Chinese wisteria	1	

Sources: Georgia EPPC (2006); University of Georgia Center for Invasive Species and Ecosystem Health (2014)

TABLE 16
Summary of Bird Surveys Conducted in the Vicinity of the Wallace Dam Project

Scientific Name	Common Name	Breeding Bird Surveys (Average Birds/Route)		CBC (Birds[a])	FS Landbird Point Counts (Birds)		
		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Corvus brachyrhynchos	American Crow	59.6	47.2	519			6
Cardinalis cardinalis	Northern Cardinal	33.7	38.5	290	1	4	3
Zenaida macroura	Mourning Dove	32.8	31.0	182			
Cyanocitta cristata	Blue Jay	26.0	21.1	132	1		2
Hirundo rustica	Barn Swallow	25.6	8.2				
Quiscalus quiscula	Common Grackle	24.4	33.1	122	5	1	
Colinus virginianus	Northern Bobwhite	23.8	20.1				
Mimus polyglottos	Northern Mockingbird	23.1	18.6	114		2	
Passerina cyanea	Indigo Bunting	19.9	30.3			1	2
Pipilo erythrophthalmus	Eastern Towhee	17.5	21.1	132		1	
Thryothorus ludovicianus	Carolina Wren	16.6	20.2	167		1	5
Agelaius phoeniceus	Red-winged Blackbird	16.0	16.4	560	4	3	
Dendroica pinus	Pine Warbler	15.1	15.9	89		1	7
Icteria virens	Yellow-breasted Chat	14.9	14.6				
Baeolophus bicolor	Tufted Titmouse	13.5	15.7	131		3	6
Sialis sialis	Eastern Bluebird	12.3	8.7	171			
Hylocichla mustelina	Wood Thrush	11.0	7.8			1	2
Spizella passerina	Chipping Sparrow	10.4	9.5	619		7	
Sturnella magna	Eastern Meadowlark	10.0	26.4	109			
Melanerpes carolinus	Red-bellied Woodpecker	9.5	14.0	83		1	4
Poecile carolinensis	Carolina Chickadee	9.1	10.3	193	2	1	3
Sturnus vulgaris	European Starling	8.8	16.0	117			

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		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Chaetura pelagica	Chimney Swift	8.8	13.1				
Turdus migratorius	American Robin	8.5	5.7	229		1	
Passer domesticus	House Sparrow	8.4	14.2	1			
Cathartes aura	Turkey Vulture	8.4	3.1	293		1	5
Stelgidopteryx serripennis	Northern Rough-winged Swallow	7.4	1.0				
Spizella pusilla	Field Sparrow	7.2	8.2	58			
Sitta pusilla	Brown-headed Nuthatch	6.6	4.7	38	2	1	
Molothrus ater	Brown-headed Cowbird	6.6	6.3	79		2	1
Toxostoma rufum	Brown Thrasher	5.9	6.7	14		1	
Coccyzus americanus	Yellow-billed Cuckoo	5.8	6.6		2		
Vireo olivaceous	Red-eyed Vireo	5.7	7.2			1	16
Colaptes auratus	Northern Flicker	5.5	2.7	62	1		
Tyrannus tyrannus	Eastern Kingbird	5.0	7.9			1	
Myiarchus crinitus	Great Crested Flycatcher	4.9	8.3		1		2
Vireo griseus	White-eyed Vireo	4.8	6.4		2	1	3
Picoides pubescens	Downy Woodpecker	4.5	5.2	60	1	1	2
Progne subis	Purple Martin	3.8	6.8				
Coragyps atratus	Black Vulture	3.7	2.6	284		50	1
Petrochelidon pyrrhonota	Cliff Swallow	3.6	0.0				
Dendroica discolor	Prairie Warbler	3.6	6.6				
Piranga rubra	Summer Tanager	3.6	8.0		1		2
Sayornis phoebe	Eastern Phoebe	3.6	4.9	87		1	

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		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Contopus virens	Eastern Wood-Pewee	3.4	6.9				
Spinus tristis	American Goldfinch	3.2	3.3	224		2	6
Passerina caerulea	Blue Grosbeak	3.2	11.6				
Columba livia	Rock Pigeon	2.5	5.1	97			
Dumetella carolinensis	Gray Catbird	2.4	1.5	1		1	
Geothlypis trichas	Common Yellowthroat	1.9	4.1	4	1	3	1
Polioptila caerulea	Blue-gray Gnatcatcher	1.9	7.9		4	2	8
Melospiza melodia	Song Sparrow	1.9	0.0	468			
Icterus spurius	Orchard Oriole	1.6	2.6		1	1	1
Dryocopus pileatus	Pileated Woodpecker	1.4	2.1	28	1		1
Melanerpes erythrocephalus	Red-headed Woodpecker	1.3	1.3	33	1	2	
Buteo jamaicensis	Red-tailed Hawk	1.3	1.0	23			
Charadrius vociferus	Killdeer	1.1	1.7	168			
Corvus ossifragus	Fish Crow	1.1	0.5	39		1	
Caprimulgus carolinensis	Chuck-will's-widow	0.8	1.2				
Carpodacus mexicanus	House Finch	0.7	2.6	15			
Ardea herodias	Great Blue Heron	0.7	0.3	37	9	3	2
Picoides villosus	Hairy Woodpecker	0.7	0.7	11		1	1
Ammodramus savvarum	Grasshopper Sparrow	0.6	4.1				
Pandion haliaetus	Osprey	0.6	0.0				
Buteo lineatus	Red-shouldered Hawk	0.6	1.8	24		1	1
Caprimulgus vociferus	Eastern Whip-poor-will	0.6	0.8				

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		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Branta canadensis	Canada Goose	0.6	1.6	239		9	
Megaceryle alcyon	Belted Kingfisher	0.5	0.5	14			
Archilochus colubris	Ruby-throated Hummingbird	0.5	0.6				1
Butorides virescens	Green Heron	0.4	0.3				
Lanius ludovicianus	Loggerhead Shrike	0.4	0.6	11			
Wilsonia citrina	Hooded Warbler	0.3	0.6				5
Piranga olivacea	Scarlet Tanager	0.3	0.2				
Parula americana	Northern Parula	0.3	1.2		1		7
Empidonax virescens	Acadian Flycatcher	0.2	2.6				2
Buteo platypterus	Broad-winged Hawk	0.2	0.1				
Phalacrocorax auritus	Double-crested Cormorant	0.2	0.0	310			
Oporornis formosus	Kentucky Warbler	0.2	1.1			1	2
Mniotilta varia	Black-and-white Warbler	0.1	0.6			1	2
Falco sparverius	American Kestrel	0.1	0.0	10			
Haliaeetus leucocephalus	Bald Eagle	0.1	0.0				
Ardea alba	Great Egret	0.1	0.1				
Vireo flavifrons	Yellow-throated Vireo	0.1	1.7		1		5
Accipiter cooperii	Cooper's Hawk	0.1	0.1	2			
Aix sponsa	Wood Duck	0.1	0.3	29		8	1
Spiza americana	Dickcissel	0.1	0.2				
Streptopelia decaocto	Eurasian Collared-Dove	0.1	1.5	11			
Bubo virginianus	Great Horned Owl	0.1	0.0	7			

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		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Troglodytes aedon	House Wren	0.1	0.1	3			
Parkesia motacilla	Louisiana Waterthrush	0.1	0.5				2
Anas platyrhynchos	Mallard	0.1	2.8	7			
Protonotaria citrea	Prothonotary Warbler	0.1	0.1			1	4
Meleagris gallopavo	Wild Turkey	0.1	0.3	10			5
Peucaea aestivalis	Bachman's Sparrow	0.0	0.2				
Strix varia	Barred Owl	0.0	0.1	4			2
Vireo solitarius	Blue-headed Vireo	0.0	0.2	1			
Megascops asio	Eastern Screech-Owl	0.0	0.0	7			
Scolopax minor	American Woodcock	0.0	0.1	8			2
Icterus galbula	Baltimore Oriole	0.0	0.0	1			
Columbina passerina	Common Ground-Dove	0.0	0.1	4			
Eremophila alpestris	Horned Lark	0.0	0.1				
Accipiter striatus	Sharp-shinned Hawk	0.0	0.1	2			
Limnothlypis swainsonii	Swainson's Warbler	0.0	0.1				4
Sitta carolinensis	White-breasted Nuthatch	0.0	0.8	4			
Dendroica petechia	Yellow Warbler	0.0	0.2		1		
Nyctanassa violacea	Yellow-crowned Night-Heron	0.0	0.1				2
Dendroica virens	Black-throated Green Warbler						3
Bobycilla cedrorum	Cedar Waxwing			391			
Zonotrichia albicollis	White-throated Sparrow			245			
Passerculus sandwichensis	Savannah Sparrow			131			

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Regulus calendula	Ruby-crowned Kinglet			121			
Zonotrichia leucophrys	White-crowned Sparrow			115			
Euphagus carolinus	Rusty Blackbird			100			
Regulus satrapa	Golden-crowned Kinglet			89			
Melospiza georgiana	Swamp Sparrow			87			
Chroicocephalus philadelphia	Bonaparte's Gull			84			
Dendroica coronata	Yellow-rumped Warbler			70			3
Catharus guttatus	Hermit Thrush			58			
Junco hyemalis	Dark-eyed Jjunco			57			
Anthus rubescens	American Pipit			41			
Spinus pinus	Pine Siskin			41			
Sphyrapicus varius	Yellow-bellied Sapsucker			34			
Scolopacidae	Peep sp.			31			
Carpodacus purpureus	Purple Finch			27			
Larus delawarensis	Ring-billed Gull			19			
Troglodytes hiemalis	Winter Wren			16			
Lophodytes cucullatus	Hooded Merganser			13			
Podilymbus podiceps	Pied-billed Grebe			8			
Passerella iliaca	Fox Sparrow			5			
Certhia americana	Brown Creeper			4			
Bucephala albeola	Bufflehead			4			
Circus cyaneus	Northern Harrier			4			

TABLE 16
Summary of Bird Surveys Conducted in the Vicinity of the Wallace Dam Project

Scientific Name	Common Name	Breeding Bird Surveys (Average Birds/Route)		CBC (Birds[a])	FS Landbird Point Counts (Birds)		
		Siloam Route (1967-2012)	Rutledge Route (1975-2009)	Lake Oconee (2012)	Town Creek Wetland (2003)	Dyar Pasture (2006)	Fishing Creek (2008)
Mergus serrator	Red-breasted Merganser			3			
Accipiter sp.	Accipiter			1			
Fulica americana	American Coot			1			
Aythya affinis	Lesser Scaup			1			
Falco columbarius	Merlin			1			
Dendroica palmarum	Palm Warbler			1			
Oxyura jamaicensis	Ruddy Duck			1			
	Total Species	**93**	**97**	**94**	**21**	**39**	**43**
	Total individuals	**598.2**	**661.5**	**8,595**	**43**	**125**	**145**

Sources: Sauer et al. (2014); National Audubon Society (2014); FS (2014a).
[a] Number of birds counted by 17 participants in 50 hours of effort.

TABLE 17
Reptiles and Amphibians of the Piedmont Ecoregion in Georgia

Scientific Name	Common Name
SNAKES:	
Agkistrodon contortix	Copperhead
Agkistrodon piscivorus	Cottonmouth
Carphophis amoenus	Eastern Wormsnake
Cemophora coccinea	Scarlet Snake
Coluber constrictor	Black Racer
Crotalus horridus	Timber Rattlesnake
Diadophis punctatus	Ringneck Snake
Elaphe guttata	Corn Snake
Elaphe obsoleta	Rat Snake
Heterodon platirhinos	Eastern Hognose Snake
Lampropeltis calligaster	Mole Kingsnake
Lampropeltis getula	Common Kingsnake
Lampropeltis triangulum elapsoides	Scarlet Kingsnake
Masticophis flagellum	Coachwhip
Nerodia erythrogaster	Plain-bellied Watersnake
Nerodia sipedon	Northern Watersnake
Nerodia taxispilota	Brown Watersnake
Opheodrys aestivus	Rough Green Snake
Regina septemvittata	Queen Snake
Sistrurus miliarus	Pygmy Rattlesnake
Storeria dekayi	Brown Snake
Storeria occipitomaculata	Red-bellied Snake
Tantilla coronata	Southeastern Crowned Snake
Thamnophis sauritus	Eastern Ribbon Snake
Thamnophis sirtalis	Garter Snake
Virginia striatula	Rough Earth Snake
Virginia valeriae	Smooth Earth Snake
LIZARDS AND SKINKS:	
Anolis carolinensis	Green Anole
Cnemidophorus sexlineatus	Six-lined Racerunner
Euneces fasciatus	Five-lined Skink
Euneces inexpectatus	Southeastern Five-lined Skink

TABLE 17
Reptiles and Amphibians of the Piedmont Ecoregion in Georgia

Scientific Name	Common Name
Euneces laticeps	Broadhead Skink
Ophisaurus attenuatus	Slender Glass Llizard
Ophisaurus ventralis	Eastern Glass Lizard
Sceloporus undulatus	Eastern Fence Lizard
Scincella lateralis	Ground Skink
FROGS AND TOADS:	
Acris crepitans	Northern Cricket Frog
Bufo americanus	American Toad
Bufo fowleri	Fowler's Toad
Gastrophryne carolinensis	Eastern Narrow-mouthed Toad
Hyla avivoca	Bird-voiced Treefrog
Hyla chrysoscelis	Cope's Gray Treefrog
Hyla cinerea	Green Treefrog
Hyla gratiosa	Barking Treefrog
Hyla squirella	Squirrel Treefrog
Pseudacris crucifer	Spring Peeper
Pseudacris feriarum	Upland Chorus Frog
Rana catesbeiana	Bullfrog
Rana clamitans	Green Frog
Rana palustris	Pickerel Frog
Rana sphenocephala	Southern Leopard Frog
Scaphiophus holbrooki	Eastern Spadefoot
TURTLES	
Apalone spinifera	Spiny Softshell Turtle
Chelydra serpentina	Common Snapping Turtle
Chrysemys picta	Painted Turtle
Kinosternon baurii	Striped Mud Turtle
Kinosternon subrubrum	Eastern Mud Turtle
Pseudemys concinna	River Cooter
Sternotherus minor	Loggerhead Musk Turtle
Sternotherus odoratus	Common Musk Turtle
Terrapene carolina	Eastern Box Turtle
Trachemys scripta	Pond Slider

TABLE 17
Reptiles and Amphibians of the Piedmont Ecoregion in Georgia

Scientific Name	Common Name
SALAMANDERS	
Ambystoma maculatum	Spotted Salamander
Ambystoma opacum	Marbled Salamander
Ambystoma talpoideum	Mole Salamander
Desmognathus conanti	Spotted Dusky Salamander
Eurycea bislineata	Southern Two-lined Salamander
Eurycea guttolineata	Three-lined Salamander
Gyrinophilus porphyriticus	Spring Salamander
Hemidactylium scutatum	Four-toed Salamander
Noyophthalmus viridescens	Red eft (Red-spotted Newt)
Plethodon chlorobryonis	Atlantic Coast Slimy Salamander
Plethodon glutinosus	Slimy Salamander
Pseudotriton montanus	Mud Salamander
Pseudotriton ruber	Red Salamander

Sources: Jensen et al., 2008; GMNH, 2008.

TABLE 18
Wetland Habitats in the Wallace Dam Project Area

NWI Wetland Type	Project Boundary		Zone Extending to 2,000 ft Beyond Project Boundary[a]	
	Area (Acres)	Percent of Total	Area (Acres)	Percent of Total
Freshwater Emergent Wetland	457.8	2.5%	496.4	2.5%
Freshwater Forested/Shrub Wetland	1,902.0	10.2%	2,805.1	14.2%
Freshwater Pond	28.6	0.2%	108.0	0.5%
Lake	16,170.3	87.1%	16,360.6	82.7%
Other	14.9	0.1%	16.7	0.1%
Grand Total	**18,573.6**		**19,786.8**	

Source: NWI data source, FWS.

[a] Includes lands and waters within the project boundary.

TABLE 19

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

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

TABLE 19

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

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

TABLE 19

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

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

TABLE 19

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

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

Sources:

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

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

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

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

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

TABLE 20
Recreation Facilities Providing Access to the Wallace Dam Project

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

TABLE 20
Recreation Facilities Providing Access to the Wallace Dam Project

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

TABLE 21
Land Use in the Wallace Dam Project Area

Type	Project Boundary		Additional Land within 2,000 foot Beyond Project Boundary	
	Area (Acres)	Percent of Total	Area (Acres)	Percent of Total
Beach/Dune/Mud	261	1%	141	0%
Open Water	17,100	72%	580	1%
Low Intensity Urban	398	2%	5,083	10%
High Intensity Urban	69	0%	224	0%
Clearcut/sparse	384	2%	3,983	8%
Quarries/ Strip mines/ Rock outcrop	22	0%	-	0%
Deciduous	1,725	7%	11,375	22%
Evergreen Forest	1,596	7%	19,525	38%
Mixed Forest	209	1%	2,714	5%
Row Crop/Pasture	418	2%	6,410	12%
Forest Wetland	1,725	7%	1,519	3%
Non-Forest Freshwater Wetland	6	0%	4	0%
Total	**23,914**		**51,559**	

TABLE 22
Population Trends in the Wallace Dam Project Vicinity

	Major Cities and Towns	2000 Population	2010 Population	2013 Population	Percent change from 2010 to 2013
Greene County	Greensboro, Siloam, Union Point	14406	15994	16321	2.0
Hancock County	Sparta, Culverton	9429	9429	8879	-5.6
Morgan County	Madison, Buckhead, Rutledge	15457	17868	17781	-0.5
Putnam County	Eatonton	18812	21218	21371	0.7

Source: Georgia Department of Labor (2014a-d).

TABLE 23
Federal or State Comprehensive Plans Potentially Applicable to Georgia (FERC, 2014)

Comprehensive Plan	Potentially Applicable (Yes or No)
Atlantic States Marine Fisheries Commission. 1996. Interstate fishery management plan for weakfish. (Report No. 27). May 1996.	Yes
Atlantic States Marine Fisheries Commission. 1998. Amendment 1 to the Interstate Fishery Management Plan for Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*). (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.	No
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.	No
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 (*Anguilla rostrata*). (Report No. 36). April 2000.	Yes
Department of the Army, Corps of Engineers. Savannah District. 1983. Northeast Georgia region water resources management study. Savannah, Georgia. September 1983.	No
Department of the Army, Corps of Engineers. Savannah District. 1985. South metropolitan Atlanta region: Georgia water resources management study. Savannah, Georgia. January 1985.	No
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.	No
Georgia Department of Natural Resources. 1984. Water availability and use - Chattahoochee River Basin. Atlanta	No
Georgia Department of Natural Resources. 1984. Water availability and use - Flint River Basin. Atlanta	No
Georgia Department of Natural Resources. 1985. Water availability and use - Oconee River Basin. Atlanta	Yes
Georgia Department of Natural Resources. 1985. Water availability and use - Ocmulgee River Basin. Atlanta	No
Georgia Department of Natural Resources. Georgia Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2013. Atlanta	Yes
Georgia Department of Natural Resources. 1985. Water availability and use report - Tallapoosa River Basin. Atlanta	No
Georgia Department of Natural Resources. 1986. Water availability and use - Savannah River Basin. Atlanta	No

TABLE 23
Federal or State Comprehensive Plans Potentially Applicable to Georgia (FERC, 2014)

Comprehensive Plan	Potentially Applicable (Yes or No)
Georgia Department of Natural Resources. 1986. Water availability and use report - Altamaha River Basin. Atlanta	Yes
Georgia Department of Natural Resources. 1986. Water availability and use report - Tennessee River Basin. Atlanta	No
Georgia Department of Natural Resources. 1987. Water availability and use report - Coastal Plain River Basin. Atlanta	No
Metropolitan North Georgia Water Planning District. 2003. Water supply and water conservation management plan. Atlanta	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. 1995. Gulf sturgeon (*Acipenser oxyrhynchus desotoi*) Recovery/Management Plan. Prepared by the Gulf Sturgeon Recovery/Management Task Team. September 15, 1995.	No
National Marine Fisheries Service. 1998. Final Recovery Plan for the shortnose sturgeon (*Acipenser brevirostrum*). 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. Gulf States Marine Fisheries Commission. 1995. Gulf sturgeon recovery/management plan. Atlanta, Georgia. September 15, 1995.	No
U.S. Fish and Wildlife Service. 2012. Alabama shad (*Alosa alabamae*) restoration and management plan for the Apalachicola-Chattahoochee-Flint River Basin. Athens, Georgia.	No
U.S. Fish and Wildlife Service and National Marine Fisheries Service. 2005. Diadromous fish restoration plan for the Middle Savannah River: strategy and implementation schedule. Charleston, South Carolina. August 2005.	No
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

FIGURES

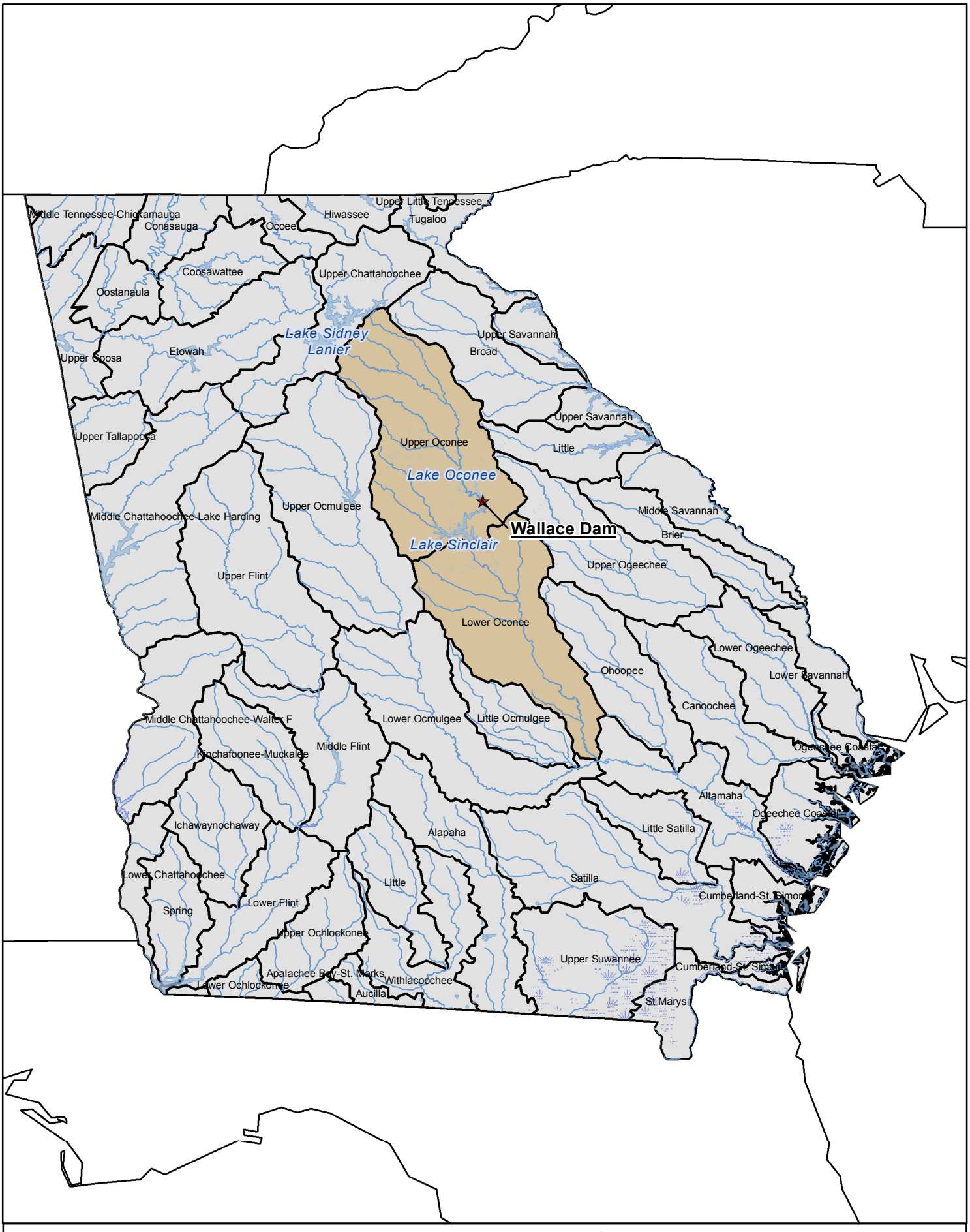

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Figure 1
Project Location in the Oconee River Basin

Wallace Dam Project
(FERC No. 2413)

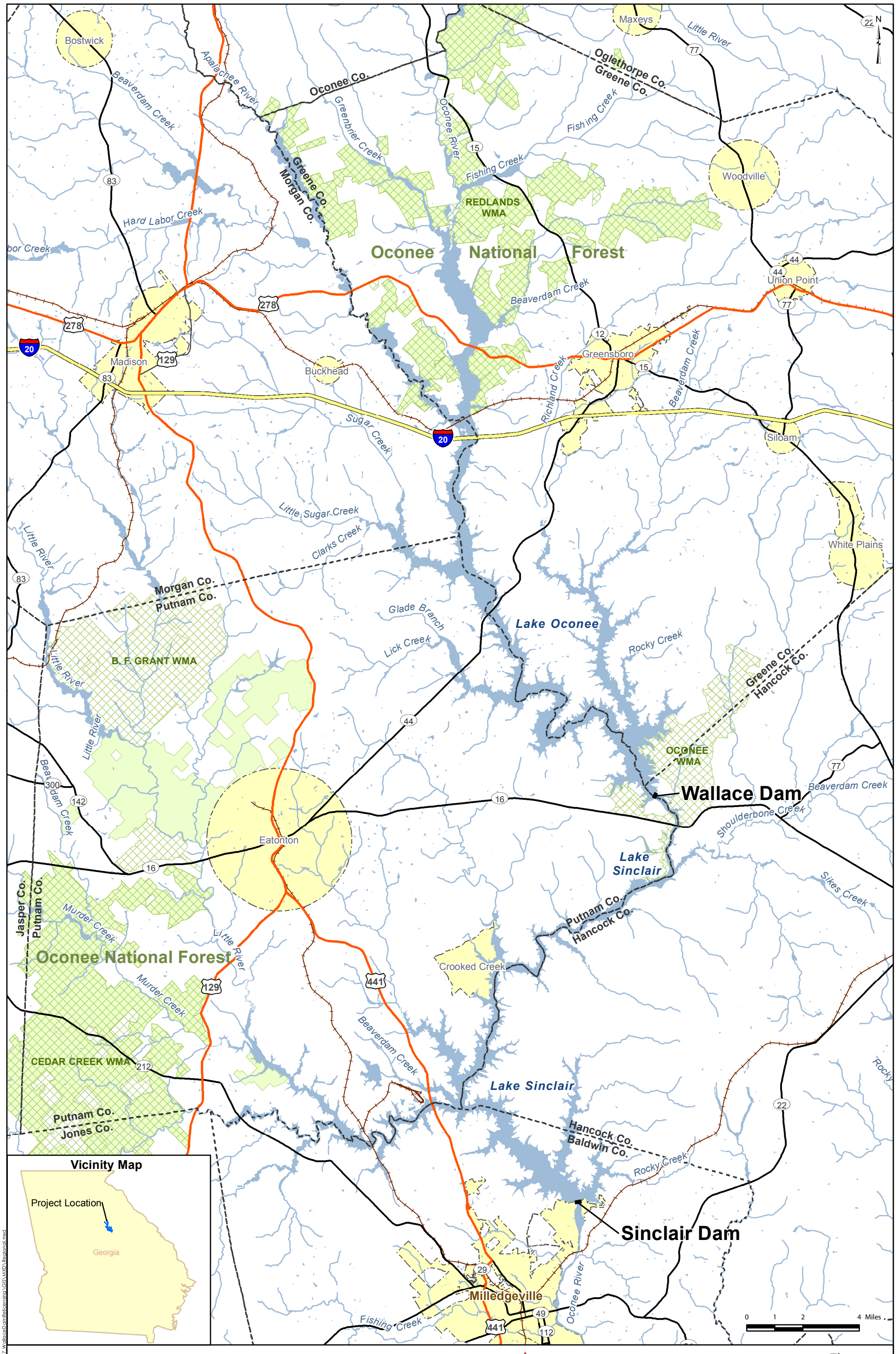

Figure 2
Project Vicinity in the Upper Oconee River Basin

Wallace Dam Project
(FERC No. 2413)

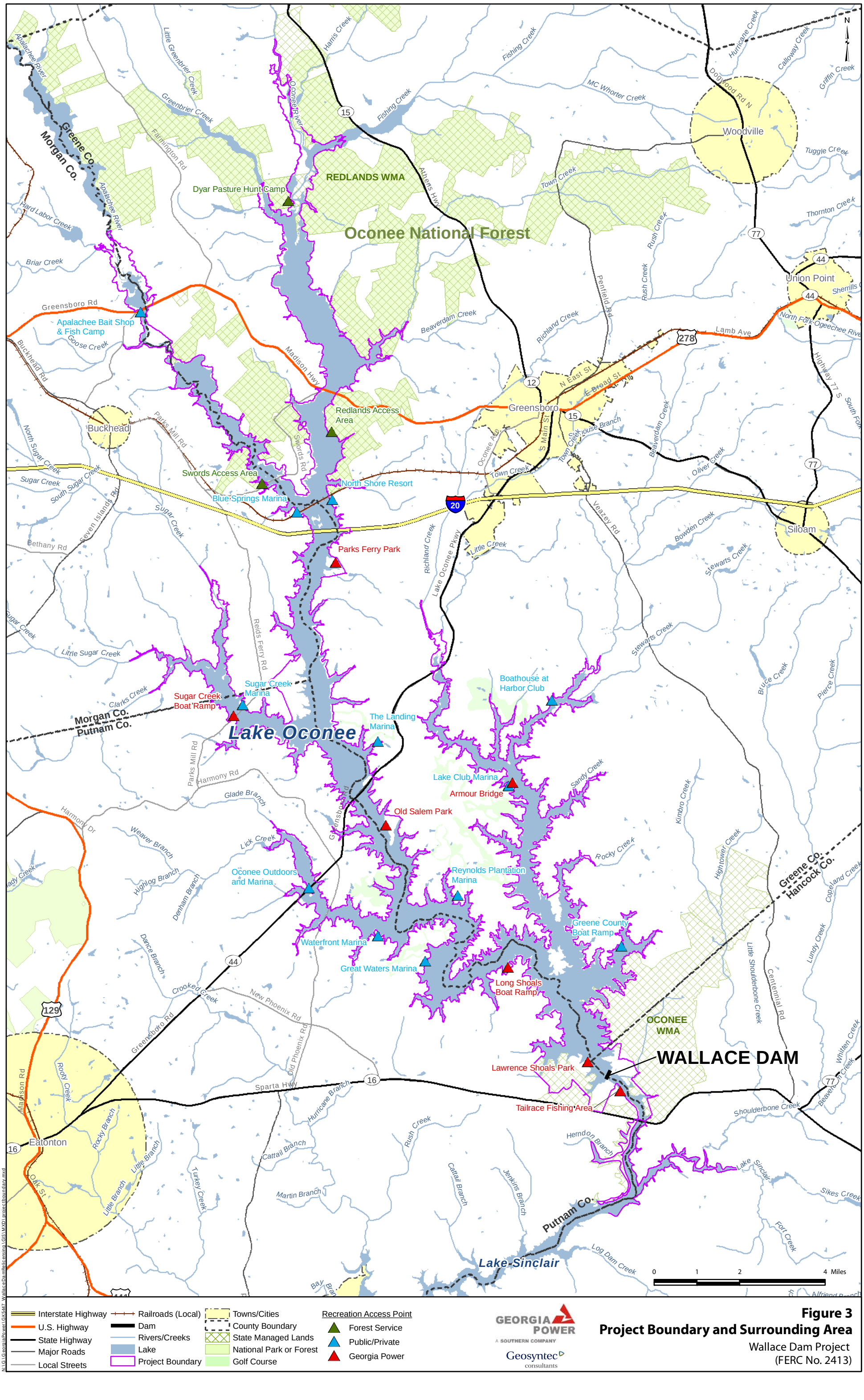

Figure 3
Project Boundary and Surrounding Area
Wallace Dam Project
(FERC No. 2413)

Project Boundary

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Figure 4
Project Facilities
Wallace Dam Project
(FERC No. 2413)

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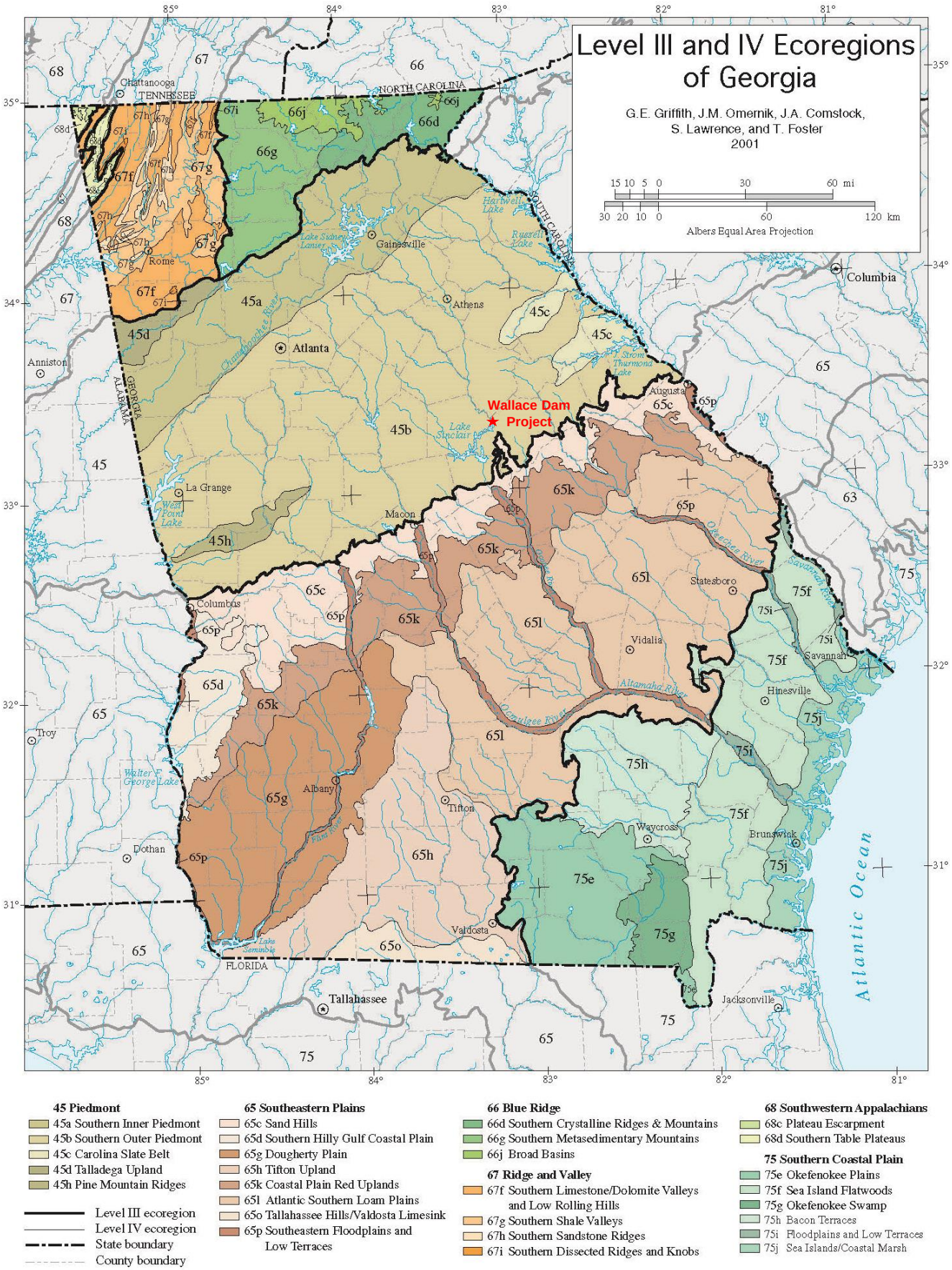

Map excerpted from Griffith et al, 2001

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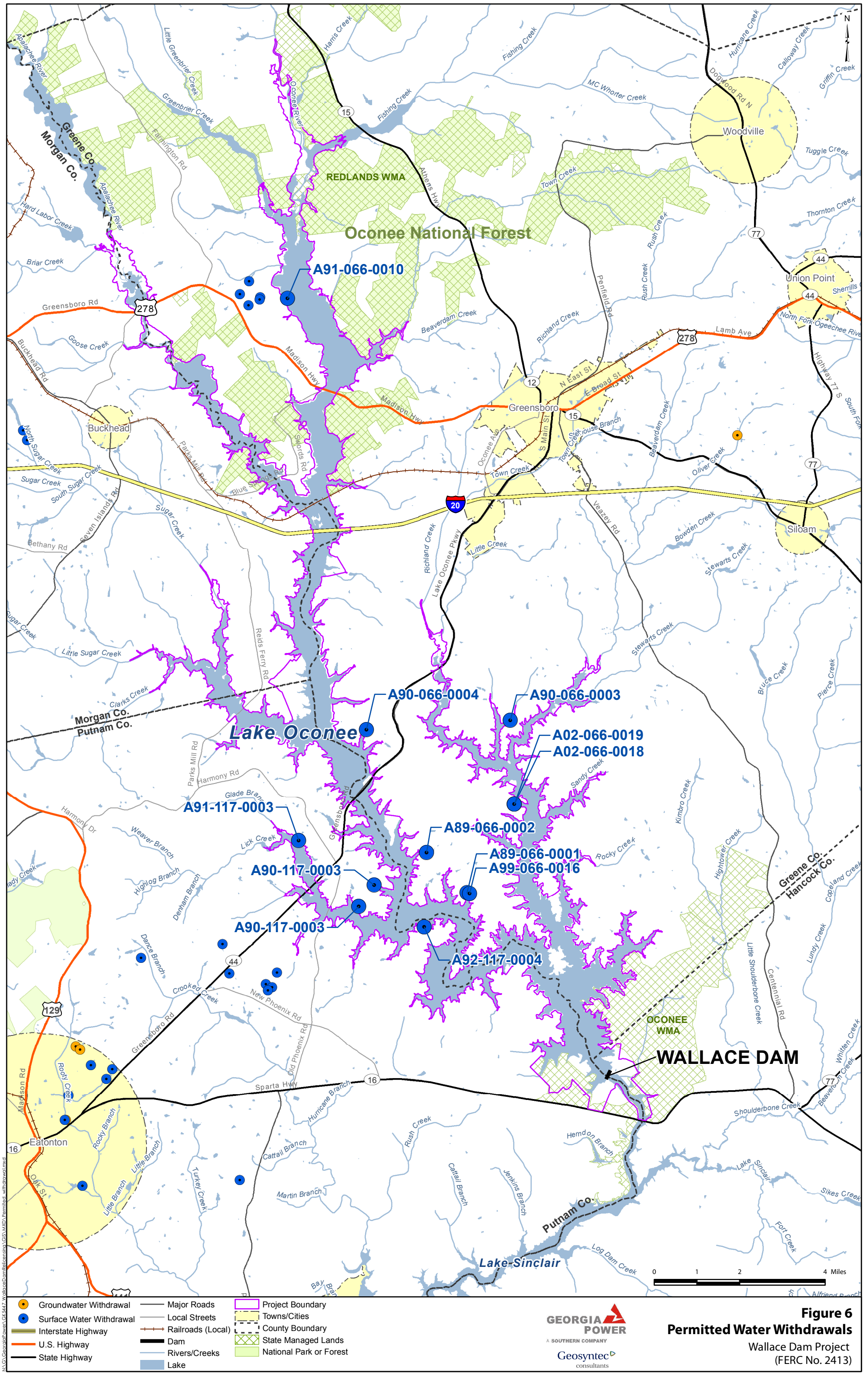
Figure 5
Level III and IV Ecoregions of Georgia
Wallace Dam Project (FERC No. 2413)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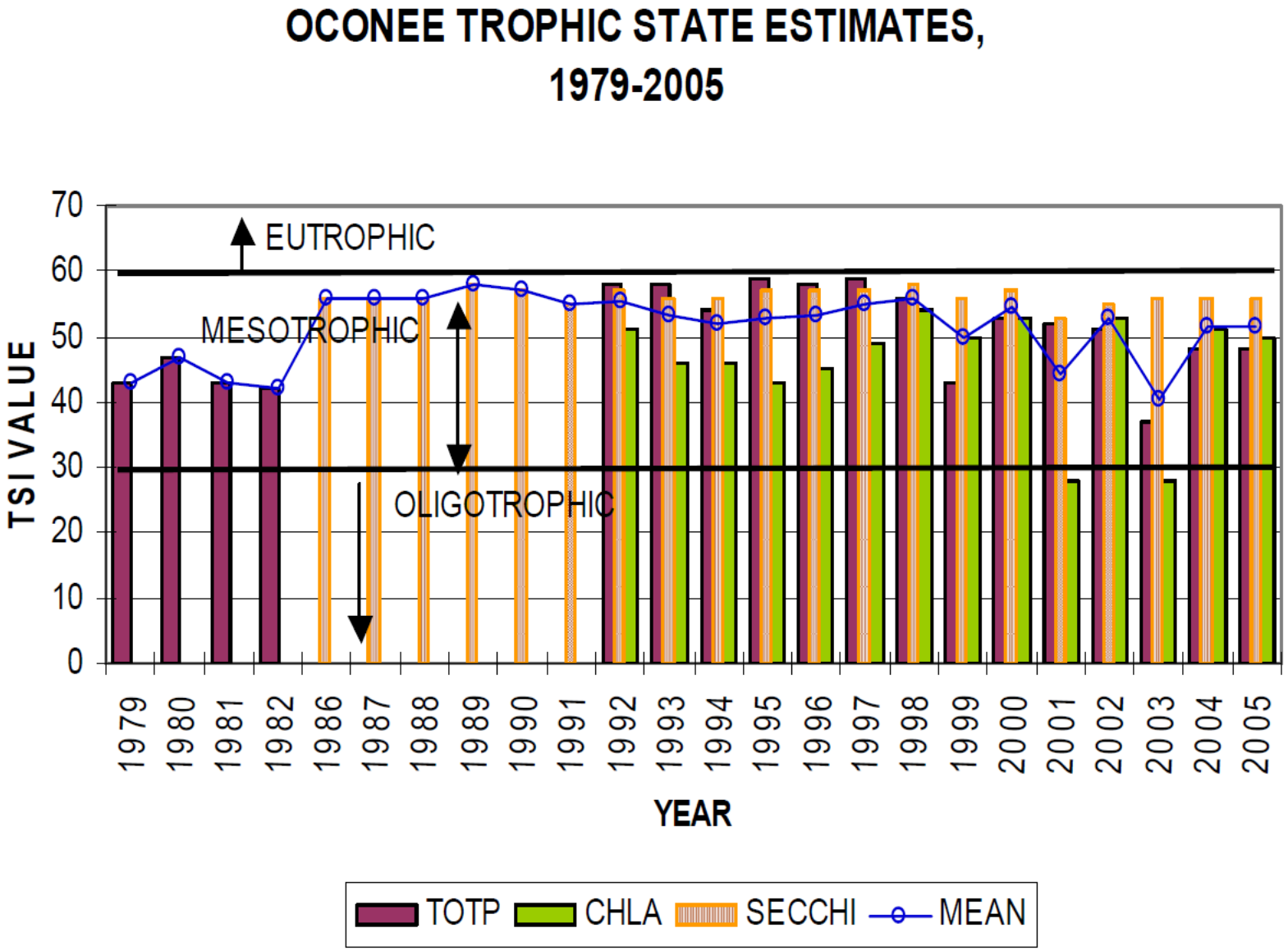
WALLACE DAM
REDLANDS WMA
Oconee National Forest
OCONEE WMA
Lake Oconee
Lake Sinclair
Greene Co.
Morgan Co.
Putnam Co.
Hancock Co.
Woodville
Union Point
Greensboro
Buckhead
Siloam
Eatonton
Groundwater Withdrawal
Surface Water Withdrawal
Interstate Highway
U.S. Highway
State Highway
Major Roads
Local Streets
Railroads (Local)
Dam
Rivers/Creeks
Lake
Project Boundary
Towns/Cities
County Boundary
State Managed Lands
National Park or Forest
0 1 2 4 Miles
GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants
Figure 6
Permitted Water Withdrawals
Wallace Dam Project
(FERC No. 2413)



Source: UGA, 2006

Figure 7
Trophic State Index for Lake Oconee
Wallace Dam Project (FERC No. 2413)

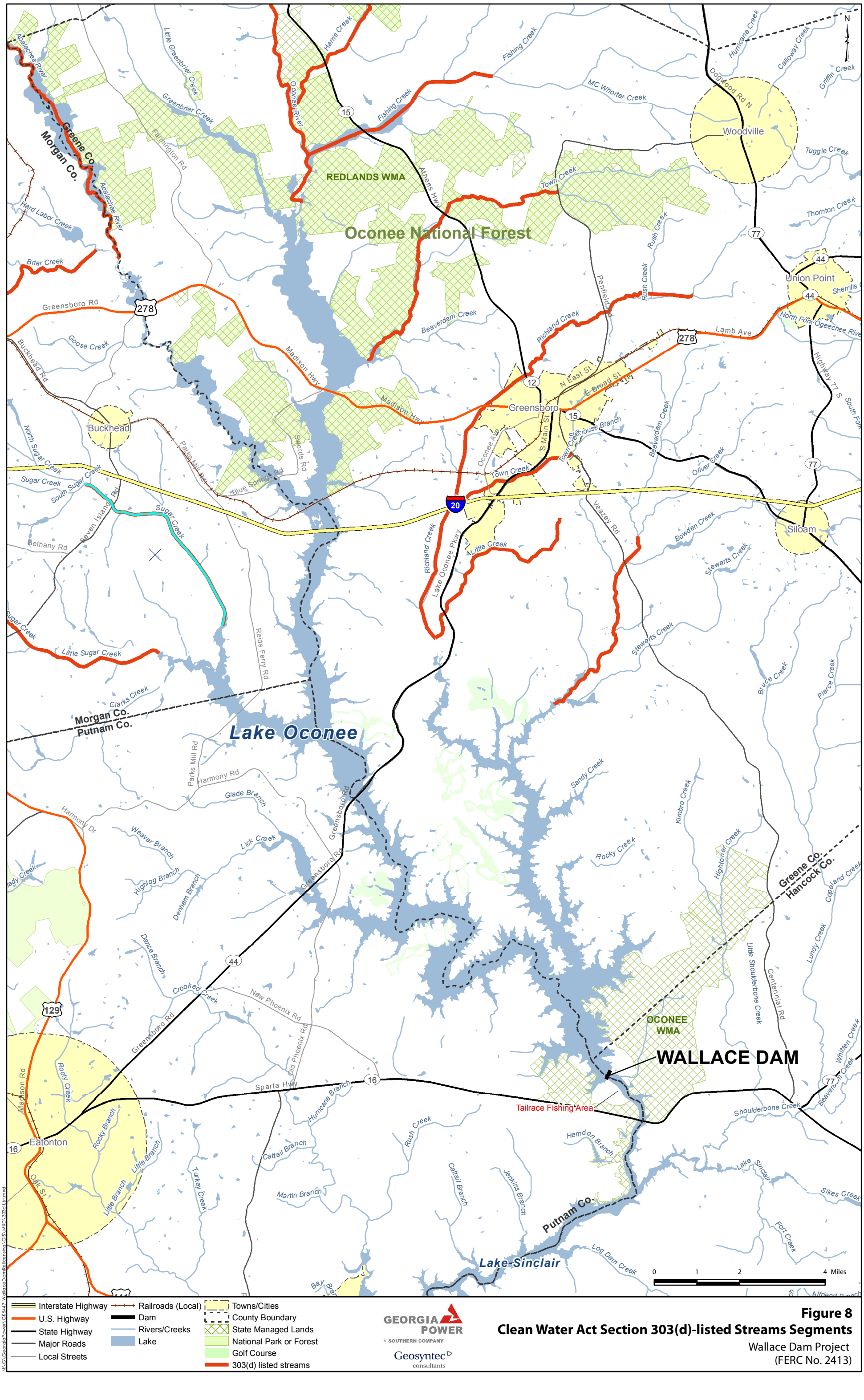


Figure 8
Clean Water Act Section 303(d)-listed Streams Segments
Wallace Dam Project
(FERC No. 2413)

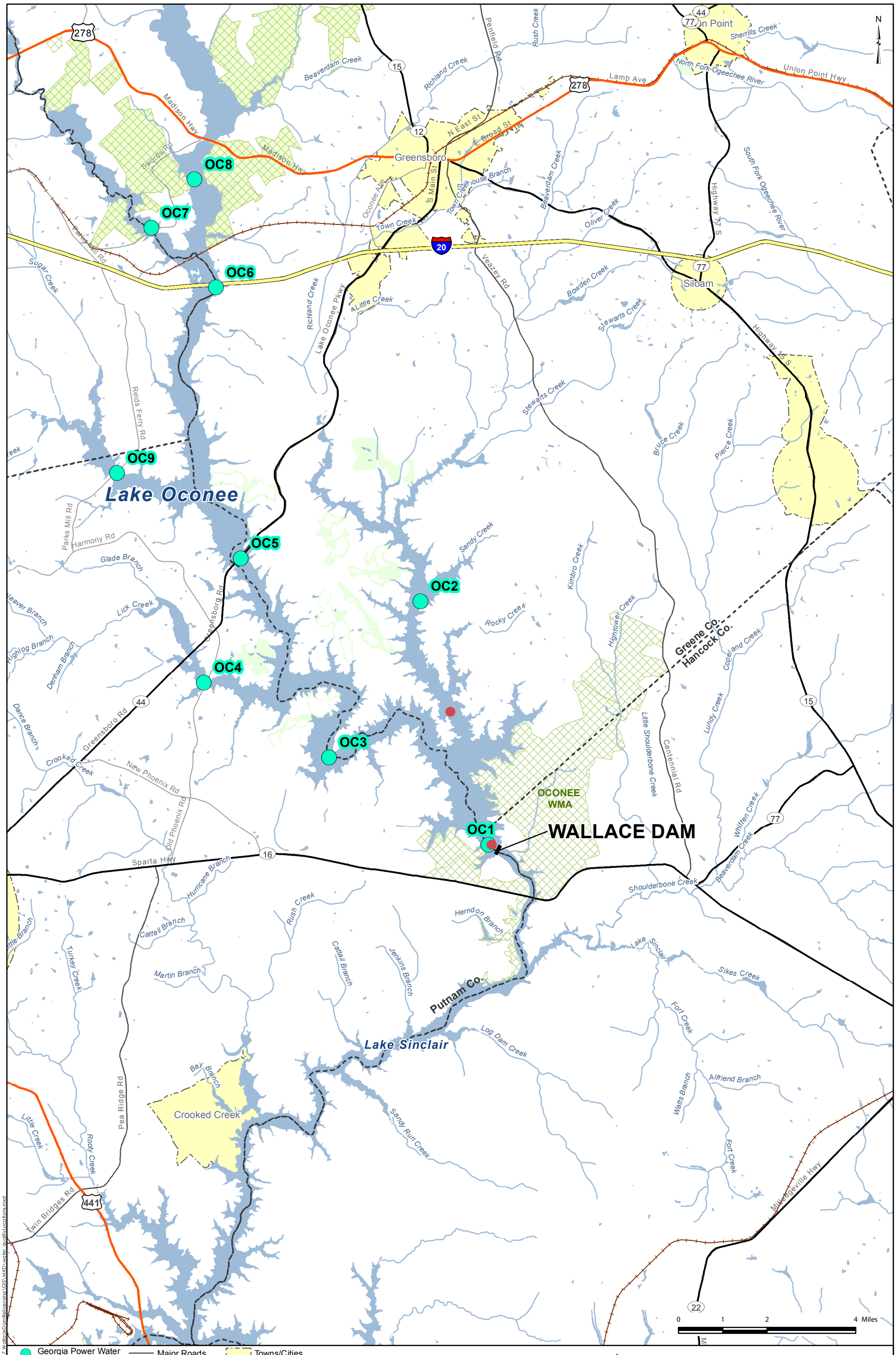
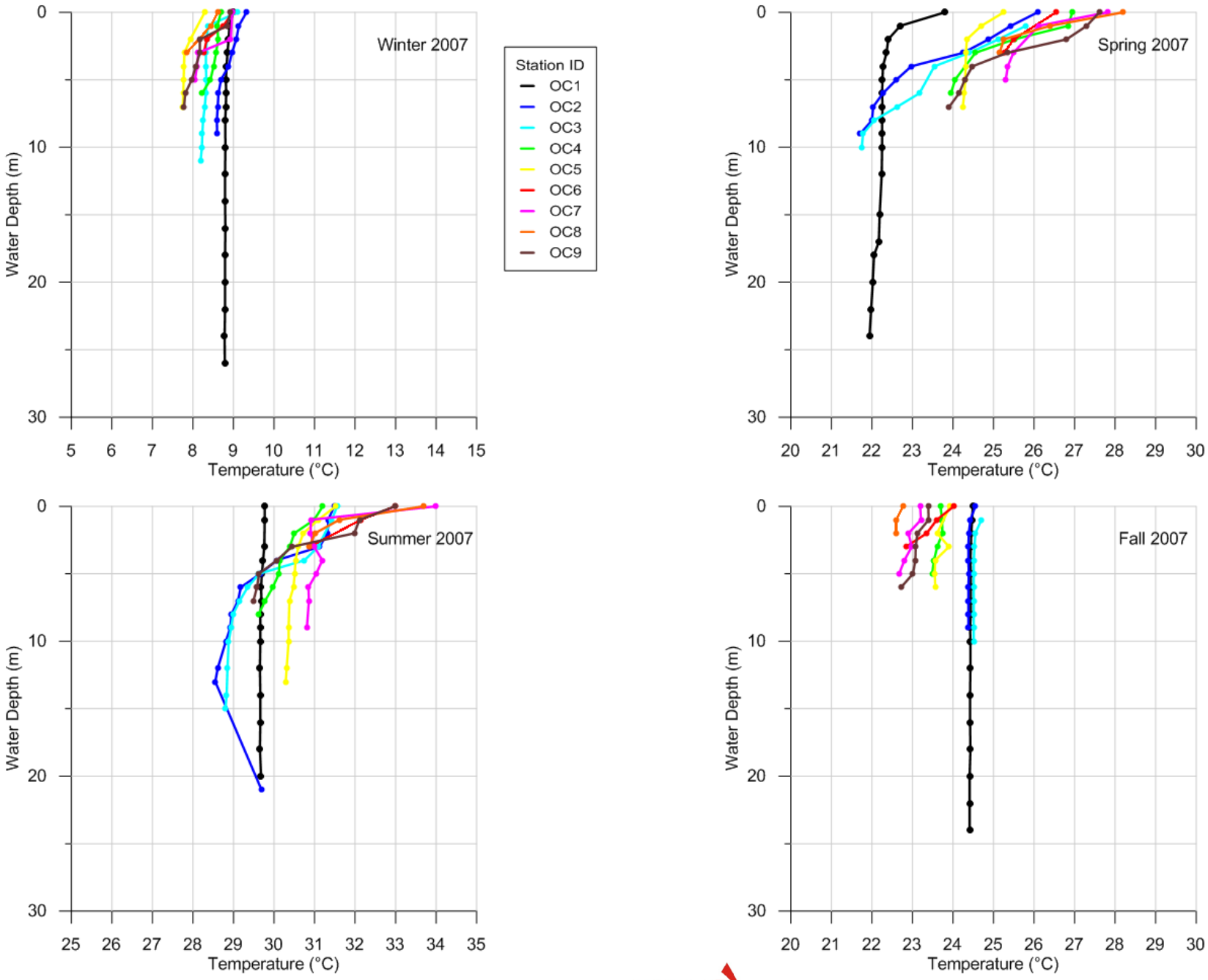


Figure 9
Georgia Power Water Quality Stations
Wallace Dam Project
(FERC No. 2413)



GEORGIA POWER
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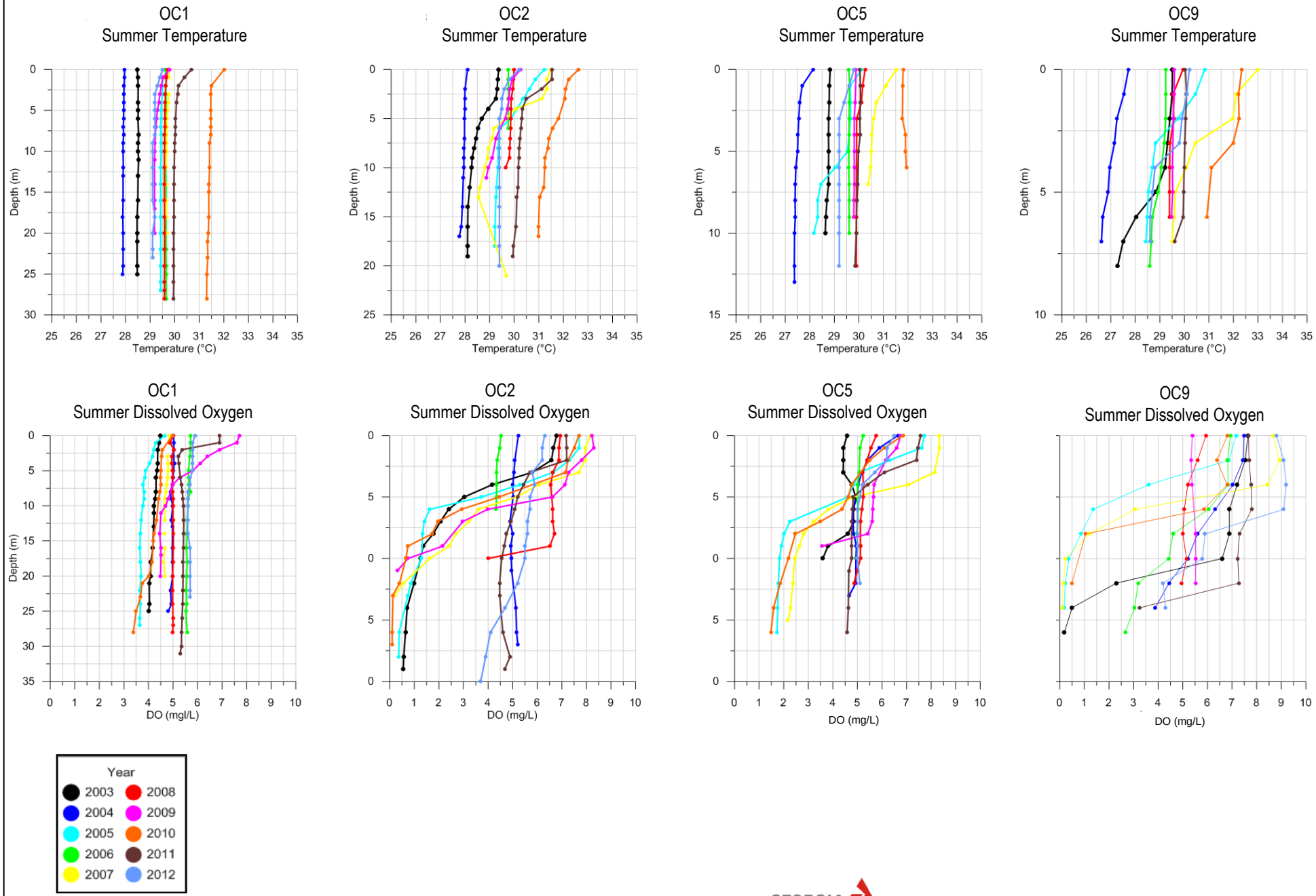
Geosyntec consultants

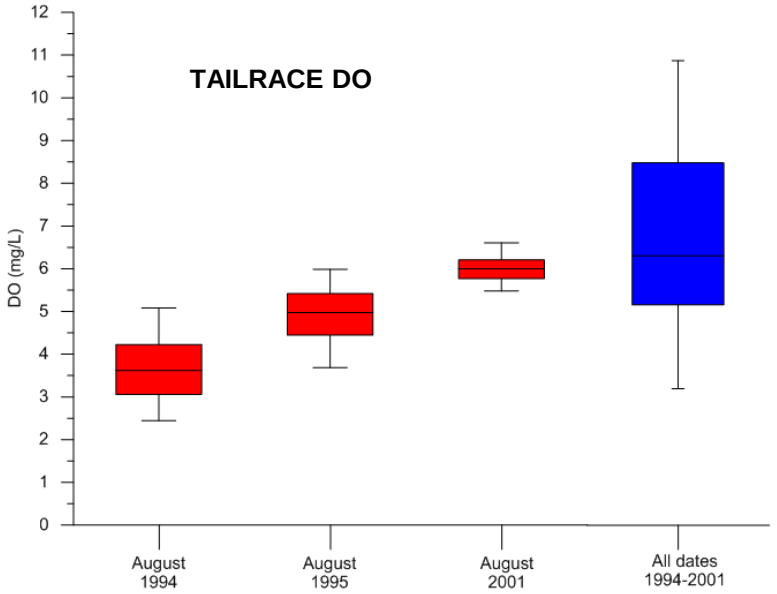
Figure 10
Seasonal Temperature Profiles in Lake Oconee, 2007
Wallace Dam Project (FERC No. 2413)

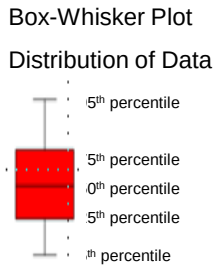


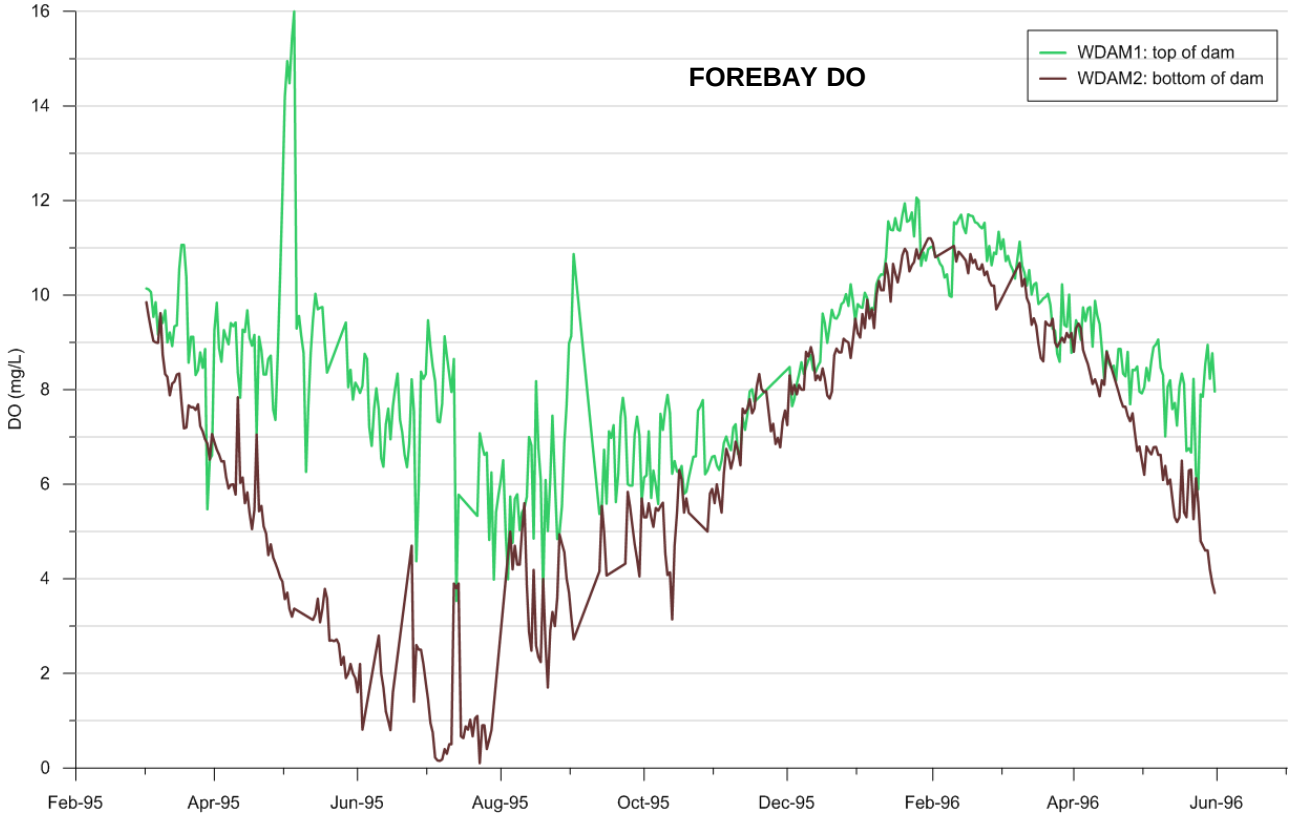
GEORGIA POWER
A SOUTHERN COMPANY

Geosyntec consultants

Figure 11
Summer Temperature Profiles in Lake Oconee
Wallace Dam Project (FERC No. 2413)

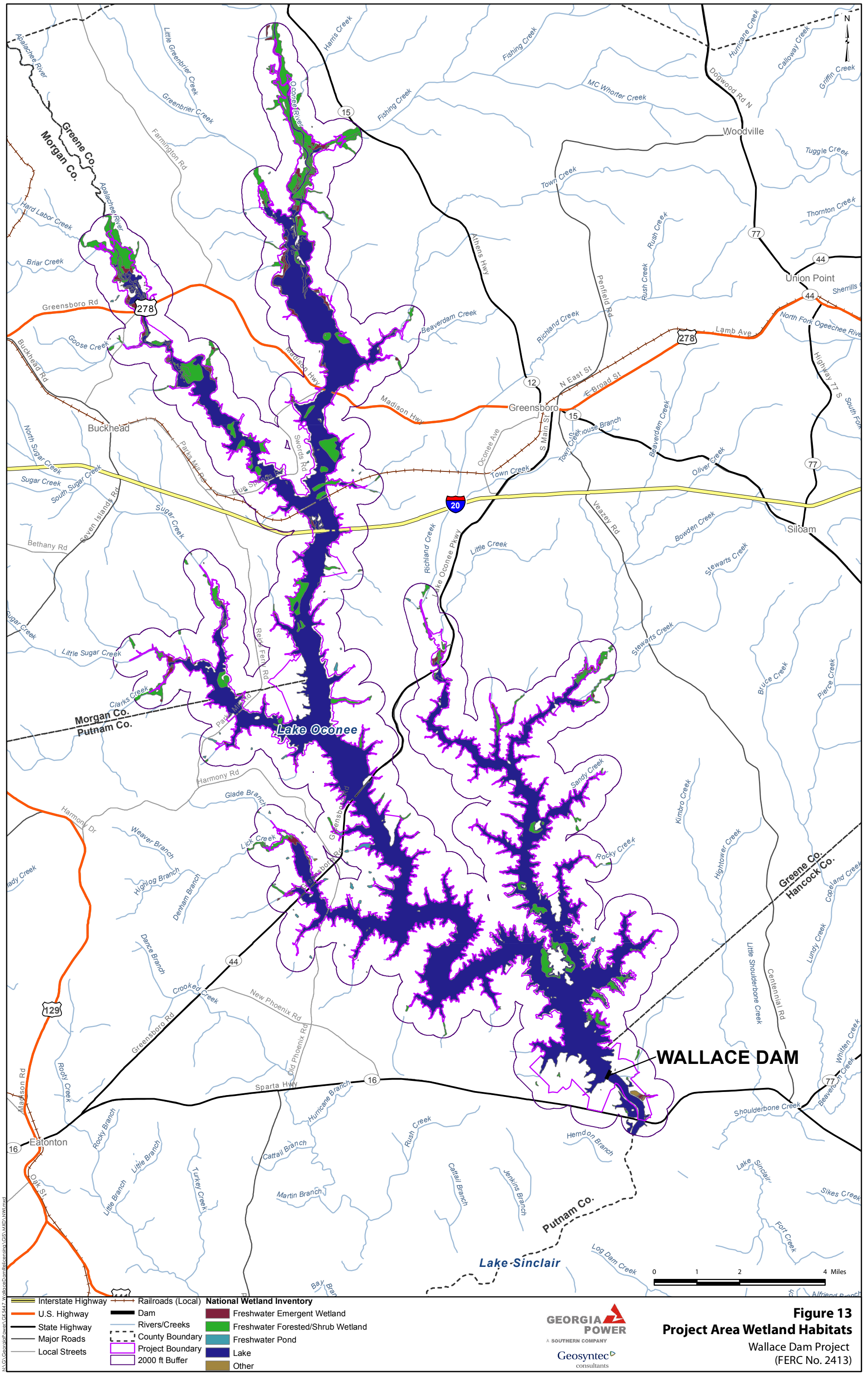






Instantaneous DO recorded at Wallace Dam.

Figure 12
Wallace Dam Dissolved Oxygen Measurements 1994-2001
Wallace Dam Project (FERC No. 2413)


Lake Oconee
Lake Sinclair
WALLACE DAM
Greene Co.
Morgan Co.
Morgan Co.
Putnam Co.
Putnam Co.
Greene Co.
Hancock Co.
Woodville
Union Point
Greensboro
Siloam
Buckhead
Eatonton
Apalachee River
Oconee River
Little Greenbrier Creek
Greenbrier Creek
Harris Creek
Fishing Creek
MC Whorter Creek
Hurricane Creek
Calloway Creek
Griffin Creek
Dogwood Rd N
Tuggle Creek
Thornton Creek
Town Creek
Rush Creek
Penfield Rd
Athens Hwy
Richland Creek
Beaverdam Creek
Lamb Ave
North Fork Ogeechee River
Sherrills
Highway 77 S
South Fork
N East St
E Broad St
S Main St
Oconee Ave
Madison Hwy
Parks Mill Rd
Swords Rd
Blue Springs Rd
Seven Islands Rd
Bethany Rd
Sugar Creek
South Sugar Creek
North Sugar Creek
Little Sugar Creek
Clarks Creek
Reids Ferry Rd
Harmony Rd
Harmony Dr
Glade Branch
Lick Creek
Weaver Branch
Highlog Branch
Denham Branch
Dance Branch
Crooked Creek
New Phoenix Rd
Old Phoenix Rd
Greensboro Rd
Sparta Hwy
Madison Rd
Rocky Creek
Rocky Branch
Little Branch
Turkey Creek
Oak St
Cattail Branch
Martin Branch
Hurricane Branch
Herndon Branch
Jenkins Branch
Shoulderbone Creek
Beaverdam Creek
Oliver Creek
Veazey Rd
Bowden Creek
Stewarts Creek
Little Creek
Sandy Creek
Rocky Creek
Kimbro Creek
Hightower Creek
Little Shoulderbone Creek
Centennial Rd
Lundy Creek
Copeland Creek
Whitten Creek
Bruce Creek
Pierce Creek
Sikes Creek
Fort Creek
Log Dam Creek
Lake Oconee Pkwy
Interstate Highway
U.S. Highway
State Highway
Major Roads
Local Streets
Railroads (Local)
Dam
Rivers/Creeks
County Boundary
Project Boundary
2000 ft Buffer
National Wetland Inventory
Freshwater Emergent Wetland
Freshwater Forested/Shrub Wetland
Freshwater Pond
Lake
Other
0 1 2 4 Miles
N
GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants
Figure 13
Project Area Wetland Habitats
Wallace Dam Project
(FERC No. 2413)
N:\GA\GeorgiaPower\GK5447 WallaceDamRelicensing\GIS\MXD\NWI.mxd

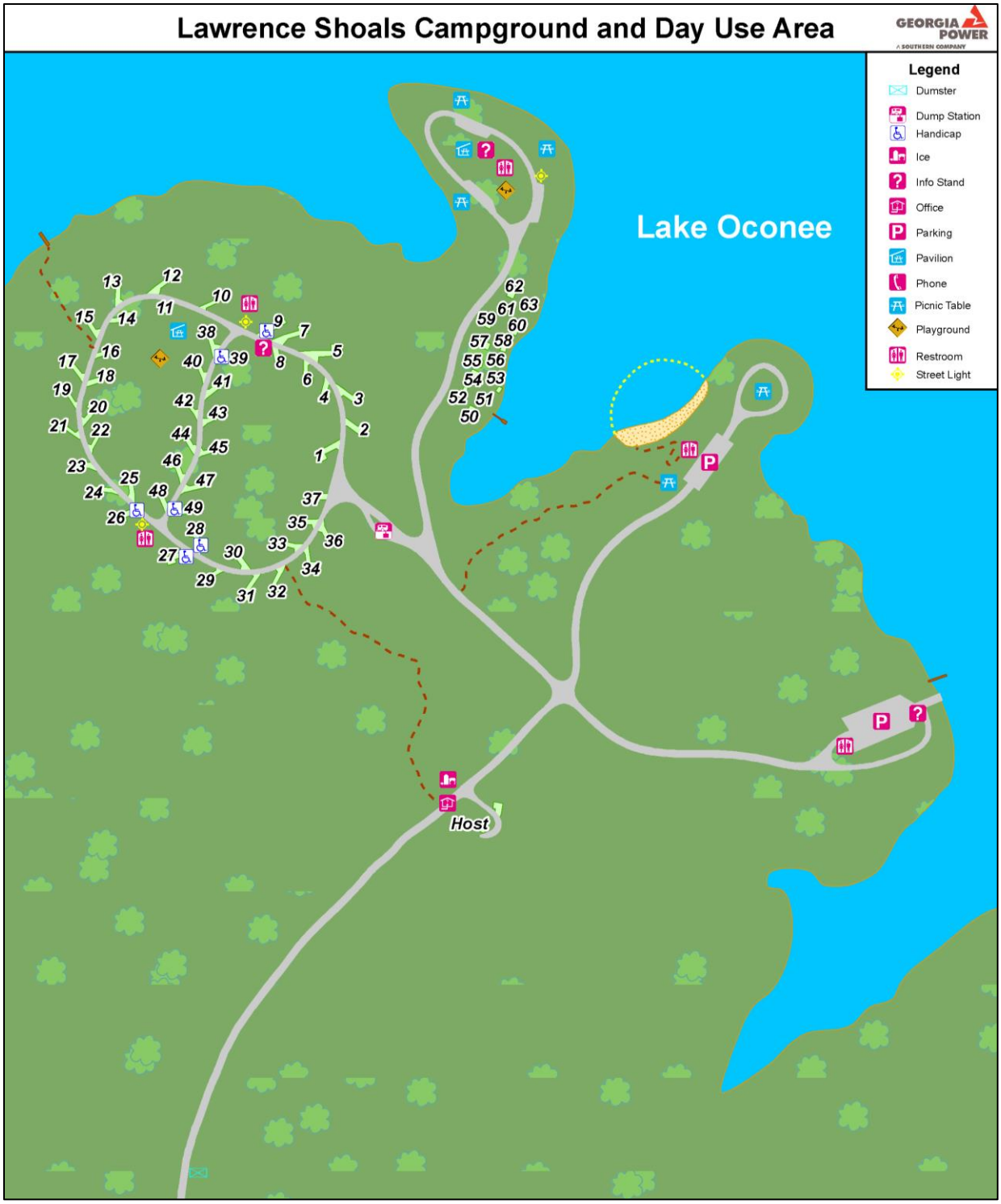


Figure 14
Lawrence Shoals Campground and Day Use Area
Wallace Dam Project (FERC No. 2413)

Figure 15
Old Salem Campground and Day Use Area
Wallace Dam Project (FERC No. 2413)

Figure 16
Parks Ferry Campground and Day Use Area
Wallace Dam Project (FERC No. 2413)

Armour Bridge Boat Ramp

Old Salem Park Comfort Station

Lawrence Shoals Park Campsite

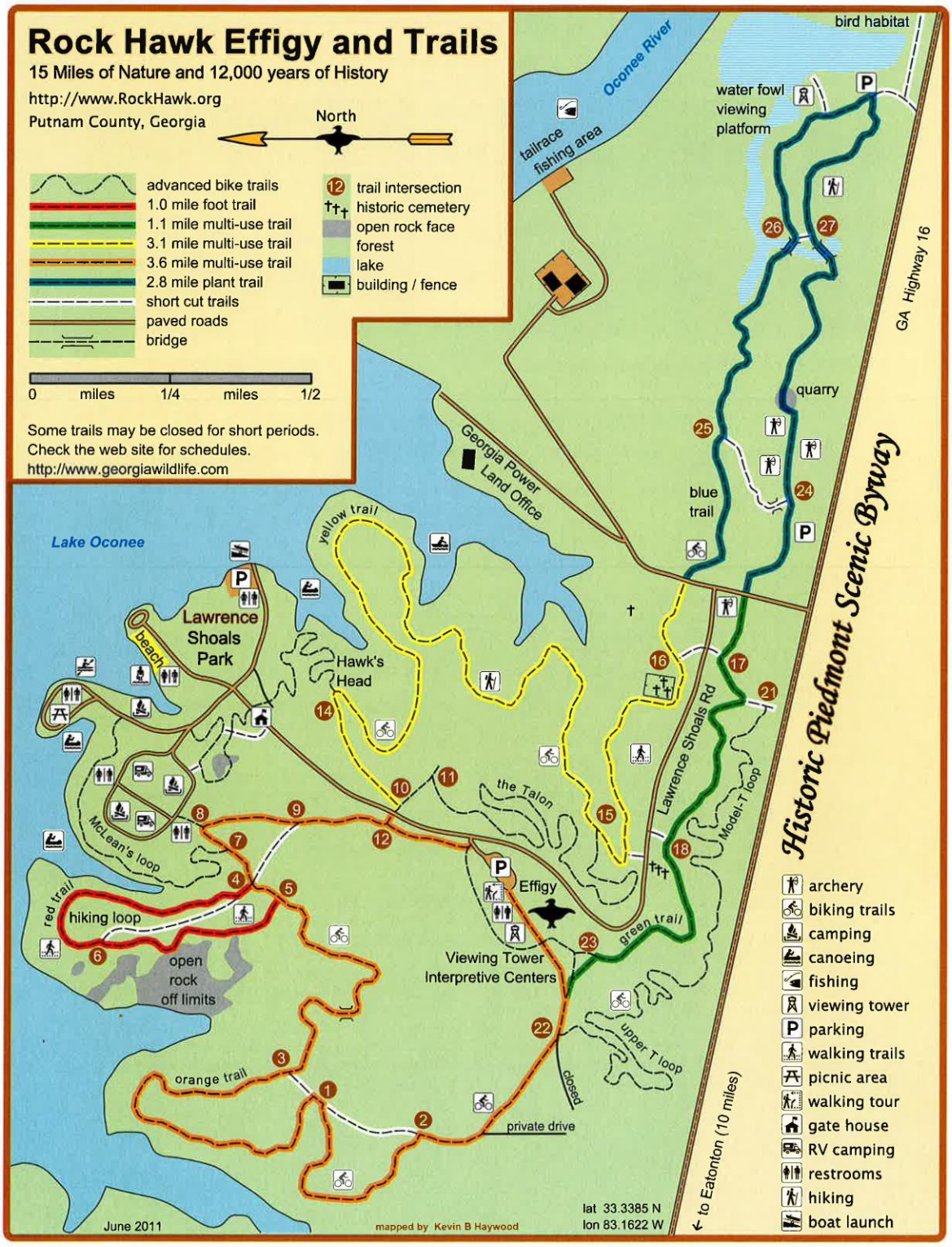
Old Salem Park Swimming Beach

Sugar Creek Boat Ramp Dock

Sugar Creek Boat Ramp Picnic Area

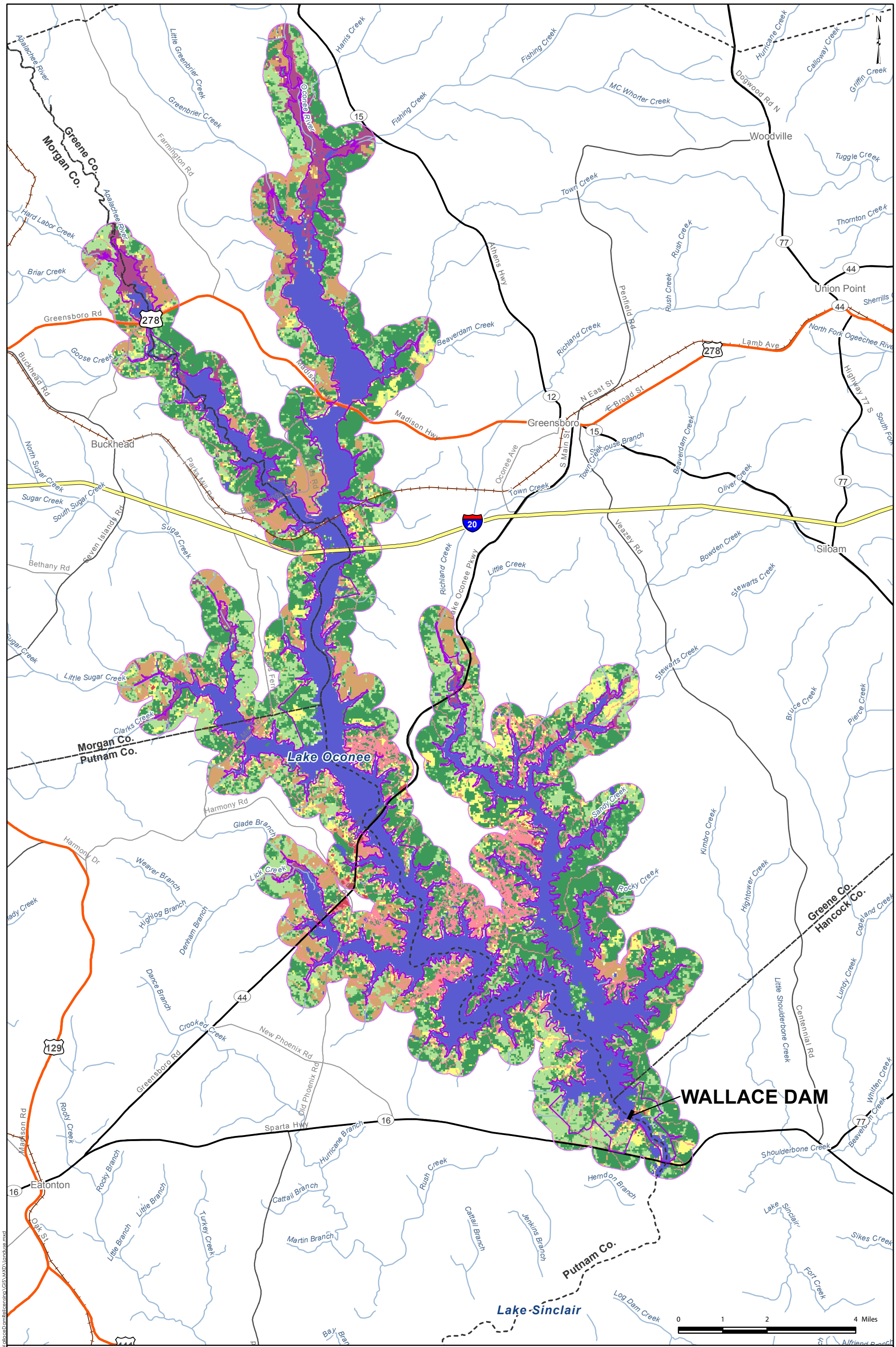
GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants

Figure 17
Representative Photographs of Project Recreation Sites
Wallace Dam Project (FERC No. 2413)



GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants

Figure 18
Rock Hawk Effigy and Trails
Wallace Dam Project (FERC No. 2413)



N:\GIS\GeorgiaPower\GK5447_WallaceDamRelicensing\GIS\MXD\landuse.mxd

GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants

Figure 19
Project Area Land Use
Wallace Dam Project
(FERC No. 2413)

GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants

Figure 20
Wallace Dam and Public Access Viewsheds
Wallace Dam Project (FERC No. 2413)

GEORGIA POWER
A SOUTHERN COMPANY
Geosyntec consultants

Figure 21
Viewsheds of Lake Oconee
Wallace Dam Project (FERC No. 2413)

APPENDIX A

Summary of Contacts

Pre-Consultation
Summary of Contacts
18 CFR § 5.6(d)(5)

18 CFR § 5.6(d)(5): An appendix summarizing contacts with Federal, state, and interstate resource agencies, Indian tribes, non-governmental organizations, or other members of the public made in connection with preparing the Pre-Application Document sufficient to enable the Commission to determine if due diligence has been exercised in obtaining relevant information.

In accordance with 18 CFR § 5.6(d)(5), the following is a summary of Georgia Power contacts with Federal, state, and interstate resource agencies, Indian tribes, non-governmental organizations and others in preparing the Pre-Application Document (PAD). As demonstrated by the summary, Georgia Power has exercised due diligence in obtaining the required information.

I. EMAIL COMMUNICATION

Georgia Power made initial contact by email with lake residents and local property owners on November 6, 2014 and other potential stakeholders, including federal and state agencies on November 12, 2014. The purpose of the email was to announce that Georgia Power was beginning the relicensing process and to confirm contact information and determine stakeholder interest in the proceeding. The email also stated that Georgia Power was going to use the Federal Energy Regulatory Commission's (FERC) Integrated Licensing Process (ILP), and that the PAD would be filed in February 2015.

The email contacts included the following stakeholders:

- American Rivers
- Altamaha Riverkeeper
- Blue Springs Marina
- Bone Island Grill
- Cuscowilla
- Cherokee Nation of Oklahoma
- City of Eatonton
- City of Greensboro
- City of Madison
- City of Sparta
- Ducks Unlimited
- Eastern Band of Cherokee Indians

- Georgia Bass Federation
- Georgia Department of Natural Resources – Oconee Wildlife Management Area
- Georgia Department of Natural Resources – Wildlife Resources Division
- Georgia Environmental Protection Division – Watershed Protection Branch
- Georgia Forestry Commission
- Georgia State Historic Preservation Officer/Georgia Historical Preservation Division
- Georgia River Network
- Granite Shoals Marina
- Greene County
- Harbor Club
- Hancock County
- Homeowners Associations
- Lake County Board of Realtors
- Lake Oconee Bass Club
- Lake Oconee Water Watch
- Morgan County
- Putnam County
- Oconee Outdoors Marina
- State Representative Butch Parish
- State Representative Mickey Channell
- State Representative Rusty Kidd
- Reynolds Plantation
- Ritz Carlton
- State Senator Burt Jones
- Southern Company
- Sugar Creek Marina
- United Keetoowah Band of Cherokee
- U.S. Environmental Protection Agency
- U.S. Fish and Wildlife Service
- U.S. Forest Service
- Waterfront Marina

II. RELICENSING INFORMATION SESSIONS

The email described above announced two relicensing information sessions. The purpose of the meetings was to provide stakeholders with the opportunity to learn about the Project and the Project's resource areas. The information sessions were advertised in the following four local newspapers the week of November 10, 2014: Eatonton Messenger; Lake Oconee News; Greensboro Herald Journal; and the Madisonian/Morgan County Citizen.

The information sessions were held on two different days at two different sites in order to accommodate the schedules of as many stakeholders as possible. Information sessions were held November 19, 2014 at the Rock Eagle 4-H Center in Eatonton, Georgia at 1-3 p.m. and 6-8 p.m. Information sessions were also held November 20, 2014 at the Parkside Main 8 Movie Theatres in Greensboro, Georgia at 3-5 p.m. and 6-8 p.m. At these information sessions FERC offered ILP training and Georgia Power resource subject matter experts were available for one-on-one discussions with stakeholders in areas such as Land Management, Recreation, Fisheries, Water Resources, Project Operations, Cultural Resources, and Tribal Issues.

In addition to numerous lake residents and property owners, attendees to the meetings included representatives from the following organizations:

- Georgia Department of Natural Resources – Wildlife Resources Division
- U.S. Environmental Protection Agency, Region 4
- U.S. Forest Service – Oconee Ranger District
- Lake Oconee Anglers

III. STAKEHOLDER MEETINGS & PAD QUESTIONNAIRES

Georgia Power set up individual meetings with stakeholders and made additional specific contacts as described below.

Federal Resource Agencies

U.S. Fish and Wildlife Service

On October 30, 2014, Georgia Power met with the U.S. Fish and Wildlife Service (FWS). The purpose of the meeting was to introduce FWS to the Wallace Dam Project, to identify reasonably available resource information for the PAD, and to learn more about FWS's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to FWS. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to FWS. Georgia Power also shared the PAD

Questionnaire seeking input from FWS on existing resource information, potential issues, and other comments.

Based on the meeting, FWS interests at this time include the following resource areas and potential issues:

- Updated surveys for imperiled species
- Understanding of reservoir drawdown rates and effects on native mussels
- Understanding of effects of dredging and shoreline development on native mussels
- Fish entrainment and fish passage and migratory fishes (American shad and eels)
- Shoreline management with consideration for land protections in undeveloped areas
- Reservoir and tailrace water quality (specifically temperature and dissolved oxygen)
- Avian Vacuolar Myelinopathy concerns with bald eagles

FWS completed the PAD Questionnaire and returned it to Georgia Power. The PAD questionnaire identified a number of sources of existing resource information and data.

U.S. Forest Service

On December 18, 2014, Georgia Power met with the U.S. Forest Service (USFS) Chattahoochee-Oconee National Forest. The purpose of the meeting was to introduce USFS to the Wallace Dam Project and Process, Plan and Schedule, to identify reasonably available resource information for the PAD, and to learn more about USFS's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to USFS. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to USFS. Georgia Power also shared the PAD Questionnaire seeking input from USFS on existing resource information, potential issues, and other comments.

Based on the meeting, USFS interests at this time include the following resource areas and potential issues:

- Recreation/access areas
- Process schedule/timeline
- USFS points of contact for stakeholders list and FERC service list
- Consultants used in field studies

State Resource Agencies

Georgia Department of Natural Resources – Wildlife Resources Division (Game – Oconee Wildlife Management Area)

On October 27, 2014, Georgia Power met with the Georgia Department of Natural Resources – Wildlife Resources Division (Wildlife Management Area) (WRD/WMA). The purpose of the meeting was to introduce WRD/WMA to the Wallace Dam Project, to identify reasonably available resource information for the PAD, and to learn more about WRD/WMA's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to WRD/WMA. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to them. Georgia Power also shared the PAD Questionnaire seeking input from WRD/WMA on existing resource information, potential issues, and other comments.

Based on the meeting, WRD/WMA interests at this time include the following resource areas and potential issues:

- Gate closure at Lawrence Shoals campground and boat ramp
- Erosion at an impoundment in a duck hunting area downstream of Wallace Dam

WRD/WMA completed the PAD Questionnaire and returned it to Georgia Power. The PAD Questionnaire identified sources of existing resource information and listed erosion at an impoundment in a duck hunting area downstream of Wallace Dam as an area of interest.

Georgia Department of Natural Resources – Historic Preservation Division

On November 14, 2014 Georgia Power met with the Georgia Department of Natural Resources – Historic Preservation Division (HPD). The purpose of the meeting was to introduce HPD to the Wallace Dam Project, to identify reasonably available resource information for the PAD, and to learn more about HPD's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to HPD. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to them. Georgia Power also shared the PAD Information Questionnaire seeking input from HPD on existing resource information, potential issues, and other comments.

HPD completed the PAD Questionnaire and returned it to Georgia Power. The PAD questionnaire identified a number of sources of existing resource information and data.

Georgia Department of Natural Resources – Environmental Protection Division – Watershed Protection Branch

On November 3, 2014, Georgia Power met with the Georgia Department of Natural Resources – Environmental Protection Division – Watershed Protection Branch (EPD). The purpose of the meeting was to introduce EPD to the Wallace Dam Project and Process, Plan and Schedule, to identify reasonably available resource information for the PAD, and to learn more about EPD's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to EPD. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to EPD. Georgia Power also shared the PAD Information Questionnaire seeking input from EPD on existing resource information, potential issues, and other comments.

Based on the meeting, EPD's interests at this time include the following resource areas and potential issues:

- Chlorophyll-a model development timeline
- Potential project tailrace data gap
- Impact of the fire retardant spill upstream of project and likely resulting fish kill

EPD also stated that WRD is likely not aware of the modeling efforts nor the status of the Athens Water treatment plant expansion and upgrade.

Georgia Department of Natural Resources – Wildlife Resources Division (Fisheries)

On October 29, 2014, Georgia Power met with the Georgia Department of Natural Resources – Wildlife Resources Division (Fisheries) (WRD). The purpose of the meeting was to introduce WRD to the Wallace Dam Project and Process, Plan and Schedule, to identify reasonably available resource information for the PAD, and to learn more about WRD's interests and resource management goals relative to the project.

Discussion topics included Georgia Power's information sessions; the project relicensing website; project operations and key resource areas at the project; and resource areas and potential issues of interest to WRD. A package of briefing cards and brochures summarizing FERC's ILP were reviewed and provided to WRD. Georgia Power also shared the PAD Information Questionnaire seeking input from WRD on existing resource information, potential issues, and other comments.

Based on the meeting, WRD interests at this time include the following resource areas and potential issues:

- Fishing tournament access

- Summer reservoir water quality
- Growth of primary sport fish species (largemouth bass and striped bass)
- Fish entrainment
- Shoreline development (specifically seawalls) effects on fish habitat
- Upstream nutrient loading/watershed water quality
- Opportunities to protect additional shoreline habitat
- Bald eagles with particular interest in effects of aquatic vegetation on health (Avian vacuolar myelinopathy)
- Aquatic plant management plan
- Altamaha shiner occurrence and distribution
- Native mussel occurrence and distribution
- Mitigation funding for development actions (docks, seawalls, shoreline vegetation thinning/clearing)
- Maintaining existing land acreage for WMA
- Maintaining lake-level stability for waterfowl

WRD completed the PAD Questionnaire and returned it to Georgia Power. The PAD Questionnaire identified sources of existing resource information and listed the following resource areas of interest to WRD:

- Public access
- Water quality
- Shoreline development
- Fish entrainment
- Navigational safety
- Fish habitat

IV. INDIAN TRIBES

In accordance with 18 CFR § 5.7, a meeting will be held no later than 30 days following filing of the notification of intent between potentially affected Indian tribes and Commission staff, if the Indian tribes agree to such meeting. As stipulated by the regulation, FERC staff is making initial contact with potentially affected Indian tribes, including the following:

Muscogee (Creek) Nation of Oklahoma
Cherokee Nation of Oklahoma
Eastern Band of Cherokee Indians
United Keetoowah Band of Cherokee

APPENDIX B

PAD Questionnaires

Pre-Application Document Information Questionnaire Wallace Dam Hydroelectric Project (FERC No. 2413)

Georgia Power Company (Georgia Power) is preparing to relicense its Wallace Dam Hydroelectric Project (Project), FERC No. 2413. The Project, which includes Lake Oconee, is located on the Oconee River in Hancock, Greene, Putnam, and Morgan Counties, Georgia. The current license expires May 31, 2020. Beginning in 2015 Georgia Power will use the Federal Energy Regulatory Commission's (FERC's) Integrated Licensing Process, or ILP, (18 CFR Part 5) to develop the license application. In 2015 Georgia Power will distribute a Pre-application Document (PAD) to Federal, state, and interstate resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the proceeding. The PAD will compile existing, relevant, and reasonably available information pertaining to the Project. This information will be used throughout the proceeding to help identify resource issues and related information needs, develop study plans, and analyze any Project impacts.

Through this PAD Information Questionnaire, Georgia Power is seeking the input of interested stakeholders and to help identify sources of existing, relevant, and reasonably available resource information pertaining to the Project. Your responses will provide Georgia Power with valuable information for preparing a comprehensive PAD.

This questionnaire can be filled out and sent to Georgia Power via email, mail, or fax. If emailed, please send to G2OCONEEREL@southernco.com. If mailed, please send to Courtenay O'Mara, 241 Ralph McGill Blvd., NE, BIN 10193, Atlanta, GA 30308. If sent via fax, please send to (404) 506-2626.

1. Information about the person completing the questionnaire:

Name & Title:	Chris Nelson - Fisheries Biologist GA DNR - Wildlife Resources
Organization:	2123 US 278 SE
Address:	Social Circle, GA 30025
Phones:	706-557-3344
Email Address:	Chris.Nelson@dnr.state.ga.us

2. Do you or your organization know of or possess existing, relevant, and reasonably available information that pertains to the Project: for example, information that describes the existing Project environment or potential impacts of the Project?

☒ Yes ***(Please complete 2a through 2d)*** ☐ No ***(Please go to 3)***

a. If yes, please check the box(es) to indicate the specific resource area(s) the information relates to:

☐	Geology and soils	☐	Recreation and land use
☒	Water resources	☐	Aesthetic resources
☒	Fish and aquatic resources	☐	Cultural resources
☐	Wildlife and botanical resources	☐	Socio-economic resources
☐	Wetlands, riparian, and littoral habitat	☐	Tribal resources
☐	Rare, threatened, and endangered species	☐	Other resource information

b. Please briefly describe the information or list available documents and references. If listing references, please provide author(s), date, title, publication, volume, and page numbers where applicable. (Additional information may be provided on separate sheets)

Annual standardized sampling data for fisheries from spring and fall seasons

Annual fish stocking records

Age and growth data for fish species (largemouth bass, black crappie and *Morone*)

Water quality (basic parameters) – Fisheries Management

Water quality (more detailed parameters) – GA DNR EPD

Age and growth for blue catfish (UGA research)

Feeding ecology of blue catfish (UGA research)

Fish habitat enhancements (Fisheries Management)

Fishing Tournament Data (Carl Quartamus/ Fisheries Management)

c. Where can Georgia Power obtain this information?

GA DNR - Fisheries Management (Chris Nelson)

UGA COOP Unit (Cecil Jennings)

Dennis Schmitt (Fish Tournament Data)

d. Please provide the name(s) of any specific representative(s) of your organization other than yourself you wish to designate for a potential follow-up contact by Georgia Power or Georgia Power's representative for the resource area(s) checked above.

Representative Contact Information

Name and Title: Thom Litts – Operations Manager

Address: 2065 US 278 SE

Social Circle, GA 30025

Phones: 706-557-3236

Email Address: Thom.Litts@dnr.state.ga.us

Name and Title: Steve Schleiger – Regional Supervisor

Address: 1014 Martin Luther King, Jr. Blvd.

Fort Valley GA 31030-6246

Phone: 478-825-6151

Email Address: Steve.Schleiger@dnr.state.ga.us

3. Are you aware of any specific Project-related issues pertaining to the resource area(s) listed in 2a above?

☒ Yes ***(Please list specific issues by resource area below)*** ☐ No ***(Please go to 4)***

Resource Area	**Specific Issue**
Recreation & land use	Public access
Recreation & land use	Shoreline development
Water resources	Water quality
Fish & aquatic resources	Fish entrainment
Recreation & land use	Navigational safety
Fish and aquatic resources	Fish habitat

4. Do you or your organization plan to participate in the Wallace Dam Project relicensing proceeding?

☒ Yes ☐ No

5. We are interested in your comments. Please provide below any comments or additional information you may have regarding the Wallace Dam Project relicensing.

Comments or Additional Information

Thank you for your participation.

Not responding within 30 days will indicate that you are unaware at this time of any existing, relevant and reasonably available information pertaining to the Project, or are not interested in participating in the Wallace Dam relicensing proceeding at this time.

Pre-Application Document Information Questionnaire Wallace Dam Hydroelectric Project (FERC No. 2413)

Georgia Power Company (Georgia Power) is preparing to relicense its Wallace Dam Hydroelectric Project (Project), FERC No. 2413. The Project, which includes Lake Oconee, is located on the Oconee River in Hancock, Greene, Putnam, and Morgan Counties, Georgia. The current license expires May 31, 2020. Beginning in 2015 Georgia Power will use the Federal Energy Regulatory Commission's (FERC's) Integrated Licensing Process, or ILP, (18 CFR Part 5) to develop the license application. In 2015 Georgia Power will distribute a Pre-application Document (PAD) to Federal, state, and interstate resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the proceeding. The PAD will compile existing, relevant, and reasonably available information pertaining to the Project. This information will be used throughout the proceeding to help identify resource issues and related information needs, develop study plans, and analyze any Project impacts.

Through this PAD Information Questionnaire, Georgia Power is seeking the input of interested stakeholders and to help identify sources of existing, relevant, and reasonably available resource information pertaining to the Project. Your responses will provide Georgia Power with valuable information for preparing a comprehensive PAD.

This questionnaire can be filled out and sent to Georgia Power via email, mail, or fax. If emailed, please send to G2OCONEEREL@southernco.com. If mailed, please send to Courtenay O'Mara, 241 Ralph McGill Blvd., NE, BIN 10193, Atlanta, GA 30308. If sent via fax, please send to (404) 506-2626.

1. Information about the person completing the questionnaire:

Name & Title:	Drew Larson – Wildlife Biologist
Organization:	GA DNR – Wildlife Resources Division
Address:	2065 U.S. Hwy 278 SE Social Circle, GA 30025
Phones:	770/918-6416
Email Address:	drew.larson@dnr.state.ga.us

2. Do you or your organization know of or possess existing, relevant, and reasonably available information that pertains to the Project: for example, information that describes the existing Project environment or potential impacts of the Project?

☒ Yes ***(Please complete 2a through 2d)*** ☐ No ***(Please go to 3)***

a. If yes, please check the box(es) to indicate the specific resource area(s) the information relates to:

☐	Geology and soils	☒	Recreation and land use
☐	Water resources	☐	Aesthetic resources
☐	Fish and aquatic resources	☐	Cultural resources
☒	Wildlife and botanical resources	☐	Socio-economic resources
☒	Wetlands, riparian, and littoral habitat	☐	Tribal resources
☒	Rare, threatened, and endangered species	☐	Other resource information

b. Please briefly describe the information or list available documents and references. If listing references, please provide author(s), date, title, publication, volume, and page numbers where applicable. (Additional information may be provided on separate sheets)

Hunter sign-in records; hunter harvest records; land management history; rare, threatened and endangered species surveys

c. Where can Georgia Power obtain this information?

GA DNR – Wildlife Resources Division

d. Please provide the name(s) of any specific representative(s) of your organization other than yourself you wish to designate for a potential follow-up contact by Georgia Power or Georgia Power's representative for the resource area(s) checked above.

Representative Contact Information

Name and Title: _____

Address: _____

_____

Phones: _____

Email Address: _____

Name and Title: _____

Address: _____

_____

Phone: _____

Email Address: _____

3. Are you aware of any specific Project-related issues pertaining to the resource area(s) listed in 2a above?

☒ Yes ***(Please list specific issues by resource area below)*** ☐ No ***(Please go to 4)***

Resource Area	**Specific Issue**
Wetlands	Streambank erosion near Pond 2

4. Do you or your organization plan to participate in the Wallace Dam Project relicensing proceeding?

☒ Yes ☐ No

5. We are interested in your comments. Please provide below any comments or additional information you may have regarding the Wallace Dam Project relicensing.

Comments or Additional Information

Thank you for your participation.

Not responding within 30 days will indicate that you are unaware at this time of any existing, relevant and reasonably available information pertaining to the Project, or are not interested in participating in the Wallace Dam relicensing proceeding at this time.

Pre-Application Document Information Questionnaire
Wallace Dam Hydroelectric Project
Supplemental Information – Oconee WMA – GA DNR Wildlife Resources Division

Estimated consumptive users: 3,220
Estimated non-consumptive users: 3,650

Harvest numbers:
Deer – 150
Turkey – 10
Ducks – 200
Doves – 150

Resource Issues:
Streambank erosion between Wallace Dam and highway 16 near the pipe coming from Pond 2. There is fairly significant sloughing of the dike between the waterway and Pond 2 for roughly 100 feet along the waterway.

Pre-Application Document Information Questionnaire Wallace Dam Hydroelectric Project (FERC No. 2413)

Georgia Power Company (Georgia Power) is preparing to relicense its Wallace Dam Hydroelectric Project (Project), FERC No. 2413. The Project, which includes Lake Oconee, is located on the Oconee River in Hancock, Greene, Putnam, and Morgan Counties, Georgia. The current license expires May 31, 2020. Beginning in 2015 Georgia Power will use the Federal Energy Regulatory Commission's (FERC's) Integrated Licensing Process, or ILP, (18 CFR Part 5) to develop the license application. In 2015 Georgia Power will distribute a Pre-application Document (PAD) to Federal, state, and interstate resource agencies, Indian tribes, local governments, and members of the public likely to be interested in the proceeding. The PAD will compile existing, relevant, and reasonably available information pertaining to the Project. This information will be used throughout the proceeding to help identify resource issues and related information needs, develop study plans, and analyze any Project impacts.

Through this PAD Information Questionnaire, Georgia Power is seeking the input of interested stakeholders and to help identify sources of existing, relevant, and reasonably available resource information pertaining to the Project. Your responses will provide Georgia Power with valuable information for preparing a comprehensive PAD.

This questionnaire can be filled out and sent to Georgia Power via email, mail, or fax. If emailed, please send to G2OCONEEREL@southernco.com. If mailed, please send to Courtenay O'Mara, 241 Ralph McGill Blvd., NE, BIN 10193, Atlanta, GA 30308. If sent via fax, please send to (404) 506-2626.

1. Information about the person completing the questionnaire:

Name & Title:	Anna Yellin
Organization:	Georgia Department of Natural Resources
Address:	2065 US Hwy 278 SE Social Circle, GA 30025
Phones:	706-557-3283
Email Address:	anna.yellin@dnr.state.ga.us

2. Do you or your organization know of or possess existing, relevant, and reasonably available information that pertains to the Project: for example, information that describes the existing Project environment or potential impacts of the Project?

☒ Yes ***(Please complete 2a through 2d)*** ☐ No ***(Please go to 3)***

a. If yes, please check the box(es) to indicate the specific resource area(s) the information relates to:

☐	Geology and soils	☐	Recreation and land use
☐	Water resources	☐	Aesthetic resources
☐	Fish and aquatic resources	☐	Cultural resources
☐	Wildlife and botanical resources	☐	Socio-economic resources
☐	Wetlands, riparian, and littoral habitat	☐	Tribal resources
☒	Rare, threatened, and endangered species	☐	Other resource information

b. Please briefly describe the information or list available documents and references. If listing references, please provide author(s), date, title, publication, volume, and page numbers where applicable. (Additional information may be provided on separate sheets)

State Rare Species Database. We can provide information upon request.

c. Where can Georgia Power obtain this information?

Send queries to Anna Yellin (anna.yellin@dnr.state.ga.us)

d. Please provide the name(s) of any specific representative(s) of your organization other than yourself you wish to designate for a potential follow-up contact by Georgia Power or Georgia Power's representative for the resource area(s) checked above.

Representative Contact Information

Name and Title: _____

Address: _____

_____

Phones: _____

Email Address: _____

Name and Title: _____

Address: _____

_____

Phone: _____

Email Address: _____

3. Are you aware of any specific Project-related issues pertaining to the resource area(s) listed in 2a above?

☐ Yes ***(Please list specific issues by resource area below)*** ☐ No ***(Please go to 4)***

Resource Area	**Specific Issue**

4. Do you or your organization plan to participate in the Wallace Dam Project relicensing proceeding?

☒ Yes ☐ No

5. We are interested in your comments. Please provide below any comments or additional information you may have regarding the Wallace Dam Project relicensing.

Comments or Additional Information

Thank you for your participation.

Not responding within 30 days will indicate that you are unaware at this time of any existing, relevant and reasonably available information pertaining to the Project, or are not interested in participating in the Wallace Dam relicensing proceeding at this time.

Pre-Application Document Information Questionnaire Wallace Dam Hydroelectric Project (FERC No. 2413)

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This questionnaire can be filled out and sent to Georgia Power via email, mail, or fax. If emailed, please send to G2OCONEEREL@southernco.com. If mailed, please send to Courtenay O'Mara, 241 Ralph McGill Blvd., NE, BIN 10193, Atlanta, GA 30308. If sent via fax, please send to (404) 506-2626.

1. Information about the person completing the questionnaire:

Name & Title:	Jennifer Dixon, Environmental Review Program Manager
Organization:	GA DNR, Historic Preservation Division
Address:	254 Washington St, SW, Atlanta, GA 30334 (will change February, 2015)
Phones:	404-651-6546
Email Address:	Jennifer.dixon@dnr.state.ga.us

2. Do you or your organization know of or possess existing, relevant, and reasonably available information that pertains to the Project: for example, information that describes the existing Project environment or potential impacts of the Project?

☒ Yes ***(Please complete 2a through 2d)*** ☐ No ***(Please go to 3)***

a. If yes, please check the box(es) to indicate the specific resource area(s) the information relates to:

☐	Geology and soils	☐	Recreation and land use
☐	Water resources	☐	Aesthetic resources
☐	Fish and aquatic resources	☒	Cultural resources
☐	Wildlife and botanical resources	☐	Socio-economic resources
☐	Wetlands, riparian, and littoral habitat	☐	Tribal resources
☐	Rare, threatened, and endangered species	☐	Other resource information

b. Please briefly describe the information or list available documents and references. If listing references, please provide author(s), date, title, publication, volume, and page numbers where applicable. (Additional information may be provided on separate sheets)

Our office contains National Register of Historic Places files, site files, county/city historic resource survey files, previous environmental review files, Centennial Farm files, and topical files that all contain information regarding historic resources. Additionally, the Georgia Site files, housed at UGA, contain information regarding archaeological surveys that have previously been completed.

c. Where can Georgia Power obtain this information?

In our office and at the GASF

d. Please provide the name(s) of any specific representative(s) of your organization other than yourself you wish to designate for a potential follow-up contact by Georgia Power or Georgia Power's representative for the resource area(s) checked above.

Representative Contact Information

Name and Title: Same as above for historic resources

Address:

Phones:

Email Address:

Name and Title: Jennifer Bedell for archaeological resources

Address: Same as above

Phone: 404-657-1042

Email Address: Jennifer.bedell@dnr.state.ga.us

3. Are you aware of any specific Project-related issues pertaining to the resource area(s) listed in 2a above?

☐ Yes ***(Please list specific issues by resource area below)*** ☒ No ***(Please go to 4)***

Have not reviewed our files to determine, as this is the agency's/delegate's responsibility

Resource Area	**Specific Issue**

4. Do you or your organization plan to participate in the Wallace Dam Project relicensing proceeding?

☒ Yes ☐ No ***Under Section 106 of the NHPA***

5. We are interested in your comments. Please provide below any comments or additional information you may have regarding the Wallace Dam Project relicensing.

Comments or Additional Information

HPD looks forward to working with the project applicants, delegates, agencies, etc. as the Project proceeds through the Section 106 process.

Thank you for your participation.

Not responding within 30 days will indicate that you are unaware at this time of any existing, relevant and reasonably available information pertaining to the Project, or are not interested in participating in the Wallace Dam relicensing proceeding at this time.

Pre-Application Document Information Questionnaire Wallace Dam Hydroelectric Project (FERC No. 2413)

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Through this PAD Information Questionnaire, Georgia Power is seeking the input of interested stakeholders and to help identify sources of existing, relevant, and reasonably available resource information pertaining to the Project. Your responses will provide Georgia Power with valuable information for preparing a comprehensive PAD.

This questionnaire can be filled out and sent to Georgia Power via email, mail, or fax. If emailed, please send to G2OCONEEREL@southernco.com. If mailed, please send to Courtenay O'Mara, 241 Ralph McGill Blvd., NE, BIN 10193, Atlanta, GA 30308. If sent via fax, please send to (404) 506-2626.

1. Information about the person completing the questionnaire:

Name & Title:	Tamara Johnson (Fish and Wildlife Biologist)
Organization:	U.S. Fish and Wildlife Service
Address:	105 Westpark Drive, Suite D, Athens, Georgia 30606
Phones:	706.613.9493
Email Address:	Tamara_Johnson@fws.gov

2. Do you or your organization know of or possess existing, relevant, and reasonably available information that pertains to the Project: for example, information that describes the existing Project environment or potential impacts of the Project?

X Yes ***(Please complete 2a through 2d)*** ☐ No ***(Please go to 3)***

a. If yes, please check the box(es) to indicate the specific resource area(s) the information relates to:

☐	Geology and soils	☐	Recreation and land use
☐	Water resources	☐	Aesthetic resources
X	Fish and aquatic resources	☐	Cultural resources
☐	Wildlife and botanical resources	☐	Socio-economic resources
☐	Wetlands, riparian, and littoral habitat	☐	Tribal resources
X	Rare, threatened, and endangered species	☐	Other resource information

b. Please briefly describe the information or list available documents and references. If listing references, please provide author(s), date, title, publication, volume, and page numbers where applicable. (Additional information may be provided on separate sheets)

Georgia DNR Heritage Data

Georgia DNR Stream Team Data

Georgia DNR Fisheries Data

Lake Sinclair relicensing studies

USFWS Bald Eagle Management Guidelines and Conservation Measures

Priority Restoration and Management Actions for the American Shad in the Altamaha River Basin, Georgia (GDNR, USFWS, & NMFS 2013)

c. Where can Georgia Power obtain this information?

I believe you have all of this information- if not, let us know.

d. Please provide the name(s) of any specific representative(s) of your organization other than yourself you wish to designate for a potential follow-up contact by Georgia Power or Georgia Power's representative for the resource area(s) checked above.

Representative Contact Information

Name and Title: Alice Lawrence (Fish and Wildlife Biologist)

Address: 105 Westpark Drive, Suite D, Athens, Georgia 30606

Phones: 706.613.9493

Email Address: Alice_lawrence@fws.gov

Name and Title:

Address:

Phone:

Email Address:

3. Are you aware of any specific Project-related issues pertaining to the resource area(s) listed in 2a above?

X Yes ***(Please list specific issues by resource area below)*** ☐ No ***(Please go to 4)***

Resource Area	**Specific Issue**
Please see notes from our October 30, 2014, meeting in Athens.	

4. Do you or your organization plan to participate in the Wallace Dam Project relicensing proceeding?

X Yes ☐ No

5. We are interested in your comments. Please provide below any comments or additional information you may have regarding the Wallace Dam Project relicensing.

Comments or Additional Information

Thank you for your participation.

Not responding within 30 days will indicate that you are unaware at this time of any existing, relevant and reasonably available information pertaining to the Project, or are not interested in participating in the Wallace Dam relicensing proceeding at this time.

APPENDIX C

Transfer of Electricity from Project to Transmission Grid (Critical Energy Infrastructure Information)

Wallace Dam Project (FERC No. 2413)

Appendix C contains critical energy infrastructure information (CEII), including a diagram showing the transfer of electricity derived from engineering documents and a map of the location of the existing project transmission line. This CEII contains details which could be useful to a person planning an attack on critical infrastructure, and the incapacity of the facility would negatively affect security, economic security, and public health and safety.

APPENDIX D

Wallace Dam Operations Primer

WALLACE DAM

Lake Oconee

Wallace Dam
Operations Primer
February 2015

GEORGIA POWER

A SOUTHERN COMPANY

How Does a Hydropower Plant Generate Power?

Hydropower is one of the oldest methods of generating power. A hydropower plant uses the stored kinetic energy in water as it moves from the higher reservoir elevation to the lower tailwater elevation to produce clean, renewable power.

Water flows from the reservoir into the intake, through passageways called penstocks, to the turbine blades. There the water turns the turbine, which turns an electric generator to make electricity (See Figure 1).

The amount of power generated is directly proportional to the head (the difference between reservoir headwater elevation and discharge tailwater elevation) and flow. For any dam, more power can be generated if there is more head, i.e. a higher dam, or if there is more flow through the turbine.

The amount of flow available upstream of a dam depends in part on rainfall and the size and geography of the drainage basin. The drainage basin, also called a watershed, is the land upon which rainfall flows to a particular stream, river, or other water body. In general, the larger the drainage basin, and the more abundant the rainfall, the higher the flow. Flows vary daily, seasonally, and annually. Typically, flows for Georgia are highest in March and lowest in September.

How is Hydropower Used?

Only certain sites have sufficient flow and are otherwise suitable for riverine hydropower plants, which limits the amount of hydropower in Georgia. Hydropower represents 6 % of the 2013 generation capacity (megawatts [MW]) for Georgia Power and provides about 1.9 % of actual generation (MW-hours), but it is an important component of the generation mix.

Because electricity from hydropower plants can be loaded onto the transmission system quickly, hydropower plants are often used to supply power during peak power demand periods in the day. Hydropower plants can also be used in system emergencies (e.g., when a large fossil or nuclear plant goes offline, or when the transmission system requires balancing). Generally, peak power demands in Georgia occur most weekday afternoons during warm seasons and most weekday mornings during winter months. Peak power demands can change rapidly, and hydropower plants can come online faster and more economically than combustion turbines and other types of quick-loading power generation plants.

How is Wallace Dam Operated?

General Project Description

The Wallace Dam Project is a pumped storage project consisting of Wallace Dam, a powerhouse, and Lake Oconee and is located on the Oconee River in Hancock, Putnam, Greene, and Morgan Counties, Georgia. Pumped storage projects move water between two reservoirs located at different elevations. The Wallace Dam Project operates using Lake Oconee as the upper reservoir. Lake Sinclair located immediately downstream serves as the lower reservoir and is operated by Georgia Power as the separately licensed Sinclair Hydroelectric Project (Sinclair Project) (FERC No. 1951).

The drainage basin above Lake Oconee is about 1830 square miles. The area of the reservoir at normal pool (elevation 435) is about 19,050 acres with a shoreline length of 374 miles. The full reservoir storage is approximately 370,000 acre-feet. The Wallace Dam Project is Georgia Power's largest hydropower development and in the period 2009-2013 contributed an average of 22% of Georgia Power's total hydropower generation.

Normal Operation of Wallace Dam

The Wallace Dam Project began operation in December 1979. The powerhouse contains six turbine units consisting of two conventional units and four units which can reverse direction and become pumps. Units 1, 2, 5, and 6 are reversible turbine/pump units. Units 3 and 4 are conventional turbines. Total generating capacity with all units operating is 321.3 MW. Because of its large generating capacity, Wallace Dam is a black-start facility for Georgia Power, meaning that it is capable of assisting in restoring electricity to the nearby system if another major generation facility goes offline.

Below is pertinent data on the turbines:

Data on Wallace Dam Turbines

UNIT	Nameplate Capacity MW	Maximum Hydraulic Capacity CFS	Commercial Operation Date
1	52.2	8390	1980
2	52.2	8825	1980
3	56.25	8600	1980
4	56.25	8600	1980
5	52.2	8210	1980
6	52.2	7920	1979

Because Wallace Dam discharges directly into Lake Sinclair, with no intervening riverine reach or bypassed reach, it has no FERC-required minimum instantaneous discharge. Although there is no instantaneous discharge requirement, for the period 1997-2013 daily average discharges exceeded 0 cfs 85% of the days, 1000 cfs 64% of the days, and 4600 cfs 75% of the days.

Water for generation at Wallace Dam comes from inflow from the Oconee River and its tributaries plus storage in the Lake Oconee reservoir. Wallace Dam passes a certain volume of water during peak demand hours to meet the electrical system demand. Some of this water subsequently passes downstream for hydropower generation at Sinclair Dam to meet both electrical system demand and river flow requirements in the Oconee River downstream of Sinclair Dam.[1] The remaining volume of water from Wallace Dam remains in Lake Sinclair for a few hours before being pumped back up and into Lake Oconee by the reversible units for reuse in the next day's generation cycle. Pumpback operations occur at night, when electrical system demand is low (i.e., off-peak electrical hours) and therefore the cost of power is lower.

For normal operations on a day to day basis, Lake Oconee fluctuates between elevation 435 ft plant datum (PD), which is full pond, and elevation 433.5 ft PD.[2] Lake Oconee typically starts near elevation 435 ft before the generation cycle and ends near elevation 433.5 ft. During the nighttime pumping cycle Lake Oconee typically refills up to elevation 435 ft. Depending upon power demand, Lake Oconee may not fluctuate the full amount on a daily basis. The average daily fluctuation of Lake Oconee is approximately 1.5 ft.

The following table (Table 1) shows generation for Wallace Dam for the last five years. Georgia Power accounts for the generation from water that is passed through Sinclair Dam differently than the generation from the volume of water which is reused every day. As you can see, the majority of the total annual generation at Wallace Dam comes from the reuse of water pumped back into Lake Oconee at night, indicating the critical importance of pumpback operations to the power benefits of the Wallace Dam Project. During drought years, there are lower inflows into Lake Oconee. Therefore, the majority of the generation for drought years is from pumpback operations. This is illustrated in Table 1 by the significantly higher generation from pumpback operations in 2012 which was a historically dry year. More water is available for conventional generation in wetter years. This is illustrated by the large amounts of conventional generation in 2010 which was a historically wet year.

Generation typically is highest during the summer months when electricity demand is highest and not when flow in the river is highest. During the summer, Wallace Dam usually generates about 7 to 8 hours across the afternoon peak demand period. During fall and winter, peak generation typically lasts 5 to 6 hours.

[1] The river flow requirements are included as articles in the separate FERC license for the Sinclair Project.
[2] Plant datum = mean sea level (NAVD88) - 0.20 feet (+/- 0.01 feet).

Table 1
Monthly Generation (MWh)

Year		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2009	**Total**	20,888	14,967	33,477	30,565	40,983	39,651	41,906	42,673	35,380	39,083	36,656	37,217	**413,446**
	Conventional	975	203	-261	-194	-252	-262	-281	-286	-264	-273	-263	-370	
	Pumpback	19,913	14,764	33,738	30,759	41,235	39,913	42,187	42,959	35,644	39,356	36,919	37,587	
2010	**Total**	37,498	38,212	27,597	25,390	34,477	35,313	41,532	40,741	41,582	37,913	25,422	22,681	**408,358**
	Conventional	19,622	18,453	12,988	8,037	4,373	4,792	793	-302	-269	-16	-197	4554	
	Pumpback	17,836	19,759	14,609	17,353	30,104	30,521	40,739	41,043	41,851	37,929	25,619	18,127	
2011	**Total**	21,472	21,837	32,877	29,678	28,478	29,965	30,944	34,827	34,267	30,218	27,598	26,796	**348,957**
	Conventional	5,529	9,819	11,671	7,305	2,420	1,894	359	-265	-262	-262	-242	362	
	Pumpback	15,943	12,018	21,206	22,373	26,058	28,071	30,585	35,092	34,529	30,480	27,840	26,434	
2012	**Total**	26,632	20,411	30,823	32,346	33,545	36,550	32,713	35,109	34,247	29,446	24,096	20,446	**356,364**
	Conventional	3,790	4,390	4,285	454	-228	264	-90	39	8	95	166	601	
	Pumpback	22,842	16,021	26,538	31,892	33,773	36,286	32,803	35,070	34,239	29,351	23,930	19,845	
2013	**Total**	19,595	23,019	22,204	24,571	22,612	26,895	30,728	32,411	29,605	27,126	17,672	27,538	**303,976**
	Conventional	4,790	14,093	8,122	6,770	8,735	2,871	14,200	5,479	70	-249	170	17,476	
	Pumpback	14,805	8,926	14,082	17,801	13,877	24,024	16,528	26,932	29,535	27,375	17,502	10,062	

Drought Operation of the Wallace Dam Project

The Wallace Dam Project supports the minimum flow requirements of the Sinclair Project during drought. During extreme drought, it is possible for inflows into Wallace Dam to drop significantly because there is virtually no runoff in the drainage basin. The Sinclair Project has an absolute minimum release requirement of 250 cfs. When Sinclair's calculated inflow drops below 250 cfs water is released from Lake Oconee to maintain Lake Sinclair at the minimum level necessary for safe pumpback operation at Wallace Dam. If Lake Sinclair was lowered below its normal elevation range, the pump units at Wallace Dam would cavitate and could become damaged. The normal minimum pond level at Lake Sinclair is 338.2 ft PD and the pump units begin to cavitate at elevation 337.2 ft PD. During recent drought years, the Wallace Dam Project supplemented river flow in the Oconee River downstream of Lake Sinclair for several months, resulting in sustained periods when the elevation of Lake Oconee was below its normal operating range (See Figure 6).

Wallace Dam Operations Figures

Figure 2 demonstrates the historical average monthly inflows to the upper reaches of Lake Oconee for the period of January 1980 through September 2013. This graph shows that typically in Georgia lower flows occur during fall and higher flows occur in winter into spring.

Figures 3 through 5 show the inflows to Lake Oconee and the hourly elevations for three one-week periods based on medium (1,591 cfs), high (13,805 cfs), and low (147 cfs) inflow. Average annual inflow for Lake Oconee is approximately 2,222 cfs.

The weeks run from Sunday to Sunday. The graphs show the inflows into the upper reaches of Lake Oconee. The actual amount available for generation is less than the inflow due to water withdrawals and evaporation from the reservoir which are not included in this inflow calculation.

The medium and low inflow graphs show the daily fluctuation of Lake Oconee due to the pumpback operations.

Figure 6 shows Lake Oconee elevations for a few recent drought years. The lowered lake elevations, which only occurred during the drier months of the drought years, occurred because water was released from Wallace Dam storage, passed through Sinclair Dam and released for flow supplementation in the Oconee River. The lowest elevations on this graph were in 2007. Both 2007 and 2008 were among the worst drought years in recent history in Georgia.

Figures 7 through 23 show the daily maximum and minimum Lake Oconee reservoir elevation for each of the years from 1997 through 2013. Some things to note about these graphs are:

- The typical operating range for the reservoir is between elevations 433.5 and 435 feet, with 435 feet being full pond.
- A fall lake drawdown for homeowner maintenance of dock structures occurred in 1999. There were no drawdowns during the drought years because Lake Oconee was already drawn down due to the combination of low inflows and flow supplementation releases (See Figure 6). Drought years were 2000, 2002, 2007, 2008, 2011, and 2012.

Figure 24 shows statistics on hourly lake elevations for the period 1997-2013. Lake Oconee was below elevation 433.5 feet only 9% of the time.

Figure 25 shows daily lake fluctuation statistics for the period 1997-2013. Daily fluctuations are less than 1.5 feet 99% of the days. Daily fluctuations are less than 1.0 feet 82% of the days and less than 0.75 feet 54% of the days.

Figure 26 shows statistics on daily discharges for the period 1997-2013. For the period 1997-2013 daily average discharges exceeded 0 cfs 85% of the days and 1000 cfs 65% of the days.

FIGURES

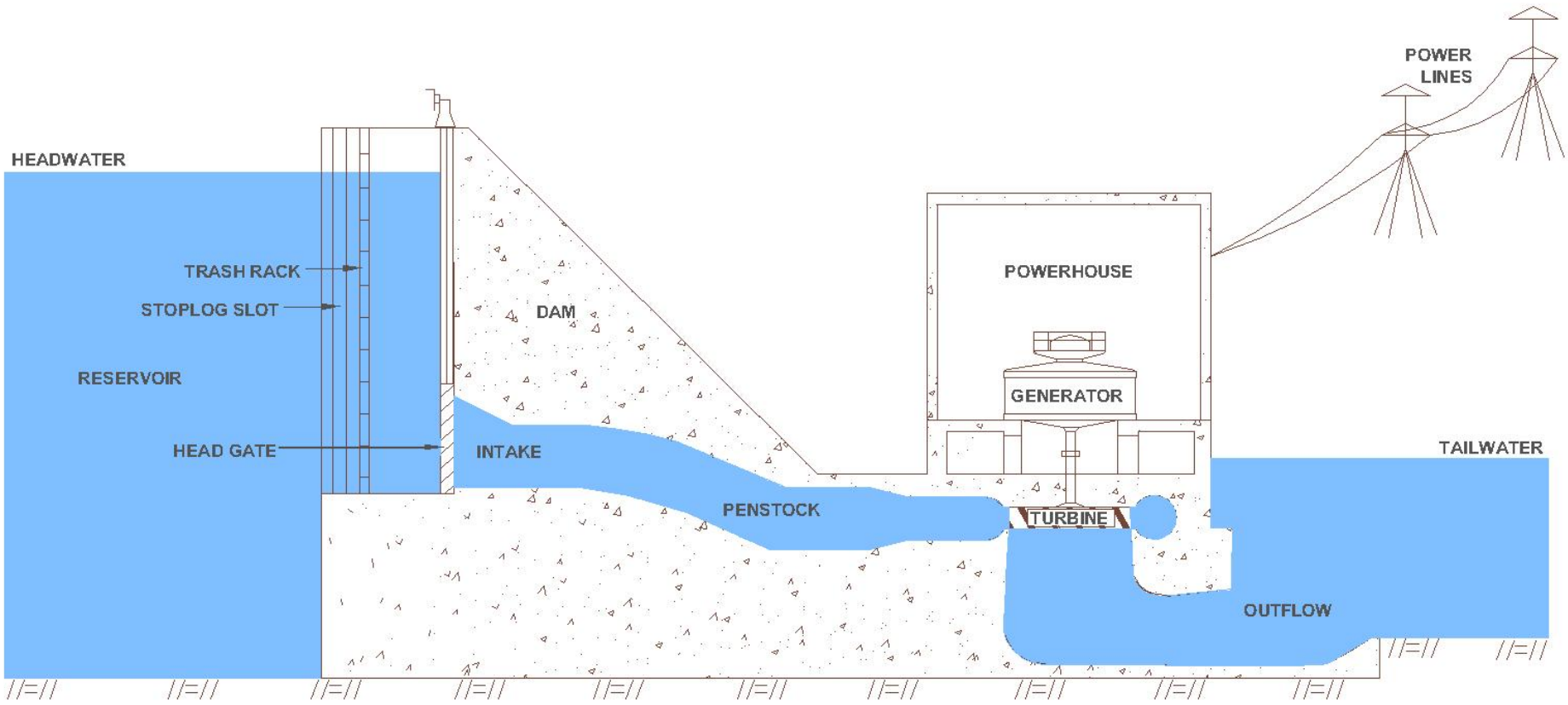

HEADWATER
TRASH RACK
STOPLOG SLOT
RESERVOIR
HEAD GATE
DAM
INTAKE
PENSTOCK
POWERHOUSE
GENERATOR
TURBINE
POWER
LINES
TAILWATER
OUTFLOW

FIGURE 1

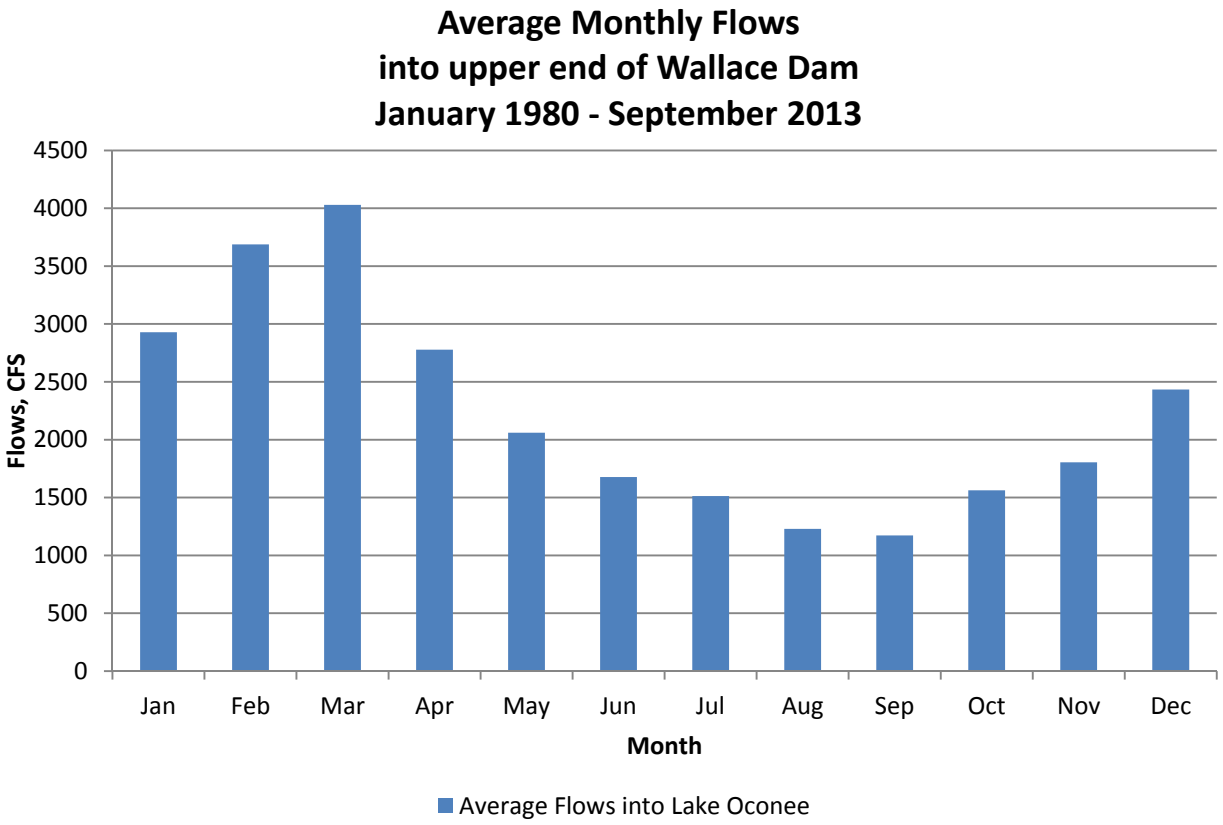

Average Monthly Flows
into upper end of Wallace Dam
January 1980 - September 2013
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Flows, CFS
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Average Flows into Lake Oconee

FIGURE 2

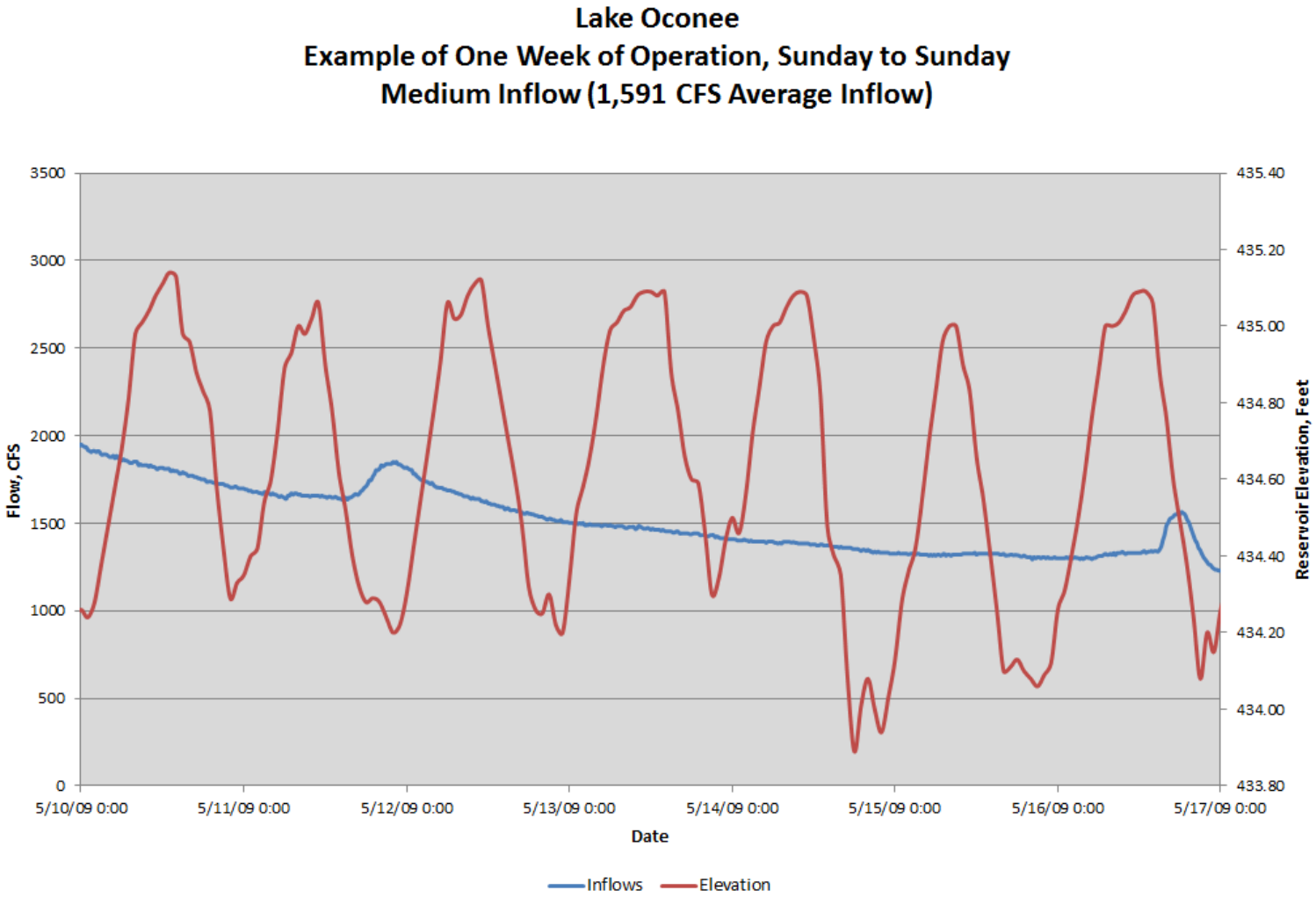

Lake Oconee
Example of One Week of Operation, Sunday to Sunday
Medium Inflow (1,591 CFS Average Inflow)
Flow, CFS
Reservoir Elevation, Feet
Date
3500
3000
2500
2000
1500
1000
500
0
435.40
435.20
435.00
434.80
434.60
434.40
434.20
434.00
433.80
5/10/09 0:00
5/11/09 0:00
5/12/09 0:00
5/13/09 0:00
5/14/09 0:00
5/15/09 0:00
5/16/09 0:00
5/17/09 0:00
Inflows
Elevation

FIGURE 3

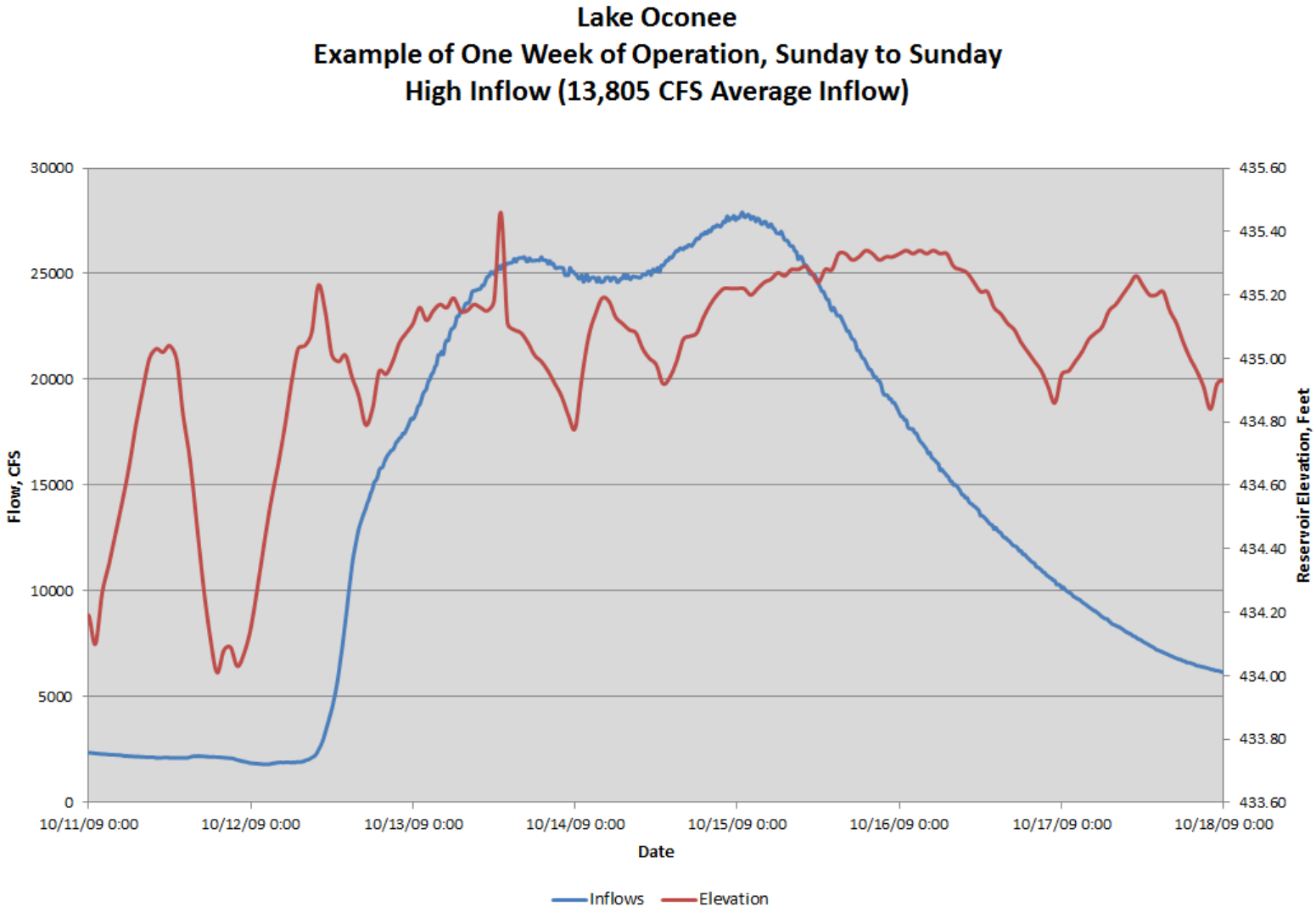

Lake Oconee
Example of One Week of Operation, Sunday to Sunday
High Inflow (13,805 CFS Average Inflow)
Flow, CFS
30000
25000
20000
15000
10000
5000
0
Reservoir Elevation, Feet
435.60
435.40
435.20
435.00
434.80
434.60
434.40
434.20
434.00
433.80
433.60
10/11/09 0:00
10/12/09 0:00
10/13/09 0:00
10/14/09 0:00
10/15/09 0:00
10/16/09 0:00
10/17/09 0:00
10/18/09 0:00
Date
Inflows
Elevation

FIGURE 4

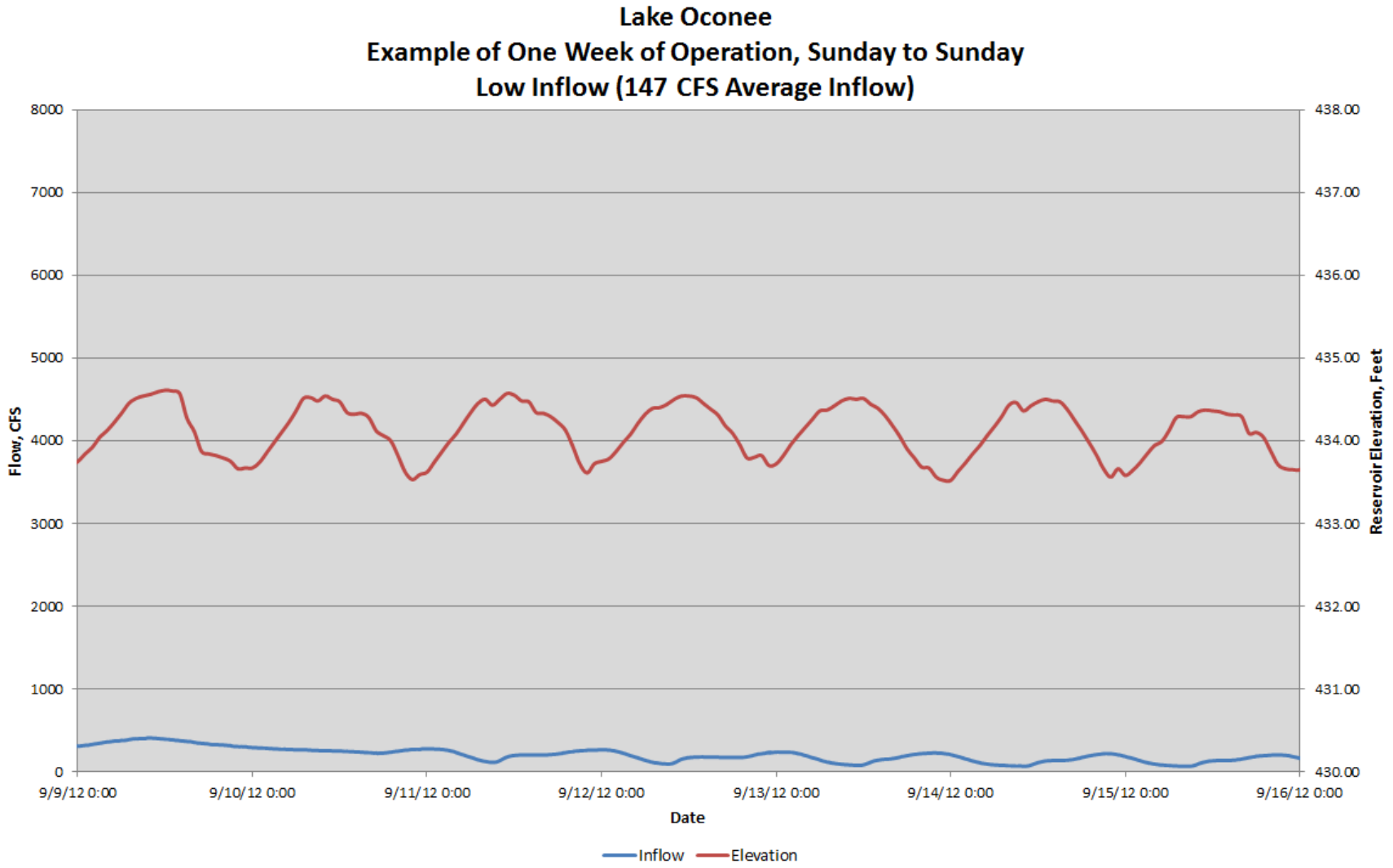

Lake Oconee
Example of One Week of Operation, Sunday to Sunday
Low Inflow (147 CFS Average Inflow)
Flow, CFS
Reservoir Elevation, Feet
8000
7000
6000
5000
4000
3000
2000
1000
0
438.00
437.00
436.00
435.00
434.00
433.00
432.00
431.00
430.00
9/9/12 0:00
9/10/12 0:00
9/11/12 0:00
9/12/12 0:00
9/13/12 0:00
9/14/12 0:00
9/15/12 0:00
9/16/12 0:00
Date
Inflow
Elevation

FIGURE 5

Lake Oconee (Wallace Dam)
Drawdown in Current and Recent Droughts

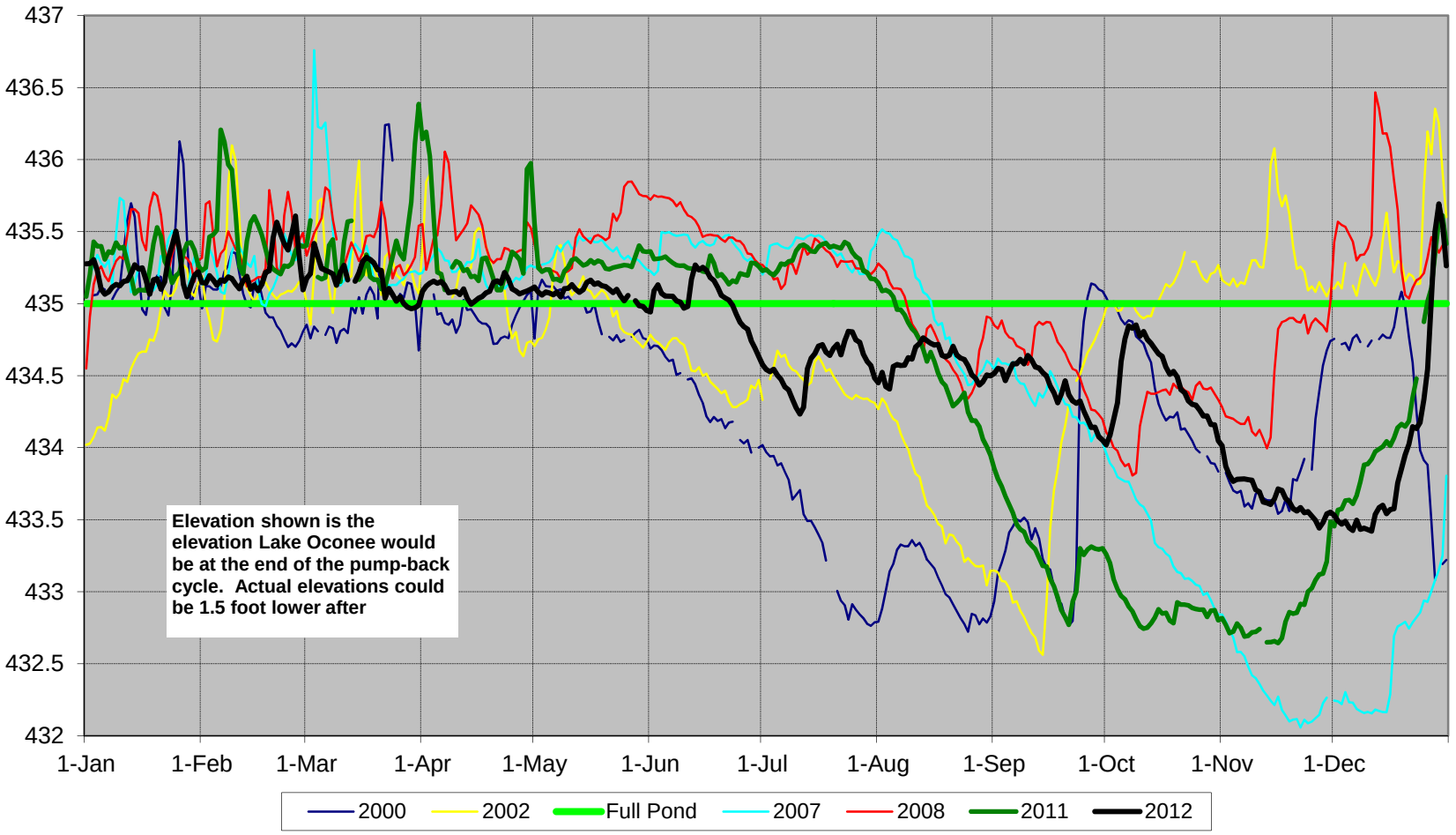


FIGURE 6

Lake Oconee
Daily Maximum and Minimum Elevations
1997

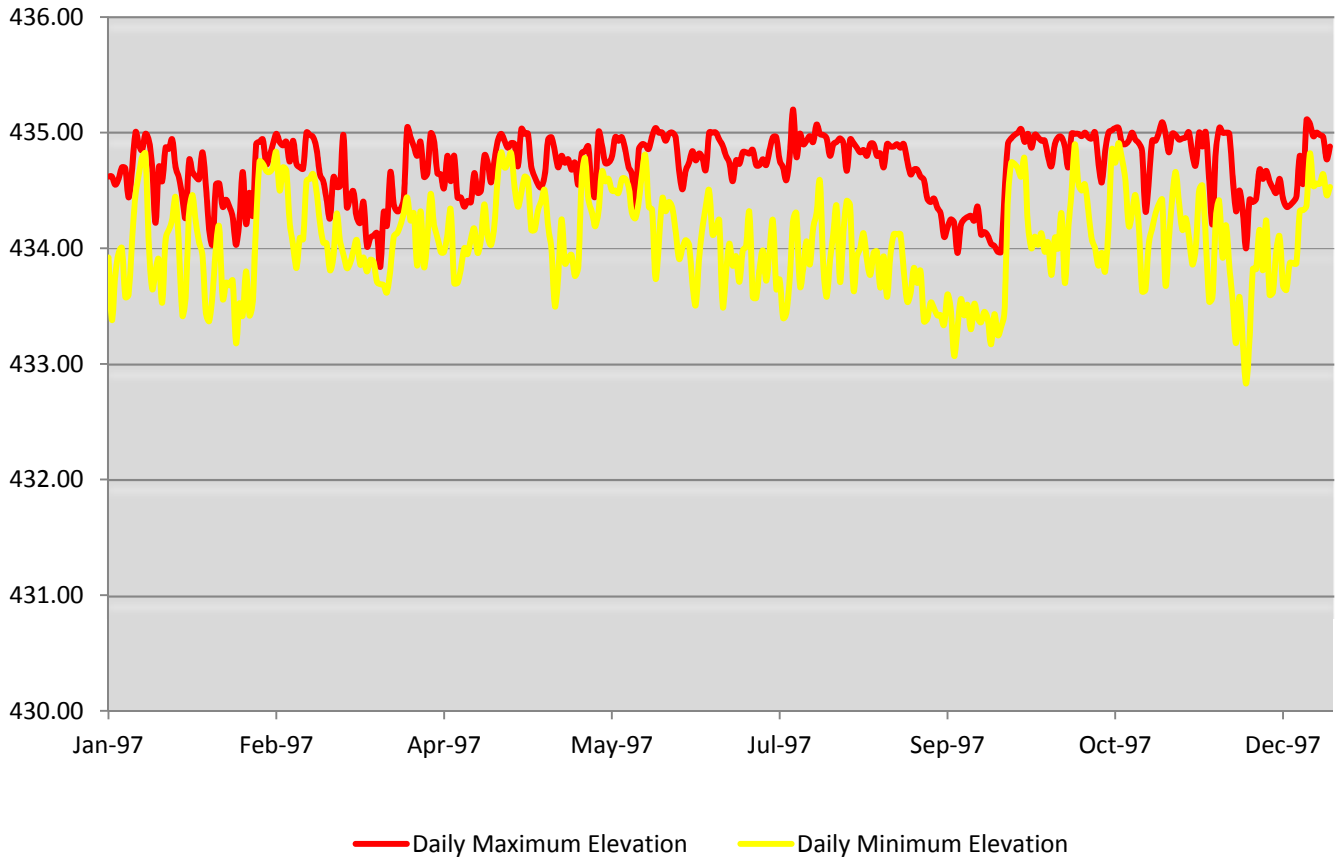


FIGURE 7

Lake Oconee
Daily Maximum and Minimum Elevations
1998

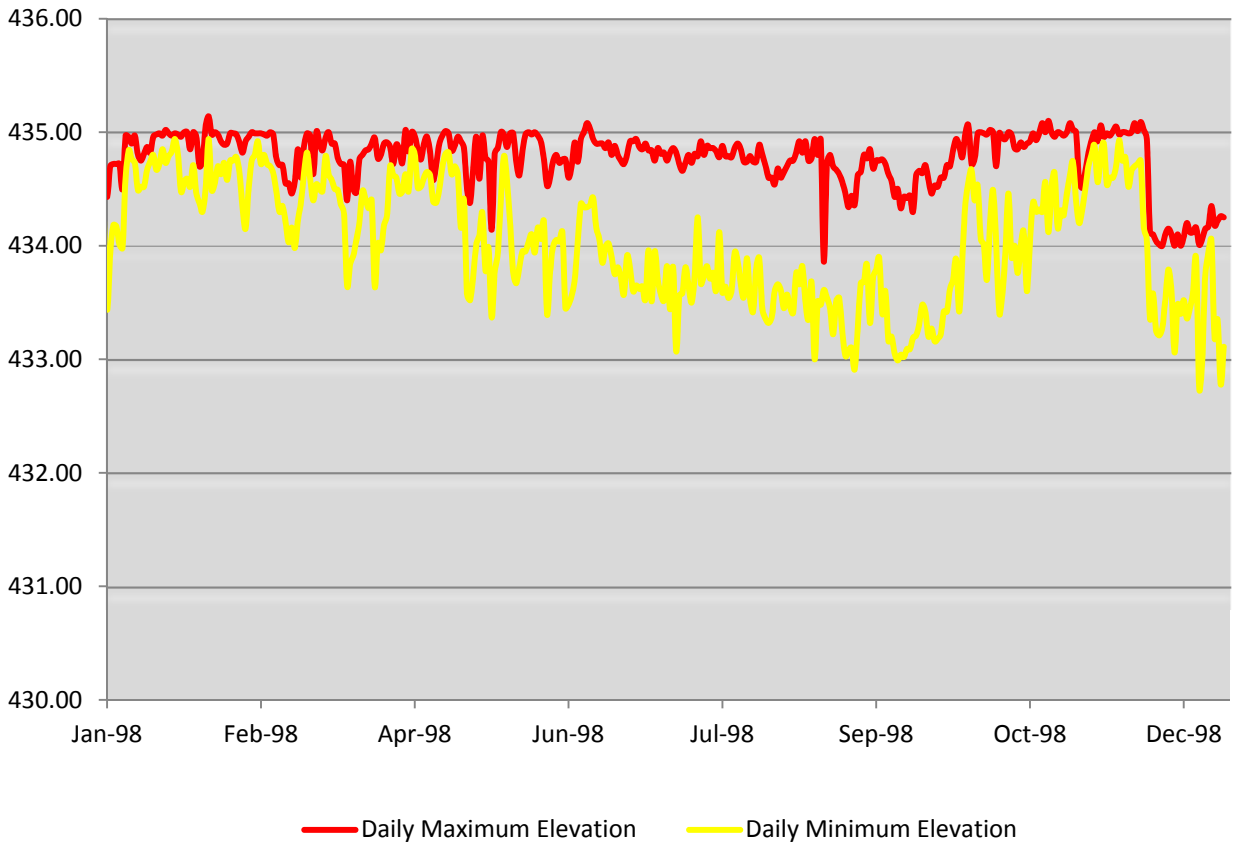


FIGURE 8

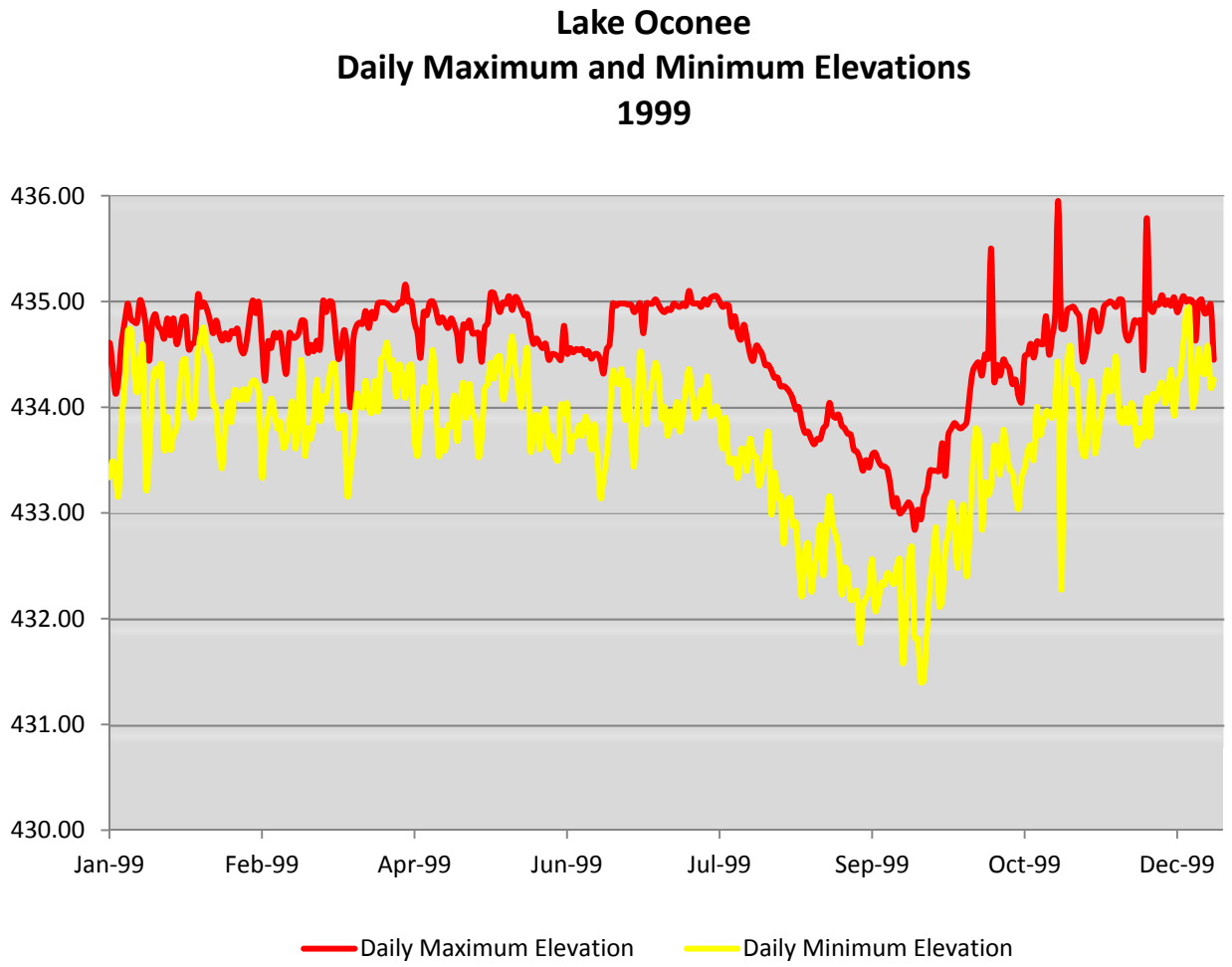

Lake Oconee
Daily Maximum and Minimum Elevations
1999
436.00
435.00
434.00
433.00
432.00
431.00
430.00
Jan-99
Feb-99
Apr-99
Jun-99
Jul-99
Sep-99
Oct-99
Dec-99
Daily Maximum Elevation
Daily Minimum Elevation

FIGURE 9

Lake Oconee
Daily Maximum and Minimum Elevations
2000

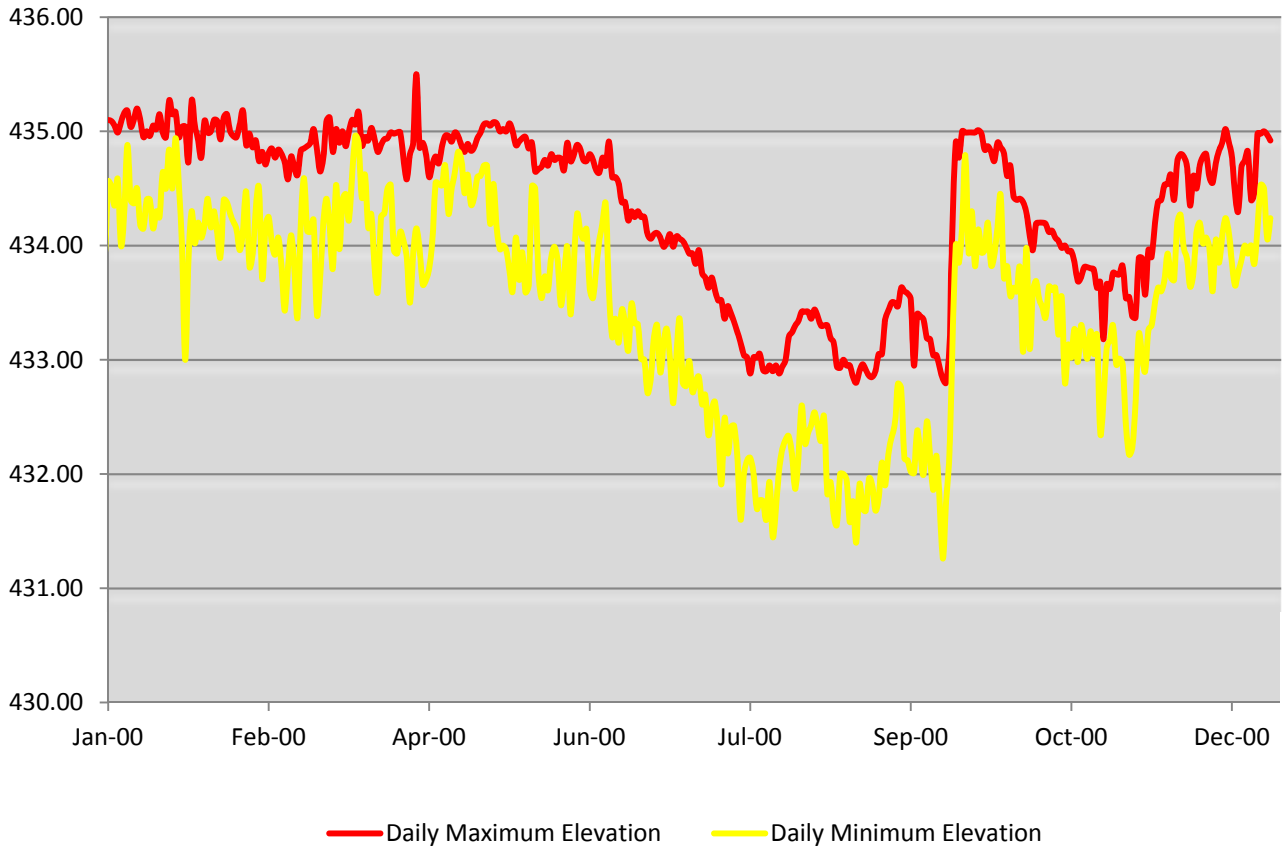


FIGURE 10

Lake Oconee
Daily Maximum and Minimum Elevations
2001

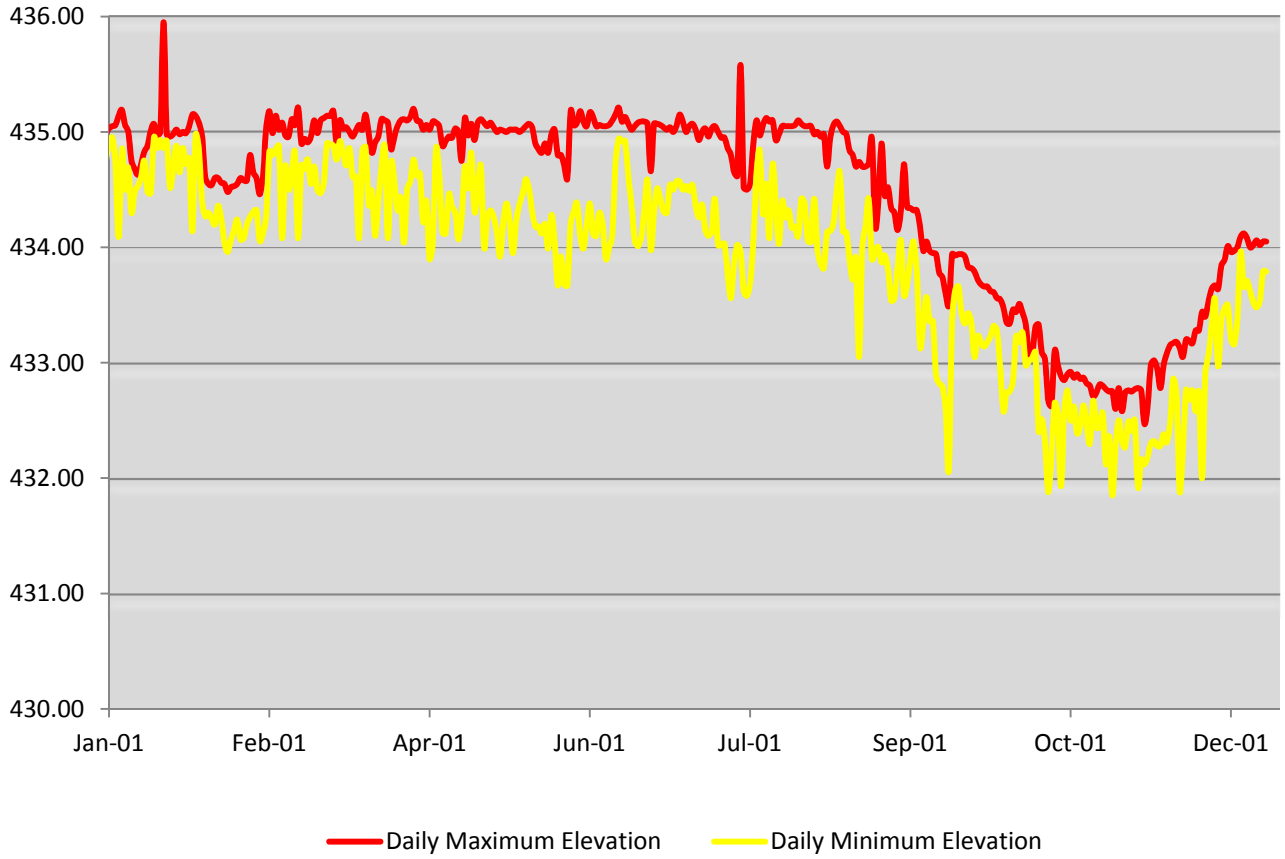


FIGURE 11

Lake Oconee
Daily Maximum and Minimum Elevations
2002

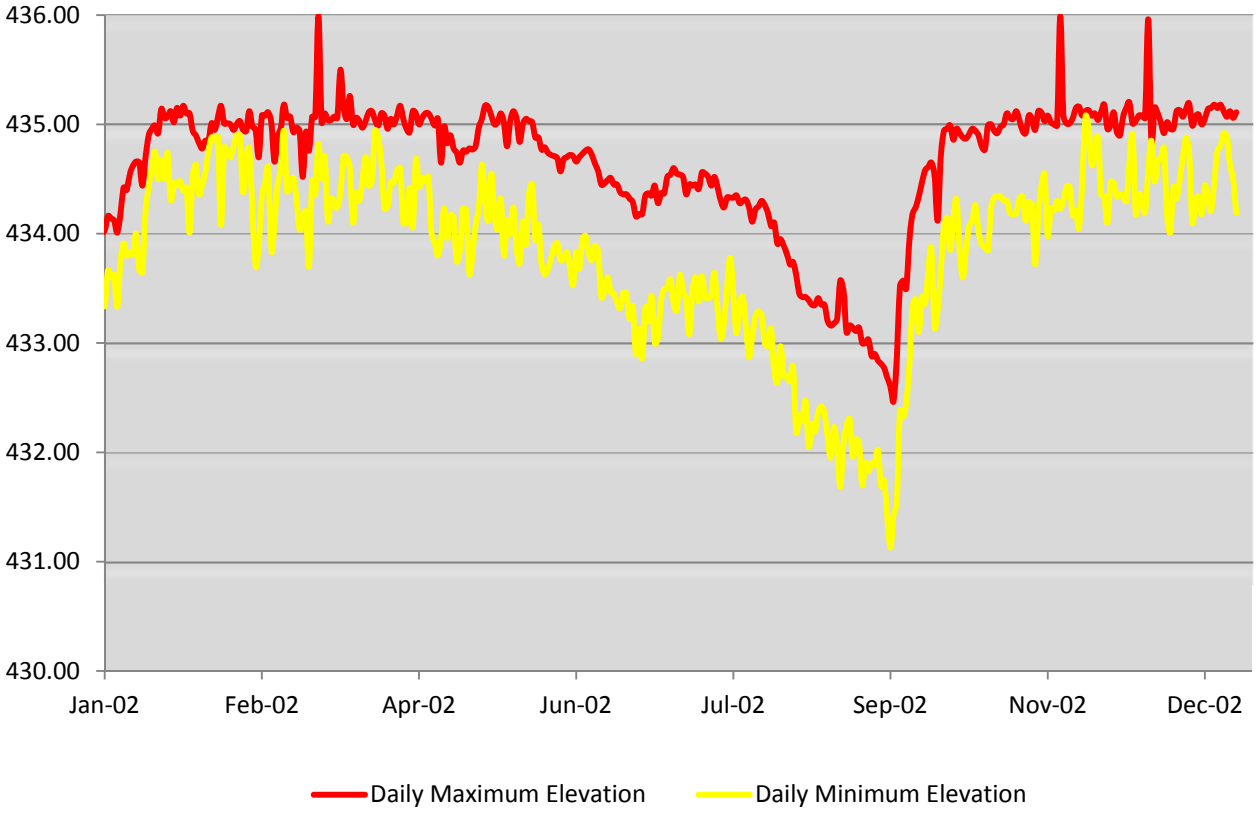


FIGURE 12

Lake Oconee
Daily Maximum and Minimum Elevations
2003

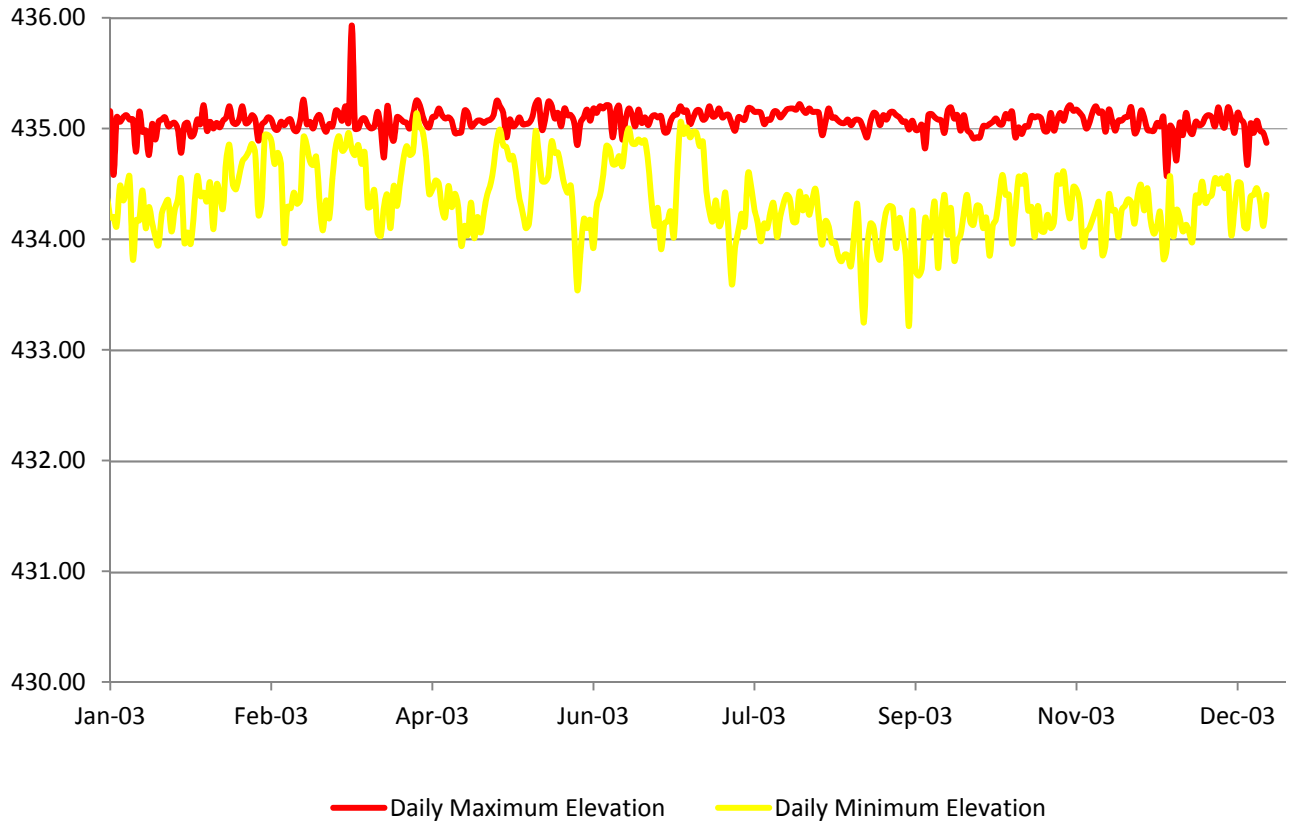


FIGURE 13

Lake Oconee
Daily Maximum and Minimum Elevations
2004

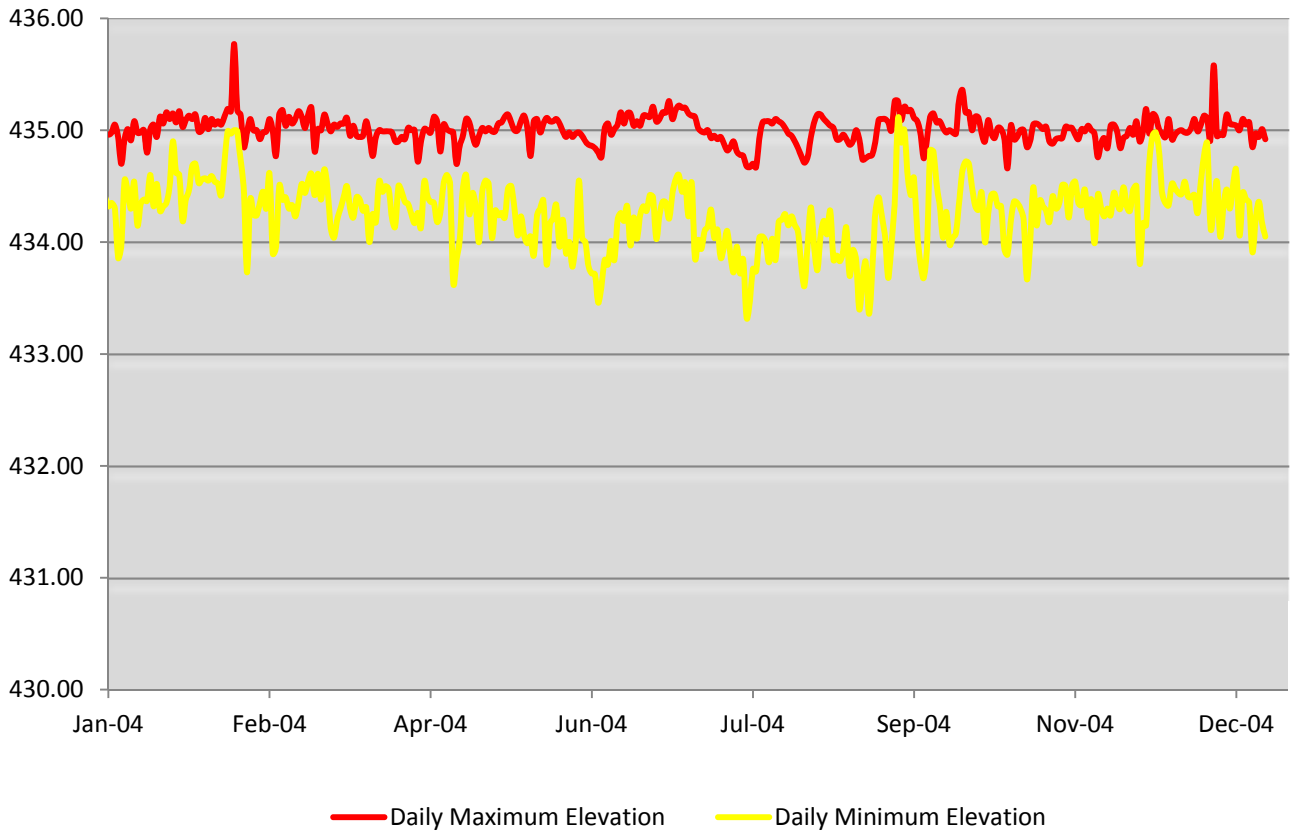


FIGURE 14

Lake Oconee
Daily Maximum and Minimum Elevations
2005

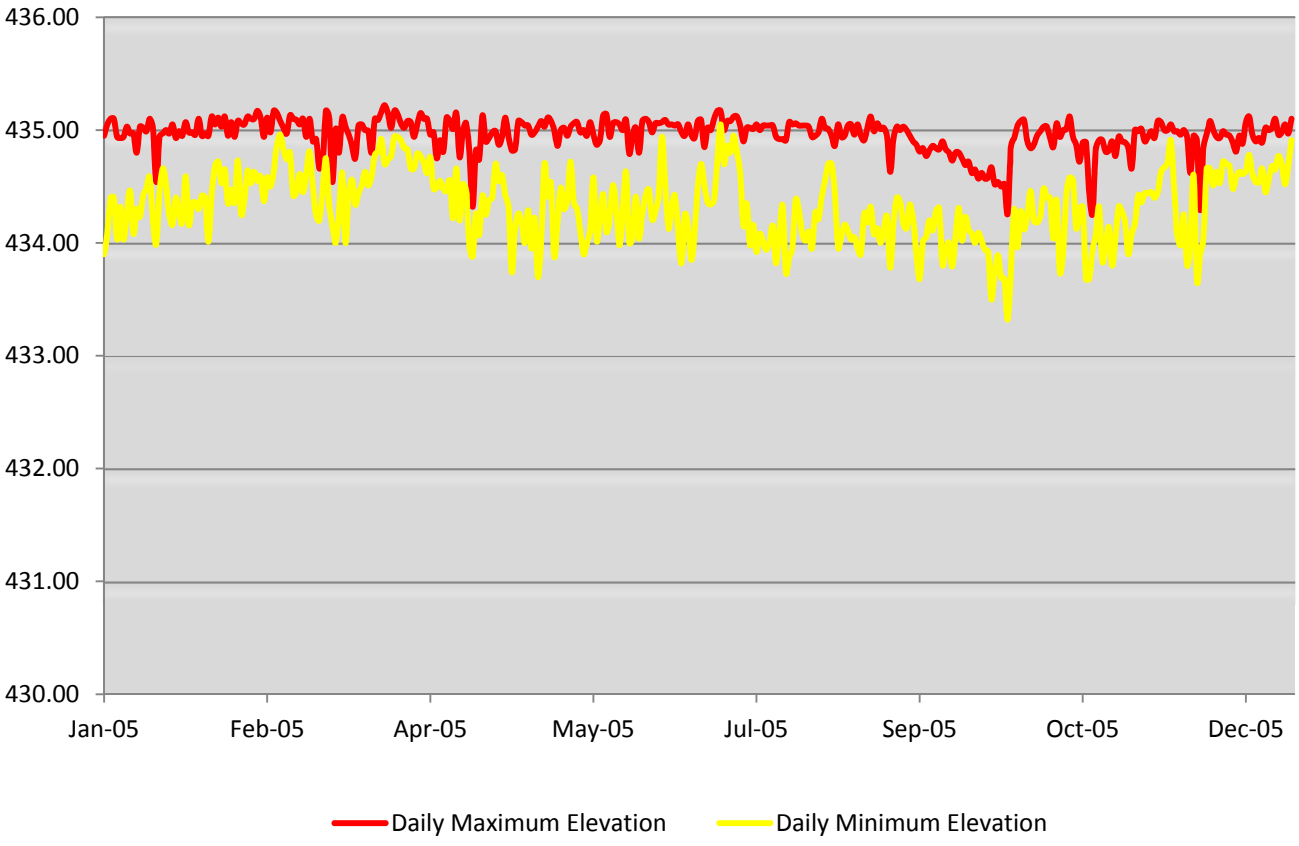


FIGURE 15

Lake Oconee
Daily Maximum and Minimum Elevations
2006

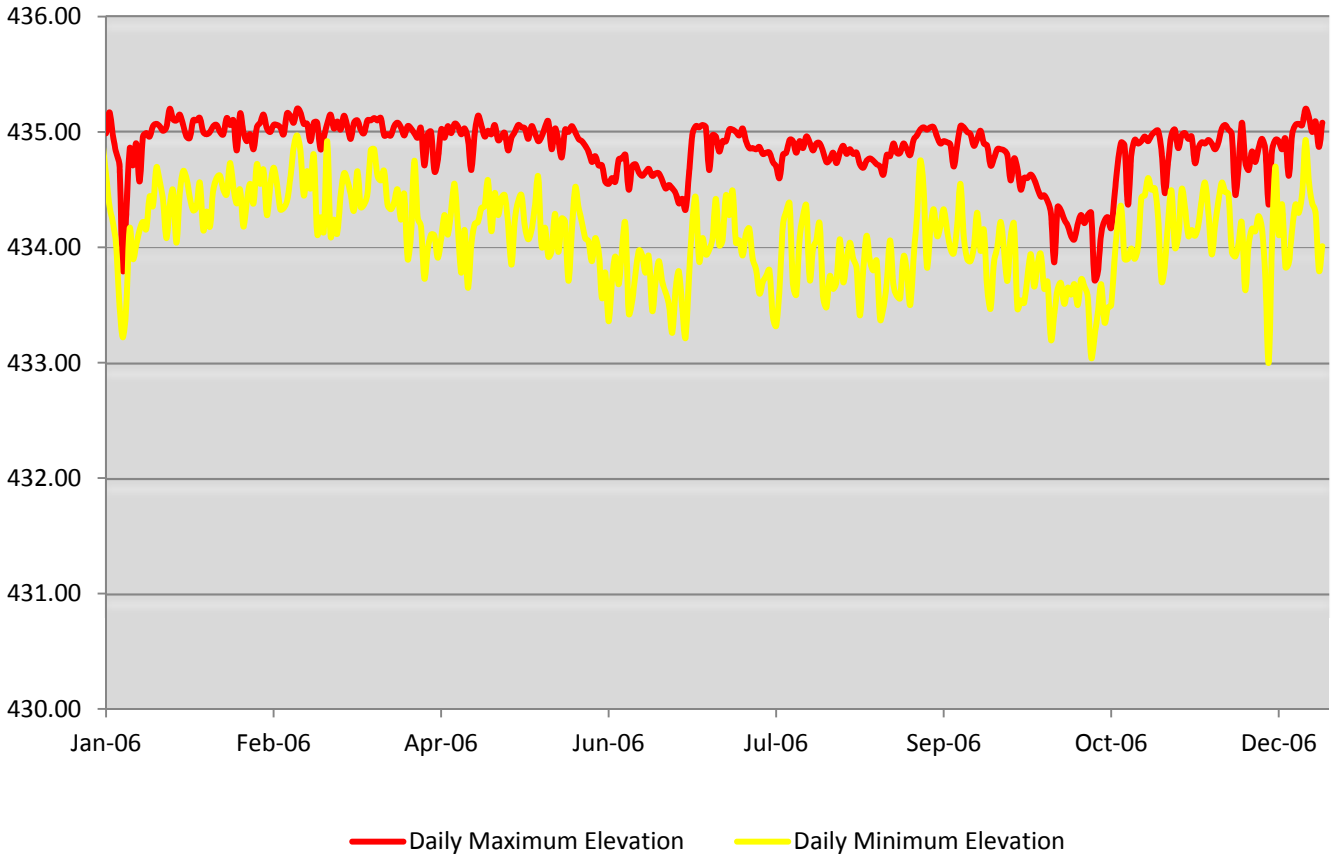


FIGURE 16

Lake Oconee
Daily Maximum and Minimum Elevations
2007

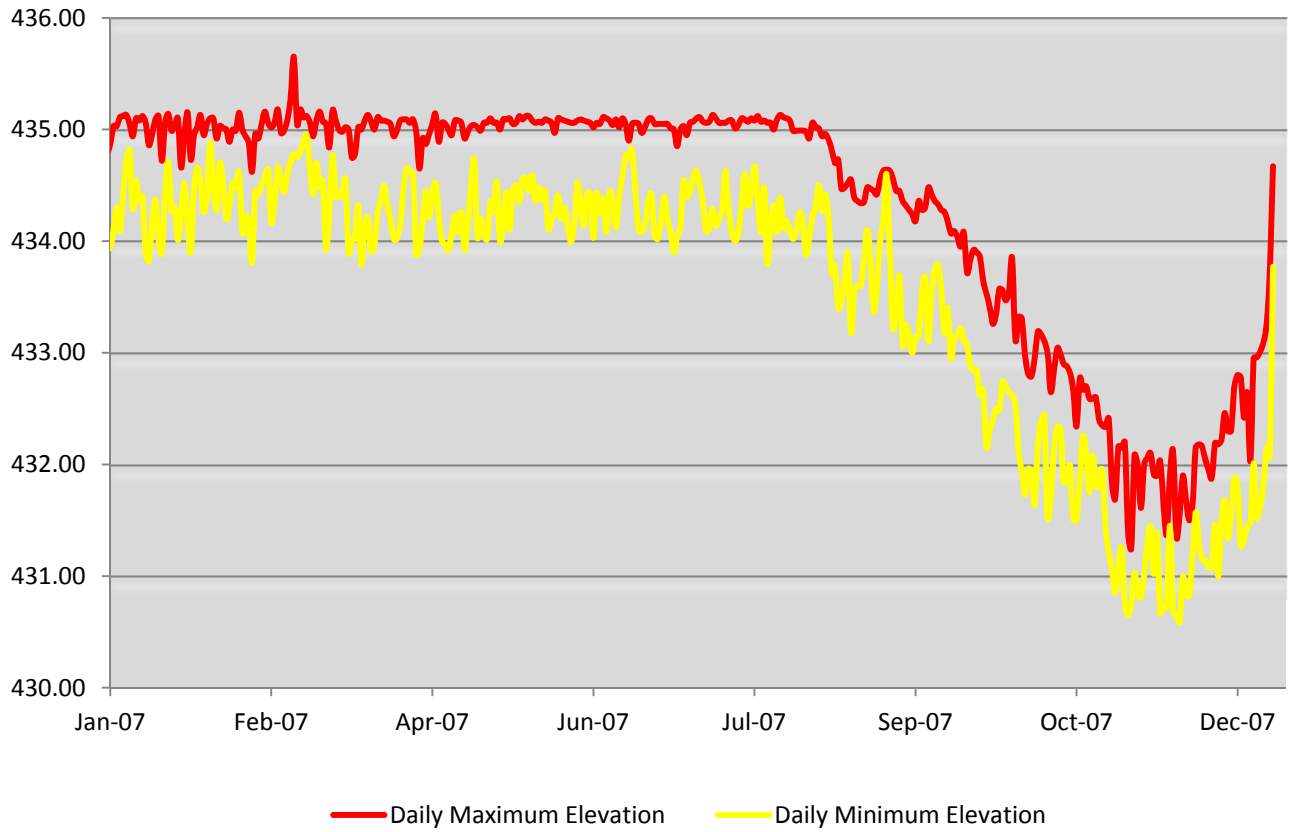


FIGURE 17

Lake Oconee
Daily Maximum and Minimum Elevations
2008

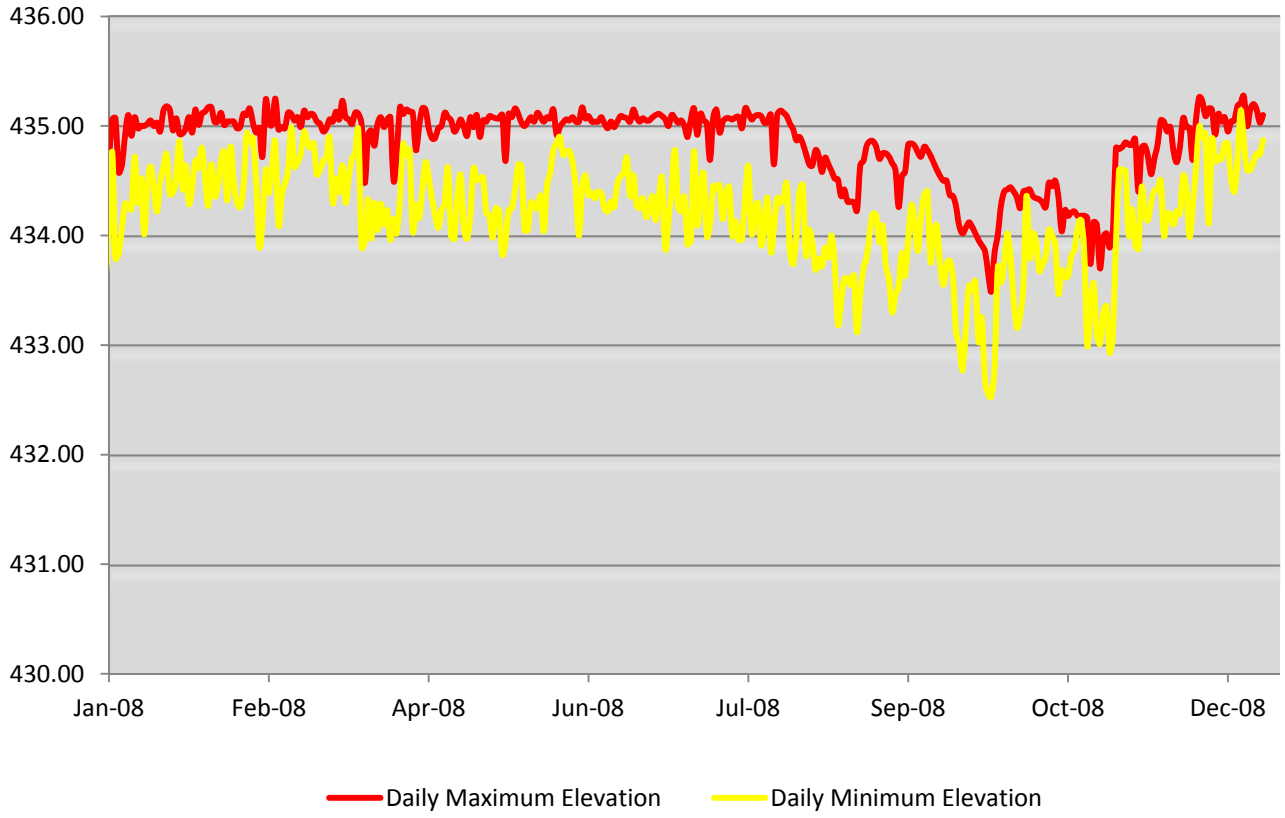


FIGURE 18

Lake Oconee
Daily Maximum and Minimum Elevations
2009

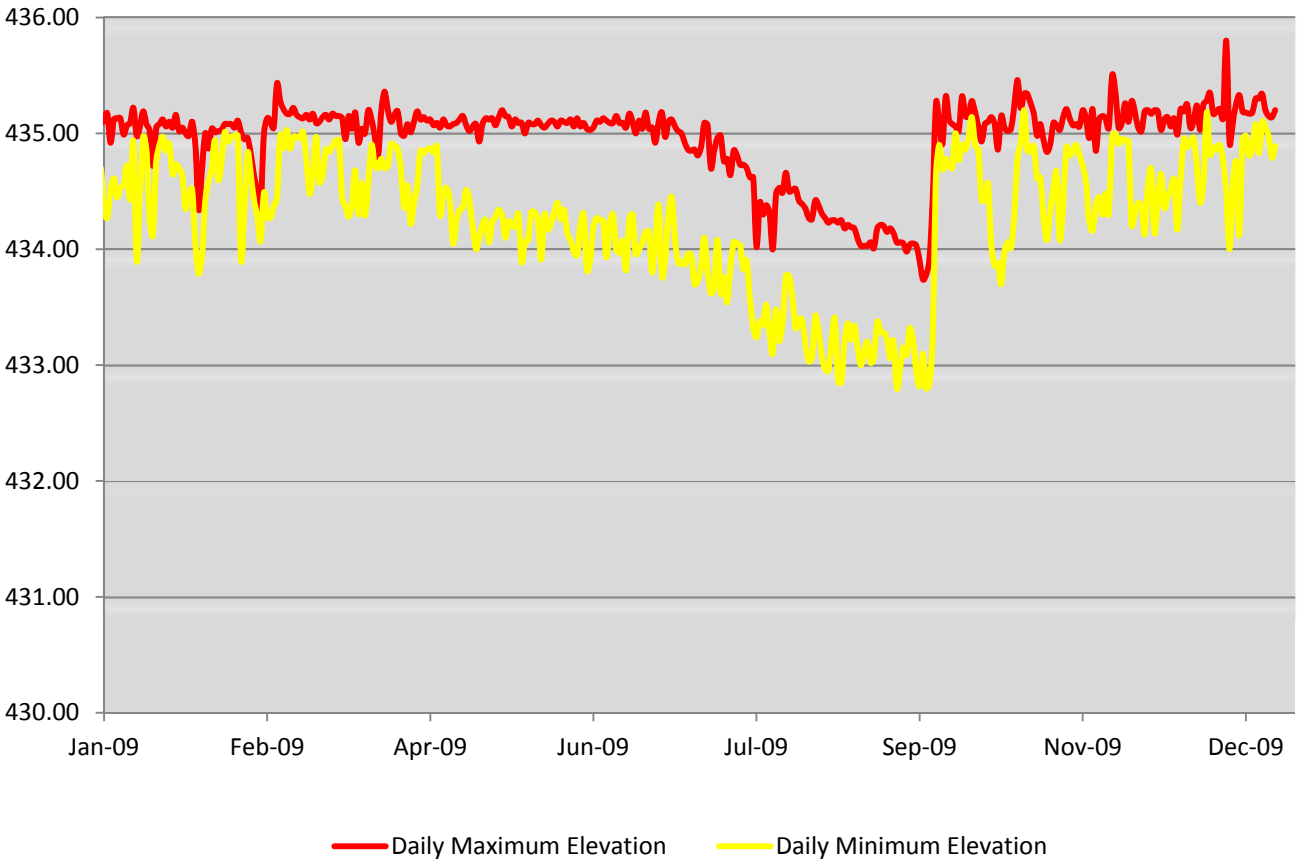


FIGURE 19

Lake Oconee
Daily Maximum and Minimum Elevations
2010

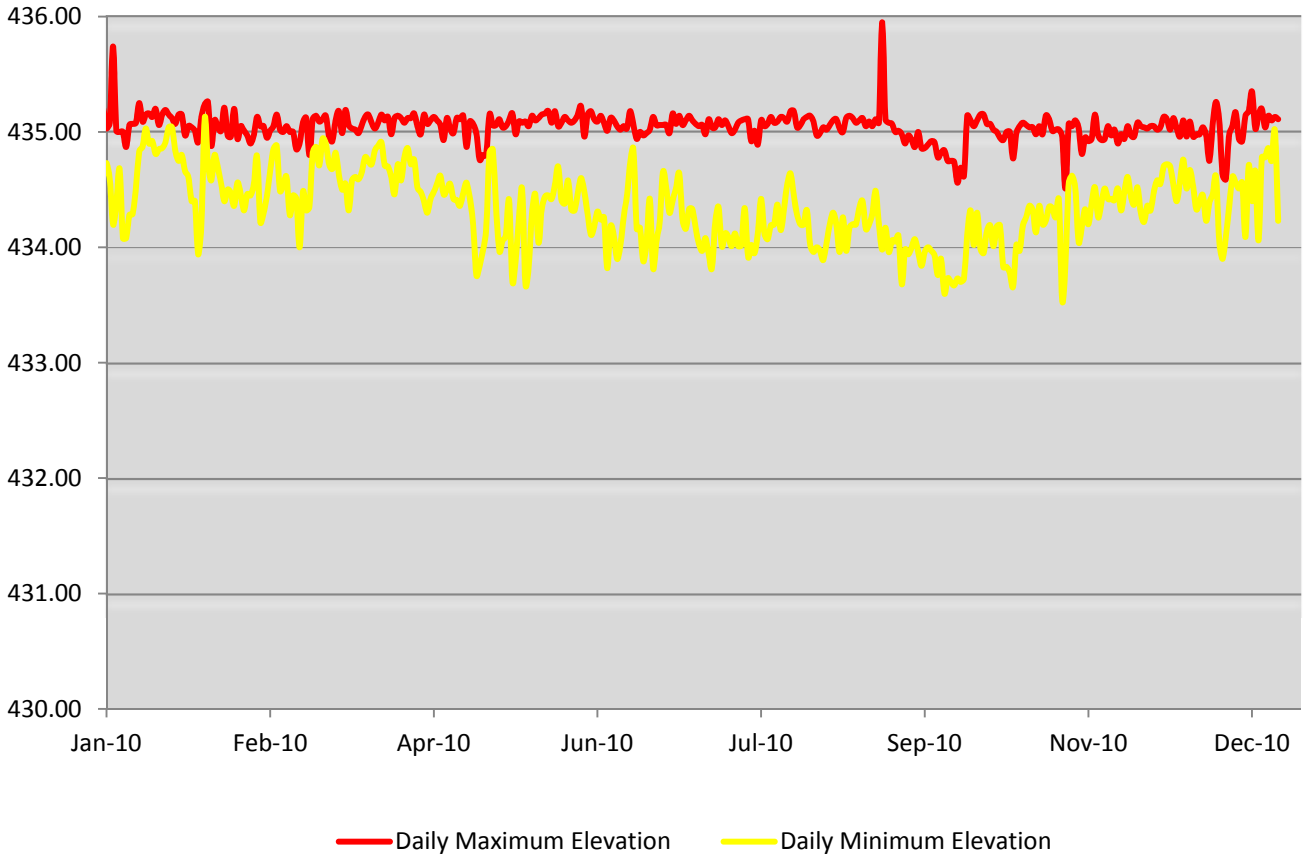


FIGURE 20

Lake Oconee
Daily Maximum and Minimum Elevations
2011

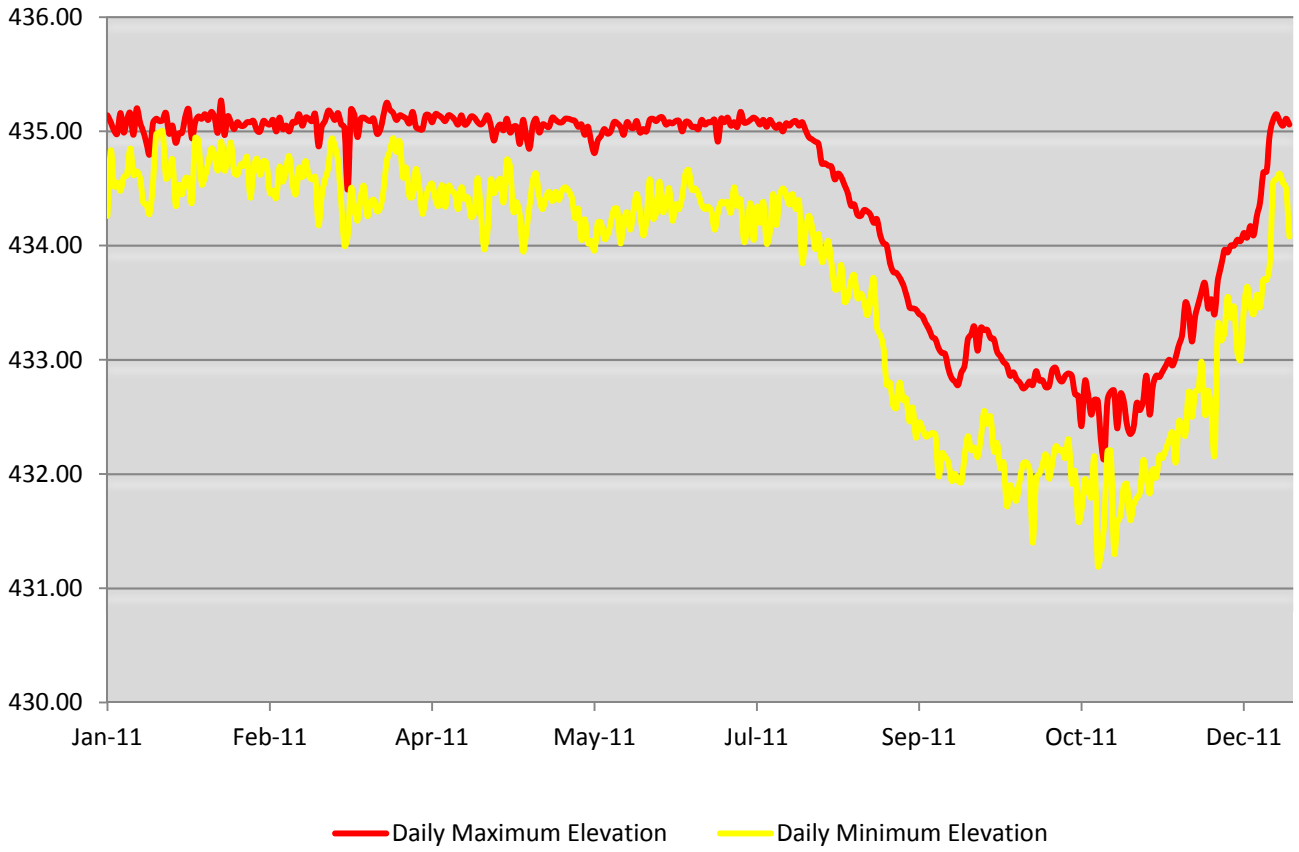


FIGURE 21

Lake Oconee
Daily Maximum and Minimum Elevations
2012

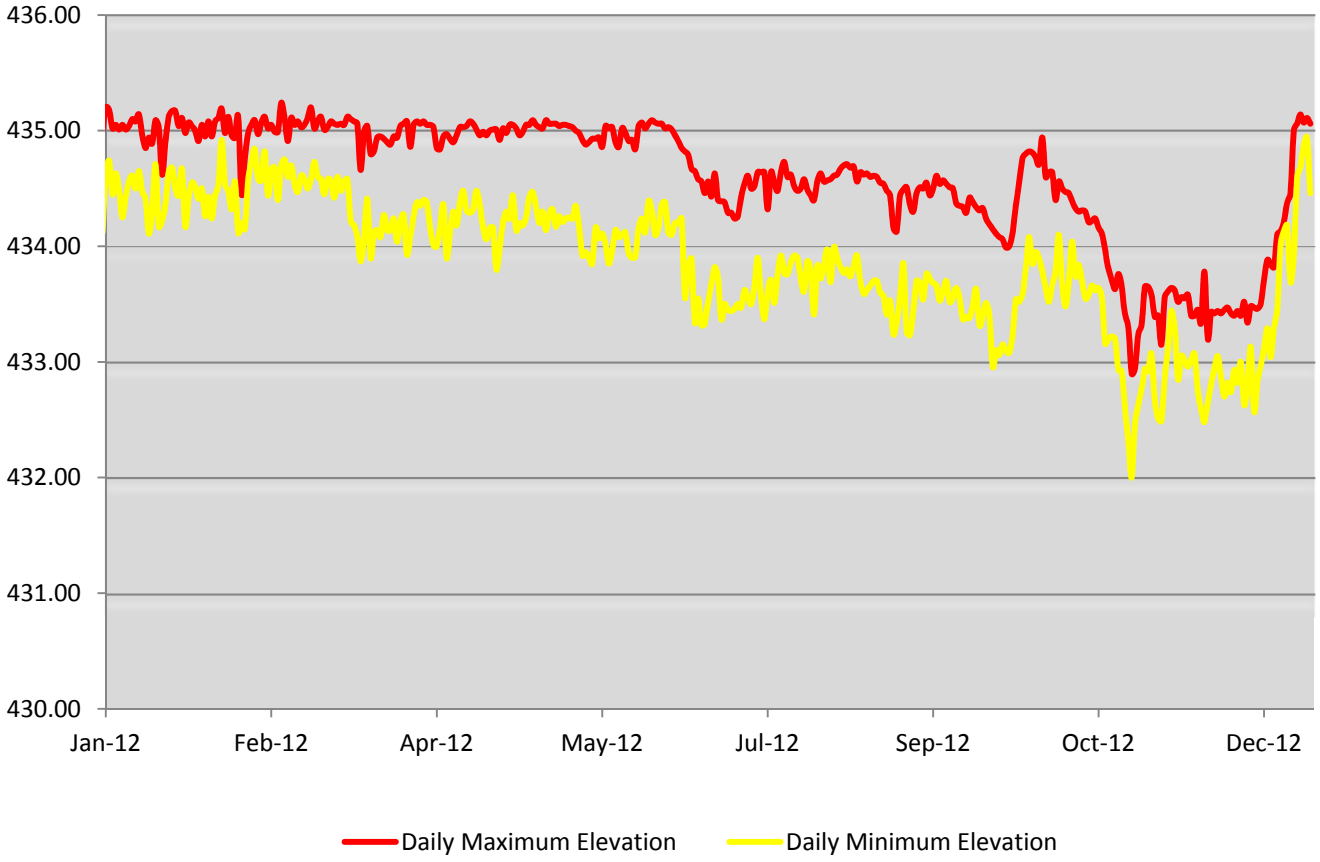


FIGURE 22

Lake Oconee
Daily Maximum and Minimum Elevations
2013

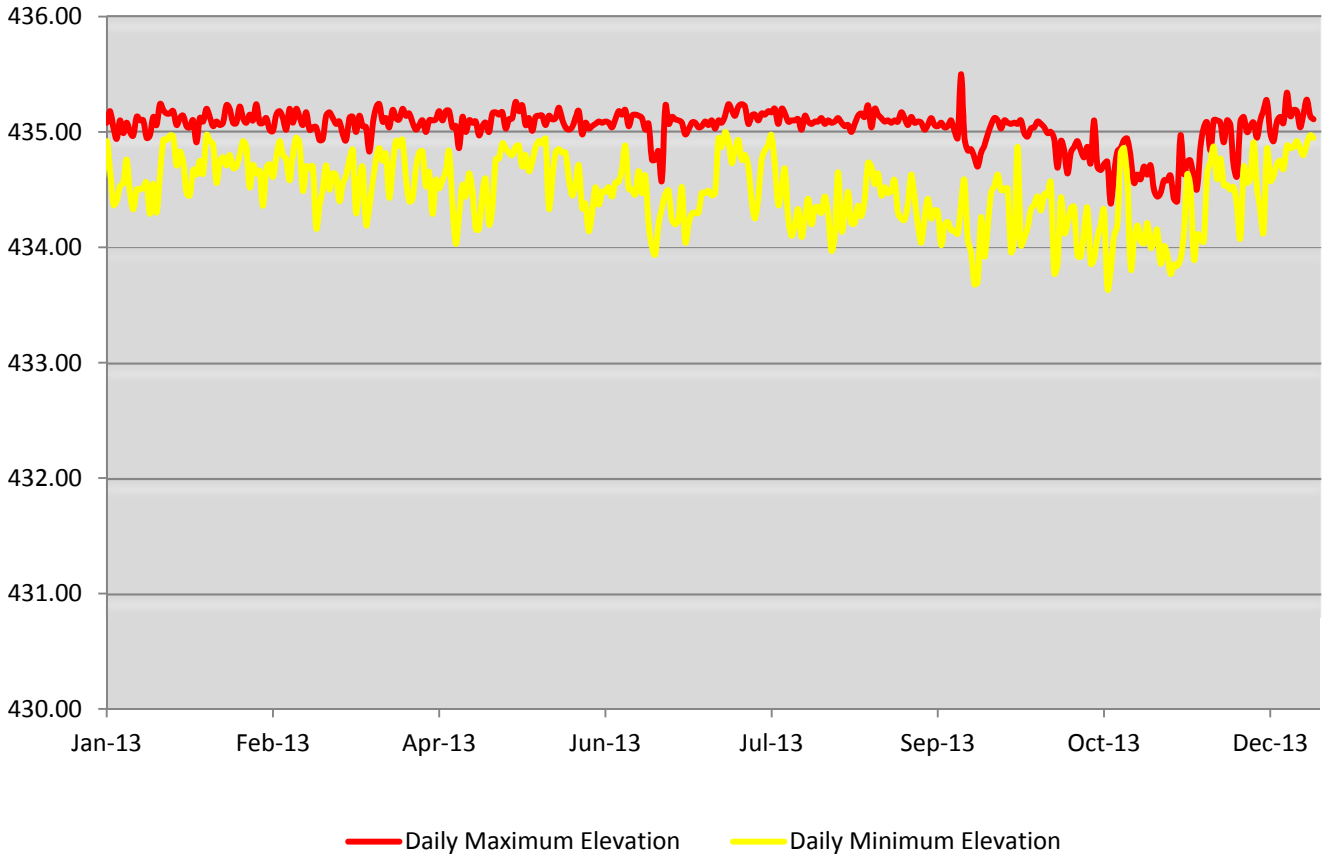


FIGURE 23

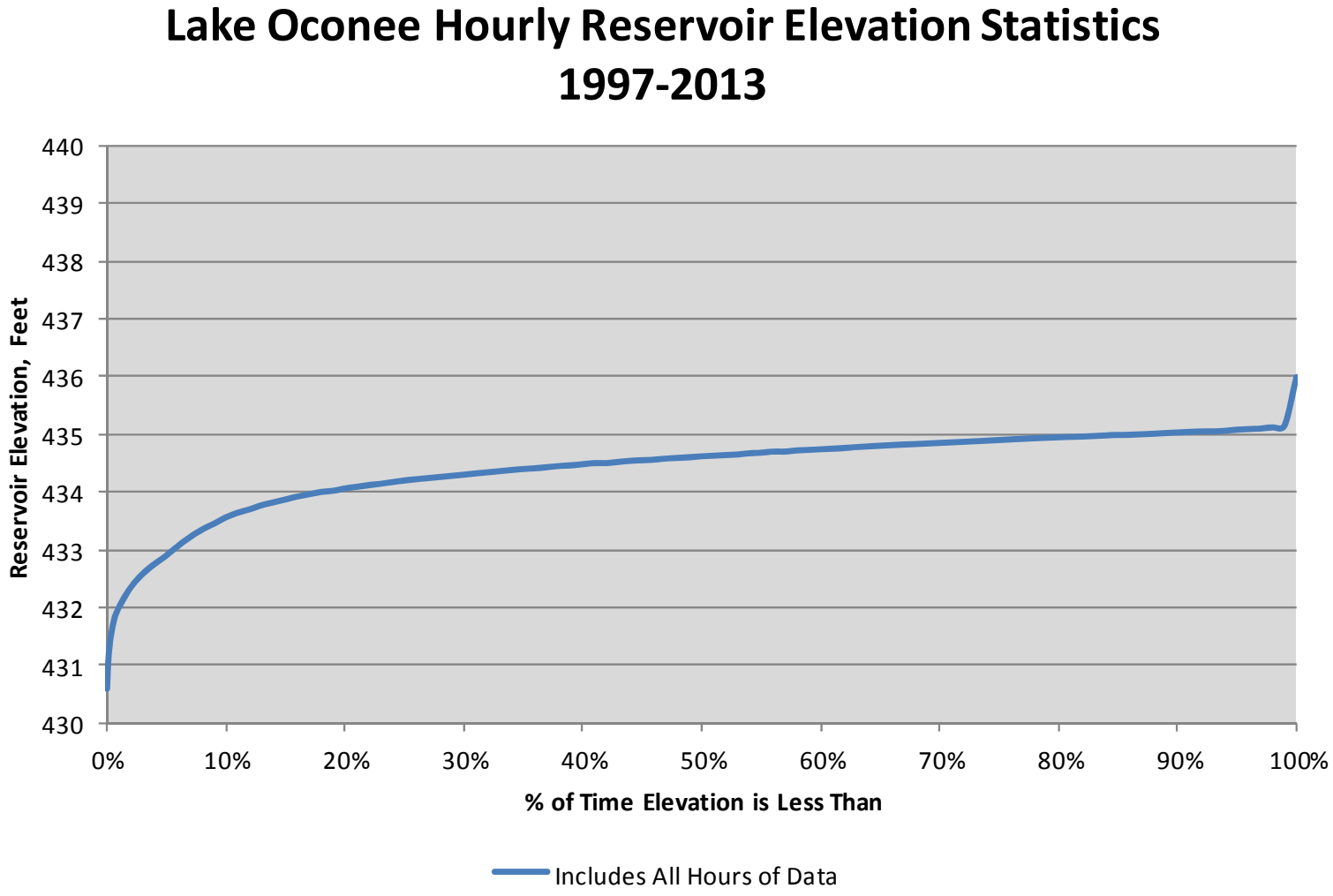

Lake Oconee Hourly Reservoir Elevation Statistics
1997-2013
Reservoir Elevation, Feet
440
439
438
437
436
435
434
433
432
431
430
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% of Time Elevation is Less Than
Includes All Hours of Data

FIGURE 24

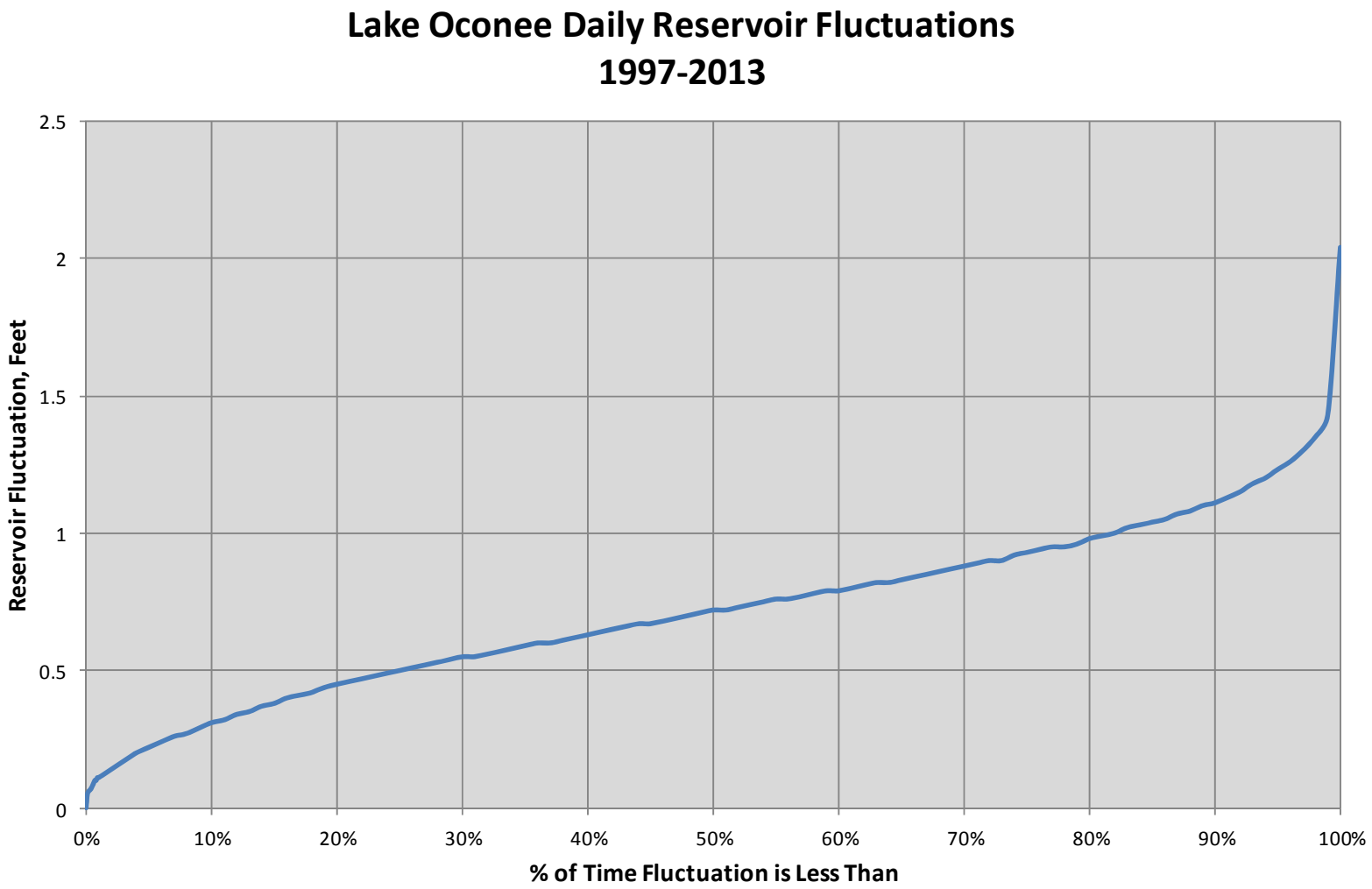

Lake Oconee Daily Reservoir Fluctuations
1997-2013
Reservoir Fluctuation, Feet
2.5
2
1.5
1
0.5
0
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% of Time Fluctuation is Less Than

FIGURE 25

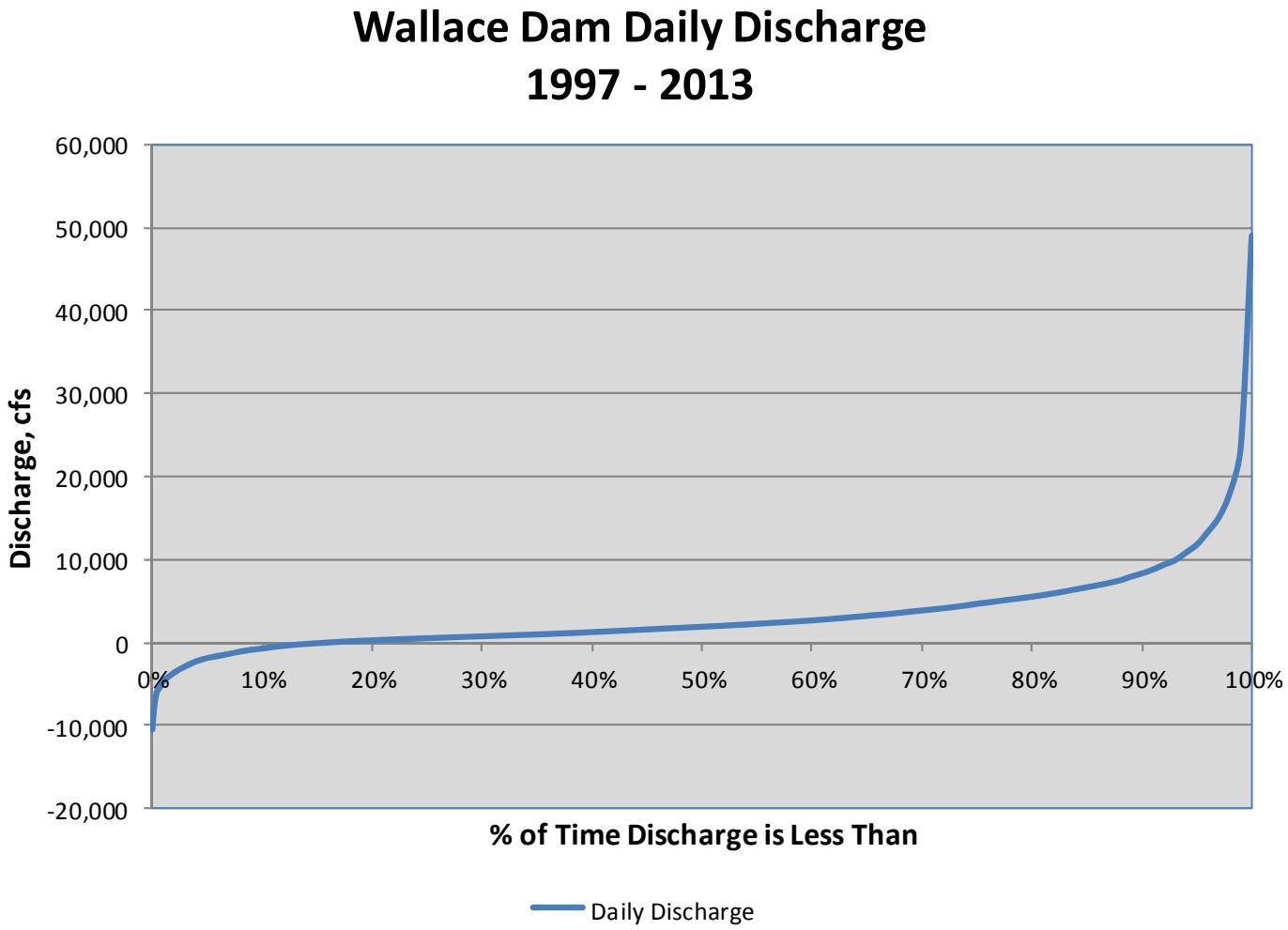

Wallace Dam Daily Discharge
1997 - 2013
60,000
50,000
40,000
30,000
20,000
10,000
0
-10,000
-20,000
Discharge, cfs
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% of Time Discharge is Less Than
Daily Discharge

FIGURE 26

APPENDIX E

Current License Requirements

Wallace Dam
FERC Project Number P-2413
Current License Articles

Article 1: The entire project, as described in the order of the Commission, shall be subject to all the provisions, terms, and conditions of the license.

Article 2: No substantial change shall be made in the maps, plans, specifications, and statements described and designated as exhibits and approved by the Commission in its order as a part of the license until such change shall have been approved by the Commission: Provided however: That if the licensee or the Commission deems it necessary or desirable that said approved exhibits, or any of them, be changed, there shall be submitted to the Commission for approval amended, supplemental, or additional exhibit or exhibits covering the proposed changes which, upon approval by the Commission, shall become a part of the license and shall supersede, in whole or in part, such exhibit or exhibits theretofore made a part of the license as may be specified by the Commission.

Article 3: Said project works shall be constructed in substantial conformity with the approved exhibits referred to in Article 2 herein or as changed in accordance with the provisions of said article. Except when emergency shall require for the protection of navigation, life, health, or property, no substantial alteration or addition not in conformity with the approved plans shall be made to any dam or other project works under the license without the prior approval of the Commission; and any emergency alteration or addition so made shall thereafter be subject to such modification and change as the Commission may direct. Minor changes in the project works or divergence for such approved exhibits may be made if such changes will not result in decrease in efficiency, in material increase in cost, or in impairment of the general scheme of development; but any of such minor changes made without the prior approval of the Commission, which in its judgment have produced or will produce any of such results, shall be subject to such alteration as the Commission may direct. Upon the completion of the project, or at such other time as the Commission may direct, the licensee shall submit to the Commission for approval revised maps, plans, specifications, and statements insofar as necessary to show any divergence from or variations in the project area and project boundary as finally located or in the project works as actually constructed when compared with the area and boundary shown and the works described in the license or in the maps, plans, specifications, and statements approved by the Commission, together with a statement in writing setting forth the reasons which in the opinion of the licensee necessitated or justified variations in or divergence from the approved maps, plans, specifications, and statements. Such revised maps, plans, specifications, and statements shall if and when approved by the Commission, be made a part of the license under the provisions of Article 2 hereof.

Article 4: The construction, operation, and maintenance of the project and any work incident to additions or alterations shall be subject to the inspection and supervision of the Regional Engineer, Federal Power Commission, in the region wherein the project is located, or of such other officer or agent as the Commission may designate, who shall be the authorized representative of the Commission for such purposes. The licensee shall cooperate fully with said representative and shall furnish him a detailed program of inspection by the licensee that will provide for an adequate and qualified inspection force for construction of the project. Construction of the project works or any feature thereof shall not be initiated until the program of inspection for the project works or any such feature thereof has been approved by said representative. The licensee shall also furnish to

said representative such further information as he may require concerning the construction, operation, and maintenance of the project, and of any alteration thereof, and shall notify him of the date upon which work will begin, as far in advance thereof as said representative may reasonable specify, and shall notify him promptly in writing of any suspension of work for a period of more than one week, and of its resumption and completion. The licensee shall allow him and other officers or employees of the United States, showing proper credentials, free and unrestricted access to, through, and across the project lands and project works in the performance of their official duties. The licensee shall comply with such rules and regulations of general or special applicability as the Commission may from time to time prescribe for the protection of life, health, and property.

Article 5: In the absence of specific Commission exemption, the licensee by December 1, 1978 shall acquire title in fee or the right to use in perpetuity all lands, other than lands of the United States, necessary or appropriate for the construction, maintenance and operation of the project. The licensee, its successors and assigns shall, during the period of the license, retain the possession of all project property covered by the license as issued or as later amended, including the project area, the project works, and all franchises, easements, water rights, and rights of occupancy and use; and none of such properties shall be voluntarily sold, leased, transferred, abandoned, or otherwise disposed of without the prior written approval of the Commission, except that the licensee may lease or otherwise dispose of interests in project lands or property without specific written approval of the Commission pursuant to the then current regulations of the Commission. The provisions of this article are not intended to prevent the abandonment or the retirement from service of structures, equipment, or other project works in connection with replacements thereof when they become obsolete, inadequate, or inefficient for further service due to wear and tear; and mortgage or trust deed or judicial sales made thereunder, or tax sales, shall not be deemed voluntary transfers within the meaning of this article.

Article 6: In the event the project is taken over by the United States upon the termination of the license, as provided in Section 14 of the Act, or is transferred to a new licensee under the provisions of Section 15 of the Act, the licensee, its successors and assigns will be responsible for and will make good any defect of title to or of right of occupancy and use in any of such project property which is necessary or appropriate or valuable and serviceable in the maintenance and operation of the project, and will pay and discharge, or will assume responsibility for payment and discharge, of all liens or encumbrances upon the project or project property created by the licensee or created or incurred after the issuance of the license: Provided, that the provisions of this article are not intended to require the licensee, for the purpose of transferring the project to the United States or to a new licensee, to acquire any different title to or right of occupancy and use in any of such project property than was necessary to acquire for its own purposes as licensee.

Article 7: The actua1 legitimate original cost of the original project, and of any addition thereto or betterment thereof, shall be determined by the Commission in accordance with the Act and the Commission's rules and regulations thereunder.

Article 8: After the first 20 years of operation of the project under the license, six percent per annum shall be the specified rate of return on the net investment in the project for determining surplus earnings of the project for the establishment and maintenance of amortization reserves, pursuant to Section 10 (d) of the Act; one-half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of six percent per annum on the net

investment, shall be set aside in a project amortization reserve account as of the end of each fiscal year: Provided, that, if and to the extent that there is a deficiency of project earnings below six percent per annum for any fiscal year or years after the first 20 years of operation under the license, the amount of such deficiency shall be deducted from the amount of any surplus earnings accumulated thereafter until absorbed, and one-half of the remaining surplus earnings, if any thus cumulatively computed, shall be set aside in the project amortization reserve account; and the amounts thus established in the project amortization reserve account shall be maintained therein until further order of the Commission. This article is effective through July 19, 1976.

Article 9: For the purpose of determining the stage and flow of the stream or streams from which water is diverted for the operation of the project works, the amount of water held in and withdrawn from storage, and the effective head on the turbines, the licensee shall install and thereafter maintain such gages and stream-gaging stations as the Commission may deem necessary and best adapted to the requirements; and shall provide for the required readings of such gages and for the adequate rating of such stations. The licensee shall also install and maintain standard meters adequate for the determination of the amount of electric energy generated by said project works. The number, character, and location of gages, meters, or other measuring devices, and the method of operation thereof, shall at all times be satisfactory to the Commission and may be altered from time to time if necessary to secure adequate determinations, but such alteration shall not be made except with the approval of the Commission or upon the specific direction of the Commission. The installation of gages, the ratings of said stream or streams, and the determination of the flow thereof, shall be under the supervision of, or in cooperation with, the District Chief of the United States Geological Survey having charge of stream-gaging operations in the region of said project, and the licensee shall advance to the United States Geological Survey the amount of funds estimated to be necessary for such supervision or cooperation for such periods as may be mutually agreed upon. The licensee shall keep accurate and sufficient record of the foregoing determinations to the satisfaction of the Commission, and shall make return of such records annually at such time and in such form as the Commission may prescribe.

Article 10: The licensee shall install additional capacity or make other changes in the project as directed by the Commission, to the extent that it is economically sound and in the public interest to do so, after notice and opportunity for hearing.

Article 11: The licensee shall, after notice and opportunity for hearing, coordinate the operation of the project, electrically and hydraulically, with such other projects or power systems and in such manner as the Commission may direct in the interest of power and other beneficial public uses of water resources, and on such conditions concerning the equitable sharing of benefits by the licensee as the Commission may order.

Article 12: Whenever the licensee is directly benefited by the construction work of another licensee, a permittee, or of the United States of a storage reservoir or other headwater improvement, the licensee shall reimburse the owner of the headwater improvement for such part of the annual charges for interest, maintenance, and depreciation thereon as the Commission shall determine to be equitable, and shall pay to the United States the cost of making such determination as fixed by the Commission. For benefits provided by a storage reservoir or other headwater improvement of the United States the licensee shall pay to the Commission the amounts for which it is billed from time to time for such headwater benefits and for the costs of making the

determinations pursuant to the then current Commission Regulations under the Federal Power Act within 60 days from the date of rendition of a bill therefore and, upon failure to do so, shall thereafter be subject to the payment of the penalties specified in the then current Regulations. The licensee shall have the right to pay such amounts under protest within the 60-day period and to reconsideration of the determination of the amounts billed or a hearing as provided by the then current Regulations under the Act.

Article 13: The United States specifically retains and safeguards the right to use water in such amount, to be determined by the Secretary of the Army, as may be necessary for the purposes of navigation on the navigable waterway affected; and the operations of the licensee, so far as they affect the use, storage and discharge from storage of waters affected by the license, shall at all times be controlled by such reasonable rules and regulations as the Secretary of the Army may prescribe in the interest of navigation, and as the Commission may prescribe for the protection of life, health, and property, and in the interest of the fullest practicable conservation and utilization of such waters for power purposes and for other beneficial public uses, including recreational purposes; and the licensee shall release water from the project reservoir at such rate in cubic feet per second, or such volume in acre-feet per specified period of time, as the Secretary of the Army may prescribe in the interest of navigation, or as the Commission may prescribe for the other purposes hereinbefore mentioned.

Article 14: On the application of any person, association, corporation, Federal agency, State or municipality, the licensee shall, after notice and opportunity for hearing, permit such reasonable use of its reservoirs or other project properties, including works, lands, and water rights, or part thereof, as may be ordered by the Commission in the interest of comprehensive development of the waterway or waterways involved and the conservation and utilization of water resources of the region, for water supply for the purpose of steam-electric, irrigation, industrial, municipal or similar uses. The licensee shall receive reasonable compensation, at least full reimbursement for any damages or expenses which the joint use causes him to incur, for use of its reservoirs or other project properties or parts thereof for such purposes, any such compensation to be fixed by the Commission either by approval of an agreement between the licensee and the party or parties benefiting or after notice and opportunity for hearing. Applications shall contain information in sufficient detail to afford a full understanding of the proposed use, including satisfactory evidence that the applicant possesses necessary water rights pursuant to applicable State law, or a showing of cause why such evidence cannot be concurrently submitted, and a statement as to the relationship of the proposed use to any State or municipal plans or orders which may have been adopted with respect to the use of such waters.

Article 15: In the construction or maintenance of the project works the licensee shall place and maintain suitable structures and devices to reduce to a reasonable degree the liability of contact between its transmission lines and telegraph, telephone and other signal wires or power transmission lines constructed prior to its transmission lines and not owned by the licensee, and shall also place and maintain suitable structures and devices to reduce to a reasonable degree the liability of any structures or wires falling or obstructing traffic or endangering life. None of the provisions of this article are intended to relieve the licensee from any responsibility or requirement which may be imposed by other lawful authority for avoiding or eliminating inductive interference.

Article 16: The licensee shall, for the conservation and development of fish and wildlife resources, construct, maintain, and operate, or arrange for the construction, maintenance and operation of such facilities and comply with such reasonable modifications of the project structures and operation as may be ordered by the Commission upon its own motion or upon the recommendation of the Secretary of the Interior or the fish and wildlife agency or agencies of any State in which the project or a part thereof is located, after notice and opportunity for hearing and upon findings based on substantial evidence that such facilities and modifications are necessary and desirable, reasonable consistent with the primary purpose of the project, and consistent with the provisions of the Act.

Article 17: Whenever the United States shall desire, in connection with the project, to construct fish and wildlife facilities or to improve the existing fish and wildlife facilities as its own expense, the licensee shall permit the United States or its designated agency to use, free of cost, such of licensee's lands and interest in lands, reservoirs, waterways and project works as may be reasonably required to complete such facilities or such improvements thereof. In addition, after notice and opportunity for hearing, the licensee shall modify the project operation as may be prescribed by the Commission, reasonably consistent with the primary purpose of the project, in order to permit the maintenance and operation of the fish and wildlife facilities constructed or improved by the United States under the provisions of this article. This article shall not be interpreted to place any obligation on the United States to construct or improve fish and wildlife facilities or to relieve the licensee of any obligation under this license.

Article 18: The licensee shall construct, maintain and operate or shall arrange for the construction, maintenance and operation of such recreational facilities including modifications thereto, such as access roads, wharves, launching ramps, beaches, picnic and camping areas, sanitary facilities and utilities, and shall comply with such reasonable modifications of the project structures and operations as may be prescribed hereafter by the Commission during the term of this license upon its own motion or upon the recommendation of the Secretary of the Interior or other interested Federal and State agencies, after notice and opportunity for hearing and upon findings based upon substantial evidence that such facilities and modifications are necessary and desirable, and reasonably consistent with the primary purpose of the project.

Article 19: So far as is consistent with proper operation of the project, the licensee shall allow the public free access, to a reasonable extent, to project waters and adjacent project lands owned by the licensee for the purpose of full public utilization of such lands and waters for navigation and recreational purposes, including fishing and hunting, and shall allow to a reasonable extent for such purposes the construction of access roads, wharves, landings, and other facilities on its lands the occupancy of which may in appropriate circumstances be subject to payment of rent to the licensee in a reasonable amount: Provided, that the licensee may reserve from public access, such portions of the project waters, adjacent lands, and project facilities as may be necessary for the protection of life, health, and property and Provided, further, that the licensee's consent to the construction of access roads, wharves, landings, and other facilities shall not, without its express agreement, place upon the licensee any obligation to construct or maintain such facilities. These facilities are in addition to the facilities that the licensee may construct and maintain as required by the license.

Article 20: The licensee shall be responsible for and shall take reasonable measures to prevent soil erosion on lands adjacent to the stream and to prevent stream siltation or pollution resulting from

construction, operation or maintenance of the project. The Commission upon request, or upon its own motion, may order the licensee to construct and maintain such preventive works to accomplish these purposes and to revegetate exposed soil surface as the Commission may find to be necessary after notice and opportunity for hearing.

Article 21: The licensee shall clear and keep clear to an adequate width lands along open conduits, shall clear lands within the bottom and margin of reservoirs (except as may be otherwise specified in the license), and shall dispose of all temporary structures, unused timber, brush, refuse, or inflammable material resulting from the clearing of lands or from the maintenance or alteration of the project works. In addition, all trees along the margins of reservoirs which may die during operations of the project shall be removed. The clearing of the lands and the disposal of the material shall be done with due diligence and to the satisfaction of the authorized representative of the Commission.

Article 22: Timber on lands of the United States cut, used, or destroyed in the construction and maintenance of the project works, or in the clearing of said lands, shall be paid for and the resulting slash and debris disposed of in accordance with the requirement of the agency of the United States having jurisdiction over said lands. Payment for merchantable timber will be at current stumpage rates, and payment for young growth timber below merchantable size will be at current damage appraisal value. However, the agency of the United States having jurisdiction may sell or dispose of the merchantable timber to others than the licensee, with the provision that timber so sold or disposed of will be cut and removed from the area prior to or without undue interference with clearing operations of the licensee and in coordination with his project construction schedules. Such sale or disposal to others will not relieve the licensee of the responsibility for the clearing and disposing of all slash and debris from project lands.

Article 23: The licensee shall do everything reasonably within its power and shall require its employees, contractors, and employees of contractors to do everything reasonably within their power, both independently and upon the request of officers of the agency concerned to prevent, make advance preparations for suppression, and suppress fires on the lands to be occupied or used under the license. The licensee shall be liable for and pay the costs incurred by the United States in suppressing fires caused from the construction, operation, or maintenance of the project works or of the work appurtenant or accessory thereto under the license.

Article 24: The licensee shall interpose no objection to, and shall in no way prevent, the use by the agency of the United States having jurisdiction over the lands of the United States affected, or by persons or corporations occupying lands of the United States under permit, of water for fire suppression from any stream, conduit or body of water, natural or artificial, used by the licensee in the operation of the project works covered by the license, or to the use by said parties of water for sanitary and domestic purposes from any stream or body of water, natural or artificial, used by the licensee in the operation of the project works covered by the license.

Article 25: The licensee shall be liable for injury to, or destruction of, any buildings, bridges, roads, trails, lands, or other property of the United States, occasioned by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto under the license. Arrangements to meet such liability, either by compensation for such injury or destruction,

or by reconstruction or repair of damaged property, or otherwise, shall be made with the appropriate department or agency of the United States.

Article 26: The licensee shall allow any agency of the United States, without charge, to construct or permit to be constructed on, through, and across the project lands, conduits, chutes, ditches, railroads, roads, trails, telephone and power lines, and other means of transportation and communication not inconsistent with the enjoyment of said lands by the licensee for the purposes of the license. This license shall not be construed as conferring upon the licensee any right of use, occupancy, or enjoyment of the lands of the United States other than for the construction, operation, and maintenance of the project as stated in the license.

Article 27: In the construction and maintenance of the project, the location and standards of roads and trails, and other land uses, including the location and condition of quarries, borrow pits, spoil disposal areas, and sanitary facilities, shall be subject to the approval of the department or agency of the United States having supervision over the lands involved.

Article 28: The licensee shall make provision, or shall bear the reasonable cost, as determined by the agency of the United States affected, of making provision for avoiding inductive interference between any project transmission line or other project facility constructed, operated, or maintained under the license, and any radio installation, telephone line, or other communication facility installed or constructed before or after construction of such project transmission line or other project facility and owned, operated, or used by such agency of the United States in administering the lands under its jurisdiction.

Article 29: The licensee shall clear such portions of transmission line rights-of-way across lands of the United States as are designated by the officer of the United States in charge of the lands; shall keep the areas so designated clear of new growth, all refuse, and inflammable material to the satisfaction of such officer; shall trim all branches of trees in contact with or liable to contact the transmission line; shall cut and remove all dead or leaning trees which might fall in contact with the transmission line; and shall take such other precautions against fire as may be required by such officer. No fires for the burning of waste material shall set except with the prior written consent of the officer of the United States in charge of the lands as to time and place.

Article 30: The licensee shall cooperate with the United States in the disposal by the United States of mineral and vegetative materials, under the Act of July 31, 1947, 61 Stat. 681 as amended, (30 U.S.C. 601, et seq.) from lands of the United States occupied by the project or any part thereof, provided that such disposal has been authorized by the Commission and that it does not unreasonably interfere with the occupancy of such lands by the licensee for the purposes of the license, and provided further that in the event of disagreement, any question or unreasonable interference shall be determined by the Commission after notice and opportunity for hearing.

Article 31: If the licensee shall cause or suffer essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, or shall abandon or discontinue good faith operation of the project for a period of three years, or refuse or neglect to comply with the terms of the license and the lawful orders of the Commission mailed to the record address to the licensee or its agent, the Commission will deem it to be the intent of the licensee to

surrender the license, and not less than 90 days after public notice may in its discretion terminate the license.

Article 32: Upon abandonment of the project the licensee shall remove all structures, equipment and power lines from the stream and from lands of the United States, restore said lands to a condition satisfactory to the agency having jurisdiction over the lands, restore said stream to a condition satisfactory to the Commission's authorized representative and fulfill such other obligations under the license as the Commission may prescribe.

Article 33: The right of the licensee and of its transferees and successors to use or occupy waters, over which the United States has jurisdiction, or lands of the United States under the license, for the purpose of maintaining the project works or otherwise, shall absolutely cease at the end of the license period, unless licensee has obtained a new license pursuant to the then existing laws and regulations or an annual license under the terms and conditions of this license.

Article 34: The terms and conditions expressly set forth in the license shall not be construed as impairing any terms and conditions of the Federal Power Act which are not expressly set forth herein.

Article 35: The licensee shall commence construction of the project within 18 months from the effective date of this license and shall complete the installation of the four pump-turbine motor-generator units and the two conventional generating units within ten years of the effective date of this license.

Article 36: The licensee shall pay to the United States the following annual charge, effective June 1, 1970:

(i) For the purpose of reimbursing the United States for the costs of administration of Part I of the Act, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations in effect from time to time. The authorized installed capacity for such purpose is 432,000 horsepower.

(ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of its lands, exclusive of those used for transmission line right-of-way, an amount as may be determined hereafter by the Commission.

(iii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of its lands used for transmission line right-of-way, if any, an amount as may be determined hereafter by the Commission.

Article 37: The licensee shall cooperate with the Forest Service in making available to it lands acquired within the boundaries of the Oconee National Forest which are not required for the project.

Article 38: The licensee shall establish and mark the 435 foot contour on National Forest lands as determined by the Forest Service to be necessary for ground control for timber salvage, recreation planning, and clearing.

Article 39: The licensee shall re-establish and/or witness to Forest Services standards existing National Forest land lines and corners obliterated or made unusable by the project.

Article 40: The licensee shall acquire a fee simple interest in and include within the project boundary to be included in Exhibit F and shown on Exhibit K maps to be filed with the Commission, as provided for by Article 46 herein, all islands in their entirety (except those on lands of the United States) and all other privately owned lands up to contour elevation 435 feet msl. (USGS Datum) and in addition all privately owned lands around the reservoir for a horizontal distance of 25 feet from the normal pool elevation of 435 feet msl. In the general area on the main stem of the reservoir across from the proposed 800-acre park, licensee shall acquire in fee all privately owned lands within 100 horizontal feet of the normal operating pool at 435 feet msl, for a distance of approximately 20 miles, and in the area across the reservoir from the 500-acre proposed ; park and across the reservoir from the proposed Forest Service recreational developments, licensee shall acquire all privately owned lands within 200 horizontal feet of the normal pool elevation of 435 msl. for a distance of approximately 10 miles along the main stem of the reservoir.

Article 41: The licensee shall file for Commission approval within one year from June 1, 1970 its revised Exhibit R, conforming to the requirements of Sections 4.41 and 4.42 of the Commission regulations under the Federal Power Act. The revised Exhibit shall include a schedule of recreational planning, land acquisition and development and provision for public access and use areas below Lauren Shoals dam; enlargement of the proposed overlook area near Laurens Shoals dam with additional consideration of picnic and sanitary facilities; consideration of additional types of recreational use facilities including trails, group facilities, playgrounds, and shore and island camp grounds; site development plans for each recreational use area; and appropriate picnic facilities adequate to meet public needs throughout the period of the license. Licensee shall construct, or arrange for the construction of, appropriate public access and use facilities and provide for the maintenance thereof. Licensee, following preparation by the Forest Service of the Department of Agriculture, shall file for Commission information functional plans for the development by the Forest Service of recreational use sites on lands within the Oconee National Forest, serving project created recreation opportunities.

Article 42: The licensee shall, prior to reconstruction of Georgia State Highway No. 44 across the Laurens Shoals reservoir site, submit for Commission approval plans for relocation or reconstruction of the crossing, including plans to provide for adequate boat passage.

Article 43: The licensee shall, following public notice and consultation and cooperation with the State of Georgia fishery and health agencies, the U.S. Fish and Wildlife Service of the Department of the Interior, the Department of Health, Education and Welfare and the U.S. Forest Service, file within one year from June 1, 1970 for Commission approval a reservoir clearing plan and a vector control plan. Upon approval of the plan therefore, the clearing shall be done to the satisfaction of the Commission's representative. In the event licensee and the agencies named herein fail to agree, the Commission reserves the right on its own motion to prescribe such plans, after notice and opportunity for hearing.

Article 44: The licensee shall, following consultation with the U.S. Fish and Wildlife Service and the Federal Water Pollution Control Administration of the Department of the Interior, the Georgia

Game and Fish Commission, the U.S. Forest Service, the Georgia Department of Public Health and other Federal and State agencies as appropriate, by September 1, 1971, file for Commission approval its plan for the protection and development of fish and wildlife resources of the project area. This plan shall comply with the requirements of Exhibit S required by Section 4.41 of the Commission's regulations. In addition, the plan shall include specified downstream water flow releases, and water quality considerations with proposed modifications of project structures and operation to provide therefor, operational studies on water temperature and dissolved oxygen of waters above and below Laurens Shoals and Sinclair Project No. 1951, and shall include costs and benefits.

Article 45: By June 1, 1972, the licensee shall submit, for Commission approval as part of this license, revised or supplemental Exhibits J and M showing and describing the transmission facilities necessary to connect the project 230 kv substation to the licensee's interconnected primary transmission system or to other points of disposal of project generation and their plan for preservation and enhancement of the environment as it may be affected by the transmission facilities. In preparing the plan licensee shall give appropriate consideration to recognized guidelines for protecting the environment and to beneficial uses, including wildlife, of the transmission facilities rights-of-way. The Commission reserves the right on its own motion to require the licensee, after notice and opportunity for hearing, to include in the license additional transmission facilities.

Article 46: Within one year after acquisition of project land including right-of-way for the transmission lines which will connect the project to the licensee's transmission system, the licensee shall submit an appropriate Exhibit K for Commission approval and an Exhibit F. Licensee shall consult with the Forest Service on the location of the project boundary on National Forest lands.

Article 47: The licensee shall submit in accordance with the Commission's rules and regulations revised Exhibit L drawings showing the final design of project works, and the licensee shall not begin construction of any project structure until the Commission has approved such exhibit therefor.

Article 48: The licensee shall employ an independent Board of Consultants, having at least three qualified members, to assess and make recommendations as to the designs, specifications, and construction of the concrete and earth dam and powerhouse structures, including their foundations. The licensee shall also submit a final report of the Board upon completion of the project.

Article 49: The operation of Project No. 2413 shall be coordinated with the operation of the Sinclair Project No. 1951, and the licensee for Project No. 2413 is authorized to utilize the Sinclair Reservoir as a source of water and as a lower pool for the operation of the pumped-storage facilities of the Laurens Shoals project when operating under this license.

Article 50: In consideration of the availability of the Sinclair Reservoir to the Laurens Shoals project as a source of water supply and as a lower pool, for the period of the latter's license, the licensee for the Laurens Shoals project shall pay annually to the licensee of the Sinclair project or its successors or assigns a sum, commencing September 1, 1997 or at such time as the license for Project No. 2413 may be transferred to another licensee, which shall consist of a portion of the fixed annual charge on the existing joint use facilities at Project No. 1951. This payment shall be

agreed upon by the licensee or assigns and if such agreement can not be obtained the payment shall be determined by the Commission on its own motion after notice and opportunity for hearing.

Article 51: The licensee shall make available to the National Park Service $2,500 to fund the necessary archaeological and historical survey to determine the extent of salvage which will be required. The licensee shall report to the Commission what archaeological and salvage is considered by the National Park Service to be necessary as the result of its survey, and the licensee shall make available such reasonable funds as the Commission, after notice and opportunity for hearing, may approve or direct for the conduct of salvage.

(The requirements of this article were expanded by the FERC Order to GPC of 4/9/1974, where GPC was authorized to spend up to $30,000 for salvage operations in addition to the $2,500 which had already been authorized. The requirements of this article were further expanded by the FERC Order to GPC of 7/20/1977, authorizing GPC to spend up to $900,000 to implement an archeological mitigation plan for the project).

Article 52: The licensee shall, prior to June 1, 1970, file an application for amendment of license to construct as part of Project No. 2413 the Upper Oconee development investigated under a preliminary permit in Project No. 2591, provided that it is found to be economically feasible and best adapted to the comprehensive development of the Oconee River.

Article 53: The licensee shall, three years prior to expiration of the lease and agreement with the Game and Fish Division, Georgia Department of Natural Resources, following consultation with the Department of the Interior, U.S. Forest Service, and other appropriate agencies, file for Commission approval a plan for continued development and enhancement of fish and wildlife resources of the project area. The plan shall specify the location, acreage of land, and management programs to be used on the lands to be managed for wildlife.

Article 54: The licensee shall consult and cooperate with the Game and Fish Division of the Georgia Department of Natural Resources and the Division of Physical Health of the Georgia Department of Human Resources on its reservoir clearing plan as outlined below, and, within six months after issuance of an order approving this article, file for Commission approval details of its clearing plan, to include letters from the above agencies showing concurrence with the plan, as well as the following items: (1) locations and sizes (on map) of hardwood forested areas in the reservoir zone to be left uncleared for fish and wildlife habitat enhancement, not to exceed a total area of 1,800 acres; (2) locations and sizes (on the map) of areas in the reservoir zone where hardwood trees are to be topped at elevation 425 feet for fish habitat enhancement, not to exceed a total area 2,700 acres; (3) locations and widths (on the map) of any cleared strips between the uncleared areas in the reservoir and the shoreline; and (4) the clearing treatment to be given to project lands adjacent to the reservoir, consistent with the Exhibit R approved on February 3, 1975.

Article 55: All islands 1/2 acre or smaller, formed by the reservoir at elevation 435 feet (msl) shall be left undeveloped for the purpose of developing wildlife refuges in cooperation with the Georgia Game and Fish Division.

Article 56A: Pursuant to Section 10(d) of the Act, after the first 20 years of operation of the project under license, a specified reasonable rate of return upon the net investment in the project shall be

used for determining surplus earnings of the project for the establishment and maintenance of amortization reserves. One half of the project surplus earnings, if any, accumulated after the first 20 years of operation under the license, in excess of the specified rate of return per annum on the net investment, shall be set aside in a project amortization reserve account as of the end of each fiscal year: Provided, that, if and to the extent that there is a deficiency of project earnings below the specified rate of return per annum for any fiscal year or years after the first 20 years of operation under the license, the amount of such deficiency shall be deducted from the amount of any surplus earnings accumulated thereafter until absorbed, and one-half of the remaining surplus earnings, if any, thus cumulatively computed, shall be set aside in the project amortization reserve account; and the amounts thus established in the project amortization reserve account shall be maintained until further order of the Commission.

The annual specified reasonable rate of return shall be the sum of the weighted cost components of long-term debt, preferred stock, and the cost of common equity, as defined herein. The weighted cost component for each element of the reasonable rate of return is the product of its capital ratios and cost rate. The current capital ratios for each of the above elements of the rate of return shall be calculated annually based on an average of 13 monthly balances of amounts properly includable in the licensee's long-term debt and proprietary capital accounts as listed in the Commission's Uniform System of Accounts. The cost rates for such ratios shall be the weighted average cost of long-term debt and preferred stock for the year, and the cost of common equity shall be the interest rate on 10-year government bonds (reported as the Treasury Department's 10 year constant maturity series) computed on the monthly average for the year in question plus four percentage points (400 basis points).

Article 56B: In constructing the project transmission facilities, licensee shall follow the guidelines for constructing transmission facilities set forth in Commission Order No.
414 and, specifically, shall use the feathering techniques for timbered areas described in those guidelines.

Article 56C: (a) In accordance with the provisions of this article, the licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain other types of use and occupancy, without prior Commission approval. The licensee may exercise the authority only if the proposed use and occupancy is consistent with the purpose of protecting and enhancing the scenic, recreational and other environmental values of the project. For those purposes, the licensee shall also have continuing responsibility to supervise and control the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or, if a covenant of a conveyance made under the authority of this article is violated, the licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any noncomplying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) noncommercial

piers, landings, boat docks, or similar structures and facilities that can accommodate no more than 10 watercraft at a time where said facility is intended to serve single-family type dwellings; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline.

To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee shall require multiple use and occupancy of facilities for access to project lands and waters. The licensee shall also ensure, to the satisfaction of the Commission's authorized representative, that the uses and occupancies for which it grants permission are maintained in good repair and comply with applicable State and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the licensee shall: (1) inspect the site of the proposed construction; (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site; and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the licensee's costs of administering the permit program. The Commission reserves the right to require the licensee to file a description of its standards, guidelines, and procedures for implementing this paragraph (b) and to require modifications of those standards, guidelines, or procedures.

(c) The licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement, expansion, realignment, or maintenance of bridges where all necessary State and Federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kVor less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary State and Federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary Federal and State water quality certificates or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary Federal and State approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources or an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project

lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter to the Director, Office of Hydropower licensing, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any Federal or State agency official consulted, and any Federal or State approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the licensee to file an application for prior approval, the licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraphs (c) or (d) of this article:

(1) Before conveying the interest, the licensee shall consult with Federal and State fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include covenants running with the land adequate to ensure that: (i) the use of lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.

(4) The Commission reserves the right to require the licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

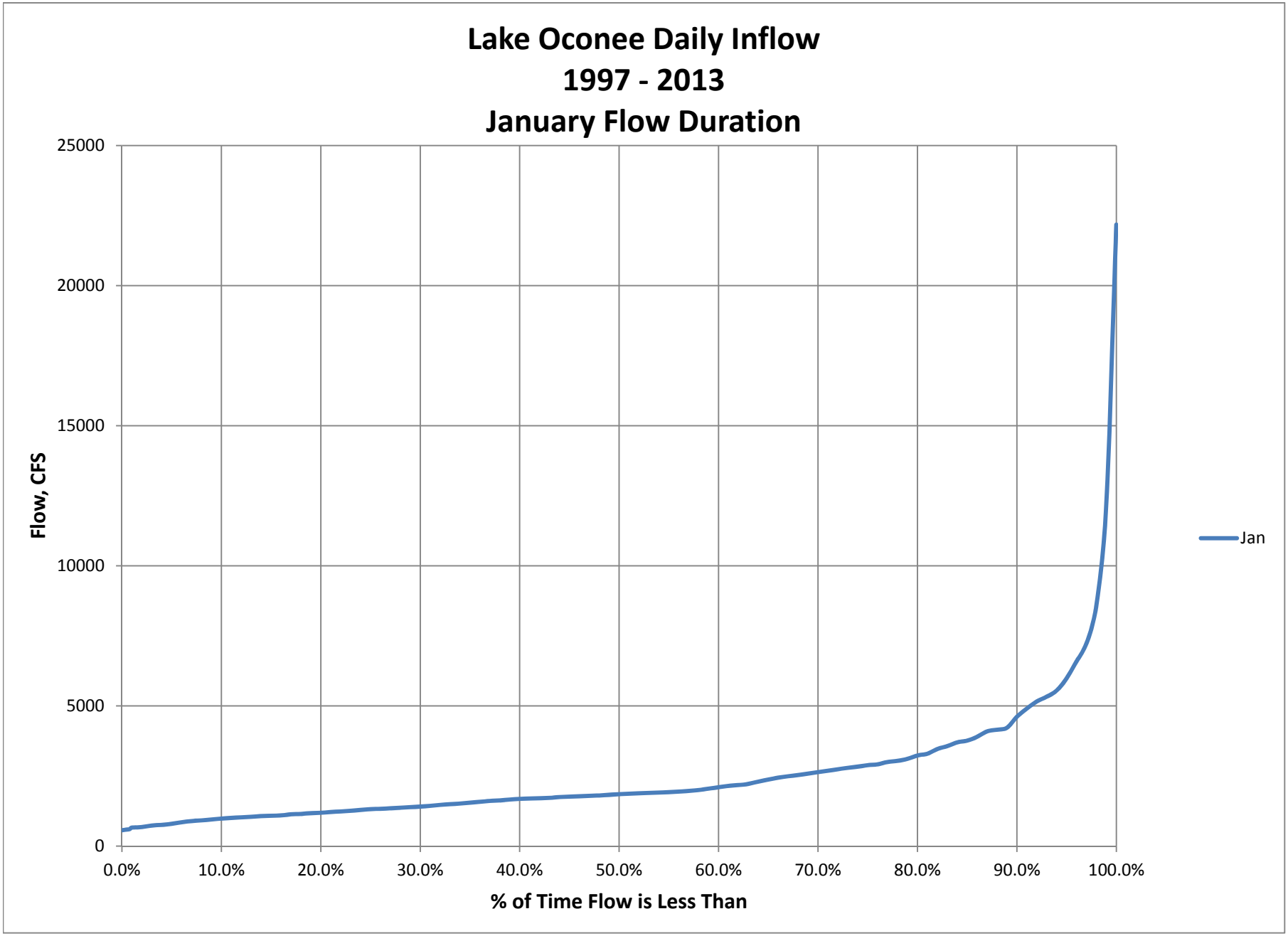
(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

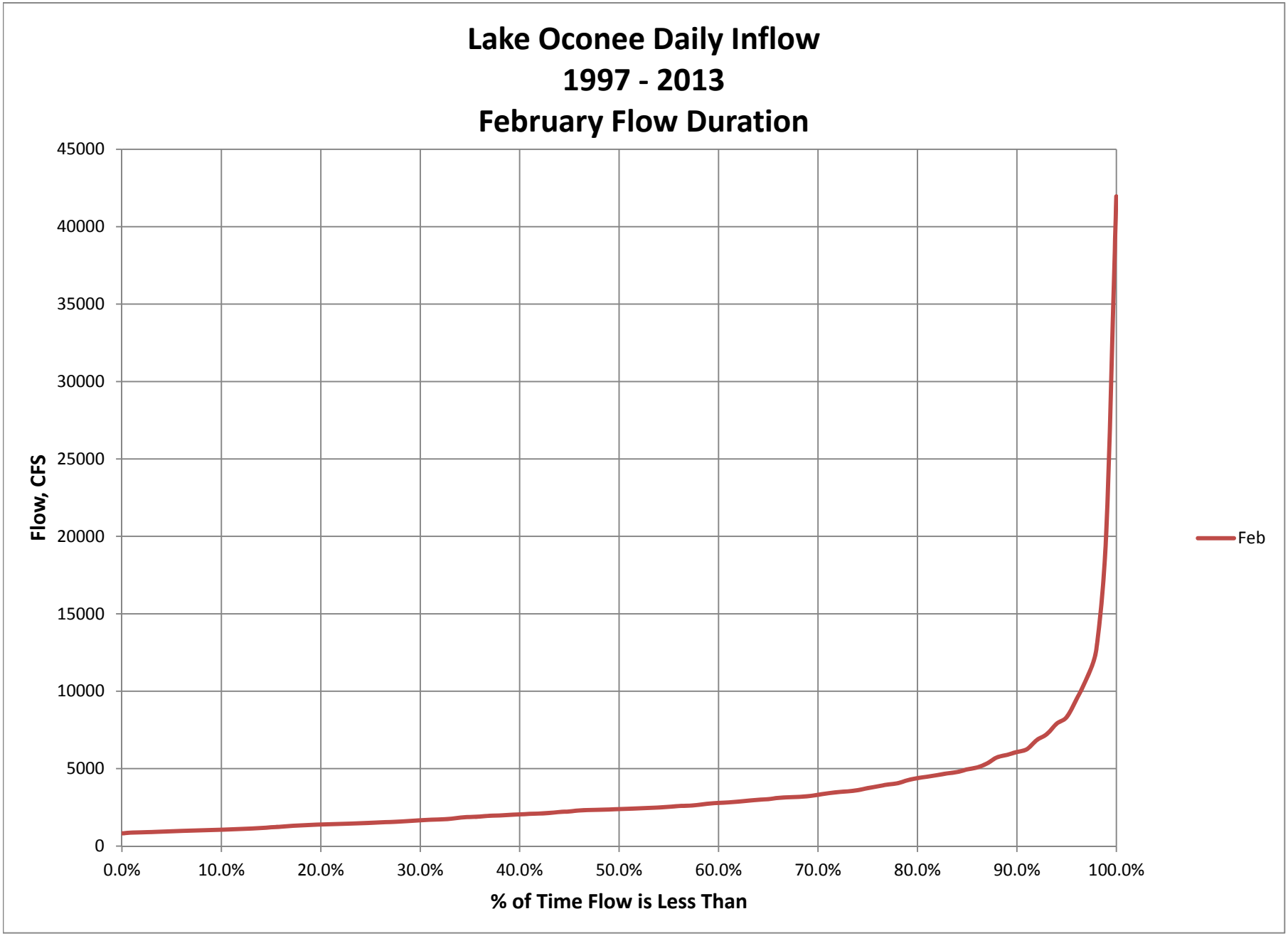
Article 57: Prior to the commencement of any construction or development of any project works or other facilities at the project, the licensee shall consult and cooperate with the State Historic Preservation Officer (SHPO) to determine the need for, and extent of, any archaeological or historic resource surveys and any mitigative measures that may be necessary. The licensee shall provide funds in a reasonable amount for such activity. If any previously unrecorded archaeological or

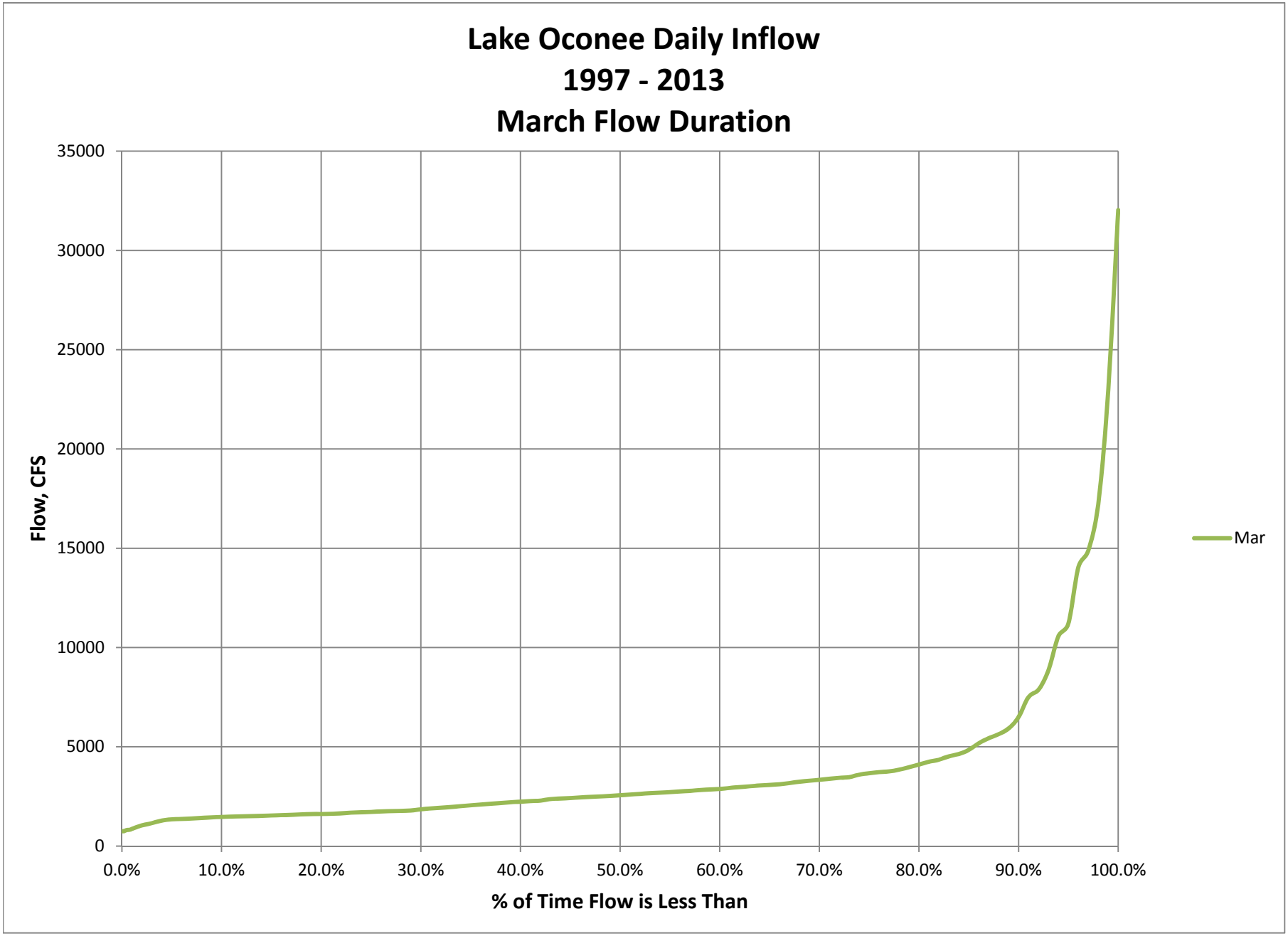
historic sites are discovered during the course of construction, construction activity in the vicinity shall be halted, a qualified archaeologist shall be consulted to determine the significance of the sites, and the licensee shall consult with the SHPO to develop a mitigation plan for the protection of significant archaeological or historic resources. If the licensee and the SHPO cannot agree on the amount of money to be expended on archaeological or historic work related to the project, the Commission reserves the right to require the licensee to conduct, at its own expense, any such work found necessary.

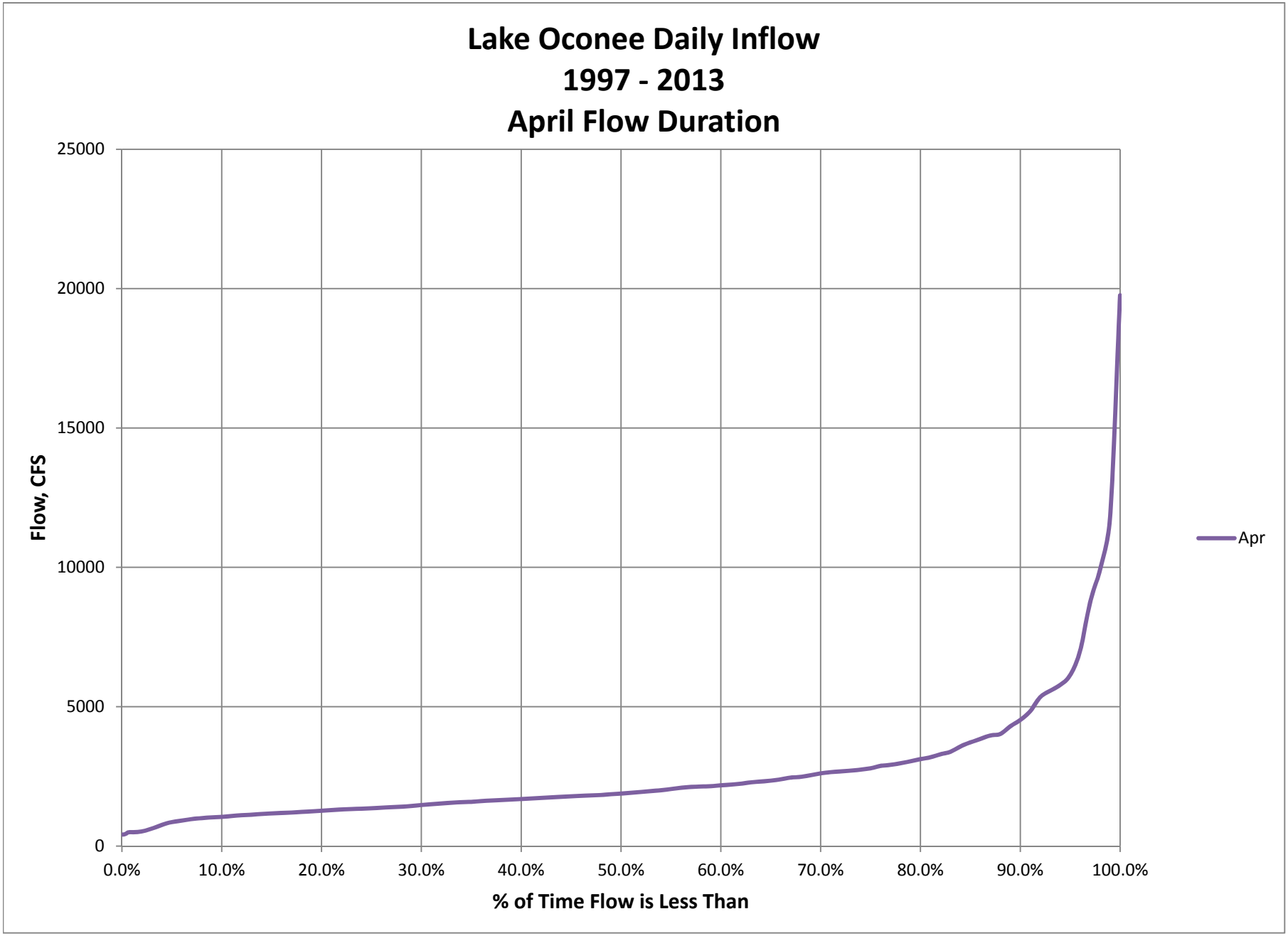
APPENDIX F

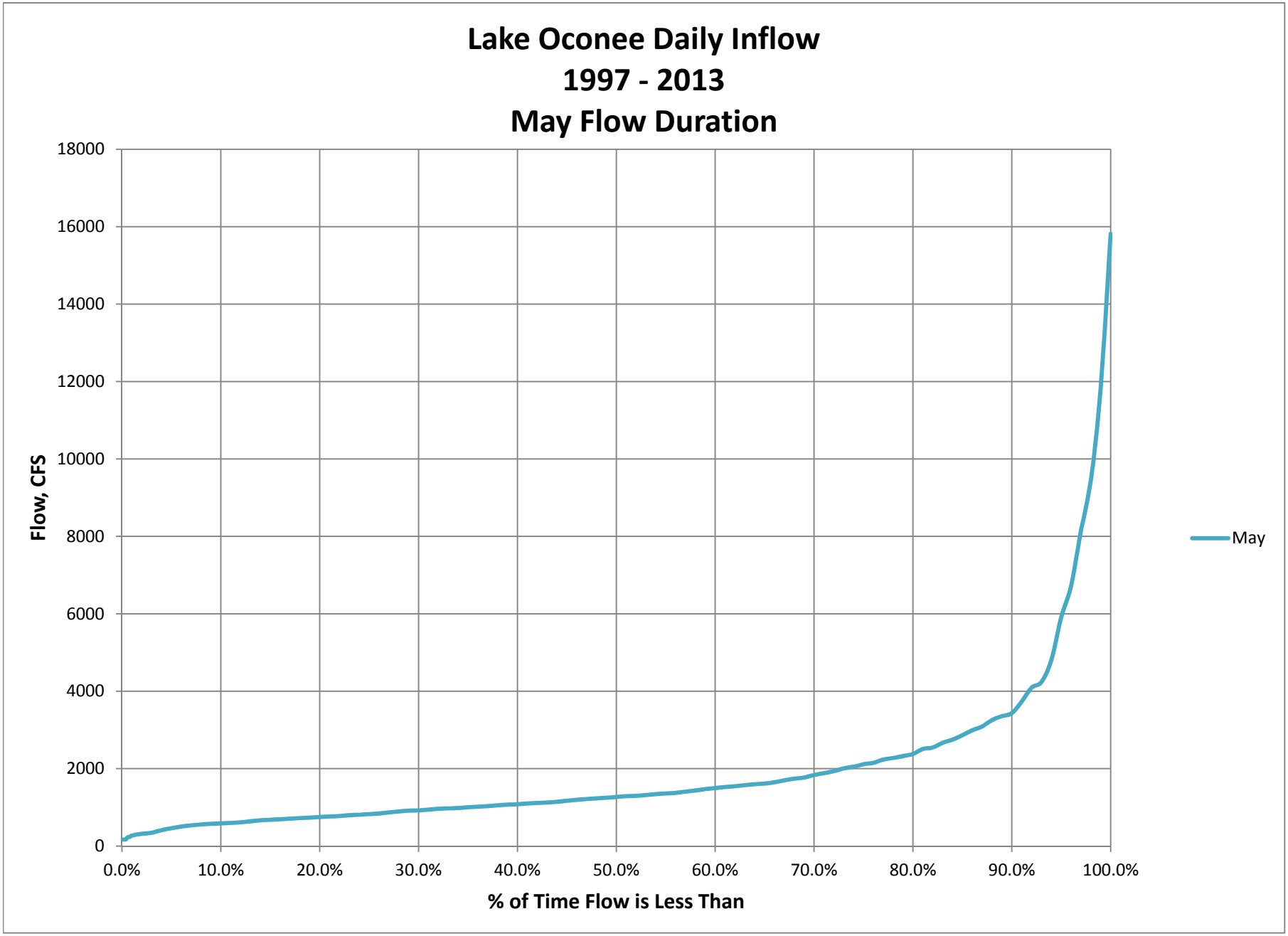
Monthly and Annual Daily Inflow Duration Curves

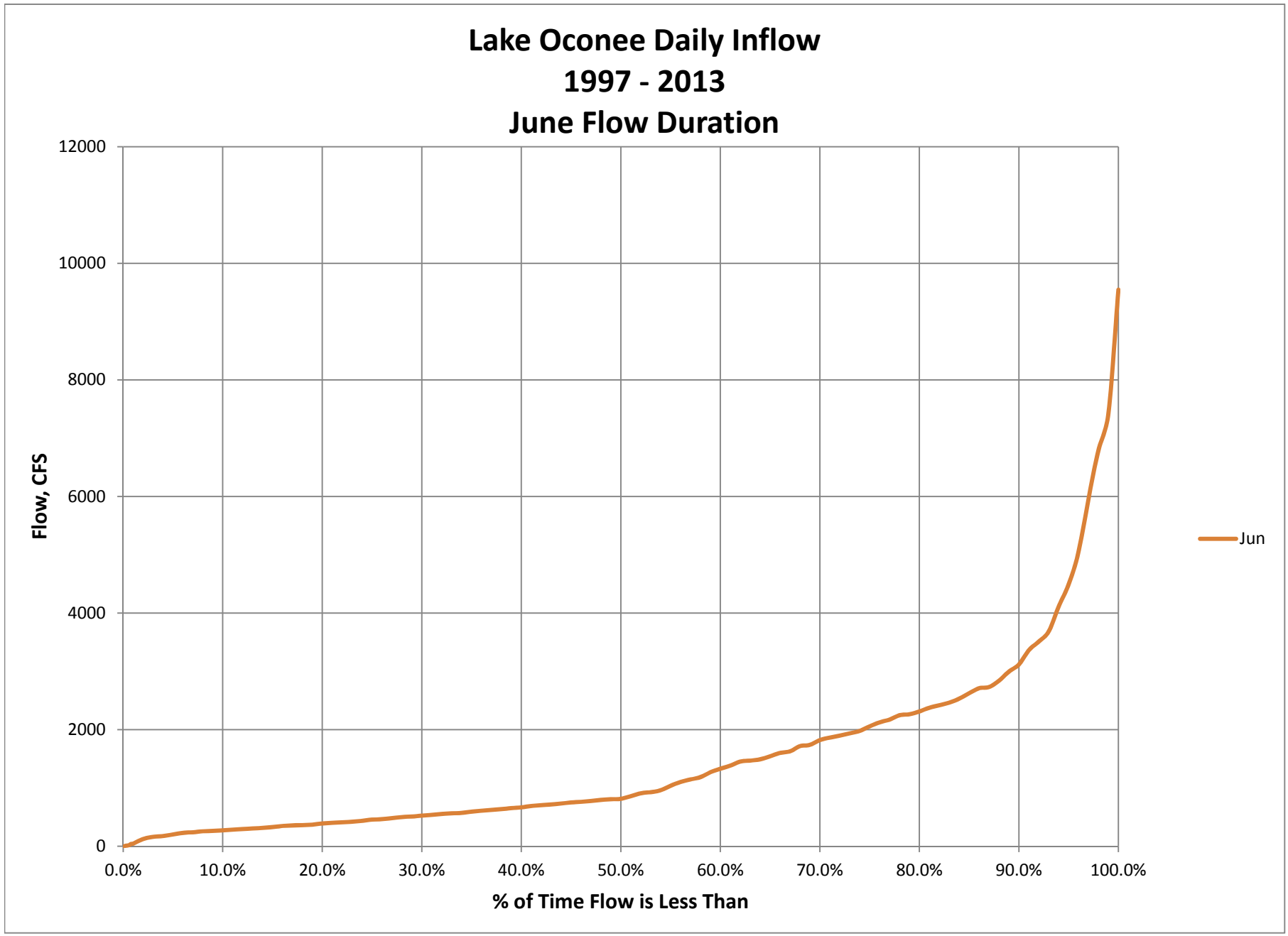

Lake Oconee Daily Inflow
1997 - 2013
January Flow Duration
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Jan

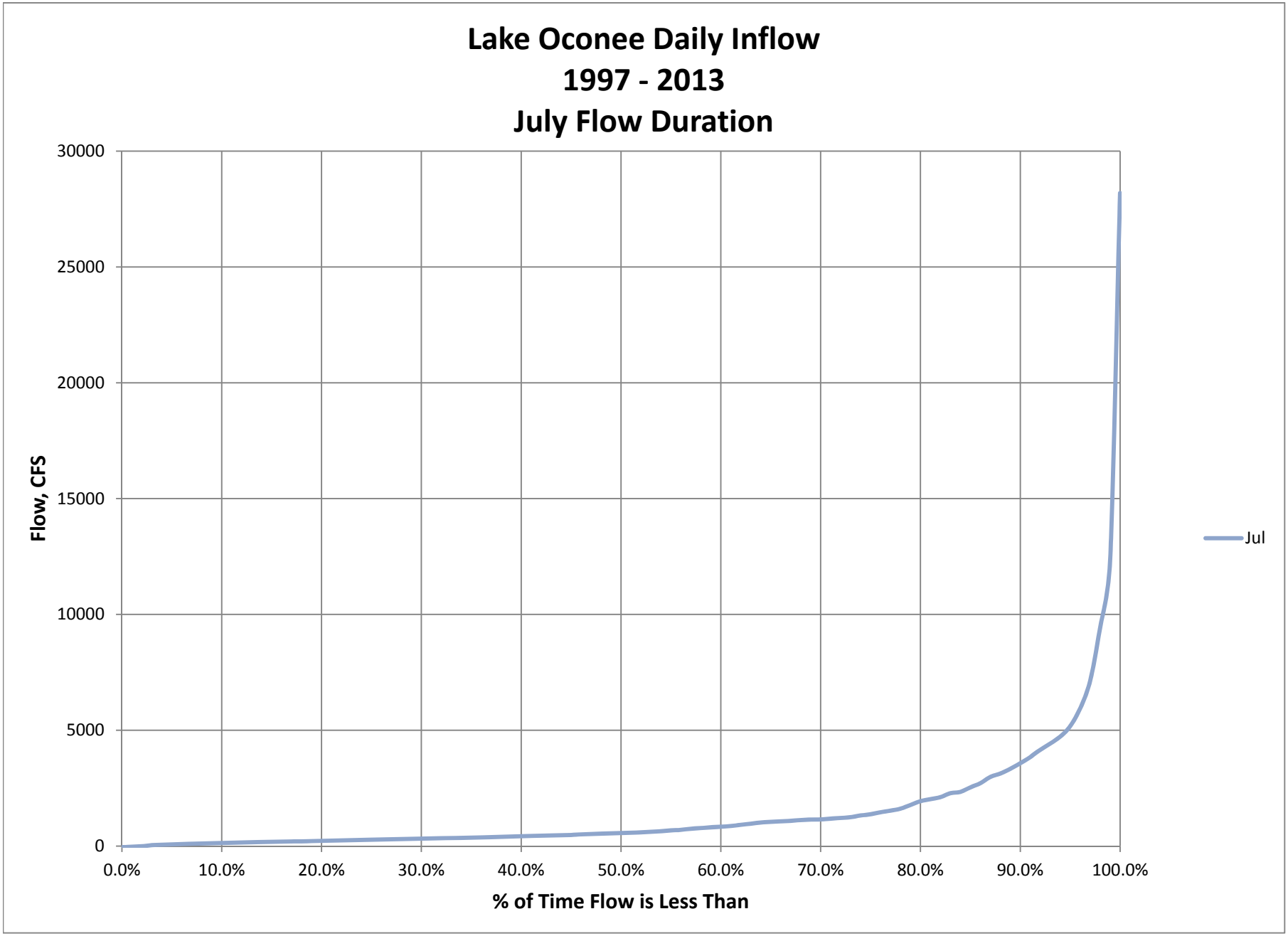

Lake Oconee Daily Inflow
1997 - 2013
February Flow Duration
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Feb

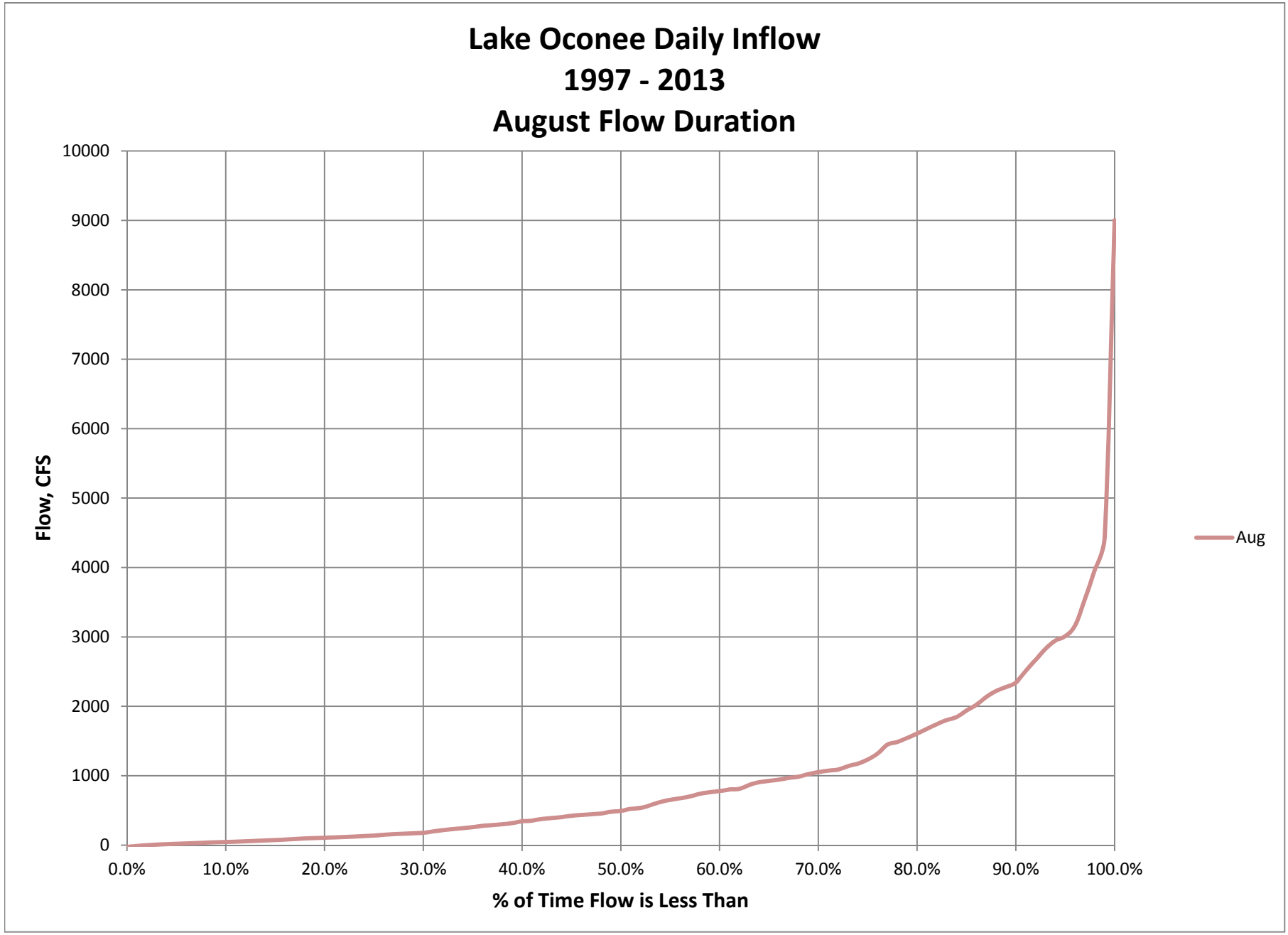

Lake Oconee Daily Inflow
1997 - 2013
March Flow Duration
35000
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Mar

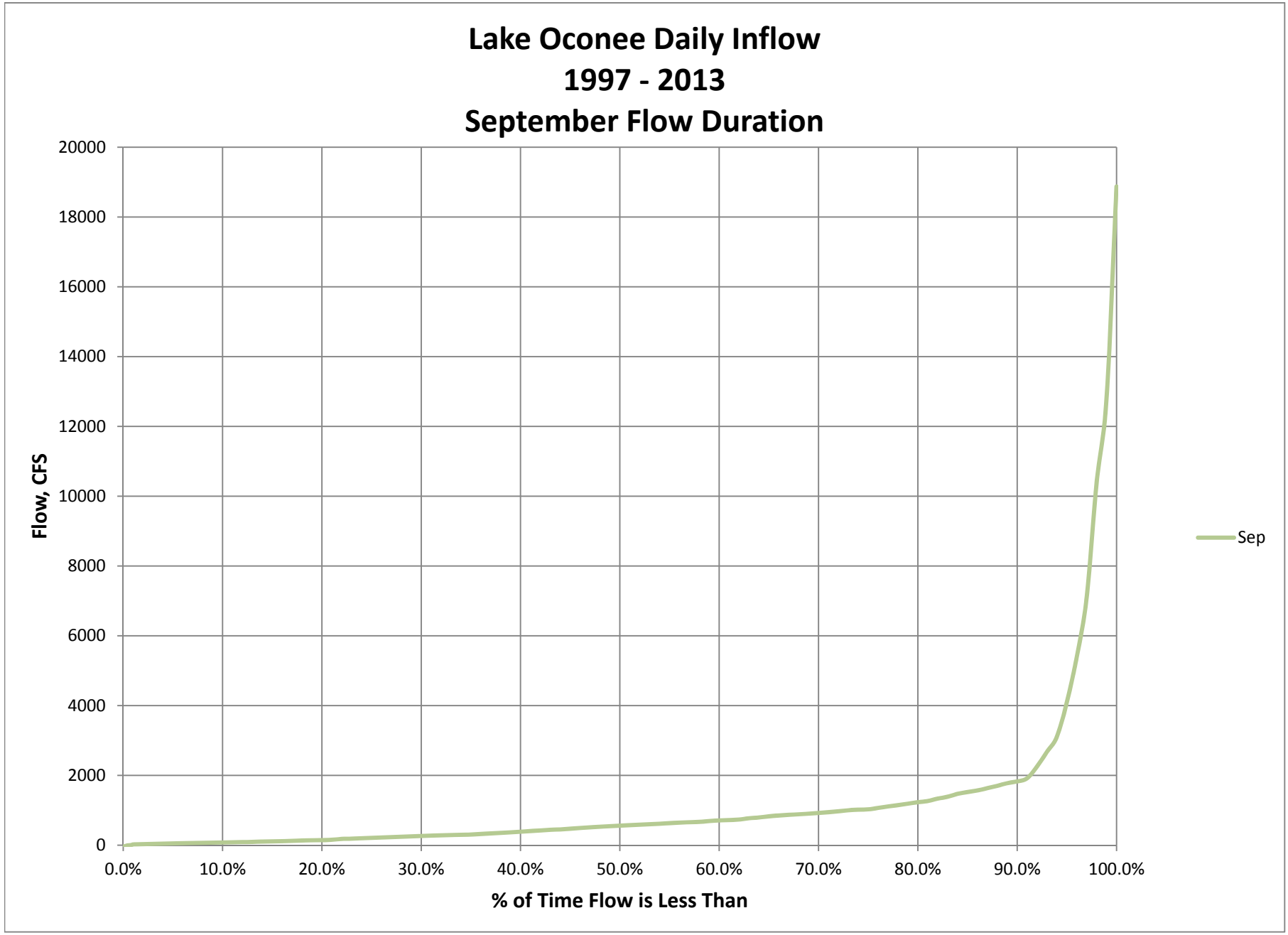

Lake Oconee Daily Inflow
1997 - 2013
April Flow Duration
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Apr

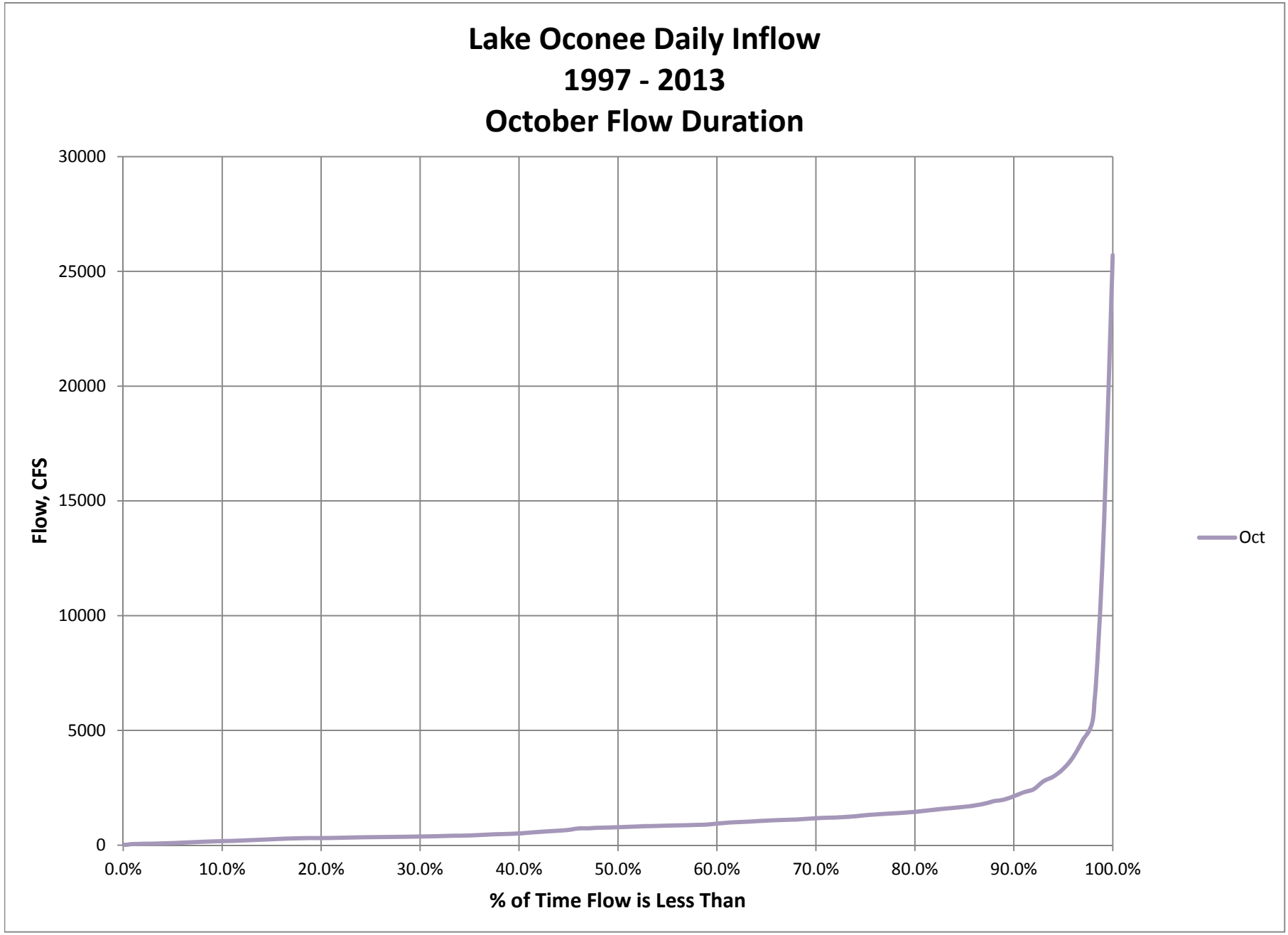

Lake Oconee Daily Inflow
1997 - 2013
May Flow Duration
Flow, CFS
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
May

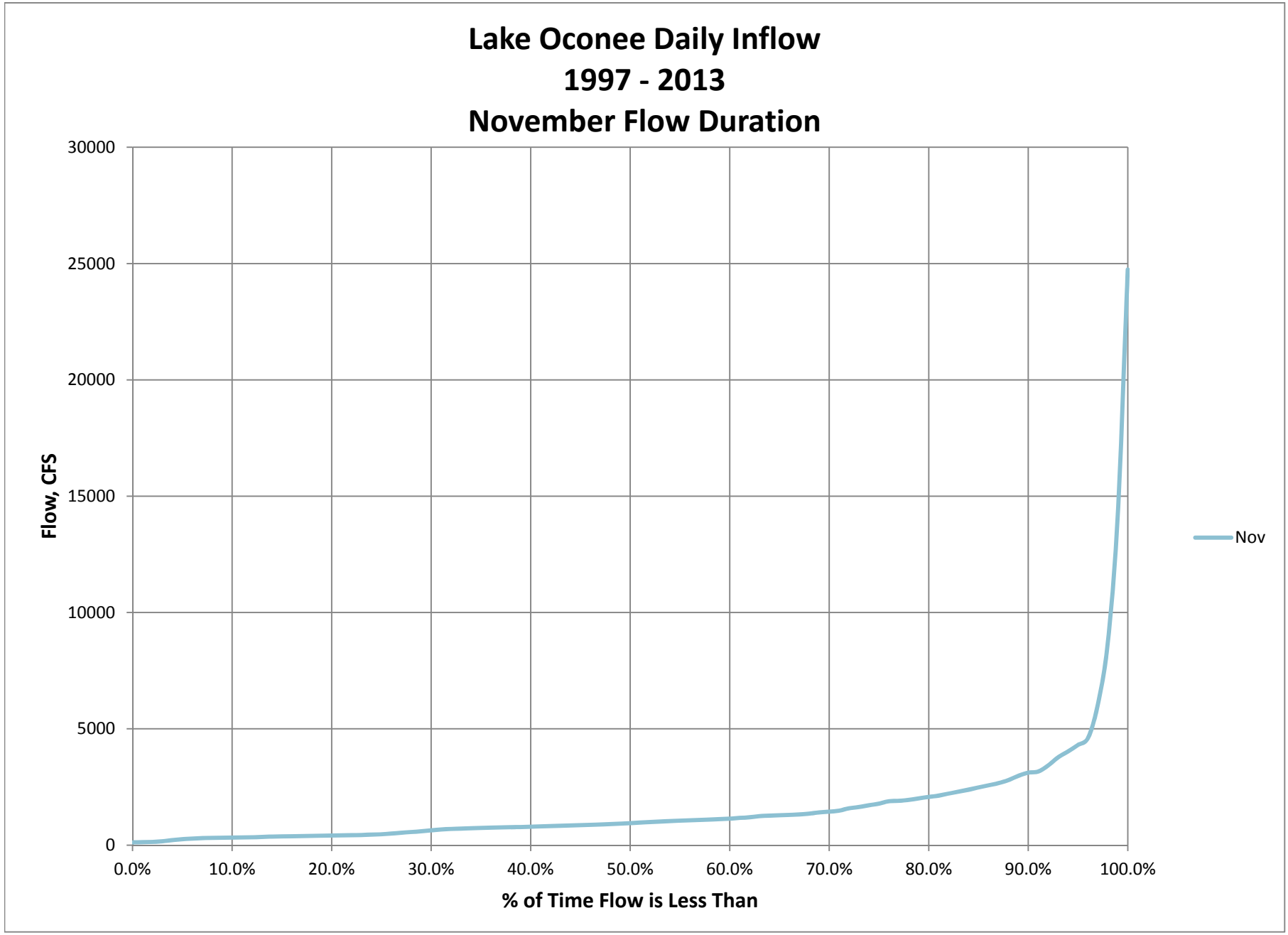

Lake Oconee Daily Inflow
1997 - 2013
June Flow Duration
12000
10000
8000
6000
4000
2000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Jun

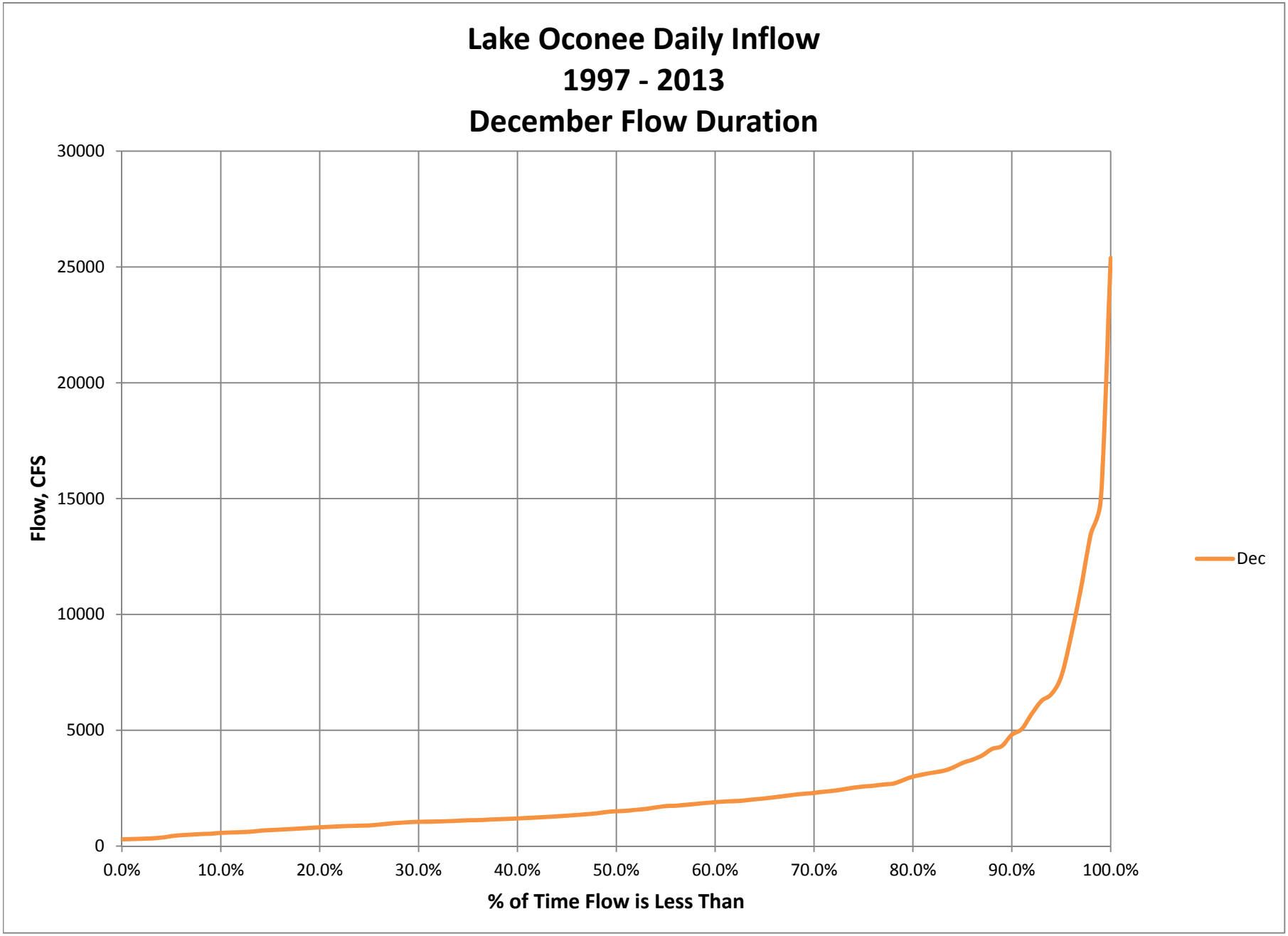

Lake Oconee Daily Inflow
1997 - 2013
July Flow Duration
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Jul

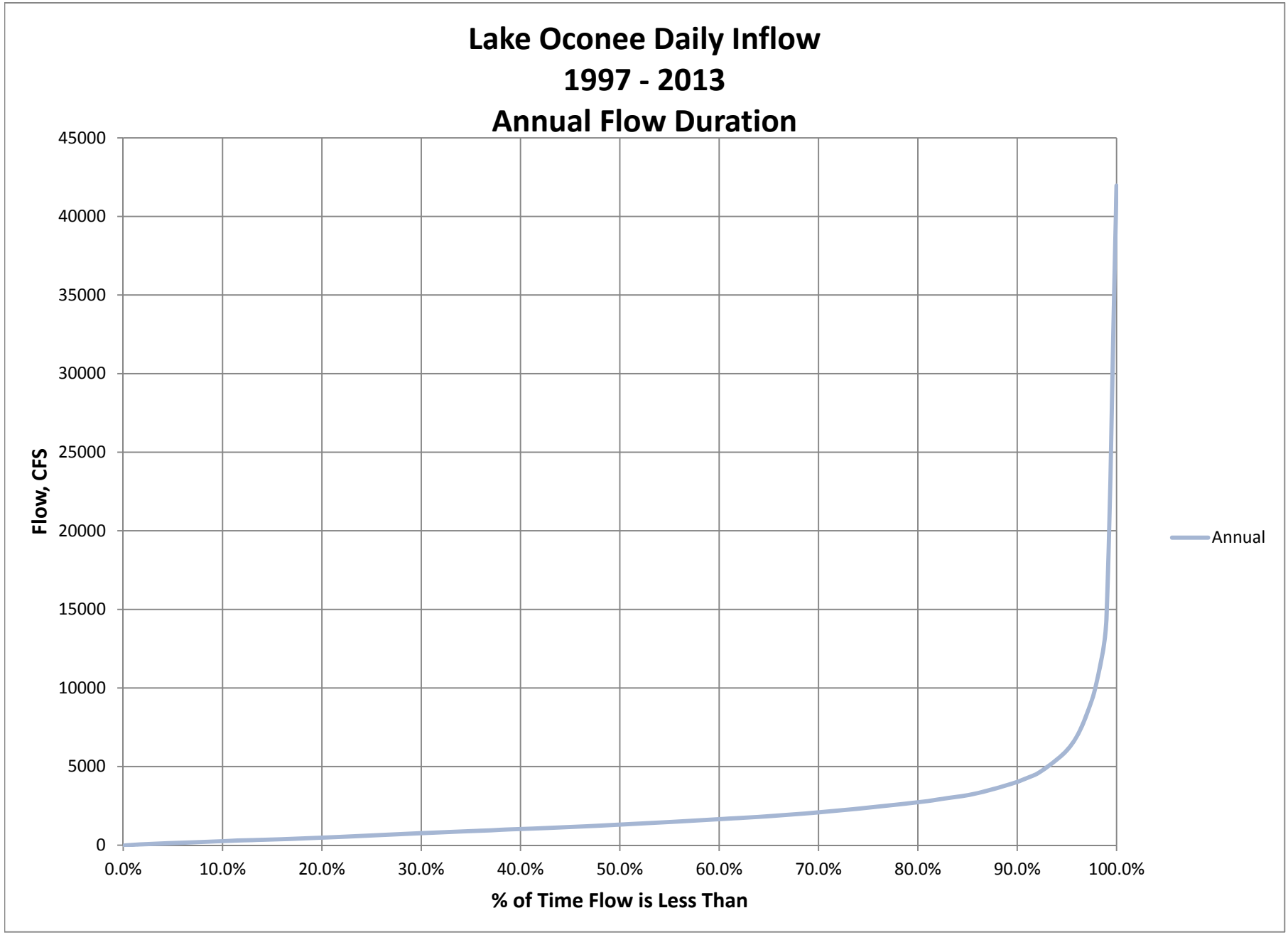

Lake Oconee Daily Inflow
1997 - 2013
August Flow Duration
Flow, CFS
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Aug


Lake Oconee Daily Inflow
1997 - 2013
September Flow Duration
Flow, CFS
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Sep


Lake Oconee Daily Inflow
1997 - 2013
October Flow Duration
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Oct


Lake Oconee Daily Inflow
1997 - 2013
November Flow Duration
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Nov


Lake Oconee Daily Inflow
1997 - 2013
December Flow Duration
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Dec


Lake Oconee Daily Inflow
1997 - 2013
Annual Flow Duration
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Flow, CFS
0.0%
10.0%
20.0%
30.0%
40.0%
50.0%
60.0%
70.0%
80.0%
90.0%
100.0%
% of Time Flow is Less Than
Annual