Attachment A – Initial Statement and Amendment Application

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Georgia Power Company **FERC Project No. 2354**

APPLICATION FOR NON-CAPACITY RELATED AMENDMENT OF LICENSE

Pursuant to Section 4.200 of the Federal Energy Regulatory Commission's (Commission or FERC) regulations,[1] Georgia Power Company (Georgia Power), hereby submits this Application for Non-Capacity Related Amendment of License (Amendment Application) for the North Georgia Project, FERC Project No. 2354 (Project). In filing this Application, Georgia Power seeks to amend the license[2] by upgrading the two generating units at the Nacoochee Development by replacing the turbine runners, and generators.

INITIAL STATEMENT

1. Georgia Power Company (Georgia Power) applies to the Federal Energy Regulatory Commission (FERC or Commission), under 18 CFR § 4.201, for a non-capacity amendment of the North Georgia Project (Project) license, a major existing waterpower project over 5 megawatts (MW), as described in the attached exhibit. This application is for a non-capacity amendment to upgrade the generating units at the Nacoochee Development by replacing the turbine runners, and generators.
2. The exact name and business address and telephone number of the applicant are:

Georgia Power Company
241 Ralph McGill Boulevard, NE
BIN 10193
Atlanta, Georgia 30308-3374

Communication and correspondence pertaining to this application should be addressed to:

Courtenay O'Mara
241 Ralph McGill Boulevard, NE
BIN 10193
Atlanta, Georgia 30308-3374
404-506-7219

[1] 18 C.F.R. § 4.200.
[2] Accession Number 19961008-0044.

3. Georgia Power is a domestic corporation and is licensee for the waterpower project, designated as Project No. 2354 in the records of the Federal Energy Regulatory Commission, issued on the 3rd day of October 1996.

4. The amendments of license proposed and the reason(s) why the proposed changes are necessary, are:

    a. CURRENT CONDITIONS

    The North Georgia Project consists of six hydropower developments (upstream to downstream): Burton, Nacoochee, Mathis-Terrora, and Tallulah Falls on the Tallulah River; and Tugalo and Yonah on the Tugaloo River. The Nacoochee dam is located at river mile (RM) 363 on the Tallulah River in Rabun County, Georgia.

    The Nacoochee Development consists of a concrete gravity dam with non-overflow, intake, low-level sluiceway[3], and free-crested spillway sections, a powerhouse with two generating units, a tailrace, and a transformer and switchgear in a small substation adjacent to the powerhouse. The Nacoochee Development reservoir (Lake Seed) has a surface area of 260 acres at 1,752.5 feet above mean sea level (msl) with a gross storage capacity of 8,250 acre-feet and a useable storage capacity of 5,350 acre-feet at full pool. Water from the tailrace of the upstream Burton powerhouse returns to the Tallulah River and almost immediately flows into Lake Seed. The Nacoochee powerhouse is a steel, reinforced concrete, and masonry structure that sits at the toe of the dam. The Nacoochee powerhouse contains two generating units, a control room, and a machine shop. Currently, each unit has a vertical shaft, propeller-type turbine rated 4,000 horsepower (hp) at 58 feet of head, and a directly connecting alternating current generator rated 3,000 kilovolt-amperes (KVA), 2,400 kilowatts (kW) at 400 revolutions per minute (rpm).

    The Nacoochee Development consists of: (1) a 73-foot-high concrete gravity dam with a left nonoverflow section, an intake section, a sluiceway section, a free-crested spillway, and a right overflow section; (2) a 260-acre reservoir (Lake Seed); (3) two steel penstocks; (4) a powerhouse at the toe of the dam with a total installed capacity of 4.85 MW; (5) a tailrace; and (6) other appurtenances. The units at the Nacoochee development are programmed to cycle on and off depending on the water elevation of Lake Seed, which depends on the operation of the upstream Burton Development.

[3] Georgia Power has submitted drawings proposing to permanently close the low level sluiceway. Accession Nos. 20220912-5170 and 20220912-5171 (filed Sept. 12, 2022) and Accession No. 20230203-5067 (filed Feb. 3, 2023).

Water for generation at the Nacoochee powerhouse comes from rainfall in the Tallulah River basin. The Nacoochee Development is operated as modified run-of-river; Lake Seed stores inflow over short periods of time, which is utilized to provide generation from the Nacoochee powerhouse during peak power demand hours. The Nacoochee powerhouse discharges directly into Lake Rabun, the reservoir for the Mathis-Terrora Development (about one-mile downstream).

The Nacoochee Development is operated to help meet the demand during peak periods of the day. Due to the small size of Lake Seed, the Nacoochee Development cannot be operated for a sustained period of time unless the upstream Burton Development is also operated to provide inflow to the Nacoochee Development. Therefore, the Nacoochee Development's mode of operation is essentially the same as Burton's: during periods of adverse or mean flow, generation is limited to peak demand hours, which generally amounts to several hours per day on weekdays. In periods of high inflow, the Nacoochee Development would operate additional hours during non-peak demand periods to make best use of the inflow without spilling water. Lake Seed is kept at or near full pool elevation throughout the year.

b. PROPOSAL

The proposed scope of work for the Tallulah Falls Development includes the following.

1) Georgia Power proposes to upgrade the two generating units at the Nacoochee Development of the North Georgia Project by replacing the turbine runners, and generators (Proposed Action). Upgrading the generating units will allow the Nacoochee Development to continue to meet the operational requirements of its existing license. The proposed unit upgrades are expected to take four months per unit, with completion anticipated by December 2024.

   Table 1-1 provides the rated generating and maximum hydraulic capacities of the existing units with the expected performance of the upgraded units. Performance of the upgraded units may vary slightly based on final design, headwater conditions, and fabrication.

TABLE 1-1 RATED GENERATING AND MAXIMUM HYDRAULIC CAPACITIES

Unit	Existing Rated (Best Gate/Most Efficient) Capacity (MW)	Existing Max Hydraulic Capacity (CFS)	Proposed Rated (Best Gate/Most Efficient) Capacity (MW)	Proposed Max Hydraulic Capacity (CFS) after Upgrade
1	2.4	617	2.7	629
2	2.4	765	2.7	629

*Max flow from units 1 and 2 were tested in the field on April 21, 2021. Best gate flow was 563 cubic feet per second (cfs) for unit 1 and 690 cfs for unit 2.

The Proposed Action will not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during and following the upgrade work period. The powerhouse work is anticipated to begin in 2024.

The work areas associated with the Proposed Action at the Nacoochee Development are located on previously disturbed land.

2) Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of their designated critical habitat. Georgia Power defined the Project Area associated with the Proposed Action in the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Consultation (IPaC) tool to identify federal threatened and endangered species that have the potential to occur within the area of impact at the Nacoochee Development (i.e., action area). An assessment of effects on ESA listed species is provided in Section 9.0 of the accompanying Applicant Prepared Environmental Assessment (APEA) (Attachment B).

3) Section 106 of the National Historic Preservation Act (NHPA) requires FERC to consider potential adverse effects to historic properties prior to approving a license amendment. FERC executed a Programmatic Agreement (PA) with the Advisory Council on Historic Preservation (Advisory Council), the Georgia State Historic Preservation Office (SHPO), South Carolina SHPO, and the Licensee, on January 30, 1996, as a condition of issuing a license for the North Georgia Project. Georgia Power consulted with the Georgia SHPO per requirements of the PA on this Amendment Application and the SHPO concurred that the license amendment would constitute an adverse effect to historic properties. Consultation with the

SHPO is summarized in Section 12.0 and provided in Appendix A of the accompanying APEA (Attachment B).

4) (i) The statutory or regulatory requirements of the state(s) in which the project would be located that affect the project as proposed with respect to bed and banks and to the appropriation, diversion, and use of water for power purposes are as follows:

Under Section 401(a)(1) of the Clean Water Act (CWA), an applicant for a federal license or permit to conduct an activity that may result in discharge into waters of the United States must provide the licensing or permitting agency with a water quality certification (WQC) that the discharge would not violate water quality standards from the applicable state. In Georgia, Water Quality Certifications (WQC) are issued by the Georgia Environmental Protection Division (Georgia EPD) as part of the Georgia Department of Natural Resources wetland regulatory program via O.C.G.A. Title 12 Chapter 5-21.

(ii) The steps which the Applicant has taken, or plans to take to comply with each of the laws cited above, are:

The existing license for the North Georgia Project includes a 401 WQC issued by Georgia EPD on August 15, 1991. The existing spillway and the Proposed Action that is the subject of this license amendment application is located in the state of Georgia and the discharge originates in Georgia. During consultation on this Amendment Application, Georgia EPD noted that the Proposed Action is not expected to impact water quality (see Appendix A of the accompanying APEA – Attachment B).

REQUIRED EXHIBITS

In accordance with 18 CFR §4.201(c), only the following applicable exhibit(s) that require revision are made part of this Application:

- Exhibit A – Project Description

Exhibit A (Project Description) requires an update; therefore, Georgia Power is attaching a revised Exhibit A in track change (Attachment C) and a clean version (Attachment D).[4] Georgia Power will provide any updates to Exhibit F after the as-built drawings are complete.

[4] Exhibit A includes changes approved for the Mathis—Terrora Development, *Order Amending License, Approving Revised Exhibit A, Revising Project Description, and Revising Annual Charges*, 174 FERC ¶ 62,064 (2021), and Tugalo Development, *Order Amending License, Approving Revised Exhibits A and F, Revising Project Description, and Revising Annual Charges*, 182 FERC ¶ 61,087 (2023).

CONSULTATION

Commission regulations under 18 CFR §4.38(a)(7) require Georgia Power to consult with resource agencies and Indian tribes, to the extent that the proposed amendment would affect their interests. Georgia Power contacted the following agencies:

a. U.S. Fish and Wildlife Service

b. Georgia Department of Natural Resources - Environmental Protection Division

c. Georgia Department of Natural Resources - Wildlife Resources Division

d. Georgia Department of Community Affairs - Historic Preservation Division

Georgia Power submitted a summary of the upgrade to the aforementioned agencies and provided an opportunity to meet and discuss the proposed upgrade in November 2022. Georgia Power also provided the agencies with a draft Amendment Application, including the initial statement, revised Exhibit A, and a draft APEA for review and comment in March 2023. Consulted agencies did not raise objections to the Proposed Action and the consultation record is provided in Appendix A of the accompanying APEA (Attachment B).

Attachment B – Applicant Prepared Environmental Assessment

Applicant Prepared Environmental Assessment for Non-Capacity Amendment Application

North Georgia Project – Nacoochee Development

FERC No. 2354

Prepared for:
Georgia Power Company

Prepared by:
Kleinschmidt Associates

April 2023

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 Statutory and Regulatory Requirements 1-2
1.1.1 Section 401 of Clean Water Act 1-2
1.1.2 Endangered Species Act 1-2
1.1.3 Magnuson-Stevens Fishery Conservation and Management Act 1-2
1.1.4 Coastal Zone Management Act 1-3
1.1.5 National Historic Preservation Act 1-3

2.0 PROPOSED ACTION & ALTERNATIVES 2-1
2.1 No Action Alternative 2-1
2.1.1 Existing Project Facilities and Operations 2-1
2.2 Proposed Action 2-2
2.2.1 Proposed Project Facilities and Operations 2-2

3.0 CUMULATIVE EFFECTS ANALYSIS 3-1

4.0 GENERAL DESCRIPTION OF THE RIVER BASIN 4-1
4.1 Topography 4-1
4.2 Climate 4-1
4.3 References 4-3

5.0 GEOLOGICAL AND SOIL RESOURCES 5-1
5.1 Affected Environment 5-1
5.2 Environmental Analysis 5-1
5.3 Protection, Mitigation, and Enhancement Measures 5-1
5.4 Unavoidable Adverse Effects 5-1
5.5 References 5-1

6.0 WATER RESOURCES 6-1
6.1 Affected Environment 6-1
6.1.1 Water Quantity 6-1
6.1.2 Water Quality 6-2
6.2 Environmental Analysis 6-2
6.2.1 Water Quantity 6-2
6.2.2 Water Quality 6-2
6.3 Protection, Mitigation, and Enhancement Measures 6-3
6.4 Unavoidable Adverse Effects 6-3
6.5 References 6-3

7.0 FISH AND AQUATIC RESOURCES 7-2
7.1 Affected Environment 7-2
7.2 Environmental Analysis 7-3
7.3 Protection, Mitigation, and Enhancement Measures 7-3
7.4 Unavoidable Adverse Effects 7-3
7.5 References 7-3

8.0 WILDLIFE AND TERRESTRIAL RESOURCES 8-1
8.1 Affected Environment 8-1
8.1.1 Wildlife Resources 8-1
8.1.2 Terrestrial Resources 8-1
8.1.3 Wetlands 8-2
8.2 Environmental Analysis 8-4
8.3 Protection, Mitigation, and Enhancement Measures 8-4
8.4 Unavoidable Adverse Effects 8-4
8.5 References 8-4

9.0 RARE, THREATENED, AND ENDANGERED SPECIES 9-1
9.1 Affected Environment 9-1
9.1.1 Threatened and Endangered Species 9-1
9.1.2 USFWS Birds of Conservation Concern 9-2
9.2 Environmental Analysis 9-2
9.3 Protection, Mitigation, and Enhancement Measures 9-3
9.4 Unavoidable Adverse Effects 9-3
9.5 References 9-3

10.0 RECREATION RESOURCES 10-1
10.1 Affected Environment 10-1
10.2 Environmental Analysis 10-1
10.3 Protection, Mitigation, and Enhancement Measures 10-2
10.4 Unavoidable Adverse Effects 10-2
10.5 References 10-2

11.0 LAND USE AND AESTHETIC RESOURCES 11-1
11.1 Affected Environment 11-1
11.1.1 Land Use 11-1
11.1.2 Aesthetic Resources 11-1
11.2 Environmental Analysis 11-2
11.2.1 Land Use 11-2
11.2.2 Aesthetic Resources 11-2
11.3 Protection, Mitigation, and Enhancement Measures 11-3
11.4 Unavoidable Adverse Effects 11-3

11.5 References 11-3

12.0 CULTURAL (HISTORIC AND ARCHAEOLOGICAL) RESOURCES 12-1
12.1 Affected Environment 12-1
12.2 Environmental Analysis 12-3
12.3 Protection, Mitigation, and Enhancement Measures 12-3
12.4 Unavoidable Adverse Effects 12-3
12.5 References 12-3

13.0 SOCIOECONOMIC RESOURCES 13-1
13.1 Affected Environment 13-1
13.2 Environmental Analysis 13-3
13.3 Protection, Mitigation, and Enhancement Measures 13-3
13.4 Unavoidable Adverse Effects 13-3
13.5 References 13-3

LIST OF TABLES

Table 2-1 Rated Generating and Maximum Hydraulic Capacities 2-2
Table 5-1 Soil Types within One Quarter Mile of the Nacoochee Development 5-1
Table 6-1 Prorated Mean Monthly Inflow into Nacoochee Dam Based on 2008 – 2021 Data from USGS Station No. 02178400 6-1
Table 8-1 Wetlands within the Quarter Mile Buffer of the Nacoochee Development 8-2
Table 9-1 Potentially Occurring Federally Listed Species Near the Action Area 9-1
Table 13-1 Estimated Population of Rabun County, Georgia and the State of Georgia 13-1
Table 13-2 Household Incomes and Distributions for Rabun County, Georgia 13-2
Table 13-3 Population Statistics for Lakemont, GA 13-2
Table 13-4 Top Employment Sectors for Lakemont, GA 13-2

LIST OF FIGURES

Figure 1-1 Nacoochee Development Location 1-1
Figure 4-1 North Georgia Project Location within the Savannah River Basin and Tugaloo Subbasin 4-2
Figure 5-1 Soil Types within One Quarter Mile of the Nacoochee Development 5-2
Figure 8-1 Wetlands near the Nacoochee Development 8-3

LIST OF PHOTOS

Photo 2-1 Work Areas at the Nacoochee Development 2-1
Photo 11-1 View of Lake Seed 11-2

LIST OF APPENDICES

Appendix A: Consultation
Appendix B: Information and Planning for Consultation (IPaC) Report

ACRONYMS, ABBREVIATIONS AND DEFINITION OF TERMS

A	
Advisory Council	Advisory Council on Historic Preservation
Amendment Application	Application for Non-Capacity License Amendment
APEA	Applicant-Prepared Environmental Assessment
B	
BCC	Birds of Conservation Concern
BMPs	Best Management Practices
C	
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
CZMA	Coastal Zone Management Act
CWA	Clean Water Act
D	
DO	Dissolved Oxygen
E	
EFH	Essential Fish Habitat
ESA	Endangered Species Act
F	
°F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
fps	feet per second
G	
Georgia DNR	Georgia Department of Natural Resources
Georgia EPD	Georgia Environmental Protection Division
Georgia HPD	Georgia Historic Preservation Division
Georgia Power	Georgia Power Company
Georgia DNR WRD	Georgia Department of Natural Resources Wildlife Resources Division
H	
HUC	Hydrologic Unit Code
I	
IPaC	Information Planning and Conservation
L	
Lake Seed	Nacoochee Development reservoir

M

mgd	million gallons per day
mg/l	milligrams per liter
msl	mean sea level
MOU	Memorandum of Understanding
MW	Megawatt

N

NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places

P

PA	Programmatic Agreement
PME	Protection, Mitigation, and Enhancement Measures

R

RM	river mile

S

SHPO	State Historic Preservation Office
SUOPWPR	Savannah-Upper Ogeechee Water Planning Region

U

USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
U.S.C	U.S. Code

W

WQC	Water Quality Certification

1.0 INTRODUCTION

Georgia Power Company (Georgia Power) owns and operates the North Georgia Project, Project No. 2354 (Project), that was issued a new license by the Federal Energy Regulatory Commission (FERC) on October 3, 1996. The existing North Georgia Project license expires September 31, 2036. The North Georgia Project consists of six hydropower developments (upstream to downstream): Burton, Nacoochee, Mathis-Terrora, and Tallulah Falls on the Tallulah River; and Tugalo and Yonah on the Tugaloo River. The Nacoochee Development of the North Georgia Project is the subject of this Applicant Prepared Environmental Assessment (APEA). The Nacoochee dam is located at river mile (RM) 363 on the Tallulah River in Rabun County, Georgia (Figure 1-1).

The Nacoochee Development consists of a 73-foot-high concrete gravity dam with non-overflow, intake, low-level sluiceway[1] and free-crested spillway sections, a powerhouse with two generating units, a tailrace, and a transformer and switchgear in a small substation adjacent to the powerhouse. The Nacoochee Development reservoir (Lake Seed) has a surface area of 260 acres at 1,752.5 feet above mean sea level (msl) with a gross storage capacity of 8,250 acre-feet and a useable storage capacity of 5,350 acre-feet at full pool. Water from the tailrace of the upstream Burton powerhouse returns to the Tallulah River and almost immediately flows into Lake Seed. The Nacoochee powerhouse is a steel, reinforced concrete, and masonry structure that sits at the toe of the dam.

The Nacoochee powerhouse contains two generating units, a control room, and a machine shop. Currently, each unit has a vertical shaft, propeller-type turbine rated 4,000 horsepower (hp) at 58 feet of head, and a directly connecting alternating current generator rated 3,000 kilovolt-amperes (KVA), 2,400 kilowatts (kW) at 400 revolutions per minute (rpm).

Georgia Power proposes to amend the North Georgia Project license to upgrade two generating units in the Nacoochee powerhouse. The upgrade will include replacing the turbine runners, and generators (Proposed Action). Georgia Power consulted with agencies on the Proposed Action and documentation of the consultation is provided in

[1] Georgia Power has submitted drawings proposing to permanently close the low level sluiceway. Accession Nos. 20220912-5170 and 20220912-5171 (filed September 12, 2022) and Accession No. 20230203-5067 (filed February 3, 2023).

Appendix A. In addition to this APEA, the application to amend the Project license consists of an initial statement and an updated Exhibit A (Amendment Application). The APEA analyzes the effects of Georgia Power's Proposed Action on environmental, recreation, socioeconomic, and cultural resources at the Nacoochee Development.

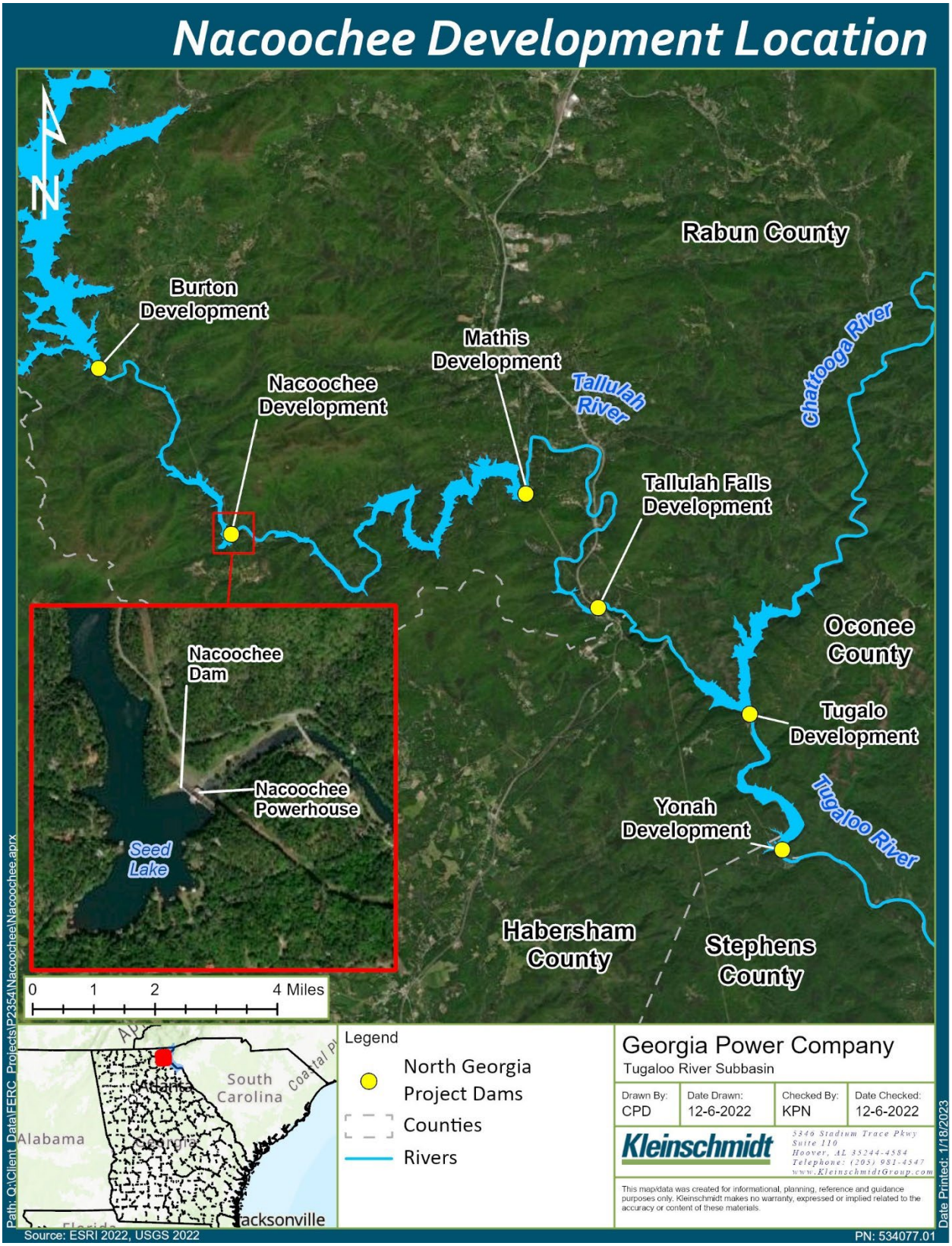


Figure 1-1 Nacoochee Development Location

1.1 Statutory and Regulatory Requirements

Georgia Power, as licensee for the North Georgia Project, is subject to the requirements of the Federal Power Act (FPA) and other statutes that may be applicable in the FERC license amendment process. The potentially applicable statutory requirements are summarized below.

1.1.1 Section 401 of Clean Water Act

Under Section 401(a)(1) of the Clean Water Act (CWA), an applicant for a federal license or permit to conduct an activity that may result in discharge into waters of the United States must provide the licensing or permitting agency with a water quality certification (WQC) that the discharge would not violate water quality standards from the applicable state. In Georgia, WQCs are issued by the Georgia Environmental Protection Division (Georgia EPD) as part of the Georgia Department of Natural Resources wetland regulatory program via O.C.G.A. Title 12 Chapter 5-21. The existing license for the North Georgia Project includes a 401 WQC issued by Georgia EPD on August 15, 1991.

The existing spillway and the Proposed Action that is the subject of this license amendment application is located in the state of Georgia and the discharge originates in Georgia. During consultation for this Amendment Application, Georgia EPD noted that the Proposed Action is not expected to impact water quality (Appendix A).

1.1.2 Endangered Species Act

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of federally listed threatened and endangered species or result in the destruction or adverse modification of their designated critical habitat. Georgia Power defined the Project Area associated with the Proposed Action in the USFWS' Information for Planning and Consultation (IPaC) tool to identify federal threatened and endangered species that have the potential to occur within the area of impact at the Nacoochee Development (i.e., action area). An assessment of effects on ESA-listed species is provided in Section 9.0 and the IPaC report is in Appendix B.

1.1.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act, first passed in 1976, fosters long-term biological and economic sustainability of the nation's marine fisheries extending to 200 nautical miles

from shore. This act is the primary law governing marine fisheries management in United States federal waters. The Magnuson-Stevens Act requires the eight regional Fishery Management Councils, in collaboration with National Oceanic and Atmospheric Administration (NOAA), to consider essential fish habitat (EFH) in resource management decisions. Congress defines EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth and maturity." The designation and consideration of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities. There is no EFH located in the North Georgia Project and EFH consultation pursuant to Section 305(b) of the Magnuson-Stevens Act is not required.

1.1.4 Coastal Zone Management Act

Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 United States Code (U.S.C.) Section 1456(3)(A), FERC must receive concurrence from the state CZMA agency that federal actions are not within or affecting the state's coastal zone prior to issuing an approval. The North Georgia Project is not located in the eleven counties included in a coastal area[2] and it does not affect any land or water use or natural resources of the coastal zone (Appendix A).

1.1.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires FERC to consider potential adverse effects to historic properties prior to approving a license amendment. FERC executed a Programmatic Agreement (PA) for the Project with the Advisory Council on Historic Preservation (Advisory Council), the Georgia State Historic Preservation Office (SHPO), South Carolina SHPO, and the Licensee, on January 30, 1996. Georgia Power consulted with the Georgia SHPO per requirements of the PA on this Amendment Application and the SHPO concurred that the license amendment would constitute an adverse effect to historic properties. Consultation with the SHPO is summarized in Section 12.0 and provided in Appendix A.

[2] The Georgia Coastal Management Program has identified the coastal zone as the eleven coastal counties of Brantley, Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, and Wayne. The North Georgia Project is not located in the coastal zone.

2.0 PROPOSED ACTION & ALTERNATIVES

This section describes the no action alternative and Georgia Power's Proposed Action.

2.1 No Action Alternative

Under the no-action alternative, the Nacoochee Development of the North Georgia Project would remain unimproved aside from routine maintenance and aging equipment (i.e., turbines) would not be replaced.

2.1.1 Existing Project Facilities and Operations

Water for generation at the Nacoochee powerhouse comes from rainfall in the Tallulah River basin. The Nacoochee Development is operated as modified run-of-river; Lake Seed stores inflow over short periods of time, which is utilized to provide generation from the Nacoochee powerhouse during peak power demand hours. The Nacoochee powerhouse discharges directly into Lake Rabun, the reservoir for the Mathis-Terrora Development (the dam is about one-mile downstream).

The Nacoochee Development is operated to help meet the demand during peak periods of the day. Due to the small size of Lake Seed, the Nacoochee Development cannot be operated for a sustained period of time unless the upstream Burton Development is also operated to provide inflow to the Nacoochee Development. Therefore, the Nacoochee Development's mode of operation is essentially the same as Burton's: during periods of adverse or mean flow, generation is limited to peak demand hours, which generally amounts to several hours per day on weekdays. In periods of high inflow, the Nacoochee Development would operate additional hours during non-peak demand periods to make best use of the inflow without spilling water. Lake Seed is kept at or near full pool elevation throughout the year.

The Nacoochee Development consists of a 73-foot-high concrete gravity dam with non-overflow, intake, low-level sluiceway[3] and free-crested spillway sections, a powerhouse with two generating units, a tailrace, and a transformer and switchgear in a small substation adjacent to the powerhouse. The Nacoochee Development reservoir (Lake Seed) has a surface area of 260 acres at 1,752.5 feet above mean sea level (msl) with a

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gross storage capacity of 8,250 acre-feet and a useable storage capacity of 5,350 acre-feet at full pool. The total installed capacity is 4.85 megawatts (MW). The units at the Nacoochee development are programmed to cycle on and off depending on the water elevation of Lake Seed, which depends on the operation of the upstream Burton Development.

2.2 Proposed Action

2.2.1 Proposed Project Facilities and Operations

Georgia Power proposes to upgrade the two generating units at the Nacoochee Development of the North Georgia Project by replacing the turbine runners and generators (Proposed Action). Upgrading the generating units will allow the Nacoochee Development to continue to meet the operational requirements of its existing license. The proposed unit upgrades are expected to take four months per unit, with completion anticipated by December 2024. Table 2-1 provides the rated generating and maximum hydraulic capacities of the existing units with the expected performance of the upgraded units. Performance of the upgraded units may vary slightly based on final design, headwater conditions, and fabrication.

Table 2-1 Rated Generating and Maximum Hydraulic Capacities

Unit[4]	Existing Rated (Best Gate/Most Efficient) Capacity (MW)	Existing Max Hydraulic Capacity (CFS)	Proposed Rated (Best Gate/Most Efficient) Capacity (MW)	Proposed Max Hydraulic Capacity (CFS) after Upgrade
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*Max flow from units 1 and 2 were tested in the field on April 21, 2021. Best gate flow was 563 cubic feet per second (cfs) for unit 1 and 690 cfs for unit 2.

The Proposed Action will not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during upgrade work period and following the upgrade. The powerhouse work is anticipated to begin in January 2024.

[4] As contemplated during agency consultation, Georgia Power will replace the trashracks at the plant. See Appendix A. This will occur in advance of implementing the Proposed Action as part of routine maintenance activities.

Photo 2-1 depicts the work areas associated with the Proposed Action at the Nacoochee Development. The work areas are located on previously disturbed land along an existing roadway and are described below.

- Laydown Area 1: Temporary material laydown area for modernization work at powerhouse. Work consists of placement of gravel on existing surface.
- Laydown Area 2: Temporary material laydown area for modernization work at powerhouse. Work consists of placement of gravel on existing surface.
- Craft Parking: Temporary contractor parking for modernization work at powerhouse. Work consists of placement of gravel on existing surface.
- Construction Trailers: Temporary trailers for modernization work at powerhouse. Work consists of placement of gravel to create pads for temporary trailers. Trailers will be utilized by the contractor and Southern Company construction management personnel.
- Wire Yard: Temporary wire yard for modernization work. Work consists of placement of gravel on existing surface.

Photo 2-1 Work Areas at the Nacoochee Development



3.0 CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA) (40 C.F.R. § 1508.7), a cumulative effect is an impact on the environment resulting from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Based on information in this APEA and consultation conducted to date, no resources have the potential to be cumulatively affected by the Proposed Action at the Nacoochee Development.

4.0 GENERAL DESCRIPTION OF THE RIVER BASIN

The North Georgia Project is located within the Savannah River Basin. The headwaters of the Savannah River Basin begin in the Blue Ridge Province and drain approximately 10,577 square miles across southwestern North Carolina, western South Carolina, and eastern Georgia. The Savannah River is approximately 300-miles-long and is the most used water resource within the basin. Downstream of the North Georgia Project, the Chattooga and Tallulah Rivers join to form the Tugaloo River. The Tugaloo River then joins the Seneca River from South Carolina to form the Savannah River, which continues to flow southeasterly to the Atlantic Ocean (Georgia EPD 2001).

The cities of Savannah and Augusta are the major population centers within the Savannah River Basin. Over 55 percent of the Savannah River Basin is covered by forests with forestry-related activities accounting for a substantial part of the basin's economy (Georgia EPD 2001). The Savannah River Basin is divided into seven subbasins. The North Georgia Project (consisting of six dams on the Tallulah and Tugaloo rivers) is located in the Tugaloo River subbasin (Hydrologic Unit Code (HUC) #03060102). Figure 4-1 shows the North Georgia Project within river basin and subbasins (Georgia EPD 2001).

4.1 Topography

The North Georgia Project has rugged topography formed by the Blue Ridge Mountains, a part of the southern end of the Appalachian Mountains. The region is defined by rugged mountains and ridges with elevation changes from 3,000 feet to 4,700 feet. The three northern-most developments (Burton, Nacoochee, and Mathis-Terrora) are located within the Blue Ridge Physiographic Region. The three uppermost associated reservoirs (Burton, Seed, and Rabun, respectively) are approximately 1,650 feet msl to 1,900 feet msl in elevation (Georgia Power 1991). The Tugalo and Yonah Developments are located in the Piedmont Physiographic Region, and the Tallulah Falls Development is located within a transition zone between the two (Georgia Power 1991).

4.2 Climate

The Savannah River Basin experiences mild winters and hot summers in the lower portions, and cold winters and mild summers in the mountainous areas. The mean annual temperature is approximately 65 degrees Fahrenheit (°F). Mean annual precipitation ranges from 40-80 inches annually (mostly rainfall with some snowfall). Rainfall is greatest in March and least in October (Georgia EPD 2001).

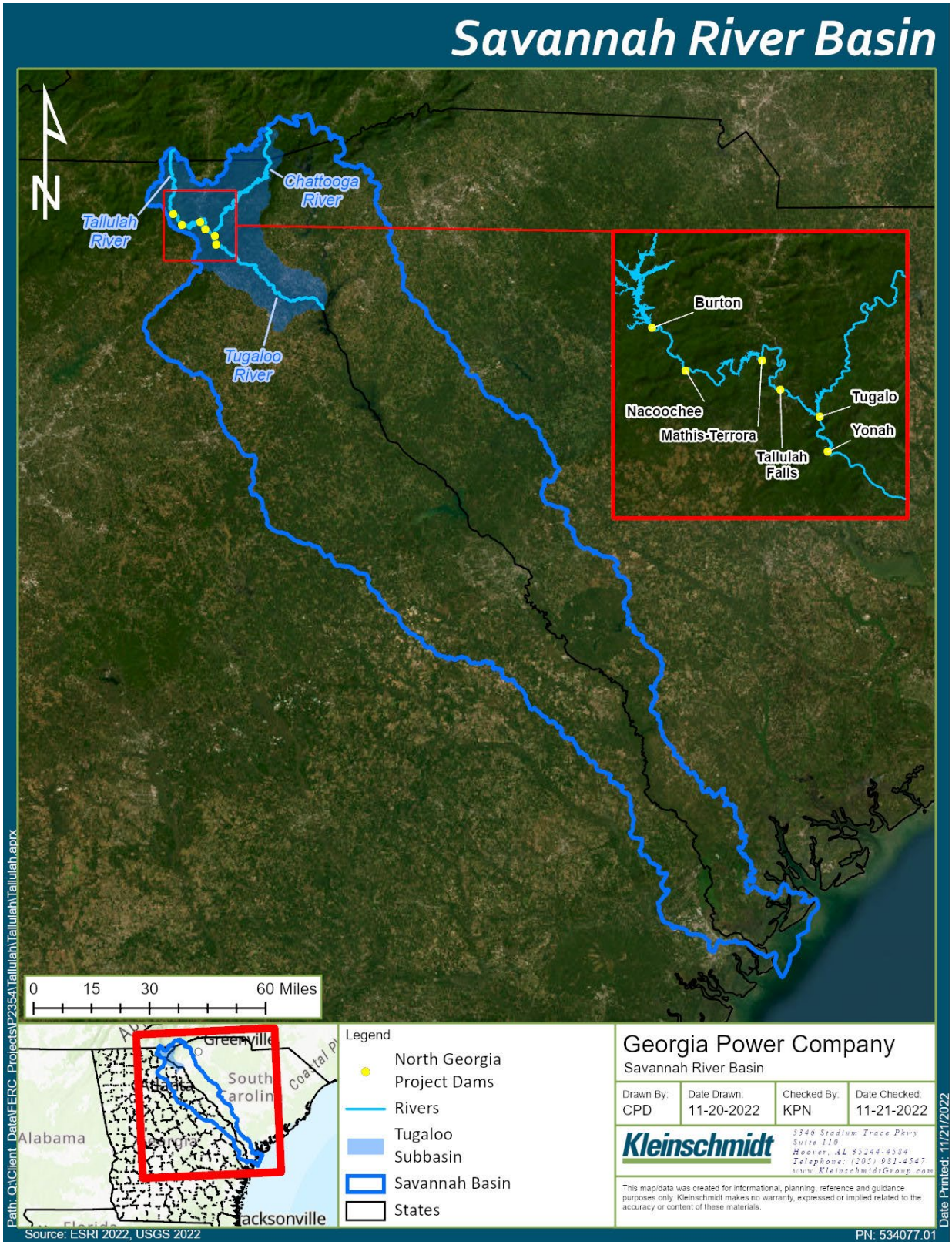


Figure 4-1 North Georgia Project Location within the Savannah River Basin and Tugaloo Subbasin

4.3 References

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

Georgia Department of Natural Resources Environmental Protection Division (Georgia EPD). 2001. Savannah River Basin Management Plan 2001. Available online: file:///J:/534/077/Docs/Background%20Info/Savannah%20River%20Basin%20Management%20Plan%20(1).pdf. Accessed January 2023.

Georgia Power Company. 1991. License Application for the North Georgia Project (FERC Project No. 2354). Accession No. 19911220-0244.

5.0 GEOLOGICAL AND SOIL RESOURCES

5.1 Affected Environment

The Savannah River Basin includes parts of three physiographic provinces: Blue Ridge, Piedmont, and Coastal Plain (Georgia EPD 2001). The North Georgia Project is located in the Blue Ridge Mountain and upper Piedmont of northeastern Georgia and western South Carolina on the Tallulah, Chattooga, and Tugaloo Rivers (FERC 1996). The head waters of the Savannah River Basin originate in the Blue Ridge province and parallels the Georgia and South Carolina border passing through the Piedmont and upper and lower Coastal Plains before reaching the Atlantic Ocean. The Blue Ridge province is dominated by rugged mountains and ridges ranging from 3,000 to 4,700 feet. The boundary between the Blue Ridge and Piedmont is defined by a sharp change in altitude of approximately 1,700 feet. The Blue Ridge and Piedmont provinces are underlain with Precambrian and early Paleozoic rocks (including schists, gneisses, amphibolites, phyllites, and granites) and characterized by numerous inactive fault zones.

The Nacoochee Development is located within the Blue Ridge level III ecoregion and the Southern Crystalline Ridges and Mountains (66d) level IV ecoregion (USEPA 2013). The bedrock of the Southern Crystalline Ridges and Mountains is mostly coarse-grained metamorphic rocks (primarily gneiss and schist), with some igneous rock (bplant 2022).

Soils of the Southern Crystalline Ridges and Mountains ecoregion tend to be well-drained, acidic loams (bplant 2022). The soil composite at the Nacoochee Development generally consists of ultisols, specifically saluda soils (Figure 5-1; Table 5-1).

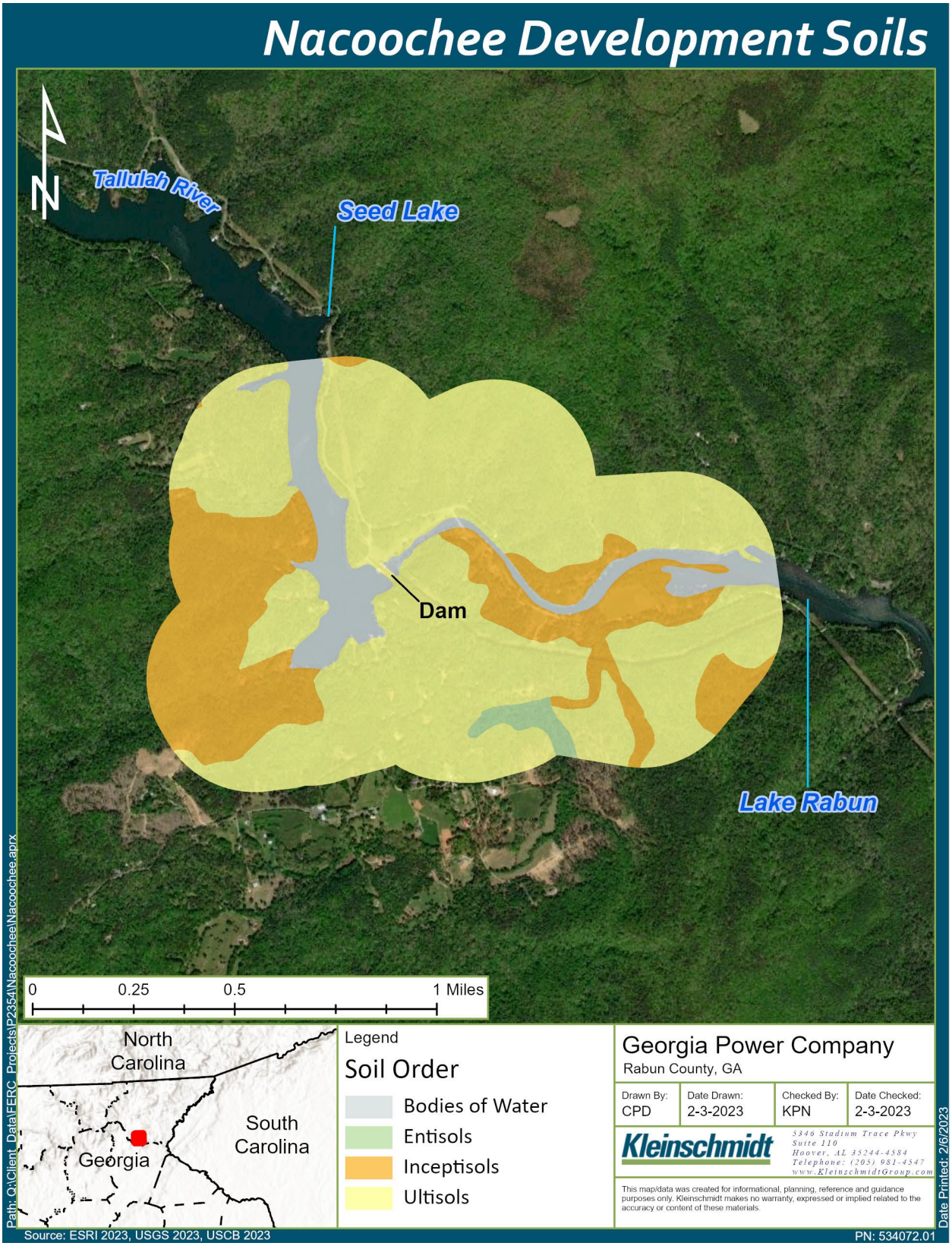


Figure 5-1 Soil Types within One Quarter Mile of the Nacoochee Development

Table 5-1 Soil Types within One Quarter Mile of the Nacoochee Development

Soil Symbol	Soil Type	Soil Order	K-Factor Rock Free	Soil Loss Tolerance Factor	Wind Erodibility Group	Wind Erodibility Index	Acres	Percent
BrE	Bradson fine sandy loam, 10 to 25 percent slopes	Ultisols	0.21	5	3	86	49.65	5.88
BrC	Bradson fine sandy loam, 2 to 10 percent slopes	Ultisols	0.21	5	3	86	5.34	0.63
EPF	Edneyville-Ashe association, stony, steep	Inceptisols	0.19	5	5	56	76.43	9.05
EdE	Edneyville sandy loam, 10 to 25 percent slopes	Inceptisols	0.21	5	3	86	16.45	1.95
EVF	Evard association, steep	Ultisols	0.24	5	3	86	110.34	13.07
HaE	Hayesville fine sandy loam, 10 to 25 percent slopes	Ultisols	0.30	5	3	86	93.24	11.05
HaC	Hayesville fine sandy loam, 2 to 10 percent slopes	Ultisols	0.29	5	3	86	64.44	7.63
PCF	Porters association, stony, steep	Inceptisols	0.24	3	6	48	13.29	1.57
SAF	Saluda association, steep	Ultisols	0.21	2	3	86	223.60	26.49
To	Toccoa fine sandy loam	Entisols	0.28	5	3	86	10.38	1.23
TVF	Tusquitee-Haywood association, steep	Inceptisols	0.20	5	3	86	31.62	3.75
TuE	Tusquitee loam, 10 to 25 percent slopes	Inceptisols	0.24	5	5	56	6.08	0.72
TuC	Tusquitee loam, 4 to 10 percent slopes	Inceptisols	0.24	5	5	56	65.25	7.73
W	Water	Bodies of Water					77.98	9.24
						Total	**844.08**	**100.00**

5.2 Environmental Analysis

Land disturbing activities associated with the Proposed Action are limited to the lay down and construction equipment staging areas.

Georgia Power proposes to perform all construction associated with these enhancements in such a manner as to minimize impacts on shoreline vegetation, bank stability, and water quality. Proper erosion control and restoration practices during and immediately following all construction activities would minimize impacts.

The Proposed Action will not require a drawdown of Lake Seed and Georgia Power will continue operating the Nacoochee Development according to the existing license conditions during and following the upgrade. Therefore, there are no anticipated impacts on the Lake Seed shorelines. Impacts to geological and soil resources will be temporary and minimal, limited to the construction associated with the Proposed Action. Construction activities may cause minor temporary impacts to geological and surface soil resources associated with the construction and movement of equipment.

5.3 Protection, Mitigation, and Enhancement Measures

Georgia Power will implement construction best management practices (BMPs). BMPs are vegetative measures and structural practices that control the erosion of soil and the resulting sedimentation. Construction BMPs include silt fences, at minimum, and Georgia Power will follow the most up to date Georgia Soil and Water Conservation Commission Manual for Erosion and Sediment Control to minimize erosion in the work areas.

5.4 Unavoidable Adverse Effects

Short-term unavoidable adverse impacts include a potential increase in erosion at the work areas. These impacts are temporary during construction periods and would not impact the Nacoochee Development post-construction.

5.5 References

bplant. 2022. Southern Crystalline Ridges and Mountains. Available online at: https://bplant.org/region/875#:~:text=The%20Southern%20Crystalline%20Ridges%20and%20Mountains%2C%20also%20referred,of%20the%20Blue%20Ridge%20mountains%20of%20the%20Appalachians. Accessed January 2023.

Georgia Department of Natural Resources Environmental Protection Division (Georgia EPD). 2001. Savannah River Basin Management Plan 2001. Available online:

file:///J:/534/077/Docs/Background%20Info/Savannah%20River%20Basin%20Management%20Plan%20(1).pdf. Accessed January 2023.

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

U.S. Environmental Protection Agency (EPA). 2013. Level III ecoregions of the continental United States: Corvallis, Oregon, U.S. EPA – National Health and Environmental Effects Research Laboratory, map scale 1:7,500,000. Available online at: https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states. Accessed January 2023.

6.0 WATER RESOURCES

6.1 Affected Environment

6.1.1 Water Quantity

The Nacoochee Development lies within the Tugaloo River Subbasin (HUC 03060102) of the Savannah River Basin (HUC 030601) and has a drainage area of 184.5-square-miles (USGS 2023a). Historically, the Nacoochee Development operated in a modified run-of-river mode; Lake Seed stores inflow over short periods of time, which is utilized to provide generation from Nacoochee powerhouse during peak power demand hours. Only short riverine sections exist downstream of the Burton, Nacoochee, and Tugalo facilities (Georgia Power 1991).

Based on streamflow measured at the Tallulah River near Clayton, GA (USGS Station No. 02178400; drainage area of 58.4-square-miles), and prorated for the increased drainage area downstream at Nacoochee Dam, the estimated monthly average inflow into Nacoochee Dam from 2008 to 2021 ranged from 265.1 cfs in September to 691.2 cfs in February based on the measured discharge at the upstream gage 02178400 (Table 6-1) (USGS 2023a, USGS 2023b).

Table 6-1 Prorated Mean Monthly Inflow into Nacoochee Dam Based on 2008 – 2021 Data from USGS Station No. 02178400

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Inflow	608.3	691.2	641.5	636.7	539.7	385.8	319.5	307.7	265.1	340.8	364.5	565.7

Source: USGS 2023a, USGS 2023b

The Nacoochee Development is within the state of Georgia's Savannah-Upper Ogeechee Water Planning Region (SUOWPR). According to the SUOWPR 2017 Regional Water Plan, surface water withdrawals in the region are primarily used for industrial (69 million gallons per day [mgd]), municipal (68 mgd), and energy (65 mgd) purposes, and the remainder is used for agriculture (16 mgd) (SUOWPC 2017). The City of Toccoa withdraws supplemental municipal water from Yonah Lake (an impoundment that begins approximately 19 miles downstream of Nacoochee Dam). The City of Clayton[5] is permitted

[5] The City of Clayton is now under a contract with the Rabun County Water and Sewer Authority.

to withdraw 3.5 mgd from Lake Rabun (Georgia Power 1991) (an impoundment that begins in the tailrace of the Nacoochee Development).

6.1.2 Water Quality

Designated water uses are assigned by the state of Georgia to all surface waters. These classifications are determined to be the best utilization of the surface water, and Georgia's dissolved oxygen (DO) standards are based on these stream-specific classifications (SUOWPC 2017). Georgia's use classification for the Tallulah River in the Project Area (from the Lake Rabun Dam to the confluence with the Chattooga River) is "Recreation" (GAEPD 2016). This classification requires a daily average DO concentration of 5 milligrams per liter (mg/L) and no less than 4 mg/L at any time (SUOWPC 2017). The GDNR Wildlife Resources Division (WRD) designated the Tallulah River as primary trout waters, which are defined as waters with the potential to hold self-sustaining populations of trout (Georgia Power 1991).

Thermal stratification does not typically occur in Lake Seed due to the relatively small storage volume and higher water exchange rate as compared to other nearby large impoundments such as Lakes Burton, Rabun and Tugalo. The entire water column in Lake Seed tends to remain relatively isothermal throughout the year; although, transient thermal stratification was observed in June and July 1988. Nacoochee DO concentrations were shown as meeting state standards (Georgia Power 1991).

6.2 Environmental Analysis

6.2.1 Water Quantity

The Proposed Action does not require a drawdown of Lake Seed, and the Nacoochee Development will operate under the current license conditions. Therefore, there are no anticipated impacts to water quantity related to the Proposed Action.

6.2.2 Water Quality

The Proposed Action will not require a drawdown of Lake Seed and Georgia Power will continue operating the Nacoochee Development according to the existing license conditions during and following the upgrade. Therefore, there are no anticipated impacts to water quality at the Nacoochee Development.

Land disturbing activities associated with the Proposed Action are limited to the lay down and construction equipment staging areas. Georgia Power proposes to perform all

construction associated with these enhancements in such a manner as to minimize impacts on shoreline vegetation, bank stability, and water quality. Proper erosion control and restoration practices during and immediately following all construction activities would minimize impacts.

6.3 Protection, Mitigation, and Enhancement Measures

Georgia Power will implement construction BMPs. BMPs are vegetative measures and structural practices that control the erosion of soil and the resulting sedimentation. Construction BMPs include silt fences, at minimum, and Georgia Power will follow the most up to date Georgia Soil and Water Conservation Commission Manual for Erosion and Sediment Control to address potential sedimentation and water turbidity.

6.4 Unavoidable Adverse Effects

Short-term unavoidable adverse impacts include a potential increase in erosion at the work areas. These impacts are temporary during construction periods and would not impact the Nacoochee Development post-construction.

6.5 References

Georgia Environmental Protection Division (Georgia EPD). 2016. Water Use Classifications and Water Quality Standards. Available online at: http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/391-3-6-.03%20Triennial%2013%20Final%20Edits.pdf. Accessed January 2023.

Georgia Power Company. 1991. License Application for the North Georgia Project (FERC Project No. 2354). Accession No. 19911220-0244.

Savannah Upper-Ogeechee Water Planning Council (SUOWPC). 2017. Savannah Upper Ogeechee Regional Water Plan. Available online at: https://waterplanning.georgia.gov/savannah-upper-ogeechee-regional-water-plan. Accessed February 2023.

United States Geological Survey (USGS). 2023a. USGS Stream Stats. https://streamstats.usgs.gov/ss/. Accessed February 2023.

United States Geological Survey (USGS). 2023b. USGS 02178400 Tallulah River near Clayton, GA. https://waterdata.usgs.gov/monitoring-location/02178400/#parameterCode=00065&period=P7D. Accessed February 2023.

7.0 FISH AND AQUATIC RESOURCES

7.1 Affected Environment

Georgia Power performed fisheries surveys from 1988 to 1989 in the spring and fall at 19 stations distributed throughout the North Georgia Project's 37-mile study area (containing six reservoirs and three riverine stretches). The riverine stretches did not include areas immediately upstream or downstream of the Nacoochee Dam, however, riverine sampling results from other riverine stretches within the North Georgia Project are included for context. Forty-four fish species were found in the study area, with the most abundant belonging to sunfish (Centrarchidae), perch (Percidae), and minnow (Cyprinidae) families. Sixteen sport-fish species (primarily walleye (*Sander vitreus)*, largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), spotted bass (*Micropterus punctulatus*), redbreast sunfish (*Lepomis auratus*), and yellow perch (*Perca flavescens*)) and 28 non-sport/forage species such as swamp darter (*Etheostoma fusiforme*), gizzard shad (*Dorosoma cepedianum*), margined madtom (*Noturus insignis*), and northern hogsucker (*Hypentelium nigricans*)) also inhabit the North Georgia Project area (FERC 1996).

Reservoir Sampling

A total of 30 species, representing 9 families, were collected in the North Georgia Project reservoirs. The North Georgia Project reservoir fish communities consisted primarily of sunfish (including Black Bass (*Micropterus* spp.)), perch, minnows, and catfish (Siluriformes) (Georgia Power 1991). Sport fish species were the dominant species within the reservoirs, representing 79-99 percent of the total number of fish captured (FERC 1996).

Riverine Stretches Sampling

A total of 33 species were collected at the riverine sampling stations, with the majority being native to the upper Savannah River Basin. The North Georgia Project riverine fish communities were more diverse than the reservoir communities and consisted primarily of minnows, sunfish, suckers (Catostomidae), catfish, and perch (Georgia Power 1991). Sport fish species represented 33-41 percent of the fish collected in riverine habitat. Non-sport fish/forage species found in the riverine stretch below Tallulah Falls Dam included darters (Etheostomatinae), chubs (*Nocomis* spp.), madtoms (*Noturus* spp.), hogsuckers (*Hypentelium* spp.), and stonerollers (*Campostoma* spp.) (all of which were generally not found within the reservoirs).

Georgia Power works with the Georgia DNR to further enhance the walleye fishery in Lake Seed through stocking (Georgia Power 1991).

7.2 Environmental Analysis

The Proposed Action will not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during and following the upgrade. Therefore, there are no anticipated impacts to fish and aquatic resources related to the Proposed Action.

7.3 Protection, Mitigation, and Enhancement Measures

Georgia Power does not propose any PME measures for fish and aquatic resources.

7.4 Unavoidable Adverse Effects

The Proposed Action at the Nacoochee Development would have no expected impact on fish populations compared to existing conditions and therefore, no unavoidable adverse effects.

7.5 References

Georgia Power Company. 1991. License Application for the North Georgia Project (FERC Project No. 2354). Accession No. 19911220-0244.

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

8.0 WILDLIFE AND TERRESTRIAL RESOURCES

8.1 Affected Environment

8.1.1 Wildlife Resources

Burton, Seed, and Rabun Lakes have been developed for both summer and permanent homes and a significant percentage of these three lakes' shorelines are affected by development. However, the remaining undeveloped shorelines and adjoining mixed forests and wetlands of Lake Seed provide habitat for many wildlife species occurring in the project area. Common terrestrial mammals include white-tailed deer (*Odocoileus virginianus*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), black bear (*Ursus americanus*), eastern cottontail (*Sylvilagus floridanus*), Virginia opossum (*Didelphis virginiana*), and gray squirrel (*Sciurus carolinensis*). Beaver (*Castor canadensis),* muskrat (*Ondatra zibethicus*), and river otter (*Lontra canadensis*) inhabit wetlands and other aquatic habitats (FERC 1996; Georgia Power 1991). Reptile and amphibian species are less diverse on North Georgia Project lands bordering the reservoirs than within the riverine stretches.

The bird community is likely diverse based on the diversity of aquatic, wetland, and terrestrial habitats within the Nacoochee Development. A number of resident and seasonally migrant songbirds (Passeriformes) occur on North Georgia Project lands (Georgia Power 1991). Expected raptors include several hawks (Accipitridae.) and owls (Strigidae), osprey (*Pandion haliaetus*), bald eagle (*Haliaeetus leucocephalus*), and peregrine falcon (*Falco peregrinus*). The North Georgia Project lakes, including Lake Seed, experience limited use by migrating waterfowl. Species such as bufflehead (*Bucephala albeola*), hooded merganser (*Lophodytes cucullatus*), common loon (*Gavia immer*), and American coot (*Fulica americana*) winter in the North Georgia Project area (FERC 1996).

8.1.2 Terrestrial Resources

Mixed pine/hardwood forest dominates vegetative cover at the upper reservoirs (Lakes Burton, Seed, and Rabun), with Virginia Pine/White Pine and mixed pine/hardwood dominating the lower reservoirs (Tugalo and Yonah Lakes) (FERC 1996). Lakes Burton, Seed, and Rabun have similar plant communities which include white pine and mixed

pine-hardwoods occurring on the lake slopes with small hardwood communities in draws[6] and streams (Georgia Power 1991).

8.1.3 Wetlands

There are approximately 90.1 acres of wetlands within a quarter-mile buffer of Nacoochee Dam and Lake Seed. Freshwater Forested/Shrub Wetland is the only wetland type besides Lake, Riverine, and Freshwater Pond within the quarter-mile buffer, comprising 3.4 acres or 3.8 percent of wetlands within the buffer (USFWS NWI 2023) (Figure 8-1; Table 8-1).

Table 8-1 Wetlands within the Quarter Mile Buffer of the Nacoochee Development

Wetland Type	Acreage	Percent
Freshwater Forested/Shrub Wetland	3.4	3.8%
Lake	84.0	93.2%
Riverine	2.4	2.7%
Freshwater Pond	0.3	0.4%
Total	90.1	100%

Source: USFWS NWI 2023

[6] A draw is a less developed stream course than a valley. In a draw, there is essentially no level ground and, therefore, little or no maneuver room within its confines. If you are standing in a draw, the ground slopes upward in three directions and downward in the other direction. A draw could be considered as the initial formation of a valley.

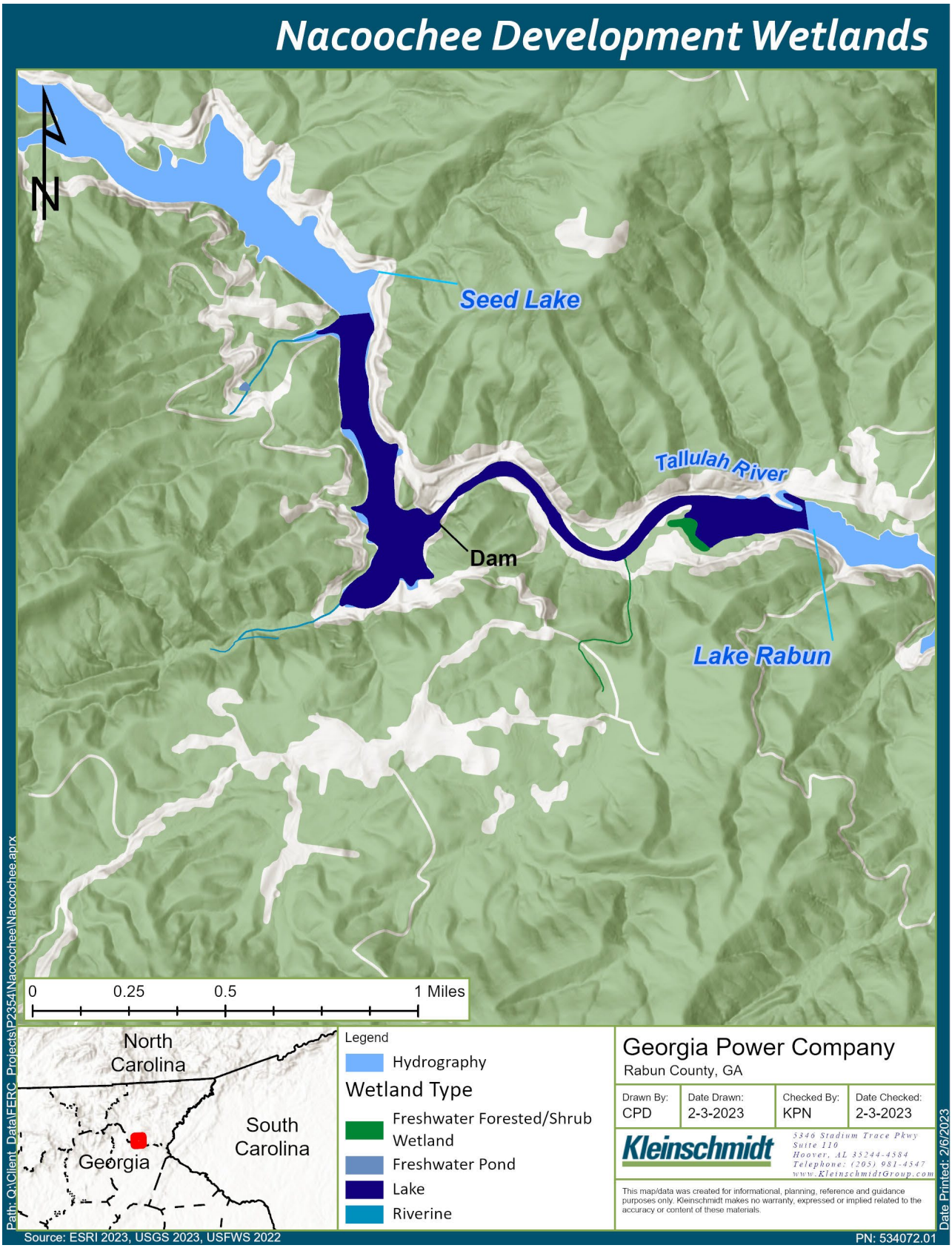


Figure 8-1 Wetlands near the Nacoochee Development

8.2 Environmental Analysis

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will continue operating the Nacoochee Development according to the existing license conditions during and following the upgrade. Therefore, there are no anticipated significant impacts to wildlife and terrestrial habitat related to the Proposed Action.

Impacts to wildlife and terrestrial resources will be temporary and minimal, limited to the construction associated with the Proposed Action. Land disturbing activities associated with the Proposed Action will be located in a previously disturbed area with limited wildlife habitat. Noise from the construction activities may cause minor temporary disturbance to wildlife and terrestrial resources during construction activities.

8.3 Protection, Mitigation, and Enhancement Measures

Any potential wetland areas would be avoided during the Proposed Action. There are no specific PME measures associated with wildlife, terrestrial, or wetland resources.

8.4 Unavoidable Adverse Effects

Short-term unavoidable adverse impacts to wildlife associated with the Proposed Action include an increase in noise around the Nacoochee dam due to construction equipment and activity. These impacts are temporary during construction periods and would not impact wildlife at the Nacoochee Development post-construction.

8.5 References

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

Georgia Power Company. 1991. License Application for the North Georgia Project (FERC Project No. 2354). Accession No. 19911220-0244.

United States Fish and Wildlife Service (USFWS). 2023. National Wetlands Inventory (NWI), Online Wetlands Mapper. https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper/. Last updated February 1, 2018. USFWS, Washington D.C.

9.0 RARE, THREATENED, AND ENDANGERED SPECIES

9.1 Affected Environment

9.1.1 Threatened and Endangered Species

A USFWS Information Planning and Conservation (IPaC) report related to the Proposed Action at the Nacoochee Development (Project code: 2023-0041542 generated on February 3, 2023) listed nine federally threatened, endangered, or candidate species potentially occurring in nearby areas (Table 9-1). There is no designated Critical Habitat for any of the species within the IPaC action area.

Table 9-1 Potentially Occurring Federally Listed Species Near the Action Area

Common Name	Scientific Name	Status	Critical Habitat?
Mammals			
Gray Bat	*Myotis grisescens*	Endangered	No
Northern Long-eared Bat	*Myotis septentrionalis*	Endangered	No
Reptiles			
Bog turtle	*Glyptemys muhlenbergii*	Threatened	No
Insects			
Monarch Butterfly	*Danaus plexippus*	Candidate	No
Flowering Plants			
Persistent Trillium	*Trillium persistens*	Endangered	No
Small Whorled Pogonia	*Isotria medeoloides*	Threatened	No
Swamp Pink	*Helonias bullata*	Threatened	No
White Fringeless Orchid	*Platanthera integrilabia*	Threatened	No
Lichens			
Rock Gnome Lichen	*Gymnoderma lineare*	Endangered	No

Gray bats roost almost exclusively in caves; there are no known caves in or near the action area. Northern long-eared bats use caves in the winter and mostly use forested habitat and tree roosts during the summer. They occasionally roost in human-made structures

but there are no known roosts in the action area. There will be no clearing of suitable forest habitat and no foreseeable impacts to potential aerial foraging habitat.

Bog turtles require very specific mountain bog habitat; there is no suitable habitat in or near the action area.

Monarch butterflies could occur essentially anywhere across the landscape. However, no suitable foraging habitat for larvae (milkweed leaves) or adults (various flowering plants) was observed in or near the action area.

The action area has a history of heavy disturbance and consists mostly of frequently mowed grass, improved driving and parking facilities, and roadside embankment. No suitable habitat for any of the plants of concern occurs in the action area, though Georgia Power works closely with Georgia DNR and USFWS to manage Persistent Trillium populations elsewhere in the vicinity.

9.1.2 USFWS Birds of Conservation Concern

The IPaC report also listed four migratory birds as Birds of Conservation Concern (BCC) potentially occurring in nearby areas of the Nacoochee Development: Bald Eagle (*Haliaeetus leucocephalus*), Chimney Swift (*Chaetura pelagica*), Kentucky Warbler (*Oporornis formosus*), and Wood Thrush (*Hylocichla mustelina*). Each of these species is designated as a BCC throughout its range in the United States. Although these species likely occur in the vicinity of the action area, the proposed action should have no impact on nesting, roosting, or foraging habitat.

The Bald Eagle is protected under the Bald and Golden Eagle Protection Act (USFWS 2023). The North Georgia Project lakes, including Lake Seed, provide limited eagle habitat due to their depth (FERC 1996). The nearest known bald eagle nest is 3.5 miles northwest of the Nacoochee Development, just below the Burton dam; therefore, there are no anticipated impacts to eagle nesting or foraging at the Nacoochee Development.

9.2 Environmental Analysis

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will continue operating the Nacoochee Development according to the existing license conditions during and following the upgrade. Therefore, there are no anticipated impacts to rare, threatened, and endangered species related to the Proposed Action.

Land disturbing activities associated with the Proposed Action are limited to an area that is heavily disturbed and consists mostly of frequently mowed grass, improved driving and parking facilities, and roadside embankment. There are no federally listed species or designated critical habitat for consideration in the action area (Appendix B); therefore, there are no impacts anticipated to federally listed threatened or endangered species by the Proposed Action.

9.3 Protection, Mitigation, and Enhancement Measures

Georgia Power will continue to consult with USFWS on the Proposed Action.

9.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects identified for rare, threatened, and endangered species.

9.5 References

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

U.S. Fish and Wildlife Service (USFWS). 2023. List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project. Project Code: 2023-0041542.

10.0 RECREATION RESOURCES

10.1 Affected Environment

The Northeast Georgia Mountains Region offers numerous recreation opportunities including hiking, biking, camping, climbing, fishing, hunting, canoeing, and kayaking. The area is considered the gateway to the Appalachian Mountains. Guided whitewater rafting trips are available on the Chattooga River on Class II, III, IV, and V rapids (Discover GA Outdoors 2019). The region is home to two of Georgia's most popular lakes, Lake Lanier, and Lake Hartwell. Lake Lanier is a 38,000-acre lake with over 690 miles of shoreline with 76 recreational areas, including 40 U.S. Army Corps of Engineers (USACE)-operated parks and campgrounds, and 10 marinas (Explore GA 2022). Lake Hartwell is a 56,000-acre lake downstream of the North Georgia Project on the Georgia-South Carolina border. Recreation activities include boating, fishing, camping, and sightseeing.

Georgia's two national forests (Chattahoochee and Oconee) cover 867,000 acres and offer approximately 850 miles of recreation trails, dozens of campgrounds, and picnic areas (USDA 2022a). Recreation activities include biking, camping, fishing, hiking, horse riding, nature viewing, swimming, and boating (USDA 2022b). The Nacoochee Development is adjacent to the Chattahoochee National Forest, and approximately 66 miles north of the Oconee National Forest.

Project Recreation

Lake Seed is the second smallest lake of the North Georgia Project and has a moderately developed shoreline. Due to its small size, Lake Seed offers one public access boat ramp, which only accommodates smaller watercraft. The Lake Seed Boat Ramp is approximately one mile upstream from the Nacoochee Dam on the eastern shoreline. In addition, Georgia Power manages the Lake Seed Campground, a primitive campground with restroom facilities located on the western shoreline in the area of the boat ramp. Recreation opportunities on Lake Seed primarily include canoeing, swimming, and bank fishing. Nacoochee Park is situated below the dam on the northern bank of the tailrace. It offers four picnic tables and restroom facilities.

10.2 Environmental Analysis

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will continue operating the Nacoochee Development according to the existing license

conditions during and following the upgrade. Recreation facilities on the lake will be available during the unit upgrades. However, downstream of the dam and located where the proposed laydown areas are, Nacoochee Park will be closed to visitors for the duration of the Proposed Action.[7]

Therefore, there will be minor impacts to recreation resources related to the Proposed Action due to the closure of Nacoochee Park.

10.3 Protection, Mitigation, and Enhancement Measures

There are no specific PME measures associated with recreation resources.

10.4 Unavoidable Adverse Effects

Short-term unavoidable adverse impacts associated with the Proposed Action include potential undesirable views to recreation users around the Nacoochee dam due to construction equipment and activity. These impacts are temporary during construction periods and would not impact the Nacoochee Development post-construction. Nacoochee Park will be closed to visitors for the duration of the Proposed Action; however, there are ample alternative recreation opportunities in the area.

10.5 References

Discover Georgia Outdoors. 2019. Northeast Georgia Mountains: Gateway to Appalachian Mountains. Available online at: https://www.discovergeorgiaoutdoors.com/locate-it/northeast-georgia-mountains/. Accessed January 2023.

Explore Georgia. 2022. Lake Lanier. Available online at: https://www.exploregeorgia.org/gainesville/outdoors-nature/lakes-rivers/lake-lanier. Accessed January 2023.

U.S. Department of Agriculture (USDA). 2022a. Chattahoochee-Oconee National Forest. Home Page Overview. Available online at: https://www.fs.usda.gov/main/conf/. Accessed January 2023.

U.S. Department of Agriculture (USDA). 2022b. Recreation. Available online at: https://www.fs.usda.gov/recarea/conf/recarea/?recid=10454. Accessed January 2023.

[7] Accession No. 20230303-5120 (filed DATE).

11.0 LAND USE AND AESTHETIC RESOURCES

11.1 Affected Environment

11.1.1 Land Use

The Nacoochee Dam is located within Rabun County, Georgia, which consists of approximately 371 square miles. Approximately 80 percent of Rabun County is owned and managed by U.S. Forest Service and Georgia Power. Approximately 18 percent remains in private-ownership and is considered land eligible for development (after removing land covered by lakes and rugged, mountainous terrain) (GA Trend 2007). Land surrounding the Nacoochee Development is primarily rural and undeveloped. The majority of lake front development has occurred at Lakes Burton, Seed, and Rabun with limited development on the shorelines of Lakes Tallulah Falls and Yonah (Georgia Power 1991).

11.1.2 Aesthetic Resources

Aesthetics at the North Georgia Project are typical of the North Georgia mountainous region, with views of diverse landscapes including steep woodlands, forested mountains, and rugged gorges. Lake Seed is primarily narrow and riverine with a few open water areas and surrounded by steep, rolling woodlands (Photo 11-1). Visibility of Nacoochee Dam is generally low due to its position around a bend in the lake. Nacoochee Dam can be seen from Nacoochee Park but not from the county road accessing the area (FERC 1996).



Source: GDEcD 2023

Photo 11-1 View of Lake Seed

11.2 Environmental Analysis

11.2.1 Land Use

There are no impacts to land use associated with the Proposed Action as the work areas are located on lands that are previously disturbed.

11.2.2 Aesthetic Resources

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during and following the upgrade.

Impacts to aesthetic resources will be temporary and minimal, limited to the construction associated with the Proposed Action. Construction activities may cause minor temporary impacts to aesthetic resources (visual and auditory) while activities associated with the

Proposed Action are completed. Due to the Nacoochee Dam's location within a bend in the lake, views from Lake Seed will be minimally impacted.

11.3 Protection, Mitigation, and Enhancement Measures

Georgia Power does not propose any PME measures for land use or aesthetic resources.

11.4 Unavoidable Adverse Effects

Short-term unavoidable adverse impacts associated with the Proposed Action include an increase in noise and undesirable views around the Nacoochee dam due to construction equipment and activity. These impacts are temporary during construction periods and would not impact the Nacoochee Development post-construction.

11.5 References

Georgia Department of Economic Development (GDEcD). 2023. Explore Georgia: Lake Seed. Available online at: https://www.exploregeorgia.org/lakemont/outdoors-nature/camping/lake-seed. Accessed February 2023.

Georgia Power Company. 1991. License Application for the North Georgia Project (FERC Project No. 2354). Accession No. 19911220-0244.

Georgia Trend. 2007. Rabun County: Looking Ahead. Available online at: https://www.georgiatrend.com/2007/04/01/rabun-county-looking-ahead/#:~:text=Of%20the%20371.1%20square%20miles%20that%20make%20up,private%20owners%20and%20is%20considered%20eligible%20for%20development. Accessed January 2023.

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

12.0 CULTURAL (HISTORIC AND ARCHAEOLOGICAL) RESOURCES

12.1 Affected Environment

A cultural resources survey conducted in 1990 identified seven archaeologic sites and all six hydroelectric developments within the North Georgia Project as eligible for inclusion in the National Register of Historic Places (NRHP). The six hydroelectric developments represent early examples of a large complex hydroelectric system, constructed over a relatively short period of time (1911-1927) and are NRHP-eligible as a historic district. In addition, the facilities are eligible due to their large size, extensive use of diversion tunnels and extended penstocks, construction of a high-head plant at the Tallulah Falls Development, physical characteristics that document changes in design/construction in hydroelectric facilities between 1910 and 1930, and their contribution to the development of a large regional utility company (FERC 1996). The Nacoochee Development was completed in 1925 and is NRHP-eligible individually and as part of the North Georgia Project under Criterion A (events) and Criterion C (architecture).

Site 9RA113 is associated with the construction village for the Nacoochee Development and was recorded and evaluated during the last relicensing. Based on historic maps and information, the site extends well outside the project boundary, but a portion of it is situated within Nacoochee Park. This portion of the site was heavily disturbed and not recommended for any further management. A more recent archaeological survey was conducted in 2022 and supported the original recommendation.

FERC executed the PA with the Advisory Council, Georgia SHPO, South Carolina SHPO, and the Licensee, on January 30, 1996, as a condition of issuing a license for the North Georgia Project. Pursuant to Article 417 of the North Georgia Project license, Georgia Power developed and implemented a Cultural Resources Management Plan (CRMP). In accordance with the PA and CRMP, Georgia Power provides annual cultural resources monitoring reports for the North Georgia Project, however there are no sites that are annually monitored at the Nacoochee Development.

12.2 Environmental Analysis

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during and following the upgrade. Additional shoreline would not be exposed compared to baseline conditions, reducing the potential for archaeological resources to be exposed, and potentially looted. Therefore, there are no anticipated adverse impacts to archaeological resources.

The generating units and turbine runners in the Nacoochee powerhouse are original and considered to be contributing elements to the resource's significance. The Proposed Action involves replacing these units and turbine runners, which will constitute an adverse effect to the resource.

12.3 Protection, Mitigation, and Enhancement Measures

Georgia Power has conducted consultation with Georgia SHPO and received concurrence with this finding. Georgia Power is working on a Memorandum of Agreement (MOA) between SHPO and Georgia Power for the mitigation of adverse effects. SHPO has indicated mitigation measures to include Level II Historic American Engineering Record (HAER) recordation and interpretive signage may be required. The details of the MOA are currently being finalized and will be submitted into the FERC docket as a supplement to the license amendment application.

Georgia Power does not propose any PME measures for cultural resources.

12.4 Unavoidable Adverse Effects

The replacement of the original generators and turbine runners constitutes an unavoidable adverse effect.

12.5 References

Federal Energy Regulatory Commission (FERC). 1996. Final Environmental Impact Statement (EIS). Relicensing the North Georgia Hydroelectric Project in the Savannah River Basin (FERC Project No. 2354-018).

Georgia Power Company. 2022. North Georgia (FERC No. 2354). 2022 Cultural Resources Monitoring. Accession No. 20221228-5199.

13.0 SOCIOECONOMIC RESOURCES

13.1 Affected Environment

Located in northeastern Georgia, the Nacoochee Development is within Rabun County, Georgia and in within the town of Lakemont, Georgia. Other nearby towns include Wiley, Tallulah Falls, Long Creek, and Turnerville, Georgia, all with a population of less than 5,000.

Based on the April 1, 2020 census, the estimated population of Rabun County, Georgia, was 16,883 representing a 3.7 percent increase from the April 1, 2010 census (U.S. Census Bureau 2023). Table 13-1 summarizes the population estimates for Rabun County and for the state of Georgia as reported in the 2010 and 2020 U.S. Census, as estimated by the U.S. Census Bureau for 2021.

Table 13-1 Estimated Population of Rabun County, Georgia and the State of Georgia

County/ State	2010 Census	2020 Census	Percent Change 2010-2020	2021 Estimates	Percent Change 2020-2021
Rabun County, GA	16,276	16,883	3.7%	17,119	1.4%
Georgia	9,687,653	10,711,908	10.6%	10,799,566	0.8%

Source: U.S. Census Bureau 2023

Rabun County is approximately 370-square-miles (U.S. Census Bureau 2023). Based on population estimates for 2020, Rabun County had a population density of 45.6 people per square-mile, which is lower than the state average density of 185.6 people per square-mile (U.S. Census Bureau 2023).

The 2017-2021 estimated median household income for Rabun County, Georgia was $48,652 and the poverty rate was 12.5 percent (U.S. Census Bureau 2023). Table 13-2 provides the household and family distribution and income for Rabun County, Georgia.

Table 13-2 Household Incomes and Distributions for Rabun County, Georgia

	Rabun County
2017-2021 Households	6,585[1]
2017-2021 Approximate Number of Persons per Household	2.48[1]
2017-2021 Percentage of Population in Civilian Labor Force	46.1%[1]
2017-2021 Median Household Income	$48,652[1]
2021 Population Below Poverty Level	12.5%[1]
December 2022 Unemployment Rate	2.8%[2]

Source: U.S. Census Bureau 2023[1]; FRED 2022a[2]

The city of Lakemont, Georgia was reviewed for socioeconomic data and is summarized in Table 13-3. The four largest ethnic groups in Lakemont, Georgia are White (Non-Hispanic) (94.6%), Black or African American (Non-Hispanic) (3.2%), Hispanic or Latina (of any race) (1.1%), and Other Race/Two or More Races (1.1%) (Scout 2023).

Table 13-3 Population Statistics for Lakemont, GA

Population Statistics	Lakemont GA
Population	2,709
Per Capita Income	$48,0925
Median Household Income	$59,163
Individuals Below Poverty Level	11.3%

Source: Scout 2023

Table 13-4 provides data on employment industry distribution in Lakemont, Georgia. The largest industries were retail, healthcare, and construction (Scout 2023).

Table 13-4 Top Employment Sectors for Lakemont, GA

Employment Sector	Percent (%)
Retail	17.6
Healthcare	13.2
Construction	10.4

Employment Sector	Percent (%)
Accommodation	8.5
Education	8.1
Manufacturing	7.6
Other	6.5
Finance	5.4
Professional, Scientific, and Technical Services	4.5
Public Service	4.0
Transportation	3.6
Utilities	2.9
Administration	2.8
Real Estate	2.3

Source: Scout 2023

13.2 Environmental Analysis

The Proposed Action does not require a drawdown of Lake Seed and Georgia Power will operate the Nacoochee Development according to the existing license conditions during and following the upgrade. There are no anticipated impacts to socioeconomic resources.

13.3 Protection, Mitigation, and Enhancement Measures

Georgia Power does not propose any PME measures for socioeconomic resources.

13.4 Unavoidable Adverse Effects

There are no unavoidable adverse effects identified for socioeconomic resources.

13.5 References

FRED Economic Research (FRED). 2022a. Unemployment Rate in Rabun County, GA. Available online at: https://fred.stlouisfed.org/series/GARABU1URN. Accessed February 2023.

Neighborhood Scout (Scout). 2023. Lakemont, GA. Demographic Data. Available online at: https://www.neighborhoodscout.com/ga/lakemont/demographics. Accessed February 2023.

U.S. Census Bureau. 2023. QuickFacts for Rabun County, Georgia; Georgia. Available online at:

https://www.census.gov/quickfacts/fact/table/rabuncountygeorgia,GA/PST045222. Accessed February 2023.

APPENDIX A

CONSULTATION

Consultation on Draft Amendment Application

U.S. Fish and Wildlife Service

Munn, Laura S.

From: Bauer, Eric F <eric_bauer@fws.gov>
Sent: Monday, March 27, 2023 8:29 AM
To: Munn, Laura S.
Subject: Re: [EXTERNAL] For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

EXTERNAL MAIL: Caution Opening Links or Files

Good morning Laura,

I don't have any further comments. Thanks.

-Eric

Eric F. Bauer, PhD
(he/him)
Fish and Wildlife Biologist
Georgia Ecological Services
US Fish and Wildlife Service
RG Stephens, Jr. Federal Building
355 East Hancock Avenue, Room 320, Box 7
Athens, GA 30601
Office #: 706-613-9493
Georgia Ecological Services Website: https://www.fws.gov/office/georgia-ecological-services [fws.gov]
Project Planning and Review Procedures: https://www.fws.gov/office/georgia-ecological-services/project-planning-review [fws.gov]

Direct Line: 706-208-7519
Teams: eric_bauer@fws.gov (preferred)

From: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Sent: Friday, March 24, 2023 4:37 PM
To: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Peacock, Clint <Clint.Peacock@dnr.ga.gov>; Bauer, Eric F <eric_bauer@fws.gov>; len.m.kring@usda.gov <len.m.kring@usda.gov>; Rempe, Kyle <kyle.rempe@dnr.ga.gov>; Zeng, Wei <Wei.Zeng@dnr.ga.gov>
Cc: Charles, Joseph D. <JCHARLES@southernco.com>; O'Mara, Courtenay R. <CROMARA@SOUTHERNCO.COM>; Dodd, Anthony Ray <ARDODD@southernco.com>; O'Rouke, Patrick Michael <PMOROUKE@southernco.com>; Ozier, James Copeland <JCOZIER@southernco.com>
Subject: [EXTERNAL] For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Attached for your review are the Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project. We appreciate your time and input in reviewing our proposed project during our consultation meetings and follow-up emails/materials. During that consultation, we stated that modernization work for Nacoochee will focus on upgrading the two generating units in the powerhouse. The scope of work will include replacing turbine runners and generators. The briefing card provided a summary of expected changes from the upgraded turbines and generators and showed the laydown areas for the proposed project.

During agency consultation, Georgia Power stated that we will replace the trashracks at the plant. As stated in the briefing card, the approach velocity expected with new trashracks is lower than the existing approach velocity by 0.1 foot per second (ft/s). The new trashracks have bars 3/8" positioned 3 inches on center and the existing racks have 7/16" bars positioned 3 inches on center. The dimensions of the proposed racks are the same dimensions as the original trashracks. No agencies expressed concern or provided comments on the trashrack replacement. Georgia Power will advance the trashrack replacement as part of routine maintenance activities occurring at the plant this summer, while we await FERC approval of the turbine and generator license amendment.

Please let me know by COB on **Friday, March 31, 2023,** if you have any comments or concerns. Comments provided via email are sufficient. We appreciate your participation in Georgia Power's ongoing Hydro Modernization projects.

Laurie Munn, P.E.
Sr. Engineer
Southern Company Generation Hydro Services
Tel 404.506.7275
Mobile 404.360.1064



Georgia Department of Natural Resources

Environmental Protection Division

Munn, Laura S.

From: Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>
Sent: Saturday, April 1, 2023 8:24 AM
To: Munn, Laura S.; Wiedl, Stephen
Subject: RE: For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

EXTERNAL MAIL: Caution Opening Links or Files

Laura,

The project as described should not cause an water quality issues.

Thanks Liz

Elizabeth A. Booth, Ph.D., P.E.
Georgia Environmental Protection Division
Watershed Protection Branch
Watershed Planning and Monitoring Program
2 Martin Luther King Jr. Drive, Suite 1452
Atlanta, Georgia 30334
470 607-2439
elizabeth.booth@dnr.ga.gov

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

From: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Sent: Friday, March 31, 2023 3:00 PM
To: Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Subject: Fwd: For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

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Good afternoon,
Please let me know if you have any comments on the application and Applicant Prepared Environmental Assessment for the Nacoochee Modernization project. Thank you!
Laurie Munn

Written Correspondence with EPD

From: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Sent: Friday, March 24, 2023 4:37 PM
To: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Peacock, Clint <Clint.Peacock@dnr.ga.gov>; Bauer, Eric F <eric_bauer@fws.gov>; len.m.kring@usda.gov <len.m.kring@usda.gov>; Rempe, Kyle <kyle.rempe@dnr.ga.gov>; Zeng, Wei <Wei.Zeng@dnr.ga.gov>
Cc: Charles, Joseph D. <JCHARLES@southernco.com>; O'Mara, Courtenay R. <CROMARA@SOUTHERNCO.COM>; Dodd, Anthony Ray <ARDODD@southernco.com>; O'Rouke, Patrick Michael <PMOROUKE@southernco.com>; Ozier, James Copeland <JCOZIER@southernco.com>
Subject: For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

Attached for your review are the Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project. We appreciate your time and input in reviewing our proposed project during our consultation meetings and follow-up emails/materials. During that consultation, we stated that modernization work for Nacoochee will focus on upgrading the two generating units in the powerhouse. The scope of work will include replacing turbine runners and generators. The briefing card provided a summary of expected changes from the upgraded turbines and generators-and showed the laydown areas for the proposed project.

During agency consultation, Georgia Power stated that we will replace the trashracks at the plant. As stated in the briefing card, the approach velocity expected with new trashracks is lower than the existing approach velocity by 0.1 foot per second (ft/s). The new trashracks have bars 3/8” positioned 3 inches on center and the existing racks have 7/16” bars positioned 3 inches on center. The dimensions of the proposed racks are the same dimensions as the original trashracks. No agencies expressed concern or provided comments on the trashrack replacement. Georgia Power will advance the trashrack replacement as part of routine maintenance activities occurring at the plant this summer, while we await FERC approval of the turbine and generator license amendment.

Please let me know by COB on **Friday, March 31, 2023,** if you have any comments or concerns. Comments provided via email are sufficient. We appreciate your participation in Georgia Power’s ongoing Hydro Modernization projects.

Laurie Munn, P.E.
Sr. Engineer
Southern Company Generation Hydro Services
Tel 404.506.7275
Mobile 404.360.1064



Georgia Department of Natural Resources
Wildlife Resources Division

Munn, Laura S.

From: Rempe, Kyle <kyle.rempe@dnr.ga.gov>
Sent: Monday, March 27, 2023 3:23 PM
To: Munn, Laura S.
Cc: O'Rouke, Patrick Michael; Peacock, Clint; Rabern, Anthony
Subject: RE: For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

EXTERNAL MAIL: Caution Opening Links or Files

Dear Laura,

Thank you for the opportunity to review the draft EA for the Nacoochee modernization project. The Wildlife Resources Division of GA-DNR is satisfied that the proposed scope of work will not pose a threat to the fish community of Lake Seed or the downstream waters.

Regards,

Kyle Rempe
Fisheries Biologist II

Wildlife Resources Division [georgiawildlife.com]
Mobile: (706) 339-7449 | Office: (706) 947-1507

Facebook [gcc02.safelinks.protection.outlook.com] Twitter [gcc02.safelinks.protection.outlook.com] Instagram [gcc02.safelinks.protection.outlook.com]
Buy a hunting or fishing license today! [gcc02.safelinks.protection.outlook.com]

A division of the
GEORGIA DEPARTMENT OF NATURAL RESOURCES

From: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Sent: Friday, March 24, 2023 4:38 PM
To: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Peacock, Clint <Clint.Peacock@dnr.ga.gov>; Bauer, Eric F <eric_bauer@fws.gov>; Kring, Len -FS <len.m.kring@usda.gov>; Rempe, Kyle <kyle.rempe@dnr.ga.gov>; Zeng, Wei <Wei.Zeng@dnr.ga.gov>
Cc: Charles, Joseph D. <JCHARLES@southernco.com>; O'Mara, Courtenay R. <CROMARA@SOUTHERNCO.COM>; Dodd, Anthony Ray <ardodd@southernco.com>; O'Rouke, Patrick Michael <PMOROUKE@southernco.com>; Ozier, James Copeland <JCOZIER@southernco.com>
Subject: For your review - Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project

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Attached for your review are the Draft Applicant Prepared Environmental Assessment and the Initial Statement and Application for the North Georgia Nacoochee Development modernization project. We appreciate your time and input in reviewing our proposed project during our consultation meetings and follow-up emails/materials. During that consultation, we stated that modernization work for Nacoochee will focus on upgrading the two generating units in the

powerhouse. The scope of work will include replacing turbine runners and generators. The briefing card provided a summary of expected changes from the upgraded turbines and generators and showed the laydown areas for the proposed project.

During agency consultation, Georgia Power stated that we will replace the trashracks at the plant. As stated in the briefing card, the approach velocity expected with new trashracks is lower than the existing approach velocity by 0.1 foot per second (ft/s). The new trashracks have bars 3/8" positioned 3 inches on center and the existing racks have 7/16" bars positioned 3 inches on center. The dimensions of the proposed racks are the same dimensions as the original trashracks. No agencies expressed concern or provided comments on the trashrack replacement. Georgia Power will advance the trashrack replacement as part of routine maintenance activities occurring at the plant this summer, while we await FERC approval of the turbine and generator license amendment.

Please let me know by COB on **Friday, March 31, 2023,** if you have any comments or concerns. Comments provided via email are sufficient. We appreciate your participation in Georgia Power's ongoing Hydro Modernization projects.

Laurie Munn, P.E.
Sr. Engineer
Southern Company Generation Hydro Services
Tel 404.506.7275
Mobile 404.360.1064



Initial Consultation

U.S. Fish and Wildlife Service

Written Correspondence with USFWS

Munn, Laura S.

From: O'Rouke, Patrick Michael
Sent: Tuesday, February 28, 2023 2:14 PM
To: Bauer, Eric F
Cc: Munn, Laura S.
Subject: RE: [EXTERNAL] Nacoochee (Lake Seed) Modernization

Eric, following back up on this, the only ground disturbance would be in areas adjacent to the dam that are already impacted by development (e.g. paved and/or cleared and planted in routinely mowed grass) and therefore do not provide suitable habitat for any of the plants listed in the iPaC.

Thank you for your help on this.

Patrick

From: Bauer, Eric F <eric_bauer@fws.gov>
Sent: Wednesday, February 08, 2023 10:03 AM
To: O'Rouke, Patrick Michael <PMOROUKE@southernco.com>
Cc: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: Re: [EXTERNAL] Nacoochee (Lake Seed) Modernization

EXTERNAL MAIL: Caution Opening Links or Files

Hey Patrick,

Are any ground disturbances planned (e.g. for equipment staging)? If so, do those areas provide suitable habitat for any of the listed plants on the IPaC list? If the answer is no to either of those questions a "no effect" determination would be appropriate and further consultation wouldn't be necessary. I also agree that the trash rack spacing changes are minimal enough and the velocity becoming slightly slower are minimal enough that I wouldn't anticipate impacts to aquatic species.

-Eric

Eric F. Bauer, PhD
(he/him)
Fish and Wildlife Biologist
Georgia Ecological Services
US Fish and Wildlife Service
RG Stephens, Jr. Federal Building
355 East Hancock Avenue, Room 320, Box 7
Athens, GA 30601
Office #: 706-613-9493
Georgia Ecological Services Website: https://www.fws.gov/office/georgia-ecological-services [fws.gov]

Project Planning and Review Procedures: https://www.fws.gov/office/georgia-ecological-services/project-planning-review [fws.gov]

Direct Line: 706-208-7519

Teams: eric_bauer@fws.gov (preferred)

From: O'Rouke, Patrick Michael <PMOROUKE@southernco.com>
Sent: Wednesday, February 8, 2023 9:17 AM
To: Bauer, Eric F <eric_bauer@fws.gov>
Cc: Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: [EXTERNAL] Nacoochee (Lake Seed) Modernization

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Eric,

Our next hydro modernization project on the schedule is going to be the Nacoochee Project (Lake Seed). Unlike previous modernization projects, I don't see a need for us to formally meet to discuss potential impacts, but take a look at the briefing card and let me know if you'd like to do so. There will be a slight decrease in intake velocity from 0.7 to 0.6 ft/s due to a minor difference in trashrack bar size. I would not expect any species impacts from such a minimal change. There will still be opportunities to consult on the license amendment once we have filed, but this is a chance for you to take a first glance at it before we file with FERC.

The IPac Report is also attached for this project. Please let me know if you have any questions or if you need any other information from us.

Thank you!
Patrick

Patrick O'Rouke
Fisheries Biologist
Georgia Power

pmorouke@southernco.com
241 Ralph McGill Blvd.
Atlanta, GA 30308
(404) 506-5025 (Office)
(470) 426-5322 (Cell)

Written Correspondence with USFWS

Georgia Power

North Georgia Project (FERC No. 2354) License Amendment
Nacoochee Unit Upgrade

- From upstream to downstream, the Nacoochee development is the second of six hydroelectric developments in the Federal Energy Regulatory Commission (FERC) licensed North Georgia Project (FERC No. 2354). Water for generation at Nacoochee comes from rainfall in the Tallulah River basin. Operation is modified run-of-river; Lake Seed (the reservoir for the Nacoochee hydropower dam) stores inflow over short periods of time, which is utilized to provide generation from Nacoochee powerhouse during peak power demand hours. The Nacoochee powerhouse discharges directly into Lake Rabun.

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UNIT	Existing Rated (Best Gate/Most Efficient) Capacity (MW)	Existing Max Hydraulic Capacity (CFS)	Proposed Rated (Best Gate/Most Efficient) Capacity (MW)	Proposed Max Hydraulic Capacity (CFS) after Upgrade
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2	2.4	765	2.7	629

*Max flow from units 1 & 2 tested in field on April 21, 2021. Best gate flow was 563 cfs for unit 1 and 690 cfs for unit 2.

- Following the upgrade, Georgia Power will operate the Nacoochee powerhouse with no change to existing lake levels.

- The approach velocity expected with new trashracks is estimated to be 0.6 foot per second (ft/s) at full gate flows. The approach velocity with the existing trashracks is 0.7 cfs. The new trashracks have bars 3/8” positioned 3 inches on center and the existing racks have 7/16” bars positioned 3 inches on center. The dimensions of the proposed racks are the same dimensions as the original trashracks.

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Written Correspondence with USFWS

- Georgia Power is consulting with the following agencies on this license amendment application:
    - Georgia Wildlife Resources Division– lake levels, trashrack velocity changes, and species affects
    - US Fish and Wildlife Service – lake levels, trashrack velocity changes/species affects
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U.S. Forest Service

Written Correspondence with USFS

Munn, Laura S.

From: O'Rouke, Patrick Michael
Sent: Wednesday, February 8, 2023 9:17 AM
To: len.m.kring@usda.gov
Cc: Munn, Laura S.; Ramey, Barbara - FS
Subject: Nacoochee (Lake Seed) Modernization
Attachments: Agency Brief Nacoochee UpgradesR2.pdf; IPaC_Nacoochee Amendment_Species List_ Georgia Ecological Services Field Office.pdf

Len,

I believe this is your first time working on one of these, but Georgia Power has been working on several modernization projects at our hydro facilities across the state. I'm sending to you because I would imagine aquatic species impacts are the primary concern for the Forest Service on this particular proposal, but I'm also including Barbara Ramey since she worked recently with us on our Tugalo modernization proposal in case she needs to look at this. These projects vary in scope, but to date all of them have been proposed as non-capacity amendments to the FERC licenses. In the case of the Nacoochee Project (which forms Lake Seed), we're limiting work to replacing two generating units, which includes new turbine runners, generators, and intake trashracks. Take a look at the attached briefing card and let me know what you think, but because the changes in intake velocity and trashrack size are so minimal, I do not anticipate any species impacts or lake level impacts from this amendment and am not proposing that we meet in person or via a Teams call (which we have done for some previous amendments) at this time. The Forest Service will have plenty of opportunity to comment on this proposal after we file the amendment application with FERC, but we're providing resource agencies with a first look and a chance to raise any concerns ahead of our filing. Please let me know if you'd prefer more information or would like to set up a call or a meeting to discuss more.

I'm also attaching the IPaC report that our consultant generated in preparation for this filing in case that is of help to you.

Thank you for the time in giving this a look and please feel free to reach out if you have questions.

Patrick

Patrick O'Rouke
Fisheries Biologist
Georgia Power

pmorouke@southernco.com
241 Ralph McGill Blvd.
Atlanta, GA 30308
(404) 506-5025 (Office)
(470) 426-5322 (Cell)

Written Correspondence with USFS

Georgia Power

North Georgia Project (FERC No. 2354) License Amendment
Nacoochee Unit Upgrade

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Georgia Department of Natural Resources
Environmental Protection Division

Written Correspondence with EPD

Munn, Laura S.

From: Dodd, Anthony Ray
Sent: Wednesday, January 18, 2023 10:50 AM
To: Wiedl, Stephen
Cc: Zeng Wei (wei.zeng@dnr.ga.gov); Dr. Booth; Munn, Laura S.
Subject: Georgia Power Hydro Modernization Projects (Nacoochee Dam)
Attachments: Nacoochee Laydown Areas.png; N_Agency Brief Nacoochee UpgradesR1.pdf

Greetings, Steve,

Continuing in light of consultations between EPD and Georgia Power (GPC) for our Hydro Modernization Project, the next hydro facility in the schedule for modernization is Nacoochee Dam which impounds Lake Seed in GPC's North Georgia Hydro Project Group (briefing card and site figure attached).

Modernization work for Nacoochee will focus on upgrading the two generating units in the powerhouse. The scope of work will include replacing turbine runners, generators, and intake trash racks. The attached briefing card provides a summary of expected, calculated change in operational capacity and related (flow, water temperature, etc.) and lists agencies included in the consultation.

The attached figure shows the project site with construction features overlay. Necessary permitting and E&SC measures will be conducted as required. Lake drawdown will not be required for this work and based on the type of work and installation methods, we don't anticipate negative water quality effects. Project activities are expected to begin by January 2024 and completed by Dec of 2024.

We appreciate EPD's participation in GPC's ongoing Hydro Modernization projects. Please review the attached information and let us know if you have any questions or concerns and especially related to 401 water quality certification for the proposed upgrades.
We are hoping to hear back on this from EPD and other agencies by 3 Feb.

Thank you and Best Regards,

Tony Dodd
Natural Resources Specialist
Georgia Power Company
241 Ralph McGill Blvd, NE
Atlanta, GA 30308
Cell: 404-434-9412
Desk: 404-506-5026
Email: ardodd@southernco.com

Georgia Power

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Low Gap Rd
Craft Parking
Haul Road
Construction Trailers
Lay Down Area 1
Lay Down Area 2
Wire Yard
Portа-let

Written Correspondence with EPD

Georgia Power

North Georgia Project (FERC No. 2354) License Amendment
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Munn, Laura S.

From: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Sent: Wednesday, January 18, 2023 6:00 PM
To: Booth, Elizabeth; Dodd, Anthony Ray
Cc: Zeng, Wei; Munn, Laura S.
Subject: RE: Georgia Power Hydro Modernization Projects (Nacoochee Dam)

EXTERNAL MAIL: Caution Opening Links or Files

Thanks for prompt feedback, Liz.

Stephen C. Wiedl, PWS
Manager – Wetlands Unit
Georgia Environmental Protection Division
7 Martin Luther King, Jr. Drive, Suite 450
Atlanta, GA 30334

404-452-5060
Stephen.Wiedl@dnr.ga.gov

From: Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>
Sent: Wednesday, January 18, 2023 5:47 PM
To: Dodd, Anthony Ray <ardodd@southernco.com>; Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Cc: Zeng, Wei <Wei.Zeng@dnr.ga.gov>; Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: RE: Georgia Power Hydro Modernization Projects (Nacoochee Dam)

Based on my read, there should be no impact to water quality. Thanks Liz

From: Dodd, Anthony Ray <ARDODD@southernco.com>
Sent: Wednesday, January 18, 2023 10:50 AM
To: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Cc: Zeng, Wei <Wei.Zeng@dnr.ga.gov>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: Georgia Power Hydro Modernization Projects (Nacoochee Dam)

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Greetings, Steve,

Continuing in light of consultations between EPD and Georgia Power (GPC) for our Hydro Modernization Project, the next hydro facility in the schedule for modernization is Nacoochee Dam which impounds Lake Seed in GPC's North Georgia Hydro Project Group (briefing card and site figure attached).

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We are hoping to hear back on this from EPD and other agencies by 3 Feb.

Thank you and Best Regards,

Tony Dodd
Natural Resources Specialist
Georgia Power Company
241 Ralph McGill Blvd, NE
Atlanta, GA 30308
Cell: 404-434-9412
Desk: 404-506-5026
Email: ardodd@southernco.com



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Georgia Department of Natural Resources
Wildlife Resources Division

Written Correspondence with WRD

Munn, Laura S.

From: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Sent: Tuesday, January 24, 2023 11:42 AM
To: Dodd, Anthony Ray
Cc: Zeng, Wei; Booth, Elizabeth; Munn, Laura S.; Thiery, Devin
Subject: RE: Georgia Power Hydro Modernization Projects (Nacoochee Dam) - GaEPD Response of No New 401 WQC Required
Attachments: RE: Georgia Power Hydro Modernization Projects (Nacoochee Dam)

EXTERNAL MAIL: Caution Opening Links or Files

Mr. Dodd,

Based on project briefing card and site figure information conveyed by Georgia Power Company in your January 18, 2023 message, and understanding that the Nacoochee Dam Modernization will constitute very minor adjustments to the physical infrastructural currently in place, and being informed by internal EPD communication from our Watershed Planning and Monitoring Program, the Georgia Environmental Protection Division's Wetlands (401) Unit responds that the proposed Nacoochee Dam Modernization would appear to present no material adverse effect on water quality. We therefore provide response that no new 401 Water Quality Certification would be necessary for the subject Nacoochee Dam Modernization.

Thank you for the information you have provided and for your coordination efforts on this project. Best wishes.

Stephen C. Wiedl, PWS
Manager – Wetlands Unit
Georgia Environmental Protection Division
7 Martin Luther King, Jr. Drive, Suite 450
Atlanta, GA 30334

404-452-5060
Stephen.Wiedl@dnr.ga.gov

From: Dodd, Anthony Ray <ARDODD@southernco.com>
Sent: Wednesday, January 18, 2023 10:50 AM
To: Wiedl, Stephen <Stephen.Wiedl@dnr.ga.gov>
Cc: Zeng, Wei <Wei.Zeng@dnr.ga.gov>; Booth, Elizabeth <Elizabeth.Booth@dnr.ga.gov>; Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: Georgia Power Hydro Modernization Projects (Nacoochee Dam)

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Written Correspondence with WRD

Munn, Laura S.

From: O'Rouke, Patrick Michael
Sent: Wednesday, February 8, 2023 9:17 AM
To: Rempe, Kyle
Cc: Peacock, Clint; Munn, Laura S.
Subject: Nacoochee (Lake Seed) Modernization
Attachments: Agency Brief Nacoochee UpgradesR2.pdf

Kyle,

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Thank you!
Patrick

Patrick O'Rouke
Fisheries Biologist
Georgia Power

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(404) 506-5025 (Office)
(470) 426-5322 (Cell)

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Georgia Power

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Munn, Laura S.

From: Rempe, Kyle <kyle.rempe@dnr.ga.gov>
Sent: Monday, February 13, 2023 8:36 AM
To: O'Rouke, Patrick Michael
Cc: Peacock, Clint; Munn, Laura S.
Subject: RE: Nacoochee (Lake Seed) Modernization

EXTERNAL MAIL: Caution Opening Links or Files

Hi Patrick,

Thanks for sending this my way, sounds good to me based off of what you mentioned regarding the impacts.

Regards,

Kyle Rempe
Fisheries Biologist II

Wildlife Resources Division [georgiawildlife.com]
Mobile: (706) 339-7449 | Office: (706) 947-1507

Facebook [gcc02.safelinks.protection.outlook.com] Twitter [gcc02.safelinks.protection.outlook.com] Instagram [gcc02.safelinks.protection.outlook.com]
Buy a hunting or fishing license today! [gcc02.safelinks.protection.outlook.com]

A division of the
GEORGIA DEPARTMENT OF NATURAL RESOURCES

From: O'Rouke, Patrick Michael <PMOROUKE@southernco.com>
Sent: Wednesday, February 8, 2023 9:17 AM
To: Rempe, Kyle <kyle.rempe@dnr.ga.gov>
Cc: Peacock, Clint <Clint.Peacock@dnr.ga.gov>; Munn, Laura S. <LSMUNN@SOUTHERNCO.COM>
Subject: Nacoochee (Lake Seed) Modernization

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Kyle,

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Thank you!
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(470) 426-5322 (Cell)

Georgia Department of Community Affairs
Historic Preservation Division

Written Correspondence with HPD

Georgia Power

241 Ralph McGill Blvd., NE
BIN 10151
Atlanta, GA 30308
404 506 2337 tel
404 506 4132 fax
404 782 8796 cell
jcharles@southernco.com

January 23, 2023

Mr. Santiago Martinez
DCA Historic Preservation Division
60 Executive Park South, NE
Atlanta, GA 30329-4940

RE: System upgrades at the Nacoochee powerhouse – North Georgia Project (#2354)

Dear Mr. Martinez:

As part of its modernization program, Georgia Power is system upgrades to the Nacoochee Development of the North Georgia Hydroelectric Project (#2354). Please find attached the ***Cultural Resources Assessment of Georgia Power's Hydro Modernization Program, North Georgia Project (FERC #2354) – Nacoochee Development.*** Also attached is a report for the ***Phase I Cultural Resources Survey of the Seed Lake Substation Expansion*** submitted here as a supplement to the Nacoochee assessment.

If you have questions or require more information, please contact me at 404-782-8796 or jcharles@southernco.com.

Sincerely,

Joseph Charles
Hydro Compliance Coordinator

Cultural Resources Assessment of Georgia Power's Hydro Modernization Program
North Georgia Hydroelectric Project (FERC #2354) – Nacoochee Development

Introduction

The North Georgia Hydroelectric Project (the Project) is located in the northeast corner of Georgia, partially spanning the Georgia-South Carolina line (Tugalo and Yonah developments only). It consists of six developments (i.e., reservoirs/dams) that operate as a unit under one license last issued by the Federal Energy Regulatory Commission (FERC). Nacoochee, downstream of Burton, is the second development in the system (looking downstream), followed by Mathis/Terrora, Tallulah Falls, Tugalo, and Yonah. The Nacoochee Development was completed in 1925 and consists of a dam, powerhouse, and 260-acre reservoir, Lake Seed (Figures 1-2). As part of its hydro modernization program, Georgia Power is planning to replace the turbine runners, generators, and intake trash racks at Nacoochee powerhouse.

The current Project license was issued in 1996 for a 40-year term. Article 417 of the license implements the "Programmatic Agreement Among the Federal Energy Regulatory Commission, the Georgia State Historic Preservation Officer, and the South Carolina State Historic Preservation Officer with the Concurrence of the Georgia Power Company, for the Management of Historic Properties Affected by the North Georgia Hydroelectric Facility," executed on January 30, 1996. The Programmatic Agreement (PA), in turn, implements the Cultural Resource Management Plan (CRMP) for the Project. According to the CRMP, Georgia Power is to consult with the State Historic Preservation Officer (SHPO) on activities that have the potential to adversely affect historic properties. As Nacoochee dam and powerhouse are eligible for inclusion on the National Register of Historic Places (NRHP), the proposed modernization program has that potential.

Background

Nacoochee dam and powerhouse were completed in 1925 on the Tallulah River approximately 4.8 miles downstream of Burton dam. The powerhouse is a single rectangular mass, with a flat parapet roof, steel frame, brick curtain walls and reinforced concrete floors (Figure 3). The powerhouse contains two vertical 4,000-horsepower, Kaplan-type (propeller) turbines supplied by the S. Morgan Smith Company and vertical 2,400-kilowatt alternating current generators supplied by General Electric (Figures 4-5). The concrete gravity-type dam is 70 ft tall and 490 ft long (Figures 6-8). Immediately downstream of the dam, on the east bank of the tailrace, is Nacoochee Park. This small facility offers restrooms and four picnic tables (Figure 9).

Modernization Program and Assessment of Effects

The Project was determined eligible for the NRHP under Criteria A and C. Georgia Power manages the Project with the goal of retaining historically significant features and protecting integrity of design, materials, workmanship, location, setting, feeling, and association of character-defining features to the extent possible without compromising safety and reliability. As noted, Nacoochee dam and powerhouse

were completed in 1925, meaning that many of the main components are almost 100 years old. In order to continue to operate safely and reliably, Georgia Power is proposing to replace, the generators, turbine runners, and the intake trash racks.

The trash racks are not original and are located underwater at the upstream intake of the dam, so we conclude that this upgrade will have no adverse effect. The generators and turbines are original equipment and are considered character-defining features, so we conclude that their replacement will constitute an adverse effect. The new units will have the same footprint as the originals and will not require any modifications to the powerhouse structure. The new generators will, however, have cooling units installed around the periphery of each unit.

Due to the limited workspace and rugged terrain surrounding the dam, equipment and materials will need to be staged in the area currently occupied by Nacoochee Park. Subsurface disturbance will be limited to installation of security fencing. There is one archaeological site (or portion of a site) in this area that was investigated during the archaeology study for the last relicensing. Site 9RA113 is associated with the camp occupied by workers during the construction of the Nacoochee Development. First recorded in 1990 by Brockington and Associates, it was described as a subsurface scatter of historic glass and ceramics. The site extends outside of the North Georgia Project boundary to the northeast, but the portion of the site examined in 1990 was recommended not eligible for inclusion in the NRHP. As part of a due diligence study for a proposed substation adjacent to the Project, this area was reexamined in 2022 by Brockington and Associates (see attached report). The results of this investigation support the original recommendation for this portion of 9RA113. We, therefore, believe that the use of this area for equipment staging and laydown will have no adverse effect on historic properties.

Proposed Mitigation

Georgia Power proposes to mitigate unavoidable adverse effects to historic properties through the creation of a Permanent Archival Record (PAR) of the Nacoochee powerhouse. This proposed mitigation would be captured in a memorandum of agreement (MOA) between FERC, Georgia SHPO, and the Advisory Council on Historic Preservation (ACHP).

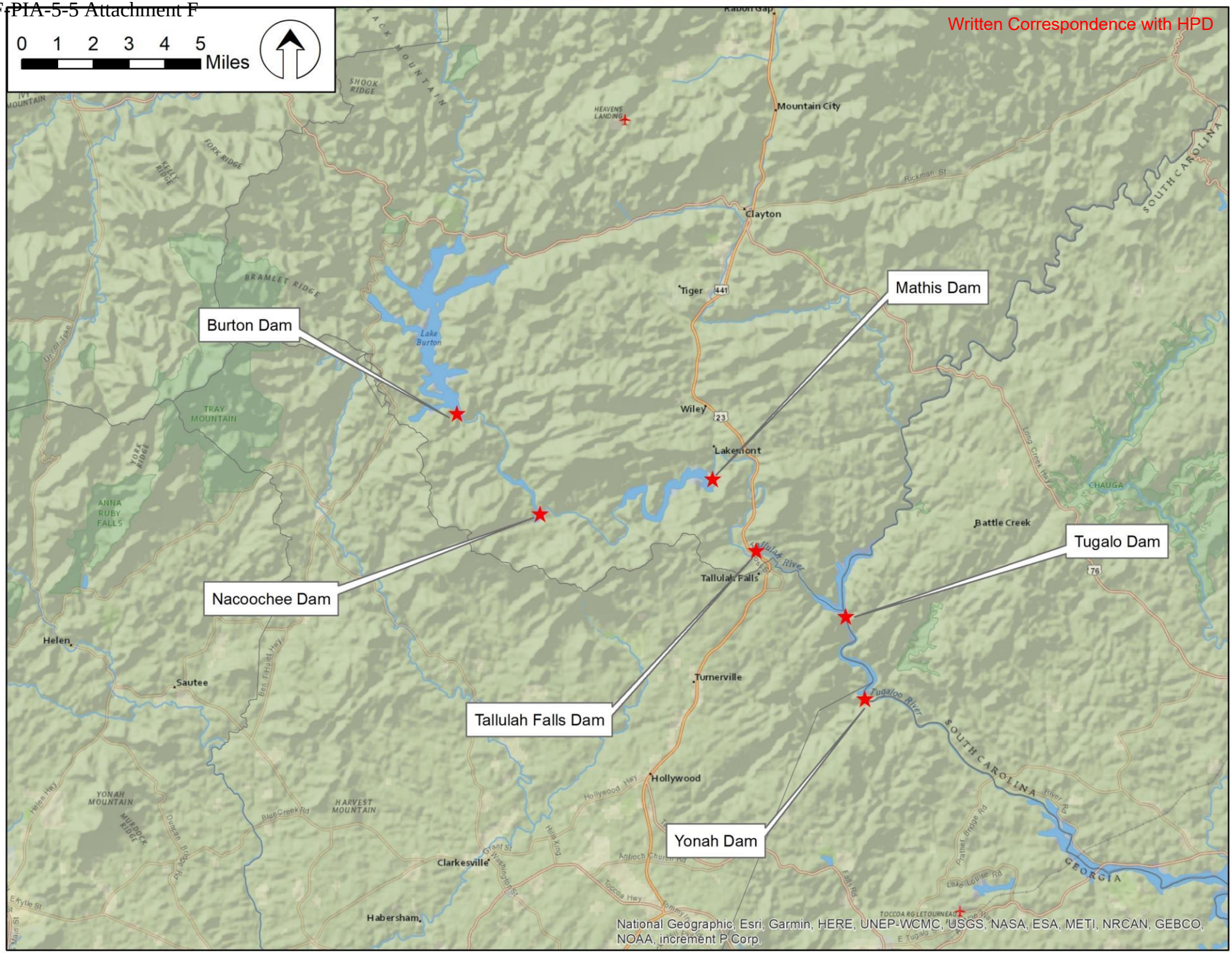


Figure 1. Map of the North Georgia Hydroelectric Project (P-2354) and vicinity.

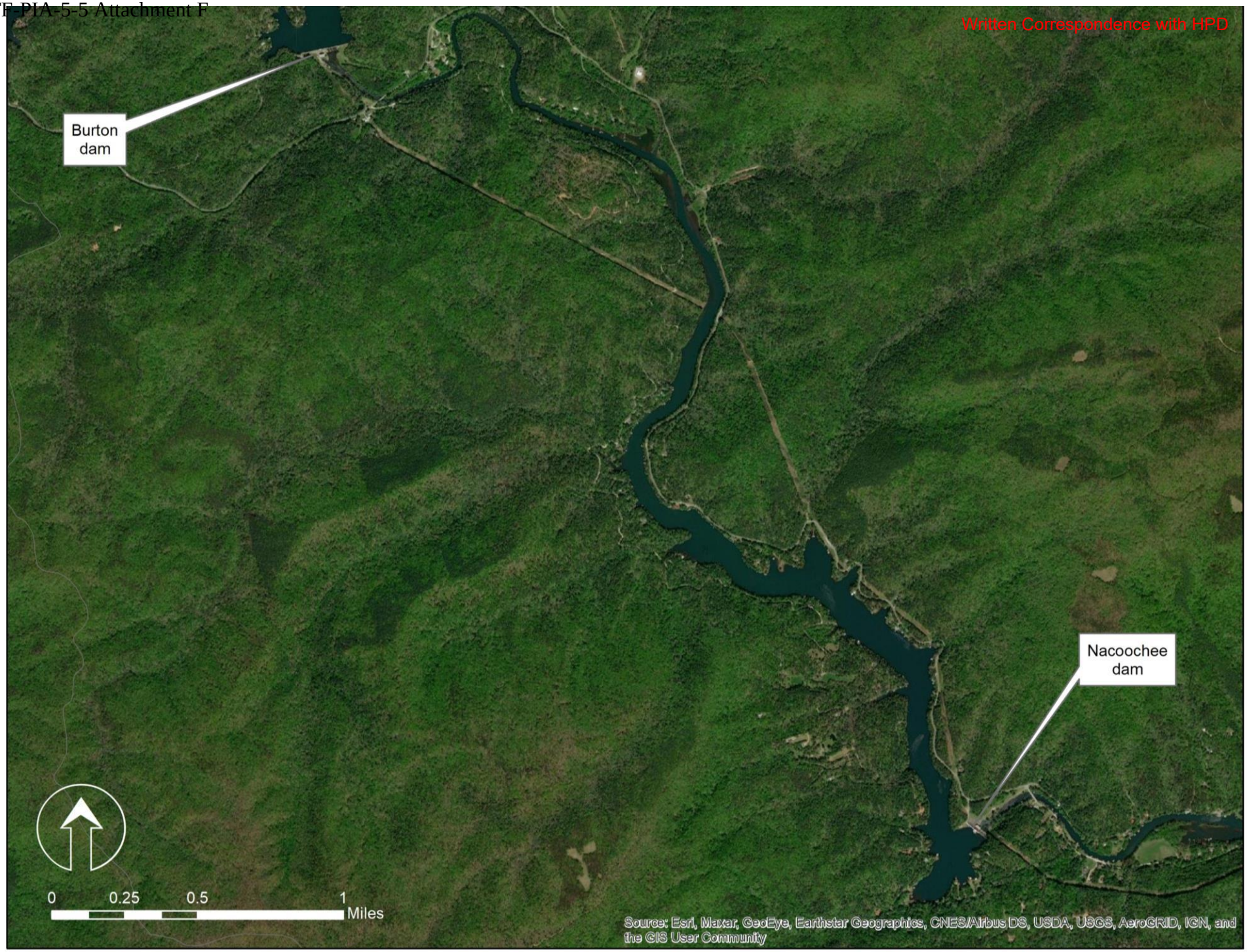


Figure 2. Aerial photograph showing Nacoochee Development.



Figure 3. View from downstream of Nacoochee dam and powerhouse.



Figure 4. View of generator floor of Nacoochee powerhouse.

Written Correspondence with HPD

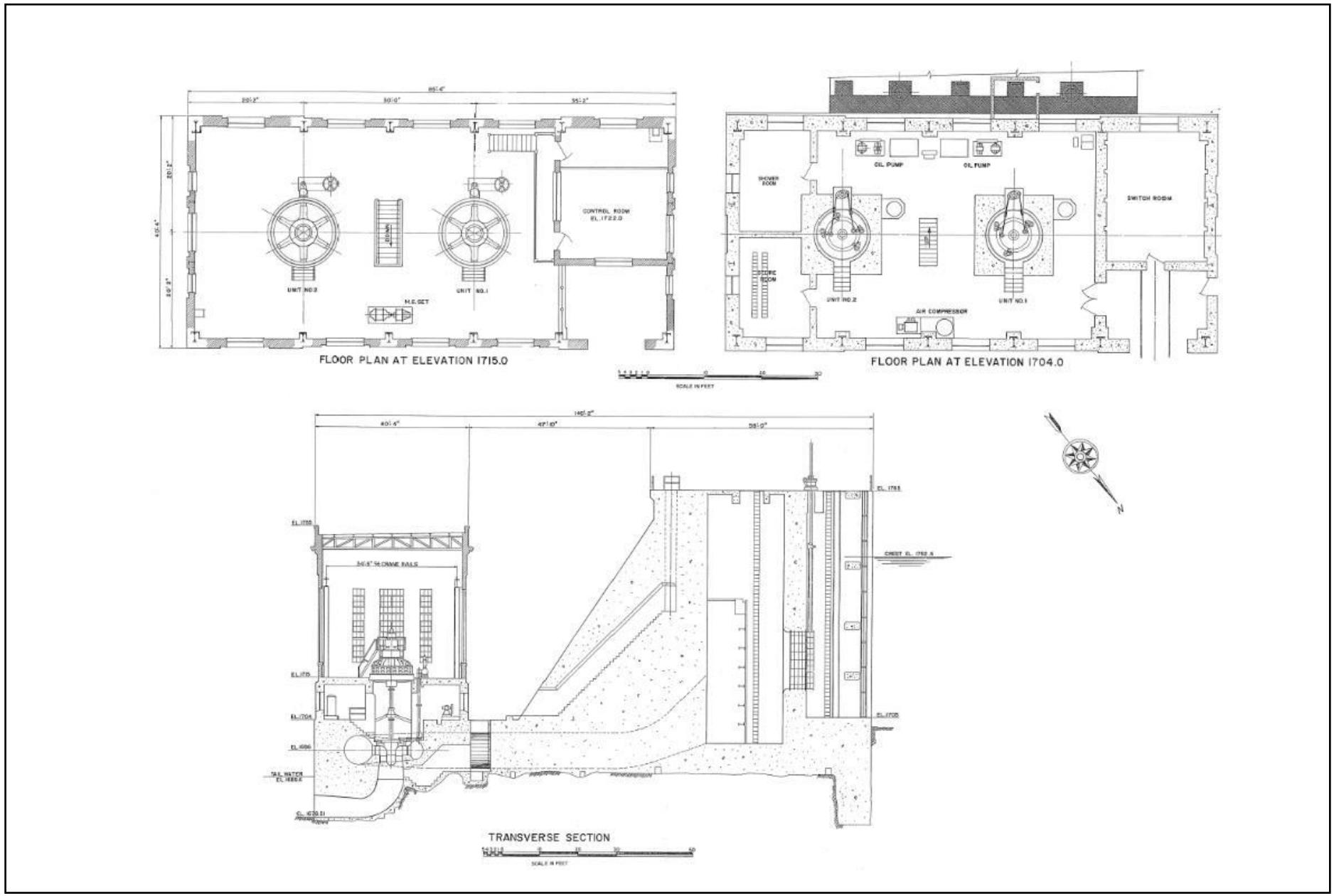


Figure 5. Floor plans and transverse section of Nacoochee powerhouse.

Written Correspondence with HPD

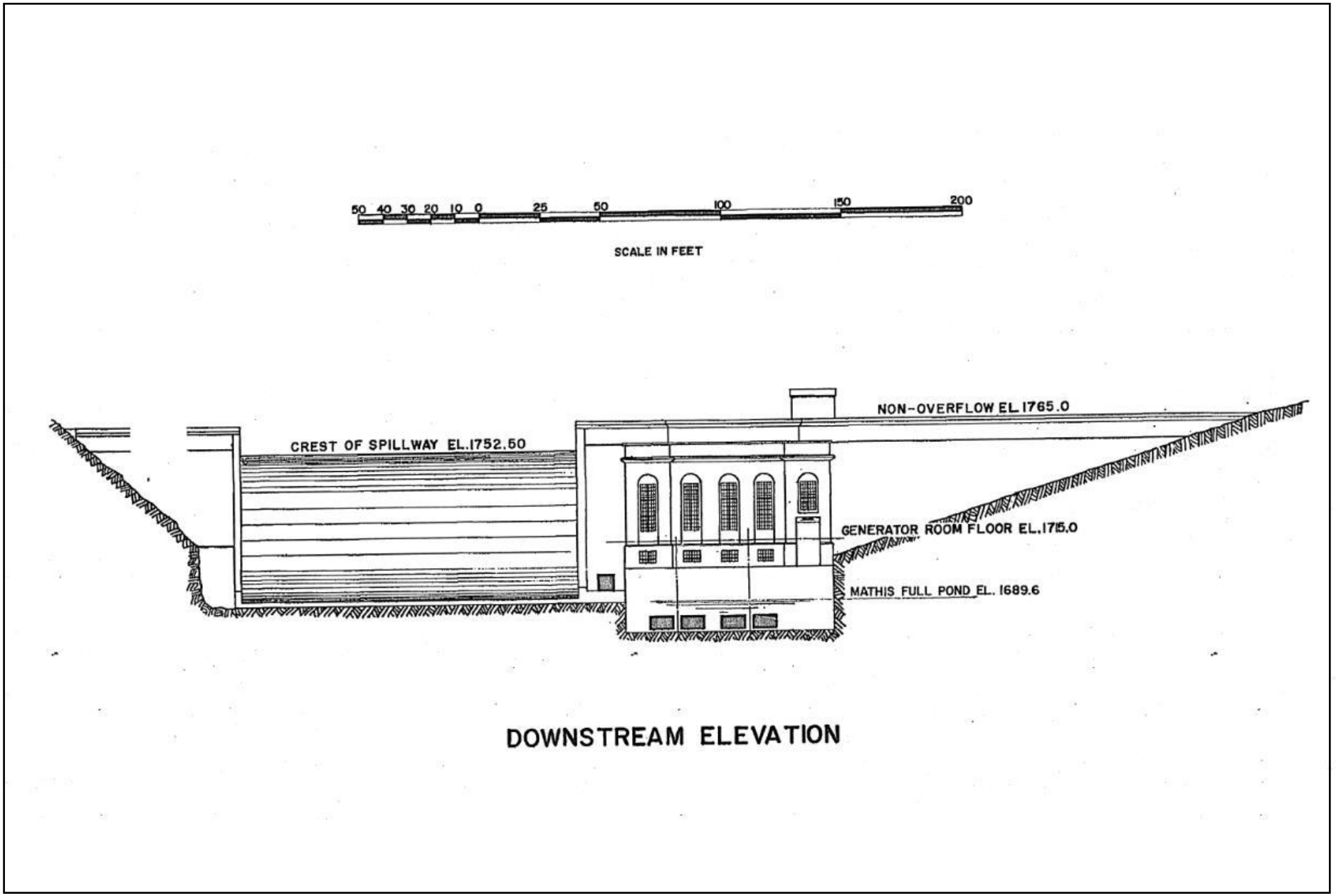


Figure 6. Downstream elevation of Nacoochee dam.

Written Correspondence with HPD

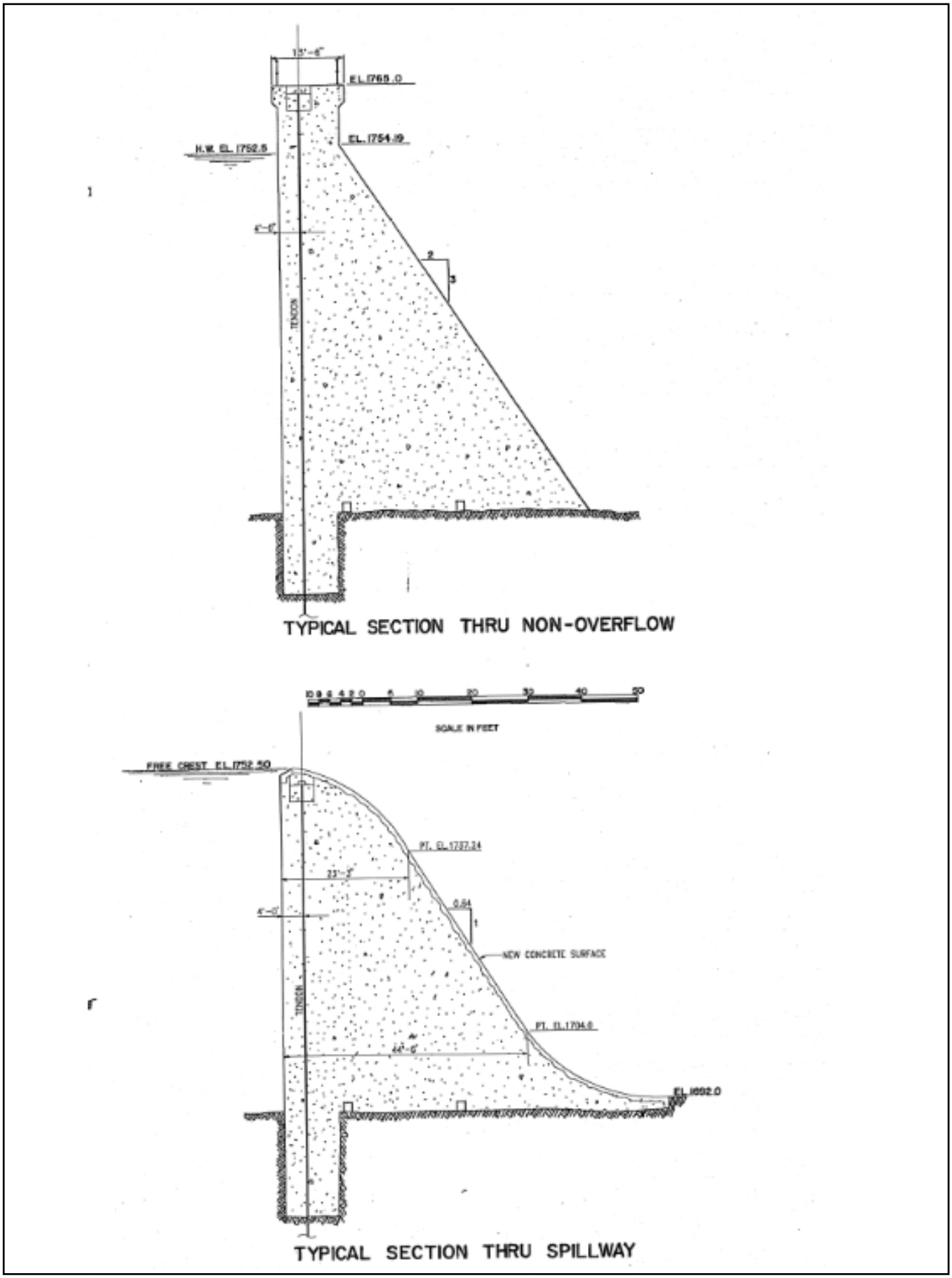


Figure 7. Cross sections of Nacoochee dam.

Written Correspondence with HPD



Figure 8. View to the northwest along top of Nacoochee dam.



Figure 9. Aerial photograph showing Nacoochee Park.

Brian P. Kemp
Governor

Written Correspondence with HPD

Christopher Nunn
Commissioner

Georgia® Department of Community Affairs
HISTORIC PRESERVATION DIVISION

February 20, 2023

Joseph Charles
Hydro Compliance Coordinator
Georgia Power
241 Ralph McGill Boulevard, NE
BIN 10151
Atlanta, Georgia 30308

RE: FERC 2354: Nacoochee Powerhouse Modernization,
Seed Lake Road and Low Gap Road, Lakemont
Rabun County, Georgia
HP-230123-003

Dear Mr. Charles:

The Historic Preservation Division (HPD) has received the information submitted concerning the above referenced project. Our comments are offered to assist the Federal Energy Regulatory Commission (FERC) and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

The subject project consists of upgrading the circa (ca) 1925 Nacoochee Dam and Powerhouse on Rabun County parcels LN01 0GP and LN03 12 GPS in Lakemont, including replacing turbines, generators, and intake racks. Based on the information provided and desktop research, HPD concurs that archaeological sites 9RA113 and 9RA118, as well as Resources 1/4242 Seed Lake Road, 2/104 Low Gap Road, 3/144 Low Gap Road, 4/6 Bear Gap Road, 5/4126 Seed Lake Road, 6/6047 Lake Rabun Road, 7/6564 Crow Creek Road, 8/6532 Crow Creek Road, 9/6500 Crow Creek Road, 10/6476 Crow Creek Road, 12/6028 Crow Creek Road, 13/6024 Crow Creek Road, 14/5960 Crow Creek Road, and 15/5301 Crow Creek Road are not eligible for listing in the National Register of Historic Places (NRHP), due to a lack of integrity. Additionally, HPD concurs that the Nacoochee Dam and Powerhouse is eligible for listing in the NRHP. Furthermore, HPD finds that the eligibility of Resource 11/6448 Crow Creek Road is unknown for listing in the NRHP and that there are multiple other historic resources within the proposed project's area of potential effect (APE), some of which may be eligible for listing in the NRHP. Therefore, HPD concurs that the subject project constitutes an **adverse effect** to historic properties within its APE, as defined in 36 CFR Part 800.5(a)(2). The replacement of original, character-defining equipment on a NRHP-eligible resource is not consistent with the Secretary of the Interior's *Standards for the Treatment of Historic Properties*. If the scope of work (SOW) for this project changes so that it conforms to the Secretary's *Standards*, prior to drafting a Memorandum of Agreement (MOA), please forward the updated SOW to HPD for review and comment, once available.

HPD would like to note that this determination of an adverse effect is not the end of the Section 106 consultation process. When an adverse effect is found, the federal agency must notify the Advisory Council on Historic Preservation (ACHP) of the determination and draft a MOA in order to resolve the adverse effect. If the federal agency delegates ACHP notification responsibility to the applicant, the applicant should utilize the ACHP's e-notification system available here: https://www.achp.gov/e106-email-form. If the federal agency delegates the drafting of a MOA to the applicant, the applicant should visit the ACHP's *Guidance on Agreement Documents* webpage, found here:

https://www.achp.gov/initiatives/guidance-agreement-documents and utilize the MOA template found therein.

Please include all avoidance and minimization measures, along with mitigation proposed to resolve the adverse effect, as stipulations in the draft MOA. HPD will review the draft MOA and should be provided the opportunity to review any associated deliverables stipulated therein, within 30 days of receipt. Absent federal agency involvement, HPD is available to provide technical assistance in resolving adverse effects. Regarding mitigation, HPD recommends a combination of Historic American Engineering Record (HAER) documentation and a public interpretive display based on the removed equipment to resolve the adverse effect.

We look forward to working with you as this project progresses and to receiving either a revised SOW or a draft MOA. Please refer to project number **HP-230123-003** in any future correspondence regarding this project. If we may be of further assistance, please contact Santiago Martinez, Environmental Review Historian, by email at Santiago.Martinez@dca.ga.gov or by telephone at (404) 486-6425 or Elijah Huszagh, Compliance Archaeologist, by email at Elijah.Huszagh@dca.ga.gov or by telephone at (404) 486-6440.

Sincerely,

Jennifer Dixon, MHP, LEED Green Associate
Division Director
Deputy State Historic Preservation Officer

JAD/sdm

cc: Joe Rothwell, Georgia Mountains Regional Commission
Kathy Papa, DCA Regional Commission, Region 2

Written Correspondence with HPD

Georgia Power

241 Ralph McGill Blvd., NE
BIN 10151
Atlanta, GA 30308
404 506 2337 tel
404 506 4132 fax
404 782 8796 cell
jcharles@southernco.com

March 29, 2023

Mr. Santiago Martinez
DCA Historic Preservation Division
60 Executive Park South, NE
Atlanta, GA 30329-4940

RE: HP-230123-003: Nacoochee Powerhouse Modernization, Seed Lake and Low Gap Road, Lakemont, Rabun County, Georgia

Dear Mr. Martinez:

On February 20, 2023, the Historic Preservation Division (HPD) issued a letter concurring with Georgia Power's recommendation that the above-referenced Undertaking constitutes an adverse effect to historic properties. HPD further recommended that a combination of Historic American Engineering Record (HAER) documentation and public interpretation be used to mitigate adverse effects. Please find attached a draft Memorandum of Agreement (MOA) incorporating those recommendations for your review and comment.

If you have questions or require more information, please contact me at 404-782-8796 or jcharles@southernco.com.

Sincerely,

Joseph Charles
Hydro Compliance Coordinator

APPENDIX B

INFORMATION AND PLANNING FOR CONSULTATION REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Georgia Ecological Services Field Office
355 East Hancock Avenue
Room 320
Athens, GA 30601-2523
Phone: (706) 613-9493 Fax: (706) 613-6059

In Reply Refer To: February 03, 2023
Project Code: 2023-0041542
Project Name: Nacoochee Development 2023 Non-Capacity Amendment

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

Thank you for your request for information on federally listed species and important wildlife habitats that may occur in your project area. The U.S. Fish and Wildlife Service (Service) has responsibility for certain species of wildlife under the Endangered Species Act (ESA) of 1973 as amended (16 USC 1531 et seq.), the Migratory Bird Treaty Act (MBTA) as amended (16 USC 701-715), Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the Bald and Golden Eagle Protection Act (BGEPA) as amended (16 USC 668-668c). We are providing the following guidance to assist you in determining which federally imperiled species may or may not occur within your project area and to recommend some conservation measures that can be included in your project design if you determine those species or designated critical habitat may be affected by your proposed project.

FEDERALLY-LISTED SPECIES AND DESIGNATED CRITICAL HABITAT

Attached is a list of endangered, threatened, and proposed species that may occur in your project area. Your project area may not necessarily include all or any of these species. Under the ESA, it is the responsibility of the Federal action agency, project proponent, or their designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. Similarly, it is the responsibility of the Federal action agency or project proponent, not the Service, to make “no effect” determinations. If you determine that your proposed action will have “no effect” on threatened or endangered species or their respective critical habitat, you do not need to seek concurrence with the Service. Nevertheless, it is a violation of Federal law to harm or harass any federally listed threatened or endangered fish or wildlife species without the appropriate permit. If you need additional information to assist in your effect determination, please contact the Service.

If you determine that your proposed action may affect federally listed species, please consult with the Service. Through the consultation process, we will analyze information contained in a biological assessment or equivalent document that you provide. If your proposed action is associated with Federal funding or permitting, consultation will occur with the Federal agency under section 7(a)(2) of the ESA. Otherwise, an incidental take permit pursuant to section 10(a)(1)(B) of the ESA (also known as a Habitat Conservation Plan) may be necessary to exempt harm or harass federally listed threatened or endangered fish or wildlife species. For more information regarding formal consultation and HCPs, please see the Service's Section 7 Consultation Library and Habitat Conservation Plans Library Collections.

Action Area. The scope of federally listed species compliance not only includes direct effects, but also any indirect effects of project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations). The action area is the spatial extent of an action's direct and indirect modifications or impacts to the land, water, or air (50 CFR 402.02). Large projects may have effects to land, water, or air outside the immediate footprint of the project, and these areas should be included as part of the action area. Effects to land, water, or air outside of a project footprint could include things like lighting, dust, smoke, and noise. To obtain a complete list of species, the action area should be uploaded or drawn in IPaC rather than just the project footprint.

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. An updated list may be requested through IPaC.

Project Planning and Review. If you determine that your action may affect any federally listed species and would like technical assistance from our office, please send us a complete project review package. A step by step guide is available at the Georgia Ecological Services Project Planning and Review page (https://www.fws.gov/office/georgia-ecological-services/project-planning-review). A complete project review package should include:

1. A description of the proposed action, including any measures intended to avoid, minimize, or offset effects of the action. Consistent with the nature and scope of the proposed action, the description shall provide sufficient detail to assess the effects of the action on listed species and critical habitat, including:
    - The purpose of the action;
    - The duration and timing of the action;
    - The location of the action;
    - The specific components of the action and how they will be carried out;
    - Description of areas to be affected directly or indirectly by the action;

- Maps, drawings, blueprints, or similar schematics of the action

2. An updated Official Species List
3. Biological Assessments (may include habitat assessments and information on the presence of listed species in the action area);
4. Description of effects of the action on species in the action area and, if relevant, effect determinations for species and critical habitat;
5. Conservation measures and any other available information related to the nature and scope of the proposed action relevant to its effects on listed species or designated critical habitat (e.g., management plans related to stormwater, vegetation, erosion and sediment plans). Visit the Georgia Planning and Consultation Tools (https://www.fws.gov/story/planning-and-consultation-tools-georgia) for guidance.

Please submit all consultation documents via email to gaes_assistance@fws.gov or by using IPaC, uploaded documents, and sharing the project with a specific Georgia Ecological Services staff member. If the project is on-going, documents can also be sent to the Georgia Ecological Services staff member currently working with you on your project. For Georgia Department of Transportation related projects, please work with the Office of Environmental Services ecologist to determine the appropriate USFWS transportation liaison.

WETLANDS AND FLOODPLAINS

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. These habitats should be conserved through avoidance, or mitigated to ensure that there would be no net loss of wetlands function and value. We encourage you to use the National Wetland Inventory (NWI) maps in conjunction with ground-truthing to identify wetlands occurring in your project area. The Service's NWI program website (https://www.fws.gov/program/national-wetlands-inventory) integrates digital map data with other resource information. We also recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands.

MIGRATORY BIRDS

The MBTA prohibits the taking of migratory birds, nests, and eggs, except as permitted by the Service's Migratory Birds Program (https://fws.gov/program/migratory-birds). To minimize the likelihood of adverse impacts to migratory birds, we recommend construction activities occur outside the general bird nesting season from March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until the young have fledged.

We recommend review of Birds of Conservation Concern to fully evaluate the effects to the birds at your site. This list identifies birds that are potentially threatened by disturbance and construction. It can be found at the Service's Migratory Birds Conservation Library Collection (https://fws.gov/library/collections/migratory-bird-conservation-documents).

Information related to best practices and migratory birds can be found at the Service's Avoiding and Minimizing Incidental Take of Migratory Birds Library Collection (https://fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds).

BALD AND GOLDEN EAGLES

The bald eagle (*Haliaeetus leucocephalus*) was delisted under the ESA on August 9, 2007. Both the bald eagle and golden eagle (*Aquila chrysaetos*) are still protected under the MBTA and BGEPA. The BGEPA affords both eagles protection in addition to that provided by the MBTA, in particular, by making it unlawful to "disturb" eagles. Under the BGEPA, the Service may issue limited permits to incidentally "take" eagles (e.g., injury, interfering with normal breeding, feeding, or sheltering behavior nest abandonment). For information on bald and golden eagle management guidelines, we recommend you review information provided at the Service's Bald and Golden Eagle Management Library Collection (https://fws.gov/library/collections/bald-and-golden-eagle-management).

NATIVE BATS

If your species list includes Indiana bat (*Myotis sodalis*) or northern long-eared bat (*M. septentrionalis*) and the project is expected to impact forested habitat that is appropriate for maternity colonies of these species, forest clearing should occur outside of the period when bats may be present. Federally listed bats could be actively present in forested landscapes from April 1 to October 15 of any year and have non-volant pups from May 15 to July 31 in any year. Non-volant pups are incapable of flight and are vulnerable to disturbance during that time.

Indiana, northern long-eared, and gray (*M. grisescens*) bats are all known to utilize bridges and culverts in Georgia. If your project includes maintenance, construction, or any other modification or demolition to transportation structures, a qualified individual should complete a survey of these structures for bats and submit your findings via the Georgia Bats in Bridges cell phone application, free on Apple and Android devices. Please include these findings in any biological assessment(s) or other documentation that is submitted to our office for technical assistance or consultation.

Additional information can be found at Georgia Ecological Services' Planning and Consultations Tools and Bat Conservation in Georgia pages.

MONARCH BUTTERFLY

On December 20, 2020, the Service determined that listing the Monarch butterfly (*Danaus plexippus*) under the Endangered Species Act is warranted but precluded at this time by higher priority listing actions. With this finding, the monarch butterfly becomes a candidate for listing. The Service will review its status each year until we are able to begin developing a proposal to list the monarch.

As it is a candidate for listing, the Service welcomes conservation measures for this species. Recommended, and voluntary, conservation measures for projects in Georgia can be found at our Monarch Conservation in Georgia (https://www.fws.gov/project/monarch-conservation-georgia) page.

EASTERN INDIGO SNAKE

The Standard Protection Measures for the Eastern Indigo Snake (*Drymarchon couperi*) include educational materials and training that can help protect the species by making staff working on a project site aware of their presence and traits. In Georgia, indigo snakes are closely associated with the state-listed gopher tortoise (*Gopherus polyphemus*), a reptile that excavates extensive underground burrows that provide the snake shelter from winter cold and summer desiccation.

SOLAR ENERGY DEVELOPMENT

The Georgia Low Impact Solar Siting Tool (LISST) is available as a map layer in IPaC (Find it in the “Layers” Box > “Environmental Data”) and as a web application to provide project managers with the data to identify areas that may be preferred for low impact development. The tool seeks to support the acceleration of large-scale solar development in areas with less impact to the environment.

STATE AGENCY COORDINATION

Additional information that addresses at-risk or high priority natural resources can be found in the State Wildlife Action Plan (https://georgiawildlife.com/WildlifeActionPlan), at Georgia Department of Natural Resources, Wildlife Resources Division Biodiversity Portal (https://georgiawildlife.com/conservation/species-of-concern), Georgia's Natural, Archaeological, and Historic Resources GIS portal (https://www.gnahrgis.org/gnahrgis/index.do), and the Georgia Ecological Services HUC10 Watershed Guidance page.

Thank you for your concern for endangered and threatened species. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. For further consultation on your proposed activity, please email gaes_assistance@fws.gov and reference the project county and your Service Project Tracking Number.

This letter constitutes Georgia Ecological Services’ general comments under the authority of the Endangered Species Act.

Attachment(s):

- Official Species List
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Georgia Ecological Services Field Office
355 East Hancock Avenue
Room 320
Athens, GA 30601-2523
(706) 613-9493

Project Summary

Project Code: 2023-0041542

Project Name: Nacoochee Development 2023 Non-Capacity Amendment

Project Type: Dam - Maintenance/Modification

Project Description: Georgia Power Company (Georgia Power) owns and operates the North Georgia Project licensed by the Federal Energy Regulatory Commission (FERC), Project No. 2354 (Project). The North Georgia Project consists of six hydropower developments (upstream to downstream): Burton, Nacoochee, Mathis-Terrora, and Tallulah Falls on the Tallulah River; and Tugalo and Yonah on the Tugaloo River. The Nacoochee dam is located at river mile (RM) 363 on the Tallulah River in Rabun County, Georgia. Georgia Power proposes to upgrade the two generating units at the Nacoochee Development of the North Georgia Project by replacing the turbine runners, generators, and intake trashracks. Upgrading the generating units will allow the Nacoochee Development to continue to meet the operational requirements of its existing license.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@34.7556589,-83.50083403345029,14z



Counties: Rabun County, Georgia

Endangered Species Act Species

There is a total of 9 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Gray Bat *Myotis grisescens* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6329	Endangered
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Reptiles

NAME	STATUS
Bog Turtle *Glyptemys muhlenbergii* Population: U.S.A. (GA, NC, SC, TN, VA) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962	Similarity of Appearance (Threatened)

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Persistent Trillium *Trillium persistens*	Endangered
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/3583	
Small Whorled Pogonia *Isotria medeoloides*	Threatened
Population:	
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/1890	
Swamp Pink *Helonias bullata*	Threatened
Population:	
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/4333	
White Fringeless Orchid *Platanthera integrilabia*	Threatened
Population:	
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/1889	

Lichens

NAME	STATUS
Rock Gnome Lichen *Gymnoderma lineare*	Endangered
No critical habitat has been designated for this species.	
Species profile: https://ecos.fws.gov/ecp/species/3933	

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Aug 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20

NAME	BREEDING SEASON
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

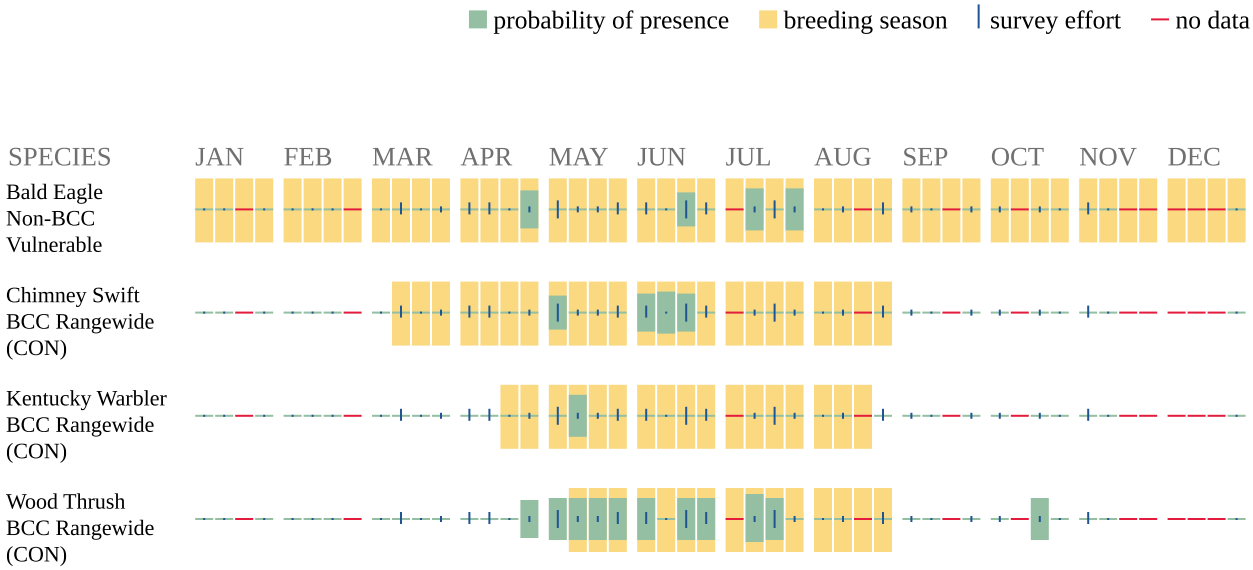
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.
Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?
The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?
The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and

3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell

me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPaC User Contact Information

Agency: Kleinschmidt Associates
Name: Sandra Wash
Address: 5346 Stadium Trace Parkway
Address Line 2: Suite 110
City: Hoover
State: AL
Zip: 35244
Email sandra.wash@kleinschmidtgroup.com
Phone: 2055424494

Lead Agency Contact Information

Lead Agency: Federal Energy Regulatory Commission

Attachment C
EXHIBIT A - AMENDED PROJECT DESCRIPTION
Marked Up Version

4.51.b Exhibit A is a description of the project. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The statement contains subsections that follow this introduction. Each of these subsections is keyed to the appropriate corresponding requirements of 18 CFR 4.51.

The North Georgia Project consists of six separate developments: Burton, Nacoochee, Mathis-Terrora, and Tallulah Falls on the Tallulah River; and Tugalo and Yonah on the Tugaloo River. Each development is described separately below. The Tugalo description was updated to reflect the project description in the June 2021 Non-Capacity Related License Amendment.

BURTON DEVELOPMENT

4.51.b.1 Physical Description

The Burton Development is located farthest upstream of the six developments in the North Georgia Project, at Mile 368 on the Tallulah River. This development impounds most of the storage volume for the project, and its discharge is used by each of the other developments in turn to generate power. The development consists of a dam with non-overflow, low-level sluiceway, intake, and gated spillway sections, a tailrace, a powerhouse with two generating units, and a transformer and switchgear in a small substation adjacent to the powerhouse.

The dam is a concrete gravity type, built using cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 296.5 feet long (including a 56.3-foot long core wall), a gated spillway section 197 feet long, a sluiceway section 69.5 feet long, an intake section 64 feet long, and a right non-overflow section 360.5 feet long. The total length of the dam is 987.5 feet and the maximum height is about 128 feet. The crest elevation of the non-overflow section is 1873.0 feet above mean sea level; there is a bridge over the spillway with this same crest elevation. The spillway crest elevation is 1860.0 feet. The spillway has eight motor-operated, bottom-hinged gates 22 feet wide and 7.5 feet high.
The steel penstocks, seven feet in diameter and 120 feet long, are built into the intake section of the dam. The penstocks and two low-level sluices in the sluiceway section are joined to a common header in the dam which connects to the two turbines and to an 84-inch free discharge gate valve.

The powerhouse sits at the toe of the dam. It is a steel, reinforced concrete, and masonry structure 88 feet long, 47 feet 8 inches wide, and about 81.5 feet tall at the downstream face. The powerhouse contains two generating units, a control room, and a machine shop.

The tailrace is about 50 feet wide and merges with the main river channel about 150 feet downstream of the powerhouse. Concrete walls contain the tailrace downstream of the powerhouse for about 120 feet on the right side and about 65 feet on the left side.

The generating units supply power at 6600 volts to a small substation adjacent to the powerhouse. A transformer in the substation steps up the power to 46 KV. Two 46-KV transmission lines leave the substation: one connects with the Habersham Electric Municipal Cooperative (EMC), and the other connects with the Nacoochee Development downstream. These transmission lines are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level of the Burton Development Impoundment (Lake Burton) is 1866.6 feet above mean sea level. At that elevation, the surface area of the lake is 2775 acres. The gross storage capacity at full-pool is 108,000 acre-feet and the usable storage capacity is 90,000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Burton has two generating units. Each unit has a vertical Francis-type turbine rated at 7300 horsepower at 110 feet of head, and a vertical, direct-coupled alternating current generator rated 4500 KVA, 4050 KW at 225 rpm.

4.51.b.4 Transmission Line Description

Only the short stub lines from the powerhouse to the substation are included in the project. The 46-KV transmission lines leaving the substation are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

2 – Vertical shaft, Francis type, S. Morgan Smith, 7300 hp at 110 feet of head, 225 rpm

Turbines are complete with steel penstocks, 84” motor operated penstock valves, steel pressure cases, Woodward governors, conical steel draft tubes, and other minor auxiliary equipment.

Gates:

8 – Crest gates: tilting type, steel with steel frame, 7.5 feet X 22 feet, with individual motor operated hoists.

2 – Head gates: steel, vertical lift, screw type, with motor operated hoists for 7 feet X 7 feet penstock opening.

1 – Sluice gate valve: 84-inch diameter, steel, vertical lift, screw type, motor operated (sluice gates are not operated).

Miscellaneous:

1 – Powerhouse crane: Shaw, 25 ton, bridge type, with 42'9" span and 31' lift.

Other miscellaneous mechanical equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, and fire protection equipment.

Electrical

Generators:

2 – Vertical shaft, General Electric, 4500 KVA, 0.9 p.f., 4050 KW, 225 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are open frame with direct connected 37-KW main exciters.

Circuit Breakers:

3 – Industrial Electric Manufacturing vacuum circuit breakers, 13.8 KV.

Switchboard:

1 – Complete nine panel switchboard for: remote control of units; local control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, 65 KW motor generator, switchgear, station batteries, and lighting and telephone systems.

Transmission

Transformer:

1 – Wagner, 7500 KVA, 46,000 GRD Y/23, 100-6600 volts, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breaker:

1 – Allis Chalmers power circuit breaker, 46 IV, 600 ampere.

Transmission Lines:

Only the short stub lines from the powerhouse to the substation are included in the project. The 46-KV transmission lines leaving the substation are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

The transmission substation is located at the west end of the powerhouse and consists of steel frames, buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

NACOOCHEE DEVELOPMENT

4.51.b.1 Physical Description

The Nacoochee Development is located approximately 4.8 miles downstream from Burton Dam. The development consists of a concrete gravity dam with nonoverflow, intake, low-level sluiceway, and free-crested spillway sections, a powerhouse with two generating units, a tailrace, and a transformer and switchgear in a small substation adjacent to the powerhouse.

The dam was built using cyclopean concrete construction. From left to right, the dam consists of : a 190-foot left nonoverflow section, a 54-foot long intake section, a 38-foot long sluiceway section, a 140-foot long free-crested spillway section, and a 78-foot long right nonoverflow section. The total length of the dam is 500 feet and the maximum height is about 73 feet. The crest elevation of the non-overflow sections is 1765.0 feet above mean sea level. The spillway crest elevation is 1752.5 feet.

Two steel penstocks nine feet in diameter and about 80 feet long are built into the intake section of the dam. The dam has a 7-foot by 7-foot sluiceway with a steel slide gate. The sluice gate is not operated.

The powerhouse sits at the toe of the dam. It is a steel, reinforced concrete, and masonry structure 85’4” long, 40’4” wide, and about 76.5 feet high at the downstream face. The powerhouse contains two generating units, a control room, and a machine shop.

The tailrace is about 50 feet wide and merges with the main river channel about 200 feet downstream of the powerhouse. Concrete walls contain the tailrace downstream of the powerhouse for about 50 feet on the right side and for about 200 feet on the left side.

A small substation adjacent to the powerhouse steps up the power generated from 6600 volts to 46,000 volts. The substation also serves as the connecting point for the 46-KV distribution line from the Burton Development, and two six-mile long 46-KV transmission lines to the Mathis-Terrora Development. These transmission lines are used primarily as distribution lines and are not part of the Nacoochee Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level for the Nacoochee Development impoundment (Seed Lake) is 1752.5 feet above mean sea level. At that level, the surface area of the lake is 260 acres. The gross storage capacity is 8250 acre-feet and the usable storage capacity is 5350 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Nacoochee has two generating units. Each unit has a vertical shaft, propeller-type turbine rated ~~4000~~ 4025 horsepower at ~~58~~ 62.9 feet of head, and a directly connecting alternating current generator rated ~~3000 KVA~~3.3 MVA~~,~~ ~~2400 KW~~ at 400 rpm.

4.51.b.4 Transmission Line Description

Only the short stub lines from the Nacoochee powerhouse to the substation transformer are included in the Nacoochee Development. The 46-KV line to Burton and the two 46-KV lines to the Terrora substation are not part of the Nacoochee Development. There are no transmission lines in the development.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

~~2~~ 1 – Vertical shaft, propeller type (Bell), ~~S. Morgan Smith~~Mavel, ~~4000~~ 4025 hp at ~~58~~ 62.9 feet of head, 400 rpm.

1- Vertical shaft, propeller type (Bell), Canadian Hydro, 4025 hp at 62.9 feet of head, 400 rpm.

Turbines are complete with steel penstocks, steel pressure cases, Woodward governors, concrete elbow type draft tubes, and other minor auxiliary equipment.

Gates:

2 – Headgates; steel, vertical lift, screw type, with motor operated hoist for 10 ft. X 15 ft. opening.

1 – Sluice gate; steel, vertical lift, screw type, with motor operated hoist for 7 ft. X 7 ft. sluiceway.

Miscellaneous:

1 – Powerhouse crane; Shaw, 20 ton, bridge type, with 34’5” span and 30 foot lift.

Other miscellaneous mechanical equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, sump pumps, and fire protection equipment.

Electrical

Generators:

2 – Vertical shaft, General Electric, ~~3000 KVA~~3.3 MVA, 0.~~8~~ 9 p.f., ~~2400~~ 3000 KW, 400
rpm, 3-phase, 60 cycle, 6600 volts.

Generators are open frame with direct connected 48-KW main exciters.

Circuit Breakers:
3 – Industrial Electric Manufacturing vacuum breaker, 13.8 KV.

Switchboard:
1 – Complete nine panel switchboard for: remote control of units; control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, 65 KW motor generator, switchgear, station batteries, and lighting and telephone equipment.

Transmission

Transformer:
1 – General Electric, 5000 KVA, 43,800 GRV/25290-6600 volts, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breaker:
1 – McGraw Edison power circuit breaker, 46 KV, 1200 ampere.

Transmission Lines:
~~Only the short stub lines from the powerhouse to the substation transformer are included in the Nacoochee Development.~~

~~The transmission substation is located just below the powerhouse and consists of steel frames, buses, disconnecting switches and cable necessary to control station from switchboard.~~

New cable bus will run from the powerhouse to the substation transformer. The transmission substation is to an area near the east abutment and consists of steel frames, busses, disconnecting switches and cable necessary to control station from switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

MATHIS-TERRORA DEVELOPMENT

4.51.b.1 Physical Description

The Mathis-Terrora Development consists of a main dam, called Mathis Dam, a saddle dike, an intake and power tunnel, a surge tank, two penstocks, a powerhouse with two generating units, and transformers and switchgear in a substation. Mathis Dam is located at mile 354 on the Tallulah River, about nine miles downstream of the Nacoochee Development. The Terrora powerhouse is located 5.6 miles downstream of Mathis Dam at the head of the impoundment of the Tallulah Falls Development. The mile-long power tunnel cuts through a mountain to connect the impoundment (Lake Rabun) and the Terrora penstocks.

Mathis Dam is a concrete slab and buttress dam with the main concrete dam structure at 617 feet long and a maximum height of 115 feet. Several walls have been added on both sides of the dam since original construction. With the added walls, the dam consists of the following sections, from left to right: 1) a 20-foot concrete wall, a 19.75-foot concrete wall, a 48.5-foot concrete panel wall, a 47.33-foot timber wall, a 275-foot left non-overflow section with a timber wall on top, a 290-foot long spillway section, a 50-foot right non-overflow section with a timber wall on top, and a 21.5-foot timber wall. These structures together create a crest elevation of 1703 feet for the impounding structure. The timber walls, on both the non-overflow sections and the abutments, and the concrete walls on the left abutment were added to raise the elevation of the structures to at least 1,702 feet, which corresponds to the probable maximum flood (PMF) elevation. A one-foot high steel splash plate was added to the timber walls, the concrete panel wall, and the 19.8-foot long concrete wall to increase the top elevation to at least 1703, or about one foot above PMF. The 20-foot long concrete wall was constructed to at least elevation 1,703 as well. The original crest elevation of the main concrete, non-overflow sections is 1695.0 feet above mean sea level, and the spillway crest elevation is 1683.1 feet. A spillway bridge at elevation 1704.0 feet extends over the length of the spillway.

The spillway is equipped with 16 Obermeyer gates with bay openings varying from about 15.5 to 16 feet wide. The skin plates for the Obermeyer gates are about 7.8 feet tall with a curved face. The new spillway gates were installed in 2014-2015 to replace the original bottom-hinged gates. The gates are operated from a control room under the dam in the old powerhouse location. Backup power to the gate control system is provided by a natural gas generator that was installed during spillway gate replacement. As a safety mechanism, the spillway gates have a mechanical device that will deflate the bladders and lower the gates automatically if about one foot of water is passing over the gates.

A saddle dike closes a low saddle in the reservoir rim about 2300 feet north of Mathis Dam. It is a homogeneous earth embankment 370 feet long and

about 65 feet high at its centerline. The dike has a 20-foot wide crest, slopes of 2.5 horizontal to 1 vertical, a downstream rock toe with a 2.75:1 slope, and a combination open cut and grouted cutoff extending into the hard mico schist foundation rock. This saddle dike was constructed in 1956 to replace the original concrete slab and buttress saddle dike, which is located just upstream of the new dike and has been breached.

The intake to the power tunnel is a separate reinforced concrete structure located on the right abutment about 500 feet upstream of the dam. The power tunnel is excavated through rock. The power tunnel is lined where it enters and exits the mountain. Between the entrance and exit, the tunnel is unlined. The power tunnel has a lower rectangular cross section that is topped by a semi-circular cross section. The width of the lower rectangular section varies from 11 to 13 feet while the semi-circular top portion varies in radius from 5’6” to 6’6. The entire power tunnel has a length of 5334 feet. The power tunnel discharges into a reinforced concrete surge tank. Two steel riveted penstocks, nine feet in diameter and about 850 feet long, connect the surge tank and the Terrora powerhouse.

The Terrora powerhouse is a steel, reinforced concrete, and masonry structure 127’4” long, 57’4” wide and about 100 feet tall at the downstream face. It houses two generating units, a control room, and a machine shop. The generating units discharge water out of the powerhouse directly into the impoundment for the Tallulah Falls Development; there is no tailrace.

The generating units supply power at 6600 volts. This is stepped up to 115,000 volts by transformers in the substation east of the powerhouse. The substation is a connecting point for the two 46-KV transmission lines from Nacoochee, and for two 110-KV lines from the Tallulah Lodge substation. The Terrora Development includes only step-up and switching facilities in the substation up to the point of junction with the 110-KV Terrora-Tallulah Lodge distribution line. Neither the transmission lines between Terrora and Nacoochee nor the lines between Terrora and the Tallulah Lodge substation are part of the development.

4.51.b.2 Areas, Elevation, Storage Capacity

The full pool elevation of Lake Rabun, the impoundment of Mathis Dam, 1689.6 feet above mean sea level. At that elevation, Lake Rabun has a surface area of 780 acres, a gross storage of 31,100 acre-feet, and a usable volume of 21,900 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

There are two generating units in the Terrora powerhouse. Each unit has a vertical Francis-type turbine rated 15,499 horsepower at 176 feet of head,

directly connected to a vertical alternating current generator rated 14,375 KVA, 11,500 KW at 200 rpm.

4.51.b.4 Transmission Line Description

This development includes only the stub lines from the Terrora powerhouse to the Terrora substation up to the point of junction with the Terrora-Tallulah Lodge transmission line.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

2 – Vertical shaft, Francis type, American Hydro Corporation, 15,499 hp at 176 feet of head, 200 rpm. Turbine units are rated approximately 10.4 MW each at best gate.

Turbines are complete with steel penstocks, 84” hydraulically operated penstock valves, steel pressure cases, Woodward governors, conical steel draft tubes, and other minor auxiliary equipment.

Gates:

16 – Crest gates; Obermeyer, with a 7.75-foot curved steel skin plate.
2 – Head gates; steel, vertical lift, screw type, with motor operated hoist for 30 ft. X 20 ft. tunnel opening.
2 – Penstock emergency gates; tilting type, steel, with motor operated hoist for 9 ft. diameter penstock opening.

Miscellaneous:

1 – Powerhouse crane, Whiting, 50 ton, bridge type, with 50 ft. span.
3 – Gate valves; 48”, for sluiceways.
2 – Relief valves; 22”, water pressure operated.
1 – Surge tank; reinforced concrete.

Other miscellaneous equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, and fire protection equipment.

Electrical

Generators:
2 – Vertical shaft, Westinghouse (Rewound by NEC), 14,375 KVA, 0.8 P.F., 11,500 KW, 200 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are direct connected with 160-KW exciters.

Circuit Breakers:
2 - 2000 amp Powell frame breakers, 6600 V, with a short circuit rating of 50kA.

Computerized Control System:
1 - digital distributed control system for remote control of units; control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous equipment includes current and potential transformers, 160 KW motor generator, 480V metal clad switchgear, station batteries, and telephone and lighting equipment.

Transmission

Transformers:
3 - Westinghouse, 6667 KVA, 110 KV/63.52 KV/6.6 KV, single phase, 60 cycle, oil insulated, water cooled, outdoor type.
1 - Westinghouse, 12,000 KVA, 115KV/46KV, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breakers:
1 - General Electric, oil-blast circuit breaker, 115 KV, 800 ampere.
1 - Westinghouse, 46 KV, 1200 ampere.
1 - Westinghouse, 46 KV, 600 ampere.
1 - McGraw-Edison, 121 KV, 1200 ampere.

Transmission Lines:
The development includes only the short stub lines from the powerhouse to the point of junction with the Terrora-Tallulah Lodge 115 KV transmission line in the Terrora substation.

The transmission substation is located at the east end of the powerhouse and consists of steel frames, buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

TALLULAH FALLS DEVELOPMENT

4.51.B.1 Physical Description

The Tallulah Falls Development consists of a dam, an intake and power tunnel, a surge tank, six penstocks, an incline railway, a powerhouse with six generating units, other plant buildings, a tailrace, transformers and switchgear, and one transmission line. The Tallulah Falls Dam is located at mile 347 on the Tallulah River, and the powerhouse is located 1.8 miles downstream at the head of the impoundment of the Tugalo Development.

The Tallulah Falls Dam is a concrete gravity dam constructed with a curved alignment. From left to right, the dam consists of: a left abutment, a gated spillway section, and a right abutment. The total length of the dam is 426 feet, and the maximum height is about 130 feet. The crest elevation of the abutments is 1514.0 feet above mean sea level, and the spillway crest elevation is 1493.0 feet. A bridge with 3-foot high parapet walls spans the dam. The spillway has 10 spillway bays, each 28 feet wide. The four left bays have wooden flashboards with aluminum pipe supports that are 7 feet high. The six right bays are bottom-hinged steel gate structures with wood facing with motor-operated hoists. The gates are 8 feet high. There are also two five-foot square sluiceways through the spillway at elevation 1425.0 feet. The sluiceways close with steel slide gates on the upstream face of the dam. The sluice gates are not operated.

The intake to the power tunnel is a separate reinforced-concrete structure on the right bank about 75 feet up stream of the dam. The power tunnel is cut through rock and is concrete lined. It is horseshoe-shaped in cross section, about 11 feet wide and 14.5 feet high, and 6665 feet long.

The tunnel discharges into a box-type surge tank partially excavated into rock. The tank is constructed of reinforced concrete. It is 93’ high, 71’ long, and 30’ wide. Six steel penstocks connect the surge tank to the powerhouse, which is located down in the Tallulah Gorge. The penstocks are five feet in diameter and average 1250 feet in length. Upper penstock sections are riveted together on all six penstocks, while the lower sections are welded together for Penstocks 1-5 (from left to right). Penstock 6, which was American-made, is riveted for its full length. The penstocks rest on concrete piers spaced 32 feet apart.

An incline railway provides access to the powerhouse in the gorge. The railway is about 1200 feet long and rises in that distance about 650 feet. The maximum grade of the railway is 98 percent. A brick and steel house covers the hoist arrangement at the head on the incline.

The power plant buildings located in the gorge are steel, reinforced concrete and masonry structures. The generator building houses the six generating units. It is 191’ 9 ½” long, 47’6” wide and approximately 115’ tall at the

downstream face. The switching house contains transformers and switchgear. It is 248' 5 ½" long, 49' 6 ¾" wide, and about 120' at its downstream face high. These two buildings are connected by a small building, 28'10" long and 28' wide, which houses the plant control room.

The tailrace was constructed almost at a right angle to the powerhouse, in the original river channel. It is tapered, being only 10 feet wide at the first unit upstream and widening to 50 feet at its lower end. The tailrace is about 250 feet long. It is bounded on its right side by the powerhouse and a concrete wall that extends downstream from the powerhouse about 50 feet. On its left side, it is bounded by a concrete wall extending downstream 250 feet.

Power is delivered from the generators at 6600 volts. This is stepped up to 110,000 volts by transformers in the switching house and delivered by one 0.3-mile long, 110 KV transmission line to the Tallulah Lodge substation at the crest of the gorge. The Tallulah Lodge substation is not a part of the Tallulah Falls Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full pool elevation of the Tallulah Falls Development impoundment (Tallulah Falls Lake) is 1500 feet above mean sea level. At that elevation the surface area of the impoundment is 63 acres. The gross storage capacity at full pool is 2450 acre-feet and the usable storage capacity is 1490 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

The Tallulah Falls Development has six generating units. Each unit has a vertical Francis-type turbine rated 19,300 horsepower at 580 feet of head. The generators are direct-connected, vertical, alternating current generators rated 12,000 KVA, 12,000 KW at 514 rpm.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

6 – Vertical shaft, Francis type, S. Morgan Smith, 19,300 hp at 580 feet of head, 514 rpm.

Turbines are complete with steel penstocks, 60” motor operated penstock valves and 45” water pressure operated valves, cast-iron pressure cases except one with cast steel pressure case, Woodward governors, elbow type steel draft tubes, and other minor auxiliary equipment.

1 - Horizontal shaft, Pelton wheel, 67 hp at 608.5 feet of head, 750 rpm, for auxiliary exciter.

Gates:

4 - Stationary flashboards, 7 ft. X 28 ft., wood with aluminum pipe supports.

6 Spillway gates- 8 ft. X 28 ft., wood-faced with steel frame, electric motor operated.

2 - Sluice gates; vertical lift, screw type, with manual operated hoist for 5’ diameter opening. The sluice gates are not operated.

5 - Intake gates; steel, vertical lift, with manual hoist for 8 ft. X 10 ft. opening.

6 - Emergency gates; steel, flap type, manually operated for steel penstocks.

Miscellaneous:

1 – Powerhouse crane, Shaw, 60 ton, bridge type.

1 – 15 ton crane for switching building.

1 – Surge tank; reinforced concrete.

1 - Passenger incline car; Intamin, Inc.

1 – Freight incline car.

Other miscellaneous equipment includes trash racks, oil pumps, air compressors, storage tanks, piping, automatic release valves, by-pass valves, meters and fire protection equipment.

Electrical

Generators:

6 – Vertical shaft, General Electric, 12,000 KVA, 1.0 p.f., 12,000 KW, 514 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are direct connected with 100 KW exciters.

1 - Horizontal shaft, 50 KW, 250 volt, 750 rpm auxiliary exciter.

Circuit Breakers:

6 - Industrial Electric Manufacturing, MCVB-1523-20 vacuum breakers, 13.8 KV, 2000 amps.

Switchboard:

1 - Complete fourteen panel switchboard for: remote control of units; control of generators, exciters, voltage regulators, station service, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, switchgear, station batteries, and lighting and telephone equipment.

Transmission

Transformers:

4 - General Electric, 3333 KVA, 63,500/110,000/6600 volt, single phase, 60 cycle, oil insulated, water cooled.
1 - Westinghouse, 12/16/20 MVA, 115,000/6900 volt, 3 phase, 60 cycle, oil insulated, water cooled.
8 - General Electric, 4167 KVA, 66,400/115,000/6900 volt, single phase, 60 cycle, oil insulated, water cooled.
1 - Kuhlman, 12/16 MVA, 115 KV/6.6 KV, oil insulated.
1 – General Electric, 8000 KVA, 63,500/100,000/6600 volt, water cooled, oil insulated.

Circuit Breakers:

1 - Westinghouse oil circuit breaker, 115 KV, 1200 ampere.
1 - General Electric oil circuit breaker, 15 KV, 300 ampere.

Transmission Line:

1 – 0.3 mile, 110-KV line from the plant to the Tallulah Lodge substation at the crest of the gorge.

The transmission substation is located in the switching house which is adjacent to the powerhouse and consists of buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

TUGALO DEVELOPMENT

The Tugalo Development is located just downstream of the confluence of the Tallulah and Chattooga Rivers into the Tugaloo River, at river mile 343. The development consists of: a concrete gravity dam with non-overflow, intake, and gated spillway sections, a powerhouse with four generating units, a tailrace, and a substation with transformers and switchgear.

The dam was built with cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 73 feet long, a gated spillway section 357 feet long, a center non-overflow section 20 feet long, an intake section 165 feet long, and a right non-overflow section 225 feet long. The total dam length if 840 feet and the maximum dam height is about 160 feet. The crest elevation of the non-overflow sections is 905.0 feet above mean sea level; there is a bridge over the spillway at this same elevation. The spillway crest elevation is 885.0 feet. The spillway has 14 motor-operated, bottom-hinged steel gates 22 feet long and 7.5 feet high. Two seven-foot square sluiceways with centerline at elevation 820.0 feet are located in the spillway section. The sluice gates are not operated.
Four steel penstocks, each about 308 feet long and 13 feet in diameter, carry water from the intake section through the dam, then under a substation located between the dam and powerhouse, and finally into the generating units. The penstocks are encased in concrete.

The powerhouse sits about 130 feet downstream of the toe of the dam; a substation is situated in the space between. The powerhouse is a steel, reinforced concrete, and masonry building 204’4” long and 64’4” wide, with a 40’ by 37’10” control room extending out from the upstream side. The powerhouse is 109.5 feet high at its downstream face. It contains four generating units, a control room, and a machine shop.

The tailrace is about 150 feet wide and joins the main river channel about 200 feet downstream of the powerhouse. The tailrace is separated from the main channel on its left by a concrete wall about 70 feet long. On the right side a concrete wall extends about 200 feet downstream.

The plant substation is located between the powerhouse and the toe of the dam. Transformers step up power from 6600 volts to 115,000 volts for transmission. Interconnection to the 115-KV Tallulah Lodge – Tugalo – Commerce transmission line of the distribution system is done in the substation. Only the short stub lines from the powerhouse to the substation transformers are part of the Tugalo Development. The 115-KV Tallulah Lodge – Tugalo – Commerce transmission line is primarily for distribution and so is not part of the Tugalo Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level for the Tugalo impoundment (Tugalo Lake) is 891.5 feet above mean sea level. At full pool the reservoir surface area is 597 acres, the gross storage capacity is 43,000 acre-feet and the usable storage is 14,000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Tugalo has four generating units. Each unit has a vertical Francis-type turbine rated 22,850 horsepower at 143 feet of head. Turbine units are rated approximately 16 MW each at best gate. Each generator is a vertical shaft, General Electric, 18,293 KVA, 0.9 p.f., 17,041 KW, 171.4 rpm, 3 phase, 60 cycle, 6600 volts.

4.51.b.4 Transmission Line Description

Only the stub lines connecting the Tugalo powerhouse and the substation transformers are part of the Tugalo Development. The 115 KV Tallulah Lodge – Tugalo – Commerce distribution line is not part of the Tugalo Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

4 – Vertical shaft, Francis type, Mavel Americas , 22,850 hp at 143 feet of head, 171.4 rpm.

Turbines are complete with steel penstocks, steel pressure cases, American Governor HPUs, elbow type draft tubes, and other minor auxiliary equipment.

Gates:

14 - Crest gates; tilting type, steel, 7'6" X 22', with individual motor operated hoists. 2 - Sluice gates; steel, vertical lift, motor operated for 7 ft. X 7 ft. sluiceway. The sluice gates are not operated.

8 - Intake gates; cast iron, vertical lift, screw type, with motor operated hoist for 13 foot diameter penstock.

1 - Intake gate; cast iron, vertical lift, screw type, with motor operated hoist for 3 ft. diameter penstock.

Miscellaneous:

1 – Powerhouse crane, Northern, 50- ton, bridge type.

4 – Turbine Bearing Lube Oil Circulation Skids equipped with 2 – AC pumps with VFDs, 480v/ 3ph and 1 - DC pump 125v supplying ISO VG 68 oil to the generator bearings for the four (4) units. Each skid has a shell & tube heat exchanger to remove the heat that will be generated from the bearings and a sump tank for the heaters.

4 – Hydraulic Power Units (HPU) equipped. 2 – redundant AC pumps, sump tank and air over oil accumulator tanks and piping provides oil to and from the servo motors for the four (4) units.

2 – Air compressors, Atlas Copco #LS15-175 120H, 230v/3 ph, 15 hp and 240-gallon air receiver tank and Atlas Copco #FD50 desiccant dryer.

2 – 100% redundant service/cooling water pumps

4 – Oil Water Separators (OWS)

4 – Braking & Hydraulic Jacking Units and brake cylinders. Each of the 4 - units are equipped with eight (8) brake cylinders each.

<u>Electrical</u>

Generators:

4 – Vertical shaft, General Electric, 18,293 KVA, 0.9 p.f., 17,041 KW, 171.4 rpm, 3 phase, 60 cycle, 6600 volts.

Exciters:

4 - DECS-400 static exciter with constant pressure brush rigging and high side Potential Power Transformer (PPT) fed from generator bus

Generator Breakers:
4 - 6600V, 2000 amperes.

Station Service Transformers:
1 - 6.6/0.48kV, 500kVA
1 - 12/0.48kV, 500kVA

DCS:
Emerson Ovation DCS control system for: remote control of units, control of generators and auxiliary systems, turbines and auxiliary systems, exciters, voltage requlators, and station service

Switchboard:
Vertical Panels for housing of Generator, Generator Step-up Transformer (GSU), and Station Service protective relaying and metering

Other electrical equipment, includes current and potential transformers, switchgear, station batteries, lighting and telephone systems, transfer switch, and 480V switchgear and MCC.

Transmission

Generator Step-up Transformers (GSU):
2 - 40,000 KVA, 115,000 GRDY/6400 volts, 3 phase, 60 cycle, oil insulated, forced air cooled.

Circuit Breakers:
1 - General Electric, 115 KV, 1200 ampere.
1 - General Electric, 115 KV, 600 ampere.

Transmission Lines:
Only the short stub lines connecting the powerhouse with the substation transformers are part of the Tugalo Development.

The transmission substation is located between the powerhouse and the dam and consists of buses, disconnecting switches, and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

YONAH DEVELOPMENT

4.51.b.1 Physical Description

The Yonah Development is the farthest downstream development in the North Georgia Project. Yonah is located at mile 340 on the Tugaloo River, 3.1 miles downstream of Tugalo Dam. The development consists of: a concrete gravity dam with non-overflow, intake, low-level sluiceways, spillway sections, a powerhouse with three generating units, a tailrace, and a substation with transformers and switchgear.

The dam is a concrete gravity dam of cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 112 feet long, a 450-foot long spillway section with 2-foot high flashboards, a sluiceway section 49'4" long, an intake section 131'6" long, and a 204'2" long right non-overflow section. The total length of the dam is 947 feet and the maximum height is about 95 feet. The crest of the non-overflow sections is 757.0 feet above mean sea level and the spillway crest elevation is 742.25 feet. Two-foot high flashboards make the spillway crest elevation 744.25 feet during normal operation.

Three penstocks approximately 15 feet in diameter are built into the dam. Two 7-foot square sluiceways were constructed at an invert elevation of 676.50 feet.

The powerhouse is located at the toe of the intake. It is a steel, reinforced concrete, and masonry structure 184'8" long, 58'8" wide, and about 120 feet tall at its downstream face. The powerhouse contains three generating units, a control room, and a machine shop.

The tailrace is about 120 feet wide and merges with the main river channel about 300 feet downstream of the powerhouse. The tailrace is separated from the main river channel on the left by a concrete wall about 240 feet long. Another concrete wall extends out from the powerhouse about 200 feet on the right side of the tailrace.

Generation from the Yonah units is at 6600 volts. Power is transmitted from the powerhouse to the adjacent substation with short stub lines. In the substation, the power is stepped up to 115 KV and connected to the 115-KV Tallulah Lodge – Yonah – Commerce transmission line. The Tallulah Lodge – Yonah – Commerce transmission line is part of the power distribution system and is not included in the Yonah Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool elevation of the Yonah impoundment (Yonah Lake) is 744.25 feet above mean sea level. At that elevation, the surface area of the lake is about 293 acres, the gross storage capacity is 10,200 acre-feet, and the usable storage is estimated to be 6000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Yonah has three generating units. Each unit has a vertical Francis-type turbine rated at 13,700 horsepower at 68 feet of head, and a directly connected alternating current generator rated 8333 KVA, 7500 KW, at 128.6 rpm. Power from the units is at 6600 volts and is stepped up to 115 KV in the substation adjacent to the powerhouse.

4.51.b.4 Transmission Line Description

Only the short stub lines connecting the Yonah powerhouse and the substation transformers are part of the Yonah Development. The 115 KV Tallulah Lodge – Yonah – Commerce transmission line is primarily for distribution purposes and is not part of the Yonah Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

3 – Vertical shaft, Francis type, S. Morgan Smith, 13,700 hp at 68 feet of head, 128.6 rpm.

Turbines are complete with steel penstocks, cast-iron pressure cases, Woodward governors, elbow type draft tubes, and other minor auxiliary equipment.

Gates:

30 - Crest gates; timber flashboards, 15 ft. X 2.25 ft. supported by steel pipe. These are operated in three sections, with each section having a different trip elevation.

2 - Sluice gates; steel, vertical lift, screw type, with motor operated hoist for 7 ft X 7 ft. sluiceway. The sluice gates are not operated.

6 - Head gates; steel, vertical lift, screw type, with motor hoist for 15 ft. diameter penstock.

Miscellaneous:

1 – Powerhouse crane, Northern, 60 ton, bridge type.

Other mechanical equipment includes trash racks, oil pumps, air compressors, storage tanks, piping, and fire protection equipment.

Electrical

Generators:

3 – Vertical shaft, General Electric, 8333 KVA, .9 p.f., 7500 KW, 128.6 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are complete with direct connected with 175 KW exciters.

Circuit Breakers:

1 - General Electric oil circuit breaker, 7500 volt, 500 ampere.
3 - Industrial Electric Manufacture's vacuum breakers, 13.8 KV.

Switchboard:

1 - Complete 23- panel switchboard for: remote control of units; control of governors, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment including current and potential transformers, 125-KW motor generator, switchgear, station batteries, and lighting and telephone systems.

Transmission

Transformers:

4 - General Electric, 8333 KVA, 63.7/110/6.6 KV, single phase, 60 cycle, oil insulated, water cooled.
1 - Kuhlman, 7500 KVA, oil insulated, air cooled.

Circuit Breakers:

1 - General Electric, pneumatic air circuit breaker, 115000 v, 1200 ampere.
1 - Allis Chalmers, 14.4 KV, 1200 ampere, solenoid operated.

Transmission Lines:
Only the stub lines between the powerhouse and the substation transformers are part of the Yonah Development.

The transmission substation is located at the southwest corner of the powerhouse and consists of steel frames, buses, disconnecting switches, and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

Attachment D
EXHIBIT A – AMENDED PROJECT DESCRIPTION
Clean Version

4.51.b Exhibit A is a description of the project. If the project includes more than one dam with associated facilities, each dam and the associated component parts must be described together as a discrete development. The statement contains subsections that follow this introduction. Each of these subsections is keyed to the appropriate corresponding requirements of 18 CFR 4.51.

The North Georgia Project consists of six separate developments: Burton, Nacoochee, Mathis-Terrora, and Tallulah Falls on the Tallulah River; and Tugalo and Yonah on the Tugaloo River. Each development is described separately below. The Tugalo description was updated to reflect the project description in the June 2021 Non-Capacity Related License Amendment.

BURTON DEVELOPMENT

4.51.b.1 Physical Description

The Burton Development is located farthest upstream of the six developments in the North Georgia Project, at Mile 368 on the Tallulah River. This development impounds most of the storage volume for the project, and its discharge is used by each of the other developments in turn to generate power. The development consists of a dam with non-overflow, low-level sluiceway, intake, and gated spillway sections, a tailrace, a powerhouse with two generating units, and a transformer and switchgear in a small substation adjacent to the powerhouse.

The dam is a concrete gravity type, built using cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 296.5 feet long (including a 56.3-foot long core wall), a gated spillway section 197 feet long, a sluiceway section 69.5 feet long, an intake section 64 feet long, and a right non-overflow section 360.5 feet long. The total length of the dam is 987.5 feet and the maximum height is about 128 feet. The crest elevation of the non-overflow section is 1873.0 feet above mean sea level; there is a bridge over the spillway with this same crest elevation. The spillway crest elevation is 1860.0 feet. The spillway has eight motor-operated, bottom-hinged gates 22 feet wide and 7.5 feet high.
The steel penstocks, seven feet in diameter and 120 feet long, are built into the intake section of the dam. The penstocks and two low-level sluices in the sluiceway section are joined to a common header in the dam which connects to the two turbines and to an 84-inch free discharge gate valve.

The powerhouse sits at the toe of the dam. It is a steel, reinforced concrete, and masonry structure 88 feet long, 47 feet 8 inches wide, and about 81.5 feet tall at the downstream face. The powerhouse contains two generating units, a control room, and a machine shop.

The tailrace is about 50 feet wide and merges with the main river channel about 150 feet downstream of the powerhouse. Concrete walls contain the tailrace downstream of the powerhouse for about 120 feet on the right side and about 65 feet on the left side.

The generating units supply power at 6600 volts to a small substation adjacent to the powerhouse. A transformer in the substation steps up the power to 46 KV. Two 46-KV transmission lines leave the substation: one connects with the Habersham Electric Municipal Cooperative (EMC), and the other connects with the Nacoochee Development downstream. These transmission lines are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level of the Burton Development Impoundment (Lake Burton) is 1866.6 feet above mean sea level. At that elevation, the surface area of the lake is 2775 acres. The gross storage capacity at full-pool is 108,000 acre-feet and the usable storage capacity is 90,000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Burton has two generating units. Each unit has a vertical Francis-type turbine rated at 7300 horsepower at 110 feet of head, and a vertical, direct-coupled alternating current generator rated 4500 KVA, 4050 KW at 225 rpm.

4.51.b.4 Transmission Line Description

Only the short stub lines from the powerhouse to the substation are included in the project. The 46-KV transmission lines leaving the substation are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

2 – Vertical shaft, Francis type, S. Morgan Smith, 7300 hp at 110 feet of head, 225 rpm

Turbines are complete with steel penstocks, 84” motor operated penstock valves, steel pressure cases, Woodward governors, conical steel draft tubes, and other minor auxiliary equipment.

Gates:

8 – Crest gates: tilting type, steel with steel frame, 7.5 feet X 22 feet, with individual motor operated hoists.

2 – Head gates: steel, vertical lift, screw type, with motor operated hoists for 7 feet X 7 feet penstock opening.

1 – Sluice gate valve: 84-inch diameter, steel, vertical lift, screw type, motor operated (sluice gates are not operated).

Miscellaneous:

1 – Powerhouse crane: Shaw, 25 ton, bridge type, with 42'9" span and 31' lift.

Other miscellaneous mechanical equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, and fire protection equipment.

Electrical

Generators:

2 – Vertical shaft, General Electric, 4500 KVA, 0.9 p.f., 4050 KW, 225 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are open frame with direct connected 37-KW main exciters.

Circuit Breakers:

3 – Industrial Electric Manufacturing vacuum circuit breakers, 13.8 KV.

Switchboard:

1 – Complete nine panel switchboard for: remote control of units; local control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, 65 KW motor generator, switchgear, station batteries, and lighting and telephone systems.

Transmission

Transformer:

1 – Wagner, 7500 KVA, 46,000 GRD Y/23, 100-6600 volts, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breaker:

1 – Allis Chalmers power circuit breaker, 46 IV, 600 ampere.

Transmission Lines:

Only the short stub lines from the powerhouse to the substation are included in the project. The 46-KV transmission lines leaving the substation are primarily used to distribute power to Habersham EMC and are not part of the Burton Development.

The transmission substation is located at the west end of the powerhouse and consists of steel frames, buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

NACOOCHEE DEVELOPMENT

4.51.b.1 Physical Description

The Nacoochee Development is located approximately 4.8 miles downstream from Burton Dam. The development consists of a concrete gravity dam with nonoverflow, intake, low-level sluiceway, and free-crested spillway sections, a powerhouse with two generating units, a tailrace, and a transformer and switchgear in a small substation adjacent to the powerhouse.

The dam was built using cyclopean concrete construction. From left to right, the dam consists of : a 190-foot left nonoverflow section, a 54-foot long intake section, a 38-foot long sluiceway section, a 140-foot long free-crested spillway section, and a 78-foot long right nonoverflow section. The total length of the dam is 500 feet and the maximum height is about 73 feet. The crest elevation of the non-overflow sections is 1765.0 feet above mean sea level. The spillway crest elevation is 1752.5 feet.

Two steel penstocks nine feet in diameter and about 80 feet long are built into the intake section of the dam. The dam has a 7-foot by 7-foot sluiceway with a steel slide gate. The sluice gate is not operated.

The powerhouse sits at the toe of the dam. It is a steel, reinforced concrete, and masonry structure 85’4” long, 40’4” wide, and about 76.5 feet high at the downstream face. The powerhouse contains two generating units, a control room, and a machine shop.

The tailrace is about 50 feet wide and merges with the main river channel about 200 feet downstream of the powerhouse. Concrete walls contain the tailrace downstream of the powerhouse for about 50 feet on the right side and for about 200 feet on the left side.

A small substation adjacent to the powerhouse steps up the power generated from 6600 volts to 46,000 volts. The substation also serves as the connecting point for the 46-KV distribution line from the Burton Development, and two six-mile long 46-KV transmission lines to the Mathis-Terrora Development. These transmission lines are used primarily as distribution lines and are not part of the Nacoochee Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level for the Nacoochee Development impoundment (Seed Lake) is 1752.5 feet above mean sea level. At that level, the surface area of the lake is 260 acres. The gross storage capacity is 8250 acre-feet and the usable storage capacity is 5350 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Nacoochee has two generating units. Each unit has a vertical shaft, propeller-type turbine rated 4025 horsepower at 62.9 feet of head, and a directly connecting alternating current generator rated 3.3 MVA at 400 rpm.

4.51.b.4 Transmission Line Description

Only the short stub lines from the Nacoochee powerhouse to the substation transformer are included in the Nacoochee Development. The 46-KV line to Burton and the two 46-KV lines to the Terrora substation are not part of the Nacoochee Development. There are no transmission lines in the development.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

1 – Vertical shaft, propeller type (Bell), Mavel, 4025 hp at 62.9 feet of head, 400 rpm.

1- Vertical shaft, propeller type (Bell), Canadian Hydro, 4025 hp at 62.9 feet of head, 400 rpm.

Turbines are complete with steel penstocks, steel pressure cases, Woodward governors, concrete elbow type draft tubes, and other minor auxiliary equipment.

Gates:

2 – Headgates; steel, vertical lift, screw type, with motor operated hoist for 10 ft. X 15 ft. opening.

1 – Sluice gate; steel, vertical lift, screw type, with motor operated hoist for 7 ft. X 7 ft. sluiceway.

Miscellaneous:

1 – Powerhouse crane; Shaw, 20 ton, bridge type, with 34’5” span and 30 foot lift.

Other miscellaneous mechanical equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, sump pumps, and fire protection equipment.

Electrical

Generators:

2 – Vertical shaft, General Electric, 3.3 MVA, 0.9 p.f., 3000 KW, 400 rpm, 3-phase, 60 cycle, 6600 volts.

Generators are open frame with direct connected 48-KW main exciters.

Circuit Breakers:
3 – Industrial Electric Manufacturing vacuum breaker, 13.8 KV.

Switchboard:
1 – Complete nine panel switchboard for: remote control of units; control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, 65 KW motor generator, switchgear, station batteries, and lighting and telephone equipment.

Transmission

Transformer:
1 – General Electric, 5000 KVA, 43,800 GRV/25290-6600 volts, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breaker:
1 – McGraw Edison power circuit breaker, 46 KV, 1200 ampere.

Transmission Lines:

New cable bus will run from the powerhouse to the substation transformer. The transmission substation is to an area near the east abutment and consists of steel frames, busses, disconnecting switches and cable necessary to control station from switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

MATHIS-TERRORA DEVELOPMENT

4.51.b.1 Physical Description

The Mathis-Terrora Development consists of a main dam, called Mathis Dam, a saddle dike, an intake and power tunnel, a surge tank, two penstocks, a powerhouse with two generating units, and transformers and switchgear in a substation. Mathis Dam is located at mile 354 on the Tallulah River, about nine miles downstream of the Nacoochee Development. The Terrora powerhouse is located 5.6 miles downstream of Mathis Dam at the head of the impoundment of the Tallulah Falls Development. The mile-long power tunnel cuts through a mountain to connect the impoundment (Lake Rabun) and the Terrora penstocks.

Mathis Dam is a concrete slab and buttress dam with the main concrete dam structure at 617 feet long and a maximum height of 115 feet. Several walls have been added on both sides of the dam since original construction. With the added walls, the dam consists of the following sections, from left to right: 1) a 20-foot concrete wall, a 19.75-foot concrete wall, a 48.5-foot concrete panel wall, a 47.33-foot timber wall, a 275-foot left non-overflow section with a timber wall on top, a 290-foot long spillway section, a 50-foot right non-overflow section with a timber wall on top, and a 21.5-foot timber wall. These structures together create a crest elevation of 1703 feet for the impounding structure. The timber walls, on both the non-overflow sections and the abutments, and the concrete walls on the left abutment were added to raise the elevation of the structures to at least 1,702 feet, which corresponds to the probable maximum flood (PMF) elevation. A one-foot high steel splash plate was added to the timber walls, the concrete panel wall, and the 19.8-foot long concrete wall to increase the top elevation to at least 1703, or about one foot above PMF. The 20-foot long concrete wall was constructed to at least elevation 1,703 as well. The original crest elevation of the main concrete, non-overflow sections is 1695.0 feet above mean sea level, and the spillway crest elevation is 1683.1 feet. A spillway bridge at elevation 1704.0 feet extends over the length of the spillway.

The spillway is equipped with 16 Obermeyer gates with bay openings varying from about 15.5 to 16 feet wide. The skin plates for the Obermeyer gates are about 7.8 feet tall with a curved face. The new spillway gates were installed in 2014-2015 to replace the original bottom-hinged gates. The gates are operated from a control room under the dam in the old powerhouse location. Backup power to the gate control system is provided by a natural gas generator that was installed during spillway gate replacement. As a safety mechanism, the spillway gates have a mechanical device that will deflate the bladders and lower the gates automatically if about one foot of water is passing over the gates.

A saddle dike closes a low saddle in the reservoir rim about 2300 feet north of Mathis Dam. It is a homogeneous earth embankment 370 feet long and

about 65 feet high at its centerline. The dike has a 20-foot wide crest, slopes of 2.5 horizontal to 1 vertical, a downstream rock toe with a 2.75:1 slope, and a combination open cut and grouted cutoff extending into the hard mico schist foundation rock. This saddle dike was constructed in 1956 to replace the original concrete slab and buttress saddle dike, which is located just upstream of the new dike and has been breached.

The intake to the power tunnel is a separate reinforced concrete structure located on the right abutment about 500 feet upstream of the dam. The power tunnel is excavated through rock. The power tunnel is lined where it enters and exits the mountain. Between the entrance and exit, the tunnel is unlined. The power tunnel has a lower rectangular cross section that is topped by a semi-circular cross section. The width of the lower rectangular section varies from 11 to 13 feet while the semi-circular top portion varies in radius from 5'6" to 6'6. The entire power tunnel has a length of 5334 feet. The power tunnel discharges into a reinforced concrete surge tank. Two steel riveted penstocks, nine feet in diameter and about 850 feet long, connect the surge tank and the Terrora powerhouse.

The Terrora powerhouse is a steel, reinforced concrete, and masonry structure 127'4" long, 57'4" wide and about 100 feet tall at the downstream face. It houses two generating units, a control room, and a machine shop. The generating units discharge water out of the powerhouse directly into the impoundment for the Tallulah Falls Development; there is no tailrace.

The generating units supply power at 6600 volts. This is stepped up to 115,000 volts by transformers in the substation east of the powerhouse. The substation is a connecting point for the two 46-KV transmission lines from Nacoochee, and for two 110-KV lines from the Tallulah Lodge substation. The Terrora Development includes only step-up and switching facilities in the substation up to the point of junction with the 110-KV Terrora-Tallulah Lodge distribution line. Neither the transmission lines between Terrora and Nacoochee nor the lines between Terrora and the Tallulah Lodge substation are part of the development.

4.51.b.2 Areas, Elevation, Storage Capacity

The full pool elevation of Lake Rabun, the impoundment of Mathis Dam, 1689.6 feet above mean sea level. At that elevation, Lake Rabun has a surface area of 780 acres, a gross storage of 31,100 acre-feet, and a usable volume of 21,900 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

There are two generating units in the Terrora powerhouse. Each unit has a vertical Francis-type turbine rated 15,499 horsepower at 176 feet of head,

directly connected to a vertical alternating current generator rated 14,375 KVA, 11,500 KW at 200 rpm.

4.51.b.4 Transmission Line Description

This development includes only the stub lines from the Terrora powerhouse to the Terrora substation up to the point of junction with the Terrora-Tallulah Lodge transmission line.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

2 – Vertical shaft, Francis type, American Hydro Corporation, 15,499 hp at 176 feet of head, 200 rpm. Turbine units are rated approximately 10.4 MW each at best gate.

Turbines are complete with steel penstocks, 84” hydraulically operated penstock valves, steel pressure cases, Woodward governors, conical steel draft tubes, and other minor auxiliary equipment.

Gates:

16 – Crest gates; Obermeyer, with a 7.75-foot curved steel skin plate.
2 – Head gates; steel, vertical lift, screw type, with motor operated hoist for 30 ft. X 20 ft. tunnel opening.
2 – Penstock emergency gates; tilting type, steel, with motor operated hoist for 9 ft. diameter penstock opening.

Miscellaneous:

1 – Powerhouse crane, Whiting, 50 ton, bridge type, with 50 ft. span.
3 – Gate valves; 48”, for sluiceways.
2 – Relief valves; 22”, water pressure operated.
1 – Surge tank; reinforced concrete.

Other miscellaneous equipment includes trash racks, oil pumps, an air compressor, storage tanks, piping, and fire protection equipment.

Electrical

Generators:
2 – Vertical shaft, Westinghouse (Rewound by NEC), 14,375 KVA, 0.8 P.F., 11,500 KW, 200 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are direct connected with 160-KW exciters.

Circuit Breakers:
2 - 2000 amp Powell frame breakers, 6600 V, with a short circuit rating of 50kA.

Computerized Control System:
1 - digital distributed control system for remote control of units; control of generators, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous equipment includes current and potential transformers, 160 KW motor generator, 480V metal clad switchgear, station batteries, and telephone and lighting equipment.

Transmission

Transformers:
3 - Westinghouse, 6667 KVA, 110 KV/63.52 KV/6.6 KV, single phase, 60 cycle, oil insulated, water cooled, outdoor type.
1 - Westinghouse, 12,000 KVA, 115KV/46KV, three phase, 60 cycle, oil insulated, forced air cooled, outdoor type.

Circuit Breakers:
1 - General Electric, oil-blast circuit breaker, 115 KV, 800 ampere.
1 - Westinghouse, 46 KV, 1200 ampere.
1 - Westinghouse, 46 KV, 600 ampere.
1 - McGraw-Edison, 121 KV, 1200 ampere.

Transmission Lines:
The development includes only the short stub lines from the powerhouse to the point of junction with the Terrora-Tallulah Lodge 115 KV transmission line in the Terrora substation.

The transmission substation is located at the east end of the powerhouse and consists of steel frames, buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

TALLULAH FALLS DEVELOPMENT

4.51.B.1 Physical Description

The Tallulah Falls Development consists of a dam, an intake and power tunnel, a surge tank, six penstocks, an incline railway, a powerhouse with six generating units, other plant buildings, a tailrace, transformers and switchgear, and one transmission line. The Tallulah Falls Dam is located at mile 347 on the Tallulah River, and the powerhouse is located 1.8 miles downstream at the head of the impoundment of the Tugalo Development.

The Tallulah Falls Dam is a concrete gravity dam constructed with a curved alignment. From left to right, the dam consists of: a left abutment, a gated spillway section, and a right abutment. The total length of the dam is 426 feet, and the maximum height is about 130 feet. The crest elevation of the abutments is 1514.0 feet above mean sea level, and the spillway crest elevation is 1493.0 feet. A bridge with 3-foot high parapet walls spans the dam. The spillway has 10 spillway bays, each 28 feet wide. The four left bays have wooden flashboards with aluminum pipe supports that are 7 feet high. The six right bays are bottom-hinged steel gate structures with wood facing with motor-operated hoists. The gates are 8 feet high. There are also two five-foot square sluiceways through the spillway at elevation 1425.0 feet. The sluiceways close with steel slide gates on the upstream face of the dam. The sluice gates are not operated.

The intake to the power tunnel is a separate reinforced-concrete structure on the right bank about 75 feet up stream of the dam. The power tunnel is cut through rock and is concrete lined. It is horseshoe-shaped in cross section, about 11 feet wide and 14.5 feet high, and 6665 feet long.

The tunnel discharges into a box-type surge tank partially excavated into rock. The tank is constructed of reinforced concrete. It is 93’ high, 71’ long, and 30’ wide. Six steel penstocks connect the surge tank to the powerhouse, which is located down in the Tallulah Gorge. The penstocks are five feet in diameter and average 1250 feet in length. Upper penstock sections are riveted together on all six penstocks, while the lower sections are welded together for Penstocks 1-5 (from left to right). Penstock 6, which was American-made, is riveted for its full length. The penstocks rest on concrete piers spaced 32 feet apart.

An incline railway provides access to the powerhouse in the gorge. The railway is about 1200 feet long and rises in that distance about 650 feet. The maximum grade of the railway is 98 percent. A brick and steel house covers the hoist arrangement at the head on the incline.

The power plant buildings located in the gorge are steel, reinforced concrete and masonry structures. The generator building houses the six generating units. It is 191’ 9 ½” long, 47’6” wide and approximately 115’ tall at the

downstream face. The switching house contains transformers and switchgear. It is 248' 5 ½" long, 49' 6 ¾" wide, and about 120' at its downstream face high. These two buildings are connected by a small building, 28'10" long and 28' wide, which houses the plant control room.

The tailrace was constructed almost at a right angle to the powerhouse, in the original river channel. It is tapered, being only 10 feet wide at the first unit upstream and widening to 50 feet at its lower end. The tailrace is about 250 feet long. It is bounded on its right side by the powerhouse and a concrete wall that extends downstream from the powerhouse about 50 feet. On its left side, it is bounded by a concrete wall extending downstream 250 feet.

Power is delivered from the generators at 6600 volts. This is stepped up to 110,000 volts by transformers in the switching house and delivered by one 0.3-mile long, 110 KV transmission line to the Tallulah Lodge substation at the crest of the gorge. The Tallulah Lodge substation is not a part of the Tallulah Falls Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full pool elevation of the Tallulah Falls Development impoundment (Tallulah Falls Lake) is 1500 feet above mean sea level. At that elevation the surface area of the impoundment is 63 acres. The gross storage capacity at full pool is 2450 acre-feet and the usable storage capacity is 1490 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

The Tallulah Falls Development has six generating units. Each unit has a vertical Francis-type turbine rated 19,300 horsepower at 580 feet of head. The generators are direct-connected, vertical, alternating current generators rated 12,000 KVA, 12,000 KW at 514 rpm.

4.51.b.5 Additional Equipment Description

Mechanical

Turbines:

6 – Vertical shaft, Francis type, S. Morgan Smith, 19,300 hp at 580 feet of head, 514 rpm.

Turbines are complete with steel penstocks, 60” motor operated penstock valves and 45” water pressure operated valves, cast-iron pressure cases except one with cast steel pressure case, Woodward governors, elbow type steel draft tubes, and other minor auxiliary equipment.

1 - Horizontal shaft, Pelton wheel, 67 hp at 608.5 feet of head, 750 rpm, for auxiliary exciter.

Gates:

4 - Stationary flashboards, 7 ft. X 28 ft., wood with aluminum pipe supports.

6 Spillway gates- 8 ft. X 28 ft., wood-faced with steel frame, electric motor operated.

2 - Sluice gates; vertical lift, screw type, with manual operated hoist for 5’ diameter opening. The sluice gates are not operated.

5 - Intake gates; steel, vertical lift, with manual hoist for 8 ft. X 10 ft. opening.

6 - Emergency gates; steel, flap type, manually operated for steel penstocks.

Miscellaneous:

1 – Powerhouse crane, Shaw, 60 ton, bridge type.

1 – 15 ton crane for switching building.

1 – Surge tank; reinforced concrete.

1 - Passenger incline car; Intamin, Inc.

1 – Freight incline car.

Other miscellaneous equipment includes trash racks, oil pumps, air compressors, storage tanks, piping, automatic release valves, by-pass valves, meters and fire protection equipment.

Electrical

Generators:

6 – Vertical shaft, General Electric, 12,000 KVA, 1.0 p.f., 12,000 KW, 514 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are direct connected with 100 KW exciters.

1 - Horizontal shaft, 50 KW, 250 volt, 750 rpm auxiliary exciter.

Circuit Breakers:

6 - Industrial Electric Manufacturing, MCVB-1523-20 vacuum breakers, 13.8 KV, 2000 amps.

Switchboard:

1 - Complete fourteen panel switchboard for: remote control of units; control of generators, exciters, voltage regulators, station service, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment includes current and potential transformers, switchgear, station batteries, and lighting and telephone equipment.

Transmission

Transformers:

4 - General Electric, 3333 KVA, 63,500/110,000/6600 volt, single phase, 60 cycle, oil insulated, water cooled.
1 - Westinghouse, 12/16/20 MVA, 115,000/6900 volt, 3 phase, 60 cycle, oil insulated, water cooled.
8 - General Electric, 4167 KVA, 66,400/115,000/6900 volt, single phase, 60 cycle, oil insulated, water cooled.
1 - Kuhlman, 12/16 MVA, 115 KV/6.6 KV, oil insulated.
1 – General Electric, 8000 KVA, 63,500/100,000/6600 volt, water cooled, oil insulated.

Circuit Breakers:

1 - Westinghouse oil circuit breaker, 115 KV, 1200 ampere.
1 - General Electric oil circuit breaker, 15 KV, 300 ampere.

Transmission Line:

1 – 0.3 mile, 110-KV line from the plant to the Tallulah Lodge substation at the crest of the gorge.

The transmission substation is located in the switching house which is adjacent to the powerhouse and consists of buses, disconnecting switches and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

TUGALO DEVELOPMENT

The Tugalo Development is located just downstream of the confluence of the Tallulah and Chattooga Rivers into the Tugaloo River, at river mile 343. The development consists of: a concrete gravity dam with non-overflow, intake, and gated spillway sections, a powerhouse with four generating units, a tailrace, and a substation with transformers and switchgear.

The dam was built with cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 73 feet long, a gated spillway section 357 feet long, a center non-overflow section 20 feet long, an intake section 165 feet long, and a right non-overflow section 225 feet long. The total dam length if 840 feet and the maximum dam height is about 160 feet. The crest elevation of the non-overflow sections is 905.0 feet above mean sea level; there is a bridge over the spillway at this same elevation. The spillway crest elevation is 885.0 feet. The spillway has 14 motor-operated, bottom-hinged steel gates 22 feet long and 7.5 feet high. Two seven-foot square sluiceways with centerline at elevation 820.0 feet are located in the spillway section. The sluice gates are not operated.
Four steel penstocks, each about 308 feet long and 13 feet in diameter, carry water from the intake section through the dam, then under a substation located between the dam and powerhouse, and finally into the generating units. The penstocks are encased in concrete.

The powerhouse sits about 130 feet downstream of the toe of the dam; a substation is situated in the space between. The powerhouse is a steel, reinforced concrete, and masonry building 204’4” long and 64’4” wide, with a 40’ by 37’10” control room extending out from the upstream side. The powerhouse is 109.5 feet high at its downstream face. It contains four generating units, a control room, and a machine shop.

The tailrace is about 150 feet wide and joins the main river channel about 200 feet downstream of the powerhouse. The tailrace is separated from the main channel on its left by a concrete wall about 70 feet long. On the right side a concrete wall extends about 200 feet downstream.

The plant substation is located between the powerhouse and the toe of the dam. Transformers step up power from 6600 volts to 115,000 volts for transmission. Interconnection to the 115-KV Tallulah Lodge – Tugalo – Commerce transmission line of the distribution system is done in the substation. Only the short stub lines from the powerhouse to the substation transformers are part of the Tugalo Development. The 115-KV Tallulah Lodge – Tugalo – Commerce transmission line is primarily for distribution and so is not part of the Tugalo Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool level for the Tugalo impoundment (Tugalo Lake) is 891.5 feet above mean sea level. At full pool the reservoir surface area is 597 acres, the gross storage capacity is 43,000 acre-feet and the usable storage is 14,000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Tugalo has four generating units. Each unit has a vertical Francis-type turbine rated 22,850 horsepower at 143 feet of head. Turbine units are rated approximately 16 MW each at best gate. Each generator is a vertical shaft, General Electric, 18,293 KVA, 0.9 p.f., 17,041 KW, 171.4 rpm, 3 phase, 60 cycle, 6600 volts.

4.51.b.4 Transmission Line Description

Only the stub lines connecting the Tugalo powerhouse and the substation transformers are part of the Tugalo Development. The 115 KV Tallulah Lodge – Tugalo – Commerce distribution line is not part of the Tugalo Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

4 – Vertical shaft, Francis type, Mavel Americas , 22,850 hp at 143 feet of head, 171.4 rpm.

Turbines are complete with steel penstocks, steel pressure cases, American Governor HPUs, elbow type draft tubes, and other minor auxiliary equipment.

Gates:

14 - Crest gates; tilting type, steel, 7'6" X 22', with individual motor operated hoists. 2 - Sluice gates; steel, vertical lift, motor operated for 7 ft. X 7 ft. sluiceway. The sluice gates are not operated.

8 - Intake gates; cast iron, vertical lift, screw type, with motor operated hoist for 13 foot diameter penstock.

1 - Intake gate; cast iron, vertical lift, screw type, with motor operated hoist for 3 ft. diameter penstock.

Miscellaneous:

1 – Powerhouse crane, Northern, 50- ton, bridge type.

4 – Turbine Bearing Lube Oil Circulation Skids equipped with 2 – AC pumps with VFDs, 480v/ 3ph and 1 - DC pump 125v supplying ISO VG 68 oil to the generator bearings for the four (4) units. Each skid has a shell & tube heat exchanger to remove the heat that will be generated from the bearings and a sump tank for the heaters.

4 – Hydraulic Power Units (HPU) equipped. 2 – redundant AC pumps, sump tank and air over oil accumulator tanks and piping provides oil to and from the servo motors for the four (4) units.

2 – Air compressors, Atlas Copco #LS15-175 120H, 230v/3 ph, 15 hp and 240-gallon air receiver tank and Atlas Copco #FD50 desiccant dryer.

2 – 100% redundant service/cooling water pumps

4 – Oil Water Separators (OWS)

4 – Braking & Hydraulic Jacking Units and brake cylinders. Each of the 4 - units are equipped with eight (8) brake cylinders each.

<u>Electrical</u>

Generators:

4 – Vertical shaft, General Electric, 18,293 KVA, 0.9 p.f., 17,041 KW, 171.4 rpm, 3 phase, 60 cycle, 6600 volts.

Exciters:

4 - DECS-400 static exciter with constant pressure brush rigging and high side Potential Power Transformer (PPT) fed from generator bus

Generator Breakers:
4 - 6600V, 2000 amperes.

Station Service Transformers:
1 - 6.6/0.48kV, 500kVA
1 - 12/0.48kV, 500kVA

DCS:
Emerson Ovation DCS control system for: remote control of units, control of generators and auxiliary systems, turbines and auxiliary systems, exciters, voltage requlators, and station service

Switchboard:
Vertical Panels for housing of Generator, Generator Step-up Transformer (GSU), and Station Service protective relaying and metering

Other electrical equipment, includes current and potential transformers, switchgear, station batteries, lighting and telephone systems, transfer switch, and 480V switchgear and MCC.

Transmission

Generator Step-up Transformers (GSU):
2 - 40,000 KVA, 115,000 GRDY/6400 volts, 3 phase, 60 cycle, oil insulated, forced air cooled.

Circuit Breakers:
1 - General Electric, 115 KV, 1200 ampere.
1 - General Electric, 115 KV, 600 ampere.

Transmission Lines:
Only the short stub lines connecting the powerhouse with the substation transformers are part of the Tugalo Development.

The transmission substation is located between the powerhouse and the dam and consists of buses, disconnecting switches, and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.

YONAH DEVELOPMENT

4.51.b.1 Physical Description

The Yonah Development is the farthest downstream development in the North Georgia Project. Yonah is located at mile 340 on the Tugaloo River, 3.1 miles downstream of Tugalo Dam. The development consists of: a concrete gravity dam with non-overflow, intake, low-level sluiceways, spillway sections, a powerhouse with three generating units, a tailrace, and a substation with transformers and switchgear.

The dam is a concrete gravity dam of cyclopean concrete construction. From left to right, the dam consists of: a left non-overflow section 112 feet long, a 450-foot long spillway section with 2-foot high flashboards, a sluiceway section 49'4" long, an intake section 131'6" long, and a 204'2" long right non-overflow section. The total length of the dam is 947 feet and the maximum height is about 95 feet. The crest of the non-overflow sections is 757.0 feet above mean sea level and the spillway crest elevation is 742.25 feet. Two-foot high flashboards make the spillway crest elevation 744.25 feet during normal operation.

Three penstocks approximately 15 feet in diameter are built into the dam. Two 7-foot square sluiceways were constructed at an invert elevation of 676.50 feet.

The powerhouse is located at the toe of the intake. It is a steel, reinforced concrete, and masonry structure 184'8" long, 58'8" wide, and about 120 feet tall at its downstream face. The powerhouse contains three generating units, a control room, and a machine shop.

The tailrace is about 120 feet wide and merges with the main river channel about 300 feet downstream of the powerhouse. The tailrace is separated from the main river channel on the left by a concrete wall about 240 feet long. Another concrete wall extends out from the powerhouse about 200 feet on the right side of the tailrace.

Generation from the Yonah units is at 6600 volts. Power is transmitted from the powerhouse to the adjacent substation with short stub lines. In the substation, the power is stepped up to 115 KV and connected to the 115-KV Tallulah Lodge – Yonah – Commerce transmission line. The Tallulah Lodge – Yonah – Commerce transmission line is part of the power distribution system and is not included in the Yonah Development.

4.51.b.2 Areas, Elevations, Storage Capacity

The full-pool elevation of the Yonah impoundment (Yonah Lake) is 744.25 feet above mean sea level. At that elevation, the surface area of the lake is about 293 acres, the gross storage capacity is 10,200 acre-feet, and the usable storage is estimated to be 6000 acre-feet.

4.51.b.3 Turbine and Generator Descriptions

Yonah has three generating units. Each unit has a vertical Francis-type turbine rated at 13,700 horsepower at 68 feet of head, and a directly connected alternating current generator rated 8333 KVA, 7500 KW, at 128.6 rpm. Power from the units is at 6600 volts and is stepped up to 115 KV in the substation adjacent to the powerhouse.

4.51.b.4 Transmission Line Description

Only the short stub lines connecting the Yonah powerhouse and the substation transformers are part of the Yonah Development. The 115 KV Tallulah Lodge – Yonah – Commerce transmission line is primarily for distribution purposes and is not part of the Yonah Development.

4.51.b.5 Additional Equipment Description

<u>Mechanical</u>

Turbines:

3 – Vertical shaft, Francis type, S. Morgan Smith, 13,700 hp at 68 feet of head, 128.6 rpm.

Turbines are complete with steel penstocks, cast-iron pressure cases, Woodward governors, elbow type draft tubes, and other minor auxiliary equipment.

Gates:

30 - Crest gates; timber flashboards, 15 ft. X 2.25 ft. supported by steel pipe. These are operated in three sections, with each section having a different trip elevation.

2 - Sluice gates; steel, vertical lift, screw type, with motor operated hoist for 7 ft X 7 ft. sluiceway. The sluice gates are not operated.

6 - Head gates; steel, vertical lift, screw type, with motor hoist for 15 ft. diameter penstock.

Miscellaneous:

1 – Powerhouse crane, Northern, 60 ton, bridge type.

Other mechanical equipment includes trash racks, oil pumps, air compressors, storage tanks, piping, and fire protection equipment.

Electrical

Generators:

3 – Vertical shaft, General Electric, 8333 KVA, .9 p.f., 7500 KW, 128.6 rpm, 3 phase, 60 cycle, 6600 volts.

Generators are complete with direct connected with 175 KW exciters.

Circuit Breakers:

1 - General Electric oil circuit breaker, 7500 volt, 500 ampere.
3 - Industrial Electric Manufacture's vacuum breakers, 13.8 KV.

Switchboard:

1 - Complete 23- panel switchboard for: remote control of units; control of governors, exciters, voltage regulators, station service, motor generator, and outgoing transmission lines; and all necessary instruments, controls, indicating devices and protective relays.

Miscellaneous electrical equipment including current and potential transformers, 125-KW motor generator, switchgear, station batteries, and lighting and telephone systems.

Transmission

Transformers:

4 - General Electric, 8333 KVA, 63.7/110/6.6 KV, single phase, 60 cycle, oil insulated, water cooled.
1 - Kuhlman, 7500 KVA, oil insulated, air cooled.

Circuit Breakers:

1 - General Electric, pneumatic air circuit breaker, 115000 v, 1200 ampere.
1 - Allis Chalmers, 14.4 KV, 1200 ampere, solenoid operated.

Transmission Lines:
Only the stub lines between the powerhouse and the substation transformers are part of the Yonah Development.

The transmission substation is located at the southwest corner of the powerhouse and consists of steel frames, buses, disconnecting switches, and cable necessary to control the station from the switchboard.

4.51.b.6 Description of Lands of the United States

No lands of the United States are enclosed within the project boundary.