EXHIBIT E

ENVIRONMENTAL EXHIBIT

STEVENS CREEK HYDROELECTRIC PROJECT
FERC PROJECT NO. 2535

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT E
ENVIRONMENTAL REPORT

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DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS

A	
ACHP	Advisory Council on Historic Preservation
ADA	Americas with Disabilities Act
Alderman	Alderman Environmental Services, Inc.
AOI	Area of Interest
APE	Area of Potential Effect
Applicant	Dominion Energy South Carolina, Inc.
Augusta Project	Augusta Canal Project (FERC No. 11810)
B	
BMPs	Best Management Practices
BOD	biochemical oxygen demand
C	
ºC	degrees Celsius
CEII	Critical Energy Infrastructure Information
CFR	Code of Federal Regulation
cfs	cubic feet per second
CI	Credible Interval
Commission	Federal Energy Regulatory Commission
CZMA	Coastal Zone Management Act
D	
DESC	Dominion Energy South Carolina, Inc.
DLA	Draft License Application
DO	dissolved oxygen
E	
EFH	Essential Fish Habitat
EL	elevation
ESA	Endangered Species Act
F	
ºF	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FPA	Federal Power Act
G	
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division

H

HCPD	Historic and Cultural Preservation Department
HPMP	Historic Properties Management Plan
HUC	Hydrologic Unit Code

I

IPaC	Information for Planning and Consultation

J

JAM	Joint Agency Meeting

K

kV	kilovolts
KVA	kilovolt amps
kW	kilowatts

L

Licensee	Dominion Energy South Carolina, Inc.

M

mg/L	milligrams per liter
MOA	Memorandum of Agreement
MW	megawatts
MWh	megawatt-hours

N

ND	no data
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NRHP	National Register of Historic Places
NSBLD	New Savannah Bluff Lock and Dam
NWI	National Wetlands Inventory

P

PA	Programmatic Agreement
PAD	Pre-Application Document
PM&E	protection, mitigation, and enhancement

R

RCG	Resource Conservation Group

RM	river mile
RMP	Recreation Management Plan
RTE	Rare, Threatened, and Endangered
RUN	Recreation Use and Needs

S

SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCEPPC	South Carolina Exotic Pest Plant Council
SHEP	Savannah Harbor Expansion Project
SHPO	State Historical Preservation Officer
SNF	Sumter National Forest
Stevens Creek Project	Stevens Creek Hydroelectric Project; FERC No. 2535

T

TES	Threatened, Endangered, and Sensitive
Thurmond Dam	J. Strom Thurmond Dam; USACE Project
TLP	Traditional Licensing Process
TRC	TRC Environmental Corporation
TWC	Technical Working Committee

U

USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

STEVENS CREEK HYDROELECTRIC PROJECT
FERC PROJECT NO. 2535

APPLICATION FOR NEW LICENSE
FOR MAJOR PROJECT – EXISTING DAM

EXHIBIT E
ENVIRONMENTAL REPORT

1.0 INTRODUCTION

1.1 APPLICATION

Dominion Energy South Carolina, Inc. (DESC) (Licensee or Applicant) is in the process of preparing an application for a new license for the existing Stevens Creek Hydroelectric Project (FERC No. 2535; Stevens Creek Project). The Stevens Creek Project is located in Edgefield and McCormick counties, South Carolina and Columbia County, Georgia, at the confluence of Stevens Creek and the Savannah River (Figure 1.1). The hydroelectric facility has an installed capacity of 17.28 megawatts (MW). The Stevens Creek Project occupies approximately 104 acres of federal lands within the Sumter National Forest (SNF) with pre-existing easements and an additional 0.21 acres of federal lands within the SNF without pre-existing easements. DESC is proposing no changes to existing project operations.

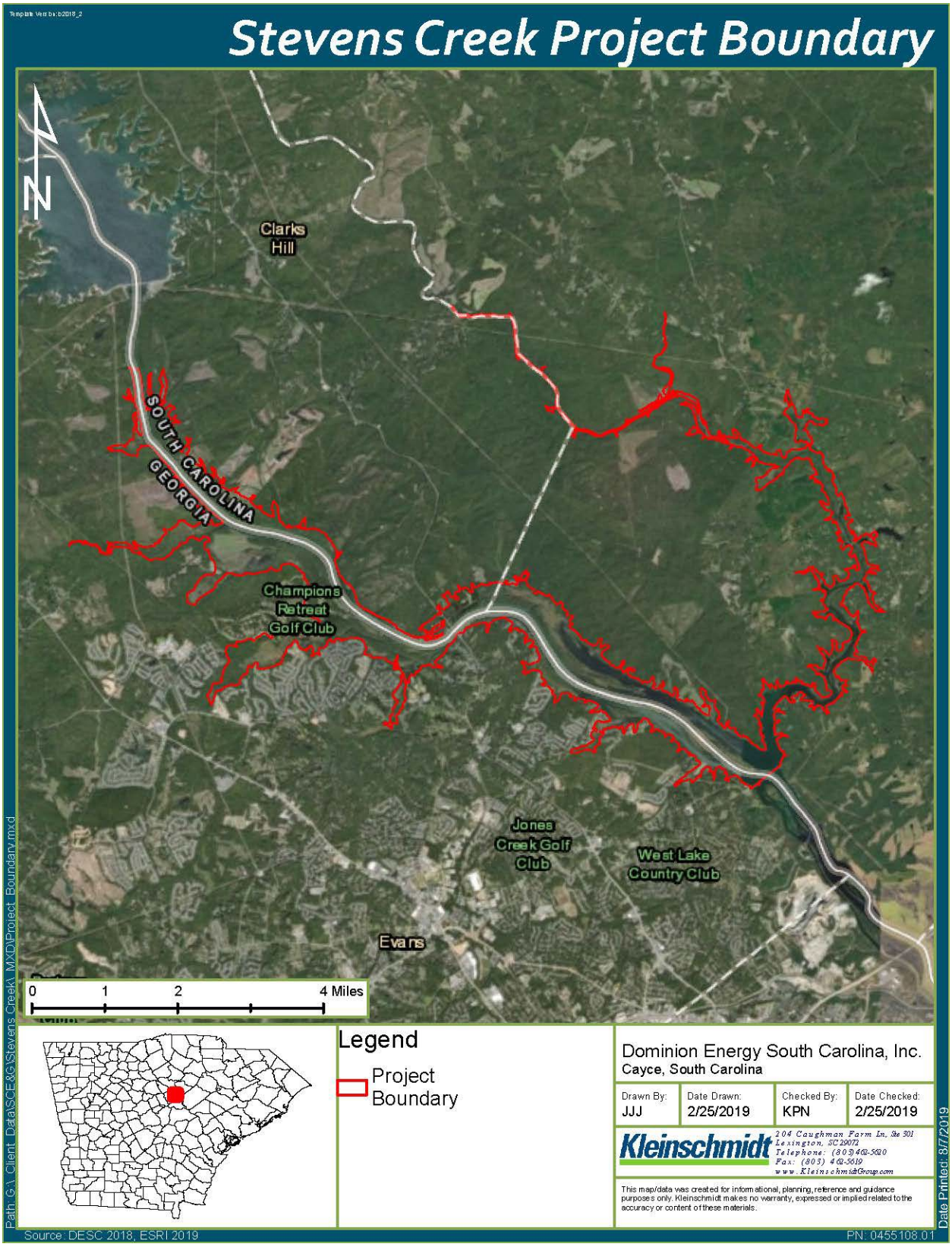

FIGURE 1.1 STEVENS CREEK PROJECT LOCATION MAP

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The existing license was issued by the Federal Energy Regulatory Commission (FERC or Commission) on November 22, 1995, for a 30-year period, terminating on October 31, 2025. DESC intends to file a Final License Application (FLA) with FERC on or before October 31, 2023. This draft application is being submitted to agencies, stakeholders and other interested parties for a 90-day review and comment period. Comments on the draft application will be addressed in the FLA filed with the Commission.

The Commission must decide whether to issue a license for continued operation of the Stevens Creek Project and determine what conditions the license should contain. When deciding whether to issue a license for a hydroelectric project, the Commission must determine whether, as proposed in a Licensee's application, a hydroelectric project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued, FERC must give equal consideration to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement (PM&E) of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality.

Issuing a new license for the Stevens Creek Project would allow the Licensee to generate electricity for the term of a new license, making electric power from a renewable resource available to its customers. In addition, the Stevens Creek Project would continue to serve an important function to downstream resources in the Savannah River by re-regulating river flow as required by Article 402 of the current license. Issuing a new license for the Stevens Creek Project under the proposed action (i.e., no changes from existing operations) would allow continued downstream flow regulation.

This Exhibit E, organized in the form of an applicant-prepared Environmental Assessment, assesses the effects associated with continued operation of the project under the applicant-proposed terms and conditions. Alternatives included in this analysis include the no-action alternative. Section 3.3 includes alternatives considered but eliminated from detailed study within this Exhibit E.

1.2.2 Need for Power

The Stevens Creek Project would provide hydroelectric generation to meet part of DESC's demand for power, resource diversity, and capacity needs. The Stevens Creek Project has an installed capacity of 17.28 MW and would generate approximately 63,000 megawatt-hours (MWh) per year. Power generated by the Stevens Creek Project would continue to provide low-cost power that displaces non-renewable, fossil-fuel generation and contributes to a diversified generation mix. Additionally, the Stevens Creek Project would aid in fulfilling the Licensee's demand needs as a part of the North American Electric Reliability Council, in particular Standard BAL-001, Real Power Balancing Control Performance, and Standard BAL-002, Disturbance Control Performance. These Standards include requirements for balancing load and generation, maintaining steady-state frequency, providing for operating reserves, and frequency regulation to address the resolution of inadvertent interchange between electric systems or conditions of insufficient generator resources.

The Stevens Creek Project would additionally continue to provide an important service to downstream resources as a re-regulating facility. Maximum flow releases from the Stevens Creek Project are only a fraction of the amount of flow normally released from the U.S. Army Corps of Engineers' (USACE) J. Strom Thurmond Dam Project (Thurmond Dam), which is immediately upstream of the Stevens Creek Project. The Stevens Creek Reservoir has very little storage capacity to accommodate incoming USACE releases thus requiring DESC to lower the reservoir to receive incoming flows. Lowering the reservoir allows DESC to provide more stable flows downstream and thereby meet its function as a re-regulation facility.

1.3 PUBLIC REVIEW AND COMMENT

FERC's regulations (18 CFR[1] § 16.8) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a new license. The consultation is the first step in complying with the Fish and Wildlife Coordination Act, the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing consultation must be completed and documented according to FERC regulations. A list of names and addresses of every federal, state, and interstate resource agency, Native American tribe, non-governmental organization (NGO), and individual, unaffiliated members of the public with which the Licensee consulted in preparation of this document is provided in Section 7.0, *List of*

1 Code of Federal Regulation

Consulted Parties. DESC's actions with respect to each stage of consultation are discussed in greater detail in the following sections.

1.3.1 Scoping of Initial Issues

Prior to the issuance of the Pre-Application Document (PAD), DESC formed Resource Conservation Groups (RCGs) with representatives from federal and state agencies, NGOs, and interested members of the public. Three RCGs were created including the Water Quality, Fish, and Wildlife RCG; the Recreation and Lake and Land Management RCG; and the Operations RCG. Later, a smaller working group, the Fish Passage Technical Working Committee (TWC) was formed. These groups met to identify and discuss resource issues and to develop recommendations for addressing and resolving them (RCG meeting notes are provided in Appendix E-1). DESC developed study plans and conducted the following studies based on discussions with members of each RCG and other stakeholder input:

- Water Quality Study
- Mussel Study
- Recreation Study

Proposed study plans were distributed with the PAD on May 15, 2020, as discussed below.

1.3.2 First-Stage Consultation

On May 15, 2020, DESC filed a Notice of Intent (NOI) to relicense the Stevens Creek Project, the PAD, and requested to use FERC's Traditional Licensing Process (TLP). DESC also published a public notice of its filing of the NOI, PAD, and request to use the TLP in the Edgefield Advertiser and the North Augusta Star on May 13, 2020, and the Augusta Chronicle and the McCormick Messenger on May 14, 2020. Comments on the request to use the TLP were due to FERC within 30 days of the filing (i.e., on or before June 15, 2020). Concurrence to use the TLP process was received from the U.S Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), the Georgia Department of Natural Resources (GADNR), and the South Carolina Department of Natural Resources (SCDNR). FERC approved DESC's request to use the TLP on July 16, 2020. In accordance with deadlines set by FERC, DESC held a virtual Joint Agency Meeting (JAM) and site visit on September 3, 2020, at 2:00 pm and 6:00 pm to accommodate as many people as possible. FERC was notified of this meeting on August 17, 2020. The meetings, including all comments and statements made during the meetings, were recorded through

Microsoft Teams, and these are part of the Commission's public record for the Stevens Creek Project. In addition to comments provided at the JAM, Table 1.1 provides a list of comment letters received from state and federal resource agencies.

TABLE 1.1 COMMENTS RECEIVED

Commenting Entity	Date Filed
USFWS	October 28, 2020
SCDNR	November 2, 2020
GADNR	November 2, 2020
NMFS	November 3, 2020
City of Augusta	May 28, 2021

Comments and study requests are discussed within each respective resource section of this Exhibit E (i.e., the Environmental Report) and summarized in the consultation table included in Appendix E-2.

1.3.3 Second-Stage Consultation

Resource studies were performed in 2021 and 2022 in accordance with study plans. Study reports were distributed to consulting parties upon completion of each study, as specified in the study plan. Study reports were discussed during RCG meetings. Notes from the various meetings are included in Appendix E-1. DESC is conducting an addendum to the Water Quality study within the Stevens Creek Arm of the reservoir during the summer and early fall of 2023. Initial results from this study will be included in the FLA and/or within a supplement to the FLA.

As previously noted, the Draft License Application (DLA), which includes this Exhibit E is being submitted to consulting parties for review; comments on the DLA are due within 90 days of the date of this filing (by June 22, 2023).

1.3.4 Third-Stage Consultation

DESC plans to file a FLA with FERC by October 31, 2023. The FLA will incorporate or discuss any comments submitted in response to this DLA by consulting parties.

2.0 STATUTORY AND REGULATORY REQUIREMENTS

DESC, as Licensee for the Stevens Creek Project, is subject to the requirements of the Federal Power Act (FPA) and other applicable statutes. The FPA gives FERC legal authority to issue licenses to non-federal hydropower projects. Major regulatory and statutory requirements are summarized below.

2.1 FEDERAL POWER ACT

2.1.1 Section 18 Fishway Prescriptions

Under Section 18 of the FPA, the USFWS and NMFS have the authority to prescribe fishways at federally regulated hydropower projects. DESC has been working with USFWS and NMFS to understand the appropriate timing and implementation of fishways at the Stevens Creek Project. DESC has formed the Fish Passage TWC and will continue to work with NMFS and USFWS through the post-filing and license implementation process. Fish passage prescriptions or reservations of authority to prescribe fishways may be included in any license issued for the project, as is indicated by the USFWS comments in response to the PAD (See Appendix E-2).

2.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by FERC for a hydropower project within a federal reservation shall contain and be subject to such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection of and use of the reservation. The Stevens Creek Project currently encompasses 104 acres of federal land administered by the U.S. Forest Service (USFS). DESC has been in consultation with the USFS throughout the relicensing process to date. At this time, no preliminary 4(e) conditions have been provided for inclusion in this Environmental Report but DESC is actively working with the USFS to discuss appropriate provisions pertaining to the Stevens Creek Project.

2.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, FERC must consider recommendations provided by federal and state fish and wildlife agencies for the PM&E of fish and wildlife resources that may be affected by the Stevens Creek Project prior to issuing a new license. FERC will include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or

other applicable law. At this time, no preliminary 10(j) recommendations have been provided for inclusion in this Environmental Report.

2.2 CLEAN WATER ACT – SECTION 401

The Licensee is subject to Water Quality Certification under Section 401(a)(1) of the federal Clean Water Act of 1977. The Project is located on the Savannah River, which bisects the states of South Carolina and Georgia. The South Carolina Department of Health and Environmental Control (SCDHEC) establishes water quality standards consistent with South Carolina Code Section 48-1-10 et seq. The Georgia Environmental Protection Division (GAEPD) establishes water quality standards consistent with Georgia's Rules and Regulations for Water Quality Control (Chapter 391-3-6-.03). The Stevens Creek Project powerhouse and associated release of water is located within the boundaries of Georgia. Therefore, DESC will file an application for 401 Water Quality Certification with GAEPD within 60 days of the Commission's notice requesting terms and conditions, and recommendations, as required under Commission regulations.

2.3 ENDANGERED SPECIES ACT

Under provisions of Section 7(a)(2) of the ESA, a federal agency that authorizes, permits, or carries out activities must consult with the USFWS or NMFS to ensure that such actions will not jeopardize the continued existence of any listed species. A federal agency is required to consult USFWS or NMFS if an action "may affect" listed species or designated critical habitat, even if the effects are expected to be beneficial. A "may affect" determination includes actions that are "not likely to adversely affect," as well as "likely to adversely affect" listed species. If the action is "not likely to adversely affect" listed species (i.e., the effects are beneficial, insignificant, or discountable), and the USFWS or NMFS agrees with the determination, the USFWS or NMFS provides concurrence in writing and no further consultation is required. If the action is "likely to adversely affect" listed species, then the federal action agency must request initiation of formal consultation. This request is made in writing to the USFWS or NMFS and must include a complete initiation package. Formal consultation concludes with the USFWS's or NMFS's issuance of a biological opinion to the federal action agency. DESC has engaged with USFWS and NMFS as the non-federal designee to initiate informal consultation under the ESA. Section 4.7, *Rare, Threatened, and Endangered Species,* describes federally listed species within the vicinity of the Stevens Creek Project and provides an initial analysis of project-related effects based on consultation with resource agencies.

2.4 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Act is the primary law governing marine fisheries management in U.S. federal waters. First passed in 1976, the Magnuson-Stevens Act fosters long-term biological and economic sustainability of marine fisheries out to 200 nautical miles from shore. The Magnuson-Stevens Act requires the eight regional Fishery Management Councils, in collaboration with the National Oceanic and Atmospheric Administration, consider Essential Fish Habitat (EFH) in resource management decisions. Congress defines EFH as "those waters and substrates necessary to fish for spawning, breeding, feeding or growth and maturity." The designation and consideration of EFH seeks to minimize adverse effects on habitat caused by fishing and non-fishing activities.

Although areas along the coast of South Carolina and Georgia are subject to the Magnuson-Stevens Fishery Conservation and Management Act, the Stevens Creek Project is not located in one of these areas. Therefore, DESC believes that EFH consultation pursuant to Section 305(b) of the Magnuson-Stevens Act is not required for relicensing.

2.5 COASTAL ZONE MANAGEMENT ACT

Pursuant to section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. Section 1456(3)(A), the Commission must receive concurrence from the state CZMA agency that the project is not within or affecting the state's coastal zone prior to issuing a license for the Stevens Creek Project.

The Stevens Creek Project is not located within a Coastal Zone; however, the Licensee submitted a CZMA consistency determination letter to SCDHEC on October 28, 2022. The SCDHEC replied later the same day, informing DESC that based upon the location of the Stevens Creek Project, that work is outside of the coastal zone of South Carolina and would not require review for the coastal zone consistency section. The GADNR has a standard letter that notes that Georgia's Coastal Management Program area encompasses eleven coastal counties, and that intergovernmental reviews outside of the eleven counties are not subject to the CZMA provisions and do not require approval from GADNR. The Stevens Creek Project is not located within one of the eleven counties. Consultation documentation is included in Appendix E-1.

2.6 NATIONAL HISTORIC PRESERVATION ACT

The NHPA (Public Law 89-665; 16 U.S.C. § 470 et seq.) is legislation intended to preserve historical and archaeological sites in the United States. Section 106 of the NHPA and its implementing regulation (35 CFR 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 July 16, 2020, FERC designated DESC as the non-federal representative for informal consultation regarding Section 106 of the NHPA. DESC is in the process of coordinating with the State Historical Preservations Officers (SHPOs) from the South Carolina Department of History and Archives and the Georgia Historic Preservation Division on the results of recent survey efforts and appropriate updates to the Historic Properties Management Plan for the Stevens Creek Project.

2.7 WILD AND SCENIC RIVERS AND WILDERNESS ACT

The Wild and Scenic Rivers Act was created by the U.S. 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. It also defined wilderness as “an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain” and “an area of undeveloped Federal land retaining its primeval character and influence without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions.”

There are no rivers designated under the federal Wild and Scenic Rivers Act within the Stevens Creek Project boundary. The Chattooga River is the closest Wild and Scenic River to the Stevens Creek Project and is located more than 100 miles to the northwest, also within the SNF.

2.8 FEDERAL LANDS

The Stevens Creek Project occupies approximately 104 acres of federal lands within the SNF with pre-existing easements and 0.21 acres of federal lands within the SNF without pre-existing

easements. The Licensee has an agreement with the USFS for use of their lands for the Stevens Creek Project and pays annual charges for that use.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 NO-ACTION ALTERNATIVE

The no-action alternative is the baseline from which to compare the proposed action and all action alternatives that are assessed within this document. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license.

The Stevens Creek Project is thoroughly described in Exhibit A of this DLA. However, a brief description is provided below to orient the reviewer.

3.1.1 Project Description

The Stevens Creek Project is located at river mile (RM) 209.1 of the Savannah River, at its confluence with Stevens Creek, in Columbia County, Georgia, and Edgefield and McCormick counties, South Carolina (Figure 1.1). The Stevens Creek Dam is located approximately 1 mile upstream of the Augusta Canal Project (FERC No. 11810; Augusta Project), and approximately 13 miles downstream of Thurmond Dam.

Stevens Creek Project structures include: 1) non-overflow portions of the dam, located at the abutments with crest elevation (EL) of 198.54 feet (1929 National Geodetic Vertical Datum [NGVD], 184.0 feet - project datum); 2) 2,000-foot-long spillway composed of a (a) cyclopean concrete gravity section, ogee crest, with a crest EL of 183.54 (1929 NGVD; 169.0 project datum), (b) a 1,000-foot-long section of 5-foot-high steel flashboards from the lock to the center of the spillway, (c) a 1,000-foot-long section of 4-foot-high flashboards from the center of the spillway to the South Carolina abutment; 3) a concrete gravity lock 85-feet-wide by 165.5-feet-long located between the powerhouse and spillway section; 4) a 388-foot-long powerhouse, integral with the dam, consisting of a reinforced concrete substructure and a steel-framed brick superstructure that contains eight turbine-generators; 5) a reservoir with a surface area of approximately 2,400 acres (gross capacity is 23,600 acre-feet and usable storage is approximately 7,800 acre-feet); 6) transmission interconnecting electrical equipment including (a) unit pairs 1-2 and 3-4 with two 5600/6272/7000/7840 kilovolt amps (kVA), 2,300 volt (V)/46,000 V step-up transformers, (b) for pairs 5-6 and 7-8 with two 500/7000 kVA, 2,300 V/46,000 V step-up transformers, and (c) two 46 kilovolt (kV) ties to a 46 kV/115 kV substation; and 7) appurtenant facilities.

3.1.1.1 Powerhouses, Dams, Spillways, and Penstocks

The Stevens Creek Project from left to right (looking downstream) includes a 97-foot-long concrete non-overflow section, a 2,000-foot-long concrete ogee spillway, an 85-foot-wide inoperative lock, a 388-foot-long powerhouse, and a 102.5-foot-long non-overflow section. The total length of the structure is 2,635 feet with a height of approximately 30 feet. The spillway has approximately equal lengths of 4-foot-high (left half) and 5-foot-high (right half) steel flashboards that trip when pool level is approximately 1-foot over the top of the flashboards. The far-right portion of the dam (110 feet of the spillway) contains five sluice gates that are no longer operated because they are covered by silt at the upstream face of the dam.

The powerhouse is three levels with a concrete substructure with integral intake and water passages and a steel-framed, brick-covered superstructure. The powerhouse has a total length of 388 feet, a width (upstream to downstream) of approximately 87 feet, and a structural height of 102 feet from the draft tube-foundation interface to the top of the superstructure. The brick superstructure is shorter in length (328 feet) because it does not enclose two unused turbine bays on the left end; it is approximately 50-feet-wide and 57-feet-tall. The powerhouse contains eight turbine-generator units. As noted, the two leftmost bays are not used and do not have units installed. Each generating unit is equipped with trash racks with approximately 3.75-inch-clear spacing and steel head gates. There is an automated trash rake system installed at the powerhouse.

3.1.1.2 Reservoir

The Stevens Creek Reservoir extends upstream approximately 12 miles from the Stevens Creek Dam to approximately 1 mile downstream of Thurmond Dam. The surface area of the reservoir is approximately 2,400 acres at full pool (EL 187.54 feet 1929 NGVD). Gross storage capacity in the reservoir is approximately 23,600 acre-feet, but usable storage is approximately 7,800 acre-feet. The reservoir may fluctuate between EL 183.0 feet and 187.5 feet, using available, licensed storage capacity to re-regulate flow releases from Thurmond Dam.

3.1.1.3 Turbines and Generators

The powerhouse contains eight turbine-generator units, with a total maximum rated capacity of 17,280 kilowatts (kW). This includes five I.P. Morris Francis vertical shaft turbines; three S. Morgan Smith Francis vertical shaft turbines; and eight synchronous Westinghouse

generators. There are four Rapid Power Technologies excitation transformers, each feeding two Rapid Power Technologies static DC Excitation Power Supplies to supply excitation power to each generator field. The estimated total hydraulic capacity of the generating units at the Stevens Creek Project is approximately 8,300 cubic feet per second (cfs) at a head EL of 28 feet.

3.1.1.4 Project Transmission Lines

Energy generated is conducted from the powerhouse set-up transformers through the main leads exiting the powerhouse approximately 100 feet west of the powerhouse, and then another 100 feet west to the Stevens Creek Project switchyard. There are no transmission lines included in the Stevens Creek Project boundary. Single line drawings are included in Exhibit A of this DLA.

3.1.1.5 Project Safety

The Stevens Creek Project has been operating for more than 100 years, and almost 30 of those years have been under the existing license. During the term of the existing license, Commission staff have conducted operational inspections focusing on the continued safety of the structures, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the Stevens Creek Project has been inspected and evaluated every five years by an independent consultant and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in the license issued, as appropriate. Commission staff would continue to inspect the Stevens Creek Project during the new license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

3.1.1.6 Existing Project Operation

The Stevens Creek Project is staffed five days a week, eight hours a day and is operated remotely from DESC's Urquhart Steam Station near Beech Island, South Carolina. The Stevens Creek Project serves an importation function to the Savannah River in that it operates as a re-regulating project as required by Article 402 of the current FERC license. More specifically, the Stevens Creek Project redistributes the varying discharges from the upstream Thurmond Dam to provide a more uniform flow in the Savannah River, downstream of the Stevens Creek Project. The Thurmond Dam is the furthest downstream project of three multiple purpose projects in the upper

Savannah River Basin operated by the Savannah District of USACE. Thurmond Dam and the other two projects, Hartwell and Richard B. Russell, are operated to maximize the public benefits of hydroelectric power, flood damage reduction, recreation, fish and wildlife, water supply, and water quality.

The Stevens Creek Project is operated in accordance with an Operating Plan on file with FERC.[2] The Operating Plan was developed in consultation with the USACE, USFWS, GADNR, SCDNR, and the City of Augusta, Georgia and includes details regarding how the Stevens Creek Project is operated. The normal operating target range for the Stevens Creek Project is to provide an hourly discharge of +/- 15 percent of the scheduled daily average discharge from Thurmond Dam, if the actual discharge from Thurmond Dam is within 500 cfs of the scheduled discharge. Excerpts from the Operating Plan, with minor edits, are provided in the following sections to describe Stevens Creek Project operations under varying flow conditions.

3.1.1.6.1 OPERATING CONDITIONS – FLOOD (INFLOW GREATER THAN 30,000 CFS)

During flood conditions (periods of sustained flows of greater than 30,000 cfs from the Savannah River and Stevens Creek), the Stevens Creek Project will generate to its full capability (approximately 8,300 cfs), while spilling all additional flow over the 2,000-foot-long overflow section of the dam (flashboards will be tripped). In this situation, all water coming down the Savannah River passes directly through the Stevens Creek Reservoir, and the reservoir elevation may exceed EL 187.5 feet, depending upon the volume of flow at any given time. If the reservoir and river elevations reach a level which threatens to flood the powerhouse, operation will cease, and personnel will evacuate the plant. At this point, all river flow will be discharged over the spillway. When the river flow returns to a level controllable by normal operation at Thurmond Dam, the Stevens Creek Reservoir will be drawn down to an approximate EL of 183.5 feet so that flashboards can be reset. The resetting may take three to five days or more, depending on the amount of debris on the spillway and damage to the flashboards. Normal operation of the Stevens Creek Project will resume when any damage to the plant has been repaired and flashboards have been reset.

3.1.1.6.2 OPERATING CONDITIONS – HIGH FLOWS (INFLOW OF 8,300 CFS TO 30,000 CFS)

During periods of sustained high flow in the Savannah River, the Stevens Creek Project will generate to its full capability (approximately 8,300 cfs), while spilling all additional flow over the

[2] Order issued June 22, 2018

2,000-foot-long overflow section of the dam (some flashboards will be tripped). In this situation, all water coming down the Savannah River passes directly through the Stevens Creek Reservoir, and the reservoir elevation may exceed EL 187.5 feet, depending on the volume and duration of the high flow. When river flow returns to a level controllable by normal operation at the Thurmond Dam, the Stevens Creek Reservoir will be drawn down to approximate EL 183.5 feet allowing the flashboards to be reset. The amount of time required to reset the flashboards will depend on the number of boards tripped and the amount of debris on the spillway. Normal operation of the Stevens Creek Project will resume when the flashboards have been reset.

3.1.1.6.3 OPERATING CONDITIONS – NORMAL FLOWS (INFLOW OF 4,200 CFS TO 8,300 CFS)

During periods of normal flow in the Savannah River, the Stevens Creek Project will generate in accordance with the schedule in Table 3.1 to approximate the scheduled daily average discharge from Thurmond Dam, with the Stevens Creek Reservoir elevation fluctuating within its normal operating range (EL 183.0 feet to 187.5 feet) daily.

TABLE 3.1 STEVENS CREEK GENERATION SCHEDULE

Scheduled Thurmond Dam Discharge - cfs								
Stevens Creek Headwater Elevation (feet-NGVD 1929*)	2,500	2,700	2,900	3,000	3,200	2,500	3,800	4,000
	MW	MW	MW	MW	MW	MW	MW	MW
183.0-184.0	3.5	3.8	4.1	4.2	4.5	5.0	5.4	5.7
184.0-186.0	3.9	4.2	4.5	4.7	5.0	5.5	6.0	6.3
186.0-187.0	4.5	4.9	5.2	5.4	5.7	6.2	6.8	7.1
187.0-187.5	4.9	5.2	5.6	5.7	6.1	6.6	7.1	7.4
Scheduled Thurmond Dam Discharge - cfs								
Stevens Creek Headwater Elevation (feet-NGVD 1929*)	4,300	4,500	4,700	5,000	5,800	6,300	6,600	7,000
	MW	MW	MW	MW	MW	MW	MW	MW
183.0-184.0	6.2	6.5	6.8	7.2	8.4	9.2	9.6	10.2
184.0-186.0	6.8	7.1	7.4	7.9	9.2	10.0	10.5	11.1
186.0-187.0	7.6	7.9	8.3	8.8	10.2	11.0	11.5	12.2
187.0-187.5	7.9	8.3	8.6	9.1	10.5	11.3	11.8	12.5

Source: Stevens Creek Hydroelectric Project Operations Plan, rev. June 22, 2018

* ft, NGVD 1929: feet in National Geodetic Vertical Datum 1929

When daily average discharges from Thurmond Dam vary from those originally scheduled, operation at the Stevens Creek Project is adjusted to accommodate the change. In the normal flow range, the re-regulating operation requires using the full active storage (between EL 183.0 feet and 187.5 feet).

3.1.1.6.4 OPERATING CONDITIONS – LOW FLOWS (INFLOWS OF 4,000 CFS TO 4,200 CFS)

During periods of low flow in the Savannah River, when Thurmond Dam discharges are reduced to a daily average of 4,000 cfs to 4,200 cfs, the Stevens Creek Project will continue to generate in accordance with the schedule in Table 3.1 to approximate the scheduled daily average discharge from Thurmond Dam. The powerhouse would generate 6 MW to 9 MW, depending on the reservoir elevation. The primary difference from normal conditions would be that the discharge from the Stevens Creek Project would not exceed approximately 4,200 cfs unless more water is discharged from Thurmond Dam. Stevens Creek Reservoir fluctuation would be slightly less than under normal conditions, due to the reduced storage required to re-regulate the lower Thurmond Dam discharges.

3.1.1.6.5 OPERATING CONDITIONS – DROUGHT (INFLOW OF 3,800 CFS TO 4,000 CFS)

During periods of drought, when Thurmond Dam discharges are reduced to a daily average of 3,800 cfs to 4,000 cfs, the Stevens Creek Project will continue to generate in accordance with the schedule in Table 3.1 to approximate the scheduled daily average discharges from Thurmond Dam. The Stevens Creek Project would generate 5 MW to 7 MW depending on the reservoir elevation. The primary difference from normal conditions would be that the discharge from the Stevens Creek Project would not exceed approximately 4,000 cfs unless more water is discharged from Thurmond Dam. Stevens Creek Reservoir fluctuation would be slightly less than under normal conditions, due to the reduced storage required to re-regulate the lower Thurmond Dam discharges.

3.1.1.6.6 OPERATING CONDITIONS – SEVERE DROUGHT (INFLOW OF LESS THAN 3,800 CFS)

During periods of severe drought, when Thurmond Dam discharges are less than 3,800 cfs, the Stevens Creek Project will continue to generate in accordance with the schedule in Table 3.1 to approximate the scheduled daily average discharge from Thurmond Dam. Daily average discharge from Thurmond Dam can fall as low as 3,100 cfs as noted in the Savannah River Basin Drought Management Plan.

3.2 APPLICANT'S PROPOSAL

3.2.1 Proposed Project Facilities and Operations and PM&E Measures

DESC is proposing to continue to operate the Stevens Creek Project in the same manner as is performed under the existing license, as described under Section 3.1.1, above. Proposed PM&E

measures relating to environmental and recreational resources are summarized in the following sections.

3.2.1.1 Annual Shoreline Inspection

DESC currently performs annual shoreline inspections at Stevens Creek Reservoir to identify any areas of erosion along the shorelines (DESC 2020 and 2021). Shoreline inspections are conducted upstream of Stevens Creek Dam following both the Stevens Creek and Savannah River arms. Stevens Creek shorelines are inspected up to the Woodlawn Road Bridge. Savannah River shorelines are inspected up to the Thurmond Dam. DESC is proposing to continue to conduct shoreline inspections annually through the term of the new license.

3.2.1.2 Water Quality PM&E Measures

Water quality studies performed during Stage 2 of this relicensing process have identified areas within the Stevens Creek arm of the reservoir that also experience episodic low DO events. DESC is currently working with relicensing stakeholders to perform additional analyses to identify the extent of which project operations, including the re-regulation function of the Stevens Creek Project, may be contributing to low DO conditions in the Stevens Creek arm of the reservoir. Initial results of these findings will be included in the FLA (with supplemental information filed upon study completion) and will inform DESC's proposal regarding future water quality monitoring efforts for the new license term.

3.2.1.3 Fish Passage Technical Working Committee

Article 408 of the existing license discusses the construction of fish passage at the Stevens Creek Project, which was proposed to be initiated subsequent to the completion of a fishway at the downstream Augusta Project. Since that time, USFWS and NMFS have been working with downstream federal agencies and licensees on the timing and implementation of fish passage structures at downstream dams. More specifically, the USFWS and NMFS submitted a preliminary fishway prescription for the Augusta Project in 2004 that included a vertical slot fishway on the Georgia side of the river. Based on comments received from the City of Augusta, and additional evaluation and review by the USFWS and NMFS, the fishway prescription was modified to include a vertical slot fishway on the South Carolina side of the Savannah River. Negotiations between the USFWS and NMFS and the City of Augusta are ongoing and construction of the fishway has not been initiated. Fish passage in the lower portion of the

Savannah River is also contingent on fish passage at the New Savannah Bluff Lock and Dam (NSBLD), which is currently undergoing legal proceedings. No updated timeline for downstream fish passage installation is known at this time.

Given the ongoing fish passage proceedings in the basin, DESC proposes to maintain the Fish Passage TWC that was created during the relicensing through the post-filing and license implementation process or until fish passage at the Stevens Creek Project is satisfied under Section 18 of the FPA, whichever comes first. The purpose of this would be to inform the timing, siting and implementation of fishways that may be prescribed for the Stevens Creek Project during the new license term. DESC understands that downstream flow patterns and fish communities may change after implementation of passage at downstream facilities. Additionally, data collected after the implementation of downstream facilities can be used to inform fish passage design and placement at the Stevens Creek Project.

3.2.1.4 Recreation Enhancements

DESC is proposing recreation enhancements to the Stevens Creek and Fury's Ferry recreation sites. DESC is also proposing to develop an updated Recreation Management Plan (RMP) to include details on the proposed recreation site enhancements and additional information to be filed with the FLA. DESC is not proposing new, additional recreation sites or a canoe portage at this time. Further information on the proposed recreation enhancements as well as a discussion as to why some agency-recommended facilities are not currently proposed is included in Section 4.8, *Recreation Resources.*

3.2.1.5 Updated Historical Properties Management Plan

DESC contracted TRC Company (TRC) to conduct an archeological resource evaluation in Edgefield and McCormick counties, South Carolina to provide baseline information for an HPMP update. The study was conducted in 2021, and DESC will consult with the South Carolina SHPO, Georgia SHPO, and Tribes to update the HPMP for filing prior to FERC's environmental analysis.

3.2.2 Additional PM&Es or Off-License Agreements Under Evaluation

DESC is currently consulting with Columbia County, Georgia regarding facility improvements to the Betty's Branch Recreation Site under an off-license agreement, as these improvements would likely occur outside of the Stevens Creek Project boundary. Off-license agreements will be

detailed in the FLA for informational purposes but will be excluded from detailed analysis as they will be outside the scope of FERC's review.

3.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

3.3.1 Federal Takeover of Project Facilities

A federal takeover of the Stevens Creek Project has not been raised as an alternative by a federal agency, nor has it thus far been raised as a reasonable alternative during relicensing by any party involved. Although further consideration of this alternative may occur, a federal takeover of a project requires congressional approval and there is no evidence suggesting that a federal takeover should be recommended to the U.S. Congress.

3.3.2 Issuance of Non-Power License

A non-power license is a temporary license issued by FERC upon its determination that another governmental agency will assume regulatory authority and supervision over the lands and facilities covered under the non-power license. Thus far, this option has not been proven necessary or suggested as a viable option during relicensing. There is no basis for concluding that the operation of the Stevens Creek Project should not continue to occur for power production. Because of this, the issuance of a non-power license has not been deemed a reasonable alternative and has not been analyzed as part of this report.

3.3.3 Project Decommissioning

The decommissioning of a power project could include either the partial or complete removal of the dam. Through the relicensing process, project decommissioning has not been presented as an issue by an entity involved and is not considered a reasonable alternative. The Stevens Creek Project as operated for electricity generation and re-regulation, is an important and reliable source of clean, renewable energy, and provides a service to downstream resources on the Savannah River. Were it to be decommissioned, a source of replacement power and re-regulation functions would need to be identified. Additionally, the Stevens Creek Project provides many recreational opportunities and socioeconomic benefits to the surrounding region. Consequently, project decommissioning is not an alternative that is evaluated in this report.

3.4 REFERENCES

Dominion Energy South Carolina, Inc. (DESC) 2020. Article 412 – Historic Properties Management Plan and Programmatic Agreement Annual Report 2020. November 2020.

DESC. 2021. Article 412 – Historic Properties Management Plan and Programmatic Agreement Annual Report 2021. November 2021.

4.0 ENVIRONMENTAL ANALYSIS

4.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Savannah River is one of the largest rivers in the southeastern U.S., with a drainage area of 10,577 square miles, with 175 in North Carolina, 4,581 in South Carolina, and 5,821 square miles in Georgia (GAEPD 2001). The Savannah River forms most of the border between Georgia and South Carolina (Figure 1.1). The Savannah River drainage area incorporates portions of the Blue Ridge, Piedmont, Southeastern Plains, and Southern Coastal Plain physiographic ecoregions. The Savannah River begins at the confluence of the Seneca and Tugaloo Rivers at Lake Hartwell and flows southeast for approximately 300 miles to the Atlantic Ocean. The surface waters within the Savannah River Basin are divided into the following major hydrologic units: Tugaloo River, Upper Savannah River, Broad River, Middle Savannah River, Brier Creek, and Lower Savannah River. The Stevens Creek Project is within the Middle Savannah River Basin (Hydrologic Unit Code [HUC] 03060106), which begins at Thurmond Dam and extends downstream to Brier Creek, approximately halfway between Augusta and Savannah, Georgia. The Stevens Creek Project is located near the upper end of the Fall Line, which is a 20-mile-wide geologic boundary that divides the Piedmont and Southeastern Plains physiographic provinces. The Fall Line is the first location inland from the Atlantic Ocean where sets of rock rapids occur in the Savannah River. The Stevens Creek Project is approximately 8 RMs upstream of Augusta, Georgia, and 209 RMs from the Atlantic Ocean. The Stevens Creek Project area extends upstream about 13 miles along the Savannah River to the tailrace of the Thurmond Dam, and 12 miles upstream into Stevens Creek (FERC 1995). The drainage area at the Stevens Creek Project is approximately 7,122 square miles, which encompasses drainage below the Thurmond Dam.

4.1.1 Topography

The Stevens Creek Project area is located at the Fall Line, which is the transition between the Piedmont and Southeastern Plains physiographic ecoregions. In general, the Piedmont ecoregion is a complex mosaic of moderately dissected irregular plains and hills, with less relief than areas in higher elevations in the foothills of the Appalachian Mountains. The Southeastern Plains in this area consist of broad, river floodplains and low terraces. Surrounding topography in the Stevens Creek Project vicinity is primarily hilly, which is typical of the Piedmont ecoregion, with complex folds and draws, which eventually drain to the Savannah River floodplain. Within the Stevens Creek Project boundary itself, topography is generally limited to the broad, flat, historic floodplain

of the Savannah River and Stevens Creek. Many of the perennial streams and numerous tributaries in the Stevens Creek Project vicinity (and the Fall Line in general), can quickly transition from higher gradient, incised, Piedmont streams, into low gradient Southeastern Plain streams as they enter the Savannah River floodplain.

4.1.2 Climate

The climate of the region is characterized by long, hot summers and short, mild winters. Average annual temperature in the Stevens Creek Project area is approximately 18.3°C (65°F). Temperatures average approximately 27°C (81°F) in summer and 9.5°C (49°F) in winter. Annual precipitation averages approximately 44 inches, with the driest periods typically occurring in October and November.

4.1.3 Major Land Uses

The Stevens Creek Project area is within the Savannah-Upper Ogeechee Water Planning Region, which includes 20 counties and 67 incorporated municipalities in Georgia, with a 2015 population of about 629,700 (GAEPD 2017). The region is predominantly rural with dispersed population centers with only eight percent of the region's land considered urban (GAEPD 2017). Based on 2008 land use data, the Savannah-Upper Ogeechee region is approximately 53 percent forested and 23 percent agriculture, which supports forestry operations, animal operations, and commodity production (GAEPD 2017). The urban areas are primarily Richmond and Columbia counties, with Augusta, Georgia, being the main urban center near the Stevens Creek Project.

As of 2019, the predominant land coverage in the 10-mile radius of the Stevens Creek Project is evergreen forest (34.1 percent) and developed lands (20.1 percent) (USGS 2019). Most of the evergreen forests are the pine forests and timberlands in South Carolina, whereas the developed lands include Augusta and the surrounding areas in Georgia. Deciduous forests comprise approximately 13.3 percent of the surrounding areas, followed by open water (8.6 percent), which is mostly associated with Thurmond Reservoir and the Savannah River. Remaining land cover types such as pasture, cultivated crops, herbaceous, and shrubby cover each comprise 5 percent or less of the surrounding areas (USGS 2019).

The Stevens Creek Project area includes public and private lands, such as national forest, private timber lands, rural residential developments, and some agriculture lands (FERC 1995) (see Figure 4.13 in Section 4.10). Land on the Georgia side of the Stevens Creek Project area is

predominantly privately owned with intermittent rural residential development. Some private residential properties and timber lands are present on the South Carolina side of the Stevens Creek Project, but the majority are associated with the SNF, which is managed for recreation and timber. Agricultural use of the land is limited due to the amount of forested uplands that persist. DESC owns approximately 95 acres of land within the Stevens Creek Project boundary and retains flowage easements for the remainder of land within the project boundary.

4.1.4 Major Water Uses

DESC operates the Stevens Creek Project to generate hydropower and re-regulate flows from USACE dams to downstream water users. The USACE manages the Hartwell, Richard B. Russel, and J. Strom Thurmond Hydroelectric projects for water supply, water quality, hydropower production, flood risk management, downstream navigation, recreation, and fish and wildlife management. The Savannah River between Thurmond Dam and Stevens Creek Dam supports its designated uses as drinking water supply and fishing according to Georgia's 2022 Integrated 303(d) List (GAEPD 2022). Downstream, the Augusta Canal was designed to drive mills, provide river transportation, and provide a municipal water supply. Today, the Augusta Canal still provides drinking water to the city of Augusta, hydropower, and recreational and tourism opportunities. More detail addressing major water uses within the vicinity of the Stevens Creek Project are discussed in Section 4.4, *Water Resources.*

4.1.5 Dams and Diversion Structures in the Basin

The USACE operates three hydropower projects upstream of the Stevens Creek Project: Hartwell, Richard B. Russel, and Thurmond Dam (Figure 4.1). The three reservoirs form a chain along the Georgia-South Carolina border for a length of 120 miles. Thurmond Dam, located at RM 220.9, is the most downstream of these projects and is operated primarily for peaking hydroelectric production and flood control. The Thurmond Dam is approximately 13 RMs upstream of the Stevens Creek Project. There are also two dams and smaller reservoirs downstream of the Stevens Creek Project: the Augusta Project and the NSBLD. The Augusta Project, located one mile downstream of the Stevens Creek Project, feeds water into the Augusta Canal, which supplies water for production at Sibley Mill, King Mill, and Graniteville Enterprise Division. The NSBLD is approximately 20 RMs downstream of the Stevens Creek Project. The upper portion of the Savannah River is highly regulated by the three USACE hydropower projects.

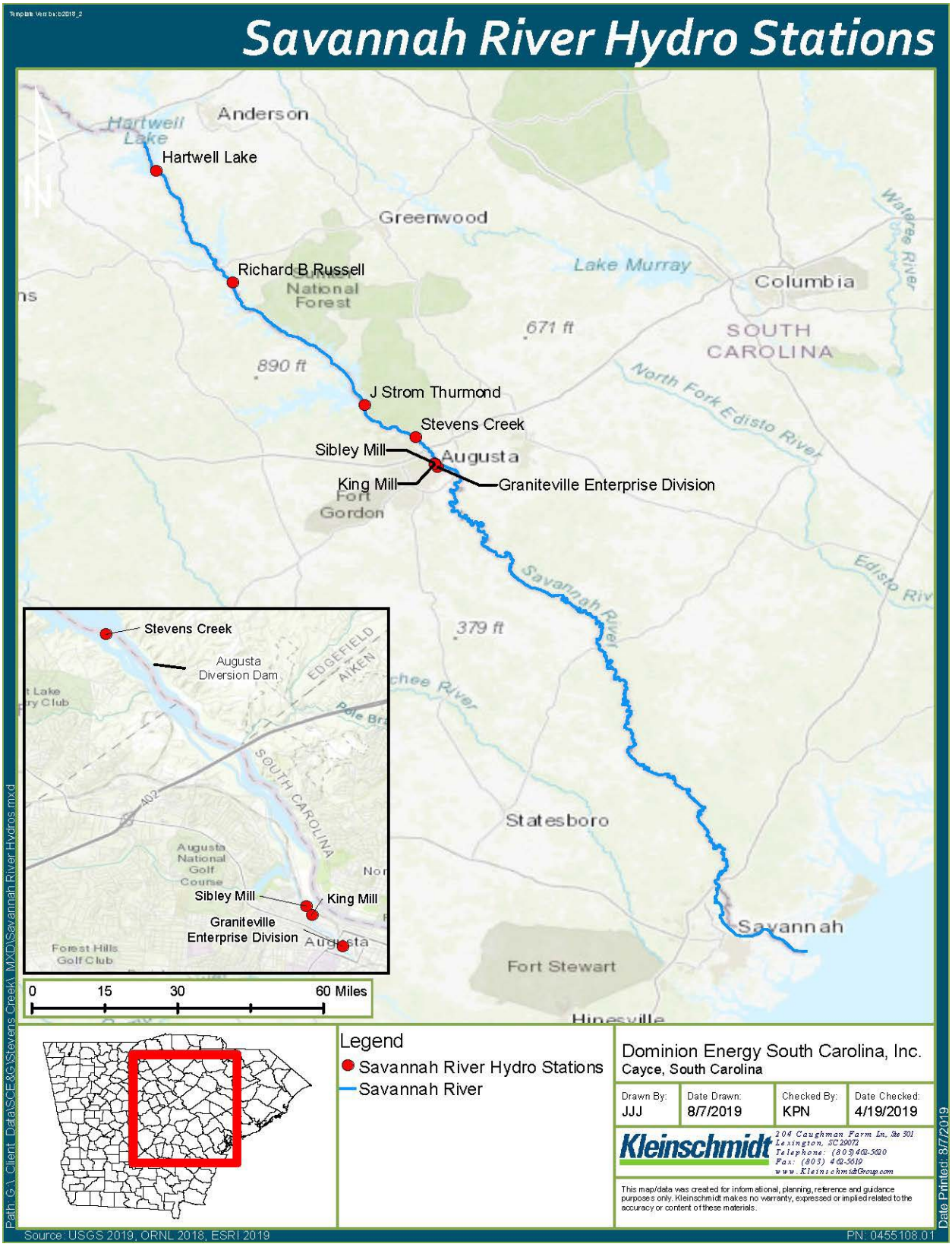

FIGURE 4.1 HYDROELECTRIC PROJECTS ON THE SAVANNAH RIVER

4.1.6 Tributary Rivers and Streams

Stevens Creek is a major tributary of the Savannah River within the Stevens Creek Project boundary. It empties into the river on the South Carolina side just upstream of the Stevens Creek Dam. The project boundary encompasses the lowermost 12 RMs of Stevens Creek. Kiokee Creek, Uchee Creek, and Little River are tributaries of the Savannah River on the Georgia side within the project boundary. In addition, numerous unnamed perennial streams, intermittent tributaries, and ephemeral drainages are tributaries to the Stevens Creek Reservoir.

Many of the perennial streams and tributaries in the Stevens Creek Project vicinity are transitional between the higher gradient, incised, Piedmont streams, and the low gradient Southeastern Plains streams. In addition, these streams tend to have high sediment loads resulting from historic farming, as well as recent local developments and land clearing. In the upper reaches of the watershed, these streams are greatly incised with steep banks and are generally flashy during rain events. Increased water velocities result in scour and bank erosion. As these streams approach the Savannah River floodplain, they widen, slow, and sediments are deposited and accumulated.

4.1.7 References

Federal Energy Regulatory Commission (FERC). 1995. Final environmental assessment for hydropower license. Stevens Creek Hydroelectric Project. FERC Project 2535.

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4.2 CUMULATIVE EFFECTS

A cumulative effect is defined as an impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions (40 CFR § 1508.7). Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Based on our review, fisheries resources and water quality have the potential to be cumulatively affected by the proposed relicensing of the Stevens Creek Project. Fisheries was selected because multiple hydroelectric developments along a waterway have the potential to cumulatively affect the fishery and habitat by altering the flow regime, blocking or delaying fish movement, and entraining fish into diversion canals or penstocks. Water quality may be cumulatively affected due to the re-regulation function of Stevens Creek Project operation in concert with upstream USACE releases from Thurmond Dam. This cumulative effect could be considered a net positive impact for downstream aquatic resources, as well as a potentially negative impact on water quality in some areas within the Stevens Creek Reservoir.

The geographic scope of the analysis defines the physical limits or boundaries of the proposed action's effect on the resources. The geographic scope of a cumulative effects analysis may vary from resource to resource. As previously discussed, the Savannah River is highly regulated with three USACE dams upstream of the Stevens Creek Project and two dams located downstream of the Stevens Creek Project. It is likely that the dams have cumulatively affected the fishery (anadromous fish species) in the Savannah River. As such, the geographic scope for fisheries resources encompasses the Savannah River from the upstream-most USACE dam at Lake Hartwell to the NSBLD, 20 miles downstream. As water quality within the Stevens Creek Project vicinity is highly influenced by upstream Thurmond Dam operations, the geographic scope of cumulative impacts on water quality has been defined as extending from Thurmond Dam downstream to the NSBLD. The geographic scope of water quality also encompasses Stevens Creek from its confluence with the Savannah River to 12 miles upstream.

The temporal scope of the cumulative effects analysis includes a discussion of past, present, and future actions and their respective effects on each resource that could be cumulatively affected. Based on the potential term of any new licenses issued for a project, the temporal scope will last 30-50 years into the future, concentrating on the effects on the resources from reasonably

foreseeable future actions. The historical discussion will be limited to the amount of information available for fisheries within the geographic scope.

4.3 GEOLOGY AND SOILS

4.3.1 Affected Environment

4.3.1.1 Description of Geological Features

The Stevens Creek Project is located between the borders of Columbia County, Georgia, and Edgefield and McCormick counties, South Carolina, in the Piedmont physiographic region. The region generally consists of rolling hills dissected by narrow stream and river valleys. Elevations within the region range from approximately 400 feet to 1,000 feet (Figure 4.2) (SCDNR 2019).

The Piedmont region within South Carolina is subdivided into four ecoregions (Figure 4.3). The Stevens Creek Project is located within the Southern Outer Piedmont ecoregion, which tends to have lower elevations, less relief, and irregular plains when compared to other Piedmont ecoregions. The Piedmont region within Georgia is subdivided into five ecoregions (Figure 4.4). As is the case with South Carolina, the Stevens Creek Project is located within the Southern Outer Piedmont ecoregion. General rock types within the region include gneiss, schist, and granite overlain by saprolite and red, clayey subsoils. Local formations within the Stevens Creek Project area include migmatite paragneiss and schist of Kiokee belt in Georgia and the Savannah River terrane in South Carolina (SCDNR 2019; Figure 4.5). The most common rock types are metasedimentary, including biotite-amphibole paragneiss, sillimanite schist, and quartzite.

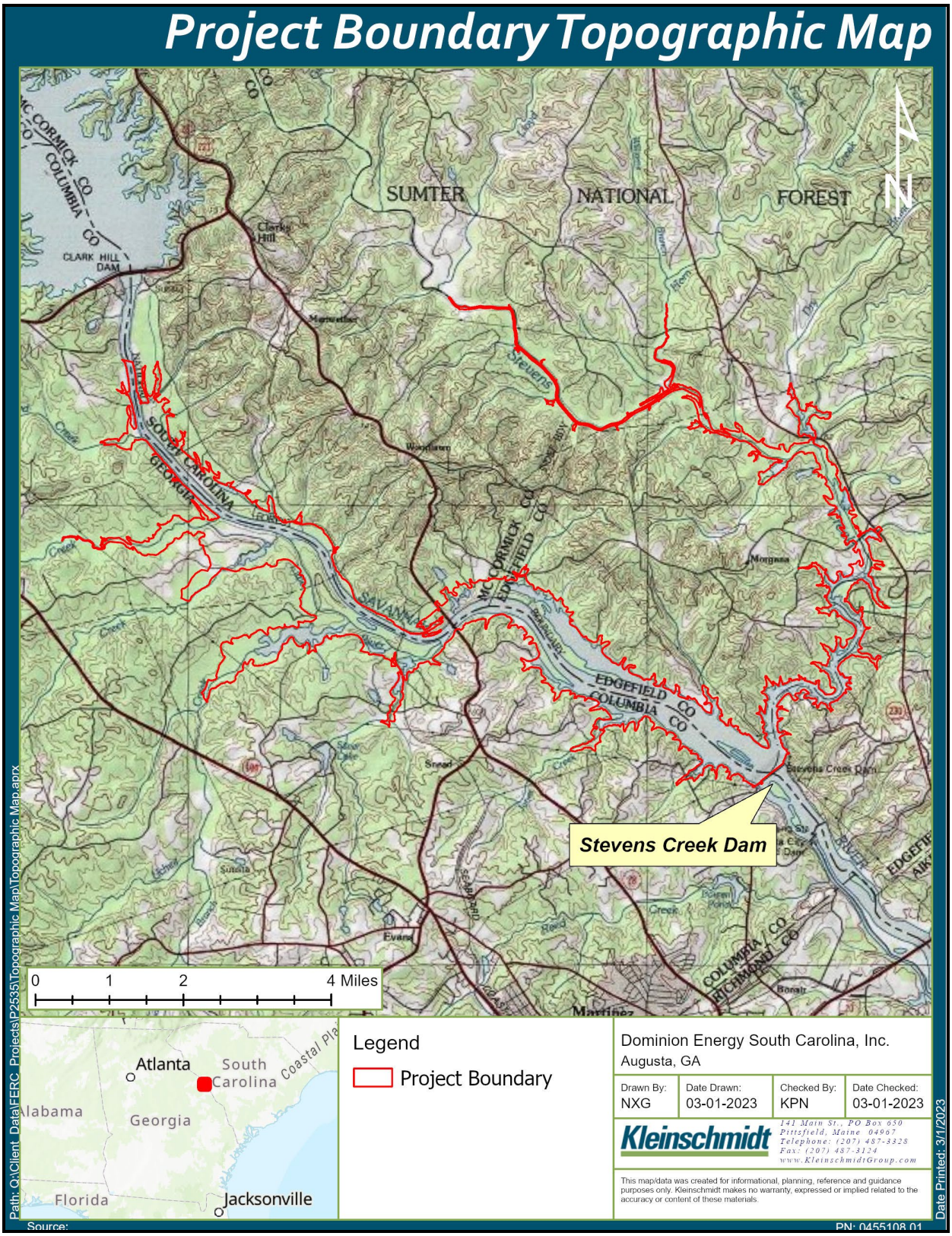
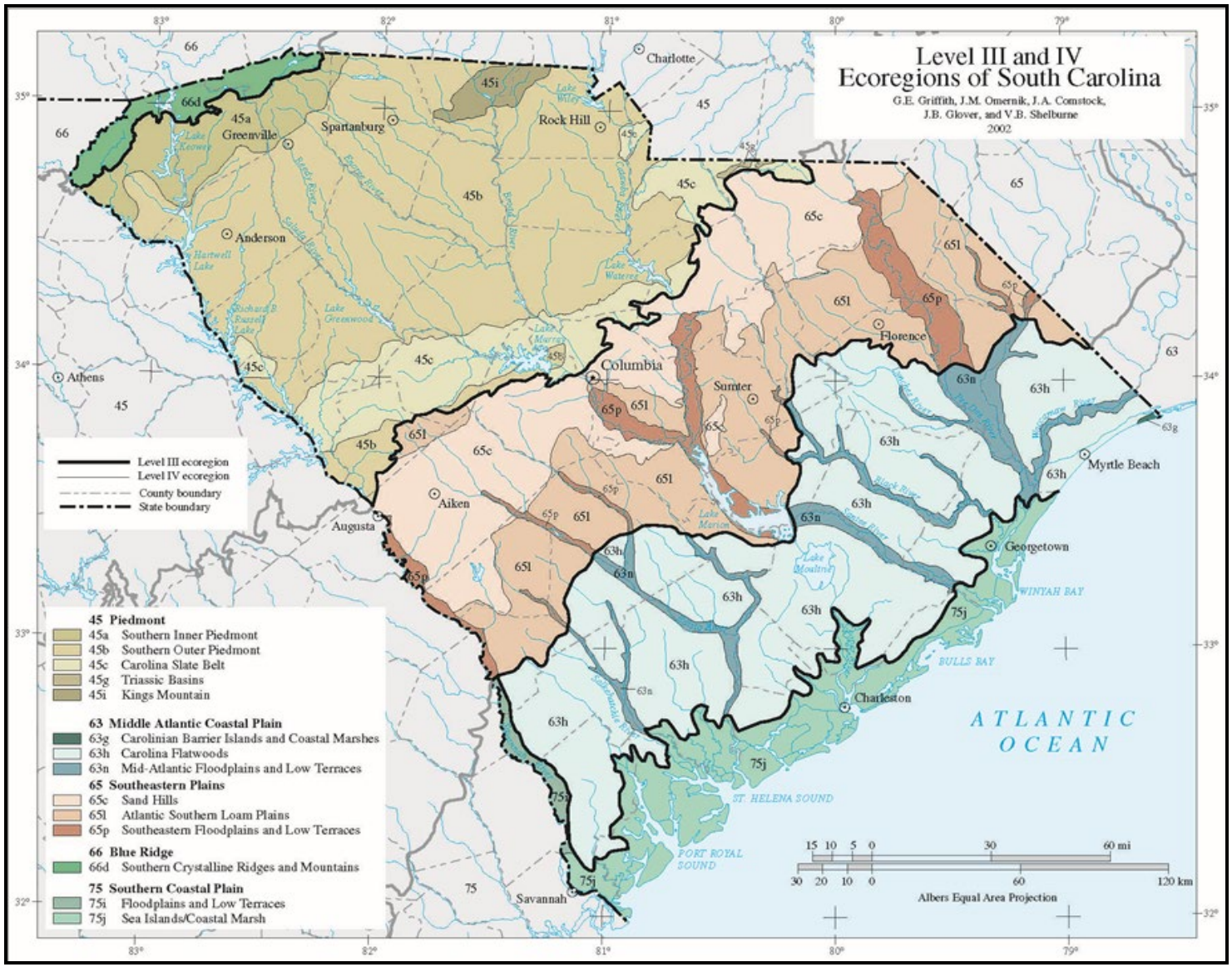
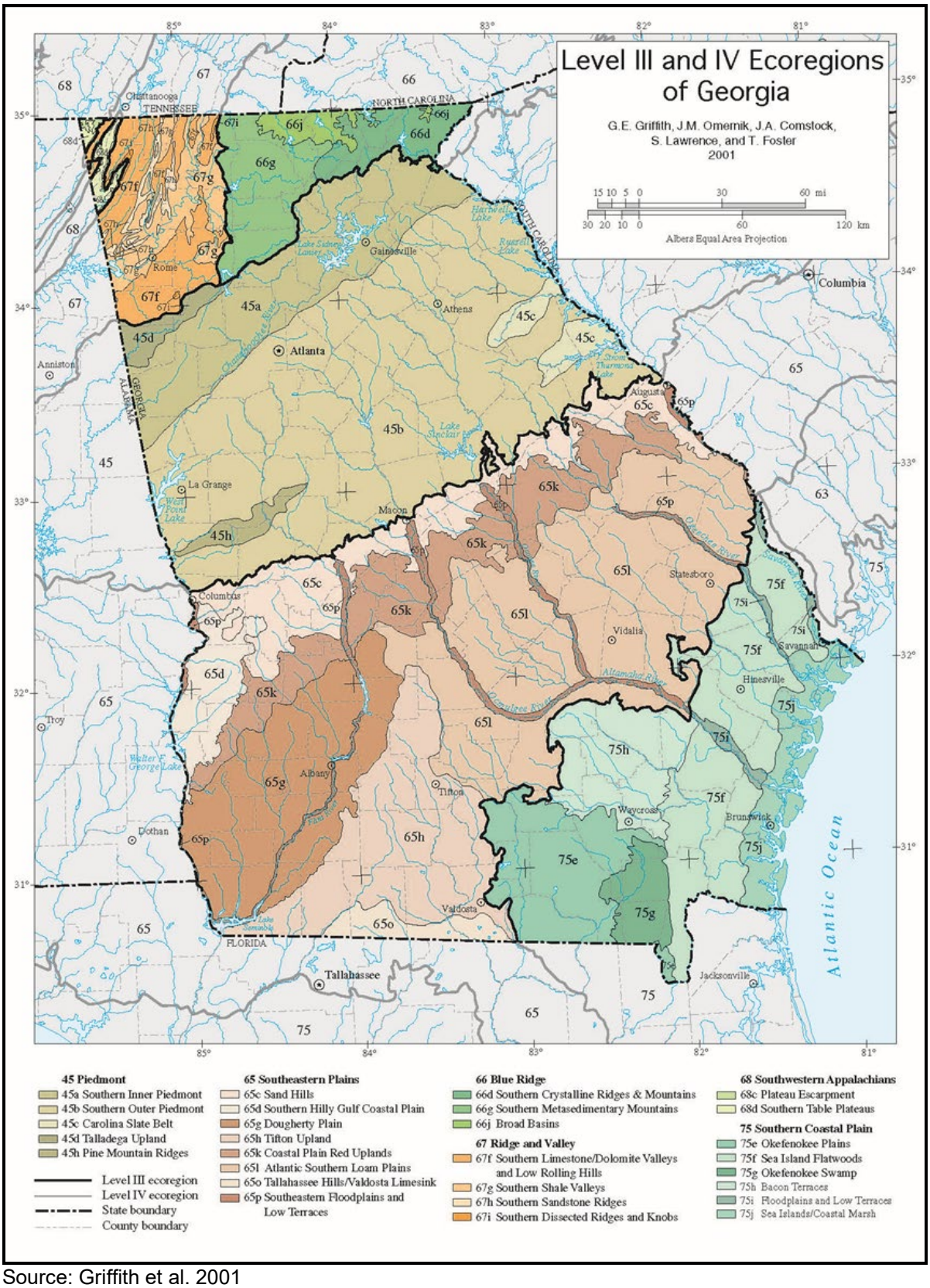


FIGURE 4.2 TOPOGRAPHY IN THE STEVENS CREEK PROJECT AREA



Source: Griffith et al. 2002

FIGURE 4.3 ECOREGIONS IN SOUTH CAROLINA



Source: Griffith et al. 2001

FIGURE 4.4 ECOREGIONS IN GEORGIA

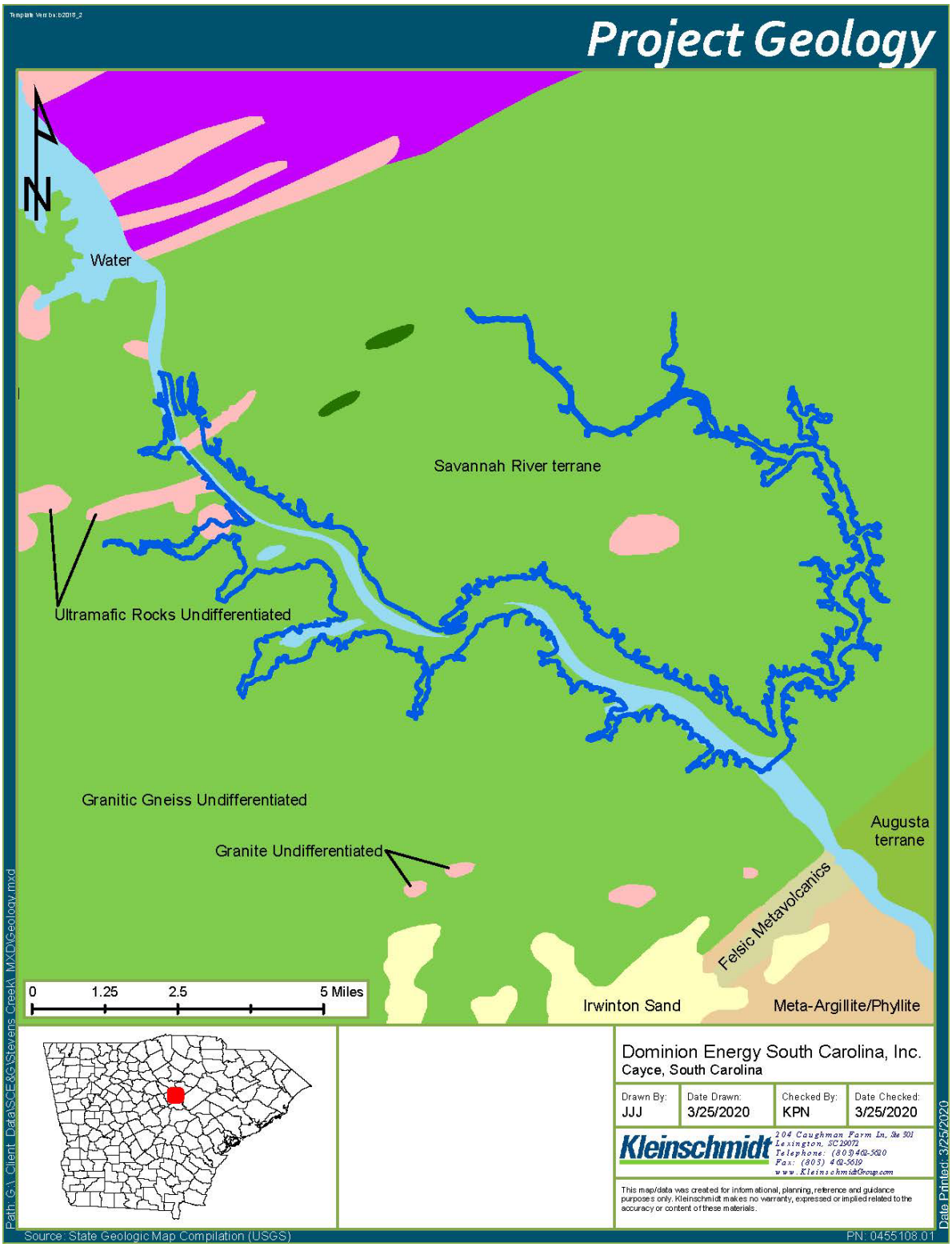


FIGURE 4.5 GENERAL GEOLOGY SURROUNDING THE STEVENS CREEK PROJECT

4.3.1.2 Description of Soil Types

Table 4.1 and Figure 4.6 describe soils surrounding the Stevens Creek Project area. The most prevalent soil families in the area include the Wehadkee, Chewacla, Congaree, Toccoa, Cartecay, and the Cecil-Pacolet (NRCS 2014). The Wehadkee family soils, consisting primarily of silt loams, are poorly drained with zero percent to two percent slopes. Chewacla family soils, consisting of silt loams, loams, and sandy clay loams, are somewhat poorly drained with zero to two percent slopes. Congaree family soils, consisting primarily of silt loams, are well drained with zero to two percent slopes. Toccoa family soils, consisting of primarily sandy loams, are moderately well drained with zero to two percent slopes. Cartecay family soils, consisting of very fine sandy loams, are somewhat poorly drained with zero to two percent slopes. Cecil-Pacolet complex consists of both Cecil and Pacolet family soils. Cecil family soils, consisting of sandy loams, clays, and loams, are well drained with 15 percent to 25 percent slopes. Pacolet family soils, consisting of sandy loam and clay, are also well drained with 15 to 25 percent slopes (NRCS 2014).

TABLE 4.1 GENERAL GEOLOGY SURROUNDING THE STEVENS CREEK PROJECT

Columbia, McDuffie, and Warren Counties, Georgia			
Map Unit Symbol	Map Unit Name	Acres in AOI*	Percent of AOI
AkA	Altavista sandy loam, 0 to 2 percent slopes	24.0	0.4%
AmB	Appling sandy loam, 2 to 6 percent slopes	30.2	0.5%
AmC	Appling sandy loam, 6 to 10 percent slopes	14.6	0.2%
CfB2	Cecil sandy clay loam, 2 to 6 percent slopes, eroded	6.0	0.1%
CfC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	9.1	0.1%
CfE2	Cecil sandy clay loam, 10 to 25 percent slopes, moderately eroded	73.0	1.2%
CK	Chewacla and Congaree soils	474.5	7.7%
EnD	Enon sandy loam, 10 to 15 percent slopes	20.2	0.3%
GeB	Grover sandy loam, 2 to 6 percent slopes	0.0	0.0%
GeC	Grover sandy loam, 6 to 10 percent slopes	0.6	0.0%
GeD	Grover sandy loam, 10 to 15 percent slopes	0.2	0.0%
HeB	Helena loamy coarse sand, 2 to 6 percent slopes	6.2	0.1%
HeC	Helena loamy coarse sand, 6 to 10 percent slopes	6.4	0.1%
MdB	Madison sandy loam, 2 to 6 percent slopes	0.0	0.0%
MdC	Madison sandy loam, 6 to 10 percent slopes	8.7	0.1%
MdE	Madison sandy loam, 10 to 25 percent slopes	5.5	0.1%
Tv	Toccoa loam	266.9	4.4%
W	Water	1,079.7	17.6%
WeB	Wedowee loamy sand, 2 to 6 percent slopes	1.9	0.0%
WeC	Wedowee loamy sand, 6 to 10 percent slopes	6.2	0.1%
WeD	Wedowee loamy sand, 10 to 15 percent slopes	19.1	0.3%
WeE	Wedowee loamy sand, 15 to 25 percent slopes	7.9	0.1%
Wf	Wehadkee silt loam	621.2	10.1%
WhB	Wickham fine sandy loam, 2 to 6 percent slopes	92.0	1.5%
Subtotals for Soil Survey Area		2,774.4	45.3%
Edgefield County, South Carolina			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ApB	Appling sandy loam, 2 to 6 percent slopes	7.0	0.1%
ApC	Appling sandy loam, 6 to 10 percent slopes	11.6	0.2%
CaB	Cataula sandy loam, 2 to 6 percent slopes	1.8	0.0%
CaC	Cataula sandy loam, 6 to 10 percent slopes	4.7	0.1%
CcB	Cecil sandy loam, 2 to 6 percent slopes	3.1	0.1%
CcC	Cecil sandy loam, 6 to 10 percent slopes	1.5	0.0%
CcD	Cecil sandy loam, 10 to 15 percent slopes	71.3	1.2%
CpE	Cecil-Pacolet complex, 15 to 25 percent slopes	240.1	3.9%
Cw	Chewacla loam, 0 to 2 percent slopes, frequently flooded	74.8	1.2%
EN	Enoree silt loam, 0 to 2 percent slopes, frequently flooded	29.4	0.5%
HwB	Hiwassee sandy loam, 2 to 6 percent slopes	6.9	0.1%
HwC	Hiwassee sandy loam, 6 to 10 percent slopes	32.1	0.5%
HwD	Hiwassee sandy loam, 10 to 15 percent slopes	0.1	0.0%
MeB	Mecklenburg sandy loam, 2 to 6 percent slopes	0.1	0.0%
Rv	Riverview silt loam	44.3	0.7%

To	Toccoa sandy loam	438.1	7.2%
W	Water	1,328.2	21.7%
WeE	Wateree sandy loam, 10 to 25 percent slopes	2.0	0.0%
WkE	Wilkes sandy loam, 15 to 40 percent slopes	14.8	0.2%
WnB	Winnsboro fine sandy loam, 2 to 6 percent slopes	1.0	0.0%
WnD	Winnsboro fine sandy loam, 10 to 15 percent slopes	2.2	0.0%
Subtotals for Soil Survey Area		2,315.1	37.8%
McCormick County, South Carolina			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ApB	Appling loamy sand, 2 to 6 percent slopes	4.3	0.1%
ApC	Appling loamy sand, 6 to 10 percent slopes	0.4	0.0%
Ca	Cartecay and Toccoa soils	352.4	5.8%
CdB	Cecil sandy loam, 2 to 6 percent slopes	16.0	0.3%
CdC	Cecil sandy loam, 6 to 10 percent slopes	1.6	0.0%
Cn	Chewacla loam, 0 to 2 percent slopes, frequently flooded	90.0	1.5%
LoE	Louisburg loamy sand, 10 to 25 percent slopes	2.3	0.0%
PaF	Pacolet sandy loam, 15 to 40 percent slopes	0.4	0.0%
W	Water	283.6	4.6%
We	Wehadkee soils	282.4	4.6%
Subtotals for Soil Survey Area		1,033.5	16.9%
Totals for Area of Interest		**6,123.0**	**100.0%**

Source: NRCS 2014
*AOI area of interest

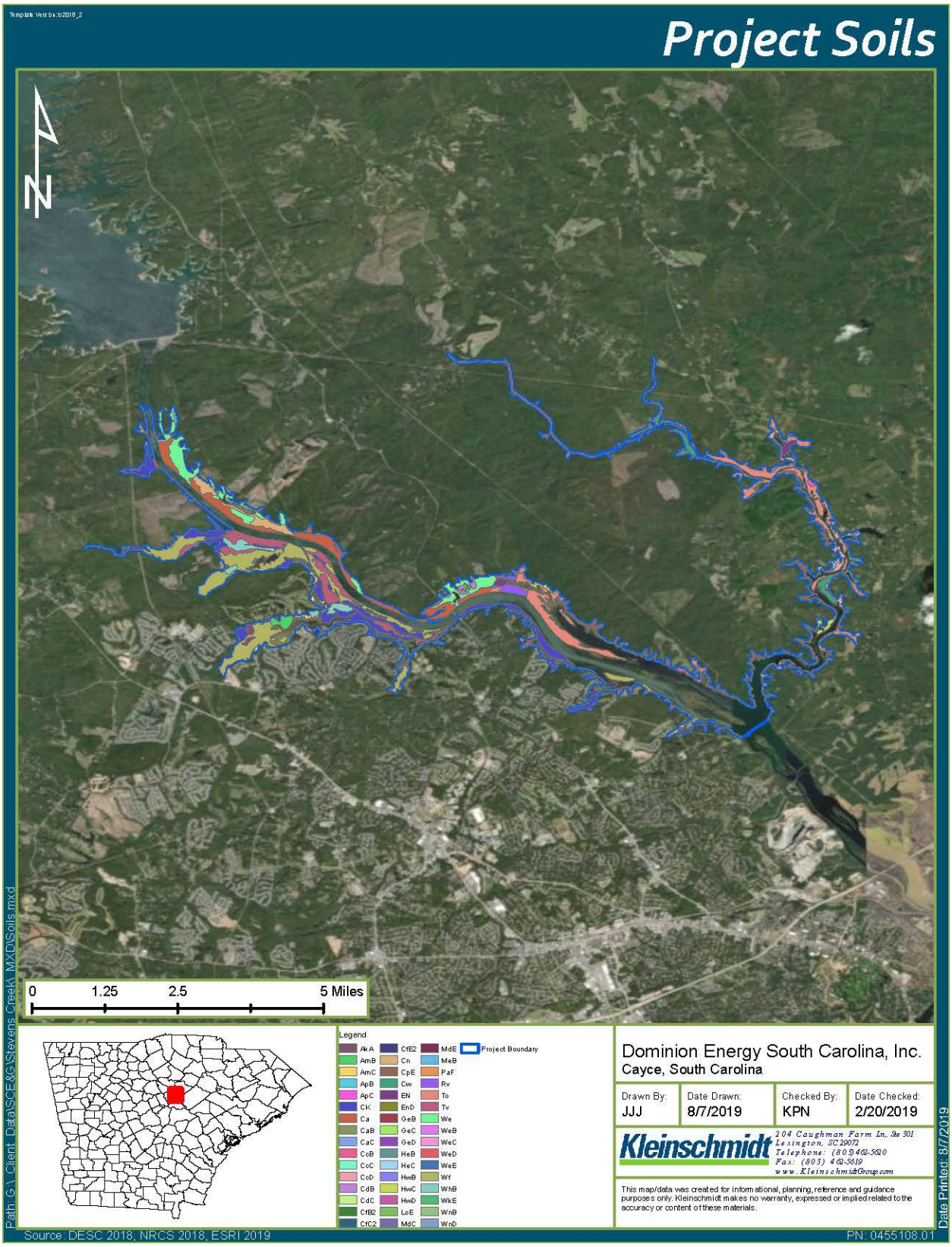


FIGURE 4.6 SOILS WITHIN THE STEVENS CREEK PROJECT BOUNDARY

4.3.1.3 Description of Reservoir Shorelines and Stream Banks

Most of the area within the Stevens Creek Project boundary consists of gradual slopes ranging from zero percent to five percent. Some smaller portions of the shoreline contain steeper slopes ranging from 5 percent to 45 percent. Figure 4.7 illustrates representative slopes within the Stevens Creek Project boundary.

Shorelines within the Stevens Creek Project boundary are subject to anthropogenic disturbances, which primarily include residential developments. Generally, the shorelines surrounding the Stevens Creek Project are forested, with a large majority of the northern shoreline bordering lands managed by the USFS. The western shoreline in Georgia and the eastern shoreline in South Carolina contain the areas most influenced by residential development.

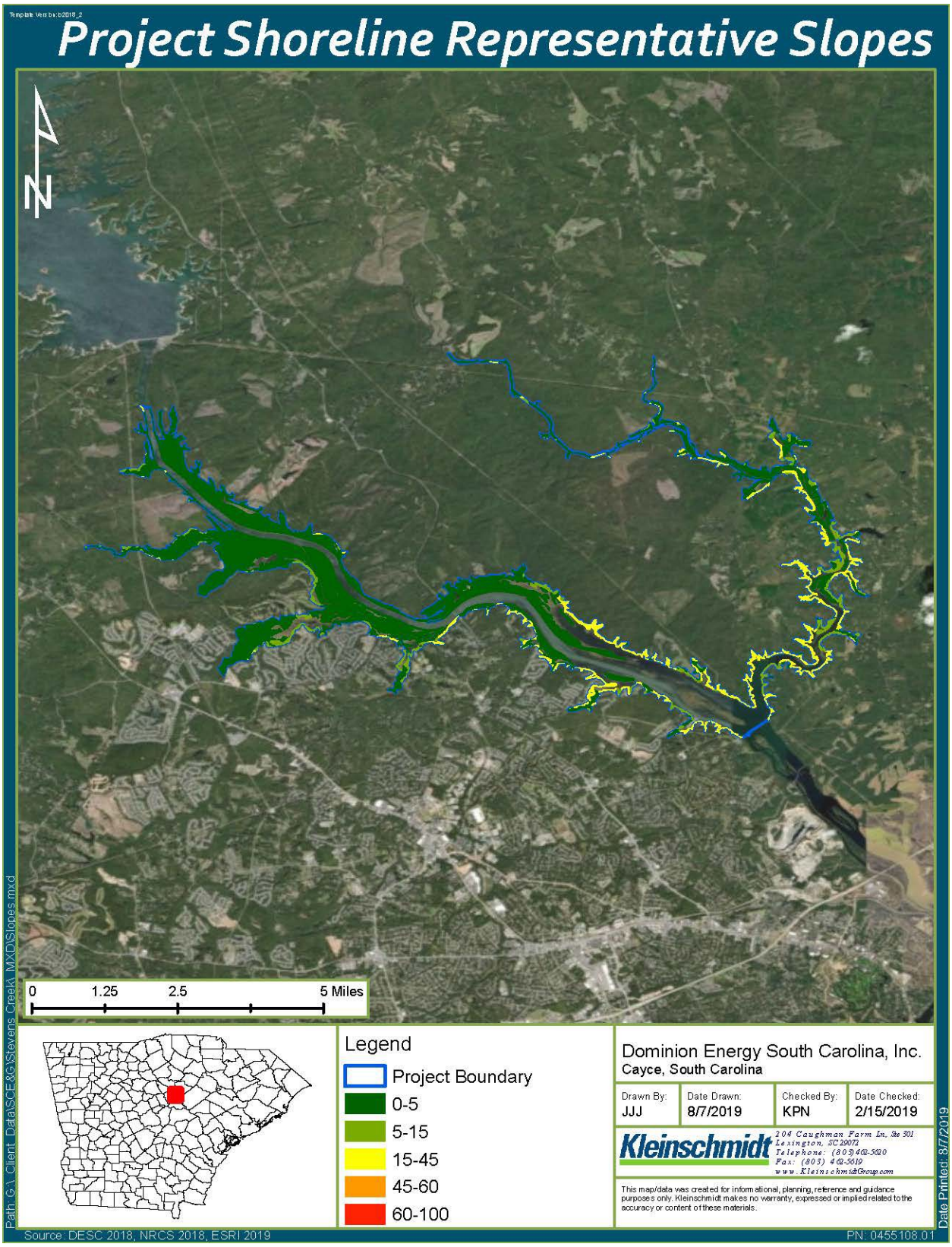


FIGURE 4.7 SLOPES WITHIN THE STEVENS CREEK PROJECT BOUNDARY

4.3.1.4 Existing Erosion, Mass Soil Movement, Slumping, or Other Forms of Instability

DESC performs annual shoreline inspections within the Stevens Creek Reservoir to identify any areas of erosion along the shorelines (DESC 2020 and 2021). No areas of significant erosion have been documented in recent shoreline inspections from 2018-2020. Low flow conditions did not allow for the shoreline inspection in 2021. Shorelines around the reservoir are generally found to be well vegetated with aquatic vegetation as well as mature timber that provides adequate protection from erosion during normal river flows and plant operations.

4.3.2 Environmental Effects

DESC has held stakeholder meetings to scope resource issues from 2018 through present. The group discussed issues relating to sedimentation within the Stevens Creek project reservoir and whether this is a resource issue to be addressed within the context of relicensing. As discussed in the Aquatic Habitat Whitepaper (Appendix E-3), streams typical of the Fall Line generally have high sediment loads resulting from historic agricultural practices, as well as recent local developments and land clearing. In the upper reaches of the watershed, these streams are greatly incised with steep banks, and are generally flashy during rain events. Increased water velocities result in scour and bank erosion, and sediments are transported downstream. As these streams approach the Savannah River floodplain, the streams widen, slow, and sediments are deposited and accumulated. The Stevens Creek Project reservoir serves to re-regulate flows downstream and is also subject to a FERC defined operating band within the reservoir. Sedimentation typical of the region does not affect the re-regulation function of the reservoir or hydroelectric operations of the powerhouse. Due to frequent high flow events from the upstream USACE project, it is likely that sedimentation within the Stevens Creek reservoir has reached equilibrium. Should natural sedimentation processes be affecting shoreline resident access, the USACE offers property owner permits for sediment removal.

4.3.2.1 Proposed Action

The Licensee proposes to continue to operate the Stevens Creek Project as it has under the existing license. Ongoing inspections under the current operating regime have not identified any areas of significant or troublesome erosion. Continuing the current operating regime is unlikely to cause significant erosion or shoreline destabilization in the future. DESC will continue to perform shoreline inspections of the reservoir annually. Areas of significant erosion will be identified and

stabilized as appropriate based on land ownership, consulting with USFS if the area is within their jurisdiction.

4.3.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be identical to that of the proposed action. No adverse effects on geology and soils are expected from the no-action alternative.

4.3.2.3 Unavoidable Adverse Effects

Reservoir fluctuations, wind and wave action, and natural riverine processes, particularly within the Stevens Creek arm, could have adverse impacts on erodible soils around the shoreline areas and siltation within the reservoir. While no areas of significant or troublesome erosion have been identified at this time, continued monitoring and potential mitigation and armoring of identified areas by DESC would likely reduce the extent of these adverse impacts.

4.3.3 References

Dominion Energy South Carolina, Inc. (DESC) 2020. Article 412 – Historic Properties Management Plan and Programmatic Agreement Annual Report 2020. November 2020.

Dominion Energy South Carolina, Inc. (DESC) 2021. Article 412 – Historic Properties Management Plan and Programmatic Agreement Annual Report 2021. November 2021.

U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS). 2022. Web Soil Survey. [Online] URL: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx. Accessed October 10, 2022.

4.4 WATER RESOURCES

4.4.1 Affected Environment

4.4.1.1 Drainage Area

The Stevens Creek Project is approximately 8 RMs upstream of Augusta, Georgia, and 209 RMs from the Atlantic Ocean. The drainage area at the Stevens Creek Project is 7,122 square miles. This number reflects the subbasin drainage below the Thurmond Dam (Figure 4.8).

4.4.1.2 River Flow Characteristics

Mean, median, minimum, and maximum river flows by month as reported by the U.S. Geological Survey (USGS) at river gage # 02197000 (Savannah River – Augusta; located just downstream of the NSBLD approximately 21 RMs downstream of the Stevens Creek Dam) are provided in Table 4.2. Annual and monthly flow duration curves are provided in Exhibit B of this DLA. Data from USGS gage # 02197000 was pro-rated by a factor of 0.95 (i.e., river flow values at the USGS gage were reduced by five percent) to account for the difference in the drainage area at the Stevens Creek Project (7,122 square miles) and gage # 02197000 (7,510 square miles). The period of record for this hydrologic analysis is 30 years (1993 to 2022).

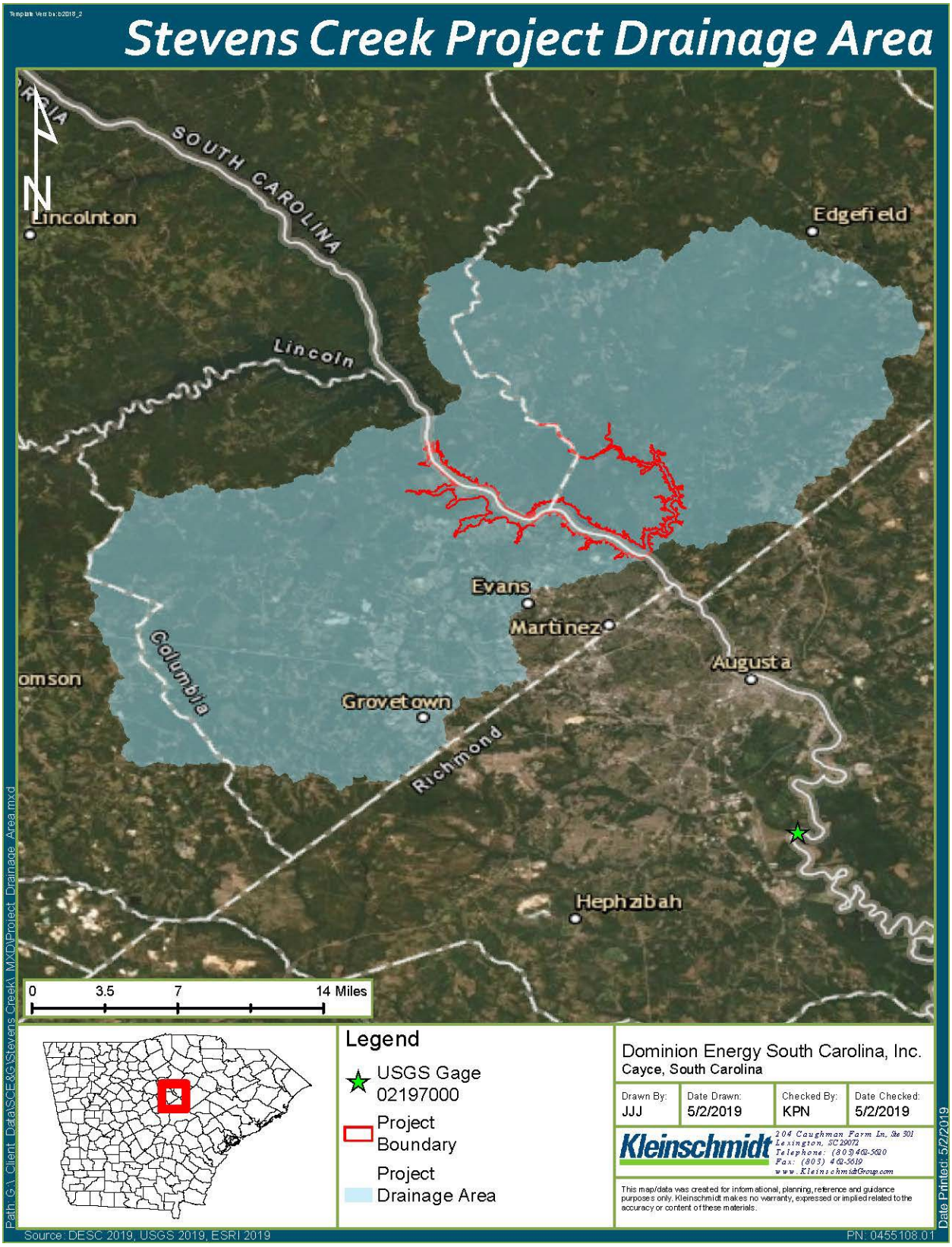


FIGURE 4.8 STEVENS CREEK PROJECT DRAINAGE AREA

TABLE 4.2 ESTIMATED MONTHLY MINIMUM, AVERAGE, MEDIAN, AND MAXIMUM RIVER FLOWS AT THE STEVENS CREEK DAM (1993 TO 2022)

Month	Average	Median	Minimum	Maximum
January	10,366	7,550	3,066	47,317
February	10,625	7,636	3,208	40,653
March	10,663	5,493	3,456	31,799
April	8,431	4,208	2,828	35,036
May	6,714	6,593	2,980	28,276
June	6,377	5,198	3,047	33,798
July	6,726	3,980	3,351	38,273
August	6,619	4,137	3,408	31,704
September	5,673	5,160	2,970	21,707
October	5,702	4,598	3,123	26,943
November	6,877	6,350	3,028	28,371
December	8,082	6,926	3,132	31,037
Annual	7,726	5,217	2,828	47,317

4.4.1.3 Water Use

DESC operates the Stevens Creek Project to generate and re-regulate highly variable river flows discharged by the USACE from the Thurmond Dam by generating to approximate their average discharge. Article 402 of the existing license requires the Licensee to obtain the predicted Thurmond Dam discharge schedule from the USACE and generate to approximate the scheduled daily average discharge in order to minimize pool fluctuations. DESC maintains the Stevens Creek Reservoir between EL 183.0 feet and 187.5 feet NGVD in accordance with the FERC operating license.

DESC files updates to the operating plan with FERC every 5 years pursuant to license Article 403. The operating plan describes operational protocols at the Stevens Creek Project based on releases from Thurmond Dam during flood conditions (i.e., higher than 30,000 cfs), high flow conditions (8,300 to 30,000 cfs), normal flows (4,200 to 8,300 cfs), low flows (4,000 to 4,200 cfs), drought (3,800 to 4,000 cfs), and severe drought (flows less than 3,800 cfs). The intent of the operating plan is to identify downstream flows for Stevens Creek under various operating conditions, improve operational efficiency, minimize reservoir fluctuations (particularly during March through June spawning periods), provide more uniform downstream flows, and to address planned storage under different Thurmond Dam operating scenarios. Re-regulation of river flows benefits downstream resources, sustains aquatic habitats, and improves water quality by re-oxygenating water released from the Thurmond Dam.

The diversion dam associated with the Augusta Project is located one mile downstream from the Stevens Creek Dam and the impoundment the diversion dam creates extends to the toe of the Stevens Creek Dam. Likewise, the FERC project boundary associated with the Augusta Project includes this area. The diversion dam feeds water into the Augusta Canal, which was designed to harness waterpower at the Fall Line to drive mills, provide transportation of goods, and provide a municipal water supply. It is the only canal in the U.S. in continuous use for its original purposes of providing power, transport, and municipal water. Today, the Augusta Canal provides drinking water to the City of Augusta, recreational and tourism opportunities, and hydropower.

Municipalities and industries withdraw water and discharge treated wastewater into the Savannah River in compliance with state permitting requirements. Entities near the Stevens Creek Project withdrawing water or discharging treated wastewater into the Savannah River include the City of Augusta (Georgia), the City of North Augusta (South Carolina), Columbia County Water and Sewer (Georgia), and Edgefield County Water and Sewer (South Carolina). Columbia County's Little River Water Pollution Control Plant discharges to the Savannah River within the Stevens Creek Reservoir approximately one mile upstream of the Highway 28 bridge crossing.

4.4.1.4 Water Quality

The GAEPD is charged with establishing and maintaining the quality and quantity of Georgia's water resources. South Carolina's water quality is managed and administered by SCDHEC. The Savannah River at the Stevens Creek Project is a Class A water, with a designated use of drinking water. All freshwater systems in Georgia and South Carolina must meet the following criteria:

- Dissolved Oxygen (DO): A daily average of 5.0 milligrams per liter (mg/L) and no less than 4.0 mg/L for water supporting warm water species of fish.
- pH: Within the range of 6.0 – 8.5.
- Water Temperature: Not to exceed 90°F. At no time is the temperature of the receiving waters to be increased more than 5°F above intake temperature except that in estuarine waters the increase will not be more than 1.5°F.
- Safe Drinking Water Standards – numerous standards exist for safe drinking water and pollutant discharges (e.g., arsenic, polychlorinated biphenyl); however, given that the Stevens Creek Project does not produce or discharge toxins, these standards are not discussed further.

The states of Georgia and South Carolina classified the Savannah River from the J. Strom Thurmond reservoir to Johnson's Landing as impaired due to low DO. The impaired reach includes the Stevens Creek Project area, the USACE dam, and the Augusta Project. Water

released from Thurmond Dam can have low DO levels depending on the depth of the withdrawal and the time of the year. A total maximum daily load was completed by the U.S. Environmental Protection Agency (USEPA) in 2000 (USEPA 2000). In 2011, the USACE installed a major oxygen diffuser system in the Thurmond Dam reservoir to provide supplemental DO to support aquatic and fisheries habitat. The system consists of nine diffuser pipes installed at four elevations that supply DO to the impounded waters. The diffusers are supplied with pure gaseous oxygen from an onsite liquid storage and supply facility. The oxygen supply facility is capable of infusing over 200 tons of oxygen per day.

As required by License Article 404 and Article 405 of the Stevens Creek Project license, DESC has been responsible for the collection and synthesis of DO, pH, conductivity, and water temperature data for the past 25 years at eight monitoring locations throughout the Stevens Creek Reservoir and in the tailwater (Figure 4.9). These articles were developed to specifically address water quality issues identified at the Stevens Creek Project prior to the USACE's implementation of oxygenation, as discussed above. Under this water quality monitoring plan, DESC funds the collection of vertical profiles by USGS on two consecutive days, once daily in each month from November to May. Profiles are also collected diurnally (morning and afternoon) twice a month on two consecutive days from June through October. DESC also receives data collected by USACE, which includes monthly vertical profiles in the Thurmond Dam forebay, and continuous (15-minute interval) measurements of DO and water temperature in the Thurmond Dam tailrace.

From January 2021 to February 2022, DESC monitored water quality according to a study plan developed in consultation with stakeholders (Appendix E-5). The water quality study included the following components:

- Continuous (hourly interval) measurements of water temperature, DO, specific conductance, pH, and turbidity at five pre-determined sites.
- Periodic monitoring of water temperature, DO, and pH at one location (study site 6) for 24-48 hour periods monthly from June through October.
- Monthly nutrient sampling at study sites 1 through 5, and at study site 6 during periodic monitoring. Analytes included ammonia, nitrate-nitrite, Kjeldahl nitrogen, orthophosphate, and total phosphorus.

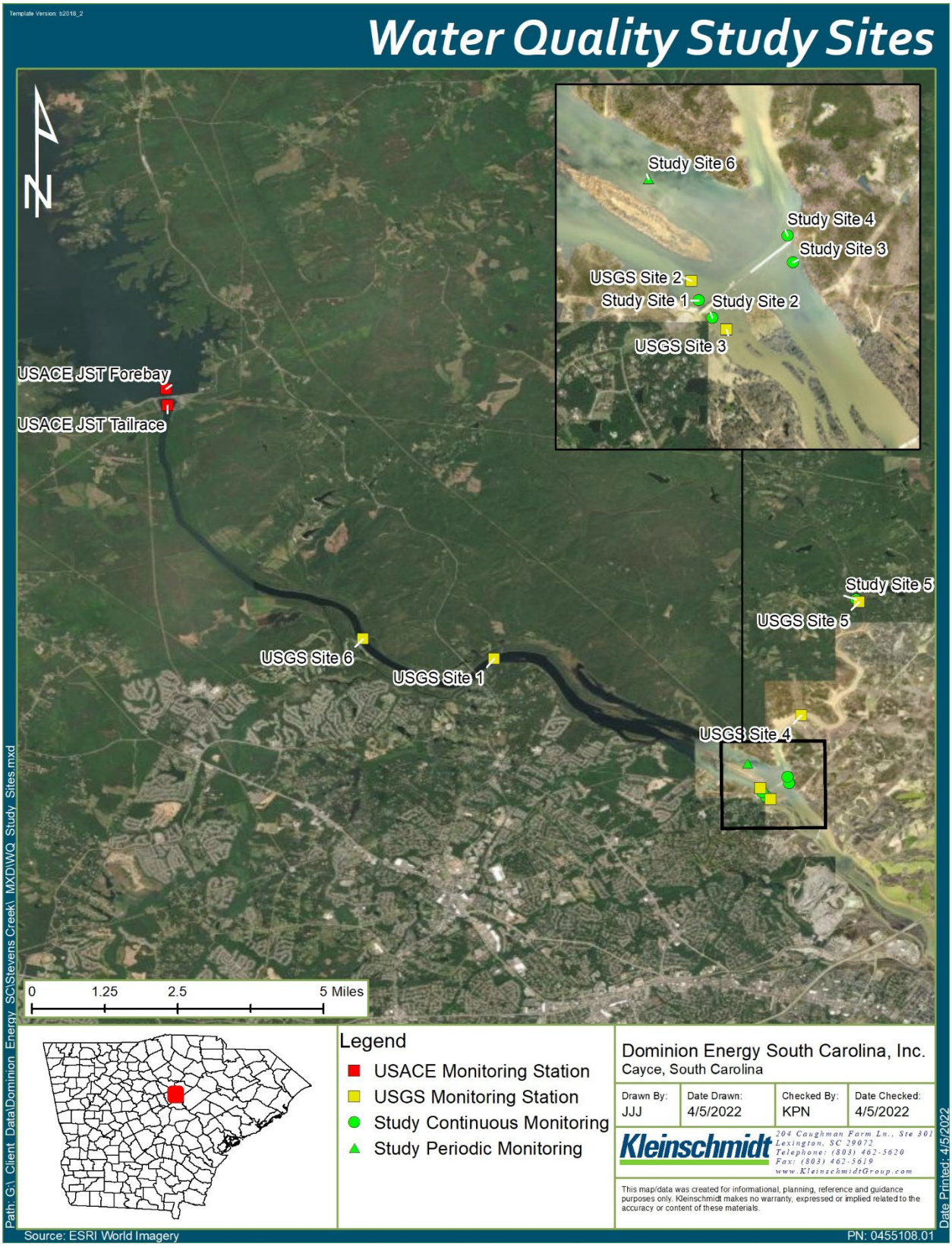


FIGURE 4.9 WATER QUALITY DATA COLLECTION LOCATIONS

Monitoring results from 2010 to 2019, as summarized in the PAD, revealed that DO levels in the Thurmond Dam and Stevens Creek reservoirs were above the instantaneous state standard (4 mg/L) during the winter and spring. The Thurmond Dam reservoir begins to stratify annually in late spring or early summer, resulting in discharge DO levels below 4 mg/L. Tailrace DO data collected by USACE in 2021 indicated low DO levels in the Thurmond Dam discharge from May through October, with the lowest monthly average DO occurring in August (3.2 mg/L; Table 4.3). Data collected by USGS in 2021 at sites 1, 2, and 6 revealed DO levels were between 4 and 5 mg/L from July to early October. DO levels measured in 2021 at DESC water quality study sites in the Savannah River portion of the Stevens Creek Reservoir (study sites 1, 4, and 6) were occasionally below the 5 mg/L average, but measurements below 4 mg/L were rare. DO levels in the Stevens Creek arm of the reservoir were the lowest among all sites. During the study, daily average DO was below 5 mg/L on 89 days, and 1,133 of 7,194 (15.7 percent) measurements were below 4 mg/L.

TABLE 4.3 SUMMARY OF 2021 DO DATA IN THURMOND TAILRACE AND STEVENS CREEK RESERVOIR

Month	Monthly Average DO (mg/L)				
	Thurmond Tailrace	Study Site 1	Study Site 4	Study Site 5	Study Site 6
2021-01	9.8	10.5	-	-	-
2021-02	10.8	10.7	10.5	10.6	-
2021-03	10.2	10.5	9.5	8.7	-
2021-04	7.9	9.8	9.3	6.9	-
2021-05	4.5	8.0	8.0	5.5	-
2021-06	3.6	7.0	6.7	-	8.5
2021-07	4.0	5.7	6.1	4.1	5.9
2021-08	3.2	4.9	5.8	3.8	5.3
2021-09	3.8	4.8	5.4	4.3	5.2
2021-10	4.0	4.8	5.3	4.3	5.6
2021-11	6.9	8.4	8.4	7.2	-
2021-12	7.9	9.1	8.9	10.0	-

Several factors may be responsible for the low DO levels observed in Stevens Creek proper. The magnitude of releases from Thurmond Dam and the presence of Stevens Creek Dam cause water levels in Stevens Creek to rise and flow upstream for several miles. As water levels in Stevens Creek rise, shallow, off-channel areas that were dry become wetted. Dead and decaying materials in these previously dry areas likely exhibit some level of oxygen demand that manifests within the creek. A previous study found high levels of biochemical oxygen demand (BOD) within this vicinity

of Stevens Creek (SNSA 2008). Additionally, a study by USGS on the Roanoke River in Virginia found that DO sags were correlated with decreasing river flows and drainage of high-BOD waters from off-channel areas (Bales and Walters 2003).

DESC, in consultation with resource agencies and stakeholders, will conduct a targeted water quality study in 2023 to better understand the potential mechanisms affecting DO in Stevens Creek within the project boundary. The study will be conducted between May 1 and October 31 and include continuous water quality monitoring in Stevens Creek at study site 5 in addition to longitudinal surveys and off-channel surveys within the creek. Consultation regarding methodology is ongoing with resource agencies. A final study report will be filed with FERC after the submission of the FLA.

DO levels in the Savannah River immediately downstream of the Stevens Creek powerhouse (i.e., in the tailwater; study site 2) and below the spillway near the South Carolina side (study site 3) exceeded the daily average and instantaneous minimum DO for the entire monitoring period (Table 4.4). The monitoring data demonstrate that re-oxygenation occurs as water passes through the Stevens Creek Reservoir, powerhouse, and over the spillway. Additionally, values for temperature, pH, and specific conductivity were within the normal range through the main body of the reservoir and below the Stevens Creek Project.

TABLE 4.4 SUMMARY OF WATER QUALITY STUDY DO LEVELS BELOW THE STEVENS CREEK PROJECT DAM

Month	Monthly DO (mg/L) Average (Min – Max)	
	Study Site 2 (Tailwater)	Study Site 3 (Spillway)
2021-01	11.0 (10.8 - 11.2)	10.7 (9.3 - 11.3)
2021-02	11.3 (10.4 - 11.8)	11.0 (10.1 - 11.7)
2021-03	11.2 (9.6 - 11.8)	10.2 (8.7 - 11.4)
2021-04	ND	9.5 (7.9 - 10.6)
2021-05	ND	9.0 (7.2 - 9.8)
2021-06	7.3 (6.3 - 8.5)	8.6 (6.0 - 9.7)
2021-07	6.4 (5.1 - 7.8)	7.9 (4.9 - 9.2)
2021-08	5.7 (4.6 - 6.8)	7.4 (4.9 - 9.0)
2021-09	5.6 (4.8 - 6.4)	7.0 (5.0 - 8.7)
2021-10	5.9 (4.6 - 8.1)	8.1 (5.2 - 9.2)
2021-11	8.8 (6.5 - 9.7)	9.1 (6.7 - 10.2)
2021-12	9.7 (9.0 - 10.5)	ND

Month	Monthly DO (mg/L) Average (Min – Max)	
	Study Site 2 (Tailwater)	Study Site 3 (Spillway)
2022-01	10.7 (9.4 - 12.0)	ND
2022-02	11.6 (11.2 - 12.1)	ND

ND = no data

Nutrient sampling performed during the water quality study revealed relatively low levels at most sites (Table 4.5). Study site 5 (Stevens Creek) was the only site with detectable levels of phosphorus. Nutrient sampling results indicate levels of total phosphorus and total nitrogen do not exceed criteria for lakes (0.09 mg/L and 1.5 mg/L, respectively) (SCDHEC 2022).

TABLE 4.5 SUMMARY OF RESULTS FROM DISCRETE SAMPLES

Parameter		Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Ammonia (mg/L)		N/D	N/D	0.68	N/D	N/D	N/D
Nitrate-Nitrite (mg/L)	Min	0.09	0.10	0.09	0.09	0.03	0.10
	Avg	0.16	0.17	0.18	0.19	0.19	0.18
	Max	0.24	0.35	0.34	0.34	0.41	0.30
Orthophosphate (mg/L)		N/D	0.19	N/D	N/D	0.16	N/D
Phosphorus (mg/L)	Min	---	---	---	---	0.055	---
	Avg	N/D	N/D	N/D	N/D	0.062	N/D
	Max	---	---	---	---	0.066	---
TKN (mg/L)	Min	0.11	0.15	0.17	0.12	0.24	0.11
	Avg	0.21	0.27	0.34	0.41	0.59	0.24
	Max	0.41	0.66	0.61	0.65	0.93	0.31

N/D = Non-Detect

4.4.2 Environmental Effects

Water quantity, including associated upstream and downstream flow conditions, and water quality were reviewed and assessed throughout Stages 1 and 2 of the TLP pre-filing process. As discussed above, water quality studies were performed in consultation with resource agencies, determining the appropriate scope in relation to resources and developments within the basin. The City of Augusta, SCDNR and GADNR provided specific written comments regarding water quality and quantity in response to the PAD and proposed study plans, which are further detailed in Appendix E-2 – Stakeholder Comment Matrix. DESC will be working to collect supplemental water quality data, as directed by the Water Quality TWC, within the Stevens Creek Arm of the reservoir in 2023. As previously discussed, study results will be provided in the FLA, as available, and in supplemental filings to the FLA if study timing directs.

4.4.2.1 Proposed Action

The Licensee proposes to continue to operate the Stevens Creek Project as it has under the existing license. Articles 404 and 405 of the existing license were developed prior to the USACE's implementation of oxygenation at Thurmond. Article 405 notes that "[w]hen dissolved oxygen enhancement measures are in place and the monitoring data show that state dissolved oxygen standards are consistently being met in the Stevens Creek Reservoir and down-stream of the dam, the Licensee may petition FERC to reduce the frequency of water quality monitoring." As demonstrated in this section, the Stevens Creek Project reservoir experiences seasonally low DO levels as a result of releases from USACE's Thurmond Dam. However, DO levels improve as they pass through the Stevens Creek Project and have consistently exceeded state water quality standards in the tailrace.

Regarding the nexus between project operations and effects on water quality resources, a reasonable connection between operation of the Stevens Creek Project and potential effects on the resource in question is a threshold requirement that must be demonstrated for the Commission to require that an applicant gather additional information. Operations from the USACE dam and its subsequent effects on water quality downstream are now well-understood through a substantial period of data collection by DESC under the current license. As it is generally not the Commission's practice to recommend that a licensee conduct studies on effects caused by developmental activities over which the licensee has no control (FERC 2012), DESC is not proposing to continue the water quality monitoring plan developed under the current license. DESC is continuing to work with stakeholders to better understand water quality impacts potentially resulting from re-regulation operations within the Stevens Creek Arm of the reservoir. Any PM&E proposals resulting from those discussions will be included in the FLA. Additionally, DESC will work with GAEPD to develop and file an application for 401 Water Quality Certification within 60 days of the Commission's notice requesting terms and conditions, and recommendations, as required under Commission regulations.

4.4.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license and current water quality conditions would persist in the project vicinity, as has been documented over the period of record. DESC

would continue to monitor in accordance with the approved water quality monitoring plan, however DESC would largely lack control over upstream water quality impacts.

4.4.2.3 Unavoidable Adverse Effects

As previously discussed, the Stevens Creek Project reservoir experiences seasonally low DO levels as a result of releases from USACE's Thurmond Dam. However, DO levels improve as they pass through the Stevens Creek Project and have consistently exceeded state water quality standards in the tailrace. Unless additional measures are implemented by the USACE, which is entirely outside of the licensee's control, the reservoir is likely to continue to experience seasonally low DO levels under the proposed action. Additionally, low DO levels have been observed within Stevens Creek and additional information is being gathered to understand how these conditions may be exacerbated by re-regulation operations. Re-regulation operations are proposed to continue under the new license, therefore water quality impacts resulting from these operations may be considered unavoidable if reasonable PM&E measures are unavailable.

4.4.2.4 Cumulative Effects

As discussed in Section 4.2, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities. Water quality has been identified as having the potential to be cumulatively affected due to the re-regulation function of Stevens Creek Project operation in concert with upstream USACE releases from Thurmond Dam. This cumulative effect could be considered a net positive impact for downstream aquatic resources, as well as a potentially negative impact on water quality in some areas within the Stevens Creek Reservoir. Seasonally negative impacts on water quality resulting from re-regulation operations are being further explored within the Water Quality TWC at the time of this DLA and additional detail will be available for the NEPA analysis post-filing. Nevertheless, it is understood by DESC that the overall cumulative effects of the upstream water flow regime and associated re-regulation operations of the Stevens Creek Project provide a net-benefit for aquatic resources downstream. This is supported by general comments received by resource agencies during the relicensing process (see Appendix E-1).

4.4.3 References

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South Carolina Department of Health and Environmental Control (SCDHEC). 2022. Water Classifications and Standards. https://scdhec.gov/BOW/water-regulations-standards/water-regulations-standards-water-classification-standards. Accessed August 15, 2022.

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4.5 FISHERY AND AQUATIC RESOURCES

4.5.1 Affected Environment

4.5.1.1 Aquatic Habitat

The Stevens Creek Reservoir provides approximately 25 RMs of shallow, littoral, and shoreline habitat for cool and warm water fish species and other aquatic species (e.g., aquatic macroinvertebrates, amphibians, and aquatic reptiles), extending 13 miles upstream to the Thurmond Dam and 12 miles into Stevens Creek. The surface area of the reservoir is 2,400 acres at the normal full pond EL 187.5 feet (FERC 1995). Habitat in the Stevens Creek Reservoir is characterized by shallow, clear water with numerous stumps, snags, and aquatic macrophyte (i.e., rooted plants) beds; however, the Stevens Creek arm of the reservoir can be more turbid (FERC 1995). Substrates consist mostly of sand and silt (FERC 1995). The gradient of the river bottom is gently sloped near the Stevens Creek Dam but becomes moderately steep in areas upstream of the Route 28 bridge (FERC 1995). The Savannah River at the Stevens Creek Dam is approximately 3,500-feet-wide with numerous islands and shoreline habitats.

The 1-mile-long reach of the Savannah River immediately downstream of the Stevens Creek Project is impounded by the Augusta Project and is included in the proposed FERC-designated boundary of the Augusta Project. The Savannah River in this reach is generally shallow and narrow with numerous islands and former shoal habitat (FERC 1995). Substrates in the reach include rock outcrops, boulders, sand, and silt (Entrix 2002a). Macrophyte beds are common, especially downstream of the Interstate 20 bridge (FERC 1995). Discharge from the Stevens Creek Project typically ranges from 4,500 to 8,300 cfs under normal flow conditions. Previous research by DESC documented that water depths of five feet or more are common throughout the reach (FERC 1995). Water depth may exceed ten feet, depending on river flow conditions (Entrix 2002a).

A more recent evaluation of aquatic habitats within the Stevens Creek Project were described in the 2022 draft Aquatic Habitat Whitepaper (Appendix E-3). The impounded portions of the Savannah River within the Stevens Creek Project boundary can generally be separated into two habitat reaches, approximately divided where Highway 28 crosses the river. The upstream reach just below Thurmond Dam is relatively deep, directly receives the peaking flows from USACE dam operations, and contains a mix of gravels and sands with occasional cobble. As the Savannah River approaches Highway 28, the Savannah River slows and shallows. Substrates

transition from gravels and coarse sand to fine sands and accumulated sediments. Aquatic vegetation can be found in the shallow areas and bank margins. Submerged woody structure can be found along the banks and is generally most abundant in areas with steep banks. Downstream of Highway 28, the Savannah River widens, slows, and the river channel is less consolidated. Sediment deposition is heavy within this reach with sand, silt, and accumulated organics dominating the substrate. Aquatic vegetation is widespread, dense, and further contributes to sediment capture and retention within Stevens Creek Reservoir (Appendix E-3).

Within the project boundary, Stevens Creek can be characterized by three reaches with differing habitats (i.e., downstream reach, middle reach, and upstream reach) (Appendix E-3). Although habitat transitions occur along a gradient, the three habitat reaches are generally described as the following. The downstream reach of Stevens Creek is similar to the impounded condition of the mainstem Savannah River near the Project dam. Substrates are a mix of silt, accumulated sediments, and organic material. Some woody structure is present and provides cover for fish, basking platforms for turtles, and perches for birds. The middle reach of Stevens Creek is still affected by the dam with impounded conditions, but the stream is generally more confined to a consolidated channel contained within the steep banks that provide undercut banks, root wads, overhanging shrubs, and large woody debris. Substrates in the reach include sand, some accumulated silt sediments, and bank margins with mixed clays and sands. The upstream reach of Stevens Creek is shallow, with evidence of sediment deposition in the form of sand bars and benches. Although wide in some locations, water within the upstream reach of Stevens Creek is often only a couple of inches deep in warmer months. The point bars and woody debris within the channel provide some localized structure, variable flows, and coarser sands and gravels. Otherwise, this portion of Stevens Creek can be of relatively uniform flow and mobile sandy substrates. In times of drought or low flow, some areas can be braided, or a series of isolated pools connected by subsurface flow within the sandy streambed. The banks are tall but with relatively gentle, stable slopes protected by herbaceous and shrubby vegetation (Appendix E-3).

4.5.1.2 Resident Fishery

The middle Savannah River supports a diverse, productive, and healthy fish community typical of a large river in the southeastern U.S. (Marcy et al. 2005). At least 70 species of fish representing 15 families occur in the Savannah River in the vicinity of the Stevens Creek Project (Table 4.6). Common fish species include bluegill, yellow perch, largemouth bass, redbreast sunfish, threadfin shad, golden shiner, longnose gar, gizzard shad, chain pickerel, white bass, pickerel/walleye,

northern hogsucker, brown bullhead, yellow bullhead, redeye bass[3], white crappie, and black crappie (Avondale 2001). Entrix (2002a) reported that redbreast sunfish, yellow perch, bluegill, gizzard shad, spottail shiner, and spotted sucker were the most abundant fish species in the middle Savannah River. The dominant species by biomass are reported as common carp, spotted sucker, longnose gar, gizzard shad, and American shad (Entrix 2002a). Bluegill, redear sunfish, largemouth bass, and redbreast sunfish were the most common species collected by GADNR between 2006 and 2017 (GADNR 2019). Cool water fishes such as yellow perch, smallmouth bass, striped bass, and redeye bass[3] are bolstered by releases of cool, hypolimnetic water from the Thurmond Dam (Entrix 2002a).

The SCDNR reports that the coastal shiner was the most dominant species in the Stevens Creek Reservoir during electrofishing efforts in October of 2016 and 2017 (Bettinger and Bulak 2019). Bluegill, redear sunfish, spotted sucker, largemouth bass, and redbreast sunfish were the dominant species collected in Stevens Creek proper (Bettinger and Bulak 2019). The SCDNR 2016/2017 study also examined condition and growth rates of sportfish species. Relative weight and growth rates of centrarchids and chain pickerel in the Stevens Creek Reservoir indicate sufficient forage and suitable water quality for these species. Some species, such as bluegill and yellow perch, have a much higher growth rate compared to the national standards (Bettinger and Bulak 2019). Alternatively, largemouth bass growth rates were lower compared to other reservoirs in South Carolina, requiring approximately 2.7 years to reach the 12-inch minimum length limit for possession (Bettinger and Bulak 2019).

The robust redhorse, an uncommon, large-bodied sucker that historically occupied the Savannah River, was documented in the Augusta Shoals area, just downstream of the Augusta Project, in the 1990s and 2000s. Robust redhorse inhabit mainstream rivers in riffles, runs, and pools (Entrix 2002a). Adults are usually found with tree snags, often in deep water near shore. The Savannah River now contains a substantial population of robust redhorse, although no estimates of the size of the population have been made (GADNR 2016a). New individuals continue to be encountered, indicating relatively steady recruitment into the Savannah River population. Within the last five years, robust redhorse has been documented as occurring in the Savannah River immediately downstream of the Stevens Creek Dam (RRCC 2020). Recent spawning surveys indicate that the Savannah River is likely the most stable of the known wild populations (GADNR 2016a).

[3] At the time of these studies this species was referred to as redeye bass (*Micropterus coosae*); however, redeye bass from the Savannah River drainages is now known to be a distinct species: Bartram's bass (*Micropterus sp. cf. coosae*) as described in Freeman et al. 2013.

Spawning occurs in course gravel beds, and in the Savannah River, it occurs from late April through early June when water temperatures approach 64 to 68°F. Spawning has been observed in rivers with water depths ranging from approximately 1 foot to 3.5 feet with water velocities of less than 0.10 feet per second over coarse gravel bed sediments (GADNR 2016a). Suitable gravel spawning habitat has been documented directly below the NSBLD (RRCC 2017).

Bartram's bass[4] is a species of interest among state fishery management agencies. Savannah River populations of this species have shown to be genetically distinct and are listed as a species of Highest Conservation Concern by SCDNR. The primary threat to this species is hybridization with Alabama bass and smallmouth bass, which are both introduced species. Although Bartram's bass is known to thrive in a variety of habitats, hybridization has severely impacted this species in lentic environments, above the Fall Line, in the Savannah River system (SCDNR 2015). State agencies and universities are continuing to investigate this species and its status.

Since 2005, striped bass greater than 27 inches have been open to anglers in the Savannah River. The number of striped bass and the number of legal-size fish have rebounded due to a stocking program by GADNR that began in the 1990s. Striped and hybrid bass are stocked annually to help control forage fish populations. Striped bass populations in the Savannah River are essentially riverine with spawning occurring in downstream estuarine habitats. Upstream migrations of striped bass in the spring and summer are associated with a search for cool water refugia supplied by the hypolimnetic releases from Thurmond Dam rather than spawning habitat (Entrix 2002a). Although striped bass are present in the Thurmond Dam tailrace year-round, they are most prominent between June and September (Bettinger and Bulak 2019). Adult fish congregate in the area downstream of NSBLD during warm season months to remain in the cool water that occurs there. Some individuals subsequently pass upstream during periods of high runoff when water levels equilibrate on both sides of the dam. Juvenile striped bass are more tolerant of water temperatures above 77°F and may occur throughout the Savannah River during the summer. Adult striped bass migrate downstream during fall and are thought to remain in the estuary during the winter (Entrix 2002). Although seasonal distribution of striped bass and hybrid striped bass is similar, striped bass occupy warmer waters, such as Stevens Creek proper, in winter and early spring (Bettinger and Bulak 2019).

[4] Prior to 2013, Bartram's bass (*Micropterus sp. cf. coosae*) was formerly referred to as redeye bass (*Micropterus coosae*) but is now considered a distinct species.

The largemouth bass population is healthy despite drought conditions that have contributed to slightly slower growth rates over the last few years. A radio telemetry monitoring study conducted in the Stevens Creek Reservoir by SCDNR in 2019 estimated the total annual mortality rate of largemouth bass was approximately 35 percent (95 percent credible interval [CI] 23-49 percent), which is considered on the lower end of typical mortality rates observed in South Carolina reservoirs (23-60 percent). Fishing mortality in Stevens Creek Reservoir was 15 percent (95 percent CI 7-26 percent), which is lower than the mean annual rate of other North American largemouth bass fisheries (Bettinger and Bulak 2019).

Nearby J. Strom Thurmond Reservoir provides 1,200 miles of shoreline and 71,000 acres of water for experienced and novice anglers. Hartwell Lake and Richard B. Russell Lake also provide ample angling opportunities. The Bassmaster Elite Series fishing tournament was held on Thurmond Lake in 2007. In 2016, over 100 bass tournaments on Thurmond, Hartwell, Richard B. Russell, and the main stem of the Savannah River totaled over 12,500 fishing sites; three to four-pound bass were commonly collected (GADNR 2016b). Numerous recreation areas, fishing piers, and bank fishing areas provide fishing opportunities in Savannah River lakes. There are over 30 public fishing sites near the Stevens Creek Project, most of which are along the shoreline of Thurmond Reservoir. Fishing access to the Savannah River is also provided at Savannah Rapids Park in Augusta and at three Stevens Creek Project recreation sites.

TABLE 4.6 FISH SPECIES TYPICAL OF AQUATIC HABITATS IN THE STEVENS CREEK PROJECT VICINITY

Family	Common Name	Scientific Name
Lepisosteidae	Longnose Gar	*Lepisosteus osseus*
Amiidae	Bowfin	*Amia calva*
Anguillidae	American Eel	*Anguilla rostrata*
Clupeidae	Blueback Herring	*Alosa aestivalis*
	Gizzard Shad	*Dorosoma cepedianum*
	Threadfin Shad	*Dorosoma petenense*
Cyprinidae	Goldfish	*Carassius auratus*
	Grass Carp	*Ctenopharyngodon idella*
	Common Carp	*Cyprinus carpio*
	Bannerfin Shiner	*Cyprinella leedsi*
	Whitefin Shiner	*Cyprinella nivea*
	Eastern Silvery Minnow	*Hybognathus regius*
	Rosyface Chub	*Hybopsis rubrifrons*
	Bluehead Chub	*Nocomis leptocephalus*

Family	Common Name	Scientific Name
	Golden Shiner	*Notemigonus crysoleucas*
	Spottail Shiner	*Notropis hudsonius*
	Ironcolor Shiner	*Notropis chalybaeus*
	Dusky Shiner	*Notropis cummingsae*
	Yellowfin Shiner	*Notropis lutipinnis*
	Taillight Shiner	*Notropis maculatus*
	Coastal Shiner	*Notropis petersoni*
	Pugnose Minnow	*Opsopoeodus emiliae*
	Creek Chub	*Semotilus atromaculatus*
Catostomidae	Creek Chubsucker	*Erimyzon oblongus*
	Lake Chubsucker	*Erimyzon sucetta*
	Northern Hogsucker	*Hypentelium nigricans*
	Spotted Sucker	*Minytrema melanops*
	Notchlip Redhorse	*Moxostoma collapsum*
	Robust Redhorse	*Moxostoma robustum*
Ictaluridae	Snail Bullhead	*Ameiurus brunneus*
	White Catfish	*Ameiurus catus*
	Yellow Bullhead	*Ameiurus natalis*
	Brown Bullhead	*Ameiurus nebulosus*
	Flat Bullhead	*Ameiurus platycephalus*
	Channel Catfish	*Ictalurus punctatus*
	Blue Catfish	*Ictalurus furcatus*
	Tadpole Madtom	*Noturus gyrinus*
	Margined Madtom	*Noturus insignis*
	Speckled Madtom	*Noturus leptacanthus*
Esocidae	Redfin Pickerel	*Esox americanus*
	Chain Pickerel	*Esox niger*
Aphredoderidae	Pirate Perch	*Aphredoderus sayanus*
Fundulidae	Golden Topminnow	*Fundulus chrysotus*
	Lined Topminnow	*Fundulus lineolatus*
Poeciliidae	Eastern Mosquitofish	*Gambusia holbrooki*
Atherinopsidae	Brook Silverside	*Labidesthes sicculus*
Moronidae	White Perch	*Morone americana*
	White Bass	*Morone chrysops*
	Striped Bass	*Morone saxatilis*
Centrarchidae	Flier	*Centrarchus macropterus*
	Bluespotted Sunfish	*Enneacanthus gloriosus*
	Redbreast Sunfish	*Lepomis auratus*
	Green Sunfish	*Lepomis cyanellus*
	Pumpkinseed	*Lepomis gibbosus*

Family	Common Name	Scientific Name
	Warmouth	*Lepomis gulosus*
	Bluegill	*Lepomis macrochirus*
	Dollar Sunfish	*Lepomis marginatus*
	Redear Sunfish	*Lepomis microlophus*
	Spotted Sunfish	*Lepomis punctatus*
	Largemouth Bass	*Micropterus salmoides*
	Bartram's Bass	*Micropterus sp. cf. coosae*
	White Crappie	*Pomoxis annularis*
	Black Crappie	*Pomoxis nigromaculatus*
Percidae	Savannah Darter	*Etheostoma fricksium*
	Swamp Darter	*Etheostoma fusiforme*
	Christmas Darter	*Etheostoma hopkinsi*
	Turquoise Darter	*Etheostoma inscriptum*
	Tessellated Darter	*Etheostoma olmstedi*
	Yellow Perch	*Perca flavescens*
	Blackbanded Darter	*Percina nigrofasciata*

4.5.1.3 Migratory Fishes

Historically, the Savannah River Basin supported seven diadromous species: American shad, blueback herring, hickory shad, American eel, striped bass, Atlantic sturgeon, and shortnose sturgeon. All seven species are known to occur downstream of the NSBLD presently, which is currently the most downstream dam on the Savannah River. There are six dams on the Savannah River, of which only the first dam, the NSBLD at RM 187, approximately 21 RMs downstream of the Stevens Creek Project, has an upstream fish passage system using its navigation lock. However, due to concerns about structural integrity, the lock has not been operated for fish passage since May 2014. The Augusta Project, which is approximately 19 RMs upstream of the NSBLD and 1 mile downstream of the Stevens Creek Dam, does not currently have fish passage, nor do the three USACE dams upstream of the Stevens Creek Project. Striped bass and blueback herring occur throughout the USACE reservoirs due to stocking efforts to establish a game fishery. Atlantic and shortnose sturgeon are listed as endangered species under the ESA. Shortnose sturgeon were listed in 1967 and Atlantic sturgeon were listed in 2012 (Federal Register 2012). Atlantic sturgeon and shortnose sturgeon historically migrated throughout the Savannah River to reach spawning or rearing grounds at the Augusta Shoals, located between the NSBLD and the Augusta Project. Shortnose sturgeon swim up large coastal rivers to spawn, then return to the lower river or estuary for the rest of the year, only occasionally venturing into the Atlantic Ocean.

In the southern portion of their range, shortnose sturgeon inhabit freshwater during the late spring and summer, migrating to estuarine areas during the fall and winter. Spawning in Georgia for shortnose sturgeon begins in February when water temperatures exceed 48°F, and post-spawning migrations downriver begin in March (GADNR 2023). Spawning in Georgia for Atlantic sturgeon occurs during the fall. However, a spring migration has been noted for Atlantic sturgeon in which some individuals stage in the upper portions of the river in the spring and summer before migrating to suspected spawning habitat during the fall (Ingram and Peterson 2016).

Major river channel modifications near the City of Savannah for shipping and commerce have occurred since colonial times. These activities have altered salinity, decreased DO at depth, increased flushing rates in the lower estuary, and reduced freshwater tidal wetlands, all of which have adversely affected migratory fish species and their habitats (SCNDR and GADNR 2014). The USACE recently completed the Savannah Harbor Expansion Project (SHEP) to deepen the 18.5-mile outer harbor to 49 feet at mean low water and the Savannah River channel (i.e., inner harbor) to 47 feet (USACE 2022). As mitigation for the SHEP, the USACE is currently required to provide sturgeon passage at the NSBLD (USACE 2022). Design of fish passage at the NSBLD is ongoing and construction has not been initiated.

DESC's existing license for the Stevens Creek Project requires upstream passage following the construction of a fishway at the Augusta Project. The Section 18 prescription in the current license includes a requirement to refurbish the navigation lock[5], which would be operated using attraction flows or other fish attraction mechanisms to provide a minimum of 30 lockages during the shad migration season (SCDNR and GADNR 2014). The USFWS and NMFS submitted a preliminary fishway prescription for the Augusta Project in 2004 that included a vertical slot fishway on the Georgia side of the river. Based on comments received from the City of Augusta, and additional evaluation and review by the USFWS and NMFS, the fishway prescription was modified to include a vertical slot fishway on the South Carolina side of the Savannah River. Negotiations between the USFWS and NMFS and the City of Augusta are ongoing and construction of the fishway has not been initiated.

[5] Consultation with the USFWS and NMFS has indicated that the navigation lock, which is more centrally located on the river as opposed to being located on or near one of the banks, may not be the preferred option for fish passage at this time. The nature of fish passage will continue to be explored with the resource agencies through the implementation of a post-license TWC.

4.5.1.4 Freshwater Mussels

In 2006, the Catena Group inventoried freshwater mussels in the Savannah River from the Augusta Shoals area (near RM 203) downstream to estuarine waters (near RM 23). The Catena Group identified 26 species of freshwater mussels during the survey, noting that diverse and viable mussel populations occur throughout the Savannah River. Carolina slabshell, eastern elliptio, and Roanoke slabshell were the most common native species; however, the most abundant bivalve throughout the Savannah River drainage was the Asiatic clam (The Catena Group 2007). The Catena Group identified 15 freshwater mussel species that occur downstream of the Stevens Creek Project (i.e., between RM 203 and RM 196.2) (Table 4.7).

TABLE 4.7 FRESHWATER MUSSEL SPECIES NEAR THE STEVENS CREEK PROJECT

Common Name	Scientific Name	Location Present
Asiatic Clam	*Corbicula fluminea*	Stevens Creek, Little Kiokee Creek, Uchee Creek
Carolina Lance	*Elliptio angustata*	Augusta Shoals – Island, Augusta Shoals – River Run, Below King Mill Canal Discharge
Delicate Spike	*Elliptio arctata*	Below King Mill Canal Discharge
Eastern Elliptio	*Elliptio complanata*	Augusta Shoals – Island, Augusta Shoals – River Run, Augusta Shoals RM 202.2, Below King Mill Canal Discharge, Stevens Creek
Carolina Slabshell	*Elliptio congarea*	Augusta Shoals – Island, Augusta Shoals – River Run, Augusta Shoals RM 202.2, Below King Mill Canal Discharge, River Run on SC Side
Northern Lance	*Elliptio fisheriana*	River Run on SC Side
Pod Lance	*Elliptio folliculate*	Augusta Shoals*
Brother Spike	*Elliptio fraternal*	Augusta Shoals – Island, Augusta Shoals – River Run
Altamaha Slabshell	*Elliptio hopetonensis*	Augusta Shoals RM 202.2, Below King Mill Canal Discharge, River Run on SC Side
Variable Spike	*Elliptio icterina*	Augusta Shoals – Island, Augusta Shoals – River Run, Augusta Shoals RM 202.2, Below King Mill Canal Discharge, River Run on SC Side, Stevens Creek
Atlantic Spike	*Elliptio producta*	Below King Mill Canal Discharge, River Run on SC Side, Stevens Creek
Roanoke Slabshell	*Elliptio roanokensis*	Augusta Shoals RM 202.2, Below King Mill Canal Discharge
Atlantic Pigtoe	*Fusconaia masoni*	Augusta Shoals – River Run, Augusta Shoals RM 202.2
Tidewater Mucket	*Leptodea ochracea*	River Run on SC Side

Common Name	Scientific Name	Location Present
Eastern/Florida Pondhorn	*Uniomerus carolinanus*	River Run on SC Side, Augusta Shoals*
Eastern Creekshell	*Villosa delumbis*	Below King Mill Canal Discharge, Augusta Shoals*, Stevens Creek

Sources: Alderman 2017, 2022; Entrix 2002b; The Catena Group 2007
Augusta Shoals*: Refers to the general area

Researchers found seven live freshwater mussel species in the Augusta Shoal area in 2002: Carolina slabshell, Roanoke slabshell, variable spike, pod lance, eastern elliptio, eastern pondhorn, and eastern creekshell (Entrix 2002b). No state or federally threatened or endangered freshwater mussel species were found (Entrix 2002b).

In 2017, Alderman Environmental Services, Inc. (Alderman) performed freshwater mussel surveys along approximately 38 miles of streams within the SNF in McCormick, Greenwood, and Edgefield counties, South Carolina. Stream miles surveyed were outside of, but adjacent to, the Stevens Creek arm of the Stevens Creek Project boundary. Biologists documented four freshwater mussel species during survey activities. These included eastern elliptio (23 live/36 shells), variable spike (1 live), eastern creekshell (3 live/1 shell), and Atlantic spike (8 live). Asiatic clam was also observed within most streams surveyed. Substrate compositions observed during survey streams varied from mostly sand and gravel, to silt, sand, gravel, pebble, cobble, boulder, and bedrock. Beaver activity was observed on most survey streams. Alderman noted that the relatively low numbers of mussels observed was likely due to sediment accumulation and transport within stream valleys (Alderman 2017).

In October 2021, DESC performed mussel surveys in portions of Stevens Creek, Little Kiokee Creek, and Uchee Creek within the Stevens Creek Project boundary (Figure 4.10). During the reconnaissance portion of the survey, it was observed that Stevens Creek has poor lotic habitat with little flow and unconsolidated organic rich substrate. After approximately 2.6 hours of effort, three shells and shell fragments were found during the mussel survey: one eastern elliptio and two eastern creekshell. The only live bivalve specimens found were the invasive Asiatic clam, which were limited to a couple of individuals. The vast majority of the Uchee Creek survey area exhibited poor lotic habitat conditions, with substrates dominated by clay, silt, and organics. No evidence of freshwater mussels (live or dead) was documented in the Uchee Creek survey areas and only a few Asiatic clam were found. Accessible portions of Little Kiokee Creek exhibited poor mussel habitat, with slick, dense clay substrates and steep banks. A total effort of 0.7 person

hours yielded no evidence of freshwater mussels in the survey area. The only living bivalves found were Asiatic clam. The report is included in its entirety in Appendix E-6.

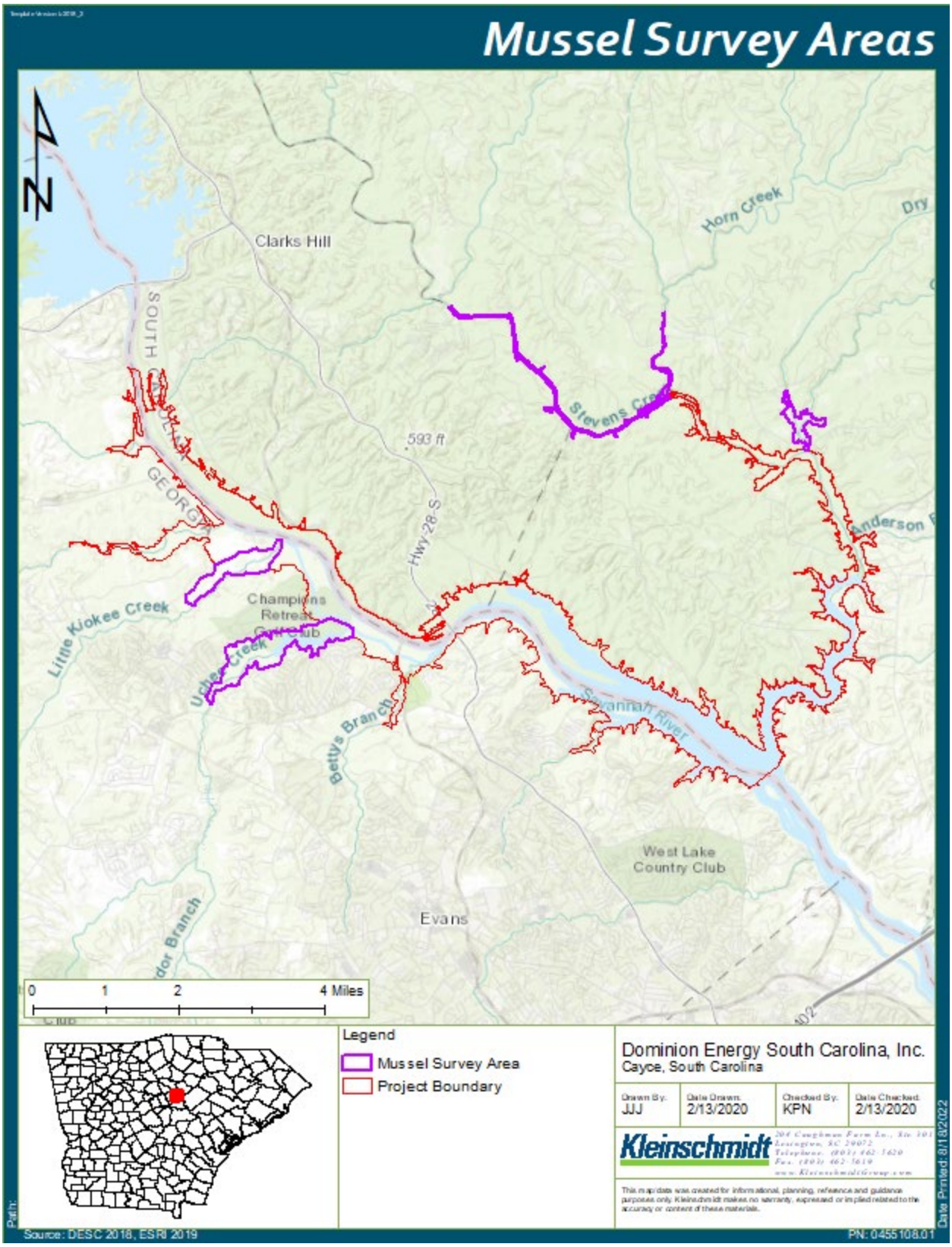

FIGURE 4.10 2021 MUSSEL SURVEY AREAS

4.5.1.5 Benthic Macroinvertebrates

The Southeastern Natural Sciences Academy (SNSA) conducted a water quality study within the Savannah River Basin in 2006 and 2007 to characterize the effects of the urban corridor on Savannah River water quality under baseline and storm event conditions. As part of the study, SNSA sampled the benthic macroinvertebrate community at two sampling locations within the Stevens Creek Project boundary: 7 miles downstream of Thurmond Dam within the Stevens Creek impoundment and 4.2 miles upstream of the Stevens Creek and Savannah River confluence. SNSA researchers deployed pairs of Hester-Dendy sampling plates at each location for approximately 30 days to sample the invertebrate community in the Savannah River and Stevens Creek. The results of the study demonstrated that some EPT taxa were present in the Stevens Creek Project area, but at lower densities than in other sampling stations downstream; EPT taxa were lower in pooled waters (i.e., impoundments) upstream of RM 185 compared to free-flowing sections lower in the river. EPT taxa are sensitive species that are generally intolerant of polluted water of water that has low DO levels. SNSA's research indicated that water with low DO released from the Thurmond Dam and flow fluctuations resulting from Thurmond Dam peaking operations adversely affected the benthic macroinvertebrate community at the two sampling sites in the Stevens Creek Project area (SNSA 2008).

4.5.2 Environmental Effects

DESC has explored potential issues regarding fishery resources with the Water Quality Fish and Wildlife RCG and Fish Passage TWC during the pre-filing process. Several issues were additionally raised in written comments on the PAD, as discussed in Appendix E-2. DESC has performed two studies and developed an information whitepaper to gather more information as it relates specifically to aquatic resources, including:

- Stevens Creek Project Water Quality Study
- Freshwater Mussel Water Quality Study
- Stevens Creek Aquatic Habitat Whitepaper

Potential issues identified resulting from the proposed action are further detailed below.

4.5.2.1 Proposed Action

FISH PASSAGE TWC

Currently, there are two dams below the Stevens Creek Project and three above that impede fish passage in the Savannah River. Fish that pass above the NSBLD can utilize the habitat and existing tributaries but cannot move beyond the Augusta Project. As discussed previously, the City of Augusta is in negotiations with the USFWS and NMFS to construct a working fish passage at the Augusta Project. Fish passage in the lower portion of the Savannah River is also contingent on fish passage at the NSBLD, which is undergoing legal proceedings as well. No current timeline for downstream fish passage installation is known at this time.

Given the ongoing fish passage proceedings in the basin, DESC proposes to maintain the Fish Passage TWC that was created during the relicensing through the post-filing and license implementation process or until fish passage at the Stevens Creek Project is satisfied under Section 18 of the FPA, whichever comes first. The purpose of this would be to inform the timing, siting and implementation of fishways that may be prescribed for the Stevens Creek Project during the new license term. DESC understands that downstream flow patterns and fish communities may change after implementation of passage at downstream facilities. Additionally, data collected after the implementation of downstream facilities can be used to inform fish passage design and placement at the Stevens Creek Project.

4.5.2.1.1 IMPINGEMENT AND ENTRAINMENT

Fish entrainment and turbine mortality are generally an unavoidable impact of hydropower operations. During the previous relicensing of the Stevens Creek Project, DESC performed studies to characterize fish entrainment and survival through the turbines. During the entrainment study, the most abundantly entrained fish included threadfin shad (25 percent), yellow perch (15 percent), American eel (15 percent), blueback herring (11.25 percent), and bluegill (11.25 percent). The turbine survival study found mortality rates of 6 percent for blueback herring, 5 percent for sunfishes, and 4 percent for yellow perch and suckers. Annual entrainment was estimated to be 277,331 fish and annual turbine mortality was estimated to be 15,044 fish (FERC 1995). In its environmental assessment of the previous license application, FERC concluded that entrainment mortality was not adversely affecting the fish community in Stevens Creek Reservoir.

DESC conducted an updated turbine survival study as part of the current relicensing, specifically focused on blueback herring and American eel (Appendix E-7). The software program Stryke

(Nebiolo 2022) was used to simulate the results of passing adult blueback herring through the Stevens Creek Project turbines. Stryke utilizes the Franke et al. (1997) equations to calculate the probability that a fish will be struck by a turbine blade. The simulations yielded a mean survival rate of 95.2 percent for blueback herring (4.8 percent mortality rate). The results of the current study are similar to the entrainment study conducted as part of the previous relicensing in which estimated survival of blueback herring was 96.7 percent (3.3 percent mortality rate). As stated in the FERC EA (1995) for the Stevens Creek Project, turbine-induced mortality of 4 to 6 percent represents a small proportion of the high natural mortality that occurs among small fish, including blueback herring. FERC concluded that entrainment mortality at the Stevens Creek Project did not adversely affect the fish community in the reservoir.

A literature search was conducted to identify sources of data for turbine passage survival of yellow/silver phase American eel. Turbine survival data from 11 studies that were reviewed ranged from 75.7 percent to 98 percent. Analysis of these data by beta distribution fitting yielded a median survival rate of 92.7 percent (7.3 percent mortality rate).

Under the current license, Article 406 requires annual payments to fund resource-based enhancements in the Savannah River Basin in coordination with the SCDNR, GADNR, and USFWS. DESC proposes to continue to provide annual payments as described in Article 406 for the term of the new license to benefit resource restoration and study efforts.

4.5.2.1.2 RESERVOIR FLUCTUATION

Currently, Stevens Creek Reservoir experiences fluctuations associated with the re-regulation operations of up to 4.5 feet per day. These fluctuations can dewater potential spawning habitat and may reduce spawning success or recruitment of juvenile fish to adult life stages. The potential for habitat enhancements, such as in-reservoir structures was discussed during relicensing stakeholder meetings. However, it is anticipated that these structures would be difficult to secure and maintain due to the frequency of high flows from upstream USACE operations.

4.5.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be similar to

the proposed action. Fish Passage TWC coordination, however, would not take place under the no-action alternative.

4.5.2.3 Unavoidable Adverse Effects

Some level of fish entrainment mortality would continue to occur at the Stevens Creek Project. Long-term impacts to the fishery are expected to be minor given the existing condition of the fishery in the vicinity of the Project. Additionally, reservoir fluctuations would continue to occur as a result of re-regulation operations.

4.5.2.4 Cumulative Effects

Section 4.2 discusses cumulatively affected resources analyzed within this Exhibit E, which include water quality and fisheries resources. More specifically with respect to fisheries, multiple hydroelectric developments along a waterway have the potential to cumulatively affect the fishery and habitat by altering the flow regime, blocking or delaying fish movement, and entraining fish into diversion canals or penstocks. This includes the downstream NSBLD upstream to the USACE dams above Stevens Creek. Collectively these dams have likely cumulatively affected migratory species. The USFWS and NMFS have been working in conjunction with downstream entities to address fish passage implementation. Fish passage at Stevens Creek will continue to be discussed with these agencies as proposed through the Fish Passage TWC.

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4.6 TERRESTRIAL RESOURCES AND RIPARIAN RESOURCES

4.6.1 Affected Environment

4.6.1.1 Wildlife and Botanical Resources

The Stevens Creek Project is in the Southern Outer Piedmont ecoregion, just south of a portion of South Carolina that is designated as Carolina Slate Belt (Griffith et al. 2002). The Georgia portion of the Stevens Creek Project also lies within the Southern Outer Piedmont land class designation. This ecoregion is characterized by rolling hills with broad, shallow, stream-cut valleys. Oak-hickory forests are widely distributed in this ecoregion, and in some areas these hardwoods are co-dominant with pines (SCDNR 2005). The landscape has a long history of deforestation associated with economic uses including agriculture. These anthropogenic alterations have resulted in land that, along with mixed hardwood and oak-hickory-pine forests, include agricultural land and forests that are managed for timber production. Loblolly pine plantations are an especially prevalent form of timber production in this region (Griffith et al. 2002, SCDNR 2005). This habitat supports wildlife typical of the Piedmont, including white-tailed deer, raccoon, box turtle, copperhead, and American toad (Conant and Collins 1998, Reid 2006). The following sections provide additional detail regarding the wildlife and botanical communities found in the Stevens Creek Project area. Wetlands, littoral habitats, and riparian zones, and rare, threatened, and endangered (RTE) species that may occur in the Stevens Creek Project area are discussed below.

UPLAND HABITATS IN THE PROJECT VICINITY

The Stevens Creek Project boundary includes the area around Stevens Creek Reservoir between EL 192.5 feet and 198.5 feet, and thus, this area includes only a small area of upland habitat. Nearby areas include some upland pine forests, a habitat that may be used by the federally listed red-cockaded woodpecker (*Picoides borealis*). Operations do not affect areas where this habitat type occurs. Second-growth stands of natural and agriculturally propagated loblolly pine are present in the area, as are hardwood-pine stands that include white oak and sweetgum (FERC 1995).

PINE FORESTS

Naturally occurring and agriculturally produced pine forests are present in the Stevens Creek Project vicinity. These are generally even-aged stands that are characterized by a closed canopy and little understory growth. While the low vegetated diversity in these stands does not produce

habitat for many wildlife species, it can be suitable habitat for the red-cockaded woodpecker (FERC 1995, SCDNR 2005).

MIXED PINE-HARDWOOD FOREST

Mixed pine-hardwood forests in the Stevens Creek Project vicinity include loblolly pine and a variety of hardwood species including multiple oak species, hickory species, red maple, and winged elm. Understory in this habitat type can include species such as yaupon holly, American beautyberry, and multiple species of woody vines (FERC 1995).

HARDWOOD FOREST

Hardwood dominant stands occur on side slopes and along stream edges. This habitat type is found in some low-lying areas adjacent to the Stevens Creek Reservoir. Along with oak and hickory species, American beech is present along with smaller understory trees such as flowering dogwood. Wet tolerant species including water oak, willow oak, sweetgum, and river birch are found closer to the reservoir (FERC 1995).

4.6.1.2 Terrestrial Plant and Animal Species in the Project Vicinity

A variety of wildlife species typical of the Southern Outer Piedmont ecoregion of South Carolina and Georgia inhabit the forested, wetland, and aquatic habitats of the Stevens Creek Project vicinity, including amphibians, reptiles, birds, and mammals.

MAMMALS

Mammals that are documented or expected to occur in the Stevens Creek Project vicinity include species typically found in the Piedmont and Sandhills regions. Species include white tailed deer, black bear, eastern cottontail, grey squirrel, red fox, grey fox, coyote, muskrat, beaver, hispid cotton rat, eastern mole, house mouse, eastern spotted skunk, opossum, and raccoon (FERC 1995, Reid 2006).

AMPHIBIANS AND REPTILES

The Southern Outer Piedmont ecoregion does not have as diverse of a herpetofauna community as does mountainous or coastal regions (SCDNR 2005); however, several species of reptiles and amphibians are likely to occur in the Stevens Creek Project vicinity. These include box turtle, copperhead, and American toad (Conant and Collins 1998).

BIRDS

The multiple habitat types in the Stevens Creek Project vicinity, including forested, wetland, and upland habitats, support a diverse bird population. Over 300 bird species are documented in the adjacent SNF. This includes dabbling ducks such as wood duck, mallard, and green-winged teal. Bald eagles and red-cockaded woodpeckers are known to nest in or adjacent to the Stevens Creek Project vicinity. Multiple migratory and non-migratory birds also occur in the Stevens Creek Project vicinity (FERC 1995, Peterson 2002).

4.6.1.3 Invasive Terrestrial Plant and Wildlife Species

Non-native wildlife species known or expected to occur in the Stevens Creek Project vicinity include feral hogs and coyotes (FERC 1995, Reid 2006). There are also numerous exotic plant species that are known to occur in the Piedmont and Sandhills regions of South Carolina and are expected to occur in the Stevens Creek Project area and vicinity. Previous studies conducted by the USFS suggest that exotic plants are prevalent in this part of South Carolina (SCDNR 2005). The South Carolina Exotic Pest Plant Council (SCEPPC) has identified numerous exotic plant species that occur in the Piedmont ecoregion of South Carolina (Table 4.8). Site-specific data are not available, but any of the species listed in Table 4.8 may occur in the Stevens Creek Project area. Some of the more ubiquitous species include kudzu, mimosa, and Japanese honeysuckle. These species could occur in abundance.

TABLE 4.8 TERRESTRIAL EXOTIC INVASIVE SPECIES OCCURRING IN THE PIEDMONT ECOREGION

Common Name	Scientific Name	Threat Category
Trees		
Tree of Heaven	*Ailanthus altissima*	Severe Threat
Mimosa, Silkberry	*Albizia julibrissin*	Significant Threat
Paper Mulberry	*Broussonetia papyrifera*	Significant Threat
Russian Olive	*Elaeagnus angustifolia*	Alert
Chinese Elm	*Elmus parvifolia*	Alert
Chinese Parasol Tree	*Firmiana simplex*	Significant Threat
Chinaberry	*Melia azedarach*	Severe Threat
White Mulberry	*Morus alba*	Significant Threat
Princess Tree, Royal Paulownia	*Paulownia tomentosa*	Severe Threat
White Poplar	*Populus alba*	Significant Threat
Callery Pear, Bradford Pear	*Pyrus calleryana*	Significant Threat
Sawtooth Oak	*Quercus acutissima*	Alert
Chinese Tallow Tree	*Triadica sebifera*	Severe Threat

Common Name	Scientific Name	Threat Category
Shrubs		
Japanese Barberry	*Berberis thunbergia*	Alert
Scotch Broom, English Broom	*Cytisus scoparius*	Severe Threat
Thorny Olive	*Elaeagnus pungens*	Severe Threat
Autumn Olive	*Elaeagnus umbellate*	Severe Threat
Winged Euonymus, Winged Burning Busy	*Euonymus alata*	Alert
Two-color Bush Clover, Shrub Lespedeza	*Lespedeza bicolor*	Severe Threat
Amur Privet	*Ligustrum amurense*	Alert
Japanese Privet, Waxy-leaf Privet	*Ligustrum japonicum*	Significant Threat
Chinese Privet	*Ligustrum sinense*	Severe Threat
European Privet	*Ligustrum vulgare*	Emerging Threat
Jasmine	*Lonicera fragrantissima*	Emerging Threat
Amur Honeysuckle	*Lonicera maackii*	Alert
Leatherleaf Mahonia	*Mahonia bealei*	Alert
Nandina, Sacred Bamboo	*Nandina domestica*	Significant Threat
Japanese Knotweed	*Polygonum cuspidatum*	Severe Threat
Trifoliate Orange, Hardy Orange	*Poncirus trifoliata*	Severe Threat
Macartney Rose	*Rosa bracteate*	Emerging Threat
Multiflora Rose	*Rosa multiflora*	Significant Threat
Wineberry, Wine Raspberry	*Rubus phoenicolasius*	Alert
Jerusalem Cherry	*Solanum pseudocapsicum*	Emerging Threat
Meadowsweet	*Spiraea japonica*	Emerging Threat
Vines		
Fiveleaf Akebia, Chocolate Vine	*Akebia quinate*	Alert
Porcelain Berry	*Ampelopsis brevipedunculata*	Alert
Asian/Oriental Bittersweet	*Celastrus orbiculatus*	Significant Threat
Sweet Autumn Virgin's Bower	*Clematis terniflora*	Significant Threat
Chinese Yam	*Dioscorea polystachya (=D. oppositifolia)*	Significant Threat
English Ivy	*Hedera helix*	Severe Threat
Japanese Hop	*Humulus japonicus*	Alert
Japanese Honeysuckle	*Lonicera japonica*	Severe Threat
Japanese Climbing Fern	*Lygodium japonicum*	Severe Threat
Kudzu	*Pueraria montana*	Severe Threat
Cherokee Rose	*Rosa laevigata*	Severe Threat
Purple Crownvetch	*Securigera varia (Coronilla varia)*	Emerging Threat

Common Name	Scientific Name	Threat Category
Bigleaf Periwinkle	*Vinca major*	Severe Threat
Common Periwinkle	*Vinca minor*	Significant Threat
Asian/Japanese Wisteria	*Wisteria floribunda*	Emerging Threat
Chinese Wisteria	*Wisteria sinense*	Severe Threat
Grasses/Sedges		
Giant Reed	*Arundo donax*	Significant Threat
Weeping Lovegrass	*Eragrostis curvula*	Significant Threat
Tall Fescue	*Festuca arundinacea*	Significant Threat
Cogongrass	*Imperata cylindrica*	Severe Threat
Nepalese Browntop, Japanese Stiltgrass	*Microstegium vimineum*	Severe Threat
Chinese Silvergrass	*Miscanthus sinenses*	Severe Threat
Dallis Grass, Dallas Grass	*Paspalum dilatatum*	Significant Threat
Bahia Grass	*Paspalum notatum*	Significant Threat
Vasey's Grass, Vaseygrass	*Paspalum urvillei*	Significant Threat
Golden Bamboo, Fishpole Bamboo	*Phyllostachys aurea*	Significant Threat
Johnson Grass	*Sorghum halepense*	Severe Threat
Herbs		
Nodding Thistle, Nodding Plumeless Thistle, Musk Thistle	*Carduus nutans*	Significant Threat
Bull Thistle	*Cirsium vulgare*	Significant Threat
Showy Rattlebox	*Crotalaria spectabilis*	Significant Threat
Queen Anne's Lace/Wild Carrot	*Daucus carota*	Significant Threat
Fig Buttercup, Lesser Clenandine	*Ficaria verna*	Emerging Threat
Sericea, Chinese Bush Clover	*Lespedeza cuneata*	Severe Threat
Liriope, Monkey Grass, Big Blue	*Liriope muscari*	Alert
Spotted Knapweed	*Micranthos* spp. (=*Centaurea* spp.)	Alert
Wart Removing Herb, Marsh Dewflower, Aneilema, Asian Spiderwort	*Mudannia keisak*	Severe Threat
Rattlebox, Scarlet Wisteria Tree, Spanish Gold/Purple/Red	*Sesbenia punicea*	Significant Threat
Tropical Soda Apple	*Solanum viarum*	Severe Threat
Ferns		
Swordfern/Mariana Maiden Fern/Torres's Fern	*Macrothelypteris torresiana*	Alert

Source: SCEPPC 2014

4.6.1.4 Temporal or Spatial Distribution of Commercially, Recreationally, or Culturally Important Species

Multiple migratory waterfowl species are known to occur on the Savannah River during the fall and winter months. Diving ducks, such as lesser scaup, ring-necked ducks, and buffleheads, as well as dabbling ducks, such as mallards and green-winged teal, pass through the area during their annual migration. Additionally, some wood ducks occur in the area year-round, with others migrating through during the fall and winter (Peterson 2002). These species attract high volumes of waterfowl hunters to the area.

4.6.1.5 Floodplains, Wetlands, Riparian, and Littoral Habitat

The Stevens Creek Project boundary includes Stevens Creek Reservoir, the Savannah River, Stevens Creek, numerous tributary streams, and the immediately adjacent terrestrial environments. The Stevens Creek Project boundary includes extensive floodplains, riparian zones, littoral habitats, and adjacent wetlands. The adjacent floodplains and riparian zones provide a variety of ecological functions such as floodwater and sediment retention and provide unique habitats for wildlife, including cover, forage, and travel corridors. The littoral zone acts as an interface between the open water aquatic environment and the terrestrial environment (Wetzel 2001). The size and extent of the littoral zone within a waterbody varies depending upon geomorphology and sedimentation within the aquatic system (Wetzel 2001). The littoral zone within the Stevens Creek Project boundary includes stream margins and banks of the Savannah River, Stevens Creek, and numerous tributaries. The littoral zones include shallow shores, areas of dense aquatic or emergent vegetation, undercut banks, woody debris, and overhanging shrubs. These provide an array of habitats available to wildlife and plant species.

The USFWS maintains the National Wetlands Inventory (NWI) that provides reconnaissance level information on the location, type, and size of wetlands and deep-water habitats (USFWS 2019). The NWI indicates that wetland and deep-water habitats occurring within the Stevens Creek Project vicinity include freshwater emergent, freshwater forested and shrub wetlands, freshwater ponds and lakes, and riverine habitat. Most of the mapped wetland area is classified as L1UBHh, which is a lacustrine system (Figure 4.11). The Stevens Creek Project area also contains palustrine emergent, palustrine forested and/or palustrine shrub, and palustrine unconsolidated bottom systems around reservoir islands and in backwater coves.

Lacustrine habitat within the Stevens Creek Project vicinity is constituted of the permanently impounded habitat located above the dam. This NWI classification describes deep water habitats created by dammed river channels and contains less than 30 percent vegetative cover (USFWS 1992). Palustrine habitat includes all freshwater wetlands, such as freshwater emergent wetlands, freshwater forested and shrub wetlands, and freshwater ponds. Ponds are freshwater bodies of water with an area of less than 20 acres. Palustrine wetlands are most commonly found along shorelines of lake or rivers and contain water depths less than two meters and salinity less than 0.5 percent (USFWS 1992).

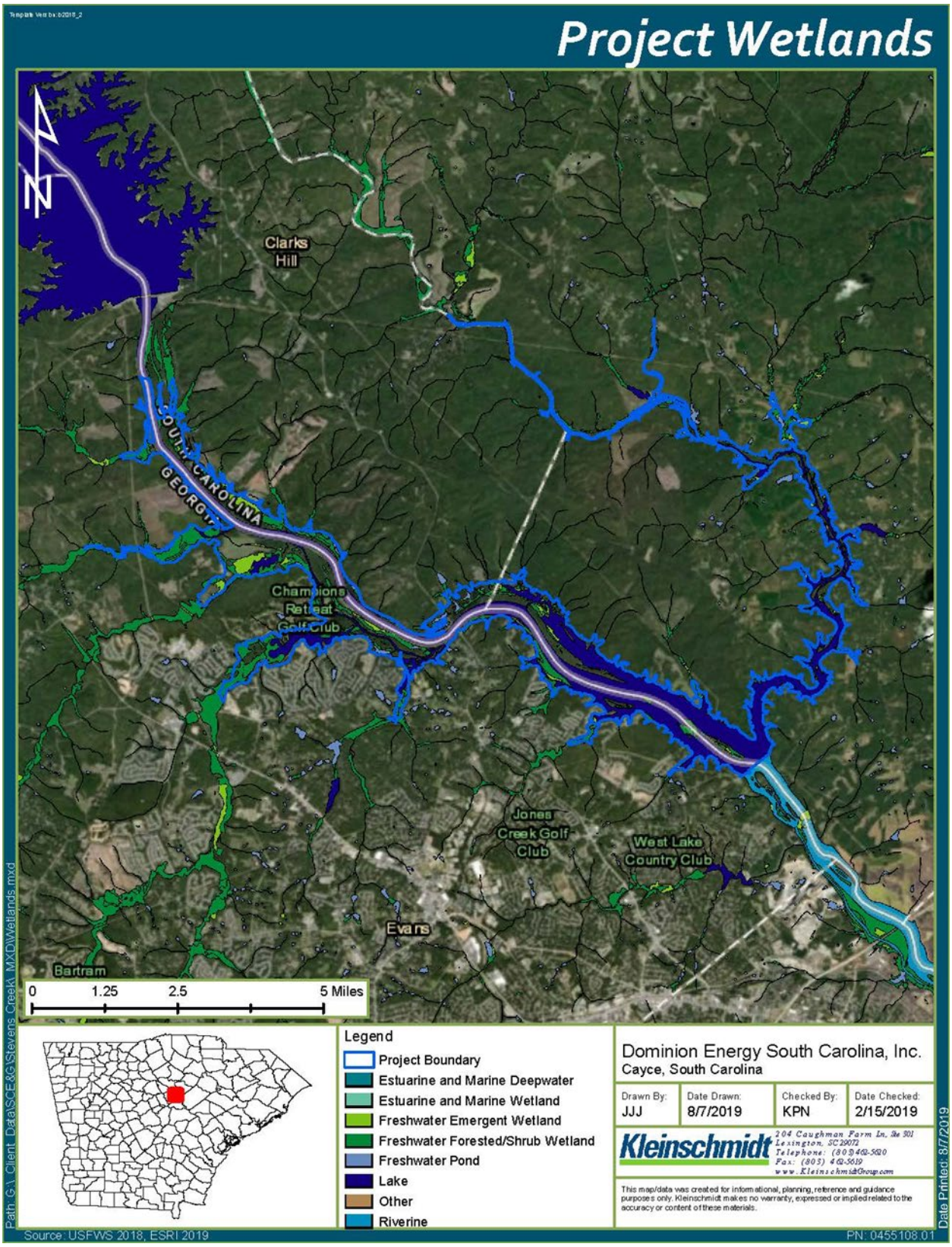

FIGURE 4.11 STEVENS CREEK PROJECT WETLAND HABITAT

4.6.1.6 List of Plant and Animal Species, Including Invasive Species, That Use Wetland, Littoral, and Riparian Habitat

The SCDNR lists priority species in South Carolina by ecoregion and habitat. Many plant and animal species have the potential to occur in the littoral, wetland, and riparian habitats of the Stevens Creek Project. Species within the Piedmont ecoregion of South Carolina that utilize river bottoms, small stream forests, and streams, rivers, and lakes are listed in Table 4.9.

TABLE 4.9 TERRESTRIAL PRIORITY SPECIES EXPECTED TO OCCUR IN WETLANDS, LITTORAL, AND WETLAND HABITATS IN THE PROJECT VICINITY

Common Name	Scientific Name	State Priority for Conservation
Mammals		
Star-nosed Mole	*Condylura cristata*	High
Big Brown Bat	*Eptesicus fuscus*	Highest
Red Bat	*Lasiurus borealis*	Highest
Hoary Bat	*Lasiurus cinereus*	Highest
Seminole Bat	*Lasiurus cinereus*	Highest
Mink	*Neovison vison*	High
Tri-colored Bat	*Perimyotis subflavus*	Highest
Southern Fox Squirrel	*Sciurus niger*	Moderate
Swamp Rabbit	*Sylvilagus aquaticus*	High
Black Bear	*Ursus americanus*	Moderate
Birds		
Spotted Sandpiper	*Actitis macularia*	Moderate
Wood Duck	*Aix sponsa*	High
Blue-winged Teal	*Anas discors*	Moderate
Mallard	*Anas platyrhynchos*	Highest
American Black Duck	*Anas rubripes*	Highest
Great Egret	*Ardea alba*	High
Great Blue Heron	*Ardea herodias*	Moderate
Red-shouldered Hawk	*Buteo lineatus*	Moderate
Broad-winged Hawk	*Buteo platypterus*	Moderate
Green Heron	*Butorides virescens*	Highest
Pectoral Sandpiper	*Calidris melanotus*	Moderate
Least Sandpiper	*Caladris minutilla*	High
Chuck-will's-widow	*Caprimulgus carolinensis*	High
Whip-poor-will	*Caprimulgus vociferus*	High
Belted Kingfisher	*Ceryle alcyon*	High
Yellow-billed Cuckoo	*Coccyzus americanus*	High
Prairie Warbler	*Dendroica discolor*	High
Pileated Woodpecker	*Dryocopus pileatus*	Moderate
Little Blue Heron	*Egretta caerulea*	Highest
Acadian Flycatcher	*Empidonax virescens*	High

Common Name	Scientific Name	State Priority for Conservation
Rusty Blackbird	*Euphagus carolinus*	Highest
American Coot	*Fulica americana*	Moderate
Wilson's Snipe	*Gallinago gallinagodelicata*	High
Common Gallinule	*Gallinula galeata*	Moderate
Bald Eagle	*Heliaeetus leucocephalus*	High
Worm-eating Warbler	*Helmitheros verminvorum*	Moderate
Wood Thrush	*Hylocichla mustelina*	High
Baltimore Oriole	*Icterus galbula*	High
Long-billed Dowitcher	*Limnodrumos scolopaceus*	Moderate
Swainson's Warbler	*Limnothypis swainsonii*	High
Red-bellied Woodpecker	*Melanerpes carolinus*	Moderate
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Moderate
Prothontary Warbler	*Protonaria citrea*	Moderate
Reptiles and Amphibians		
Northern Cricket Frog	*Acris crepitans*	Moderate
Spiny Softshell Turtle	*Apalone spinifera*	Moderate
Common Snapping Turtle	*Chelydra serpentina*	Moderate
Eastern Painted Turtle	*Chrysemys picta picta*	Moderate
Spotted Turtle	*Clemmys guttata*	High
Chamberlain's Dwarf Salamander	*Eurycea chamerlainii*	Highest
Four-toed Salamander	*Hemidactylium scutatum*	High
Upland Chorus Frog	*Pseudacris feriarum*	Moderate
River Cooter	*Pseudemys concinna*	Moderate
Gulf Coast Mud Salamander	*Pseudotriton montanus flavissimus*	High
Pickerel Frog	*Rana palustris*	High
Eastern Box Turtle	*Terrapene Carolina*	Moderate
Yellow-bellied Slider	*Trachemys scripta*	High

Sources: SCDNR 2015

4.6.1.7 Non-Native, Exotic, or Pest Plant Species

Two species of non-native, invasive aquatic plant occur at the Stevens Creek Project, including Brazilian elodea and Eurasian watermilfoil (SCDNR 2008). Large mats of these plants develop and clog the intake screens at the Stevens Creek Dam (SCDNR 2008). On May 23, 1996, DESC filed an Aquatic Plant Management Plan, pursuant to Article 409 of the current license. The plan was modified and approved by FERC on December 4, 1996. Per the modified plan, DESC explored the use of herbicides to aid in the control and management of invasive aquatic plants. However, DESC currently limits aquatic plant management to mechanical means to mitigate the effect of these plant species on operations. Aquatic plant material that is removed from the trash

racks is raked into a hopper and hauled to an area upstream, unloaded, and stockpiled for drying. After it has dried, the material is composted on Steven Creek Project lands or hauled away for permanent disposal. DESC also has signs posted at boat ramps requesting boaters to remove aquatic plants from boats and trailers to help prevent the spread of these species to other waters.

4.6.2 Environmental Effects

The GADNR have identified the impacts of invasive species, both plant and animal, as having direct effects on native flora and fauna within and downstream of the project boundary. Issues with aquatic invasive plant species, in particular, have been discussed at length within RCGs. More specifically, the stakeholder group has explored the possibility of reducing the amount of invasive aquatic plants in the reservoir by measures that include the occasional flushing of the reservoir and herbicide spraying. However, drawing down the reservoir for flushing and/or spraying is not a feasible option due to the re-regulation function of the Stevens Creek Project. In addition, herbicide spraying is not an ideal method as it is not environmentally favorable. Removal of vegetation through use of amphibious harvesters has also been explored, however this has not been identified as a practical, long-term or cost-effective solution for large areas of the reservoir and generally serve to best facilitate recreational access in the immediate area of a boat ramp or launch. In summary, no reservoir-wide workable and environmentally sound treatment measures have been identified at this time. Signage regarding invasive aquatic species as been posted at boat ramps, as discussed above. Additionally, permits are available from the USACE for individual aquatic herbicide application, should shoreline homeowners have access affected by aquatic vegetation.

4.6.2.1 Proposed Action

No new adverse effects or issues related to terrestrial, wildlife, and botanical resources have been identified under the proposed action. DESC proposes to continue to operate the Stevens Creek Project as it does under the existing license. The reservoir, shorelines, littoral, and riparian areas in the Stevens Creek Project boundary would continue to experience daily fluctuations from project operations, however any effects to these areas resulting from operation of the Stevens Creek Project are expected to have reached equilibrium.

4.6.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be identical to that as the proposed action. No adverse effects on terrestrial resources are expected from the no-action alternative.

4.6.2.3 Unavoidable Adverse Effects

No unavoidable adverse effects have been identified for terrestrial and riparian resources as a result of the continued operation of the Stevens Creek Project.

4.6.3 References

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4.7 RARE, THREATENED, AND ENDANGERED SPECIES

4.7.1 Affected Environment

DESC used the USFWS's Information for Planning and Consultation (IPaC) online system to identify federally protected species that may occur within the Stevens Creek Project boundary. According to the IPaC lists, four federally protected species could occur (Table 4.10; Appendix E-8). The USFS also provided a list of Threatened, Endangered, and Sensitive (TES) species that occur in the Long Cane Ranger District of the SNF. These species are also included in Table 4.10. In addition, NMFS is responsible for the protection of threatened and endangered anadromous and marine fish species. Atlantic sturgeon and shortnose sturgeon, two species that inhabit freshwater seasonally, are listed under the ESA as endangered. These species are not known to occur in the Stevens Creek Project area at this time; however, there is potential for the species to occur in the future, following the implementation of fish passage downstream of Stevens Creek Dam (i.e., NSBLD and August Project). These species are discussed in further detail in Section 4.5.1.

TABLE 4.10 FEDERALLY PROTECTED AND U.S. FOREST SERVICE THREATENED, ENDANGERED, AND SENSITIVE SPECIES THAT MAY OCCUR IN THE STEVENS CREEK PROJECT AREA

Common Name	Scientific Name	Federal Protection	TES Species – SNF
Animals			
Brook Floater	*Alasmidonta varicose*		Sensitive
Monarch Butterfly	*Danaus plexippus*	Candidate	Sensitive
Piedmont Prairie Burrowing Crawfish	*Distocambarus crockeri*		Sensitive
Red-cockaded Woodpecker	*Dryobates borealis*	Endangered	Endangered
Atlantic Spike	*Elliptio producta*		Sensitive
Roanoke Slabshell	*Elliptio roanokensis*		Sensitive
Bald Eagle	*Haliaeetus leucocephalus*	*	
Yellow Lampmussel	*Lampilis cariosa*		Sensitive
Carolina Heelsplitter	*Lasmigona decorate*	Endangered	Endangered
Bartram's Bass	*Micropterus sp. Cf. coosae*		Sensitive
Robust Redhorse	*Moxostoma robustum*		Sensitive
Wood Stork	*Mycteria americana*	Threatened	Endangered
Tri-colored Bat	*Perimyotis subflavus*		Sensitive
Bachman's Sparrow	*Peucaea aestivalis*		Sensitive
Webster's Salamander	*Plethodon websteri*		Sensitive

Common Name	Scientific Name	Federal Protection	TES Species – SNF
Plants			
Shoals Spider Lily	*Hymenocallis coronaria*		Sensitive
Sweet Pinesap	*Monotropsis odorata*		Sensitive
Oglethorpe Oak	*Quercus oglethorpensis*		Sensitive
Miccosukee Gooseberry	*Ribes echinellum*	Threatened	Threatened
Georgia Aster	*Symphyotrichum georgianus*		Sensitive
Faded Trillium	*Trillium discolor*		Sensitive
Lanceleaf Trillium	*Trillium lancifolium*		Sensitive
Relict Trillium	*Trillium reliquum*	Endangered	Endangered

* This species is protected under the Bald and Golden Eagle Protection Act of 1940.

The states of Georgia and South Carolina maintain databases of rare and protected species. In September 2022, the state of Georgia provided a list of state-protected plants and animals that are known to occur near the Stevens Creek Project, including three federally listed species (Table 4.11). In August 2022, SCDNR provided a list of state-protected plants and animals that are known to occur in the Stevens Creek Project area. This list is provided in Table 4.11.

TABLE 4.11 SOUTH CAROLINA AND GEORGIA PROJECTED SPECIES THAT MAY OCCUR IN THE STEVENS CREEK PROJECT AREA

Common Name	Scientific Name	Georgia Protected Species[1]	South Carolina Protected Species[2]
Animals			
Shortnose Sturgeon	*Acipenser brevirostrum*	High	Highest
Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	High	Highest
Blueback Herring	*Alosa aestivalis*		Highest**
Hickory Shad	*Alosa mediocris*		Highest**
American Shad	*Alosa sapidissima*		Highest**
Tiger Salamander	*Ambystoma tigrinum*		Highest
Snail Bullhead	*Ameiurus brunneus*		Moderate
Flat Bullhead	*Ameiurus platycephalus*		Moderate
American Eel	*Anguilla rostrata*		Highest
Lean Crayfish	*Cambarus strigosus*		NA**
Spotted Turtle	*Clemmys guttata*	High	High
Savannah Elimia	*Elimia caelatura*	*	
Delicate Spike	*Elliptio arctata*	High	
Eastern Elliptio	*Elliptio complanata*		Moderate
Carolina Slabshell	*Elliptio congarea*	*	

Common Name	Scientific Name	Georgia Protected Species[1]	South Carolina Protected Species[2]
Brother Spike	*Elliptio fraterna*	High	Highest
Atlantic Spike	*Elliptio producta*		High**
Roanoke Slabshell	*Elliptio roanokensis*	*	High
Christmas Darter	*Etheostoma hopkinsi*		Highest
Turquoise Darter	*Etheostoma incriptum*		High
Atlantic Pigtoe	*Fusconaia masoni*	High	Highest
Bald Eagle	*Heliaeetus leucocephalus*		High
Four-toed Salamander	*Hemidactylium scutatum*		High**
Rosyface Chub	*Hybopsis rubrifrons*		Moderate
Baltimore Oriole	*Icterus galbula*		High
Yellow Lampmussel	*Lampsilis cariosa*	High	Highest
Eastern Red Bat	*Lasiurus borealis*		Highest
Seminole Bat	*Lasiurus seminolus*		Highest
Bartram's Bass	*Micropterus sp. Cf. coosae*		Highest
Notchlip Redhorse	*Moxostoma collapsum*		Moderate
Robust Redhorse	*Moxostoma robustum*	High	Highest
Dwarf Waterdog	*Necturus punctatus*	High	
Highfin Shiner	*Notropis altipinnis*		Moderate
Ironcolor Shiner	*Notropis chalybaeus*	*	Moderate
Webster's Salamander	*Plethodon websteri*		Highest
Savannah Lilliput	*Toxolasma pullus*	High	Highest
Florida Pondhorn	*Uniomerus carolinanus*		*
Eastern Creekshell	*Villosa delumbis*		Moderate
Plants			
Carolina Trefoil	*Acmispon helleri*	High	
Ghostpipe, Cancer-root	*Aphyllon uniflorum*		*
American Barberry	*Berberis canadensis*	High	
Side-oats Grama	*Bouteloua curtipendula*	High	
Tall Bellflower	*Campanulastrum americanum*		Moderate
Slender Loose-flowered Sedge	*Carex graculescens*		Moderate
James' Sedge	*Carex jamesii*		Moderate
Curly-heads	*Clematis ochroleuca*	*	
Lowland Bladder Fern	*Cystopterus protrusa*		*
Prairie Larkspur, Carolina Larkspur	*Delphinium carolinianum carolinianum*		Moderate
Dutchman's Breeches	*Dicentra cucullaria*		Moderate
Log Fern	*Dryopteris celsa*	*	

Common Name	Scientific Name	Georgia Protected Species[1]	South Carolina Protected Species[2]
Georgia Plume	*Elliottia racemose*	High	High
False-rue Anemone, Isophyrum	*Enemion biternatum*	*	Moderate
Whiteleaf Sunflower	*Helianthus glaucophyllus*		Moderate
Shoals Spiderlily, Cahaba Lily	*Hymenocallis coronaria*		High**
Southern Stoneseed, Tuberous Gromwell	*Lithospermum tuberosum*		Moderate
Pineland Barbara Buttons	*Marshallia ramose*	*	
Southern Adder's-tongue	*Ophioglossum pycnostichum*		*
One-flowered Broomrape	*Orobanche uniflora*		*
American Ginseng	*Panax quinquefolius*		High
Yellow Nailwort	*Paronychia virginica*	High	
Dixie Mountain Breadroot	*Pediomelum piedmontanum*	High	
Streambank Mock Orange	*Philadelphus hirsutus*		*
Wingpod Purslane	*Portulaca umbraticola*	High	Moderate
Miccosukee Gooseberry	*Ribes echinellum*		Highest
Ocmulgee Skullcap	*Scutellaria ocmulgee*	High	*
Eared Goldenrod	*Solidago auriculata*		Moderate
Georgia Aster	*Symphyotrichum georgianum*		Highest
Virginia Spiderwort	*Trasescantia virginiana*		Moderate
White-nymph	*Trepocarpus aethusae*		Moderate
Faded Trillium	*Trillium discolor*		*
Lanceleaf/Narrowleaf Trillium	*Trillium lancifolium*		High**
Relict Trillium	*Trillium reliquum*	High	Highest**
Southern Nodding Trillium	*Trillium regelii*		High
Dwarf Stinging Nettle, Heartleaf	*Urtica chamaedryoides*		*
Aethusa-like Trepocarpus			Moderate
Pale Yellow Trillium		*	
Smooth Indigobush			*
Weak Nettle			*

[1] GA State Wildlife Action Plan (SWAP) species with state protection are indicated with an asterisk (*); species identified as "high" are state protected species with high priority status.
[2] Listed species categorized in the SC SWAP are noted as having moderate, high or highest priority status; species identified with an asterisk (*) are state "tracked" species.

CRITICAL HABITAT AND HABITAT USE

No critical habitat for federally protected species occurs within the Stevens Creek Project boundary. Critical habitat for Atlantic sturgeon (designated in 2017 by NMFS) begins at the mouth of the Savannah River at the Atlantic Ocean and extends upstream to the NSBLD, which is located at RM 180, approximately 20 RMs downstream of the Stevens Creek Project. Critical habitat has not been designated for shortnose sturgeon. The SCDNR documented 13 adult and two juvenile shortnose sturgeon make presumed spawning runs to potential spawning habitat near RM 130 during late winter and early spring over a five-year period from 2014 to 2018 (Post et al. 2018). Similarly, SCDNR documented four adult Atlantic sturgeon make presumed spawning runs to potential spawning habitat between RM 104 and to within approximately 9 RMs of the NSBLD during late winter and early spring from 2014 to 2018 (GADNR 2017, Post et al. 2018). Juveniles of both species tend to stay lower in the river system closer to the mouth (GADNR 2017, Post et al. 2018, Collins et al. 2002). Hall et al. (1991) reported that shortnose sturgeon made spawning runs upstream to between RM 111 and 118 and between RM 170 and 172; Collins and Smith (1993) reported that shortnose sturgeon made spawning runs upstream to between RM 111 and 141. The GADNR reports that shortnose and Atlantic sturgeon may inhabit the Savannah River up to or near the NSBLD at RM 180 (Appendix E-9). Designated critical habitat for Carolina heelsplitter (*Lasmigona decorata*) is present in Turkey Creek and Beaverdam Creek, which are tributaries to Stevens Creek. However, the designated critical habitat is over 16 river miles upstream of the Stevens Creek Project boundary.

Habitat requirements and range in the Stevens Creek Project vicinity for federal-protected species are shown in Table 4.12.

TABLE 4.12 FEDERALLY PROTECTED SPECIES AND THEIR HABITAT REQUIREMENTS THAT MAY OCCUR IN THE STEVENS CREEK PROJECT VICINITY

Common Name	Status	Description of Habitat Requirements and Range in Project Area	Recovery Plan Reference
Red-cockaded Woodpecker	Endangered	Mature forests with old growth longleaf pines and loblolly pines; *not known to occur in Project area but may occur in surrounding upland habitats. Given habitat requirements, unlikely to be adversely affected by Stevens Creek Project relicensing.*	USFWS 2003
Wood Stork	Threatened	Various freshwater and estuarine wetlands for nesting, feeding, and roosting throughout	USFWS 1997

Common Name	Status	Description of Habitat Requirements and Range in Project Area	Recovery Plan Reference
		range; *Occurs occasionally in Stevens Creek Project area.*	
Carolina Heelsplitter	Endangered	One population known from Turkey Creek, a tributary to Stevens Creek in the upper Stevens Creek watershed; * *not known to occur in or near the Stevens Creek Project area.*	USFWS 1996
Miccosukee Gooseberry	Threatened	Upland plant that grows in deciduous forest stands; occurs within a 35-acre plot within the Stevens Creek Heritage Preserve; *not known to occur in Stevens Creek Project area but may occur in surrounding upland habitats. Given habitat requirements, unlikely to be adversely affected by Stevens Creek Project relicensing.*	No recovery plan identified; see five-year review (USFWS 2015)
Relict Trillium	Endangered	Known to occur in understory of mature, undisturbed hardwood forest stands; *known to occur near Stevens Creek Project area – given habitat requirements, unlikely to be adversely affected by Stevens Creek Project relicensing.*	USFWS 1991
Atlantic Sturgeon	Endangered	May occupy Savannah River from mouth upstream to the NSBLD during spawning runs.	Post et al. 2018
Shortnose Sturgeon	Endangered	May occupy Savannah River from mouth upstream to the NSBLD during spawning runs.	Post et al. 2018

Source: USFWS 2019
* Turkey Creek is approximately 40 RMs upstream from the Stevens Creek dam.

USFS SENSITIVE SPECIES

There are approximately 104 acres of USFS lands within the Stevens Creek Project boundary. Therefore, in addition to state and federally listed species, this Exhibit E considers USFS TES Species that may occur in Long Cane Ranger District of the SNF (Table 4.13) (Appendix E-9).

TABLE 4.13 THREATENED, ENDANGERED, AND SENSITIVE SPECIES POTENTIALLY OCCURRING IN THE SUMTER NATIONAL FOREST

Species	Scientific Name	Species Group	Status	Habitat Description	Habitat Group[a]
Carolina Heelsplitter	*Lasmigona decorata*	Mussel	Federally Endangered	Known historically from Catawba, Pee Dee, and Savannah River basins in North Carolina and South Carolina with a possibility that they were historically found in the Saluda River Basin in South Carolina; it is found in the Upper Stevens Creek, Bush River–Saluda River, and Turkey Creek–Stevens Creek watersheds on or adjacent to the SNF; on the SNF it has been found in the Beaverdam Creek–Turkey Creek and Lower Turkey Creek–Stevens Creek subwatersheds	1
Florida (Miccosukee) Gooseberry	*Ribes echinellum*	Plant	Federally Threatened	Known from the Stevens Creek drainage on north-facing hardwood slopes in association with basic soils	8
Red-cockaded Woodpecker	*Dryobates borealis*	Bird	Federally Endangered	Known from Edgefield County; historically known from Laurens County; nests in live large pines and forages in open pine woodlands	4,5
Relict Trillium	*Trillium reliquum*	Plant	Federally Endangered	Occurs in basic mesic forests in Savannah and Chattahoochee drainages; known from Aiken County in proximity to the SNF	8
Wood Stork	*Mycteria americana*	Bird	Federally Endangered	Known to forage in freshwater wetlands on both Enoree and Long Cane Ranger Districts	1,3
Atlantic Spike	*Elliptio producta*	Mussel	Sensitive	Widespread in South Carolina, the species is found in streams or rivers with sandy, rocky, and/or muddy bottoms in sections where the current is not too rapid; on the SNF it is known from the Long Cane and Andrew Pickens Ranger Districts	1
Bachman’s Sparrow	*Peucaea aestivalis*	Bird	Sensitive	Inhabits forest stands with open canopies and herbaceous understories	4

Species	Scientific Name	Species Group	Status	Habitat Description	Habitat Group[a]
Bartram's Bass	*Micropterus sp. Cf. coosae*	Fish	Sensitive	In South Carolina this species occurs in the Savannah River drainage and has been introduced in the Saluda River drainage; it inhabits small upland streams and rivers with undercut banks and vegetation, such as water willow, as well as boulders and submerged logs; it is found on the Andrew Pickens and Long Cane Ranger Districts	1
Brook Floater	*Alasmidonta varicose*	Mussel	Sensitive	Small streams and rivers with gravel bottoms; known from Chattooga, Turkey, and Upper Stevens Creek watersheds on the Andrew Pickens and Long Cane Ranger Districts	1
Faded Trillium	*Trillium discolor*	Plant	Sensitive	Basic mesic hardwood forests restricted to the Savannah River drainage system	4
Georgia Aster	*Symphyotrichum georgianus*	Plant	Sensitive	Known from select open woodlands, including those associated with utility and roadside rights-of-way	4
Lanceleaf Trillium	*Trillium lancifolium*	Plant	Sensitive	Basic mesic hardwood and floodplain forests	3,8
Monarch Butterfly	*Danaus plexippus*	Insect	Sensitive	Summer breeding habitat includes woodlands, roadsides, or utility rights-of-way containing nectaring plants throughout summer for the adults and abundant, healthy, larval plants (milkweeds)	3,4,5,7,8
Oglethorpe Oak	*Quercus oglethorpensis*	Plant	Sensitive	Streamside forests and depressional wetlands in the Carolina Slate Belt	3,5,9
Piedmont Prairie Burrowing Crayfish	*Distocambarus crockery*	Crustacean	Sensitive	This species is most abundant on a perched water table along ridge tops and negatively associated with aquatic habitats; found in forest canopy openings like roadside ditches usually with sedges present; it is present in Thurmond Lake–Savannah River, Upper Stevens Creek, Kiokee Creek–Savannah River, Turkey Creek–Stevens Creek, Bush River–Saluda River, and Little River–Savannah River watersheds that contain USFS land on	4,9

Species	Scientific Name	Species Group	Status	Habitat Description	Habitat Group[a]
				the Long Cane Ranger District; on the SNF it has only been found in the Mountain Creek–Turkey Creek subwatershed	
Roanoke Slabshell	*Elliptio roanokensis*	Mussel	Sensitive	In South Carolina, it is found in the Pee Dee River and in the Catawba, Congaree, and Savannah River basins, typically in large rivers but can occasionally be found in small creeks; it has the potential to be found in watersheds on the Long Cane Ranger District that are in the Savannah River Basin but no known records on the SNF exist	1
Robust Redhorse	*Moxostoma robustum*	Fish	Sensitive	In South Carolina it is found in the Savannah River and Pee Dee River basins; it was extirpated from the Santee River Basin, but recent stocking has been completed in the Broad and Wateree River systems to reestablish a population in the Santee River Basin; on the SNF it has the potential to be found on the Enoree Ranger District within the Broad River and lower parts of the Enoree, Tyger, and Sandy rivers	1
Shoal's Spider Lily	*Hymenocallis coronaria*	Plant	Sensitive	Rocky River shoals; known from Stevens Creek and historically from the Broad River	2
Sweet Pinesap	*Monotropsis odorata*	Plant	Sensitive	Shortleaf pine-oak heaths in the Southern Appalachians and piedmont	5
Tri-colored Bat	*Perimyotis subflavus*	Mammal	Sensitive	Found in mines and caves in winter	2,3,4,5,6
Webster's Salamander	*Plethodon websteri*	Amphibian	Sensitive	Mesic hardwood slopes with rocky outcrops	7

Species	Scientific Name	Species Group	Status	Habitat Description	Habitat Group[a]
Yellow Lampmussel	*Lampsilis cariosa*	Mussel	Sensitive	In South Carolina it is found in the Savannah, Wateree, Cogaree, and Pee Dee River basins; on the SNF it is found on the Long Cane Ranger District in the Lower Stephens Creek and Turkey Creek–Stevens Creek watersheds; it also has the potential to occur in the Upper Stevens Creek watershed	1

[1]Habitat Group: 1 = Aquatic habitats; 2 = Rock outcrops associated with streams; 3 = Riparian forests and native canebrakes; 4 = Woodlands, savannas, prairies, and openings; 5 = Upland oak and pine forests; 6 = Mines and caves; 7 = Mesic forests; 8=Basic mesic forests and rich coves; 9 = Upland depression ponds, bogs, and seepage areas; 10 = Glades and mafic woodlands

4.7.2 Environmental Effects

DESC worked with resource agencies and stakeholders to prepare and review an RTE Species whitepaper. The purpose of this whitepaper is to provide baseline information on federal and state listed RTE species within the FERC Stevens Creek Project boundary and area of potential project influence (Appendix E-10). The whitepaper identified several federally protected and TES species that have been documented within the Stevens Creek Project boundary or have the potential to occur within the Stevens Creek Project boundary due to availability of suitable habitat. These species are listed below.

- Atlantic Spike
- Bald Eagle
- Bartram's Bass
- Brook Floater
- Carolina Heelsplitter
- Faded Trillium
- Miccosukee Gooseberry
- Monarch Butterfly
- Relict Trillium
- Roanoke Slabshell
- Robust Redhorse
- Shoals Spider Lily
- Tri-colored Bat
- Webster's Salamander
- Wood Stork
- Yellow Lampmussel

DESC would continue to consult with the USFWS and NMFS under the provisions of Section 7(a)(2) of the ESA to ensure that the proposed action will not jeopardize the continued existence of any listed species.

4.7.2.1 Proposed Action

Although several species occur or have the potential to occur within the Stevens Creek Project boundary, continued operation of the project under the proposed action is not expected to have

any adverse effect on these species. Additional discussion on the effects of continued project operation on individual listed species is provided in Appendix E-10. DESC does not have any plans for significant logging or shoreline changes within the Stevens Creek Project boundary and owns very little land surrounding the Stevens Creek Reservoir. If the need arises for tree removal, construction, or other shoreline modifications in the future (i.e., such as those that may be required for recreational improvements at the project), DESC would consult with the USFWS, USFS, and the GADNR or SCDNR (as appropriate) prior to the commencement of these activities to ensure best management practices are in place.

4.7.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no significant modifications to lands and shorelines, the effects of the no-action alternative would be identical to that as the proposed action. No adverse effects on RTE species are expected from the no-action alternative.

4.7.2.3 Unavoidable Adverse Effects

No unavoidable adverse effects or issues related to RTE species and their habitats have been identified at this time and none are expected to occur during continued operation of the Stevens Creek Project.

4.7.3 References

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4.8 RECREATION RESOURCES

4.8.1 Affected Environment

4.8.1.1 Existing Recreational Facilities

In 2014, DESC filed a revised RMP with FERC pursuant to Article 413 of the existing license. FERC issued an order modifying and approving the RMP on March 24, 2015.[6] There are four public recreation sites associated with the Stevens Creek Project (Table 4.14, Figure 4.12), which are described in further detail below.

TABLE 4.14 EXISTING PROJECT RECREATION SITES AT THE STEVENS CREEK PROJECT

Recreation Site Name	Recreation Site Name as Listed in 2014 Recreation Plan	Recreation Site Name as Listed in 1995 Project License/Exhibit G Drawings
Stevens Creek Recreation Site	SC Recreation Site #1	Stevens Creek Recreation Site
Fury's Ferry Recreation Site	SC Recreation Site #2	Fury's Ferry Recreation Site
Chota Drive Recreation Site	SC Recreation Site #4	Recreation Site #2
Betty's Branch/Riverside Park	SC Recreation Site #5	GA Recreation Site

Source: SCE&G 2014

[6] Following discussion with the USFS and FERC in December 2019, DESC filed a request to amend Article 413 and the RMP to remove the Mims Recreation Site from the Plan. FERC approved that request on July 24, 2020.

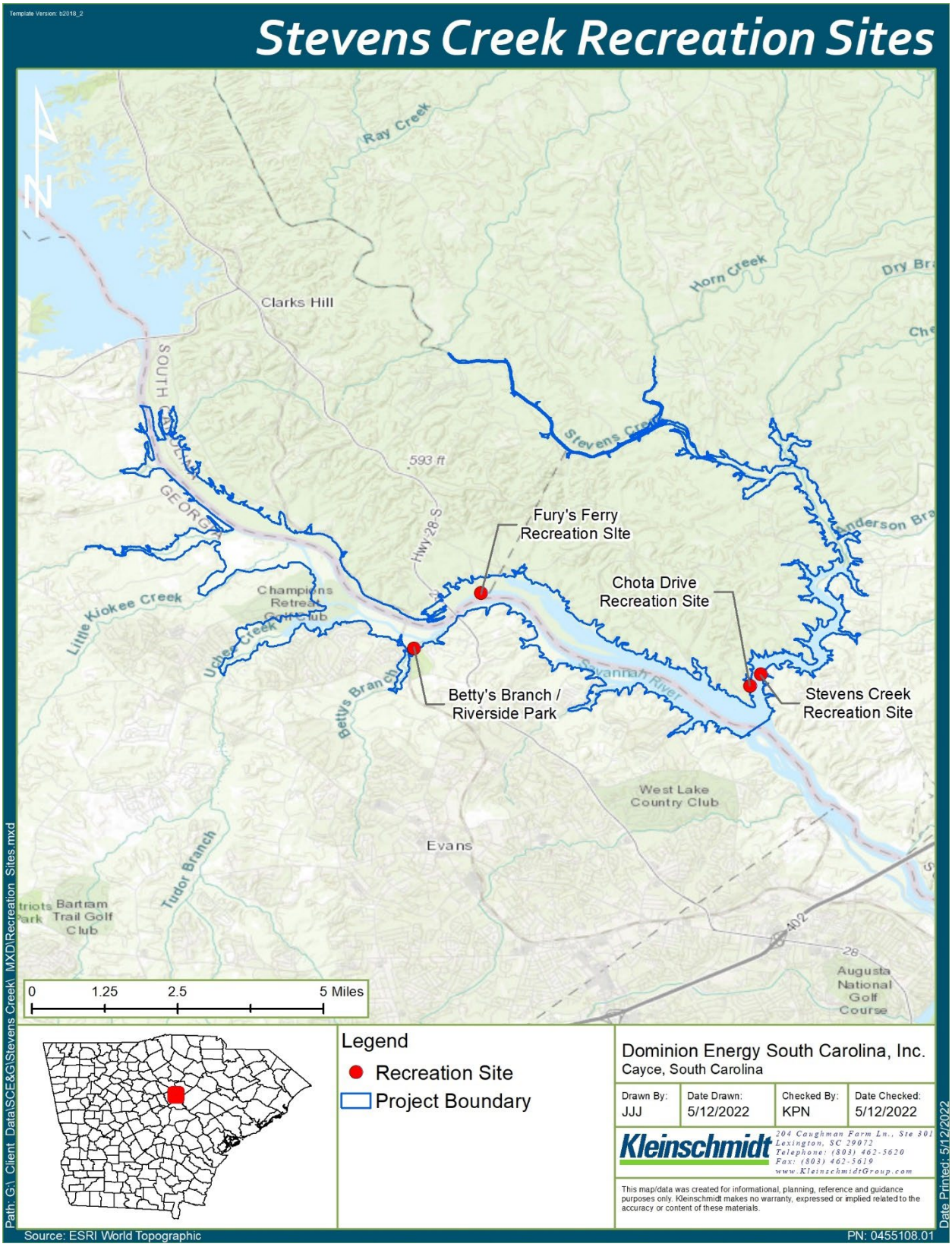

FIGURE 4.12 STEVENS CREEK PROJECT RECREATION SITES

The Stevens Creek Recreation Site is located in North Augusta, South Carolina, on the Stevens Creek arm of the Stevens Creek Reservoir. The site is owned and operated by DESC and includes a parking lot with space for six vehicles with trailers, one concrete boat launch, three picnic tables, and one unisex restroom (Kleinschmidt 2022). DESC maintains the recreation site by collecting litter and trash at the site; inspecting signs, handicapped facilities, and parking areas quarterly, with maintenance and repair as needed; and mowing and edging five times during the yearly growing season (SCE&G 2014).

The Fury's Ferry Recreation Site is in the SNF Long Cane Ranger District in Clarks Hill, South Carolina, on the Savannah River arm of the Stevens Creek Reservoir. The site is owned, operated, and maintained by the USFS. This site has one concrete boat ramp, two picnic tables, and a gravel parking lot. The parking lot can hold approximately five vehicles with trailers or 11 vehicles without trailers (Kleinschmidt 2022).

The Chota Drive Recreation Site is in Clarks Hill, South Carolina, on the Stevens Creek arm of the Stevens Creek Reservoir on USFS property. Due to the location of Chota Drive, which is close to archaeological sites, the USFS, in a meeting held with DESC in October 2022 regarding 4e conditions, requested that this site maintain its primitive existence. The site provides bank fishing access, non-motorized boat launch access, and a gravel parking area with space for approximately two vehicles.

The Betty's Branch Recreation Site is in Evans, Georgia, on Betty's Branch of the Little River, adjacent to the Georgia side of the Stevens Creek Reservoir (Kleinschmidt 2022). DESC dredged Betty's Branch to allow boat access through Little River to the Stevens Creek Reservoir. Recent depth measurements verified the ability of boats to continue to access this section. This site is located at the north end of Riverside Park, a non-project multi-use recreational facility owned and operated by Columbia County, Georgia. Betty's Branch has a small parking lot with four Americans with Disabilities Act (ADA) parking spots, one concrete boat ramp, one courtesy dock, one fishing pier, a canoe/kayak launch, and two picnic tables. Adjacent to Betty's Branch is a large parking area associated with Riverside Park. Betty's Branch recreators that do not require ADA parking use the Riverside Park parking lot. Riverside Park includes facilities for baseball, softball, tennis, picnicking, and water-related activities, such as fishing and boating (Kleinschmidt 2022). Under a Memorandum of Agreement (MOA) between Columbia County and DESC, Columbia County is responsible for the operation and maintenance of the following facilities at the Betty's Branch Recreation Site: boat ramp; boat dock; barrier-free fishing pier; and safety

signage (SCE&G 2014). DESC anticipates that a new MOA would be developed with Columbia County that discusses the construction and maintenance of recreational facilities at Betty's Branch for the new license term.

4.8.1.2 Existing and Potential Use

DESC conducted a RUN study in 2021 and 2022 to assess existing and future recreational use, opportunities, and needs for the Stevens Creek Project. The study was designed to provide information pertinent to the current and future availability and adequacy of DESC owned and managed recreation sites, USFS owned and managed recreation sites, and Columbia County (Georgia) owned and managed recreation sites at the Stevens Creek Project. Data collection focused on obtaining information related to existing public recreation sites and facilities owned by DESC and the USFS, estimating recreational use of those sites, learning recreation user perceptions, and determining site capacities. Analysis was performed to support study objectives, characterize existing and potential future recreational use at DESC's public access sites, and assess future requirements necessary to adequately support public recreational use of the Stevens Creek Project. The Stevens Creek Project RUN Study Report is included in its entirety in Appendix K and summarized below.

Table 4.15 provides a summary of the recreation days that occurred at each recreation site by month and day type. Traffic counter data demonstrated that there were 100,213 visits, or recreation days, at the Stevens Creek recreational areas between April 2021 and March 2022. The Stevens Creek Recreation Site and Fury's Ferry Recreation Site received comparable use with 11,723 recreation days and 12,813 recreation days, respectively. The Chota Drive Recreation Site, which is the least developed site, received the lowest number of recreation days of all Stevens Creek Project recreation sites (approximately 1,600). The Betty's Branch and Riverside Park parking lot, the most developed recreation area at the Stevens Creek Project, received the most recreation days, with approximately 26,000 visitors to Betty's Branch and approximately 48,000 to the Riverside Park parking lot.

TABLE 4.15 ESTIMATED RECREATION DAYS FOR INDIVIDUAL STEVENS CREEK PROJECT RECREATION SITES

Month, Day Type	Stevens Creek Recreation Site	Fury's Ferry Recreation Site[1]	Chota Drive Recreation Site	Riverside Park Parking Lot[2]	Betty's Branch Recreation Site	Total
April 2021						
Weekdays	950	608	60	1,036	3,928	6,582
Weekends	428	427	77	2,159	563	3,654
Holidays	----	----	----	----	----	---
May 2021						
Weekdays	828	543	154	2,151	2,764	6,440
Weekends	585	376	37	3,566	795	5,359
Holidays	218	197	17	1,590	237	2,259
June 2021						
Weekdays	701	583	118	3,589	2,539	7,530
Weekends	436	369	62	3,295	737	4,899
Holidays	----	----	----	----	----	
July 2021						
Weekdays	562	459	164	2,595	2,087	5,867
Weekends	291	318	33	2,240	314	3,196
Holidays	162	187	15	1,118	362	1,844
August 2021						
Weekdays	625	1,048	100	2,137	1,549	5,459
Weekends	344	396	33	2,689	443	3,905
Holidays	----	---	----		----	
September 2021						
Weekdays	471	742	81	2,003	1,216	4,513
Weekends	197	286	29	1,376	197	2,085
Holidays	98	135	12	778	162	1,185
October 2021[3]						
Weekdays	488	674	79	2,216	889	4,346
Weekends	242	340	25	988	176	1,771
Holidays	76	132	12	229	151	600
November 2021						
Weekdays	500	698	67	2,016	627	3,908
Weekends	207	274	22	682	119	1,304
Holidays	83	108	14	152	167	524
December 2021						
Weekdays	488	721	62	1,554	606	3,431

Month, Day Type	Stevens Creek Recreation Site	Fury's Ferry Recreation Site[1]	Chota Drive Recreation Site	Riverside Park Parking Lot[2]	Betty's Branch Recreation Site	Total
Weekends	208	262	15	528	124	1,137
Holidays	125	195	14	296	92	722
January 2022						
Weekdays	374	681	60	1,321	848	3,284
Weekends	166	340	17	526	161	1,210
Holidays	124	193	33	355	125	830
February 2022						
Weekdays	502	384	71	1,167	1,095	3,219
Weekends	203	189	35	886	193	1,506
Holidays	114	85	14	372	113	698
March 2022						
Weekdays	571	579	42	1,391	1,935	4,518
Weekends	355	284	25	1,093	673	2,430
Holidays	----	----	----		----	
Total						
Weekdays	7,060	7,721	1,059	23,176	20,082	59,098
Weekends	3,663	3,860	410	20,027	4494	32,454
Holidays	1,001	1,232	129	4,890	1409	8,661
TOTAL	11,723	12,813	1,598	48,093	25,986	**100,213**

[1]The traffic counter at Fury's Ferry recreation site malfunctioned between May 13-24, 2021, and was stolen on September 9, resulting in a loss of data from September 9 – September 30. Data presented in the table for May and September were extrapolated based on data collected during the remainder of these months.

[2]The Riverside Park parking lot traffic counter malfunctioned resulting in lost data from May 13-24, 2021; data were extrapolated based on data collected during the remainder of May.

[3]Numbers were extrapolated from October 6, 2021, to November 11, 2021, due maintenance of all counters.

Stevens Creek Project recreation sites are well used throughout the year and generally used within their design capacities. For the RUN study, sites were considered to be used within their design capacity if parking areas were regularly less than 75 percent full. Use was considered to be approaching capacity if parking areas were regularly between 75 and 99 percent full. Use was considered to be exceeding capacity if parking areas were regularly greater than 99 percent full. High levels of use typically experienced on holidays are regarded as special circumstances, as these use levels are experienced only a few times per year. Recreation capacity is considered for typical weekday and non-peak weekend use in management and site design decisions.

Recreation site use density was calculated using the data collected by traffic counters (Table 4.16). All sites were generally within their design capacity on weekdays and non-peak weekends. The only site to exceed capacity was the Stevens Creek Recreation Site. At this site on weekends and holidays during May, the parking area was calculated to be 105 percent full, on average. The Stevens Creek Recreation Site also approached capacity on non-peak weekends in April and June. Most sites received their highest use on non-peak weekends during the spring (March through June) except for Betty's Branch; use was highest at Betty's Branch on weekdays. All sites generally received the least use during the fall and winter (September through February).

TABLE 4.16 RECREATION SITE AVERAGE CAPACITY BY MONTH AND DAY TYPE

Month, Day Type	Stevens Creek Recreation Site	Fury's Ferry Recreation Site[1]	Chota Drive Recreation Site	Betty's Branch Recreation Site	Riverside Park Parking Lot
April 2021					
Weekdays	68%	33%	13%	48%	29%
Weekends	77%	58%	42%	19%	40%
Holidays	---	---	---	---	---
May 2021					
Weekdays	60%	29%	33%	37%	29%
Weekends	105%	51%	20%	27%	64%
Holidays	105%	71%	25%	21%	71%
June 2021					
Weekdays	46%	29%	23%	31%	33%
Weekends	78%	50%	33%	25%	59%
Holidays	---	---	---	---	---
July 2021					
Weekdays	40%	25%	35%	28%	27%
Weekends	60%	49%	20%	12%	43%
Holidays	58%	51%	17%	24%	43%
August 2021					
Weekdays	41%	51%	20%	19%	20%

Month, Day Type	Stevens Creek Recreation Site	Fury's Ferry Recreation Site[1]	Chota Drive Recreation Site	Betty's Branch Recreation Site	Riverside Park Parking Lot
Weekends	55%	47%	16%	13%	41%
Holidays	---	---	---	---	---
September 2021					
Weekdays	32%	38%	17%	16%	18%
Weekends	47%	51%	21%	9%	31%
Holidays	47%	49%	17%	15%	37%
October 2021					
Weekdays	35%	36%	17%	12%	18%
Weekends	44%	46%	14%	6%	17%
Holidays	37%	48%	17%	14%	15%
November 2021					
Weekdays	34%	36%	14%	8%	15%
Weekends	50%	49%	16%	5%	16%
Holidays	40%	39%	19%	15%	12%
December 2021					
Weekdays	33%	37%	13%	8%	12%
Weekends	50%	47%	11%	6%	13%
Holidays	45%	53%	15%	6%	11%
January 2022					
Weekdays	27%	37%	13%	11%	13%
Weekends	40%	61%	13%	7%	13%
Holidays	36%	42%	28%	7%	11%
February 2022					
Weekdays	38%	22%	16%	16%	14%
Weekends	49%	34%	25%	9%	21%
Holidays	55%	31%	19%	10%	19%
March 2022					
Weekdays	36%	27%	8%	25%	17%
Weekends	64%	38%	14%	23%	26%
Holidays	---	---	---	---	---
Total					
Average Capacity – Weekdays	41%	33%	18%	22%	20%
Average Capacity – Weekends	61%	48%	21%	14%	33%
Average Capacity – Holidays	51%	48%	20%	14%	26%

[1]The traffic counter for the Fury's Ferry recreation site malfunctioned and data were lost from May 13-24, 2021 and from September 9-30, 2021

[2]The Riverside Park parking lot traffic counter malfunctioned resulting in lost data from May 13-24, 2021.

Current population data were collected from the U.S. Census Bureau (2021) for the three counties and two states in which the Stevens Creek Project is located. Population projections through 2035 were also collected for these counties and states from the South Carolina Revenue and Fiscal Affairs Office and the Georgia Office of Planning and Budget. This information was used to determine estimated population growth for the Stevens Creek Project region. The population projection for the three-county region was applied to the estimated recreation days for the recreation sites at the Stevens Creek Project and the average non-peak weekend capacity for each recreation site. By 2035, the Stevens Creek Project is estimated to accumulate nearly 127,000 annual recreation days (Table 4.17). Estimated future average non-peak weekend capacities for all recreation sites are shown in Table 4.18. All sites are projected to remain below full capacity on non-peak weekends.

TABLE 4.17 ESTIMATED FUTURE RECREATION DAYS FOR THE STEVENS CREEK PROJECT, 2025-2035[1]

Year	Population Growth Rates (3-County Subtotal)	Stevens Creek Recreation Site	Fury's Ferry Recreation Site	Chota Drive Recreation Site	Riverside Park Parking Lot	Betty's Branch Recreation Site	Recreation Days (All Project Recreation Sites)
2021	--	11,723	12,813	1,598	48,093	25,986	100,213
2025	10.93%	13,004	14,213	1,773	53,350	28,826	111,166
2030	7.28%	13,951	15,248	1,902	57,233	30,925	119,259
2035	6.32%	14,833	16,212	2,022	60,851	32,879	126,796

[1] Current population projections for South Carolina counties are only available through 2035.

TABLE 4.18 ESTIMATED FUTURE AVERAGE NON-PEAK WEEKEND CAPACITY AT THE STEVENS CREEK PROJECT RECREATION SITES

Year	Population Growth Rates (3-County Subtotal)	Stevens Creek Recreation Site	Fury's Ferry Recreation Site	Chota Drive Recreation Site	Riverside Park Parking Lot	Betty's Branch Recreation Site
2021	--	61%	48%	21%	14%	33%
2025	10.93%	68%	54%	23%	16%	37%
2030	7.28%	73%	58%	25%	17%	40%
2035	6.32%	78%	61%	26%	18%	42%

During the survey, visitors indicated their primary reason for visiting the Stevens Creek Project was to participate in boat fishing, canoeing, and kayaking. As such, most visitors indicated they spent time on the water. A small portion of visitors recreated on or near the islands in Stevens Creek Reservoir. Nearly half of all visitors indicated they would be very likely to portage around Stevens Creek Dam if it were possible.

Most visitors viewed the recreation sites as being lightly to moderately crowded. Most visitors rated the condition of the recreation sites as excellent or good. Some visitors suggested additional facilities or improvements at the recreation sites, including restrooms, boat launches, and trash cans.

Few visitors indicated they used the Fury's Ferry and Chota Drive recreation sites. The most frequently reported activity when visitors were at these sites was boat fishing. Visitors suggested increased security and improved access for these recreation sites.

4.8.1.3 Designated Waters and Project Lands

The Stevens Creek Project is not located on a designated Wild and Scenic River segment and no portion of the Savannah River is designated as wild and scenic. In addition, no Stevens Creek Project lands are being considered for inclusion in the National Trails System or as a Wilderness Area.

4.8.2 Environmental Effects

In their responses to the PAD, GADNR commented that available public boating and fishing access sites do not adequately provide Georgia residents with recreational access to the Stevens Creek Project area. The GADNR noted their desire for a fishing platform in the tailrace. Similarly, GADNR noted that the only fishing and boating access on the Georgia side of the Stevens Creek Reservoir is near the upper end of the reservoir at Betty's Branch. The GADNR requested that DESC evaluate the likelihood of adding an access area on the Georgia side of the Stevens Creek Project, both within the reservoir and downstream of the dam. The GADNR and SCDNR requested that DESC evaluate the likelihood of providing a publicly accessible canoe portage around the dam.

DESC has weighed this request through the relicensing and considered a number of options to support the request for additional access. DESC has held site visits with resource agencies and stakeholders to explore options and accessibility. Several factors impact the consideration of both

downstream and in-reservoir access, including safety, accessibility, need for access, and cultural resources. Relating to additional, new downstream access, such as a downstream fishing pier or put-in, significant concerns have arisen during relicensing consultation relating to downstream cultural resources. The proposed location of a new facility would be situated directly downstream of the project powerhouse, adjacent to a DESC-maintained boat ramp used only for utility access to project facilities, and directly across from Stallings Island. Stallings Island, located directly downstream of the Stevens Creek Dam, is listed on the National Register of Historic places and is a National Historic Landmark. The Georgia SHPO, South Carolina SHPO, Archaeological Conservancy (owner and conservator of Stallings Island), Chickasaw Nation, and the Muscogee Nation have expressed concern about how the potential addition of a fishing pier or put-in facility would potentially result in higher visitation within the immediate area and result in adverse effects to Stallings Island (see Appendix E-1 for Consultation Documentation). The Muscogee Nation has particularly noted that Stallings Island holds special cultural significance for the Tribe. Although the public can currently access the island via the Savannah Rapids Pavilion near the Augusta Project, an additional access area downstream of the Stevens Creek Dam could increase and encourage the public to visit the island, which is already vulnerable to vandalism and looting. Although a fishing pier was considered, close positioning to the DESC boat ramp would make it difficult to maintain recreators exclusively to the fishing pier. Safety must also be considered when encouraging the public to access areas near the Stevens Creek powerhouse. The lands surrounding the powerhouse are maintained in the “Project Operations” land classification and the public is not allowed access for safety and security reasons. Because the Augusta Project is located immediately downstream of the Stevens Creek Project, and the Augusta Project impoundment ends at the Stevens Creek Dam, any recreation site downstream of the Stevens Creek Dam would provide direct access to the Augusta Project impoundment and would be partially located within the Augusta Project boundary. A primitive boat launch is already located within the 1 mile stretch between the Stevens Creek Dam and the Augusta Diversion Dam. Therefore, DESC believes that access within the areas downstream of the Stevens Creek Project are sufficient and appropriately scaled considering the needs, safety and cultural resource concerns of the area.

The possibility of a canoe portage around the Stevens Creek Dam was also considered during this relicensing process. The South Carolina side of the Stevens Creek Dam is extremely steep with difficult terrain. A portage route would be difficult to traverse and DESC has significant concerns regarding safety of the general public. The safety and security concerns discussed

above would also pertain to the potential for a portage around the Georgia side of the dam, adjacent to project facilities.

The Commission's regulations outline a licensee's general responsibilities to provide suitable recreation development and public access at a project consistent with recreation needs. DESC is proposing recreational enhancements at the Stevens Creek Project that consider the availability of DESC-owned land, public needs, and safety, as well as weighing other resource concerns. At this time, DESC is not proposing enhancements downstream of the project dam for the reasons discussed above. Recreational enhancements under the proposed action are discussed below.

4.8.2.1 Proposed Action

STEVENS CREEK RECREATION SITE

DESC is proposing to improve the existing Stevens Creek recreation site by re-lining and maximizing spaces in the parking lot. The boat ramp at the Stevens Creek recreation site will also be extended to allow for easier access during periods of low water. In addition, DESC will investigate bank fishing enhancements.

USFS RECREATION SITES

During discussions between DESC and the USFS on October 5, 2022, the USFS indicated they no longer plan to support the Chota Drive recreation site, including implementing any improvements or maintaining the access road. Chota Drive is currently maintained as a primitive bank fishing area with no formal facilities. Additionally, the Recreation Use and Needs (RUN) study, discussed more in Section 4.8, *Recreation Resources*, identified very low use at this recreation site. For these reasons, and because the site is located near the more popular Stevens Creek and Fury's Ferry sites, DESC is not proposing any modifications to the Chota Drive site. The public may continue to access the site via boat similar to the public access along the remainder of the Stevens Creek Reservoir shoreline.

The USFS indicated their interest in focusing funding and improvements on the Fury's Ferry recreation site. DESC will install lighting at the site to improve visibility and security in the area. DESC will consult with the USFS to determine the type and positioning of lighting. Improvements performed on USFS property may require a Special Use Permit from the USFS, which will be considered in the proposed timing of implementation. DESC will continue to consult with the USFS to identify additional, appropriate enhancements at Fury's Ferry. Additional specifics will be included in the FLA.

RECREATION MANAGEMENT PLAN

DESC is proposing to develop an updated Recreation Management Plan (RMP) to include details on proposed recreation site enhancements, an implementation schedule, best management practices (BMPs), and recreation site operation and maintenance information. A draft RMP will be filed with the FLA.

OFF-LICENSE AGREEMENTS FOR RECREATIONAL ENHANCEMENTS

As discussed previously, DESC is currently consulting with Columbia County, Georgia regarding facility improvements to the Betty's Branch Recreation Site under an off-license agreement, as these improvements would likely occur outside of the Stevens Creek Project boundary. Off-license agreements will be detailed in the FLA for informational purposes but will be excluded from detailed analysis as they will be outside the scope of FERC's review.

4.8.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. No improvements to recreational resources, as included under the proposed action, would be implemented.

4.8.2.3 Unavoidable Adverse Effects

Proposed civil improvements at Stevens Creek Project recreation sites would likely result in temporary visual and audible effects. Recreation site construction activities could also temporarily affect access at the site and may require the targeted clearing of riparian and upland vegetation for proposed amenities. Implementation of BMPs, as well as thoughtful timing on construction activities would minimize unavoidable adverse effects to the recreators, as well as environmental resources.

4.8.3 References

Kleinschmidt Associates (Kleinschmidt). 2022. Recreation Use and Needs Study Report, Stevens Creek Hydroelectric Project, FERC No. 2535. Prepared for Dominion Energy South Carolina, Inc. June 2022.

South Carolina Electric & Gas Company (SCE&G). 2014. Stevens Creek Hydroelectric Project, FERC Project No. 2535. Revised Recreation Plan. January 2014.

4.9 CULTURAL RESOURCES

4.9.1 Affected Environment

4.9.1.1 Area of Potential Effect

The ACHP defines an Area of Potential Effect (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The Stevens Creek Project HPMP, filed with FERC in November 2004, defines the APE for the Stevens Creek Project as the lands enclosed by the project boundary as delineated in DESC's 1995 application for new license and any lands or properties outside the Stevens Creek Project boundary where project operation or project-related actions may cause changes in the character or use of historic properties, if any exist.

The Stevens Creek Project extends approximately 12 miles up the Savannah River to a point about one mile downstream of the Thurmond Dam and 12 miles up Stevens Creek. The reservoir has a surface area of approximately 2,400 acres, with a full pool EL 187.5 feet NGVD. The Stevens Creek Project boundary varies from 5 to 11 feet above full pool, between EL 192.5 feet and EL 198.5 feet as shown on the Exhibit G maps. DESC owns 95 acres, or approximately 5 percent, of land within the Stevens Creek Project boundary and holds flowage rights for the remaining project boundary. The Stevens Creek Project boundary encompasses approximately 104 acres of the SNF in South Carolina, managed by the USFS. In Georgia, most of the land within the Stevens Creek Project boundary is privately owned and contains scattered rural residential development (SCE&G 2004).

Outside of the Stevens Creek Project boundary, the APE encompasses both shorelines of the Savannah River downstream from the Stevens Creek Dam for a distance of approximately 2,000 feet and includes Stallings Island, situated just below the dam (SCE&G 2004). The current Stevens Creek Project APE, as defined in the 2004 HPMP, is depicted in Figure 4.13. Both the Georgia Historic Preservation Division and the South Carolina Department of Archives and History concurred with the identified 2004 APE during the prefiling consultation process. DESC contracted TRC Environmental Corporation (TRC) to conduct a Cultural Resources Study Update for the Stevens Creek Project HPMP as part of the current relicensing. Data generated through this effort demonstrates that the APE has been thoroughly assessed, excepting private property where access is denied (TRC 2022).

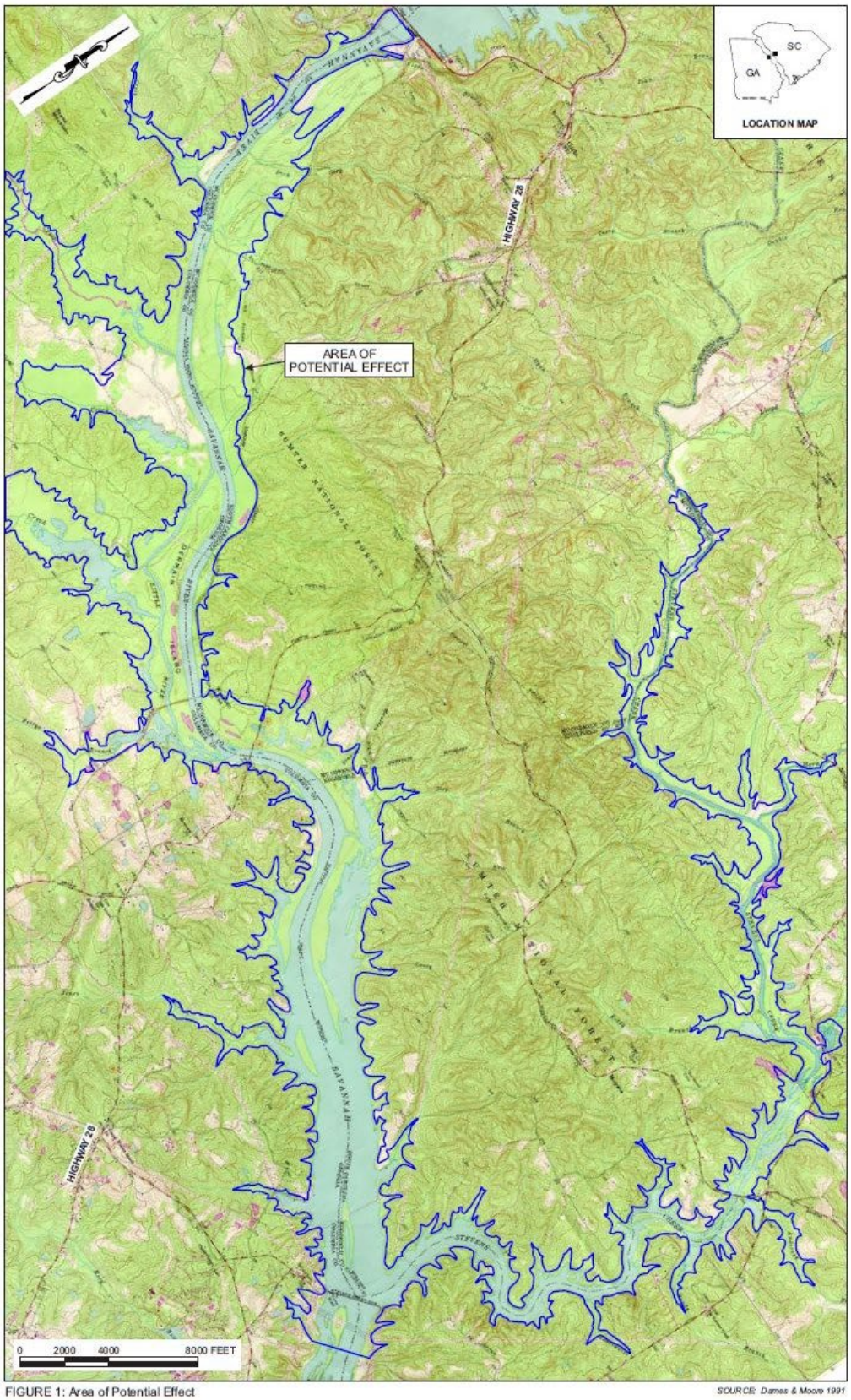

FIGURE 4.13 STEVENS CREEK PROJECT AREA OF POTENTIAL EFFECT

4.9.1.2 Completed Studies

EXISTING DISCOVERY MEASURES

During the relicensing of the Stevens Creek Project in the 1990s, the Licensee commissioned several studies to identify historic properties that might be affected by operations or project-related activities during the new license term (SCE&G 2004). Phase I and Phase II surveys were conducted from 1991 to 1995 and included the portion of the APE from the Stevens Creek Dam up the Savannah River to the Route 28 bridge and from the mouth of Stevens Creek upstream to the Woodlawn Road bridge. Besides these previous relicensing studies, other studies conducted by entities such as the USFS have identified additional archaeological sites within the APE. A total of 40 historic properties were identified in the APE as of 1996 (SCE&G 2004).

FERC issued a new license for the continued operation of the Stevens Creek Project on November 11, 1995. As a license condition, FERC required the preparation and implementation of an HPMP for the Stevens Creek Project in accordance with a Programmatic Agreement (PA) among FERC, the ACHP, and the South Carolina and Georgia SHPOs. The existing PA and HPMP were filed with FERC in November 1995 and November 2004, respectively. The HPMP contains policies and procedures for identifying effects of the Stevens Creek Project operations on historic properties over the term of the new license. It also contains policies and procedures for the development and implementation of measures to avoid, minimize, or mitigate any adverse effects. The HPMP was developed based on previous cultural resources investigations conducted on the entire APE (South Carolina and Georgia) for the Stevens Creek Project licensing efforts in 1991 (Rogers and Gresham 1991a, 1991b) and 1994-1995 (Kratzer et al. 1996).

CULTURAL RESOURCES STUDY UPDATE

Consultation between DESC, the South Carolina SHPO, Georgia SHPO, and USFS, identified 19 previously recorded archaeological sites whose locations, extents, and/or integrity required verification (Table 4.19). TRC revisited the recorded locations of 13 of the 19 sites during the 2021 study. One site is a submerged resource and had been previously found to be silted over and inaccessible for evaluation. Five additional sites were on private property and access was denied by landowners. These sites are unassessed and retain their original 1990s NRHP assessment, as indicated in Table 4.19, which also contains the recommendations from the 2021 Cultural Resources Study Update. The identified historic properties in the APE in Columbia County, Georgia were not reassessed as part of the current relicensing, and thereby retain their original 1990s recommendations (Table 4.20). Properties described as “potentially eligible” are those for

which existing information is insufficient to determine NRHP eligibility. According to the 2004 HPMP, DESC treats these resources as historic properties until such time as they are formally evaluated and found not eligible for the NHRP. None of the visited sites are threatened by operation of the Stevens Creek Project.

TABLE 4.19 SUMMARY OF HISTORIC PROPERTIES IN THE STEVENS CREEK PROJECT AREA OF POTENTIAL EFFECT IN EDGEFIELD AND MCCORMICK COUNTIES, SOUTH CAROLINA AS OF 2021

Site Number / Dimensions as Available	Description	National Register Status
38ED5 Ed Marshall site	Prehistoric: Late Archaic shell midden and burial	Unassessed (2021); Eligible (1999)
38ED9 Mims Point 210 x 210 m	Early Archaic-Late Woodland midden and burials	Eligible (2021 and 1999)
38ED48	Late Paleoindian, Late Archaic, and Woodland	Eligible (2021 and 1999)
38ED118	Archaic-Mississippian camp	Eligible (2021 and 1999)
38ED119/283	Multi-component prehistoric and historic scatter	Eligible (2021 and 1999)
38ED121	Unknown Prehistoric	Not Eligible (2021 and 1999)
38ED282	Unknown Prehistoric	Not Relocated (2021); Potentially Eligible (1999)
38ED285	High-density prehistoric campsite or village	Not Relocated (2021); Potentially Eligible (1999)
38ED290	Unknown Prehistoric	Not Eligible (2021); Potentially Eligible (1999)
38ED291	Short-term resource procurement camp	Not Relocated (2021); Potentially Eligible (1999)
38ED292	Short-term resource procurement camp	Not Relocated (2021); Potentially Eligible (1999)
38ED293	Short-term resource procurement camp	Not Relocated (2021); Potentially Eligible (1999)
38ED388	Underwater remains of 1920s steam-powered barge	Not Relocated (2021); Potentially Eligible (1999)
38ED432	Short-term resource procurement camp	Unassessed (2021); Potentially Eligible (1999)
38ED433	Short-term procurement camp	Not Eligible (2021); Potentially Eligible (1999)
38ED441	High-density prehistoric scatter	Eligible (2021 and 1999)
38MC699 200 x 150 m	Historic cemetery	Not Eligible (2021); Potentially Eligible (1999)
38MC811	Short-term resource procurement camp	Eligible (2021 and 1999)

Site Number / Dimensions as Available	Description	National Register Status
38MC915	Middle Archaic – Middle Woodland	Not Eligible (2021); Potentially Eligible (1999)

Sources: SCE&G 2004; TRC 2022

TABLE 4.20 SUMMARY OF HISTORIC PROPERTIES IN THE STEVENS CREEK PROJECT AREA OF POTENTIAL EFFECT IN COLUMBIA COUNTY, GEORGIA AS OF 1999

Site Number / Dimensions as Available	Description	National Register Status	Impacts
9CB1	Stallings Island Site	NRHP; National Historic Landmark	Erosion; vandalism
9CB2	Unknown Prehistoric	Potentially Eligible	Unknown
9CB7 80 x 100 m	Prehistoric: Middle Archaic; possible Late Archaic	Potentially Eligible	Cultivated
9CB13 100 x 100 m	Prehistoric: Possible steatite quarry	Potentially Eligible	Partially cultivated
9CB14	Prehistoric: Possible Late Archaic quarry/lithic reduction site with Woodland period component	Potentially Eligible	Partially eroded; looting
9CB15 200 x 100 m	Prehistoric: Late and Middle Archaic midden with possible Woodland period component	Potentially Eligible	Heavily eroded and partially dug out by bulldozer for dam fill c. 1950
9CB20	Prehistoric: Early and Middle Archaic	Potentially Eligible	Some surface shift erosion
9CB21	Unknown Prehistoric	Potentially Eligible	Intact
9CB24	No Information Available		
9CB25 1,200 x 300 m	Prehistoric: Late Archaic shell-midden	Potentially Eligible	Erosion from dam water release; vandalism
9CB126/133 1,000 x 30 m	Unknown Prehistoric	Potentially Eligible	Cultivated
9CB127/134 500 x 50 m	Unknown Prehistoric	Potentially Eligible	Unknown
9CB128/135	Prehistoric: archaic, Early Woodland, Mississippian	Potentially Eligible	Unknown
9CB130 50 x 15 m	Historic: mid-/late 19th century dam ruins	Potentially Eligible	Slightly threatened from erosion related

Site Number / Dimensions as Available	Description	National Register Status	Impacts
			to release of water from dam
9CB131 100 x 50 m	Prehistoric: Archaic (possibly part of 9CB15)	Potentially Eligible	Unknown
9CB132 120 x 30 m	High-density Early Archaic through Early Mississippian campsite, with a moderate- to high-density domestic refuse scatter, dating from the early 19th century to the early 20th century: historic artifacts are confined to the Ap-horizon and slopewash soils. Prehistoric artifacts retrieved from Ap-, Bw-, and Bt- horizon soils.	Prehistoric: Eligible; Historic: Not Eligible	None
9CB142 100 x 100 m	Prehistoric: Possible Late Archaic and Woodland	Potentially Eligible	Cultivated
9CB197 420 x 80 m	High-density short-term resource procurement encampment with Middle Archaic, Late Archaic, and Woodland components; a high-density section of the site is derived from intact deposits	Eligible	Minor erosion
NA 825 x 60 m	Stevens Creek Hydroelectric facility constructed 1913-1914. Contributing elements are the dam, lock, headwall and headgates, powerhouse, and related powerhouse equipment: turbine-generator units, exciters, governors; disused control board, transfer bus structure, and rheostats	Eligible	None

Source: SCE&G 2004

Among the historic properties identified in the APE during the 1991 study was the Stevens Creek Hydroelectric Project. Contributing features of the facility include the dam, lock, headwall and headgates, powerhouse, and related powerhouse equipment including the turbine-generator units, exciters, governors, control board, transfer bus structure, and rheostats. In 2021, TRC recommended that the Stevens Creek Project remain eligible for inclusion in the NRHP as it has not undergone major alterations or additions since the 1991 study and, therefore, retains its integrity of location, design, setting, materials, workmanship, feeling, and association (TRC 2021).

4.9.1.3 Tribes and Historic Properties

Original natives of the area that is now the state of Georgia include the Apalachee; Cherokee; Hitchiti, Oconee, and Miccosukee; Muscogee Creek; Timucua; and the Yamasee and Guale Native Americans (NLA 2020). In addition, the Shawnee and the Yuchi Native Americans were driven into the state after Europeans arrived. Native American tribes were evicted from the state during the 19th century. Currently, there are no federally recognized Native American tribes in the state of Georgia (BIA 2019). However, there are tribes in Georgia that are recognized as descendants of these people. These include the Cherokee of Georgia, the Georgia Tribe of Eastern Cherokee, and the Lower Muscogee Creek Tribe (NLA 2020).

Indigenous inhabitants of the area that is now South Carolina include the tribes of Catawba; Cherokee; Creek; Yuchi; Cusabo and Edisto; and the Carolina Siouan bands, which include the Chicora, Pee Dee, Waccamaw, and Santee (NLA 2020). In addition, the Chickasaw Tribe and the Shawnee Tribe moved into South Carolina after Europeans arrived. Currently the only federally recognized Native American tribe in South Carolina today is the Catawba Indian Nation (BIA 2019). Other Native American tribes, bands, and communities remaining in South Carolina today include the Cherokee Tribe of South Carolina; Chaloklowas Chickasaw People; Chicora Tribe of South Carolina; Edisto Tribe (Natchez-Kusso); Pee Dee Tribe; Santee Tribe of South Carolina; the Waccamaw People; and the Wassamasaw Tribe of the Creek Nation (NLA 2020).

DESC sent initial consultation to the following tribes in August 2019: Absentee Shawnee Tribe of Oklahoma; Catawba Indian Nation; Cherokee Nation; Chickasaw Nation; Eastern Band of Cherokee Indians; Eastern Shawnee Tribe of Oklahoma; Muscogee Nation; Poarch Band of Creek Indians; and Santee Sioux Nation. DESC received responses from the Catawba Indian Nation and the Cherokee Nation as indicated in Appendix A-2 of the Stevens Creek Project PAD. The Chickasaw Nation filed a response with FERC in August 2021 accepting the invitation to consult and stating the proposed recreation facilities located near Stallings Island, a National Historical Landmark on the NRHP, would adversely affect the site. Consultation with the Muscogee Nation Historic and Cultural Preservation Department (HCPD) also occurred, and on July 12, 2022, the Muscogee Nation HCPD filed a letter with FERC also stating the concern about the potential negative impacts that increased recreation access would pose to Stallings Island.

4.9.2 Environmental Effects

As the non-federal representative responsible for informal consultation regarding Section 106 of the NHPA, DESC is in the process of coordinating with state and federal resource agencies and tribes regarding the results of recent survey efforts and appropriate updates to the Historic Properties Management Plan for the Stevens Creek Project. These consultations are on-going at the time of this DLA and appropriate updates will be provided for the filing of the FLA.

4.9.2.1 Proposed Action

The continued management and operations of the Stevens Creek Project may affect historic properties within the APE as a result of project-induced shoreline and riverbank erosion, the construction of any new project-related recreational facilities, vandalism, and continuing development of the shoreline. The extent of effects on cultural resources can vary widely, depending on the setting, size, and visibility of the resource, and whether the location of the resource is public knowledge.

As previously discussed, as a condition of the license issued in 1995, FERC required the preparation and implementation of a HPMP for the Stevens Creek Project in accordance with a PA. DESC had an archeological resource evaluation completed within the South Carolina portion of the APE in 2021 to help provide the basis for the update of the current HPMP. DESC proposes to update and file the HPMP prior to FERC's environmental analysis. As previously stated, TRC stated that none of the South Carolina sites are threatened by the operation of the Stevens Creek Project.

Stallings Island has been identified as a particular concern related to the Stevens Creek Project. As previously discussed, the Muscogee Nation filed a letter with FERC and requested consultation concerning Stallings Island. Both SHPOs have expressed similar concerns (Appendix E-1).

4.9.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be similar to

that as the proposed action. However, the project would be operated under the existing HPMP and no HPMP updates would occur as is planned under the proposed action.

4.9.2.3 Unavoidable Adverse Effects

DESC has proposed no changes to operations or the facilities of the Stevens Creek Project that would result in unavoidable adverse effects to cultural resources.

4.9.3 References

Bureau of Indian Affairs (BIA). 2019. Indian Entities Recognized by and Eligible to Receive Services from the United States Bureau of Indian Affairs. Federal Register, Vol. 84, No. 22, Friday, February 1, 2019, Notices.

Federal Energy Regulatory Commission (FERC). 1995. Programmatic Agreement among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the Georgia State Historic Preservation Officer, and the South Carolina State Historic Preservation Officer, for Managing Historic Properties that may be Affected by a License Issuing to South Carolina Electric & Gas Company for the Continued Operation of the Stevens Creek Hydroelectric Power Project in Georgia and South Carolina. October 1995.

Kratzer, K.P., C.J. Rinehart, J.A. Calabrese, and I. Wuebber. 1996. Phase I and II Cultural Resource Investigations, Stevens Creek Hydroelectric Project, FERC Project No. 2535. The Cultural Resource Group Louis Berger & Associates, Inc., Richmond, Virginia. Prepared for South Carolina Electric and Gas Company, Columbia, South Carolina.

Native Languages of the Americas (NLA). 2020. Native Languages of the Americas: Preserving and promoting American Indian languages. [Online] URL: http://www.native-languages.org. Accessed August 2022.

Rogers, R., and T.H. Gresham. 1991a. A Reconnaissance Level Cultural Resources Survey of the Stevens Creek Hydroelectric Project: FERC Project No. 2535. Southeastern Archaeological Services, Inc., Atlanta, Georgia. Prepared for South Carolina Electric & Gas Company, Columbia, South Carolina.

Rogers, R., and T.H. Gresham. 1991b. An Intensive (Stage II) Cultural Resources Survey of the Stevens Creek Hydroelectric Project: FERC Project No. 2535. Southeastern Archaeological Services, Inc., Atlanta, Georgia. Prepared for South Carolina Electric & Gas Company, Columbia, South Carolina.

South Carolina Electric and Gas (SCE&G). 2004. Historic Properties Management Plan: Stevens Creek Hydroelectric Project, FERC Project No. 2535. South Carolina And Georgia. November 2004.

TRC Environmental Corporation (TRC). 2022. Archaeological Resource Evaluations for the Update of the Stevens Creek HPMP and Stevens Creek Hydroelectric Project, Edgefield and McCormick Counties, South Carolina. Prepared for Dominion Energy South Carolina, Inc. February 2022.

TRC. 2021. Architectural Survey and Evaluation, Stevens Creek Hydroelectric Project (FERC No. 2535), Columbia County, GA, Edgefield and McCormick Counties, SC. Prepared for Dominion Energy South Carolina, Inc. April 2021.

4.10 LAND USE AND AESTHETICS

4.10.1 Affected Environment

4.10.1.1 Land Use and Management Adjacent to the Project Boundary

The largest land use categories for lands adjacent to the Stevens Creek Project are agricultural/forestry, residential, public, and recreation. Land use classifications in Edgefield County, South Carolina and Columbia County, Georgia are included in Table 4.21 and Table 4.22, respectively. Land uses in McCormick County, South Carolina are described in the paragraph below.

TABLE 4.21 LAND USE CLASSIFICATIONS IN EDGEFIELD COUNTY, SOUTH CAROLINA

Land Use Classification	Acres	% of Total
Rural/Agricultural and Vacant	278,110	85.6
Single-Family Residential	7,008	2.2
Multi-Family Residential	0	0.0
Commercial and Mixed Use	260	0.08
Industrial	360	0.11
Institutional and Public*	32,606	10.0
Towns and Cities	6,734	2.1

*This category includes USFS lands
Source: Robert and Company 2019

TABLE 4.22 LAND USE CLASSIFICATION IN COLUMBIA COUNTY, GEORGIA

Land Use Classification	Acres	% of Total
Agriculture/Forestry	88,985	50.1
Parks/Recreation/Conservation	10,449	5.9
Residential (Single-Family)	55,200	31.1
Multi-Family	704	0.4
Manufactured Home Park	377	0.2
Commercial	3,003	1.7
Industrial	2,498	1.4
Public/Institutional	10,034	5.6
Transportation/Communication/Utilities	932	0.5

Source: Columbia County 2015

Land uses in McCormick County, South Carolina fall in the following categories: residential/commercial; industrial; institutional; public lands; and agricultural (McCormick 2015). The largest land use in McCormick County is public lands, with more than 100,000 acres of public

lands existing within the county, including 48,000 acres of USFS land. The second largest land use in McCormick County is agricultural lands with approximately 24,934 acres (McCormick 2015).

The closest city to the Stevens Creek Project is the City of Augusta, Georgia. Land uses within the City of Augusta are included in Table 4.23.

TABLE 4.23 LAND USE CLASSIFICATION IN THE CITY OF AUGUSTA, GEORGIA

Land Use Classification	Acres	% of Total
Public Industrial	52,698	25.7
Low Density Residential	37,623	18.4
Agriculture	31,992	15.6
Forestry	23,065	11.3
Rural Residential	19,619	9.6
Industrial	15,592	7.6
Parks, Recreation, and Conservation	11,131	5.4
Commercial	8,241	4.0
Transportation, Communication, and Utility	2,507	1.2
High Density Residential	2,123	1.0
Office	257	0.1

Source: Augusta Georgia 2018

4.10.1.2 Land Use and Management Within the Project Boundary

Stevens Creek Project operations, maintenance, and recreation are the primary activities on project lands. The land use types within the Stevens Creek Project boundary consist mostly of privately-owned lands and rural residential developments (FERC 1995) (Figure 4.14). On the South Carolina side of the Stevens Creek Project is the SNF, which is managed for recreation and timber harvesting. Timber harvesting is the primary land use on both public and private lands near the Stevens Creek Project. Agricultural use in the project boundary is limited due to a large amount of wooded lands (FERC 1995). DESC manages timber on a small tract of land within the Stevens Creek Project boundary on the South Carolina side of the reservoir, approximately 10 miles upstream of the Stevens Creek Dam. DESC manages timber in accordance with South Carolina BMPs.

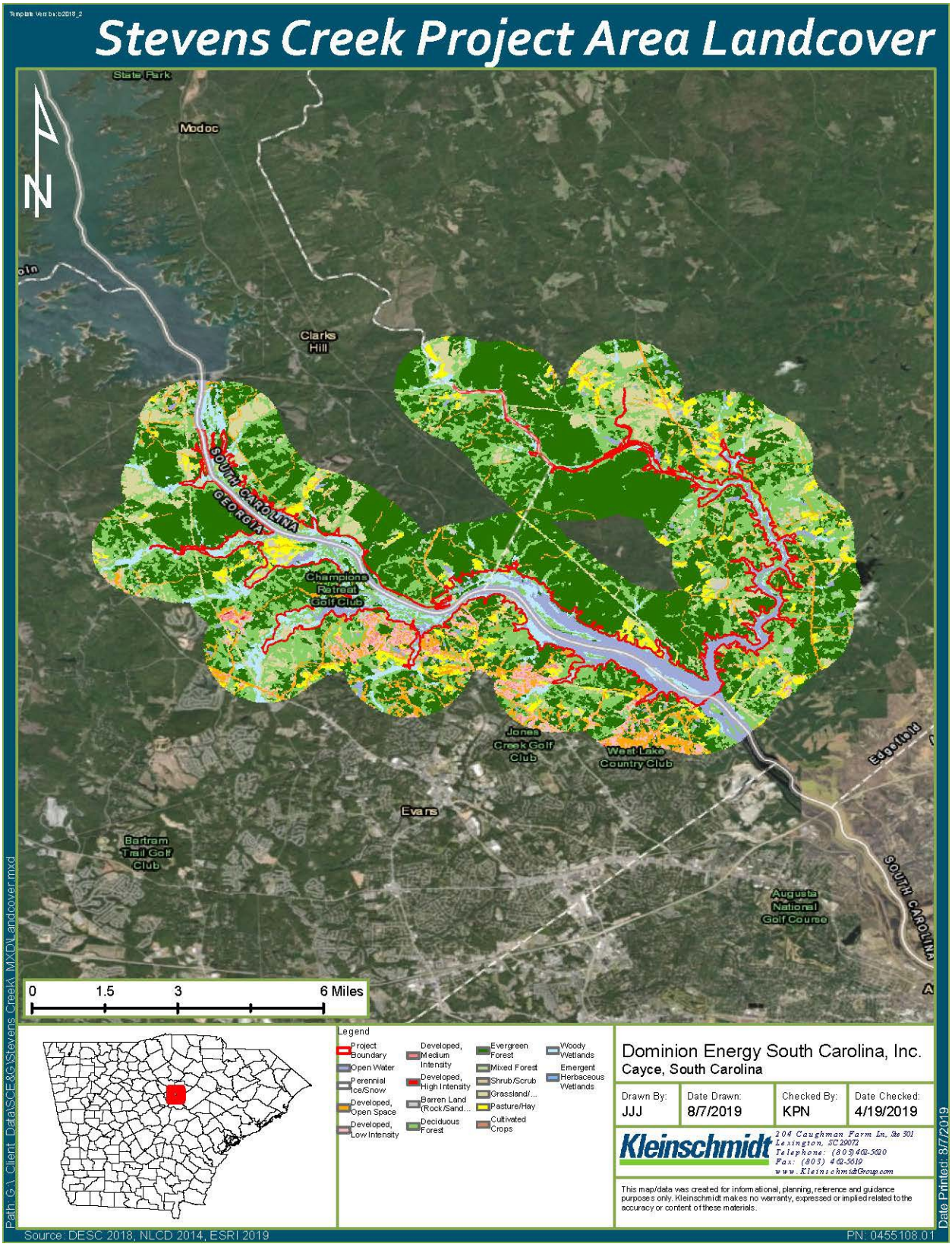

FIGURE 4.14 LAND COVER MAP OF THE STEVENS CREEK PROJECT AREA

4.10.1.3 Current Shoreline Management Plan or Policy

DESC owns limited land surrounding the reservoir and retains flowage easements on the remainder of Stevens Creek Project boundary land. Moreover, all existing shoreline structures on the reservoir are permitted to shoreline property owners through the USACE. Due to limited property ownership and the limited ability for DESC to manage property surrounding the reservoir or permit activities on project shorelines, a formal Shoreline Management Plan is not pertinent for the Stevens Creek Project.

In accordance with license article 410, DESC maintains a buffer of trees along the shoreline of DESC-owned property. DESC encourages reservoir landowners to also maintain a buffer of trees on private property within the Stevens Creek Project boundary. This is consistent with the SCDNR's recommendations regarding riparian forest buffers. The SCDNR recommends a statewide minimum riparian forest buffer width of 35 feet of native vegetation on lands bordering waterways. Additionally, SCDNR recommends expanded buffer widths in non-forested or more developed areas, or areas that would benefit from additional protection measures (SCDNR 2000). The Georgia Erosion and Sedimentation Control Act restricts land disturbance and trimming of vegetation within a 25-foot buffer adjacent to creeks, streams, rivers, and most lakes and ponds (GSWCC 2016).

It is DESC's policy to utilize the SCDHEC Stormwater BMPs during any DESC-implemented construction activities. These BMPs help prevent excessive runoff and erosion resulting from land disturbing activities. General guidelines include fitting the activity to the topography and soils; minimizing erosion of the disturbed areas; stabilizing disturbed areas immediately; retaining or accommodating runoff; retaining sediment; and not encroaching upon water courses. Besides these BMPs, DESC does the following when managing the Stevens Creek Project shoreline:

- Plant alternative native species when possible, paying particular attention to any added benefits of providing food sources and wildlife habitat.
- Ensure materials will, to the extent possible, blend in with the natural environment and maintain project aesthetics.
- Minimize destruction of the natural vegetation directly adjacent to the reservoir, and where possible, on the land inside the project boundary.
- Minimize unauthorized use and vandalism at recreation sites.
- Blend the recreation development into the existing landscape character by selective vegetation removal and landscaping.

- Revegetate, stabilize, and landscape new construction areas and slopes damaged by erosion.

In addition, DESC conducts annual shoreline inspections at the Stevens Creek Project Reservoir. If specific areas of shoreline erosion are identified, DESC will consult with the USFS, GADNR, and SCDNR, as appropriate, to address adverse effects, such as unstable slopes or suspended sediments. Deficiencies of the shoreline are noted and repaired, as necessary and appropriate based on land ownership.

4.10.1.4 Visual Character of the Project Vicinity

The Stevens Creek Project facilities include a 2,000-foot spillway consisting of a cyclopean concrete gravity section with flashboards; a concrete gravity lock between the powerhouse and the spillway section; a reservoir with a surface area of 2,400 acres; a powerhouse integral with the dam that contains a reinforced concrete substructure, a steel-framed brick superstructure, and vertical shaft turbines and generators; a transmission system; and appurtenant facilities. Figure 4.15 through Figure 4.19 include a variety of views of the Stevens Creek Project, including the powerhouse and upstream and downstream views.

FIGURE 4.15 OVERVIEW OF THE STEVENS CREEK PROJECT AREA

FIGURE 4.16 STEVENS CREEK PROJECT POWERHOUSE

FIGURE 4.17 STEVENS CREEK DAM, VIEW LOOKING FROM GEORGIA TOWARDS SOUTH CAROLINA

FIGURE 4.18 STEVENS CREEK PROJECT NAVIGATION LOCK, VIEW LOOKING DOWNSTREAM

FIGURE 4.19 UPSTREAM OF STEVENS CREEK DAM

4.10.1.5 Nearby Scenic Attractions

The SNF, which overlaps with the Stevens Creek Project boundary, is a scenic attraction that brings hikers, boaters, and other visitors to the project vicinity. It is home to many scenic waterfalls, including the popular Yellow Branch Waterfall. The SNF is home to the Chattooga River, a nationally recognized Wild and Scenic River that contains scenic waterfalls and is renowned for its whitewater paddling opportunities (SC Tourism 2019; USDA 2019a). The Francis Marion National Forest is also nearby, and together, the two national forests span a wide variety of environments, featuring forested areas, rivers, and swamps (USDA 2019b).

4.10.1.6 Visual Character of Project Lands and Waters

In the Stevens Creek Project area, views include generally forested rolling hills, rural residential areas, forested areas in various stages of regrowth, the Stevens Creek Dam and associated

facilities, and the open water areas of the Savannah River and Stevens Creek. Most of the shoreline is forested, limiting views from the water to the water's edge. Due to the heavily forested shoreline, there are limited views of timber management areas adjacent to the reservoir that may be considered less aesthetically pleasing. The USFS maintains a streamside buffer zone within SNF by allowing no more than 50 percent of canopy cover to be cut within a 100-foot strip along the shoreline.

Key viewsheds are located at existing public access points at recreation areas, boat ramps, and bridges. This includes the bridge at Highway 28, Fury's Ferry Recreation Site, and Stevens Creek Recreation Site. These points provide generally scenic and unobstructed views of the Savannah River and Stevens Creek.

The hydroelectric facilities, including the powerhouse, lock, and dam, are eligible for the NRHP. The powerhouse is brick and has visually appealing architectural characteristics.

The area downstream of the existing dam and hydroelectric facilities has remained largely undeveloped. The downstream area represents a typical Piedmont riverine system with rocky shoals; mid-stream islands featuring sycamore, willow, and river birch; and forested riverbanks. Stallings Island, a National Historic Landmark, is located directly downstream of the dam and remains in a relatively natural state. Stream banks remain forested down to the river, and instream flows below the dam have not negatively affected the visual integrity of the river.

The Augusta Project is located approximately one mile downstream of the Stevens Creek Project. The Augusta Project diversion dam impounds a small volume of water so that it can be diverted into the Augusta Canal. This one-mile reach below the Stevens Creek Project still exhibits riverine characteristics; however, the diversion dam retains a small amount of water thereby affecting the natural stream flow and visual conditions of the Savannah River between the Stevens Creek Project and the Augusta Project diversion dam. The water released from the Stevens Creek Dam provides flowing water in the river segment immediately downstream of the dam.

4.10.2 Environmental Effects

Resource discussions with relicensing stakeholders have not identified any significant aesthetic effects that would result from the continued operation of the Stevens Creek Project. Potential environmental effects are further explored below.

4.10.2.1 Proposed Action

Adverse visual impacts associated with the Stevens Creek Project are limited to the industrial quality of the substation and adjacent facilities, as well as the exposure of stream or reservoir bottom during water level fluctuation. Visual effects from the industrial nature of the substation are minimal because the facilities are not accessible to the public, cannot be seen from key public viewpoints, and can generally only be seen from the water. For safety reasons, recreational boaters are discouraged from getting too close to the area, thereby limiting their view.

The aesthetic quality of the reservoir shorelines varies daily due to exposure of the stream beds during water level fluctuations; however, this visual impact is minimal. No adverse aesthetic impacts resulting from operation of the Stevens Creek Project are evident downstream.

Since there is limited public viewing of the substation and immediate surroundings, DESC does not propose visual enhancement or mitigation measures.

The current license lists some aesthetic enhancement and mitigation measures, including:

- Develop a plan to control erosion, slope instability, and sedimentation during construction of the proposed recreation enhancements and any other land disturbing or land-clearing activities. DESC must inspect the reservoir shoreline annually for erosion and report its findings to FERC every three years.
- Maintain a buffer area of trees on DESC-owned land around the reservoir to minimize soil erosion and maintain aesthetic quality.
- Protect archaeologic and historic sites within the Stevens Creek Project area by developing and implementing an HPMP.

DESC will continue to follow these measures, which will help maintain and conserve the Stevens Creek Project's shorelines. While DESC is not able to control land use practices on privately owned property outside the project boundary, implementing the above measures should have a positive effect on Stevens Creek Project shorelines by providing a balance between recreational use and development, environmental protection, and energy production.

4.10.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee

is proposing no changes to operations, the effects of the no-action alternative would be identical to that as the proposed action. No adverse effects on land use and aesthetic resources are expected from the no-action alternative.

4.10.2.3 Unavoidable Adverse Effects

Development of private lands outside of the Stevens Creek Project, but adjacent to Stevens Creek Project shorelines will continue into the foreseeable future. Regardless of the implementation of BMPs for the Stevens Creek Reservoir, private development use will continue to affect land use practices surrounding the development.

4.10.3 References

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South Carolina Office of Tourism (SC Tourism). 2019. Chattooga National Wild & Scenic River. South Carolina Department of Parks, Recreation, and Tourism. [Online] URL: https://discoversouthcarolina.com/products/25746. Accessed January 2019.

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USDA. 2019b. Special Places. USDA. [Online] URL: https://www.fs.usda.gov/attmain/scnfs/specialplaces. Accessed January 2019.

4.11 SOCIOECONOMIC RESOURCES

4.11.1 Affected Environment

4.11.1.1 General Land Use Patterns

The Stevens Creek Project area includes lands within Edgefield and McCormick counties, South Carolina and Columbia County, Georgia. Lands within the Stevens Creek Project vicinity, both in Georgia and South Carolina, are primarily privately owned, with rural residential developments scattered throughout. A majority of the Stevens Creek Project area is located within the SNF, which is managed for timber and also provides public recreation. There are also some residential areas within the SNF that are in close proximity to the Stevens Creek Reservoir. The primary land use in the Stevens Creek Project vicinity is timber harvesting. Agriculture is limited because the area is so heavily wooded.

The cities of Augusta, Georgia, and North Augusta, South Carolina, are located approximately six miles south of the Stevens Creek Dam. Suburban development associated with these cities extends north toward the Stevens Creek Project area, especially on the Georgia side of the reservoir; however, the reservoir shoreline remains relatively undeveloped. The reservoir can be accessed by gravel USFS roads, private roads, other local rural roads, and Highway 28, which is the only roadway that crosses the reservoir. Upstream of the Stevens Creek Project are three USACE dams and reservoirs, which all provide public recreation opportunities.

DESC owns approximately 95 acres of land within the Stevens Creek Project boundary and public access is restricted. DESC owns flowage rights on the remainder of land within the project area. DESC maintains a buffer of trees along the shoreline and encourages other reservoir landowners to do the same (FERC 1995).

4.11.1.2 Population Patterns

As of the July 2020 census, 25,657 people were living in Edgefield County, South Carolina. This represents a 4.9 percent decrease from the population estimate at the April 2010 census (U.S. Census 2022b). The population of McCormick County, South Carolina was estimated to be 9,526 in the July 2020 census, representing a 6.9 percent decrease from the April 2010 population estimate (U.S. Census 2022d). The population of South Carolina increased by 10.6 percent during this period, from 4,625,364 in April 2010 to 5,118,425 in April 2020 (U.S. Census 2022e). Table

4.24 provides a summary of population patterns in Edgefield County and McCormick County as compared to those of the state of South Carolina.

TABLE 4.24 POPULATION PATTERNS IN EDGEFIELD AND MCCORMICK COUNTIES, SOUTH CAROLINA

	Edgefield County	McCormick County	South Carolina
Population			
Population (2010)	26,985	10,233	4,625,364
Population (2020)	25,657	9,526	5,118,425
Population Change (2010 to 2020)	-4.9%	-6.9%	10.6%
Geography			
Land Area in square miles (sq mi) (2020)	500.41	359.13	30,064.28
Population Density (people/sq mi) (2020)	51.0	26.5	170.3
Gender			
Female	46.5%	45.8%	51.4%
Male	53.5%	54.2%	48.6%
Age			
Persons under 5 years old	3.9%	2.3%	5.5%
Persons under 18 years old	17.3%	10.9%	21.5%
Persons 65 years old and over	20.0%	35.7%	18.6%
Race			
Caucasian	63.1%	55.4%	68.6%
Black	33.8%	42.5%	26.7%
American Indian and Alaska Native	0.6%	0.2%	0.6%
Asian	0.6%	0.6%	1.9%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%	0.1%
Hispanic or Latino	6.7%	1.6%	6.4%
Two or More Races	1.9%	1.2%	2.1%

Sources: U.S. Census 2022b; 2022d; 2022e

The population of Columbia County, Georgia was estimated at 156,010 at the April 2020 census, representing a 25.7 percent increase from the April 2010 population estimate (U.S. Census 2022a). The population of Georgia increased from approximately 9,687,653 in 2010 to 10,711,908 in 2020, or by 10.5 percent since 2010 (U.S. Census 2022c). Table 4.25 provides a summary of population patterns in Columbia County as compared to those of the state of Georgia.

TABLE 4.25 POPULATION PATTERNS IN COLUMBIA COUNTY, GEORGIA

	Columbia County	Georgia
Population		
Population (2010)	124,053	9,687,653
Population (2020)	156,010	10,711,908
Population Change (2010 to 2020)	25.7%	10.5%
Geography		
Land Area in square miles (sq mi) (2020)	290.19	57,716.96
Population Density (people/sq mi) (2020)	537.6	185.6
Gender		
Female	50.9%	51.2%
Male	49.1%	48.8%
Age		
Persons under 5 years old	5.9%	5.9%
Persons under 18 years old	25.0%	23.4%
Persons 65 years old and over	14.4%	14.7%
Race		
Caucasian	71.3%	59.4%
Black	20.0%	33.0%
American Indian and Alaska Native	0.5%	0.5%
Asian	4.5%	4.6%
Native Hawaiian and Other Pacific Islander	0.2%	0.1%
Hispanic or Latino	7.6%	10.2%
Two or More Races	3.5%	2.4%

Sources: U.S. Census 2021a; 2021c

4.11.1.3 Household/Family Distribution and Income

The estimated number of households in Edgefield County between 2016 and 2020 was 9,171. These households had an average of 2.65 people. The median household income from 2016 to 2020, measured in 2020 dollars, was $52,491 (U.S. Census 2022b). McCormick County had an estimated 3,984 households for the same period, with an average of 2.10 persons per household and a median household income of $47,402 (U.S. Census 2022d). South Carolina had an estimated 1,961,481 households with an average of 2.53 persons per household and a median household income of $54,864 (2020 dollars) during that time (U.S. Census 2022e).

In Columbia County, the estimated number of households was 48,233 during 2016-2020; the average persons per household was 3.19 and the median household income was estimated at $82,251 (in 2020 dollars) (U.S. Census 2022a). Georgia had an estimated 3,830,264 households

during the same period. The average number of persons per household was 2.68 and the median household income was $61,225 (in 2020 dollars) (U.S. Census 2022c).

4.11.2 Project Vicinity Employment Sources

Edgefield County's economy includes sectors that DataUSA (n.d.b.) classifies as farming, fishing, and forestry occupations; utilities; and manufacturing. These sectors respectively employ 4.11, 3.52, and 1.46 times more people than is typical of a county of its size. The largest industries in the county are manufacturing, healthcare and social assistance, and retail (DataUSA n.d.b).

McCormick County's economy includes manufacturing; public administration; and agriculture, forestry, fishing, and hunting occupations, which have 1.94, 1.75, and 1.49 times more employees than is typical for a county of its size. The county's largest industries are manufacturing, healthcare and social assistance, and public administration (DataUSA n.d.d).

Columbia County's economy includes utilities; public administration; and educational services, each respectively employing 3.31, 1.72, and 1.08 times more employees than would be expected in a county of this size. The largest industries in the county are healthcare and social assistance, educational services, and retail (DataUSA n.d.a).

4.11.3 The Regional Economy

The state of South Carolina's economy includes a variety of industries, including tire manufacturing; fabric mills; and fiber, yarn, and thread mills, each respectively employing 11.5, 9.25, and 6.52 times more employees than a state of similar size would be expected to. However, the state's largest industries are classified as restaurants and food services, elementary and secondary schools, and construction (DataUSA, n.d.e.).

Georgia shares many of the same industries as South Carolina and includes specialties such as carpet and rug mills; fiber, yarn, and thread mills; and fabric mills, each respectively employing 19.8, 7.22, and 3.66 times more employees than a state of similar size would be expected to. Similar to South Carolina, the state of Georgia's largest industries are restaurants and food services, elementary and secondary schools, and construction (DataUSA n.d.c).

4.11.4 Environmental Effects

Resource discussions with relicensing stakeholders have not identified any significant socioeconomic effects that would result from the continued operation of the Stevens Creek Project. Potential environmental effects are further explored below.

4.11.4.1 Proposed Action

Continued operation of the Stevens Creek Project may not significantly affect the local economy regarding job creation; however, the Stevens Creek Project provides renewable, low-cost energy, which benefits the public. Recreation site enhancements would likely improve socioeconomic conditions in the surrounding region.

4.11.4.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be identical to that as the proposed action. No adverse effects on socioeconomic resources are expected from the no-action alternative.

4.11.4.3 Unavoidable Adverse Effects

DESC has proposed no changes to operations or the facilities of the Stevens Creek Project that would result in unavoidable adverse effects to socioeconomic resources.

4.11.5 References

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4.12 ENVIRONMENTAL JUSTICE

Pursuant to Executive Orders 12898[7] and 14008[8] FERC is required to complete an analysis of potential impacts from project operations on the local community in the vicinity of the project to understand the impacts to human health and the environment as they relate to environmental justice (EJ) communities, or communities that stand to be disproportionately impacted by construction of a new facility or the continued operation of an existing facility, including socioeconomic and/or sociocultural impacts.

Additionally, the FERC understands that it plays an integral role in regulating large parts of the United States energy industry, having far-reaching impacts to the nation, especially regarding the move toward cleaner energy (FERC 2022). Although FERC is not required to comply with Executive Order 13985[9] the Commission has voluntarily elected to participate in the process, in an effort to ensure everyone can benefit from the clean energy transition (FERC 2022). Pursuant to Executive Order 13985, FERC has developed an Equity Action Plan based on five focus areas, that discusses barriers traditionally experienced by underserved and EJ communities regarding FERC practices, and outlines actions to remove those barriers and foster a commitment to equity (FERC 2022).

The FERC recognizes that many of the licensed hydropower projects were constructed prior to implementation of the National Environmental Policy Act (NEPA), or the issuance of executive orders related to equity or EJ (FERC 2022). The steps taken by FERC related to the three executive orders will include equity considerations when making decisions regarding hydropower relicensing and consider EJ communities as they relate to the relicensing process.

Identification of Environmental Justice Communities

The thresholds used for populations meeting EJ status are as follows:

- For minority populations, the meaningfully greater analysis method was used, where the minority population in a block group is at least 10 percent greater than that of the same population for the county:

[7] Exec. Order No. 12898, 59 Fed. Reg. 7629 (Feb. 16, 1994). Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.
[8] Exec. Order No. 14008, 86 Fed. Reg. 7619-7633 (Jan. 27, 2021) Tackling the Climate Change Crisis at Home and Abroad.
[9] Exec. Order No. 13985 (June 2021). Advancing Racial Equity and Support for Underserved Communities Through the Federal Government.

(County minority population) x (1.10) = threshold above which a minority population must be for inclusion as an EJ community

- The “low-income threshold criteria” was used to identify EJ communities based on income level, where the block group must have a higher percentage of low-income households than the county.

4.12.1 Affected Environment

The Stevens Creek Project is located on the Savannah River in the County of Columbia, Georgia, and the counties of Edgefield and McCormick, South Carolina on approximately 104 acres of federally owned land in the SNF. Within one mile of the Stevens Creek Project there are twenty-four census block groups that could potentially be impacted by relicensing (Figure 4.20). Of the twenty-four census block groups within the Stevens Creek Project area, twelve include EJ communities.

Out of the twelve EJ communities present within the Stevens Creek Project area, eight block groups represent minority populations only and two include low-income populations only. Two of the block groups represent both minority and low-income communities (Table 4.26). The African American race represents the majority of the minority population in seven of the ten EJ communities based on minority populations. Hispanic or Latino populations were the majority minority in Census Track 0301304, Block 4 and Census Track 0301310, Block 1, both in Columbia County, Georgia.

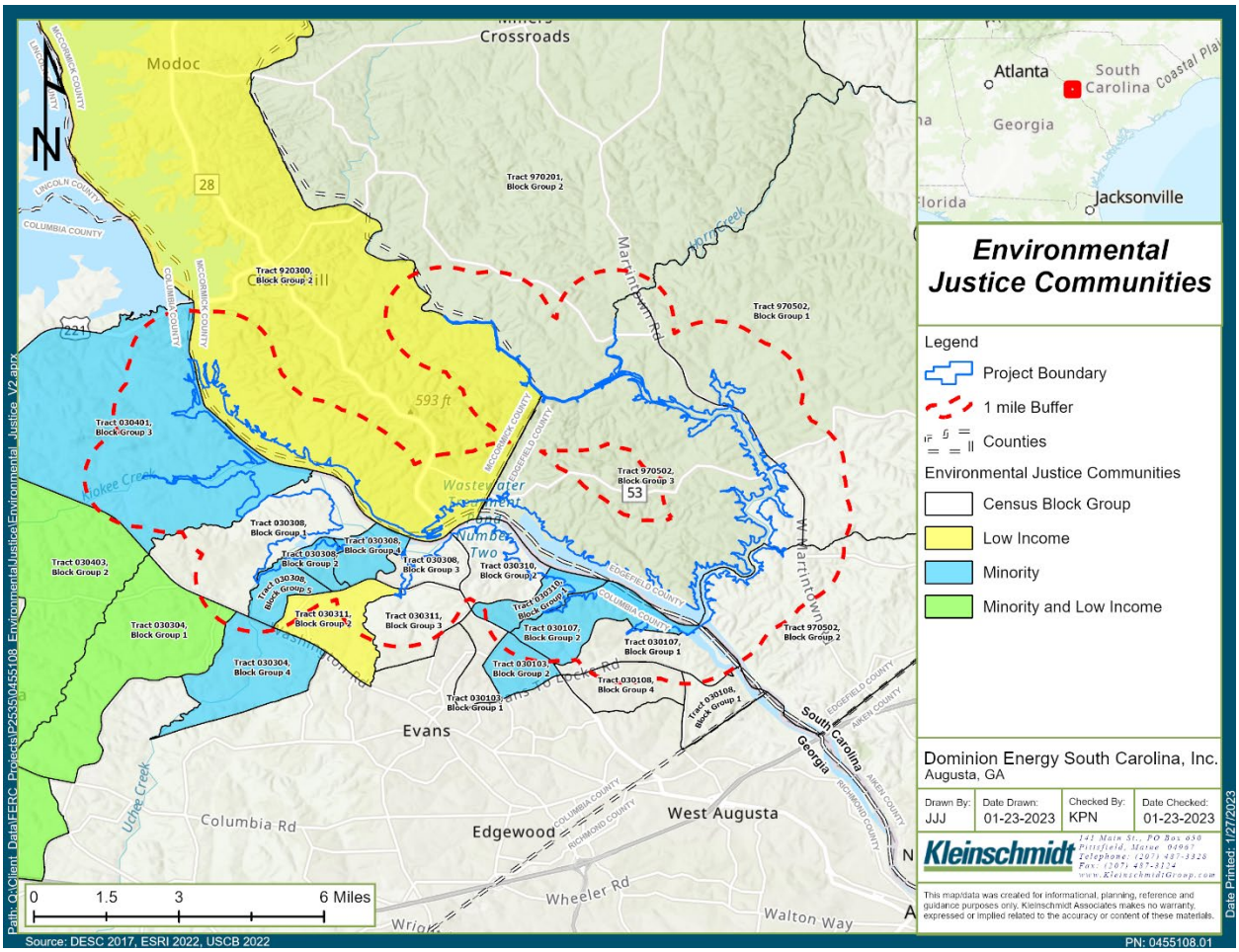

FIGURE 4.20 ENVIRONMENTAL JUSTICE CENSUS BLOCK MAP

TABLE 4.26 COMMUNITY DATA FOR THE 1-MILE ZONE AROUND THE STEVENS CREEK HYDROELECTRIC PROJECT

Geographic Area	Total Population (count)	White Alone, not Hispanic (count)	African American/ Black (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 Population (%)	Households Below Poverty (%)
Georgia	10,516,579	6,020,265	3,319,844	34,962	434,603	7,127	306,609	393,169	1,013,057	52.39%	13.90%
Columbia County	154,257	111,740	25,908	387	6,376	0	1,866	7,980	10,644	34.46%	6.51%
Census Tract 030103, Block Group 1	1,761	1,571	155	0	25	0	0	10	22	12.04%	5.22%
Census Tract 030103, Block Group 2	1,797	1,340	101	0	356	0	0	0	304	**42.35%**	0.72%
Census Tract 030107, Block Group 1	2,772	2,059	94	0	530	0	0	89	0	25.72%	1.16%
Census Tract 030107, Block Group 2	834	477	231	0	126	0	0	0	0	**42.81%**	1.92%
Census Tract 030108, Block Group 1	545	452	0	0	93	0	0	0	0	17.06%	0.00%
Census Tract 030108, Block Group 4	1,995	1,738	21	0	208	0	0	28	0	12.88%	0.00%
Census Tract 030304, Block Group 1	2,268	1,287	831	0	126	0	13	11	24	**44.31%**	**7.65%**
Census Tract 030304, Block Group 4	3,818	2,836	361	0	471	0	24	126	507	**39.00%**	4.19%
Census Tract 030308, Block Group 1	4,609	3,858	380	0	6	0	39	326	166	19.90%	5.12%
Census Tract 030308, Block Group 2	1,782	1,144	400	0	41	0	0	197	45	**38.33%**	4.15%
Census Tract 030308, Block Group 3	2,016	1,848	17	0	0	0	76	75	85	12.55%	1.24%
Census Tract 030308, Block Group 4	2,903	1,922	486	0	58	0	271	166	420	**48.26%**	0.49%
Census Tract 030308, Block Group 5	977	619	181	0	31	0	0	146	50	**41.76%**	0.00%
Census Tract 030310, Block Group 1	2,470	1,875	88	3	121	0	316	67	458	**42.63%**	1.85%
Census Tract 030310, Block Group 2	1,507	1,456	0	0	51	0	0	0	0	3.38%	0.00%
Census Tract 030311, Block Group 2	1,225	1,188	21	0	0	0	0	16	0	3.02%	**6.61%**
Census Tract 030311, Block Group 3	1,680	1,425	52	0	131	0	0	72	94	20.77%	0.00%
Census Tract 030401, Block Group 3	926	274	625	0	0	0	0	27	27	**73.33%**	4.00%
Census Tract 030403, Block Group 2	2,264	917	1,271	0	0	0	0	76	8	**59.85%**	**30.21%**

South Carolina	5,091,517	3,386,329	1,346,560	16,951	83,573	3,633	102,760	151,711	296,897	39.32%	14.27%
Edgefield County	27,021	16,344	9,459	76	43	23	533	543	1,633	45.56%	13.86%
Census Tract 970201, Block Group 2	973	959	14	0	0	0	0	0	0	1.44%	2.57%
Census Tract 970502, Block Group 1	2,151	2,086	26	0	14	0	0	25	234	13.90%	13.81%
Census Tract 970502, Block Group 2	2,759	2,051	558	0	11	0	40	99	75	28.38%	7.25%
Census Tract 970502, Block Group 3	623	538	0	18	0	0	0	67	159	39.17%	0.00%
McCormick County	9,495	4,928	4,185	0	21	0	47	314	115	49.31%	13.39%
Census Tract 920300, Block Group 2	1,403	1,018	304	0	0	0	34	47	87	33.64%	**14.62%**

4.12.2 Environmental Effects

Resource discussions with relicensing stakeholders have not identified any significant concerns for EJ communities that would result from the continued operation of the Stevens Creek Project under the proposed action. Potential environmental effects are further explored below.

4.12.2.1 Proposed Action

The FERC has implemented an Equity Action Plan for addressing EJ concerns at the Commission level. The USEPA issued a 2016 guidance document for assessing EJ within a regulatory context, and although the environmental stressors are different, the following three questions posed by the USEPA document are transferable:

- Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for the population groups of concern in the baseline?
- For the regulatory option(s) under consideration, are potential EJ concerns created or mitigated compared to the baseline?
- Are there potential EJ concerns associated with environmental stressors affected by the regulatory action for population groups of concern for the regulatory option(s) under consideration?

BASELINE CONDITIONS

The Stevens Creek Project has been in place since 1914, providing safe and renewable power to the region (REW 2014) as well as recreational opportunities to the public. The Stevens Creek Project is operated as a re-regulating facility to mitigate downstream effects from the upstream Thurmond Dam, providing an important service to downstream resources and residents by softening the flow released from the upstream facility.

The primary uses of the land within the Stevens Creek Project area include hydroelectric power generation and associated maintenance activities, and recreation. There is minimal agricultural use of the surrounding land and reservoir, as well as limited residential use, due to the heavily forested nature of the region.

PROPOSED ACTION CONSIDERATIONS

According to the 2020 U.S. Census there has been a steady decrease since 2010 in the population of residents identifying as African American in Edgefield and McCormick counties, South Carolina, with either the same population, or a slight increase in the population of all other

surveyed choices for race (U.S. Census 2022b, 2022d). In Columbia County, Georgia, all potential EJ groups have seen an increase in population (U.S. Census 2022a). The population increase of EJ groups in each county indicates that there is the potential for more communities to be impacted by decisions made as part of this relicensing. However, the Licensee for the Stevens Creek Project is not proposing changes to current operations or infrastructure as part of this relicensing process. Impacts to shoreline property owned by EJ communities or archeological or tribal sites within the Stevens Creek Project area are not anticipated to change as a result of this relicensing.

4.12.2.2 No-Action Alternative

The no-action alternative is the baseline from which to compare the proposed action to other action alternatives. Under the no-action alternative, the Stevens Creek Project would continue to operate under the terms and conditions of the current license. As such, and because the Licensee is proposing no changes to operations, the effects of the no-action alternative would be identical to that as the proposed action. No adverse effects on environmental justice communities are expected from the no-action alternative.

4.12.2.3 Unavoidable Adverse Effects

No infrastructure or operational changes are proposed; therefore, relicensing, and continued operation of the Stevens Creek Project is not expected to have any new unavoidable adverse effects on EJ communities.

4.12.3 References

Federal Energy Regulatory Commission (FERC). 2022. Equity Action Plan. Retrieved from file:///J:/012/217/Docs/FLA/Exhibit%20E/Environmental%20Justice/Equity%20Action%20Plan%20for%20FERC%20EO13985.pdf on August 31, 2022.

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United States Environmental Protection Agency (USEPA). 2016. Technical Guidance for Assessing Environmental Justice in Regulatory Analysis. Retrieved from https://www.epa.gov/sites/default/files/2016-06/documents/ejtg_5_6_16_v5.1.pdf on August 31, 2022.

5.0 DEVELOPMENTAL ANALYSIS

The objective of a developmental analysis is to explain the electric power benefits of a project, as well as to describe the cost, power value, and net benefit for the proposed action and the no-action alternative. The developmental analysis also summarizes, and provides the estimated cost for each proposed environmental measure for the PM&E. For the purposes of this application, relevant information for the Developmental Analysis will be provided in the Exhibit D of the FLA. General information regarding the power and economic benefits of the Stevens Creek Project is nevertheless provided in the following sections.

5.1 POWER AND ECONOMIC BENEFITS

The Stevens Creek Project has an authorized installed generation capacity of 17.28 MW. The average annual generation figure for the Stevens Creek Project is 63,000 MWh. Under the proposed action, the Stevens Creek Project would continue to operate as currently authorized under the existing license, re-regulating flows from the Thurmond Dam.

Information regarding the power and economic benefits of the Stevens Creek Project will be included in Exhibits D and H of the FLA.

5.2 COMPARISON OF ALTERNATIVES

A comparison of the economics of the proposed action will be included in Exhibits D of the FLA.

5.2.1 Proposed Action

Under the proposed action, DESC would continue to operate the Stevens Creek Project as currently authorized under the existing license, with the function of re-regulating flows from the upstream Thurmond Dam. DESC is proposing a number of additional PM&E measures through this application. The cost of each measure will be estimated in the Exhibit D of the FLA.

5.2.2 No Action Alternative

Under the no action alternative, the Stevens Creek Project would continue to operate as currently licensed. Average annual generation would be assumed to remain consistent with historical MWhs. Additional information regarding an average annual value of power will be included in Exhibit D of the FLA.

5.3 COST OF ENVIRONMENTAL MEASURES

The cost of environmental measures will be included in Exhibit D of the FLA.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 COMPARISON OF ALTERNATIVES

The purpose of this section is to compare the effects of the proposed action and the no action alternatives.

TABLE 6.1 COMPARISON OF EFFECTS OF PROPOSED ACTION AND NO ACTION ALTERNATIVE

Resource	Proposed Action	No Action Alternative
Generation	63,000 MWh/year	63,000 MWh/year
Geology and Soils	• No change • DESC would continue to monitor and implement erosion control measures at the Project	• No change • SCE&G would continue to monitor and implement erosion control measures at the Project
Water Resources	• TBD - Targeted water quality monitoring discussed in consultation with TWC	• No change • Continued implementation of the existing Water Quality Monitoring Plan
Fishery Resources	• Continuation of the Fish Passage TWC to guide discussions and studies relating to fish passage implementation • Fish entrainment enhancement funds would be provided in the same form or manner as in Article 406 of the existing license • No change in reservoir fluctuations	• No change • Article 406 would continue to be implemented (no change between either alternative) • No change in reservoir fluctuations
Terrestrial & Riparian Resources	• No change	• No change
RT&E Species	• No change	• No change
Recreation	• Recreation at the Project would be enhanced through recreation site improvements at certain facilities	• No change
Cultural	• Cultural resources would be preserved and mitigated through implementation of the HPMP	• No change
Land Use & Aesthetics	• No change	• No change
Socioeconomic	• Recreation site enhancements would likely improve socioeconomic conditions in the surrounding region	• No change

Resource	Proposed Action	No Action Alternative
Environmental Justice	• No change	• No change

6.2 UNAVOIDABLE ADVERSE EFFECTS

The following unavoidable adverse effects have been identified for the Project, regardless of what alternative is undertaken:

Geology and Soils - Reservoir fluctuations, wind and wave action, and natural riverine processes, particularly within the Stevens Creek arm, could have adverse impacts on erodible soils around the shoreline areas and siltation within the reservoir. While no areas of significant or troublesome erosion have been identified at this time, continued monitoring and potential mitigation and armoring of identified areas by DESC would likely reduce the extent of these adverse impacts.

Water Quality - The Stevens Creek Project reservoir experiences seasonally low DO levels as a result of releases from USACE's Thurmond Dam. However, DO levels improve as they pass through the Stevens Creek Project and have consistently exceeded state water quality standards in the tailrace. Unless additional measures are implemented by the USACE, which is entirely outside of the licensee's control, the reservoir is likely to continue to experience seasonally low DO levels under the proposed action. Additionally, low DO levels have been observed within Stevens Creek and additional information is being gathered to understand how these conditions may be exacerbated by re-regulation operations. Re-regulation operations are proposed to continue under the new license, therefore water quality impacts resulting from these operations may be considered unavoidable if reasonable PM&E measures are unavailable.

Fishery Resources - Some level of fish entrainment mortality would continue to occur at the Stevens Creek Project. Long-term impacts to the fishery are expected to be minor given the existing condition of the fishery in the vicinity of the Project. Additionally, reservoir fluctuations would continue to occur as a result of re-regulation operations.

RT&E Species – Project operations, in addition to high inflows to the Project, have the potential to create downstream flow fluctuations. These may interfere with the spawning of various RT&E species.

Recreation - Proposed civil improvements at Stevens Creek Project recreation sites would likely result in temporary visual and audible effects. Recreation site construction activities could also temporarily affect access at the site and may require the targeted clearing of riparian and upland vegetation for proposed amenities. Implementation of BMPs, as well as thoughtful timing on construction activities would minimize unavoidable adverse effects to the recreators, as well as environmental resources.

Land Use and Aesthetics - Development of private lands outside of the Stevens Creek Project, but adjacent to Stevens Creek Project shorelines will continue into the foreseeable future. Regardless of the implementation of BMPs for the Stevens Creek Reservoir, private development use will continue to affect land use practices surrounding the development.

Unavoidable adverse effects were not identified for the following resources: Terrestrial and Riparian Resources, Cultural Resources, Socioeconomic Resources, and Environmental Justice.

6.3 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a) of the FPA, 16 U.S.C. § 803(a)(2)(A), requires FERC to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the Stevens Creek Project. On April 27, 1988, FERC issued Order No. 481—A revising Order No. 481, issued October 26, 1987, establishing that FERC will accord FPA Section 10(a)(2)(A) comprehensive plan status to any federal or state plan that:

- Is a comprehensive study of one or more of the beneficial uses of a waterway or waterways;
- Specifies the standards, the data, and the methodology used; and
- Is filed with the Secretary of the Commission.

FERC currently lists comprehensive plans for the State of South Carolina, State of Georgia, and United States resources. Of the listed plans, 32 are potentially relevant to the Stevens Creek Project, as detailed below in Table 6.2.

TABLE 6.2 COMPREHENSIVE PLANS RELEVANT TO THE STEVENS CREEK PROJECT

Resource	Comprehensive Plan
Fisheries Resources	Atlantic States Marine Fisheries Commission. 1998. Amendment 1 to the Interstate Fishery Management Plan for Atlantic sturgeon (*Acipenser oxyrhynchus oxyrhynchus*). (Report No. 31). July 1998.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 1998. Interstate fishery management plan for Atlantic stiped bass. (Report No. 34). January 1998.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for American eel (*Anguilla rostrata*). (Report No. 36). April 2000.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2000. Technical Addendum 1 to Amendment 1 of the Interstate Fishery Management Plan for shad and river herring. February 9, 2000.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2008. Amendment 2 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2008.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2009. Amendment 2 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. May 2009.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2020. Amendment 3 to the Interstate Fishery Management Plan for shad and river herring, Arlington, Virginia. February 2010.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2013. Amendment 3 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. August 2013.
Fisheries Resources	Atlantic States Marine Fisheries Commission. 2014. Amendment 4 to the Interstate Fishery Management Plan for American eel. Arlington, Virginia. October 2014.
Water Resources	Department of the Army, Corps of Engineers. Savannah District. 1983. Northeast Georgia region water resources management study. Savannah, Georgia. September 1983.
Water Resources	Department of the Army, Corps of Engineers. Savannah District. 1985. Water resources development by the U.S. Army Corps of Engineers in Georgia. Savannah, Georgia. January 1985.
Water Resources	Georgia Department of Natural Resources. 1986. Water availability and use – Savannah River Basin. Atlanta, Georgia.
Recreation and Land Use Resources	Georgia Department of Natural Resources. 2008. Georgia Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2008-2013.

Resource	Comprehensive Plan
Fisheries Resources	National Marine Fisheries Service. 1998. Final Recovery Plan for the shortnose sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. December 1998.
Recreation and Land Use Resources	National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.
Water Resources	State of Georgia. Office of the Governor. 1987. Water resources management strategy-summary document. Atlanta, Georgia. January 12, 1987.
Fisheries Resources	U.S. Fish and Wildlife Service. n.d. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.
Fisheries Resources	U.S. Fish and Wildlife Service and National Marine Fisheries Service. 2005. Diadromous fish restoration plan for the Middle Savannah River: strategy and implementation schedule. Charleston, South Carolina. August 2005.
Recreation and Land Use Resources	Forest Service. 2004. Sumter National Forest revised land and resource management plan. Department of Agriculture, Columbia, South Carolina. January 2004.
Water Resources	South Carolina Department of Health and Environmental Control. 1989. Assessment of non-point source pollution for the State of South Carolina. Columbia, South Carolina. April 1989.
Water Resources	South Carolina Department of Health and Environmental Control. 1989. Non-point source management program for the State of South Carolina. Columbia, South Carolina. April 1989.
Recreation and Land Use Resources	South Carolina Department of Parks, Recreation, & Tourism. 2008. South Carolina State Comprehensive Outdoor Recreation Plan (SCORP). Columbia, South Carolina. April 2008.
Recreation and Land Use Resources	South Carolina Department of Parks, Recreation, & Tourism. 2002. The South Carolina State Trails Plan. Columbia, South Carolina. 2002.
Fisheries and Aquatic/Wildlife and Botanical Resources	South Carolina Department of Natural Resources. 2014. South Carolina's State Wildlife Action Plan 2015. Columbia, South Carolina. October 2014.
Water Resources	South Carolina Department of Natural Resources. 2004. South Carolina Water Plan-Second Edition. Columbia, South Carolina. January 2004.
Water Resources	South Carolina Water Resources Commission. 1985. Instream flow study – Phase I: identification and priority listing of streams in South Carolina for which minimum flow levels need to be established. Report No. 149. Columbia, South Carolina. June 1985.

Resource	Comprehensive Plan
Water Resources	South Carolina Water Resources Commission. 1988. Instream flow study – Phase II: determination of minimum flow standards to protect instream uses in priority stream segments. Report No. 163. Columbia, South Carolina. May 1988.
Recreation and Land Use Resources	South Carolina Water Resources Commission. National Park Service. 1988. South Carolina rivers assessment. Columbia, South Carolina. September 1988.
Water Resources	South Carolina Wildlife and Marine Resources Department. 1989. South Carolina instream flow studies: a status report. Columbia, South Carolina. June 1, 1989.
Fisheries Resources	U.S. Fish and Wildlife Service. 1994. Elements of consensus on American shad management in the stretch of Savannah River between Strom Thurmond (Clarks Hill) Dam and Augusta. Department of the Interior, Charleston, South Carolina. October 1994.
Wildlife Resources	U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986.

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