Langdale and Riverview Projects
Applicant Prepared Environmental Assessment

FERC Nos.
2341
2350

Prepared for: Georgia Power

Prepared by: Kleinschmidt Associates

August 2022

This Page Intentionally Left Blank

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PHOTOS

LIST OF APPENDICES

A

ADA	Americans with Disabilities Act
ACF	Apalachicola-Chattahoochee-Flint
ACHP	Advisory Council on Historic Preservation
ADCNR	Alabama Department of Conservation and Natural Resources
ADECA	Alabama Department of Economic and Community Affairs
ADEM	Alabama Department of Environmental Management
AIR	Additional Information Request
APE	area of potential effects
APEA	Applicant Prepared Environmental Assessment

B

BCC	Birds of Conservation Concern
BMP	best management practice

C

°C	Degrees Celsius
CBMPP	Construction Best Management Practices Plan
C.F.R.	Code of Federal Regulation
cfs	cubic feet per second
CPUE	catch per unit effort
CRMP	Cultural Resources Management Plan
Crow Hop Dam	Crow Hop Diversion Dam
CWA	Clean Water Act
CZMA	Coastal Zone Management Act

E

EA	Environmental Analysis
EAWSFPD	East Alabama Water, Sewer, and Fire Protection Division
ESA	Endangered Species Act
ESV	ecological screening values

F

F&W	fish and wildlife
°F	Degrees Fahrenheit
Final EIS	Final Environmental Impact Statement

FERC	Federal Energy Regulatory Commission
Form 80	FERC Form No. 80
FPA	Federal Power Act
FPC	Federal Power Commission

G

Georgia HPD	Georgia Department of Community Affairs – Historic Preservation Division
GDNR	Georgia Department of Natural Resources
GEC	Geotechnical & Environmental Consultants
Georgia EPD	Georgia Environmental Protection Division
Georgia Power	Georgia Power Company

H

H&H	hydrologic and hydraulic
HABS	Historic American Buildings Survey
HAER	Historic American Engineering

I

I-85	Interstate 85
IPaC	Information Planning and Conservation

K

kW	kilowatt

L

Langdale Project	Langdale Hydroelectric Project

M

M.A.R.S.H.	Matching Aid for Restoring Resources
MCWPR	Middle Chattahoochee Water Planning Region
mg/L	milligrams per liter
mgd	million gallons per day
mL	milliliter
MLRA	Major Land Resource Area
mm	millimeter

N

NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanographic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NPS	National Park Service
NTU	Nephelometric Turbidity Unit
NWI	National Wetlands Inventory

P

PA	Programmatic Agreement
PCB	polychlorinated biphenyl
PEL	probable effects level
PEM	palustrine unconsolidated bottom
PFO	palustrine forested
PME	palustrine emergent marsh
Projects	Langdale and Riverview Hydroelectric Projects
PSS	palustrine scrub-shrub
PUB	Palustrine Unconsolidated Bottom
PWS	Public Water Supply

R

RA	relative abundance
Riverview Project	Riverview Hydroelectric Project
RM	river mile
RTE	rare, threatened, and endangered

S

SCORP	State Comprehensive Outdoor Recreation Plan
SHPO	State Historic Preservation Officer
Southern Research	Southern Research, Historic Preservation Consultants

T

TEL	threshold effects level
2D	two-dimensional

U

U.S.C	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

W

WMA	Wildlife Management Area
WQC	Water Quality Certification
WWTP	wastewater treatment plant

1.0 INTRODUCTION

Georgia Power Company (Georgia Power) is the Federal Energy Regulatory Commission (FERC) licensee for the Langdale Hydroelectric Project (Langdale Project) (FERC No. 2341) and the Riverview Hydroelectric Project[1] (Riverview Project) (FERC No. 2350) (collectively, the "Projects"). On December 18, 2018[2], Georgia Power filed a Notice of Intent (NOI) to not seek a subsequent license with FERC and applications for license surrender for the Langdale and Riverview Projects in accordance with FERC regulations at 18 Code of Federal Regulations (C.F.R.) § 6.1 and 6.2. The licenses for the Projects expire on December 31, 2023.

Georgia Power proposes to surrender the Langdale and Riverview Projects' licenses and decommission the Projects (i.e., the Proposed Action). A complete description of the decommissioning activities for the Projects is provided in Section 5, Proposed Action. This Applicant Prepared Environmental Assessment (APEA) evaluates the effects of the Proposed Action on the Projects' environmental, recreational, cultural and other resources. This APEA considers the three phases of decommissioning: pre removal, removal, and post removal activities in this analysis. Concurrent with filing this APEA with FERC, Georgia Power is also filing the Langdale and Riverview Projects' Decommissioning Plan, which includes engineering descriptions of the Proposed Action, design drawings, and a draft Post Removal Monitoring Plan.

[1] The Riverview Hydroelectric Project includes the Riverview Dam, Riverview powerhouse, and Crow Hop Diversion Dam.
[2] Accession Number 20181218-5451 and 20181218-5452

2.0 PROJECT OVERVIEW

The Projects are located on the Chattahoochee River between the U.S. Army Corps of Engineers' (USACE) West Point Dam, which is located approximately 9.5 miles upstream of the Projects, and Lake Harding (the reservoir for Georgia Power's Bartletts Ferry Project), which is located downstream of the Projects. The Projects' dams and powerhouses lie within the state of Georgia. River flow for the Langdale and Riverview Projects is regulated by discharges from the upstream USACE West Point Dam, which serves flood control and other purposes and contains a hydroelectric station that operates as a peaking facility. From upstream to downstream, the Projects include the Langdale dam and powerhouse (Langdale Project), and the Crow Hop Diversion Dam (Crow Hop Dam) and Riverview dam and powerhouse (collectively, the Riverview Project). Figure 2-1 provides the river mile (RM) location for the Projects as well as other FERC licensed projects on the Chattahoochee River. The Project components are presented in Figure 2-2.

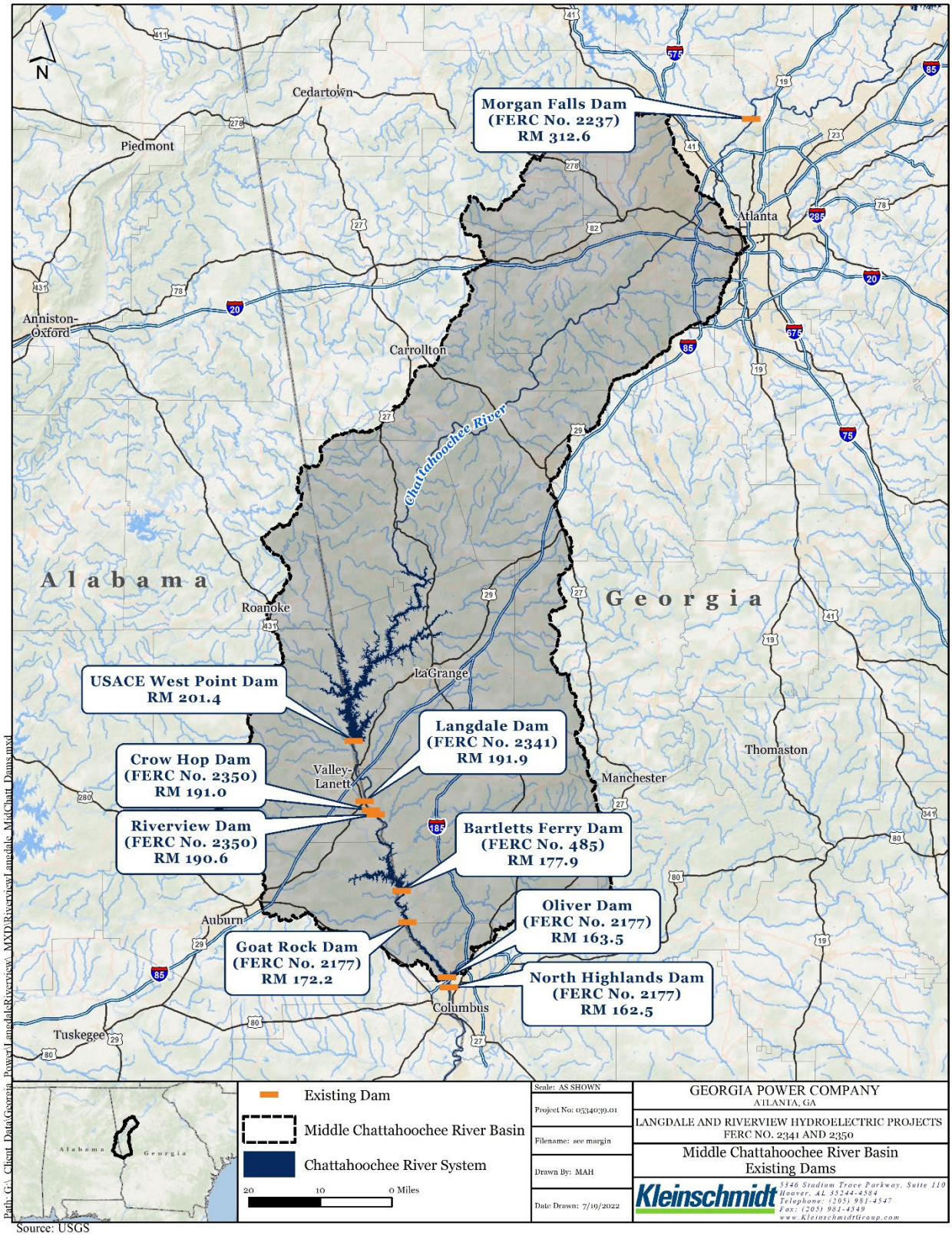


Figure 2-1 Langdale and Riverview Project Locations

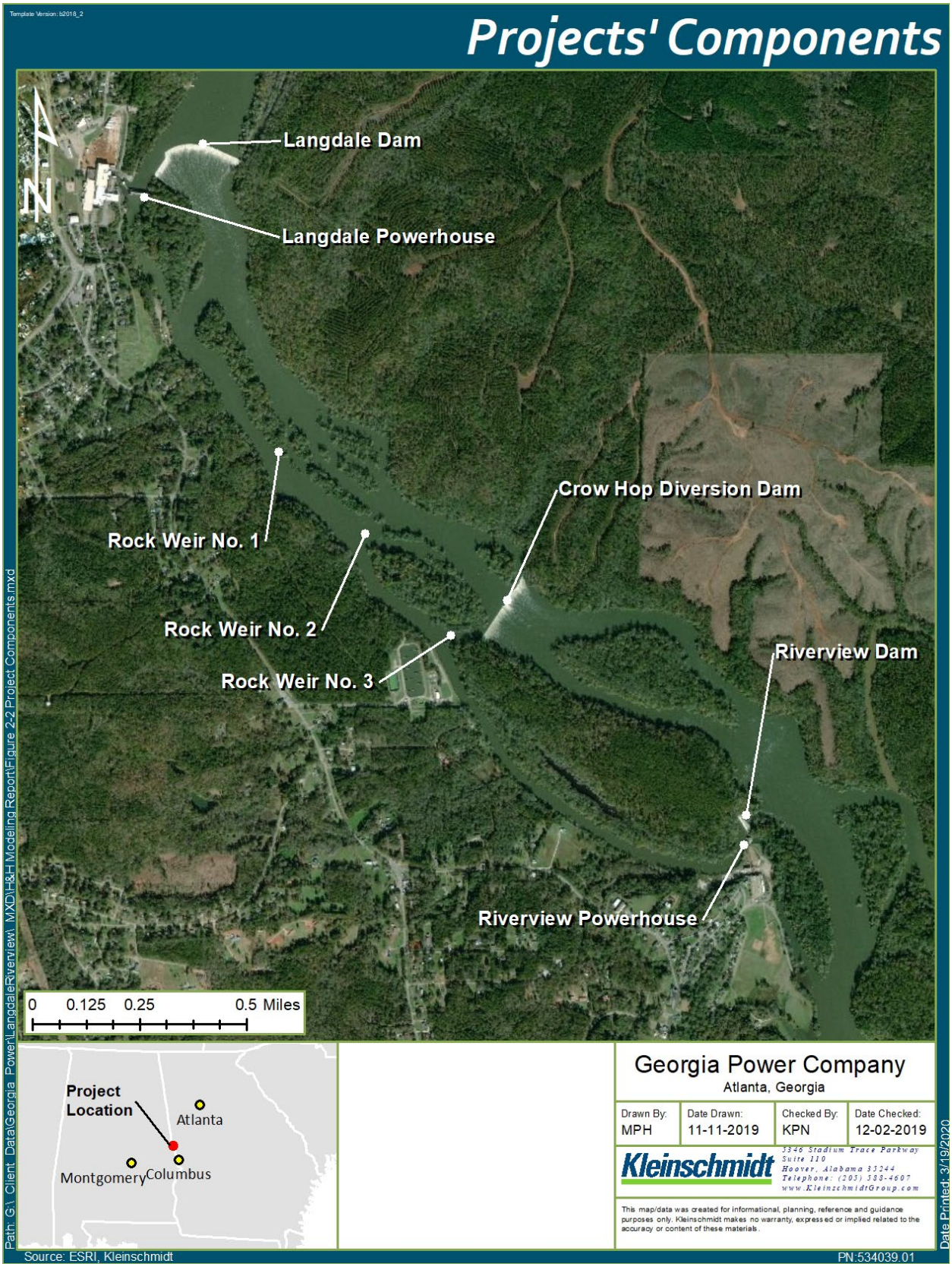


Figure 2-2 Langdale and Riverview Project Components

2.1 Langdale Project

The Langdale Project was first licensed by the FERC's predecessor agency, the Federal Power Commission[3] (FPC), on October 15, 1964. FERC issued an Order Issuing Subsequent License (Minor Project) on May 24, 1993; the license expires on December 31, 2023. The Langdale Project was designed to operate as a run-of-river project. The Project has not operated since 2009 (Georgia Power 2018a).

The Langdale Project is located at RM 191.9 on the Chattahoochee River, in the city of Valley, Alabama (USACE 2016) along the border of Georgia and Alabama. Langdale Dam is located approximately 9.5 RMs downstream of the USACE West Point Dam (RM 201.4). West Point Dam began operating in 1976 and regulates the flow through the Middle Chattahoochee River region. The upper extent of the Langdale impoundment ends at approximately RM 196.5, approximately 5 miles downstream of the West Point Dam.

The Langdale Project was purchased by Georgia Power from West Point Manufacturing Company in 1930. There are few details available regarding the construction of the dam and powerhouse; however, the dam and powerhouse were built for West Point Manufacturing Company by Hardaway Construction Company between 1904 and 1908. West Point Manufacturing Company utilized the Langdale Project to supply water and power to their mill adjacent to the dam. Turbines with horizontal generators were installed in the powerhouse as early as 1907; eventually, a total of four horizontal units were installed. A fifth unit, with a direct-coupled vertical generator, was installed in 1924, and a similar sixth unit was installed in 1926. This produced some of the electricity needed to run the mills; the remaining electricity was purchased from the local utility. In 1930, West Point Manufacturing Company determined that it was more efficient to obtain all the electricity from the local utility and sold the Langdale Project to Georgia Power (Georgia Power 2018a).

Georgia Power began operating the six generating units at the Langdale Project in 1930. Over time, the four horizontal units became a maintenance problem, and eventually were no longer operable or repairable. Generation records suggest that Georgia Power stopped operating the horizontal units in approximately 1954. The horizontal units were officially retired in 1960, leaving only the two 520-kilowatt (kW) vertical units operating at the

[3] The Federal Power Commission was the predecessor of the Federal Energy Regulatory Commission.

Langdale Project; these two units remain in place in the powerhouse but have not operated since 2009. Units 1, 2, 3 and 4 are filled with concrete.

2.1.1 Project Features

The Langdale Project consists primarily of an approximately 1,300-foot-long, 12-foot-tall[4] stone masonry dam across the Chattahoochee River that forms the headpond for the Langdale powerhouse located on the west side of the river (Photo 2-1). An approximately 420-foot-long concrete diversion wall (Photo 2-2) protects the upstream (north) side of the mid-channel island. The Langdale Exhibit G map is provided in Appendix A. Note that the Project boundary is described as metes and bounds that encompass the project works (e.g., the dam, powerhouse, east bank abutment).

Note: View is downstream, eastern side of the Chattahoochee River

Photo 2-1 Langdale Dam

[4] Original drawings cited 15-feet tall but recent survey shows 12 feet.

Note: View is downstream of the dam looking upstream from the mid-channel island at Langdale dam diversion wall

Photo 2-2 View of Concrete Diversion Wall

The Langdale powerhouse and concrete bulkhead wall span from the western shore to the mid-river island, with the powerhouse tailrace discharging to the south, where its flow joins that of Moore's Creek (Photo 2-3). The approximately 220-foot-long stone masonry powerhouse abutment wall joins the Langdale powerhouse to the masonry dam.

Note: View looking west from Georgia side at the Langdale Dam

Photo 2-3 Langdale Powerhouse

2.2 Riverview Project

The Riverview Project was first licensed by the FPC on March 2, 1965, with the current license expiring on December 31, 2023. FERC issued an Order Issuing Subsequent License (Minor Project) on May 24, 1993. The Riverview Project was designed to operate as a run-of-river project. It has not operated since 2009 (Georgia Power 2018b).

The Riverview Project is located approximately at RM 191.0 (Crow Hop Dam) and RM 190.6 (Riverview Dam) on the Chattahoochee River, downstream of the city of Valley, Alabama and in Harris County, Georgia (USACE 2016). The Riverview Project is located approximately 10.5 RM downstream of the USACE West Point Project and 0.9 RM downstream of the Langdale Project (Georgia Power 2018b).

The Riverview Project consists of the two dams and the Riverview powerhouse with generating equipment located on the right (south) abutment of Riverview Dam. Crow Hop Dam is the upstream dam and is situated across the main river, diverting flow into a headrace channel between an island and the right bank of the river. The headrace channel is approximately 1-mile-long. The Riverview dam and powerhouse are located at the lower end of this headrace channel (Georgia Power 2018b).

The Riverview Project was constructed in several phases. Riverview Dam was constructed in 1906 by Hardaway Construction Company for West Point Manufacturing Company. Originally, the dam diverted water into the adjacent mill building to provide power for mill operation. The existing powerhouse was built in 1918 and houses two 240-kW generating units. Crow Hop Dam was constructed in 1920. Both the Riverview and Crow Hop dams are of concrete construction. The Riverview powerhouse produced some of the electricity needed to run the mills, and the remaining electricity was purchased from the local utility. In 1930, West Point Manufacturing Company determined that it was more efficient to obtain all the electricity from the local utility and sold the Riverview Project to Georgia Power. In 1978, 2-foot-high wooden flashboards were added to Riverview Dam adjacent to the powerhouse (Georgia Power 2018b); however, the flashboards are no longer present on the spillway.

In 1930, Georgia Power began operating the two generating units at the Riverview Project. Over time, the units became a maintenance problem, and eventually were no longer operable or repairable. Georgia Power stopped operating the units in 2009 (Georgia Power 2018b).

2.2.1 Project Features

The Riverview Project consists primarily of the Crow Hop Dam on the main (east) stem of the Chattahoochee River, the Riverview Dam at the downstream end of the Riverview headrace (west channel of the river), and the Riverview powerhouse at the western end of the Riverview Dam. Crow Hop Dam (Photo 2-4) is an approximately 950-foot long, 9-foot-tall concrete dam with its east abutment on the east bank of the river, while the west abutment is on a mid-channel island that is located between the main stem of the river and the Riverview headrace channel. There is a rock weir (third in a series in the river upstream of Riverview headrace channel) at the upstream end of a channel that connects the Riverview headrace to the main stem. Rock weir #3 (Photo 2-5) terminates into the mid channel island just upstream of the west abutment of Crow Hop Dam. Figure 2-2 provides an aerial view of the Riverview Project components. The Riverview Exhibit G map is provided in Appendix B. Note that the Project boundary is described as metes and bounds that encompass the project works (e.g., the dams, powerhouse, east bank abutments).

Note: View is just below dam looking upstream and north.

Photo 2-4 Crow Hop Dam

Note: View is looking upstream and north.

Photo 2-5 Existing Rock Weir #3 at Upstream End of Riverview Headrace

The Riverview Dam (Photo 2-6) is an approximately 205-foot-long, 12-foot-tall concrete dam with its north abutment on the same mid-channel island as the western abutment of the Crow Hop Dam. The south abutment of the Riverview Dam abuts the Riverview powerhouse at the southern end of the Riverview headrace channel (Photo 2-7). The powerhouse discharges on the western side of an island that has its northern terminus at the junction of the Riverview Dam and powerhouse. These Project components are shown in Figure 2-2.

Note: View is standing on the mid-channel island downstream of the dam, looking upstream and north.

Photo 2-6 Riverview Dam

Note: View: from Riverview headrace channel above dam, looking downstream

Photo 2-7 Riverview Powerhouse

2.3 General Description of the Chattahoochee River Basin

Due to the proximity of Langdale and Riverview Projects, which are within approximately 1 mile of each other in the same river basin, basin descriptions and resources are presented together in this APEA. Unique features or resources are described for the individual Project, as applicable.

The Chattahoochee River has a drainage area of 8,770 square miles and flows 430 miles from the Blue Ridge Mountains in the Chattahoochee National Forest in Georgia to its confluence with the Flint River. The Chattahoochee River includes five federal projects operated by USACE: Buford Dam (Lake Lanier), West Point Dam, Walter F. George Lock and Dam (Lake Eufaula), George W. Andrews Lock and Dam, and Jim Woodruff Lock and Dam (Lake Seminole). Georgia Power operates seven projects on the Chattahoochee River. One is north of Atlanta, Georgia and the remaining six are located along the Fall Line near Columbus, Georgia. These projects are Morgan Falls Dam, Langdale Dam, Riverview Dam, Bartletts Ferry Dam, Goat Rock Dam, Oliver Dam, and North Highlands Dam (USACE 2010). Water use and returns in the ACF basin include public supply, self-supplied domestic, self-supplied commercial, industrial, mining, agricultural (crop irrigation, livestock, and aquaculture), and thermoelectric-power generation (Lawrence 2016).

2.3.1 Topography

The Langdale and Riverview Projects are on the Chattahoochee River in the Southern Piedmont Major Land Resource Area (MLRA) (SCS 1983). The area's general topography is characterized by rolling hills and ridges (Marbut 1913). The region is dissected by an intricate system of perennial streams and intermittent drainageways (Marbut 1913). Nearly level alluvial plains are found along the river channel and many of its tributaries (SCS 1983).

2.3.2 Climate

The climate in the Langdale and Riverview Projects' area is known for long, hot summers, due to moist tropical air from the Gulf of Mexico that persistently covers the region. Winters are typically cool and short, with an occasional cold wave that moderates in 1 or 2 days. Average annual rainfall for the region is 47 inches, as measured in Columbus, Georgia, 20 miles south of the Riverview Project. Annual temperatures average 65.6 degrees Fahrenheit (°F) with an average low temperature of 55°F and an average high temperature of 76°F (U.S. Climate Data 2022).

2.3.3 Land Uses and Economic Activities

The Projects are located in Harris County, Georgia, and Chambers County, Alabama within the Middle Chattahoochee River sub-basin, approximately 30 miles northwest of Columbus, Georgia and approximately 25 miles northeast of Auburn, Alabama.

Lands within the Langdale Project boundary total 27.75 acres, with 11.05 acres within Harris County, Georgia and 16.7 acres within Chambers County, Alabama (Georgia Power 2018a). Lands within the Riverview Project boundary total 11.6 acres, with 11.2 acres within Harris County, Georgia, and 0.4 acres within Chambers County, Alabama (Georgia Power 2018b).

The Georgia side of the Chattahoochee River near the Projects (Harris County) is undeveloped and primarily forested or used for agriculture and provides no access from the highway to the riverbank (Georgia Power 2018a). Land use within Harris County is predominately agricultural/forested lands (RVRC 2019). The Alabama side of the Chattahoochee River near the Projects (Chambers County) is developed, with industrial and commercial ownership predominating over residential use. The industrial ownership spans most of the shoreline and allows some bank fishing access for residents of the area (Georgia Power 2018a). Predominant land uses within Chambers County, Alabama,

include low density urban and forested/pasture (Georgia Power 2011). Additional information on land use in Harris County, Georgia and Chambers County, Alabama is provided in Section 12.

3.0 SUMMARY OF DECOMMISSIONING PROCESS

Georgia Power filed applications for license surrender December 18, 2018[5]. On April 11, 2019, FERC issued an additional information request (AIR)[6] regarding the decommissioning studies proposed by Georgia Power. As part of its response, Georgia Power filed the Proposed Study Plan (PSP) on May 24, 2019[7] to provide additional information on the proposed studies to support its surrender applications for the Projects. Georgia Power filed the Final Study Plan (FSP) on July 24, 2019[8] and filed five draft Study Reports on September 21, 2020[9].

The draft study reports included:

- Langdale and Riverview Projects Decommissioning Draft Hydraulic and Hydrologic Modeling Report
- Potential Effects of Dam Removal on Shoal Bass
- Water Quality Study Report
- Freshwater Mussel Survey Report
- Archaeological Reconnaissance Survey of the Chattahoochee River, Harris County, GA
- Langdale Dam Marine Remote Sensing in the Chattahoochee River, Harris County, GA
- Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County GA
- Archaeological Testing of Two Sites on the Chattahoochee River, 9HS30 and S9HS31, Harris County, GA

On October 5, 2020, Georgia Power held a Public Meeting to present the study results to stakeholders. The meeting consisted of an afternoon and evening session held virtually due to concerns with Coronavirus Disease 2019 (COVID-19). On November 18, 2020, FERC

[5] Accession Number 20181218-5451 and 20181218-5452
[6] Accession Number 20190411-3007
[7] Accession Number 20190524-5217
[8] Accession Number 20190724-5110
[9] Accession Number 20200921-5036

issued a letter commenting on the study results for the Langdale and Riverview Projects[10] and requested additional information on the study reports listed above.

To address FERC's information request and in consultation with the resource agencies, Georgia Power developed the Shoal Bass Abundance and Tracking Study Plan and filed it with FERC on April 28, 2021[11]. Georgia Power also developed the Sediment Testing Study Plan[12] and Sediment Transport Assessment Study Plan in consultation with resource agencies and filed them with FERC on October 19, 2021[13].

The proposed Projects' decommissioning activities were developed considering the following:

- Analyses and results of the Projects' studies
- Agency/stakeholder consultation
- Natural resources present (e.g., shoal bass, mussels)
- Hydraulic conditions in the Chattahoochee river in the Project area
- Sediment volume, quality, and transportation rates
- Cultural resources on the shorelines and in proposed construction areas
- Historical resources associated with the Projects
- Public input regarding fishing, boating, recreation and other topics

Concurrent with filing this APEA, Georgia Power is also filing the following final documents, which have undergone an agency and public comment[14] period:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report
- Final Water Quality Study Report
- Final Potential Effects of Dam Removal on Shoal Bass
- Freshwater Survey Mussel Report

[10] Accession Number 20201118-3015

[11] Accession Number 20210428-5120

[12] This study title was changed to "Sediment Quality"

[13] Accession Number 20211019-5118

[14] Privileged implies that these documents contain sensitive information that are provided only to cultural resource agencies and tribes.

- Archaeological Reconnaissance Survey of the Chattahoochee River, Harris County, GA (privileged)
- Langdale Dam Marine Remote Sensing in the Chattahoochee River, Harris County, GA (privileged)
- Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County GA (privileged)
- Archaeological Testing of Two Sites on the Chattahoochee River, 9HS30 and S9HS31, Harris County, GA (privileged)
- Langdale Hydroelectric Generating Project (FERC #2341) and Riverview Hydroelectric Generating Project (FERC #2350), Harris County, Georgia - Assessment of Effects for Archaeological Sites 9HS30, 9HS525, 9HS526, 9HS527, 9HS528, 9HS529, 9HS530, 9HS531, 9HS532, and 9HS533 (privileged)

Georgia Power is including the Relict Trillium Survey Technical Memorandum with the APEA (Appendix D) and is also filing the following draft documents concurrent with the APEA, which have not undergone an agency and public comment period.

- Draft Pre Dam Removal Shoal Bass Abundance and Tracking Study Report
- Draft Sediment Quality Study Report
- Draft Sediment Transport Assessment Study Report

Georgia Power is also filing a Decommissioning Plan that provides specific information on the Projects' construction activities and proposed Protection, Mitigation and Enhancement (PME) measures associated with the decommissioning. Georgia Power developed 90-percent drawings that are filed as Appendices B-D of the Decommissioning Plan.

All Draft and Final documents are available on FERC's e-library (https://elibrary.ferc.gov/eLibrary/search).

4.0 STATUTORY AND REGULATORY REQUIREMENTS

Georgia Power, as licensee for the Langdale and Riverview Projects, is subject to the requirements of the Federal Power Act (FPA) and other statues that may be applicable in the FERC decommissioning process. The major regulatory and statutory requirements are summarized in the following text.

4.1 Clean Water Act

4.1.1 Section 401

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. The federal agency, in this case FERC, may not authorize the activity unless certification has been obtained or the state has waived certification through failure to act on the request for certification within one year after receipt of that request. The Georgia Department of Natural Resources Environmental Protection Division (Georgia EPD) issued the original WQC for the state of Georgia for the Langdale and Riverview Projects. Georgia Power is filing an application for 401 WQC with Georgia EPD.

4.1.2 Section 404

Under Section 404 of the CWA, a permit is required to perform any activity that results in discharges into jurisdictional waters of the U.S., including wetlands, streams, and open waters. The Proposed Action will require a Section 404 permit from the USACE. Georgia Power is continuing to consult with USACE on Section 404 permitting.

4.2 Endangered Species Act

Endangered Species Act (ESA) 7(a)(2) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat that has been designated for those species. A federal agency is required to consult with U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) if an action "may affect" listed species or designated critical habitat.

With the filing of the NOI on December 18, 2018, Georgia Power requested that FERC designate it as the non-federal representative for purposes of consultation under Section 7 of the ESA. On March 8, 2019, FERC granted this request.

There are no federally threatened and endangered species known to occur and no designated critical habitat at the Projects. Federally threatened and endangered species known to occur within the two counties where the Langdale and Riverview Projects are located are discussed in Section 10 Rare, Threatened, and Endangered (RTE) Species.

4.3 Coastal Zone Management Act

Pursuant to Section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), Georgia Power contacted the Federal Consistency Coordinator at the Georgia Coastal Resources Division on July 25, 2022. The Federal Consistency Coordinator advised that a letter from the Coastal Resources Division defining the 11-county coastal region is found on the Georgia State Clearinghouse website and would be appropriate for filing with FERC (Appendix C).

4.4 National Historic Preservation Act

The National Historic Preservation Act (NHPA) and its implementing regulations (35 C.F.R. Part 800) require federal agencies to consider the effect of any proposed undertaking on properties listed or eligible for listing in the National Register of Historic Places (NRHP). If an agency determines that an undertaking may have adverse effects on properties listed or eligible for listing in the NRHP, the agency must afford an opportunity for the Advisory Council on Historic Preservation (ACHP) to comment on the undertaking.

On December 18, 2018, with the filing of the NOI, Georgia Power requested that FERC designate it as the non-federal representative for purposes of consultation pursuant to Section 106 of the NHPA. On January 24, 2019, FERC granted Georgia Power's request. A summary of Georgia Power's consultation with the Georgia Department of Community Affairs – Historic Preservation Division (Georgia HPD) and the Alabama Historical Commission (AHC) is included in Section 14. All cultural and historic documentation is filed as privileged information.

4.5 Wild and Scenic Rivers and Wilderness Act

The Wild and Scenic Rivers Act was created by Congress in 1968 (Public Law 90-542; 16 U.S.C. 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and

recreational values in a free-flowing condition for the enjoyment of present and future generations. The Wilderness Act of 1964 (Public Law 88-577; 16 U.S.C. 23 et seq.) created the National Wilderness Preservation System.

There are no rivers designated under the Wild and Scenic Rivers Act near the Langdale and Riverview Projects. Additionally, neither the Langdale nor the Riverview Project is located on or adjacent to areas designated under the Wilderness Act of 1964.

4.6 Magnuson-Stevens Fishery Conservation and Management Act

First passed in 1976, the Magnuson-Stevens Fishery Conservation and Management Act fosters long-term biological and economic sustainability of our 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 NOAA, consider Essential Fish Habitat (EFH) in resource management decisions. Congress defined 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. No EFH has been designated at or near the Projects.

4.7 State and Local Regulations

Georgia Power has not identified any additional state or local permits needed prior to filing the license surrender application and Decommissioning Plan with FERC. Once FERC issues an order on the license surrender, Georgia Power will coordinate with local jurisdictions on any final state and local permits that may be required to implement the decommissioning activities, such as the soil erosion and sediment control plan.

5.0 PROPOSED ACTION

Georgia Power proposes to surrender the Project licenses and decommission the Projects. The decommissioning consists of:

- Removing all of Langdale Dam except approximately 300 feet on the east side, (which will be lowered approximately 8 feet); 10-foot portions of the abutments will remain unaltered on both sides of the river for historic documentation
- Decommissioning the Langdale powerhouse in place including placing concrete in the head gate openings and decommissioning the electrical and mechanical hydropower equipment
- Removing the Crow Hop Dam in its entirety (less 10-foot portions of the abutments preserved for historic documentation)
- Removing the Riverview Dam in its entirety (less approximately 10-foot portion of the southern abutment for historic documentation and 25-foot portion of northern abutment preserved for historic documentation and to provide additional bank protection)
- Removing the Riverview powerhouse including all mechanical and electrical equipment and in-place decommissioning of the masonry, steel, and concrete structure

In addition to the removal activities, Georgia Power proposes to construct a:

- Side channel at the island below the Langdale dam to ensure water remains in the Langdale tailrace
- Day use park at Langdale
- Rock ramp at Crow Hop to protect the integrity of the existing rock weir #3 and provide flow in the Riverview headrace channel

Georgia Power also proposes to provide shoreline and riverbed scour protection at the southern end of the Riverview headrace channel. Details of the decommissioning are provided in the Decommissioning Plan.

5.1 No Action Alternative

The Projects would remain in place but would not operate. No river restoration would occur.

5.2 Alternatives Considered but Eliminated

Georgia Power considered full removal of the Langdale Dam; however, as a result of the hydraulic and hydrology (H&H) modeling (Kleinschmidt 2022a), Georgia Power determined that approximately 300 feet of the Langdale Dam was needed to spread water across the channel in the post-removal condition. In the H&H model, the full removal condition also created high velocities that would limit upstream fish movement on the far eastern side of the existing dam and potentially cause scouring post removal. The proposed action and proposed PME measures reflect the modeling results.

5.3 Proposed Protection, Mitigation, and Enhancement Measures

Georgia Power proposes to implement PME measures as part of the license surrender and decommissioning process. Table 5-1 provides a list of each PME measure by Project site and the decommissioning phase in which each PME measure would be implemented. Georgia Power will comply with all applicable Best Management Practices (BMPs) and regulatory requirements.

5.4 Organization of Discussion of Effects

Each of the Projects' resource sections provide an overview of the existing condition (Affected Environment) followed by an analysis of the effects of the Proposed Action (Environmental Analysis). Due to the proximity of the Langdale and Riverview Projects, the resources are very similar and are described from upstream (Langdale) to downstream (Crow Hop and Riverview). Any unique features specific to one or more of the Projects will be noted and described, as applicable, in each resource section.

Each resource section also includes an overview of the measures that would be implemented to protect, mitigate, or enhance an effect of the Proposed Action on each resource, if applicable. All sections describe the resource effect by each phase of the decommissioning (pre removal, removal, and post removal).

For purposes of this analysis, Project boundary is defined as lands, water and structures enclosed in defined FERC Project boundary. The Project area refers to the land and water in the Project boundary and immediate geographic area adjacent to the Project boundary. The Project vicinity refers to a larger geographic area near a hydroelectric project, such as an adjacent town or county.

Table 5-1 Proposed Environmental/Recreational/Cultural PME Measures

Proposed Environmental/Recreational PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement the Post Removal Shoal Bass Abundance and Tracking Study.	✓	✓	✓	Post Removal
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Boat Ramp above Langdale - Extend existing public boat ramp at airport to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Boat Ramp below Langdale - Extend existing public ramp below powerhouse (Cemetery Park) to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Langdale Park – Design and construct new day-use park in the city of Valley adjacent to river: o Construct 3 pavilions (~24'x36'). o Install 8 picnic tables. o Construct a ~0.5-mile-long gravel walkway connected to the parking lot with views of the riverfront. o Install three benches along the gravel walking trail. o Construct a parking lot for approximately 13 vehicles, including one barrier-free space and overhead lighting. o Provide public access to the new car-top boat area with hand-carry access to the river, includes parking for three non-trailer vehicles. These facilities will be incorporated into the proposed new Langdale Park. o Regrade and gravel access road to the car-top/hand carry boat access.	✓			Post Removal
• Leave 10-foot dam abutment on west side of the Langdale Dam; leave ~300 feet on the east side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal

PROPOSED ENVIRONMENTAL/RECREATIONAL PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Implement the stipulations of the Memorandum of Agreement between the FERC, Georgia State Historic Preservation Officer (SHPO) and the Alabama SHPO (Cultural MOA) including recordation, avoidance, protective covenants, post-dam removal monitoring, and public education/interpretation.	✓	✓	✓	Pre Removal, Removal, Post Removal
• Perform or cause to be performed Level II Historic American Buildings Survey Historic American Engineering Record (HAER) documentation of the Langdale Dam and powerhouse, to include a historic narrative, measured drawings, and medium format black and white photography, and submit documentation to the National Park Service (NPS) for approval. • This record will be housed at the Georgia and Alabama SHPO, and be available to the public at the Cobb Memorial Archives at the Chambers County Library in Valley, AL.	✓	✓	✓	Pre Removal
• Develop educational material, including interpretive signage to be located in the proposed new Langdale Park.	✓	✓	✓	Post Removal
• Leave 10-foot dam abutments on east and west sides of the Crow Hop Dam.		✓		Removal
• Each rock weir structure (3) at Crow Hop will be captured with photo documentation to the extent possible during dam removal.		✓		Removal, Post Removal
• Construct a rock ramp to preserve rock weir #3 and maintain flow in the Riverview headrace channel.			✓	Removal
• Leave a 10-foot dam abutment on south side of Riverview Dam and approximately 25-foot abutment on the north side of the Riverview Dam.			✓	Removal
• Perform or cause to be performed Level II Historic American Buildings Survey Historic American Engineering Record documentation of the Riverview Dam and powerhouse, to include an historic narrative, measured drawings, and medium format black and white photography and submit documentation to the NPS for approval. • This record will be housed at the Georgia and Alabama SHPO, and be available to the public at the Cobb Memorial Archives at the Chambers County Library in Valley, AL.			✓	Pre Removal, Removal
• Provide bank and bed scour protection in southern end of the Riverview headrace channel.			✓	Removal

PROPOSED ENVIRONMENTAL/RECREATIONAL PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Boat Ramp at Riverview Park - Extend existing public ramp to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.			✓	Post Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal
• Implement the Aquatic Organism Recovery Survey and Relocation Plan	✓	✓	✓	Removal

6.0 GEOLOGICAL AND SOIL RESOURCES

6.1 Affected Environment

There are three level III ecoregions in the Chattahoochee River Basin in the states of Georgia and Alabama: Blue Ridge, Piedmont, and Southeastern Plains (USEPA 2011). The head waters of the Chattahoochee River originate in the Blue Ridge ecosystem, where it briefly flows through an area defined by a geological history of mountains. A sharp change in altitude carries the Chattahoochee River into the lower relief Piedmont ecosystem characterized by rolling hills (GDNR 1997). From the Piedmont ecosystem, the Chattahoochee River is guided northeast to southwest by a narrow zone of intensely sheared rocks known as the Brevard Fault Zone. The river eventually cuts across a less resistant portion of the fault zone and veers south along the Alabama/Georgia border to the Langdale Project location. Approximately 34 RMs south of the Langdale and Riverview Projects is the Fall Line, which marks the transition between the Piedmont ecoregion and the Southeastern Plains (Figure 6-1). This area is underlain with Precambrian and Paleozoic crystalline rocks (predominantly gneiss and schists with lesser amounts of metamorphosed volcanic rocks, metamorphosed sedimentary rocks, and granites) and the unconsolidated Pliocene, Cretaceous, and Tertiary sands of the Southeastern Plains (GDNR 1997).

The Piedmont ecoregion can be further divided into two level IV ecoregions: Southern Inner Piedmont, located north of the Brevard Fault Zone, and the Southern Outer Piedmont, located south of the Brevard Fault Zone. The Langdale and Riverview Projects are located within the Southern Outer Piedmont, which is dominated by gneiss, schist, and granite (USEPA 2011). Specifically, the Langdale and Riverview Projects are located along a portion of the Chattahoochee River that transitions between predominantly mica schist to the east and felsic gneiss to the west (Figure 6-2 and Figure 6-3).

Slopes found within the Langdale and Riverview Project vicinities range from 0 to 45 percent, with slopes along the Chattahoochee River shoreline predominately between 0 to 5 percent (Figure 6-4). The shorelines are generally undisturbed forested areas except for anthropogenic disturbance where developed lands approach the shoreline. Within the Langdale and Riverview Project area, the Georgia shoreline is predominately forested, while the Alabama shoreline is more developed and subject to higher levels of anthropogenic disturbance. The soil composite at the Langdale and Riverview Projects generally consists of sandy loam and clay loams (Georgia Power 2018a, 2018b).

Table 6-1 and Figure 6-5 depict soil types within the Langdale and Riverview Project area. The soils generally consist of sandy loams and clay loams.

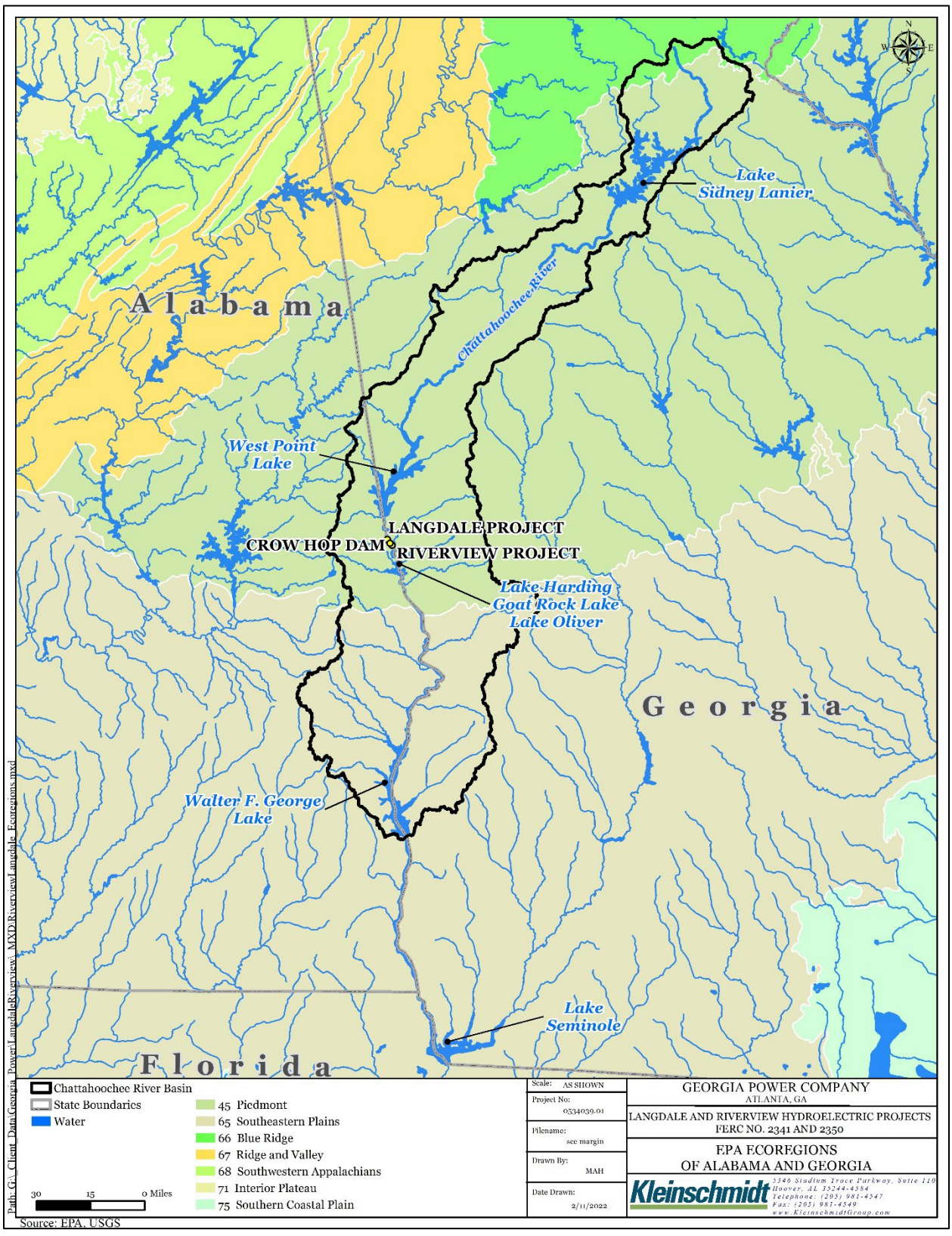


Figure 6-1 Alabama and Georgia Ecoregions in the Langdale and Riverview Project Vicinities

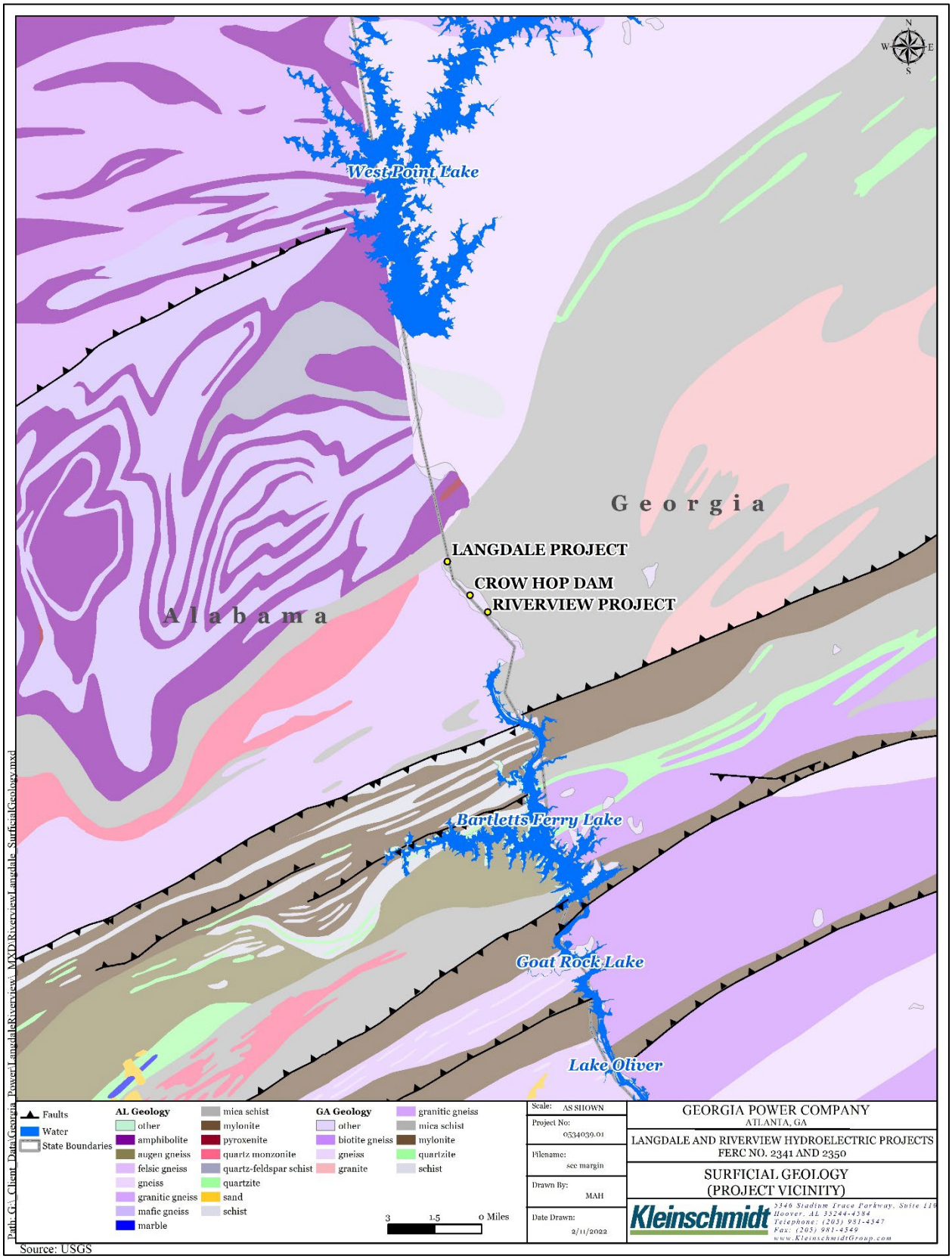


Figure 6-2 Langdale and Riverview Project Vicinities Surficial Geology

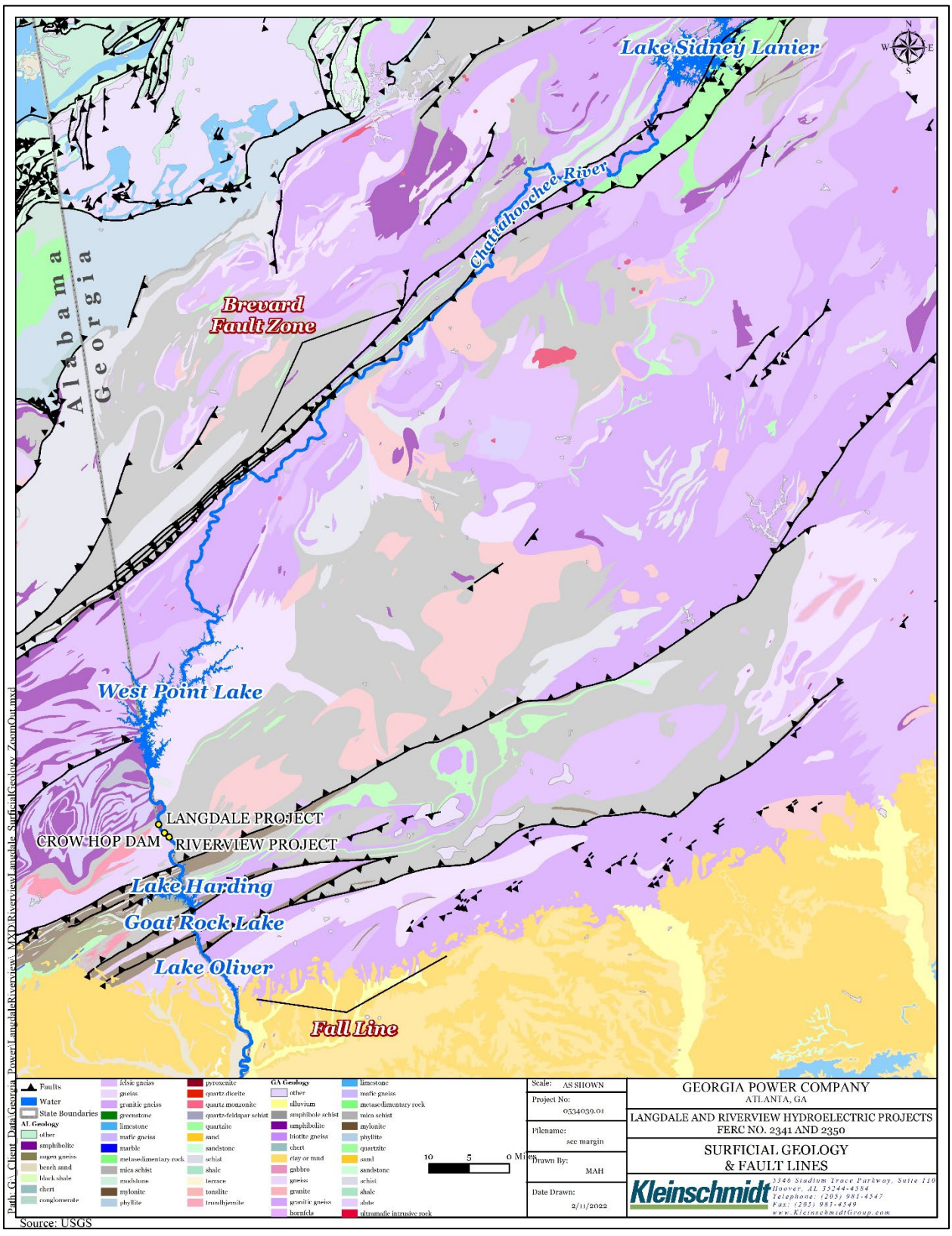


Figure 6-3 Langdale and Riverview Project Vicinities Surficial Geology and Fault Lines

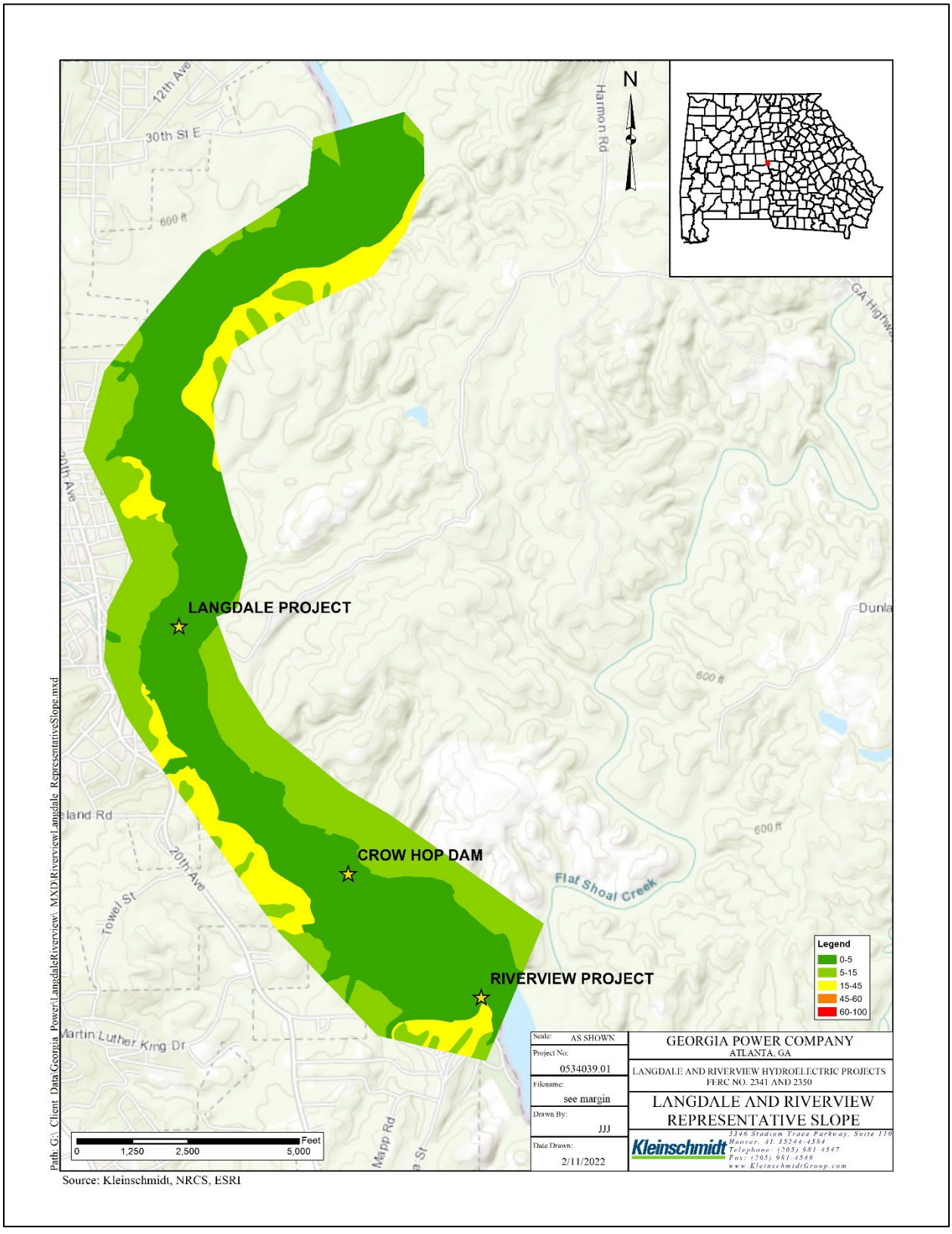


Figure 6-4 Langdale Project Representative Slope

Table 6-1 Soils of the Langdale and Riverview Projects

		Langdale		Riverview	
Symbol	**Name**	**Acreage**	**Percentage**	**Acreage**	**Percentage**
AaB	Altavista fine sandy loam, gently sloping	34.81	4.5%	---	---
AdB	Appling sandy loam, gently sloping	0.00	0.0%	---	---
AdC	Appling sandy loam, sloping	0.24	0.0%	---	---
Ba	Buncombe loamy sand	24.07	3.1%	---	---
BuA	Buncombe loamy sand, 0 to 2 percent slopes, occasionally flooded	15.66	2.0%	211.89	24.4%
CaC3	Cecil gravelly clay loam, severely eroded, sloping	2.17	0.3%	---	---
Ce	Chewacla sandy loam	1.59	0.2%	37.46	4.3%
Ch	Congaree loam	59.96	7.7%	0.12	0.0%
ChA	Chewacla loam, 0 to 2 percent slopes, frequently flooded	133.50	17.1%	2.85	0.3%
HbC2	Hiwassee fine sandy loam, eroded, sloping	1.43	0.2%	10.23	1.2%
LaB3	Lloyd clay loam, severely eroded, gently sloping	0.05	0.0%	---	---
LkF	Louisa stony sandy loam, steep	15.38	2.0%	76.73	8.8%
LhE	Louisa gravelly sandy loam, moderately steep and steep	---	---	23.43	2.7%
MbC3	Madison gravelly clay loam, severely eroded, sloping	16.65	2.1%	5.29	0.6%
MbD3	Madison gravelly clay loam, severely eroded, strongly sloping	22.38	2.9%	29.58	3.4%
MbE3	Madison gravelly clay loam, severely eroded, moderately steep	---	---	0.65	0.1%
McD2	Madison gravelly fine sandy loam, eroded, strongly sloping	46.97	6.0%	30.61	3.5%
PaC2	Pacolet sandy loam, 6 to 10 percent slopes, moderately eroded	3.65	0.5%	81.41	9.4%
PaD2	Pacolet sandy loam, 10 to 15 percent slopes, moderately eroded	20.26	2.6%	137.25	15.8%
PaE2	Pacolet sandy loam, 15 to 25 percent slopes, moderately eroded	84.40	10.8%	---	---
Rb	Rough broken land	14.19	1.8%	---	---
Sa	Sandy alluvial land, poorly to somewhat poorly drained	19.82	2.5%	0.19	0.0%
ScC	Shallow land, sloping	3.08	0.4%	---	---
ScD	Shallow land, strongly sloping	1.53	0.2%	---	---
W	Water	211.54	27.1%	212.66	24.5%
WaC2	Wickham fine sandy loam, eroded, sloping	34.74	4.4%	9.27	1.1%
WaD2	Wickham fine sandy loam, eroded, strongly sloping	2.94	0.4%	---	---
Wb	Worsham sandy loam	9.77	1.3%	---	---

Source: Georgia Power 2018a, 2018b

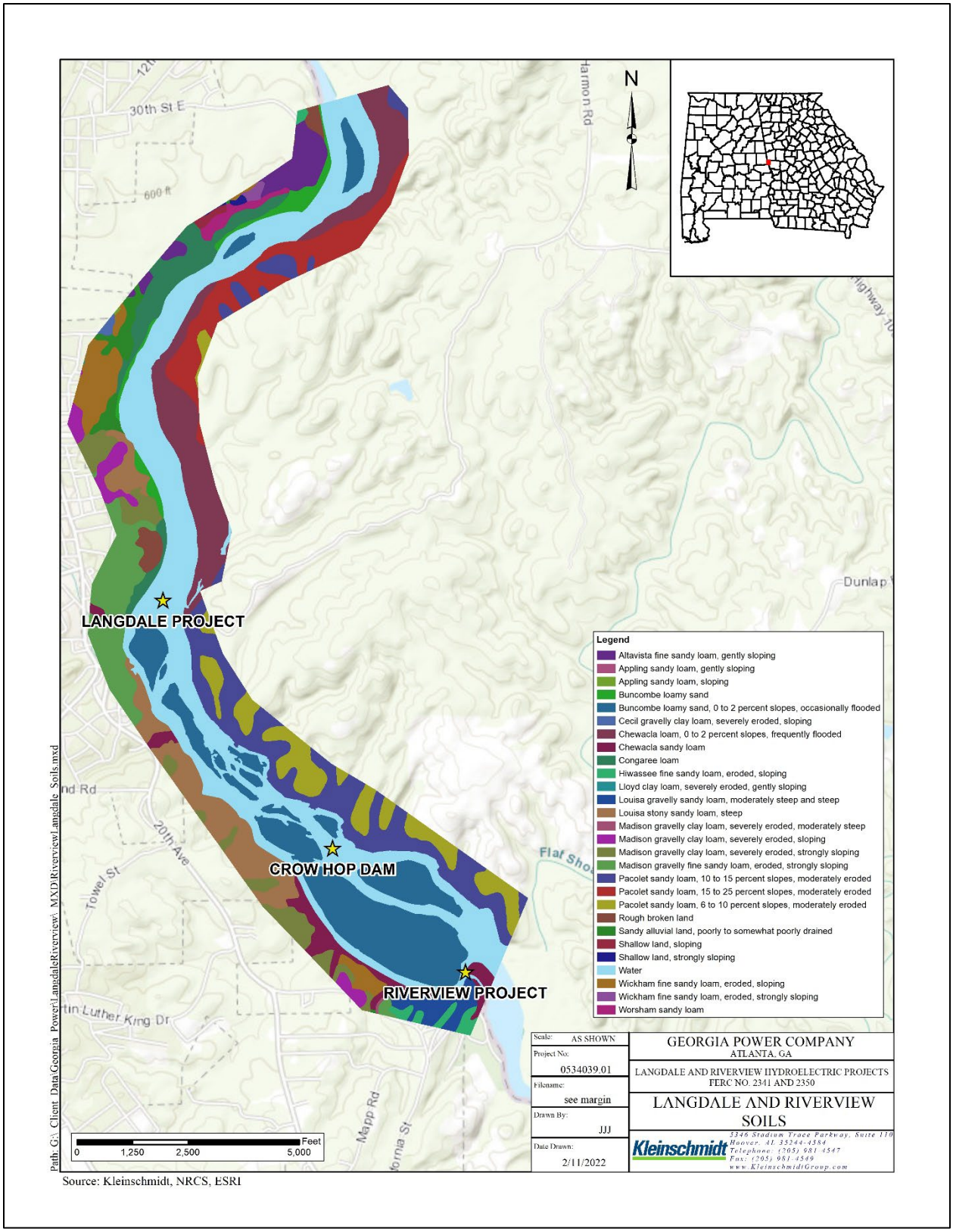


Figure 6-5 Soil Types at the Langdale and Riverview Projects

6.1.1 Sediment

6.1.1.1 Sediment Characteristics

Langdale Dam, Crow Hop Dam, and Riverview Dam were constructed over 100 years ago, and each impoundment contains stored sediments that have accumulated over the years. It is important to note that U.S. Department of Agriculture (USDA) reports (Eakin 1936; Eakin and Brown 1939) found that the Langdale and Riverview reservoirs were essentially determined to be "filled to the point of practically complete elimination of storage as a factor of power production" in 1936; this is within 30 years of the construction of the dam. Based on that finding, the reservoirs likely have effectively passed the incoming sediment load since at least 1936 as there are no recent substantial deposition areas within these reservoirs.

In 2019, Georgia Power performed a preliminary evaluation of the physical characteristics of the sediments stored upstream of the Projects' dams to understand how the hydraulics of the river may naturally evacuate the sediment down to the historic riverbed post-dam removal. Georgia Power hired Geotechnical & Environmental Consultants (GEC) to collect sediment borings upstream of all three dams. GEC drilled 11 Vibracore borings in August 2019; five upstream of the Langdale Dam, three upstream of Crow Hop Dam, and three upstream of Riverview Dam (Figure 6-6). Samples indicated that the dominant sediment load is composed of a tan-brown, silty, fine to coarse sand with a grain size distribution D50 equal to approximately 1 millimeter (mm).

The borings taken in 2019 provided depth to refusal; detailed data from the borings are provided in the Sediment Transport Assessment Study Report (Kleinschmidt 2022b). Generally, the sediment upstream of Langdale Dam varies from 2.3-feet to 8-feet in depth and is deeper on the western side of the river, which is on the inside of the riverbend and where sediment is more likely to accumulate. Two borings above Langdale Dam provided evidence of a sandy silt residuum (approximately 0.5-foot to 1-foot-thick) under a sandy alluvium that may be indicative of sediments that existed on the former shoreline or stream bed prior to the construction of Langdale Dam. Upstream of Crow Hop Dam, the sediment varies from 3-feet to 6-feet in depth and is shallowest in the middle of the river and deepest below the most downstream rock weir. The sediment in the Riverview channel varies from 8-feet to 9-feet in depth and is deepest closest to Riverview Dam (Kleinschmidt 2022b).

Figure 6-6 2019 Sediment Boring Locations and Refusal Depths

6.1.1.2 Sediment Quality

Auburn University's study of sediment and nutrient storage within the reservoirs of the Chattahoochee River Basin included the reach occupied by the Langdale and River Projects (Waters and Webster 2019). In that study, Auburn University collected sediment cores and surface sediment samples at West Point Lake (the next upstream reservoir above the Projects) and Lake Harding (Bartletts Ferry Dam; the next downstream reservoir below the Projects). Analysis of sediments at West Point Lake and Lake Harding confirmed that both reservoirs serve as primary sediment and nutrient traps for the Chattahoochee River Basin. Sediment core chemistry analysis within the basin confirmed that Lake Harding served as the primary sink within the basin from its construction in 1925 until West Point Dam was constructed in 1975. Concentrations of phosphorous, carbon, nitrogen, and organic matter generally remained stable in Lake Harding prior to 1960, but revealed a sharp increase associated with the 1960 population boom in the upper parts of the basin, and then a sharp decrease with the construction of West Point Dam indicating that West Point Dam may now be the primary sediment sink for the basin. These smaller Langdale and Riverview Project Reservoirs likely accumulated sediment initially following construction which pre-dates the construction of Lake Harding. Subsequently, periodic, limited erosion and redeposition of sediments occurred as documented in the 1936 USDA report indicating the Project reservoirs had essentially no storage capacity for hydro generation (due to sedimentation) (Eakin 1936; Eakin and Brown 1939). Sediment deposition patterns in Lake Harding suggest that the Langdale and Riverview Projects have achieved sediment equilibrium and have not served as primary sediment sinks for the basin since West Point Dam's construction upstream.

U.S. Geological Survey (USGS) collected sediment samples below West Point Dam, near the city of West Point, from 1981-1985 and 1988-1989. Grab samples of stream bed sediments and samples of suspended sediments were collected within the water column during high flow events. Sediment analyses are consistent with the findings in Auburn's basin-wide study. Bed sediment analyses throughout the decade were predominantly gravel with varying levels of sand and almost no silt or clay (USGS 2019). Analysis of the suspended sediment samples confirmed sand and silt, as typical for this type of sample. The lack of silt and clay in bed sediments suggested that either there is a large fine-sediment sink just upstream (West Point Lake) and/or the river velocity in this area is too high to allow silt and clay to settle. Since its construction, West Point Lake has functioned as a primary sink for sediments introduced to the basin. Limited fine sediment that may

occur in the river below West Point Dam is likely from bank erosion or fine sediment inputs from tributaries below West Point Dam.

In 2012 and 2013,[15] the FERC licenses for the City Mills Dam (FERC Project 8519) and the Eagle and Phenix Dam (FERC Project 2655) were surrendered and the dams removed. The dams (hereinafter referred to as the Columbus Dams) were built between 1880 and 1910 and formerly located on the Chattahoochee River in Columbus, Georgia, approximately 50 RMs downstream of the Langdale and Riverview Projects. The Columbus City Mills Dam was 10-feet-high, impounding 684 acre-feet with 114 surface acres, while the Columbus Eagle and Phenix Dam was 17-feet-high, impounding 260 acre-feet with 50 surface acres.[16] In anticipation of removal, the licensees for the Columbus Dams conducted sediment analysis upstream of each dam in 2009 (GEL 2009). Sediment sizes ranged from silty fine-grained sands to coarse grain sands, which is like those at the Langdale and Riverview Projects. The Columbus Dams and the Langdale and Riverview Projects had similar dam heights, impoundments, watershed land uses, and were surrounded by similar industries.

Sampling of sediment deposits prior to removal of the Columbus Dams detected concentrations of various metal elements and organic compounds that exceeded (GEL 2009) general National Oceanographic and Atmospheric Administration (NOAA) freshwater sediment Threshold Effects Level (TEL) or Probable Effects Level (PEL) screening criteria (Buchman 2008) or exceeded the 2001 Draft U.S. Environmental Protection Agency (USEPA) sediment Ecological Screening Values (ESV). The USEPA and NOAA provided these screening values for preliminary evaluation of ecological risks to aquatic organisms; however, the USEPA and NOAA recommended that the impact of any potential sediment release be evaluated in the context of the Project, considering existing sediment concentrations upstream and downstream of the Project sites and with input from resource agencies. Most detections exceeding the TEL at the Columbus Dams were of concentrations between the TEL and PEL levels, which is associated with limited potential toxicity conditions that may occur occasionally, depending on the aquatic biota present. A small number of volatile organic, polychlorinated biphenyl (PCB), and pesticide compounds were detected at levels exceeding screening PEL, which indicated the potential for adverse effects to the aquatic ecosystem should sediments become mobilized with subsequent transport downstream where the constituents could become

[15] Note that the Eagle and Phenix Dam was removed in 2012 followed by the City Mills Dam in 2013.
[16] Accession No. 20100823-5189

bioavailable. Based on the 2009 report, the Columbus Dams were removed without additional testing or sediment management (GEL 2009).

An analysis of sediment quality in the Langdale, Crow Hop, and Riverview impoundments is discussed in Section 6.2.

6.2 Environmental Analysis

The primary activities affecting Project soils and geology resources are construction activities related to pre removal and removal of Project structures, soil quality and quantity, and sediment transport post removal. Additional construction includes the side channel at Langdale, the rock ramp at Crow Hop, implementing shoreline protection at the southern end of the Riverview headrace channel, and adding riprap in the Riverview headrace channel.

Georgia Power conducted studies and associated analyses that pertain to effects on geology and soils. Those analyses are presented in detail in the following reports and summarized herein:

- Final Hydraulic and Hydrologic Study Report
- Draft Sediment Transport Assessment Study Report
- Draft Sediment Quality Study Report
- Decommissioning Plan

Table 6-2 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on soils and geology at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Two primary issues related to dam removal include sediment quantity and transport (i.e., how much sediment and will it migrate downstream) and sediment quality (i.e., does the sediment contain contaminants). Before evaluating the effects of implementing PME measures, a summary of the H&H, sediment transport, and sediment quality studies are presented.

Table 6-2 Proposed Environmental PME Measures that may Potentially Affect Geology and Soils

PROPOSED PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Boat Ramp above Langdale - Extend existing public boat ramp at airport to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Boat Ramp below Langdale - Extend existing public ramp below powerhouse (Cemetery Park) to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Langdale Park – Design and construct new day-use park in the city of Valley adjacent to river: o Construct 3 pavilions (~24'x36'). o Install 8 picnic tables. o Construct a ~0.5-mile-long gravel walkway connected to the parking lot with views of the riverfront. o Install three benches along the gravel walking trail. o Construct a parking lot for approximately 13 vehicles, including one barrier-free space and overhead lighting. o Provide public access to the new car-top boat area with hand-carry access to the river, includes parking for three non-trailer vehicles. These facilities will be incorporated into the proposed new Langdale Park. o Regrade and gravel access road to the car-top/hand carry boat access.	✓			Post Removal
• Leave 10-foot dam abutment on west side of the Langdale Dam; leave ~300 feet on the east side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal

PROPOSED PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Leave 10-foot dam abutments on east and west sides of the Crow Hop Dam.		✓		Removal
• Leave a 10-foot dam abutment on south side of Riverview Dam and approximately 25-foot abutment on the north side of the Riverview Dam.			✓	Removal
• Provide bank and bed scour protection in southern end of the Riverview headrace channel.			✓	Removal
• Boat Ramp at Riverview Park - Extend existing public ramp to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.			✓	Post Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal

6.2.1 Sediment Quantity

Dam removal would result in the movement of sediment stored behind the dams. Kleinschmidt Associates conducted a sediment transport assessment (Kleinschmidt 2022b) to quantify the amount of sediment that may be mobilized post removal and the amount of time needed to mobilize those sediments.

To estimate the volume of sediment behind the Langdale and Riverview dams, a series of depth probes were completed by GEC in 2019 in areas with anticipated sediment deposition as inferred from the longitudinal profiles of the existing bathymetry. The sediment depth was recorded by driving a steel rod or implement to refusal at selected locations in the Langdale and Riverview impoundments. Driving was completed using a Vibracore, pneumatic hammer, or other consistent method to drive a 1-inch rod (or similar) probe to refusal depth. Based on 2019 sediment sampling, minimal sediment volume (relative to the annual sediment loading in the river) is anticipated behind Crow Hop Dam. In 2021, GEC conducted additional sediment probes behind Riverview and Langdale Dams to inform the Sediment Transport Assessment Study (Kleinschmidt 2022b).

Sediment probes and sampling locations were based on an inference that the river mobilizes this sediment readily and transports it through the Project reach without extensive deposition. This inference is based on a review of the river reach longitudinal elevation profile, which shows a highly irregular thalweg elevation interspersed with exposed bedrock controls upstream of each dam and intervening deep pools. Finer grain size distributions were expected in quieter areas affected by backwater and in floodplain deposits, including at locations immediately upstream of each dam. After conducting the sampling discussed in more detail below, Georgia Power found these inferences to be true. The weight of the evidence from the profile and grain size distributions is that locations with greatest potential to accumulate sediments are between the dam and the first bedrock control upstream (Kleinschmidt 2022b). In 2021, additional sediment depth probes were collected in the Project reach (Figure 6-7). The stations at Langdale extend approximately 5,500 feet upstream (Figure 6-8) until the bedrock control, above which the bathymetry is non-uniform. The stations at Riverview extend approximately 7,000 feet upstream until a natural bedrock control where the bathymetric profile resumes natural variability (Figure 6-9). A subset of these samples (as noted on the figures) included grain size analysis to inform the particle size distribution of sediment at the Projects.

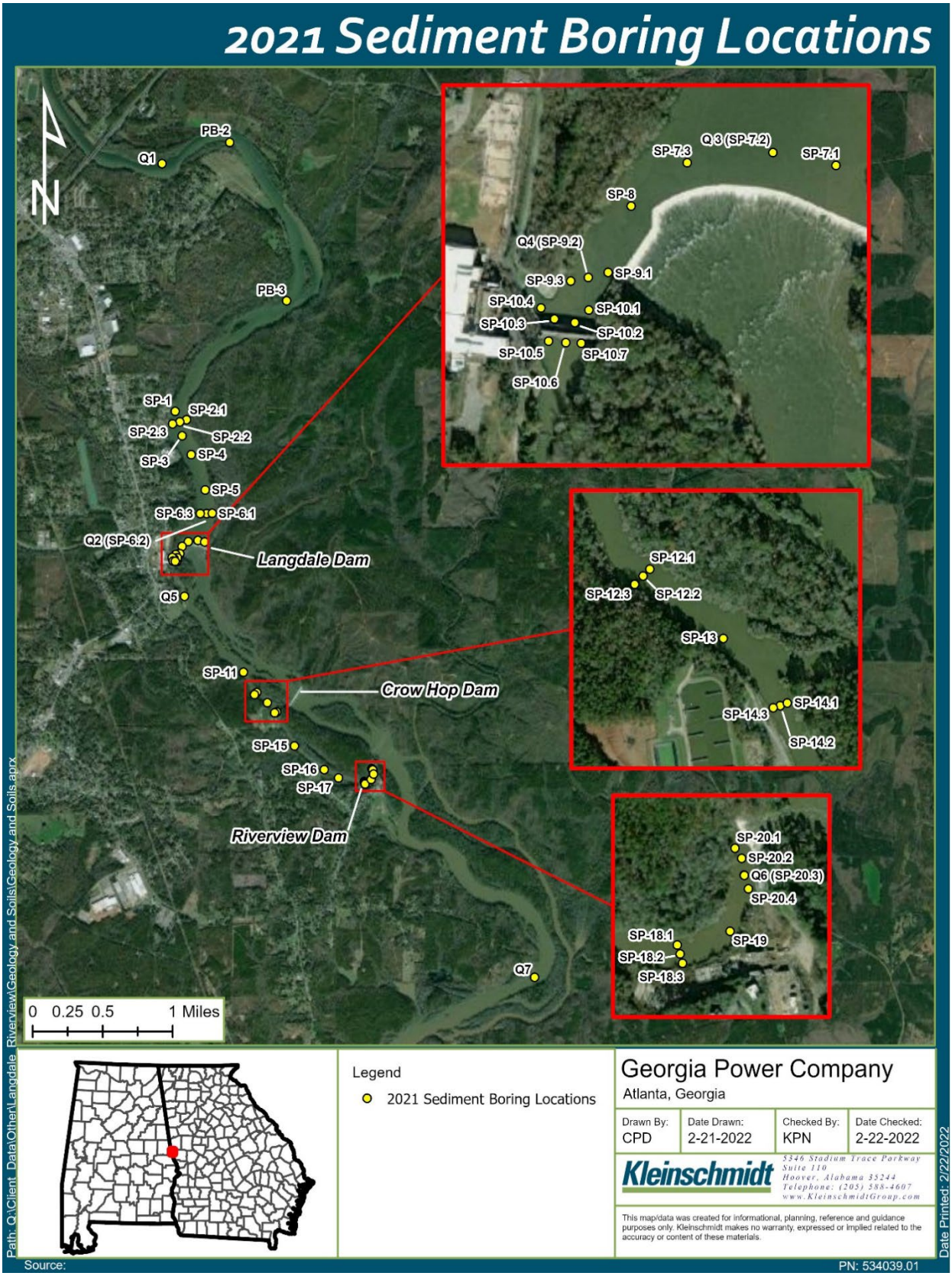


Figure 6-7 2021 Sediment Boring Locations

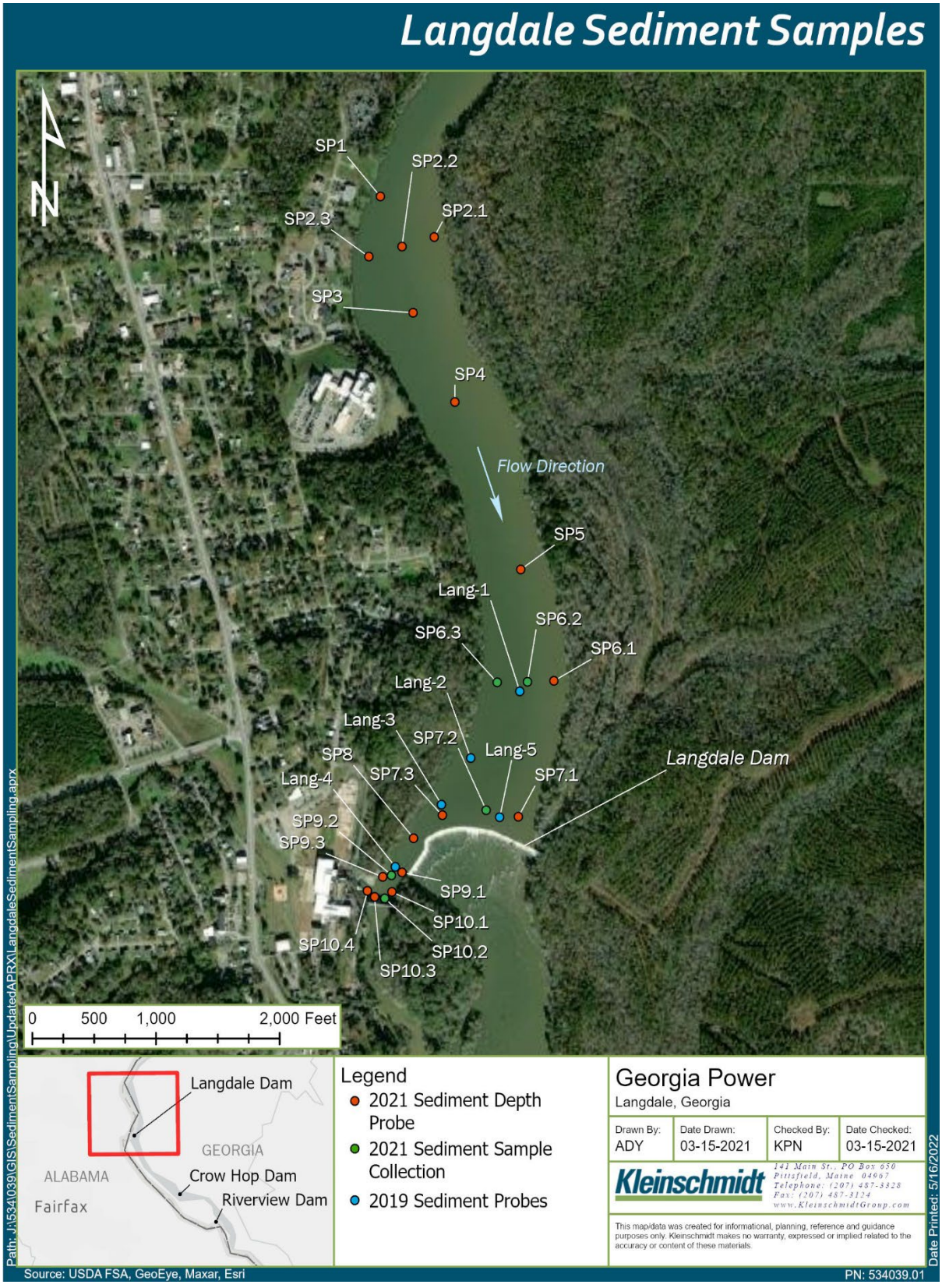


Figure 6-8 Combined 2019 and 2021 Sediment Boring Locations

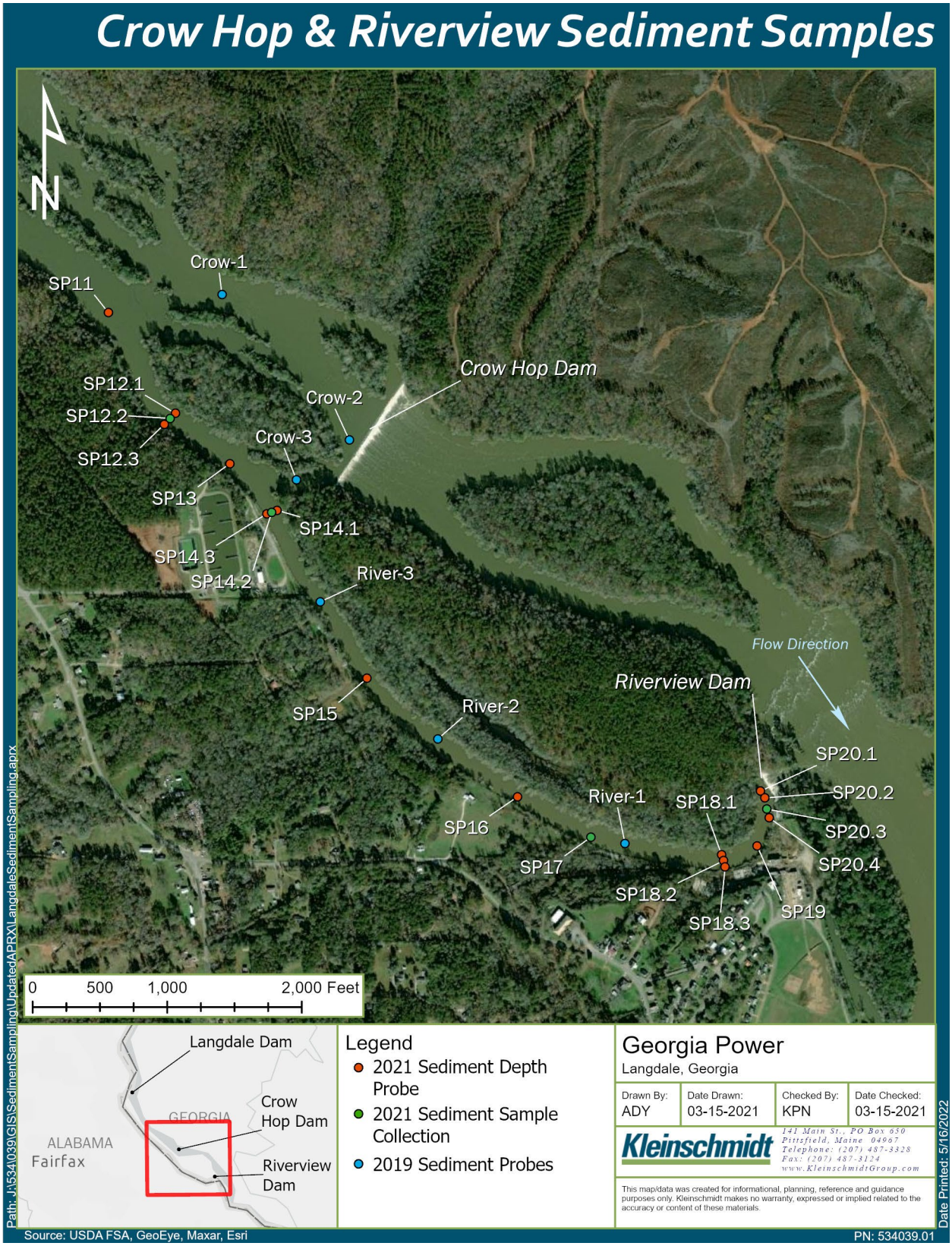


Figure 6-9 Crow Hop and Riverview Sediment Probe Locations

An existing conditions two-dimensional hydraulic model (2D model) was developed as part of the H&H Study for this decommissioning (Kleinschmidt 2022a). The hydraulic model utilizes a surface that was developed using bathymetric data collected in the river over the model extent. Sediment depth measurements collected in 2019 and 2021 were used to generate a new "adjusted" bathymetry of potential post removal conditions by lowering the existing bathymetry by the depth of the sediment found in the 2019 and 2021 probes in that area. The adjusted bathymetry sought to keep the elevation near the current water's edge the same but taper from that location down to the elevation of refusal. This adjusted bathymetry surface was created by using the existing bathymetry, the depth of the sediment at the probe locations, a zero-change in elevation at the water's edge and limited intermediate points between sediment probes (manually added to make transitions more realistic) to subtract the estimated depth of sediment (down to refusal elevation) from the existing bathymetry. This method preserved some of the natural variability in the riverbed, incorporated the variability in depths of sediment found during the 2019 and 2021 studies, and assumed less adjustment near shore, where the historical stream banks would have been prior to construction of the dams. The manually added points were interpolated between known depths to refusal. It was not practical to sample refusal depths along the entire length and width of the river, and the manually added points were a reasonable approach to develop a realistic surface. This method preserved some of the natural variability in the riverbed, incorporated the variability in depths of sediment found during the 2019 and 2021 studies, and assumed less adjustment near shore, where the historic stream banks would have been prior to construction of the dams. Modifications were made to the bathymetry upstream of all three dams. Figure 6-10 shows a profile drawn along the centerline of the Riverview channel. Note that the adjusted bathymetric surface is almost identical to the existing bathymetric surface but has simply been lowered by the refusal depths along this profile.

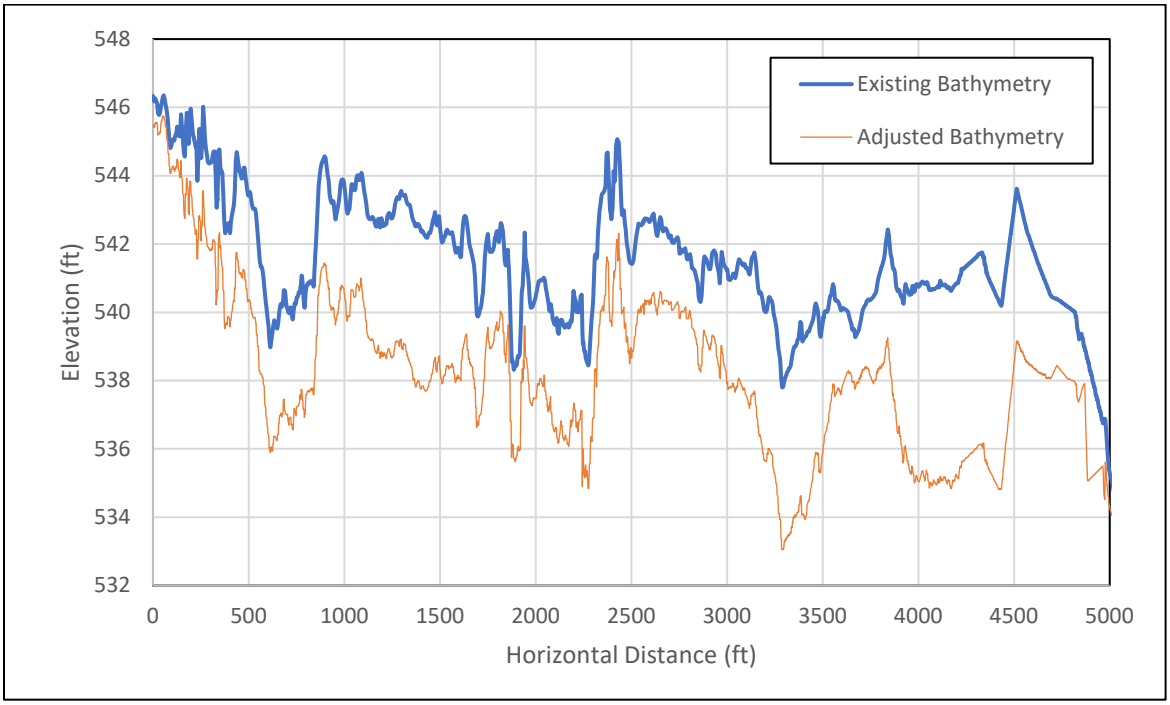


Figure 6-10 Example of Existing versus Adjusted Bathymetry

The adjusted bathymetry is likely a conservative estimate of the amount of sediment that may move, as it assumes all the sediment above the refusal depth would mobilize, when in implementation, it is likely that some areas of sediment will remain in place post-dam removal. This potential post removal surface was then compared to the existing bathymetry to estimate a potential volume of sediment that could mobilize post-dam removal.

The volume of stored sediments in the Chattahoochee River was estimated upstream from Langdale Dam, between Crow Hop Dam and Langdale Dam, and between Riverview Dam and Crow Hop Dam. The estimated volumes in these three reaches based on the volume difference between the existing bathymetry and adjusted bathymetry (conservatively assumed all sediment mobilized down to refusal depth in main channel) are as follows:

- Upstream from Langdale Dam – 495,000 cubic yards (306.8 acre-feet)
- Between Crow Hop Dam and Langdale Dam – 108,000 cubic yard (66.9 acre-feet)
- Between Riverview Dam and Crow Hop Dam – 266,000 cubic yards (164.9 acre-feet)

The total volume of stored sediment is estimated to be 869,000 cubic yards (538.6 acre-feet).

The collected sediment samples from 2019 and 2021 at select sites were processed in geotechnical laboratories to characterize sediment grain size distributions. The capacity of the Chattahoochee River to transport sediments stored behind the dams will depend on the grain size distributions of the sediment. Results of the geotechnical laboratory procedures are included in the Sediment Transport Assessment Study Report (Kleinschmidt 2022b).

There is some variability in the grain size distributions of the sediment samples (Figure 6-11), which is commonly observed in reservoir sediment deposits. While some samples had more silt (these were generally in areas that will not mobilize sediment post removal) and some more gravel, the central tendency was clear; a median grain size distribution was delineated for use in the Sediment Transport analyses (thick red line in Figure 6-11).

The percent composition of the median grain size distribution is shown in Figure 6-12. The dominant grain size is coarse sand with a median size (D_{50}) of 0.83 mm.

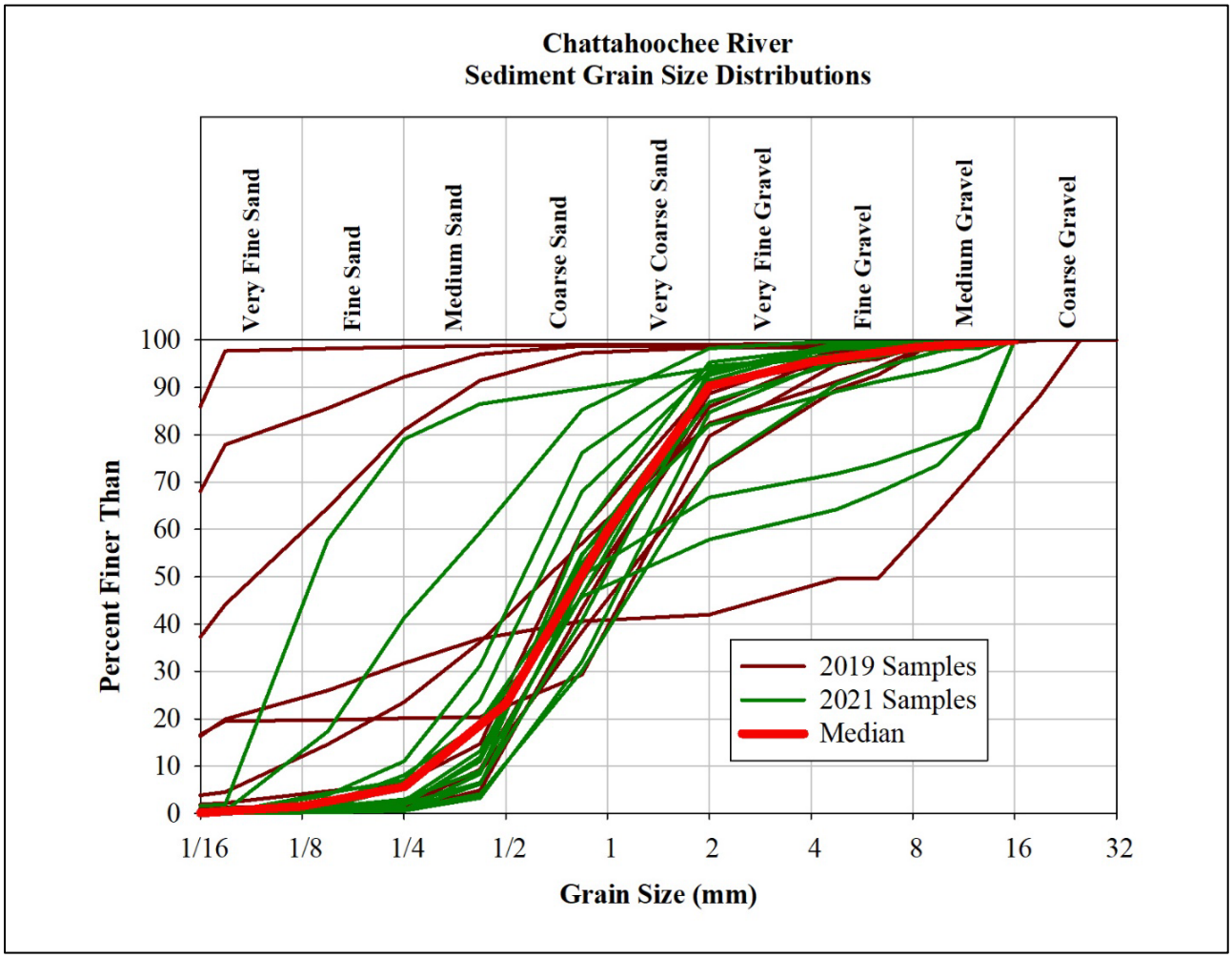


Figure 6-11 Grain Size Distributions of Sediment Stored in the Chattahoochee River from Samples Collected in 2019 and 2021, and a Median Distribution of all of the Samples

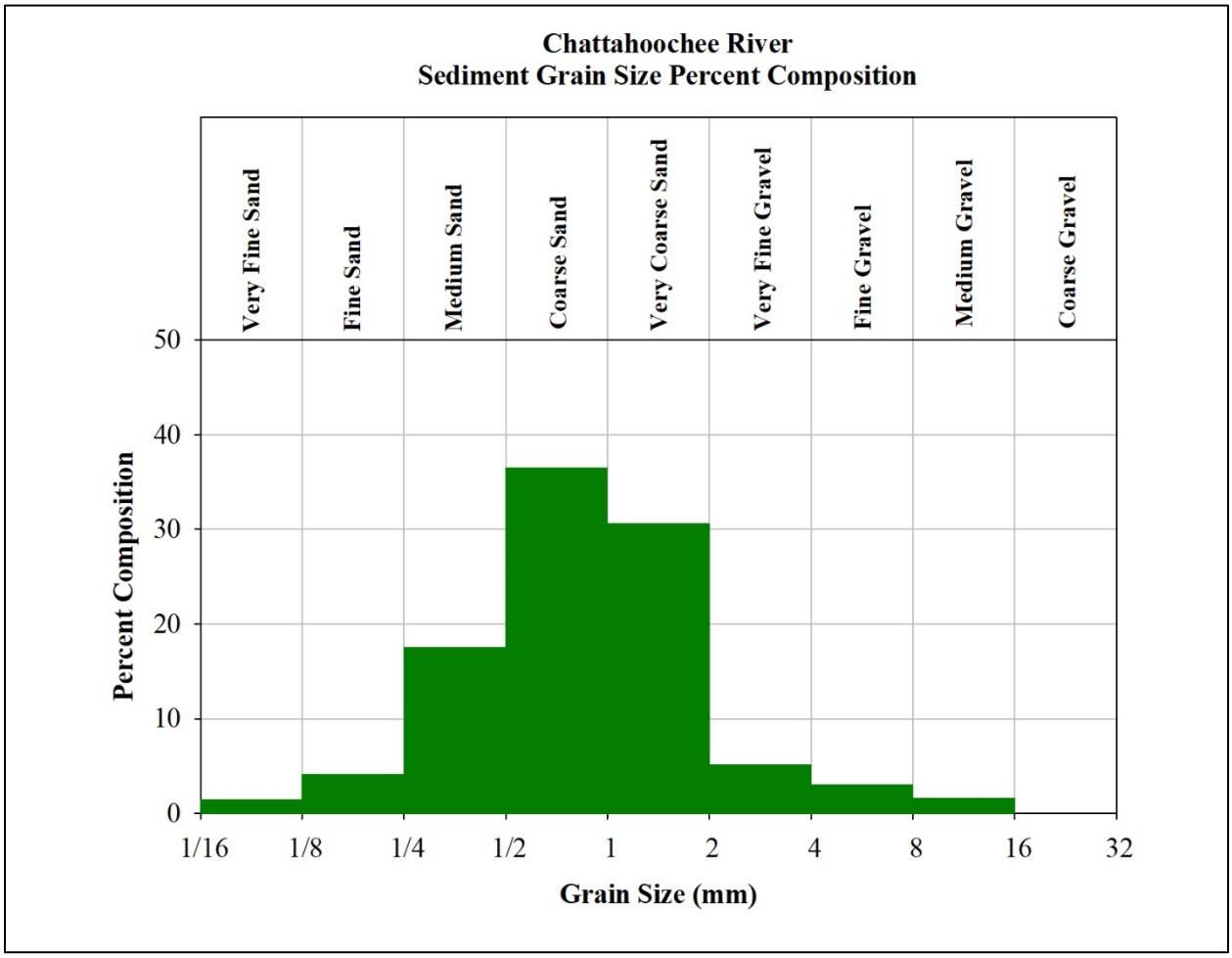


Figure 6-12 Median Composition of Grain Size of Stored Sediments in the Chattahoochee River

6.2.2 Sediment Transport

There are two critical thresholds for transport of sediment. The first threshold occurs when the shear stress is sufficient to start moving the sediment as bedload (sediment bouncing or rolling along the bottom of the river). The second threshold occurs when the shear stress is sufficient to start moving the sediment as suspended load (sediment suspended in the water column). Both of these thresholds depend on the grain size. The shear stress needed to move larger sediment particles is greater than the shear stress needed to move smaller sediment particles (Kleinschmidt 2022b).

Brownlie (1981) provides a method to estimate the shear stress sufficient to initiate sediment motion as bedload. Brownlie's method is based on the well-known Shields Diagram. To initiate suspended load, the shear velocity must exceed the particle fall velocity.

A summary of the critical shear stresses needed to initiate bedload and suspended load is listed in Table 6-3 for sediment particles ranging in size from very-fine sand to medium gravel. For example, the shear stress needed to initiate bedload for coarse sand is 0.00763 pounds per square foot while the shear stress needed to initiate suspended load for coarse sand is 0.1862 pounds per square foot or over twenty times greater.

Table 6-3 Critical Shear Stresses Needed to Initiate Bedload and Suspended Load for Sediment Particles Ranging in Size from Very Fine Sand to Medium Gravel

Grain Size Classification	Geometric Mean Grain Size		Critical Shear Stress (pounds per square foot)	
	(ft)	(mm)	Bedload	Suspended Load
Very Fine Sand	0.00029	0.088	0.0037	0.0037
Fine Sand	0.00058	0.177	0.0040	0.0072
Medium Sand	0.00116	0.35	0.0047	0.044
Coarse Sand	0.0023	0.71	0.0076	0.186
Very Coarse Sand	0.0046	1.41	0.0173	0.52
Very Fine Gravel	0.0093	2.8	0.042	1.24
Fine Gravel	0.0186	5.7	0.096	2.6
Medium Gravel	0.037	11.3	0.21	5.3

In addition to grain size distribution, the capacity of the Chattahoochee River to transport stored sediments depends on hydraulic characteristics such as velocity, shear stress, depth, (hydraulic radius), and wetted width of the river (Kleinschmidt 2022b). These hydraulic characteristics were derived from the 2D hydraulic model at the three critical cross sections shown in Figure 6-13 and presented in the Final H&H Study Report (Kleinschmidt 2022a). A total of six different flow conditions were used to derive these data, based on flows from the upstream USACE West Point project and the 2, 20, and 100-year floods.

- 675 cfs Base flow (from upstream USACE West Point Dam)
- 8,275 cfs Base flow plus one generating unit
- 15,875 cfs Base flow plus two generating units
- 27,300 cfs 2-year flood
- 57,625 cfs 20-year flood
- 75,100 cfs 100-year flood

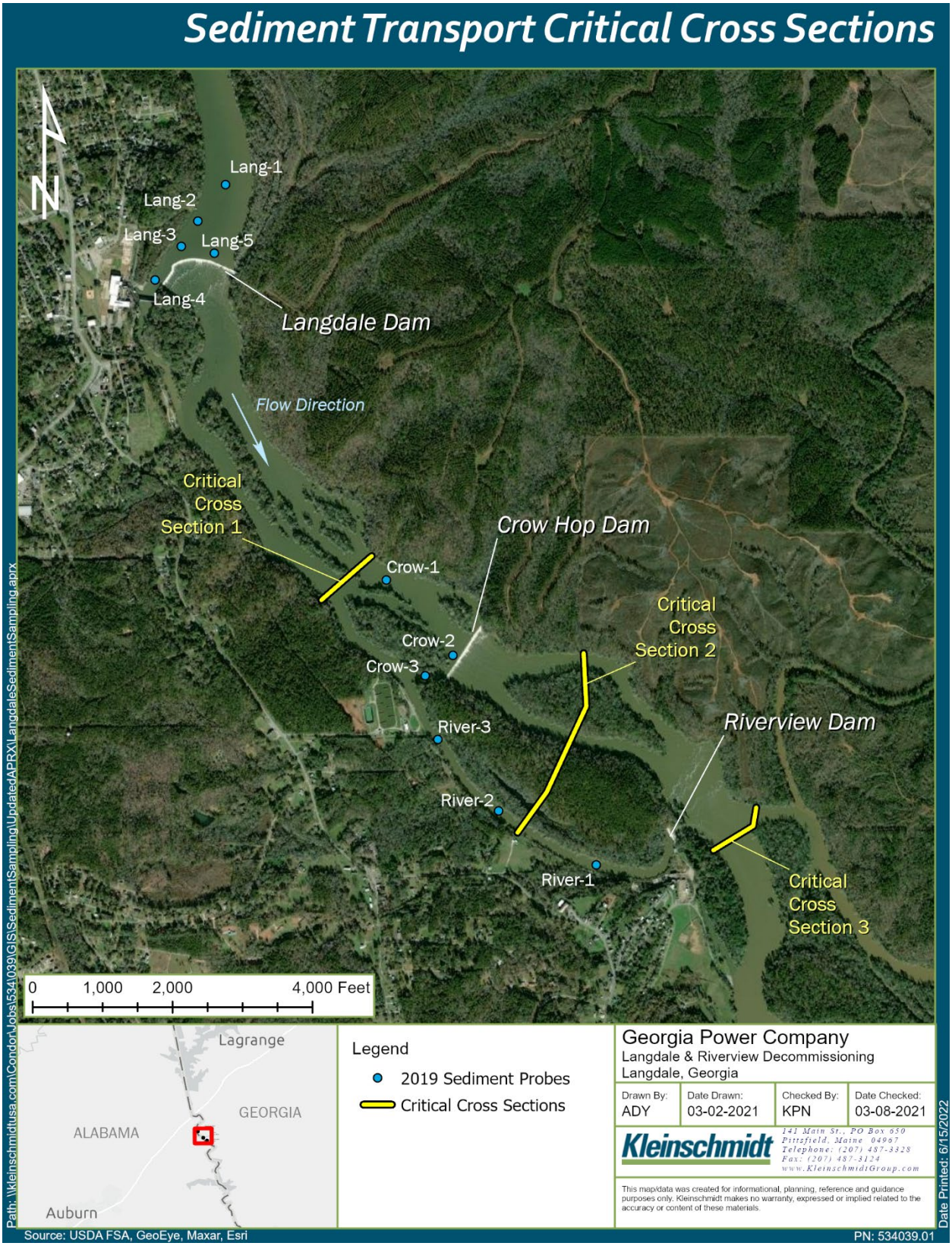


Figure 6-13 Locations of Critical Cross-Sections on the Chattahoochee River where Sediment Transport Rating Curves Were Developed

Average hydraulic characteristics at Critical Cross Sections 1, 2, and 3 are listed in Table 6-4. The assessment is focused on the hydraulic characteristics on the channel portion of each cross section. Under high flow conditions the river will inundate the adjacent floodplain. Sediment transport will occur in the channel portion of the river but not be significant in the floodplain. The floodplain portions of a river are often regarded as sediment depositional zones.

Table 6-4 Average Hydraulic Characteristics in Chattahoochee River at Critical Cross Sections 1, 2, and 3 for Discharges Ranging from 675 to 75,100 cfs

Location	Discharge (cfs)	Hydraulic Characteristic			
		Velocity (fps)	Shear Stress (psf)	Depth (ft)	Wetted Width (ft)
Critical Cross Section 1	675	0.69	0.036	2.6	689
	8,275	2.35	0.183	4.6	917
	15,875	3.22	0.302	6.1	943
	28,370	4.01	0.405	8.3	944
	57,625	4,70	0.490	12.7	955
	75,100	5.14	0.540	14.7	955
Critical Cross Section 2	675	0.28	0.008	7.0	589
	8,275	1.37	0.051	9.3	602
	15,875	2.04	0.112	10.8	629
	28,370	2.87	0.214	13.0	659
	57,625	4.13	0.401	18.0	659
	75,100	4.40	0.439	20.1	659
Critical Cross Section 3	675	0.22	0.003	4.8	880
	8,275	1.24	0.042	8.2	899
	15,875	1.67	0.064	10.9	912
	28,370	2.24	0.100	14.3	912
	57,625	3.08	0.179	19.5	912
	75,100	3.43	0.215	21.8	912

The average velocities at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River are shown in Figure 6-14 for discharges ranging from 675 to 75,100 cfs. The highest velocities are at Critical Cross Section 1 and the lowest velocities are at Critical Cross Section 3. This is indicative of the backwater effect from Lake Harding at Cross Section 3 (most downstream). Velocity is one of the more important indicators of the capacity of the river to transport sediment. The decreasing trend of velocity as Lake Harding is approached suggests a decreasing trend of sediment transport capacity.

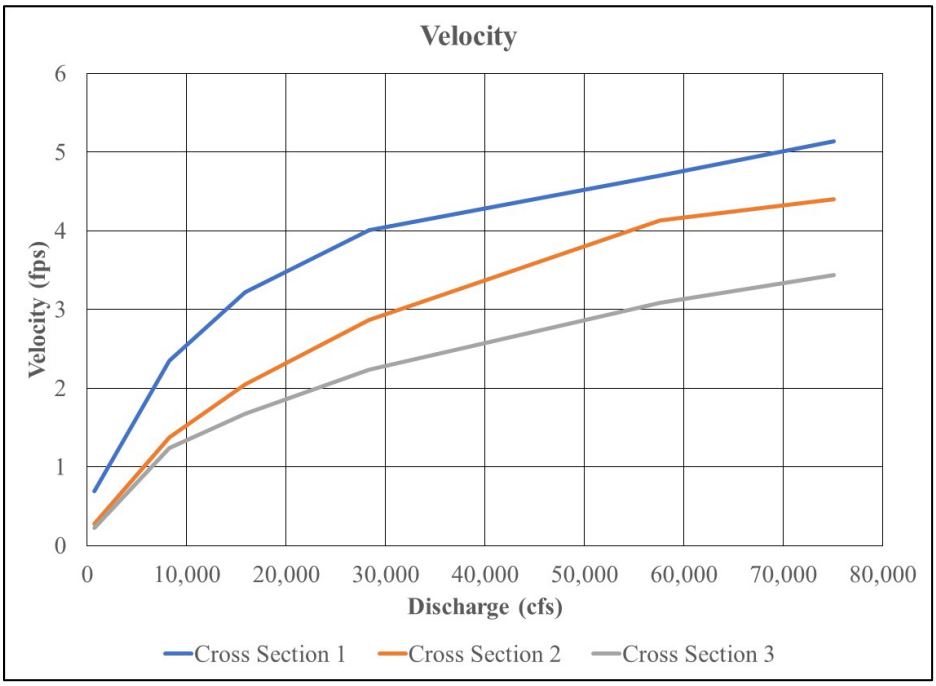


Figure 6-14 Average Velocity at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River

Similarly, the average shear stresses at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River are shown in Figure 6-15. The highest shear stresses are at Critical Cross Section 1 and the lowest shear stresses are at Critical Cross Section 3. Again, this is indicative of the backwater effect from Lake Harding lower in the study reach. Shear stress is another important indicator of the capacity of the river to transport sediment. The decreasing trend of shear stress as Lake Harding is approached suggests a decreasing trend of sediment transport capacity.

The average depths at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River are shown in Figure 6-16 for discharges ranging from 675 to 75,100 cfs. The river is generally deeper at Critical Cross Sections 2 and 3, and shallower at Critical Cross Section 1.

The wetted widths at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River are shown in Figure 6-17. The river is generally wider at Critical Cross Sections 2 and 3, and narrower at Critical Cross Section 1.

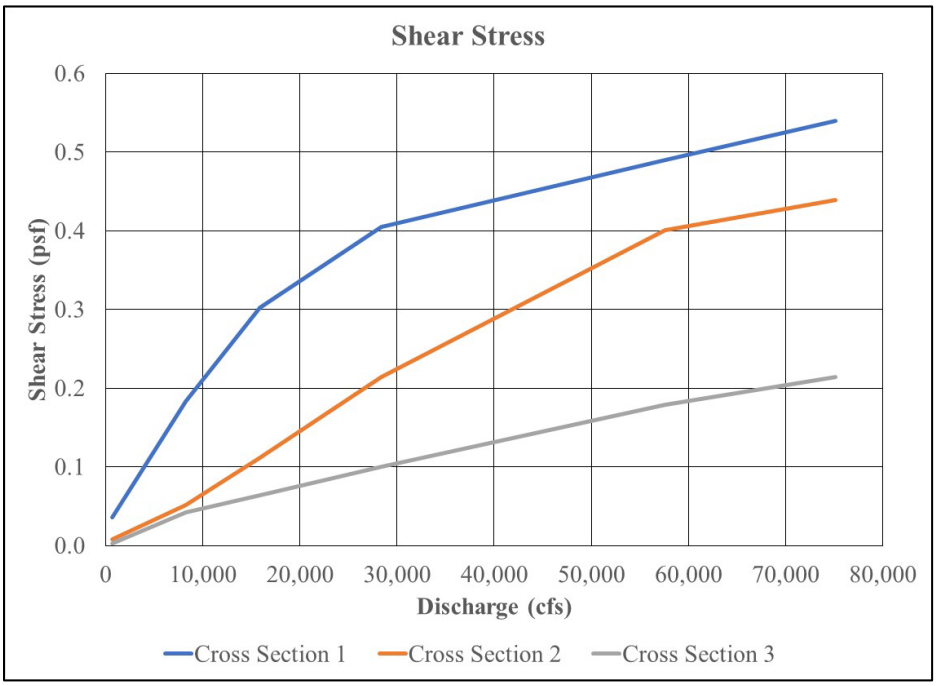


Figure 6-15 Average Shear Stress at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River

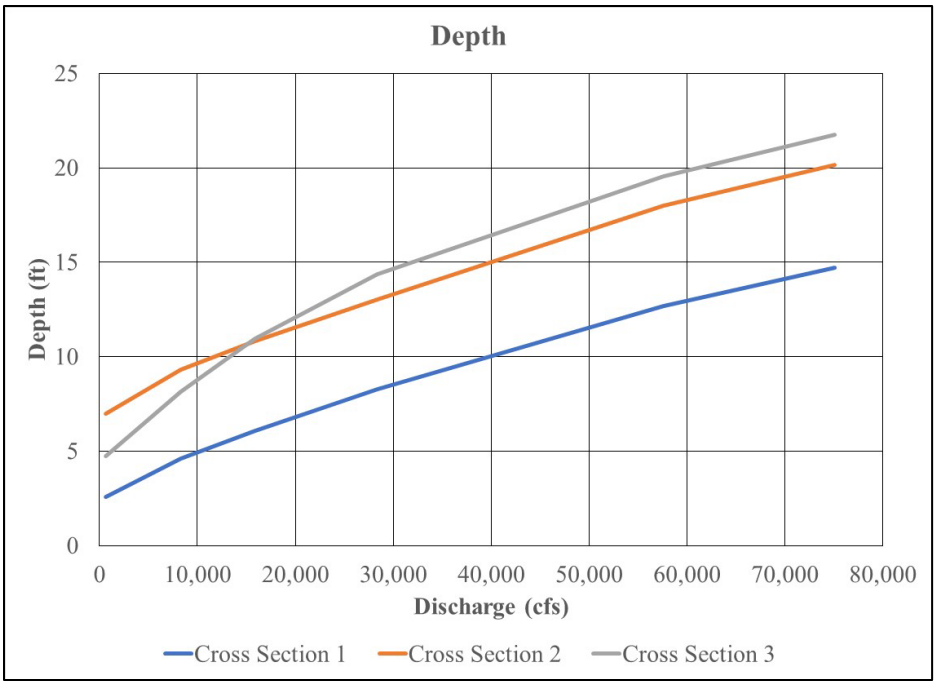


Figure 6-16 Average Depth at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River

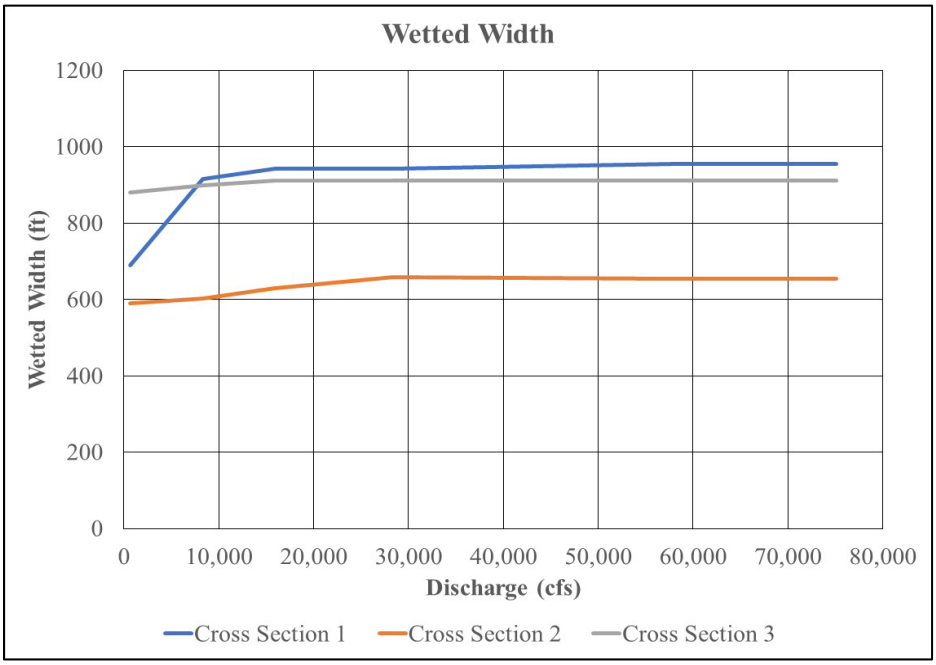


Figure 6-17 Wetted Width at Critical Cross Sections 1, 2, and 3 of the Chattahoochee River

From the sediment grain size and hydraulic characteristics of the Chattahoochee River, sediment transport rating curves were developed for Critical Cross Sections 1, 2, and 3. Rating curves were based on the Engelund Hansen (1967), Yang (1973), Ackers White (1974), and Brownlie (1981) methods. A median sediment transport rating curve was derived from the four methods and the median curve was used for time series analyses. The assumptions for the sediment transport rating curves are provided in the Sediment Transport Assessment Report (Kleinschmidt 2022b).

Results of the sediment transport rating curve analyses are summarized in Table 6-5. Results are also illustrated graphically in Figure 6-18, Figure 6-19, and Figure 6-20 for Cross Sections 1, 2, and 3, respectively. Median rating curves are shown in Figure 6-21 for the three cross sections.

From the rating curves shown in Figure 6-21, the sediment transport capacity is relatively high at Cross Section 1 and relatively low at Cross Section 3. This is expected as Cross Section 3 is located in the upper extent of Lake Harding. The effects from Lake Harding are more apparent at Cross Section 3, and they attenuate further upstream.

Table 6-5 Sediment Transport Rates Based on Engelund Hansen (1967), Yang (1973), Ackers White (1973), and Brownlie (1981), and a Median Transport Rate Derived from the Four Methods

Location	Discharge (cfs)	Sediment Transport (cubic yards per day)				
		Engelund Hansen (1967)	Yang (1973)	Ackers White (1973)	Brownlie (1981)	Median
Critical Cross Section 1	670	29	0	0	0	0
	8,275	5,080	3,250	1,128	1,811	2,530
	15,875	20,800	13,190	4,480	8,680	10,940
	28,370	49,900	31,300	10,120	23,500	27,400
	57,625	92,600	61,600	18,690	51,100	56,300
	75,100	128,100	85,400	25,400	75,100	80,200
Critical Cross Section 2	670	0	0	0	0	0
	8,275	166	84	0	28	56
	15,875	1,255	1,054	316	567	811
	28,370	6,880	5,980	2,020	3,870	4,920
	57,625	36,200	29,600	8,740	22,600	26,100
	75,100	47,200	41,200	11,860	32,500	36,900
Critical Cross Section 3	670	0	0	0	0	0
	8,275	151	53	0	13	33
	15,875	528	334	53	155	245
	28,370	1,850	1,362	517	891	1,126
	57,625	8,390	6,880	2,840	5,340	6,110
	75,100	13,700	11,660	4,680	9,480	10,570

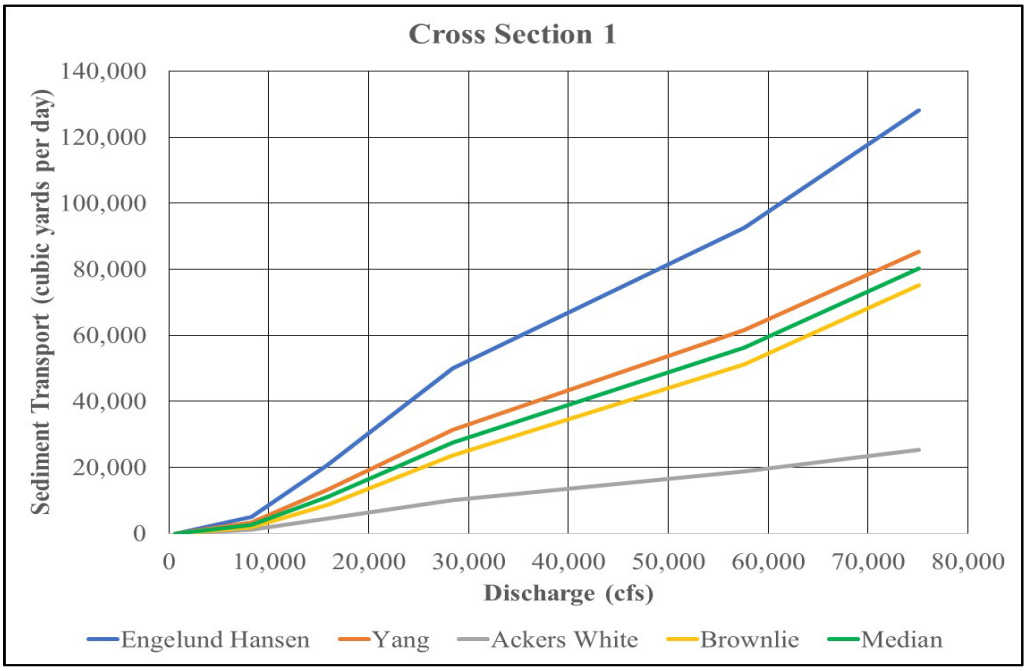


Figure 6-18 Sediment Transport Rates at Critical Cross Section 1 on the Chattahoochee River Based on Engelund Hansen (1967), Yang (1973), Ackers White (1973), and Brownlie (1981), and a Median Transport Rate Derived from the Four Methods

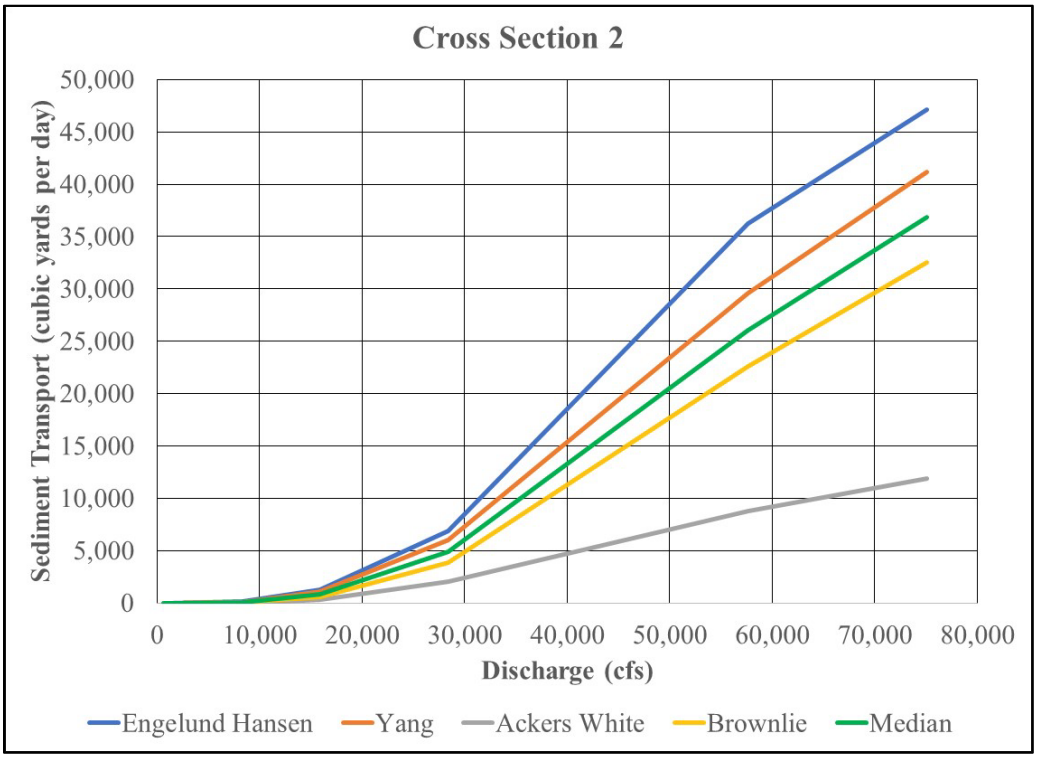


Figure 6-19 Sediment Transport Rates at Critical Cross Section 2 on the Chattahoochee River Based on Engelund Hansen (1967), Yang (1973), Ackers White (1973), and Brownlie (1981), and a Median Transport Rate Derived from the Four Methods

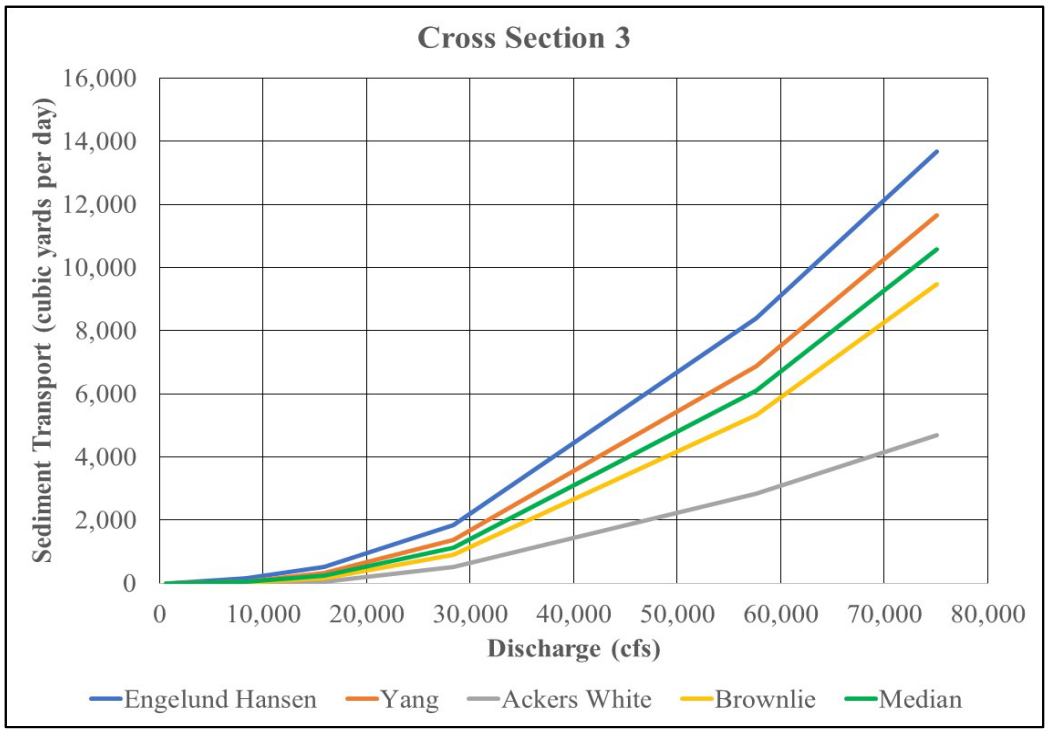


Figure 6-20 Sediment Transport Rates at Critical Cross Section 3 on the Chattahoochee River Based on Engelund Hansen (1967), Yang (1973), Ackers White (1973), and Brownlie (1981), and a Median Transport Rate Derived from the Four Methods

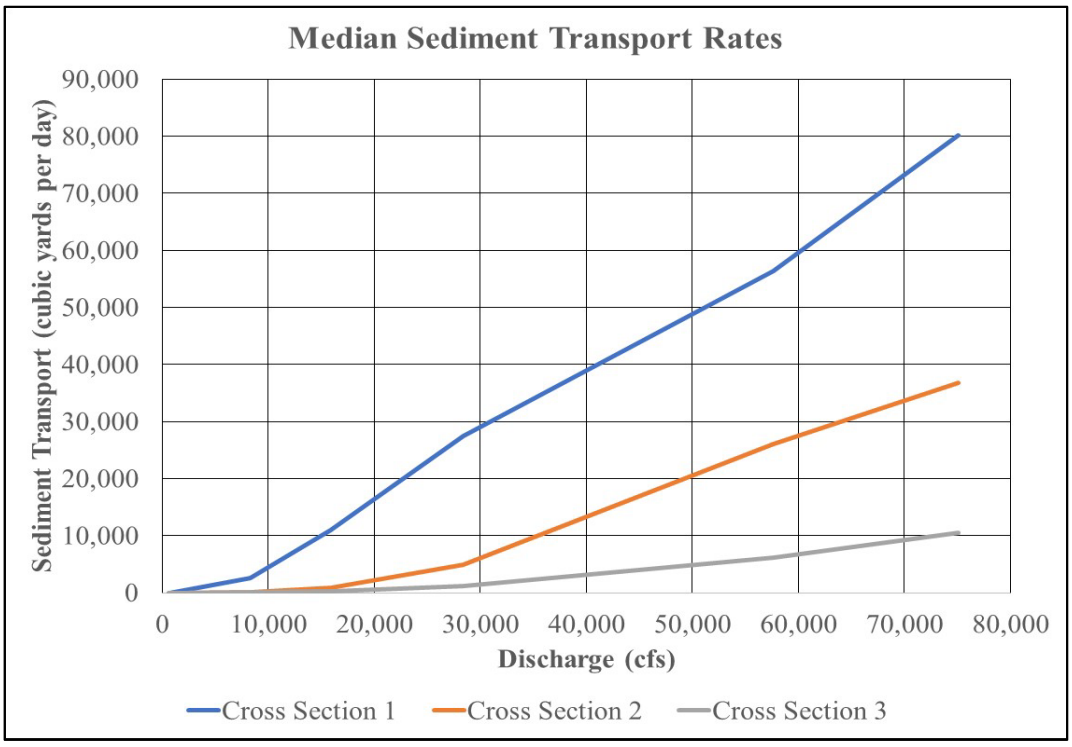


Figure 6-21 Median Sediment Transport Rates at Critical Cross Sections 1, 2, and 3 on the Chattahoochee River

The sediment transport rating curves shown in Figure 6-21 were used to estimate the timeline for transport of stored sediment to Lake Harding. For this analysis, historical flows from USGS Gage 02339500 (Chattahoochee River at West Point) were used. A 46-year period following construction of West Point Dam was the basis of this analysis. This period extended from Water Year 1976 to Water Year 2021 (Kleinschmidt 2022b).

To characterize the range of hydrologic conditions, the average annual flow was calculated from the daily flows from the USGS Gage in the Chattahoochee River at West Point. These average annual flows were ranked from lowest to highest. The lowest average flow occurred in Water Year 2008 (2,090 cfs) and the highest average flow occurred in 1990 (8,500 cfs). These years were selected for a dry year and a wet year, respectively. A median year (1994) was also selected.

The selected wet (1990), median (1994), and dry (2008) years were used to illustrate transport of sediment on a daily basis. Results of these analyses are shown in Figure 6-22, Figure 6-23, and Figure 6-24 for Cross Sections 1, 2, and 3, respectively. Most of the time, transport rates are relatively low, and high rates of transport can occur over a small portion of the year for wet and median years. Low rates of transport occur for the entire year during the dry year.

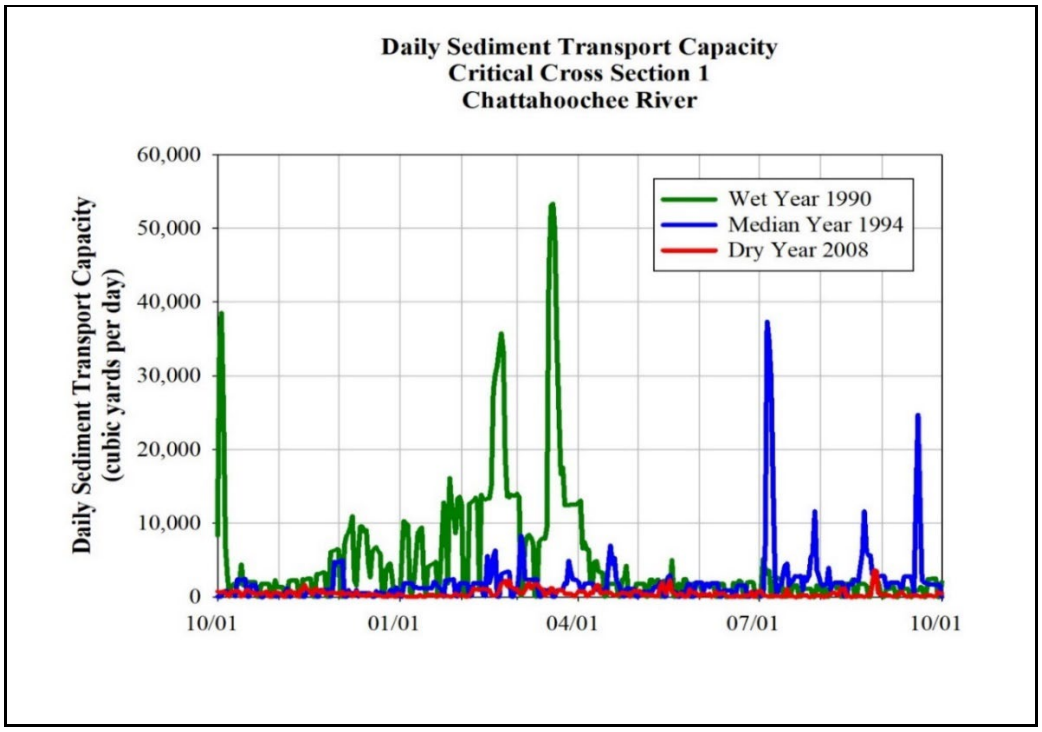


Figure 6-22 Daily Sediment Transport Capacity at Cross Section 1 During Wet (1990), Median (1994), and Dry (2008) Years

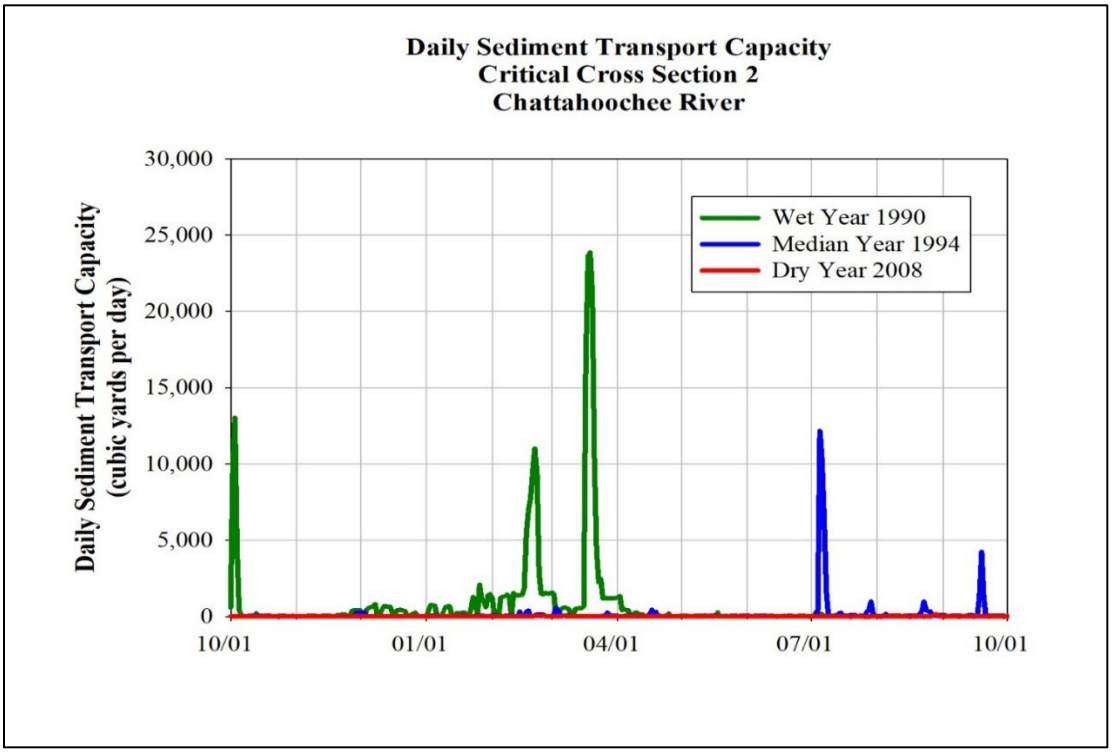


Figure 6-23 Daily Sediment Transport Capacity at Cross Section 2 During Wet (1990), Median (1994), and Dry (2008) Years

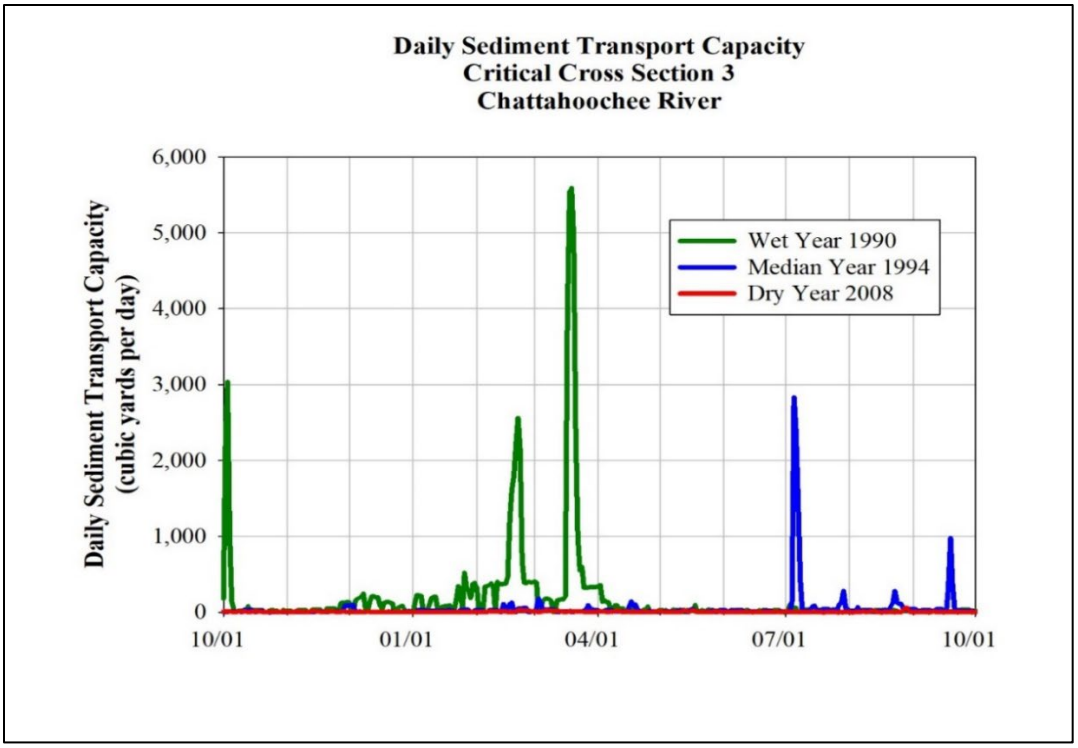


Figure 6-24 Daily Sediment Transport Capacity at Cross Section 3 During Wet (1990), Median (1994), and Dry (2008) Years

Annual sediment transport capacity is shown in Figure 6-25, Figure 6-26, and Figure 6-27 for Cross Sections 1, 2, and 3, respectively. The results shown in these graphics were used to estimate the timeline for transport of stored sediment above Langdale Dam downstream to Lake Harding.

The total volume of sediment stored in the Chattahoochee River upstream from Langdale Dam is conservatively estimated at 495,000 cubic yards (assuming the full estimated volume of sediment mobilizes). In 31 of the 46 years, the flow would be sufficient to transport at least 495,000 cubic yards in one year. During a low flow period from Water Year 2006 to Water Year 2008, it would take three years to transport 495,000 cubic yards. Therefore, it would take approximately 1 to 3 years to transport this volume through Critical Cross Section 1.

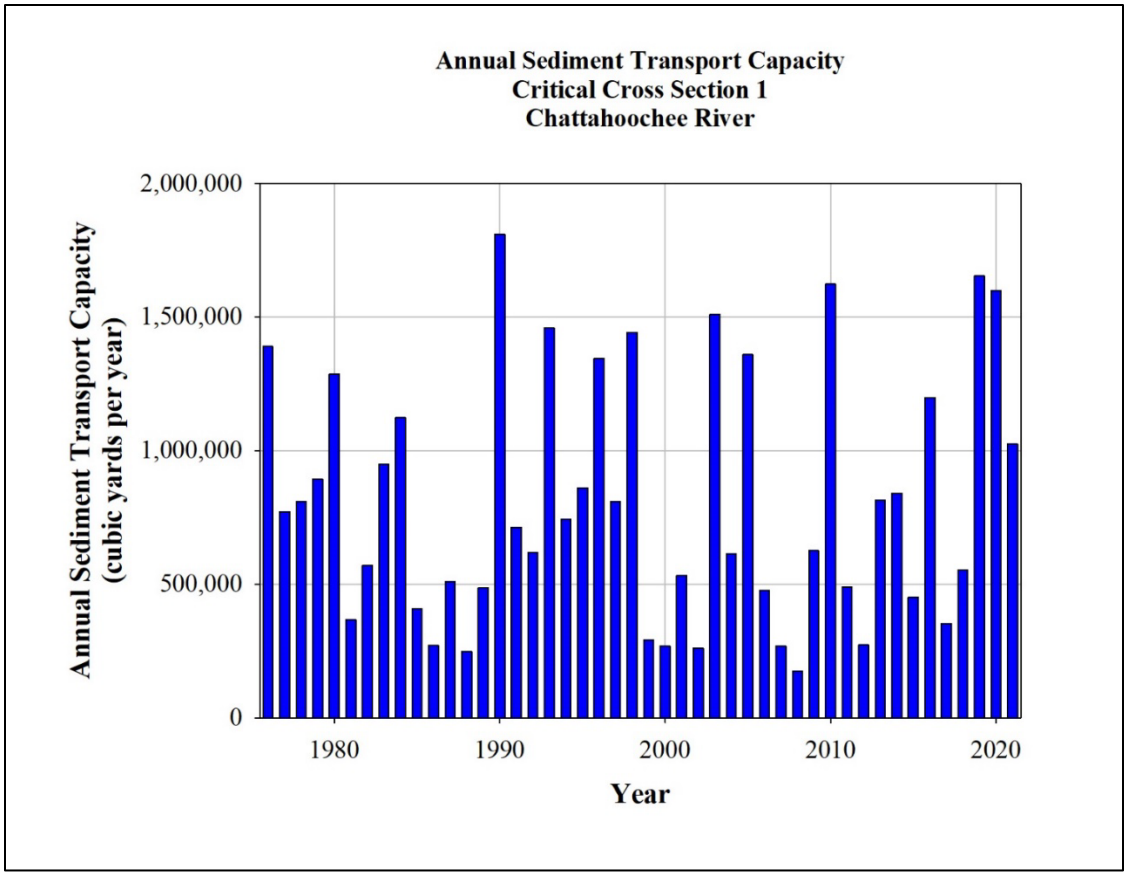


Figure 6-25 Annual Sediment Transport Capacity at Cross Section 1 of the Chattahoochee River, Water Years 1976 Through 2021

The total volume of sediment stored in the Chattahoochee River upstream from Crow Hop Dam/Critical Cross Section 2 is conservatively estimated at 603,000 cubic yards (assuming the full estimated volume of sediment behind Langdale and Crow Hop dams mobilizes). During a high flow period from Water Year 1990 to Water Year 1996, it would take 7 years to transport 603,000 cubic yards. During a low flow period from Water Year 2004 to Water Year 2018, it would take 15 years to transport 603,000 cubic yards. Therefore, it is estimated it would take approximately 7 to 15 years to transport the sediment through Critical Cross Section 2. Some of the sediment stored upstream from Langdale Dam would be transported downstream and would be temporarily stored in the reach between Crow Hop Dam and Langdale Dam before being transported further downstream.

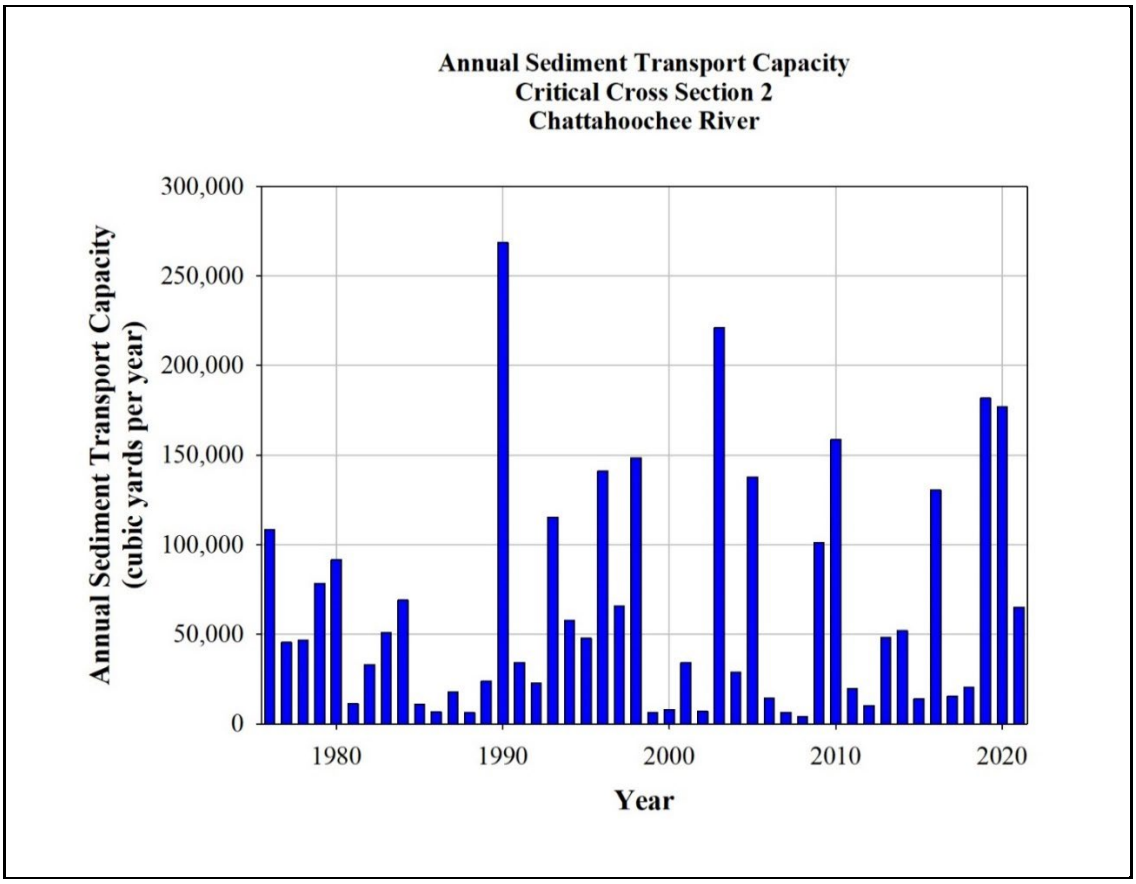


Figure 6-26 Annual Sediment Transport Capacity at Cross Section 2 of the Chattahoochee River, Water Years 1976 Through 2021

The total volume of sediment stored in the Chattahoochee River upstream from Critical Cross Section 3 is conservatively estimated at 869,000 cubic yards (assuming the full estimated volume of sediment behind the three dams mobilizes). From the information shown in Figure 6-26, it is estimated it would take the entire 46 years to transport the sediment through Critical Cross Section 3 (Figure 6-27). Some of the sediment stored upstream from Crow Hop Dam would be transported downstream and would be temporarily stored in the reach between Riverview Dam and Crow Hop Dam before being transported further downstream.

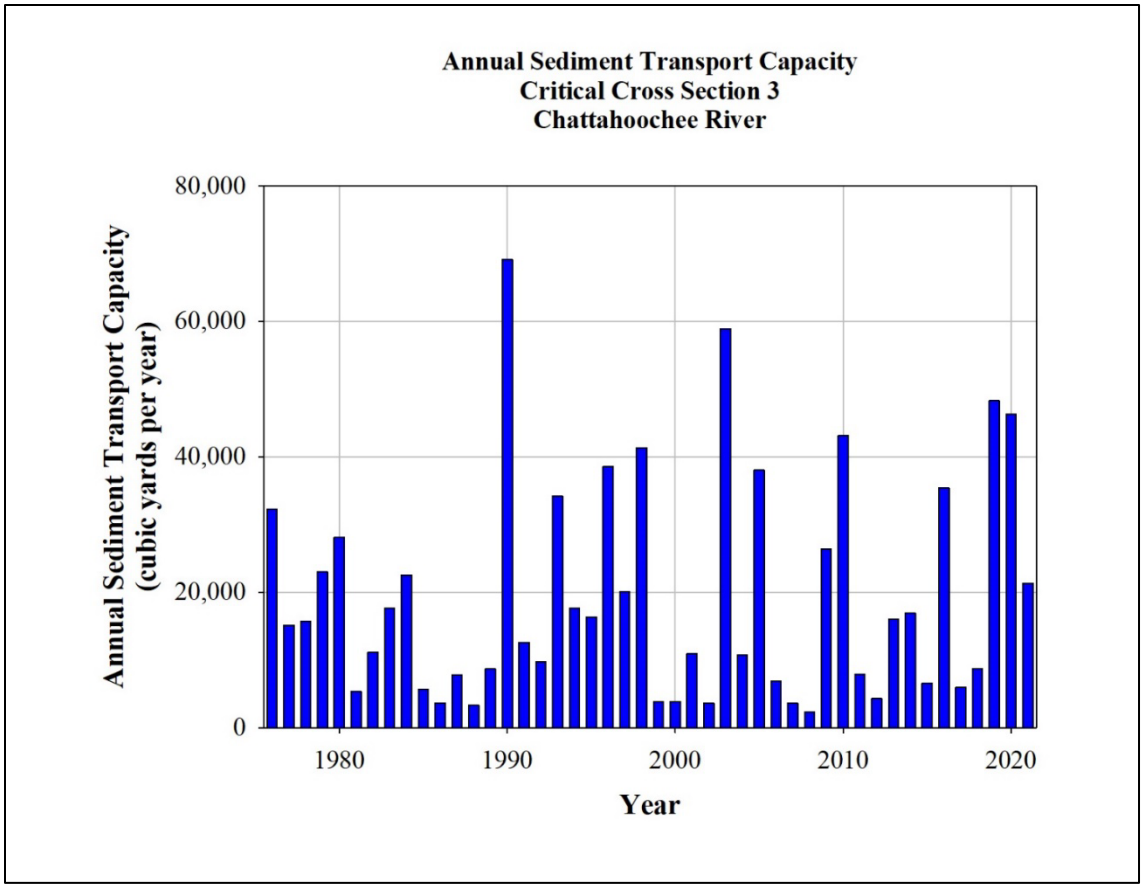


Figure 6-27 Annual Sediment Transport Capacity at Cross Section 3 of the Chattahoochee River, Water Years 1976 Through 2021

Results of these analyses indicate that the capacity of the river to transport stored sediments downstream decreases as Lake Harding is approached. The timelines for downstream transport of stored sediment are summarized as follows:

- Critical Cross Section 1 – it would take approximately 1 to 3 years to transport the upstream stored sediments (for the given cross section geometry)
- Critical Cross Section 2 – it would take approximately 7 to 15 years to transport the upstream store sediments (for the given cross section geometry)
- Critical Cross Section 3 – it would take approximately 46 years to transport the upstream stored sediments (for the given cross section geometry)

The timeline for downstream transport of stored sediments could be accelerated if Lake Harding is drawn down during high flow events, which may increase the velocity and shear stress at the Critical Cross Section 3, speeding up that timeline.

These analyses were based on 46 years of daily flows (averaging out known daily peaking flows at West Point) in the Chattahoochee River downstream from USACE West Point Dam and do not account for the effects of hourly peaking operations at West Point. The timeline for downstream transport of sediment would be accelerated with hourly peaking operations and the sediment transport processes would occur more rapidly than the estimates provided herein. The West Point Project is known to peak for between two and four hours per day during peak demand periods, with either one or two units turning on, resulting in periods of higher flow each day that exceed the daily average flow during this peaking operation.

Further, this sediment transport assessment utilized the same cross section (and corresponding depth, velocity, shear stress) to evaluate sediment transport across all flow ranges and does not account for any natural changes to that cross section. In a natural river system, the channel cross section changes in response to hydraulic and sediment inputs, so it is likely that the cross sections used in this assessment will adapt to the changes in hydraulics and sediment supply after the dam removal. These changes will occur so that the system can handle the hydraulic and sediment supply being input to the reach, thus in this case, it is feasible, for example, that Critical Cross Section 3 may adapt (potentially by aggrading some sediment on the east channel area and deepening flow in the main channel; resulting in higher velocities and sediment transport capacity) to become more efficient at transporting sediment. This natural evolution of channel geometry occurs on all streams in geologic time and is more evident in shorter periods of time during substantial changes in either the hydrology (e.g., major storm event) or sediment supply (e.g., dam removal, fire in the watershed resulting in increased erosion). For these Projects, there is anticipated to be a period of adjustment after the initial dam removal as the river adjusts to the new terrain, distribution of flow, and sediment supply, but it is expected that with the daily peaking flows and natural evolution of the cross sections, the period for the system to pass the sediment and stabilize will be shorter than the time periods identified, particularly at the two lower cross sections studied in this report.

6.2.3 Sediment Quality

Removal of the Project dams will result in sediment migration downstream. Georgia Power tested the sediment behind the dams to evaluate the presence and geographic distribution of targeted potential constituents from representative sediment samples of

the Projects and identify any of those potential constituents that may be of concern based on screening level. Sampling was performed at five key locations in the study reach where finer sized sediments may have accumulated in response to dam construction and would be expected to mobilize downstream upon dam removal (Figure 6-28). One additional sample was collected both upstream and downstream of the Projects to provide background concentrations at a single point. The sampling distribution was focused on the Langdale impoundment, as any contaminants arriving at the Projects would be deposited in that impoundment because it is the most upstream and largest of the Projects' impoundments (Figure 6-29). One sample was located at Riverview to capture any additional inputs between Langdale and Riverview (Figure 6-30). Further, the 2019 sampling indicated relatively shallow sediment depths behind the Crow Hop Dam, which is the smallest impoundment; therefore, no sampling was conducted in that area. Note that the sediment testing number is identified as "Q" and the sediment depth probe "SP/PB" refers to the nomenclature used in the Sediment Transport Assessment Study (Kleinschmidt 2022b), as some sample points are co-located on the river.

In 2021, Georgia Power conducted studies that measured sediment depth and tested for potential constituents in sediments accumulated behind Langdale, Crow Hop, and Riverview Dams (Figure 6-7) (Kleinschmidt 2022a; Kleinschmidt 2022b). Water depth, sediment probe depth, refusal depth, and recovery depth are displayed in Table 6-6. No constituent found in sampled sediments tested above its Ecological Screening Value (ESV).

Each sediment sample was tested for physical properties to inform the anticipated entrainment in the restored river reach and for use in the Sediment Transport Assessment Study. Physical properties measured included:

- Sieve analysis: necessary to develop a sediment grain size distribution curve (min. sieves: 0.5," 0.375," 0.25," #4, #10, #20, #40, #60, #100, and #200; per ASTM D6913).
- Bulk density (per ASTM D7263).
- Specific gravity (per ASTM D854 – 14).

Each composite sample (and split sample if they were collected) was tested for the potential constituents listed in Table 6-7. The target constituents listed are those found in samples of downstream sediments at the Columbus Dams (as reported in GEL, 2009) that

were reported to exceed the 2008 NOAA Freshwater Sediment Probable Effect Levels (PEL) and/or the 2001 EPA Region 4 Sediment Ecological Screening Values (ESV) (Buchman 2008; GEL 2009). In consultation with the Georgia EPD[17], Georgia Power also tested the composite sediment samples for antimony, arsenic, cadmium, nickel, selenium, silver, chlordane and total dioxins/furans, which were not in exceedance of the criteria in the Columbus Dams sediment sampling results but are constituents of interest relative to the reservoirs before West Point Dam was built (metals) or were found to be high in past watershed sediment studies (chlordane, per Frick et. al., 1998). Samples from the Projects were tested using the analytical methods identified in Table 6-7 and the storage and handling guidance described in the Sediment Quality Study Report.

[17] See June 21, 2021 email from Georgia EPD to Georgia Power regarding constituents to be tested.

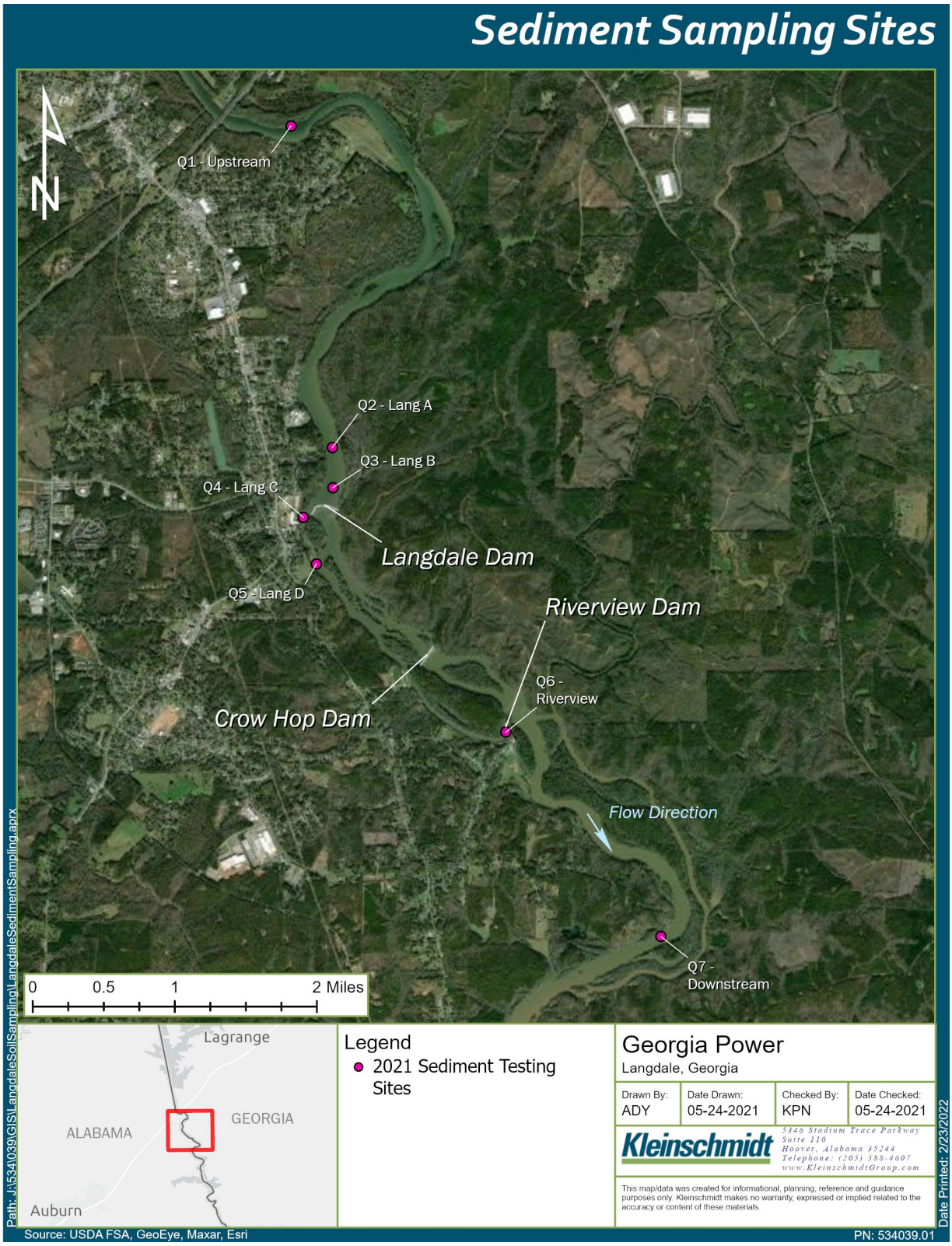


Figure 6-28 Overview of Sediment Testing Sites

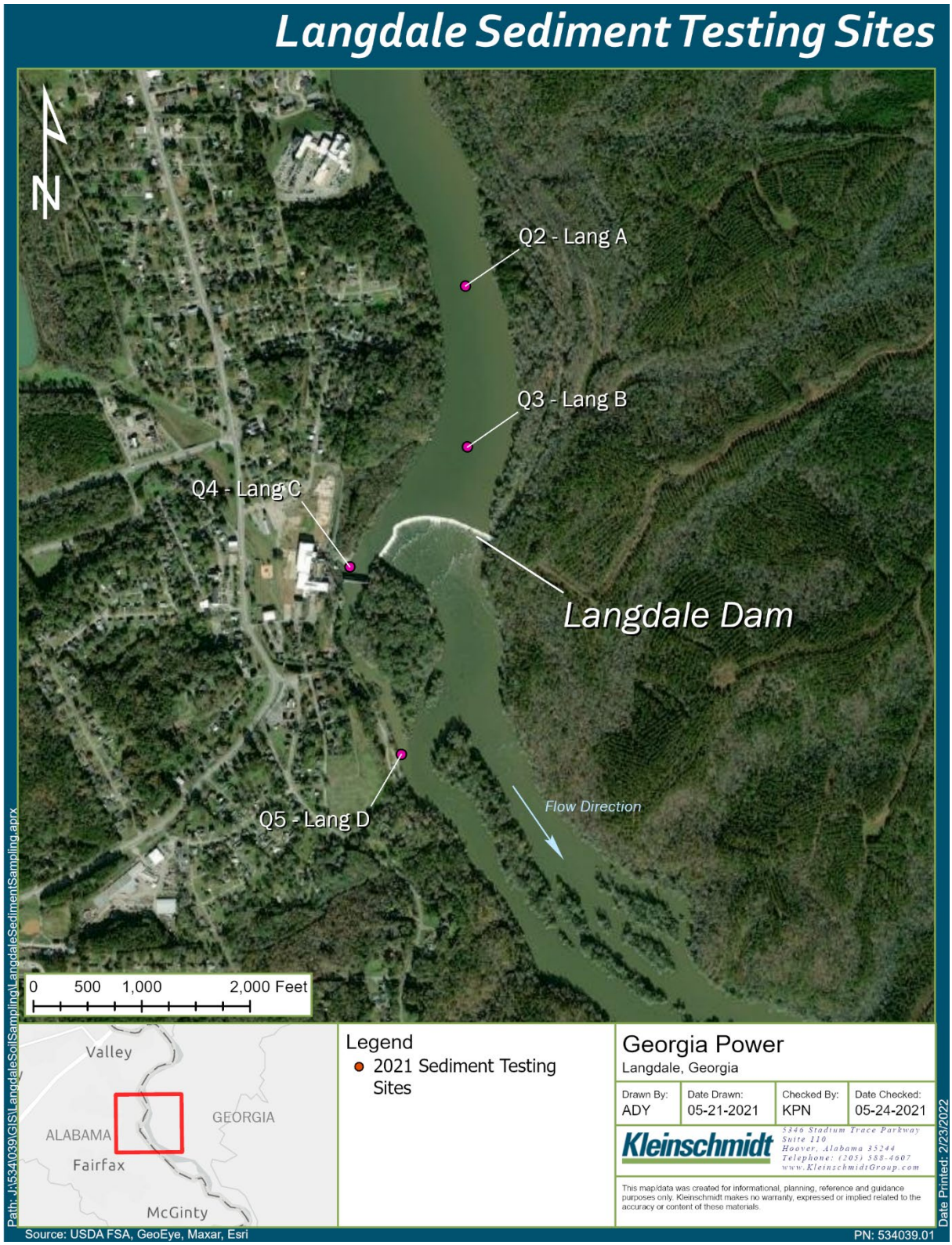


Figure 6-29 Langdale Sediment Testing Sites

Figure 6-30 Riverview Sediment Testing Sites

Table 6-6 Sediment Testing Locations and Depths

Location ID	Sample Date	Water Depth (ft)	Sediment Probe Depth (ft)	Refusal Depth (ft)	Recovery Depth (ft)	Comments
Q1	10/26/2021	4.5	1.5	1.5	1	large rocks within sample
PB-2	10/26/2021	2.6	10	12	5.8	
PB-3	10/29/2021	3.2	9	10	4	
SP-1	10/26/2021	9.8	0.6	0.6	none	Shallow rock in the area
SP-2.1	10/26/2021	6	0.5	0.5	none	
SP-2.2	10/26/2021	5	1.75	1.75		Vibracore slid down a rock face to refusal.
SP-2.3	10/26/2021	5	0.25	0.25	none	Rocks observed in the area
SP-3	10/26/2021	5.6	3.3	3.3	1	
SP-4	10/26/2021	6.3	4.75	4.75	2	
SP-5	10/26/2021	7.6	1.6	1.6	0.6	
SP-6.1	10/26/2021	8.6	2	2	1	
Q2 (SP-6.2)	10/26/2021	10	1	1	0.6	
SP-6.3	10/26/2021	7	7	7	2.2	
SP-7.1	10/27/2021	14	1	1	none	
Q3 (SP-7.2)	10/27/2021	9	2.6	2.6	1.5	
SP-7.3	10/27/2021	4	9	9	4	
SP-8	10/27/2021	10	1	1	none	
SP-9.1	10/27/2021	3	10	13	6	
Q4 (SP-9.2)	10/27/2021	3	8	8	3.5	
SP-9.3	10/27/2021	4.5	3.6	3.6	2	
SP-10.1	10/27/2021	6	6.25	6.25	3.3	
SP-10.2	10/27/2021	9.2	3.6	3.6	1.5	
SP-10.3	10/27/2021	7	5.5	5.5	2	
SP-10.4	10/27/2021	5.7	3	3		

Location ID	Sample Date	Water Depth (ft)	Sediment Probe Depth (ft)	Refusal Depth (ft)	Recovery Depth (ft)	Comments
SP-10.5	10/28/2021	6	3.6	3.6	1.5	
SP-10.6	10/28/2021	7	1.3	1.3	none	
SP-10.7	10/28/2021	2.25	8.3	8.3	5.6	
Q5	10/28/2021	2	8.3	8.3	4.2	
SP-11	10/28/2021	7	1.5	1.5	none	Vibracore slid down a rock face to refusal.
SP-12.1	10/28/2021	4.2	8	8	5	
SP-12.2	10/28/2021	7	4.8	4.8	1.2	
SP-12.3	10/28/2021	10	2	2	none	Vibracore slid down a rock face to refusal.
SP-13	10/28/2021	4.6	4.3	4.3	1.5	
SP-14.1	10/28/2021	5	4.3	4.3	1.5	
SP-14.2	10/28/2021	4	4.6	4.6	2.5	
SP-14.3	10/28/2021	3.3	5.5	5.5	2.5	
SP-15	10/28/2021	5.5	6.75	6.75	3.6	
SP-16	10/28/2021	5	5.8	5.8	2	
SP-17	10/28/2021	6	5.25	5.25	2.75	
SP-18.1	10/28/2021	5.25	8	8	4.5	
SP-18.2	10/28/2021	4.6	2	2	1	
SP-18.3	10/28/2021	7	5.5	5.5	2.6	
SP-19	10/28/2021	8.75	0.5	0.5	none	On rock, with rock in the area.
SP-20.1	10/28/2021	--	--	--	--	Conditions not safe to access.
SP-20.2	10/28/2021	5.6	5.5	5.5	2	
Q6 (SP-20.3)	10/28/2021	11	2	2	1	
SP-20.4	10/28/2021	11.25	1	1	none	
Q7	10/29/2021	7	4.8	4.8	2.5	

Table 6-7 List of Sediment Quality Parameters Testing and Relevant Criteria

Type	Parameter	Unit (dry weight)	Detection Limit	Analytical Method	ESV*	Columbus Dams Sediment **
Metal	Antimony	mg/kg	0.1	6010D	2	Non-detect
Metal	Arsenic	mg/kg	0.1	6010D	9.8	4.02
Metal	Cadmium	mg/kg	0.1	6010D	1.0	0.37
Metal	Chromium	mg/kg	0.1	6010D	43.4	38.2
Metal	Copper	mg/kg	0.17	6010D	31.6	27
Metal	Lead	mg/kg	0.34	6010D	35.8	43.1
Metal	Mercury (inorganic)	mg/kg	0.003	7470A	0.180	0.250
Metal	Nickel	mg/kg	0.1	6010D	22.7	9.08
Metal	Selenium	mg/kg	0.1	6010D	0.72	3.9
Metal	Silver	mg/kg	0.1	6010D	1.0	1.43
Metal	Zinc	mg/kg	0.7	6010D	121	140
PAH	Total Low Molecular Weight PAHs (LMW-PAHs)	µg/kg	analyte specific	8270E	600	N/A***
PAH	Total High Molecular Weight PAHs (HMW-PAHs)	µg/kg	analyte specific	8270E	1,000	N/A***
PCB	Total PCB Aroclors	µg/kg	100	EPA 8082A	59.8	327.5
Pesticide	4,4′ DDE	µg/kg****	0.18	8081B	1.4	14.2
Pesticide	Chlordane	µg/kg	2.9	8081B	3.2	Non-detect
Dioxin	Dioxins/Furans	µg/kg	analyte specific	1613B*****	0.0025	Not tested

*EPA 2018, Table 2a and 2b for Region 4 Freshwater Sediment Ecological Screening Values for Hazardous Waste Sites

**Maximum sample concentration reported in GEL, 2009

***The testing at the Columbus Dams was for individual PAH's. The current (2018) EPA Screening Level evaluation recommends testing only for Total LMW-PAHs and Total HMW-PAHs. Georgia Power is following the more recent guidance for screening level assessments (EPA, 2018), and as such, the LMW-PAHs and HMW-PAHs will be evaluated as the sum of the individual PAHs in each category. These constituents may have varying detection limits by PAH.

**** µg/kg at 1 percent OC

***** Analytical method 1613B was used to quantify the dioxins/furans results and was summarized using the Toxicity Equivalent Quotient (TEQ)

The sediment core field collection effort was performed in October 2021. Seven locations were analyzed for sediment bulk chemistry and physical characteristics. Eurofins TestAmerica analyzed sediment bulk chemistry. All constituent concentrations were found to be less than ESVs for all samples.

Summary tables of the analytical results are presented in Table 6-8 and Table 6-9. The complete summary of analytical results is provided in Kleinschmidt 2022c.

Table 6-8 Analytical Results for Metals Analyzed in Sediment Samples Collected from the Langdale and Riverview Project during October 2021

Analyte	ESV	Sampling Location						
		Q1	Q2	Q3	Q4	Q5	Q6	Q7
Metals: dry-weight (mg/kg)								
Antimony	2	<0.18	<0.2	<0.2	<1.2	<0.18	<0.2	<0.19
Arsenic	9.8	<0.25	0.3	<0.27	<1.6	<0.24	0.295	0.285
Cadmium	1.0	<0.0087	0.031	<0.0095	0.5085	<0.0087	0.0847	0.0796
Chromium	43.4	7.3	1.8	2.1	6.8	1.2	2.6	2.2
Copper	31.6	1.4	1.2	0.72	13	0.3975	0.98	0.94
Lead	35.8	1.3	1.4	1.3	15	0.99	1.6	1.7
Mercury	0.18	<0.003	<0.0032	<0.0032	<0.0039	<0.003	<0.0032	<0.0031
Nickel	22.7	3.3	0.88	0.82	3.2	0.6275	1.4	1.2
Selenium	0.72	<0.073	<0.076	<0.077	<0.092	<0.071	<0.076	<0.076
Silver	1.0	<0.027	<0.029	<0.029	<0.17	0.0885	<0.029	<0.028
Zinc	121	6.3	6.7	7.3	43	2.8	13	10

Table 6-9 Analytical Results for PAHs, PCBs, and Pesticides in Sediment Samples Collected from the Langdale and Riverview Projects during October 2021

Analyte	ESV	Sampling Location						
		Q1	Q2	Q3	Q4	Q5	Q6	Q7
PAHs, PCBs, and Pesticides: dry-weight (µg/kg)								
Total Low Molecular Weight PAHs (LMW-PAHs)	600	1.8	<5.97	<5.97	60.5	1.7	<6	170.8
Total High Molecular Weight PAHs (HMW-PAHs)	1,000	7.1	<16.11	<16.11	511	25.8	<16.22	650
Total PCB Aroclors	59.8	0.26	<1.008	<1.007	<1.182	0.54	0.22	0.18
Chlordane	3.2	<0.21	<0.23	<0.23	<0.27	<0.21	<1.1	<0.22
4,4′ DDE	1.4	<0.01	<0.011	<0.011	<0.013	<0.0099	<0.054	<0.01
Dioxins/Furans	0.0025	0.00041	0.00012	0.0001	0.0023	0.00032	0.000097	0.00023

Table 6-8 and Table 6-9 screening values are from EPA 2018, Tables 2a and 2b for Region 4 Freshwater Sediment Ecological Screening Values for Hazardous Waste Sites. As stated in the EPA's document titled "Region 4 Ecological Risk Assessment Supplemental Guidance – March 2018 Update", the freshwater sediment ESVs are "…derived from statistical interpretation of effects databases obtained from the literature, as reported in publications from states such as Florida and Washington, and from other agencies. These benchmarks are generally based on observations of direct toxicity to benthic organisms."

Since none of the sediment sample constituents were detected at or above respective ESVs, potential concerns for ecological risk are not expected due to mobilization of sediments currently stored behind the dams during dam removal activities nor due to natural sediment mobilization following completion of dam removals.

The Unified Soil Classification System (SCS) classification for all seven sediment sampling locations was silty sand with gravel (SM). The "S" part of the classification indicates that 50 percent or more of the coarse fraction is smaller than the No. 4 sieve size. The "M" part of the classification indicates more than 12 percent fines in the silty sand, sand-silt mixture. Water depths ranged from 2 to 11 feet. Sediment depths varied between 1 and

8.3 feet. Recovery depths were sampled between 0.6 and 4.2 feet. The boring log summary is presented in Table 6-10.

Table 6-10 Boring Log Summary for Sediment Samples Collected from the Langdale and Riverview Projects during October 2021

Sampling Location	Description	Water Depth (ft)	Sediment Depth (ft)	Recovery Depth (ft)
Q1	Silty Sand with Gravel (SM)	4.5	1.5	1
Q2	Silty Sand with Gravel (SM)	10	1	0.6
Q3	Silty Sand with Gravel (SM)	9	2.6	1.5
Q4	Silty Sand with Gravel (SM)	3	8	3.5
Q5	Silty Sand with Gravel (SM)	2	8.3	4.2
Q6	Silty Sand with Gravel (SM)	11	2	1
Q7	Silty Sand with Gravel (SM)	7	4.8	2.5

Sieve analysis, bulk density, and specific gravity measurements were performed for each sediment sample. To further analyze the sediment samples' physical characteristics, a grain size distribution was computed from each sieve analysis. The equivalent "percent passing" for 60 percent (D_{60}), 50 percent (D_{50}), 30 percent (D_{30}), and 10 percent (D_{10}) was determined from the grain size distribution. The coefficient of uniformity, C_u, is a crude shape parameter that defines the uniformity of the gradation. For example, a C_u = 1 would be a soil with only one grain size. Very poorly graded soils, such as beach sands, have a C_u of 2 or 3, whereas very well graded soils may have a C_u of 15 or greater. The proportions of gravel, sand, and silt/clay for each sediment sample were determined from the grain size distribution. A summary of the sediment samples' physical characteristics is presented in Table 6-11.

Table 6-11 Grain Size Distribution and Bulk Density for Sediment Samples Collected from the Langdale and Riverview Projects during October 2021

Sieve Analyses	Sampling Location						
	Q1	Q2	Q3	Q4	Q5	Q6	Q7
60% Passing by Weight, D_{60} [mm]	2.84	1.02	0.86	0.12	0.41	1.47	1.14
50% Passing by Weight, D_{50} [mm]	1.23	0.80	0.77	N/A	0.12	0.83	0.87
30% Passing by Weight, D_{30} [mm]	0.59	0.61	0.60	N/A	N/A	0.55	0.66
10% Passing by Weight, D_{10} [mm]	0.27	0.40	0.44	N/A	N/A	0.28	0.46
Coeff. of Uniformity, C_u	10.4	2.5	2.0	N/A	N/A	5.2	2.5
Gravel	18.0%	3.0%	1.1%	0.1%	0.5%	9.4%	0.6%
Sand	81.6%	96.7%	98.7%	44.4%	50.6%	88.5%	99.2%
Silt/Clay	0.5%	0.3%	0.2%	55.5%	48.8%	2.1%	0.2%
Wet Density	116.7	108.3	100.3	113.6	111.8	117	111.7
Dry Density	105.2	90.1	86.1	84.7	88.2	97	87.9
Moisture	10.9	20.2	16.5	34.2	28.7	20.6	27.2
Specific Gravity of soil @ 20°C	2.680	2.650	2.644	2.664	2.669	2.662	2.653

In reference to this study's October 2021 borings, five of the seven composite sediment samples (Q1, Q2, Q3, Q6, and Q7) were primarily comprised of sands based on their grain size distributions (Table 6-11). Contaminants generally do not bind to larger grain sizes such as sands and gravels (e.g., Tansel and Rafiuddin 2016). The chemical analytical results may support this assertion since all analyzed constituents were lower than their respective Ecological Screening Value in the sand and gravel dominant samples. Therefore, the sands and gravels impounded by the Langdale and Riverview dams are not likely to pose a contamination risk even if they are suspended in the water column during the proposed dam removal.

The focus of this sediment quality study was to screen potential risks in areas with greater capacity to accumulate finer grained sediments, especially because contaminants are more likely to bind to fine grain sediments such as silts and clays (e.g., Tansel and

Rafiuddin 2016). Composite sediment sample Q4 was collected immediately upstream (approximately 200 feet) of the Langdale powerhouse. Composite sediment sample Q5 was collected within the downstream end of the Langdale powerhouse tailrace channel. Samples Q4 and Q5 were comprised of 56 percent and 49 percent fine grained sediments, respectively, with the remainder of the mixture being sands. While constituent concentrations were greater in siltier samples Q4 and Q5 (i.e., cadmium, copper, lead, zinc, PCBs, dioxins/furans) in comparison to the remaining samples, there were no exceedances of the ESV for all analyzed constituents. Therefore, silts and clays are not likely to pose a significant contamination risk even if suspended and transported downstream during dam removal activities.

As reported by the USDA, the Langdale and Riverview reservoirs had maximized their sediment capacity within the first 30 years of their construction. This may suggest that the dams have been passing the incoming sediment load since 1936. The lack of silts and clays in bed sediments suggests that finer grain sediments may be suspended in the water column where high river velocities pass the load downstream to Lake Harding. Based on these observations, substantial deposition of new silts and clays are unlikely to occur. Therefore, the chemical contamination risk assessments and related findings in this report should remain valid during the proposed dam removals.

In conclusion, the supporting evidence indicates that the accumulated sediments do not pose a chemical contamination risk. Limited to no adverse effects to the aquatic ecosystem are expected should the sediments become mobilized with subsequent transport downstream where constituents could become bioavailable to aquatic organisms.

The analytical reports for the sediment samples are presented in the Appendices to the Sediment Quality Study Report (Kleinschmidt 2022c).

6.2.4 PME Measures

6.2.4.1 Phase 1 – Pre Removal Phase

Prior to beginning construction, Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan and implement the approved plan to reduce turbidity, erosion, and sedimentation related to construction. Implementing this plan would have a beneficial effect on Project soils by erecting silt fences to reduce run off. In addition, providing rip rap in a portion of the Riverview headrace channel prior to construction would provide stability to the channel and reduce bank sloughing post removal.

6.2.4.2 Phase 2 – Removal

During construction, Georgia Power will implement an Erosion and Sediment Control Plan to reduce turbidity, erosion, and sedimentation related to construction.

Georgia Power proposes to leave 10-foot dam abutments on the west side of the Langdale Dam and to leave approximately 300 feet on the east side of the Langdale Dam at a lower elevation, leaving the 10-foot-long section abutting the shoreline at full height. Leaving a portion of the dam beyond the shoreline abutment is necessary to help distribute water towards the western side of the channel and reduce water velocities on the eastern side. This provision addresses the USFWS and Georgia Department of Natural Resources (GDNR) requests to reduce velocities on the eastern side of the river and to aid in fish movement. Lower velocities on the eastern bank would also reduce potential erosion at that bend on the river. The abutments should also serve as armoring on the bank to reduce erosion.

Georgia Power proposes to leave 10-foot dam abutments on east and west sides of the Crow Hop Dam. Leaving these abutments will primarily address cultural resources while also providing some armoring that may prevent erosion on the eastern and western banks of the river.

Georgia Power proposes to leave a 10-foot dam abutment on the south side of Riverview Dam and a 25-foot abutment on the north side of Riverview Dam. Leaving these abutments will primarily address cultural resources but may also help reduce erosion and head cutting on the south and north sides, respectively.

The right riverbank of the Riverview headrace channel, just upstream of the Riverview powerhouse, is located on a sharp bend in the channel and is anticipated to be subject to

higher scouring forces in the post removal condition, given the channel geomorphology, anticipated changes in water velocities, and flow distribution post removal. Georgia Power will implement additional shoreline armoring to reduce near-bank shear stress on the right bank of the Riverview headrace channel for approximately 700-feet upstream of the Riverview powerhouse. Providing riprap along the Riverview headrace channel will assist in stabilizing the bank and protect riparian area.

6.2.4.3 Phase 3 – Post Removal Phase

Georgia Power proposes to implement a Post Removal Monitoring Plan that includes three monitoring periods: 1 month, 6 months, and 1 year to ensure bank stability and prevent erosion, which includes planting, seeding, and live stake installation post dam removal. The Post Removal Monitoring Plan provides a schedule for monitoring, specifies locations for plantings and seeding, and includes a process for identifying and addressing management actions should there be unforeseen issues that arise during the monitoring period related to the dam removal and sediment movement.

As part of the Post Removal Monitoring Plan, Georgia Power proposes to develop and implement Outfall Pipe Armoring/Extension which would protect the integrity of discharge pipes, if affected, by reducing soil erosion and scouring of the surrounding bank. The Post Removal Monitoring Plan would have a short term beneficial effect in the first year post removal, and a long term beneficial effect on shoreline and riparian areas as well as in the headrace channel as the riprap settles and provides a more stable bathymetry.

Georgia Power proposes to extend the existing public boat ramp at the airport above Langdale Dam and extend the existing public boat ramp below Langdale powerhouse (Cemetery Park) to at least 2 feet of water depth at the new water surface election (measured at the West Point minimum flow) following dam removal and river stabilization. Sediment and runoff will be contained during any construction activities, and the extension of the boat ramp would have little effect on geology and soil resources other than temporary disturbance related to extension of the ramp.

Georgia Power proposes to design and construct a park in the city of Valley adjacent to the river and regrade and gravel the access road to the car-top/hand carry boat access. Soil erosion and sedimentation during construction would be managed by implementing an Erosion and Sediment Control Plan. Georgia Power would implement the Construction

Best Management Practices Plan (CBMPP) for Alabama to address potential water quality impacts associated with construction.

Georgia Power proposes to extend the existing public boat ramp at Riverview Park to at least 2 feet of water depth to at least 2 feet of water depth at the new water surface elevation (measured at the West Point minimum flow) following dam removal and river stabilization. Sediment and runoff will be managed during construction activities, and the extension of the boat ramp would have little effect on geology and soil resources other than temporary disturbance related to extension of the ramp.

6.3 Unavoidable Adverse Impacts

Decommissioning and removal of the Langdale and Riverview Projects could potentially have an unavoidable adverse impact on sediment in the Chattahoochee River to Lake Harding. The stored sediments behind Langdale, Riverview, and Crow Hop Dams are expected to be transported downstream to Lake Harding after removal of the dams creating a short-term effect as sediment moves through the river, possibly accumulating in some areas which may cause sand bars or areas of increased sedimentation. Implementing Georgia Power's Post Removal Monitoring Plan would any identify potential sedimentation affecting public access and contains a process for addressing any needed management actions.

7.0 WATER RESOURCES

7.1 Affected Environment

7.1.1 Water Quantity

The Langdale and Riverview Projects lie within the Middle Chattahoochee River Basin (HUC 03130002) and has a drainage area of 3,640-square-miles (USGS 2018) and 3,661 square miles, respectively. The surface area of the water impounded by the Langdale Dam is approximately 152 acres (USACE 2016). The *1993 FERC Order Issuing a Subsequent License and Environmental Assessment* identified 270 surface acres for the Langdale Reservoir, while the USACE *Final Environmental Impact Statement (Final EIS) for the Update of Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin in Alabama, Florida, and Georgia* identified 152 surface acres for the Langdale Reservoir (USACE 2016). These two numbers for reservoir surface area differ, which may be due to mapping errors. For purposes of this APEA, Georgia Power will use the 152 acres identified in the 2016 USACE Final EIS.

Similarly, the *1993 FERC Order Issuing a Subsequent License and Environmental Assessment* identified 25.3 surface acres for the Riverview Reservoir, while the USACE *Final Environmental Impact Statement for the Update of Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin in Alabama, Florida, and Georgia* identified 75 surface acres for the Riverview Reservoir (USACE 2016). These two numbers for reservoir surface area differ, which may be due to mapping errors. For purposes of this APEA, Georgia Power is using the 75 acres identified in the 2016 USACE Final EIS. The Riverview Project waters flow into the Chattahoochee River, and eventually enter the headwaters of Lake Harding (located 18 RMs downstream), which is a reservoir created by the Bartletts Ferry Dam.

Historically, the Langdale and Riverview Projects operated in a run-of-river mode and passed inflows, including releases from West Point Dam, located upstream. Major tributaries to the Langdale Project Reservoir include Oseligee Creek, Alabama and Long Cane Creek, Georgia, however these tributaries contribute very little inflow into Langdale Dam. Moores Creek is the only significant tributary that drains into the Riverview Project Reservoir.

Approximately 98 percent of the inflows to Langdale are comprised of the USACE's West Point Dam discharges. The West Point Dam typically peaks Monday through Friday with

only minimum flow (670 cfs, through their minimum flow unit) being released Saturday and Sunday, and Monday through Friday when not peaking. When peak generating, the USACE uses either 1 or 2 units. West Point Dam discharges 8,275 cfs and 15,875 cfs (including the minimum flow discharge) for generation with 1 and 2 generating units, respectively The USACE generates during peak demand periods as scheduled by the Southeastern Power Administration (SEPA).

For model simulations, the minimum flow was referred to as the "WP min flow"; an addition of 1 generating unit at West Point as "WP min flow +1 gen unit", and the addition of 2 generating units at West Point "WP min flow +2 gen units" (Table 7-1). The model assumed no other inflows to the Chattahoochee River under any scenario analyzed using the hydraulic model.

Table 7-1 West Point Dam Typical Discharges

Unit Operation	Flow (cfs)
WP min flow	670
WP min flow +1 Gen Unit	8,275
WP min flow +2 Gen Units	15,875

The drainage area of the Chattahoochee River at the West Point Dam is approximately 3,443 square miles and approximately 3,640 square miles at the Langdale Dam. Based on a proration of discharges measured at the West Point gage (USGS Station No. 02339500; discharge area of 3,550-square-miles), flows at Langdale Dam from 2008 to 2020 ranged from a monthly average of 3,302 cfs in August to 7,577 cfs in February) (Table 7-2) (USGS 2022).

Table 7-2 Prorated Mean Monthly Discharge at Langdale Dam Based on 2008 – 2017 Data from USGS Station No. 02339500

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Discharge	7,177	7,577	7,403	6,501	4,942	3,907	3,353	3,302	3,496	3,722	4,932	7,065

Source: USGS 2022

Based on a proration of discharges measured at the West Point gage (USGS Station No. 02339500; discharge area of 3,550-square-miles), flows at the Riverview Project from 2008 to 2020 ranged from a monthly average of 3,321 cfs in August to 7,105 cfs in December

(Table 7-3). Inflows into the Riverview Project are comprised of 98 percent of the discharges from West Point Dam, with the remaining 2 percent due to local runoff and small tributary flow (USGS 2022).

Table 7-3 Prorated Mean Monthly Discharge at Riverview Dam Based on 2008-2020 Data from USGS Station No. 02339500

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean Discharge	7,219	7,621	7446	6,538	4,971	3,929	3,372	3,321	3,517	3,744	4,960	7,105

Source: USGS 2022

The Langdale and the Riverview Projects lie within the state of Georgia's Middle Chattahoochee Water Planning Region (MCWPR). According to the MCWPR 2017 Regional Water Plan, water withdrawals in the basin are primarily used for public supply (12.39 million gallons per day [mgd]), irrigation (0.54 mgd), and livestock (0.18 mgd). The city of West Point, Georgia and Chattahoochee Valley Water Supply District, Alabama maintain municipal water supply withdrawals in the area, with a combined maximum daily and maximum monthly average permit limits of 10.1 mgd and 8.6 mgd, respectively (USACE 2016). Chattahoochee Valley Water Supply District is a co-op organization that supplies municipal water to the Alabama cities of Huguley, Lanett, and Valley.

7.1.2 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 from an environmental and economic standpoint. Georgia's use classification for the Chattahoochee River in the Project area is "Drinking Water" (GAEPD 2016a).

The state of Alabama use classifications for the Chattahoochee River in the Project area are Public Water Supply (PWS) and Fish and Wildlife (F&W) (ADEM 2017). The specific criteria applicable to these use classifications are presented in Table 7-4 (Kleinschmidt 2022d).

Table 7-4 Georgia and Alabama Water Quality Criteria for Applicable Classifications in the Langdale and Riverview Project Area

Parameter	Drinking Water (Georgia)	Public Water Supply and Fish and Wildlife (Alabama)
Bacteria	May through October: <200/100 mL November through April:	*E.coli:* Geometric mean <548 colonies/100 mL;

Parameter	Drinking Water (Georgia)	Public Water Supply and Fish and Wildlife (Alabama)
	<1,000/100 mL	≤2,507 colonies/100 mL in any sample
Dissolved Oxygen	≥ 5.0 mg/L daily average, and > 4 mg/L at all times	≥ 5.0 mg/L at all times
pH	6.0 – 8.5	6.0 – 8.5
Water Temperature	≤ 90°F	≤ 90°F

Source: ADEM 2017, GAEPD 2016a
Note: mL milliliter

The most recent CWA Section 305(b) reports for Georgia and Alabama indicate that the Chattahoochee River in the Riverview Project area is currently fully supporting its designated uses (GAEPD 2016a, ADEM 2016).

Between 2000 and 2013, the USGS and Georgia EPD conducted periodic monitoring on the Chattahoochee River approximately 7 RMs upstream of Langdale Dam (Station No. 02339500, which is co-located with a USGS gage and is approximately 2 RMs below West Point Dam and just above where the city of West Point begins. During this period, average monthly water temperatures ranged from a low of 47.24 °F in January to a high of 81.81 °F in August (Monthly average dissolved oxygen levels were generally above 5 milligrams/liter (mg/L), except for September (4.94 mg/L) (Table 7-5).

The Georgia EPD conducted forebay monitoring in West Point Lake since 1994 (Monitoring Location ID LK_12_4060). Vertical profiles of water temperature and dissolved oxygen collected at approximately 1-meter intervals indicate West Point Lake becomes stratified in spring and remains so through early fall (Figure 7-1, Figure 7-2). During this time, dissolved oxygen levels at depths greater than 10 meters are extremely low (Kleinschmidt 2022d).

The Georgia EPD also conducted monthly monitoring in the Chattahoochee River approximately 0.5 miles downstream of West Point Dam since January 2019 (Monitoring Location ID RV_12_4063). Data from that monitoring effort indicates low dissolved oxygen levels in the West Point tailrace in July and August (Table 7-6). This is due to the release of hypolimnetic water from the West Point Dam (Kleinschmidt 2022d).

The Georgia EPD conducted monthly monitoring in the Chattahoochee River at Highway 29, approximately 3-miles downstream of West Point Dam and 6.3-miles upstream of Langdale Dam, from 2010 to 2012 (Monitoring Location ID RV_12_4067). Mean monthly

values for select parameters were calculated and are presented in Table 7-7. Similar to the data from the West Point tailrace, these data confirm dissolved oxygen levels are lowest during the summer months and the data also indicates relatively low levels of nutrients (nitrogen and phosphorus).

Table 7-5 Summary of Monthly Average Water Quality Data for the Chattahoochee River Upstream of Langdale Dam (2000-2013)

Month	Water Temperature (°C)*	pH	Specific Conductance (µS/cm)**	Dissolved Oxygen (mg/L)***
January	47.24	6.88	121	10.96
February	48.94	7.15	109	11.60
March	56.30	6.67	92	10.06
April	62.42	6.78	90	8.89
May	71.46	6.44	102	7.32
June	77.94	6.80	98	6.59
July	79.69	6.46	97	5.50
August	81.81	6.46	107	5.29
September	79.30	6.94	123	4.94
October	72.32	7.06	122	7.26
November	61.88	7.01	136	8.39
December	55.33	6.82	127	10.10

Source Georgia Power 2020a

*C Celsius
**µS/CM microsiemens per centimeter
***mg/L milligrams per liter

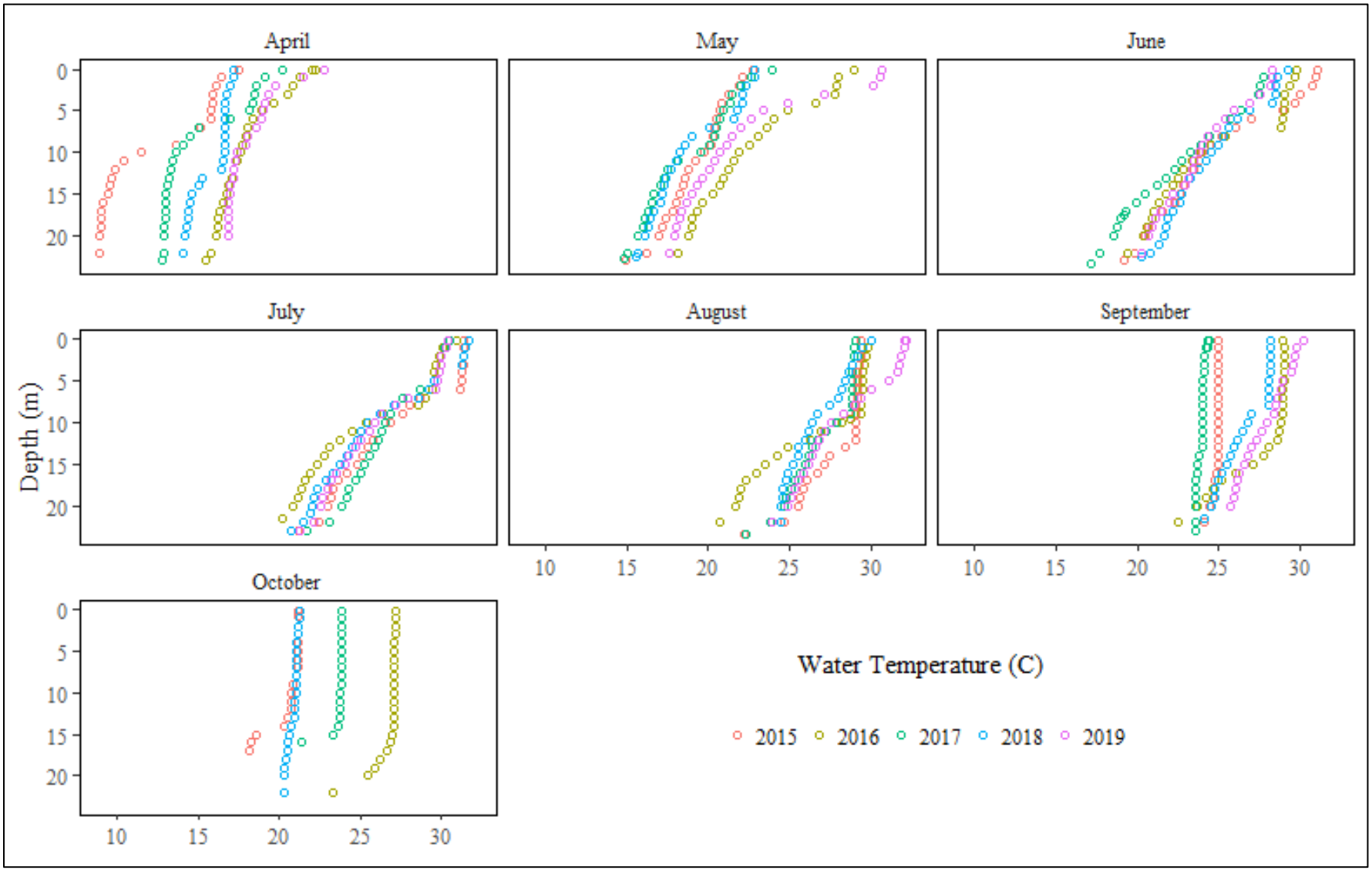


Figure 7-1 West Point Lake Forebay Water Temperature Profiles

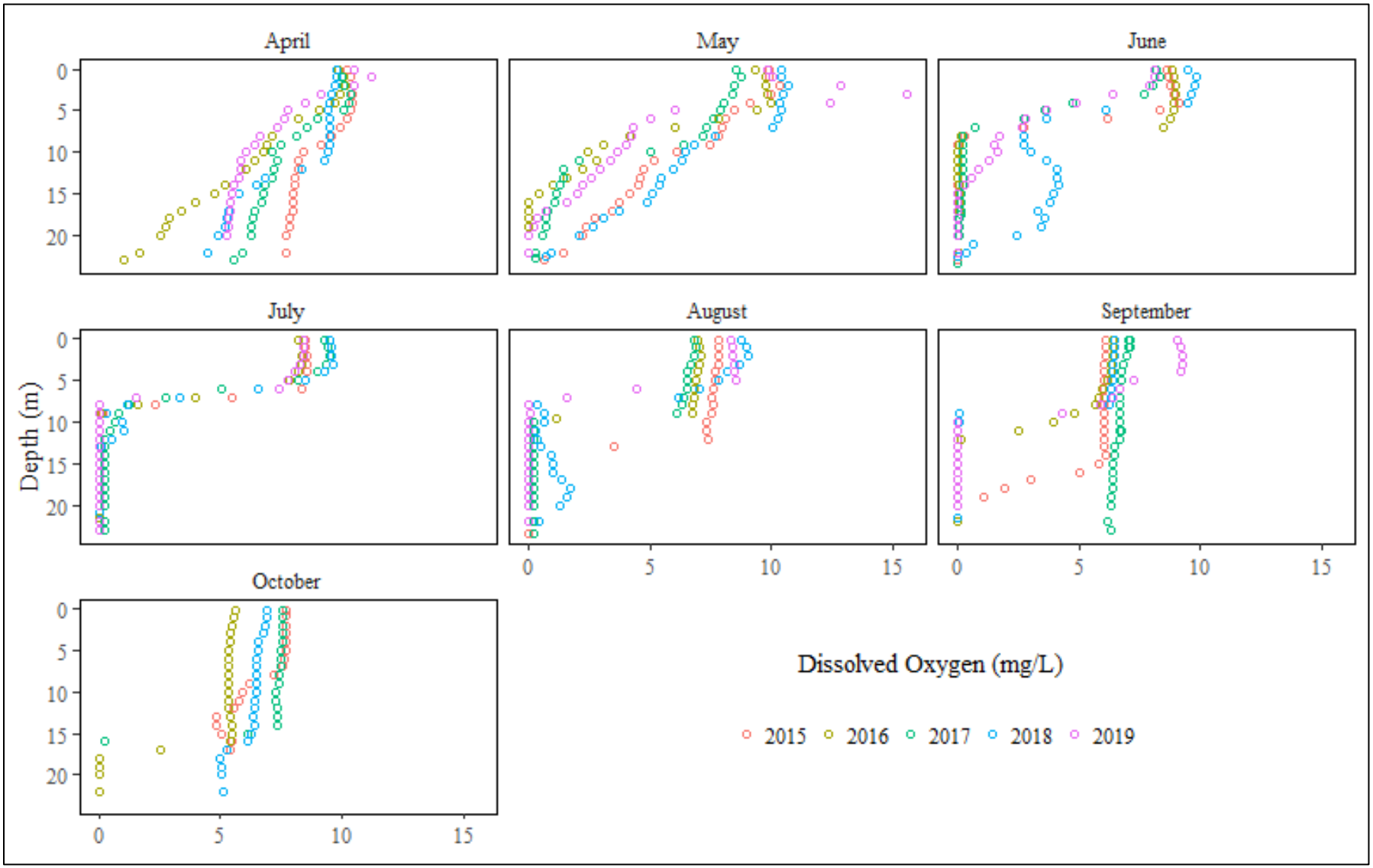


Figure 7-2 West Point Lake Forebay Dissolved Oxygen Profiles

Table 7-6 Summary of 2019 Water Quality Data from Chattahoochee River Below West Point Dam

Month	Water Temp (C)	Conductivity (us/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	NO_2^- NO_3 (mg/L)	NH_3 (mg/L)	TKN (mg/L)	Total Phosphorus (mg/L)
Jan	9.76	70.4	10.00	7.20	12.0	0.63	0.06	0.31	0.04
Feb	9.58	65.3	10.33	6.90	8.5	0.71	0	0.27	0.03
Mar	12.88	67.1	9.92	7.00	12.0	0.64	0	0.29	0.03
Apr	14.67	64.4	-	7.00	3.9	0.63	0	0.29	0.03
May	19.02	56.6	7.50	7.30	9.8	0.49	0.04	0.38	0.03
Jun	25.36	78.4	5.37	6.80	3.3	0.57	0.05	0.31	0
Jul	26.92	87.8	4.52	6.83	2.9	0.54	0.08	0.34	0
Aug	29.08	102.0	3.74	6.21	2.7	0.45	0.23	0.56	0.02
Sep	24.90	-	5.15	6.59	7.0	-	-	-	-

Source Georgia Power 2020a

C	Celsius
µS/CM	microsiemens per centimeter
mg/L	milligrams per liter
NTU	Nephelometric Turbidity Unit
NO_2^-	nitrite
NO_3	nitrate
NH_3	ammonia
TKN	total Kjeldahl nitrogen

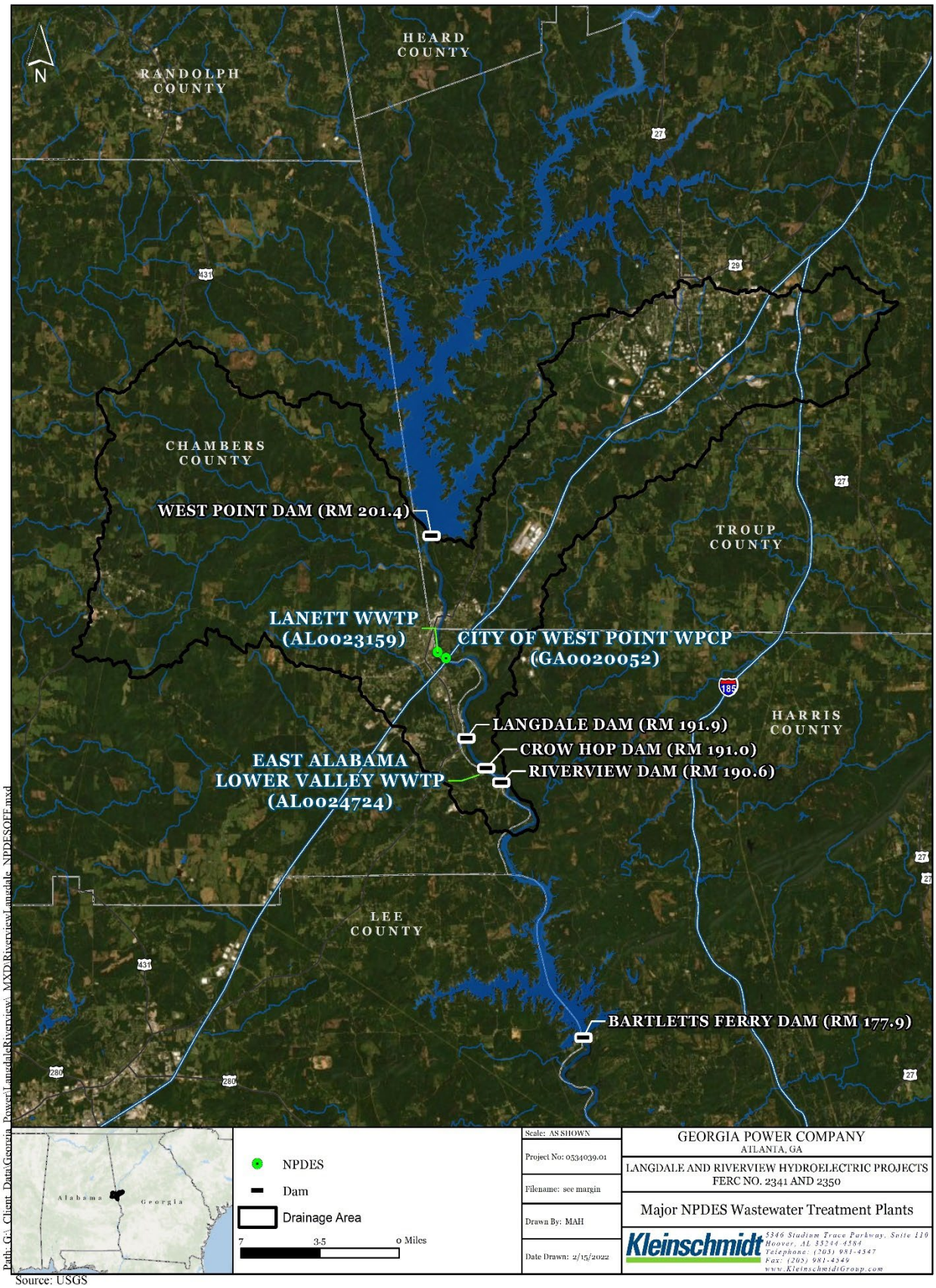
Table 7-7 Summary of Water Quality Parameter Means from Chattahoochee River at Hwy 29 (2010 – 2012)

Month	Water Temp (C)	Conductivity (us/cm)	Dissolved Oxygen (mg/L)	pH	Turbidity (NTU)	NO_2^- NO_3 (mg/L)	NH_3 (mg/L)	TKN (mg/L)	Total Phosphorus (mg/L)
Jan	8.16	106.0	10.79	6.67	7.8	0.99	0.04	0.27	0.05
Feb	9.70	102.7	11.44	6.74	10.7	1.05	0.06	0.31	0.03
Mar	12.32	93.0	10.39	6.51	7.8	0.91	0.05	0.30	0.04
Apr	17.06	75.7	9.40	6.33	5.1	0.74	0.06	0.30	0.03
May	21.06	116.3	7.96	6.33	8.7	0.72	0.04	0.25	0.03
Jun	26.17	93.3	6.44	6.51	1.9	0.67	0.04	0.26	-
Jul	28.14	102.7	5.63	6.39	2.3	0.44	0.10	0.35	0.02
Aug	27.97	112.3	4.29	6.41	2.3	0.43	0.22	0.46	0.02
Sep	27.33	127.3	4.35	6.42	2.4	0.53	0.27	0.49	-
Oct	22.32	132.3	6.85	6.82	1.3	0.88	0.07	0.28	-
Nov	16.21	139.3	7.45	6.52	2.5	1.31	0.05	0.20	0.02
Dec	13.21	133.0	9.93	6.54	1.8	1.30	0.04	0.25	0.02

Source USGS 2018

C	Celsius
µS/CM	microsiemens per centimeter
mg/L	milligrams per liter
NTU	Nephelometric Turbidity Unit
NO_2^-	nitrite
NO_3	nitrate
NH_3	ammonia
TKN	total Kjeldahl nitrogen

Three wastewater plants discharge treated effluent into the Chattahoochee River upstream of the Riverview Project (e.g., cites of Lanett [AL] discharge, West Point [GA] discharge, and the East Alabama Water, Sewer, and Fire Protection District [EAWSFPD] discharge). The EAWSFPD provides water, sewer, and fire protection for portions of Chambers County, Alabama, including the city of Valley, Alabama (Figure 7-3). Only the EAWSFPD discharge is within the Project boundary; the other discharges are above the Project boundary and above the Interstate-85 (I-85) bridge. The EAWSFPD discharges treated effluent to the Chattahoochee River at the upstream end of the Riverview channel. Alabama Department of Environmental Management (ADEM) has indicated that the National Pollution Discharge Elimination System (NPDES) permit for the EAWSFPD's discharge is based on the 7Q10 flow of 136 cfs in the Riverview channel.



Source: USGS

Figure 7-3 Major NPDES Wastewater Treatment Plants

Water quality conditions in the Chattahoochee River basin, particularly in West Point Reservoir and Long Cane Creek, have a direct effect on the Riverview Project's water quality. Riverview Project water quality parameters affected by influent water quality primarily include dissolved oxygen. Previously, the Chattahoochee River downstream of West Point was listed as impaired due to low dissolved oxygen levels in releases from West Point Dam. This reach is now attaining the dissolved oxygen standards and has been removed from CWA Section 303(d) list of impaired waters.

A study performed in 2009 and 2010 (Georgia Power 2011b) documented water quality in the Chattahoochee River approximately 1 RM downstream of the Riverview powerhouse. Monthly vertical profile samples at this location confirmed dissolved oxygen levels exceed applicable criteria (Table 7-8). An additional water quality study was performed by the Georgia EPD approximately 3-miles downstream of West Point Dam and 6.3-miles upstream of Langdale Dam, from 2010 to 2012. Mean monthly values for select parameters were calculated and are presented in Table 7-9. Similar to the data from the West Point tailrace, these data revealed dissolved oxygen levels are lowest during the summer months. The data indicated relatively low levels of nutrients (nitrogen and phosphorus). Georgia EPD conducted monthly monitoring in the Chattahoochee River approximately 0.5-miles downstream of West Point Dam since January 2019. Data from that monitoring effort indicated low dissolved oxygen levels in the West Point tailrace in July and August (Table 7-10). This is due to the release of hypolimnetic water from the West Point Dam. Summary conclusions of the water quality studies performed in the Langdale and Riverview Project area between 2009 and 2019 indicate that water quality currently meets applicable standards and supports existing designated uses. The 2009-2010 study involved the collection of monthly discrete water chemistry samples. Analysis of these samples for 24 different parameters is summarized in Table 7-11 (Kleinschmidt 2022d)

The ADEM conducted monthly monitoring from March to October of 2014 and 2016 in Moores Creek, a tributary that joins the Chattahoochee River approximately 800 feet downstream of the Langdale powerhouse. The sampling site was located approximately 0.4 miles upstream of the confluence with the Chattahoochee River. Monthly samples at this location indicated dissolved oxygen levels exceed applicable criteria (Kleinschmidt 2022d).

Table 7-8 Results of 2009-2010 Water Quality Monitoring below Riverview Powerhouse

Parameter	Minimum	Mean	Maximum
Dissolved Oxygen (mg/L)	7.54	9.57	11.90
Water Temperature (°C)	7.94	18.87	29.68
Specific Conductance (µs/cm)	57.70	92.10	128.70
pH (Standard units)	6.61	7.26	7.70
Turbidity (NTU)	0.0	79.9	3000.0
Secchi Depth (ft)	2.0	4.51	8.50

Source: Georgia Power 2011b

µs/cm Microsiemens per centimeter
mg/L milligrams per liter
NTU Nephelometric Turbidity Unit

Table 7-9 Summary of Water Quality Parameter Means from Chattahoochee River at Hwy 29 (2010 – 2012)

Month	Water temperature (°C)	Conductivity (µs/cm)	Dissolved Oxygen (mg/L)	pH (Standard units)	Turbidity (NTU)
January	8.16	106.0	10.79	6.67	7.8
February	9.70	102.7	11.44	6.74	10.7
March	12.32	93.0	10.39	6.51	7.8
April	17.06	75.7	9.40	6.33	5.1
May	21.06	116.3	7.96	6.33	8.7
June	26.17	93.3	6.44	6.51	1.9
July	28.14	102.7	5.63	6.39	2.3
August	27.97	112.3	4.29	6.41	2.3
September	27.33	127.3	4.35	6.42	2.4
October	22.32	132.3	6.85	6.82	1.3
November	16.21	139.3	7.45	6.52	2.5
December	13.21	133.0	9.93	6.54	1.8

Source: Georgia Power 2011b

µs/cm Microsiemens per centimeter
mg/L milligrams per liter
NTU Nephelometric Turbidity Unit

Table 7-10 Summary of Water Quality Parameter Means from Chattahoochee River below West Point Dam (2019)

Month	Water Temperature (°C)	Conductivity (µs/cm)	Dissolved Oxygen (mg/L)	pH (Standard Units)	Turbidity (NTU)
January	9.76	70.4	10.0	7.2	12.0
February	9.58	65.3	10.33	6.9	8.5
March	12.88	67.1	9.92	7.0	12.0
April	14.67	64.4	-	7.0	3.9
May	19.02	56.6	7.5	7.3	9.8
June	25.36	78.4	5.37	6.8	3.3
July	26.92	87.8	4.52	6.83	2.9
August	29.08	102.0	3.74	6.21	2.7
September	24.90	102	5.15	6.59	7.0
October	23.67	104.9	7.11	6.27	10
November	16.32	119.2	8.3	6.81	2
December	13.92	122.2	8.65	6.9	1.9

Source: Georgia Power 2020a

µs/cm Microsiemens per centimeter
mg/L milligrams per liter
NTU Nephelometric Turbidity Unit

Table 7-11 Results of 2009-2010 Water Samples Collected below Riverview Powerhouse

Analyte	Number of Samples	Number of Detections	Minimum	Mean	Maximum
Alkalinity (mg/L)	19	19	15	22	31
Ammonia (mg/L)	16	12	0	0.13	0.4
Arsenic (mg/L)	24	24	0	0	0.01
BOD (mg/L)	17	16	0	1	3
COD (mg/L)	17	15	0	5	15
Cadmium (mg/L)	24	24	0	0	0.001
Calcium (mg/L)	24	24	2.6	6.3	8.8
Chlorophyll a (µg/L)	24	24	0.4	1	2.4
Copper (mg/L)	24	24	0	0	0.01
Fecal Coliform (col./100 mL)	23	21	2	14	>336
Hardness (mg/L as CaCO3)	24	24	13	23	30
Iron (mg/L)	24	24	0.06	0.64	2.2
Lead (mg/L)	24	24	0	0	0.02
Magnesium (mg/L)	24	24	1.4	1.75	2.2
Manganese (mg/L)	24	24	0.034	0.12	0.42
Mercury (mg/L)	23	23	0	0.0001	0.0002
Nickel (mg/L)	24	24	0	0.001	0.005
Nitrate (mg/L)	24	24	0.262	0.665	1.12
Nitrite (mg/L)	24	24	0	0.014	0.13
Selenium (mg/L)	24	24	0	0	0.02
TSI Chlorophyll a	24	24	21.6	29.8	39.2
TSI Total Phosphorus	24	24	27.36	52.81	90.55
Total Phosphorus (mg/L)	24	24	0.01	0.05	0.4
Turbidity (NTU)	19	19	1	8	24

Source: Georgia Power 2011b

7.2 Environmental Analysis

The primary activities affecting Project water resources (quantity and quality) are temporary construction activities related to the removal of Project structures. Additional construction includes the side channel at Langdale and the rock ramp at Crow Hop.

Georgia Power conducted studies and associated analyses that pertain to effects on water resources. Those analyses are presented in detail in the following reports and summarized herein:

- Final Hydraulic and Hydrologic Study Report
- Draft Sediment Transport Assessment Study Report
- Draft Sediment Quality Study Report
- Final Water Quality Study Report

Table 7-12 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on water resources at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Table 7-12 Proposed PME Measures that may Potentially Affect Water Resources

Proposed PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Leave 10-foot dam abutment on west side of the Langdale Dam; leave ~300 feet on the east side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal
• Construct a rock ramp to preserve rock weir #3 and maintain flow in the Riverview headrace channel.			✓	Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal

7.2.1 Water Quantity

Removal of the Project dams would affect the river water surface elevation, depths of flow and velocities and specific to water resources, anticipated effects to infrastructure. A H&H model was developed to evaluate the hydraulics at the dams pre and post removal. The model simulates how dam removal would affect the areas wetted by the Chattahoochee River, the depths of flow in the river and its various channels and the velocities in the river at various flow conditions. Specific to water resources, the model results were used to evaluate anticipated effects to infrastructure along the river including wastewater treatment plant discharges and public water supply intakes. The structure data, model domain and computational mesh, and boundary conditions are described in the Final H&H Modeling Report (Kleinschmidt 2022a). The model was calibrated using the USGS flow data collected at nine locations between the Projects. The results of the USGS field data collection indicated that the model distribution of flow among the different channels of the Chattahoochee River generally replicate field conditions.

The effects of dam removal include two scenarios: the "existing bathymetry" and "adjusted bathymetry." The two bathymetry scenarios represent the extent for anticipated natural migration of river sediments post-dam removal. The existing bathymetry condition represents a condition where the bathymetry with the dams in place would not likely change following dam removal (i.e., little to no sediment movement following dam removal). The adjusted bathymetry represents the best approximation of conditions after all sediment located in the dams' impoundments mobilizes following dam removal, resulting in changes to the streambed elevations.

7.2.1.1 Existing Bathymetry

Removing the dams would result in a redistribution of flow in the Chattahoochee River between its various channels. However, the proposed decommissioning is not anticipated to have any substantial change to the Chattahoochee River below the Riverview powerhouse as flows are redistributed in the Project area, but all return to the main channel below Riverview Dam. There are no proposed changes to the amount of flow in the river. Figure 7-4 shows the river near the two Projects with different channels assigned numbers, and Table 7-13, Table 7-14, and Table 7-15 provide the flow in each channel under existing conditions and the post-dam removal, existing bathymetry conditions.

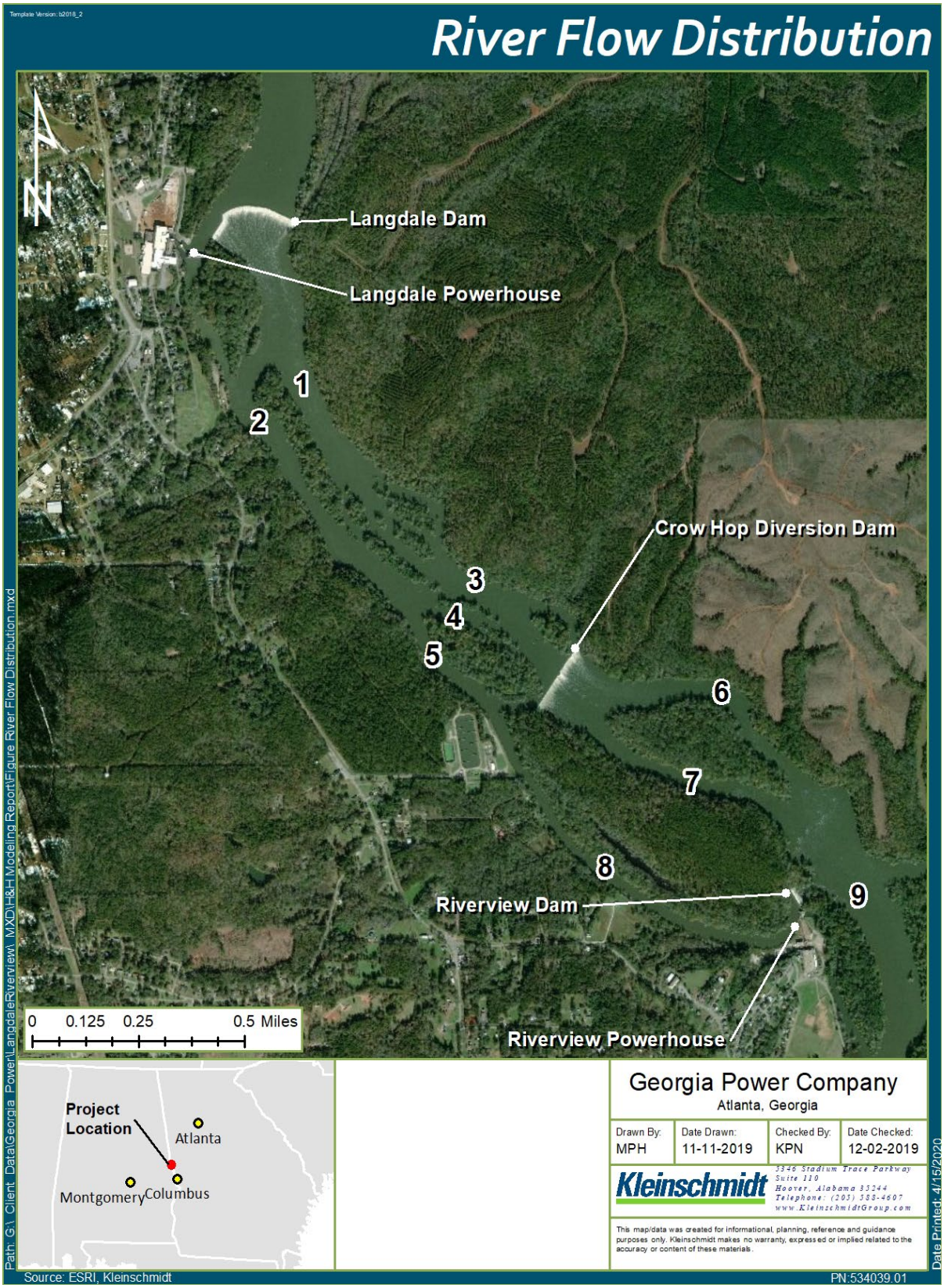


Figure 7-4 Chattahoochee River Flow Distribution Locations

Table 7-13 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	115	86	-29	-25%
2	560	589	29	5%
3	212	291	79	37%
4	35	49	14	40%
5	428	335	-93	-22%
6	74	349	275	372%
7	24	133	109	454%
8	577	193	-384	-67%
9	670	670	0	0%

Table 7-14 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow +1 Generating Unit

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	3,756	3,750	-6	0%
2	4,519	4,525	6	0%
3	5,146	5,999	853	17%
4	1,006	974	-32	-3%
5	2,123	1,302	-821	-39%
6	4,781	5,244	463	10%
7	2,203	2,449	246	11%
8	1,292	583	-710	-55%
9	8,275	8,275	0	0%

Table 7-15 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow +2 Generating Units

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	7,940	7,916	-24	0%
2	7,933	7,957	24	0%
3	9,996	11,543	1,547	15%
4	2,050	1,949	-101	-5%
5	3,828	2,382	-1,446	-38%
6	9,234	9,807	573	6%
7	4,706	5,102	396	8%
8	1,934	965	-969	-50%
9	15,875	15,875	0	0%

7.2.1.2 Adjusted Bathymetry

Removing the dams and adjusting the bathymetry results in a redistribution of flow in the Chattahoochee River between its various channels, as was likely typical prior to the construction of the Project dams. Figure 7-4 shows the river near the Projects with different channels assigned numbers, and Table 7-16, Table 7-17, and Table 7-18 provide the flow in each channel under existing conditions (i.e., dams in place) and post-dam removal with the adjusted bathymetry. The model shows a significantly higher flow into the Riverview channel under the three flows.

Table 7-16 Dam Removal, Adjusted Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	115	81	-34	-30%
2	560	594	34	6%
3	212	80	-132	-62%
4	35	0	-35	-100%
5	428	595	167	39%
6	74	74	0	0%
7	24	5	-19	-79%
8	577	595	18	3%
9	670	670	0	1%

Table 7-17 Adjusted Bathymetry Dam Removal Flow Distribution Versus Existing Conditions – West Point Minimum +1 Generating Unit

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	3,756	3,694	-62	-2%
2	4,519	4,580	61	1%
3	5,146	4,678	-468	-9%
4	1,006	679	-327	-33%
5	2,123	2,919	796	37%
6	4,781	3,879	-902	-19%
7	2,203	1,775	-428	-19%
8	1,292	2,622	1,330	103%
9	8,275	8,275	0	0%

Table 7-18 Adjusted Bathymetry Dam Removal Flow Distribution Versus Existing Conditions – West Point Minimum Flow +2 Generating Units

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	7,940	7,831	-109	-1%
2	7,933	8,044	111	1%
3	9,996	10,358	362	4%
4	2,050	1,563	-487	-24%
5	3,828	3,953	125	3%
6	9,234	8,328	-906	-10%
7	4,706	4,286	-420	-9%
8	1,934	3,261	1,327	69%
9	15,875	15,875	0	0%

As noted in the flow distribution tables, using the adjusted bathymetry resulted in the model predicting more water entering the Riverview channel at all flow conditions. However, an increase in flow does not mean that the water surface elevations in the channel will rise above the existing conditions. Table 7-19 provides water surface elevation in the Riverview channel at the WP min flow and WP min flow +2 gen units. It is important to note that the assumption made in the development of the adjusted bathymetry is that all sediment (as estimated based on boring log data) in the channel will mobilize, and the values in Table 7-19 represent the greatest changes in water surface elevation expected based on the conservative assumption.

Table 7-19 Riverview Channel Water Surface Elevation Changes

	West Point Minimum Flow			West Point Minimum flow +2 gen units		
	Existing Water El (feet)	Adjusted Bathymetry Water El (feet)	Change (feet)	Existing Water El (feet)	Adjusted Bathymetry Water El (feet)	Change (feet)
Downstream from Rock Weir No. 3	534	528.8	-5.2	536.8	533.7	-3.1
Upstream of Riverview Dam	532.3	524.77	-7.53	533.2	528.3	-4.9

7.2.2 Infrastructure

Various types of infrastructure located on the Chattahoochee River between the West Point Dam and the Projects may be affected by Georgia Power's proposed removal of the dams. Infrastructure on the river includes the EAWSFPD's Lower Valley Wastewater Treatment Plant (Valley WWTP) wastewater treatment plant outfalls, raw water intakes, public boat launches, and lift stations. Figure 7-5 shows the infrastructure located throughout the model study area that may be affected by dam removal.

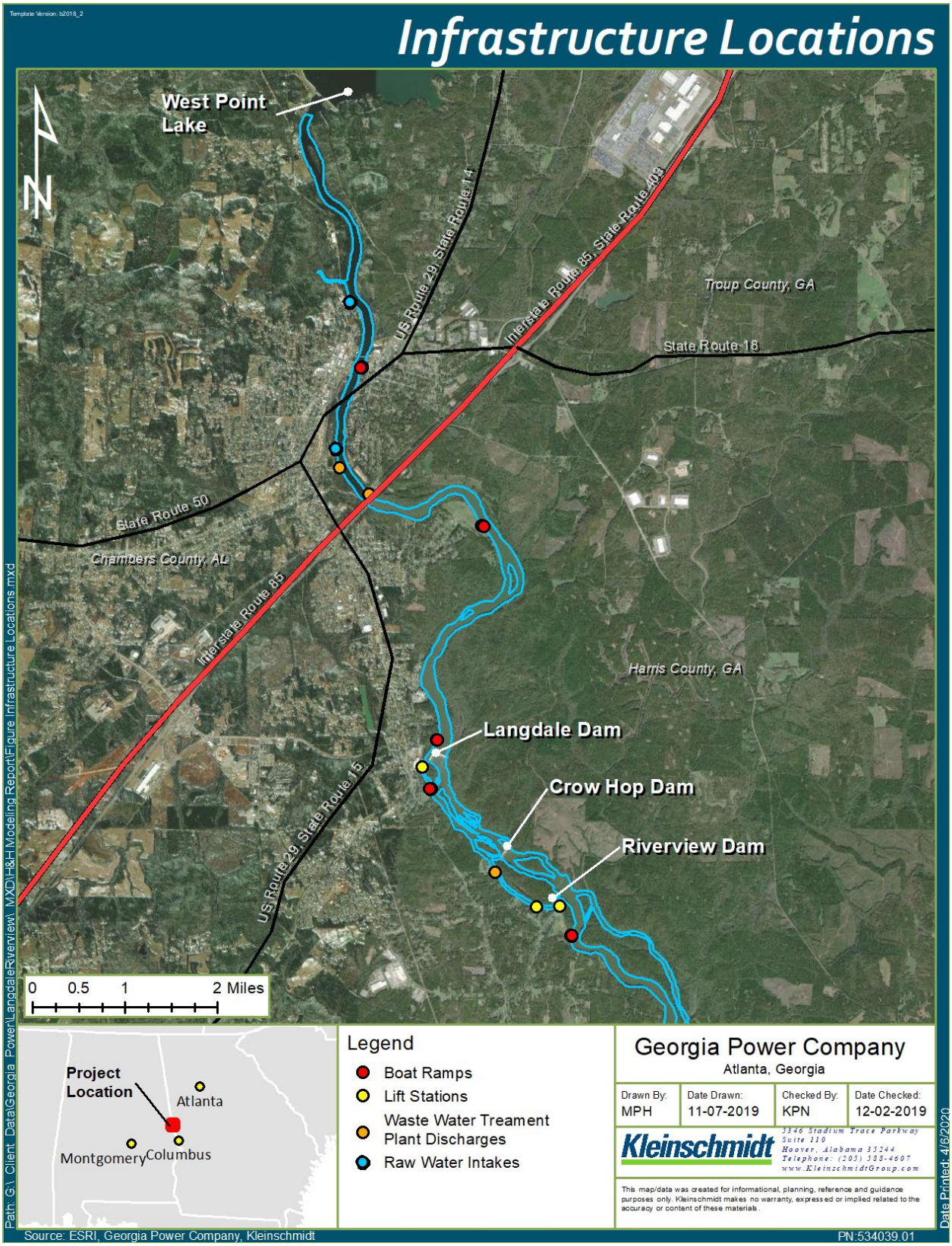


Figure 7-5 On-River Infrastructure Locations

7.2.2.1 Existing Bathymetry - EAWSFPD's Lower Valley Wastewater Treatment Plant

The Valley WWTP discharges treated effluent to the Chattahoochee River at the upstream end of the Riverview channel. ADEM has indicated that the NPDES permit for the Valley WWTP is based on the 7Q10 flow of 136 cfs in the Riverview channel. Based on modeling results, the decommissioning and removal of Crow Hop and Riverview Dams will result in a minimum flow of at least 193 cfs in the Riverview channel under the WP min flow discharge from the upstream West Point Dam and the existing bathymetry and allow Valley WWTP to continue operating to meet NPDES requirements (Kleinschmidt 2022a). Additionally, when West Point Dam's large turbine units are added during peaking there is significantly more flow than 193 cfs present in the Riverview channel.

Georgia Power's proposal to construct a channel through the Langdale Island and construct a rock ramp at Crow Hop will support the integrity of the rock weir #3 so that river flow is maintained in the Riverview headrace channel to meet the wastewater flow dilution requirement for EAWSFPD's Valley WWTP.

7.2.2.2 Existing Bathymetry -Water Intakes and Boat Ramp Infrastructure Upstream of the I-85 Bridge and the West Point Dam Tailrace

No substantial impacts to known public infrastructure along the river, specifically upstream of Interstate 85, are anticipated based on the modeling results (Kleinschmidt 2022a). Figure 7-6 shows the existing condition and post-dam removal, existing bathymetry condition water surface profiles measured along the Chattahoochee River from the Interstate 85 bridges to the Langdale Dam. As the profiles show, there is a natural hydraulic control (i.e., shoals) based on the bathymetry just downstream of the Interstate 85 bridge that prevents substantial impacts to infrastructure located upstream of Interstate 85. The model predicts a 0.3-foot water surface elevation decrease at the I-85 bridge at WP min flow, and the change continues to decrease moving upstream of I-85.

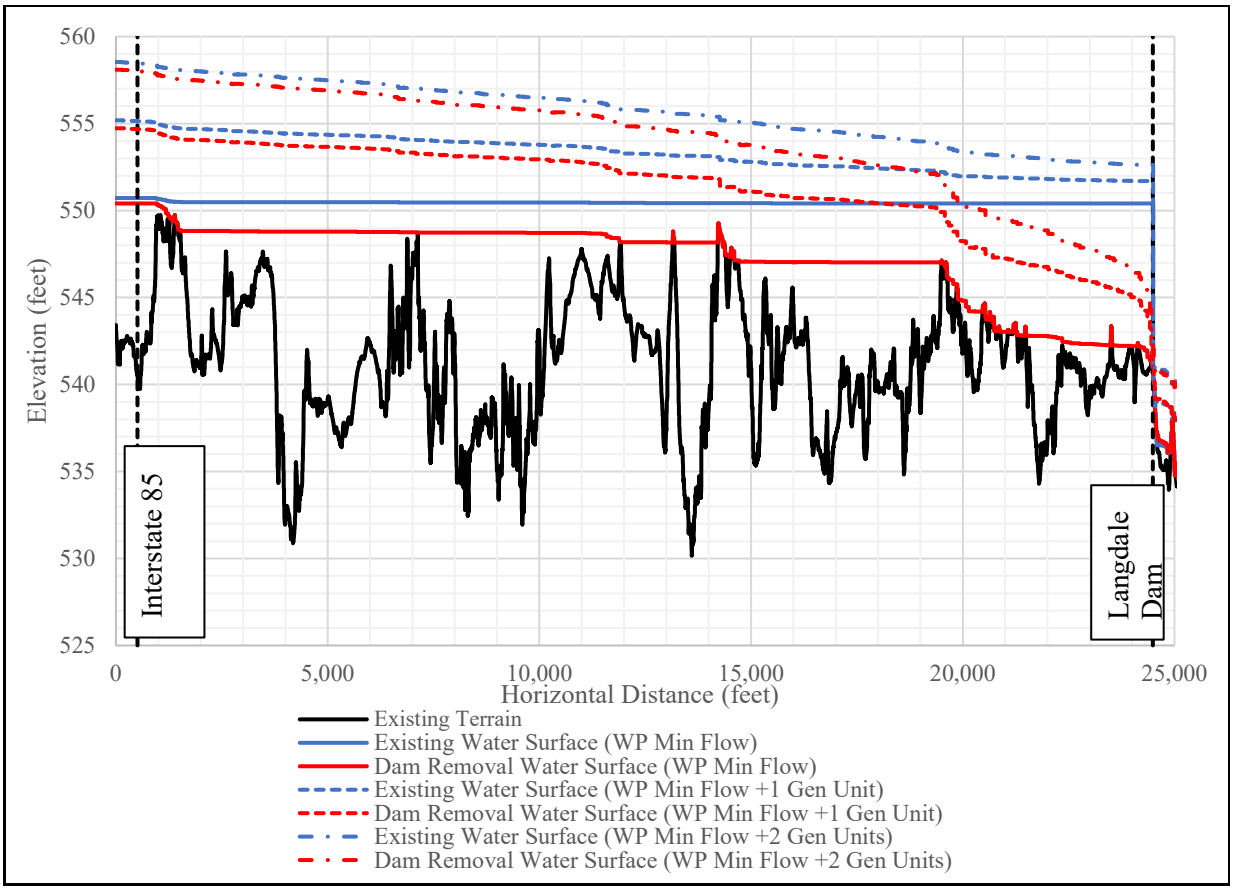


Figure 7-6 Dam Removal, Existing Bathymetry – Water Surface Profiles from Interstate 85 to Langdale Dam

7.2.2.3 Adjusted Bathymetry -East Alabama Water, Sewage & Fire Protection District - Lower Valley Wastewater Treatment Plant

Based on modeling results, the decommissioning and removal of Crow Hop and Riverview Dams will result in a minimum flow of at least 595 cfs in the Riverview channel under the WP min flow discharge from the upstream West Point Dam and the adjusted bathymetry and will allow Valley WWTP to continue operating to meet NPDES requirements. Additionally, when West Point Dam's two turbine units are added during peaking there is significantly more flow than 595 cfs present in the Riverview channel.

7.2.2.4 Adjusted Bathymetry - Water Intakes and Boat Ramp Infrastructure Upstream of the I-85 Bridge and the West Point Dam Tailrace

No other substantial impacts to known public infrastructure along the river, specifically upstream of Interstate 85, are anticipated based on the modeling results. Figure 7-7 shows the existing condition and post-dam removal, adjusted bathymetry condition water surface profiles measured along the Chattahoochee River from the Interstate 85 bridges

to the Langdale Dam. As the profiles show, there is a natural hydraulic control (i.e., shoals) based on the bathymetry just downstream of the Interstate 85 bridge that prevents substantial impacts to infrastructure located upstream of Interstate 85. The model predicts a 0.3-foot water surface elevation decrease at the I-85 bridge at WP min flow, and the change continues to decrease moving upstream of I-85.

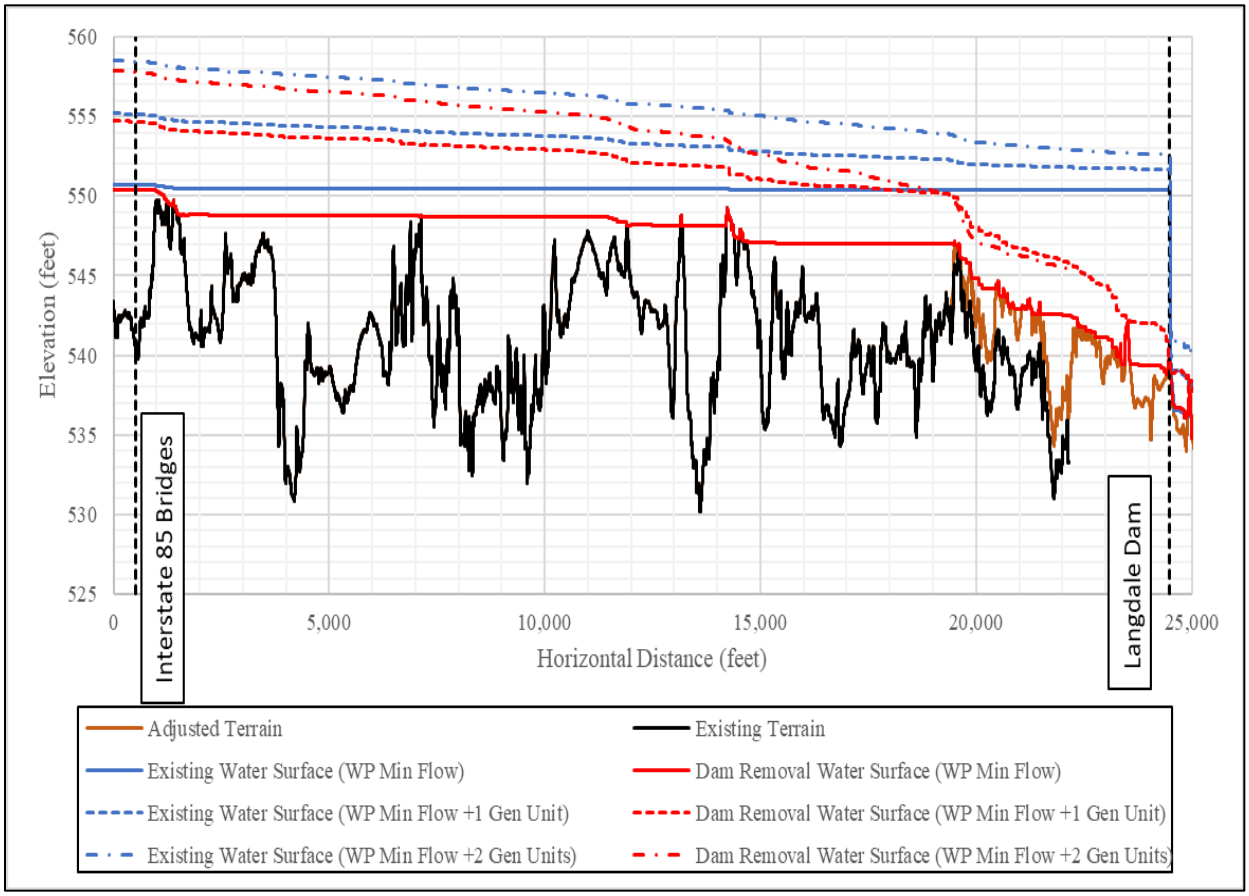


Figure 7-7 Dam Removal, Adjusted Bathymetry – Water Surface Profiles from Interstate 85 to Langdale Dam; 100-year Flood Conditions – Existing and Adjusted Bathymetry

Removing the Projects' dams provides a benefit to the local communities by reducing the peak 100-year flood elevations upstream of the dams. The most dramatic reduction in the 100-year floodplain extent occurs upstream of the Langdale Dam (Figure 7-8 and Figure 7-9), and the model shows that removal of the dams would reduce the area affected by flooding upstream of the Projects during the 100-year flood by approximately 120 acres (Kleinschmidt 2022a). The results of the 100-year flood modeling using the adjusted bathymetry are similar to the results using the existing condition bathymetry with the dams removed.

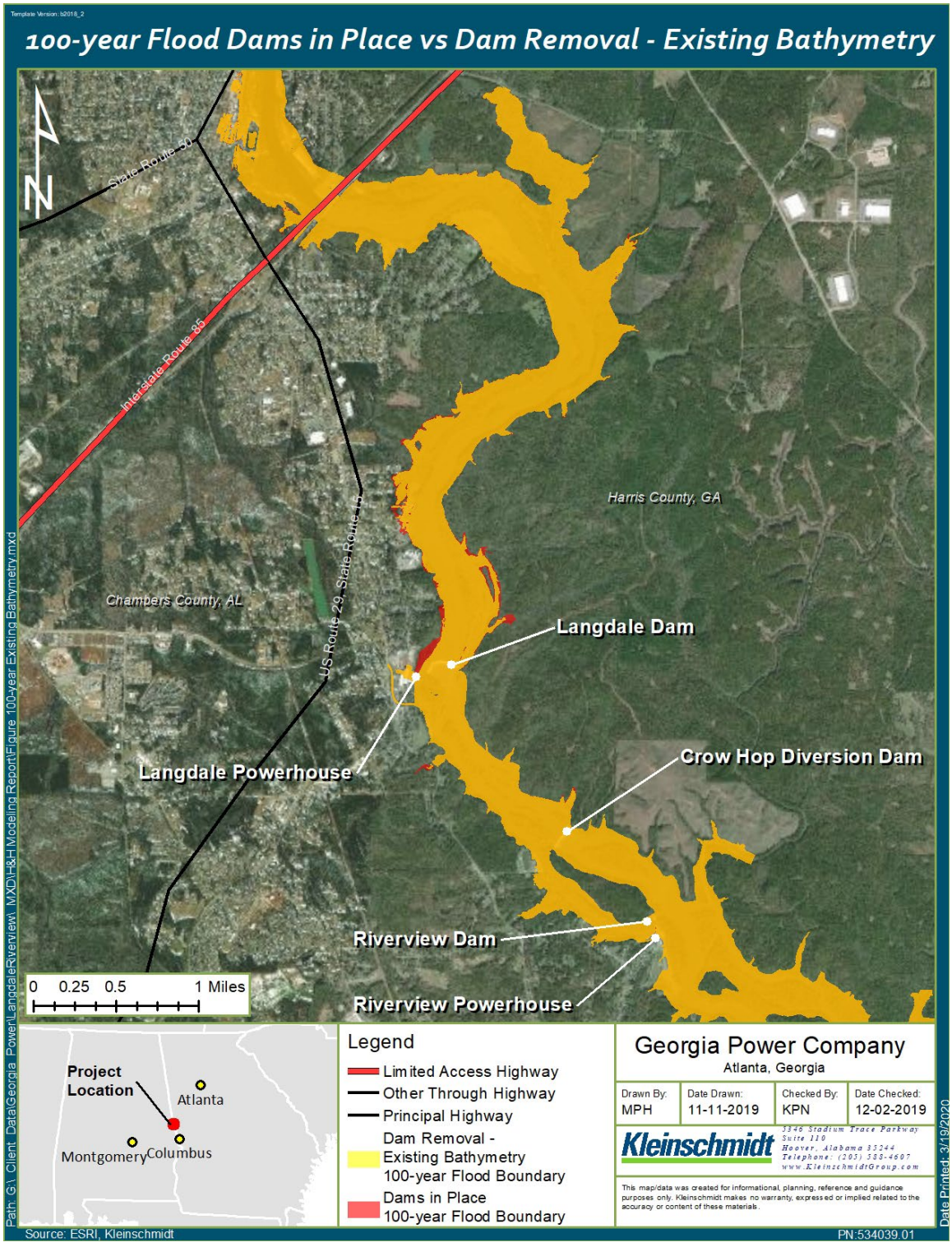


Figure 7-8 100-year Flood Boundary Existing Conditions Versus Dam Removal – Existing Bathymetry

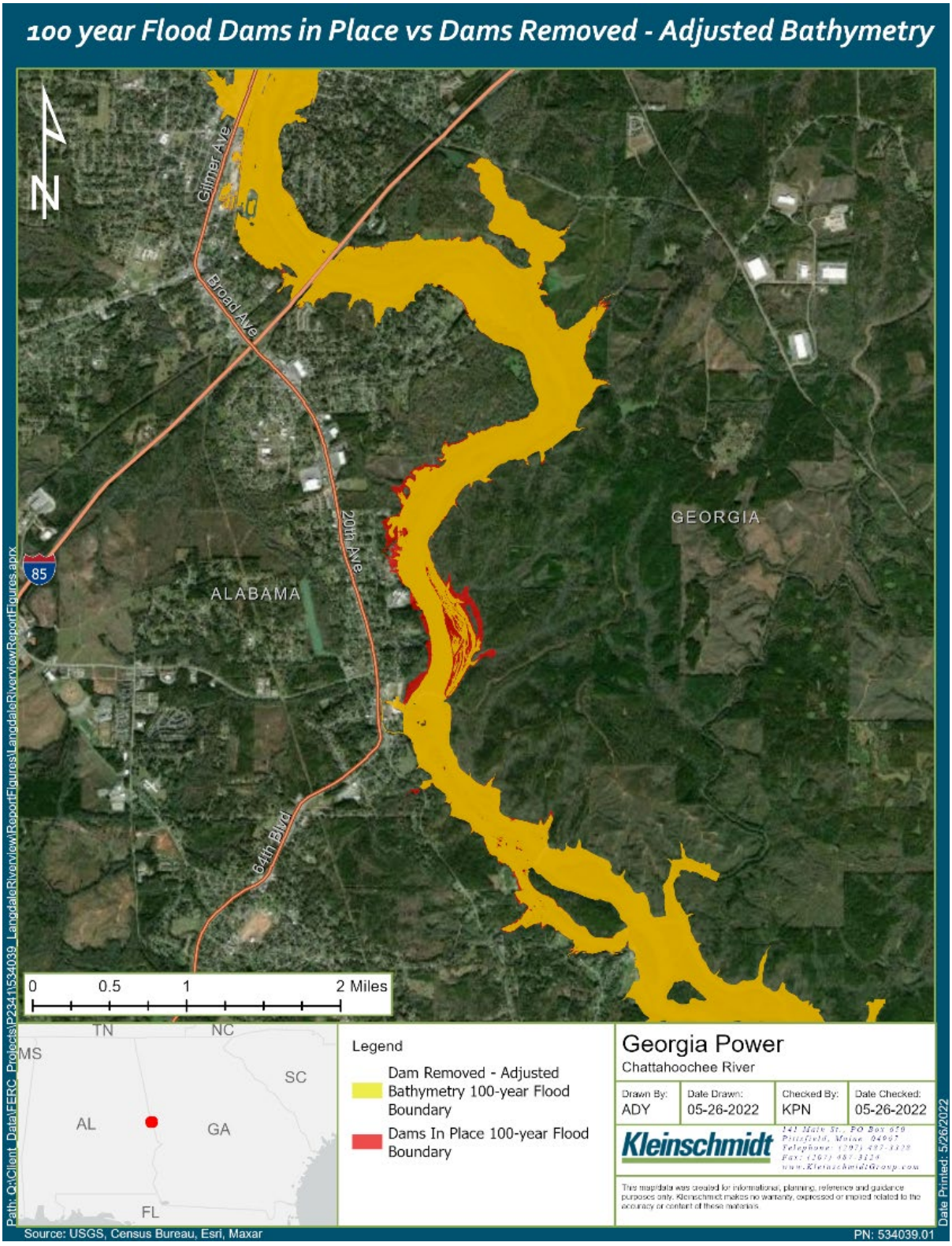


Figure 7-9 100-year Flood Boundary Existing Conditions Versus Dam Removal – Adjusted Bathymetry

7.2.3 Water Quality

The dam removal activities should not be detrimental to the ecosystem and surface water with regard to contaminants in the sediment (communication from Amy Potter, GA EPD June 2, 2022). Georgia Power is applying to Georgia EPD for a 401 WQC.

The Riverview Project incorporates two low-head dams and was historically operated run-of river. As a run-of-river facility, the Riverview Project is small and shallow, with short retention times, and does not undergo thermal stratification or associated dissolved oxygen depletion. Water quality at the Langdale and Riverview Projects should continue to meet applicable standards and support existing designated uses after decommissioning and removal of the dams. Decommissioning and removal would not impact the Valley WWTP permitted effluent discharge.

7.2.4 PME Measures

7.2.4.1 Phase 1 – Pre Removal Phase

Prior to beginning construction, Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan which will reduce turbidity, erosion, and sedimentation during the construction.

7.2.4.2 Phase 2 – Removal Phase

During construction, Georgia Power will implement an Erosion and Sediment Control Plan to reduce turbidity, erosion, and sedimentation related to construction.

Georgia Power proposes to leave 10-foot dam abutments on the west side of the Langdale Dam and to leave approximately 300 feet on the east side of the Langdale Dam at a lower elevation, leaving the 10-foot long section abutting the shoreline at full height. Leaving a portion of the dam on the east side beyond the shoreline abutment is necessary to help distribute water towards the western side of the channel and reduce water velocities on the eastern side. The H&H modeling results indicated that full removal of the Langdale dam would result in higher velocities on the eastern bank and reduce the amount of water flowing on the western side of the river (Kleinschmidt 2022a).

Georgia Power proposes to construct a rock ramp in the river channel at Crow Hop to ensure the integrity of the rock weir #3 so that river flow is maintained in the Riverview headrace channel to meet the wastewater flow dilution requirement for EAWSFPD's Valley WWTP.

7.2.4.3 Phase 3 – Post Removal Phase

Georgia Power proposes to implement a Post Removal Monitoring Plan for a period of no more than 12 months post removal to ensure bank stability and minimize erosion. This will reduce soils from entering the water way and prevent unnatural turbidity and sedimentation.

7.3 Unavoidable Adverse Impacts

Decommissioning and removal of the Langdale and Riverview Projects could potentially have a short-term unavoidable adverse impact of increased turbidity as sediment stored behind the Langdale, Riverview, and Crow Hop dams is transported downstream to Lake Harding. However, implementing the Erosion and Sediment Control Plan would provide protection for any potential water quality effects.

8.0 FISH AND AQUATIC RESOURCES

8.1 Affected Environment

Habitats within the Projects have historically been characterized as mostly riverine, consisting of large pools, shoal areas, and backwaters. The Projects' waters of the Chattahoochee River support a diverse fishery, consisting of approximately 40 different species of fish (Table 8-1) and 8 species of freshwater mussels.

The presence of native aquatic fauna in the Chattahoochee River near the Langdale Project have been documented through several fish assemblage studies performed in the last 40 years. Sampling studies in 1980 conducted by Auburn University revealed several habitat types in the downstream reaches. Fish sampling and collection sites included main-channel shoreline, creek, riprap, and inter-island areas that yielded a total of 21 fish species representing 9 families. Bluegill (*Lepomis macrochirus*), Black Crappie (*Poxomis nigromaculatus*), Redbreast Sunfish (*Lepomis auratus*), Common Carp (*Cyprinus carpio*), and Largemouth Bass (*Micropterus salmoides*) represented approximately 78 percent of the fish caught, with no other species representing more than 5 percent of the total catch. Most species caught (over 90 percent), were found along the shoreline, in riprap dominated habitats (Auburn 1980).

Fish species composition on the Chattahoochee River between West Point Lake and Lake Harding was characterized for Georgia Power in 1990 (ESTI 1992, 1990). While the sport of angling in the Langdale Project is limited due to shallow water and rocky, uneven bathymetry coupled with safety concerns due to variable flows, there are known game fish in the area. These species include Channel Catfish (*Ictalurus punctatus*), Striped Bass (*Morone saxatilis*), White Bass (*Morone chrysops*), Spotted Bass (*Micropterus punctulatus*), Shoal Bass (*Micropterus cataractae*), Bluegill, Largemouth Bass, Black Crappie, and Yellow Perch (*Perca flavescens*) (ESTI 1992).

More recent aquatic surveys included mussel surveys in 2009, and 2010, along with multiple fishery surveys conducted in 2010 downstream of the Langdale Project to Bartletts Ferry. During these surveys, fish species composition (more than 75 percent of catch) was dominated by Redbreast Sunfish, Bluegill, Spotted Bass, Redear Sunfish (*Lepomis auratus*), Snail Bullhead (*Ameiurus natalis*), and Greater Jumprock (*Moxostoma lachneri*) (Georgia Power 2011)

The mussel surveys conducted in 2009 and 2010 revealed the presence of approximately 900 live mussels representing eight species in the area downstream of the Langdale Project. The most common mussel species collected during the surveys was the Eastern Floater (*Pygandodon cataracta)*. A single Delicate Spike (Elliptio arctata) was collected at the upstream end of the Bartletts Ferry Project (Georgia Power 2012); however, this specimen was located downstream of the immediate shoals at Riverview dam and outside of the limits of disturbance defined by the proposed Riverview and Crow Hop dam removal work. In the reach where Delicate Spike specimen was detected in 2012, field survey observations described the area as a transitional nature located between shoals (Riverview) and lacustrine conditions within the reservoir (Lake Harding). The most recent mussel survey of the study area completed in 2020 did not detect Delicate Spike and noted observations of poor to moderate habitat throughout for the seven target species, including the Delicate Spike, in the Project area (Ecological Solutions 2020). Delicate spike is currently State-endangered in Harris County, Georgia but does not receive Federal protection. Georgia Power Company maintains consultation for dam removal planning with the USFWS Ecological Services Field Office, Fort Benning, GA (Sandy Abbott, USFWS, August 2022 – personal communication). Based on prior surveys, no Federally protected mussel species have been detected in the Project area and recent discussions with USFWS acknowledged the unlikely detection of Federally protected species based on current aquatic habitat condition in the Project area.

Additional mussel surveys targeting Oval Pigtoe (*Pleurobema pyriforme*), Purple Bankclimber (*Elliptiodeus sloatianus*), Gulf Moccasinshell (*Medionidus penicillatusl*), and Delicate Spike were conducted in 2020, as part of the decommissioning studies proposed by Georgia Power. The purpose of the study was to further characterize the current mussel community in the vicinity of the Langdale and the Riverview Projects. A total of 31 individual mussels were collected, including 12 Gulf Spike (*Elliptio pullata),* and 19 Southern Rainbow (*Villosa vibex)*, with the health of all species collected deemed as stable (Georgia Power 2020b) (Table 8-2). Asian Clam (*Corbicula fluminea*) were present at every survey site, and none of the mussel species with any status of concern (Table 8-2) were collected during the 2020 mussel survey (Georgia Power 2020b).

In 2021, Kleinschmidt Associates conducted surveys for Shoal Bass on the Chattahoochee River in the vicinity of the Langdale and Riverview Projects and in Flat Shoal Creek, a tributary to the Chattahoochee River. Reach 1 included the Chattahoochee River from West Point Dam downstream to Langdale Dam (9.4 miles); Reach 2 included the Chattahoochee River from Langdale Dam to Crow Hop Dam, including the Riverview

headrace channel (1.3 miles); Reach 3 included the Chattahoochee River from Crow Hop and Riverview Dams to the upper reaches of Lake Harding (3.7 miles); and Reach 4 included Flat Shoal Creek upstream of Hwy 103 (1 mile) (Figure 8-1)(Kleinschmidt 2022e).

During the pre removal study, a total of 1,173 individual fish were captured within the Chattahoochee River and Flat Shoal Creek, representing 34 species across the study area.

Over the course of the study, a total of 56 Shoal Bass were collected, comprising approximately 4.8 percent of the total catch during the pre removal fish survey Table 8-3. Sampling effort and total number of fish captures were relatively similar between the first and second sampling efforts. Shoal Bass were not observed in Reach 1 but were present in Reaches 2-4. Twenty-eight Shoal Bass were captured in Reach 2, five Shoal Bass were collected within Reach 3, and 23 Shoal Bass were captured in Reach 4 within Flat Shoal Creek (Table 8-4).

Shoal Bass size varied between young-of-year, sub-adults, and mature adults. The smallest individuals (i.e., YOY) ranged between 30 and 42 mm total length (TL) and were collected in Reach 4, within Flat Shoal Creek. Approximately 37.5 percent of the Shoal Bass were sub-adults between 100-150 mm TL and were primarily located within Reach 2 and 4. Larger individuals (200-500 mm TL) exhibited a normal distribution (Figure 8-2, Figure 8-3, Figure 8-4) with the longest individual reaching 490 mm in length and the heaviest individual weighing 3.5 pounds.

Spotted Bass was the most abundant Black Bass species (*Micropterus* spp.) (71 captures; approximately 6.0 percent), Shoal Bass were the second-most abundant, and Largemouth Bass, (54 captures; approximately 4.6 percent) was the least abundant. In general, the black basses were visually distinct and there were no obvious signs of hybridization. However, detecting hybrid black basses in the field is imperfect, and the need for genetic markers to augment field surveys may more accurately detect cryptic hybridization (Lewis et al. 2021). Because fin clips were collected from all fish identified as shoal bass, genetic analysis can be conducted to determine if collected fish are genetically pure (Lewis et al. 2021).

Habitats within the Riverview Project reach are similar to those in the Langdale Project consisting of large pools, shoal areas, and backwaters. In the immediate vicinity upstream and downstream of the Riverview Project, the river is wide and shallow, with rocky areas that can experience turbulent flow (ESTI 1990). The fish assemblage studies, and the

resulting species composition discussed above are representative of the aquatic species in the Langdale Project waters.

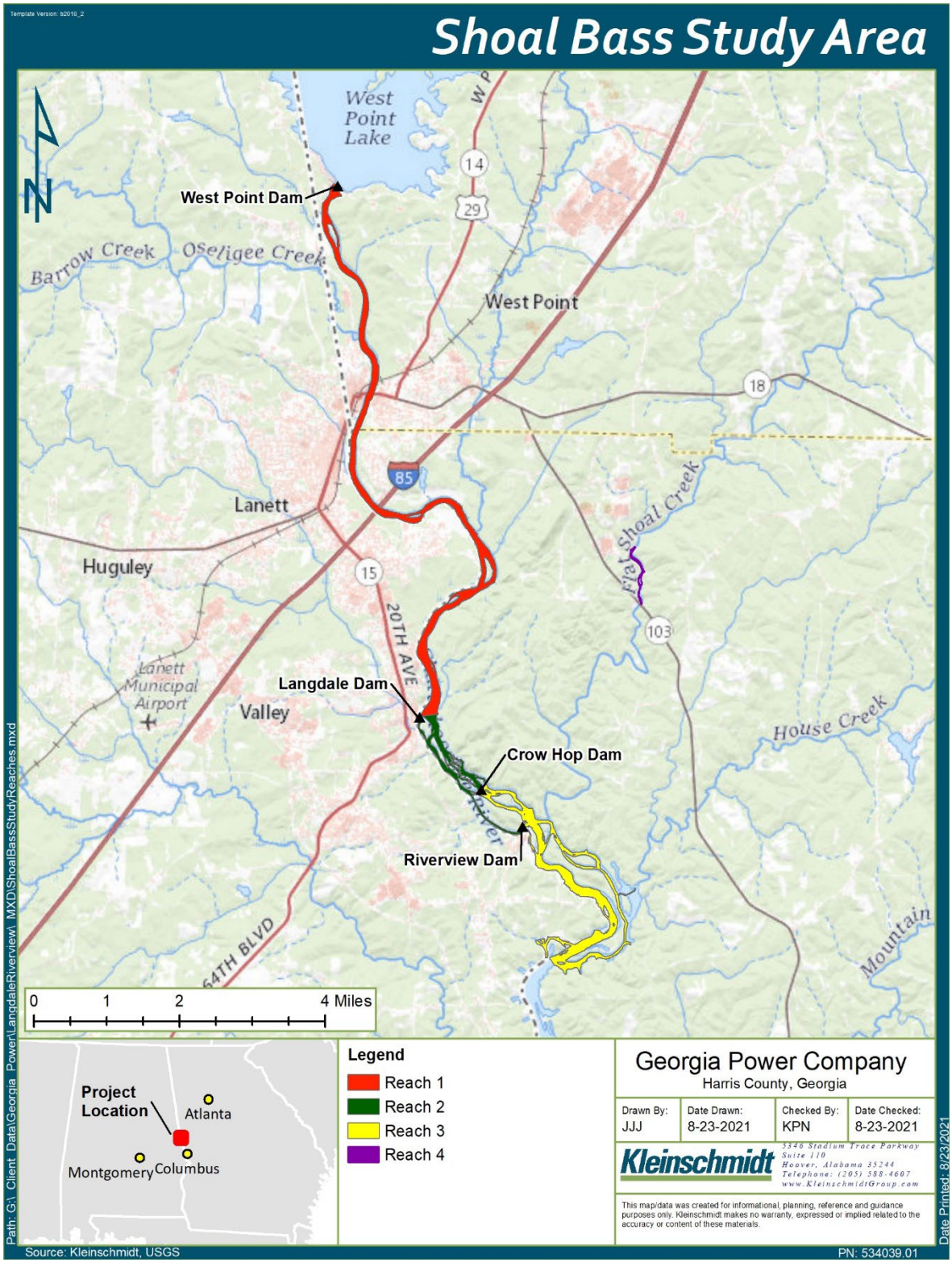


Figure 8-1 Shoal Bass Study Area

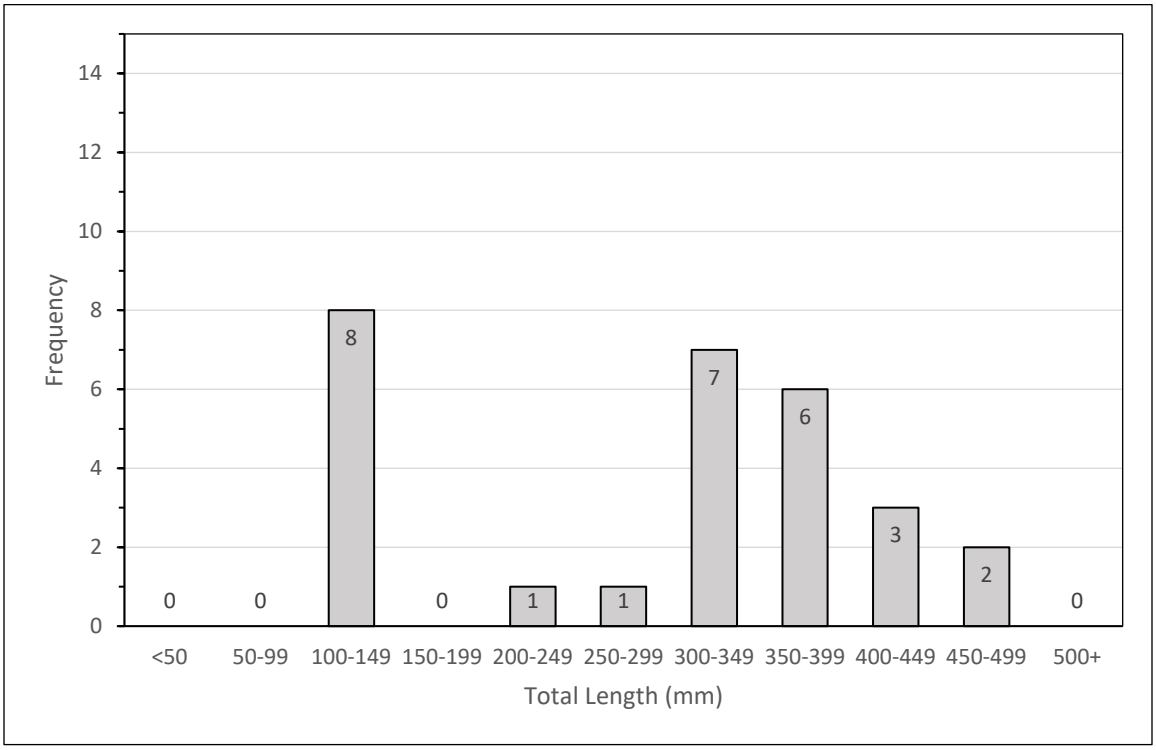


Figure 8-2 Length-Frequency Distribution of Shoal Bass for Reach 2

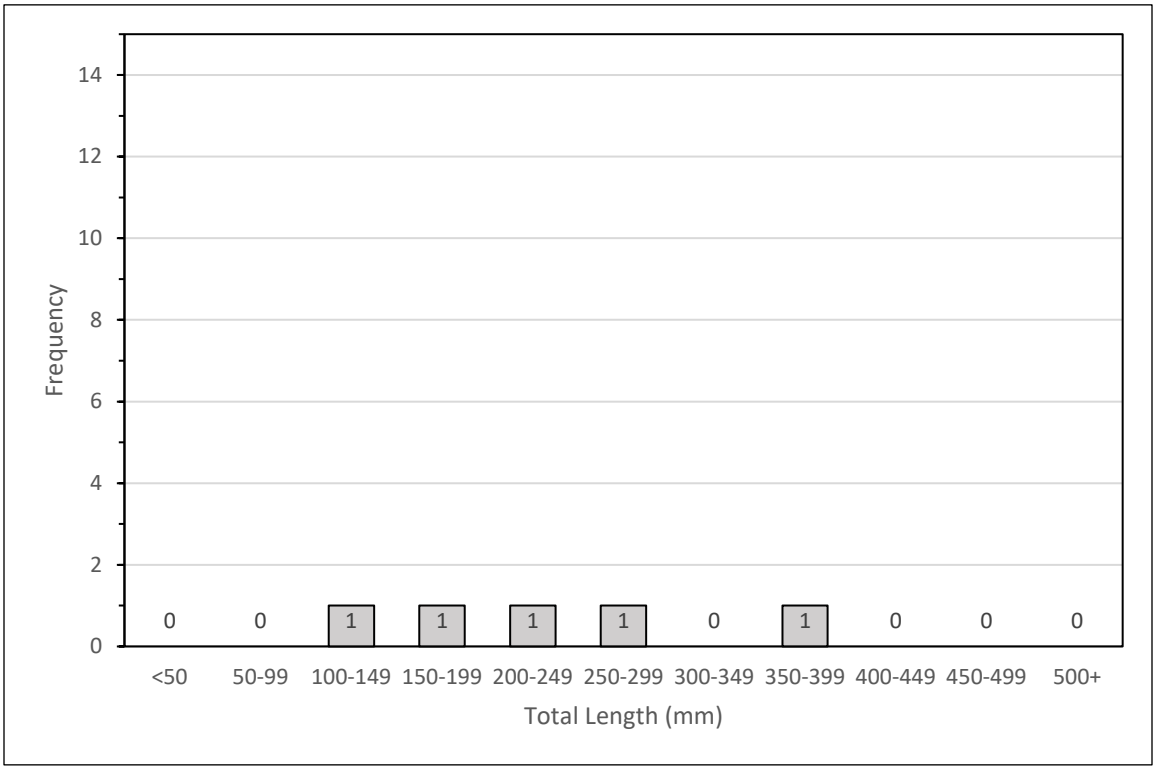


Figure 8-3 Length-Frequency Distribution of Shoal Bass for Reach 3

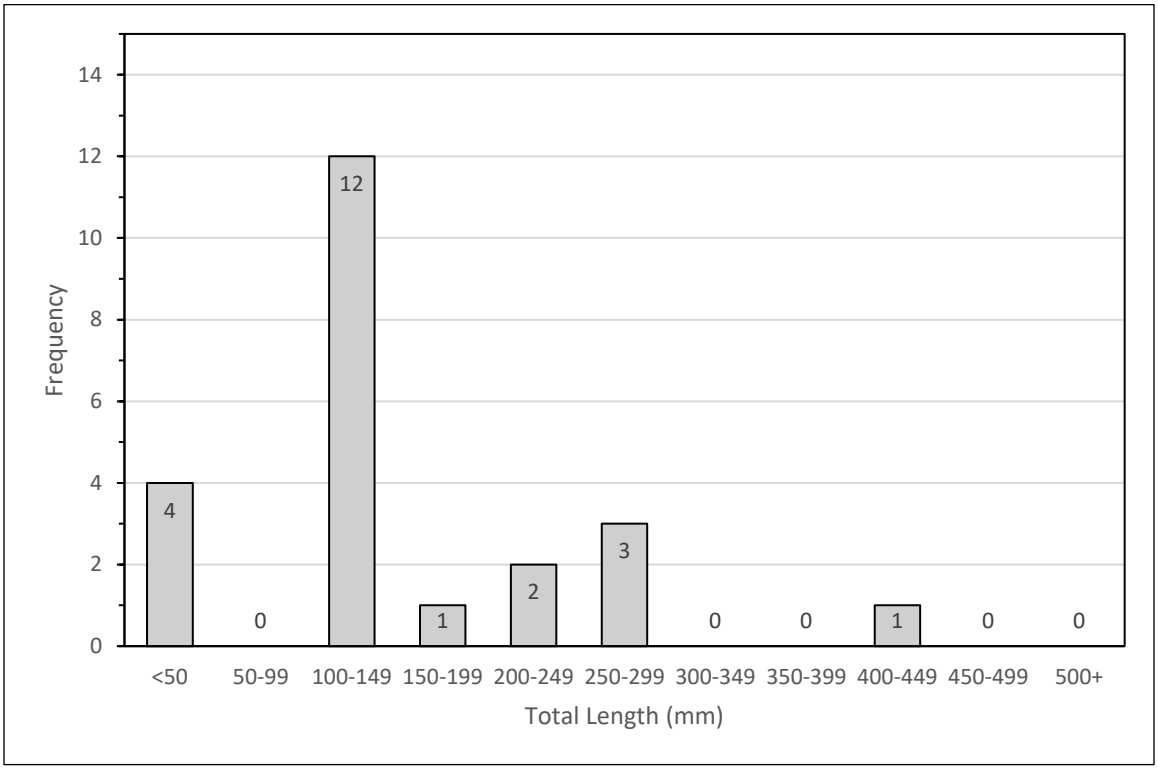


Figure 8-4 Length-Frequency Distribution of Shoal Bass for Reach 4

Table 8-1 Fish Species Collected in the Reach of the Chattahoochee River, Upstream and Downstream of Langdale Dam

Family	Common Name	Scientific Name
Lampreys	Southern Brook Lamprey	*Ichthyomyzon gagei*
Gars	Spotted Gar	*Lepisosteus oculatus*
	Longnose Gar	*Lepisosteus osseus*
Bowfins	Bowfin	*Amia calva*
Herring and Shad	Gizzard Shad	*Dorosoma cepedianum*
	Threadfin Shad	*Dorosoma petenense*
Minnows and Carps	Bluefin Stoneroller	*Campostoma pauciradii*
	Bluestripe Shiner	*Cyprinella callitaenia*
	Blacktail Shiner	*Cyprinella venusta*
	Hybrid Blackshiner Blackband Shiner	*Cyprinella venusta x Lexilus zonistius*
	Common Carp	*Cyprinus carpio*
	Clear Chubb	*Hybopsis winchelli*
	Bandfin Shiner	*Luxilus zonistus*
	Blacktip Shiner	*Lythrurus atrapiculus*
	Bluehead Chub	*Nocomis leptocephalus*
	Golden Shiner	*Notemigonus crysoleucas*
	Longjaw Minnow	*Notropis amplamala*
	Rough Shiner	*Notropis baileyi*
	Highscale Shiner	*Notropis hypsilepis*
	Longnose Shiner	*Notropis longirostris*
	Yellowfin Shiner	*Notropis lutipinnis*
	Weed Shiner	*Notropis texanus*
	Creek Chub	*Semotilus atromaculatus*
	Dixie Chub	*Semotilus thoreauianus*
Suckers	Quillback	*Carpiodes Cyprinus*
	Creek Chubsucker	*Erimyzon oblongus*
	Alabama Hogchoker	*Hypentelium etowanum*
	Spotted Sucker	*Minytrema melanops*
	Striped Jumprock	*Moxostoma rupiscartes*
	Apalachicola Redhorse	*Moxostoma sp.*
	Greater Jumprock	*Moxostoma lachneri*
Bullhead Catfishes	Snail Bullhead	*Ameiurus natalis*
	White Catfish	*Ameiurus catus*
	Yellow Bullhead	*Ameiurus natalis*
	Brown Bullhead	*Ameiurus nebulosus*
	Spotted Bullhead	*Ameiurus serracanthus*
	Channel Catfish	*Ictalurus punctatus*
	Speckled Madtom	*Noturus leptacanthus*

Family	Common Name	Scientific Name
Pikes and Pickerels	Redfin Pickerel	*Esox americanus*
	Chain Pickerel	*Esox niger*
Silversides	Brook Silverside	*Labidesthes sicculus*
Topminnows	Blackspotted Topminnow	*Fundulus olivaceus*
Livebearers	Western Mosquitofish	*Gambusia affinis*
	Eastern Mosquitofish	*Gambusia holbrooki*
Sculpins	Banded Sculpin	*Cottus carolinae*
Temperate Basses	White Bass	*Morone chrysops*
	Striped Bass	*Morone saxatilis*
	Hybrid Bass	*Morone chrysops x Morone saxatilis*
Sunfishes	Redbreast Sunfish	*Lepomis auritus*
	Green Sunfish	*Lepomis cyanellus*
	Hybrid Redbreast Sunfish Green Sunfish	*Lepomis auratus x Lepomis cyanellus*
	Warmouth	*Lepomis gulosus*
	Bluegill	*Lepomis macrochirus*
	Dollar Sunfish	*Lepomis marginatus*
	Longear Sunfish	*Lepomis megalotis*
	Redear Sunfish	*Lepomis microlophus*
	Intergrade between Redspotted Sunfish and Spotted Sunfish	*Lepomis miniatus x Lepomis punctatus*
	Shoal Bass	*Micropterus cataractae*
	Hybrid Shoal Bass Spotted Bass	*Micropterus cataractae x Micropterus punctulatus*
	Redeye Bass	*Micropterus coosae*
	Alabama Bass	*Micropterus henshalli*
	Spotted Bass	*Micropterus punctulatus*
	Largemouth Bass	*Micropterus salmoides*
	White Crappie	*Pomoxis annularis*
	Black Crappie	*Pomoxis nigromaculatus*
Perches and Darters	Gulf Darter	*Etheostoma swaini*
	Redfin Darter	*Etheostoma whipplei*
	Yellow Perch	*Perca flavescens*
	Blackbanded Darter	*Percina nigrofasciata*

Source: Georgia Power 2018a

Table 8-2 2009-2010 and 2020 Mussel Species Collected in the Langdale and Riverview Project Area and Bartlett's Ferry Project Vicinity

Common Name	Scientific Name	Year Observed/ Collected
Delicate Spike	*Elliptio arctata*	2009
Gulf Slabshell	*Elliptio fumata*	2009, 2010
Gulf Spike	*Elliptio pullata*	2009, 2010, 2020
Washboard	*Megalonaias nervosa*	2009, 2010
Eastern floater	*Pyganodon cataracta*	2009, 2010
Giant floater	*Pyganodon grandis*	2009, 2010
Paper pondshell	*Utterbackia imbecillis*	2009, 2010
Southern rainbow	*Villosa vibex*	2009, 2010, 2020

Source: Georgia Power 2018

Table 8-3 Summary of Fish Collected during the Pre Removal Study by Reach

Species	Total		Reach 1		Reach 2		Reach 3		Reach 4	
	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)
Longnose Gar *Lepisosteus osseus*	**12**	**1.0**	-	-	-	-	12	2.6	-	-
Bowfin *Amia calva*	**2**	**0.2**	-	-	-	-	2	0.4	-	-
Gizzard Shad *Dorosoma cepedianum*	**9**	**0.8**	1	0.3	1	0.3	7	1.5	-	-
Threadfin Shad *Dorosoma petenense*	**2**	**0.2**	-	-	-	-	2	0.4	-	-
Bluefin Stoneroller *Campostoma pauciradii*	**1**	**0.1**	-	-	-	-	-	-	1	0.9
Bluestripe Shiner *Cyprinella callitaenia*	**17**	**1.4**	-	-	-	-	17	3.6	-	-
Blacktail Shiner *Cyprinella venusta*	**41**	**3.5**	10	3.4	11	3.6	10	2.1	10	8.8
Common Carp *Cyprinus carpio*	**3**	**0.3**	-	-	3	1.0	-	-	-	-
Weed Shiner *Notropis texanus*	**6**	**0.5**	-	-	-	-	6	1.3	-	-
Northern Hogsucker *Hypentelium nigricans*	**4**	**0.3**	-	-	-	-	-	-	4	3.5
Spotted Sucker *Minytrema melanops*	**22**	**1.9**	12	4.1	7	2.3	3	0.6	-	-
Greater Jumprock *Moxostoma lachneri*	**18**	**1.5**	-	-	-	-	1	0.2	17	15.0
Apalachicola Redhorse *Moxostoma sp.*	**70**	**6.0**	4	1.4	-	-	66	14.1	-	-
Snail Bullhead	**35**	**3.0**	17	5.8	8	2.6	-	-	10	8.8

Species	Total		Reach 1		Reach 2		Reach 3		Reach 4	
	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)
Ameiurus brunneus										
Yellow Bullhead *Ameiurus natalis*	**3**	**0.3**	2	0.7	-	-	1	0.2	-	-
Blue Catfish *Ictalurus furcatus*	**7**	**0.6**	-	-	-	-	7	1.5	-	-
Channel Catfish *Ictalurus punctatus*	**16**	**1.4**	8	2.7	-	-	6	1.3	2	1.8
Flathead Catfish *Pylodictus olivaris*	**10**	**0.9**	-	-	-	-	9	1.9	1	0.9
Brook Silverside *Labidesthes sicculus*	**18**	**1.5**	6	2.1	5	1.7	7	1.5	-	-
Striped Bass *Morone saxatilis*	**19**	**1.6**	-	-	1	0.3	18	3.9	-	-
Redbreast Sunfish *Lepomis auritus*	**379**	**32.3**	159	54.6	140	46.4	67	14.3	13	11.5
Green Sunfish *Lepomis cyanellus*	**3**	**0.3**	-	-	3	1.0	-	-	-	-
Bluegill *Lepomis macrochirus*	**141**	**12.0**	11	3.8	15	5.0	107	22.9	8	7.1
Dollar Sunfish *Lepomis marginatus*	**1**	**0.1**	-	-	-	-	1	0.2	-	-
Redear Sunfish *Lepomis microlophus*	**95**	**8.1**	3	1.0	10	3.3	80	17.1	2	1.8
Spotted Sunfish intergrade *Lepomis punctatus/marginatus*	**5**	**0.4**	-	-	2	0.7	2	0.4	1	0.9
Warmouth *Lepomis gulosus*	**1**	**0.1**	-	-	1	0.3	-	-	-	-
Shoal Bass *Micropterus cataractae*	**56**	**4.8**	-	-	28	9.3	5	1.1	23	20.4

Species	Total		Reach 1		Reach 2		Reach 3		Reach 4	
	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)	Count	RA (%)
Spotted Bass *Micropterus punctulatus*	**71**	**6.1**	26	8.9	29	9.6	16	3.4	-	-
Largemouth Bass *Micropterus salmoides*	**54**	**4.6**	17	5.8	26	8.6	11	2.4	-	-
Black Crappie *Pomoxis nigromaculatus*	**1**	**0.1**	-	-	-	-	1	0.2	-	-
Swamp Darter *Etheostoma fusiforme*	**1**	**0.1**	-	-	1	0.3	-	-	-	-
Yellow Perch *Perca flavescens*	**2**	**0.2**	1	0.3	-	-	1	0.2	-	-
Blackbanded Darter *Percina nigrofasciata*	**48**	**4.1**	14	4.8	11	3.6	2	0.4	21	18.6
Total	**1,173**	**100**	291	100	302	100	467	100	113	100
Number of Species	**34**		15		18		27		13	
Shannon-Weiner Diversity Index	**2.56**		1.75		1.96		2.43		2.21	
Evenness	**72.67**		64.74		68.09		73.73		86.08	

Notes: * RA = relative abundance

Table 8-4 Summary of Species Collected During the Pre-Dam Removal by Effort

Species	Grand Total				Effort 1				Effort 2			
	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)	Count	RA (%)	CPUE (fish/hr)	Mass (g)	Count	RA (%)	CPUE (fish/hr)	Mass (g)
Longnose Gar *Lepisosteus osseus*	**12**	**1.0**	**1.1**	**9,208**	8	1.5	1.5	5,510	4	0.6	0.7	3,698
Bowfin *Amia calva*	**2**	**0.2**	**0.2**	**2,606**	2	0.4	0.4	2,606	-	-	-	-
Gizzard Shad *Dorosoma cepedianum*	**9**	**0.8**	**0.8**	**3,111**	8	1.5	1.5	2,421	1	0.2	0.2	690
Threadfin Shad *Dorosoma petenense*	**2**	**0.2**	**0.2**	**30**	-	-	-	-	2	0.3	0.4	30
Bluefin Stoneroller *Campostoma pauciradii*	**1**	**0.1**	**0.1**	**-**	-	-	-	-	1	0.2	0.2	-
Bluestripe Shiner *Cyprinella callitaenia*	**17**	**1.4**	**1.6**	**61**	5	0.9	1.0	25	12	1.9	2.2	36
Blacktail Shiner *Cyprinella venusta*	**41**	**3.5**	**3.8**	**390**	13	2.4	2.5	151	28	4.5	5.1	239
Common Carp *Cyprinus carpio*	**3**	**0.3**	**0.3**	**2,962**	3	0.5	0.6	2,962	-	-	-	-
Weed Shiner *Notropis texanus*	**6**	**0.5**	**0.6**	**19**	6	1.1	1.1	19	-	-	-	-
Northern Hog Sucker *Hypentelium nigricans*	**4**	**0.3**	**0.4**	**-**	-	-	-	-	4	0.6	0.7	-
Spotted Sucker *Minytrema melanops*	**22**	**1.9**	**2.0**	**22,603**	10	1.8	1.9	7,163	12	1.9	2.2	15,440
Greater Jumprock *Moxostoma lachneri*	**18**	**1.5**	**1.7**	**9**	1	0.2	0.2	9	17	2.7	3.1	-
Apalachicola Redhorse *Moxostoma sp.*	**70**	**6.0**	**6.5**	**53,918**	24	4.4	4.6	16,264	46	7.4	8.4	37,654
Snail Bullhead *Ameiurus brunneus*	**35**	**3.0**	**3.3**	**2,396**	12	2.2	2.3	955	23	3.7	4.2	1,441
Yellow Bullhead *Ameiurus natalis*	**3**	**0.3**	**0.3**	**46**	3	0.5	0.6	46	-	-	-	-

Species	Grand Total				Effort 1				Effort 2			
	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)
Blue Catfish *Ictalurus furcatus*	**7**	**0.6**	**0.7**	**5,391**	3	0.5	0.6	2,019	4	0.6	0.7	3,372
Channel Catfish *Ictalurus punctatus*	**16**	**1.4**	**1.5**	**18,868**	6	1.1	1.1	1,194	10	1.6	1.8	17,674
Flathead Catfish *Pylodictus olivaris*	**10**	**0.9**	**0.9**	**5,097**	-	-	-	-	10	1.6	1.8	5,097
Brook Silverside *Labidesthes sicculus*	**18**	**1.5**	**1.7**	**51**	9	1.6	1.7	19	9	1.4	1.6	32
Striped Bass *Morone saxatilis*	**19**	**1.6**	**1.8**	**19,772**	10	1.8	1.9	7,301	9	1.4	1.6	12,471
Redbreast Sunfish *Lepomis auritus*	**379**	**32.3**	**35.3**	**17,238**	214	39.1	40.8	8,907	165	26.4	30.0	8,331
Green Sunfish *Lepomis cyanellus*	**3**	**0.3**	**0.3**	**69**	2	0.4	0.4	52	1	0.2	0.2	17
Bluegill *Lepomis macrochirus*	**141**	**12.0**	**13.1**	**4,357**	65	11.9	12.4	2,025	76	12.2	13.8	2,332
Dollar Sunfish *Lepomis marginatus*	**1**	**0.1**	**0.1**	**6**	1	0.2	0.2	6	-	-	-	-
Redear Sunfish *Lepomis microlophus*	**95**	**8.1**	**8.8**	**10,408**	29	5.3	5.5	2,747	66	10.6	12.0	7,661
Spotted Sunfish intergrade *Lepomis punctatus/marginatus*	**5**	**0.4**	**0.5**	**83**	3	0.5	0.6	59	2	0.3	0.4	24
Warmouth *Lepomis gulosus*	**1**	**0.1**	**0.1**	**16**	-	-	-	-	1	0.2	0.2	16
Shoal Bass *Micropterus cataractae*	**56**	**4.8**	**5.2**	**23,552**	28	5.1	5.3	7,704	28	4.5	5.1	15,848
Spotted Bass *Micropterus punctulatus*	**71**	**6.1**	**6.6**	**11,692**	35	6.4	6.7	6,849	36	5.8	6.6	4,843

Species	Grand Total				Effort 1				Effort 2			
	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)	Count	RA* (%)	CPUE** (fish/hr)	Mass (g)
Largemouth Bass *Micropterus salmoides*	**54**	**4.6**	**5.0**	**14,879**	31	5.7	5.9	7,755	23	3.7	4.2	7,124
Black Crappie *Pomoxis nigromaculatus*	**1**	**0.1**	**0.1**	**81**	-	-	-	-	1	0.2	0.2	81
Swamp Darter *Etheostoma fusiforme*	**1**	**0.1**	**0.1**	**2**	1	0.2	0.2	2	-	-	-	-
Yellow Perch *Perca flavescens*	**2**	**0.2**	**0.2**	**7**	1	0.2	0.2	1	1	0.2	0.2	6
Blackbanded Darter *Percina nigrofasciata*	**48**	**4.1**	**4.5**	**118**	15	2.7	2.9	64	33	5.3	6.0	54
Total	**1,173**	**100**	**109.3**	**229,046**	548	100	104.5	84,835	625	100	113.8	144,211
Number of Species	**34**				28				28			
Effort	**644.2**				314.6				329.6			
Shannon-Weiner Diversity Index	**2.56**											
Evenness	**72.67**											

* RA = relative abundance

** CPUE = catch per unit effort

8.2 Environmental Analysis

The primary activities affecting Projects' fish and aquatic resources are construction activities related to the removal of Project structures and the post removal flows, velocities, and wetted area. Georgia Power conducted studies and associated analyses that pertain to effects on fish and aquatic resources. Refer to Section 7, Water Resources, for a discussion of the existing and adjusted bathymetry and H&H modeling. Analyses are presented in detail in the following reports and summarized herein:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report
- Final Water Quality Study Report
- Final Potential Effects of Dam Removal on Shoal Bass
- Freshwater Mussels Survey Report
- Draft Pre-Dam Removal Shoal Bass Abundance and Tracking Study Report
- Draft Sediment Quality Study Report
- Draft Sediment Transport Assessment Study Report
- Draft Aquatic Organism Recovery Survey and Relocation Plan

Table 8-5 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on fish and aquatic resources at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Georgia Power's proposal would open approximately 10.8 RMs of riverine habitat between the West Point Dam and the headwaters of Lake Harding. Opening this reach of the river would allow for fish to make larger scale seasonal movements throughout the system and would result in improved connectivity of the Chattahoochee River for fish spawning runs between West Point Lake and Bartlett's Ferry. It is presumed that the habitat characteristics along this reach would change by shifting the slow-moving impounded waters to a more lotic system (i.e., flowing water). Increasing river connectivity would likely provide important habitat for several species including Shoal Bass and sucker species with an increase in shoal habitats and mussel species. Effects of the Proposed Action on Shoal Bass are presented in Section 10.

Table 8-5 Proposed PME Measures that may Potentially Affect Fish and Aquatic Resources

Proposed PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement the Post Removal Shoal Bass Abundance and Tracking Study	✓	✓	✓	Post Removal
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Leave 10-foot dam abutment on west side of the Langdale Dam; leave ~300 feet on the east side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal
• Implement the Aquatic Organism Recovery Survey and Relocation Plan	✓	✓	✓	Removal

8.2.1 Existing Bathymetry –Velocity and Wetted Areas

The H&H model indicates that with the existing bathymetry, the Langdale Dam removal will result in flow being concentrated on the eastern side of the river. At the three regularly occurring flow conditions[18], water no longer reaches the upstream side of the Langdale powerhouse. Leaving a portion of the Langdale Dam at a reduced crest elevation on the eastern side of the river will help to redistribute the flow towards the center of the river. At the WP min flow condition, a constructed channel through the island between the Langdale Dam and powerhouse and flow from Moores Creek (Moores Creek flows were not included in the models as this tributary is not gaged by the USGS) will be used to maintain flow to the powerhouse tailrace. During the WP min +1 gen unit and WP min +2 gen units flows, the powerhouse tailrace receives water through the constructed channel, Moores Creek, and will also be backwatered from the river downstream of the island. The maximum velocity through the breached dam approaches 6 fps at WP min flow and exceeds 11 fps at the WP min flow +2 gen units condition in the center of the channel, with lower velocities near the shores (Figure 8-5, Figure 8-6, and Figure 8-7). Fish will be able to seek refuge in pools between the dams and will find routes upstream of the dams by avoiding the high velocity areas in the center of the breach, which can be seen in the cross section plots through the breached dam section.

The remainder of the Langdale Dam that will be left in place is shown on Figure 8-5, Figure 8-6, and Figure 8-7. This portion of the dam will be exposed under the minimum flow condition and overtopped at higher flows (WP min flow +1 gen unit, WP min flow +2 gen units) because this is the portion of the spillway that will be demolished down from the existing crest elevation of approximately 550.4 feet to approximately elevation 542 feet, excluding the 10-foot section which will be preserved at original elevations for cultural resources protection and historical preservation. It should also be noted that high velocities over existing sediments will likely mobilize sand-size substrates; loose coarse sand is typically mobilized at a near-streambed velocity of 2 fps.

[18] WP min flow (670 cfs), WP min flow +1 gen unit (8,275 cfs), and WP min flow +2 gen units (15,875 cfs)

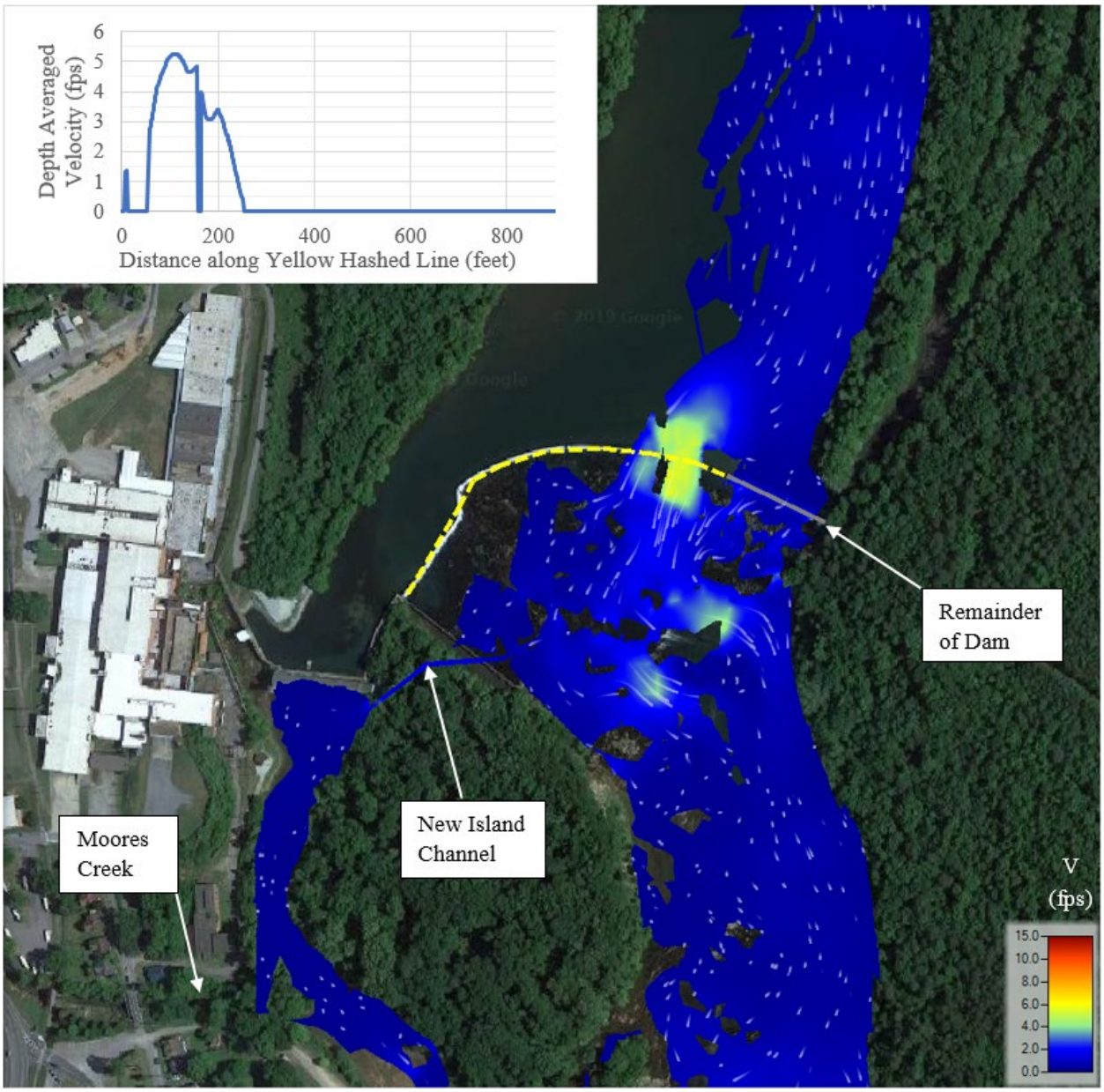


Figure 8-5 Dam Removal, Existing Bathymetry – West Point Minimum Flow Velocity and Wetted Area at Langdale Dam

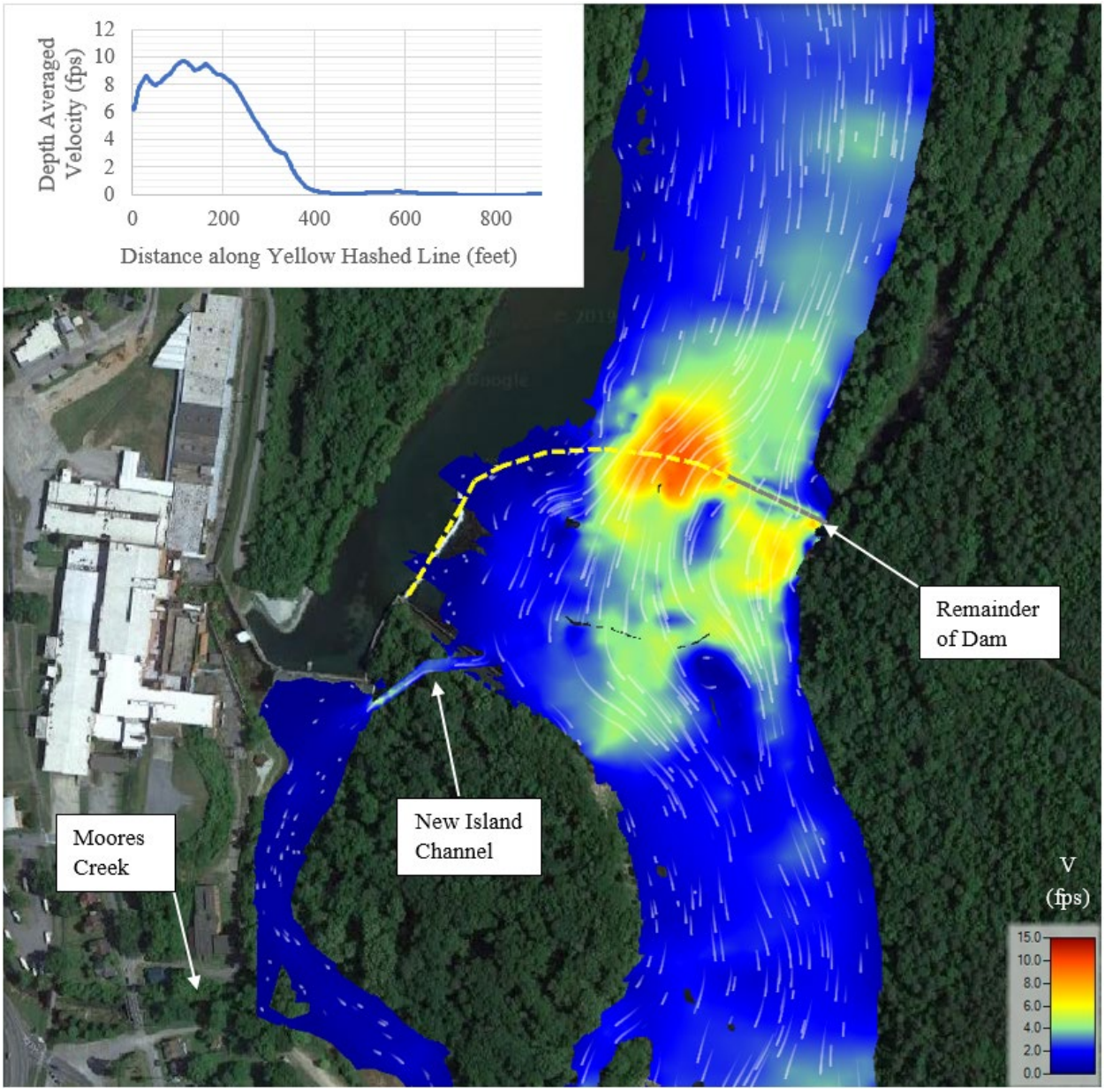


Figure 8-6 Dam Removal, Existing Bathymetry – West Point Minimum Flow +1 Generating Unit Velocity and Wetted Area at Langdale Dam

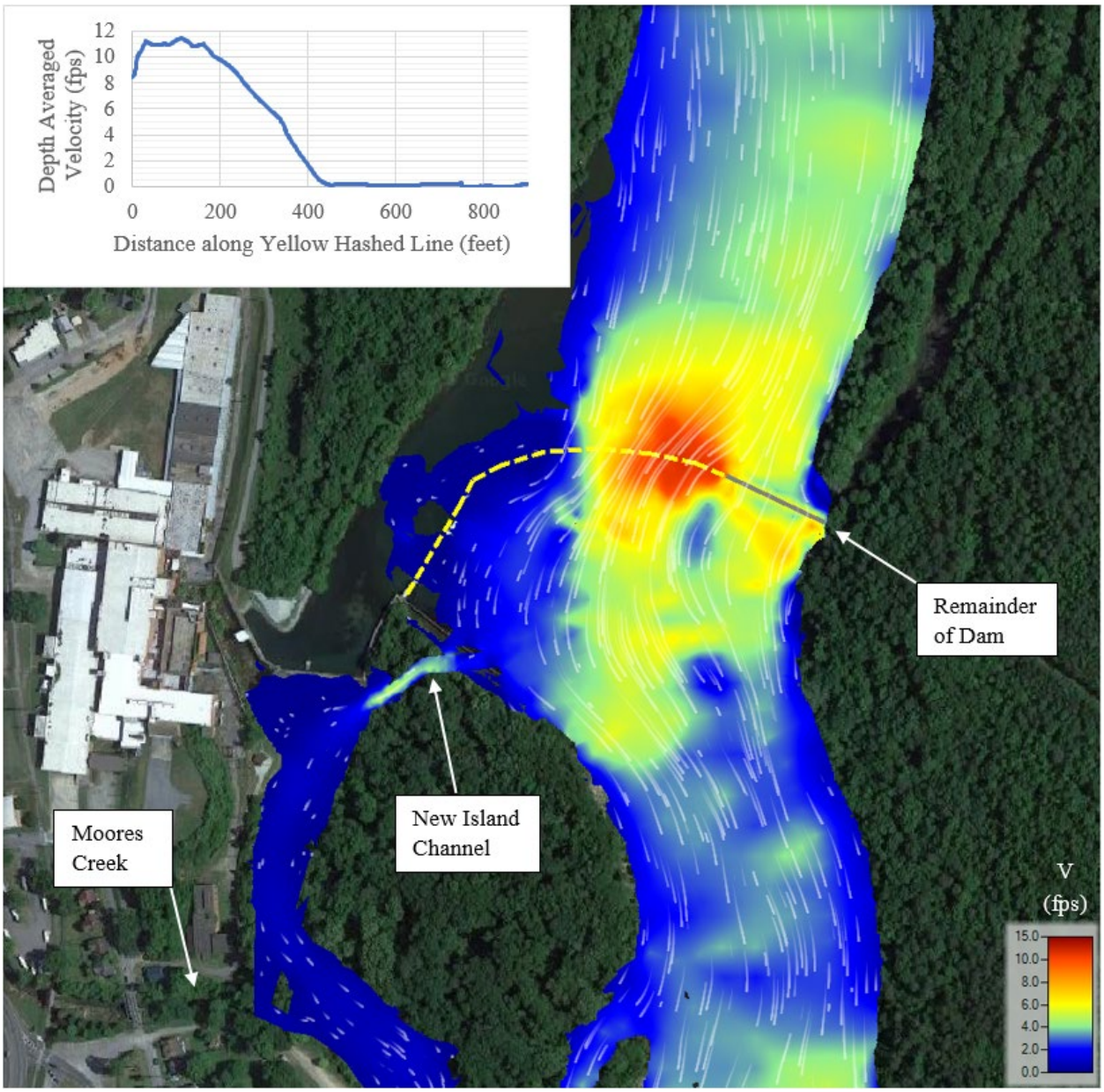


Figure 8-7 Dam Removal, Existing Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area at Langdale Dam

The removal of Crow Hop Dam causes the flow to be centralized through the center of the breach due to the natural rock riverbed. At WP min flow, portions of the river on either bank are no longer wetted following dam removal. At WP min flow +1 gen unit, most of the river would be wetted and at WP min flow +2 gen unit the entire river is wetted, similar to existing conditions (i.e., dams in place). Maximum velocities through the breached dam are less than 4 fps at WP min flow and exceed 8 fps at WP min flow +2 gen units flow in the center of the channel, with lower velocities near shore (Figure 8-8, Figure 8-9, and Figure 8-10). Flow passing over the rock ramp is concentrated in the middle of the ramp;

however, because the rock ramp does not modify the crest of the rock weir it does not affect the flow partitioning between the Riverview channel and the main channel. Fish will be able to seek refuge in pools approaching the dam and find routes upstream by avoiding the high velocity areas in the center of the breach, which can be seen in the cross-section plots through the breached dam section in each of the figures. High velocities over existing sediments will likely mobilize sand-size substrates, as loose coarse sand is typically mobilized at a near-streambed velocity of 2 fps (Kleinschmidt 2022a).

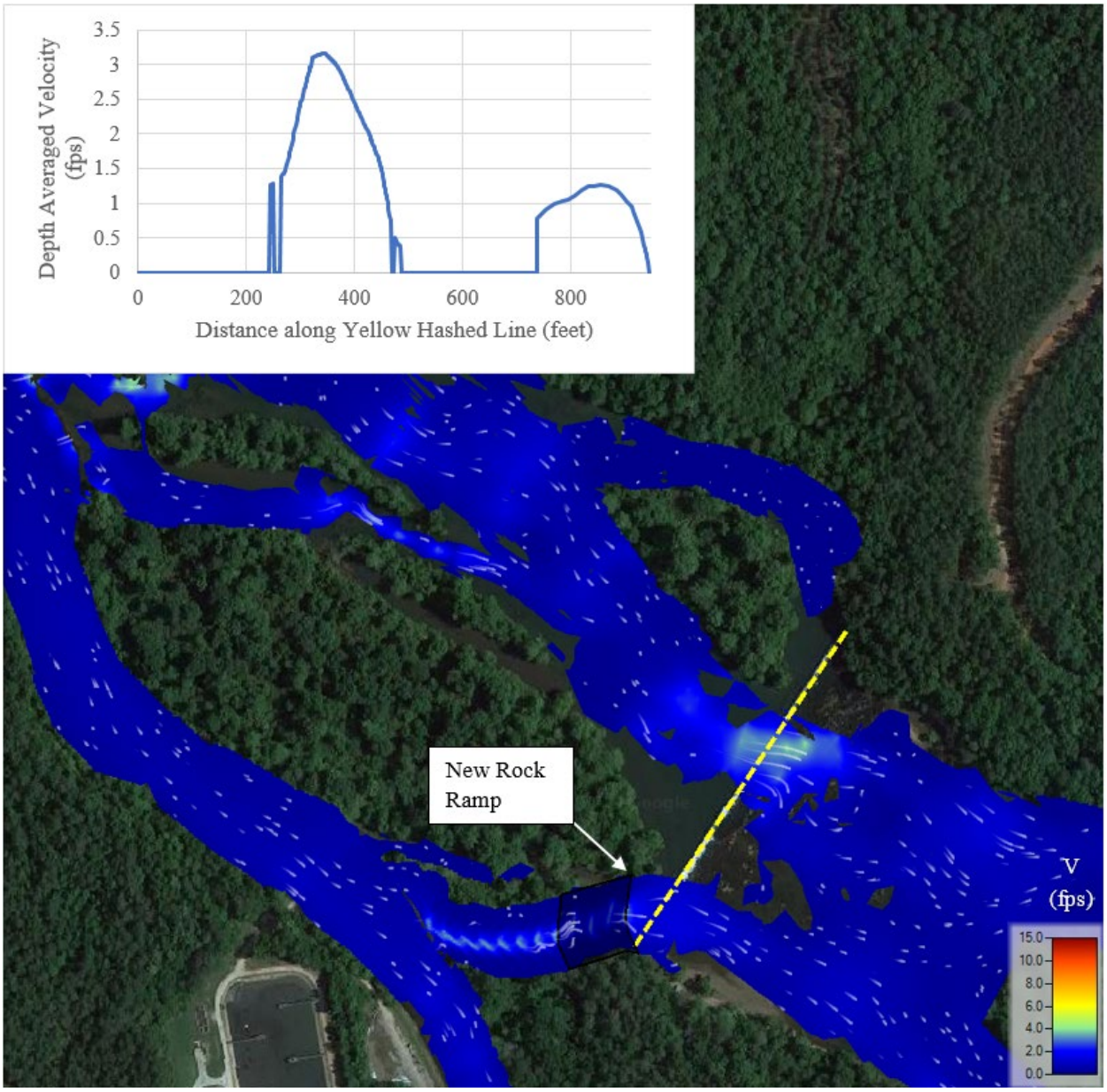


Figure 8-8 Dam Removal, Existing Bathymetry – West Point Minimum Flow Velocity and Wetted Area near Crow Hop Dam

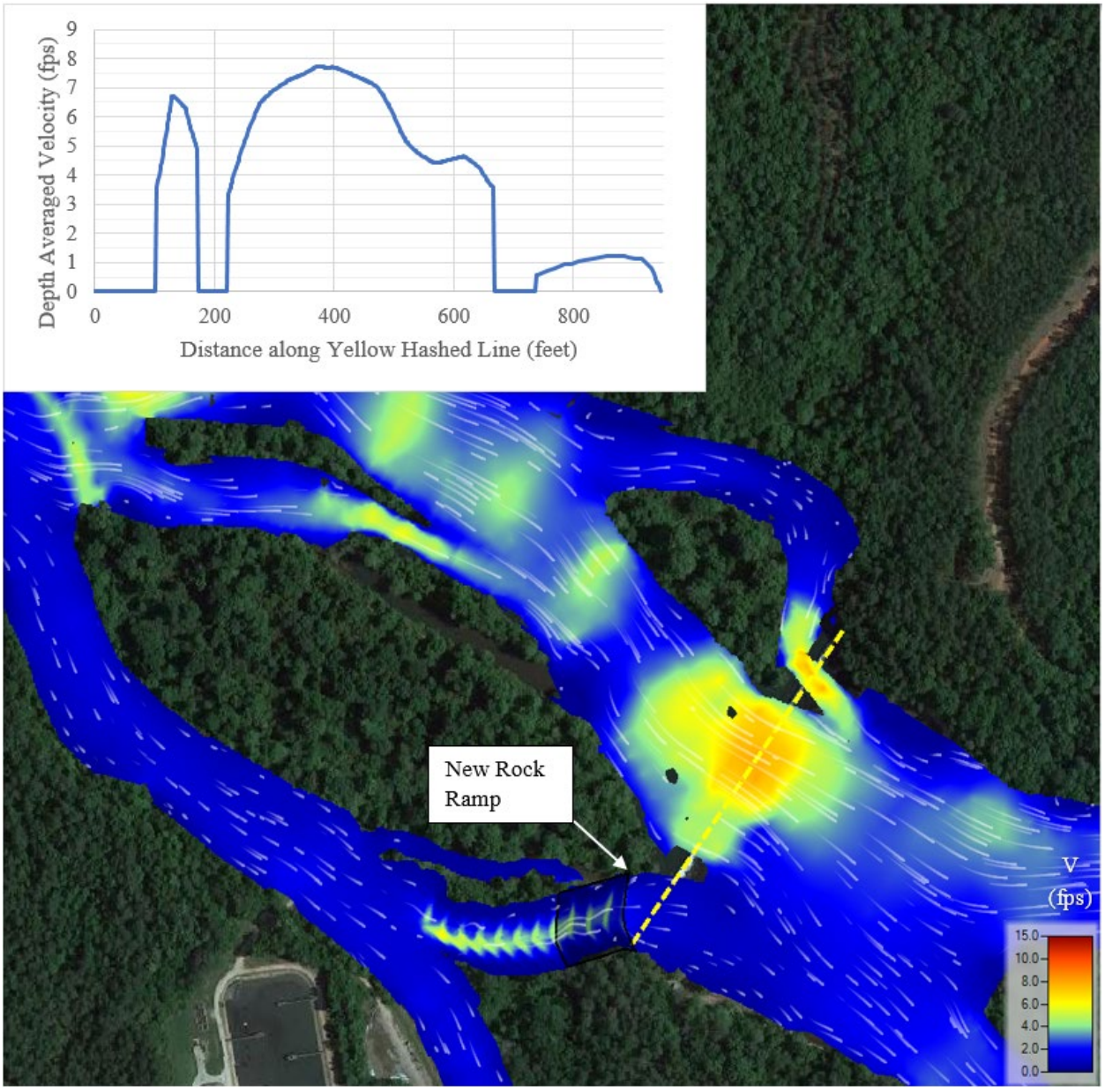


Figure 8-9 Dam Removal, Existing Bathymetry – West Point Minimum Flow +1 Generating Units Velocity and Wetted Area near Crow Hop Dam

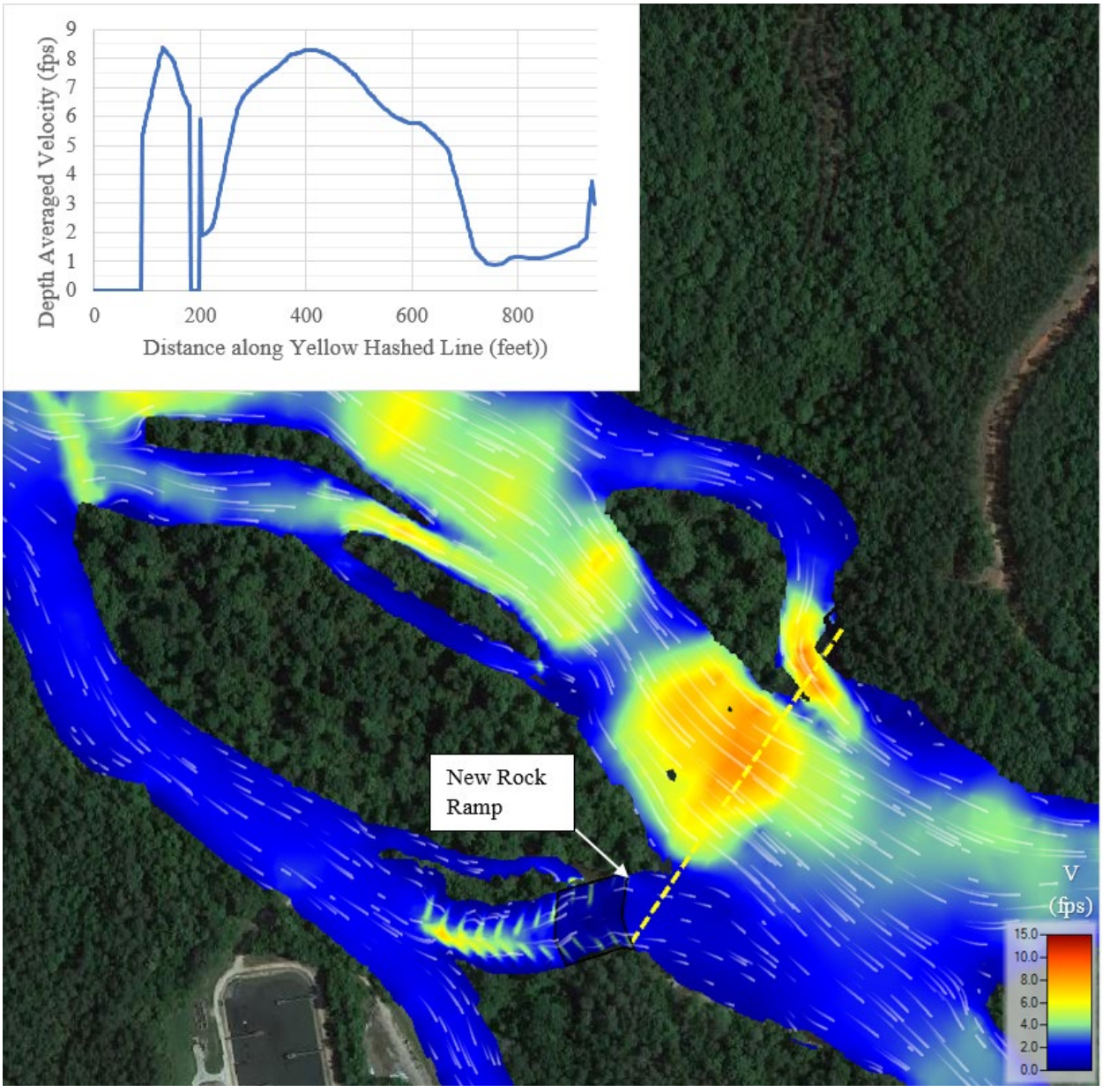


Figure 8-10 Dam Removal, Existing Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area near Crow Hop Dam

The model indicates that near the Riverview Dam, the wetted area at WP min flow will decrease, similar to the Crow Hop Dam. At WP min flow +1 gen unit and WP min flow +2 gen units, the river will be wetted similar to existing conditions (i.e., dams in place). There is a steep drop in the terrain where the Riverview Dam is located, and maximum velocities spilling over the breached dam will exceed 5 fps at WP min flow and 8 fps at WP min flow +2 gen units, with lower velocities upstream and downstream of this area (Figure 8-11, Figure 8-12, and Figure 8-13). Fish will be able to seek refuge in pools approaching the dam and find routes upstream by avoiding the high velocity areas in the center of the

breach, which can be seen in the cross section plots through the breached dam section in each of the figures. High velocities over existing sediments will likely mobilize sand-size substrates, as loose coarse sand is typically mobilized at a near-streambed velocity of 2 fps. See the Sediment Transport Assessment Study Report (Kleinschmidt 2022a).

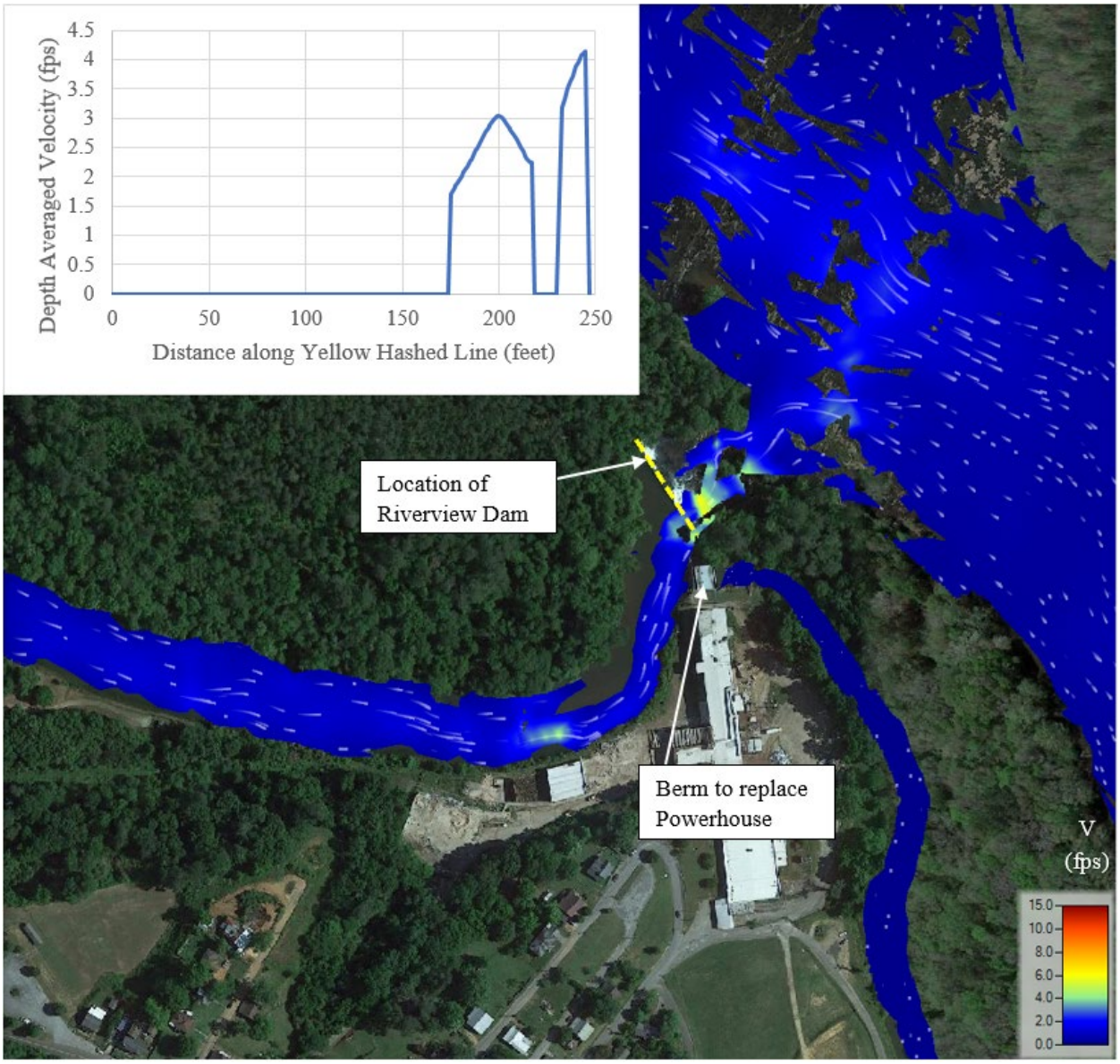


Figure 8-11 Dam Removal, Existing Bathymetry – West Point Minimum Velocity and Wetted Area Near Riverview Dam

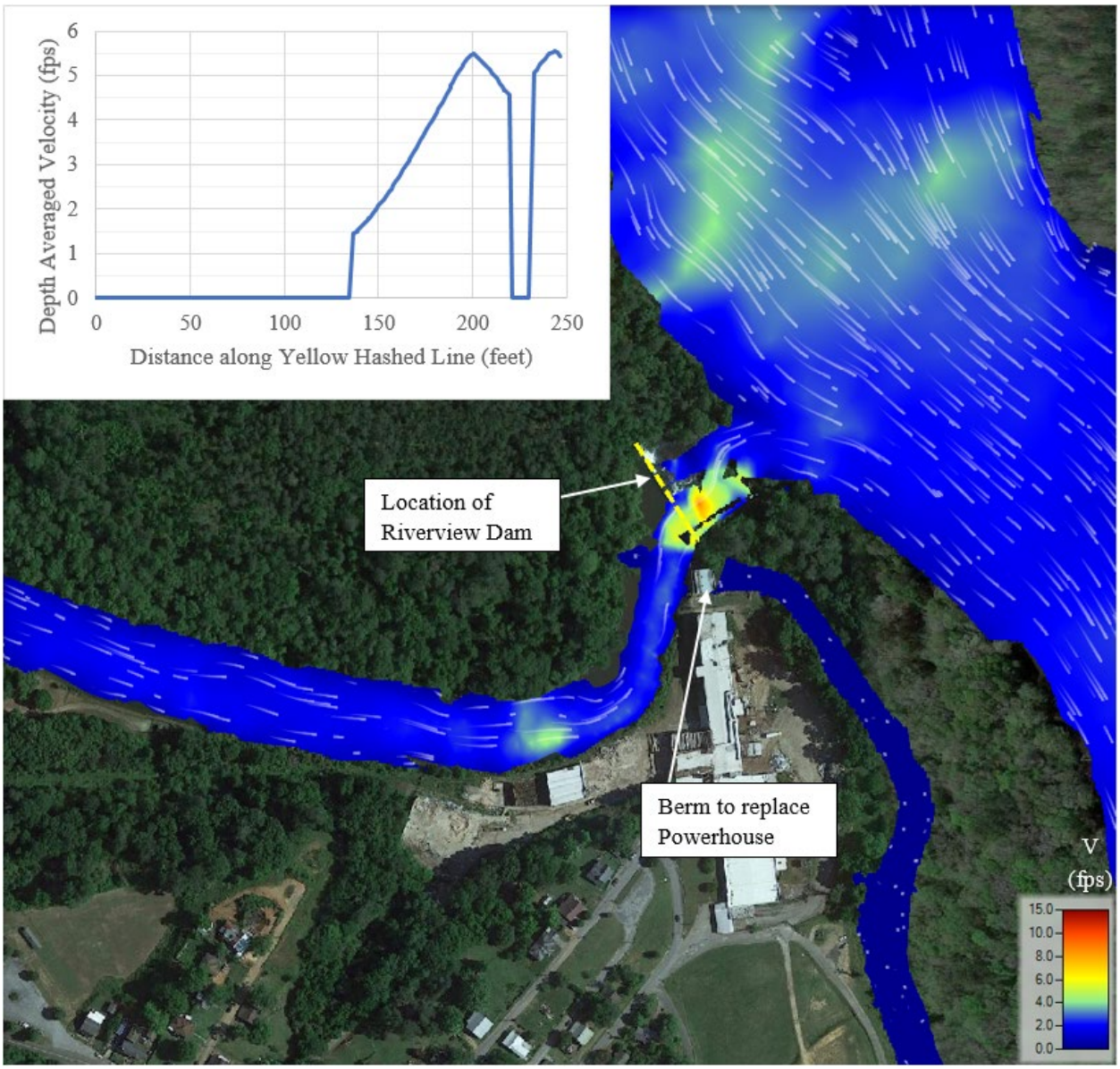


Figure 8-12 Dam Removal, Existing Bathymetry – West Point Minimum Flow +1 Generating Unit Velocity and Wetted Area Near Riverview Dam

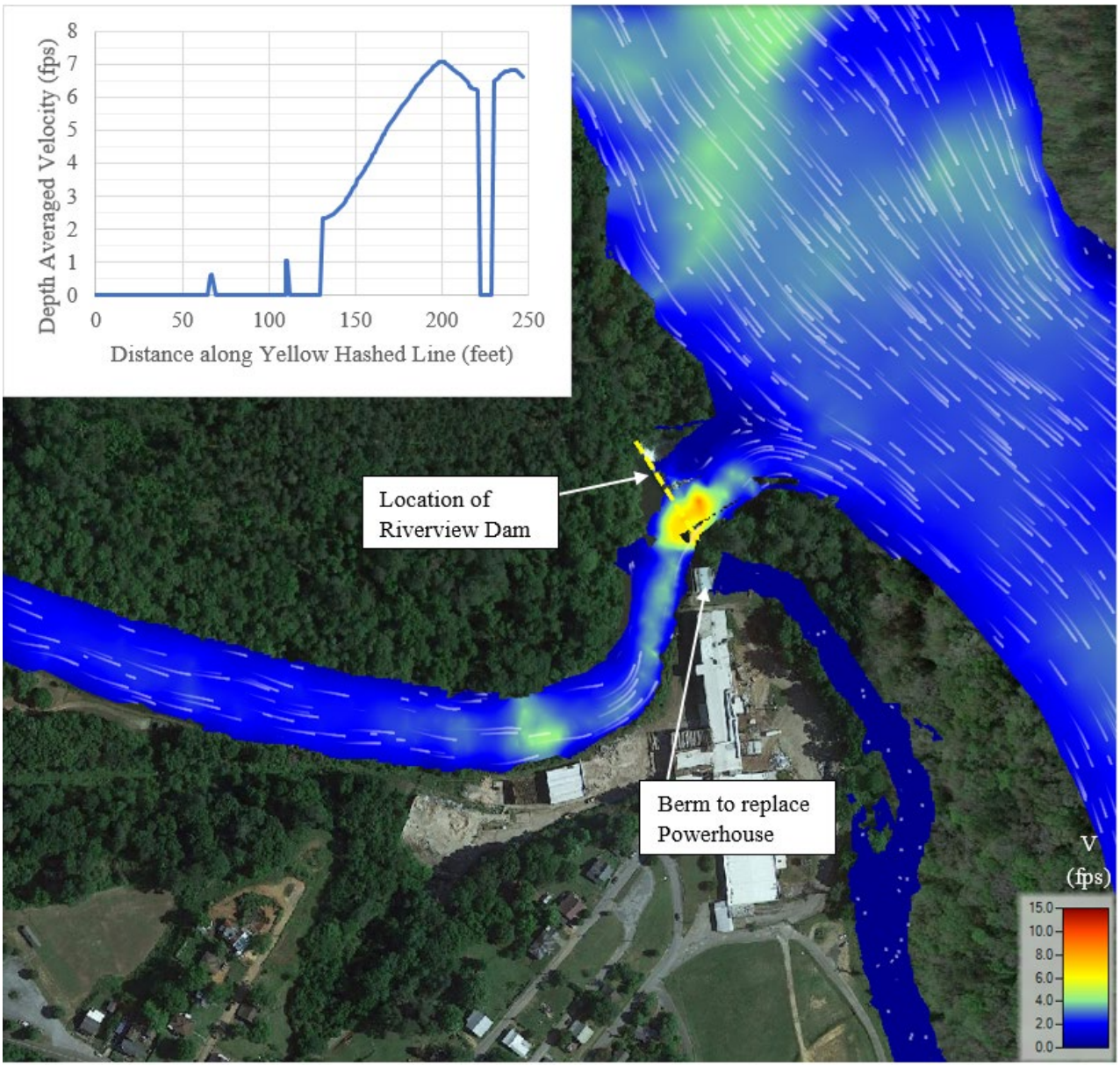


Figure 8-13 Dam Removal, Existing Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area Near Riverview Dam

Figure 8-14 provides a comparison of the areas wetted by the river at the Projects with dams removed and existing bathymetry for all three flow conditions.

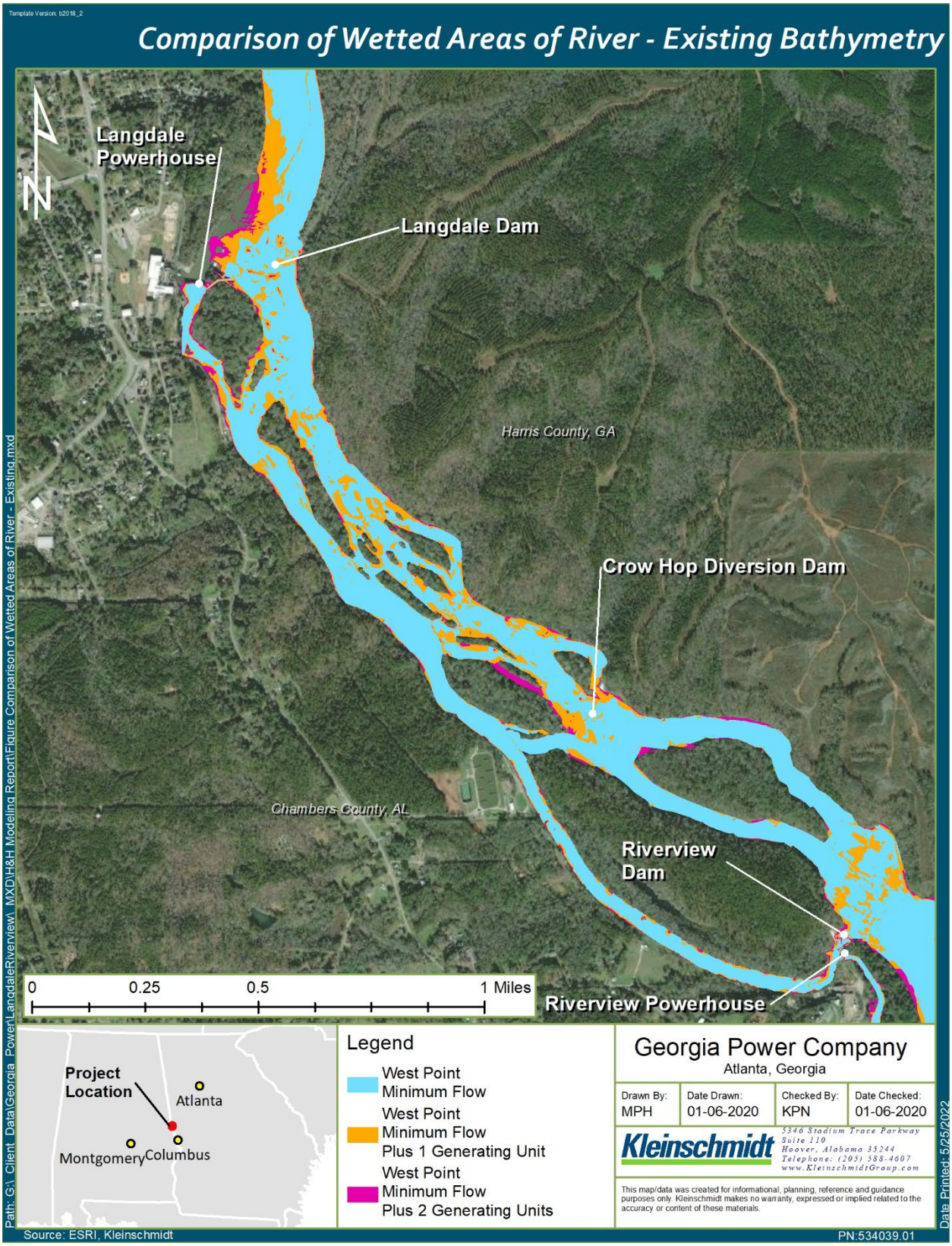


Figure 8-14 Dam Removal, Existing Bathymetry Comparison of Wetted Area

8.2.2 Adjusted Bathymetry – Velocity and Wetted Area

Following removal of the Langdale Dam, the model indicates that with the adjusted bathymetry the flow more widely distributes across the river. At the WP min flow and WP min flow +1 gen unit conditions, water does not reach the upstream side of the Langdale powerhouse, but it does reach the powerhouse at the WP min flow +2 gen units. At the WP min flow condition, the channel excavated through the island between the Langdale Dam and powerhouse and flow from Moores Creek (Moores Creek flows were not included in the models as there is poor data on flows in this creek) provides flow to the powerhouse tailrace. During the WP min flow +1 gen unit and WP min flow +2 gen units flows, the powerhouse tailrace receives water through the channel but will also be backwatered from the river downstream of the island. The maximum velocity through the breached dam approaches 4 fps at WP min flow and exceeds 8 fps at the WP min flow +2 gen units, with lower velocities near the shore (Figure 8-15, Figure 8-16, and Figure 8-17). Fish will be able to seek refuge in pools between the dams and will find routes upstream of the dams by avoiding the high velocity areas in the center of the breach, which can be seen in the cross section plots through the breached dam section in each of the figures. High velocities over existing sediments will likely mobilize sand-size substrates, as loose coarse sand is typically mobilized at a near-streambed velocity of 2 fps (Kleinschmidt 2022a). Note Figure 8-15, Figure 8-16, and Figure 8-17 show the location of the remainder of the Langdale Dam that will be left in place, but this is for presentation purposes only. The remainder of dam will be overtopped at higher flows (WP min flow +1 gen unit, WP min flow +2 gen units).

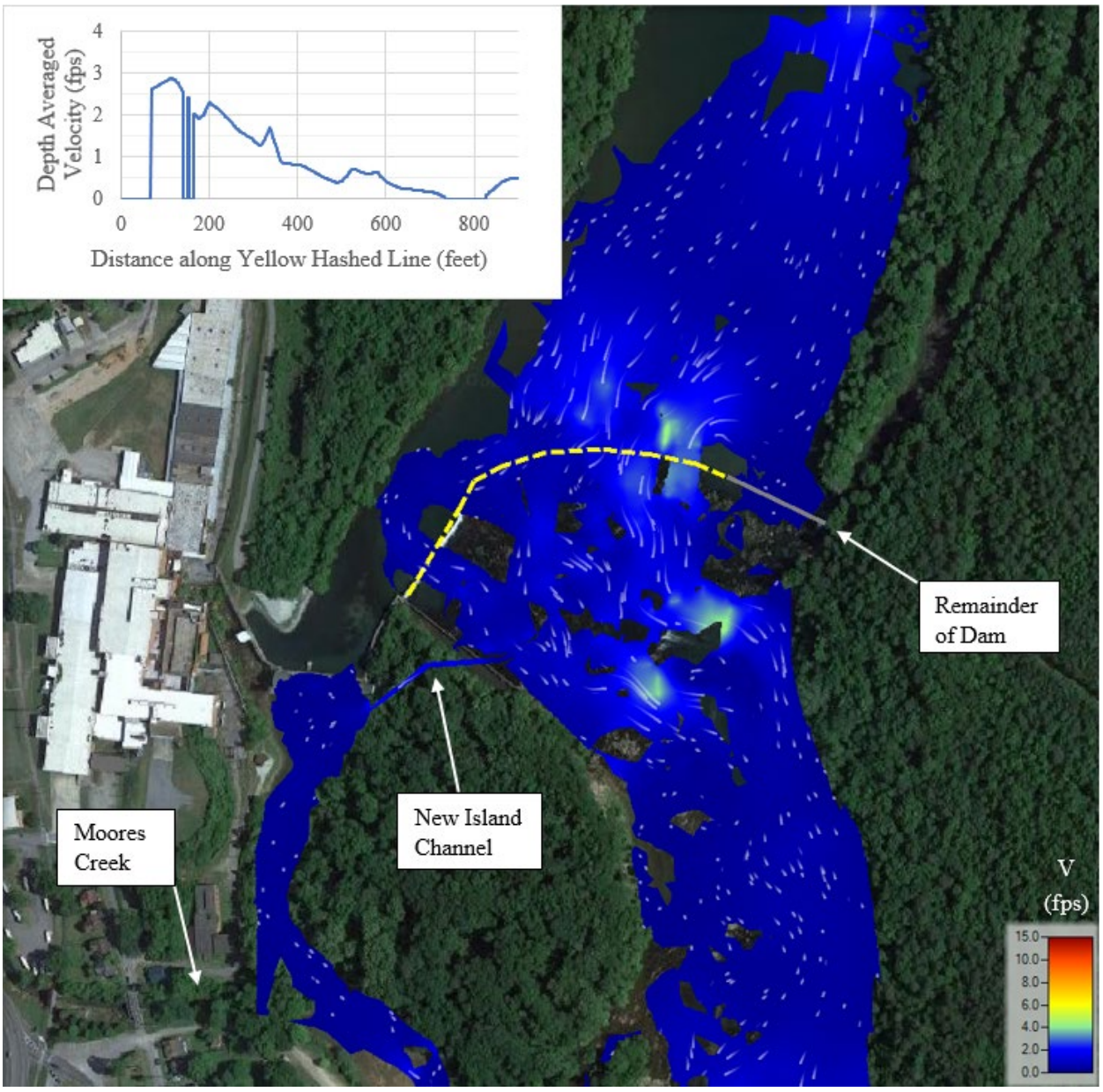


Figure 8-15 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow Velocity and Wetted Area at Langdale Dam

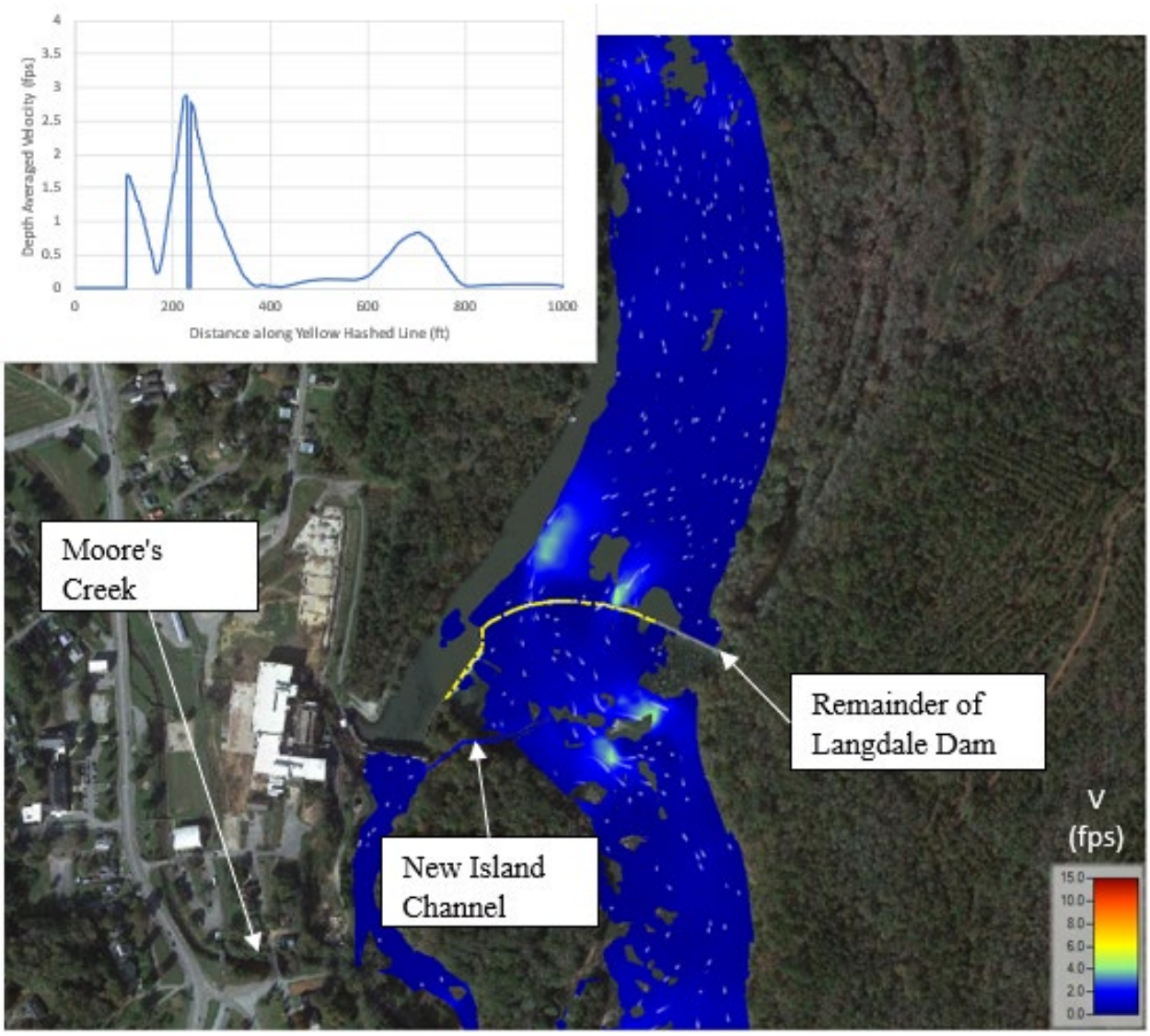


Figure 8-16 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +1 Generating Unit Velocity and Wetted Area at Langdale Dam

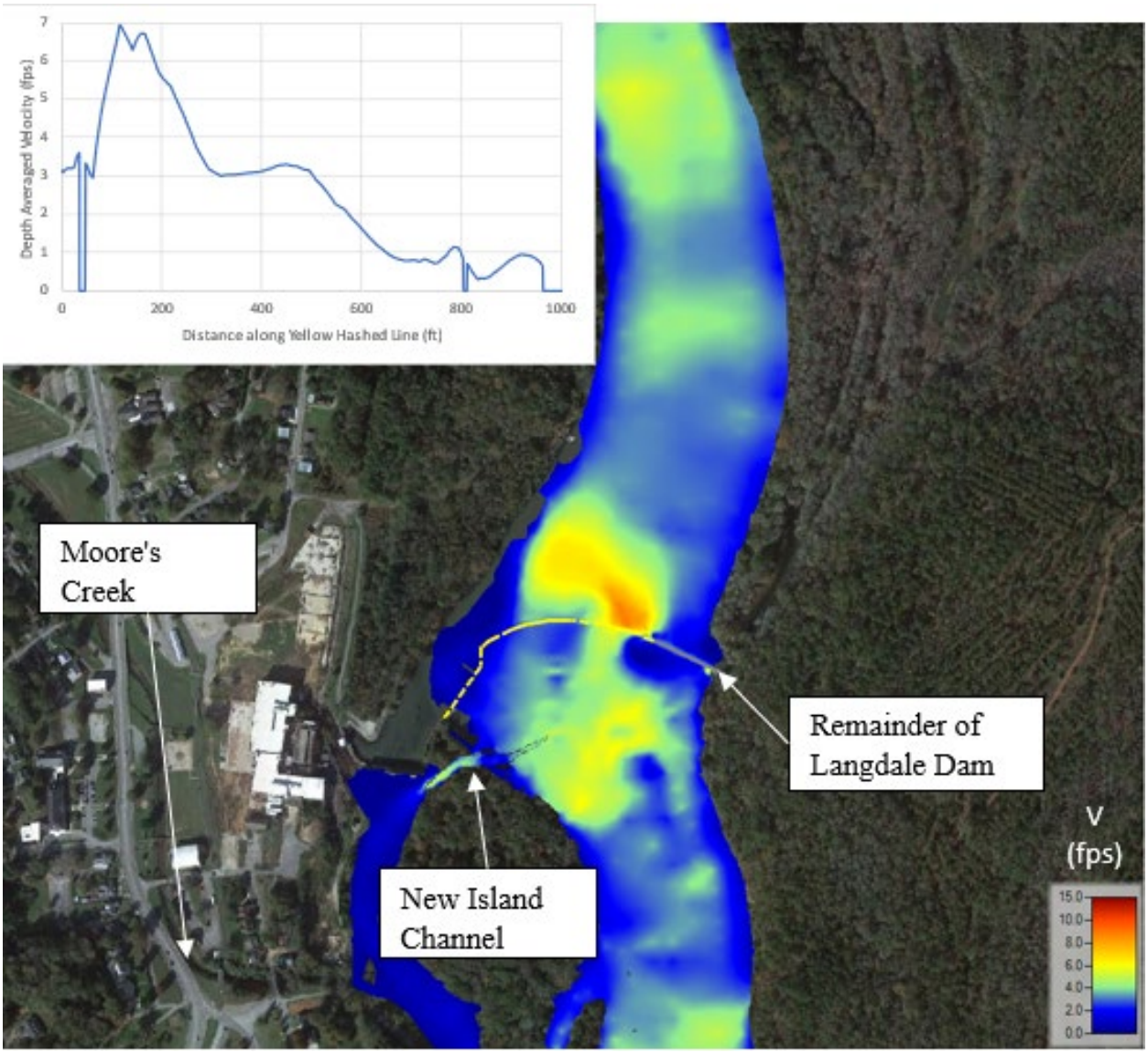


Figure 8-17 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area at Langdale Dam

Adjusting the bathymetry in the Riverview channel using the refusal depth data resulted in substantial changes in the flow distribution in the river. Decreasing the elevation of the Riverview channel's bathymetry, while holding the existing rock weir and rock ramp elevations constant, resulted in most river flow entering the Riverview channel at the WP min flow, even with the removal of the Crow Hop Dam. As noted earlier, no adjustment to the bathymetry upstream of Crow Hop was made because there was not sufficient data to do so. The model shows that with the adjusted bathymetry, the flow through the Crow Hop Dam breach is diminished significantly and centralized through the center of the breach. At the WP min flow, portions of the main river channel are no longer wetted, and the areas downstream from the second and third rock weirs (including the proposed rock

ramp) are dry. At WP min flow +1 gen unit, most of the river would be wetted and at WP min flow +2 gen units the entire river is wetted, similar to existing conditions (i.e., dams in place). Maximum velocities through the breached dam are approximately 2 fps at WP min flow and exceed 8 fps at WP min flow +2 gen units, with lower velocities near the shore (Figure 8-18, Figure 8-19, and Figure 8-20).

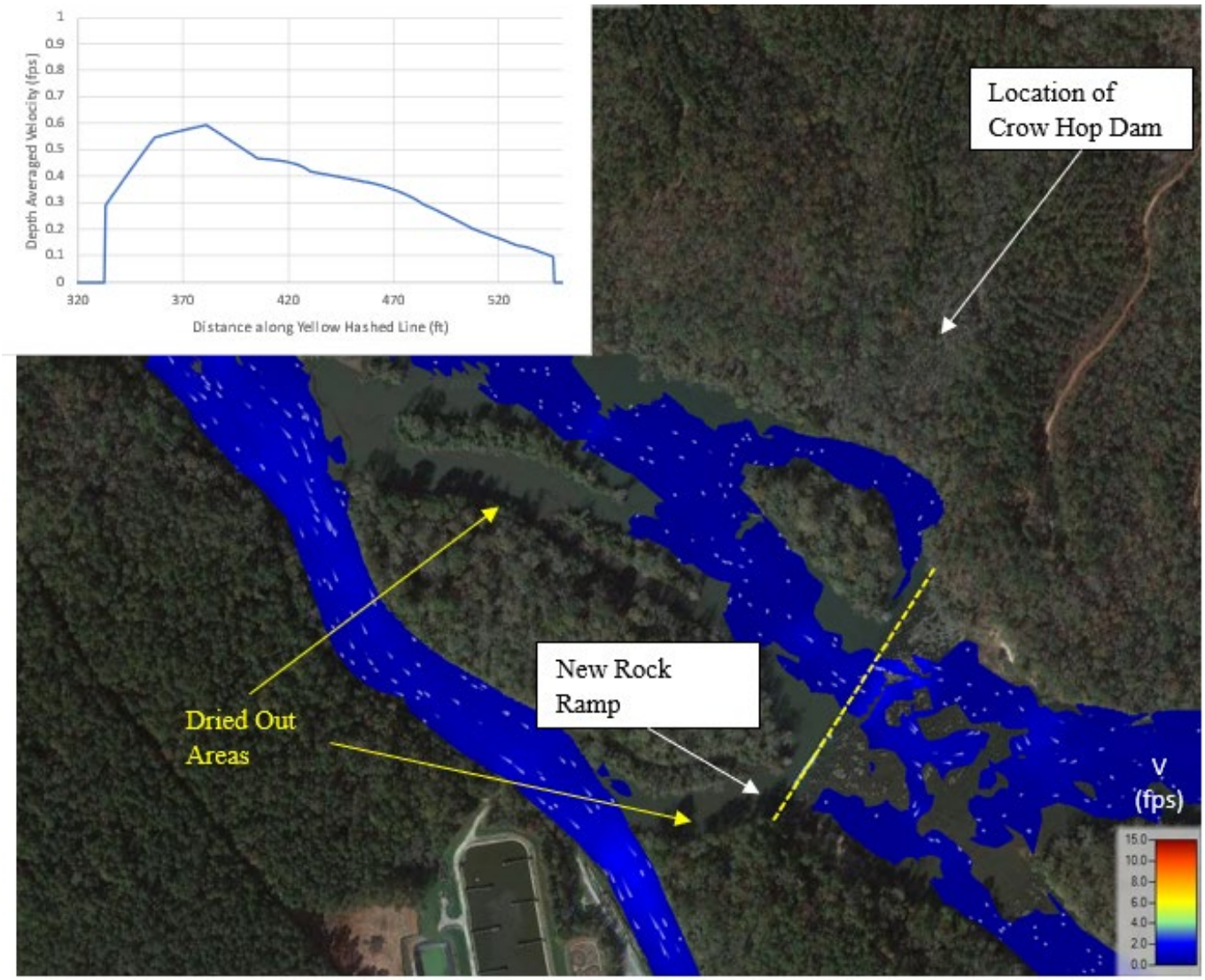


Figure 8-18 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow Velocity and Wetted Area near Crow Hop Dam

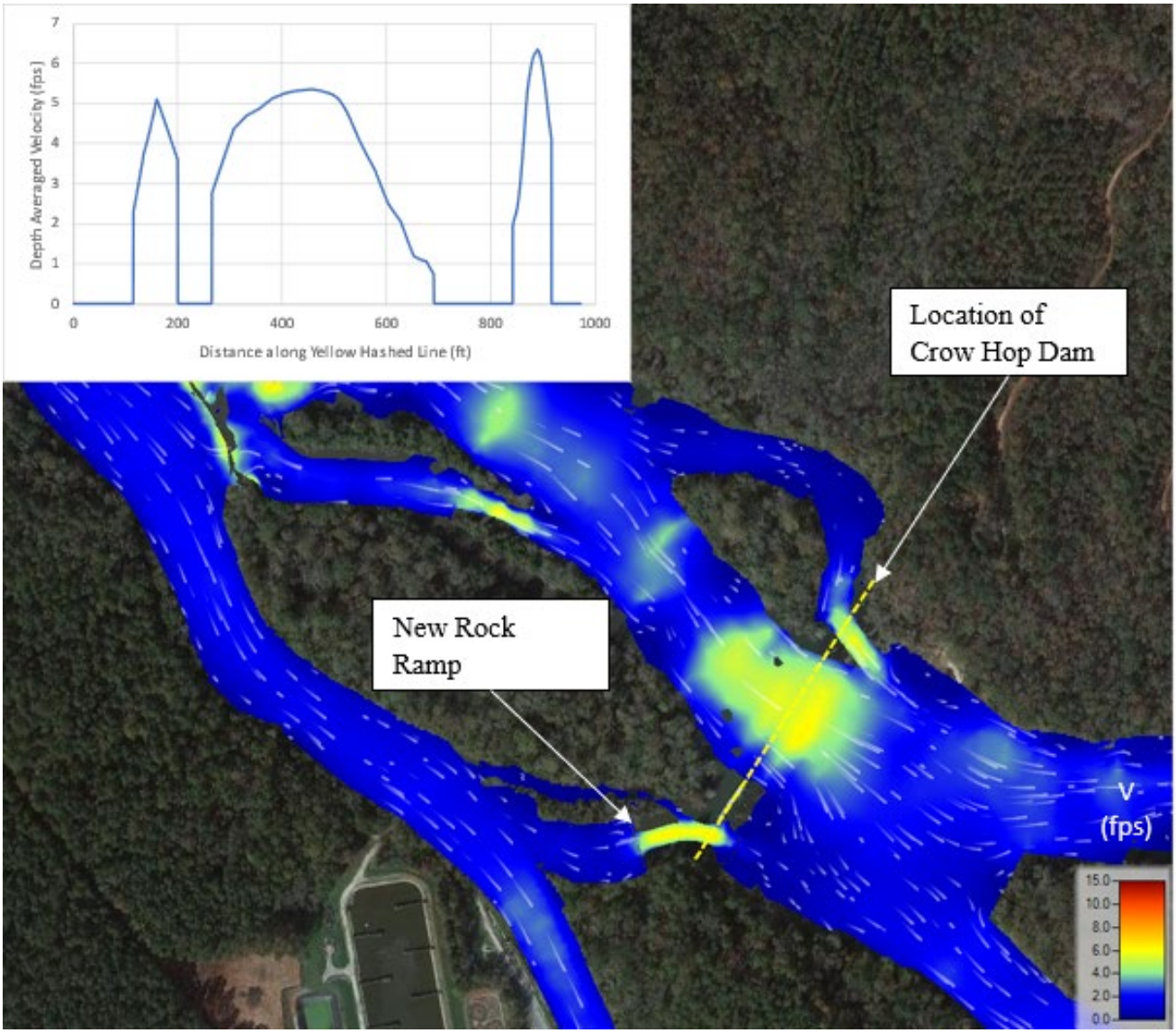


Figure 8-19 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +1 Generating Unit Velocity and Wetted Area near Crow Hop Dam

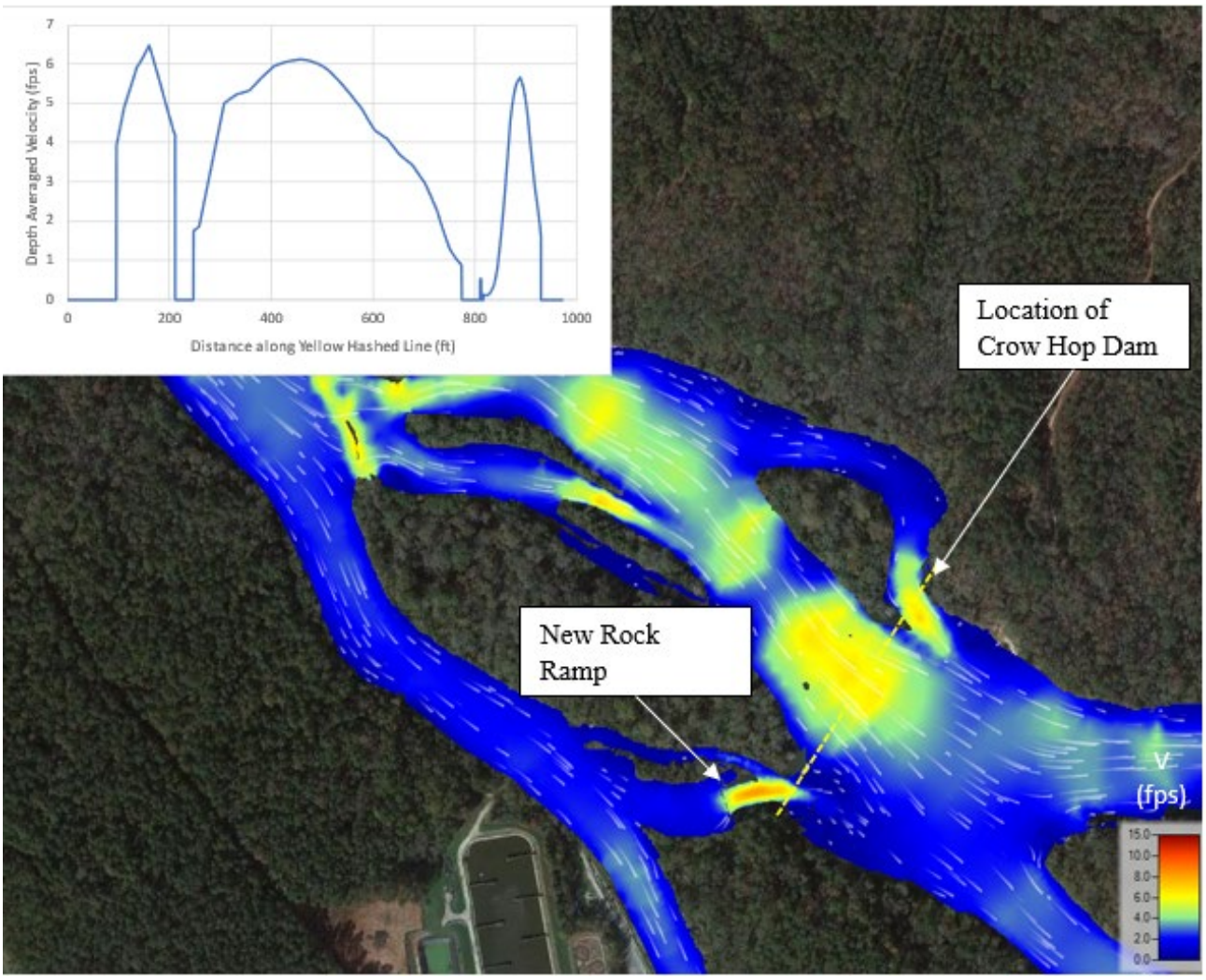


Figure 8-20 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area near Crow Hop Dam

The model indicates that due to the significant increase in flow associated with the adjusted bathymetry in the Riverview channel, the water surface will drop but the area remains wetted under all flow conditions. The steep drop in the terrain where the Riverview Dam is located is removed with the adjusted bathymetry, and velocities spilling over the breached dam will exceed 5 fps at WP min flow and 6 fps at WP min flow +2 gen units, with lower velocities near shore, as well as upstream and downstream of the breach (Figure 8-21, Figure 8-22, and Figure 8-23). It should be noted that high velocities over existing sediments will likely mobilize sand-size substrates, as loose coarse sand is typically mobilized at a near-streambed velocity of 2 fps (Kleinschmidt 2022a). Figure 8-24 provides a comparison of wetted areas near the two Projects after dam removal. While overall river connectivity increases as a result of dam removal, lower water surface elevations (due to dam removal) result in side channels near rock weirs 1-3 having

reduced connectivity to additional river reaches until higher flows are released from West Point. Although some localized water connectivity is limited during WP min flow at the rock weirs, these structures do not act as migration barriers to fish. Upstream and downstream movement of fish can be achieved via the existing Riverview headrace channel, or in the channels and shoal complexes in the main channel during WP min flow. Traversal over rock weirs can be achieved during higher flows during generation activities or other high flow events. Main channel and the Riverview head race channel will substantially improve river longitudinal (upstream and downstream) connectivity removal following dam removal.

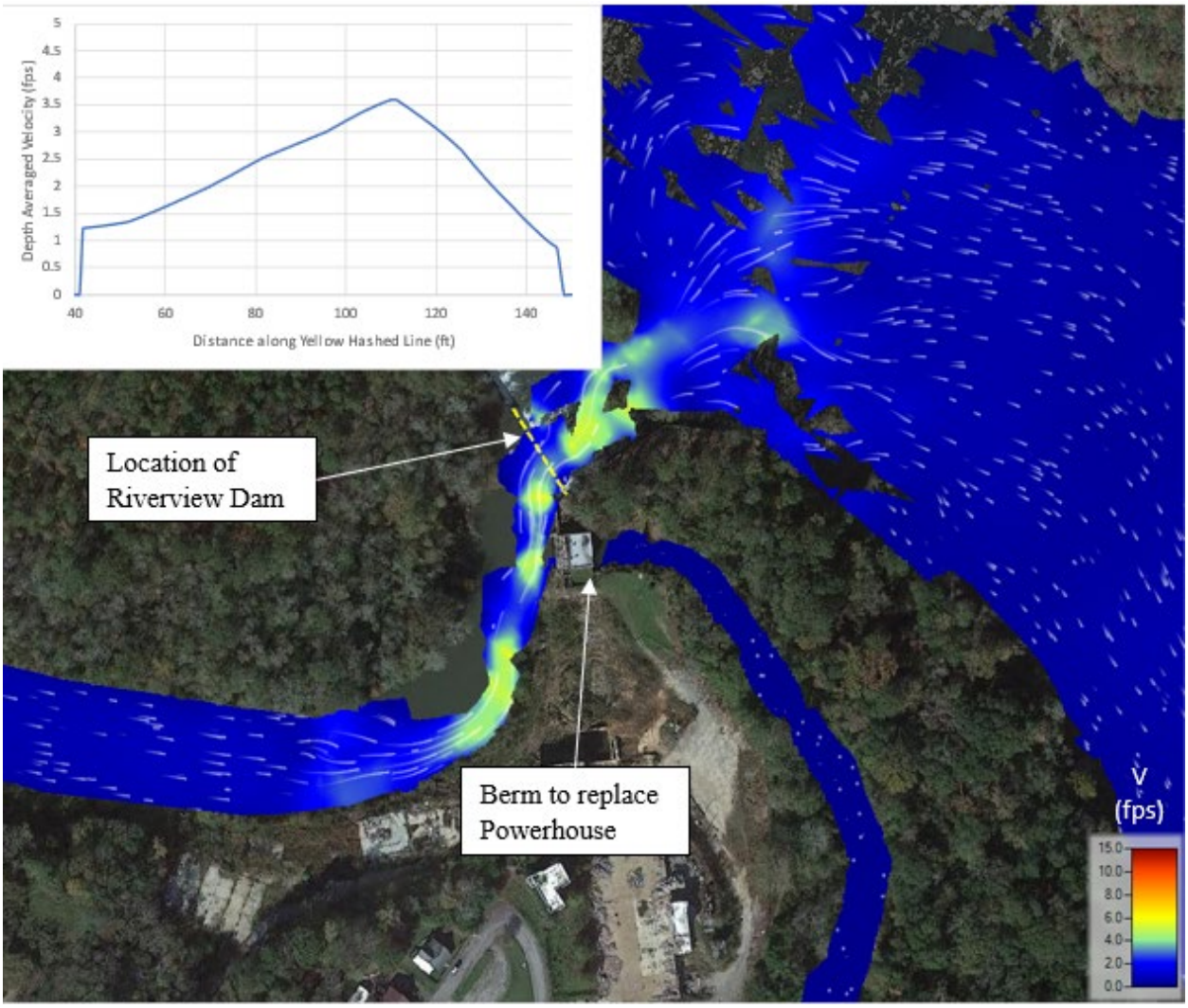


Figure 8-21 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow Velocity and Wetted Area Near Riverview Dam

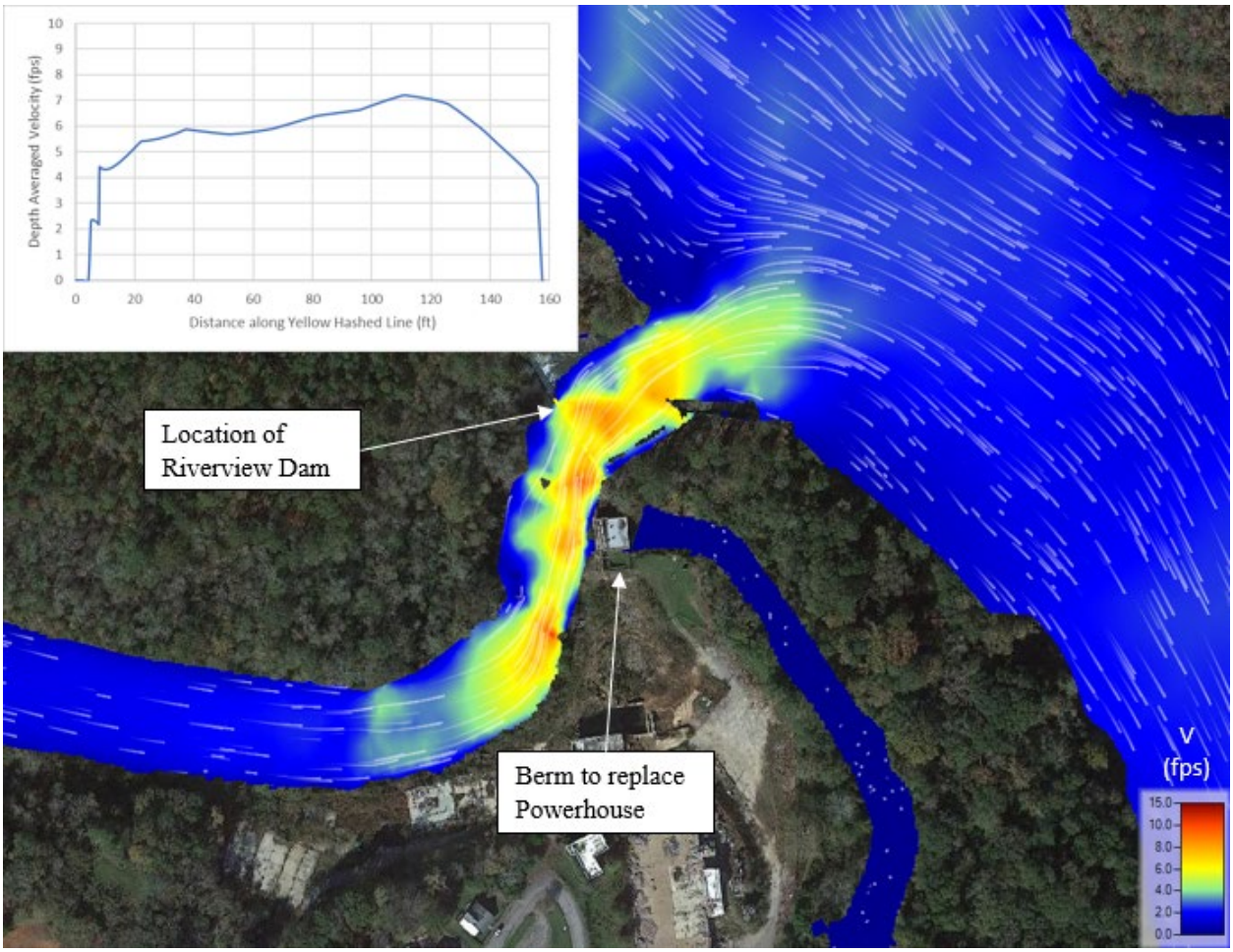


Figure 8-22 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +1 Generating Unit Velocity and Wetted Area Near Riverview Dam

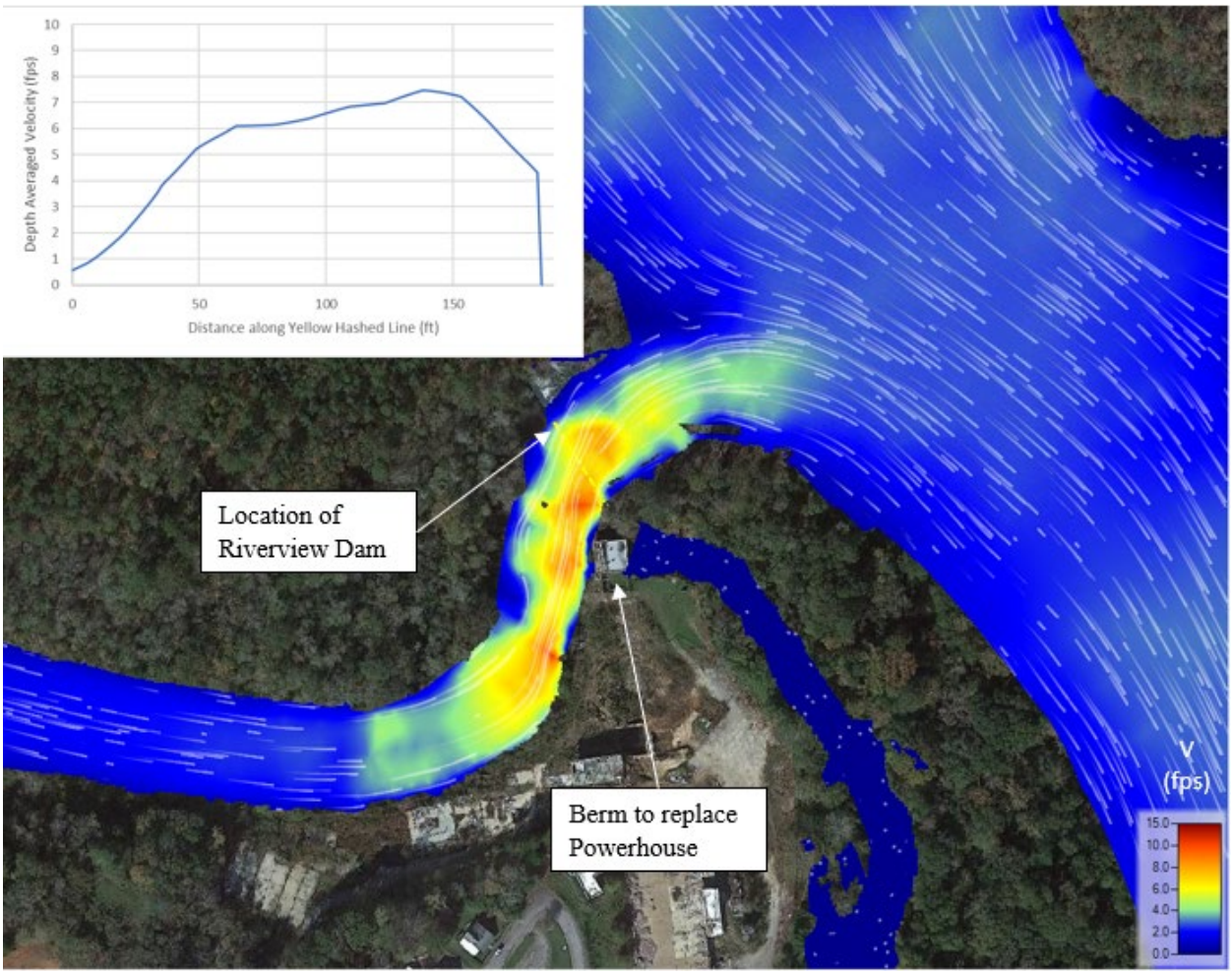


Figure 8-23 Dam Removal, Adjusted Bathymetry – West Point Minimum Flow +2 Generating Units Velocity and Wetted Area Near Riverview Dam

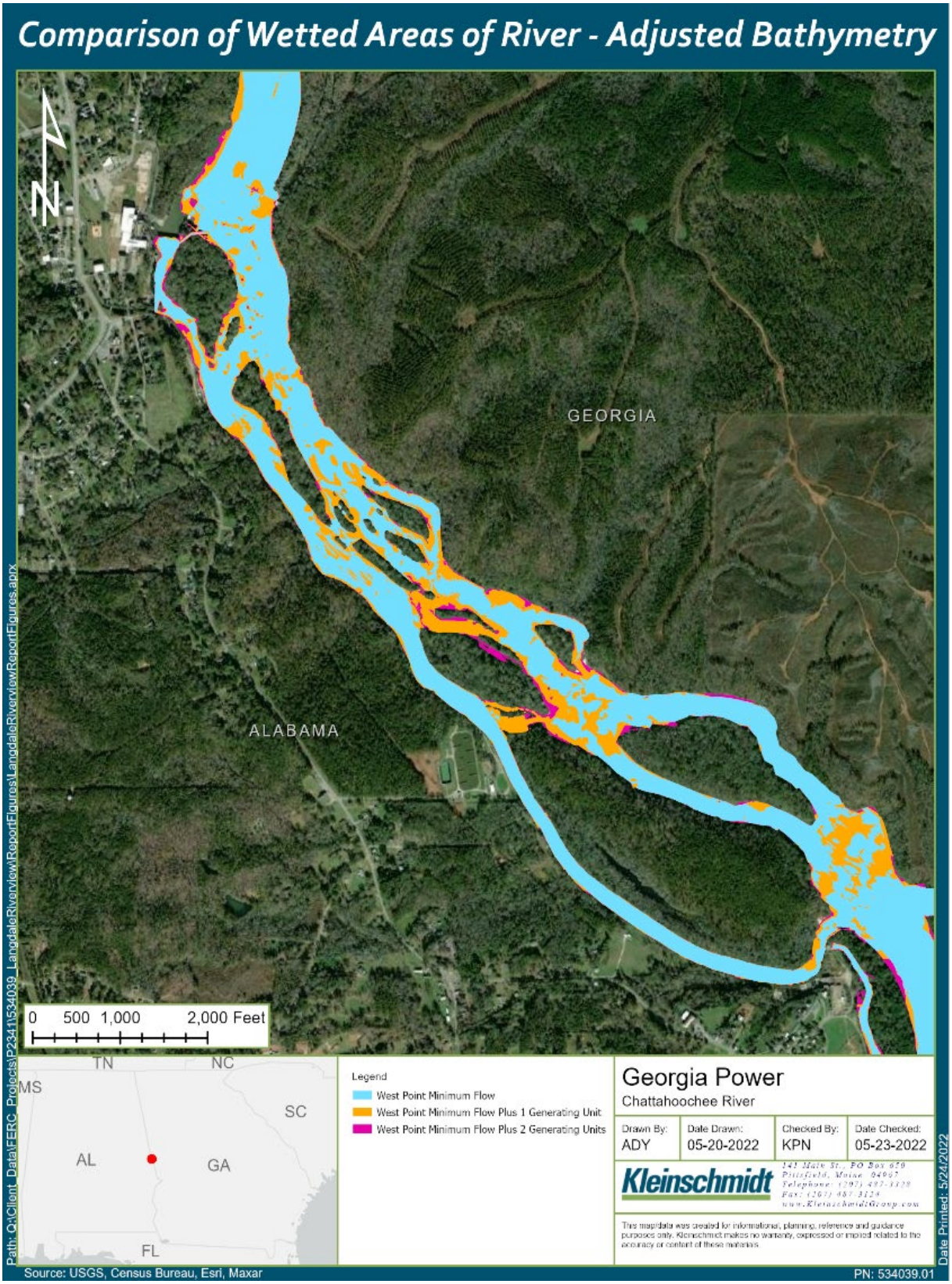


Figure 8-24 Dam Removal, Adjusted Bathymetry – Wetted Areas of the River Post-Dam Removal

8.2.3 Existing Bathymetry – River Flow Distribution

Dam removal results in a redistribution of flow in the Chattahoochee River between its various channels. However, the proposed decommissioning is not anticipated to have any substantial change to the Chattahoochee River below the Riverview powerhouse as flows are redistributed in the Project area, but all return to the main channel below Riverview Dam. There are no proposed changes to the amount of flow in the river. Fish will be able to move throughout the river reaches due to additional connectivity post removal, seek refuge in pools, and find routes upstream to previously unavailable habitat as flows vary across the typical WP releases. Figure 8-25 shows the river near the two Projects with different channels assigned numbers, and Table 8-6, Table 8-7, and Table 8-8 provide the flow in each channel under existing conditions and the post-dam removal, existing bathymetry conditions. Note that flows in some reaches increase and some decrease; however, all remain wetted during WP min flow, WP + 1 gen unit and WP+ 2 gen units and the existing bathymetry condition is expected to transition toward the adjusted bathymetry condition post removal.

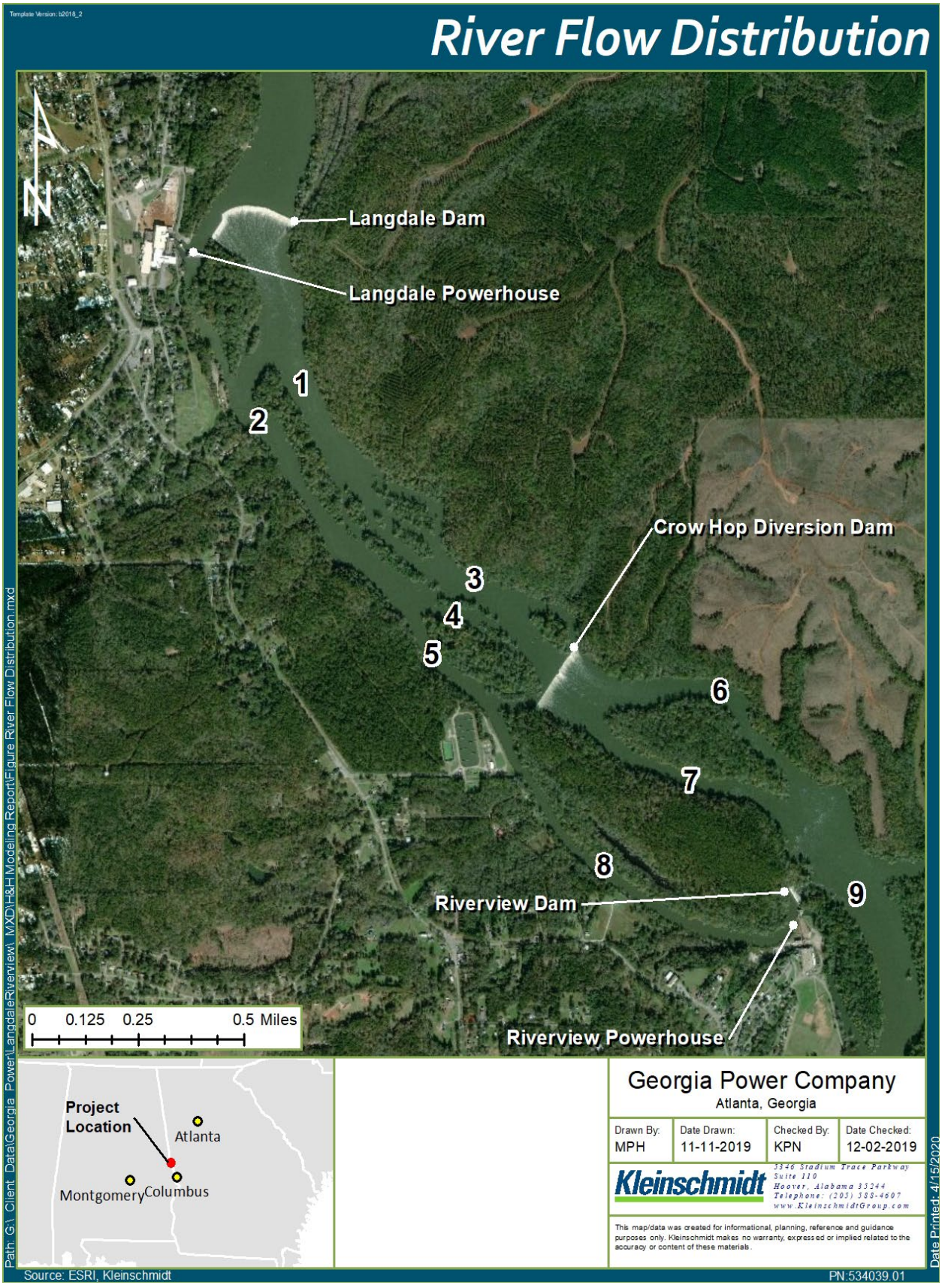


Figure 8-25 Chattahoochee River Flow Distribution Locations

Table 8-6 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	115	86	-29	-25%
2	560	589	29	5%
3	212	291	79	37%
4	35	49	14	40%
5	428	335	-93	-22%
6	74	349	275	372%
7	24	133	109	454%
8	577	193	-384	-67%
9	670	670	0	0%

Table 8-7 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow +1 Generating Unit

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	3,756	3,750	-6	0%
2	4,519	4,525	6	0%
3	5,146	5,999	853	17%
4	1,006	974	-32	-3%
5	2,123	1,302	-821	-39%
6	4,781	5,244	463	10%
7	2,203	2,449	246	11%
8	1,292	583	-710	-55%
9	8,275	8,275	0	0%

Table 8-8 Dam Removal, Existing Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow +2 Generating Units

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	7,940	7,916	-24	0%
2	7,933	7,957	24	0%
3	9,996	11,543	1,547	15%
4	2,050	1,949	-101	-5%
5	3,828	2,382	-1,446	-38%
6	9,234	9,807	573	6%
7	4,706	5,102	396	8%
8	1,934	965	-969	-50%
9	15,875	15,875	0	0%

8.2.4 Adjusted Bathymetry – River Flow Distribution

Removing the dams and adjusting the bathymetry results in a redistribution of flow in the Chattahoochee River between its various channels, as was likely typical prior to the construction of the Projects' dams. Figure 7-5 shows the river near the Projects with different channels assigned numbers, and Table 8-9, Table 8-10, and Table 8-11 provide the flow in each channel under existing conditions (i.e., dams in place) and post-dam removal with the adjusted bathymetry. The model shows a significantly higher flow into the Riverview channel (river location 8) under the three flows. Fish will be able to seek refuge in pools approaching the dam and will have access to the shoals above and below the existing Langdale and Crow Hop dams, and above the Riverview dam.

Table 8-9 Dam Removal, Adjusted Bathymetry Flow Distribution Versus Existing Conditions – West Point Minimum Flow

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	115	81	-34	-30%
2	560	594	34	6%
3	212	80	-132	-62%
4	35	0	-35	-100%
5	428	595	167	39%
6	74	74	0	0%
7	24	5	-19	-79%
8	577	595	18	3%

9	670	670	5	1%

Table 8-10 Adjusted Bathymetry Dam Removal Flow Distribution Versus Existing Conditions – West Point Minimum +1 Generating Unit

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	3,756	3,694	-62	-2%
2	4,519	4,580	61	1%
3	5,146	4,678	-468	-9%
4	1,006	679	-327	-33%
5	2,123	2,919	796	37%
6	4,781	3,879	-902	-19%
7	2,203	1,775	-428	-19%
8	1,292	2,622	1,330	103%
9	8,275	8,275	0	0%

Table 8-11 Adjusted Bathymetry Dam Removal Flow Distribution Versus Existing Conditions – West Point Minimum Flow +2 Generating Units

River Location	Existing Conditions Flow (cfs)	Post-Dam Removal Flow (cfs)	Change in Flow (cfs)	Percent Change in Flow (%)
1	7,940	7,831	-109	-1%
2	7,933	8,044	111	1%
3	9,996	10,358	362	4%
4	2,050	1,563	-487	-24%
5	3,828	3,953	125	3%
6	9,234	8,328	-906	-10%
7	4,706	4,286	-420	-9%
8	1,934	3,261	1,327	69%
9	15,875	15,875	0	0%

As noted in the flow distribution tables, using the adjusted bathymetry resulted in the model predicting more water entering the Riverview channel at all flow conditions. However, an increase in flow does not mean that the water surface elevations in the channel will rise above the existing conditions. Table 8-12 provides water surface elevation in the Riverview channel at the WP min flow and WP min flow +2 gen units. It is important to note that the assumption made in the development of the adjusted bathymetry is that all sediment (as best as could be estimated based on boring log data) in the channel will

mobilize, and the values in Table 8-12 represent the greatest changes in water surface elevation expected based on the conservative assumption.

Table 8-12 Riverview Channel Water Surface Elevation Changes

	West Point Minimum Flow			West Point Minimum flow +2 gen units		
	Existing Water El (feet)	Adjusted Bathymetry Water El (feet)	Change (feet)	Existing Water El (feet)	Adjusted Bathymetry Water El (feet)	Change (feet)
Downstream from Rock Weir No. 3	534	528.8	-5.2	536.8	533.7	-3.1
Upstream of Riverview Dam	532.3	524.77	-7.53	533.2	528.3	-4.9

8.2.5 PME Measures

8.2.5.1 Phase 1 – Pre-Removal Phase

There are no specific activities relative to fish and aquatic resources that would occur in the pre removal phase of the dam decommissioning. All studies relative to fisheries and other aquatic organisms present at the Projects were conducted during the pre-filing[19] decommissioning process.

8.2.5.2 Phase 2 - Removal Phase

Georgia Power proposes to leave a 10-foot dam abutment on the west side of the Langdale Dam and an approximately 300-feet on the east side of the Langdale Dam at a lower elevation which would leave the 10-foot-long section abutting the shoreline at full height. Leaving a portion of the dam beyond the shoreline abutment is necessary to help distribute water towards the western side of the channel and reduce water velocities on the eastern side would address USFWS and GDNR requests to lower velocities in this area to aid in fish movement.

During dam removal, Georgia Power will implement the Aquatic Organism Recovery Survey and Relocation Plan (Appendix D). During drawdown of the impoundments at each Project, biologists will conduct surveys to monitor for potentially stranded fish and mussels and relocate as needed.

[19] Prefiling refers to the period preceding Georgia Power filing the Decommissioning Plan, APEA, and all studies with FERC.

8.2.5.3 Phase 3 – Post Removal Phase

Georgia Power proposes to implement the Post Removal Shoal Bass Abundance and Tracking Study which would be compared to the Pre Dam Removal Shoal Bass Abundance and Tracking Study to assess the effects of dam removal on Shoal Bass abundance, mobility, genetic mixing, and habitat.

Georgia Power proposes to implement a Post Removal Monitoring Plan for a period of no more than 12 months Post Removal to ensure bank stability and prevent erosion. The Post Removal Monitoring Plan includes revegetation activities to reestablish vegetative communities both in the riparian zone and upland. The Post Removal Monitoring Plan would have a beneficial effect on riparian and aquatic habitat.

8.3 Unavoidable Adverse Impacts

Decommissioning and removal of the Langdale and Riverview Projects could potentially have unavoidable short-term impacts to aquatic organisms (fish and macroinvertebrates). The transport of stored sediment may temporarily accumulate at downstream locations before reaching Lake Harding. This could result in temporary impacts to preferred fish spawning grounds such as gravel beds. Sediments transported through the affected reach could scour periphyton (i.e., attached algae) and macroinvertebrates resulting in short-term effects to some fish species that utilize these as food sources (Wood and Armitage 1997).

Another potential short-term adverse impact would be shifting of littoral habitat and possible stranding of aquatic species as the water level decreases back to historic or more natural levels. To minimize impacts, Georgia Power will implement the Aquatic Organism Recovery Survey and Relocation Plan.

9.0 WILDLIFE AND TERRESTRIAL RESOURCES

9.1 Affected Environment

9.1.1 Wildlife

Wildlife resources are dependent on the quality of Langdale and Riverview Project lands and the surrounding lands. The Langdale and Riverview Project lands have low wildlife value. Wildlife that can tolerate human activities are the primary users of available habitat in the area. This includes Songbirds (*Passeriformes spp.*), Raccoons (*Procyon lotor*), Rabbits (*Leporidae spp.*), Squirrels (*Sciuridae spp.*), and Virginia Opossums (*Didelphis virginiana*). On the eastern side of the Chattahoochee River in Georgia, the land is less developed and primarily forested near the Project area (Georgia Power 2018a, 2018b).

There are approximately 51 mammal species present in Alabama and Georgia that may occur within the Langdale and Riverview Project vicinity. Of these species, the most likely to occur in the habitats surrounding the Projects are White-tailed Deer (*Odocoileus virginianus*), Coyote (*Canis latrans*), Grey Fox (*Urocyon cinereoargenteus*), Red Fox (*Vulpes vulpes*), raccoon, and several other small mammals. Since the Langdale and Riverview Projects are along a river corridor, it is likely that a variety of species may cross through the Project Boundaries (Georgia Power 2018a, 2018b).

Limited habitat for reptiles and amphibians may be available within the Langdale and Riverview Project area. Wetlands with adjacent and undeveloped uplands may provide aquatic breeding sites, terrestrial habitat, and migration pathways for amphibians (Georgia Power 2018a, 2018b).

The Alabama Ornithological Society lists 420 bird species that occur within Alabama. Of these birds, 178 bird species are known to breed in Alabama, with 158 bird species regularly breeding within the state (ADCNR 2022). Migratory and non-migratory birds are anticipated to use the habitats available within the Langdale and Riverview Project area for feeding, nesting, mating, or as a travel corridor. Migratory Waterfowl species, such as the Mallard (*Anas platyrhynchos*) are expected to utilize the Langdale and Riverview Project area during breeding season. Neotropical species like Flycatchers (*Tyrannidae spp.*) and Warblers (*Parulidae spp.*) are likely to occupy land surrounding the Langdale and Riverview Projects during spring, summer, and fall before returning to the tropics in the winter season. Passerine species may inhabit the shrubland areas, forest, roadsides, and

residential areas. Many avian species may also occupy the littoral zone within the Langdale Project area (Georgia Power 2018a, 2018b).

Wildlife habitat managed within the Langdale and Riverview Project vicinity include the Blanton Creek Wildlife Management Area (WMA), managed by the GDNR and Georgia Power; the Blanton Creek Matching Aid for Restoring State Habitat (M.A.R.S.H) Project managed by GDNR and Georgia Power; West Point WMA managed by the USACE and GDNR; and the Roosevelt State Park which is managed by GDNR (Georgia Power 2018a, 2018b).

Local WMAs are generally managed for White-tailed Deer, Eastern Wild Turkey (*Meleagris gallopavo*), Ducks (*Anatidae spp.*), Geese (*Anatidae spp.*), Northern Bob-white Quail (*Colinus virginianus*), Rabbit, and Squirrel. Additionally, management of these areas also benefits nongame animals, including Chipmunks (*Sciuridae spp.*), Mice (*Rodentia spp.*), Skunks (*Mephitis mephitis*), and furbearers such as: Raccoon, Virginia Opossum, North American Beaver (*Castor canadensis*), Common Muskrat (*Ondatra zibethicus*), American Mink (*Neovison vison*), and River Otter (*Lontra canadensis*). Management areas provide natural habitat, supplemental housing, and food for Songbirds, birds of prey, reptiles, and amphibians (Georgia Power 2018a, 2018b).

9.1.2 Terrestrial Resources

The land located on the eastern side of the Chattahoochee River in Harris County, Georgia within the Langdale and Riverview Project boundaries consists of hardwood and pine forests. Mast producing trees (oaks and hickories) in this area provide foraging resources and cover for wildlife. The surrounding lands outside the Project boundaries are a mixture of forest, agricultural land, and developed areas. The forested areas are periodically harvested, and therefore found in several successional stages from early to mature forest, however no old growth forest or forests over 25 years old are within this area (Georgia Forestry Commission 2015). On the western side of the Chattahoochee River in Alabama, the proximity of industrial and urban residential development limits the availability of naturally vegetated terrestrial habitats (Georgia Power 2018a).

Extensive alluvial wetland systems have developed in and are adjacent to the Langdale and Riverview Project lands. Wetlands form on river-deposited sediments from the Chattahoochee River and tributaries and include extensive palustrine forested (PFO) wetlands (USFWS 2018). Upstream of the dams, wetlands are dominated by palustrine emergent marsh (PEM), palustrine scrub-shrub (PSS), and palustrine unconsolidated

bottom (PUB). These well-developed, forested wetlands provide important habitat for wetland and water-dependent species including Beaver, Waterfowl, and Wading Birds. Wetlands within and adjacent to the Langdale and Riverview Projects, according to the National Wetlands Inventory (NWI) are shown in Figure 9-1 (Georgia Power 2018a, 2018b).

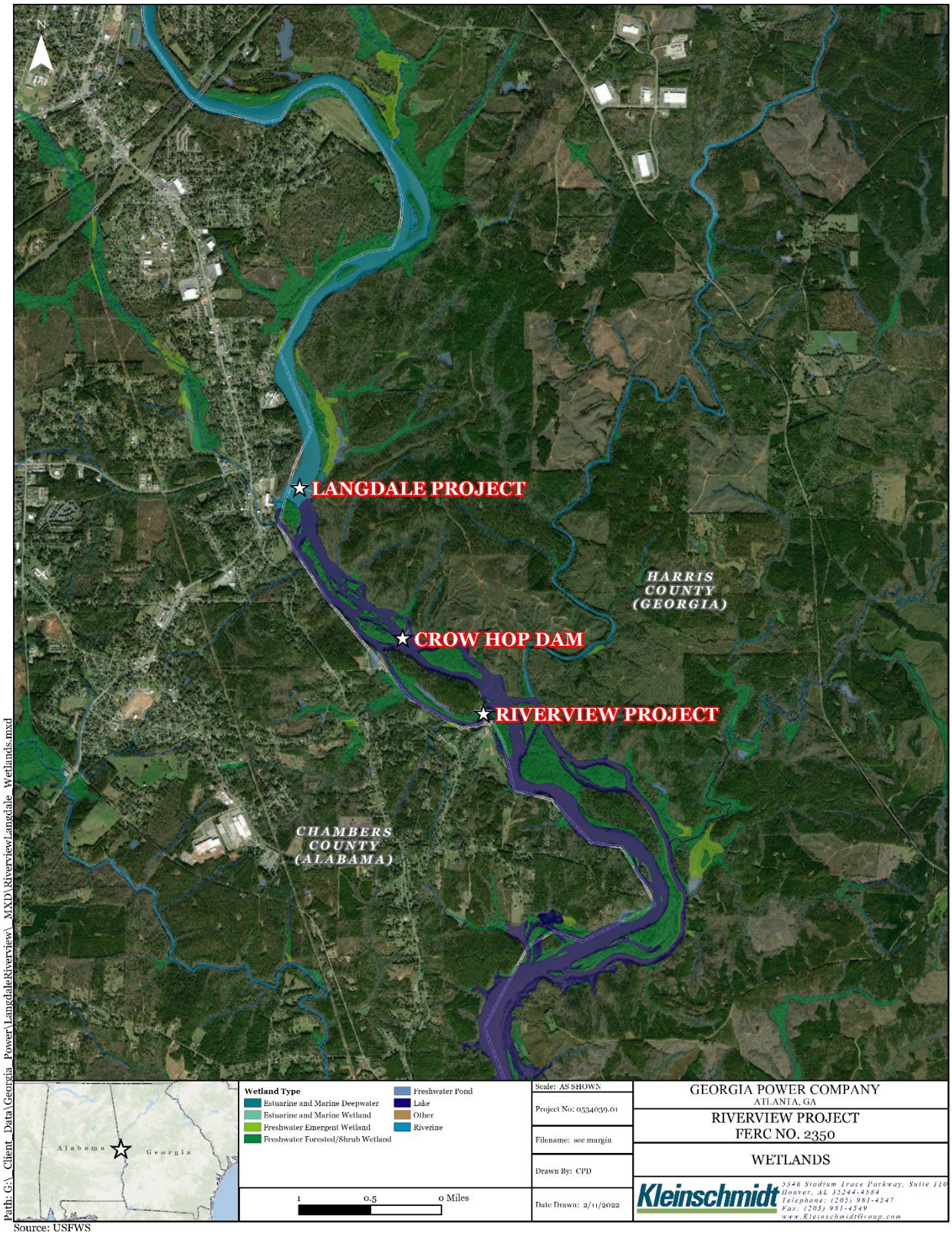


Figure 9-1 NWI Wetland near the Langdale and Riverview Projects

In 1988, Georgia Power conducted field surveys to describe existing botanical resources within the Langdale Project area (Gaddy 1989a; 1989b). The dominate plant species along this section of the Chattahoochee River are associated with PFO plant communities which includes tree species such as Black Willow (*Salix nigra*), American Sycamore (*Platanus occidentalis*), Boxelder (*Acer negundo*), and Chinese Privet (*Ligustrum sinense*). Typical understory species include Virginia Buttonweed (*Diodia virginiana*), Common Needlerush (*Juncus effusus*), Winged Sedge (*Carex alata*), Punctate Knotweed (*Persicaria punctata*), and Hop Sedge (*Carex lupulina*). Four plant communities were described as existing within the Langdale Project boundary, including pine-mixed hardwoods (6 acres), mixed hardwood pine (5 acres), hardwood floodplain (1 acre), and non-woody emergent (0.5 acre) (Georgia Power 2018a).

Upland vegetation in Project area and vicinities is composed primarily of mixed deciduous hardwood forest along low lying areas, such as adjacent wetlands near the Chattahoochee Rivers and tributaries. In drier areas, forests are primarily oak-hickory and pine forests. Typical hardwood species include Post Oak (*Quercus stellata*), Blackjack Oak (*Quercus marilandica*), Red Oak (*Quercus falcata*), White Oak (Quercus alba), Mockernut Hickory (*Carya alba*), and Sweetgum (*Liquidamber styraciflua*). Shortleaf Pine (*Pinus echinata*) is the most common pine species, though Loblolly Pine (*Pinus teada*) grows on heavier soils (SCS 1956; Georgia Forestry Commission 2015).

The island between the Riverview and Crow Hop dams is privately owned except for the small portion of land that abuts the dam, which is owned by Georgia Power. The island is primarily a Loblolly Pine forest but supports a narrow hardwood floodplain, a hardwood bluff area, and an old rock quarry pond (Georgia Power 2018b).

9.2 Environmental Analysis

The primary activities affecting Projects' wildlife and terrestrial resources are construction activities related to the removal of Project structures and the subsequent flows, velocities, and wetted area. Georgia Power conducted studies and associated analyses that pertain to effects on wildlife and terrestrial resources. Those analyses are presented in detail in the following reports and summarized herein:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report
- Draft Sediment Quality Study Report
- Draft Sediment Transport Assessment Study Report

Table 9-1 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on wildlife and terrestrial resources at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre-removal, removal, post removal).

Table 9-1 Proposed PME Measures that may Potentially Affect Wildlife and Terrestrial Resources

PROPOSED PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal

9.2.1 PME Measures

9.2.1.1 Phase 1 – Pre Removal Phase

Negligible changes are expected to wildlife resources along the Chattahoochee River associated with the Proposed Action. No critical wildlife habitats are within the Langdale and Riverview Project Boundaries. Distribution of wildlife species may shift slightly but the diversity and density of species is expected to remain intact. Most terrestrial species common to the area are species generalists and therefore are expected to be found in a variety of habitats throughout the Langdale and Riverview Project Vicinities and adjacent lands. (Georgia Power 2018a, 2018b).

Upland and riparian habitats would be temporarily affected during decommissioning activities from heavy equipment but are expected to return to existing conditions following the Langdale, Riverview and Crow Hop Dam removals (Georgia Power 2018a, 2018b). Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan that includes best management practices (BMP) to address potential impacts associated with the Proposed Action. Specifically, during pre-removal, Georgia Power would install timber mats over all sensitive resource areas (such as wetlands) as work commences. Timber mats lessen ground disturbance from heavy equipment and would provide a protective layer for wetlands. In addition, Georgia Power would flag the boundaries of clearing limits at construction sites and access roads to prevent the disturbance of riparian vegetation and wetlands.

9.2.1.2 Phase 2 - Removal Phase

No significant changes to wetland botanical structure or function would occur downstream of the dams. These wetlands would likely continue to flood during high flows, and therefore continue to support the existing habitat (Georgia Power 2018a, 2018b). However, the removal of Projects' dams would reduce wetted areas upstream of the dam (Kleinschmidt 2022a), directly affecting upland terrestrial, wetland, riparian, and littoral habitats for wildlife and botanical resources. Some wetlands may become drier during lower flows due to the lowering of the impoundment and return to a riverine condition. As a result, some of the existing PFO wetlands would likely become alluvial upland forest. However, new PEM, PSS, and PFO wetlands would form along the riverbanks exposed by dam removal and impoundment lowering. Tributaries upstream of the dam would continue to help maintain wetlands, both in terms of sediment and hydrologic inputs. These wetlands would continue to provide habitat to those aquatic and terrestrial species

that favor wetland habitat. USACE provided guidance (Regulatory Letter Guidance No. 18-01 Date: 25 September 2018) on jurisdictional wetlands in the removal of obsolete dams. USACE states that "most of the adverse effects from removing dams and other obstructions are short-term and are eventually supplanted by the long-term restoration of stream structure, function, and dynamics" (USACE 2018a).

Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan that includes BMPs to address potential impacts associated with the Proposed Action. During removal, Georgia Power would minimize the area and duration of exposed areas, install rip rap for bank stabilization, and ensure all temporary erosion controls are in place until construction is complete to prevent the disturbance of riparian vegetation and wetlands. In addition, Georgia Power would seed and mulch all disturbed areas as final grades are achieved to mitigate for any disturbance of terrestrial resources.

Sediments stored behind the Projects' dams would be mobilized by the removal, as post removal velocities are anticipated to be high enough to mobilize sand size particles upstream of the existing dams (Kleinschmidt 2022b).

9.2.1.3 Phase 3 – Post Removal Phase

Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan that includes BMPs to address potential impacts associated with the Proposed Action. Georgia Power also proposes to implement a Post Removal Monitoring Plan for a period of up to 12 months after the removal of the Langdale, Riverview and Crow Hop dams that would promote revegetation and ultimately enhance terrestrial resources following dam removal. Georgia Power would establish permanent vegetation of upland laydown areas and temporary access roads to mitigate for any disturbance of upland vegetation.

9.3 Unavoidable Adverse Impacts

Construction activities associated with the Proposed Action at the Langdale and Riverview Projects may cause short-term disturbance to the terrestrial environment due to deployment of construction machinery. Implementing construction BMPs and procedures would reduce or eliminate adverse impacts to terrestrial resources. In addition, construction activities may temporarily displace wildlife in the immediate area; however, most species are expected to return post removal.

10.0 RARE, THREATENED, AND ENDANGERED SPECIES

10.1 Affected Environment

10.1.1 Terrestrial Species

During a survey of the Chattahoochee River along the Langdale Project and Riverview Project area performed by Georgia Power in the early 1990s, no state or federally listed RTE terrestrial species were identified (Gaddy 1991a-d; ESTI 1992, 1990. However, a helicopter flyover of the Riverview Project was performed in 1992 and observers noted a small patch of Shoals Spider Lily (*Hymenocallis coronaria*) located approximately 400-feet-downstream of Riverview.

A Bald Eagle (*Haliaeetus leucocephalus*) nesting site was located approximately 0.5 miles from the Riverview Project where suitable foraging habitat exists within the Project waters. Bald Eagles are no longer listed or protected under the ESA, but they are still protected under the Bald Eagle and Golden Eagle Protection Act.

A USFWS Information Planning and Conservation (IPaC) report for the Langdale and the Riverview Project area (generated on December 2, 2020) listed the potential of three migratory birds as Birds of Conservation Concern (BCC): Prairie Warbler (*Dendroica discolor*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), and Wood Thrush (*Hylocichla mustelina*). Each of these species is designated as a BCC throughout its range in the United States. The threatened plant, Georgia Rockcress (*Arabis georgiana*), and endangered clam, Oval Pigtoe (*Pleurobema pyriforme*) were listed as potentially occurring within the Langdale and Riverview Project area; additionally, a later IPaC report (generated on February 14, 2022) included the candidate insect Monarch Butterfly (*Danaus plexippus*). Further, a review of Georgia's Natural Archaeological, and Historic Resources GIS (GNAHRGIS) online database indicated threatened Relict Trillium had a known occurrence within three miles of the project survey areas. Suitable habitats for Relict Trillium were located on the Georgia side of the Chattahoochee River of the Langdale and Crow Hop Dam Project areas. In May 2022, a survey for Relict Trillium was performed within the Project area, but no Relict Trillium or other trillium species were located within the surveyed areas (Appendix D). No designated critical habitat for any of these species has been established on the Langdale or Riverview Project lands (USFWS 2020, 2022).

Recent searches within the GDNR Database (2022) detail the potential occurrence of several terrestrial species of plants and wildlife of conservation concern within Harris County, GA. However, no terrestrial species of conservation concern have been observed in the Project area.

10.1.2 Aquatic Species

Shoal Bass are a popular species for Chattahoochee River angling and are currently recognized by the Alabama Department of Conservation and Natural Resources (ADCNR) and the GDNR as a high priority, rare species. Studies involving Shoal Bass in the vicinity include a radio telemetry study performed in 2010, that resulted in the collection and tagging of 40 Shoal Bass in the Chattahoochee River within the headwaters of Bartletts Ferry Reservoir (Sammons and Earley 2015, Sammons 2011). Movement analysis from this study revealed that the majority of Shoal Bass remained in the reach from the Riverview Dam's Shoal Areas, moving slightly downstream to where flow was noticeably impounded. The majority of tagged Shoal Bass remained in their preferred habitat (shoals, rocky areas, and bedrock outcroppings), which would suggest that Shoal Bass likely would remain upstream of the Riverview Project where those habitats are more prevalent (Sammons 2011).

In 2021, Kleinschmidt Associates conducted surveys for Shoal Bass on the Chattahoochee River in the vicinity of the Langdale and Riverview Projects and in Flat Shoal Creek, a tributary to the Chattahoochee River. Results from this study are discussed in Section 8, Fish and Aquatic Resources. There is expected to be a short-term and long-term response of Shoal Bass to the removal of the Project dams. Following dam removal, habitats at the existing dam sites are anticipated to transition from sandy pools to runs with coarse substrates once river hydraulic conditions and substrates stabilize. The short-term response is predicted to be the initial dispersal of existing juvenile and adult Shoal Bass and exploration into newly accessible habitats. The dam removal will allow adult and juvenile Shoal Bass to travel freely between the spawning and nursery grounds in Flat Shoal Creek throughout into the Chattahoochee River and upstream to the shoals downstream of West Point dam. The long-term response of Shoal Bass could include shifts in habitat use, potential colonization of previously inaccessible shoals, or changes in reproduction and recruitment.

In addition to Shoal Bass, other rare fish species collected in the 2021 surveys include Bluestripe Shiner (*Cyprinella callitaenia*, Alabama Imperiled, Georgia Rare), and Apalachicola Redhorse (*Moxostoma sp*., Alabama Imperiled, Georgia Vulnerable). Under

existing conditions, the homogeneous sandy, stagnant habitats in the impounded areas do not provide suitable habitat for Shoal Bass and are generally poor habitat for other fluvial specialists, intolerant, or non-generalist fish species. After substrates are mobilized with increased water velocities following dam removal, this area is likely to reveal additional rocky habitats, providing suitable habitats for Bluestripe Shiner, Apalachicola Redhorse, and other benthic fluvial specialists. By revealing additional shoal habitat and eliminating impounded conditions that currently exist in the Project area, the Proposed Action would improve and interconnect habitats within the Chattahoochee River that have been separated since dam construction over 100 years ago.

Mussel surveys in the Langdale and Riverview Project locations were conducted in 2009 and 2010 (Georgia Power 2012). During these surveys, a single Delicate Spike was collected. This species is considered endangered in the state of Georgia and is under review for federal listing status (Table 10-1). An additional mussel survey was conducted in 2020, with the objective of targeting specific species deemed federally endangered Gulf Moccasinshell, federally threatened Oval Pigtoe and Purple Bankclimber, or state endangered Delicate Spike were targeted (Georgia Power 2020b). None of the target species were collected within the Langdale or Riverview Project vicinity. None of the mussel species with any status of concern were collected during the 2020 mussel survey (Georgia Power 2020b).

Table 10-1 Fish and Mussel Species with State or Federal Conservation Status in Chambers County, Alabama and Harris County, Georgia

Mussel Species	Scientific Name	Status
Purple Bankclimber	*Elliptiodeus sloatianus*	Threatened (Federal), Imperiled (Georgia)
Oval Pigtoe[20]	*Pleurobema pyriforme*	Threatened (Federal)
Finelined Pocketbook	*Lampsilis altilis*	Threatened (Federal)
Ovate Clubshell	*Pleurobema perovatum*	Endangered (Federal)
Gulf Moccasinshell	*Medionidus penicillatus*	Endangered (Federal), Critically Imperiled (Georgia)
Southern Elktoe	*Alasmidonta triangulate*	Under Review (Federal), Critically Imperiled (Georgia)
Delicate Spike	*Elliptio arctata*	Under Review (Federal), Endangered (Georgia)
Alabama Spike	*Elliptio arca*	Imperiled (Alabama)
Sculptured Pigtoe	*Quadrula cylindrica*	Critically Imperiled (Alabama), Vulnerable (Georgia)
Fish Species	*Scientific Name*	Status
Greater Jumprock	*Moxostoma lachneri*	Vulnerable (Alabama)
Apalachicola Redhorse	*Moxostoma sp. Cf. poecilurum*	Imperiled (Alabama), Vulnerable (Georgia)
Bluefin Stoneroller	*Campostoma pauciradii*	Vulnerable (Alabama)
Tallapoosa Shiner	*Cyprinella gibbsi*	Vulnerable (Alabama)
Lined Chub	*Hybopsis lineapunctata*	Vulnerable (Alabama)
Bandfin Shiner	*Luxilus zonistius*	Vulnerable (Alabama)
Highscale Shiner	*Notropis hypsilepis*	Imperiled (Alabama), Vulnerable (Georgia)
Stippled Studfish	*Fundulus bifax*	Imperiled (Alabama)
Shoal Bass	*Micropterus cataractae*	Imperiled (Alabama), Vulnerable (Georgia)
Lipstick Darter	*Etheostoma chuckwachatte*	Imperiled (Alabama)
Swamp Darter	*Etheostoma fusiforme*	Vulnerable (Alabama)
Tallapoosa Darter	*Etheostoma tallapoosae*	Vulnerable (Alabama)
Yellow Perch	*Perca flavescens*	Vulnerable (Alabama)
Bronze Darter	*Percina pamaris*	Vulnerable (Alabama)
Muscadine Darter	*Percina smithvanizi*	Imperiled (Alabama)
Tallapoosa Sculpin	*Cottus tallapoosae*	Vulnerable (Alabama)
Snail Bullhead	*Ameiurus brunneus*	Vulnerable (Alabama)
Spotted Bullhead	*Ameiurus serracanthus*	Imperiled (Alabama), Vulnerable (Georgia)
Bluestripe Shiner	*Cyprinella callitaenia*	Imperiled (Alabama)

Source: Georgia Power 2018a

[20] IPaC no longer lists this species as a threatened or endangered species potentially occurring in Chambers County, AL or Harris County, GA as of 2022.

10.2 Environmental Analysis

The primary activities affecting Projects' rare, threatened and endangered species are construction activities related to the removal of Project structures. Georgia Power conducted studies and associated analyses that informed the effects analysis for these species; although there are no known federally listed threatened or endangered species in the Project area. Analyses are presented in detail in the following reports and summarized herein:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report
- Freshwater Mussels Survey Report
- Final Potential Effects of Dam Removal on Shoal Bass
- Draft Pre-Dam Removal Shoal Bass Abundance and Tracking Study Report
- Draft Sediment Quality Study Report
- Draft Sediment Transport Assessment Study Report

Table 10-2 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on rare, threatened, and endangered species at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Table 10-2 Proposed PME Measures for Rare, Threatened, and Endangered Species

Proposed PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement the Post Removal Shoal Bass Abundance and Tracking Study	✓	✓	✓	Post Removal
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal
• Leave 10-foot dam abutment on West side of the Langdale Dam; leave ~300 feet on the East side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal
• Implement the Aquatic Organism Recovery Survey and Relocation Plan	✓	✓	✓	Removal

10.2.1 PME Measures

10.2.1.1 Phase 1 – Pre Removal

Prior to construction, Georgia Power would consult with the USFWS, GA DNR, and ADCNR regarding any changes to the listed species that may occur in the Project area.

10.2.1.2 Phase 2 - Removal Phase

Removal of the Langdale, Riverview, and Crow Hop dams would not adversely affect the Bald Eagles' incidental use of the Projects. The forage base for Bald Eagles primarily consists of fish and although the fish assemblage may temporarily change as a result of dam removal, Bald Eagles would adjust to the species of fish available. Additionally, dam removal would not result in the removal of mature trees that could be used by Bald Eagles for perching or nesting. Removal of the dams would also not adversely affect the Shoals Spider Lily. If discovered during any phase of the dam removal, the plant would be avoided.

Removal of the dams would not adversely affect Shoal Bass and would instead create several miles of additional habitat for all life stages of the species. This would likely improve the viability of this species in the Chattahoochee River and support federal and state agency goals for Shoal Bass in the Chattahoochee River.

Dam removal construction activities could result in limited impacts to individual mussel species within the construction footprint. Construction activities could have short-term limited impacts on fish species within the construction footprint.

Georgia Power proposes to leave 10-foot dam abutments on the west side of the Langdale Dam and approximately 300 feet on the east side of the Langdale Dam at a lower elevation, leaving the 10-foot long section abutting the shoreline at full height. Leaving a portion of the dam beyond the shoreline abutment is necessary to help distribute water towards the western side of the channel and reduce water velocities on the eastern side. Distribution of water to reduce the water velocities on the eastern side would address USFWS and GDNR requests to lower velocities in this area to aid in fish movement, including Blackbanded Darter (*Percina nigrofasciata*), Black Bass species, and other fish species that the threatened and endangered mussels may utilize as host fish (USFWS 2020, Mirarchi et al. 2004, O'Brien and Williams 2002).

Georgia Power proposes to implement an Aquatic Organism Recovery Survey and Relocation Plan. The goal of this plan is to identify the procedures that will be used to assess potential stranding of aquatic organisms that may occur as the Projects dams are removed and their associated impoundments are drawn down to natural (pre-dam) levels. This plan will also identify measures that will be undertaken if stranded aquatic organisms are encountered during the drawdown. If a Federally listed threatened or endangered live mussel is detected, Georgia Power would immediately contact the USFWS Ecological Field Services Office in Columbus, GA. USFWS will provide consultation and directly handle specimen collection and handling as needed (S. Abbott, USFWS Ft. Benning/West Georgia Office, personal communication, 07/29/2022). If Federally listed threatened or endangered fish is detected, it will be positively identified, held live then possibly transported to a specific relocation area for live release based on consultation from the USFWS Regional Ecological Services Office and Georgia WRD Fisheries.

10.2.1.3 Phase 3 – Post Removal Phase

Georgia Power proposes to implement the Post Removal Shoal Bass Study. Results of the Post Removal Shoal Bass Study would be compared to the Pre-Dam Removal Shoal Bass Study to assess the effects of dam removal on Shoal Bass abundance, mobility, genetic mixing, and habitat. These results would be distributed to the USFWS and GDNR, and ADCNR.

Existing Shoals Spider Lily habitat downstream of the dams would continue to persist post dam removal. Following the dam removal phase, additional shoal habitat is anticipated to be exposed, ultimately increasing the suitable habitats for Shoals Spider Lily.

Georgia Power proposes to implement a Post Removal Monitoring Plan for a period of no more than 12 months. Revegetation and soil and bank stabilization would have a long-term beneficial impact on federally listed threatened and endangered aquatic and terrestrial species, should any be discovered.

10.3 Unavoidable Adverse Impacts

Decommissioning and removal of the Langdale and Riverview Projects could potentially have a short-term unavoidable adverse impact on mussels by shifting the littoral habitat and stranding these species as the water level decreases to historic or more natural levels. However, no federally listed mussel species are known to occur in the Project area. Construction activities associated with the Proposed Action at the Projects may also cause

short-term disturbances to wildlife and terrestrial species; however, no disturbances are expected for the Bald Eagle and Shoals Spider Lily, which may occur in the Project area.

11.0 RECREATION RESOURCES

11.1 Affected Environment

There are numerous regional recreation opportunities within the Langdale and Riverview Project vicinity, including West Point Dam, which is approximately 9.5 RMs upstream of the Langdale Dam, the Blanton Creek WMA, and the Bartletts Ferry Reservoir (Lake Harding), less than 1.3 RMs downstream of the Langdale Dam. The Shawmut Airport Boat Ramp, operated by the city of Valley, is located approximately 3-miles upstream of the Langdale Dam. Other major recreation opportunities within a 1-hour drive from the Langdale Project include the Middle Chattahoochee Project (Goat Rock, Oliver, and North Highlands reservoirs), and Lake Martin, Yates Reservoir, and Thurlow Reservoir on the Tallapoosa River in Alabama northwest of the Langdale Project (Georgia Power 2011a).

West Point Lake includes approximately 25,900 surface acres, 525 miles of shoreline, and extends approximately 35-miles-along the Chattahoochee River. Recreation opportunities at West Point Lake include fishing, camping, boating, picnicking, swimming, hiking, and hunting. There are 35 recreation areas at West Point Lake, including 21 public day use parks, two privately operated marinas, and eight campgrounds (four private and four operated by USACE); 30 of the recreation areas provide boat ramp access to the lake. Fishing is a popular activity at West Point Lake, with boat, bank, and public fishing pier access. The USACE manages approximately 10,000 acres of hunting land at West Point Lake. Annual recreation visitation at West Point Lake in 2012 was over two million visitor days (Georgia Power 2011a; USACE 2018b).

The 4,800-acre Blanton Creek WMA, located in Harris County, Georgia, is downstream of the Riverview Project, and is managed by the GDNR. The Blanton Creek WMA is operated for wildlife management, watershed protection, visual aesthetics, and commercial timber harvest. Public recreational opportunities at the WMA include wildlife viewing and photography, picnicking, fishing, hiking, and hunting opportunities for White-tailed Deer, Wild Turkey, small game, Dove (*Columbidae spp.*) and waterfowl (Georgia Power 2011a; Georgia Wildlife 2018).

Lake Harding includes 5,850 surface acres, 156 miles of shoreline, and extends 12.7 RMs upstream on the Chattahoochee River to Riverview Dam. There are seven public recreation areas at Bartletts Ferry Reservoir, and two private marinas, providing boating, fishing, camping, and picnicking recreation opportunities. Georgia Power maintains six recreation

access areas as part of the Bartletts Ferry Project, including Longbridge Park, Halawakee Boat Ramp, Po Boy's Boat Recreation Area and parking, Chattahoochee Valley Recreation Area, Valley Park, Blanton Creek Recreation Area, and Idle Hour Park. As provided on the 2015 FERC Form No. 80 (Form 80), Georgia Power estimated approximately 137,674 recreation daytime visitation days during 2014 at the Bartletts Ferry recreation areas (Georgia Power 2015a).

On July 17, 2013, the Trust for Public Land finalized a Feasibility and Master Plan for Portages and Launches on the Chattahoochee Blueway. The Trust for Public Land reviewed a 37-mile-length of the Chattahoochee River from West Point Dam to Columbus, Georgia and recommended the upper 12 miles for viable development of the Blueway Paddling Trail. Parts I and II of the Feasibility and Master Plan recommendations include launches, portages/livery shuttle, and signage. Part III recommends boat and fish passage routes around Langdale Dam and suggests complete removal of the dam for the benefit of boat and fish passage should be given equal if not greater consideration should Georgia Power make an independent decision to cease power generation at these sites (McLaughlin Whitewater 2013). Recommendations in the Feasibility and Master Plan for the Langdale Project includes improving recreation access (parking, grading, informational and safety signage, and measures to provide universal access at the west bank take-out and portage trail enhancements) (McLaughlin Whitewater 2013). Georgia Power supported this Project by installing the universally accessible formal takeout on the west side of the river, 0.13-miles-upstream of the dam. The Trust for Public Land includes plans to complete parking, a livery shuttle route and signage, and may consider a foot route option on the east side of the river (Georgia Power 2018a). Recommendations in the Feasibility and Master Plan for the Riverview Project include an east and west portage if the dam is not removed. The Feasibility and Master Plan recommended a portage at the Riverview powerhouse (west channel); however, this area would eliminate the scenic main channel to the east. The Feasibility and Master Plan does not anticipate or recommend developing the Riverview Project area for engineered whitewater boating (McLaughlin Whitewater 2013).

Approximately 35 miles downstream or nearby in downtown Columbus, Georgia and Phenix City, Alabama area, a 2.3-mile constructed whitewater venue was added to the Riverwalk Park because of a joint project amongst UPTown Columbus, Phenix City, and USACE. The whitewater component was constructed as an ancillary project to the USACE Chattahoochee River Aquatic Ecosystem Restoration Project, which consisted of removal of Eagle and Phenix dams in 2012 and City Mills Dam in 2013. This project provides an

un-impounded engineered whitewater experience in an urban setting (Georgia Power 2018a).

Currently, riverine recreation opportunities are not abundant in the Langdale and Riverview Project area due to multiple dams along the Chattahoochee River, including the upstream West Point Dam and the downstream Bartletts Ferry, Goat Rock, Oliver, and North Highlands dams.

11.1.1 Recreation Needs Identified in Management Plans

The Alabama 2021 State Comprehensive Outdoor Recreation Plan (SCORP) provides information about the use and demand for outdoor recreation facilities and trails within Alabama and guides the planning and development of an outdoor recreation system that meets the needs of Alabama residents. The Alabama Department of Economic and Community Affairs (ADECA), as part of the 2021 Alabama SCORP update, conducted online surveys, formed a SCORP working group, and utilized an online research panel to obtain information about resident participation, unmet demand, opinions, and experiences associated with outdoor recreation (ADECA 2021).

The Alabama SCORP identified recreation needs both statewide and within the planning regions. Of the 1,103 survey responses received in Alabama, 65.6 percent of all households had at least one person participate in outdoor recreation in the past year and 31.6 percent indicated a desire for additional outdoor recreational opportunities. An "unmet demand index" was calculated to reflect the need of a given facility by multiplying the respondent request rate by the average days the respondent would use the facility. For the statewide assessment, the top additional outdoor recreation facilities requested by Alabama residents was for: paved walking/jogging paths; hiking trails; interpretive/nature trails (education-focused); water parks/splash pad areas); outdoor swimming pools; paved bicycle paths (off-street); dog parks/off-leash dog areas; and botanical gardens/ arboretums (ADECA 2021).

For the planning region assessment, the Alabama SCORP indicated regional needs for the 12 regional planning councils that are affiliated with the Alabama Association of Regional Councils. The Langdale Project is located within Planning Region 4 – the East Alabama Regional Planning and Development Commission, which includes Calhoun, Chambers, Cherokee, Clay, Cleburne, Coosa, Etowah, Randolph, Talladega, and Tallapoosa counties. Of the 106 survey responses received within Planning Region 4, 63.2 percent noted someone in the household participated in outdoor recreation activities within the past

year and 73.6 percent indicated a desire to for additional outdoor recreational opportunities. Similar to the state assessment, paved walking/jogging trails, hiking trails, and interpretive/nature trails (education-focused) were identified in Planning Region 4 as having the highest unmet demand among all outdoor recreation facility types listed in the survey (ADECA 2021).

The Georgia Plan for Outdoor Recreation 2022-2026 (Georgia SCORP) identified outdoor recreation resources, supply, demand and trends, and strategic priorities and goals to maximize outdoor recreation opportunities. The Georgia SCORP assessed the supply and demand of recreation resources and facilities by performing an inventory of existing public recreation opportunities, and accessing demand through surveys, public meetings, written comments, and feedback from an advisory committee. The statewide public opinion survey revealed more than 90 percent of respondents participated in at least one form of outdoor recreation within the previous year, with walking/jogging/running, picnicking, swimming outdoors, and visiting a nature center (or outdoor education facility) being the most popular activities. Lack of time, overcrowding, distance to outdoor recreation, and health issues were the most prevalent factors limiting participation in outdoor recreation (GDNR 2021).

11.1.2 Recreation Facilities within the Project Area

Project-related recreation areas within the existing Langdale Project area include the Cemetery Road boat launch area located approximately 0.3-miles downstream of the Langdale Dam, a boat ramp, accessible courtesy dock and fishing pier, parking, lighting, and signage (Table 11-1). The city of Valley owns this property, but Georgia Power funded the improvements as a result of the 1993 relicensing for the Langdale Project and FERC-approved Recreation Plan (Georgia Power 2018a). Fishing is the most popular recreation activity at the Riverview Project; anglers can access the reservoir from the bank and by boat from a boat launch. The boat launch is a non-Project facility and is owned by the city of Valley. There is one Project-related recreation amenity at Riverview—Georgia Power constructed and maintains a pedestrian bridge to enhance bank fishing at the Riverview Project tailrace; however, this bridge provides access to land that is primarily private property and the owner has requested that this bridge be removed due to repeated trespassing issues onto his property. Georgia Power plans to remove this footbridge with the Riverview dam and powerhouse removals.

Table 11-1 includes information on other non-project recreation facilities in the vicinity of the Projects.

Table 11-1 Non-Project Recreation Access Areas in the Projects Vicinity

Facility	Location	Owner	Capacity	Proximity
Concrete boat launch, paved parking area	West Point	USACE	Unknown – parking area shared with fire department	6 miles upstream
Unpaved boat launch	Langdale	City of Valley	2-3 cars with trailers	<1/2 miles upstream of Langdale Dam
Park with boat launch, gravel parking area, grass overflow parking area	Riverview	City of Valley	16 cars with trailers in main lot plus 22 cars with trailers in overflow lot	<1/2 miles downstream of Riverview powerhouse
Boat launch	Cemetery Road	City of Valley	5-8 cars with trailers	Between the Langdale and Riverview dams

Source: FERC 1997

Due to development and limited access to the area, the Langdale Project does not offer any significant recreation potential other than bank fishing and a small area for boat fishing. There is no access to the Georgia side of the Langdale Project due to remote highway access in the area and the adjacent property being owned by private entities. In addition, there is no demand or need for additional recreational facilities (Georgia Power 2018a).

Previously, FERC required licensees to file a Form 80 recreation report for each project development every 6 years, unless the licensee obtained an exemption. FERC used information from Form 80 reports to inventory recreation facilities located at FERC-licensed projects, to determine if the facilities meet the public's recreation demand and needs, and to identify where additional amenities may be needed to meet future needs (FERC 2014a; 2015). FERC eliminated the Form 80 requirement for licensees via Final Rule (83 FR 67060) effective March 28, 2019. However, the last Form 80 filing for the Langdale and Riverview Projects were completed on March 31, 2015. Recreation visitation at the Langdale Project was estimated at 5,525 daytime visitor days during 2014, with the boat launch area estimated at 30 percent capacity (Georgia Power 2015a). Recreation visitation at the Riverview Project was estimated at 3,600 daytime visitor days during 2014, with the boat launch area estimated at 30 percent capacity (Georgia Power 2015b).

11.2 Environmental Analysis

The primary activities affecting Projects' recreation resources are construction activities related to the removal of Project structures and the subsequent flows, velocities, and wetted area that support boat access and boating, and the removal of the Riverview tailrace footbridge. Georgia Power conducted studies and associated analyses that pertain to effects on recreation resources. Those analyses are presented in detail in the following reports and summarized herein:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report
- Draft Sediment Quality Study Report
- Draft Sediment Transport Assessment Study Report

Table 11-2 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on recreation at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Table 11-2 Proposed PME Measures that may Potentially Affect Recreation Resources

Proposed PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement the Post Removal Shoal Bass Abundance and Tracking Study.	✓	✓	✓	Post Removal
• Boat Ramp above Langdale - Extend existing public boat ramp at airport to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Boat Ramp below Langdale - Extend existing public ramp below powerhouse (Cemetery Park) to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.	✓			Post Removal
• Langdale Park – Design and construct new day-use park in the city of Valley adjacent to river: o Construct 3 pavilions (~24'x36'). o Install 8 picnic tables. o Construct a ~0.5-mile-long gravel walkway connected to the parking lot with views of the riverfront. o Install three benches along the gravel walking trail. o Construct a parking lot for approximately 13 vehicles, including one barrier-free space and overhead lighting. o Provide public access to the new car-top boat area with hand-carry access to the river, includes parking for three non-trailer vehicles. These facilities will be incorporated into the proposed new Langdale Park. o Regrade and gravel access road to the car-top/hand carry boat access.	✓			Post Removal
• Develop educational material, including interpretive signage to be located in the proposed new Langdale Park.	✓	✓	✓	Post Removal
• Boat Ramp at Riverview Park - Extend existing public ramp to at least 2 feet of water depth at the new water surface elevation (measured at West Point minimum flow) following dam removal and river stabilization.			✓	Post Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal

Two primary issues affecting recreation in a dam removal are 1) the effect of the dam removal and sediment transport on the navigability of various vessel types (i.e., canoe, kayak, bass boats); and 2) public access to the river post dam removal (i.e., existing boat ramps). Refer to Section 7, Water Resources, for a discussion of existing and adjusted bathymetry.

11.2.1 Navigability

Georgia Power used the H&H model to determine the depths in the river and correlated those depths with the conservatively estimated minimum depths necessary to operate three types of vessels: 1) canoes and kayaks; 2) Jon boat; and 3) bass boat. Georgia Power assigned a color code representing a specific depth range to depict the types of watercraft that are useable in the river at existing conditions-dams in place, compared to post dam removal with existing and adjusted bathymetry. Figure 11-1 through Figure 11-9 show the depth ranges used to create the aforementioned figures:

- Red (0 – 0.8 foot) this depth is not navigable by any boat type
- Orange (0.8 – 1.5 feet) this depth can be floated/poled through with a canoe
- Yellow (1.5 – 2.5 feet) this depth is navigable by canoes, but not Jon boats
- Green (2.5 – 4.0 feet) this depth is navigable by canoes and Jon boats, but not bass boats
- Blue (4.0+ feet) this depth is navigable by all three boat types

Georgia Power developed these depth ranges based on conversations with the state departments of natural resources, the personal experience of personnel who use the river in various conditions, and research of available resources. There are not published official values of minimum depth requirements for different types of vessels, since boats within the same "vessel class" built by different manufacturers can have different operating ranges. It is also important to note that depths less than those described can provide passage by each respective vessel class, but their navigational ability may be limited at lesser depths.

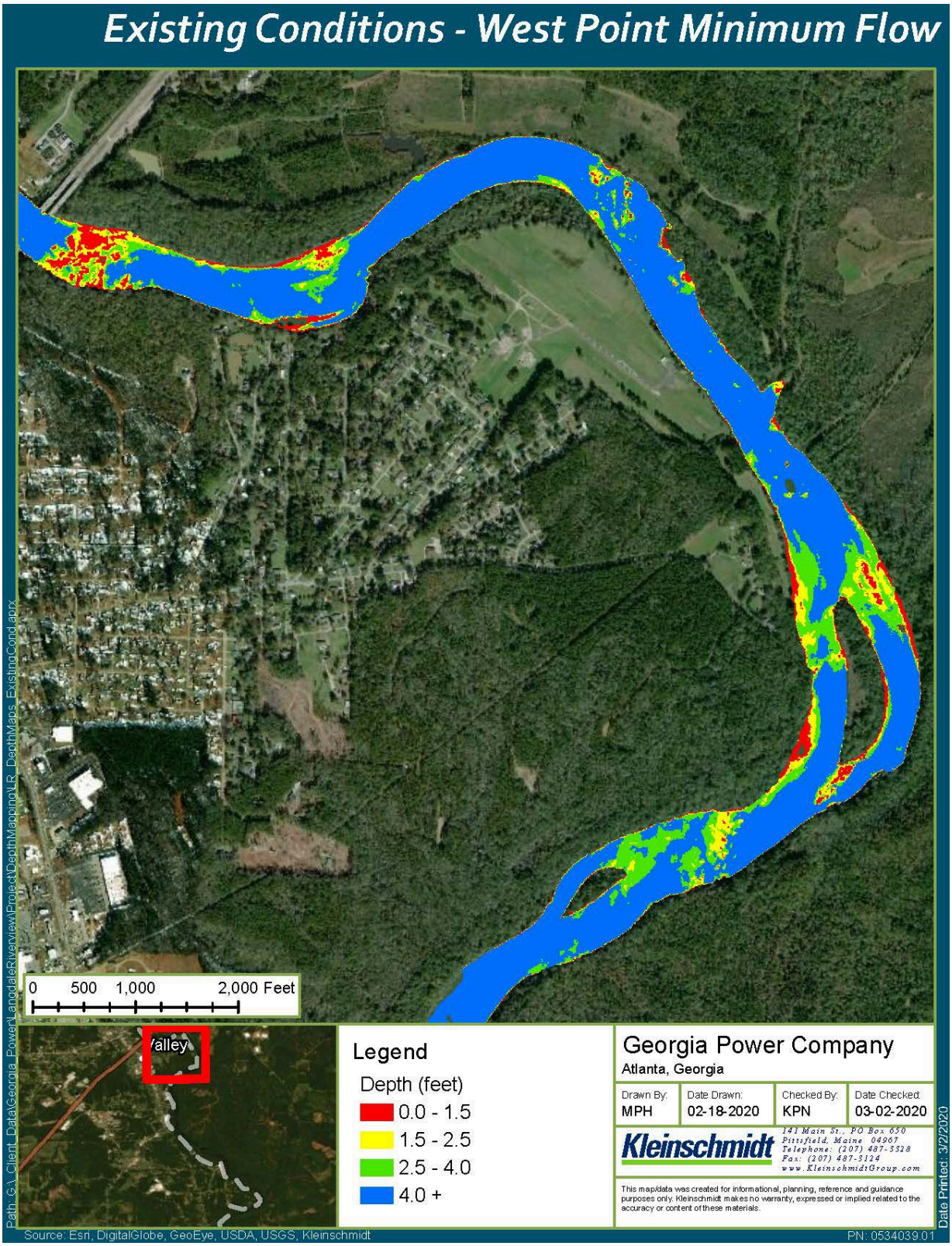


Figure 11-1 Existing Conditions under West Point Minimum Flow – Upper Reach Depth Ranges for Navigability

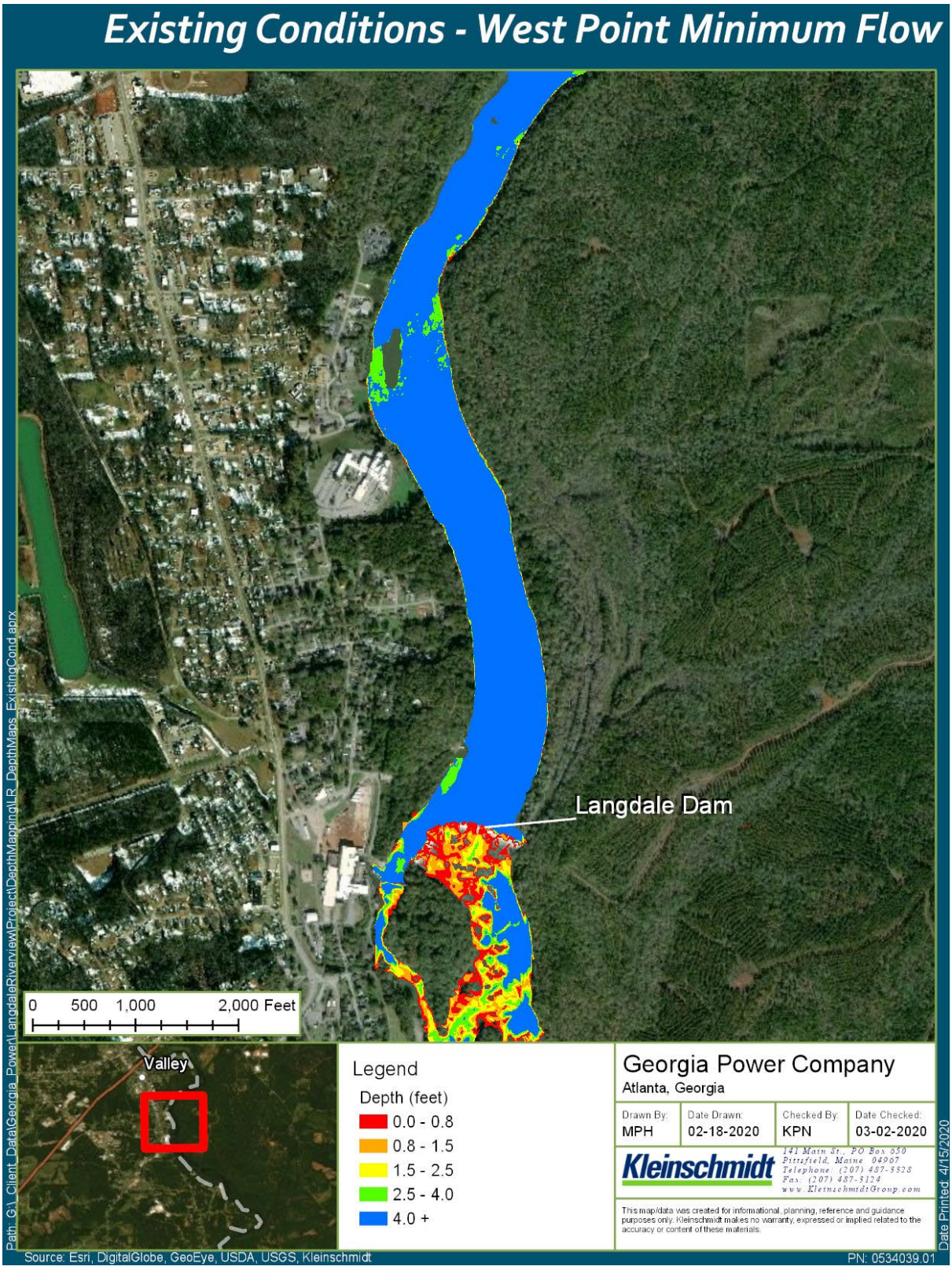


Figure 11-2 Existing Conditions under West Point Minimum Flow – Middle Reach Depth Ranges for Navigability

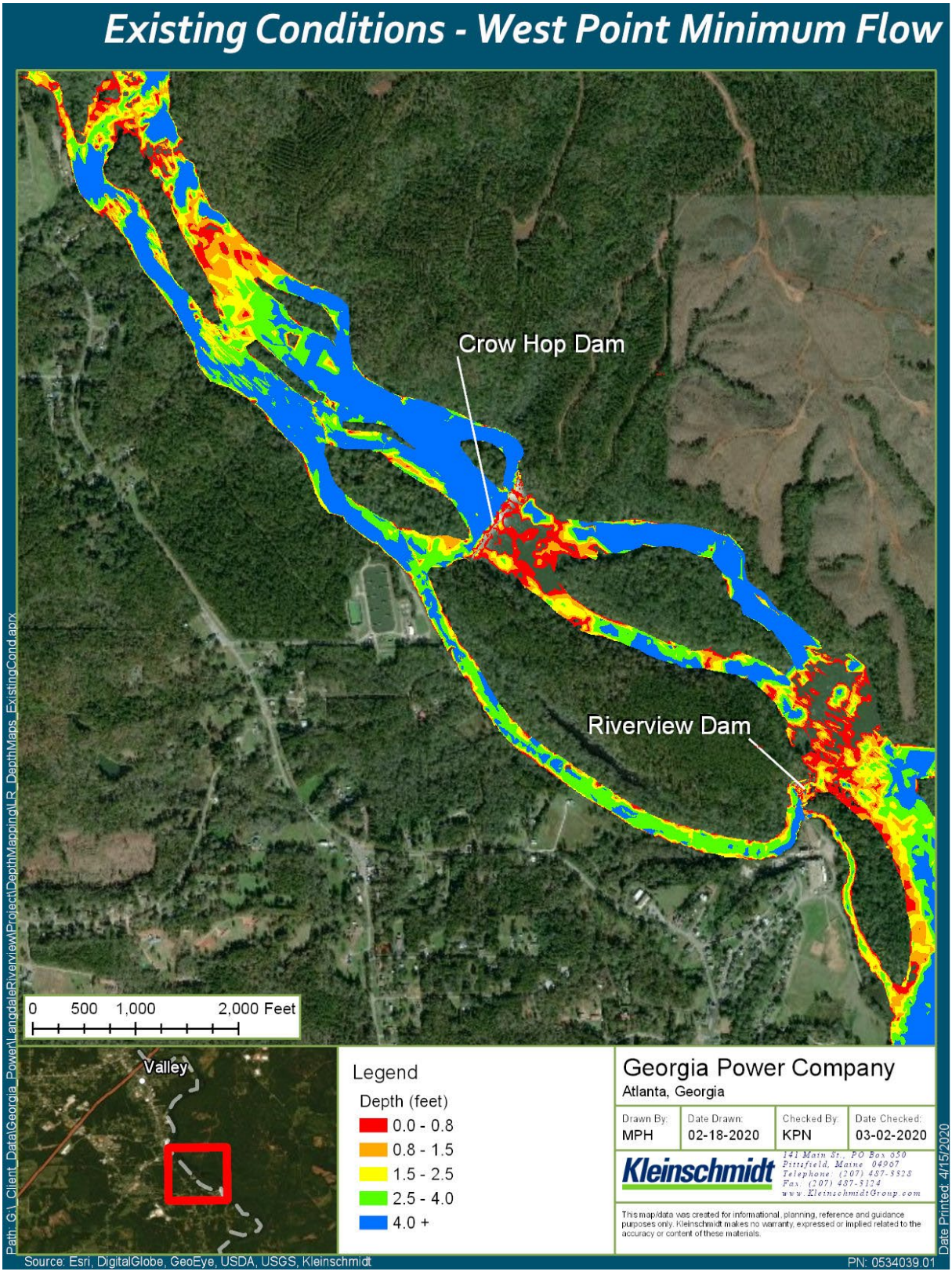


Figure 11-3 Existing Conditions under West Point Minimum Flow – Lower Reach Depth Ranges for Navigability

11.2.1.1 Navigability – Dams Removed with Existing Bathymetry

Figure 11-4 through Figure 11-6 show model results for depth along the river for post removal conditions using the existing bathymetry at the West Point minimum flow for the dam removal scenario. The shoal complex just downstream from I-85 that is navigable by kayaks and canoes continues to not be navigable by bass boat and cannot be navigated by Jon boat (Figure 11-4). The two shoal complexes further downstream can be navigated by kayaks and canoes but not by other vessels (Figure 11-5). Figure 11-6 shows that the removal of the Langdale Dam makes navigability upstream to downstream of the dam possible by kayaks and canoes, but the headpond of the Langdale Dam is not universally navigable by Jon boat or bass boat. The shoals downstream of Langdale Dam is navigable for kayaks and canoes. By sticking to the west side of the river, Jon boats can navigate from the Langdale powerhouse tailrace to the entrance to the Riverview channel, but the Riverview channel is not entirely navigable by Jon boat. It is not possible to operate a bass boat between the Langdale powerhouse tailrace and the Riverview channel. After the Crow Hop Dam is removed, it appears that it may be possible to navigate upstream and downstream of the dam using a kayak or canoe (Figure 11-6).

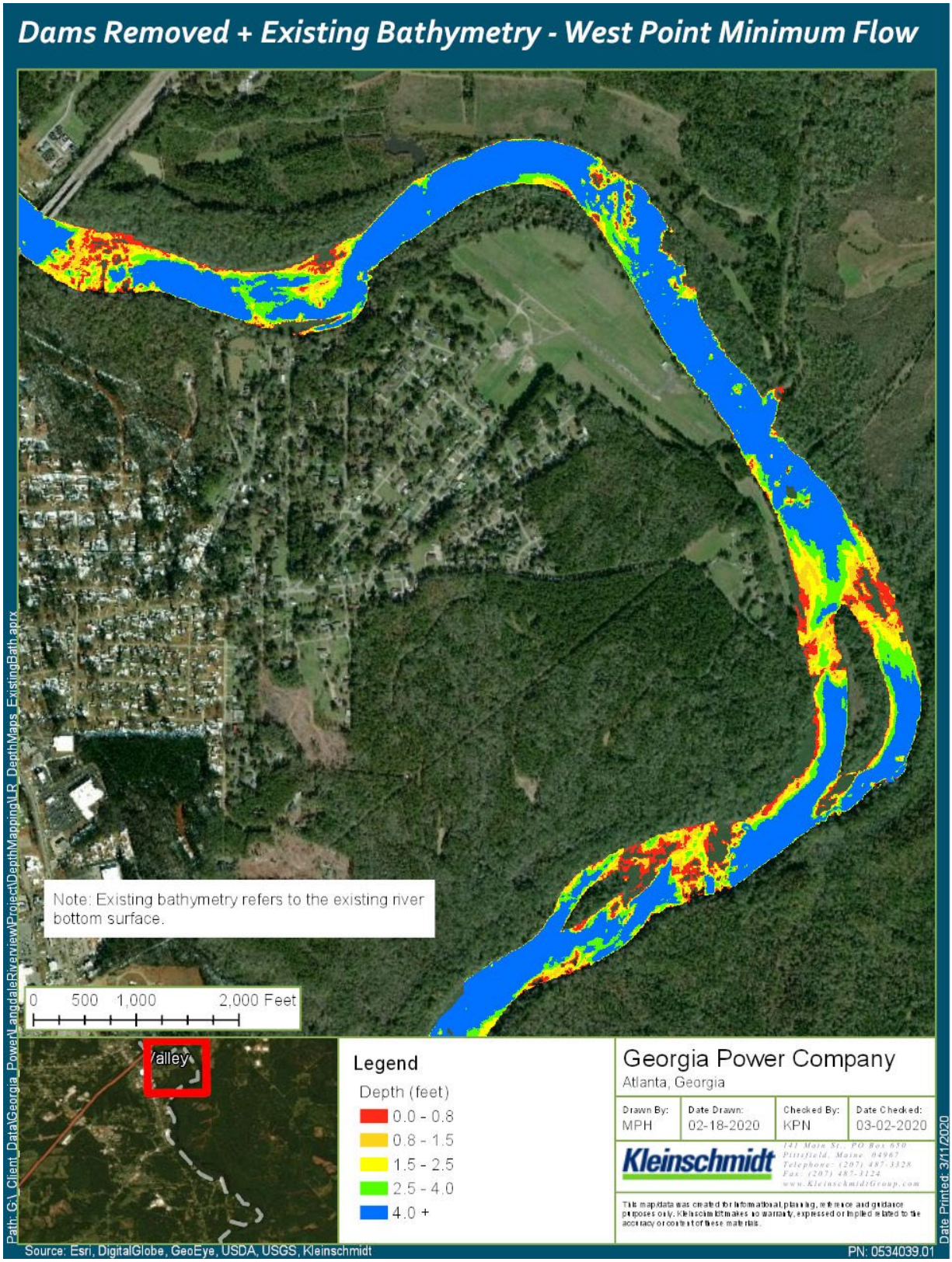


Figure 11-4 Dam Removed, Existing Bathymetry under West Point Minimum Flow – Upper Reach - Depth Ranges for Navigability

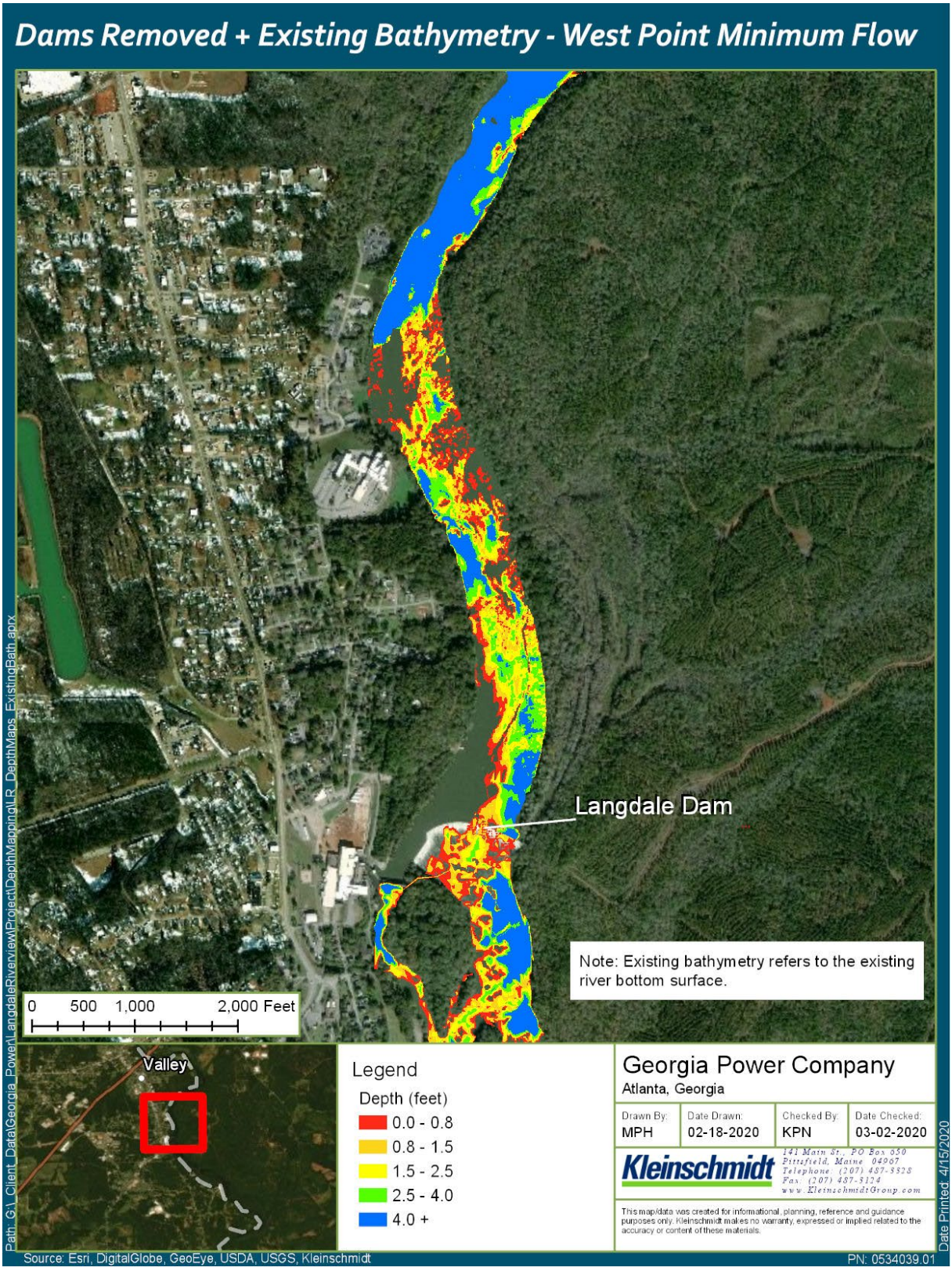


Figure 11-5 Dam Removed, Existing Bathymetry under West Point Minimum Flow – Middle Reach - Depth Ranges for Navigability

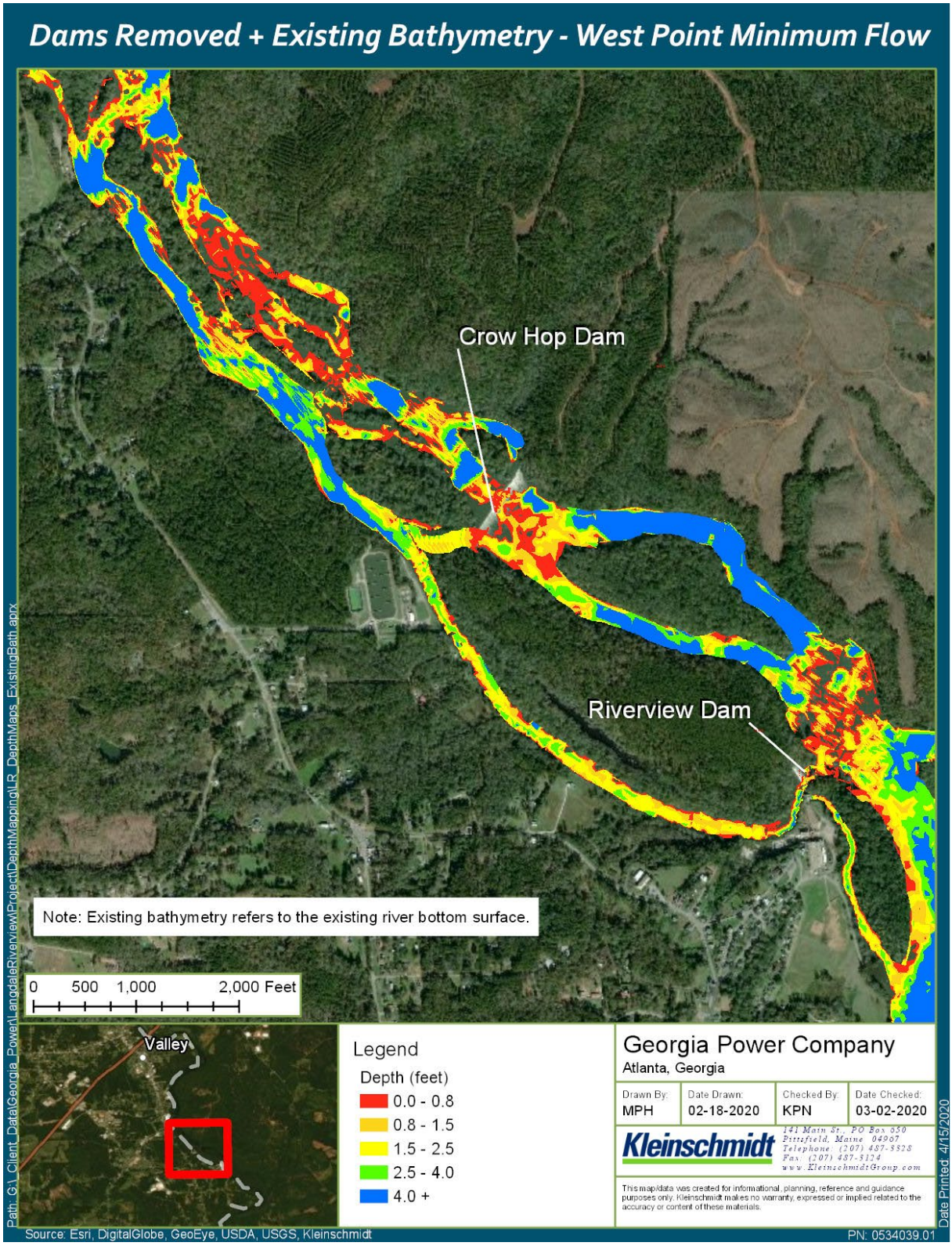


Figure 11-6 Dams Removed, Existing Bathymetry – West Point Minimum Flow – Lower Reach – Depth Ranges for Navigability

11.2.1.2 Dams Removed with Adjusted Bathymetry

Figure 11-7 through Figure 11-9 show depth along the river for the post removal conditions using the adjusted bathymetry at the WP min flow. The shoal complex just downstream from I-85 that is navigable by kayaks and canoes, continues to not be navigable by bass boat, and cannot be navigated by Jon boats (Figure 11-7). However, river access by larger vessels, such as bass boats, would be available at the West Point (above I-85) ramp. The two shoal complexes further downstream can be navigated by kayaks and canoes but not by other vessels (Figure 11-6). Figure 11-8 shows that after the removal of the Langdale Dam, the shoals downstream of Langdale Dam at WP min flow are no longer navigable for kayaks and canoes. By sticking to the west side of the river, Jon boats can navigate from the Langdale powerhouse tailrace to the entrance to the Riverview channel, and the Riverview channel may be navigable by skilled Jon boat operators. It is not possible to operate a bass boat between the Langdale powerhouse tailrace and the Riverview channel. As noted above, Georgia Power is proposing to extend the ramps at Cemetery Park and Shawmut which would provide access for canoe/kayak; larger boat access is available in Lake Harding, below Riverview. After the Crow Hop Dam is removed, under WP min flow no boats will be able to pass through the area (Figure 11-9).

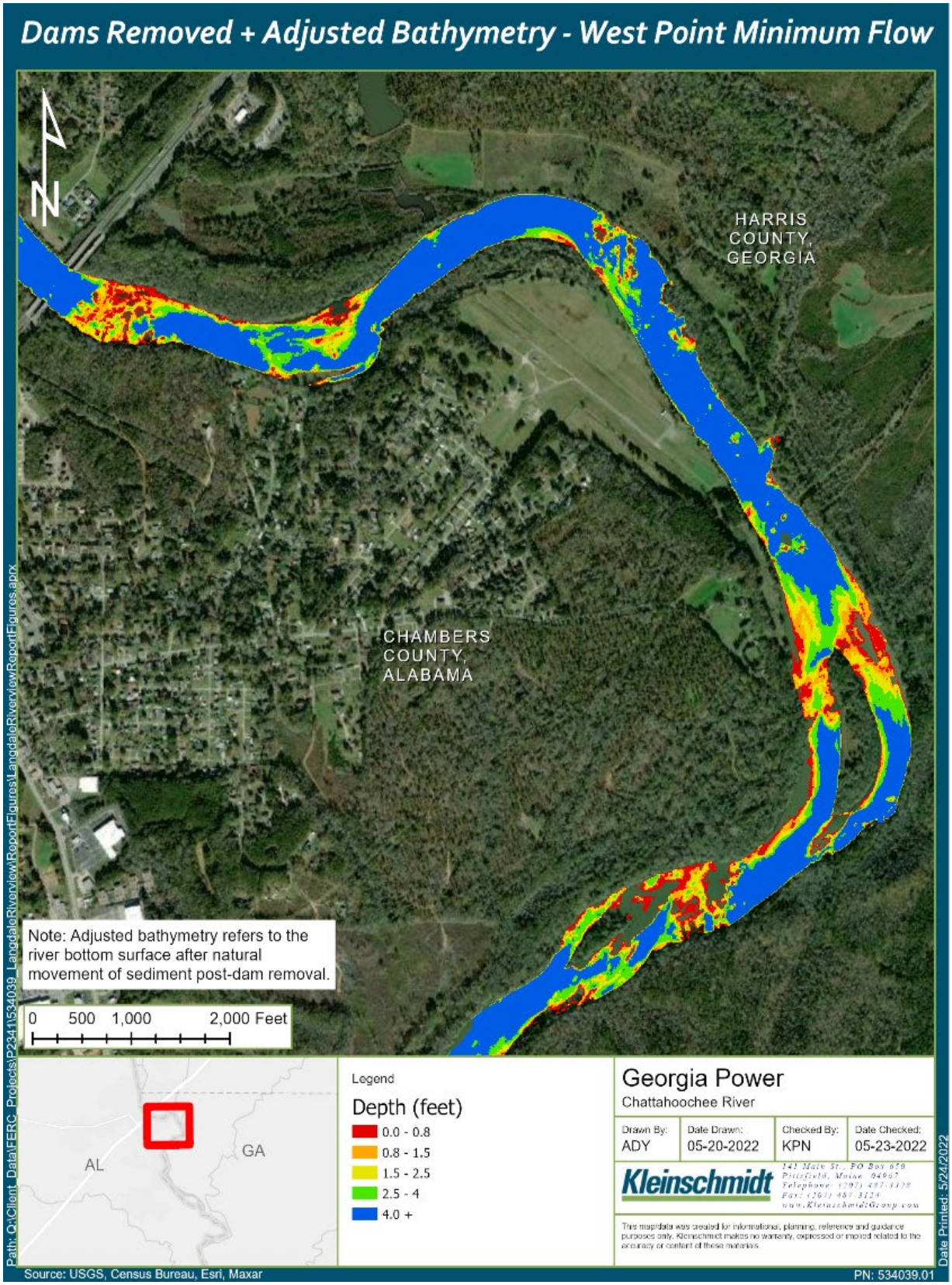


Figure 11-7 Dams Removed, Adjusted Bathymetry under West Point Minimum Flow – Upper Reach - Depth Ranges for Navigability

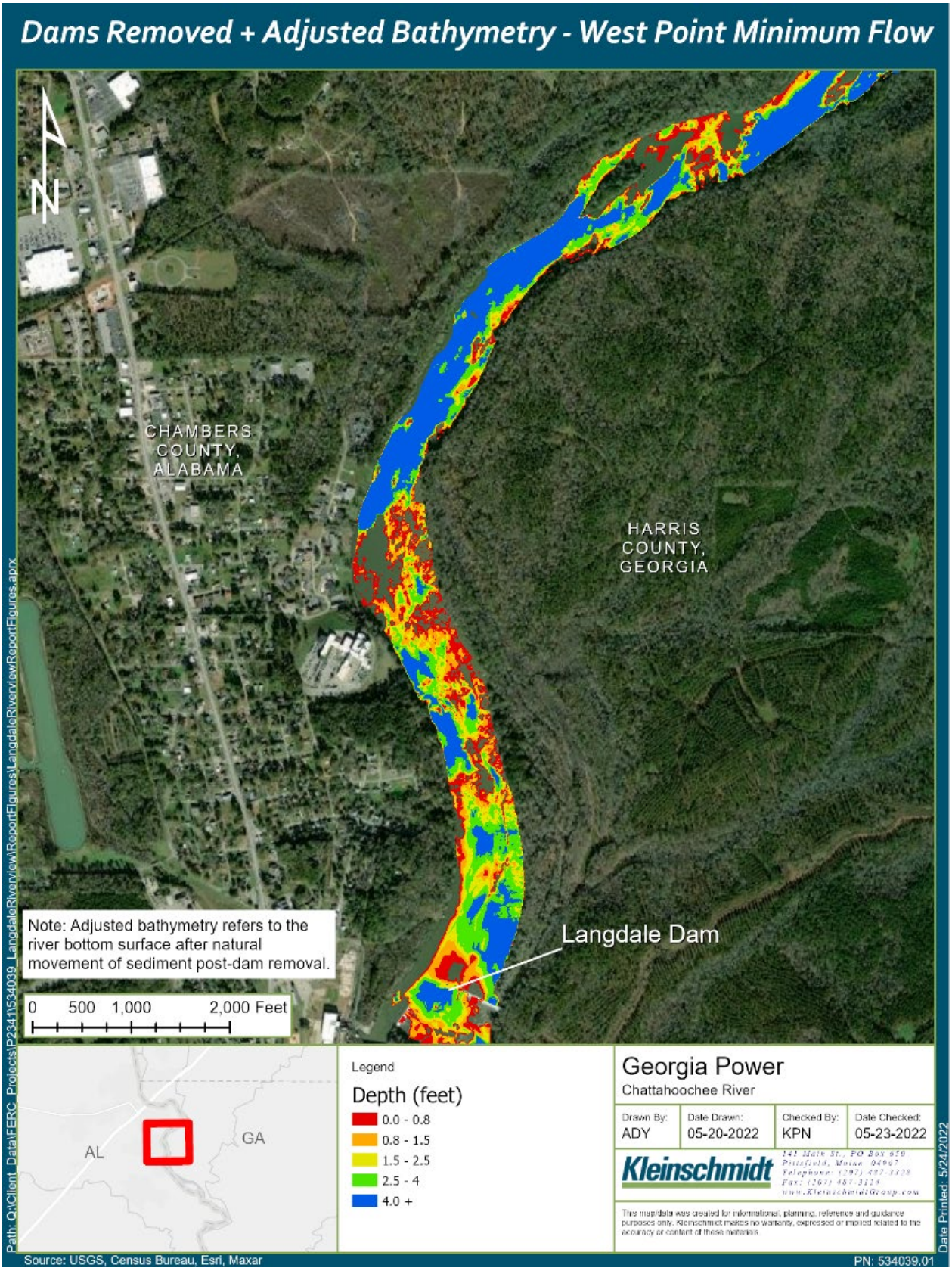


Figure 11-8 Dams Removed, Adjusted Bathymetry under West Point Minimum Flow – Middle Reach - Depth Ranges for Navigability

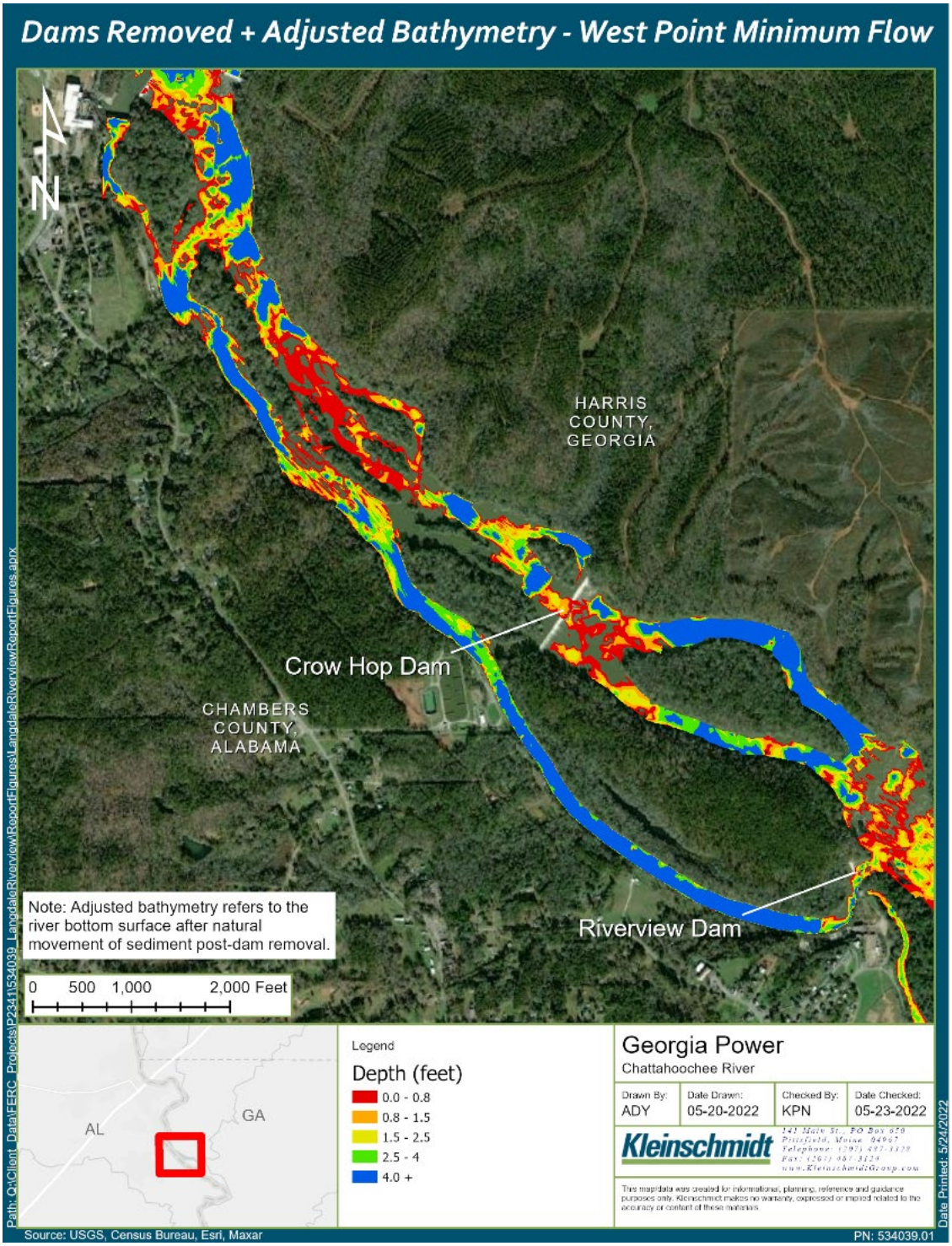


Figure 11-9 Dams Removed, Adjusted Bathymetry Minimum Flow under West Point Minimum Flow Lower Reach - Depth Ranges for Navigability

11.2.2 Public River Access

Based on the H&H model and accounting for the existing bathymetry and adjusted bathymetry, the proposed removal of the dams would have a long-term effect on the distribution of flows and wetted area and a short-term effect on recreation infrastructure along the river, as described below.

11.2.2.1 Existing Bathymetry

The model indicates that proposed dam removal with the adjusted bathymetry results in the following effects to recreation infrastructure along the river:

- The public Cemetery Park boat ramp located between the Langdale and Crow Hop Dams may be partially dewatered at WP min flow, but not WP min flow +1 or +2 gen units. Under WP min flow post-dam removal, the velocity of the river closest to the boat launch would decrease from approximately 0.2 fps to 0.1 fps; under WP min flow +1 gen unit the velocity would decrease from approximately 1.4 fps to 0.5 fps; and under WP min flow +2 gen units the velocity would decrease from approximately 1.8 fps to 1.1 fps.
- The Shawmut Airport boat ramp, located approximately 3 miles upstream of the Langdale Dam, would be dewatered at WP min flow. The ramp would not be dewatered at WP min flow +1 or +2 gen units but may be affected by the reduced water depth. Under WP min flow post-dam removal, the velocity of the river closest to the boat launch would not change from existing conditions; under WP min flow +1 gen unit the velocity would increase from approximately 1.5 fps to 1.7 fps; and under WP min flow +2 gen units the velocity would increase from approximately 2.0 fps to 2.3 fps.

11.2.2.2 Adjusted Bathymetry

The model indicates that proposed dam removal with the adjusted bathymetry results in the following effects to infrastructure (see Figure 7-8) along the river:

- The Cemetery Park boat ramp located between the Langdale and Crow Hop Dams may be partially dewatered at WP min flow but wetted under WP min flow +1 or +2 gen units. Under WP min flow post-dam removal, the velocity of the river closest to the boat launch would decrease from approximately 0.2 fps to 0.1 fps; under WP min flow +1 gen unit the velocity would decrease from approximately 1.4 fps to 0.5 fps; and under WP min flow +2 gen units the velocity would decrease from approximately 1.8 fps to 1.2 fps.

- The Shawmut Airport boat ramp, located approximately 3 miles upstream of Langdale Dam, would be partially dewatered at WP min flow. The ramp would not be dewatered at WP min flow +1 or +2 gen units but may be affected by reduced water depth. Under WP min flow post-dam removal, the velocity of the river closest to the boat launch would not change from existing conditions; under WP min flow +1 gen unit the velocity would increase from approximately 1.5 fps to 1.7 fps; and under WP min flow +2 gen units the velocity would increase from approximately 2.0 fps to 2.5 fps.

11.2.3 Private River Access

There are 72 property parcels abutting the river between the I-85 bridges and Riverview Dam, which have been assigned values 1 to 79 (7 parcels are owned by Georgia Power). The parcel maps show an existing conditions depth and velocity, a post removal depth and a velocity, and post removal water surface change, all at a location near where owners could access the river from their property. The model simulations that show the greatest lateral change at each property (e.g., dam removal simulations using existing bathymetry or adjusted bathymetry) are shown on each map. The simulations using existing bathymetry show greater lateral changes for parcels 1 to 42 and the simulations using the adjusted bathymetry show greater lateral changes for parcels 43 to 79. The parcel maps and figures are provided in the appendices of the Final H&H Modeling Report (Kleinschmidt 2022a).

11.2.4 PME Measures

11.2.4.1 Phase 1 – Pre Removal

In anticipation of dam removal, Georgia Power would close the existing access temporarily at the Projects to restrict public access to the river in the Project area during the decommissioning and removal construction. The construction is estimated to be approximately eight months (five months in river at dams) and begin in the late summer/early fall in the typical low flow conditions. The actual schedule may be compressed or extended by 1-2 shoulder months depending upon site specific temporal flow conditions during the year of decommissioning. Should decommissioning approval and flow conditions not align with this proposed schedule, the Projects' decommissioning may extend to encompass two low flow periods (i.e., two calendar years). Recreation users would travel to other locations for access, including upstream to Shawmut boat ramp or West Point Lake, or downstream to Lake Harding.

11.2.4.2 Phase 2 –Removal

Recreation access to the Project area would be restricted for at least eight months to allow construction activities to occur at the Projects. During that time, the area will be primarily a construction zone and large equipment will be visible to the public. Georgia Power will ensure that public ramps at Lake Harding are available for a temporary increase in recreation users. Canoe/kayak trips on the Chattahoochee Blueway in the Project area would be suspended during the construction period.

11.2.4.3 Phase 3 – Post Removal

Under Georgia Power's Proposed Action, paddlers would no longer need to portage around the dams. Paddlers would have access to an approximately 22-miles of riverine from the toe of West Point Dam to Bartletts Ferry Dam during generation flows, which would add to the existing Chattahoochee Blueway, providing a unique boating opportunity for paddlers in the southeast.

Langdale Park

Georgia Power proposes to design and construct a new park in the city of Valley (on the west bank of the Chattahoochee River) during the post removal phase to provide users with river access and the following amenities:

- Three pavilions approximately 24-feet by 36-feet
- 15 picnic tables
- 0.5-mile-long gravel walkway connected to the parking lot with views of the river front
- Three benches along walking trail
- Parking lot with overhead lighting with approximately 13 vehicle parking spaces, including one Americans with Disabilities Act (ADA) parking space and overhead lighting
- Provide public access to the new car-top boat area with hand-carry access to the river, includes parking for three non-trailer vehicles. These facilities will be incorporated into the new Langdale Park
- Regrade and gravel access road to the car-top/hand carry boat access
- Public access to existing concrete boat ramp and new canoe/kayak slide above the Langdale powerhouse

In addition, Georgia Power proposes to develop educational material, including interpretive signage at the new park to document the historic significance of the Langdale Dam and decommissioned powerhouse. A conceptual rendering of the proposed park under post removal conditions is presented in Photo 11-1.

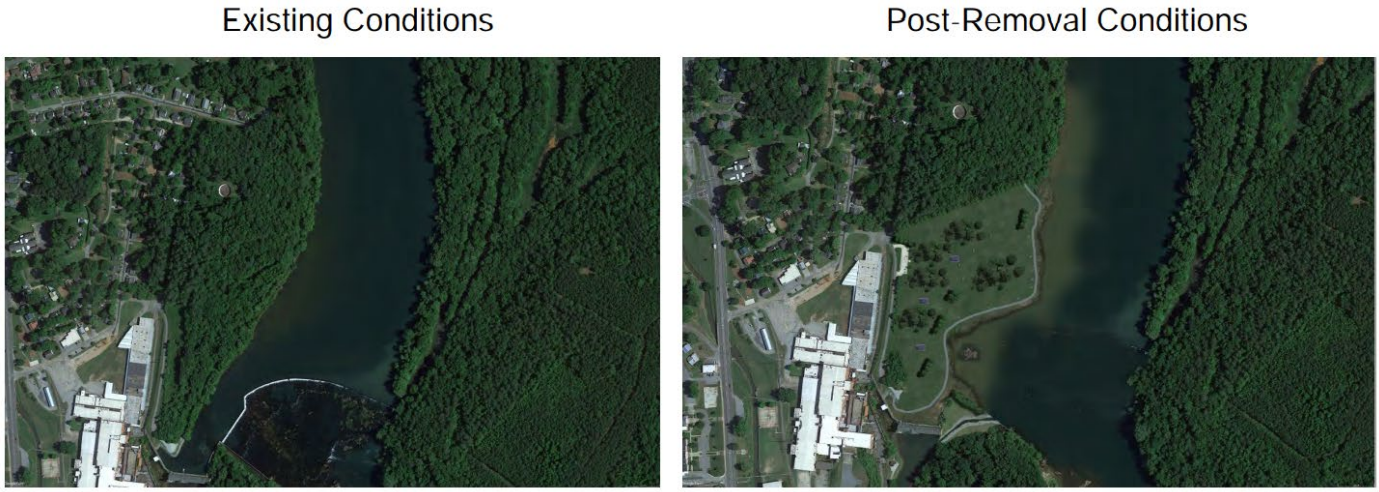


Photo 11-1 Example of Possible Conditions at Proposed Park at Langdale after Dam Removals

Georgia Power proposes to implement the Post Removal Shoal Bass Abundance and Tracking Study which would provide information regarding changes in the fisheries community or species composition post removal. The information could assist resource agencies in future management decision making, potentially benefitting recreational anglers of the river.

Georgia Power proposes to implement Erosion and Sediment Control Plan during any recreation construction activities to protect soils and water quality.

11.3 Unavoidable Adverse Impacts

Recreation users would experience short-term unavoidable adverse impacts during the decommissioning and removal of the Langdale and Riverview Projects as access to this section of the Chattahoochee River would be prohibited. Long-term impacts to recreation would occur as recreation activities would shift from those related to impounded waters to those of a free-flowing river. Additional long-term effects include a shift from access by larger vessels (bass boats, Jon boats) in the shoal complex upstream of Langdale dam

and below I-85 where there would be limited access by canoes/kayaks during WP min flow. There is a similar scenario with the shoal complex below Crow Hop under WP min flow. However, recreationists seeking reservoir recreation opportunities in the Projects' vicinities have several nearby options up-and downstream of the Project area. Together, the Langdale and Riverview Projects provide less than 1 percent of the reservoir surface acres and less than 1 percent of the shoreline miles provided by the nearby West Point Lake and Lake Harding combined. Removal of the dams and subsequent loss of reservoir recreation opportunities at the Langdale and Riverview Projects are generally minor compared to reservoir recreation opportunities remaining in the immediate Project vicinity.

Post dam removal, some areas within the Project reaches would be difficult to navigate in a canoe/kayak under WP min flow. However, additional flows from WP provide additional areas of navigability.

12.0 LAND USE AND AESTHETIC RESOURCES

12.1 Affected Environment

Lands within the Langdale Project boundary total 27.75 acres, with 11.05 acres within Harris County, Georgia and 16.7 acres within Chambers County, Alabama. Lands within the Riverview Project boundary total 11.6 acres, with 11.2 acres within Harris County, Georgia, and 0.4 acres within Chambers County, Alabama. The land on the Georgia side of the Chattahoochee River (Harris County) is undeveloped and primarily forested or used for agriculture and provides no access from the highway to the riverbank. The Alabama side of the Projects (Chambers County) is developed, with industrial and commercial ownership predominating over residential use. The industrial ownership spans most of the shoreline and allows some bank fishing access for area residents (Georgia Power 2018a).

Predominant land uses within Harris County include agricultural/forested (82 percent), residential (8.7 percent), and transportation/communication/utility (3.3 percent) (Table 12-1) (RVRC 2019). Predominant land uses within Chambers County, Alabama includes low density urban and forested/pasture (Georgia Power 2011a). In 2017, the USDA determined that approximately 128,655 acres of land within Chambers County is farmland (USDA 2017).

Table 12-1 2019 Existing Land Use in Harris County, Georgia

Land Use Category	Estimated Acreage	Percent of Total
Residential	26,025	8.73%
Commercial	155	0.05%
Industrial	966	0.33%
Transportation/Communication/Utility	9,946	3.34%
Recreation/Parks & Conservation	4,538	1.52%
Public/Institutional	3,093	1.04%
Agricultural/Forestry	243,795	81.81%
Vacant/Undeveloped	9,309	3.12%
No Classification	172	0.06%
Total	297,999	100.00%

Source: RVRC 2019

Georgia Power conducted the H&H study (Kleinschmidt 2022a) which categorized land use at the Projects prior to hydraulic modeling (Figure 12-1); most of the affected environment is undeveloped and covered by conifer forest.

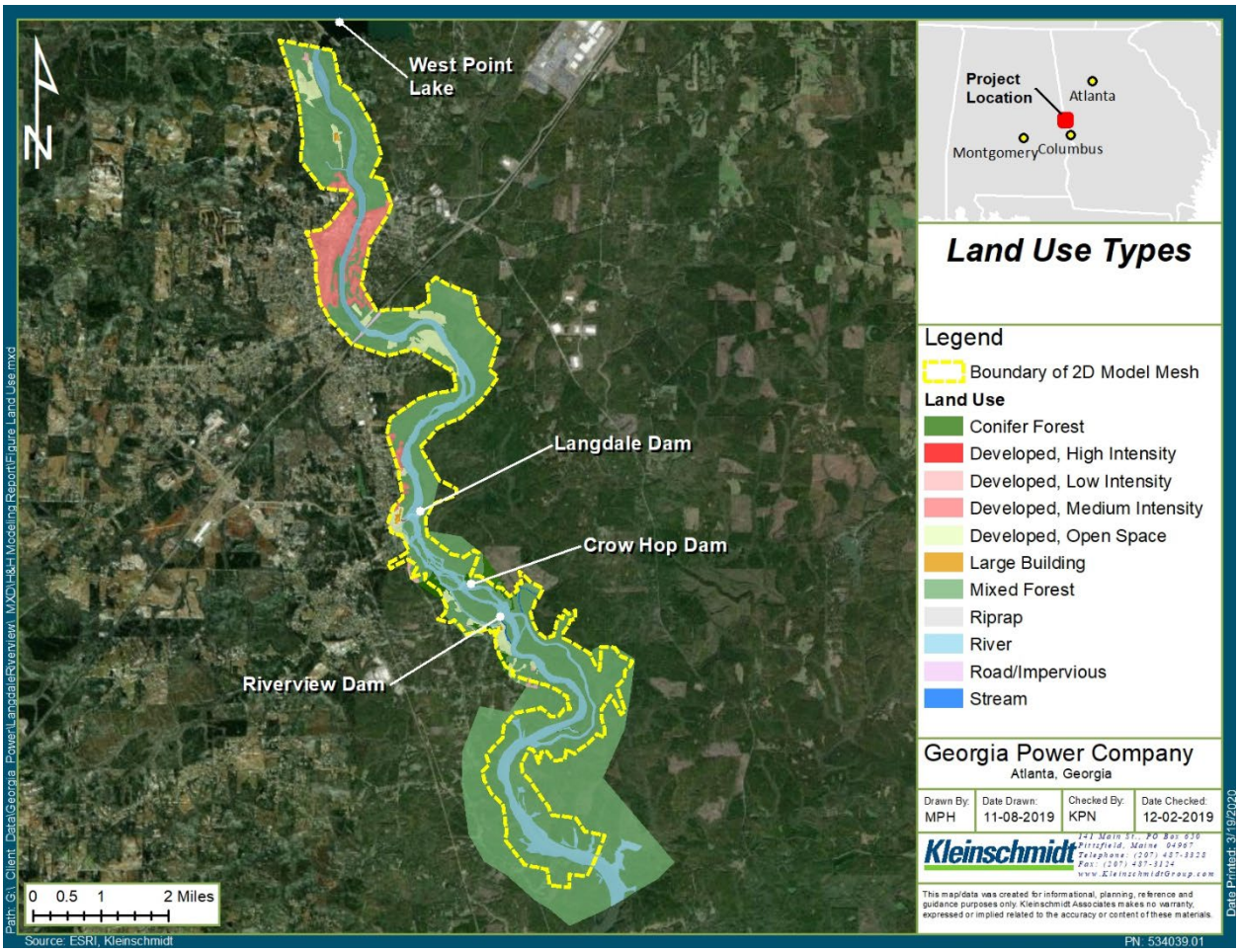


Figure 12-1 Land Use Types

The Langdale and Riverview Project vicinity includes gently rolling hills with open agricultural and industrial areas. The water surface area is open with a relatively narrow, riverine-type visual character (Photo 12-1). The shoreline areas are predominantly densely wooded along the eastern Georgia shoreline, and mixed wooded and industrial and commercial use along the western Alabama shoreline. The views are typically short views upstream and downstream, with the key public viewing areas at the Cemetery Road boat launch area downstream of the Langdale Project (Georgia Power 2018a) (Photo 12-2). Photos 12-3 and 12-4 provide views of the Riverview Dam and Riverview powerhouse headrace channel.

Source: Georgia Power 2018a

Photo 12-1 Langdale Dam

Source: Georgia Power 2018a

Photo 12-2 Cemetery Park Boat Launch and Dock

Source: Georgia Power 2018b

Photo 12-3 Riverview Dam

Source: Georgia Power 2018b

Photo 12-4 Powerhouse Channel Upstream of Riverview Dam

12.2 Environmental Analysis

Land use in the Project area is not expected to change significantly, and Georgia Power is not proposing any specific measures related to land use. Land within the existing Projects that is currently impounded would become exposed following dam removal and over time would return itself to floodplain and riparian land.

The primary activities affecting Projects' aesthetic resources are construction activities related to the removal of Project structures and the subsequent flows, velocities, and wetted area. Georgia Power conducted studies and associated analyses that pertain to effects on land use and aesthetic resources. Those analyses are presented in detail in the following reports and summarized herein:

- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report

Table 12-2 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on aesthetic resources at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measure would be implemented (i.e., pre removal, removal, post removal).

Table 12-2 Proposed PME Measures that may Potentially Affect Aesthetic Resources

Proposed PME Measures	Langdale	Crow Hop	Riverview	Removal Phase
• Implement Post Removal Monitoring Plan o Develop outfall pipe armoring/extension if needed o Revegetation Plan o Monitoring and agency consultation	✓	✓	✓	Post Removal

12.2.1 PME Measures

12.2.1.1 Phase 1 – Pre Removal

There are no known effects to aesthetic resources in the pre removal phase.

12.2.1.2 Phase 2 – Removal

During construction there would be no public access to the river during removal activities thus limiting views of the river. Private residences along the river would see construction equipment, changes in water surface elevations, and potential dewatered areas. Additional short term adverse impacts include increased dust, and increased noise associated with dam removal and the construction of the new Langdale Park.

12.2.1.3 Phase 3 – Post Removal

Aesthetics would shift from views of a low-head dam across the Chattahoochee River and a small impoundment to a long, free-flowing section of river. Views of water passing over the low-head dam would be replaced with water cascading over natural shoals in the river, producing a riverine scenic vista. This change would enhance aesthetics in the area and allow for whitewater experiences in a completely natural setting versus engineered urban whitewater courses constructed elsewhere in the Project vicinity. Immediately following dam removal and related construction activities, riverbanks may appear barren and some mud flats would be present, having a short-term adverse effect on aesthetics. Georgia Power proposes to implement a Post Removal Monitoring Plan for a period of up to 12 months after the removal of the Langdale Dam that would promote revegetation and bank stabilization and ultimately improve landscape aesthetics.

An example of possible conditions north of the Langdale Dam and powerhouse near the George H. Lanier Memorial Hospital are shown in Photo 12-5.

Existing Conditions

Post-Removal Conditions

Photo 12-5 Example of Possible Conditions North of Langdale Post Removal

12.3 Unavoidable and Adverse Impacts

Long-term impacts to aesthetics would occur due to dam removal with views shifting from those of impounded waters to a free-flowing river. Short-term adverse impacts associated with dam removal include exposed impoundment beds along river embankments that would revegetate over time along the new high-water line. Additional short term adverse impacts include views of construction, increased dust, and increased noise associated with dam removal and the construction of the new park. Implementation of the Post Removal Monitoring Plan would provide vegetative plantings including trees, shrubs and native seed mixes to aid in the natural revegetation activity post dam removal.

13.0 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

13.1 Affected Environment

The Langdale Project is located at RM 191.9 on the Chattahoochee River in Chambers County, Alabama and Harris County, Georgia. The Riverview Project is located approximately at RM 191.0 (Crow Hop Dam) and RM 190.6 (Riverview Dam) on the Chattahoochee River, downstream of the city of Valley, Alabama and in Harris County, Georgia. The following is a summary of socioeconomic data for these two counties and four nearby towns and cities (including population patterns, average household income, and employment sectors).

Based on the April 1, 2020 census, the estimated population of Chambers County, Alabama, was 34,772, representing a 1.6 percent increase from the April 1, 2010 census (U.S. Census Bureau 2020a). The estimated population of Harris County, Georgia, was 34,668, representing an 8.3 percent increase from the April 1, 2010 census (U.S. Census Bureau 2020b). Table 13-1 summarizes the population estimates for these two counties in which Projects' lands are located and for the states of Alabama and Georgia as reported in the 2010 and 2020 U.S. Census, as estimated by the United States Census Bureau for 2021.

Table 13-1 Estimated Population of Chambers County, Alabama and Harris County, Georgia and the States of Alabama and Georgia

County/ State	2010 Census	2020 Census	Percent Change 2010-2020	2021 Estimates	Percent Change 2020-2021
Chambers County, AL[1]	34,215	34,772	1.6%	-	-
Harris County, GA[2]	32,024	34,668	8.3%	-	-
Alabama[3]	4,779,736	5,024,279	5.1%	5,039,877	0.3%
Georgia[4]	9,687,653	10,711,908	10.6%	10,799,566	0.8%

Source: U.S. Census Bureau 2020a[1], 2020b[2], 2020c[3], 2020d[4]

Chambers County, Alabama is approximately 596.53-square-miles and Harris County, Georgia is approximately 463.87-square-miles (U.S. Census Bureau 2020a; 2020b). Based

on population estimates for 2010, Chambers County, Alabama had a population density of 57.4 people per square-mile, which was lower than the state average density of 94.4 people per square-mile (U.S. Census Bureau 2020a; 2020c). The population density for Harris County, Georgia was 69.0 people per square-mile, lower than the state average of 168.4 people per square-mile (U.S. Census Bureau 2020b; 2020d).

The 2015-2019 estimated median household income for Chambers County, Alabama was $42,289, and for Harris County, Georgia was $76,319 (U.S. Census Bureau 2020a; 2020b). The 2019 poverty rate was 16.3 percent in Chambers County, compared to 14.9 percent in Alabama (U.S. Census Bureau 2020a; 2020c). The 2019 poverty rate was 9.0 percent in Harris County, compared to 14.0 percent in Georgia (U.S. Census Bureau 2020b; 2020d). Table 13-2 provides the household and family distribution and income for Chambers County, Alabama and Harris County, Georgia.

Table 13-2 Household Incomes and Distributions for Chambers County, Alabama and Harris County, Georgia

	Chambers County, Alabama	Harris County, Georgia
2015-2019 Households	13,448[1]	12,156[2]
2015-2019 Approximate Number of Persons per Household	2.46[1]	2.76[2]
2015-2019 Percentage of Population in Civilian Labor Force	56.5%[1]	60.4%[2]
2019 Median Household Income	$42,289[1]	$76,319[2]
2019 Population Below Poverty Level	16.3%[1]	9.0%[2]
2019 Unemployment Rate	2.4%[3]	3.3%[4]

Source: U.S. Census Bureau 2020a[1]; 2020b[2]; Data Central 2019[3]; Statesman Journal 2019[4]

The industry distribution (16 years and older) in Chambers County, Alabama is represented with 31.4 percent employed in the manufacturing industry, 11.5 percent in health care and social assistance, and 9.4 percent in retail trade (Data USA 2019a). The industry employment distribution is similar in Harris County, Georgia and is represented with 14.2 percent employed in the health care and social assistance industry, 11.2 percent in manufacturing, and 9.8 percent in retail trade (Data USA 2019b).

Four cities and towns near the Projects were reviewed for socioeconomic data, including Riverview, Valley, and Lanett, Alabama, and Hamilton, Georgia. Riverview, Alabama had the smallest population at 106 and Valley, Alabama had the highest population at 9,286 individuals (Data USA 2019c; 2019d). Riverview, Alabama had the lowest median household income at $33,333, followed by Lanett, Alabama at $34,363 and Hamilton, Georgia had the highest median household income at $85,254 (Data USA 2019c; 2019e; 2019f). Between 2018 and 2019 the population of Valley, Alabama decreased 0.20 percent and its median household income increased 18.8 percent (Data USA 2019d). Riverview, Alabama experienced a 24.7 percent increase in population and a 3.9 percent increase in median household income between 2018 and 2019 (Data USA 2019c). A summary of these population statistics is provided in Table 13-3.

Table 13-3 2019 Population Statistics for Towns Near the Projects

	Riverview, AL[1]	Valley, AL[2]	Lanett, AL[3]	Hamilton, GA[4]
Population	106	9,286	6,271	1,867
Population increase/decrease (from 2018 to 2019)	24.7%	-0.20%	-0.74%	20.5%
Median Household Income	$33,333	$47,747	$34,363	$85,254
Poverty Rate	35.8%	11.4%	27.3%	4.8%

Source: Data USA 2019c[1]; 2019d[2]; 2019e[3]; 2019f[4]

Table 13-4 provides data on employment industry distribution in Riverview, Valley, and Lanett, Alabama and Hamilton, Georgia. In Riverview, Alabama, the largest industries are public administration, construction, and retail trade (Data USA 2019c). The largest industries in Valley, Alabama and Hamilton, Georgia are manufacturing, health care and social assistance, and retail trade (Data USA 2019d; 2019f). In Lanett, Alabama, the largest industries are manufacturing, educational services, and health care and social assistance (Data USA 2019e).

Table 13-4 2019 Employment Statistics for Towns near the Projects

	Riverview AL[1]	Valley AL[2]	Lanett AL[3]	Hamilton GA[4]
Public Administration	28.2%	4.7%	3.0%	8.3%
Manufacturing	5.1%	33.4%	41.3%	10.8%

	Riverview AL[1]	Valley AL[2]	Lanett AL[3]	Hamilton GA[4]
Retail Trade	12.8%	9.1%	7.18%	13.3%
Healthcare and Social Assistance	5.1%	11.6%	7.6%	18.8%
Education Services	2.6%	6.4%	8.3%	7.3%
Construction	17.9%	3.6%	1.1%	3.4%
Transportation and Warehousing	5.1%	-1.1%	5.0%	6.3%
Administration Support and Waste Management Services	-	6.2%	5.4%	4.4%
Other Services, Except Public Administration	7.7%	3.2%	6.2%	2.4%
Accommodation and Food Services	7.7%	5.4%	4.6%	7.9%

Source: Data USA 2019c[1], 2019d[2], 2019e[3], 2019f[4]

13.1.1 Environmental Justice

As defined by Executive Order 12898 of February 16, 1994 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations), federal agencies should identify and address any disproportionately high and adverse human health and environmental effects of agency programs, policies, and actions on minority and low-income populations. Figure 13-1 depicts the environmental justice (EJ) block groups within the census tract numbers 1201.98, 9546, and 9547. Table 13-5 provides the associated census ethnicity data for these block groups.

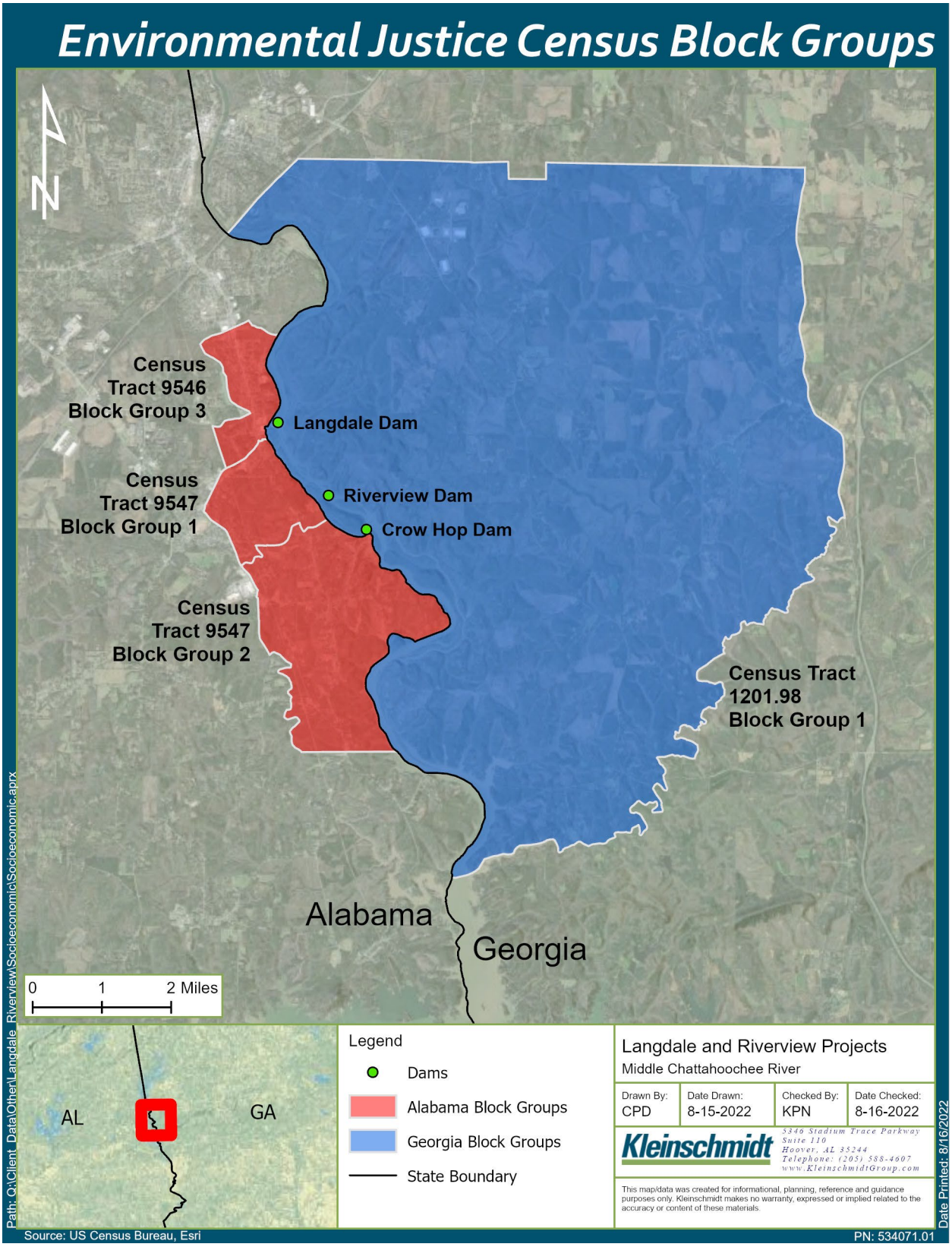


Figure 13-1 Environmental Justice Census Block Groups for the Projects

Table 13-5 Race and Ethnicity Data for the Projects Including State, County and Block Groups

	Race and Ethnicity Data									
Geography	**Total Population (count)**	**White Alone Not Hispanic (count)**	**African American (count)**	**Native American/Alaska Native (count)**	**Asian (count)**	**Native Hawaiian & Other Pacific Islander (count)**	**Some Other Race (count)**	**Two or More Races (count)**	**Hispanic or Latino (count)**	**Total Minority (%)***
Alabama	4,876,250	3,320,247	1,299,048	25,565	66,270	2,238	70,662	92,220	208,626	34.5%
Georgia	10,403,847	6,098,889	3,289,020	37,440	414,481	6,233	291,872	265,912	991,394	47.3%
Chambers County, Alabama	33,660	19,423	13,316	112	376	-	91	342	800	44.5%
Harris County, Georgia	34,105	27,006	5,495	26	364	4	211	999	1,213	23.1%
Census Tract 1201.98, Block Group 1	1,751	1,243	370	-	-	-	-	138	-	29%
Census Tract 9546, Block Group 3	1,341	710	631	-	-	-	-	-	-	47.1%
Census Tract 9547, Block Group 1	1,128	481	647	-	-	-	-	-	-	57.4%

*Calculated the percent total minority population by subtracting the percentage of "White Alone Not Hispanic" from 100 percent for any given area.

Source: American Community Survey 2019a; 2019b; 2019c; 2019d

13.2 Environmental Analysis

Decommissioning and removal of the Projects are not anticipated to have adverse long-term effects on area socioeconomics. Rather, the removal of the Projects would likely result in temporary beneficial effects on the economy (gas, hotels, food) related to the influx of construction crews working at the Projects. Additionally, restoring this portion of river to a free-flowing segment of the Chattahoochee may result in an increase in recreational users, particularly paddling individuals and clubs. Access to the Project area would be temporarily closed during construction activities related to the decommissioning; however, access to the river above and below the Project area for subsistence fishing and recreation would remain available. Environmental impacts as a result of the Proposed Action are discussed in the relevant sections of the APEA, and the community surrounding the Projects would not disproportionately experience EJ impacts related to the decommissioning and removal of the Projects.

Georgia Power does not propose any measures that would directly affect socioeconomic resources or EJ for the Projects.

13.2.1 PME Measures

13.2.1.1 Phase 1 – Pre Removal

There are no known effects to socioeconomic resources in the pre removal phase.

13.2.1.2 Phase 2 – Removal

The Proposed Action would affect the economy in the Project vicinity with an increase in temporary jobs related to construction activities. Additional workers may temporarily inhabit the area, producing a short-term increase in business for the local restaurant, fuel, and hotel industries (Georgia Power 2018a). Watershed restoration and dam removal activities can have substantial economic effects, generating both equipment-intensive and labor-intensive work opportunities that, in turn, create jobs and stimulate economic activity in several ways (Nielsen-Pincus and Moseley 2009). Indirect jobs are created through the sourcing of materials and services (e.g., equipment rentals, materials vendors, fuel purchases). and when construction crew employees and contractors spend wages locally on goods and services.

13.2.1.3 Phase 3 – Post Removal

It is anticipated that long-term socioeconomic benefits of the Proposed Action may occur with improved recreational fishing and paddling opportunities due to the restored free-flowing section of the Chattahoochee River. Paddling outfitters and non-local anglers may be drawn to the area to take advantage of the newly unobstructed river section and newly constructed Langdale Park on the river shoreline.

13.3 Unavoidable Adverse Impacts

The Projects have not been in operation since 2009, therefore any loss of employment related to discontinued Project operation has already occurred.

14.0 CULTURAL RESOURCES

14.1 Affected Environment

14.1.1 Prehistoric Setting

Prior to the arrival of European settlers, the Project area was home to many different peoples over several distinct periods, including the Paleo-Indian, Archaic, Woodland, and Mississippian. People of the Paleo-Indian Period are characterized as hunters and gatherers, following a hunting and gathering subsistence pattern in small, mobile groups. The Archaic Period experienced a shift to plant cultivation and hunting smaller prey, with people settling into regional territories. Agricultural communities emerged during the Woodland Period. The period is also marked by the development of pottery. Eventually, during the Mississippian Period, people began developing ceremonial mounds, villages, and trade networks (Georgia Power 2018a).

14.1.2 Historic Setting

With the arrival of the Spanish Conquistadors in Florida and eventually Georgia, the cultural landscape in the Langdale Project area began to change. European goods and diseases caused the destruction of southeastern native communities (Southern Research 2020a).

The Project vicinity is located between the Upper Creek Town and Lower Creek Town, with the Upper Creeks upstream along the middle and upper Chattahoochee and west along the Tallapoosa and Coosa rivers. The Upper Creek political center was Okfuskee, located on the Tallapoosa, where the Upper Creeks often interacted with the French and English settlers. The Creeks traded with the English along two primary paths including the Upper Trading Road, which crossed the Chattahoochee River north of present-day West Point, and the Lower Trading Road, also known as the "Old Horse Path" which crossed the Chattahoochee River at the Lower Creek Town of Cusseta. The Lower Trading Road eventually became the first Federal Road in Georgia and Alabama (Southern Research 2020a).

During the American Revolution, settlers and traders flooded the Middle Chattahoochee area. After the war, due to their loyalty to the British, the Creeks were forced to cede lands east of the Ocmulgee River to Americans residing in Georgia (Southern Research 2020a).

During the War of 1812, General Andrew Jackson defeated the Red Stick Creeks at the Battle of Horseshoe Bend, leading to an influx of American settlers in the Alabama Territory. All that remained of the Creek's territory was a small portion of land between the Coosa River, Chattahoochee River, and a line running between Fort Jackson to near Fort Mitchell. However, in the town of Cusseta, a treaty was signed in 1832 between the Creeks and the United States government requiring the Creeks to cede their remaining territory in Alabama. Eventually whites and Creeks began to intermarry, resulting in a loss of Creek identity (Southern Research 2020a).

The Langdale Project is located approximately 9.5 RMs downstream of the USACE West Point Dam (located at RM 201.4). The Riverview Project is located approximately 10.5 RM downstream of the USACE West Point Dam and 0.9 RM downstream of the Langdale Project (Georgia Power 2018a). There are ten sites near West Point Lake that have Proto-historic affiliations, with several of the sites identified as known Creek towns. Table 14-1 lists these cultural sites and their associated Creek town. Ceramics collected from West Point Reservoir include Chattahoochee Brushed, Ocmulgee Field Incised, plain, and possible red filmed (Southern Research 2020a).

Table 14-1 Cultural Sites and Associated Creek Towns near West Point Lake

Site ID	Creek Town
9TP9 (Burnt Village Site)	Okfuskenena
9TP2 (Faulkner Site)	Okfuskutchie Tallahassee
9TP35 (Brush Lanier Site)	Hothlitaiga
9TP24 and 9TP25	Chulakonina
9HE10 (Brush Creek Site)	Chocothlucco

Source: Southern Research 2020a

14.1.3 Summary of Cultural Resources Surveys

During the 1980s, Georgia Power conducted several cultural resources surveys of the Project area (Gardner and Brockington 1988; Gardner et al. 1988; Hay 1989). The surveys identified the Langdale Dam and powerhouse and one archeological site at the Langdale Project as eligible for inclusion on the NRHP (Georgia Power 2018a). Archaeological site IP#7 is representative of the Late Mississippian period, Bull Creek phase of the Lamar culture and has substantial undisturbed cultural deposits. Late Mississippian sites are not common in this area along the Chattahoochee River (Georgia Power 2018a). Georgia

Power developed a Cultural Resources Management Plan (CRMP) for the Langdale Project and filed a programmatic agreement (PA) in 1993 to implement the CRMP (Klima 1993).

In 2020, Southern Research Historic Preservation Consultants (Southern Research) conducted three cultural resource studies in the Riverview Project area. These studies include the Archaeological Reconnaissance Survey of the Chattahoochee River, Harris County, Georgia (Southern Research 2020a); the Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County, Georgia (Southern Research 2020b); and the Archaeological Testing of Two Sites on the Chattahoochee River, 9HS30 and 9HS31, Harris County, Georgia (Southern Research 2020c). The study area for cultural resources included the Langdale and Riverview Project lands, affected shoreline and riverbed, and surrounding passageways needed for deconstruction of the dams. Each study is summarized in the following text.

The Archaeological Reconnaissance Survey was conducted within the Chattahoochee River channel from the Valley, Alabama airport boat ramp to Riverview Dam in Harris County, Georgia. The area of potential effect (APE) included approximately 5.5 miles of river. The survey identified eight previously unrecorded archaeological sites including three pre-contact period Native American sites and five historic period stone and timber crib weirs. These sites are listed in Table 14-2. The Native American sites did not receive any systematic survey or site boundary delineation and until this work is completed, their eligibility for NRHP listing will remain unknown (Southern Research 2020a).

Table 14-2 Archaeological Sites Identified during the Archaeological Reconnaissance Survey, Harris County, Georgia, 2020

Site ID	Description	NRHP Recommendation
9HS529	Native American Artifact Scatter	Unknown
9HS530	Native American Artifact Scatter	Unknown
9HS531	Native American Artifact Scatter	Unknown
9HS525	Historic Stone and Timber Weir	Recommended Eligible
9HS533	Historic Stone and Timber Weir	Recommended Eligible
9HS526	Historic Stone and Timber Weir	Recommended Eligible
9HS527	Historic Stone and Timber Weir	Recommended Eligible
9HS528	Historic Stone and Timber Weir	Recommended Eligible

Source: Southern Research 2020a

In addition to the sites listed in Table 14-2, side-scan sonar recorded nine contacts upstream of the Langdale Dam that are likely cultural. These nine contacts include a partially submerged barge derrick, two sets of pilings, and seven features that are remnants of Elisha Trammell's 1857 timber dam and/or Chattahoochee Manufacturing's 1870s stone weir dam. Once the Langdale Dam is removed, these areas would be exposed and should be recorded as archaeological structures. Although features associated with Campbell's mid nineteenth century grist mill and early features of the Alabama-Georgia Manufacturing Company's 1866 stone and timber dam were not detected, portions of these structures would likely be exposed once the Riverview and Crow Hop dams are removed. These sites should be recorded as archaeological structures at that time (Southern Research 2020a).

Phase I testing was conducted during the Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County, Georgia. The area is included in the APE and located within Chattahoochee River channel. One previously unrecorded archeological site (9HS532) was identified and may contain buried cultural deposits that would provide valuable information regarding occupations in the area. The site is likely eligible for NRHP listing (Southern Research 2020b).

Phase II testing was performed on archaeological sites 9HS30 and 9HS31 however, no cultural features were identified at either site (Southern Research 2020c). Site 9HS30 overlooks the Langdale Dam and was previously recommended eligible for listing on the NRHP (Gardner and Brockington 1988). The site is thought to span a large period, from the Middle Archaic to Proto-historic. Although no cultural features were identified, testing determined that the site has the potential to contain intact buried cultural features affiliated with several occupations (Southern Research 2020c). Site 9HS31 is 1 mile south of 9HS30, located on a ridge above the Crow Hop Dam. The site was previously recommended not eligible for NRHP listing (Gardner and Brockington 1988). The site is associated with the Archaic and Mississippian Periods and unlikely to contain intact buried cultural features (Southern Research 2020c).

In a letter dated December 10, 2021, HPD asked Georgia Power to conduct an assessment of effects (AOE) for the National Register eligible archaeological sites identified in prior surveys. Southern Research (2022) conducted Assessment of Effects for Archaeological Sites 9HS30, 9HS525, 9HS527, 9HS528, 9HS529, 9HS530, 9HS531, 9HS532, and 9HS533.

lists the archaeological sites within the APE of the Projects and their associated NRHP recommendation.

Table 14-3 Archaeological Sites within the Projects' APE

Site ID	Description	NRHP Recommendation
9HS30	Prehistoric Artifact Scatter and Midden	Eligible
9HS525	Historic Stone and Timber Weir	Eligible
9HS526	Historic Stone and Timber Weir	Eligible
9HS527	Historic Stone and Timber Weir	Eligible
9HS528	Historic Stone and Timber Weir	Eligible
HS529	Prehistoric Artifact Scatter	Unknown
9HS530	Prehistoric Artifact Scatter	Eligible
9HS531	Prehistoric Artifact Scatter	Eligible
9HS532	Prehistoric and Historic Artifact Scatter	Eligible
9HS533	Historic Stone and Timber Weir	Eligible

Source: Southern Research 2022

14.1.4 Tribal Resources

While there are no federally recognized tribal lands within the Langdale or Riverview Project Boundaries, Georgia Power consulted with federally recognized tribes that may have had an interest in the license surrender and dam decommissioning.

The Langdale Project is located in Harris County, Georgia, and Chambers County, Alabama within the Middle Chattahoochee River sub-basin (Georgia Power 2018a). During the 1700s, at least 32 ethnic groups came to live on the Chattahoochee River, integrating to become the Creek Indians by the end of that century (AAA 2021). The Chattahoochee River's name is derived from Creek Indian words meaning "painted rock" (USGS 2021). Creeks outnumbered and occupied more land in Georgia than European colonists until the 1760s (GA Encyclopedia 2020).

On December 18, 2018, Georgia Power mailed the Application for Surrender for the Projects cover letter to the following American Indian Tribes:

- Alabama Coushatta Tribes of Texas
- Alabama Quassarte Tribal Town
- Choctaw Nation of Oklahoma
- Coushatta Indian Tribe
- Jena Band of Choctaw Indians
- Kialegee Tribal Town
- Mississippi Band of Choctaw Indians
- Muscogee (Creek) Nation of Oklahoma

FERC requested comments on the Langdale Surrender Application from the Muscogee (Creek) Nation, Alabama-Coushatta Tribe of Texas, Coushatta Tribe of Louisiana, and Alabama-Quassarte Tribal Town. On May 28, 2019, Georgia Power provided notice that a response to FERC's April 11, 2019, AIR had been filed. This notice was provided to the Project's interested tribes (Alabama-Coushatta Tribe of Texas, Alabama Quassarte Tribal Town, Coushatta Indian Tribe, and the Muscogee [Creek] Nation).

14.2 Environmental Analysis

Georgia Power conducted surveys and associated analyses that pertain to effects on cultural resources. Those analyses are presented in the following reports:

- Archaeological Reconnaissance Survey of the Chattahoochee River, Harris County, Georgia
- Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County, Georgia
- Archaeological Testing of Two Sites on the Chattahoochee River, 9HS30 and 9HS31, Harris County, Georgia
- Langdale Hydroelectric Generating Project (FERC #2341) and Riverview Hydroelectric Generating Project (FERC #2350), Harris County, Georgia - Assessment of Effects for Archaeological Sites 9HS30, 9HS525, 9HS526, 9HS527, 9HS528, 9HS529, 9HS530, 9HS531, 9HS532, and 9HS533
- Decommissioning Plan
- Final Hydraulic and Hydrologic Study Report

Table 14-4 includes the proposed PME measures that would be implemented to address effects of the Proposed Action on cultural resources at the Projects. This table also includes reference to the phase of the decommissioning in which the PME measures would be implemented (i.e., pre removal, removal, post removal).

Table 14-4 Proposed PME Measures to Address Effects on Cultural Resources

PROPOSED PME MEASURES	LANGDALE	CROW HOP	RIVERVIEW	REMOVAL PHASE
• Leave 10-foot dam abutment on west side of the Langdale Dam; leave ~300 feet on the east side of the Langdale Dam at a lower elevation and the 10 feet abutting the shoreline at full height.	✓			Removal
• Implement the stipulations of the Memorandum of Agreement between the FERC, Georgia State Historic Preservation Officer (SHPO) and the Alabama SHPO (Cultural MOA) including recordation, avoidance, protective covenants, post-dam removal monitoring, and public education/interpretation.	✓	✓	✓	Pre Removal, Removal, Post Removal
• Perform or cause to be performed Level II Historic American Buildings Survey Historic American Engineering Record (HAER) documentation of the Langdale Dam and powerhouse, to include a historic narrative, measured drawings, and medium format black and white photography, and submit documentation to the National Park Service (NPS) for approval. • This record will be housed at the Georgia and Alabama SHPO, and be available to the public at the Cobb Memorial Archives at the Chambers County Library in Valley, AL.	✓	✓	✓	Pre Removal
• Develop educational material, including interpretive signage to be located in the proposed new Langdale Park.	✓	✓	✓	Post Removal
• Leave 10-foot dam abutments on east and west sides of the Crow Hop Dam.		✓		Removal
• Each rock weir structure (3) at Crow Hop will be captured with photo documentation to the extent possible during dam removal.		✓		Removal, Post Removal
• Leave a 10-foot dam abutment on south side of Riverview Dam and approximately 25-foot abutment on the north side of the Riverview Dam.			✓	Removal
• Develop and implement an Erosion and Sediment Control Plan	✓	✓	✓	Pre Removal, Removal

Georgia Power proposes to decommission the Langdale Project and Riverview Projects, which would result in the removal of the majority of the Langdale Dam, decommissioning of the Langdale powerhouse in place, removal of the Crow Hop Dam and Riverview Dam and powerhouse. In addition, Georgia Power proposes to construct a channel through the Langdale island to convey flow to the Langdale tailrace and construct a rock ramp to protect rock weir #3 to ensure that adequate flow remains in the Riverview headrace channel.

Georgia Power, Georgia and Alabama SHPOs, federally recognized Tribes, and FERC are consulting and developing a Cultural and Historic Memorandum of Agreement (MOA) that further identifies effects and mitigation measures for historic properties related to the decommission. Georgia Power would adhere to the MOA during all phases of the decommissioning and removal of the Langdale Dam, Crow Hop Dam, and Riverview Dam and powerhouse. In addition, the MOA may govern a protective covenant or preservation easement of the historic Langdale powerhouse in the event the building is conveyed to another party.

14.2.1 PME Measures

14.2.1.1 Phase 1 – Pre Removal

Prior to removal of the Langdale, Riverview, and Crow Hop dams, the Riverview powerhouse, and decommissioning of the Langdale powerhouse, Georgia Power proposes to perform (or cause to be performed) Level II Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER) documentation of the Projects' dam and powerhouses, to include a historic narrative, measured drawings, and medium-format black and white photography. This documentation would be submitted to the National Park Service (NPS) for approval. In addition, this record would be housed at the Georgia and Alabama SHPOs and available to the public at the Cobb Memorial Archives at the Chambers County Library in Valley, Alabama.

Pre removal construction activities at the Projects would include the improvement of an existing construction access road on the east side of the Project. Although this area is pre disturbed, improvement of the road could potentially damage cultural resources because of increased vehicular traffic. Georgia Power would clearly mark access roads during construction and traffic would be limited to these areas to minimize the impact to cultural resources. Georgia Power would also install public safety signs and buoys to warn public

of active construction and prohibit trespassing, potentially minimizing looting of cultural resources. Prior to beginning construction, Georgia Power proposes to develop and implement an Erosion and Sediment Control Plan which will reduce turbidity, erosion, and sedimentation during the construction.

14.2.1.2 Phase 2 – Removal

As listed in Table 14-2, the Archaeological Reconnaissance Survey recommended five historic period stone and timber crib weir structures located in the river channel at Crow Hop eligible for listing on the NRHP (Southern Research 2020a). Georgia Power proposes to document each of the crib weir structures at Crow Hop with a laser scanner and produce detailed drawings prior to and during dam removal activities.

Georgia Power's proposal to leave 10-foot dam abutments on the west side of the Langdale Dam and leave approximately 300 feet on the east side of the Langdale Dam will allow documentation of the historic structures. Similar effects would occur for the 10 foot abutments on the east and west side of the Crow Hop dam and 10 foot and 25 foot abutments for the Riverview dam to document the historical context of the dams.

Construction activities at Langdale would include the construction of a temporary access road from the Project laydown area to the east riverbank. In addition, Georgia Power would construct a temporary access road to the island channel area from the west end of the main dam to install a small, rip rap lined channel from the mainstem of the Chattahoochee River to the Langdale tailrace. Construction activities would include the construction of a temporary access road from the Riverview Project laydown area to the Riverview Dam and from the Project laydown area to the riverbank on the east side of Crow Hop Dam, which could potentially damage unknown cultural resources as a result of vehicular traffic and erosion.

During construction, Georgia Power will implement an Erosion and Sediment Control Plan to reduce turbidity, erosion, and sedimentation related to construction. Specifically, Georgia Power would install timber mats over all sensitive resource areas (wetlands and if applicable, cultural resources), as applicable, as work commences. Timber mats lessen ground disturbance from heavy equipment and would provide a protective layer for cultural resources. Georgia Power would clearly mark access roads during construction and limit traffic to these areas to minimize the impact to cultural resources. During the removal phase, Georgia Power would remove any temporary facilities (including roads)

and seed and mulch all disturbed areas as final grades are achieved to minimize erosion and further protect cultural resources from exposure.

14.2.1.3 Phase 3 – Post Removal

Georgia Power proposes to develop educational material, including interpretive signage, to document the historical significance of the Langdale and Riverview Dams and decommissioned powerhouse.

Georgia Power proposes to implement a post-removal river survey, as part of the MOA, to identify any historic properties that were not previously identified and to assess potential effects of changes in the water levels to identified sites. Site 9HS529, located on an island upstream of the Langdale dam would be surveyed post-removal. Since the island is owned by the USACE, Georgia Power will consult and coordinate this effort with the USACE.

14.3 Unavoidable Adverse Impacts

Decommissioning and removal of the Langdale and Riverview Projects could potentially have an unavoidable adverse impact to unknown cultural resources in the area. There is potential for disturbing or uncovering cultural resources during construction activities associated with decommissioning or those unearthed when new riverbanks are exposed. Through the MOA, Georgia Power would implement mitigation measures to lessen impacts to known and discovered cultural resources.

15.0 REFERENCES

AAA Native Arts (AAA). 2021. Chattahoochee Creeks. Available online: https://www.aaanativearts.com/chattahoochee-creeks-2. Accessed February 2021.

Alabama Department of Conservation and Natural Resources (ADCNR) 2022. Outdoor Alabama: Birds. Available online at: https://www.outdooralabama.com/wildlife/birds. Access January 2022.

Alabama Department of Economic and Community Affairs (ADECA). 2021. Statewide Comprehensive Outdoor Recreation Plan, 2021, Prepared by The University of Alabama Center for Business and Economic Research (CBER) and The University of Alabama Center for Economic Development (UACED). Tuscaloosa, Alabama. Available online at: https://adeca.alabama.gov/wp-content/uploads/2021-Alabama-SCORP.pdf. Accessed January 2022.

Alabama Department of Environmental Management (ADEM). 2016. 2016 Integrated Water Quality Monitoring and Assessment Report. http://www.adem.state.al.us/programs/water/waterforms/2016AL-IWQMAR.pdf. Accessed May 3, 2018.

Alabama Department of Environmental Management (ADEM). 2017. ADEM Admin. Code r. 335-6-10 & 11. http://adem.state.al.us/alEnviroRegLaws/files/Division6Vol1.pdf. Accessed May 3, 2018.

Alabama Department of Labor (2019). Chambers County Profile. Labor Market Information Division. Available online at http://www2.labor.alabama.gov/workforcedev/CountyProfiles/Chambers%20County.pdf. Accessed November 2020.

American Community Survey. 2019a. Georgia; Harris County, Georgia; and Block Group 1, Census Tract 1201.98. https://data.tallahassee.com/american-community-survey/block-group-1-census-tract-120198-harris-county-georgia/population/total-population/yty/15000US131451201981/area/.

American Community Survey. 2019b. Alabama; Chambers County, Georgia; and Block Group 3, Census Tract 9546. https://data.tallahassee.com/american-community-survey/block-group-3-census-tract-9546-chambers-county-alabama/population/total-population/yty/15000US010179546003/area/.

American Community Survey. 2019c. Block Group 1, Census Tract 9547. https://data.tallahassee.com/american-community-survey/block-group-1-census-tract-9547-chambers-county-alabama/population/total-population/yty/15000US010179547001/area/.

American Community Survey. 2019d. Block Group 2, Census Tract 9547.https://data.tallahassee.com/american-community-survey/block-group-2-census-tract-9547-chambers-county-alabama/population/total-population/yty/15000US010179547002/area/.

American Trails. 2021. Chattahoochee Valley Railroad Tr–il - Valley, Alabama. Available online at: https://www.americantrails.org/resources/chattahoochee-valley-railroad-trail-valley-alabama. Accessed January 2022.

Auburn University. 1980. A Fishery Assessment Downstream of West Point Dam, Georgia. Contract No. DACW01-80-C-0069. (Obtained from Environmental Protection Division, Georgia Department of Natural Resources, Atlanta, Georgia).

Buchman, M.F., 2008. NOAA Screening Quick Reference Tables. https://repository.library.noaa.gov/view/noaa/9327.

Data Central. 2019. Unemployment Rate – Chambers County, AL. Available online at: https://data.rgj.com/unemployment/chambers-county-al/CN0101700000000/2019-october/. Accessed January 2022.

Data USA. 2019a. Chambers County, AL. Available online at: https://datausa.io/profile/geo/chambers-county-al. Accessed January 2022.

Data USA. 2019b. Harris County, GA. Available online at: https://datausa.io/profile/geo/harris-county-ga. Accessed January 2022.

Data USA. 2019c. Riverview, AL. Available online at: https://datausa.io/profile/geo/riverview-al/. Accessed January 2022.

Data USA. 2019d. Valley, AL. Available online at: https://datausa.io/profile/geo/valley-al. Accessed January 2022.

Data USA. 2019e. Lanett, AL. Available online at: https://datausa.io/profile/geo/lanett-al. Accessed January 2022.

Data USA. 2019f. Hamilton, GA. Available online at: https://datausa.io/profile/geo/hamilton-ga. Accessed January 2022.

EA Engineering, Science, and Technology, Inc. (ESTI). 1990. Fisheries Investigations at the Langdale and Riverview Hydroelectric Facilities on the Chattahoochee River Near West Point, GA. Prepared for Georgia Power Company. August 1990.

EA Engineering, Science, and Technology, Inc. (ESTI). 1992. Protected Species Survey of the Chattahoochee River Near the Langdale (FERC Project No. 2341) and Riverview (FERC Project No. 2350) Hydroelectric Facilities, West Point, Georgia, September 1992.

Eakin, Henry M. July 1936. U.S. Department of Agriculture. Silting of Reservoirs. Technical Bulleting No. 524. Issued July 1936. United States Department of Agriculture Washington, D.C.

Eakin, Henry M. and Carl B. Brown. 1939. U.S. Department of Agriculture. Silting of Reservoirs. Technical Bulleting No. 524. Revised and Issued November 1939. United States Department of Agriculture Washington, D.C.

Federal Energy Regulatory Commission (FERC). 1997. Order Approving Revised Recreation Plan, Project No. 2341-017, Federal Energy Regulatory Commission, Office of Energy 4-46 December 2018 Projects, Division of Hydropower Administration and Compliance, Washington, D.C., March 1997.

Federal Energy Regulatory Commission (FERC). 2014a. Environmental Assessment for Hydropower License, Bartletts Ferry Hydroelectric Project, FERC Project No. 485-065, Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing April 2004.

Federal Energy Regulatory Commission (FERC). 2015. Compliance Handbook, Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Administration and Compliance Washington, D.C.

Federal Energy Regulatory Commission (FERC). 2019. Comment of Chris Manganiello in Docket(s)/Project(s) P-2350-025, P-2341-033 Submission Date: 6/26/2019. Accession Number: 20190626-5049. Available: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15282448.

Federal Energy Regulatory Commission (FERC). 2020. Comment of Chris Manganiello in Docket(s)/Project(s) P-2341-033, P-2350-025 Submission Date: 5/1/2020. Accession Number: 20200501-5244. Available: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15526066.

Federal Energy Regulatory Commission (FERC). 2022. List of Comprehensive Plans, Federal Energy Regulatory Commission, Office of Energy Projects, Washington, D.C. March 2022.

Gaddy, L.L. 1989a. Biological Investigations at the Langdale Hydroelectric Project. 5pp. 1 Table

Gaddy, L.L. 1989b. Wetland Plant Communities of the Langdale Hydroelectric Project, 4pp, 1 map.

Gaddy, L.L. 1991a. Biological Investigations at the Langdale Hydroelectric Project. Consulting Biologist, Walhalla, South Carolina. 6pp.

Gaddy, L.L. 1991b. Biological Investigations of the Riverview Hydroelectric Project. Consulting Biologist, Walhalla, South Carolina. 6pp.

Gaddy, L.L. 1991c. Wetland plant communities of the Riverview Hydroelectric Project. Consulting Biologist, Walhalla, South Carolina. 6pp.

Gaddy, L.L. 1991d. Wetland plant communities of the Langdale Hydroelectric Project. Consulting Biologist, Walhalla, South Carolina. 6pp

Gardner, J. W., R. A. Mitchell, and P. Brockington. 1988. Documentation Langdale Hydroelectric Generating Project (FERC #2341), Riverview Hydroelectric Generating Project (FERC #2350), Chambers County, Alabama, and Harris County, Georgia. RI-I. Report on File – Georgia Power Company Land Department, Atlanta. 4-55 December 2018.

Gardner, J. W., and P. Brockington. 1988. Documentation Langdale Hydroelectric Generating Project (FERC #2341), Riverview Hydroelectric Generating Project (FERC #2350), Chambers County, Alabama, and Harris County, Georgia. RI-II. Report on File –Georgia Power Company Land Department, Atlanta.

GEL Engineering, LLC. 2009 Sediment Testing Report, Chattahoochee River Ecosystem Restoration Section 206 Project, City Mills Dam and Eagle Phenix Dam, Columbus, Georgia. Report prepared for CH2M HILL. February.

Georgia Department of Natural Resources, Environmental Protection Division (GDNR). 1997. Chattahoochee River Basin Management Plan 1997. Accessed May 4, 2018.

Georgia Department of Natural Resources (GDNR). 2020 (sec 9)

Georgia Department of Natural Resources (GDNR). 2021. Georgia's Statewide Comprehensive Outdoor Recreation Plan, 2022-2026. Available online at: https://gastateparks.org/sites/default/files/parks/pdf/scorp/SCORP_BoardDraft_FINAL.pdf. Accessed January 2022.

Georgia Encyclopedia. 2020. Creek Indians. Available online at: https://www.georgiaencyclopedia.org/articles/history-archaeology/creek-indians/. Accessed January 2022.

Georgia Environmental Protection Division (GAEPD). 2016. Water Use Classifications and Water Quality Standards. Available: http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/391-3-6-.03%20Triennial%2013%20Final%20Edits.pdf. Accessed May 3, 2018.

Georgia Environmental Protection Division (GAEPD). 2016a. Water Use Classifications and Water Quality Standards. Available: http://epd.georgia.gov/sites/epd.georgia.gov/files/related_files/site_page/391-3-6-.03%20Triennial%2013%20Final%20Edits.pdf. Accessed May 3, 2018.

Georgia Environmental Protection Division (GAEPD). 2020. Georgia Water Quality Standards. Available: http://epd.georgia.gov/watershed-protection-branch/georgia-water-quality-standards. Accessed February 3, 2022.

Georgia Forestry Commission. 2015. Georgia Statewide Assessment of Forest Resources. August 2015. Georgia Forestry Commission, Dry Branch, Georgia.

Georgia Power Company (Georgia Power). 2011. Application to the Federal Energy Regulatory Commission for a License for Bartletts Ferry Project No. 485.

Georgia Power Company (Georgia Power). 2011a. Exhibit E, Bartletts Ferry Hydroelectric Project, FERC Project Number 485, Bartletts Ferry Hydroelectric Project, FERC Project Number 485, prepared with CH2MHill and Geosyntec Consulting. December 2012.

Georgia Power Company (Georgia Power). 2011b. Study Report – Water Resources. Bartletts Ferry Hydroelectric Project, FERC Project Number 485.

Georgia Power Company (Georgia Power). 2012. Exhibit E – Bartletts Ferry Hydroelectric Project FERC Project Number 485. December 2012.

Georgia Power. 2015a. Langdale Hydroelectric Project (FERC Project No. 2341) FERC Form 80.

Georgia Power. 2015b. Riverview Hydroelectric Project (FERC Project No. 2350) FERC Form 80.

Georgia Power. 2018a. Application for License Surrender of Minor Project. Langdale Hydroelectric Project FERC Project No. 2341. Submitted to FERC on December 18, 2018. Available: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15125780.

Georgia Power. 2018b. Application for License Surrender of Minor Project. Riverview Hydroelectric Project FERC Project No. 2350. Submitted to FERC on December 18, 2018. Available: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15125773.

Georgia Power. 2020a. Water Quality Study Report Draft. Langdale Hydroelectric Project FERC Project No. 2341. Riverview Hydroelectric Project FERC Project No. 2350.

Georgia Power. 2020b. Freshwater Mussel Report. Langdale Hydroelectric Project FERC Project No. 2341 and Riverview Hydroelectric Project FERC Project No. 2350. September 2020.

Georgia Wildlife 2018. Blanton Creek Wildlife Management Area. Available online at: http://georgiawildlife.com/blanton-creek-wma. Accessed January 2022.

Hay, D. E. 1989. Documentation, Langdale Hydroelectric Generating Project (FERC #2341), Riverview Hydroelectric Generating Project (FERC #2350), Harris County, Georgia. Report on file – Land Department, Georgia Power Company, Atlanta.

Industrial Economics Inc. 2012. The Economic Impacts of Ecological Restoration in Massachusetts. Massachusetts Division of Ecological Restoration, Boston, MA. https://www.mass.gov/doc/phase-1-economic-impacts-of-ecological-restoration-in-massachusetts/download. Accessed January 2022.

Kleinschmidt Associates (Kleinschmidt). 2020. Langdale (P-2341) and Riverview Project (P-2350) Langdale and Riverview Project Decommissioning Draft Hydraulic & Hydrologic Modeling Report, May 2020. Accession Number: 20200921-5036. Available: https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15626286.

Kleinschmidt Associates (Kleinschmidt). 2022a. Langdale (P-2341) and Riverview Project (P-2350) Hydraulic and Hydrologic Study Report. August 2022.

Kleinschmidt Associates (Kleinschmidt). 2022b. Langdale (P-2341) and Riverview Project (P-2350) Sediment Transport Assessment Study Report. August 2022.

Kleinschmidt Associates (Kleinschmidt). 2022c. Langdale (P-2341) and Riverview Project (P-2350) Sediment Quality Study. August 2022.

Kleinschmidt Associates (Kleinschmidt). 2022d. Langdale (P-2341) and Riverview Project (P-2350)Final Water Quality Study Report. August 2022.

Kleinschmidt Associates (Kleinschmidt). 2022e. Draft Pre-Removal Shoal Bass Abundance and Tracking Study Report. August 2022.

Klima, D. L. 1993. Programmatic Agreement among the Federal Energy Regulatory Commission, The Advisory Council on Historic Preservation, and the Georgia State

Historic Preservation Officer and Alabama State Historic Preservation Officer with the Concurrence of the Georgia Power Company, for the Management of Historic Properties Affected by the Langdale Hydroelectric Facility.

Lawrence, S.J. 2016. Water use in the Apalachicola-Chattahoochee-Flint River Basin, Alabama, Florida, and Georgia, 2010, and water-use trends, 1985–2010: U.S. Geological Survey Scientific Investigations Report 2016–5007. Available online at https://pubs.usgs.gov/sir/2016/5007/sir20165007.pdf. Accessed January 2022.

Lewis, M.L, K.E. Sillman, B. Beck, S.M. Sammons, E.J. Peatman. 2021. Failure of phenotypic markers to accurately identify black bass species and associated hybrids in the Mobile River Basin, Alabama. North American Journal of Fisheries Management. Volume 41, Issue 5, 1591-1601.

McLaughlin Whitewater. 2013. Feasibility and Master Plan for Portages and Launches on the Chattahoochee Blueway, July 17, 2013, Prepared for The Trust for Public Land.

Marbut, Curtis Fletcher. 1913. Soils of the United States. 1913 Edition.

Mirarchi, Ralph E., ed. 2004. Alabama Wildlife, Volume One. A Checklist of Vertebrates and Selected Invertebrates: Aquatic Mollusks, Fishes, Amphibians, Reptiles, Birds and Mammals. The University of Alabama Press, Tuscaloosa, AL.

Nielsen-Pincus, M. and C. Moseley. 2009. A Preliminary Estimate of Economic Impact and Job Creation from the Oregon Watershed Enhancement Board's Restoration Investments. Ecosystem Workforce Program Briefing Paper #13. University of Oregon.

O'Brien, C.A., and J.D. Williams. 2002. Reproductive biology of four freshwater mussels (*Bivalvia:Unionidea*) endemic to eastern Gulf Coastal Plain drainages of Alabama, Florida, and Georgia. American Malacological Bulletin 17(1/2):147-158.

River Valley Regional Commission (RVRC). 2019. Harris County Georgia Comprehensive Plan, prepared by the River Valley Regional Commission for Harris County, Georgia. Available online at: https://www.rivervalleyrc.org/images/harriscounty/harriscountycompplan_2019.pdf. Accessed January 2022.

Sammons, S.M. 2011. Habitat use, movement, and behavior of shoal bass, Micropterus cataractae, in the Chattahoochee River near Bartletts Ferry Reservoir. Auburn University Department of Fisheries and Allied Aquaculture. February 28, 2011.

Sammons, STEVEN M., and LAURIE A. Earley. (2015). "Movement and habitat use of Shoal Bass in a regulated portion of the Chattahoochee River, Alabama-Georgia,

USA." *Black bass diversity: multidisciplinary science for conservation. American Fisheries Society, Symposium*. Vol. 82. 2015.

Soil Conservation Service (SCS). 1956. U.S. Department of Agriculture. Soil Survey for Chambers County, Alabama.

Soil Conservation Service (SCS). 1983. U.S. Department of Agriculture. Soil Survey for Muscogee County, Georgia. Athens, Georgia: College of Agriculture

Southern Research, Historic Preservation Consultants (Southern Research). 2020a. Archaeological Reconnaissance Survey of the Chattahoochee River, Harris County, Georgia. September 2020.

Southern Research, Historic Preservation Consultants (Southern Research). 2020b. Archaeological Survey of 20 Acre Island in the Chattahoochee River, Harris County, Georgia. September 2020.

Southern Research, Historic Preservation Consultants (Southern Research). 2020c. Archaeological Testing of Two Sites on the Chattahoochee River, 9HS30 and 9HS31, Harris County, Georgia. September 2020.

Southern Research, Historic Preservation Consultants, Inc. (Southern Research). 2022. Assessment of Effects for Archaeological Sites 9HS30, 9HS525, 9HS526, 9HS527, 9HS528, 9HS529, 9HS530, 9HS531, 9HS532, and 9HS533. Langdale Hydroelectric Generating Project (FERC #2341) and Riverview Hydroelectric Generating Project (FERC #2350), Harris County, Georgia.

State of Georgia. 2020. Historical Census Data. Available online at: https://census.georgia.gov/census-data/historical-census-data. Accessed November 2020.

Statesman Journal. 2019. Unemployment Rate – Harris County, GA (August 2019). Available online at: https://data.statesmanjournal.com/unemployment/harris-county-ga/CN1314500000000/2019-august/. Accessed November 2020.

United States Army Corps of Engineers (USACE). 2010. Mobile District Website. Appendix C: Apalachicola-Chattahoochee-Flint (ACF) Basin Detailed Analysis. Available online at https://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/appendixC.pdf. Accessed November 2020.

United States Army Corps of Engineers (USACE). 2016. Final Environmental Impact Statement – Update of the Water Control Manual for the Apalachicola-

Chattahoochee Flint River Basin in Alabama, Florida, and Georgia and a Water Supply Storage Assessment Volume 1. USACE Mobile District, Mobile, Alabama.

U.S. Army Corps of Engineers (USACE). 2018a. Regulatory Letter Guidance. Determination of Compensatory Mitigation Credits for the Removal of Obsolete Dams and Other Structures from Rivers and Streams. 18-01. September 25, 2018.

U.S. Army Corps of Engineers (USACE). 2018b. West Point Lake Recreation Areas. http://www.sam.usace.army.mil/Missions/Civil-Works/Recreation/West-Point-Lake/. Accessed January 2022.

U.S. Census Bureau (U.S. Census Bureau). 2019a. QuickFacts: Chambers County, Alabama. Available online at: https://www.census.gov/quickfacts/fact/table/chamberscountyalabama/PST045216. Accessed November 2020.

U.S. Census Bureau (U.S. Census Bureau). 2019b. QuickFacts: Harris County, Georgia. Available online at https://www.census.gov/quickfacts/fact/table/harriscountygeorgia/PST045216. Accessed November 2020.

U.S. Census Bureau (U.S. Census Bureau). 2019c. *QuickFacts: Georgia*. Available online at: https://www.census.gov/quickfacts/fact/table/GA/PST045219. Accessed November 2020.

U.S. Census Bureau (U.S. Census Bureau). 2019d. *QuickFacts: Harris County, Georgia*. Available online at: https://www.census.gov/quickfacts/fact/table/harriscountygeorgia/PST045216.

U.S. Census Bureau (U.S. Census Bureau). 2000. Alabama 2000: Summary Population and Housing Characteristics. Available online at: https://www.census.gov/prod/cen2000/phc-1-2.pdf. Accessed November 2020.

U.S. Census Bureau (Census Bureau). 2020a. *QuickFacts: Chambers County, Alabama*. Available online at: https://www.census.gov/quickfacts/fact/table/chamberscountyalabama/PST045216. Accessed January 2022.

U.S. Climate Data. 2022. Monthly Climate Columbus-Fort Benning, Georgia. URL: https://www.usclimatedata.com/climate/columbus-fort-benning/georgia/unitedstates/usga0133. Accessed January 2022.

U.S. Department of Agriculture (USDA). 2017. National Agricultural Statistics Service 2017 Census of Agriculture County Profile: Chambers County, Alabama. Available

Online at https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Alabama/cp01017.pdf. Accessed January 2022.

U.S. Environmental Protection Agency (USEPA). 2011. Ecoregions of Alabama and Georgia. ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/al/alga_front.pdf. Accessed May 4, 2018.

U.S. Fish and Wildlife Service (USFWS). 2006. Purple Bankclimber (*Elliptoideus sloatianus*) 5-Year Review: Summary and Evaluation. U.S. Fish and Wildlife Service South Atlantic-Gulf Region Panama City Ecological Services Field Office Panama City, Florida.

US Fish and Wildlife Service (USFWS). 2018. National Wetlands Inventory (NWI), Online Wetlands Mapper, Last updated Feb. 1, 2018. USFWS, Washington, DC.

U.S. Fish and Wildlife Service (USFWS). 2020. IPaC – Information for Planning and Consultation. Langdale and the Riverview Project Area. Generated December 2, 2020.

U.S. Fish and Wildlife Service (USFWS). 2022. IPaC – Information for Planning and Consultation. Langdale and the Riverview Project Area. Generated February 14, 2022.

United States Geological Survey (USGS). 2018. Water Quality Data Portal – Station ID USGS02339500. https://www.waterqualitydata.us/portal/. Accessed May 3, 2018

U.S. Geological Survey (USGS). 2019. Water Quality Portal – Sediment Analysis Results for USGS Site 02339500 – Chattahoochee River at West Point, GA. Retrieved from: https://www.waterqualitydata.us/portal/#siteid=USGS-02339500&huc=03130002&sampleMedia=Sediment&mimeType=csv.

U.S. Geological Survey (USGS). 2021. The Apalachicola-Chattahoochee-Flint (ACF) River National Water Quality Assessment (NAWQA) Program study. Available online at: https://www2.usgs.gov/water/southatlantic/ga/nawqa/basin/chattahoochee-basin.html. Accessed February 2021.

United States Geological Survey (USGS). 2022. Water Quality Data Portal – Station ID USGS02339500. https://www.waterqualitydata.us/portal/. Accessed February 21, 2022

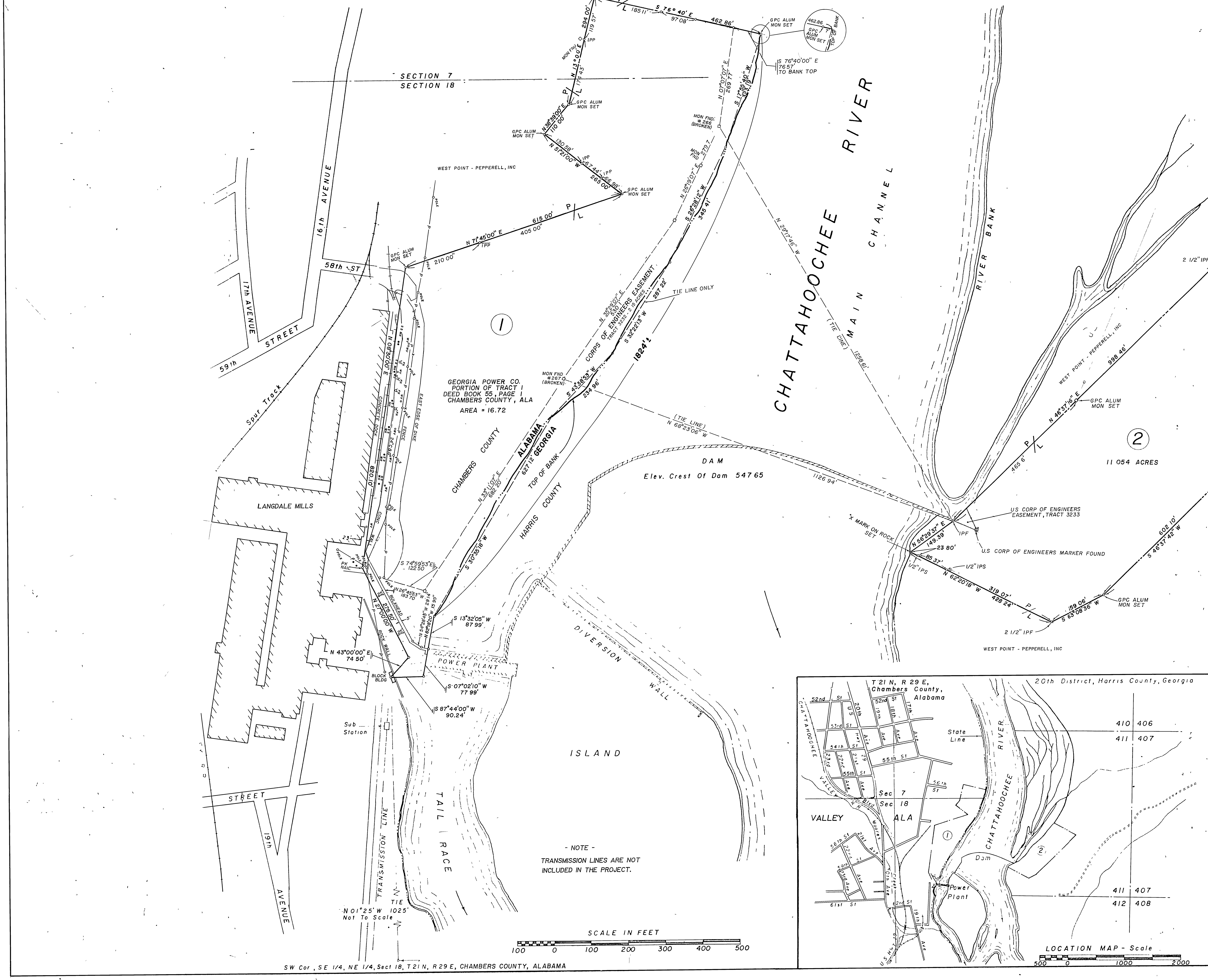
Waters, M., and B. Webster. 2019. Identifying sediment characteristics through time and biogeochemical impacts of Hydrilla for five reservoirs in the Columbus area of the Chattahoochee River System. Department of Crop, Soil, and Environmental Sciences, Auburn University, Auburn, Alabama.

Wilderness.net. 2021. Cheaha Wilderness. Available online at: https://wilderness.net/visit-wilderness/?ID=115. Accessed January 2022.

APPENDIX A

LANGDALE PROJECT – EXHIBIT G

EXHIBIT G



THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 23rd DAY OF SEPT., 1991.

GEORGIA POWER COMPANY

BY J. A. Wilson

TITLE. VICE-PRESIDENT LAND

GEORGIA POWER COMPANY
ATLANTA, GEORGIA

LANGDALE PROJECT

PROPERTY DETAIL MAP

SCALE	DATE	DRAWN BY	APPROVED BY
	NOV 1989	DBS	DBS Joe B. Thacker

FILE NO. J-33-11

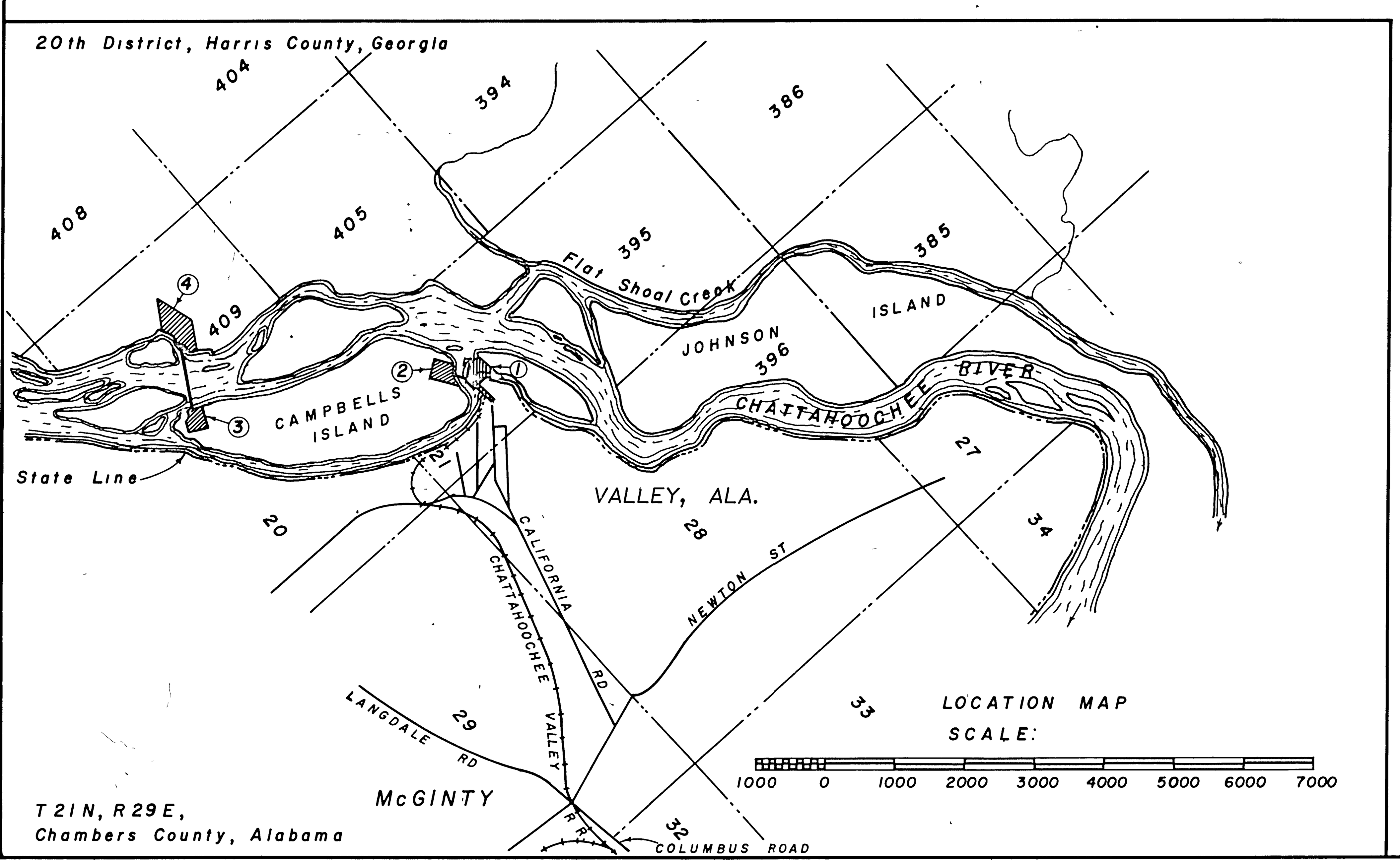
2341 - 4

APPENDIX B

RIVERVIEW PROJECT – EXHIBIT G

EXHIBIT G

TRACT No. 1	
1 - 2	S 83°52' W 24'
2 - 3	N 06°43' W 154.1'
3 - 4	N 51°36' E 141.6'
4 - 5	N 55°57' E 109.8'
5 - 6	S 83°27' E 175.1'
6 - 7	S 04°29' E 559.14'
7 - 8	Along Bank 354'±
8 - 9	S 83°52' W 161.89'
9 - 10	S 06°40' E 363'
10 - 11	S 83°52' W 30'
11 - 1	N 06°40' W 363'



THIS DRAWING IS A PART OF THE APPLICATION FOR LICENSE MADE BY THE UNDERSIGNED THIS 23rd DAY OF SEPT., 1991.

GEORGIA POWER COMPANY

BY: J. A. Wilson

TITLE: VICE-PRESIDENT LAND

GEORGIA POWER COMPANY
ATLANTA, GEORGIA

RIVERVIEW PROJECT

PROPERTY DETAIL MAP

SCALE	DATE	DRAWN BY	APPROVED BY
	NOV 1989	DBS	JBS Joe B. Thacker

004796

FILE NO. J-33-12

APPENDIX C

COASTAL ZONE MANAGEMENT ACT - CONSULTATION

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
COASTAL RESOURCES DIVISION
ONE CONSERVATION WAY · BRUNSWICK, GA 31520 · 912.264.7218
COASTALGADNR.ORG

MARK WILLIAMS
COMMISSIONER

DOUG HAYMANS
DIRECTOR

NOTIFICATION

Effective August 1, 2021

To: Interested Applicants/Sponsors/General Public

From: Jill Andrews, Coastal Resources Division, Coastal Management Program Section Chief

RE: Executive Order 12372 Intergovernmental Coordination & Environmental Review

The Coastal Zone Management Act (CZMA, 15 CFR 930) includes provisions that are intended to ensure that federal assistance to applicant agencies for activities affecting any coastal use or resource is granted only when such activities are consistent with approved coastal management programs. Georgia's Coastal Management Program (GCMP) area encompasses eleven coastal counties: Brantley, Bryan, Camden, Charlton, Chatham, Effingham, Glynn, Liberty, Long, McIntosh, and Wayne. For assistance within these counties please contact our Federal Consistency Coordinator (Kelie.Moore@dnr.ga.gov)

Assistance programs and intergovernmental reviews **outside** of these eleven (11) counties are not subject to the CZMA provisions and do not require approval from Coastal Resources Division.

Coastal Barrier Resources Act (CRBA) areas do not extend outside these eleven (11) coastal counties and do not require approval from Coastal Resources Division.

Housing and Urban Development (HUD) federal assistance projects proposed **anywhere** within Georgia, including within the eleven (11) coastal counties, do not require approval from Coastal Resources Division.

Please use this Notification as an official document to send when submitting your application to a funding agency or for other intergovernmental review verification needs. This letter is also available on the Georgia State Clearinghouse website: http://www.opb.georgia.gov/state-clearinghouse and on the Georgia Department of Natural Resources Coastal Resources Division website: https://www.coastalgadnr.org/MarshShore

APPENDIX D

RELICT TRILLIUM SURVEY TECHNICAL MEMORANDUM

Relict Trillium Survey Technical Memorandum

Langdale Project (FERC No. 2341)
and
Riverview Project (FERC No. 2350)

Prepared for:

Georgia Power Company

Prepared by:

Kleinschmidt Associates

Kleinschmidt

August 2022

This Page Intentionally Left Blank

TABLE OF CONTENTS

List of Figures

List of Photos

1.0 INTRODUCTION

At the request of Georgia Power in May 2022, Kleinschmidt Associates (Kleinschmidt) performed a survey for the relict trillium (*Trillium reliquum*) at the Langdale and Riverview Hydroelectric Projects[1] ("Projects"). This memorandum summarizes the protected species survey that occurred at the Project sites on May 4, 2022.

In August 2020, an ecological survey was conducted within the proposed limits of disturbance at the Projects which identified potentially suitable habitat for relict trillium (US threatened, GA endangered) in the Crow Hop survey area. Because potentially suitable habitat was identified, and the limits of disturbance have changed since the 2020 ecological survey, the Project areas were revisited in Spring 2022 (i.e., the flowering season) to locate the previously identified habitats and performed targeted relict trillium surveys where suitable habitats occur. The limits of disturbance for each Project area are included in Figure 3-1 through Figure 3-3.

[1] Langdale Project consists of the Langdale Dam and powerhouse; the Riverview Project includes the Crow Hop Diversion Dam, Riverview Dam, and Riverview powerhouse.

2.0 EXISTING RELICT TRILLIUM HABITAT

In 2022, suitable habitat for relict trillium was located on the eastern portion of the Langdale Project and surrounding area. The mature hardwood forest, sparse understory, and rich soils along the hillslopes at the Langdale Project area provided the preferred habitat for relict trillium. In both 2020 and 2022, marginally suitable habitat was located on the eastern portion of the Crow Hop Dam area, which exhibited steep topography and dry, shallow, rocky soils. No suitable habitats were located near the Riverview Dam and powerhouse and immediate surrounding areas in 2020 or 2022.

3.0 SURVEY AND RESULTS

To ensure complete coverage of identified habitats within the Langdale and Crow Hop survey areas, linear transects parallel to one another were visually surveyed for the presence of relict trillium. Kleinschmidt did not observe relict trillium during the protected species surveys at either survey area. Common vegetative species observed in the mid- and understory at the Langdale survey area included swamp titi (*Cyrilla racemiflora*), red mulberry (*Morus rubra*), mayapple (*Podophyllum peltatum*), striped wintergreen (*Chimaphila maculata*), deerberry (*Vaccinium stramineum*), downy rattlesnake plantain (*Goodyera pubescens*), and various *Carex spp* (see Photo 3-1). Conversely, the Crow Hop survey area had mid- and understory species such as farkleberry (*Vaccinium arboreum*), brackenfern (*Pteridium aquilinum*), rivercane (*Arundinaria gigantea*), wild blue phlox (*Phlox divaricata*), firepink (*Silene virginica*), pussytoes (*Antennaria plantaginifolia*), Virginia spiderwort (*Tradescantia virginiana*), *Vitis spp.*, sweetgum (*Liquidambar styraciflua*), and Virginia sweetspire (*Itea virginica*) (see Photo 3-2).

Figure 3-1 – Langdale Limits of Disturbance

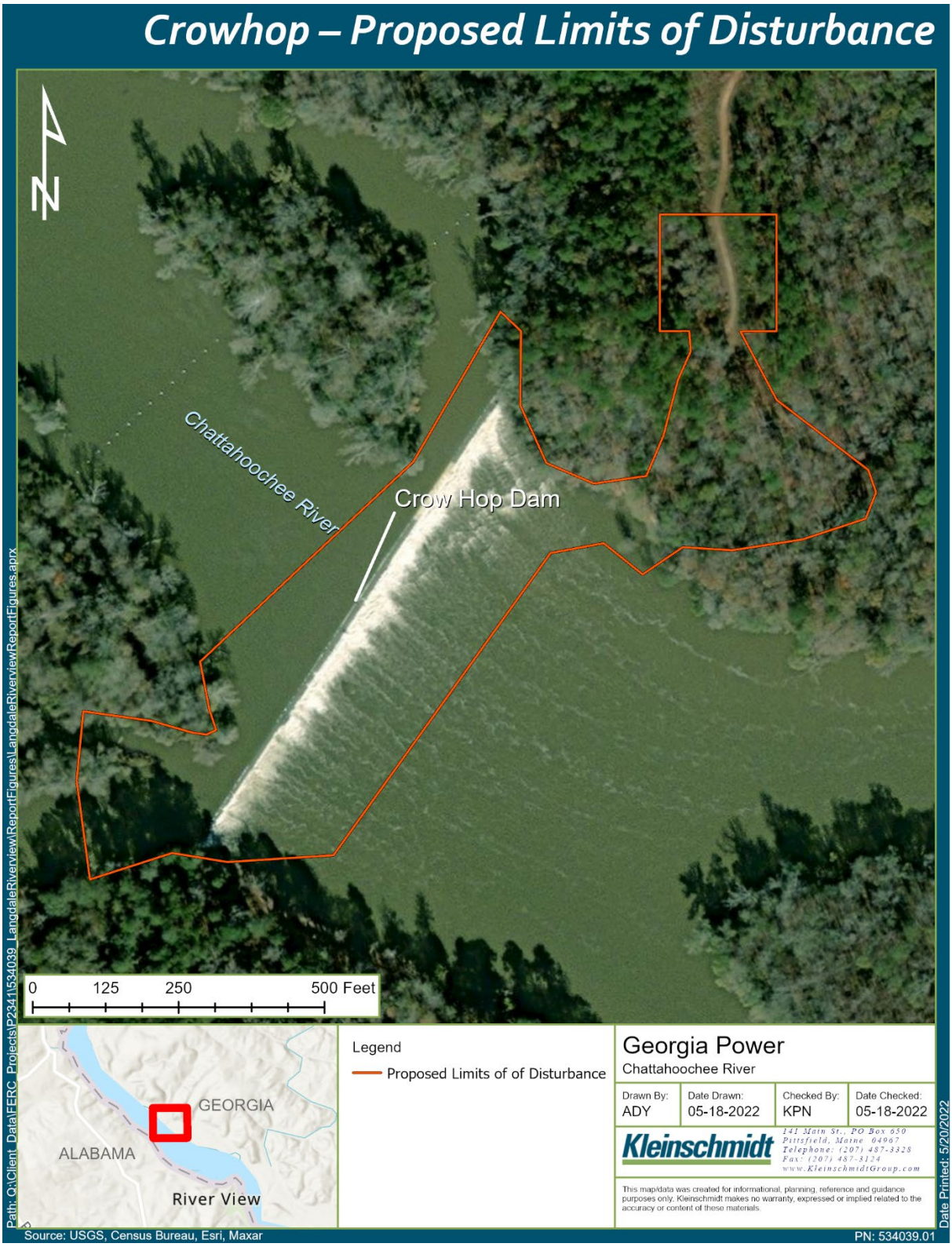


Figure 3-2 – Crow Hop Limits of Disturbance

Figure 3-3 – Riverview Limits of Disturbance

Photo 3-1 Eastern portion of the Langdale Dam Project Area Exhibiting Preferred Habitat for Relict Trillium

Photo 3-2 Eastern Portion of the Crow Hop Dam Project Area Exhibiting Marginally Suitable Habitat for Relict Trillium

4.0 SUMMARY

Although habitat for relict trillium was present during the 2022 protected species survey, Kleinschmidt did not observe relict trillium in the proposed limits of disturbance for the Langdale, Crow Hop, or Riverview Project areas.