

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

South Carolina Electric and Gas Company, South Carolina

Project No. 516-459

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(July 20, 2010)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission or FERC's) regulations, 18 Code of Federal Regulations (CFR) Part 380 (Order No. 486, 52 Federal Register [FR] 47897), the Office of Energy Projects has reviewed South Carolina Electric and Gas Company's application for license for the Saluda Hydroelectric Project (FERC Project No. 516), located on Saluda River in Richland, Lexington, Saluda, and Newberry counties, near Columbia, South Carolina. The project does not occupy any federal lands.

This environmental assessment (EA) contains staff's analysis of the potential environmental effects of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's website at www.ferc.gov using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov ; toll-free at 1-866-208-3676, or for TTY, 202-502-8659.

For further information, contact Lee Emery by telephone at (202) 502-8379, or by email at lee.emery@ferc.gov.

Kimberly D. Bose,
Secretary.

**ENVIRONMENTAL ASSESSMENT
FOR HYDROPOWER LICENSE**

Saluda Hydroelectric Project—FERC Project No. 516-459

South Carolina

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
888 First Street, NE
Washington, DC 20426

July 2010

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ACRONYMS AND ABBREVIATIONS

Buffer Plan	Buffer Zone and Shallow Water Habitat Management Plan
°C	degrees Celsius
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
Council	South Carolina Aquatic Plant Management Council
DO	dissolved oxygen
EA	environmental assessment
EFH	Essential Fish Habitat
EPT	Ephemeroptera, Plecoptera, and Trichoptera
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
HPMP	Historic Properties Management Plan
IFIM	Instream Flow Incremental Methodology
Interior	U.S. Department of the Interior
kV	kilovolt
Low Inflow Protocol	Maintenance, Emergency, and Low Inflow Protocol
Entrainment Program	Fish Entrainment Mitigation Program
Fish Monitoring Program	Lower Saluda River Fish Community Monitoring Program
mg/L	milligrams per liter
Macroinvertebrate Program	Lower Saluda River Benthic Macroinvertebrate Monitoring and Enhancement Program
Mussel Program	Freshwater Mussel Enhancement Program
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
NAVD88	North American Vertical Datum of 1988
NMFS	National Marine Fisheries Service
NPS	U.S. Department of the Interior, National Park Service
permitting handbook	Lake Murray Shoreline Management Handbook and Permitting Guidelines
<i>Plant and Animal</i> brochure	Rare Plant and Animal Species of Interest around Lake Murray and the Lower Saluda River brochure
Saluda Settlement	Comprehensive Relicensing Settlement Agreement
Santee Basin Accord	Santee River Basin Accord for Diadromous Fish Protection, Restoration, and Enhancement
SCE&G	South Carolina Electric & Gas Company
SERC	Southeastern Electric Reliability Council
SHPO	State Historic Preservation Officer

SMP	Shoreline Management Plan
South Carolina DHEC	South Carolina Department of Health and Environmental Control
South Carolina DNR	South Carolina Department of Natural Resources
Sturgeon Program	Sturgeon Protection and Adaptive Management Plan
T&E Program	Rare, Threatened, and Endangered Species Management Program
Tribes	Catawba Indian Nation and Eastern Band of Cherokee Indians
Trout Program	Trout Evaluation and Monitoring Program
USGS	U.S. Geological Survey
VACAR	Virginia-Carolinas
Warning Siren	
Enhancement Program	Lower Saluda River Warning System Enhancement Plan
Woody Debris Plan	Woody Debris Management Plan
Working Group	Saluda Hydro Freshwater Mussel Working Group
WUA	weighted usable area

EXECUTIVE SUMMARY

On August 28, 2008, South Carolina Electric & Gas Company (SCE&G) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) for a new license to operate and maintain the 207.3-megawatt (MW) Saluda Hydroelectric Project. The project is located on the Saluda River in Lexington, Richland, Newberry, and Saluda counties, South Carolina. The project does not occupy any federal lands.

On July 31, 2009, SCE&G filed a Comprehensive Relicensing Settlement Agreement (Saluda Settlement). The Saluda Settlement¹ replaces and completes the proposed measures included in the license application and includes a wide range of environmental protection and enhancement measures.

Proposed Action

The project consists of a 7,800-foot-long, 213-foot-high dam (Saluda dam) creating a 41-mile-long, 50,900-acre reservoir (Lake Murray) at a full pool elevation of 385.5 feet. South Carolina Highway 6 (Highway 6) southbound lanes run along the top of the dam and the northbound lanes are between the original dam and the backup dam. A dike extends from the north end of the dam and runs parallel to Highway 6. An emergency spillway is located beyond the south end of the dam, and the spillway channel reconnects with the Saluda River about 0.75 mile downstream of the Saluda powerhouse. A compacted concrete backup dam is located along the downstream toe of the Saluda dam. The proposed upgrades would increase the design capacity from the licensed 207.3 to 247 MW. SCE&G proposes turbine upgrades and operational changes to improve water quality and aquatic habitat downstream of the dam. SCE&G operates the project to manage reservoir water surface elevations on a seasonal basis and to provide reserve generation on an as-needed basis to its electrical system by releasing water stored in Lake Murray. The project and its operations are described in more detail in section 2.1.

Proposed Measures

SCE&G proposes to provide increased minimum flows and recreational boating releases to the lower Saluda River, maintain higher water surface elevations in Lake Murray, and implement a Maintenance, Emergency, and Low Inflow Protocol (Low Inflow Protocol) with a trigger at 1 foot below the proposed guide curve elevation that would reduce flows to the lower Saluda River during low inflow conditions. SCE&G also proposes to implement a variety of resource management plans and programs relating to the enhancement of: (1) aquatic resources, including macroinvertebrates,

¹ The Saluda Settlement is available on the Commission's website from the eLibrary feature at <http://www.ferc.gov/docs-filing/elibrary.asp>. The accession number is 20090731-5124.

freshwater mussels, diadromous fish, shortnose sturgeon, trout, and fish community populations in the lower Saluda River; (2) rare, threatened, and endangered species; (3) existing and future recreation facilities; (4) shoreline management, including sedimentation and erosion control, woody debris, and buffer zones; (5) warning systems for recreational users in the lower Saluda River; and (6) historic properties. These measures are described in detail in sections 2.2.2 and 2.2.3 of this environmental assessment (EA).

Alternatives Considered

In this EA, we analyze the effects of continued project operation and recommend conditions for a new license for the project. In addition to SCE&G's proposed action, we consider two alternatives: (1) the proposed action with staff modifications (staff alternative) and (2) no action.

The staff alternative includes SCE&G's proposals included in the Saluda Settlement to implement: (1) the Flow Release Program that provides various flow releases under various inflow conditions and the associated Low Inflow Protocol to address minimum flows and recreational boating releases to the lower Saluda River during low-inflow conditions; (2) the Normal Reservoir Operating Guidelines to maintain higher water surface elevations in Lake Murray; (3) the Reservoir Drawdown Plan; (4) an adaptive management team to periodically review the effectiveness of proposed project operations and minimum flow releases at protecting and enhancing aquatic resources; (5) an operational compliance monitoring plan; (6) upgrades of unit runners to improve dissolved oxygen (DO) in the lower Saluda River; (7) the Lower Saluda River Benthic Macroinvertebrates Monitoring and Enhancement Plan; (8) the Freshwater Mussel Restoration Program (Mussel Program), except for the funding provision of contributing \$75,000 to the U.S. Department of the Interior, Fish and Wildlife Service, for mussel experimental studies and restoration/reintroduction activities; (9) Unit 5 hydroacoustic monitoring to minimize fish entrainment and consultation with the agencies on how best to operate Unit 5 to maintain coolwater fish habitat in both the reservoir and in the lower Saluda River downstream; (10) the Shortnose Sturgeon Protection and Adaptive Management Program (Sturgeon Program); (11) the Santee Basin Accord provisions that directly relate to project operations; (12) the Trout Program provisions that directly relate to project operations; (13) the Lower Saluda River Fish Community Monitoring Program (Fish Monitoring Program); (14) the Rare, Threatened, and Endangered Species Management Program; (15) coordination with the South Carolina Department of Natural Resources (South Carolina DNR) Aquatic Nuisance Species Program and the South Carolina Aquatic Plant Management Council on managing invasive aquatic plants at the project and also developing a public education program to inform the public about terrestrial and aquatic invasive species entering the project area; (16) leasing lands to the South Carolina DNR for placement and maintenance in the Wildlife Management Area Program; (17) designation of Lunch Island as a protected area for purple martin; (18)

distribution of the Rare Plant and Animal Species of Interest around Lake Murray and the Lower Saluda River brochure to inform the public of the life history, conservation status, and habitat needs of rare species and species of interest located at the project; (19) the final Recreation Plan for upgrading existing and developing future recreation facilities, including improved facilities and barrier-free access at certain recreation sites; (20) certain recreational flow releases to the lower Saluda River totaling about 45,000 acre-feet annually for wade angling, whitewater boating, and swift water rescue training; (21) the Lower Saluda River Warning System Enhancement Program; (22) the Shoreline Management Plan (SMP), including the SMP's Woody Debris Plan, Buffer Plan, and Erosion Control Plan; and (23) the final Historic Properties Management Plan.

The staff alternative includes a number of additional measures. First, we include in the Low Inflow Protocol, a trigger at 2 feet below the proposed guide curve elevation to begin reducing flows to the lower Saluda River during low inflow conditions.

Second, we modify the final Mussel Program to include a provision to tag and relocate, as a one-time event, any mussels found on the Saluda River side of the Congaree River during monitoring, to the Broad River side of the river. If larger than expected numbers of mussels are captured, such that tagging and relocation of all of the captured mussels would be difficult or infeasible, SCE&G would consult with the Saluda Hydro Freshwater Mussel Working Group (Working Group) to determine whether modifications to this tagging and relocation program should be made. We also recommend modifying the Mussel Program to include a provision for monitoring four locations on the Broad River side of the Congaree River having concentrations of mussels, for 5 years, with the caveat that, if less than four suitable monitoring locations are found, this monitoring could occur with less than four locations. Upon conclusion of the monitoring, we recommend that SCE&G and the Mussel Working Group review the monitoring results and make recommendations for further measures, with a report on the results and any recommendations to be filed with the Commission. If any proposed measures would involve changes to the license, SCE&G should file those proposed measures for Commission approval.

Third, we add a reporting requirement to the Fish Monitoring Program requiring that SCE&G report the program's monitoring results to the Commission and resource agencies for a period of 5 years after each generating unit is upgraded.

Fourth, in addition to coordination with the South Carolina DNR's Aquatic Nuisance Species Program, we add provisions for public education about how to identify snakeheads, report snakehead captures, and consult with the resource agencies regarding further monitoring and control measures if snakeheads or other exotic terrestrial and aquatic invasive species are detected in the project area.

Fifth, we recommend adding four provisions to the final SMP that would require SCE&G to: (1) after consultation with the settlement parties and Cloud's Creek Properties, LLC, develop procedures to allow existing structures to remain within the SMP's buffer zone (i.e., a grandfather clause); (2) file an annual report documenting the permits granted for dock facilities that exceed 10 slips, including the location, type, and number of authorized slips for each facility; (3) annually file a revised exhibit G, for Commission approval, if any buffer zone lands are acquired; and (4) continue to provide overnight anchoring at Hurricane Cove and Two Bird Cove.

Sixth, the staff alternative includes a recommendation for the Commission to reserve its authority to require fishways that may in the future, be prescribed by the U.S. Department of the Interior or the National Marine Fisheries Service. Finally, we recommend that the National Park Service should be a member of the adaptive management team that is involved in determining the effects of the project's proposed flow releases on striped bass and other resources.

Public Involvement and Areas of Concern

Before filing its license application, SCE&G conducted a prefilings consultation process under the Commission's traditional licensing process. The intent of the Commission's prefilings process is to initiate public involvement early in the project planning process and to encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to the formal submittal of the license application with the Commission. After the application was filed, we conducted scoping to determine what issues and alternatives to address in this EA. We distributed a scoping document to interested parties on March 12, 2009, and held two scoping meetings in Columbia, South Carolina, on April 7, 2009. On July 31, 2009, we requested conditions and recommendations in response to the notice of ready for environmental analysis.

On March 24, 2010, the Commission issued a notice of availability of the draft EA, which set a deadline of May 11, 2010, for filing comments. Comments were received from the National Marine Fisheries Service; SCE&G; Al Billings; John Frick; FWS; South Carolina DNR; American Whitewater; U.S. Department of the Interior, National Park Service; Steve Bell, Lake Murray Watch; Coleman Parks, Advance Land and Timber, LLC; Dave Landis, The Lake Murray Association, Inc.; Robert Sellers, CRW Investments, Inc.; and Beth Trump, Cloud's Creek Properties LLC. Appendix A summarizes the comments that were filed and our responses to the comments. As appropriate, we have modified the text of this EA in response to comments received on the draft EA.

The primary issues associated with relicensing the project are the elevation that would trigger reduced flow releases into the lower Saluda River during low flow conditions and the proposed SMP's shoreline classifications and restrictions associated with each classification.

Project Effects

Water Resources

Under SCE&G's proposal, maximum and minimum reservoir levels would be higher under the new guide curve, minimum flows to the lower Saluda River would be higher under the flow release regime, and drawdowns would be scheduled every 3 years depending on inflow to the lake. With the higher reservoir levels, we would expect that the long-term rate of net sediment accumulation would increase slightly near the points of entry of the upper Saluda River and tributaries into Lake Murray, compared to current rates. SCE&G would start to reduce flow releases to the lower Saluda River during low inflow conditions when the reservoir level reaches 1 foot below the proposed new guide curve. Higher minimum flows to the lower Saluda River and upgrading the turbine runners would improve DO conditions in the lower Saluda River.

Under the staff alternative, the proposed reductions in flow releases to the lower Saluda River would not be implemented until the reservoir water level reached 2 feet below the new guide curve during low inflow conditions, resulting in slightly lower lake levels during drought conditions. Our alternative would provide more protection to the aquatic habitat in the lower Saluda River during drought conditions.

Aquatic Resources

Higher water levels in Lake Murray and reduced drawdowns under the SCE&G proposal would benefit the resident fisheries in the lake. Reduced drawdowns would inundate about 4,000 more acres of shallow water habitat during the normal spawning and rearing period (growing season) from March to September for most of the resident fish species. In general, increased minimum flows to the lower Saluda River would improve conditions for aquatic resources. Increased flow releases to the lower Saluda River in the spring also would provide favorable spawning conditions for striped bass in the Congaree River (located about 10 miles downstream from the project). SCE&G's proposal includes studies and monitoring of freshwater mussels, trout, shortnose sturgeon, and the fish community in the lower Saluda River that are designed to provide state and federal resource agencies with more information about the abundance and behavior of these species under the proposed operating scenarios as well as provide them with information that would assist in their general management of these species. SCE&G's proposal also provides for compensation to be provided to South Carolina DNR for fish lost to entrainment.

Under normal conditions the staff alternative would provide the same benefits to fisheries as SCE&G's proposal. However, under our proposed alternative during low flow conditions, reductions in flows to the lower Saluda River would not start until the reservoir water level reaches 2 feet below the proposed new guide curve, resulting in slightly lower lake levels and slightly higher flow releases to the lower Saluda River

during low inflow conditions. The staff alternative includes proposed mussel and fish monitoring designed to assess project operational effects on mussels and certain fish species; however, the staff alternative does not include proposed monitoring for the purpose of providing the resource agencies with information needed to inform the agencies' general management of the species. The staff alternative also does not include SCE&G's proposal to provide South Carolina DNR with compensation for fish lost to entrainment.

Terrestrial Resources

Under both SCE&G's proposal and the staff alternative, rare species such as the bald eagle, rocky shoals spider lily, and purple martin would continue to be protected, and additional lands would be made available to improve waterfowl habitat. Under the staff alternative, SCE&G would consult with resource agencies to develop invasive species management for both aquatic and terrestrial invasive species, if necessary. The proposed SMP would protect the remaining patches of habitat through the designation of the Natural Areas classification and stricter requirements within lands classified as Future Development and Forest Management.

Threatened and Endangered Species

Under both SCE&G's proposal and the staff alternative, protection of two federally listed species, shortnose sturgeon and the wood stork, would be enhanced. We conclude that continued operation of the project with our recommended measures would not be likely to adversely affect the wood stork but may adversely affect shortnose sturgeon.

Recreation, Land Use, and Aesthetics

Under both SCE&G's proposal and the staff alternative, increased and scheduled boating flows in the lower Saluda River combined with more warning sirens and strobe lights would enhance boating opportunities and safety. Existing recreational facilities would be upgraded, and facilities at the sites near or at capacity would be expanded to meet the existing recreational demand. SCE&G would designate nine new recreational facilities and improve five future recreation sites within the next 10 years to keep pace with the growth in demand. Additional future recreation sites would be designated as part of the Recreation Plan and reserved to address future recreation demand at the project.

Under both SCE&G's proposal and the staff alternative, the proposed SMP would reclassify about 185 miles of shoreline from Future Development to Public Recreation, Forest Management, and Natural Areas to protect wildlife habitat and enhance recreational experiences.

Cultural Resources

Under both SCE&G's proposal and the staff alternative, completion of surveys along the shoreline and prior to ground-disturbing activities, along with the guidelines for rehabilitation of the existing facilities would avoid unintended harm to historic properties in the project area.

Socioeconomic Resources

Under both SCE&G's proposal and the staff alternative, the generally higher lake level, increased flows to the lower Saluda River, and improved recreational facilities would benefit the economy because they would support higher levels of recreational use, and hence more spending related to recreational pursuits. Implementation of the SMP under both alternatives may affect property values.

Conclusions

Based on our analysis, we recommend licensing the project as proposed by SCE&G with some staff modifications and additional measures, as described above under *Alternatives Considered*.

In section 4.2 of the EA, we compare the total project cost to the cost of obtaining power from a likely alternative source of power in the region for each of the alternatives identified above. Our analysis shows that during the first year of operation under the no-action alternative, project power would cost \$23,562,900, or \$130.85/megawatt-hour (MWh), less than the likely alternative cost of power. Under the applicant's proposal, the project would produce power at a cost \$19,120,880, or \$97.63/MWh, less than the cost of alternative cost of power. Under the staff alternative, project power would cost \$19,224,230, or \$98.22/MWh, less than the likely alternative cost of power.

On the basis of our independent analysis, we conclude that issuing a new license for the project with the staff-recommended measures, would not be a major federal action significantly affecting the quality of the human environment.

We chose the staff alternative as the preferred alternative because under it the project would: (1) provide a dependable source of electrical energy for the region (195,725 MWh annually); (2) provide energy generated from a renewable resource that may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving non-renewable resources and reducing atmospheric pollution; and (3) with the recommended environmental measures, protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the additional costs of the recommended environmental measures.

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ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Licensing
Washington, DC

Saluda Hydroelectric Project FERC Project No. 516-459—South Carolina

1.0 INTRODUCTION

1.1 APPLICATION

On August 28, 2008, South Carolina Electric & Gas Company (SCE&G) filed an application for new license for the Saluda Hydroelectric Project with the Federal Energy Regulatory Commission (Commission or FERC). The 207.3-megawatt (MW) project is located on the Saluda River about 10 miles west of the city of Columbia, South Carolina (figure 1). The project does not occupy any federal lands. The project generated an average of about 180,069 megawatt-hours (MWh) of energy annually from 1988 to 2007. SCE&G proposes to upgrade the five existing generating units by replacing the turbine runners and rewinding the generators. The upgrades would increase the installed capacity to about 247 MW.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The Commission must decide whether to issue a license to SCE&G for the Saluda Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

2

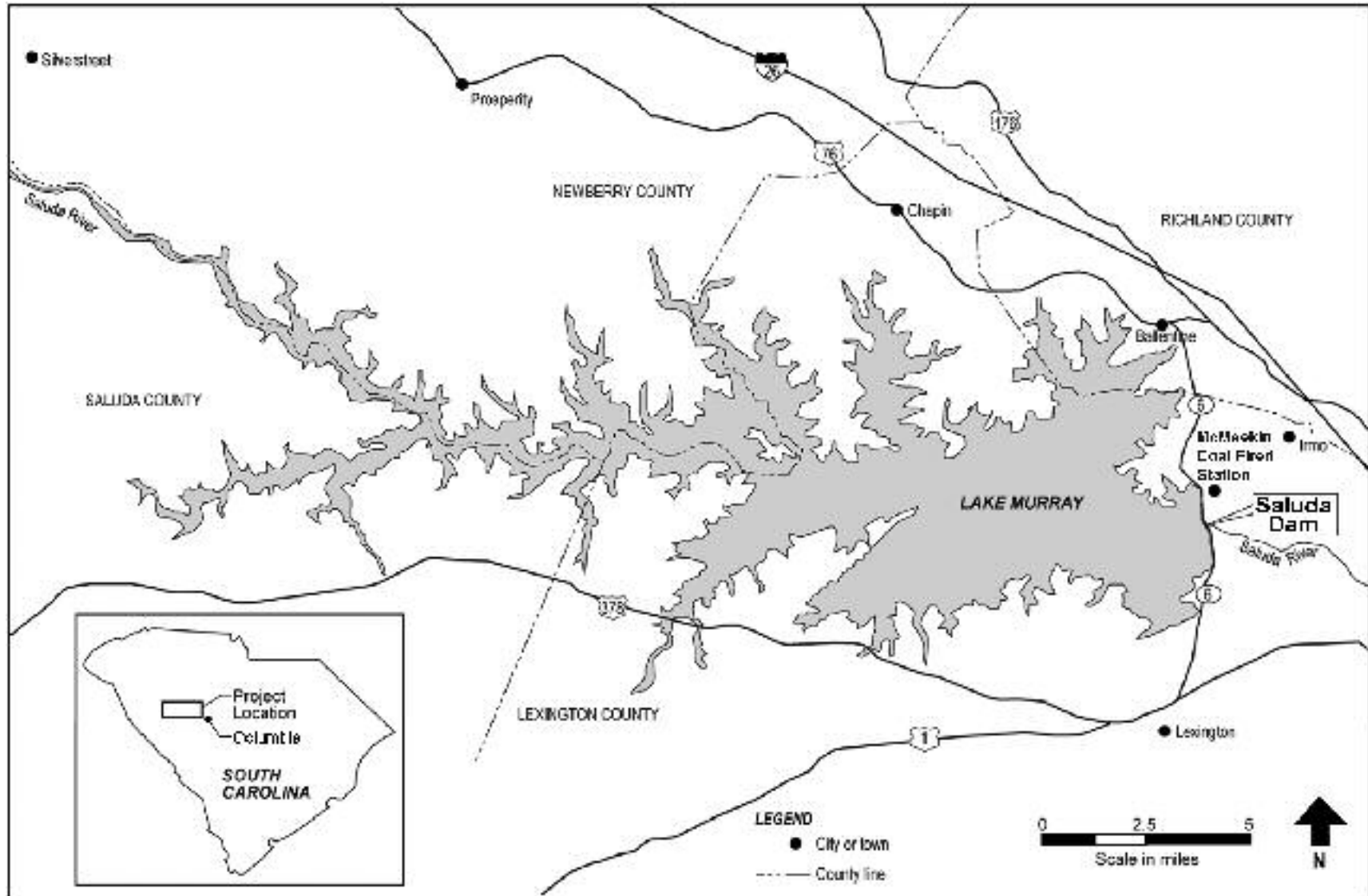


Figure 1. Location of Saluda Hydroelectric Project (Source: SCE&G, 2008, as modified by staff).

In this environmental assessment (EA), we assess the effects of (a) continued project operation as proposed in the application (proposed action), (b) alternatives to the proposed action, and (c) no-action. We also make recommendations to the Commission on whether to issue a new license, and if so, what conditions should be included in any new license issued. The primary issues associated with relicensing the project are: (1) managing water levels in Lake Murray and flow releases to the lower Saluda River especially during drought conditions; (2) improving dissolved oxygen (DO) downstream of the dam; (3) protecting rare, threatened, and endangered species; (4) providing recreational facilities sufficient to meet demand; (5) ensuring public safety downstream of the dam; and (6) revising the Shoreline Management Plan (SMP) to include more lands in protection categories.

Issuing a new license for the Saluda Project would allow SCE&G to generate electricity for the term of a new license, making electrical power from a renewable resource available to its customers.

1.2.2 Need for Power

The Saluda Project would provide hydroelectric generation to meet part of South Carolina's power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 247 MW and generate about 180,069 MWh per year.

The project is located in the Virginia-Carolinas (VACAR) subregion of Southeastern Electric Reliability Council (SERC), which is one of eight regional reliability councils of the North American Electric Reliability Council. SERC is a summer peaking region, and the peak summer energy demand for the SERC region is projected to grow at a compound annual growth rate of 1.8 percent over the planning period from 2009 through 2018 (North American Electric Reliability Council, 2009). Coal is the major source of energy generated in the SERC region. About 39 percent of the energy utilized in the SERC is generated from coal, 22 percent from natural gas, 15 percent from dual-fuel (oil/gas), 14 percent from nuclear, 5 percent from hydropower, 4 percent from pumped storage facilities, 1 percent from oil, and 0.1 percent from biomass (North American Electric Reliability Council, 2009).

We conclude that power from the Saluda Project would help meet a need for power in SERC's VACAR subregion in both the short and long term. The project provides low-cost power that displaces non-renewable, fossil-fired generation and contributes to a diversified generation mix. Displacing the operation of fossil-fueled facilities may avoid some power plant emissions and creates an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Saluda Project is subject to numerous requirements under the Federal Power Act (FPA) and other applicable statutes. We summarize the major regulatory requirements in table 1 and describe them below.

Table 1. Major statutory and regulatory requirements for the Saluda Hydroelectric Project.

Requirement	Agency	Status
Section 18 of the FPA (fishway prescriptions)	U.S. Department of the Interior (Interior) and National Marine Fisheries Service (NMFS)	Interior and NMFS requested a reservation of authority to prescribe fish passage on September 25 and September 29, 2009, respectively.
Section 10(j) of the FPA	Interior, NMFS, South Carolina Department of Natural Resources (South Carolina DNR)	Interior, NMFS, and South Carolina DNR provided section 10(j) recommendations on September 25, September 29, and October 2, 2009, respectively.
Clean Water Act—water quality certification	South Carolina Department of Health and Environmental Control (South Carolina DHEC)	South Carolina DHEC received an application for water quality certification from SCE&G on September 29, 2009.
Endangered Species Act Consultation	Interior, NMFS	SCE&G consulted with the U.S. Department of the Interior, Fish & Wildlife Service (FWS) and NMFS regarding the potential occurrence of listed species in the area. For shortnose sturgeon, SCE&G conducted field surveys for the presence of sturgeon downstream of the project, and as part of the settlement prepared a Shortnose Sturgeon Protection and

Requirement	Agency	Status
Coastal Zone Management Act Consistency	South Carolina DHEC	Adaptive Management Program (Sturgeon Program), in coordination with FWS, NMFS, and South Carolina DNR. Coastal zone certification not required by South Carolina.
National Historic Preservation Act	South Carolina State Historic Preservation Office	Programmatic Agreement in process
Magnuson-Stevens Act	NMFS	By letter to SCE&G dated March 12, 2008, NMFS indicated that no Essential Fish Habitat (EFH) occurs in areas affected by the project. NMFS also stated that, if flow recommendations consistent with the Saluda Settlement are included in a new license for the project, adverse effects on federally managed species and EFH are not anticipated.

1.3.1 Federal Power Act

Section 18--Section 18 of the FPA states that the Commission is to require construction, operation, and maintenance by a licensee of such fishways as may be prescribed by the Secretaries of Commerce or the U.S. Department of the Interior (Interior). Interior and National Marine Fisheries Service (NMFS), by letters filed September 25 and 29, 2009, respectively, request that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

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

include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

Interior, NMFS, and South Carolina Department of Natural Resources (DNR) timely filed, on September 25, September 29, and October 2, 2009, respectively, recommendations under section 10(j), as summarized in table 18, in section 5.4.1, *Recommendations of Fish and Wildlife Agencies*. In section 5.4, we also discuss how we address the agency recommendations and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act, a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the Clean Water Act. On September 29, 2009, SCE&G applied to the South Carolina Department of Health and Environmental Control (DHEC) for 401 water quality certification for the Saluda Project. South Carolina DHEC received this request on September 29, 2009. South Carolina DHEC has not yet acted on the request. The water quality certification is due by September 28, 2010.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. Two federally listed species are known to occur in the Saluda Project vicinity: shortnose sturgeon have been documented in the upper Congaree River but not in the lower Saluda River and wood storks have been observed foraging and flying through the project vicinity. No critical habitat for the shortnose sturgeon or the wood stork occurs in the project vicinity, although NMFS considers the present range of shortnose sturgeon to be all accessible waters downstream of the dams on the Saluda, Broad, and Wateree rivers. Our analyses of project impacts on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that relicensing the Saluda Project, as proposed with staff-recommended measures, may adversely affect the shortnose sturgeon based on effects on habitat. We are requesting formal consultation with NMFS pursuant to section 7 of the ESA.

We conclude that relicensing the Saluda Project, as proposed with staff-recommended measures, is not likely to adversely affect the wood stork. The U.S. Department of the Interior, Fish & Wildlife Service (FWS) in a letter filed on May 7, 2010, concurs that the project is not likely to adversely affect the federally listed as endangered wood stork.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act, 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state coastal zone management agency concurs with the license applicant's certification of consistency with the state's coastal zone management program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

The project is not located within any of the eight coastal counties that make up the coastal zone in South Carolina; therefore, the project is not subject to South Carolina coastal zone program review (letter from B. Neale, Director, Regulatory Programs, South Carolina DHEC, to W. Argentieri, Manager, Civil Engineering, SCE&G, filed on October 15, 2009). No consistency certification is needed for the action.

1.3.5 National Historic Preservation Act

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

To meet the requirements of section 106, the Commission intends to execute a Programmatic Agreement for the protection of historic properties from the effects of the operation of the Saluda Project. The terms of the Programmatic Agreement would ensure SCE&G addresses and treats all historic properties identified within the project's area of potential effects through implementation of the final Historic Properties Management Plan (HPMP).

1.3.6 Magnuson-Stevens Conservation and Management Act

The Magnuson-Stevens Fishery Conservation Management Act requires federal agencies to consult with NMFS on all actions that may adversely affect Essential Fish Habitat (EFH). In the case of the Saluda Project, EFH consultation is required for the federally managed fish and invertebrate species, including white shrimp, brown shrimp, bluefish, and summer flounder found in the tidally influenced waters of the lower Santee and Cooper rivers, and diadromous fish species, including American shad, blueback

herring, and other alosines for the Saluda River, and American eel found in the Santee River. NMFS made flow recommendations that were consistent with the Saluda Settlement and states that, if these flow recommendations are included in a new license for the project, adverse effects on federally managed species and EFH are not anticipated from relicensing the Saluda Project.

We conclude that relicensing the project as proposed by SCE&G, consistent with the Saluda Settlement, would not adversely affect EFH, would improve habitat conditions overall, and would provide a net benefit to the federal management species. As such, no consultation is required with NMFS.

1.4 PUBLIC REVIEW AND CONSULTATION

The Commission's regulations (18 CFR, section 16.8) require that applicants consult with appropriate resource agencies, tribes, and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, the ESA, the National Historic Preservation Act, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations. Our review of the license application verifies that all required consultation occurred.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document was distributed to interested agencies and others on March 12, 2009. It was noticed in the Federal Register on March 17, 2009. Two scoping meetings, advertised in the local newspapers, were held on April 7, 2009, in Columbia to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

<u>Commenting Entity</u>	<u>Date Filed</u>
County of Newberry	April 29, 2009
American Whitewater	May 6, 2009
Brenda and John Parsons	May 6, 2009
Robert Wells	May 7, 2009
South Carolina Department of Parks, Recreation & Tourism	May 7, 2009
South Carolina Electric & Gas Company	May 7, 2009
National Park Service, Congaree National Park	May 8, 2009
James Mattox	May 8, 2009
Lake Murray Watch	May 8, 2009

<u>Commenting Entity</u>	<u>Date Filed</u>
U.S. Fish and Wildlife Service	May 8, 2009
American Rivers and Coastal Conservation League	May 8, 2009
Heath Hewett	May 8, 2009
Jeff Wilson	May 8, 2009
South Carolina Council Trout Unlimited	May 8, 2009
South Carolina Department of Natural Resources	May 8, 2009
Lower Saluda Scenic River Advisory Council	May 11, 2009
George King	May 11, 2009
Capital City/Lake Murray Country Regional Tourism Board	May 11, 2009
Linda, George, Kirk, and Wendy Schneider	May 11, 2009
Lake Murray Homeowners Coalition	May 13, 2009
The Mungo Company	May 26, 2009

The Commission issued a revised scoping document addressing these comments on June 24, 2009.

1.4.2 Interventions

On May 29, 2009, the Commission issued a notice that SCE&G had filed an application to relicense the Saluda Project. This notice set July 29, 2009, as the deadline for filing protests and motions to intervene. In response to the notice, the following entities filed motions to intervene:

<u>Intervenor</u>	<u>Date Filed</u>
U.S. Department of the Interior	July 13, 2009
American Whitewater	July 17, 2009
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	July 17, 2009
South Carolina Department of Natural Resources	July 20, 2009
South Carolina Department of Parks, Recreation and Tourism	July 23, 2009
American Rivers and Coastal Conservation League (Conservation Groups)	July 27, 2009
South Carolina Trout Unlimited	July 27, 2009
Lake Murray Homeowners Coalition	July 28, 2009

<u>Intervenor</u>	<u>Date Filed</u>
Lake Murray Association, Inc.	July 29, 2009
Lake Murray Fisherman's Group	July 29, 2009
Lake Murray Watch, Steve Bell	July 29, 2009
South Carolina Wildlife Federation	July 29, 2009
South Carolina Council of Trout Unlimited	July 29, 2009
Lake Murray Docks, Inc.	August 4, 2009 ²
Advance Land and Timber, LLC	August 27, 2009 ³
Congaree Riverkeeper	September 17, 2009 ⁴
Cloud's Creek Properties, LLC	February 4, 2010 ⁵

1.4.3 Comprehensive Relicensing Settlement Agreement

On July 31, 2009, SCE&G filed a Comprehensive Relicensing Settlement Agreement (Saluda Settlement). The Saluda Settlement⁶ was signed by representatives of state agencies, non-governmental organizations, and individuals listed below:

Signatories to the Saluda Settlement

American Rivers
 American Whitewater
 Capitol City/Lake Murray Country Tourism
 Catawba Indian Nation
 City of Columbia Fire and Rescue
 City of Columbia Parks and Recreation
 Coastal Conservation League
 Lake Murray Association
 Lake Murray Docks, Inc.
 Lake Murray Homeowners Coalition
 Lake Murray Power Squadron
 Lake Watch⁷

² Late intervention granted on September 15, 2009.

³ Late intervention granted on July 2, 2010.

⁴ Late intervention granted on October 13, 2009.

⁵ Late intervention granted on July 2, 2010.

⁶ The Saluda Settlement is available on the Commission's website from the eLibrary feature at <http://www.ferc.gov/docs-filing/elibrary.asp>. The accession number is 20090731-5124.

⁷ Although the entity signed the Saluda Settlement as Lake Watch, it is also known as Lake Murray Watch.

Lake Murray Chamber of Commerce
 Midlands Striper Club
 Riverbanks Zoo and Gardens
 South Carolina DNR
 SCE&G
 South Carolina Wildlife Federation
 South Carolina Department of Archives and History

The Saluda Settlement replaces and completes the proposed measures included in the final license application and resolves all the outstanding issues associated with relicensing the Saluda Project except for the target elevation trigger for implementation of the Maintenance, Emergency, and Low Inflow Protocol (Low Inflow Protocol). The signatories to the Saluda Agreement offered to accept either a 1-foot or 2-foot below target elevation for implementation of the Low Inflow Protocol with the understanding that they could provide justification for alternative triggers for the Commission to evaluate in the EA. The major issues covered in the Saluda Settlement include: (1) revising the reservoir operating guideline for Lake Murray; (2) increasing minimum flow released downstream of Saluda dam; (3) upgrading turbine runners to improve DO downstream of the Saluda dam; (4) implementing plans related to aquatic resources in the lower Saluda River including macroinvertebrate surveys, freshwater mussel research and enhancement, sturgeon management, trout evaluation and monitoring, and fish community monitoring; (5) continued involvement in the Santee River Basin Accord for Diadromous Fish Protection, Restoration, and Enhancement (Santee Basin Accord); (6) implementing plans to protect rare, threatened, and endangered species including the bald eagle, wood stork, and rocky shoals spider lily; (7) providing habitat for the purple martin; (8) implementing the Recreation Plan to upgrade project recreation facilities; (9) implementing the revised SMP including sediment and erosion control, woody debris management, and buffer zone management; and (10) implementing the HPMP.

In the Notice of Settlement Agreement and Soliciting Comments issued August 7, 2009, the Commission set September 29, 2009, as the deadline for filing comments, and November 13, 2009, as the deadline for reply comments. The following entities filed comments on the Saluda Settlement:

<u>Commenting Agency and Other Entity</u>	<u>Date Filed</u>
Advance Land and Timber, LLC	August 27, 2009
The Lake Murray Association	September 21, 2009
Lake Murray Homeowners Coalition	September 22, 2009
American Whitewater	September 22, 2009
South Carolina DNR	September 22, 2009
Lake Murray Fisherman's Group	November 12, 2009

Five of the six letters provided justifications for a preferred trigger elevation for implementation of the Low Inflow Protocol. Advance Land and Timber, LLC expressed concern that changes to the SMP would be too restrictive for development.

1.4.4 Comments on the License Application

A notice requesting terms, conditions, recommendations, and prescriptions was issued on July 31, 2009. The following entities commented:

<u>Commenting Agency and Other Entity</u>	<u>Date Filed</u>
U.S. Department of the Interior	September 25, 2009
U.S. Department of the Interior	September 28, 2009
National Marine Fisheries Service	September 29, 2009
American Rivers and Coastal Conservation League	September 29, 2009
Trout Unlimited	September 29, 2009
Congaree Riverkeeper	September 29, 2009
South Carolina DNR	October 2, 2009

SCE&G filed reply comments on November 13, 2009.

1.4.5 Comments on the Draft Environmental Assessment

The Commission issued the draft EA for the Saluda Project on March 24, 2010, and comments were due within 45 days of the issuance date on May 11, 2010. The Commission also held a public hearing in Columbia on April 29, 2010, to receive public comments on the draft EA.

In appendix A we list the commenters, summarize the comments that were filed, include our responses to those comments, and indicate where we made modifications to the EA.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is the baseline from which to compare the proposed action and all action alternatives that are assessed in the environmental document. Under the no-action alternative, for relicenses, the project would continue to operate under the terms and conditions of the current license. Thus the no-action alternative would include the existing facilities and current project operation.

2.1.1 Existing Project Facilities

The project is located about 10 miles west of the city of Columbia on the Saluda River in Richland, Lexington, Saluda, and Newberry counties, South Carolina. The Saluda Project was given a 30-year license in 1984. On November 18, 2003, the Commission extended the term of the license by 3 years based on some activities related to the construction of the backup project dam downstream of the original dam. The current expiration date for the license is August 31, 2010.

The existing 207.3-MW Saluda Project consists of a single development with the following features: (1) a 7,800-foot-long, 213-foot-high earth-fill dam (Saluda dam), with South Carolina State Highway 6 (Highway 6) running along the top of the dam; (2) a dike that extends 2,550 feet from the north end of the dam, running parallel with Highway 6; (3) a 2,900-foot-long emergency spillway, with six steel Taintor gates, that is located 500 feet from the south end of Saluda dam, and a spillway channel that reconnects with the Saluda River about 0.75 mile downstream from the Saluda powerhouse; (4) a 2,300-foot-long, 213-foot-high roller compacted concrete backup dam located along the downstream toe of the Saluda dam,⁸ with (i) a crest elevation of 372.0 feet North American Vertical Datum of 1988 (NAVD88),⁹ and (ii) rock fill embankment sections on the north and south ends of the backup dam, having a combined length of 5,700 feet; (5) a 41-mile-long, 50,900-acre reservoir (Lake Murray) at a full pool elevation of 358.5 feet, with a total usable storage of about 635,000 acre-feet; (6) five

⁸ A study conducted by SCE&G in 2002 concluded that an earthquake similar in magnitude to the 1886 Charleston earthquake would cause the Saluda dam to fail putting more than 100,000 Lexington and Richland County residents at risk. This study led to construction of a massive dam of rock with a concrete midsection to serve as a back-up dam and retain the reservoir in case of failure. The project was completed in 2005.

⁹ The license application contains documents that provide elevations based on NAVD88 datum or based on Plant Datum. To convert from Plant Datum to NAVD88 datum, subtract 1.5 feet. Throughout this remainder of this document elevations are in NAVD88.

223-foot-high intake towers and associated penstocks; (7) a concrete and brick powerhouse containing four vertical Francis turbine generating units (three at 32.5 MW and one at 42.3 MW), and a fifth vertical Francis turbine generating unit (67.5 MW); (8) a 150-foot-long tailrace; (9) five 750-foot-long, 13.2-kilovolt primary transmission lines;¹⁰ and (10) appurtenant facilities. There is no transmission line or bypassed reach associated with the project.

The existing project boundary is defined by compass bearings and distances in most areas and elevations in other areas. The project boundary includes all project features and includes lands surrounding the reservoir beyond the maximum normal operating level of 358.5 feet. The final SMP filed in July 2009 states that the project boundary includes 15,878 acres of land above the elevation 358.5 feet, excluding land inundated by the reservoir. The distance from the maximum normal operating level to the project boundary varies from about 50 feet to more than 1,000 feet. Within the project boundary, there are about 130 public, commercial, and private recreation sites supporting such facilities as boat launches, marinas, boat slips, wet and dry storage, campgrounds, picnic areas, beaches, fishing areas and piers, trails, playgrounds, and other facilities. Ten sites within the project boundary are informal sites that are primarily used for bank fishing. There are a total of 17 formal recreation sites owned by SCE&G, including 14 sites located on the Lake Murray shoreline and 3 located along the lower Saluda River. These access sites function primarily as lake or river access, providing opportunity for boat launches, shoreline angling, picnicking, and swimming.

2.1.2 Project Safety

The project has been operating for more than 82 years under the existing and past licenses. During this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff evaluates the adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during a new license term to ensure continued adherence to Commission-approved plans and specifications, special

¹⁰ The Commission defines a primary transmission line as a line that is solely used to transmit power from a hydroelectric powerhouse to a load center (i.e., substation) or to an interconnection point in a regional power grid. In performing our analysis, we rely on the fact that, without a primary transmission line, there would be no way to transmit the project's power to market.

license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.3 Existing Project Operation

The Saluda dam (composed of the original dam and a new retaining dam located immediately downstream of the original dam) impounds the Saluda River and forms the project reservoir (Lake Murray). Water from the reservoir enters five separate intake towers located in Lake Murray and upstream of the original dam. Water enters each of the intake towers at various depths in each tower (at a depth of about 175 feet for Units 1 to 4 and at a depth of 55 feet for Unit 5) and then flows through a single penstock attached to each generating unit located at the powerhouse. The powerhouse is located downstream of the new retaining dam. Water is diverted from various intakes at various times, depending on which unit or units are selected for operation each day. The powerhouse units discharge directly back to the Saluda River downstream of the project powerhouse.

The Saluda Project currently operates as a reserve generation facility in SCE&G's generating system. The Saluda powerhouse operates with one unit on line at minimum gate to provide a downstream flow of at least 180 cubic feet per second (cfs) in the Saluda River. Unit 5 is operated in a last on-first off mode because of environmental and operational factors, including potential fish entrainment caused by the higher elevation of the intake opening in the Unit 5 intake tower versus other units. In the event of a loss of generation of one unit, the remaining Saluda units can be started and brought to full load within 15 minutes. The rapid response of the Saluda units is important in meeting emergencies in SCE&G's system and fulfills its reserve share obligation as a member of VACAR under the VACAR Reserve Sharing Arrangement. To be considered a reserve generation asset at any given time, the Saluda units must remain on standby and cannot be providing generation for other purposes.

The Saluda Project is operated to manage the reservoir elevation on a seasonal basis. Under the current license, the reservoir is managed using monthly target elevations, which may be modified by SCE&G based primarily on climatic conditions, reservoir level at the time, and dam and reservoir maintenance requirements. Historically, the reservoir has been maintained between elevation 348.5 feet (winter) and 356.5 feet (summer) (see complete discussion and guide curve in section 3.3.1.1, *Water Resources*). Occasionally SCE&G draws down the reservoir to elevation 343.5 feet for project maintenance work or control of aquatic vegetation (primarily hydrilla) in the reservoir. The current license allows a maximum operating water surface elevation of 358.5 feet.

The powerhouse units are occasionally operated to release water from the reservoir for seasonal or maintenance drawdowns, or to pass inflow from precipitation in the drainage basin. During the relatively infrequent periods when the project is used for

reservoir management, the units being used are not available for reserve generation, and other generating assets must be made available to meet SCE&G's obligation under the VACAR Reserve Sharing Arrangement.

2.1.4 Existing Environmental Measures

- Turbine aeration measures (i.e., turbine venting and hub baffles) and operational modifications implemented since 1999 aimed at optimizing DO in project releases (required by article 31¹¹ as amended on July 15, 2004).
- Macroinvertebrate sampling (voluntarily implemented beginning in 1996).
- Recreational access to project waters through existing public access sites on Lake Murray and the lower Saluda River (required by article 18).
- Implement an existing Rocky Shoals Spider Lily Management and Enhancement Plan as required under article 409 of the Columbia Hydroelectric Project (FERC No. 1895).¹²
- Memorandum of Agreement with South Carolina DNR and the Columbia Chapter of the National Audubon Society to manage the purple martin habitat on Lunch Island.
- Operate the 14 formal public access sites on Lake Murray and the 3 formal access sites on the lower Saluda River, and continue leasing Dreher Island State Park to the South Carolina Department of Parks, Recreation, and Tourism; Larry Koon Boat Landing and James Metts landing on the lower Saluda River to the Lexington County Recreation Commission; and Saluda Shoals Park to the Irmo-Chapin Recreation Commission (required by article 17).

¹¹ The existing license was issued on July 1, 1984, and made retroactive to 1977. By order issued on November 18, 2003, the Commission extended the term of the existing license through August 31, 2010.

¹² The known population of rocky shoals spider lily is located at the confluence of the lower Saluda and Broad rivers, outside the Saluda Project boundary, but within an area influenced by both the Saluda and Columbia projects' operations.

2.2 APPLICANT'S PROPOSAL

2.2.1 Proposed Project Facilities

SCE&G proposes to upgrade the existing turbine runners and rewind the existing generators which would result in an increase in capacity from 207.3 to 247 MW. SCE&G does not propose any new transmission facilities or removal of any existing transmission facilities from the project boundary. SCE&G identifies 9 new sites for future park development in its final Recreation Plan filed with the Saluda Settlement. Nine of these sites are on 662 acres of land located outside of the existing project boundary. SCE&G proposes to bring these lands into the project boundary as individual sites are developed.

2.2.2 Proposed Project Operation

SCE&G proposes to operate the project according to the Normal Reservoir Operating Guidelines that consider the elevations at which municipal water intakes on Lake Murray can maintain normal pumping rates and the ability of the project to remain available for reserve generation at any reservoir level consistent with the original design of the project structures throughout the year. The guidelines also provide seasonal adjustments to ensure sufficient flows downstream to enhance fish passage over shoals in the lower Saluda River during the spring and to enhance access to recreational boating facilities during throughout the summer.

SCE&G proposes a Low Inflow Protocol that includes staged reductions in seasonal minimum flow and scheduled downstream recreation flows to conserve the remaining water stored in Lake Murray during periods of low inflow to delay or prevent depletion of the usable storage (between elevation 358.5 feet and 343.5 feet). The intent of the Low Inflow Protocol is to allow the project to continue to fulfill its three primary critical functions for as long as possible during drought periods: reserve electric generation, municipal water supply, and critical downstream flows.

SCE&G proposes a Flow Release Regime whereby operation of the Saluda Project in mean flow years would generally consist of continuous generation to provide downstream flow; intermittent generation for reserve requirements and to provide downstream recreation flows throughout the year; occasional generation for reservoir level management; and some sustained generation in the fall if necessary to reduce the reservoir level to accommodate inflow from winter storms and spring runoff from the upper river basin.

In high flow years, the need to pass higher inflow may require that the Saluda Project be dispatched on an economic basis for several hours per day or for several days per week, in addition to the operations listed above for mean flow conditions. During these periods of extended generation, the units being so used are not available for reserve

use, as described previously. Because of the relatively large hydraulic capacity through the powerhouse (18,000 cfs, which is higher than inflow about 99 percent of the time), SCE&G reports that it is rarely necessary to use the spillway for reservoir level management. The proposed Low Inflow Protocol includes guidelines for project operations during high inflow events.

SCE&G proposes to continue to operate Unit 5 in a “last on-first off” mode prior to the upgrade of Unit 5, and at the same time investigate, in cooperation with the stakeholders, possible operation in a “first on-last off” mode on an interim basis during parts of the year prior to the upgrade of Unit 5 (letter from J.M. Landreth, Vice President Fossil & Hydro Operations, SCE&G, to K.D. Bose, Secretary, FERC, filed May 7, 2010). Once the Unit 5 upgrades are complete, SCE&G would continue to consult with state and federal resource agencies and other stakeholders to determine how best to operate Unit 5 to aid in the preservation of coolwater habitat for both the reservoir and riverine fishes, taking into account hydroacoustic fish monitoring results and the results of the trout entrainment and mortality studies.

2.2.3 Proposed Environmental Enhancement Measures

SCE&G proposes to operate the Saluda Project with the following environmental protection and enhancement measures:

Water Resources

- Implement the final Normal Reservoir Operating Guidelines (appendix A-14 of the Saluda Settlement) that would operate Lake Murray between elevations 356.5 and 352.5 feet based on a guide curve with a target elevation of 356.5 feet from March 1 through September 1 and a gradual decrease to 354.5 feet on December 1 and then to 352.5 feet by December 31 and increase to 356.5 feet by March 1; maintain a maximum operating pool elevation of 358.5 feet and a minimum operation pool elevation of 343.5 feet for periodic maintenance activities.
- Implement the Flow Release Program (appendix A-11 of the Saluda Settlement) that would, in normal years, release from the project powerhouse into the Saluda River a minimum flow of 700 cfs from January 1 through

March 31; provide the striped bass release flows¹³ as target release flows from April 1 through May 10, with a “default” 1,000-cfs minimum flow during this period; a 1,000-cfs minimum flow release from May 11 through May 31; and a 700-cfs minimum flow release from June 1 through December 31.

- Implement a final Low Inflow Protocol (appendix A-13 of the Saluda Settlement) that would be triggered by a 1-foot drop in reservoir elevation and would use 14-day flow averaging. During low inflow operations, the above minimum flow releases from the project powerhouse to the Saluda River would be modified as follows:
 - January 1 through March 31, provide a target flow release of 500 cfs and a minimum flow of 400 cfs;
 - April 1 through May 10: if 14-day average inflow is greater than the striped bass requested flow release, provide the striped bass flow release as a target flow with a 1,000-cfs minimum; if 14-day average inflow is less than the striped bass requested flow, provide a 1,000-cfs minimum flow release; if 14-day average inflow is less than 1,000 cfs, provide a 700-cfs minimum flow release; if 14-day average inflow is less than 700 cfs, provide a target flow release of 500 cfs and a minimum flow release of 400 cfs;
 - May 11 through May 31, provide a target flow release of 700 or 500 cfs, depending on inflow as described above, and a minimum flow release of 400 cfs; and
 - June 1 through December 31, provide a target flow release of 500 cfs and a minimum flow of 400 cfs.
- Implement the Reservoir Drawdown Plan (appendix A-12 of the Saluda Settlement) which would reduce the frequency and occurrence of drawdowns and increase minimum flows to the lower Saluda River. Install new runners

¹³ South Carolina DNR requested striped bass enhancement flows that would range from 1,000 to 2,700 cfs, depending on the average daily flow reported at the upstream U.S. Geological Survey Alston Gage No. 0216100, located on the Broad River at Alston, South Carolina. The objective of these flows would be for enhancement of striped bass spawning in the Congaree River, where South Carolina DNR has concluded that spawning conditions are most favorable at a flow of about 9,000 cfs (a combined flow from the Broad and Saluda rivers).

and upgrade all five generating units to improve DO in flows released from the project into the Saluda River.

- Develop and implement an operational compliance monitoring plan.

Aquatic Resources

- Implement the final Lower Saluda River Benthic Macroinvertebrate Monitoring and Enhancement Plan (Macroinvertebrate Program) (appendix A-3 of Saluda Settlement) that calls for continued macroinvertebrate sampling in the lower Saluda River.
- Implement the final Freshwater Mussel Enhancement Program (Mussel Program) (appendix A-4 of Saluda Settlement) to restore freshwater mussels in the lower Saluda River.
- Change project operations to operate Unit 5 in a possible “first on-last off” mode after the Unit 5 upgrades. One year after the Unit 5 upgrades are made, SCE&G would consult with state and federal agencies and other stakeholders to determine how best to operate Unit 5 to aid in the preservation of coolwater habitat for both the reservoir and riverine fishes.
- Continue to participate in the Santee Basin Accord to address any diadromous fish restoration activities in the Santee-Congaree River Basin.
- Implement the final Sturgeon Program (appendix A-6 of Saluda Settlement), under which SCE&G would provide the DO enhancements and instream flows to the lower Saluda River already proposed as part of other provisions of the Saluda Settlement; establish a Sturgeon Technical Advisory Team with NMFS, FWS, and South Carolina DNR; and provide funding for conducting several agency-recommended studies on shortnose sturgeon associated with the studies to be conducted under the Santee Basin Accord.
- Implement the final Trout Evaluation and Monitoring Program (Trout Program) (appendix A-7 of Saluda Settlement) for the lower Saluda River, which includes five types of studies to be conducted that may identify ways to enhance the trout fishery in the lower Saluda River.
- Implement the Lower Saluda River Fish Community Monitoring Program (Fish Monitoring Program) (appendix A-8 of Saluda Settlement) that calls for continued fish community sampling in the lower Saluda River that has been ongoing since the mid 1990s.

- Implement a Fish Entrainment Mitigation Program (Entrainment Program) including Unit 5 hydroacoustic monitoring to minimize fish entrainment.

Terrestrial Resources

- Implement the final Rare, Threatened, and Endangered Species Management Program (T&E Program) (appendix A-9 of Saluda Settlement) including formal management plans for bald eagles and rocky shoals spider lily.
- Publish and make available the *Rare Plant and Animal Species of Interest Around Lake Murray and the Lower Saluda River* brochure (*Plant and Animal* brochure) addressing life history, conservation status, and habitat needs of species known to occur in the project area, including bald eagle, rocky shoals spider lily, and purple martin.
- Coordinate with the South Carolina DNR Aquatic Nuisance Species Program and the South Carolina Aquatic Plant Management Council (Council) to manage invasive aquatic plants in the project area.
- Designate Lunch Island (Bomb Island) as a protected habitat for purple martins.
- Lease about 1,100 acres of Forest Management land between the project boundary and the 360 foot contour elevation to South Carolina DNR to be placed/maintained in the Wildlife Management Area Program, as determined by South Carolina DNR.

Threatened and Endangered Species

- Implement the final T&E Program (appendix A-9 of Saluda Settlement) including reporting future occurrences of wood stork to FWS and South Carolina DNR.
- Publish and make available the *Plant and Animal* brochure addressing life history, conservation status, and habitat needs of species known to occur in the project area, including the shortnose sturgeon and wood stork.

Recreation and Land Use

- Implement the final Recreation Plan (appendix A-2 of Saluda Settlement) to address future recreational use and capacity concerns, improvements to existing recreation sites, and monitoring public access needs.

- As part of the final Recreation Plan, improve facilities and accessibility at the Larry Koon boat landing, Shull Island, Murray Shores, River Bend, Sunset, Hilton, Dam Site – Irmo side, Higgins Bridge, Kempson Bridge, Lake Murray Estates Park, Metts Landing, and Gardendale public access areas.
- Within 10 years of license issuance, develop recreational facilities at Cloud's Creek (including gravel parking and carry-in), Little Saluda Point (including additional acreage for future expansion, accessible fishing piers, and a walking path), Old Corley Bridge Road canoe access (including gravel parking, carry-in, and signage), Twelve-Mile Creek (including potential leasing), and Candi Lane (including potential leasing).
- Set aside project lands for future recreation use at 19 locations (some of these lands are adjacent to existing public access areas). Provide recreational flow releases in the lower Saluda River of about 45,000 acre-feet of water, including target flows of between 700 and 1,000 cfs for 33 days annually for wade angling; target flows of between 2,000 and 10,000 cfs for 19 days annually for whitewater boating activities, including kayaking events, and rafting; and between 8,000 and 15,000 cfs for 11 days annually for swift water rescue training.
- Implement the final Lower Saluda River Warning System Enhancement Plan (Warning Siren Enhancement Plan)(appendix A-1 of Saluda Settlement) for the installation of additional warning sirens and strobe lights along the lower Saluda River.
- Implement the final SMP, including the Woody Debris Management Plan (Woody Debris Plan) (appendix A of the SMP), the Buffer Zone and Shallow Water Habitat Management Plan (Buffer Plan) (appendix B of the SMP), and the Sedimentation and Erosion Control Plan (appendix C of the SMP).

Cultural Resources

- Implement the final HPMP (appendix A-17 of Saluda Settlement).

2.2.4 Modifications to Applicant's Proposal—Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the applicant's proposal.

Section 18 Fishway Prescriptions

Interior, by letter filed with the Commission on September 25, 2009, and NMFS, by letter filed September 29, 2009, requested that the Commission include a license

condition reserving Interior's and NMFS' authority to require such fishways, additional fishways, or modified fishways, including their construction, operation, maintenance, and effectiveness monitoring, as they may prescribe over the term of any new license for the Saluda Project. Interior states that its section 18 reservation of authority extends to existing riverine fish species and any fish species to be managed, enhanced, protected, or restored in the Santee River Basin during the term of the license, including American shad, blueback herring, American eel, shortnose sturgeon and Atlantic sturgeon. NMFS states that it is responsible for managing diadromous species in the Santee River Basin, including anadromous American shad and alosines, Atlantic sturgeon, shortnose sturgeon, striped bass, and the catadromous American eel.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include SCE&G's proposals to implement: (1) the Flow Release Program to provide increased minimum flows and recreational boating releases to the lower Saluda River; (2) the Normal Reservoir Operating Guidelines to maintain higher water surface elevations in Lake Murray; (3) the Reservoir Drawdown Plan; (4) an operational compliance monitoring plan; (5) upgrades of unit runners to improve DO; (6) the Macroinvertebrate Program; (7) the Mussel Program; (8) consultation on how best to operate Unit 5; (9) the T&E Program; (10) coordination with the South Carolina DNR Aquatic Nuisance Species Program; (11) the lease of lands to South Carolina DNR for waterfowl habitat and hunting; (12) designation of Lunch Island as a protected area for purple martin; (13) distribution of the *Plant and Animal* brochure; (14) the final Recreation Plan for upgrading existing and development future recreation facilities; (15) the Warning Siren Enhancement Program; and (16) the final HPMP.

The staff alternative modifies six of SCE&G's proposals. First, we include in the Low Inflow Protocol a trigger at 2 feet below the proposed guide curve elevation to begin reducing flows to the lower Saluda River during low inflow conditions. Second, we modify the final Mussel Program to include a provision to tag and relocate, as a one-time event, any mussels found on the Saluda River side of the Congaree River during monitoring, to the Broad River side of the river. Should larger than expected numbers of mussels be captured, such that tagging and relocation of all of the captured mussels would be difficult or infeasible, SCE&G should consult with the Working Group to determine whether modifications to this tagging and relocation program should be made. We also modify the Mussel Program to recommend monitoring four locations on the Broad River side of the Congaree River that have a concentration of mussels for 5 years, with the caveat that, if less than four suitable monitoring locations are found, this monitoring could occur with less than four locations. Upon conclusion of the monitoring, we recommend that SCE&G and the Mussel Working Group review the monitoring results and make recommendations for further measures, with a report on the results and any recommendations to be filed with the Commission. If any proposed measures would

involve changes to the license, SCE&G should file those proposed measures for Commission approval. Third, we add a reporting requirement to the Lower Saluda River Fish Community Monitoring Program requiring that SCE&G report the program's monitoring results to the Commission and resource agencies for a period of 5 years after each generating unit is upgraded. Fourth, in addition to coordination with the South Carolina DNR's Aquatic Nuisance Species Program, we add provisions for public education about how to identify snakeheads, report snakehead captures, and consult with the resource agencies regarding further monitoring and control measures if snakeheads or other exotic invasive species are detected in the project area. Fifth, we recommend four provisions to the final SMP that would require SCE&G to: (1) include a provision, after consultation with settlement parties and Cloud's Creek Properties, LLC, to develop procedures to allow existing structures to remain within the SMP's buffer zone (i.e., a grandfather clause); (2) file an annual report documenting the permits granted for dock facilities that exceed 10 slips, including the location, type, and number of authorized slips for each facility ; (3) annually file a revised exhibit G, for Commission approval, that includes all newly acquired buffer zone lands; and (4) continue to provide overnight anchoring at Hurricane Cove and Two Bird Cove.

Sixth, the staff alternative also includes a reservation of the Commission's authority to require the construction, operation, and maintenance by the licensee of such fishways as may be prescribed by the Secretaries of Commerce or Interior.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

We considered several alternatives to the applicant's proposal, but eliminated them from further analysis because they are not reasonable in the circumstances of this case. They are: (1) issuing a non-power license; (2) federal government takeover of the project; and (3) retiring the project.

2.4.1 Issuing a Non-power License

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

2.4.2 Federal Government Takeover of the Project

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is no

evidence to indicate that federal takeover should be recommended to Congress. No party has suggested federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

2.4.3 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of the relicense application and surrender or termination of the existing license with appropriate conditions. No participant has suggested that dam removal would be appropriate in this case, and we have no basis for recommending it. The primary function of the project is as a reserve generation facility that can readily and rapidly dispatch energy generated from the project to meet changing electric and system demands. As part of the reserve generation function, the project can provide black start capability for SCE&G's generating system and for the local region in case of a major power outage of the electric grid. Lake Murray provides extensive recreational benefits to the residents who live along the shoreline as well as to the residents of neighboring communities. Lake Murray also supplies water to residents of four area municipalities. The McMeekin Station (see figure 1), a coal-fired base load unit, draws water from the penstocks of two of the Saluda hydro generating units and returns the water to the penstock or to Lake Murray. Finally, Lake Murray provides important flood storage and flood storage release. Thus, dam removal is not a reasonable alternative to relicensing the project with appropriate protection, mitigation, and enhancement measures.

The second project retirement alternative would involve retaining the dam and disabling or removing equipment used to generate power. Project works would remain in place and could be used for historic or other purposes. This would require us to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No agency has stepped forward, and no participant has advocated this alternative. Nor have we any basis for recommending it. Because the power supplied by the project is needed, a source of replacement power would have to be identified. In these circumstances, we do not consider removal of the electric generating equipment to be a reasonable alternative.

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3.0 ENVIRONMENTAL ANALYSIS¹⁴

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area. Under each resource area, we first describe the historic and current conditions. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.1 GENERAL DESCRIPTION OF THE SALUDA RIVER BASIN

The project is located on the Saluda River in the Piedmont of South Carolina. Steep to moderate slopes and rolling hills with well-drained valleys are predominant features of the regional landscape. The Saluda River originates in the Blue Ridge Mountains, flows southeast for about 200 miles to its confluence with the Congaree River, and has a total drainage area of 2,519 square miles. The Congaree River flows into the Santee River, which empties into the Atlantic Ocean.

In general, the river banks and riparian zones are forested. There is a gradual shift in land use from rural to suburban and suburban to urban moving downstream towards the city of Columbia. Lake Murray and the downstream reach extending 10 miles from the Saluda dam to the Congaree River are major recreational resources for the region. Richland and Lexington counties are among the most densely populated counties in the state. Lake Murray provides a primary source for recreation, primarily boating and fishing, to these surrounding communities.

The Saluda Project area has a moderate climate year-round with long hot summers and short mild winters. July and August are typically the hottest months, with temperatures reaching above 90 degrees Fahrenheit (about 32 degrees Celsius [°C]) on an average of 40 days during those 2 months. Summer is typically the wettest season, with one-third of the total annual rainfall occurring during this time, because of the frequent occurrence of showers and thunderstorms throughout the season. Fall is characteristically the driest season, with warm, comfortable weather. Typically, only 19 percent of the total annual rainfall occurs during this time. However, occasionally, tropical storms and hurricanes travel through the area during this season.

¹⁴ Unless otherwise indicated, our information is taken from the application for license for this project (SCE&G, 2008).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing National Environmental Policy Act (40 CFR §1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we identified water quality and quantity, fishery resources, and terrestrial resources (specifically, effects on floodplain vegetation downstream of the Saluda Project) as having the potential to be cumulatively affected by the proposed project in combination with other past, present, and foreseeable future activities. For fishery resources, particularly diadromous species, these species may use habitat in the lower Saluda, Congaree, Cooper, and Santee rivers, and would be exposed to a number of other hydroelectric projects, flow diversions, and other activities that could have a cumulative effect.

3.2.1 Geographic Scope

The geographic scope of analysis for cumulatively affected resources defines the physical limits or boundaries of the effects of the proposed action on the resources. Because the proposed action can affect resources differently, the geographic scope for each resource may vary.

At this time, we propose the geographic scope for water quality to encompass the Saluda River from the upstream (western) limits of Lake Murray downstream on the Saluda River to river mile 35 on the Congaree River (which is located about 8 miles upstream from the Congaree National Park). The geographic scope for water quantity would extend from the upstream western limits of Lake Murray downstream to the confluence of the Congaree and Wateree rivers. We chose this geographic scope for water quality and quantity because other activities such as water uses, in combination with the operation of the project, may influence water quantity as well as water quality, but this effect is generally not observable downstream of the confluence of the Congaree and Wateree rivers. For fishery resources, our proposed geographic scope includes the Saluda River from the project dam downstream to the Atlantic Ocean, including the Congaree, Cooper, and Santee rivers. We chose this geographic scope because anadromous and catadromous species may utilize habitat in these rivers from the ocean up to Saluda dam, and would be exposed to a number of other hydroelectric projects, flow diversions, and other activities that could have a cumulative effect on the fishery resources. The proposed geographic scope for our cumulative analysis of effects on floodplain vegetation includes the lower Saluda River from the project downstream to the

Congaree National Park, because flow releases from the project may affect floodplain vegetation as far downstream as the Congaree National Park.

3.2.2 Temporal Scope

The temporal scope of analysis includes a discussion of the past, present, and future actions and their effects on water quality and quantity, fishery resources, and terrestrial resources (specifically effects on floodplain vegetation downstream of the Saluda Project). Based on the potential term of a license, the temporal scope looked 30 to 50 years into the future, concentrating on the effect on water quality and fisheries from reasonably foreseeable future actions. The historical discussion is limited, by necessity, to the amount of available information for each resource. We identified the present resource conditions based on the license application, agency comments on the draft license application, and comprehensive plans.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific site-specific and cumulative environmental issues.

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. We have not identified any substantive issues related to geology and soils associated with the proposed action, and, therefore, we do not assess geology and soils in this EA. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Water Resources

3.3.1.1 Affected Environment

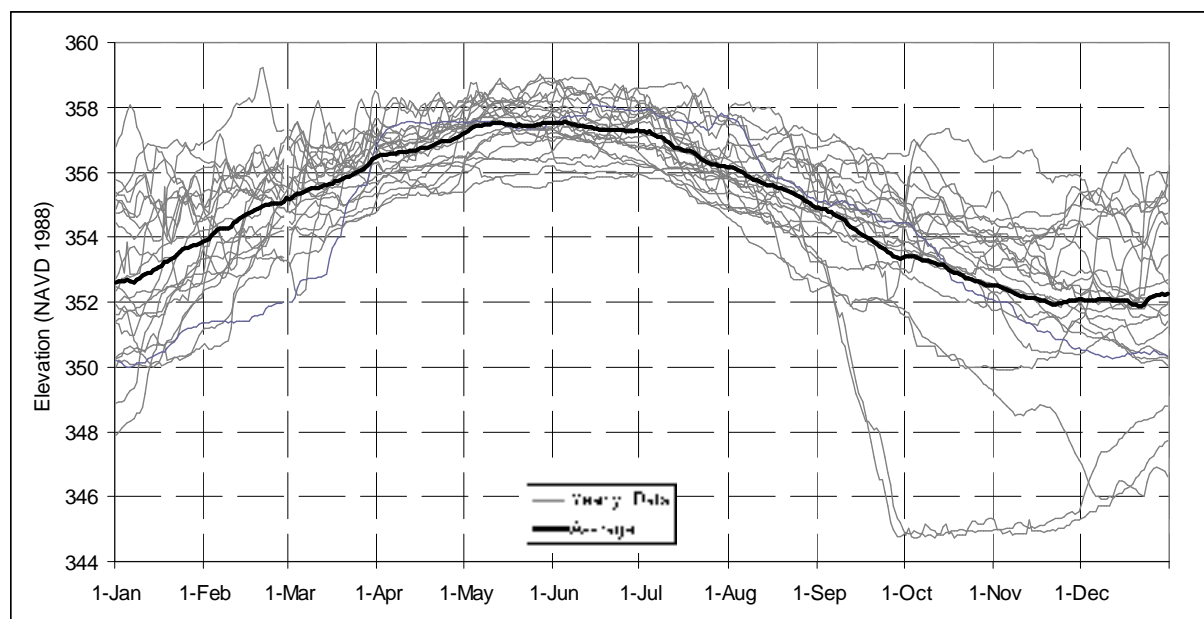
Water Quantity

The Saluda Project uses water of the Saluda River and tributaries to generate electricity. The Saluda River Basin drains portions of the eastern slopes of the Blue Ridge Mountains and some of the Piedmont in northwestern South Carolina. Lake Greenwood is located on the Saluda River about 20 river miles upstream and to the northwest of the farthest upstream reaches of Lake Murray. The total drainage area to Lake Murray is 2,420 square miles, of which about 68 percent is from the Saluda River, with tributaries flowing directly to Lake Murray accounting for the rest. Downstream of Lake Murray, the Saluda River flows for about 10 miles to the confluence with the Broad River and the start of the Congaree River near the city of Columbia. The Congaree River

forms the southern boundary of the Congaree National Park about 24 river miles downstream of Columbia.

At the normal maximum water surface elevation (356.5 feet) Lake Murray has a surface area of about 75 square miles and is about 41 miles long with a maximum width of 14 miles, a mean depth of 42 feet, a maximum depth of 189 feet, and a total shoreline of about 649 miles. The estimated gross storage of Lake Murray is about 2 million acre-feet and a retention time of about 417 days based on an average inflow of about 2,400 cfs. Inflow to Lake Murray is measured at U.S. Geological Survey (USGS) gage no. 02167000 Saluda River at Chappells, USGS gage no. 02167450 Little River near Silverstreet, and USGS gage no. 02167582 Bush River near Prosperity (see figure 6 for these gage locations). These three gages have a total drainage area of 1,705 square miles or about 70 percent of the total drainage area to Lake Murray.

SCE&G operates the project to manage Lake Murray water surface elevation on a seasonal basis. Historically, Lake Murray's water surface has been maintained between elevation 348.5 feet (winter) and 356.5 feet (summer) (figure 2). Occasionally SCE&G draws down the reservoir to elevation 343.5 feet for project maintenance work or control of aquatic vegetation, and the existing license allows a maximum operating water surface elevation of 358.5 feet.



Note: The low elevation lines in the October through December time frame shown above represent 1990 and 1996.

Figure 2. Lake Murray historical water surface elevations for October 1979 to December 31, 2002 (Source: USGS, 2009).

The existing license does not require a minimum flow to the downstream lower Saluda River; however, under an informal agreement with South Carolina DHEC, SCE&G releases a minimum flow of 180 cfs. Typically daily average flows released from the project have exceeded the voluntary minimum flow (table 2). Since October 1988, USGS maintains two real-time gages downstream of the project gage (no. 02168504 Saluda River below Lake Murray) about 1,000 feet below the dam in operation since 1988 and a gage (no. 02169000 Saluda River near Columbia) located 8.4 miles downstream from the dam, upstream of the Millrace Rapids area in operation since 1925. Table 2 shows monthly flow data for releases from Lake Murray¹⁵ based on these two gages for October 1979 to September 2003. Releases from Lake Murray normally take about 2 to 3 hours to reach the Millrace Rapids area near the gage location and the confluence with the Broad River. Spillage has only occurred from the outlet structure associated with Lake Murray during spill gate testing, and, within the last 40 years, all other flow has been routed through the powerhouse, which has a maximum hydraulic capacity of about 18,000 cfs.

Water Use

Water in Lake Murray is used primarily for hydropower production. However, the reservoir also provides water withdrawals for municipal and industrial purposes. Table 3 shows the maximum water withdrawals from Lake Murray of the four largest water users. SCE&G states that, when the water level of Lake Murray falls to at or below elevation 343.5 feet, one or more of the four municipal water intakes begin to have difficulties maintaining their normal pumping rates. Other users withdraw minor amounts of water from the reservoir for agricultural, domestic, and recreational uses. SCE&G's McMeekin Station, a coal fired generation power plant adjacent to the Saluda powerhouse (see figure 1), has a consumptive use of about 35 gallons a minute or less than 0.1 cfs.

¹⁵ USGS gage no. 0216900 includes about 100 square miles of tributaries that enter the Saluda River below Lake Murray.

Table 2. Monthly outflow (cfs) data from Lake Murray (Source: USGS, 2009).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
USGS gage nos. 02169000 Saluda River near Columbia (Oct. 1, 1979 to Sep. 30, 1988) and 02168504 Saluda River below Lake Murray (Oct. 1, 1988 to Sep. 30, 2003)												
Mean	3,246	3,477	3,770	2,403	1,645	1,593	2,028	2,305	2,236	2,136	2,112	2,470
Median	1,930	2,087	2,240	1,100	743	843	1,250	1,323	1,377	1,565	1,518	1,755
Max.	21,800	18,100	23,048	17,862	15,557	16,000	16,600	19,500	12,900	18,700	13,000	17,200
Min.	162	223	163	196	206	175	166	213	155	158	163	168
10% Exceed.	8,838	9,036	10,300	6,828	3,847	3,650	5,101	5,524	5,609	4,367	4,680	5,840
90% Exceed.	456	487	479	386	357	331	355	413	434	444	411	438

Note: Data from USGS gage no. 02169000 prorated by 2,420/2,520 cfs to account for the difference in the drainage area between the gage and Lake Murray.

Table 3. Major water withdrawals from Lake Murray (Source: SCE&G, 2009a).

Entity	Million Gallons Per Day	Cubic Feet Per Second
City of Columbia	100	155
City of West Columbia	48	74.4
City of Newberry	10	15.5
Saluda County Water and Sewer Authority	15	23.3

Water Quality

South Carolina DHEC classifies Lake Murray, and the Saluda River entering the lake, as Freshwater suitable for primary and secondary contact recreation, a source for drinking water after conventional treatment, suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora, and suitable for industrial and agricultural uses (South Carolina DHEC, 2004). Relevant water quality criteria for Freshwater waters are as follows:

- The daily average DO concentration in the Saluda River and Lake Murray shall not be less than 5.0 milligrams per liter (mg/L). The minimum concentrations shall not be less than 4.0 mg/L.
- The temperature shall not vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses.
- Fecal coliform shall not exceed a geometric mean of 200 colonies/100 milliliter based on five consecutive samples during any 30-day period, nor shall more than 10 percent of the total samples during any 30-day period exceed 400 colonies/100 milliliter.
- Turbidity shall not exceed 50 nephelometric turbidity units (25 nephelometric turbidity units for lakes) provided that existing uses can be maintained.
- The nutrient and chlorophyll a concentrations in Lake Murray shall not exceed the following:
 - Total Phosphorus 0.06 mg/L
 - Total Nitrogen 1.50 mg/L
 - Chlorophyll *a* 40 ug/L

The lower Saluda River has been classified as Trout Put, Grow, and Take waters, suitable for supporting the growth of stocked trout populations and a balanced, indigenous aquatic community of fauna and flora, along with the other uses of Freshwater waters (South Carolina DHEC, 2004). Based on scientific studies, the following site-specific DO standards were adopted for the lower Saluda River for the protection of the fishery: Instantaneous DO of 4.0 mg/L minimum, daily average DO of 5.0 mg/L, and 30-day average DO of 5.5 mg/L minimum. Standards for temperature and fecal coliform are the same as for Freshwater waters. Turbidity standards are 10 nephelometric turbidity units which is lower than for Freshwater waters.

Upper Saluda River and Lake Murray

Primary issues of concern are elevated total phosphorus and pathogen loading, algal growth, sediment buildup in the western part of Murray Lake near the inflow of the Saluda River, and low DO concentrations in the deeper parts of the lake which affect the project tailwater. In the Saluda River watershed between Lake Greenwood and Lake Murray dam there are 30 sites on the 303(d)¹⁶ list for 2008 (South Carolina DHEC, 2008). The reasons for these listings are primarily elevated fecal coliform concentrations, low DO, total phosphorus loading, and macroinvertebrate impairments. Aside from very small discharges from Dreher Island, there are currently no direct wastewater dischargers to the lake. Key water quality parameters are discussed in more detail below.

Pathogens

The water quality in Lake Murray supports recreational uses. However, elevated fecal coliform concentrations are of potential concerns for recreational uses. Studies in 1995 and 1998 found elevated fecal coliform concentrations at six and eight locations, respectively, in either the inflows/tributaries to the lake or in the tailwater of the Saluda dam. The elevated concentrations were attributable to point and non-point sources.

In the last 10 years, fecal coliform loading to Lake Murray appears to have decreased, although it is still one of the more common water quality indicators on the 303(d) list. Of the seven listed sites between Lake Greenwood and the Lake Murray dam, five sites are located in the Ninety-Six Creek watershed; total maximum daily loads are planned by 2010 for two of these five sites. The other two of the seven sites are

¹⁶ The 303(d) list is required by Section 303(d) of the Clean Water Act to record and track waterbodies that do not meet water quality standards even after controls for point and nonpoint source pollution have been put in place and/or a Total Maximum Daily Load (TMDL) for the pollutant has been developed. The purpose of the list is to identify impaired waters so that the source of impairment can be described and corrective actions can be implemented to improve water quality.

located along the mainstem of the Saluda River and in the watershed of the Little Saluda River. Recreational uses at the inflow areas to the lake are potentially affected, particularly after larger rainfall events.

Fecal coliform loads in the upper Saluda River watershed are not expected to affect the lower Saluda River; the long water retention time of 417 days in Lake Murray provides sufficient time for pathogens to decay.

Total Phosphorus

Total phosphorus concentrations tend to be highest in the upstream section of the lake as a result of inflows from the Saluda River and tributaries. Two sites are listed on the 303(d) list for total phosphorus for the Saluda River watershed between Lake Greenwood and the Murray Lake dam: Bush River arm and Little Saluda River arm (South Carolina DHEC, 2008). In the past, high phosphorus concentrations were also reported in Rocky Creek. Total phosphorus concentrations in the lake water decreases as one moves downstream toward the dam because of the uptake of phosphorus by plants and algae and subsequent settling of the organic matter to the lake bottom.

The primary sources of total phosphorus are the discharges from smaller tributaries. While the Saluda River carries 81 percent of the stream flow into Lake Murray, it contributes a total phosphorus load of only 19 percent. The remaining 81 percent of the total phosphorus load is transported into the lake by tributaries that include the Ninety-Six Creek (enters the Saluda River immediately downstream of the Greenwood dam (FERC No.1267) (36 percent), Bush River (25 percent), Little Saluda River (9 percent), Little River (6 percent), and Cloud's Creek (5 percent). Jointly, these tributaries contribute only 19 percent of the stream inflow to the lake.

The trophic status of Lake Murray is generally considered to be oligotrophic/mesotrophic (i.e., low to medium algal bloom and plant growth), based on 1995 and 1998 South Carolina DHEC reports. Highest levels of plant growth are associated with the tributary arms such as the Bush River and Rocky Creek. The Rocky Creek and Bush River sections of the lake are eutrophic (i.e., extensive algal bloom and plant growth). The trophic conditions in the western part of Lake Murray appear to have generally improved from conditions in the 1980s, in part because of the implementation of tertiary treatment for Greenville's wastewater discharges to the Reedy River (located above Lake Greenwood and upstream from the project). Based on the 2005 305(d) report by South Carolina DHEC, the trophic status of Lake Murray has generally remained consistent since then.

Temperature and Dissolved Oxygen

Lake Murray is a monomictic lake (i.e., thermally stratified throughout part of the year). The density difference between the epilimnion (warm surface waters) and the

hypolimnion (colder bottom waters) prevents the lake from mixing in the summer. Extensive DO monitoring conducted in Lake Murray in the 1990s showed that the lake stratifies each year starting in May or June, and this lasts until about October. The epilimnion remains well oxygenated but extended only 20 feet in the water column in some locations in Lake Murray in 1998. The hypolimnion contains the coolest water (down to 11 °C in 1996) and contains little to no DO. In the layer between these two layers (the metalimnion), the temperature drops sharply with depth (i.e., thermocline), limiting vertical mixing.

Low-oxygen conditions (< 2 mg/L) at depth (in the meta- and hypolimnia) appear to start first in western part of Lake Murray near the stream inflows associated with the Saluda and Little Saluda Rivers. This area has a higher DO demand as a result of a greater amount of decaying organic matter in the water column and the thermal stratification that prevents a resupply of oxygen from surface waters. Additional DO demand comes from the sediment column. However, the DO demand from decaying organic matter in the water column particularly in the western part of Lake Murray is estimated to be 25 times greater than the DO demand from the sediment column. Once the DO has been depleted in the water column, organic matter settles to the bottom of the lake where it depletes the remaining DO in the hypolimnion further. Within a month after thermal stratification starts, the low DO conditions at depth have spread within the meta- and hypolimnia of the entire lake. DO concentrations may actually be lower in the metalimnion than in the hypolimnion because of the greater demand from sinking biomass.

During years of low flow in the Saluda River, DO in the forebay is much greater than in normal flow years. In July 1999 and 2000, DO was generally greater than 5 mg/L; in normal flow years, DO was generally less than 5 mg/L with minimum DO concentrations ranging from <1 to <3 mg/L. In August 1999 and 2000, DO was generally greater than 3 mg/L; in normal flow years, DO was generally less than 3 mg/L with minimum DO concentrations of <0.5 mg/L.

During wet summers low DO water probably moves more rapidly through the reservoir. By September, DO concentrations in the forebay area are typically <0.5 mg/L during normal years and >1.5 mg/L during low flow years. By October, DO concentrations are normally <0.5 mg/L.

pH

The pH in Lake Murray can be low. The Environmental Research Center, Inc. (1976) measured pH levels between 5.3 and 9.1. The pH can decrease as a result of low DO concentrations and the production of carbon dioxide during decomposition of the decaying organic matter. This commonly occurs in lake waters with low alkalinity such as Lake Murray. Such minor low pH excursions have minor effects on aquatic life. The

only practical mitigation consists of watershed reductions of man-made sources of nutrients and organic loads and, possibly, reductions in internal nutrient cycling by appropriate organic matter removal and management.

Sediments

Sediment deposition occurs in the inflow areas of the Saluda River and tributaries. In addition to particulate matter transported by the streams, the dissolved nutrient load in the water triggers algal growth in these areas which adds to sediment buildup. Drawdown of the reservoir mobilizes some of the deposited sediments, which are then transported further into the reservoir.

Lower Saluda River

Dissolved Oxygen

Since 1999, SCE&G has monitored DO concentrations and the temperature in the water released by the project turbines. Prior to the installation of the turbine vents, the waters downstream of the dam were either not supporting or partially supporting for aquatic life uses because of low DO and pH levels, according to the South Carolina DHEC 1995 and 1998 reports. Data from 1989 to 1998 showed that the DO concentrations in the Saluda dam tailwaters were below 5 mg/L about 82 percent of the time and below 4 mg/L about 70 percent of the time.

In 1999, SCE&G installed turbine vents and modified its operation. These changes increased the median DO concentrations from 2.7 mg/L before 1999 to 7.2 mg/L after 1999. Occurrences of DO concentrations below 5.0 mg/L changed from 88 to about 12 percent of the time. Occurrences of DO concentrations below 3.0 mg/L changed from 55 to 3 percent of the time.

Between 2005 and 2007, hub baffles were designed to further enhance the turbine aeration. Baffles at Unit 5 were larger than at other units for further DO increases. In addition, head cover seals in units 2 and 3 were repaired, and improved operational controls were implemented. During the period from 2005 and 2007, the DO concentrations in the Saluda dam tailwaters had further improved to below 5 mg/L only 6 percent of the time and below 4 mg/L about 4 percent of the time.

Temperature

SCE&G studied the water temperature of the lower Saluda River and Congaree River in detail between March 2006 and November 2007. In the lower Saluda River, temperatures about 0.5 mile downstream of the dam ranged from 9.5 to 19°C over the course of the study. In the vicinity of the Riverbank Zoo, about 6 miles downstream from the dam, the water temperature ranged from 8.7 to 24°C. The water experienced warming

of about 5 to 7°C in the summer, interrupted by periodic excursions to temperatures adjacent to the dam during periods of project operation. The water within the river was well-mixed, and it did not show substantial differences between the left and right banks.

Water temperatures in the Congaree River at the Gervais Street bridge, just downstream of the confluence between the lower Saluda River and the Broad River, differed significantly on the opposing river banks, reflecting the temperatures of the inflowing rivers. The western side of the Congaree River which was more influenced by the Saluda River inflow experienced the greatest variability over time, reflective of power generation at the project dam. Specifically, the water temperature on that side of the river decreased because cooler water was released when the project was operating. On the other hand, during periods of extreme drought, the western side of the river can experience localized warming.

At a monitoring site near the Route 77 bridge that crosses the Congaree River, about 5 miles downstream of the confluence of the Saluda and Broad Rivers, the water was generally fairly mixed across the river. Project operations were still detectable on time scale and hours. Farther downstream, including at the entrance to the Congaree National Park, the water temperature pattern was similar to the Route 77 site, and variances associated with project generation were still detectable.

Coldwater releases from Lake Murray affect the thermal regime of the lower Saluda River and the upper Congaree River. The degree of influence varies depending on rainfall/drought conditions, which affect releases at the project. Cross-sectional temperature differences in the upper Congaree River gradually become less prominent within several miles downstream of the confluence of the Saluda and Broad rivers.

3.3.1.2 Environmental Effects

Water Quantity

Lake Murray Water Levels

SCE&G proposes to operate Lake Murray between elevations 356.5 and 352.5 feet based on a guide curve with a target elevation of 356.5 feet from March 1 through September 1 and a gradual decrease to 354.5 feet on December 1 and then to 352.5 feet by December 31 and increase to 356.5 feet by March 1. SCE&G also proposes to maintain a maximum operating pool elevation of 358.5 feet and a minimum operation pool elevation of 343.5 feet for periodic maintenance activities. Figure 3 shows the existing rule curves and the proposed guide curve or target curve. The proposed guide curve would maintain the water surface of Lake Murray at an elevation about 4 feet higher than under the existing rule curve during the majority of the year, other than during March 15 to September 1 when the difference would be less than 4 feet. On March 15, the difference between the proposed guide curve and the existing rule curve is

about 4 feet but the difference decreases to zero by May 1. On June 1, the difference between the two curves is zero, but increases to 4 feet on September 1.

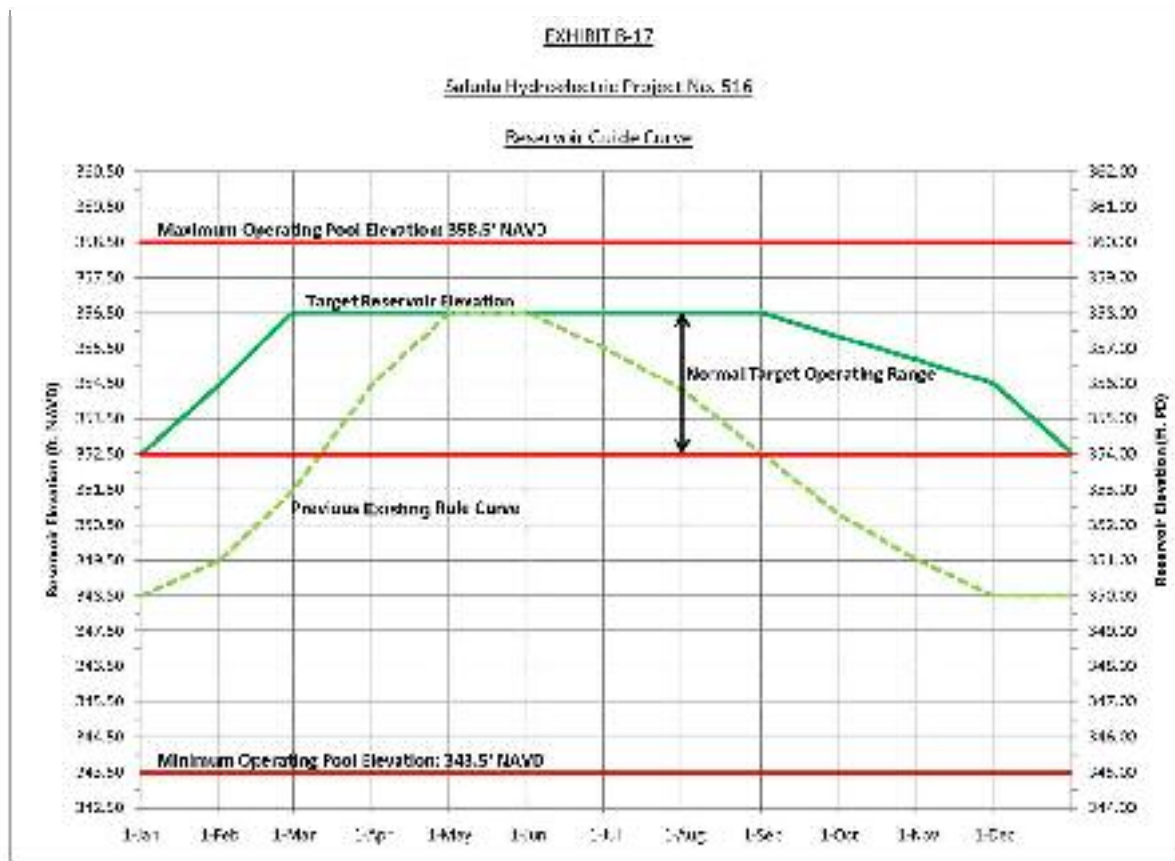


Figure 3. Lake Murray existing rule curve and proposed guide curve (Source: SCE&G, 2009a).

All signatories to the Saluda Settlement, and other entities including Interior and South Carolina DNR, support the proposed guide curve.

Any drawdown restrictions on Lake Murray would limit the amount of available water, especially during low inflow, that SCE&G could use to maintain power generation and could affect its ability to meet minimum flow requirements to the lower Saluda River. Therefore, in addition to the potential effects on aquatic, terrestrial, and recreational resources, the reservoir level management scenario is directly related to the ability to meet minimum flow requirements.

Our Analysis

Compared to existing conditions, the proposed guide curve for Lake Murray water surface elevations would result in a higher and narrower range of water levels. The proposed guide curve targets having the reservoir at its normal maximum operating

elevation of 356.5 feet by March 1 to have sufficient water to provide higher seasonal minimum flows, especially during drought conditions; provide striped bass flows during April and May; and to ensure access to the majority of public boats ramps on the lake.

SCE&G modeled Lake Murray operations with proposed minimum flows, reservoir levels, and inflows, in conjunction with a modern flow forecast model that allows greater warning of high inflow events. This flow forecasting model allows SCE&G to anticipate most high inflow events and to reduce the reservoir level in advance of the flood, if necessary. The use of the model reduces the need to spill water. A review of the annual high flow events as recorded at USGS gage no. 02167000 Saluda River at Chappells (which accounts for more than 60 percent of the total drainage to Lake Murray), over the past 50 years shows that about 50 percent of the annual high flow events occur during the months when the guide curve target is below elevation 356.5 feet. More than half of these events occurred in early to mid March. The daily maximum inflow to Lake Murray, as measured at USGS gage no. 02167000 during the last 50 years, was about 34,000 cfs or 67,000 acre feet. Between target elevation 356.5 feet and the normal maximum operating elevation of 358.5 feet, there is about 99,000 acre-feet of storage, which is greater than the anticipated inflow during storm events. Given that the storage available exceeds the likely daily maximum inflow, we conclude that the proposed rule curve target would accommodate anticipated high flow events.

The proposed guide curve also reflects the changes from operation of the Saluda Project when it served baseload, peaking, and load following functions. Presently, baseload generation requirements are primarily met by fossil and nuclear units. SCE&G states that peaking and load following generation requirements are primarily met by combustion turbines and a pumped storage facility while the Saluda Project is now primarily used for reserve generation.

The proposed guide curve would decrease the flood storage capacity of the Saluda Project. However, the loss of storage capacity would only be slightly noticeable during rainfall associated with tropical storms and hurricanes during the summer, which are largely predictable several days in advance. During the rest of the year including the fall and winter there would be less storage available than under existing conditions, but enough to accommodate likely flood events with proposed operational adjustments and storage capacity without negatively affecting downstream locations. The proposed guide curve balances the potential effects on aquatic, terrestrial, and recreational resources, and the ability to meet minimum flow requirements, especially during drought conditions for the lower Saluda River.

Maintenance, Emergency, and Low Inflow Protocol

Operation of the Saluda Project directly affects the water flow in the lower Saluda River which governs the water quality, aquatic habitat, and recreation opportunities in the

lower Saluda River. In dry periods or drought conditions, flows released from Lake Murray also account for a large percentage of the flows downstream along the Congaree River to the confluence with the Wateree River located below Congaree National Park.

SCE&G proposes to implement a Low Inflow Protocol that would be triggered by a 1-foot drop below the proposed reservoir guide curve elevation and 14-day average inflows that fall below the regular minimum flow releases proposed during non-low-flow conditions (as described in the Flow Release Program in section 2.2.3). The 14-day average inflow would be determined using the scaled gaged inflow to Lake Murray minus estimated municipal withdrawals, without accounting for evaporation from Lake Murray. Regular minimum flow releases could be re-implemented when 14-day average inflows exceed the regular minimum flow release amounts even if the reservoir levels are still below the 1-foot trigger elevation. During low inflow, the regular minimum flow releases would be suspended in favor of the following minimum flow releases:

- June 1 through March 31: provide a target flow release of 500 cfs and a minimum flow release of 400 cfs¹⁷;
- April 1 through May 10: if 14-day average inflow is greater than the striped bass enhancement flow release (i.e., between 1,000 and 2,700 cfs), provide the striped bass flow as the target flow release with a 1,000-cfs minimum; if 14-day average inflow is less than the striped bass enhancement flow, provide a 1,000-cfs minimum flow release; if 14-day average inflow is less than 1,000 cfs, provide a 700-cfs minimum flow release; if 14-day average inflow is less than 700 cfs, provide a target flow release of 500 cfs and a minimum flow release of 400 cfs; and
- May 11 through May 31: provide a target flow release of 700 or 500 cfs, depending on inflow as described above, and a minimum flow release of 400 cfs.

¹⁷ Another provision of the Low Inflow Protocol is that, during the period of December 16 to January 17 (for a 1-foot trigger), or between December 1 and February 1 (for a 2-foot trigger), if the 14-day average inflow is less than the scheduled minimum flow and the target reservoir elevation is within 1 or 2 feet (depending on whether there is a 1 or 2-foot trigger) of elevation 352.5 feet, the reservoir would not be required to drop 1 or 2 feet (depending on whether there is a 1 or 2-foot trigger) below the current target elevation before reducing the minimum flow. Also, at any time during a low-inflow period, should the reservoir level fall below elevation 352.5 feet, the minimum flow from the project would be reduced to a target flow of 500 cfs (400 cfs minimum), and would remain at that level regardless of any increase of inflow until the reservoir level has risen above elevation 352.5 feet.

The Saluda Settlement left unresolved the water surface elevation at which the Low Inflow Protocol should be implemented and invited signatories and other stakeholders to file with the Commission their recommendations and justifications. As noted above, SCE&G proposes a 1-foot trigger. South Carolina DNR recommends a 2-foot drop in lake level to trigger the Low Inflow Protocol. Trout Unlimited, Coastal Conservation League, American Rivers, and American Whitewater also support a 2-foot drop in lake level to trigger implementation of the Low Inflow Protocol. The minimum flow regime resulting from this trigger would be generally the same as SCE&G proposes. However, Trout Unlimited recommends a 600-cfs target flow release and a 500-cfs minimum flow release, with 400 cfs as the absolute minimum flow release only after more than a month of low inflow.

Interior recommends a 4-foot-below-the-upper-target-reservoir level to initiate the Low Inflow Protocol with the following requirements:

- the 14-day average net inflow flow falls below the scheduled instream flow; and
- the reservoir pool falls to an elevation of 352.5 feet.

Because Interior is in agreement with the proposed reservoir guide curve and specifies implementation of the Low Inflow Protocol at a reservoir elevation of 352.5 feet, it is in essence only recommending a full 4-foot trigger from March 1 until September 1. During this time, the guide curve is at elevation 356.5 feet, but during the rest of the year the trigger would be less than 4 feet because the proposed guide curve varies between elevation 356.5 and 352.5 feet. As a result of the 10(j) meeting held in Columbia on April 29, 2010, Interior now agrees with the implementation of a 2-foot trigger during the implementation of a Low Inflow Protocol.

The Lake Murray Association, a non-profit organization of Lake Murray users, prefers a 6-inch trigger but supports SCE&G's 1-foot trigger; however, the Lake Murray Fishermen's Group recommends a 6-inch trigger but would support SCE&G's proposal if the 6-inch trigger is not possible.

Our Analysis

The proposed Low Inflow Protocol trigger is intended to balance the needs of hydropower generation, reservoir levels, aquatic resources, terrestrial resources, recreational use and water supply, both within the project area and downstream on the lower Saluda River and the Congaree River, during drought conditions. The key issue is the lake level below the guide curve that would trigger implementation of the Low Inflow Protocol and subsequently, lower minimum flows to the lower Saluda River.

Lake Murray has a usable storage of about 635,000 acre-feet of water between elevation 343.5 and 358.5 feet. At the lower water elevation, maximum withdrawal by the municipal water intakes starts to become problematic and therefore SCE&G tries to keep the reservoir above 343.5 feet, even during extreme droughts. Water levels above elevation 343.5 feet also affect other resources. For example, at an elevation of 352.5 feet, about 48 percent of the residential boat docks become unusable. Under the existing rule curve (see figure 3), elevation 352.5 feet was not reached until mid March and lasted until only September 1. SCE&G and South Carolina DNR both provided detailed information and analyses in support of their proposed and recommended 1- and 2-foot triggers. We reviewed the methods SCE&G and South Carolina DNR used to model the alternative triggers and find the approaches and assumptions to be reasonable. Table 4 shows a comparison of the usable storage depleted using the 1- and 2-foot triggers to implement the reduced minimum flows. The percent depleted is based on both the usable storage and the difference between the guide curve and the trigger elevation. South Carolina DNR also provided percent depleted numbers for the 4-foot trigger recommended by Interior, and the values for that trigger follow almost a linear relationship (about 2 times) the values for the 2-foot trigger. In addition, our analyses show that, for the 6-inch trigger, the values would be about one-half of the values shown in table 4 for the 1-foot trigger.

Table 4. Usable storage depleted under the 1- and 2-foot trigger elevations (Source: South Carolina DNR, 2009).

Month	Guide Curve Elevation (feet)	Usable Storage (acre/feet)	1-foot Trigger	Percent Usable Storage Depleted	2-foot Trigger	Percent Usable Storage Depleted
Jan	353.5	1,375,987	352.5	3.3	351.5	6.4
Feb	355.5	1,467,585	354.5	3.2	353.5	6.3
Mar	356.5	1,515,174	355.5	1.0	354.5	6.3
Apr	356.5	1,515,174	355.5	1.0	354.5	6.3
May	356.5	1,515,174	355.5	1.0	354.5	6.3
Jun	356.5	1,515,174	355.5	1.0	354.5	6.3
Jul	356.5	1,515,174	355.5	1.0	354.5	6.3
Aug	356.5	1,515,174	355.5	1.0	354.5	6.3
Sep	356.0	1,500,897	355.0	3.2	354.0	6.3

Month	Guide Curve Elevation (feet)	Usable Storage (acre/feet)	1-foot Trigger	Percent Usable Storage Depleted	2-foot Trigger	Percent Usable Storage Depleted
Oct	355.5	1,467,585	354.5	3.2	353.5	6.3
Nov	354.9	1,439,747	353.9	3.2	352.9	6.3
Dec	353.5	1,375,987	352.5	3.3	351.5	6.4

Note: Under the 4-foot trigger, about 12 percent of the usable storage would be depleted.

SCE&G used historical inflow values and reservoir levels from 1981 until 2008,¹⁸ which represents the extent of fully available gaged data from upstream USGS inflow locations, for its modeling. This modeling shows that the 1-foot trigger would have been implemented 17 out of the 28 modeled years including 10 drought years,¹⁹ the 2-foot trigger would have been implemented only during the 10 drought years, and the 4-foot trigger in only about 5 of the drought years. Of the additional years that the 1-foot trigger would have been implemented, three of the years (1990, 1994, and 1995) were short duration occurrences because of reservoir levels lowered during the modeled release of the striped bass enhancement flows during April and May. The other four years when the 1-foot trigger would have been implemented would have averaged 29 days of reduced downstream flows. During the four severe drought years, the average number of days that the downstream flow reduction would have been implemented with the 6-inch trigger is 206 days, 193 days with the 1-foot trigger, and 153 days for the 2-foot trigger. The analysis by SCE&G showed that both the 6-inch and 1-foot trigger would have been implemented during relatively short dry periods and many non drought years, and the overall number days per year of smaller flows released from Lake Murray would be substantially more.

SCE&G's modeling illustrates that the reservoir level difference between the 1- and 2-foot triggers is small (less than 1 foot) in most circumstances. From 1981 to 2008, the modeling shows that under both trigger levels, the reservoir levels would be similar to historical conditions during the summer and about 1 to 2 feet higher during the late

¹⁸ Lower operation levels at Lake Murray in 2003 and 2004 for the construction of the backup dam are not included in this historical period.

¹⁹ The 10 drought years in this period were: 1981, 1985, 1986, 1988, 2000, 2001, 2002, 2006, 2007, and 2008, with 1981, 1988, 2007, and 2008 classified as severe drought years.

summer and the rest of the year. In addition under both trigger levels, the minimum flows released to the lower Saluda River would be substantially higher (more than 300 cfs) than the historical average. On average, only about a 0.25-foot (3-inch) difference is noted in the reservoir level between the 1- and 2-foot triggers. Figure 4 shows the modeled reservoir differences between the two triggers during the 10 drought years (only about 0.5 foot). The differences in minimum flows between the 1- and 2-foot triggers are somewhat small other than in mid April to June 1 when higher flows are supplied to the lower Saluda River for striped bass enhancement. The volume lost from Lake Murray to supply the higher flows in this time period was responsible for the majority of the reservoir level difference. During the rest of the year, the difference between the minimum flows between the 1- and 2-foot triggers and historical conditions released during the rest of year were between about 250 and 400 cfs, with the lower value occurring during July and August.

Modeling by SCE&G shows that, during the two recent consecutive drought years of 2007 and 2008, because of very low inflow, the reservoir levels shown in figure 5 would have fallen to about elevation 350.5 feet in December 2007 under both the 1- and 2-foot trigger values. Our estimates show that elevations would have been about 348 to 349 feet in December 2007 with Interior's recommended 4-foot trigger. Similarly, under the 4-foot trigger, recovery to the guide curve level would not have occurred during the winter and spring of 2008 and, by December 1, 2008, reservoir levels would have fallen back to about elevation 350.5 to 351.0 feet. In addition, with a 4-foot trigger level, the water level would have less opportunity to recover and would result in estimated water levels near elevation 349 feet by December 1 and levels about 1 to 2 feet below the other two levels during the recreation season of 2008. The maximum difference in reservoir stage between the 1-foot and 2-foot triggers was modeled to be about 0.8 foot during the summer of 2008 which probably was one of the worst 2- year drought periods on record.

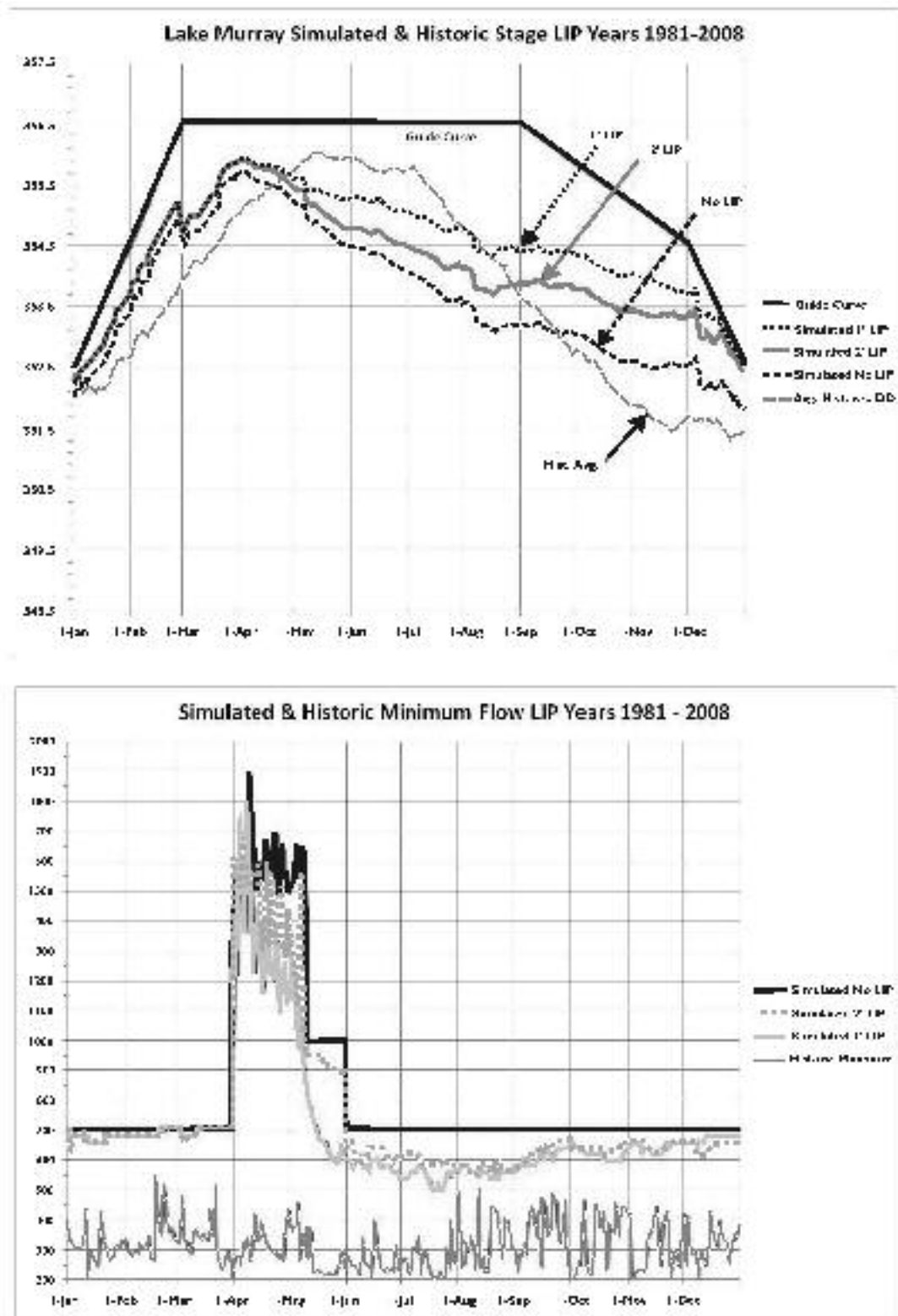


Figure 4. Comparison of the modeled Lake Murray elevations and minimum flows for the 10 driest years between 1981 and 2008 (Source: SCE&G, 2009a).

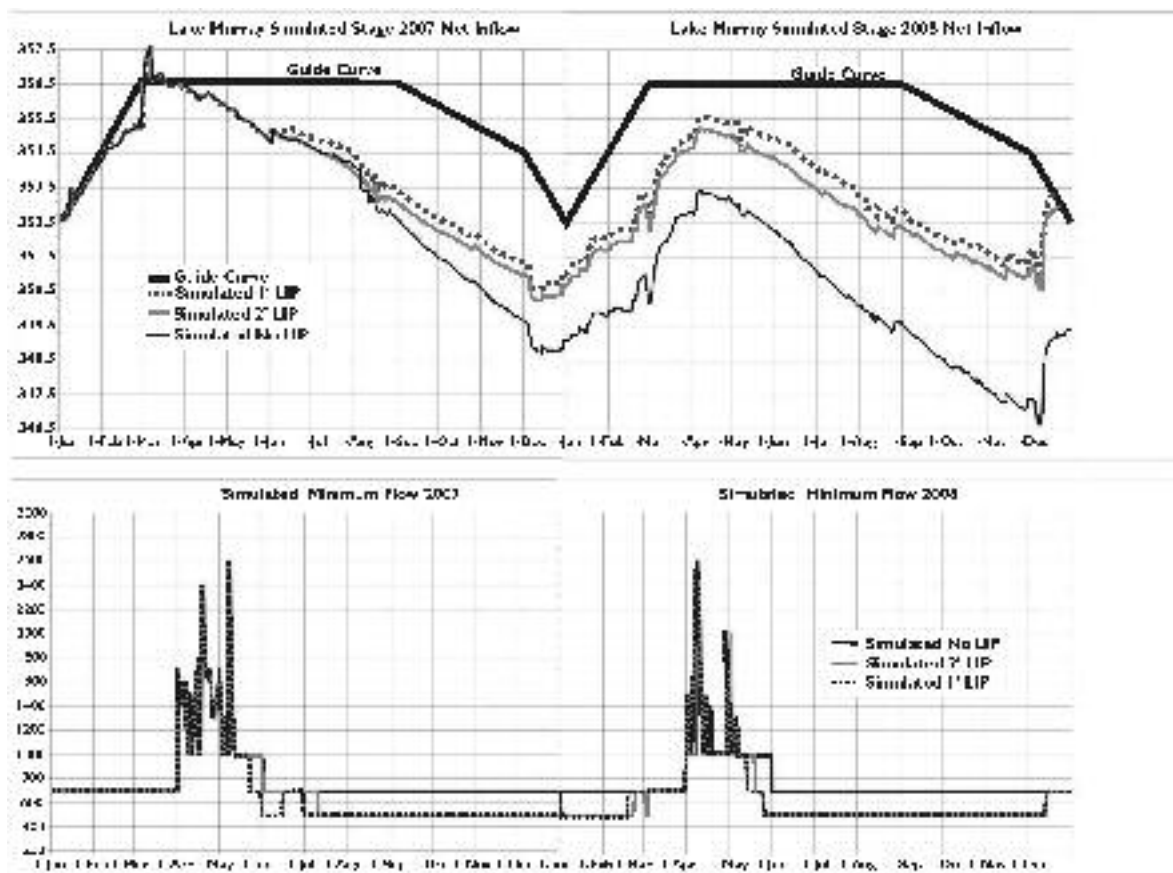


Figure 5. Comparison of modeled Lake Murray elevations and minimum flows for 2007 and 2008 (Source: SCE&G, 2009a).

As expected the 6-inch and 1-foot triggers would generally result in slightly higher reservoir levels and lower flows in the lower Saluda River than the 2- and 4- foot triggers. Both the 6-inch and 1- and 2-foot triggers and the higher guide curve would result in generally higher reservoir levels in Lake Murray and higher flows in the lower Saluda River than have occurred historically. The 2-foot trigger would be implemented normally only in drought years and about half as often on both a yearly and total number of days as the 6-inch and the 1-foot trigger. The 4-foot trigger would supply more water to the lower Saluda River, result in lower reservoir levels, and would be implemented even less often than the 2-foot trigger. During some severe droughts, the proposed guide curve, regardless of a 6-inch, 1-, 2-, or 4-foot trigger, would not be able to be maintained. However, the 6-inch, 1-, and 2-foot triggers, and to a lesser extent the 4-foot trigger,

would help keep the reservoir high enough²⁰ to maintain most recreational uses and allow for the use of the current municipal water withdrawal systems. During these droughts, the 4- and 2-foot triggers would allow for slightly higher flows to the lower Saluda River, but during severe droughts, the flows would reach the lowest minimum flows allowed but not as quickly as would occur with the 6-inch and 1-foot triggers.

Monitoring Flow and Water Levels

SCE&G currently funds the USGS gages that monitor compliance with existing license conditions. A USGS water level gage is located on Lake Murray, and similar USGS flow and level gages are upstream and downstream of Lake Murray. All these gages are real-time USGS gages with values recorded at 15-minute intervals, and data are available on the Internet. Table 5 describes these gages, and figure 6 shows the locations.

Table 5. USGS gages in the Saluda Project area (Source: USGS, 2009).

Gage	Name	Parameters	Funding
02167705	Little Saluda River near Saluda	Gage height and discharge	SCE&G
02167582	Bush River near Prosperity	Gage height and discharge	SCE&G
02167450	Little River near Silverstreet	Gage height and discharge	SCE&G
02167000	Saluda River at Chappells	Gage height and discharge	
02168500	Lake Murray near Columbia	Reservoir elevation and water quality	SCE&G
02168504	Saluda River below Lake Murray dam	Gage height, discharge, water quality, and precipitation	SCE&G
02169000	Saluda River near Columbia	Gage height, discharge, and water quality	USGS

²⁰ The water levels would be above the elevation of 343.5 feet needed for municipal water withdrawals and for access to all of SCE&G-owned public boat ramps, as well as some private and commercial ramps. Water elevation would also be high enough to allow access to more than 50 percent of private docks. As discussed in section 3.3.5, *Recreation, Land Use, and Aesthetics*, 51 percent of private boat docks are accessible at 352.5 feet.

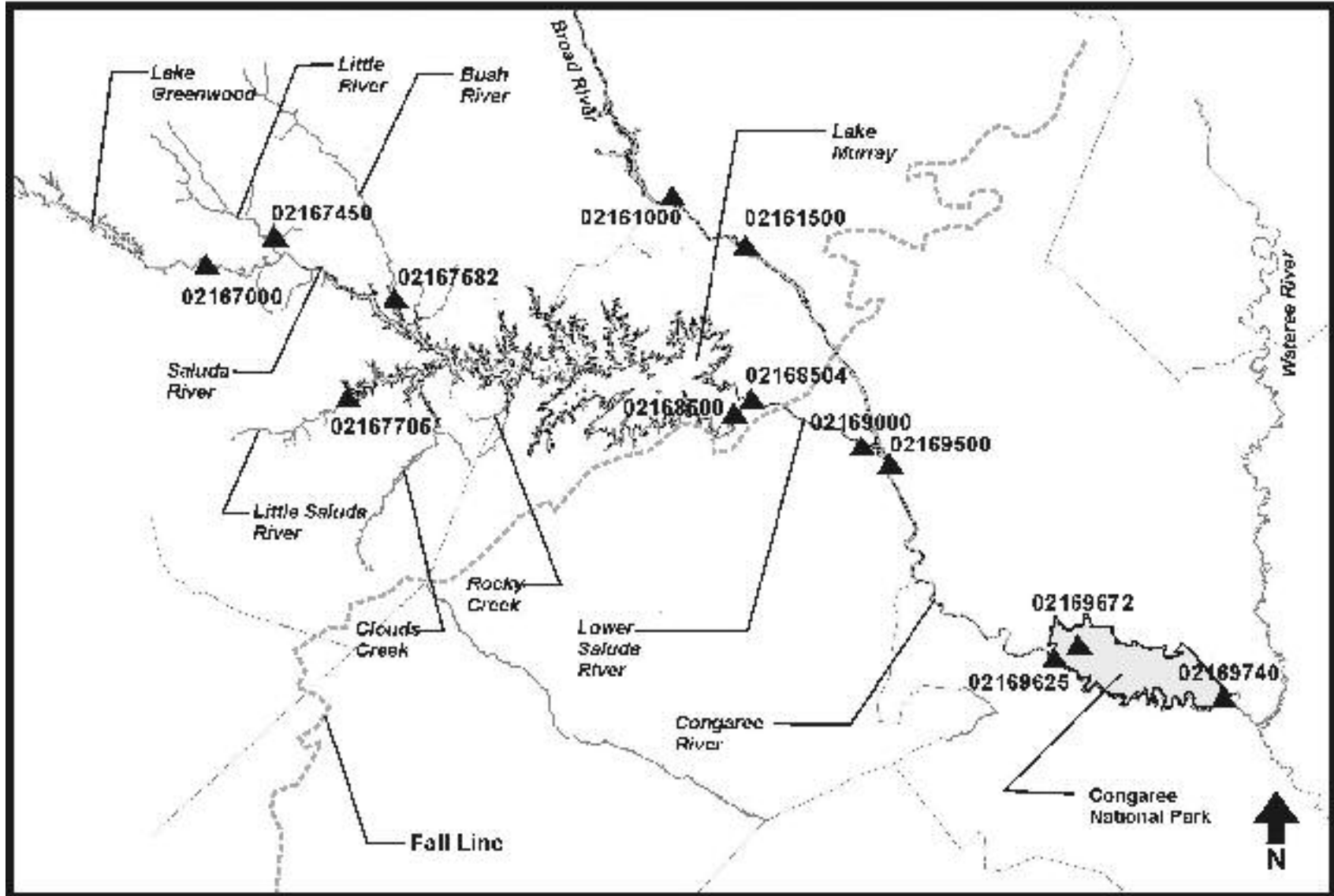


Figure 6. Gage locations in the Saluda Project area (Source: Conrads et al., 2008; USGS, 2009, as modified by staff).

Under the Saluda Settlement, SCE&G would develop and implement an operational compliance monitoring plan. The plan would include: (1) provisions to monitor water surface elevations in Lake Murray and flows in the lower Saluda River; (2) a description of the methodology to calculate storage and measure flow for Swift Water Safety Training and recreational flow releases in the lower Saluda River; (3) provision to make available gaging data to FWS and South Carolina DNR within 30 days of receipt of written requests; (4) provisions for filing an annual report to the Commission with copies to NMFS, FWS, and South Carolina DNR summarizing deviations from the Flow Release Program; and (5) an implementation schedule.

Interior and the U.S. Department of the Interior, National Park Service (NPS) recommend that SCE&G provide funding to assist USGS with gages in and adjacent to the Congaree National Park to monitor effects of the new flow regime in the lower Saluda River on surface and ground water in the park.

Our Analysis

Existing real-time USGS gaging stations (supported by SCE&G) currently monitor the lake level and the flow released by the project. These gaging stations have a recording interval of 15 minutes and can be accessed on the Internet at: <http://waterdata.usgs.gov/sc/nwis/current/?type=flow>. Continuing the existing 15-minute monitoring for reservoir level and discharges would be sufficient to ensure compliance with the proposed water levels, discharges, and water quality aspects of the Saluda Settlement. Development of an operational compliance monitoring plan would provide additional insurance for the continuation of the current monitoring and specify provisions for the reporting of the gaging data to the Commission and specified agencies.

USGS recently published a study (Conrads et al., 2008) showing that the effects of operations of the Saluda dam over the past almost 80 years on flood events is relatively minor since the Broad River and other tributaries to the Congaree River account for about 70 percent of the watershed at Congaree National Park. This analysis also shows that, while the operation of the Saluda dam has a very small effect on flows during other periods of the year, such as increasing the flow rate in the Congaree River during very dry periods, most of the effect has been slightly changing the water level during times when the flow is contained within the river banks. In general, this effect has caused slightly lower water levels during the first half of the year and slightly higher levels during the last half of the year and might slightly affect groundwater level within the floodplain. The result is limited effects on the inundation of the floodplain and maybe some minor effect, if any, on the groundwater level of the floodplain or of the root zone in the Congaree National Park. Another report (Plewa and Graf, 2005) shows similar slight effects on the Congaree River from historical operations of the project.

Our analysis of these reports and historical gage data shows that project operation does have a slight effect on the Congaree River at the Congaree National Park.

Conditions proposed in the Saluda Settlement and by other parties would result in very limited changes to the hydrology at Congaree National Park, however, compared to historical conditions, which have existed for the past 80 years and since the protection of the Congaree National Park area in 1976.²¹ Thus, there would be limited, if any, effects on groundwater levels of the floodplain or the root zone in the Congaree National Park and therefore, no need for SCE&G to provide funding for USGS gages near the Congaree National Park. Continued use of current USGS gages in the immediate project area would be sufficient to ensure compliance with minimum flows, striped bass enhancement flows, Lake Murray water level requirements, and other related measures proposed for the project.

Water Quality

Under SCE&G's proposed operations, some water quality issues identified in Lake Murray would remain, such as elevated fecal coliform loading and eutrophication in the tributaries. These issues, however, are beyond SCE&G's control. In areas where SCE&G has control over point and nonpoint runoff, it has implemented shoreline management procedures to minimize impacts from stormwater runoff on water quality in coves and tributaries of Lake Murray. SCE&G also maintains a 100-foot vegetated buffer along the Saluda River channel to protect water quality (and natural and aesthetic resources). Releases of cold water into the lower Saluda River would continue.

Dissolved Oxygen

Water quality monitoring data show that Lake Murray stratifies in the summer resulting in a sharp decline in DO concentrations in the deeper waters. Releases of these low DO waters during project generation affect DO concentrations in the lower Saluda River. SCE&G's improved generating equipment and procedures have greatly improved DO conditions in the lower Saluda River over the last 10 years. Nevertheless, as stated in the Saluda Settlement, SCE&G will do all it reasonably can to maintain applicable state water quality standards to support the existing uses. Therefore, SCE&G proposes to install new runners of modern design that offer higher efficiencies, output, and DO uptake, and to rewind the generators. SCE&G's goal is to achieve 100-percent support of the South Carolina lower Saluda River site-specific DO standards within 3 to 11 years after license issuance.

SCE&G proposes to use an adaptive management program to implement the improvements. Unit 5 would be the first unit to be upgraded for the new runners within 3 years after issuance of a license. This time period is required for needed design and

²¹ Congaree National Park received initial protection as Congaree Swamp National Monument in 1976 and became a national park in 2003.

performance testing of the unit. Thereafter, additional units would be upgraded in the following order: Units 3, 4, 1 and 2. Once DO standards have been achieved consistently with the first few units, further upgrades of the remaining units would be implemented based purely on an economics-driven schedule. This could extend the upgrade period to 25 years after issuance of a license.

SCE&G would measure DO concentrations and temperatures at USGS gage no. 02168504 about 0.5 mile downstream of the dam. If after completing all upgrades, the project operations still do not support the South Carolina site-specific DO standards for the lower Saluda River, SCE&G would meet with South Carolina DHEC and Saluda Settlement signatories within 1 year after the completion of final unit upgrade and testing to develop a plan to ensure future support of the standard. If an acceptable plan in support of the standard has not been developed within a year, “a party may withdraw from the Settlement Agreement and take independent action to assure support of the standard” (Saluda Settlement, p. A-7).

In the meantime, until the upgrades of individual units are complete, SCE&G would continue with turbine aeration measures (i.e., turbine venting and baffles) and operational modifications that were implemented in 1999 and as conditioned by the Commission in its order issued in *South Carolina Electric & Gas Company*, 109 FERC ¶ 61,316 (2004).

As stated in the Saluda Settlement, within 1 year after completion of Unit 5 upgrades, SCE&G would consult with South Carolina DNR and DHEC, FWS, and other applicable resource agencies and relicensing stakeholders with relevant experience that are signatories of the Saluda Settlement, to evaluate Unit 5 operational scenarios to aid in the preservation of cool-water refuge habitat for the benefit of reservoir and riverine fisheries.

Our Analysis

Despite the changes in the pool elevations, the reservoir would continue to stratify in the summer, resulting in the continued formation of low DO conditions at depth (i.e., in the meta- and hypolimnia). However, we find the approach proposed in the Saluda Settlement for the upgrades of the unit runners reasonable to achieve compliance with the South Carolina water quality standards for DO in the lower Saluda River downstream of the project. The approach includes a well-developed adaptive management component that should allow for adjustments to achieve compliance with South Carolina water quality standards for DO.

The Unit 5 withdrawal zone is located in the middle of the water column of the reservoir at a depth of about 80 feet below typical summer pool, while units 1 to 4 have near-bottom withdrawal zones. Based on water quality modeling conducted by SCE&G, it appears that preferential operation of Unit 5 would help to preserve the volume of cool

hypolimnetic water available during the summer months. This cool water provides refuge habitat for striped bass that prefer water temperatures of $<27^{\circ}\text{C}$ and DO concentrations of $>2.5\text{ mg/L}$. On the other hand, more extensive use of Unit 5 might cause increased entrainment of blueback herring that seem to congregate in front of Unit 5 in the August/September time period (see further discussion in section 3.3.2, *Aquatic Resources*).

Temperature

SCE&G is not proposing any upgrades or operational changes that are expected to substantially change temperature conditions in the lower Saluda River or in the Congaree River downstream of the project from those of existing conditions.

Our Analysis

The effects of project-induced temperature changes in the lower Saluda River and other rivers downstream from the project are discussed in section 3.3.2, *Aquatic Resources*.

Reservoir Drawdowns

SCE&G also proposes to implement a periodic Reservoir Drawdown Program for water quality maintenance, sediment transport, and aquatic vegetation management. Specifically, SCE&G plans to draw the reservoir elevation to 348.5 feet every third year if the average flow in November at USGS gage no. 02167000 on the Saluda River in Chappells, South Carolina, is equal to greater than 1,500 cfs. The drawdown would be conducted in December, and the elevation 348.5 feet would be held for a period of 28 days once it is reached. Following the drawdown, the water elevation in the reservoir would be allowed to return as fast as inflow permits, while minimum flows are maintained. The drawdown would be coordinated by the adaptive management team,²² consisting of SCE&G, state and federal agencies, and other relicensing stakeholders with relevant experience and interests. Such a team would coordinate, for example, if a 3-year drawdown does not occur or when the next drawdown should occur if it is outside the every third year routine. In addition, SCE&G, resource agencies, and other interested stakeholders would coordinate a strategy if water quality, aquatic plant, or fish population management problems require special drawdowns. If it is agreed that a drawdown for lake management is required, SCE&G and appropriate resource agencies plan to publicly communicate the nature of the problem and the recommended management approach.

²² According to the Saluda Settlement, the adaptive management team would consist of SCE&G, state and federal resource agencies, and other relicensing stakeholders with relevant experience and interests. The Saluda Settlement also states that all members of this team must be signatories to the Saluda Settlement.

Our Analysis

Generally higher pool elevations throughout the year under the new guide curve would result in greater sediment accumulation near the points of entry of the upper Saluda River and tributaries into Lake Murray, compared to present conditions. Sediment accumulation may result in localized shoaling and nutrient buildup in these areas which in turn could cause greater aquatic vegetation growth. Periodic reservoir drawdowns as proposed would assist in managing sediment entering the reservoir from the Saluda River and the tributaries. Intermittent scouring resulting from the extended drawdown period would also assist with nuisance plant vegetation control in the tributaries. Organic matter rich sediments would be mobilized and transported to greater water depth, reducing the degree of recycling of nutrients from the sediments back into the water column in the tributaries.

3.3.1.3 Cumulative Effects

Low DO conditions in Lake Murray in the summer are a result of nutrient loading from the upper Saluda River watershed and thermal stratification in the lake. Nutrient loading is the result of largely non-hydropower activities. Presently, the release of low DO water by the project into the lower Saluda River is largely avoided because of turbine vents and hub baffles installed by SCE&G over the last 10 years.

Proposed installation of new modern runners and other improvements are designed to achieve full compliance with the South Carolina water quality standards for DO, which would improve the aquatic habitat in the lower Saluda River and upper Congaree River.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Fishery Resources

The fishery resources of the Saluda Project area can be divided into three primary segments: the resident fishery of Lake Murray, the resident fishery of the lower Saluda River, and the diadromous fishery of the lower Saluda River and downstream Congaree/Santee rivers.

Lake Murray

Lake Murray has a variety of aquatic habitat ranging from extensive shallow littoral areas with associated wetlands to deep open-water habitat. The total shoreline length is 691 miles and is irregular with several coves and tributaries. The mean and maximum depths of the reservoir are 46 feet and 190 feet, respectively. The reservoir water quality is typical of many southeastern reservoirs with high turbidity and nutrient

levels and strong thermal and DO stratification during the summer and early fall. During this period, the reservoir hypolimnion (lower depths) exhibits cool water temperatures and low DO levels (less than 1 mg/L), while the reservoir epilimnion (surface waters) has warm water temperatures and high DO levels (often exceeding 8 mg/L).

Lake Murray supports a substantial warmwater fishery that has produced state records for some game species. Primary game species include striped bass, largemouth bass, black crappie, and redear and bluegill sunfish. Primary forage species include threadfin shad, gizzard shad, and landlocked blueback herring (blueback herring are an anadromous species that may occasionally become landlocked in large reservoirs). The striped bass fishery is considered the premier fishery in the lake, with an estimated one-third of the total fishing effort on the lake devoted to striped bass. The striped bass population, however, is not self-sustaining and is maintained by stocking. More than 30 million striped bass have been stocked in the lake since 1971.

Lower Saluda River

The lower Saluda River flows for about 10 miles from the project dam to the confluence with the Broad River, where the confluence of the Saluda and Broad rivers creates the Congaree River. The lower Saluda River follows a generally straight southeastern course with mostly forested riverbanks, except in the vicinity of occasional transmission line crossings or developments. The river can be characterized as mostly low-gradient pools and glides with occasional riffles in the upper reach, and a somewhat higher-gradient lower reach with pools, riffles, and rapids over bedrock and boulder substrate, particularly where the river cuts through the fall line near Columbia. The river becomes braided with several side channels and islands at the confluence with the Broad River. Water quality in the lower Saluda River is heavily influenced by low-level water releases from Lake Murray through the Saluda powerhouse, resulting in cooler than normal water temperatures (less than 20°C) and DO levels occasionally less than 1 mg/L during the summer months. DO levels, however, are generally maintained at greater than 6 mg/L since the installation of turbine venting equipment by SCE&G in 1999.

The lower Saluda River supports an important sport fishery for both coldwater and warmwater species. The coldwater fishery is possible because of the cooler than normal water released from Saluda powerhouse, and is maintained by annual trout stocking by South Carolina DNR. DNR annually stocks about 30,000 trout, with about 75 percent brown trout and 25 percent rainbow trout. Typical length at stocking is from 7 to 10 inches, but rainbow trout of 4 to 8 pounds have been caught, indicating some carryover of fish from year to year and longer-term survival and growth. South Carolina DHEC classifies the lower Saluda River as Put, Grow, and Take Trout Waters, which are defined as freshwaters suitable for supporting the growth of stocked trout populations and a balanced, indigenous aquatic community of fauna and flora. Warmwater species occurring in the lower Saluda River include chain pickerel, redbreast sunfish, redear sunfish, bluegill, largemouth bass, carp, channel catfish, spotted sucker, yellow perch,

sandbar shiner, and gizzard shad. Most fishing efforts in the lower Saluda River, however, are directed at the two trout species, in that this is a unique year-round trout fishery in a relatively large southeastern river in a metropolitan area (Columbia).

Diadromous Fishery

The Santee River Basin, which includes the Saluda and Congaree rivers, currently supports populations of several diadromous species, including American shad, hickory shad, blueback herring, shortnose and Atlantic sturgeon, striped bass, and American eel. Large runs or migrations of American shad and blueback herring enter the lower Santee River and Cooper River (which receives Santee River flows via the Santee Cooper Hydroelectric Project [FERC No. 199]), and are passed upstream at the Pinopolis navigation lock (part of the Santee Cooper Project) and at the U.S. Army Corps of Engineers' St. Stephen Station fish lift.²³ Since the year 2000, fish counts for American shad have numbered in the hundreds of thousands, while blueback herring counts have ranged from the hundreds of thousands up to more than a million fish. Striped bass are also passed at the St. Stephen fish lift and have numbered generally less than 5,000 fish per year (FERC, 2007). Diadromous species that are passed upstream at the Pinopolis lock and at St. Stephen station continue their upstream migration through Lake Moultrie and Lake Marion and into the upper basin including the Congaree and Saluda rivers.

The numbers of these species reaching as far upstream as the upper Congaree River and Saluda River are not known with certainty, although recent surveys have found some of these species in the upper Congaree River. In both 2005 and 2006, the South Carolina Cooperative Fish and Wildlife Research Unit from Clemson University sampled both the lower Saluda River and upper Congaree River for the presence of diadromous species during the spring migration period. Sampling sites on the lower Saluda River extended from the project dam downstream to the confluence with the Broad River, and on the Congaree River to the Rosewood Landing about 3 miles downstream of the lower Saluda River/Broad River confluence. In 2006, the most downstream location sampled on the Congaree River was at the I-77 bridge, about 5.5 miles downstream of the confluence. No diadromous species were collected in either year in the lower Saluda River or upper Congaree River study area, but in 2006 sampling in the vicinity of the highway 601 bridge on the Congaree River, about 30 miles downstream of the confluence, collected an estimated 200 American shad and 50 blueback herring. Other studies have collected small numbers of American shad in the Broad River.

²³ The Santee Cooper Project diverts most of the Santee River flow from Lake Marion into Lake Moultrie, where it is used to generate hydropower. The two hydropower stations on Lake Moultrie include Jefferies Station, which discharges into the Cooper River next to the Pinopolis lock, and the Corps' St. Stephen Station, which returns flow to the Santee River as part of the Corps' Cooper River Rediversion Project.

Sampling in both years did collect small numbers of striped bass (2 in 2005 and 1 in 2006), both on the Congaree River at Rosewood, but these fish were likely from the landlocked striped bass population in the Santee Cooper lakes. According to the South Carolina DNR fact sheet on striped bass in the Santee Cooper lakes (South Carolina DNR, undated), the lakes support a large landlocked striped bass population that in turn supports an intense sport fishery. Striped bass from the Santee Cooper lakes migrate upstream to the Congaree, Wateree, lower Broad, and lower Saluda rivers to spawn in the spring, and also use the cooler lower Saluda River as a thermal refuge during the summer months. South Carolina DNR reports, however, that natural spawning is not sufficient to maintain the striped bass population in the lakes, similar to Lake Murray, because of high annual mortality, and as a result DNR has stocked the lakes since 1985.

Sampling directed at the capture of American eel occurred in 2005, 2006, and 2007. Eel traps were fished at multiple locations in the lower Saluda River, Congaree River, and Broad River in 2005 and 2006, and experimental eel ramps were placed in the Saluda Project tailrace and spillway from 2006 through 2007. No eel were captured during this directed sampling, although small numbers of eels have been captured in the general study area during other fisheries programs, indicating that small numbers of American eels do reach as far upstream as the upper Congaree and lower Saluda rivers. The American eel has been confirmed to be present within the Congaree National Park (letter from T. Swartout, Superintendent, Congaree National Park, Hopkins, SC, to K.D. Bose, Secretary, FERC, filed May 10, 2010).

Shortnose sturgeon in the Santee River Basin are considered to be amphidromous (migrating between freshwater and estuarine areas), and have been documented at several locations in the basin. Population groups of shortnose sturgeon occur downstream of the Santee Cooper Project dams, as well as in the Santee Cooper Project lakes, with the Lake Marion landlocked population apparently the largest. Based on South Carolina DNR telemetry studies, Lake Marion sturgeon are known to migrate upstream into the Congaree River for spawning, and have been documented in the Congaree River near Columbia. SCE&G conducted sampling for shortnose sturgeon (adults, juveniles, eggs, and larvae) in 2007 in the upper Congaree and lower Saluda rivers, but no sturgeon were collected. NMFS, however, considers the present range of shortnose sturgeon to be all accessible waters downstream of the dams on the Saluda, Broad, and Wateree rivers.

The Atlantic sturgeon²⁴ is an anadromous species, but its distribution within the Santee Basin is not well known. Few Atlantic sturgeon likely occur upstream of the

²⁴ The Atlantic sturgeon is currently considered a candidate species for potential federal listing under ESA. In a NMFS fact sheet about Atlantic sturgeon dated February 23, 2010, it states that spawning for Atlantic sturgeon occurs in flowing waters between the salt front and the “fall line” in larger rivers.

Santee Cooper Project dams, because of the lack of adequate fish passage facilities for sturgeon, although three adult Atlantic sturgeon were reported upstream of the Santee Cooper dams in recent years. NMFS considers the present range of Atlantic sturgeon to be all accessible waters downstream of dams on the Saluda, Broad, and Wateree rivers.

Freshwater Mussels

In 2006, SCE&G sponsored a comprehensive mussel survey of Lake Murray and its tributaries, the lower Saluda River, the Broad River, and the Congaree River. Sixteen freshwater mussel species were collected and identified within the areas surveyed, including: common elliptio, variable spike, Carolina lance, northern lance, Atlantic spike, Roanoke slabshell, Carolina slabshell, Florida pondhorn, paper pondshell, eastern floater, creeper, eastern creekshell, yellow lampmussel, rayed pink fatmucket, Savannah lilliput, and another lilliput species (*Toxolasma parvus*). The lilliput, *T. parvus*, is a non-native mussel species that has been confirmed from at least one location in Lake Murray. This mussel species is native to the Upper Mississippi River Basin and it uses similar habitats as the native Savannah lilliput. Distribution of the other mussel species varied according to habitat, with species tolerant of lacustrine habitat occurring within Lake Murray, and lotic species more common in riverine habitat. In the upper Congaree River, most mussels were found along the Broad River side of the river, indicating that the colder water temperatures from the lower Saluda River may be affecting mussel distribution in the Congaree River.

Thirteen species within the Santee Cooper River Basin are considered federal species of concern, and 6 of these species are found within the general project area, including: Carolina slabshell, Roanoke slabshell, Carolina lance, Savannah lilliput, yellow lampmussel, and rayed pink fatmucket. No federally listed species, however, occur within the project area.

Macroinvertebrates

The macroinvertebrate fauna of the lower Saluda River has been studied for several years, with the most recent study supported by SCE&G in 2007 (Carnagey Biological Services, LLC, 2007). The Carnagey study sampled the river at six locations from the project tailrace downstream to the zoo, just upstream of the confluence with the Broad River. A total of 1,123 specimens representing 69 taxa were collected. A number of metrics were used to assess the health of the macroinvertebrate community including: taxa richness; Ephemeroptera, Plecoptera, and Trichoptera (EPT) Index; Chironomidae taxa and abundance; ratio of EPT and Chironomidae abundance; ratio of scraper/scraper and filtering collectors; shredder/total number of specimens collected; percent contribution of dominant taxon; and North Carolina biotic index. Although results were somewhat variable, overall biotic conditions in the lower Saluda River improved as distance from the dam increased. For example, EPT Index values and overall EPT abundance (an indication of higher water quality and biotic conditions) increased as

distance from the dam increased. The North Carolina biotic index also indicated improving conditions farther downstream from the dam.

3.3.2.2 Environmental Effects

Reservoir Levels

As described in the *Water Quantity* section of this EA, SCE&G proposes to implement a new guide curve for Lake Murray that would maintain the reservoir at generally higher levels during the year than under current operations. This new guide curve is supported by all the signatories to the Saluda Settlement.

Our Analysis

Under the proposed guide curve, the target reservoir level would be maintained at no less than 2 feet below the normal maximum reservoir level of 358.5 feet from March 1 to September 1, decreasing to 4 feet below normal maximum level from September 1 to December 1, and to 6 feet below normal maximum level by January 1, when reservoir refill would resume to return to the March 1 target level. A minimum pool elevation of 15 feet below normal maximum would also be established for periodic maintenance activities.

These proposed reservoir levels would benefit aquatic resources, as more aquatic habitat would be maintained (less dewatering would occur) throughout the year, compared to existing operations that allow drawdowns of up to 6 feet from full pool levels during March to September, and up to 10 feet during the remainder of the year. Reducing drawdowns during the March to September growing season would be particularly beneficial, because these months include the normal spawning and rearing periods for most of the resident reservoir fish species, and maintaining more aquatic habitat in the reservoir littoral zone would benefit these species. Under current operations, Lake Murray may be drawn down to elevation 352.5 feet during the growing season, which results in a reservoir area of about 44,000 acres. Under proposed operations, a growing season drawdown to elevation 356.5 feet would result in a reservoir area of about 48,000 acres, which would inundate about 4,000 more acres of shallow (less than 4 feet deep) littoral zone habitat, or an increase in overall wetted habitat of about 9 percent.

The proposed winter drawdown of no more than 6 feet below maximum pool level (to elevation 352.5 feet) would maintain a reservoir area of about 44,000 acres, compared to existing operations of up to a 10-foot drawdown (to elevation 348.5 feet), resulting in a reservoir area of about 40,000 acres. Thus the proposed guide curve would maintain an additional 4,000 acres of aquatic habitat during the winter period, which would act to protect shoreline littoral habitat and bordering wetlands, which are important habitat for

shoreline species. Protection of this shoreline habitat over the winter period would have a beneficial effect on both invertebrate and vertebrate aquatic species.

Periodic Reservoir Drawdowns

Appendix A-12 of the Saluda Settlement includes a Reservoir Drawdown Program in which Lake Murray would be periodically drawn down for water quality maintenance, sediment transport, aquatic vegetation management, dock maintenance, shoreline stabilization, excavations, or other lake user maintenance activities. This would allow a drawdown every third year to elevation 348.5 feet in December (about 4 feet lower than the proposed guide curve in December), but only if the average November flow at Saluda River USGS gage no. 02167000 at Chappells, South Carolina, is at least 1,500 cfs or higher. The drawdown would be held for 28 days, and then the reservoir would be allowed to refill as quickly as possible thereafter. Drawdowns would be coordinated among SCE&G, state and federal agencies, and other stakeholders, through a Drawdown Advisory Group and a Drawdown Regulatory Committee, who would evaluate the drawdown program and determine whether any changes to the drawdown are required. The Drawdown Regulatory Committee would meet no later than year 13 of the license to evaluate the program, although more frequent meetings may occur as needed. Special drawdowns for water quality, aquatic plant, or fisheries management purposes may also be requested and would be discussed among the Drawdown Advisory Group and Drawdown Regulatory Committee.

The Settlement parties and Interior agree with this provision of the Saluda Settlement, although South Carolina DNR expressed concerns about the effects of lower winter drawdowns, particularly on overwintering waterfowl and waterfowl hunting/observing opportunities, but did not provide a firm recommendation to address this issue.

Our Analysis

Allowing for periodic, deeper reservoir drawdowns for specific resource management and maintenance activities would be a reasonable measure that would allow some types of work to be performed that may not be possible at higher reservoir levels (such as dock maintenance). Effects on shoreline aquatic resources would be no more severe than currently occurs on the lake, where drawdowns to elevation 348.5 feet are allowed. The timing of the drawdown in December would mitigate some of the effects of the drawdown, in that it would occur after the normal growing season, and at a time when shoreline littoral zones would likely have lower biological activity. Any effects that do occur could be discussed among the Drawdown Advisory Group and Drawdown Regulatory Committee members. If adverse effects are observed, the Drawdown Regulatory Committee could act to modify the drawdowns appropriately. Because South Carolina DNR would be a member of the Drawdown Regulatory Committee, any concerns that it has about the effects of the winter drawdown could be addressed through

the Committee. In section 3.3.3, *Terrestrial Resources*, we note factors that may be contributing to the reduced numbers of overwintering waterfowl using the lake. Additionally, in sections 3.3.5, *Recreation, Land Use, and Aesthetics*, and 3.3.7, *Socioeconomic Resources*, we discuss the effects of periodic reservoir drawdowns on opportunities to hunt and observe waterfowl.

Instream Flow Releases

SCE&G proposes to provide minimum flow releases²⁵ from the project powerhouse as follows:

- January 1 – March 31 - 700 cfs,
- April 1 – May 10 – striped bass enhancement target flows (see below),
- May 11 – May 31 – 1,000 cfs,
- June 1 – December 31 – 700 cfs.

The striped bass enhancement target flow releases would be for enhancement of striped bass spawning in the Congaree River and would be implemented when the flow at the Alston, South Carolina, gage on the Broad River (USGS gage no. 02161000) is between 2,500 and 8,000 cfs. These target flow releases are based on South Carolina DNR's conclusion that spawning conditions are most favorable at a flow of about 9,000 cfs in the Congaree River, with the Saluda River contributing about 30 percent of this total flow of 9,000 cfs in the Congaree River. This striped bass flow in the Saluda River would correspond to a flow of about 45 percent of the Broad River flow at the Alston gage. During the April 1 to May 10 period, if the Broad River flows at Alston are in the target range (2,500 to 8,000 cfs), the striped bass enhancement flows (to be released from the project) would be the lesser of: a flow equal to 45 percent of the previous day's daily average flow in the Broad River at the Alston gage, or the balance of what is required to create a 9,000-cfs flow in the Congaree River. The striped bass enhancement flows would range from about 1,000 to 2,700 cfs, depending on flows reported at the Alston gage.²⁶ The objective is to provide these flows on a continuous basis, but if the daily

²⁵ As described in appendix A-11 of the Saluda Settlement and identified as the Flow Release Program.

²⁶ The Saluda Settlement states that it is recognized that target striped bass enhancement flows would vary on a day-by-day basis, and that, for compliance purposes, SCE&G would be granted a range of plus or minus 100 cfs. In addition, SCE&G would be allowed to release higher flows into the lower Saluda River during the striped bass spawning period, if additional generation is required. Once this additional generation is no longer needed, releases from the project would return to the appropriate striped bass enhancement flow.

average flow at the Alston gage is outside of the target range, the default minimum flow from the project would be 1,000 cfs.

Another aspect of the striped bass enhancement flows would be an annual review of these flows (and other flows provided during April and May of the previous year) by an adaptive management team, to determine effects of the flows on striped bass and other resources, with the potential for adjustment of flow releases depending on findings.

All the signatories to the Saluda Settlement endorse these proposed instream flows, as do Interior and NMFS.

Our Analysis

The Saluda Settlement states that an overall objective of the proposed minimum flows would be to provide 80 percent of the available weighted usable area (WUA), an index of aquatic habitat as determined by the Instream Flow Incremental Methodology (IFIM) study. We reviewed the results of the instream flow study (Kleinschmidt, 2008), which was conducted at multiple study sites in the lower Saluda River, from the project tailrace downstream to just above the confluence with the Broad River. The study did not extend into the Congaree River. A total of 32 evaluation species/life stages and habitat guilds were selected for analysis, and differed according to study site and the type of habitat available at each study site, with up to 17 species/life stages/guilds analyzed at some sites. The most common evaluation species at all study sites included several life stages of brown and rainbow trout, smallmouth bass, American shad, redhorse sucker, shortnose sturgeon, and several habitat guilds such as shallow-slow, shallow-fast, shallow-slow spawning, and shallow-fast spawning.

Because of the complexity of the IFIM study (multiple study sites with different habitat types, and multiple evaluation species and life stages), the results showed variable habitat benefits for the several sites and evaluation life stages. Kleinschmidt (2008) summarized the results of the study by including an appendix to the report that showed the flow ranges that would provide 80 percent of the maximum WUA for the target species and guilds at 10 study sites in the lower Saluda River. Although results varied by species, life stage, and study sites, for the majority of evaluation species, the 80-percent objective is met at the mainstem study sites between flows of about 300 and 3,000 cfs. Many species also show the highest WUA values between 500 and 1,000 cfs, indicating that flows in this range would provide good levels of suitable habitat for these species. Based on these results, the proposed minimum flows of between 700 and 1,000 cfs would provide adequate protection and enhancement of aquatic habitat for many of the target species and life stages in the lower Saluda River.

Striped bass were initially not an evaluation species for the IFIM study, but striped bass adult habitat was evaluated as an additional life stage for analysis by Kleinschmidt (2008), because adult striped bass use the lower Saluda River as a thermal refuge during

the summer months. The additional IFIM analysis indicated that pool habitat in the lower Saluda River would remain highly suitable for adult striped bass holding at all river flows, and that run habitat (which would also provide suitable adult striped bass holding habitat) would meet the 80-percent-of-maximum-WUA target at flows of 2,000 to 4,000 cfs. Although this range of flows is higher than the proposed minimum flows, existing pool habitat, which comprises a high percentage of the habitat in some parts of the lower Saluda River, would be adequately protected at the proposed minimum flows.

Striped bass generally do not use the lower Saluda River for spawning, as most spawning occurs in the Congaree River, and the striped bass enhancement flow releases would be targeted for protection of spawning habitat in the Congaree River. Because striped bass spawning flows were not directly evaluated in the Congaree River as part of the IFIM study, we cannot quantitatively assess the adequacy of the proposed striped bass enhancement flows. However, these flows were designed based on the hydraulic objective of meeting an overall target flow of 9,000 cfs in the Congaree River, which South Carolina DNR concluded would provide favorable spawning conditions in the Congaree River. Based on this information and on hydrology of the lower Saluda and Broad rivers, the proposed enhancement flows would provide adequate striped bass spawning conditions in the Congaree River. However, in the event these flows are not adequate, they would be reviewed on an annual basis by the adaptive management team and potentially adjusted to provide more optimum habitat.

Regarding the adaptive management team, the Saluda Settlement specifies that the team should consist of SCE&G, state and federal resource agencies, and other relicensing stakeholders with relevant experience and interests, but also states that all members of this team must be signatories to the Saluda Settlement. In its comments on the draft EA, NPS requests that the Commission require SCE&G to include NPS as a participant on the adaptive management team despite the fact that NPS is not a signatory to the Saluda Settlement. It also comments that the overall adaptive management program should be focused on a wider range of environmental factors and not limited to striped bass. It would be appropriate for NPS to be a member of the adaptive management team because it is a federal resource agency that has responsibility for managing important resources on the Congaree River (Congaree National Park), and its presence would be important to ensure that the resources of Congaree National Park are considered in any review and adjustment of minimum flows released from the project.

Maintenance, Emergency, and Low Inflow Protocol

As described under in the *Water Quantity* section of this EA, SCE&G proposes to implement a Low Inflow Protocol that would be triggered by a 1-foot drop below the proposed reservoir guide curve elevation and a 14-day average inflow below the proposed regular, non-low-flow minimum flow release amounts. Both the 1-foot drop below the guide curve and the inflow criteria would have to be met, and regular flow

releases could be re-implemented if the inflow criteria are met, even if the reservoir levels are still below the trigger elevation.

As previously described, Low Inflow Protocol is supported by the signatories to the Saluda Settlement and other commenting entities, but the Settlement parties have not agreed on the appropriate reservoir trigger level (below guide curve elevation) to implement the Low Inflow Protocol. Although SCE&G is proposing a 1-foot trigger, other entities have recommended triggers of 6 inches, 2 feet, and 4 feet. The parties agreed to let the Commission determine the appropriate trigger level through the National Environmental Policy Act process.

Our Analysis

The overall objective of the Low Inflow Protocol was to provide a method that would provide a balance between potential adverse effects to Lake Murray levels and to instream flows in the lower Saluda River, in the event drought conditions occur and inflow to Lake Murray is not sufficient to maintain both the proposed guide curve lake levels and instream flow requirements in the lower Saluda River. As noted, all the Settlement parties have agreed to the Low Inflow Protocol, but not to the reservoir level that would trigger the Low Inflow Protocol. Thus, the focus of our analysis is the appropriate trigger level.

Under the *Water Quantity* section, we conclude that a 2-foot trigger would provide an adequate balance hydraulically between maintaining Lake Murray levels and the instream flows in the lower Saluda River. Our analysis found that, on average over a 28-year modeled period, a 1-foot trigger maintains higher reservoir levels than a 2-foot trigger, but the differences are small – about 0.25 foot (3 inches). Differences in downstream flow releases are also small. Differences in reservoir water levels become greater (up to 0.5 foot) when only dry years are modeled, as do flow releases downstream. For example, during the late-May period of dry years when a 1,000-cfs flow is required, average minimum flows would range from 900 to 950 cfs for a 2-foot trigger and from 600 to 800 cfs for a 1-foot trigger. During the summer months (700-cfs minimum flow requirement), average minimum flows would range from about 550 to 650 cfs for a 2-foot trigger and 500 to 600 cfs for a 1-foot trigger.

South Carolina DNR, which supports a 2-foot trigger, by letter filed November 10, 2009, provides an analysis of potential effects on lower Saluda River aquatic habitat of alternative trigger levels for the Low Inflow Protocol, using the results of SCE&G's IFIM study. South Carolina DNR assessed the WUA that would be provided for the evaluation species included in the IFIM study if downstream flow releases were reduced from 700 to 400 cfs. A flow of 400 cfs would be the absolute minimum flow that would be provided during implementation of the Low Inflow Protocol and thus would represent the worse-case scenario. This analysis showed that for the total species/life stages analyzed at the 10 study sites in the lower Saluda River, 80 species/life stages showed a decrease in

WUA while 38 showed an increase in WUA, indicating that a majority of species/life stages would experience reduced habitat availability at the lowest minimum flow that would occur under the Low Inflow Protocol. While this may represent the worst-case scenario, it would none-the-less be an impact that could occur anytime the Low Inflow Protocol is implemented and the minimum flow would need to decrease to 400 cfs.

Based on modeling of 28 water years previously discussed in the *Water Quantity* section, a Low Inflow Protocol with a 1-foot trigger would be expected to occur about 61 percent of the time. A Low Inflow Protocol with a 2-foot trigger, however, would be expected to occur about 36 percent of the time. Thus, adverse impacts to aquatic resources in the lower Saluda River could occur on a much greater frequency with a 1-foot trigger, compared to a 2-foot trigger, while lake levels would only experience, on average, an additional drawdown of 0.25 foot (3 inches) with a 2-foot trigger. An additional drawdown of 3 inches would likely have an imperceptible impact on shoreline aquatic resources in Lake Murray, and may be within the range of fluctuation normally seen with typical operations and as a result of wave action. In appendix A-13 of the Saluda Settlement, it is stated that the purpose of the Low Inflow Protocol is “to provide operational guidance for *abnormal operating situations* caused by maintenance activities, emergency situations (including high inflow or flood events), and *periods of sustained low inflow or drought conditions*” (emphasis added). A Low Inflow Protocol with a 1-foot trigger that would be expected to occur in about 61 percent of the years would not appear to meet the definition of “abnormal operating scenarios” or “sustained low inflow or drought conditions.” However, a Low Inflow Protocol that would occur in about a third of the years (a 2-foot trigger), would better meet the definition described in appendix A-13, and would provide a better balance of potential adverse effects on aquatic resources in Lake Murray and in the lower Saluda River.

Interior initially recommended a Low Inflow Protocol with a 4-foot trigger, which would act to prioritize minimum flow releases into the lower Saluda River and allow a greater drawdown of Lake Murray, except that Interior supported the proposed guide curve, which would call for a minimum operating level of elevation 352.5 feet. Thus, Interior’s recommended Low Inflow Protocol with 4-foot trigger would only apply to the period of March 1 to September 1, when the guide curve calls for a minimum elevation of 356.5 feet. As we discussed in the *Water Quantity* section, a Low Inflow Protocol with 4-foot trigger would only occur in 5 of the 28 years modeled (about 18 percent), which would likely be only in years with the most severe droughts. While instream flows and aquatic resources in the lower Saluda River would be well protected under Interior’s initial recommendation, there would be a greater potential for impacts on aquatic resources in Lake Murray. We previously discussed that under a Low Inflow Protocol with 4-foot trigger Lake Murray levels would decrease to 1.5 to 2.5 feet lower than either a 1- or 2-foot trigger under severe drought conditions, which would have greater effects on shoreline aquatic resources in Lake Murray. Because the criterion for a 4-foot trigger would be met infrequently, there is the potential that a Low Inflow Protocol would not be

implemented or would be delayed in some moderate drought years, resulting in more frequent and deeper Lake Murray drawdowns and associated effects on aquatic resources before the Low Inflow Protocol is triggered. While aquatic resources in the lower Saluda River would more likely be protected under a Low Inflow Protocol with a 4-foot trigger, there would be less of a balance between resource protection in Lake Murray and in the lower Saluda River.

Following issuance of the draft EA, Commission and Interior staffs met on April 29, 2010, in Columbia, to resolve inconsistencies with the FPA related to Interior's section 10(j) recommendations. During the meeting Commission and Interior staffs reached agreement regarding the Low Inflow Protocol trigger, and on May 7, 2010, Interior filed revised section 10(j) recommendations consistent with Commission staff's recommendation for implementing a 2-foot trigger for the Low Inflow Protocol.

Macroinvertebrates

As we previously described, macroinvertebrate populations in the lower Saluda River may be affected by project operations, in that overall biotic conditions improved as distance from the dam increased. Appendix A-3 of the Saluda Settlement provides for a Macroinvertebrate Program in the lower Saluda River following each turbine runner upgrade that would include DO enhancement designs. This monitoring would be conducted concurrent with water quality monitoring to determine the effects of each turbine upgrade. Once water quality monitoring indicates that DO standards are being attained in the lower Saluda River, SCE&G would consult with state and federal agencies to determine the need for additional macroinvertebrate monitoring or mitigative measures.

The Macroinvertebrate Program is supported by all the signatories to the Saluda Settlement, and by Interior, which is not a party to the settlement.

Our Analysis

Existing macroinvertebrate monitoring indicates that macroinvertebrates may be affected by project operations, although it is unclear whether these effects are because of water quality (low DO), lower stream temperatures, or habitat (armored substrate). Implementing the proposed Macroinvertebrate Program would allow assessment of whether water quality improvements following the runner replacements would enhance macroinvertebrate populations in the lower Saluda River. If, however, the runner replacements do not result in improvements in the populations, based on the monitoring metrics to be utilized, this measure includes an adaptive management strategy that would provide for further consultations and identification of additional mitigative measures, if required. Monitoring metrics would likely include taxa richness (diversity); EPT Index; Chironomidae taxa and abundance; ratio of EPT and Chironomid abundance; ratio of scraper/scraper and filtering collectors; shredder/total number of specimens collected;

percent contribution of dominant taxa; and North Carolina biotic index. Regression analyses may also be used to detect trends in community composition as a function of distance from the dam. The specific criteria for determining whether additional monitoring or mitigative measures would be required after the final runner replacement is made was not described in the Saluda Settlement. We expect that those criteria would be developed among SCE&G and the resource agencies during the course of consultations associated with this program.

Freshwater Mussels

As we previously described, mussel populations in the lower Saluda River may be affected by project operations, in that no mussels are found in the lower Saluda River and there is low diversity and abundance of mussels in the Saluda River side of the Congaree River, where most of the flows from the lower Saluda River pass. University of South Carolina research by Dr. J. Price (unpublished data) suggests that colder water temperatures in the lower Saluda River may delay female mussel gravidity by one to several months, and that gravidity is higher in Broad River mussels. The cooler water temperatures from the lower Saluda River are observable up to 16 miles downstream of the Saluda River/Broad River confluence on the Congaree River. Appendix A-4 of the Saluda Settlement provides a Mussel Program that would include:

- Formation of a Saluda Hydro Freshwater Mussel Working Group to provide technical expertise and to oversee the mussel program;
- Phase I surveys for Savannah lilliput in upper Lake Murray, and for baseline characterization of mussel populations in the Congaree River to a point 16 miles downstream of the Saluda River/Broad River confluence (1 to 2 years after license issuance);
- Phase II surveys and activities including: follow-up survey of the Congaree River 10 years after implementation of proposed minimum flows in the lower Saluda River, contribution of \$75,000 to FWS for mussel experimental studies, restoration/reintroduction activities, and in-kind services to assist in mussel culture efforts by collecting mussel brood stock and host fish; and
- Phase III surveys occurring a minimum of 5 years after initiation of mussel reintroductions, to assess the success of mussel restoration/reintroduction efforts.

The Mussel Program is supported by the Settlement parties, and by Interior (not a Settlement party), but Interior also provided specific recommendations for a freshwater mussel mitigation program. SCE&G, in its response to agency-recommended terms and conditions (letter from M.C. Summer, General Manager, Fossil/Hydro Technical Services, SCE&G, to K.D. Bose, Secretary, FERC, filed November 13, 2009), stated that

it was in general agreement with Interior's recommended program, but also questioned the justification for some of its elements.

Following issuance of the draft EA, Commission and Interior staffs met on April 29, 2010, in Columbia to resolve inconsistencies with the FPA related to Interior's section 10(j) recommendations. During the meeting Commission and Interior staffs reached agreement regarding the freshwater mussel mitigation program, and on May 7, 2010, Interior filed revised section 10(j) recommendations. These revised recommendations include:

- Formation of a Saluda Hydro Freshwater Mussel Working Group, similar to the provisions of the Mussel Program;
- A provision to conduct a baseline survey for freshwater mussels in the Congaree River from the confluence of the Saluda and Broad rivers to 16 miles downstream, within 1 year of license issuance, similar to the provisions of the Mussel Program;
- Tag any freshwater mussels found on the Saluda River side of the Congaree River during the survey and relocate them to the Broad River side of the river (one-time action), which Interior anticipates would involve only small numbers of mussels, but should larger numbers be encountered, the Working Group would determine the best course of action; and
- Identify four locations with concentrations of freshwater mussels on the Broad River side of the Congaree River for tagging and monitoring by the Working Group and monitor these locations annually for five consecutive years; after 5 years, the Working Group should review the monitoring results and provide recommendations for future conservation and mitigation actions.

Our Analysis

The proposed Mussel Program is a reasonable program for mitigating the potential effects of the project on freshwater mussel populations in the Congaree River, as well as for enhancing those populations. SCE&G did not agree with some of Interior's original section 10(j) recommendations for the program. Specifically, SCE&G differed on: (1) the length of the Congaree River that should be investigated (20 miles under Interior's initial recommendation vs. 11 to 12 miles as stated by SCE&G in its response to Interior's recommendations); (2) the extent of mussel tagging on the four identified mussel communities on the Congaree River, where Interior appeared to recommend that *all* mussels be tagged and monitored; (3) the need to translocate all the mussels from the Saluda River side to the Broad River side of the Congaree River; (4) the requirement that SCE&G develop a mussel propagation facility on the river (as per the Saluda Settlement, SCE&G would provide funding to FWS conduct various mussel activities, including collecting mussel brood stock and host fish to aid in mussel culture efforts); and (5) the

need for continuing monitoring for the life of the license. In the draft EA we analyzed these areas of disagreement on the Mussel Program and concluded that it would be appropriate to monitor 16 miles downstream of the confluence of the Saluda and Broad rivers, and to tag, relocate, and monitor a subset of mussels, with the duration and frequency of monitoring to be determined by the Working Group based on the monitoring results.

We also analyzed the proposed funding provision of the Mussel Program (contribution of \$75,000 to FWS for mussel experimental studies and restoration/reintroduction activities) in the draft EA, and concluded that this funding provision should not be made a requirement of any license. This funding would not have a direct relationship to the project in that it would not be used for directly mitigating any effects of project operation.

Because Interior has recently revised its section 10(j) recommendations as described above, we have revised our discussion to only assess the two recent Interior recommendations related to tagging, relocating, and monitoring mussel populations in the Congaree River. Interior's other recommendations are consistent with the provisions of the Mussel Program described in appendix A-4 of the Saluda Settlement.

The extent of mussel tagging and the need for translocation of mussels from one side of the Congaree River to the other was an area of disagreement, but Interior now recommends that *any* mussels (not *all*) found on the Saluda River side of the Congaree River during the survey be tagged and relocated to the Broad River side of the river as a one-time event. Based on previous sampling, Interior believes that the number of mussels to be collected would be small. This is consistent with our previous conclusion in the draft EA that tagging and relocation of mussels could be done with a subsample of mussels collected. Interior's revised recommendation also provides that should larger than expected numbers of mussels be encountered that the Working Group would determine the best course of action for the study, which we agree would be a reasonable contingency.

Interior also recommends that four locations containing concentrations of freshwater mussels (which it calls "subpopulations") on the Broad River side of the Congaree River be identified for mussel tagging and monitoring by the Working Group for a minimum of 5 years. This would also be a reasonable program to implement. The Mussel Program includes provisions for monitoring mussels in the Congaree River, and tagging and monitoring mussels at four locations would be one metric for measuring the response of mussel populations to the proposed changes in the flow regime from the project, and any other provisions of the Mussel Program. One caveat to this program, however, should be that, if less than four locations are found that are suitable for monitoring, this monitoring could occur with less than four locations. Interior recommends that these locations be monitored annually for 5 consecutive years, and that after 5 years, the Working Group should review the monitoring results and provide

recommendations for future conservation and mitigation actions. This 5-year monitoring proposal would be a reasonable monitoring interval and is consistent with our previous conclusion that the frequency of monitoring may also be best determined by the experts within the Working Group, although annual monitoring would appear to be a reasonable frequency. It would be appropriate, upon completion of the 5 years of monitoring, for SCE&G to consult with the other entities in the Working Group to review the program results and file a report with the Commission that summarizes the monitoring results and includes any recommendations made by SCE&G or other Working Group entities for future conservation and mitigation measures. If any of those measures involve changes to the license, SCE&G would file those proposed measures for Commission approval.

Unit 5 Operations for Fisheries Enhancement

SCE&G operates Unit 5, which withdraws water from the reservoir at a depth of about 80 feet below the surface (mid water column), in a last-on and first-off scenario. Unit 5 is operated in this manner to minimize potential fish entrainment associated with the higher elevation of the intake opening in the Unit 5 intake tower versus other units, which causes fish attraction to the Unit 5 intake. However, withdrawal of cooler water from Lake Murray via the other deeper intakes reduces the area of cool water in the lake and adversely affects striped bass refuge habitat during the summer months. Thus, in the license application, SCE&G proposed to change this operation to a first-on and last-off scenario after the runner upgrade to Unit 5 is completed, so that coolwater refuge habitat for striped bass in Lake Murray could be maintained during the summer months. Operating Unit 5 preferentially would reduce the operation of the units with deeper intakes and in turn would reduce the withdrawal of cooler water (preferred by striped bass during the summer months) from the lake. In the Saluda Settlement (appendix A, section 4.3), however, proposed Unit 5 operations are not specified. That section only states that 1 year after the Unit 5 upgrades are made, the applicant would consult with state and federal agencies and other stakeholders to determine how best to operate Unit 5 to aid in the preservation of coolwater habitat for both the reservoir and riverine fishes.

Our Analysis

Operation of the five units at the Saluda powerhouse affects the water temperature and DO levels in both Lake Murray and in the lower Saluda River, as described in the *Water Quality* section of this EA. There are benefits in releasing cooler waters into the lower Saluda River, because that allows for the continuation of the existing and popular put, grow, and take trout fishery, as well as providing a coolwater refuge for striped bass from the Congaree River. Likewise, maintaining the coolwater pool of water in the Lake Murray hypolimnion provides a coolwater refuge for striped bass in the lake. At the same time, releases from the Saluda powerhouse must meet state standards for DO, for the protection of aquatic resources in the lower Saluda River, and SCE&G is proposing to upgrade Unit 5 (and other units if required) and continue DO enhancement measures, to meet state water quality standards. Thus, operation of the Saluda powerhouse is

somewhat of a “balancing act” for the protection of aquatic resources in both the lake and the lower Saluda River. It would be appropriate for SCE&G and resource agencies to consult, after Unit 5 upgrades are completed, to determine how best to operate the unit to benefit both the reservoir and lower Saluda River fisheries. New information that would become available after initial monitoring of Unit 5 operations, or other monitoring studies, may allow SCE&G and agencies to make a better informed decision on how best to operate the unit. In the interim, until Unit 5 is upgraded, it would appear prudent for SCE&G to continue operating Unit 5 in a last-on and first-off scenario to minimize potential fish entrainment.

In its comments on the draft EA, SCE&G reports that the company has recently been discussing alternative Unit 5 operating scenarios with stakeholders, and that it is considering operating the unit in a first-on and last-off mode later in the year when fish densities are lowest near the intake towers. SCE&G requests the opportunity to continue to study these alternative modes of operation off-license, prior to making the Unit 5 upgrades, and that it not be mandated to operate Unit 5 in any particular mode. Allowing SCE&G and the stakeholders to continue ongoing investigations on the best operating mode for Unit 5 may provide data that would assist in determining the optimum long-term operating mode for Unit 5. These investigations could continue without any specific license requirements, but any future substantial change in Unit 5 operations may require Commission approval.

Diadromous Fish Restoration

SCE&G has been an active participant in the Santee Basin Accord. The Santee Basin Accord is a 2008 cooperative agreement among SCE&G, Duke Energy Carolinas, LLC, FWS, South Carolina DNR, and North Carolina Wildlife Resources Commission, with the objective of addressing diadromous fish protection, enhancement, and restoration in the Santee River Basin. The Santee Basin Accord supports the Santee-Cooper Basin Diadromous Fish Passage Restoration Plan (2001), which has been accepted as a comprehensive plan by the Commission. The Santee Basin Accord is also an agreement to implement a 10-year action plan for restoration and enhancement of diadromous fish in the Santee River Basin, which would involve a number of activities and biological studies, including developing biological triggers for installation of fish passage facilities at certain projects in the basin and conducting studies on the shortnose sturgeon.

Under the Santee Basin Accord, SCE&G agrees to incorporate into its relicensing proposal for the Saluda Project, any agreements reached with the agencies for limits on reservoir elevations, instream flow releases, high or low inflow protocols, and any reservation of authority or fishway prescriptions developed by FWS pursuant to section 18 of the FPA. SCE&G would also conduct a number of studies at its Parr Hydroelectric Project (FERC No. 1894) and Neal Shoals Hydroelectric Project (FERC No. 2315), related primarily to potential development of fish passage at those projects. In addition,

SCE&G would contribute \$200,000 annually to support the activities under the 10-year action plan, which officially commenced on April 15, 2008, and would provide other in-kind support services and technical/scientific input to program development. As part of this 10-year action plan, SCE&G would provide funding for 5 years of shortnose sturgeon research.

Our Analysis

SCE&G's current and future participation in the Santee Basin Accord has little to do with the Saluda Project, other than the agreement to include any operational measures to protect fisheries (reservoir elevations, instream flows) in its relicensing proposal. The applicant has done that with its filing of the Saluda Settlement, so that part of the Santee Basin Accord has been satisfied. Other measures to be provided by SCE&G under the Santee Basin Accord relate to other licensed projects, and to the provision of general funding to support the 10-year action plan. The funding is not proposed to support any measure specifically tied to the Saluda Project, and would mainly involve studies designed to determine the distribution of diadromous fishes in the basin, including sturgeon, and the need for development of fish passage facilities at other projects.

Shortnose Sturgeon Protection

Shortnose sturgeon have been observed in the Congaree River near Columbia, but have not been documented in the lower Saluda River, although NMFS considers the lower Saluda River to be potential habitat for the sturgeon. Telemetry studies conducted by South Carolina DNR have documented the migration of Lake Marion shortnose sturgeon as far upstream as the Gervais Street Bridge on the Congaree River, which is adjacent to the city of Columbia and just downstream of the confluence of the Broad and Saluda rivers (see appendix E-6). As a result, the Saluda Settlement includes a Sturgeon Program (appendix A-6 of the Saluda Settlement). Under this program, SCE&G would provide the DO enhancements and instream flows to the lower Saluda River already proposed as part of other provisions of the Saluda Settlement; would establish a Sturgeon Technical Advisory Team with NMFS, FWS, and South Carolina DNR; and would conduct several agency-recommended studies on shortnose sturgeon, associated with the studies to be conducted under the Santee Basin Accord (see above). These studies would include: (1) a telemetry study of shortnose sturgeon behavior and movements in the lower Saluda, lower Broad, and Congaree rivers; (2) temperature and water quality monitoring in the lower Saluda, lower Broad, and Congaree rivers; and (3) if shortnose sturgeon are found in the lower Saluda River in the telemetry study, conduct a detailed physical habitat study in the lower Saluda, lower Broad, and Congaree rivers, including identification of potential critical habitats. These studies would provide support to a long-term shortnose sturgeon recovery effort in the Santee River Basin.

Although NMFS did not sign the Saluda Settlement, it recommends implementation of this shortnose sturgeon program.

Our Analysis

The shortnose sturgeon may currently be found in small numbers in the upper Congaree River, which is influenced by project releases. The overall objective for developing the Sturgeon Program was to design measures to mitigate any continuing impact of project operations on the species. Although some of the program measures are directed at monitoring the effects of project operations on the shortnose sturgeon, some of the provisions of the program are related to general recovery of the species in the Santee River Basin. As noted, project-specific measures (DO enhancements and instream flows) would be provided under other parts of the Saluda Settlement and would satisfy the objective of the Sturgeon Program to improve habitat for the species. The proposed studies would be conducted in association with the studies to be implemented under the Santee Basin Accord, which addresses fish restoration throughout the Santee Basin. However, two of those studies, the telemetry and water quality monitoring studies, would be focused on assessing the effects of project operations on the shortnose sturgeon. The detailed physical habitat study in the lower Saluda River, which would only be conducted if shortnose sturgeon are observed to use the river during the telemetry study, would not be directly related to project operations but instead would be more related to identifying and categorizing sturgeon habitat as part of any future restoration efforts.

We assess the overall effects of the project on shortnose sturgeon in section 3.3.4, *Threatened and Endangered Species*.

Trout Protection and Enhancement

As previously described, the lower Saluda River supports an important and popular trout fishery, made possible by coldwater releases from Saluda dam and trout stocking by South Carolina DNR. The Saluda Settlement includes appendix A-7, a Trout Program for the lower Saluda River, which includes a number of studies to be conducted that may identify ways to enhance the trout fishery in the lower Saluda River. Specific study goals and objectives for this program include: (1) assess the relative contribution to the fishery of brown and rainbow trout and native warmwater species; (2) assess qualitative changes in trout habitat as a result of proposed minimum flow releases and DO enhancements; (3) investigate existing trout reproductive success in the lower Saluda River (documentation of trout eggs, larvae, and young-of-year in the river); (4) evaluate the potential for a naturally reproducing trout population as a South Carolina DNR management goal; and (5) determine growth rates of trout after implementation of the proposed instream flows. The Trout Program also calls for the release of waters from the project that would meet state water quality standards, and the formation of an advisory committee to guide the program. In addition, the Trout Program specifies that the applicant would provide \$30,000 to the South Carolina DNR for a trout mortality study to be conducted by DNR, although the applicant does not provide any information on the objectives or the methodology to be used for the mortality study. The specific trout studies would be conducted in concert with other studies provided for under the Saluda

Settlement, and an annual report on all trout studies would be prepared by the applicant for submittal to the advisory committee. The advisory committee would make recommendations to the applicant for any changes to the program, following review of the annual report.

Our Analysis

The Trout Program for the lower Saluda River would be a useful program to gather additional data on the existing trout populations in the river, whether proposed instream flow and DO enhancements are having any effect on those populations, and to determine whether a naturally reproducing trout population would be a reasonable management goal. This would be a cooperative program with the South Carolina DNR, although SCE&G's full financial responsibility for the program is unclear. Some parts of the Trout Program would be associated with assessing the effects of project operations and proposed mitigative and enhancement measures, but other parts of the program are more designed as research projects that would assist the South Carolina DNR in its fisheries management of the lower Saluda River. The three parts of the Trout Program that would assess the effects of project operations on the trout fishery are: (1) the assessment of qualitative changes in trout habitat as a result of proposed minimum flow releases and DO enhancements; (2) investigation of existing trout reproductive success in the lower Saluda River under proposed operations; and (3) determining growth rates of trout after implementation of the proposed instream flows. The investigations related to general management of the trout fishery in the lower Saluda River, and the non-specific trout mortality study to be conducted by the South Carolina DNR, would not be directly related to project operations, mitigation, or enhancement of the trout fishery. Therefore, we conclude these measures would not be related to project effects and would not provide any specific enhancement to the trout fishery related to project operations.

Lower Saluda River Fish Community Monitoring Program

SCE&G has conducted fish community sampling on the lower Saluda River since the 1990s, and appendix A-8 of the Saluda Settlement provides for continuation of this sampling under the Fish Monitoring Program. Sampling would be conducted in spring and fall using electrofishing, and all fish would be identified to lowest taxonomic level, measured, weighed, and released.

Our Analysis

This sampling would continue to provide a long-term database on fishery resources in the lower Saluda River, and could be useful in identifying long-term trends in the fishery and in documenting any changes in the fish community following changes in minimum flow releases or other operations, including the proposed upgrade of the generating units. This sampling program, as proposed, would not require an annual report to any regulatory agency, nor would there be a provision for adjustment of project

measures depending on the results of the monitoring. These fish collections, along with an annual report to the Commission and other agencies and interested parties, however, would be a useful tool for assessing the benefits of new measures to be implemented under any new license. Adding a reporting requirement to this proposed sampling program would be an appropriate requirement for any new license. A reasonable reporting period would be for a period of 5 years after each unit upgrade.

Fish Entrainment

Continued project operation would result in some fish entrainment through the turbine generators with associated mortality of a portion of those fish entrained. The project has occasionally experienced high fish entrainment (mostly blueback herring) in the past associated with the operation of Unit 5. SCE&G, however, installed hydroacoustic monitoring in the vicinity of Unit 5, and when high concentrations of fish were observed via the hydroacoustics, Unit 5 operations would be curtailed to minimize fish entrainment. Under section 3.4 of appendix A of the Saluda Settlement, SCE&G would formalize this Entrainment Program, by operating the Unit 5 monitoring equipment along with Unit 5 operational modifications from July through October, or in other periods as agreed upon with South Carolina DNR. Section 3.4 would also provide for investigation of any turbine-induced fish kills, and if SCE&G is found responsible for the fish kill, would compensate South Carolina DNR for staff time investigating the kill and for any lost fish.

Our Analysis

Formalizing Unit 5 hydroacoustic (or other equipment) monitoring, along with operational modifications to minimize fish entrainment, would be an appropriate measure for mitigating fish entrainment effects at the project. This would not mitigate for all entrainment that would occur at the project (through the other generating units), but would address Unit 5 entrainment, which has been shown to be the location where most entrainment has occurred. Unit 5 has a shallower intake compared with the bottom intakes for other units, so it would likely attract a greater number of fish, particularly blueback herring, a pelagic species that would avoid the low-DO waters at the lake bottom.

As described in the Saluda Settlement, SCE&G would also mitigate for fish entrainment effects at the project through its proposed Entrainment Program that would provide monetary compensation for fish lost during an entrainment event, as well as pay for South Carolina DNR staff time to investigate the fish kill. Generally, mitigation for fish losses at a project should be in the form of specific measures to reduce or prevent entrainment (such as Unit 5 hydroacoustic monitoring and operational modifications) or to otherwise enhance a resource affected by a project, and not simply monetary compensation to a state resource agency for fish lost by entrainment. Here, the provision for compensation has not been related to a specific measure that would benefit the fishery

resources affected by project operations. Therefore, we are unable to establish how providing compensatory funding to the agency would fulfill the project purpose of fishery enhancement.

Invasive Species Management

Interior recommends that SCE&G consult with Interior in the development of a terrestrial and aquatic invasive species management plan. The recommended plan would include: (1) baseline surveys to identify the range and extent of terrestrial invasive plant species within the project boundary; (2) methods for management (such as mechanical removal, mowing, herbicide treatment, etc.); (3) a requirement that SCE&G staff involved in herbicide use be trained as certified herbicide applicators; (4) a schedule of surveys and management; and (5) estimated costs for management. The terrestrial aspects of this plan are discussed in section 3.3.3, *Terrestrial Resources*, but one group of invasive aquatic species of concern is mentioned by Interior – the snakeheads.

Snakeheads are freshwater fish in the family *Channidae* that are native to Africa and Asia, and are considered in the U.S. to be injurious, invasive species because they are known to be voracious predators with the potential to adversely affect native fishes. Interior states that the northern snakehead (*Channa argus*) has been documented in Lake Wylie, North Carolina, which is part of the Catawba-Wateree Project in the Santee River Basin. Interior is concerned that the northern snakehead may spread within the Santee River Basin and adversely affect the important existing sport fishery within the basin. Thus, Interior recommends that SCE&G develop a program to monitor and detect northern snakeheads and other injurious fishes in the project vicinity, take coordinated actions to control the spread of the species, aid anglers in correctly identifying northern snakeheads by posting flyers that illustrate the difference between a bowfin and a northern snakehead at locations around Lake Murray, and encourage anglers to report all snakehead captures. The applicant did not propose any specific measures for the control of snakeheads or other aquatic invasive species.

Our Analysis

Currently, there are no known populations of snakeheads in the project area. Most snakehead introductions in the United States are believed to be the result of illegal releases from pet owners, and as a result have been banned from import and interstate transport without a permit from FWS, as cited in Interior's letter filed on September 25, 2009. Because snakeheads do not occur in the project area at this time, it would be premature to include Interior's recommendation to implement a control program as a requirement of any license. However, requiring SCE&G to provide information to the public about how to identify snakeheads and to report any snakehead captures would be a reasonable measure to ensure that should snakeheads gain access to the area, their presence would be detected. If snakeheads are detected in the project area, then SCE&G and the resource agencies could consult regarding further monitoring and control

measures. SCE&G's other proposed monitoring programs, such as fish community sampling in the lower Saluda River, would also provide for some of the monitoring recommended by Interior. We discuss the need for the terrestrial and aquatic invasive species management plan recommended by Interior below in section 3.3.3.2, *Environmental Effects*.

3.3.2.3 Cumulative Effects

We identified fishery resources, specifically diadromous fish species, as a resource that could be cumulatively affected by relicensing this project, in concert with other activities in the basin. For diadromous fish resources, our geographic scope includes the Saluda River from the project dam downstream to the Atlantic Ocean, including the Congaree, Cooper, and Santee rivers. We chose this geographic scope because anadromous and catadromous species may use habitat in these rivers from the ocean up to Saluda dam and would be exposed to a number of other hydroelectric projects, flow diversions, and activities that could have a cumulative effect on these fishery resources.

Any anadromous or catadromous species migrating to or from the lower Saluda River and upper Congaree River must pass through the downstream Santee Cooper Project facilities and the St. Stephen Project. Upstream fish passage is only available via the St. Stephen Project fish lift and the Pinopolis navigation lock at the Santee Cooper Project. No special provisions for downstream fish passage are currently in place at the Santee Cooper or St. Stephen projects. The Saluda Project is the current upstream limit for fish migrations in the Saluda River, and that would not change in the foreseeable future, as there are no agency plans for providing fish passage at the Saluda Project. The nearby Columbia dam on the Broad River, just upstream of the Saluda River/Broad River confluence has a new vertical slot fish ladder, so any fish migrating upstream on the Broad River would have the opportunity to use that facility to continue upstream passage on the Broad River. Relicensing the Saluda Project as proposed would not cumulatively affect fish migration in the Santee River Basin, as the primary projects affecting fish migration are located in the lower basin.

Water quality associated with hypolimnetic releases from Saluda dam, low water temperatures and occasionally low DO levels, have affected fish distribution in the lower Saluda River and potentially in 16 miles of the upper Congaree River, where Saluda River water temperatures have been shown to be detectable. Some species that prefer warmer water temperatures for spawning or other life stages, including some of the anadromous species (American shad and blueback herring), may avoid entry into the cooler lower Saluda River, and thus would not use any habitat available in the river. Other species (salmonids), however, prefer cooler water temperatures, and, as a result, the lower Saluda River now supports a popular and intense sport fishery for trout. In addition, striped bass, which occur in the Santee River Basin in both the anadromous and landlocked forms, prefer the cooler waters of the lower Saluda River during the summer months and use habitat in the river during those months. Episodes of low DO levels in

the lower Saluda River have decreased in the last 10 years since the implementation of DO enhancement measures by SCE&G at Saluda dam. As a result, fisheries in the river have generally not been adversely affected by low DO events in recent years.

Under the proposed project, SCE&G would increase minimum flows from the project, including striped bass enhancement flows for the upper Congaree River, and would make further improvements to their DO enhancement measures at Saluda dam. The current temperature regime from Saluda dam (cooler water temperatures) would not change under the relicensing. Thus, overall habitat for both freshwater and diadromous species would be enhanced in the lower Saluda River and in the Congaree River as a result of relicensing, and would have an overall beneficial cumulative effect on fishery resources in the basin.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

The botanical and forestry resources of the project area consist mainly of the dominant woody pioneer or climax species of the southern Piedmont hardwood forests. Forested areas of the project function mostly in support of forestry, wildlife or game management, and recreational or aesthetic values. Various combinations of tree and shrub species cover project lands, but one of the most common trees is loblolly pine, establishing itself early after disturbance of most well-drained sites and dominating for up to 40 years afterwards.

Lake Murray

The upland habitat located above the 358.5-foot contour interval along the Lake Murray shoreline is characterized by vegetation typical of southern Piedmont hardwood forests. It is dominated by a combination of woody tree and shrub species, including both pioneer and climax species. The most common tree species is loblolly pine, which is a quick and dominating colonizer to disturbed, well-drained sites.

In areas not managed for pine, succession to deciduous tree species has occurred. Common species of deciduous forests include red maple, sweet gum, several oak species (i.e., white, red, southern red, black, chinquapin), and several hickory species (i.e., shagbark, mockernut, and pignut). Common mesic sub-canopy species found in these forested areas include flowering dogwood, American holly, black cherry, hop hornbeam, redbud, wax myrtle and wild azalea.

Lower Saluda River

Habitat diversity found in the lower Saluda River is more homogeneous than the highly diversified habitats of Lake Murray. In the areas below the dam, botanical resources consist of mesic (moderately moist) hardwood forests, pine plantations of various ages, and wetlands. The mixed hardwood forest cover type dominates much of the available habitat along the lower Saluda River, especially near the river's edge. Canopy species in this forest type include white oak, southern red oak, shagbark hickory, post oak, winged elm, as well as loblolly pine stands.

The forest edge habitat of the lower Saluda River, which is located in the transitional area between open and forested cover types, comprises about 10 percent of the total habitat along the lower Saluda River. This cover type is the interface between the forested and field habitats and provides a great deal of vegetative diversity and height class complexity.

Open field habitat makes up about 15 percent of the available habitat along the lower Saluda River. Open field habitat is limited to those areas that are periodically mowed and maintained and are typically dominated by assorted grasses. These cover types are confined to narrow strips in agricultural areas along the river corridor as well as in transmission line rights-of-way.

Islands

The 62 SCE&G-owned islands within the project boundary support a variety of plant communities depending on elevation and land-use history. The riverine islands primarily support bottomland hardwood forests. The herbaceous layer on the islands consists of a mixture of forbs and graminoid plants (such as grasses and sedges) and may be patchy depending on the canopy cover.

Loblolly pine-mixed hardwood islands are found on the middle and lower portions of the lake. Most of these islands have been subjected to periodic burning and have a dense canopy composed of loblolly and shortleaf pine, water oak, and sweetgum, which does not allow for a significant herbaceous understory to develop.

Other islands are more open and disturbed. They support scattered trees and shrubs and, in the most open areas, a dense herbaceous layer consisting of assorted grasses and forbs. The disturbed vegetation community is dominated by successional species.

The most ecologically distinct island is Lunch Island (also known as Bomb Island), located about 4.5 miles upstream of the dam, which has a dense stand of switch cane and abundant pokeberry. Like a number of other small islands in the lake, Lunch

Island is covered by an open habitat of scattered trees and shrubs over a dense herbaceous layer of grasses and composite forbs.

Wetlands

The wetland habitats represented within the project area have been classified according to Cowardin et al. (1979), and represent several subsystems/classes. They include palustrine forests,²⁷ emergent and scrub-shrub wetlands, and lacustrine littoral wetlands. Each of these wetland types and their general distribution in the project area are described further below.

Palustrine forests are the most abundant wetland community in the project area, occupying about 1,618 acres below the 358.5-foot contour around the lake. Palustrine forested wetlands are characterized by woody vegetation 6 meters or taller, and consist primarily of broad-leaved deciduous species. Typical species include various oaks (i.e., cherrybark, chestnut, willow, water, shumard, and laurel) and sweet gum. The subcanopy includes red maple, American hornbeam, and American elm, and the herbaceous layer includes various grasses and sedges. In some areas around the lake, this wetland type experiences seasonal flooding; however, the water regime for most areas is semi-permanently flooded. Hydrologic inputs are from flooding, stream flow, and runoff.

Palustrine scrub-shrub wetlands occupy the lake fringe along shallow coves and tributary banks. There are about 140 acres of this type of wetland below the 358.5-foot contour around Lake Murray. Palustrine scrub-shrub wetlands can be found in coves, with the most extensive areas occurring along the Saluda River arm of Lake Murray just upstream of the Little River confluence. The vegetative community is dominated by woody vegetation shorter than 6 meters that can include young trees as well as true shrubs. It consists mostly of broad-leaved deciduous species such as buttonbush, black willow, and occasional persimmon and water willow.

Palustrine emergent wetlands are located throughout the lower elevations of the shoreline of Lake Murray, within the coves. The plant communities include emergent, rooted, herbaceous hydrophytes (water-loving) species that are present most of the growing season in most years. This vegetation is present particularly along the larger flat regions of the Saluda River and Little Saluda River arms of Lake Murray (see figure 6). About 363 acres of emergent wetland exist below the 358.5-foot contour around the lake, with nearly 90 percent of them occurring in the headwater region of the lake along the Saluda River.

²⁷ Some forested wetlands around Lake Murray also have been referred to as bottomland hardwoods during various assessments.

Lacustrine littoral wetlands, most of which are unconsolidated bottom wetlands, occur in the upper arms of the lake but are most prevalent near the central body of the lake. Generally, this wetland type extends from the shoreward boundary of the lake to a depth of 2 meters. It is dominated by non-persistent emergent plant species that fall below the water's surface at the end of the growing season so that little sign of emergent vegetation is present during parts of the year. Vegetative cover is largely lacking (less than 30 percent) as are large stable surfaces for plant and animal attachment.

Floodplains

The lower Saluda River and the Congaree National Park each possess plant species typical of Piedmont and Southeastern Plains ecoregions of South Carolina. The lower Saluda Basin is narrow and the lower Saluda River is steeply banked and channelized. After extended high flows, water may top the river bank in some low lying areas; however, areas considered floodplain along the lower Saluda River are few in number and limited to scattered locations in river bends.

Habitat along the lower Saluda River is more homogeneous than the diversified floodplain habitats of the Congaree National Park. In the areas adjacent to the lower Saluda River below the Saluda dam, botanical resources consist of mesic hardwood forests and pine plantations of various ages. Mixed hardwood forest dominates much of the available habitat along the lower Saluda River, especially near the river's edge. Canopy species in this forest type include white oak, southern red oak, shagbark hickory, post oak, winged elm, as well as loblolly pine stands. On the north bank of the lower Saluda River, a small area of bottomland hardwood forest has been identified. This represents a wetland vegetation community more common to the Congaree National Park.

Unlike the habitat along the lower Saluda River, the Congaree National Park contains a wide variety of floodplain communities that have been thoroughly studied in recent years. Even high bluffs along the Congaree River are overtopped during flood events, allowing waters to descend into the park. The varied geomorphic features of the Congaree National Park include back-water swamps supporting flood-tolerant communities of old-growth cypress, water tupelo, and overcup oak. Higher elevation and bluff areas in the park support flood-intolerant species of sweet gum and cherrybark oaks. The riparian vegetation along the Congaree River consists of species such as sugarberry, green ash, box elder, paw paw, silver maple, and black willow.

Exotic Invasive Plants

There are several invasive aquatic plant species that are under observation on Lake Murray. These include hydrilla, Eurasian water milfoil, and several species of pondweed. Hydrilla populations have declined in Lake Murray because of the introduction of triploid Chinese grass carp into the lake. The diet of grass carp is almost exclusively aquatic

plants and they have been shown to be very effective in reducing invasive plant species. As of the 2007 survey, the hydrilla appeared to be well controlled on Lake Murray with no direct evidence of this species being observed. However, concern was noted that there may be tubers and/or hardened root crowns surviving in the lake sediments that may regeminate. Eurasian milfoil, although once a cause for concern on Lake Murray, was not mentioned as a problem species in the 2007 report. Several species of pondweed are present; however, colonies have been reduced because of their consumption by grass carp. Small patches of Illinois pondweed were noted during the 2007 survey.

The 2007 survey also notes the establishment of rattlebush, a wetland shrub that is found on marshy shorelines or disturbed areas, as a common species along the Lake Murray shoreline. Until 2 years ago, this exotic species was not known to exist at the project. Water primrose, an aquatic herbaceous species that grows in shallow water, continued to be observed along the Lake Murray shoreline in 2007.

According to Interior, cogongrass, a terrestrial invasive grass, was found in Greenville, Williamsburg, Pickens, Allendale and Hampton counties, South Carolina. It has not been found in the project boundary.

Rare, Threatened, and Endangered Plant Species

The only rare plant species likely to occur in the project vicinity is the rocky shoals spider lily (*Hymenocallis coronaria*), a federal species of special concern.

On May 31, 2006, members of the Rare, Threatened, and Endangered Species Technical Working Committee conducted a survey of the lower Saluda River for presence of the rocky shoals spider lily. The survey was conducted by canoe and foot where necessary along the entire reach from the project dam to the Senate Street Landing on the Congaree River. To aid in identification, the survey was conducted during the rocky shoals spider lily blooming season, which typically is from mid-May through mid-June. A large population occurs in the island complex at the confluence of the Broad and Saluda rivers and just upstream of the confluence in the bypassed reach of the Broad River downstream of the Columbia Hydroelectric Project.

Wildlife

Shoreline habitats are typical of the Piedmont area of South Carolina and include pine plantations, bottomland and upland hardwood forests, mixed pine/hardwood forests, open fields, and sandhills. The majority of wildlife habitats in shoreline areas are found in the 75-foot setback zone around the reservoir, riparian buffer zones, Environmentally Sensitive Areas, Forest and Game Management areas, and undeveloped areas of the project.

Forested and other terrestrial areas surrounding the project harbor typical woodland species such as wild turkey, white-tailed deer, raccoon, gray squirrel, opossum, and gray fox. Terrestrial areas also support a variety of resident and migratory birdlife including songbirds, woodpeckers, raptors, and upland game birds. Typical species include red-tailed and red-shouldered hawks, bobwhite quail, mourning dove, American robin, eastern bluebird, pileated woodpecker, and meadowlark. The project area also supports an abundance of terrestrial reptiles and amphibians such as eastern box turtle, green anole, broad-headed skink, gray rat snake, southern toad, green tree frog, and marbled salamander.

The abundant open- and shallow-water habitats within the project area support a variety of aquatic and semi-aquatic wildlife such as beaver, river otter, muskrat, and possibly mink. Shallow, often vegetated areas in creekmouths, backwaters, and along reservoir shorelines are used for foraging and cover by migratory and resident waterfowl such as wood ducks, Canada geese, American coots, and black ducks, as well as wading birds such as great blue herons, great egrets, and green herons. In addition to providing important breeding habitat for most amphibian species, these shallow waters also provide year-round habitat for aquatic reptile and amphibian species including eastern newt, bullfrog, spring peepers, brown and red-bellied water snakes, and mud and musk turtles. Open water areas are often utilized by species including bald eagle, kingfisher, osprey, and various gulls for foraging.

Lunch Island (Bomb Island), on Lake Murray, is one of the largest pre-migratory roosting sites for purple martins in the United States. The purple martin is a neotropical migrant, meaning that it migrates annually from its normal range in South America, the West Indies, and portions of Central America, northward to breeding grounds across North America. This species nests in large colonies and is almost entirely dependent upon man-made structures for nesting. Following the fledging period, purple martins often congregate in large nocturnal roosts of 100,000 or more birds prior to returning southward. Beginning in late June and extending through August or early September these congregations engage in two mass movements daily as they exit the roost in the morning to feed and return in the evening. It has been estimated that at least 700,000 birds per year utilize the Lunch Island roost.

Wintering Waterfowl

In recent years, during its mid-winter waterfowl surveys, South Carolina DNR has noted a declining trend in waterfowl use of Lake Murray. SCE&G developed and has initiated an ongoing study on the abundance and distribution of wintering waterfowl using the reservoir. The study consists of aerial surveys conducted during the winter months over a three year period from 2006 to 2009. Preliminary results of the first season of aerial surveys (2006-2007) documented 7 waterfowl species and more than 4,000 individuals in the project vicinity. Lesser scaup were the most numerous species

observed, with groups of 500 to 1,535 documented during individual sightings. All seven species documented during the surveys were fairly common. Concentrations of greater than 100 birds were documented at four locations including: (1) an area just west of the South Carolina Highway 391 bridge over the Saluda River fork; (2) the Hollow Creek region of the lake; (3) the Lowman Creek area near the Lighthouse Marina; and (4) around islands in the vicinity of the Saluda dam.

In the second year, aerial surveys documented only about 850 waterfowl using the reservoir, a decline of almost 80 percent. In 2007–2008, biologists only identified four waterfowl species (including American coots) using Lake Murray during the surveys. As in the previous year, the mallard was the only dabbling duck species seen at Lake Murray, but their numbers never exceeded more than 104 individuals on any single survey. Biologists observed mallards and Canada geese on every aerial survey in 2007–2008. The only diving duck species observed at Lake Murray in 2007–2008 was the lesser scaup, but only 10 individuals were seen on a single occasion.

Rare, Threatened, and Endangered Species

As part of relicensing, SCE&G formed a Rare, Threatened, and Endangered Species Technical Working Committee to address project-related issues related to rare, threatened, and endangered species. The Rare, Threatened, and Endangered Technical Working Committee is composed of representatives from state and federal resource agencies (i.e., South Carolina DNR, NMFS, and FWS), representatives from several non-governmental organizations, and other stakeholders.

The Technical Working Committee performed an assessment of the likelihood that rare, threatened, and endangered species or their habitats occur within the project area. Only the federally endangered wood stork and the state endangered bald eagle are known to occur within the project boundary. The wood stork is discussed further in section 3.3.4, *Threatened and Endangered Species*.

Bald Eagle

Bald eagles may be found throughout North America, typically around water bodies where they feed primarily on fish and scavenge carrion. Eagles nest in large trees near water and typically use the same nest for several years, making repairs to it annually.

Bald eagles have likely used Lake Murray for foraging and nesting since its construction in 1930. Eagles using the lake for foraging are thought to be a mix of native nesting adults and juveniles from South Carolina and adult and juveniles from outside the state. Eagles forage on Lake Murray year round, with peak usage likely occurring during the winter months. Nesting of bald eagles on Lake Murray was first documented in 1996, and since that time, the nesting population has increased to six pairs. Productivity (young produced) has also increased substantially around the lake from two chicks in 1996 to 10

chicks in the 2002/2003 nesting season. According to reports by the Lower Saluda Scenic River Advisory Council, bald eagles have been seen nesting in an area near the confluence of the lower Saluda and Broad rivers.

3.3.3.2 Environmental Effects

Project Operations

Project operations affect the amount of water in the lower Saluda and Congaree rivers. Existing and proposed flows could potentially affect riparian vegetation both along the lower Saluda River and in the Congaree National Park by altering the frequency of bank overflow or ground water levels.

As part of the Saluda Settlement, SCE&G proposes to implement the Flow Release Program, which provides a proposed minimum flow schedule including the Striped Bass Enhancement Flow Regime component. This proposed Flow Release Program for the lower Saluda River is described further in section 3.3.2, *Aquatic Resources*.

All signatories to the Saluda Settlement, and Interior, are in agreement with the proposed program; however, Interior remains concerned about the effects of project operations on the resources downstream of the Saluda dam.

Our Analysis

Because the lower Saluda River Basin is narrow, steeply banked, and channelized, floodplains are limited and proposed flows are not expected to affect riparian and floodplain vegetation. The Congaree River in Congaree National Park, however, contains a wide variety of floodplain communities. As discussed in section 3.3.1.2, *Water Resources*, existing flows from Saluda dam have had limited effects on surface and groundwater levels in the Congaree River. Flows from Saluda dam have only slightly changed the water levels within the river banks, resulting in slightly lower groundwater levels during the first half of the year and slightly higher groundwater levels during the last half of the year. Existing operations have relatively little effect on Congaree River flows near the Congaree National Park because hydrology is primarily influenced by the Broad River, with only 0.25 to 0.5 foot of fluctuation attributable to project operations (Plewa and Graf, 2005). Existing flows have had limited effect on inundation of the floodplain. The changes to groundwater levels from existing operations have a slight effect on the root zone and vegetative structure of the Congaree floodplain.

SCE&G's proposed Flow Release Program would result in very limited changes to the hydrology, and therefore floodplain vegetation, at Congaree National Park compared to historical and existing conditions. Striped Bass Enhancement Flows would increase the amount of water released from the Saluda dam to the Congaree River, but it is likely

these flows would only slightly increase inundation in some backwater areas. Our analysis shows that proposed flows would result in slightly higher water levels in low flow conditions; however, water would only be an inch or two higher and remain within the river banks, thereby only slightly affecting groundwater levels. Overall, the proposed operations would have a minimal effect on riparian vegetation and floodplain vegetation in the Congaree River in Congaree National Park.

Rare, Threatened, and Endangered Species

In the Saluda Settlement, SCE&G proposes to implement the T&E Program (appendix A-9 of the Saluda Settlement). This Program includes proposed management measures for the bald eagle and the rocky shoals spider lily. SCE&G proposes to implement the following bald eagle measures: (1) adhere to the National Bald Eagle Management Guidelines (FWS, 2007) in regards to distance restrictions for various types of disturbance; (2) consult the aforementioned disturbance distance restrictions as part of the shoreline permitting process to ensure that permitted shoreline activities do not violate buffer requirements; (3) coordinate with South Carolina DNR biologists on an annual basis to acquire the most up-to-date data information regarding the location and status of active eagle nests in the project vicinity; (4) consult with FWS and South Carolina DNR if a yet undocumented nest is discovered in an area of proposed shoreline disturbance or if there is difficulty in determining the disturbance category of a proposed activity; (5) implement the Rare, Threatened, and Endangered Species Public Awareness Program (publishing and making available the *Plant and Animal* brochure); and (6) adhere to its Avian Protection Plan that requires incident reporting and tracking of avian interactions with SCE&G power lines and substations.

SCE&G currently supports and assists the city of Columbia with the implementation of an existing Rocky Shoals Spider Lily Management and Enhancement Plan as required under article 409 of the Columbia Hydroelectric Project. This plan is a collaborative effort between the City, SCE&G, South Carolina Native Plant Society, Riverbanks Botanical Gardens, and South Carolina DNR. As part of the T&E Program, SCE&G proposes to continue to support and assist the city of Columbia and other partners with the following rocky shoals spider lily measures that are contained within article 409 of current license for the Columbia Hydroelectric Project: (1) rocky shoals spider lily propagation and transplantation; (2) employment of a regional expert; (3) monitoring at the confluence of the Broad and Saluda rivers on a minimum 5 year interval; (4) support and assist the city of Columbia in experimental bulb planting; (5) phase I planting that involves large scale propagation and transplantation of seedlings into the confluence of the Broad River bypassed reach until 3,000 new rocky shoals spider lily plants have become established; (6) phase II planting which would involve commercial scale production of rocky shoals spider lily seedlings, with a goal of establishing up to 1,000,000 new rocky shoal spider lily plants (funded by others); and, (7) annually filing a report in accordance with article 409 of the Columbia Hydroelectric

Project license. In addition, for the Saluda Project, SCE&G proposes to implement the Rare, Threatened, and Endangered Species Public Awareness Program (i.e., publishing and making available the *Plant and Animal* brochure).

All signatories to the Saluda Settlement, and Interior, are in agreement with the proposed T&E Program and publishing of the *Plant and Animal* brochure.

Our Analysis

Although recent surveys (2007) indicate there are seven active bald eagle nests on Lake Murray and one active nest on the lower Saluda River, overall, project-related activities could adversely affect nesting eagles if proper management is not implemented. For example, project-related recreation within 330 feet of an active nest during nesting season could cause the nesting eagle to abandon or flush from the nest, which would affect productivity. SCE&G's proposed T&E Program includes tables of potential activities and the minimum set back distance requirements these activities need to be from an active nest. In addition, SCE&G would require all shoreline activities going through the shoreline permitting process to adhere to these distance requirements. Because these distances are based on the National Bald Eagle Management Guidelines (FWS, 2007), it is likely that by enforcing these setback requirements on project activities, SCE&G would minimize effects on bald eagles.

SCE&G would be able to update its database of active eagle nests by coordinating with South Carolina DNR, through public input on the proposed Rare, Threatened, and Endangered Species Public Awareness Program, and its Avian Protection Plan. This would allow SCE&G to implement the proposed distance requirements on all active nests throughout the length of any new license.

Although relicensing surveys found no viable populations of rocky shoals spider lily in the project boundary, a large population occurs in the island complex at the confluence of the Broad and Saluda rivers and project operations could potentially affect this population. SCE&G currently assists the city of Columbia in managing this population under the Columbia Hydroelectric Project; however, because Saluda River flows could affect this population, including the rocky shoals spider lily in the proposed T&E Program would provide a regulatory link between project operations and rocky shoals spider lily management. Although the costs for the proposed measures are already accounted for under the Columbia Hydroelectric Project, SCE&G's continued implementation of these measures would be beneficial for the rocky shoals spider lily in the project area. In addition, the proposed Rare, Threatened, and Endangered Species Public Awareness Program would increase public awareness about the lily, aiding in the protection of the species, and allowing the public to become involved in the ongoing restoration and enhancement efforts.

SCE&G has prepared a brochure that includes life history information, identification information, and mechanisms for the protection of the bald eagle, rocky shoals spider lily, wood stork, shortnose sturgeon, and the purple martin. SCE&G indicates that the *Plant and Animal* brochure would be available on its website. Hard copies also would be available at recreational sites, marinas, and parks around Lake Murray. This brochure is intended to educate the public, including the residents and visitors to the Lake Murray area. Educating the public on the life history requirements and identification methods for these species would help guide the public to minimize disturbance to these species. In addition, the brochure provides the public information on how to participate in the conservation of these species.

Purple Martin

Lunch Island on Lake Murray is one of the largest pre-migratory roosting sites for purple martins in the United States. As part of the Saluda Settlement, SCE&G proposes to designate Lunch Island as a protected habitat for purple martins. In addition, SCE&G proposes to publish and make available the *Plant and Animal* brochure, which includes life history information and a website where the public can register any purple martin colonies they identify. All signatories to the Saluda Settlement, including South Carolina DNR, are in agreement with the proposed measure.

Our Analysis

SCE&G signed a Memorandum of Agreement with South Carolina DNR and the Columbia Chapter of the National Audubon Society to manage the purple martin habitat on Lunch Island. SCE&G's proposal to designate the island as protected habitat would further serve to protect this important roosting habitat from disturbance. Discussion of purple martins in SCE&G's brochure would increase public awareness of the purple martin and allow the public to become involved in monitoring populations in the project area.

Waterfowl

Lake Murray has the potential to provide important winter waterfowl habitat. SCE&G surveys have indicated declining waterfowl populations could be the result of project effects. In addition, the June 23, 2004, FERC Order (SCE&G, 107 FERC ¶ 62,272 (2004)) approving the existing SMP requires SCE&G to mitigate for habitat that has been lost to land sales and development.

As part of the Saluda Settlement, SCE&G proposes to lease about 1,100 acres of Forest Management land within the project boundary (see appendix A-16 of the Saluda Settlement), to South Carolina DNR to be placed/maintained in the state's Wildlife Management Area Program, as determined by South Carolina DNR.

All signatories to the Saluda Settlement including South Carolina DNR are in agreement with the proposed measure.

Our Analysis

In its February 9, 2009, comments on SCE&G's draft additional information requests, South Carolina DNR indicates as much as 10 percent of the statewide total waterfowl harvest appears to have occurred on or in association with Lake Murray prior to widespread shoreline development. South Carolina DNR mid-winter surveys indicate that winter waterfowl populations are declining. SCE&G's consultants conducted aerial winter waterfowl studies from 2006 to 2009. The survey report indicates that the declining trend in winter waterfowl populations could be attributed to recreational boat disturbance and aquatic invasive plant control activities that have limited vegetation and macroinvertebrates that wintering waterfowl use as food resources (Savannah River Ecology Laboratory, 2008). The report further concludes that Lake Murray would likely function primarily as a temporary stopover location for migrating waterfowl because of lower quantity and quality waterfowl food resources and winter disturbance.

SCE&G's proposed measure to lease 1,100 acres of land between the project boundary and the 360-foot-contour elevation to South Carolina DNR would allow South Carolina DNR to manage these lands for waterfowl habitat enhancement and to provide waterfowl hunting opportunities. South Carolina DNR's Wildlife Management Area Program manages Wildlife Management Areas as protected areas that play a critical role in conserving fish, wildlife, and other natural resources. Appropriate and compatible uses of South Carolina DNR-managed lands are hunting, fishing, wildlife or other natural resource observation, wildlife or other natural resource photography, environmental education, and environmental interpretation (DNR Policy 203.04)(South Carolina DNR, 2009b). Although the specific management activities are not identified, it is likely that South Carolina DNR managing these lands would enhance waterfowl habitat and hunting opportunities. In addition, as discussed below, SCE&G would continue to coordinate with agencies and groups that are actively managing aquatic invasive plants in the project area.

Although aquatic invasive plant management has been shown to limit vegetation used by wintering waterfowl, as discussed above, South Carolina DNR's Aquatic Nuisance Species Program for Lake Murray (South Carolina DNR, 2010) includes habitat enhancements such as planting of native species such as buttonbush, cypress, black willow, pondweed, and wild celery in various locations around the lake as well as submerging Christmas trees, which provides a surface where aquatic plants can grow. Since these measures promote the growth of native aquatic vegetation, they would benefit wintering waterfowl over any new license term

Exotic Invasive Species

Although the invasive species hydrilla has declined in Lake Murray because of SCE&G's introduction of the Chinese grass carp into the lake in 2003, there is still concern over other aquatic invasives such as Eurasian milfoil, water primrose, and several species of pondweed. In addition, there is regional concern over terrestrial invasive plants such as cogongrass entering the project area.

As part of the Saluda Settlement, SCE&G is proposing to coordinate with the South Carolina DNR Aquatic Nuisance Species Program and the Council to manage invasive aquatic plants in Lake Murray for the term of any new license. SCE&G would assist in the development, implementation, and funding of annual aquatic plant management plans for Lake Murray that are identified by the Council. SCE&G would file with the Commission a copy of the Council's annual plan within 60 days of receipt by SCE&G.

All signatories to the Saluda Settlement including South Carolina DNR are in agreement with the proposed measure.

Interior recommends SCE&G develop and implement a terrestrial and aquatic invasive species management plan, in consultation with Interior, that includes: (a) baseline surveys to identify the range and extent of terrestrial invasive plant species within the project boundary; (b) methods for management (such as mechanical removal, mowing, herbicide treatment, etc.); (c) a requirement that SCE&G train staff involved in herbicide use as certified herbicide applicators; (d) a schedule of surveys and management; and (e) estimated costs for management. In particular, Interior is concerned with snakeheads and cogongrass. Snakehead management is discussed previously in section 3.3.2.2, *Aquatic Resources*.

Our Analysis

Project operations, including reservoir drawdowns and fluctuations, have contributed to the proliferation of invasive aquatic species such as rattlebush and water primrose (Aulbach, 2007). In addition, recreation on Lake Murray, in particular boating, can spread aquatic invasives. SCE&G currently provides some invasive species control, such as the introduction of grass carp in 2005 to control the hydrilla population. SCE&G's proposal to develop, implement, and fund annual aquatic plant management plans approved by the Council would ensure that aquatic invasive management is ongoing throughout the term of any new license. In addition, by coordinating with the South Carolina DNR Aquatic Nuisance Species Program and the Council, SCE&G would be able to focus annual management on species of the most concern by the resource agencies and adjust if new invasive species become established.

Interior's recommendation for a separate terrestrial and aquatic invasive species management plan is redundant and unnecessary in light of the applicant's proposal, as it relates to aquatic invasive plants. SCE&G's proposal would include assisting in the development and implementation of the Council's annual plan. This annual plan, when implemented by the Council, would provide appropriate aquatic invasive species management. Interior's focus on cogongrass, in terms of baseline surveys and developing a monitoring and control plan for the species, has not been proven to be necessary at this time because it has yet to be discovered in the project boundary. However, it could become established in the project area over the course of any new license. If SCE&G provides public education on the spread of cogongrass and other terrestrial invasive plants and consults annually with South Carolina DNR and Interior regarding their spread, SCE&G can determine appropriate control measures if or when these species are determined to occur within the project boundary. Thus, we see no need to require a separate terrestrial and aquatic invasive species management plan as recommended by Interior. Interior's concerns about cogongrass and snakehead invasions into the project area would be addressed by SCE&G's coordination with the Council and South Carolina DNR in development of an annual plan for managing invasive species.

Shoreline Management Plan

Shoreline development has, and could continue, to reduce wildlife habitat and increase habitat fragmentation. SCE&G has an existing SMP that was designed to help balance shoreline development, recreational use, and environmental protection. Proposed updates to the SMP could create new land classifications to protect wildlife habitat and other habitats.

In the Saluda Settlement, SCE&G proposes to modify the existing SMP for lands classified as Future Development or Easement Property to establish a 75-foot wide non-disturbance zone buffer allowing one 10-foot wide meandering path per dock, provide incentives to deed land within the 360 foot contour to SCE&G, require larger lots for docks, reduce the number of future docks, increase the distance between docks, and provide incentives to create greenspaces along the shoreline. In addition, the proposed SMP creates a new Natural Areas land classification for lands that warrant special protection because they provide important habitat for various wildlife species. The SMP is discussed in further detail in section 3.3.5, *Recreation, Land Use, and Aesthetics*.

Both South Carolina DNR and Interior recommend and support the SMP, as included in the Saluda Settlement.

Our Analysis

Development of the land around Lake Murray has increased habitat fragmentation. More than 50 percent of the shoreline is privately developed, which has created smaller patches of habitat, limiting access to foraging, breeding, and roosting habitat for many

wildlife species. In addition, species that travel between patches for life history needs, such as turtles and many mammals are at risk for predation and adverse human interactions. Although the proposed SMP would not reduce the existing habitat fragmentation, it would protect the remaining patches of habitat through the designation of the Natural Areas classification and stricter requirements within lands classified as Future Development and Easement Property.

3.3.3.3 Cumulative Effects

Flows released from Saluda dam join the larger Broad River to form the Congaree River. The Broad River contributes about two-thirds of the mean annual flow to the Congaree River, whereas the Saluda River contributes about one-third of the flow (Plewa and Graf, 2005). As a result, flows from the Broad River are the primary influence on the Congaree River in the vicinity of the Congaree National Park. The Plewa and Graf study (2005) determined that 0.25- to 0.5-foot increases in water level in the Congaree River result from Saluda project operations; however, daily and hourly fluctuations in lower Saluda River flow are washed out by variations in the Broad River flows. Proposed operations would increase flows into the lower Saluda River, but the two-thirds Broad River to one-third lower Saluda River ratio of flow in the Congaree River would continue. As a result, proposed operations would only have a minimal cumulative effect on floodplain vegetation in the Congaree National Park.

Without management activities, the project would contribute to the regional spread of invasive species through project recreation and maintenance. SCE&G's proposed aquatic invasive plant measures could help stem the regional spread of invasive exotic aquatic species. By coordinating with the South Carolina DNR Aquatic Nuisance Species Program and the Council as proposed, SCE&G would be able to focus annual management on aquatic species of the most concern by the resource agencies and adjust if new aquatic invasive species become established. In addition, if SCE&G consults annually with South Carolina DNR and FWS regarding new terrestrial invasive species in the project area, SCE&G would be able to implement control and/or eradication measures for newly established invasives such as cogongrass as they enter the area. Through these measures, the project would cumulatively contribute to the control of invasive species in the region.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

Aquatic Species

The only federally listed aquatic species potentially occurring within the project vicinity is the shortnose sturgeon. The shortnose sturgeon was listed as endangered throughout its range on March 11, 1967, under the Endangered Species Preservation Act

of 1966 (a predecessor to the Endangered Species Act of 1973). Shortnose sturgeon historically occurred in most major river systems along the eastern seaboard of North America from the St. Johns River in Florida to the St. Johns River in New Brunswick.

Shortnose sturgeon in the Santee River Basin are considered to be amphidromous (migrating between freshwater and estuarine areas), and have been documented at several locations. Population groups of shortnose sturgeon occur downstream of the Santee-Cooper Project dams, as well as in the Santee Cooper Project lakes (which are located downstream of the project in the Santee River), with the Lake Marion landlocked population apparently the largest. Based on South Carolina DNR telemetry studies, Lake Marion sturgeon are known to migrate upstream into the Congaree River for spawning, and have been documented in the Congaree River near Columbia (i.e., near the Gervais Street Bridge). SCE&G conducted sampling for shortnose sturgeon (adults, juveniles, eggs, and larvae) in 2007 in the upper Congaree and lower Saluda rivers, but no life stages of shortnose sturgeon were collected. NMFS considers the present range of shortnose sturgeon to be all accessible waters downstream of the dams on the Saluda, Broad, and Wateree rivers, but the historical distribution of the shortnose sturgeon population within the Santee River Basin is not known, and data on the historical population are unavailable. The Santee Cooper Project dams, constructed in the early-1940s, are thought to have had a major impact on shortnose sturgeon in the basin, by blocking migratory access to the upper basin, resulting in a dam-locked population in the Santee Cooper lakes, and by the diversion of most of the Santee River flows to the Cooper River, until the U.S. Army Corps of Engineers rediverted much of the flow beginning in 1985 (McCord, undated; FERC, 2007).

Terrestrial Species

FWS listed the wood stork as endangered on February 28, 1984. The only stork native to North America, wood storks occurred historically throughout the coastal plain of the southeastern United States and Texas. Currently, nesting of the species in the United States is thought to be limited to the coastal plains of South Carolina, Georgia, and Florida.

Wood storks are highly colonial and typically nest in large rookeries and feed in flocks. Wood storks feed primarily on small fish; however, because they feed by tactilocation (using the sense of touch), depressions where fish become concentrated during periods of falling water levels are particularly attractive sites. Typical foraging habitats include narrow tidal creeks, flooded tidal pools, and freshwater marshes, and wetlands. Storks typically nest in colonial nest sites in tall cypresses or other trees near water with nests usually located in the upper branches of large trees. Trees used for nesting and roosting typically provide easy access from the air and an abundance of lateral limbs.

While wood storks are primarily birds of freshwater and brackish wetlands along the coastal plain, wood stork activity has been reported by local residents at several locations within the Lake Murray area since about 1999. In August 2004, biologists observed more than 60 storks feeding at various locations in the middle of Saluda River and upper portion of Lake Murray. In addition, two wetland areas along the floodplain of the Saluda River contained possible wood stork nests. In 2004, SCE&G, in coordination with FWS and South Carolina DNR, developed a long-term study plan to document wood stork usage within the project boundary and in the project vicinity.

SCE&G performed aerial surveys monthly during February through November of 2005 and 2006. Biologists did not observe any nesting wood storks in either year, but 12 to 13 storks were observed soaring above and foraging in wetlands off the Saluda's main channel in 2006. Following these surveys, SCE&G met with FWS and South Carolina DNR to discuss the survey results, and it was agreed that no wood stork nesting was evident in the study area. Because of the limited nature of stork activities in the project boundary, the agencies agreed that no additional wood stork surveys on Lake Murray were necessary.

3.3.4.2 Environmental Effects

Aquatic Species

Shortnose sturgeon have been observed in the Congaree River near Columbia, but have not been documented in the lower Saluda River. However, NMFS considers the lower Saluda River to be potential habitat for the sturgeon. As a result, the Saluda Settlement includes a Sturgeon Program (appendix A-6 of the Saluda Settlement). Under this program, SCE&G would provide DO enhancements and instream flows to the lower Saluda River that are already proposed as part of other provisions of the settlement; would establish a Sturgeon Technical Advisory Team with NMFS, FWS, and South Carolina DNR; and would conduct several agency-recommended studies on shortnose sturgeon, as part of the studies to be conducted under the Santee Basin Accord. These studies would include: (1) a telemetry study of shortnose sturgeon behavior and movements in the lower Saluda, lower Broad, and Congaree rivers; (2) temperature and water quality monitoring in the lower Saluda, lower Broad, and Congaree rivers; and (3) if shortnose sturgeon are found in the lower Saluda River in the telemetry study, a detailed physical habitat study in the lower Saluda, lower Broad, and Congaree rivers, including identification of potential critical habitats. These studies would provide support to a long-term shortnose sturgeon recovery effort in the Santee River Basin.

Although NMFS did not sign the Saluda Settlement, it recommends implementation of this sturgeon program. NMFS also filed a letter (letter from D.M. Bernhart, Assistant Regional Administrator for Protected Resources, NMFS, St. Petersburg, FL, to K.D. Bose, Secretary, FERC, filed April 26, 2010) in response to our findings in the draft EA that concluded that the continued operation of the project may

affect but is not likely to adversely affect the endangered shortnose sturgeon. NMFS does not concur with our determination, as they believe that the project and the proposed enhancements: (1) may be adversely affecting and would adversely affect the shortnose sturgeon; (2) that formal section 7 consultations under the ESA are required; and (3) that a Biological Assessment (BA) should be prepared by us that addresses a number of potential project effects on the shortnose sturgeon.

Our Analysis

The shortnose sturgeon may currently be found in small numbers in the upper Congaree River, a portion of which is influenced by project releases. Although most of the provisions of the Sturgeon Program are related to general recovery of the species in the Santee River Basin, it does include project-specific measures (DO enhancements and increased minimum flows), which are also proposed under other parts of the Saluda Settlement. As a result of these proposed measures, overall habitat conditions for shortnose sturgeon in the upper Congaree and lower Saluda rivers would be improved compared to current conditions. The proposed shortnose sturgeon studies would be conducted under the auspices of the Santee Basin Accord, which addresses fish restoration throughout the Santee Basin, and would provide support to shortnose sturgeon recovery in the basin. Most of the shortnose sturgeon study efforts revolve around the collection of biological data and detection of whether the shortnose sturgeon are present or not, and are not specifically targeting the Saluda Project operation and effects on the shortnose sturgeon.

The NMFS letter, filed April 26, 2010, raises several potential project effects on shortnose sturgeon that may be occurring from project operation. These include the effects associated with water temperature, water quality, water quantity, and requests that a BA also address how: (1) the proposed project would affect shortnose sturgeon recovery efforts; (2) the existing trout fishery in the lower Saluda River would affect shortnose sturgeon; (3) shortnose sturgeon habitat would be affected by project operations and the presence of the dam; and (4) the dam is affecting shortnose sturgeon passage in the Saluda River.

Water Temperature. We previously described how coldwater releases from Saluda dam have resulted in colder water temperatures in the lower Saluda River, which has allowed the establishment of a highly popular trout fishery in the river (see sections 3.3.1, *Water Resources*, and 3.3.2, *Aquatic Resources*). NMFS expresses concern that the colder than normal (compared to other South Carolina rivers) water temperatures may affect shortnose sturgeon spawning migrations, reproductive success, survival, recruitment, population size, and recovery, and states that the water temperatures in the lower Saluda River from January through May should be compared to the sturgeon's preferred temperature range for spawning (9.7 to 15.6°C).

USGS has monitored water temperatures in the lower Saluda River on a long-term basis, and SCE&G conducted additional studies as part of relicensing. Figure 7 illustrates USGS water temperature data from gage number 02169000, located on the lower Saluda River just upstream from the confluence with the Broad River. Figure 7 shows both a 10-year and 2-year record, and illustrates that water temperatures are typically within the preferred range for sturgeon spawning during the January through May period, typically ranging from about 8 to 15°C. This indicates that the current temperature regime within the lower Saluda River should not adversely affect spawning, should shortnose sturgeon attempt to spawn in the river. Shortnose sturgeon are known to be late-winter to early-spring spawners in southern rivers (NMFS, 1998), and temperatures in the lower Saluda River match the preferred temperature range during that period. Water temperatures immediately below Saluda dam (USGS gage no. 02168504) were slightly cooler than those observed at USGS gage no. 02169000, but the greatest differences in temperature occur in the summer months, when warming of about 5 to 7°C may occur between the two gages (Kleinschmidt, 2008b). Temperatures at Saluda dam, however, still remain in the preferred temperature range for sturgeon spawning (figure 8).

We also examined the preferred temperature ranges for other shortnose sturgeon life stages. Habitat suitability curves for shortnose sturgeon (Crance, 1986), show highest suitability for the other life stages as follows: (1) egg incubation – 13 to 18°C; (2) larvae – 16 to 24°C; (3) non-migratory juveniles and adults – 10 to 24°C; and (4) adult summer foraging – 11 to 22°C. In addition, according to NMFS (1998), both adults and juveniles in southern rivers concentrate during the summer months in cool, deep, thermal refugia. Crance (1986) also reports that, although sturgeon have been found at temperatures as high as 34°C, young shortnose sturgeon experience increased distress or mortality at temperatures higher than about 25°C. These data show that shortnose sturgeon prefer cooler waters, similar to the temperatures in the lower Saluda River during the year. As figures 7 and 8 show, water temperatures in the summer/fall typically occur in the range of 16 to 24°C at the lower river gage and 15 to 18°C immediately below Saluda dam. These temperatures are within the preferred ranges for the shortnose sturgeon life stages described above.

Based on the apparent preference of shortnose sturgeon for cooler water temperatures, the lower Saluda River may in fact serve as a summer coolwater refugia for any shortnose sturgeon that may occur in the upper Congaree River, similar to what currently occurs with the striped bass usage of the lower Saluda River as a coolwater refugia. In addition, we note NMFS' concern about what the proposed operation of the Saluda Project, including coldwater releases, would have on shortnose sturgeon residing in Lake Marion. There would be no effect on shortnose sturgeon in Lake Marion, as the effects of coldwater releases from the project only extend 16 miles downstream from the confluence of the Saluda and Broad Rivers into the Congaree River, while Lake Marion is located more than 50 miles downstream. We also note that the flow from the Saluda River is moderated by the greater flows from the larger Broad River watershed once the

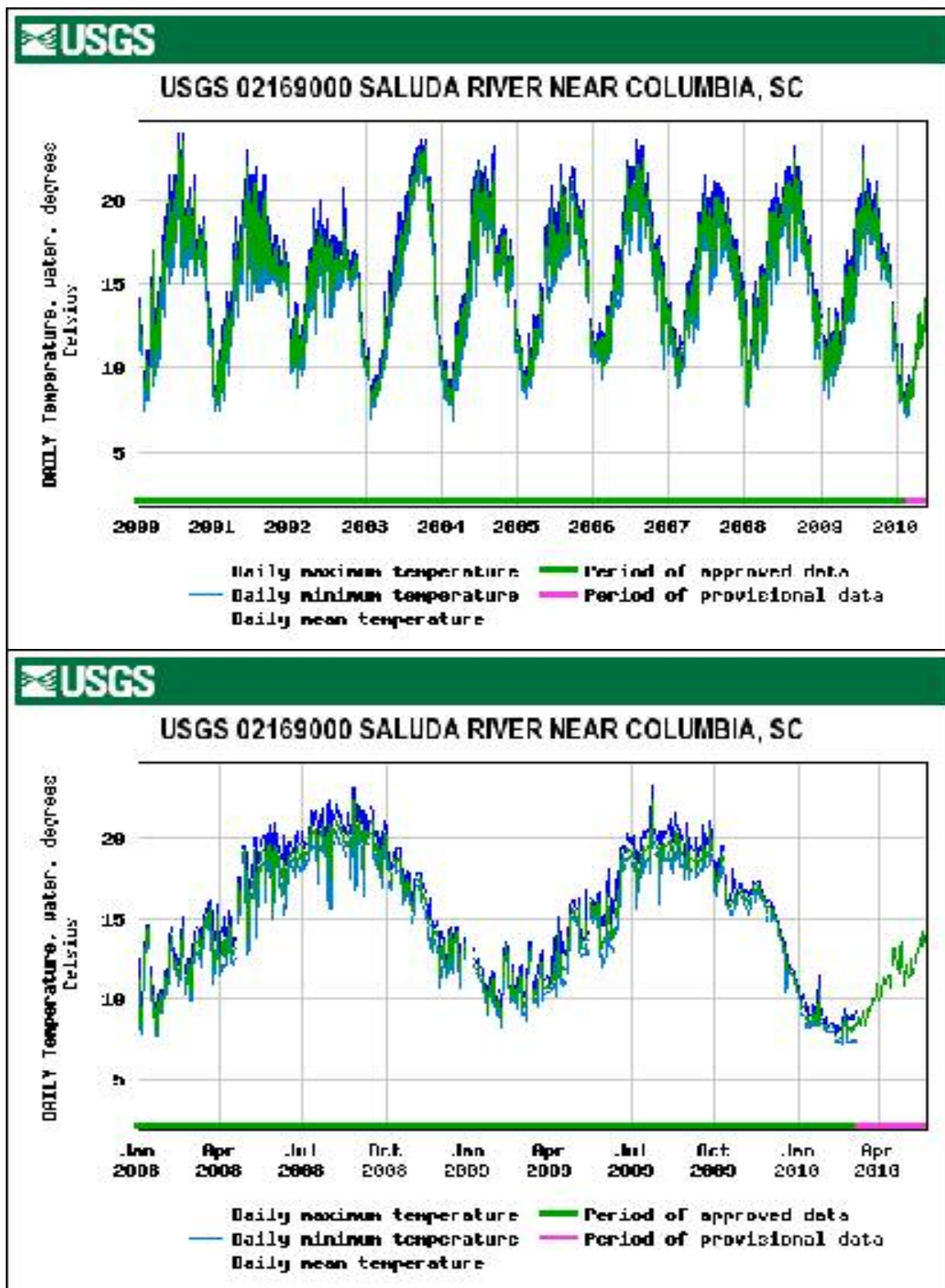


Figure 7. Water temperature data from the lower Saluda River (Source: USGS, 2010).

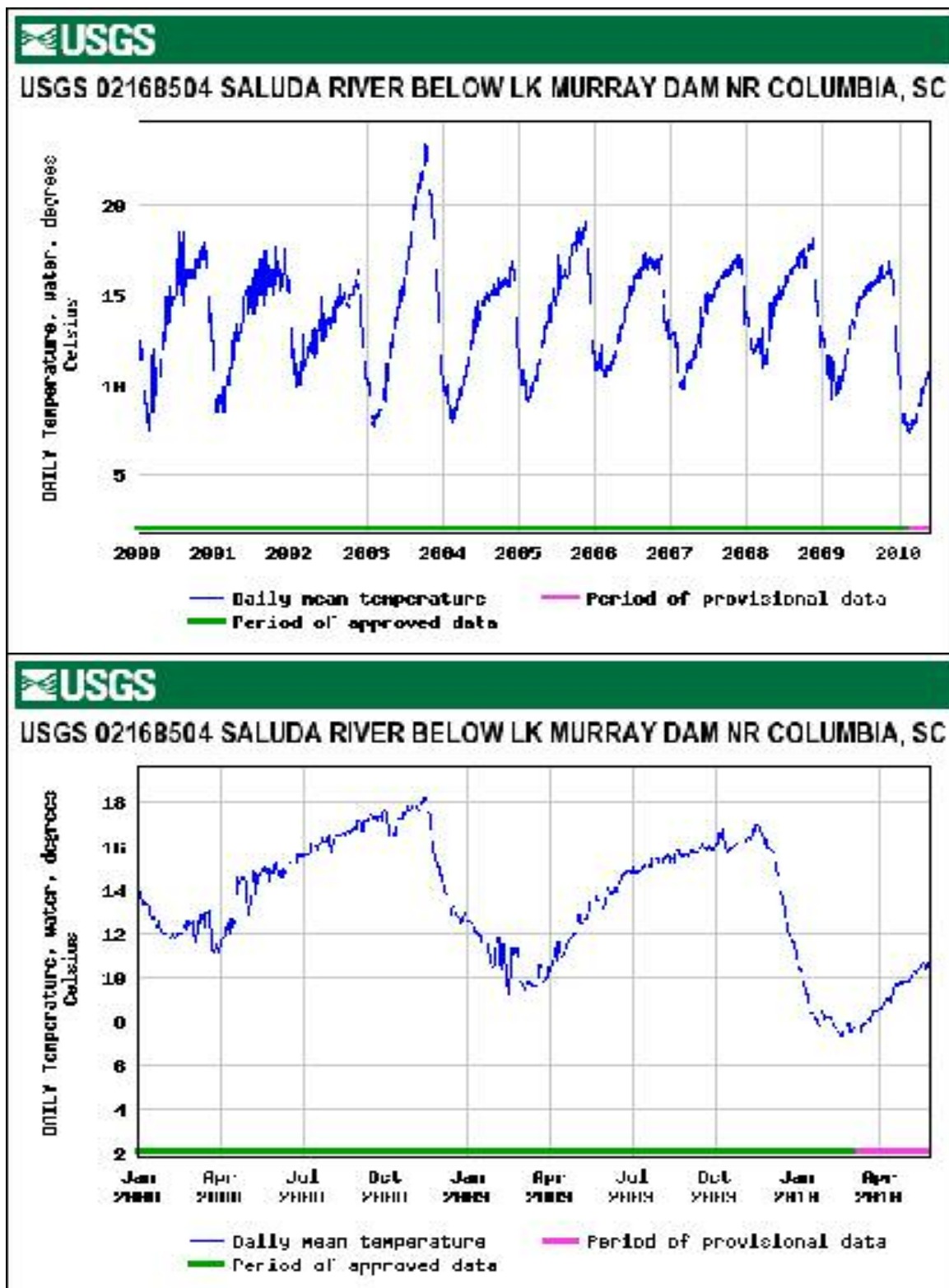


Figure 8. Water temperature data from the lower Saluda River immediately below Saluda dam (Source: USGS, 2010).

flows from these two rivers meet to form the Congaree River. As we describe in section 3.3.1.2, *Environmental Effects*, only about 30 percent of the watershed of the Congaree River near the Congaree National Park can be attributed to the Saluda River.

Water Quality. We previously described the primary water quality issue in the lower Saluda River – the occasional occurrence of low DO in releases from Saluda dam because of low-level withdrawals (see section 3.3.1, *Water Resources*). This has been a long-term issue at the project, but SCE&G has been implementing measures to improve DO levels in project releases since 1999. As described, monitoring from 2005 to 2007 showed that DO levels were lower than 5 mg/L only 6 percent of the time, and lower than 4 mg/L only 4 percent of the time. More recent USGS data since 2007 (figure 9), show that only two low-DO events occurred in the past 3 years immediately downstream from the dam: once to a low of about 5 mg/L in fall 2007, and once to a low of about 2 mg/L in fall 2009. For the rest of the time, DO levels remained above 5 mg/L and most of the time remained above 6 mg/L. Figure 9 also shows that DO levels reported at the USGS gage in the lower river (no. 02169000) have improved over the past 10 years, with DO levels of less than 5 mg/L uncommon since 2006. SCE&G also proposes to continue making improvements to its generating units to further enhance DO.

NMFS (1998) states that shortnose sturgeon may experience some distress at DO levels less than 5 mg/L, and cites two studies in which juvenile shortnose sturgeon experienced relatively high mortality (86 percent) when exposed to DO concentrations of 2.5 mg/L. Older shortnose sturgeon (greater than 100 days old), however, could tolerate DO concentrations of 2.5 mg/L with less than 20 percent mortality, indicating an increased tolerance of older fish to lowered DO levels. Shortnose sturgeon may also be less tolerant of low DO levels at higher water temperatures and show signs of stress in water temperatures that are higher than 28°C if DO levels are low, with potentially lethal effects. Although information on effects of low DO on shortnose sturgeon is limited, the information cited above indicates that shortnose sturgeon may be somewhat tolerant of DO levels less than 5 mg/L, with 80 percent survival at DO levels as low as 2.5 mg/L. In the lower Saluda River, DO excursions below 5 mg/L are now infrequent, with levels as low as 2 to 3 mg/L even more infrequent (see figure 9). Cooler water temperatures in the river would also act to protect shortnose sturgeon, in any low DO events, as shortnose sturgeon may be more tolerant of low DO levels if water temperatures are also cooler. Although the lower Saluda River now exhibits generally adequate DO levels most of the time, and SCE&G would continue to implement measures to further enhance DO in project releases, there still is potential for low DO events (less than 5 mg/L) to occur in the lower Saluda River and thus expose any shortnose sturgeon that may occur in or visit the river to unsuitable habitat. As described above, shortnose sturgeon may experience some distress at DO levels less than 5 mg/L and have experienced mortality at concentrations of 2.5 mg/L, a level that occurred as recently as the fall of 2009. We conclude that this occasionally poor water quality (low DO) may adversely affect shortnose sturgeon habitat.

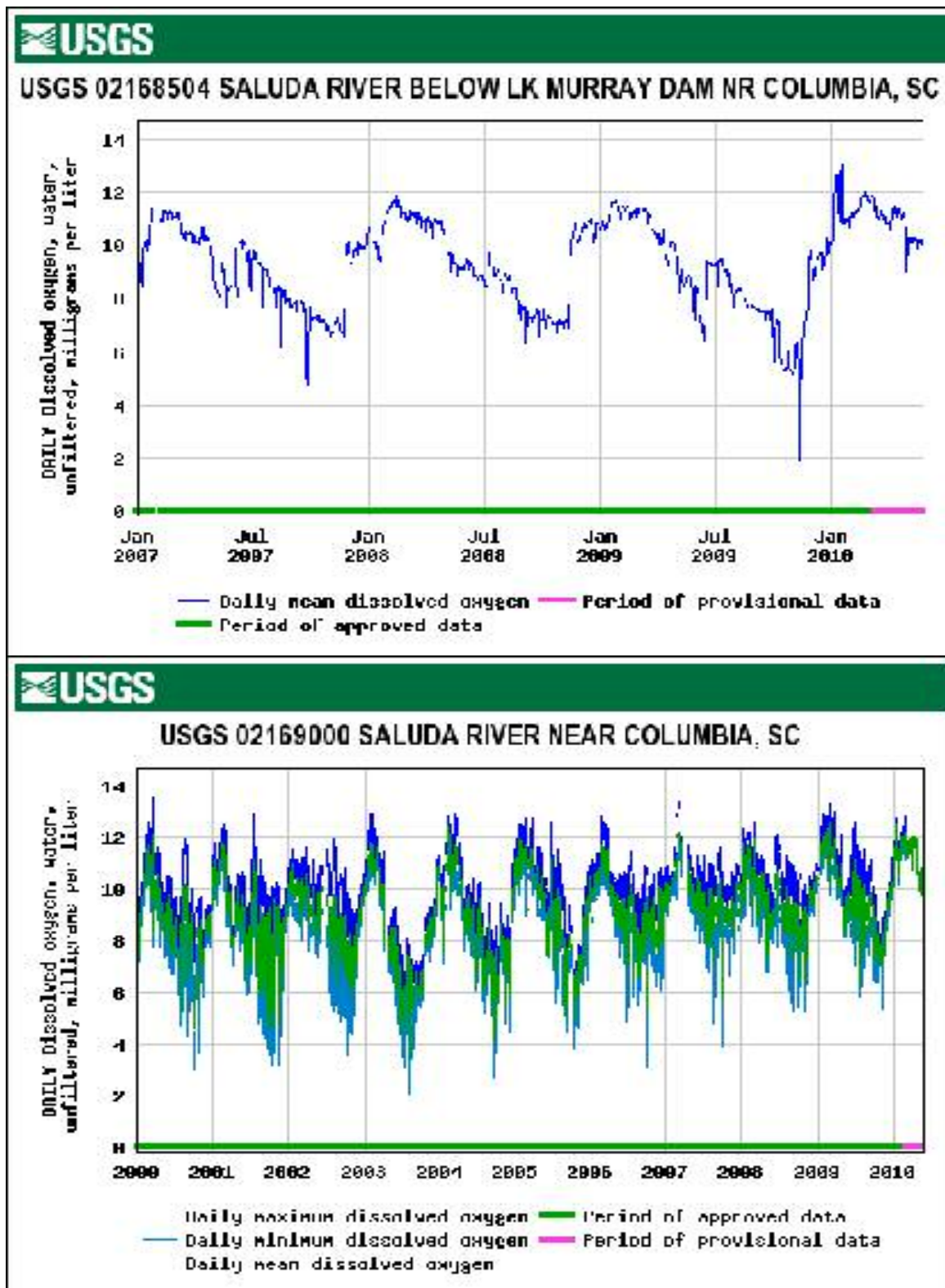


Figure 9. DO data from 2007 to 2010 immediately below Saluda dam, and for the past 10 years in the lower river (Source: USGS, 2010).

Water Quantity. Sections 3.3.1, *Water Resources*, and 3.3.2, *Aquatic Resources*, describe the current and proposed flow releases from Saluda dam, and the potential effects (in terms of available habitat) for several species and life stages, based on the instream flow study conducted for the project (Kleinschmidt, 2008a). This study included evaluation of habitat availability for shortnose sturgeon under a range of flows and at several locations within the lower Saluda River. As we described in section 3.3.2.2, *Environmental Effects*, the instream flow study identified the range of flows that would provide 80 percent of the maximum WUA for each species and life stage. For the shortnose sturgeon, the study evaluated the spawning and egg incubation life stages. The IFIM results indicated that not all the study reaches contained suitable sturgeon spawning habitat, but for those that did, spawning habitat availability generally increased at higher flows (table 6). At most of the reaches that had suitable spawning habitat, the range of flows providing 80 percent of the WUA were in the thousands of cfs, which is much higher than the minimum flows proposed for the spring period (700 to 1,000 cfs). In years when striped bass enhancement flows are provided (which could range up to 2,700 cfs), sturgeon spawning habitat would be enhanced by these flows. Nonetheless, project operations, which include flow storage and release, would expose any shortnose sturgeon occurring in the river to fluctuating habitat suitability ranging from poor to good, which would be considered an adverse effect on shortnose sturgeon spawning habitat.

In the unlikely event that a Low Inflow Protocol is implemented during the early-spring months when sturgeon would spawn, there would be a substantial reduction in spawning habitat availability at the Low Inflow Protocol flows in the range of 400 to 500 cfs (see table 6). As table 2 of the EA shows, however, the early spring months (February, March, April) typically have among the highest flows of the year, resulting in fewer periods when the project would be releasing only the minimum flows, and unlikely requiring the implementation of Low Inflow Protocol flows.

If the minimum flows and Low Inflow Protocol flows were to prevail during the early-spring spawning season, shortnose sturgeon spawning habitat availability would be reduced, based on the instream flow study (Kleinschmidt, 2008a). Previous telemetry studies by South Carolina DNR found that some shortnose sturgeon from the landlocked population in Lake Marion did migrate into the Congaree River, but apparently did not reach the Saluda River (see appendix A-6 of the Saluda Settlement). A spawning site was documented in the Congaree River below Columbia (McCord, undated), but no shortnose sturgeon were reported in the lower Saluda River. SCE&G also conducted sampling for shortnose sturgeon in the lower Saluda River as part of its relicensing studies, but no sturgeon of any life stage were collected. Although the IFIM study indicates that sturgeon spawning habitat in the lower Saluda River would be reduced under the proposed project minimum flows, available information indicates that no sturgeon currently spawn in the lower Saluda River. The early spring months typically have among the highest stream flows of the year, and therefore would only result in occasional reductions in potential spawning habitat for shortnose sturgeon (were they to

enter the river during a Low Inflow Protocol). However, if that occurred, there nonetheless would be the potential to further adversely affect sturgeon spawning habitat at the lowest minimum flow releases.

The Sturgeon Program provided under the Saluda Settlement includes proposed studies to gather more information on the distribution of shortnose sturgeon (the telemetry study) and on the suitability and availability of habitat in the Congaree, Broad, and Saluda rivers (the habitat study). If these studies were to indicate that the lower Saluda River habitat is important to the Lake Marion/Congaree River shortnose sturgeon population, consultations could resume among the Commission, NMFS, South Carolina DNR, SCE&G, and other interested parties to address whether additional sturgeon protective measures are needed.

Table 6. IFIM study results for shortnose sturgeon, lower Saluda River (Source: Kleinschmidt, 2008a).

Study Reach	Range for 80% of max weighted usable area (WUA) (cfs)	% of max WUA at 700 cfs	% of max WUA at 1,000 cfs	% of max WUA at 2,700 cfs (Striped bass flows)	% of max WUA at 500 cfs (LIP)	% of max WUA at 400 cfs (LIP)
Shandon ^a	12,000-20,000	5	8	35	4	3
Reach 4	1,000-4,000	65	82	90	52	44
Ocean Boulevard	6,552-9,360	3	6	23	1	1
Oh Brother Rapids	4,256-9,576	0	0	31	0	0
Corley Is. Side Channel	700-2,800	85	97	84	72	59
Corley Is. Main Channel	NA	NA	NA	NA	NA	NA
Reach 2	1,800-6,000	55	66	100	44	33
Sandy Beach	3,000-14,000	4	10	90	2	1
Point Bar Run	3,000-6,000	17	22	91	12	8

Study Reach	Range for 80% of max weighted usable area (WUA) (cfs)	% of max WUA at 700 cfs	% of max WUA at 1,000 cfs	% of max WUA at 2,700 cfs (Striped bass flows)	% of max WUA at 500 cfs (LIP)	% of max WUA at 400 cfs (LIP)
Toenail Riffle ^b	NA	NA	NA	NA	NA	NA

^a Most downstream.

^b Most upstream.

Shortnose Sturgeon Recovery. The NMFS plan for the recovery and de-listing of the shortnose sturgeon (NMFS, 1998), was prepared by a recovery team composed of individuals from multiple agencies and organizations. The long-term recovery goal for the shortnose sturgeon is to recover all discrete population segments of shortnose sturgeon to levels of abundance where these segments would no longer require protection under the ESA. Within the overall goal of the Shortnose Sturgeon Recovery Plan, there are three objectives, in order of priority as follows: (1) establish listing criteria by conducting studies to determine the size of population segments, their minimum or essential habitat, and the maximum allowable mortality; (2) protect shortnose sturgeon populations by reducing the bycatch of shortnose sturgeon, determining the need for critical habitat designations, mitigate or eliminate adverse anthropogenic (human related) impacts on shortnose sturgeon populations, establish a public education program to increase awareness of shortnose sturgeon, and coordinate federal, state, and private recovery efforts; and (3) rehabilitate habitat and population segments by restoring habitat, developing a breeding and stocking program, reintroducing sturgeon to rivers where they have been extirpated, and assessing the need for augmentation.

In its letter commenting on the draft EA, NMFS recommends that we assess how the proposed measures and license requirements would affect shortnose sturgeon recovery efforts, including reproductive success, survival and recruitment rates, population size and trends, and utilization of habitat downstream of Saluda dam. We have described herein the available information on the shortnose sturgeon in the Santee River Basin. In addition, the Sturgeon Program (appendix A-6) would provide additional baseline information on shortnose sturgeon movements and habitat in the basin. As we have previously discussed, the proposed Saluda Project includes higher minimum flow releases into the lower Saluda River and further DO enhancements by replacement of turbine runners. These two measures would result in an overall improvement in aquatic habitat in the lower Saluda River, and should help to support any shortnose sturgeon recovery activities that may be implemented in the future by NMFS or other entities.

Introduced Trout Fishery. As we previously described, the lower Saluda River supports a popular trout fishery, made possible by the coldwater releases from the Saluda Dam and by the stocking of trout by South Carolina DNR.

In its letter commenting on the draft EA, NMFS recommends that we assess how the proposed measures and management strategies for the trout fishery would affect shortnose sturgeon health, survival, recovery, reproductive success, population size and trends, and use of habitat downstream of Saluda dam. As we previously discussed, studies conducted to date have not verified the presence of shortnose sturgeon in the lower Saluda River, although there is no barrier to prevent sturgeon from the Lake Marion population from entering the lower Saluda River. We describe above that the cool water temperature regime of the river would benefit shortnose sturgeon by providing coolwater refuge, and that the water temperatures are within the preferred range for the various shortnose sturgeon life history stages. Any interspecific competition between the stocked population of trout and the shortnose sturgeon would be primarily related to competition for foraging habitat and for food sources, as trout natural reproduction does not occur in the lower Saluda River (brown and rainbow trout are stocked in the lower Saluda River as a put, grow, and take fishery).

The potential that competition may occur between trout and any shortnose sturgeon found in the lower Saluda River would be low, for the following reasons. According to NMFS (1998), foraging juvenile and adult shortnose sturgeon may occupy only a few short reaches of river, often in deeper pool areas having a sand/silt substrate. Shortnose sturgeon are primarily bottom feeders, with prey including crustaceans, insect larvae, worms, and mollusks (NMFS, 1998). Brown and rainbow trout, however, may occur in a variety of habitat types, including pools, riffles, runs, and rapids, usually preferring areas with hard substrate (gravel, cobble, boulders) (Raleigh et al., 1984; 1986). Trout typically feed throughout the water column, with preferred food items including terrestrial and aquatic insects, fish, crustaceans, and zooplankton and insect larvae for juvenile trout. If shortnose sturgeon were to reside in the lower Saluda River in substantial numbers, there could be minor competition for food and space with the trout population (as there could be with other resident warmwater fish species in the lower Saluda River),²⁸ but habitat segregation would likely prevent this from becoming an adverse effect on the shortnose sturgeon. Shortnose sturgeon and trout would likely occupy different habitats within the lower Saluda River, based on their habitat preferences, although some overlap in habitat usage may occur. If some habitat overlap

²⁸ Resident warmwater species may in fact have a greater potential for interspecific competition with sturgeon because the population of resident warmwater species is likely larger than the stocked trout population, and several warmwater species (e.g., suckers, carp) have food habits and habitat preferences more similar to sturgeon than trout.

was to occur between trout and sturgeon, any competition for food would likely be insignificant, based on the different food habits and preferences described above. We, therefore, conclude that the introduced trout fishery would not be likely to adversely affect shortnose sturgeon.

Habitat Availability. NMFS comments that we should assess how continued project operation would affect shortnose sturgeon habitat (both historical habitat located upstream of the dam, and current habitat located downstream of the project). NMFS also recommends that this assessment address how land and water use practices are affecting this habitat, including an assessment of the effects on shortnose sturgeon health, survival, recovery, reproductive success, and population size and trends.

Based on the best available information on the historic and current shortnose sturgeon distribution and habitat in the Santee River Basin, the project likely did not inundate historic sturgeon habitat (see discussion below on fish passage). We previously addressed (see above) the potential effects of project flow releases, low DO levels, and coldwater releases on any shortnose sturgeon habitat that may occur in the lower Saluda River. As for other impacts related to land and water use practices, practices such as water withdrawals for industrial, agricultural and municipal uses, and land use practices related to agricultural and urban development have likely all contributed to adverse effects on shortnose sturgeon and other resident and anadromous species within the basin.

Fish Passage. No state or federal agency recommended fish passage at the Saluda Project, although both NMFS and Interior requested a reservation of authority to prescribe fishways under section 18 of the FPA. NMFS, however, does request in its April 26, 2010, filing, that we assess: (1) the effects of the Saluda Project dam²⁹ as a barrier to shortnose sturgeon migration to both historic and current habitat; (2) how providing passage over the dam would affect the shortnose sturgeon population; (3) what are possible ways to provide fish passage over the project dam; and (4) how any sturgeon passed over the dam would be affected by the presence of Lake Murray.

Based on the best available information on shortnose sturgeon occurrence in the Santee River Basin, the Saluda Project may be the approximate upstream limit of the historic sturgeon migration. We base this assumption on the recent information that shortnose sturgeon from the landlocked population in Lake Marion have only been tracked as far upstream as the Congaree River below Columbia and have not been reported in the Broad or Saluda rivers, to which they have free access. Columbia is also the location of the “fall line” where the river passes from the Piedmont Plateau to the Coastal Plain, and is the location of several rapids that could have been an impediment to

²⁹ The Saluda Project actually has two dams, and any potential fish passage measures would have to include measures for fish to pass both dams.

the upstream migration of sturgeon. There is no documented sturgeon habitat or use of that habitat in the Saluda River upstream of Saluda dam. Because of the presence of the Santee Cooper Project dams in the lower basin (constructed in the 1940s), and the lack of adequate fish passage facilities for sturgeon on those dams, very few sturgeon from the tidal lower Santee (or Cooper) River pass upstream over those dams (FERC, 2007). Until adequate passage is provided at the Santee Cooper dams, few sturgeon from the lower Santee and Cooper rivers tidal population would ever reach the lower Saluda River.

In 1998 and 1999, South Carolina DNR conducted a study to determine whether there was a reproducing population of shortnose sturgeon in the Santee Cooper lakes (Collins et al., 2003, cited by FERC, 2007). This study identified a spawning site well up the Congaree River but downstream of Columbia and estimated the shortnose sturgeon population at about 200 spawning adults. Any sturgeon that may enter the lower Saluda River on its spawning migration would be part of the Lake Marion population, which has existed in this part of the basin since the 1940s.

With regard to NMFS' request that we assess potential means for passing shortnose sturgeon upstream of Saluda dam, there are no fish passage designs or facilities that are known to be highly effective for the upstream passage of sturgeon (NMFS, 1998; FERC, 2007). Fish lifts on Atlantic coastal rivers, including the fish lift at the U.S. Army Corps of Engineers' St. Stephen station on the lower Santee River, sporadically pass shortnose sturgeon, but the numbers are small. For example, according to data provided by NMFS during the relicensing of the Santee Cooper Project, only two shortnose sturgeon have been recorded passing the St. Stephen fish lift during the past two decades (1987 to present) (FERC, 2007). Should shortnose sturgeon be passed into Lake Murray, there is the theoretical potential for shortnose sturgeon to establish another landlocked population, similar to the population that has persisted in the Santee Cooper Project lakes since the 1940s. However, no data on potential shortnose sturgeon habitat have been collected upstream of the Saluda dam as the Basin Accord has been targeting the collection of information about the shortnose sturgeon from the lower parts of the basin where they are currently known to occur.

Based on our analysis, we conclude that the lack of passage facilities at Saluda dam has no effect on shortnose sturgeon migrations, because shortnose sturgeon may not have historically migrated as far upstream as the present location of the Saluda dam, nor is there any available information to indicate the Lake Marion landlocked population or the tidal populations of shortnose sturgeon in the Santee and Cooper rivers currently migrate into the lower Saluda River and are blocked by the project dam.

Summary. We have addressed the potential effects of the continued operation of the Saluda Project on the shortnose sturgeon. We conclude that there would not be any adverse effects associated with the coldwater releases from Saluda dam because resulting water temperatures remain within the preferred range for many shortnose sturgeon life

stages, and the coolwater releases likely benefit shortnose sturgeon by providing coolwater refuge during the summer months. We also conclude that occasionally poor water quality (low DO levels) associated with project releases, and instances of operating the project under the lowest proposed minimum flows under the Low Inflow Protocol may adversely affect shortnose sturgeon spawning habitat. However, these low-flow events would typically not occur during the peak shortnose sturgeon spawning period (i.e., low flows from droughts are more likely to occur in the summer months, while shortnose sturgeon are known to typically be late-winter to early-spring spawners in southern rivers [NMFS, 1998]), and thus would reduce the likelihood of exposure of shortnose sturgeon to reduced spawning habitat. Other conclusions of our analysis are that: (1) continued project operations would benefit shortnose sturgeon recovery plans in the Santee River Basin by increasing minimum flow releases into the lower Saluda River compared to current minimum flows, and by enhancing DO levels in project releases via turbine improvements; (2) the existing trout fishery in the lower Saluda River does not likely adversely affect the shortnose sturgeon; and (3) although Saluda Project dams would be an obstruction to the upstream migration of any shortnose sturgeon that may enter the lower Saluda River, the lack of passage does not adversely affect shortnose sturgeon. In addition, if shortnose sturgeon were to be passed into Lake Murray it is difficult to ascertain what might occur, but there is the theoretical potential for the establishment of another landlocked population similar to what has occurred in Lake Marion. Overall, we conclude that continued project operations would be likely to adversely affect shortnose sturgeon based on the project's operational effects on their habitat. We are requesting formal consultation with NMFS under section 7 of the ESA.

Terrestrial Species

SCE&G, in consultation with FWS and South Carolina DNR conducted wood stork surveys in 2005 and 2006. These surveys did not find any evidence of wood stork nesting in the project boundary and it was agreed that further wood stork-focused surveys were unnecessary. However, because wood storks are known to forage in the project area, wood stork awareness may be warranted.

In the Saluda Settlement, SCE&G, as part of the T&E Program, proposes to: (1) implement the T&E Program; (2) coordinate annually with South Carolina DNR and FWS to determine whether resource agencies observed wood storks in the Lake Murray vicinity during routine bald eagle surveys; and (3) notify FWS and South Carolina DNR in the event that additional wood storks are sighted on Lake Murray.

All signatories to the Saluda Settlement, and other entities including Interior and South Carolina DNR, are in agreement with the proposed program.

Our Analysis

Although SCE&G did not observe any nesting wood storks during surveys in 2005 and 2006, it is possible that nesting wood storks could become established within the project boundary during the course of any new license. In addition, project-related recreation and operations and maintenance could disturb transient wood storks as they disperse through and forage in the project area. The proposed T&E Program, which includes implementing the proposed Rare, Threatened, and Endangered Species Public Awareness Program, would educate residents and visitors on wood stork identification and habitat requirements and provide the public with a mechanism to report any wood stork findings. This, in addition to the proposed agency communication and coordination, would allow SCE&G and the agencies to be aware of any increased wood stork activity in the project area. Overall, with the implementation of the proposed measures, the Saluda Project would not be likely to adversely affect the wood stork. FWS, in a letter filed on May 7, 2010, concurred with this finding.

3.3.5 Recreation, Land Use, and Aesthetics

3.3.5.1 Affected Environment

Regional Recreation Resources

Recreation resources in the region surrounding the project include Sumter National Forest, Dreher Island State Park, Sesquicentennial State Park, Harbison State Forest, and Congaree National Park. Of these parks, only Dreher Island State Park is within the project boundary. Numerous trails, game management sites, and state heritage preserves as well as several regional, county, municipal, and local parks, are also located in proximity to the project or provide access to project waters.

Sumter National Forest lies partially within Saluda and Newberry counties, but outside the project boundary. The forest provides a wildlife management area for hunting and campgrounds, hunt camps, picnic areas, boating sites, rifle ranges, swimming areas, and trails. Dreher Island State Park is a 348-acre park with campsites, cabins, trails, picnic area, playgrounds, boat access to Lake Murray, and a marina. Sesquicentennial State Park and Harbison State Forest are both located in the city of Columbia and provide several recreational opportunities. Congaree National Park, about 25 miles downstream of the project, is 26,000 acres of designated wilderness including the largest old-growth floodplain forest in North America. The park includes recreational opportunities such as a visitor center, a 2.4-mile boardwalk trail, more than 20 miles of backwoods hiking trails, canoeing, kayaking, fishing, primitive camping, bird watching, picnicking, and other recreational activities. The Congaree River Blue Trail, which passes along the Congaree National Park, is designated as a National Recreation Trail by Interior and extends 50 miles from Columbia to just upstream of the confluence of the Congaree and Wateree rivers.

Lake Murray supports an active recreational fishery and is an important boating resource. The lake is host to numerous fishing tournaments annually and is stocked with striped bass each spring. The lake supports substantial boating activity, which includes power boating, canoeing, kayaking, and sailing. In addition, the lake is used for special events such as the annual Lake Murray Poker Run and Independence Day celebrations.

The lower Saluda River extends about 10 miles from the outflow of the Saluda dam, including 8 miles within the project boundary, to its confluence with the Broad River to form the Congaree River near downtown Columbia. The lower Saluda River also supports an active recreational trout and striped bass fishery as well as offering a range of paddling experiences from flatwater to whitewater with class II to V rapids. Ten miles of the river from about 1 mile downstream of the dam to the confluence with the Broad River, is designated as a State Scenic River, while sections of both the lower Saluda River and the Congaree River are known to have exceptional natural or cultural values, as specified in the Nationwide Rivers Inventory by NPS.

Existing Project Recreation Facilities

Within the project boundary, there are about 130 public, commercial, and private recreation sites supporting boat launches, marinas, boat slips, wet and dry storage, campgrounds, picnic areas, beaches, fishing areas and piers, trails, playgrounds, and other facilities.

Under the current license, there are 17 existing developed formal recreation sites owned by SCE&G (figures 10 and 11) that function primarily as lake or river access by providing boat launches, shoreline angling, picnicking, and swimming areas, including 14 SCE&G-owned public access sites on Lake Murray, and 3 formal public access sites along the lower Saluda River (table 7). Collectively, existing recreation sites provide two designated swimming areas, 20 total boat launches including 17 hard-surface boat launches and three carry-in launches, 20 courtesy or fishing piers, and one campground. Restroom facilities are provided at nine of the 17 sites, picnic tables are provided at 12 sites, picnic shelters at 10 sites, and hiking trails are provided at 3 sites.

Also described in table 7, Kempson Bridge is the only recreation site of the 17 existing formal recreation sites on Lake Murray and the lower Saluda River with lands outside the project boundary. Kempson Bridge is about 1.03 acres with 0.98 acre inside and 0.05 acre outside the project boundary. All other SCE&G-owned, formal recreation sites are located inside the project boundary (SCE&G, 2009b, appendix B).

Of the existing formal recreation sites, SCE&G manages all except four. South Carolina Department of Parks, Recreation, and Tourism manages Dreher Island State Park; Lexington County Recreation and Aging Commission manages Larry L. Koon Boat Landing and James R. Metts Landing; and Irmo-Chapin Recreation Commission manages Saluda Shoals Park.

Table 7. Existing Saluda Project recreational sites (Source: SCE&G, 2009a, 2009b).

Name of Recreation Site	Type of Facility	Acres	Within or Outside of Existing Project Boundary
Lake Murray Existing Sites			
Park Site - Lexington Side	Picnic Area	17.9	Within
Larry L. Koon Boat Landing	Launch Ramp	1.8	Within
Shull Island	Launch Ramp	0.4	Within
Murray Shores	Launch Ramp	1.6	Within
River Bend	Launch Ramp	11.8	Within
Sunset	Launch Ramp	2.3	Within
Rocky Point	Launch Ramp	1.7	Within
Hilton	Launch Ramp	4.4	Within
Dam Site -Irmo Side	Picnic Area/ Launch Ramp	6.8	Within
Dreher Island State Recreation Area	Campground/ Launch Ramp	348	Within
Macedonia Church	Picnic Area	4.8	Within
Higgins Bridge	Launch Ramp	1.1	Within
Kempson Bridge	Launch Ramp	1.03	.05 outside/.98 within
Lake Murray Estates Park	Launch Ramp	7.2	Within
Lower Saluda River Existing Sites			
Saluda Shoals Park	Picnic Area	160	Within
James R. Metts Landing	Launch Ramp	2.3	Within
Gardendale	Launch Ramp	4.7	Within

There are also many informal sites within the project boundary, including Bundrick Island, which is currently used by boaters because there is no road access to the site. Other informal recreation sites (those classified as existing future recreation sites in the SMP shore classifications) are available for public use, but no facilities or amenities are currently provided at these sites (table 8). There are 62 islands on Lake Murray available for public recreational use, including for primitive camping. All existing and undeveloped recreation sites are located within the existing project boundary, with the exception of the Kempson Bridge boat ramp, a small portion of which is located outside of the existing project boundary.

Table 8. Existing future Saluda Project recreational sites (Source: SCE&G, 2009a, 2009b, appendix B).

Name of Recreation Site	Acres	Within or Outside of Existing Project Boundary
Shull Island	22.4	Within
Riverbend	9.8	Within
Simpson's Ferry	11.6	Within
Long Pine	31.4	Within
Hilton	27.9	Within
Water Treatment Plant	4.3	Within
Stone Mountain	26.5	Within
Cloud's Creek	3	Within
Big Creek	22.3	Within
Little Saluda Point	15.4	Within
Bundrick Island	87.9	Within

In addition to these sites, two areas are designated as special recreation areas: Two Bird Cove and Hurricane Hole Cove as required by the FERC Order issued June 23, 2004.³⁰ The two coves have unique and historical project recreation use that precedes any development in these areas, and as such are required under the Order to be designated as water-based only recreation areas and protected for overnight anchoring.

³⁰ *South Carolina Electric & Gas Company*, 107 FERC ¶ 62,273 at ordering paragraph I (2004).

Reservoir Access

There are 12 SCE&G-owned recreation facilities with boat ramps to access the Lake Murray reservoir. According to SCE&G, all of its public boat ramps on Lake Murray are accessible at an elevation of 343.5 feet. The ramps were extended during the 2003 drawdown for the Dam Remediation Project. In addition SCE&G states that most of the commercial and private boat launch ramps were also extended to be accessible at 343.5 feet during the drawdown that occurred in 2003.

In a 2005 survey conducted by the Lake Murray Homeowners Coalition and Lake Murray Watch, about 51 percent of Lake Murray users responded that an elevation of 352.5 feet was the minimum lake level needed for safe year-round lake use; 98 percent indicated that an elevation of 354.5 feet was the minimum lake level required for safe use of their private docks.

Future Recreation Use and Demand

SCE&G estimates that future recreation use of the existing recreation sites (including Bundrick Island) at the project could total almost 784,270 recreation days during the recreation season, April 1 through September 30 in 2030, based on future population projections (table 9). This would be an increase of about 165,000 recreation days (24 percent) over 2006 recreational use levels. Recreational use of Lake Murray public access sites could increase by roughly 110,000 recreation days by 2030; while use of the lower Saluda River access sites (including Mill Race sites – outside the project boundary) could increase by about 55,000 recreation days. Applying current outdoor recreation trends and existing public recreation facilities, fishing would likely continue to be the dominant activity at the project.

Table 9. Estimated future recreation days from existing recreation sites (Source: SCE&G, 2009a).

Use Estimate (2006)		Estimated Future Use				
		2010	2015	2020	2025	2030
Population Growth Rates		4.87%	4.62%	4.37%	4.19%	3.68%
Lake Murray Sites	462,530	485,060	507,460	529,640	551,830	572,140
Lower Saluda River Sites	171,490	179,840	188,150	196,370	204,600	212,130
Mill Race Sites ^a	60,930	63,900	66,850	69,770	72,690	75,370
Total	694,950	728,800	762,460	795,780	829,120	859,640

^a Outside the project boundary. Mill Race sites are located about 9 miles downstream from Saluda dam.

SCE&G estimated the capacities of existing recreation sites around the lake and on the lower Saluda River during the 2006 recreation season. All existing recreation sites at the project were well used with several sites reportedly being used at their design capacity, particularly on weekends and holidays. Recreation sites are estimated to be used within their design capacities when parking areas are less than 75 percent full on weekends, approaching capacity when parking areas are between 75 and 99 percent full on weekends, and exceeding capacity when parking areas are greater than 99 percent full on weekends.

Results suggested that Dam Site - Irmo Side, Park Site - Lexington Side, Rocky Point, and Dreher Island State Recreation Area on Lake Murray are consistently used within their design capacities, regardless of day type (weekend, weekday or holiday), and could accommodate additional use. Three sites, River Bend, Higgins Bridge, and Kempson Bridge, are currently used at rates approaching capacity, although this trend was only observed on holidays for River Bend and Kempson Bridge.

The remaining seven existing recreation sites were observed to be used at rates that regularly meet or exceed the design capacities on some or all day types. Larry L. Koon Boat Landing and Shull Island are used beyond their capacities, regardless of day type. Lake Murray Estates Park is used at rates that exceed its capacity on weekends, and use exceeds capacity on weekends and holidays at Sunset and Hilton. Capacity is exceeded on holidays at Murray Shores but this site is consistently used within its design capacity on weekdays and weekends. Use at Macedonia Church is considered to exceed design capacity on weekdays and weekends.

Land Use and Management

Land uses for the project area consist of residential, commercial, recreation, and conservation uses. Richland and Lexington counties are among the most densely populated counties in the state. Lake Murray provides a primary source for recreation to the surrounding communities, because of its proximity to the city of Columbia and surrounding metropolitan area. Lake Murray consists of numerous peninsulas, inlets, and islands, most of which are developed or forested.

The eastern shoreline of Lake Murray is sporadically tree-covered and interspersed with extensive development, ranging from individual private docks and large houses to marinas, landings, and park sites. A few large forested islands are located in the main body of the reservoir. The western portion of the lake branches out into narrow arms that extend up into many drainage ways and creeks. Overall, the western shoreline contains less intensive development and more trees and vegetation than the main body of the lake. Much of the development in this area includes individual private boat docks and small houses. Typically, the upper ends of the coves in this area are narrow, undeveloped, and heavily vegetated.

Along the western section of Lake Murray, about 6,000 acres of land is leased to South Carolina DNR as part of the statewide Wildlife Management Areas Program, which provides waterfowl hunting opportunities to the general public. In addition, bird watching at Lunch Island (also known as Bomb Island) is popular because the island hosts one of the largest documented roosting colonies of purple martins in the country. Also, picnicking, sightseeing, and camping are supported at a variety of sites, both informally and at designated locations such as Dreher Island State Park.

The project area includes lands owned by SCE&G, as well as private and commercially owned lands. There are no federal lands within the project boundary; however, the Congaree National Park is located about 25 miles downstream of the project boundary. SCE&G leases lands to the state of South Carolina for wildlife management areas and Dreher Island State Park.

Shoreline Management and Permitting

The existing Shoreline Management Program identifies major land uses and the location of environmentally sensitive areas, and is designed to provide strategies for the managing and permitting of shoreline activities and facilities within the project boundary. SCE&G developed an SMP in 1975, and has updated the plan on a 5 year cycle in consultation with federal, state, and local agencies. The most recent plan was submitted to the Commission on February 1, 2000, was approved by the Commission with modifications on June 23, 2004 (107 FERC ¶ 62,273), and further clarified and modified on October 28, 2004 (109 FERC ¶ 61,083).

The SMP's permitting policy requires an applicant to obtain a permit from SCE&G prior to beginning any shoreline construction or activity, including boat docks, ramps, marine railways, boat lifts, water withdrawals, riprap, shoreline vegetation removal, and retaining walls. Under the existing plan, project lands fall into one of five use classifications: (1) easement; (2) recreation; (3) project operation; (4) forest and game management; and (5) future private development. Each classification is subject to specified land use controls, such as minimum construction setbacks, buffer zones, restrictions on clearing, and maintenance of wildlife habitat. The existing SMP designates a sub-classification for environmentally sensitive areas within the future private development classification.

Aesthetics

The Saluda Project is located in an area of low rolling hills between 300 and 1,000 feet above sea level. The lake is characterized by irregularly shaped peninsulas and numerous inlets and islands, most of which are heavily forested. Parkland, protected lands, and 75-foot setbacks around the lakes provide a natural buffer between the project waters and developments. The light to moderate tree covered shoreline and the lake's forested islands dominate most distant views across the open water and soften the

contrasting shoreline development. The project's dam and intake towers are visible from the main body of the lake. The area downstream of the project dam is not visible from Highway 6; however, views of the open water and project intake structures, as well as the city skyline, are prominent on clear days.

3.3.5.2 Environmental Effects

Reservoir Elevations

SCE&G's proposed guide curve and the alternative trigger for implementation of the low flow protocol are described in detail in section 3.3.1, *Water Resources*.

South Carolina DNR states concerns that winter drawdowns at Lake Murray would adversely affect wintering waterfowl and waterfowl hunting/observing opportunities and that maintaining higher water levels through January could enhance these opportunities.

Our Analysis

SCE&G's proposed reservoir elevations would increase Lake Murray reservoir levels, as compared to existing operations. All SCE&G-owned public boat ramps, as well as some private and commercial ramps were extended in 2003 to be usable at 343.5 feet, and therefore all of these proposed public boat ramps would be accessible under the proposed action. The increase in elevation would also provide for enhanced access of private residential docks, with about 51 percent being accessible at 352.5 feet.

The proposed winter drawdown would result in increased elevations during the winter period of up to 4 feet as compared to the drawdowns that could occur under the existing conditions. This would provide for enhanced waterfowl hunting opportunities during this period as compared to existing conditions. In addition, SCE&G's proposed measures include reclassification of project shoreline lands for resource protection (see section below *Shoreline Management Plan*) and protection of wildlife habitat (see section 3.3.3, *Terrestrial Resources*).

The proposed winter drawdown would be for maintenance and for the purposes of water quality maintenance, sediment transport, and aquatic vegetation management. As proposed, this drawdown would only occur every third year and would allow opportunities for dock maintenance, shoreline stabilization, excavations, and other lake user maintenance activities.

As further described in section 3.3.1, *Water Resources*, the reservoir level difference between the 1-foot SCE&G-proposed trigger and the 2-foot South Carolina DNR recommended trigger is less than 1 foot; however, the 1-foot trigger would result in about 3 percent higher reservoir levels in September through February, and 5 percent

higher reservoir levels from March through August than the 2-foot trigger (see table 4). All trigger flows would potentially keep the reservoir elevation high enough to maintain recreational uses; however, both the 1- and 2-foot triggers would enhance recreation resources because of higher reservoir levels and enhanced downstream flows, as compared to existing conditions, which would improve flows for both boaters and anglers in the lower Saluda River. The 1- and 2-foot triggers would provide greater flows to the lower Saluda River during low inflow conditions in comparison to the flows released under normal operations, thus providing enhanced boating and fishing flows downstream during low flow conditions.

Interior's recommended 4-foot trigger would maintain flows in the lower Saluda River during low flow conditions; however, this would decrease the elevation of the reservoir, which would adversely affect boating and the use of boat ramps on the reservoir. In severe drought conditions, Lake Murray reservoir levels would be 1.5 to 2.5 feet lower than the reservoir levels at the proposed 1- or 2-foot trigger, which would have greater effects on reservoir recreation.

Recreation Plan and Management

As part of the Saluda Settlement, SCE&G proposes to implement the proposed Recreation Plan. As part of relicensing proceedings, SCE&G formed the Recreation Resource Conservation Group to discuss and resolve recreation-related issues associated with the project's relicensing, including input on the development of the proposed Recreation Plan. The Recreation Plan proposes specific recreation enhancements, an implementation schedule, and future consultation schedule, as well as recreational flow releases, swift water training flow releases, and the recreational warning system on the lower Saluda River.

SCE&G proposes to assess recreation use levels, site capacities, and needs every 10 years using the FERC Form 80 Recreation Report. The Recreation Resource Conservation Group members would review the results of this periodic assessment, in light of proposed improvements implemented to date, and make appropriate recommendations for the following 10-year period to account for changing needs.

During year 9 of the current 10-year period (i.e., 9 years after license issuance, 19 years after license issuance, etc.), SCE&G would host a public meeting with interested stakeholders to review recreational use and capacity from the most recent FERC Form 80 Recreation Report to make recommendations for the following 10 years, and receive comments from stakeholders on what improvements need to be considered. Within 30 days of this meeting, SCE&G would provide a draft copy of the 10-year plan to meeting participants and ask for written comments within a 30-day comment period. Upon receipt of these written comments, SCE&G would file a Recreation Plan Addenda with the Commission. The final addendum would include any comments or edits provided by

the stakeholders, as appropriate, as well as a consultation record and table of responses to stakeholder comments.

Our Analysis

SCE&G's proposed Recreation Plan provides measures for future monitoring of recreational demand and use at the project and coordination with resource agencies and other associated groups to ensure the proposed measures are consistent with the measures agreed to under the Saluda Settlement. SCE&G would coordinate specifically with the Recreation Resource Conservation Group for review of recreation use levels, site capacities, and needs and establish recommendations for studies or improvements, as found necessary.

Because increased recreational use is anticipated in the future, the proposed Recreation Plan would provide the means for future monitoring and assessment to help ensure that project-related recreational facilities are meeting future recreational demand at the project, and as such, would help ensure public access to project waters is adequately maintained over the term of a new license. The proposed Recreation Plan also would have positive effects on future land use and management by guiding the recreation improvement process through specifying approved enhancements and upgrades, providing implementation and completion dates, and providing measures for coordinating with agencies and other affiliated agencies in project lands management.

Minimum Flows, Recreation Flows, and Training Flows

Flow releases directly affect the amount of water in the lower Saluda River, which could affect recreation opportunities, such as whitewater boating, angling, and other types of recreation occurring in the lower Saluda River.

SCE&G proposes to release a minimum flow of 700 cfs from January 1 through March 31, and June 1 – December 31, between 2,500 cfs and 8,000 cfs from April 1 – May 10 for the striped bass flow regime, and 1,000 cfs from May 11-May 31. During Low Inflow Protocol, SCE&G proposes to maintain a target flow of 500 cfs with a minimum flow of 400 cfs, as described in section 3.3.1, *Water Resources*.

As part of its Recreation Plan, SCE&G proposes to release about 45,000 acre-feet of water per year on no more than 51 days for recreational flows in the lower Saluda River (table 10). Prior to establishing recreational flow releases agreed to in the Settlement, SCE&G consulted with several groups, including Lower Saluda Scenic River Advisory Council, South Carolina DNR, South Carolina Parks and Recreation, American Whitewater, Trout Unlimited, Coastal Conservation League, American Rivers, and the City of Columbia Parks and Recreation Department which requested flows to support small boat navigation, swimming, wade and boat fishing, whitewater boating, and special events.

Table 10. Proposed lower Saluda River recreational flow releases (Source: SCE&G, 2009a).

Month	Event	No. of Days	Hours/Day	cfs	Acre-Feet
January	Iceman Race	1	6	4,000	1,636
	Wade Fishing (Sat. or Sun.)	4	5	700	0
	MLK Day	1	5	700	0
February	Wade Fishing (Sat. or Sun.)	4	5	700	0
	President's Day	1	5	700	0
March	Whitewater (WW) Festival	1	6	8,650	3,941
	WW Festival	1	3	3,300	644
	Wade Fishing (Sat. or Sun.)	4	5	700	0
April	General Recreation (Sat & Sun)	2	5	1,000	0
May	Canoeing for Kids	1	9	10,000	6,470
	Wade Fishing	1	9	700	
	Memorial Day	1	9	1,000	0
June	Rescue Rodeo	2	9	2,111	2,099
	Wade Fishing (Sat. or Sun.)	4	9	700	
July	WW Rodeo	2	8	3,300	3,437
	Wade Fishing (Sat. or Sun.)	2	9	700	
	Independence Day	1	9	1,000	223
August	USTWWR Practice	2	8	10,000	12,295
	Wade Fishing (Sat. or Sun.)	2	9	700	
September	High Boating (Sat. & Sun.)	2	6	4,500	3,768
	Labor Day	1	9	1,000	223
October	Canoeing for Kids	1	7	2,400	983
	High Boating (Sat. & Sun.)	2	6	4,500	3,768
November	Low Boating (Sat.)	1	6	2,400	843
	High Boating (Sun.)	1	6	4,500	1,884
December	Low Boating (Sat.)	1	6	2,400	843

Month	Event	No. of Days	Hours/Day	cfs	Acre-Feet
	High Boating (Sun.)	1	6	4,500	1,884
	Wade Fishing (Sat. or Sun.)	4	5	700	0
Total		51			44,941

SCE&G proposes to host an annual meeting during October each year to review the previous year's flow schedule, set the specific dates for the following year's flow schedule (with the understanding that the volume of water and number of days would remain consistent from year to year, even if the schedule varies), and discuss any outstanding issues with appropriate stakeholders. Further, a determination would be made as to the allocation of recreational flows for the upcoming recreational season in the event the Low Inflow Protocol is implemented. SCE&G also proposes to host triennial meetings for comprehensive reviews of the recreation flow schedule for the purpose of reviewing recreation trends and other factors.

In addition to the recreational releases described above, SCE&G proposes to provide the Columbia Fire Department with flow releases to allow them to train for swift water rescue on the lower Saluda River. Each year, SCE&G proposes to release about 45,000 acre-feet of water to be used at the discretion of the Columbia Fire Department for safety training during a period of up to eleven 8-hour days in December. In March each year, SCE&G proposes to notify and coordinate with the Columbia Fire Department to assist them in taking advantage of lake level management flow releases for swift water training, specifically when the lower Saluda River can accommodate a flow of at least 10,000 cfs. SCE&G proposes to meet with the Columbia Fire Department to coordinate the dates and flow regimes that would be made available, and confirm in advance of swift water training flow releases. In case of Low Inflow Protocol conditions, SCE&G proposes to coordinate and notify the Columbia Fire Department on the reduction or elimination of swift water training flow releases.

Trout Unlimited does not support any recreational flows because the organization states that flows should only be based on the needs of water quality and fisheries and provided in a manner that is safe for the public. Trout Unlimited states that recreational releases would not be needed at all if releases were announced to the public at least 12 hours in advance to allow for trip planning.

Interior supports SCE&G's proposed flows; however, it recommends consultation with NPS, as part of the adaptive management plan, and recommends that SCE&G assist in funding a long-term water level monitoring program, in coordination with USGS to determine the effects of altered flow regimes within the Congaree National Park. We

address the recommendation for additional water level monitoring in section 3.3.1, *Water Resources* and conclude that the continuing use of the existing gages would be sufficient to record any water level changes associated with the proposed operational changes for the Saluda Project. All other Settlement parties support the proposed recreation flows as well as the provision of swift water rescue flow releases.

Our Analysis

SCE&G's proposed minimum flow releases, including those for striped bass flows, recreational flow releases, and swift water rescue training, could affect recreation, land use, and aesthetic resources within and downstream from the project boundary.

The range of flows during the striped bass flow regime increases the volume of water released to the lower Saluda River, as compared to previous minimum flow operation schedules. These increased flows could potentially benefit recreation resources downstream by providing more flows for fishing.

Under the current license, SCE&G provides no additional recreation-specific flows. SCE&G's proposed recreational flow releases would enhance boating, angling, and general recreational opportunities as compared to existing conditions, specifically by providing additional flows to accommodate particular events. Multi-day recreational events require planning, in which a 12-hour, advanced notice, as suggested by Trout Unlimited would not provide sufficient time to accommodate these multi-day events. SCE&G's proposal to meet annually, in consultation with associated groups, to assess the previous year's recreational flow releases would provide opportunities for continued assessment and adjustment as needed for the provision of recreational flows in the lower Saluda River over the term of a new license.

In addition to the recreational flow releases, SCE&G's proposal to release flows for swift water rescue training on up to eleven 8-hour days would benefit the Columbia Fire Department and the overall public safety of recreational users. Flow releases would ensure that the fire department has an opportunity to train for emergency situations on the lower Saluda River.

Recreational Facility Enhancements

As part of the proposed Recreation Plan, SCE&G proposes to upgrade and improve existing recreational facilities and construct new recreational facilities within the first 5 years of license issuance, unless otherwise noted below. The proposed recreational enhancements at existing facilities on Lake Murray and the lower Saluda River are as follows.

Larry L. Koon Boat Landing

- Evaluate alternatives to increase parking capacity (such as overflow parking).
- Identify substitute sites through education (web site, maps, etc.).
- Pave an accessible path from the parking lot to the restroom facilities.
- Widen the existing driveway to eliminate the “trailer drop” into the drainage ditch.

Shull Island

- Add two accessible picnic tables (including an accessible path, as necessary).

Murray Shores

- Install additional directional signs to the site (working with Lexington and/or Saluda counties).
- Refurbish the existing courtesy dock to be accessible (including an accessible path, as necessary).
- Stripe the existing parking lot.
- Install additional lighting.
- Construct accessible restroom facilities (including an accessible path, as necessary), depending on availability of a sewer connection. If a sewer connection is not available at the scheduled time of construction, SCE&G would install an accessible vault-type restroom facility.

River Bend

- Refurbish the existing fishing pier to be accessible (including an accessible path, as necessary).
- Refurbish the existing courtesy dock for to be accessible (including an accessible path, as necessary).
- Pave and stripe the existing overflow parking area (implementation scheduled for years 6-10).

Sunset

- Refurbish the existing fishing pier to be accessible (including an accessible path, as necessary).
- Refurbish the existing courtesy dock to be accessible (including an accessible path, as necessary).

- Pave and stripe existing parking area.
- Construct accessible restroom facilities (including an accessible path, as necessary), depending on availability of a sewer connection. If a sewer connection is not available at the scheduled time of construction, SCE&G would install an accessible vault-type restroom facility.
- Install stabilization material on the sides of the existing boat ramp to eliminate drop-off conditions.
- Construct an additional accessible paved parking lot (implementation scheduled for years 6-10).

Hilton

- Refurbish the existing courtesy dock to be accessible (including an accessible path, as necessary).
- Construct accessible restroom facilities (including an accessible path, as necessary), depending on availability of a sewer connection. If a sewer connection is not available at the scheduled time of construction, SCE&G would install an accessible vault-type restroom facility.
- Install additional lighting.
- Construct an accessible fishing pier (including an accessible path, as necessary) (implementation scheduled for years 6-10).

Dam Site (Irmo-side)

- Construct an accessible courtesy dock (including an accessible path, as necessary).
- Refurbish the existing fishing pier to be accessible (including an accessible path, as necessary).
- Pave an accessible path to the existing restroom facilities.

Higgins Bridge

- Add two accessible picnic tables (including an accessible path, as necessary).

Kempson Bridge

- Install an accessible vault-type restroom facility (including an accessible path, as necessary).
- Add two accessible picnic tables (including an accessible path, as necessary).

Lake Murray Estates Park

- Install additional directional signs to the site (working with Saluda County);
- Construct accessible restroom facilities (including an accessible path, as necessary), depending on availability of a sewer connection. If a sewer connection is not available at the scheduled time of construction, SCE&G would install an accessible vault-type restroom facility.
- Pave and stripe the existing parking area.
- Pave an accessible path from the parking lot to the existing fishing pier.

James R. Metts Landing

- Add two accessible picnic tables (including an accessible path, as necessary).
- Construct a bank fishing area (implementation scheduled for years 6-10).

SCE&G proposes to operate and maintain the existing recreation sites, except for Larry L. Koon Boat Landing and the James R. Metts Landing where the facilities would continue to be leased to the Lexington County Recreation Aging Commission. SCE&G also proposes to explore lease opportunities for the existing Gardendale recreation site with the Irmo-Chapin Recreation Commission.

SCE&G also proposes expansion measures within 5 years of license issuance, unless otherwise noted, at the following future development sites:

Cloud's Creek

- Construct a gravel parking lot for about 8 to 10 vehicles.
- Construct a carry-in launch.
- Install directional signs to the site (working with Saluda County).

Little Saluda Point (implementation scheduled for years 6-10)

- Construct two accessible fishing piers (including an accessible path, as necessary).
- Install shoreline stabilization materials as necessary.

Old Corley Bridge Road

- Construct a gravel parking lot for about 8 to 10 vehicles.
- Construct a carry-in launch.
- Install directional signs to the site (working with Saluda County).

In addition to the above proposed improvements, SCE&G also proposes to set aside additional project lands for future recreational development at Lake Murray and along the lower Saluda River (table 11). SCE&G proposes to operate and maintain these future development sites: Cloud's Creek, Little Saluda Point, and Old Corley Bridge Road; SCE&G proposes to explore lease opportunities for Twelve Mile Creek with the Lexington County Recreation and Aging Commission, and Candi Lane with the city of Columbia. Also, SCE&G proposes to revise the existing project boundary to incorporate the property currently outside of the existing project boundary for all recreation sites, including existing, existing future, and proposed future.

Table 11. Proposed future recreational sites (Source: SCE&G, 2009a; 2009b).

Site Name	Existing Future (Acreage)	Proposed Future (Acreage)	Within or Outside of Existing Project Boundary
Lake Murray			
Shull Island	22.4		Within
Riverbend	9.8	5.9	Within
Sunset		31.6	9.6 acres within/ 22 acres outside
Simpson's Ferry	11.6		Within
Long Pine	31.4	20	31.4 acres within/ 20 acres future outside
Hilton	27.9		Within
Water Treatment Plant	4.3		Within
Stone Mountain	26.5		Within
Cloud's Creek	3		Within
Big Creek	22.3	15	22.3 acres within/ 15 acres future outside
Little Saluda Point	15.4	14.2	Within
Bundrick Island	87.9		Within
Old Corley Bridge Road		2	Outside
Shealy Point Tract		40.1	36.9 acres within/ 3.2 acres outside

Site Name	Existing Future (Acreage)	Proposed Future (Acreage)	Within or Outside of Existing Project Boundary
Shealy Road Access Area		27.6	15.6 acres within/ 12 acres outside
Rocky Creek		648	102 acres within/ 543 acres outside
Little River/ Harmon's Bridge		3.7	.9 acres within/ 2.8 acres outside
Crayne's Bridge Public Park		47.9	9.9 acres within/ 38 acres outside
Lower Saluda River			
Twelve Mile Creek		52	Within
Candi Lane		3.1	Outside
Lower Saluda River		275.14	Within

The Congaree Riverkeeper stated that SCE&G should better define the language used in its proposed Recreation Plan as related to the use and management of the proposed future recreation sites on the lower Saluda River to show more commitment to establishing these future recreation sites.

American Whitewater commented on the draft EA that improvements to the Candi Lane take out should be addressed soon because there is currently no safe exit from the lower Saluda River.

Our Analysis

SCE&G's proposed enhancements to existing facilities would provide significantly increased accessibility to the project's existing recreation resources. The accessible paths would provide enhanced public access to parking, restrooms, picnicking, and other recreational features. The accessible fishing pier upgrades at several sites would provide increased access, and use of fishing opportunities that were not previously available. Other upgrades to improve accessibility would allow for enhanced use of individual recreation sites. Increased parking capacity and general improvements to parking lots would encourage more efficient parking patterns, and potentially accommodate additional vehicles to meet recreation demand. Increased lighting at facilities would improve the public safety and facility security.

SCE&G's proposal to explore leasing options for specific recreation sites would be sufficient; however, SCE&G ultimately would be responsible for the provision and maintenance of any project recreation facilities over the term of a new license.

SCE&G's proposal to set aside lands for future recreational use, including the development of formal facilities at three existing areas set aside for future use, would accommodate future recreational demand and use and ensure additional public access. The proposed future recreation sites would be adequate to meet existing recreational demand as currently projected. The Recreation Plan provides measures for the future monitoring of recreational demand and use, which would provide the mechanism to help ensure that future project-related recreational facilities and access are provided over the term of a new license. The plan should ensure that future recreation sites are developed if needed, which was a concern of the Riverkeeper.

Inclusion of the existing recreation sites, as proposed by SCE&G, such as Kempson Bridge, which provides docks and reservoir access, and is the only existing site located partially outside the project boundary, would ensure maintenance of the boat ramp, docks, public access to the project reservoir, and any other project facilities throughout the term of the new license. Additionally, inclusion of future recreation sites at the time of development of those sites, as proposed by SCE&G, would ensure proper ownership and maintenance of each site, and ensure the maintenance of adequate public access to the project area throughout the term of the new license. All recreation sites that are owned by SCE&G that provide access to the project lands and waters should be included in the project boundary.

With regard to expediting improvements at Candi Lane, there is no evidence that the improvements are imminently needed at Candi Lane; therefore, Candi Lane would remain an informal access site. If future conditions warrant, improvements could be made at Candi Lane.

The recreational enhancements proposed by SCE&G could potentially affect the land use and aesthetic resources in the vicinity of the project. Construction of new amenities could alter the land use, while also affecting aesthetics temporarily as a result of construction-related closures and increased traffic during construction. However, these construction-related effects on aesthetics would be minor and short-term.

Public Safety and Recreational Warning System

As part of the Recreation Plan, SCE&G proposes to continue with Phase 2 and 3 of the planned installation of the warning system along the lower Saluda River. SCE&G proposes to install strobe lights (Phase 2) within 1 year of license issuance, and install additional sirens (Phase 3) within 2 years after the installation of Phase 2 is complete.

SCE&G also proposes to continue managing an electronic ring-down call system that is activated by the system dispatchers upon initiation of significant generation at the project dam. Upon activation, a message is sent to registered individuals via e-mail and telephone, alerting them to the initiation of generation. SCE&G also provides access to a navigational aids marking form via the company website, for reporting unmarked hazards to South Carolina DNR and SCE&G.

SCE&G supports other safety programs, as defined in the Project Safety and Public Outreach Program, referenced in the Saluda Settlement as an off-license measure.³¹ SCE&G currently participates in other existing safety initiatives including the warning system, emergency action plan, the public safety plan, swift water rescue training, updated evacuation routes, safe boating checklists, updating generation information on the website, color coded river level markers,³² and public education and outreach programs, and it partners and supports other federal, state, and local agencies to enhance the safety of public users. SCE&G also proposes to meet with the safety resource conservation group periodically after relicensing to address and review issues related to public safety at the project. SCE&G does not propose to implement ramping rates to address public safety citing constraints on the ability of the project to operate as a reserve generation facility for the region.

Interior and South Carolina DNR are specifically in support of the recreation warning system, as included in the Saluda Settlement, to address and discuss safety issues in coordination with SCE&G at scheduled meetings. South Carolina DNR indicates that it supports SCE&G's Project Safety and Outreach Program as an off-license measure because components of the plan are subject to change over time. American Whitewater supports the decision of the safety committee to continue to work on safety issues and expand the warning system for recreational visitors.

Several groups, including Trout Unlimited as noted under the discussion of recreational boating flows, also expressed concern about public safety, specifically in the lower Saluda River, as related to variable flows. These letters expressed support for the public safety and outreach program and the recreational warning system but also made additional recommendations to enhance public safety. These included increased public access along the lower Saluda River, and a warning system that better defined the volume

³¹ An off-license measure or agreement is one that parties agree not to request as a license condition. The Saluda Settlement includes four such measures (the Safety and Outreach Program, the Shoreline Management Handbook and Permitting Guidelines, the lease of additional land outside the project boundary to South Carolina DNR for inclusion in the Wildlife Area Management Program and support for an application for Low Impact Hydro Institute Certification).

³² The color markers on these poles indicate the flow levels in the river.

of water being released if advanced schedules are not provided. The Congaree Riverkeeper specifically requested that FERC should require more definite obligations for moderation of flows to protect public safety, as well as do more to reduce downstream flow fluctuations caused by unscheduled releases. Trout Unlimited also recommended implementation of ramping rates to ensure that recreationists had enough time to exit the lower Saluda River.

Our Analysis

SCE&G's proposal to install additional warning sirens and strobe lights to the existing warning system, to continue the existing warning call system, as well as to provide means to report hazards, enhances the continuing efforts to protect public safety. Additionally the Warning Siren Enhancement Plan (appendix A-1 in the Saluda Settlement), provides for consultation with the safety resource conservation group throughout the implementation and installation process.

The Congaree Riverkeeper and Trout Unlimited express concern that more should be done to address public safety issues on the lower Saluda River. Recognizing that the reserve generation purpose of the project does result in rapid rises in water levels in the lower Saluda River, SCE&G provides multiple venues for notifying the recreational users of upcoming flow releases or changes in reservoir elevation, as well as sirens and strobe lights at multiple locations for notifying users of immediate changes in water levels. Sirens that provide 15 minutes of warning would provide adequate time to get out of the river to avoid rising water levels. We find that the proposed measures to protect public safety would be adequate.

Shoreline Management Plan

SCE&G proposes to implement a revised SMP. The plan includes land management classifications and prescriptions, procedures and policies for the approval of new shoreline facilities and activities, methods of enforcement, best management practices, a public education and outreach program, and a monitoring and review process.

As part of the proposed SMP, SCE&G would reclassify some of the land management classifications (table 12). Land management classifications identified in the plan include: Forest Management, Public Recreation, Natural Areas, Project Operations, and Multi-purpose, where Multi-purpose is further divided into: 75' Buffer Zone, commercial, easement, and Future Development. Forest Management lands have been set aside for compatible recreation, scenic, aesthetic, and timber management purposes, and managed according to the South Carolina Forestry Commission's Best Management Practices. Public Recreation lands include lands such as State parks, public beaches, and islands that are owned by SCE&G. Natural areas are those areas that warrant special protection because they provide important habitat for various wildlife species, including

the recreational fishery. Lastly, lands reserved for project operations are those lands that are specifically required for operation of the Saluda Project.

Table 12. Proposed SMP land management classification changes (Source: SCE&G, 2009a).

Classification	Existing Shoreline Miles	Acreage	Proposed Shoreline Miles	Acreage
Public Recreation	38	764	47.0	955.2
Forest Management	100	3,570	109.6	3,776.4
Natural Areas	2	42	22.6	506.2
Project Operations			1.6	1,057.6
Multi-Purpose			474.7	9,583.4
75 foot Buffer Zone			29.9	263.8
Commercial			6.1	114.3
Easement ^a			387.6	8,247.2
Future Development	91	1,818	51.1	958.12
Total			655.5	15,878.8

^a Easement property values include mileage and acres associated with causeways.

Also, as part of the proposed SMP, SCE&G proposes to reclassify 1.5 miles of shoreline (including 36.8 acres of property inside the project boundary) surrounding Hurricane Hole Cove from Future Development to Recreation. SCE&G also proposes to reclassify 1.2 miles of shoreline (including 23 acres of property inside the project boundary) surrounding Two Bird Cove from Future Development to Forest Management.

The SMP provides descriptions of specific allowable uses under the various land management classifications. Under the multi-use classification, SCE&G proposes to allow up to 80 multi-slip facilities after approval by SCE&G prior to implementation, but requests that no approval would be necessary from the Commission for such facilities. SCE&G states that for commercial facilities, any proposed multi-slip facility 10 slips or greater would require Commission review and approval prior to implementation.

SCE&G proposes a 10-year review period for the SMP, which it states would allow it to assess new issues that arise as a result of development around the lake, and would allow for the analysis of cumulative effects.

In addition to the SMP, SCE&G proposes to implement a Woody Debris Plan, a Buffer Plan, and a Sediment and Erosion Management Plan. The Woody Debris Plan would provide management options for woody debris, including trees, logs, and stumps to minimize potential navigational and safety hazards. A Buffer Zone Management Plan would establish guidelines for maintaining a stable shoreline where vegetation currently exists, and can be maintained in the future. The proposed Sediment and Erosion Control Plan would provide management guidelines for improving or mitigating for erosion issues at existing and future recreation areas including SCE&G-owned islands.

Also SCE&G developed, in consultation with stakeholders and agencies, the Lake Murray Shoreline Management Handbook and Permitting Guidelines (permitting handbook) to address certain activities that require permits and consultation with SCE&G prior to instigating activities. These activities include excavation; construction, maintenance, and placement of docks, boatlifts, boat ramps, and shoreline stabilization; limited brushing; and other shoreline activities. SCE&G would reconvene with stakeholders and agencies on a yearly basis to review the permitting handbook and guidelines to address any issues. The permitting handbook was submitted with the Saluda Settlement as an off-license measure.

Both South Carolina DNR and Interior recommend and support the SMP, as included in the Saluda Settlement, including the Woody Debris Plan, the Buffer Plan, and the Sediment and Erosion Management Plan. Advanced Land and Timber, LLC, filed a comment letter about the rigid regulations of the SMP, and suggests implementing less stringent measures. Several landowners surrounding Two Bird Cove and Hurricane Hole expressed opposition to the proposed reclassification.

Coleman Parks, representative of Advanced Land and Timber, LLC, and Beth Trump, agent for Cloud's Creek Properties, LLC, made comments on the draft EA related to SCE&G's proposed SMP shoreline classifications. These comments expressed dissatisfaction in the proposed changes from the existing classifications to more stringent classifications.

Beth Trump and Robert Sellers, president of CRW Investments, Inc., also made comments related to SCE&G's proposed requirement that "back property owners"³³ who own land closer than 75 feet (or 100 feet on lands classified as Forest Management) from the 360-foot Plant Datum contour and wish to construct a dock along the shoreline should deed to SCE&G an amount of property needed to create a uniformly 75-foot-deep (or 100 feet deep on lands classified as Forest Management) Buffer Zone.

SCE&G filed reply responses to comments made by Coleman Parks, John Frick, Beth Trump, and Robert Sellers. In its reply responses, SCE&G clarified the activities that could and could not be conducted for various land classifications in the proposed SMP. In addition, SCE&G clarified the proposal to deed land for a buffer zone in exchange for a dock permit.

Our Analysis

Revisions to the SMP including the Woody Debris Plan, the Buffer Plan, and the Sediment and Erosion Management Plan, as agreed to in the Saluda Settlement, would establish measures for managing shoreline and land use, and enhance permitting processes for the term of a new license. The SMP would enhance land use management measures as well as aesthetics by updating land management classifications, emphasizing resource protection, periodic review and planning throughout the term of the new license, and establishing guidelines for maintaining the natural character of the shoreline, while managing development appropriately, and as required by the Commission and other federal and state agencies. SCE&G's proposed measures for periodic review and update of the SMP (every 10 years) would provide the means to ensure that the SMP and associated land management measures are reviewed and updated as needed over the term of any new license.

The Woody Debris Plan would provide for periodic removal of large trees and stumps in the reservoir that could pose a navigation risk, which would address safety as related to recreation on the reservoir. A Buffer Zone Management Plan would establish guidelines for maintaining a stable shoreline where vegetation currently exists and can be maintained in the future; thus, a buffer zone would be established that would protect the natural setting of the project area and preserve the aesthetics of the project. The proposed Sediment and Erosion Management Plan would provide management guidelines for improving or mitigating for erosion issues at existing and future recreation areas including SCE&G-owned islands, which would preserve and potentially enhance the aesthetic views of the project

³³ "Back property owners" are defined in the SMP as "owners of adjoining lands."

SCE&G's proposal to reclassify the land management classifications at Two Bird Cove and Hurricane Hole from Future Development to Recreation or Forest Management would provide for greater resource protection of these areas as compared to the classification as Future Development under existing conditions. The reclassification would provide more protection of the natural setting of the coves than the current classification of Future Development; however, the final SMP as written would not guarantee overnight anchoring. SCE&G is required to designate Hurricane Hole and Two Bird Cove as special recreation areas preserved specifically for overnight anchoring of all types of boats.³⁴ Modification to the SMP to explicitly state that overnight anchoring is permitted would ensure that overnight anchoring would continue to be available as a beneficial recreational activity. The reclassification from Future Development to Forest Management could also potentially reduce the value of the lands for surrounding landowners, as further discussed in section 3.3.7.2, *Environmental Effects, Socioeconomics*.

Paragraphs B and D of the Commission's use and occupancy article³⁵ grant a licensee the authority to issue dock permits for boat docks that have 10 or less watercraft (10 slips or less), without prior Commission approval. A licensee must seek Commission approval for boat docks with more than 10 slips. As part of the SMP and permitting handbook, SCE&G requests that, for lands classified as Future Development, it have the ability to issue permits for private boat dock facilities with more than 10 slips without Commission approval. Under SCE&G's proposal, the following multi-slip facilities, located on lands with less than 4,000 feet of shoreline frontage, would not require prior Commission approval: (1) easement property with a greenspace³⁶ (a maximum of 80 slips without Commission approval); (2) easement property without a greenspace (a maximum of 60 slips without Commission approval); (3) pre-2007 SCE&G-owned Future Development lands (a maximum of 60 slips without Commission approval); and (4) post-2007 SCE&G-owned Future Development lands (a maximum of 36 slips without Commission approval).

The Commission has waived paragraphs B and D of the Commission's use and occupancy article for the Smith Mountain Lake Project (FERC No. 2210). The licensee for the project was granted the waiver because its SMP has standards and definitions for the allowable shoreline development, as well as regulations for vegetative cover, and woody debris. The Smith Mountain SMP includes restrictions on shoreline stabilization,

³⁴ FERC rehearing order (109 FERC ¶ 61,083, issued October 28, 2004),

³⁵ The article is also referred to as the standard land use article.

³⁶ A greenspace is defined as undeveloped lands that have been set aside and maintained as naturally vegetated areas, and consistent with SCE&G's proposed Buffer Zone Management Plan.

vegetation, dredging, and excavation. Also, the Smith Mountain SMP contains protective measures for rare, threatened, and endangered species and cultural resources. Commission staff has also recommended that the licensee for the Osage Project (FERC No. 459) should have the ability to permit multi-slip facilities greater than 10 slips without Commission approval.³⁷ The proposed Osage SMP has policies and resource protection guidelines similar to the Smith Mountain Lake Project's SMP.

SCE&G's proposed SMP provides measures that protect environmental resources, rare, threatened, and endangered species, and cultural resources similar to the SMPs for the projects discussed above. The greenspaces for lands designated as Future Development and buffer zones around the reservoir would help: (1) minimize erosion and introduction into the water of non-point-source pollutants; (2) conserve and create new shoreline fish and wildlife habitat; and (3) improve the aesthetics of the lake. The Saluda SMP also addresses vegetative cover and woody debris, and imposes restrictions on shoreline stabilization, vegetation, dredging, and excavation. The proposed SMP's requirements and resource protection guidelines should offset any potential effects that may occur to resources, and provides for a reasonable basis for approval of granting permitting authority to SCE&G for multi-slip facilities greater than 10 slips on lands designated as Future Development. To ensure that the Commission is informed of the development within the reservoir, SCE&G should file an annual report that documents the permits granted that exceed 10 slips. The annual report should include the type of permit issued, the location of the multi-slip facility, the number of authorized slips, and the date the permit was issued.

While the proposed Saluda SMP specifies activities allowed in the buffer zone for lands purchased before 1984, between 1984 and 2007, and after 2007, it does not contain guidance or procedures on whether existing structures could remain within these buffer zones. A provision in the SMP that states that buildings existing or constructed in the buffer zone prior to approval of the proposed SMP may remain in the buffer zone, as long as the structures are maintained, would allay property owner concerns. SCE&G should develop procedures to identify existing structures and how the existing structures would be managed and maintained within the SMP's buffer zone (i.e., a grandfather clause). Procedures should also be developed to determine when such structures could not be rebuilt or replaced (e.g., the structure has fallen into disrepair). A grandfather clause would allow property owners within the buffer zone to keep their current privilege of maintaining existing structures but prohibit any new construction.

³⁷ The Commission has not yet issued an order granting or denying the request permit multi-slip facilities greater than 10 slips without Commission approval for the Osage Project.

Colman Parks is concerned that SCE&G wants to take his property's frontage land (known as the fringeland)³⁸ to: (1) reclassify the land as Public Recreation; (2) prohibit him from developing his land; and (3) develop the frontage into a local or state park. The frontage land that Mr. Parks is referring to is SCE&G-owned land that is classified as Public Recreation under the current SMP and the proposed SMP. SCE&G has maintained this frontage as an Existing Future Recreation Site³⁹ under the current license and proposes to maintain it as a Future Recreation Site. The Public Recreation designation does not apply to Mr. Parks' owned land, and SCE&G cannot prohibit Mr. Parks from developing his land.

Beth Trump objects to the reclassification of fringeland adjacent to her property from Future Development to Forest Management, and requested that the designation revert back to Future Development. The designation of Forest Management would restrict development to one dock, whereas Future Development would enable Ms. Trump to apply for a multi-slip dock permit.

The portion of the reservoir surrounding Ms. Trump's property is riverine in nature, and SCE&G has proposed to designate this portion of the reservoir as a canoe trail. SCE&G proposes that, within 10 years of any license issued, it would develop the Cloud's Creek Canoe Trail, which includes a gravel parking lot for approximately 8 to 10 vehicles, a carry-in launch, and directional signage. Designating the fringeland adjacent to Ms. Trump's land as Future Development would enable Ms. Trump to develop multi-slip docks. While there is motor boat traffic in the area, the development of multi-slip docks would increase the potential for more boats to be in the designated canoe trail, causing user conflicts between canoeists and boaters. In addition, the designation of the shoreline as Forest Management would enhance the aesthetics of the area because the 100-foot buffer zone would ensure that the area remains in a natural state and no underbrushing of vegetation would occur.

Beth Trump, John Frick, and Robert Sellers questioned SCE&G's proposed SMP requirement to "deed" property to establish a buffer zone of 75 to 100 feet to obtain a dock permit. John Frick also questioned SCE&G's proposed SMP requirement for lands classified as Future Development, that if the distance from the 306-foot Plant Datum contour to the project boundary line is greater than 75 feet (the buffer zone), the property owner wanting to obtain a dock permit would be required to purchase the land between the 75-foot buffer zone and the project boundary line.

³⁸ Fringeland is any land owned by SCE&G that is within the project boundary line and above the 360-foot Plant Datum elevation.

³⁹ Existing Future Recreation Sites are available to the public, but no facilities or amenities are provided on these sites.

The establishment of a buffer zone would minimize erosion and non-point-source pollutants, conserve shoreline fish and wildlife habitat, and preserve aesthetics. SCE&G's proposed of 75-foot buffer zone for lands designated as Future Development and 100-foot buffer zone for lands designated as Forest Management would enable a uniform development of buffer zones on licensee-owned fringeland. A deed would be needed to ensure the protection of environmental resources, and to provide SCE&G with the means to manage the land and reduce non-compliance. Although Mr. Frick comments that the Commission regulations only allow a modest fee to cover the cost associated with the issuance of the permit, the Commission has approved in the Yadkin Project's SMP (P-2197) a requirement that the property owner exchange privately owned lands for a dock permit to support the establishment of a uniform 100-foot buffer zone. The Yadkin Project's SMP requirements for a dock permit to be issued are similar to the proposed requirements for a dock permit under SCE&G's proposed SMP.

Since the issuance of a permit for a dock is at the discretion of the licensee, a licensee can impose provisions such as deeding land or requiring land to be sold to obtain a dock permit. SCE&G's proposals are reasonable limitations on the exercise of private property rights in exchange for permission to enter and construct on project lands and waters, which are managed on behalf of the broader public interest. It must be noted that it is the landowner's option not to install a boat dock. If a boat dock is not installed, then the landowner would not need to deed their land to SCE&G or buy land from SCE&G. If the landowner chose not to install a boat dock, any modification to the lands within the existing buffer zone would need to comply with the requirements of SCE&G's SMP.

Ms. Trump also requested that a dock permit be issued to her now under the current SMP. Under the use and occupancy article, SCE&G has the authority to issue permits for specified types of use and occupancy of project lands and waters, but the use and occupancy article does not establish a timeframe by which a permit may be issued or denied. As such, SCE&G has the ability, under its current license, to have an interim period where it would not issue dock permits until the proposed SMP is implemented.

The proposed buffer zone would serve a project purpose; therefore, SCE&G would need to annually file, for Commission approval, a revised exhibit G, highlighting the acreage of additional buffer zone lands acquired during that year. The revised exhibit G maps and the report for dock permits exceeding 10 slips could be combined and filed with the Commission annually.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Area of Potential Effects

Under section 106 of the National Historic Preservation Agency, the Commission must take into account whether any historic property within the project's area of potential effects could be affected by issuance of a new license. The area of potential effects is defined as the geographic area in which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. In this case, the area of potential effects for the project encompasses an area within 500 feet inland from maximum pool elevation (358.5 feet) along the Lake Murray shoreline, and 500 feet inland along the riverbank of the lower Saluda River. It also includes all islands within the lake.

Regional History

The archaeological record dates Native American presence in central South Carolina to at least the late Paleoindian period (11,000-8000 BC), a time of both climatic change and gradual extinction of large game animals such as mammoth, mastodon, bison, and giant sloth. The earliest Native Americans in the area subsisted on a combination of hunting both large and small game, augmented with foraging of wild plant foods. Over the Archaic (8000-1000 BC) and Woodland (1000BC-100AD) periods, Native populations grew larger and more sedentary. They developed trade networks, became more dependent on agriculture for subsistence, and used ceramic vessels and the bow and arrow. The conical burial mounds associated with the Woodland period may have been the precursors to the far more elaborate groups of flat-topped mounds around which Native peoples in South Carolina established villages and hamlets during the Mississippian period (1000-1540 AD). The highly complex societies associated with these mound groupings based their subsistence on the intensive cultivation of maize, although hunting, gathering, and fishing remained important sources of food.

Permanent European settlement in South Carolina began in 1670, on the Ashley River near present-day Charleston. By 1700, settlers had moved inland and up the Congaree River to the fall line (south of present-day Columbia), which marked the upper limit of navigation. Settlement in central South Carolina continued steadily during the 18th century, as lands along the Congaree were transformed into plantations dedicated to cash crops that were marketed in Charleston.

Establishment of Columbia as the new state capital after the Revolution encouraged more settlement in the South Carolina interior. Growing demand in the early 19th century for better transportation from regions north and west of Columbia led to construction of the Columbia and Saluda canals, which enabled shipments of agricultural

and timber products to pass around the shoals of the Broad and Saluda rivers to the Congaree, and thence to Charleston or Georgetown. Falls in the Broad and Saluda rivers also provided sources of hydromechanical power for new manufacturing enterprises in Columbia in the latter half of the 19th century.

One of those manufactories, the Columbia Mills, became the first textile plant in the nation to employ electric power, using water from the original Columbia Canal to generate its own power beginning in 1894. As interest in use of electric power increased, so did interest in new sources of power generation. In 1903, G.A. Guignard of Columbia formed the Lexington Water Power Company, and began to acquire land for construction of hydroelectric generating facilities on the Saluda River at Dreher's Shoals and at Bear Creek. The Lexington Water Power Company came under the control of the New York engineering firm of Murray and Flood, which under co-founder William S. Murray developed plans for a dam and hydroelectric plant at Dreher's Shoals. One of the first steps was continuing land acquisition, ultimately totaling about 100,000 acres. Land clearance included removal of three churches, six schools, 193 cemeteries, and relocation of much of the rural population. Construction of the Saluda Project began in 1927; the plant came on line in 1930, and the massive impoundment, named Lake Murray, filled to the 358.5-foot elevation in 1933. In 1943, the Lexington Water Power Company transferred the Saluda Project and its operating license to SCE&G. In 1958, SCE&G built the McMeekin Station, a coal-fired generating facility that draws cold water from the bottom of Lake Murray to cool its turbines. Since that time, the Saluda Project has been upgraded and improved as needed. Between 2003 and 2005, SCE&G constructed a backup dam immediately downstream of the original dam as a cautionary measure against earthquake and potential destruction of the original dam.

Archaeological Resources

SCE&G has commissioned a variety of cultural resource investigations at the Saluda Project over the past decade. A study in 2003, undertaken during a drawdown for dam remediation, identified two archaeological sites (38RD134 and 38SA1) that were subsequently determined eligible for the National Register. Phase I and Phase II studies undertaken between 2005 and 2007 were specifically associated with SCE&G's relicensing efforts. As a result of these most recent investigations, 156 archaeological sites and 42 isolated finds have been recorded within the project boundary. The 2007 Phase II study report recommended three sites (38LX531, 38LX526, 38NE666) as eligible for inclusion in the National Register under Criterion D, information potential. Site 38LX531 (Tree House Site) is a Native American habitation site with stratified archaeological deposits dating back to the late Paleoindian period, and possibly earlier. Sites 38LX526 (Meetze Family Cemetery) and 38NE666 (Amick Family Cemetery) are 19th century burial grounds.

The Phase II report also recommended an additional 19 archaeological sites as potentially eligible for the National Register. These included five 19th to 20th century

house sites, an 18th century causeway, 10 prehistoric sites identified as lithic or artifact scatters, a Mississippian-Woodland habitation site, a historic period cemetery, and a multicomponent site containing remains of both a 19th to early 20th century residence and a Woodland or Mississippian artifact scatter.

SCE&G consulted with the South Carolina State Historic Preservation Office (SHPO) and with the Catawba Indian Nation during the surveys. The SHPO and Catawba Indian Nation have concurred with the archaeological consultants' recommendations regarding National Register eligibility and potential eligibility.

Historical Resources

The Saluda Project contains two historical resources that the SHPO has determined eligible for inclusion in the National Register. Historic Resource 63-0521 (Epting's Campground) is a complex of seven wooden buildings (a main office and six tourist cabins) built in 1937. It is eligible under Criterion A as one of the earliest recreational developments established as a result of the creation of Lake Murray. Historic Resource 243-0127 is the Saluda Dam Complex, which according to SCE&G's application was initially evaluated as National Register-eligible in 1997 in association with South Carolina Department of Transportation's improvements to South Carolina Route 6 over the dam. For its application, SCE&G updated information about the complex, and refined the evaluations of the various elements of the complex based on SHPO recommendations. As a result, the SHPO has determined that the dam, spillway and gates, powerhouse, Lake Murray, and the stone "gates" at the entrance to the Saluda facility (all dating to 1930) are eligible under Criteria A, B and C. The spillway switching facility, also dating to 1930, is eligible under Criterion C. The McMeekin fossil fuel plant and associated hopper house (eligible under Criterion C), and "Power for Progress" sign (eligible under Criteria A and C), are associated with the 1958 expansion of generating facilities at Saluda to include a plant run on fossil fuel.

Native American Inhabitants

The archaeological record indicates that Native Americans have been a presence in the Saluda River area for 10,000 years or more, as evidenced by the range of prehistoric sites that have been identified in the project. There was a very clear and strong presence of Native Americans in the central South Carolina region in the early 18th century when European explorers first entered the region, and it continued well into the period of European settlement. This presents a well-justified traditional connection on the part of Native Americans to the region that includes the Saluda Project.

Under section 106 of the National Historic Preservation Act, the Commission is obligated to seek out any federally recognized Indian tribes that can demonstrate a traditional cultural or religious connection to land under the Commission's jurisdiction, and to involve such tribes in the relicensing process. Seventeen Indian tribes were

invited to participate in the identification and evaluation of historic properties in the Saluda Project. Two of these, the Catawba Indian Nation and Eastern Band of Cherokee Indians (Tribes), accepted the invitation to be parties to the consultations under section 106. Five other Indian tribes did not wish to actively participate, but did ask that they be provided with information regarding the results of archaeological investigations, and that they be notified if human remains or funerary artifacts are identified (as a result of survey or as inadvertent discoveries) in the project.⁴⁰

3.3.6.2 Environmental Effects

Continued management and operation of the project may affect both identified and unidentified historic properties. To address such effects, SCE&G proposes to implement a final HPMP (developed in consultation with the SHPO, Commission, and Tribes and included in the Saluda Settlement) that would guide SCE&G's management of historic properties over the term of a new license. The HPMP contains policies and procedures for treatment of historic properties (known and any that may be identified in the future) over the license term in consultation with the SHPO and Tribes. It also provides for development (within 2 years after license issuance) of a public information plan, in consultation with the SHPO, Tribes, and Commission, to disseminate information about the historical and cultural values of the Saluda Project. The HPMP also specifies that SCE&G would file a biennial report with the SHPO, Tribes, and Commission summarizing any ground-disturbing actions undertaken under the provisions of the HPMP.

Continued operation of the Saluda Project would maintain the historic project facilities in productive use for the purpose for which they were originally designed and built, and would therefore, be beneficial. However, operating the project under the protections afforded by section 106 does not eliminate the possibility of adverse effects. Adverse effects could occur on historic project features from repairs and modifications that may be necessary during the course of project operation.

To address these potential effects, SCE&G would notify the SHPO in advance of any action affecting historic project facilities that is not among the categorical exclusions listed in the HPMP and would consult with the SHPO to develop and implement appropriate measures to resolve any adverse effects.

In consultation with the SHPO and Tribes, SCE&G conducted data recovery excavations on that portion of the National Register-eligible Tree House Site (38LX531) that is on land not owned by SCE&G. To protect the remainder of the site, which is

⁴⁰ The Indian tribes are the Eastern Shawnee Tribe of Oklahoma, Muscogee (Creek) Nation, Seminole Indian Tribe, Tuscarora Nation, and United Keetoowah Band of Cherokee.

under SCE&G ownership, SCE&G proposes in the HPMP to place a restrictive covenant on its property. Should additional archaeological investigation be necessary or desired on the SCE&G-owned portion of the site, SCE&G would consult with the SHPO, Commission, and Tribes to develop a new data recovery plan.

In the HPMP, SCE&G also proposes to monitor Epting's Campground and all but two of the eligible and potentially eligible archaeological sites (Sites 38SA150 and 38SA224) at least once every 2 years to verify their condition and to identify any changes that may have resulted from erosion, recreational activities, looting or other factors. Sites 38SA150 and 38SA224 (both of which are almost entirely submerged at normal pool elevation and were stabilized with riprap and vegetation in 2004) would be monitored no more than once every 5 years during major drawdowns below elevation 357.5 feet. If monitoring at any of these sites reveals significant changes to the resource, SCE&G proposes to notify the SHPO, Tribes, and Commission within 10 days of discovery, and consult with these parties to resolve the adverse effects.

Because of landowner objection or inundation, nine shoreline segments and 14 islands in Lake Murray could not be surveyed for archaeological resources during the relicensing process. In the HPMP, SCE&G states that areas falling within SCE&G-controlled property (below the 358.5-foot contour line/maximum pool elevation) at these locations should be investigated during a scheduled drawdown to see if they contain significant cultural resources. Similarly, SCE&G states in the HPMP that areas more than 50 feet beyond the 358.5-foot maximum pool elevation, and areas above the shoreline that could not be investigated because of landowner objection, should be surveyed for archaeological resources if they are going to be affected by an undertaking conducted by or permitted by SCE&G under section 106 of the National Historic Preservation Act, as amended.

SCE&G has also drafted an SMP that classifies areas within the project having cultural and/or historical significance as Natural Areas. Under the proposed SMP, land in Natural Areas would not be for sale, and docks, excavations or shoreline activities requiring permits would not be allowed. The proposed SMP would also require permit applicants to submit required local, state, or federal permits and/or reports with their applications for permits.

The SHPO, the Catawba Indian Nation, Interior, and South Carolina DNR recommend implementation of the HPMP as part of the Saluda Settlement.

Our Analysis

Implementation of the HPMP as part of the Saluda Settlement would ensure that any adverse effects on National-Register eligible components of the project would be properly identified and resolved through consultation with the SHPO.

Because archaeological sites are often found immediately adjacent to water bodies, shoreline erosion can affect historic properties at hydropower projects. Operation of the project contributes to water level fluctuations, and water level fluctuations, in turn, contribute to erosion. Other potential effects include project-related ground-disturbing activities (such as construction of recreational facilities or habitat improvement) and also looting and vandalism associated with public use of project facilities.

Shoreline soils are susceptible to erosion from reservoir fluctuations. Such erosion could potentially affect archaeological sites if any exist below the 358.5-foot maximum pool elevation on the shoreline segments and islands that SCE&G could not survey prior to submitting its license application. Given that SCE&G provides a cost to complete surveys along these shoreline segments and islands, we construe the HPMP to include this commitment. Surveys of these areas at the earliest scheduled drawdown opportunity (in consultation with the SHPO and Tribes) would ensure that any significant or potentially significant archaeological sites present would be identified and then managed in accordance with the applicable principles and procedures as defined in the HPMP.

Land within the project more than 50 feet beyond the 358.5-foot maximum pool elevation, and areas above the shoreline that could not be investigated because of landowner objection, could potentially contain significant archaeological resources that could be affected by project activities or by activities permitted by SCE&G under its SMP. Surveying these lands prior to undertaking or permitting ground-disturbing activities in these areas, as specified in the HPMP, would ensure that any significant or potentially significant archaeological sites would be identified and appropriate measures taken to resolve any adverse effects.

Implementation of SCE&G's proposed HPMP and SMP would ensure that historic properties are identified and accorded proper treatment and, as appropriate, provided protection over the term of the license.

3.3.7 Socioeconomic Resources

3.3.7.1 Affected Environment

The Saluda Project is located in Richland, Lexington, Saluda, and Newberry counties, South Carolina, with the primary project facilities and most of Lake Murray situated in Lexington County. The city of Columbia, which is located primarily in Richland County and partially in Lexington County, is the most populous city in the state, with an estimated population of 119,961 in 2006 (U.S. Bureau of the Census, 2009a). Table 13 presents U.S. Bureau of the Census population and other demographic data for South Carolina and the 4 counties in which the project is located.

Table 13. Population characteristics of South Carolina and Richland, Lexington, Saluda, and Newberry counties (Source: U.S. Bureau of the Census, 2009b, c, d, e).

	Population, 2000	Population Estimate, 2008	Private Nonfarm Employment, 2007	Median Household Income, 2007	Persons Below Poverty Level, 2007 (percent)
Richland County	320,779	364,001	171,833	\$47,787	12.7
Lexington County	216,010	248,518	89,694	\$51,040	10.9
Saluda County	19,181	18,625	3,641	\$38,968	16.8
Newberry County	36,004	37,823	11,939	\$39,766	16.7
South Carolina	4,011,809	4,479,800	1,648,146	\$43,508	15.1

The U.S. Census Bureau (2009b, c, d, e) reports that in 2000 there were about 424.2 people per square mile in Richland County, 309.0 in Lexington County, an average of 133.2 statewide, 57.2 in Newberry County, and 42.4 in Saluda County. Table 13 shows that household incomes were higher and the percentages of people living below the poverty level were lower in the more populous urban counties (Richland and Lexington) than in the state as a whole, while the less populous, rural counties (Saluda and Newberry) showed the opposite pattern, with lower incomes and higher levels of poverty. Population increases between 2000 and 2008 have followed similar patterns, with Richland and Lexington counties showing the most growth at 13.5 and 15.0 percent, respectively, South Carolina showing intermediate growth at 11.7 percent, Newberry County experiencing a modest 5.1 percent population increase, and Saluda County losing 2.9 percent of its 2000 population (U.S. Bureau of the Census, 2009, a, b, c, d). The growth of the Richland and Lexington county populations is because of the presence of fast growing cities such as Lexington, while the very slow growth or population loss in Newberry and Saluda counties can be accounted for by their lack of major commercial and residential centers.

As shown in table 14, the U.S. Bureau of the Census (2000) reports that the top three industries in the state in terms of employment were manufacturing (19.4 percent); educational, health, and social services (18.6 percent); and retail trade (11.9 percent). The less populous rural counties (Saluda and Newberry) had the same top three industries, in the same order. In the more populous urban counties, the educational,

health and social services sector provided the most employment, with retail trade following in the second spot. The third highest employer was manufacturing in Lexington County and public administration in Richland County, reflecting Columbia's position as the state capital.

Table 14. Employment by top three industries in South Carolina and Richland, Newberry, Saluda, and Lexington counties, 2000 (Source: U.S. Bureau of the Census, 2000).

	Sector with Highest Employment (percent)	Sector with Second Highest Employment (percent)	Sector with third Highest Employment (percent)
Richland County	Educational, health and social services (24.1)	Retail trade (10.8)	Public administration (9.7)
Lexington County	Educational, health and social services (18.3)	Retail trade (11.5)	Manufacturing (11.3)
Saluda County	Manufacturing (30.1)	Educational, health and social services (14.2)	Retail trade (10.6)
Newberry County	Manufacturing (25.6)	Educational, health and social services (17.8)	Retail trade (11.0)
South Carolina	Manufacturing (19.4)	Educational, health and social services (18.6)	Retail trade (11.9)

3.3.7.2 Environmental Effects

The Saluda Project benefits the local economy by providing a reliable source of power and recreational opportunities that would not otherwise be available nearby. Neither SCE&G nor any other party has proposed any measures specifically associated with socioeconomic resources. However, several comments made during the scoping process and in response to the ready for environmental analysis notice raised socioeconomic issues related to several of SCE&G's proposals related to the guide curve, the Low Inflow Protocol, minimum flows and recreation flows in the lower Saluda River, and the SMP.

Guide Curve, Low Inflow Protocol, and Flows in the Lower Saluda River

SCE&G's proposed guide curve and Low Inflow Protocol are described in detail in section 3.3.1.2, *Environmental Effects, Water Quantity*, and the resulting effects on

recreation are described in section 3.3.5.2, *Environmental Effects, Reservoir Elevations*. SCE&G's proposed minimum flow and recreational flow regimes and their effects on recreation are described in section 3.3.5.2, *Environmental Effects, Minimum Flows, Recreation Flows, and Training Flows*.

As noted in section 3.3.5.2, all signatories to the Saluda Settlement support SCE&G's proposed guide curve. Several entities recommend alternative trigger reservoir levels for the implementation of the Low Inflow Protocol (see section 3.3.1, *Water Resources*).

In their scoping comments, South Carolina DNR, the Lower Saluda Scenic River Advisory Council, American Rivers, and many individuals commented on the merits of providing more river flow vs. maintaining the lake level based on the relative value of river-based recreation vs. lake-based recreation in supporting tourism, recreation-related businesses, and local economic development. Many of these comments were made specifically in support of or in opposition to various triggers for the Low Inflow Protocol.

Our Analysis

As discussed in section 3.3.5.2, *Environmental Effects, Reservoir Elevation*, SCE&G's proposed guide curve would increase Lake Murray reservoir levels compared to existing operations, which would improve the usability of all public boat ramps, provide for enhanced access to many private boat docks, and provide for enhanced waterfowl hunting opportunities during the winter. As further discussed in section 3.3.5.2, all trigger flows would potentially keep the reservoir water elevations high enough to maintain recreational uses. Compared to existing conditions, both the 1- and 2-foot triggers would enhance recreation resources because of higher reservoir levels and enhanced downstream flows, which would improve flows for both boaters and anglers in the lower Saluda River. A Low Inflow Protocol with a 4-foot trigger would cause Lake Murray water levels to decrease 1.5 to 2.5 feet lower than either a 1- or 2-foot trigger under severe drought conditions, which would have greater adverse effects on private dock access. Because the criterion for a 4-foot trigger would be met infrequently, a Low Inflow Protocol may not be implemented in some moderate drought years, allowing greater Lake Murray drawdowns and associated adverse effects on private dock access. While boating and angling in the lower Saluda River would be more likely to be enhanced under a Low Inflow Protocol with 4-foot trigger, there would be less of a balance between resource protection in Lake Murray and in the lower Saluda River.

Several parties to the Saluda Settlement, including the Lake Murray Association and the Lake Murray Homeowners Coalition, filed comments with the Commission stating that improving recreational activity in turn enhances the economic climate around the lake. The Lake Murray Association cites the Capital City/Lake Murray Country Regional Tourism Board (Tourism Board) as estimating that visitors add \$64 million annually to the regional economy, and that the Forrest Wood Cup bass fishing

tournament adds another \$46 million. The Tourism Board is also cited as stating that a lower lake reduces recreation visits. While we have made no independent analysis of the value of lake-based recreation to the local economy, we conclude that in general, additional recreational activity induced by lake level management can be expected to increase economic activity as tourists and other recreation users purchase food, lodging, boat and automobile fuel, fishing supplies, and other recreation-related items. Compared to existing conditions, adoption of the proposed guide curve and implementation of the low flow protocol would benefit the local economy in that regard. A 2-foot trigger for implementation of the low-flow protocol would provide a good balance for recreational boating on Lake Murray and protection of the aquatic habitat that supports angling in the lower Saluda River.

SCE&G's proposed minimum flow releases, including those for striped bass flows and recreational flow releases could affect recreation, land use, and aesthetic resources within and downstream from the project boundary. The minimum flows proposed for striped bass would increase the volume of water released to the lower Saluda River compared to previous minimum flow operation schedules. These increased flows could potentially benefit recreation resources downstream by providing more favorable flows for striped bass, and hence an improved recreational fishery and greater economic activity associated with the fishery.

Under the current license, SCE&G provides no additional recreation-specific flows. SCE&G's proposed recreational flow releases would enhance boating, angling, and general recreational opportunities compared to existing conditions, specifically by providing additional flows to accommodate particular recreational events. By increasing recreational opportunities on the lower Saluda River, these recreational flows could also benefit the local economy.

Shoreline Management Plan

As discussed in section 3.3.5.2, *Environmental Effects, Shoreline Management Plan*, SCE&G proposes to reclassify some of the land management classifications in the SMP. Land management classifications identified in the plan include: Forest Management, Public Recreation, Natural Areas, Project Operations, and Multi-purpose, where Multi-purpose is further divided into: 75' Buffer Zone, Commercial, Easement, and Future Development. In addition to the SMP, SCE&G developed a permitting handbook in consultation with stakeholders and agencies to address certain activities that require permits and consultation with SCE&G. These activities include excavation; construction, maintenance, and placement of docks, boatlifts, boat ramps, and shoreline stabilization; limited brushing; and other shoreline activities.

In its scoping comments, Newberry County commented that the SMP discriminates against the county because the county loses tax revenue from lands that

cannot be developed. In its comments in response to the ready for environmental analysis notice, Advance Land and Timber, LLC, stated that the plan puts huge constraints on most of the remaining shoreline, with certain properties being given a future development status while others are restricted to no development. The letter states that a fair and equitable plan would be implemented the same way on all property, especially if SCE&G land is given development status and other property owners are denied. John Frick, in comments made during scoping and in his intervention raises questions about the fairness of changes proposed to the SMP and whether they achieve the intended result given that lands adjacent to the project boundary can be developed.

Our Analysis

As shown in table 12, the SMP's land reclassification would, among other changes, increase acreage in the Public Recreation classification from 764 to 955.2 acres (a 191.2-acre increase) and increase Natural Areas from 42 to 506.2 acres (a 464.2-acre increase). At the same time, the acreage classified as Future Development would be reduced from 1,818 to 958.12 acres (an 859.88-acre decrease). This reclassification would likely reduce the value of these lands for development.

As we stated in the revised scoping document, a detailed study of the proposed SMP's effects on property values and taxes in the surrounding counties is beyond the scope of this EA. However, we note that creation of the SMP was a public process that included counties, state agencies, homeowner groups, SCE&G, and others. These representatives provided input for the parameters, shoreline classifications, and regulations that make up the SMP. In addition, various resource studies and data collection efforts were undertaken to obtain current information for development of the SMP. These data collection efforts included inventories of land use, shoreline conditions, ecological resources, cultural resources, recreation facilities, and existing recreation uses. Thus, attempts were made in the process to balance various interests.

Studies across the country have shown that, in general, SMP policies such as development restrictions have both positive and negative effects on development and on waterfront property values. SMP policies, regulations, and permitting processes can have negative economic implications by restricting development; however, the economic gains resulting from improved water quality, aesthetic appeal, noise reduction, wetland and habitat preservation, and greenspace may outweigh any losses associated with development constraints (Spalatro and Provencher, 2000, as cited by FERC, 2006). These environmental amenities provide economic benefits to waterfront property owners through increased property values and to local governments and economies through increased tax revenues (FERC, 2006).

Several studies document the economic benefits to property values associated with environmental enhancements to shoreline properties. A study conducted in Colorado

reported that buffer zones increase housing prices by 32 percent and buffers had a positive or neutral effect on adjacent property values in 82 percent of communities surveyed nationwide (Schueler and Holland, 2000, as cited by FERC, 2006). Development restrictions generate additional amenities to affected and nearby landowners in the form of greenspaces and viewsheds. These scenic enhancements and reductions in noise pollution for waterfront properties are major reasons residents purchase shoreline property, as reported in interviews with shoreline residents in Wisconsin and Maine (Pressing et al., 1996, as cited by FERC, 2006).

Furthermore, SMP policies help maintain and improve water quality in lakes. According to a 5-year study of 543 lakefront properties on 22 lakes in Maine, an improvement of 3 feet in the depth of water clarity resulted in \$11 to \$200 more per foot of shoreline property value, potentially increasing the overall property value per lake by millions of dollars. Alternatively, declining water clarity accounted for a 10 to 20 percent decrease in the selling price of lake front properties (Michael et al., 1996, as cited by FERC, 2006).

In addition, SMP policies typically affect only a portion of the property. Therefore, although there are limitations on activities within a buffer zone, a property owner still retains open rights to the portion of the property outside the buffer zone. This can reduce any negative economic impact.

We acknowledge that the loss of land classified as Future Development would likely reduce the taxable value of those properties, thereby reducing the counties' ability to increase tax revenues associated with those properties. However, we also note that increased tax revenue associated with developing more shoreline properties would not necessarily offset the additional costs to the counties or communities that provide services to those properties and residents. That would depend in large measure on the nature of the development, the types of residents that are attracted, the level of services provided by local governments, and of course, the tax structure.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the project would continue to operate as it has in the past. None of SCE&G's proposed measures or resource agencies' recommendations and mandatory conditions would be required. The existing trout fishery would continue in the lower Saluda River, but aquatic habitat enhancement in the lower Saluda River through higher instream flows and further enhancements to DO would not occur.

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4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Saluda Project's use of the Saluda River for hydropower purposes to see what effect various environmental measures would have on the project's costs and power benefits. Consistent with the Commission's approach to economic analysis, the power benefit of the project is determined by estimating the cost of obtaining the same amount of energy and capacity using the likely alternative generating resources available in the region. In keeping with Commission policy as described in Mead,⁴¹ our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e., for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND ECONOMIC BENEFITS OF THE PROJECT

Table 15 summarizes the parameters and economic information we use in our analysis. SCE&G provided some of this information in its license application, and we find that the values provided by SCE&G are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; net investment (the total investment in power plant facilities remaining to be depreciated); estimated future capital investment required to maintain and extend the life of plant equipment and facilities; relicensing costs; normal operation and maintenance cost; and Commission fees.

⁴¹ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

Table 15. Parameters for the economic analysis of the Saluda Hydroelectric Project
(Source: SCE&G and staff).

Assumption	Value	Source
Costs are presented in 2010 dollars unless otherwise noted		
Period of economic analysis ^a	30 years	Staff
Term of financing ^b	20 years	Staff
Current authorized installed capacity ^c	207.3 MW	Staff
Current annual on-peak generation ^d	107,409 MWh	SCE&G
Current annual off-peak generation ^d	72,660 MWh	SCE&G
Current remaining undepreciated investment ^e	\$95,173,300 (12/31/07)	SCE&G
Cost to prepare license application ^f	\$12,000,000	SCE&G
Current operation and maintenance cost, (2007 dollars) ^g	\$1,299,190	SCE&G
Discount rate ^h	8.69 percent	SCE&G
Cost of money ⁱ	8.69 percent	Staff
Federal income tax rate	35 percent	Staff
State and local tax rate	2.8 percent	Staff
On-peak energy rate ^j	\$85.36/MWh	SCE&G
Off-peak energy rate ^j	\$36.78/MWh)	SCE&G
Capacity rate ^k	\$154/kilowatts-yr	SCE&G

^a Although the Commission may issue a 30-, 40- or 50-year license, the economic analysis is limited to 30 years.

^b We limit the financing term for the project to 20 years in our economic analyses.

^c The authorized installed capacity of the project is based on the lesser of the turbine and generator rating of each unit in kilowatts and is used by the Commission to assess annual fees.

^d SCE&G, 2009b, clarification #3.

^e From revised exhibit D, section 2.0, dated July 31, 2009.

^f From revised exhibit D, section 7.0, dated July 31, 2009.

^g From revised exhibit D, section 4.0, dated July 31, 2009.

^h From revised exhibit D, section 5.0, dated July 31, 2009.

ⁱ Used same value as discount rate.

- ^j Derived by staff based on 2008 power values in exhibit D-4, dated July 31, 2009.
- ^k The capacity rate is based on the Energy Information Administration's 2009 Annual Outlook.

4.2 COMPARISON OF ALTERNATIVES

Table 16 compares the power benefits, annual costs, and annual net benefits for the four alternatives considered in this draft EA: no action, SCE&G's proposal, and the staff alternative.

Table 16. Summary of annual cost, power benefits, and annual net benefits of the alternatives for the Saluda Hydroelectric Project (Source: Staff).

	No Action	SCE&G's Proposal	Staff Alternative
Installed Capacity (MW)	207.3	247	247
Annual generation (MWh)	180,069	195,859	195,725
Annual power value, \$:	\$39,212,010	\$38,476,530	\$38,460,690
mills/kWh:	217.76	196.45	196.50
Annual cost, \$:	\$15,649,110	\$19,355,650	\$19,236,460
mills/kWh:	86.91	98.82	98.28
Annual net benefit, \$:	\$23,562,900	\$19,120,880	\$19,224,230
mills/kWh:	130.85	97.63	98.22

4.2.1 No-action Alternative

Under the no-action alternative, the project would continue to operate as it does now. The project generates an average of 180,069 MWh of electricity annually and has a dependable capacity of 206 MW. The annual power value of the project under the no-action alternative would be \$39,212,010 (about \$217.76/MWh). The average annual cost of producing this power would be about \$15,649,110 (about \$86.91/MWh), resulting in an average annual benefit of \$23,562,900 (about \$130.85/MWh). In other words, the project produces energy that is less than that of currently available alternative generation by \$130.85/MWh.

4.2.2 SCE&G's Proposal

Under SCE&G's proposal, the project would generate an average of 195,859 MWh of electricity annually. The annual power value of the project under SCE&G's proposal would be \$38,476,530 (about \$196.45/MWh). The average annual cost of

producing this power would be about \$19,355,650 (about \$98.82/MWh), resulting in an average annual benefit of \$19,120,880 (about \$97.63/MWh). In other words, the project would produce energy that is less costly than that of currently available alternative generation by \$97.63/MWh.

4.2.3 Staff Alternative

The staff alternative includes SCE&G's proposal and has the same capacity and energy attributes. Table 17 shows the staff-recommended additions, deletions, and modifications to SCE&G's proposed environmental protection and enhancement measures and the estimated cost of each. The project would continue to generate an average of 195,725 MWh of electricity annually. The annual power value of the project under the staff alternative would be \$38,460,690 (about \$196.50/MWh). The average annual cost of producing this power would be about 19,236,460 (about \$98.28/MWh), resulting in an average annual benefit of \$19,224,230 (about \$98.22/MWh). In other words, the project would produce energy that is less costly than that of currently available alternative generation by \$98.51/MWh.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 17 shows the costs for each of the environmental enhancement measures considered in the analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 17. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of continuing to operate the Saluda Hydroelectric Project (Source: Staff).

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
Water Resources				
1. Operate the project in accordance with the proposed reservoir guide curve	Saluda Settlement parties, ^b Interior, South Carolina DNR, staff	\$0	\$52,680	\$52,680
2. Provide the proposed minimum flows in the lower Saluda River of 700 cfs from January 1 through March 31; striped bass enhancement flows ranging from 1,000 cfs to 2,700 cfs from April 1 through May 10 when daily average flows in the Broad River are between 2,500 and 8,000 cfs; 1,000 cfs from May 11 through May 31; and 700 cfs from June 1 through December 31	Saluda Settlement parties, Interior, NMFS, staff	\$0	\$856,420 ^c	\$856,420

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
3. Implement a Low Inflow Protocol with low inflow provisions that would be initiated when reservoir levels in Lake Murray fall 1 foot below the target reservoir levels	SCE&G, Capitol City/Lake Murray Country Tourism, City of Columbia Fire and Rescue, Lake Murray Association, Lake Murray Docks, Inc., Lake Murray Homeowners Coalition, Lake Murray Power Squadron, Lake Watch, Lake Murray Chamber of Commerce ^b	\$0	-\$22,130 ^g	-\$22,130
4. Implement a Low Inflow Protocol with low inflow provisions that would be initiated when reservoir levels in Lake Murray fall 2 feet below the target reservoir levels	American Rivers, American Whitewater, City of Columbia Parks and Recreation, Coastal Conservation League, Midlands Striper Club, Riverbanks Zoo and Garden, Interior, South Carolina Department of Natural Resources, South Carolina Wildlife Federation, ^b staff	\$0	-\$6,290 ^g	-\$6,290

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
5. Implement a Low Inflow Protocol with low inflow provisions that would be initiated when reservoir levels in Lake Murray fall 6 inches below the target reservoir levels	Lake Murray Association, Lake Murray Fisherman's Focus Group	\$0	-\$36,290 ^g	-\$36,290
6. Implement the Reservoir Drawdown Program	Saluda Settlement parties, Interior, NMFS, staff	\$0	\$0	\$0
7. Develop and implement an operational compliance monitoring plan	Saluda Settlement parties, staff	\$0	\$0	\$0
8. Provide funding to assist USGS with streamflow gages in and adjacent to Congaree National Park	Interior	\$0	\$20,000	\$20,000
9. Install new runners to increase DO in the Saluda River downstream of the powerhouse, and upgrade all five units	Saluda Settlement parties, Interior, NMFS, staff	\$11,199,250	\$346,180 ⁱ	\$1,248,570
Aquatic Resources				
10. Continue macroinvertebrate sampling in the lower Saluda River based on the Macroinvertebrate Program	Saluda Settlement parties, Interior, staff	\$0	\$12,660	\$12,660

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
11. Implement a Mussel Program	Saluda Settlement parties, Interior, staff	\$0	\$7,280	\$7,280
12. Within 1 year after the Unit 5 turbine upgrade, meet with resource agencies to evaluate Unit 5 operational scenarios to aid in preservation of coolwater refuge habitat for striped bass	Saluda Settlement parties, Interior, NMFS, staff	\$0	\$0	\$0
13. Continue to participate in the Santee Basin Accord, associated with diadromous fish studies and restoration in the Santee-Congaree basin	Saluda Settlement parties, Interior, NMFS, staff (adopted in part) ^j	\$0	\$122,870	\$122,870
14. Develop and implement a cooperative long-term Sturgeon Program	Saluda Settlement parties, Interior, NMFS, staff (adopted in part) ^k	\$0	\$19,120	\$19,120
15. Implement the Trout Program for the lower Saluda River	Saluda Settlement parties staff (adopted in part) ^l	\$0	\$1,610	\$1,610
16. As part of the Trout Program fund South Carolina DNR to conduct a trout mortality study	Saluda Settlement parties	\$0	\$2,480	\$2,480
17. Implement the Fish Monitoring Program in the lower Saluda River	Saluda Settlement parties, Interior, staff (with additional reporting requirement) ^m	\$0	\$30,910	\$30,910

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
18. Implement the hydroacoustic portion of the Entrainment Program	Saluda Settlement parties, staff	\$0	\$10,150	\$10,150
19. Implement the mitigation funding portion of the Entrainment Program	Saluda Settlement parties	\$0	\$0 ^j	\$0
Terrestrial and Threatened and Endangered Species Resources				
20. Implement the T&E Program for bald eagle, wood stork, and rocky shoals spider lily	Saluda Settlement parties, Interior, staff	\$0	\$18,540	\$18,540
21. Coordinate with the South Carolina DNR Aquatic Nuisance Species Program and the Council to manage invasive aquatic plants in Lake Murray	Saluda Settlement parties, staff	\$0	\$27,620	\$27,620
22. Develop and implement a terrestrial and aquatic invasive species management plan	Interior staff (adopted in part) ^o	\$20,000	\$40,000	\$42,850
23. Designate Lunch Island as a protected area for purple martin	Saluda Settlement parties, Interior, staff	\$0	\$0	\$0
24. Lease 1,100 acres to South Carolina DNR to be managed under South Carolina DNR's Wildlife Management Area Program for waterfowl habitat and hunting	Saluda Settlement parties, staff	\$0	\$0	\$0

Enhancement/Mitigation Measures	Entities	Capital (2010\$) ^a	Annual (2010\$) ^a	Total Annual Cost (2010\$)
25. Publish and make available the <i>Plant and Animal</i> brochure	Saluda Settlement parties, Interior, staff	\$0	\$1,960	\$1,960
Recreation, Land Use, and Aesthetics Resources				
26. Conduct a survey of future recreation sites	Saluda Settlement parties, staff	\$216,300	\$0	\$30,810
27. Implement new recreation flows	Saluda Settlement parties, Interior, staff	\$0	\$154,390 ^p	\$154,390
28. Implement the Columbia Fire Department rescue training flows	Saluda Settlement parties, Interior, staff	\$0	\$180,730 ^q	\$180,730
29. As part of the Recreation Plan, improve facilities and barrier-free access at Larry L. Koon, Shull Island, Murray Shores, Higgins Bridge, Kempson Bridge, Metts landing, River Bend, Sunset, Hilton, Dam Site, Lake Murray Estates Park, and Gardendale recreation sites	Saluda Settlement parties, Interior, staff	\$1,458,200	\$0	\$207,650
30. As part of the Recreation Plan, provide overall operation and maintenance of recreation sites	Saluda Settlement parties, Interior, staff	\$0	\$499,660	\$499,660

Enhancement/Mitigation Measures	Entities	Capital (2010\$)^a	Annual (2010\$)^a	Total Annual Cost (2010\$)
31. As part of the Recreation Plan, provide new public access areas at Cloud's Creek, Little Saluda Point, Old Corley Bridge, Twelve-mile Creek, and Candi Lane	Saluda Settlement parties, Interior, staff	\$187,070	\$0	\$26,640
32. Implement the Warning Siren Enhancement Program including any operation and maintenance and replacements as required over the license term	Saluda Settlement parties, Interior, staff	\$1,505,860	\$53,570	\$268,000
33. Implement the final SMP	Saluda Settlement parties, Interior, staff	\$0	\$641,600	\$641,600
Cultural Resources				
34. Develop and implement the final HPMP	Saluda Settlement parties, Interior, staff	\$0	\$41,800	\$41,800

^a The costs are based on revised exhibit D-8 (7/31/09) as filed by SCE&G unless otherwise indicated

^b The Saluda Settlement parties includes 19 parties as follows: South Carolina Electric and Gas Company, American Rivers, American Whitewater, Capitol City/Lake Murray County Tourism, Catawba Indian Nation, City of Columbia Fire and Rescue, City of Columbia Parks and Recreation, Coastal Conservation League, Lake Murray Association, Lake Murray Docks, Inc., Lake Murray Homeowners Coalition, Lake Murray Power Squadron, Lake Watch, Lake Murray Chamber of Commerce, Midlands Striper Club, Riverbanks Zoo and Gardens, South Carolina Department of Natural Resources, South Carolina Wildlife Federation, and South Carolina Department of Archives and History.

^c The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09), which reduced annual generation by 976 MWh/yr for a total cost of \$52,680 based on staff estimated energy rates.

- ^d The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09) which increased annual generation by 8,174 MWh/yr and shifted 39,763 MWh/yr from on-peak to off-peak, for a net cost of \$780,290 based on staff estimated energy rates. The adaptive management portion of this measure would increase costs by an additional \$76,130 to \$856,420.
- ^e The Catawba Indian Nation and South Carolina Department of Archives and History were impartial as to whether the low inflow protocol is initiated when reservoir levels fall 1 foot or 2 feet below the target elevation and would be amenable to either trigger.
- ^f The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09) which increased annual generation by 391 MWh/yr and shifted 805 MWh/yr from off-peak to on-peak, for a total gain of \$45,840 based on staff estimated energy rates. The cost of the adaptive management portion of this measure would reduce the gain by \$23,710 to \$22,130.
- ^g The cost of the various triggers is a function of many variables, including, but not limited to, the following: reservoir levels (affects available head at powerhouse), generation with minimum flows, effects on generation during recovery of the reservoir from levels below the guide curve, on-peak versus on-peak generation potential, and frequency of occurrence. Based on these variables and the expected benefit estimated by SCE&G for the 1-foot trigger of \$46,840, we have estimated the benefit of a 2-foot-trigger to be about \$30,000; the benefit of a 4-foot trigger to be about \$20,000; and the benefit of a 6-inch trigger to be about \$60,000. These benefits would be offset by the cost of the adaptive management portion of the measure of \$23,710.
- ^h The cost shown is based on \$10,000 per year per gage as estimated by staff.
- ⁱ The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09) which increased annual generation by an average of 8,303 MWh/yr for a gain of \$346,180 based on staff estimated energy rates.
- ^j The only parts of the Santee Basin Accord that we would recommend as a part of the license would be SCE&G's proposals on reservoir levels, instream flows, and Low Inflow Protocol, as well as a Section 18 reservation of authority. Because these measures would be provided under other requirements/parts of the license, the cost for those measures under the Santee Basin Accord would be zero. All other provisions of the Santee Basis Accord are not specifically related to the Saluda Project.
- ^k Under the Sturgeon Program, we would only recommend SCE&G's DO enhancement measures and new instream flows (at no cost to the Sturgeon Program), as well as the telemetry study in the lower Saluda and Congaree rivers, and the

temperature and water quality monitoring, because both would be affected by project operations. The costs of the telemetry study and temperature and water quality monitoring would be covered by the \$50,000/yr that SCE&G cited. The third study would be a habitat study in the lower Saluda River if sturgeon are found to utilize habitat in the river by the telemetry study. No cost is included for that study because we don't know if sturgeon would be found in the river and the habitat study would, in turn, be required.

- ^l The Trout Program for the lower Saluda River would include five goals and objectives: (1) assess changes in trout habitat as a result of new flows and DO measures; (2) assess trout reproduction under the new flow regime; (3) assess growth rates after new flows are implemented; (4) assess the relative contribution to the fishery for trout and other species; and (5) evaluate the potential for a naturally reproducing trout population in the lower Saluda River. We would only recommend that objectives (1), (2), and (3) be included as license requirements. Of the \$35,000/yr cited by SCE&G for the Trout Program, we estimate the cost for implementing the three objectives would be approximately \$21,000.
- ^m We recommend this measure, but would also recommend that SCE&G file the results of the sampling with the Commission at the end of each sampling season. We would recommend that sampling and reporting be conducted for five years following the completion of each unit upgrade.
- ⁿ The cost of the mitigation portion of the Entrainment Program cannot be estimated because it would be dependent on whether or not there is an actual fish kill, the size of the kill, the species killed, etc.
- ^o We only recommend Interior's recommendation to inform the public about snakeheads and to report any snakehead captures or cogongrass observations, but if any snakeheads or cogongrass are found, we also recommend that SCE&G consult with FWS and South Carolina DNR to discuss monitoring and control strategies. We are recommending that SCE&G develop a public education program to inform the public about terrestrial and aquatic invasive species. We estimate the cost of developing such a program would be about \$1,000 per year, and if needed, consultation would cost an additional \$800 per year.
- ^p The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09) which increased annual generation by 643 MWh/yr and shifted 4,834 MWh/yr from on-peak to off-peak for a total cost of \$113,790 based on staff estimated energy rates, plus the cost of the adaptive management portion of the measure of \$40,600.

- ^q The cost shown is based on energy changes outlined in revised exhibit D-8 (7/31/09) which reduced annual generation by 745 MWh/yr and shifted 4,574 MWh/yr from on-peak to off-peak for a total cost of \$180,730 based on staff estimated energy rates.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section we compare the developmental and non-developmental effects of SCE&G's proposal, SCE&G's proposal as modified by staff (i.e., the staff alternative), and the no-action alternative.

We estimate the annual generation of the project under the proposal and two alternatives identified above. Our analysis shows that the annual generation would be 195,859 MWh for the proposed action; 195,725 MWh for the staff alternative; and 180,069 MWh for the no-action alternative. We summarize the environmental effects of the different alternatives as follows.

Water Resources

Under SCE&G's proposal, maximum and minimum reservoir levels would be higher under the new guide curve, and drawdowns would be scheduled every 3 years depending on inflow. However, with the higher reservoir levels, we would expect that the long-term rate of net sediment accumulation would increase slightly near the points of entry of the upper Saluda River and tributaries into Lake Murray, compared to current rates. SCE&G would start to reduce flow releases to the lower Saluda River during low inflow conditions when the reservoir level falls to 1 foot below the new guide curve. Upgrading the turbine runners would improve DO conditions in the lower Saluda River.

Under the staff alternative, the proposed reductions in flow releases to the lower Saluda River would not be implemented until the reservoir water level fell to 2 feet below the new guide curve during low inflow conditions, resulting in slightly lower lake levels (relative to SCE&G's proposal) during drought conditions. However, our alternative would provide more protection to the aquatic habitat in the lower Saluda River during drought conditions.

Aquatic Resources

Higher water levels in Lake Murray and reduced drawdowns under the SCE&G proposal would benefit the resident fisheries in the lake. Reduced drawdowns would inundate about 4,000 more acres of shallow water habitat during the normal spawning and rearing period (growing season) from March to September for most of the resident fish species. Increased flow releases to the lower Saluda River would provide favorable spawning conditions in the spring for striped bass in the Congaree River and other species in the lower Saluda River, as well as improved aquatic habitat year-round. SCE&G's proposal includes studies and monitoring of freshwater mussels, macroinvertebrates, trout, shortnose sturgeon, and the fish community in the lower

Saluda River designed to provide the applicant and state and federal resource agencies with more information about the abundance, behavior, and life-history related information about these species, as well as assist in the enhancement and restoration of some of these species.

Under normal flow conditions, the staff alternative would provide the same benefits to aquatic resources as SCE&G's proposal. Under low flow conditions, implementation of the Low Inflow Protocol and reduction in flows to the lower Saluda River would not start until the reservoir water level reaches 2 feet below the new guide curve, resulting in slightly lower lake levels and slightly higher flow releases to the lower Saluda River during low inflow conditions, compared to the SCE&G proposal (1-foot trigger with the Low Inflow Protocol). Under the staff alternative, some of the additional studies and monitoring for trout and shortnose sturgeon would not be required as a condition of any new license, nor would South Carolina DNR receive compensation for fish lost to entrainment. However, measures not required by the license could still be provided under the Saluda Settlement voluntarily by SCE&G.

Terrestrial Resources

Under both SCE&G's proposal and the staff alternative, rare species such as the bald eagle, rocky shoals spider lily, and purple martin would continue to be protected, and additional lands would be made available to improve waterfowl habitat. Under the staff alternative, SCE&G would consult with resource agencies to develop invasive species management for both aquatic and terrestrial invasive species, if necessary. The proposed SMP would protect the remaining patches of habitat through the designation of the Natural Areas classification and stricter requirements within lands classified as Future Development and Easement Property.

Threatened and Endangered Species

Under both SCE&G's proposal and the staff alternative, protection of two federally listed species (shortnose sturgeon and the wood stork) would be enhanced. However, we conclude that continued operation of the project with our recommended measures would adversely affect the shortnose sturgeon based on adverse effects on habitat, and would not likely adversely affect the wood stork.

Recreation, Land Use, and Aesthetics

Under both SCE&G's proposal and the staff alternative, increased and scheduled boating flows in the lower Saluda River combined with more warning sirens and strobe lights would enhance boating opportunities and safety. Existing recreational facilities would be upgraded, and facilities at the sites near or at capacity would be expanded to meet the existing recreational demand. SCE&G would develop nine new recreational facilities within the next 10 years to keep pace with the growth in demand. Additional

future recreation sites would be designated as part of the Recreation Plan and reserved to address future recreation demand at the project.

Under both SCE&G's proposal and the staff alternative, the proposed SMP would reclassify about 185 miles of shoreline from Future Development to Public Recreation, Forest Management, and Natural Areas to protect wildlife habitat and enhance recreational experiences.

Cultural Resources

Under both SCE&G's proposal and the staff alternative, completion of surveys along the project shoreline and prior to any ground-disturbing activities, along with the guidelines for rehabilitating existing facilities, would avoid unintended harm to historic properties in the project area.

Socioeconomic Resources

Under both SCE&G's proposal and the staff alternative, the generally higher lake level, increased flows to the lower Saluda River, and improved recreational facilities would benefit the economy because they would support higher levels of recreational use, and hence more localized spending related to recreational pursuits. Implementation of the SMP under SCE&G's proposal and the staff alternative may have an effect on property values.

Under the no-action alternative, environmental conditions would remain the same, and no enhancement of environmental resources would occur.

5.2 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment would be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Saluda Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative as the preferred option. We

recommend this option because: (1) issuance of a new hydropower license by the Commission would allow SCE&G to operate the project as an economically beneficial and dependable source of electrical energy for its customers; (2) the 247 MW of electric energy generated from a renewable resource may offset the use of fossil-fueled, steam-electric generating plants, thereby conserving nonrenewable resources and reducing atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect and enhance fish and wildlife resources, and would provide improved recreation opportunities at the project.

In the following section, we make recommendations as to which environmental measures proposed by SCE&G or recommended by agencies and other entities should be included in any license issued for the project. In addition to SCE&G's proposed environmental measures, we recommend several additional staff-recommended measures that would modify SCE&G's proposed environmental measures. We also discuss which measures proposed by SCE&G or recommended by others that we do not recommend including in a license.

Measures Proposed by SCE&G and Recommended by Staff

Based on our environmental analysis of SCE&G's proposal discussed in section 3 and the costs discussed in section 4, we recommend including the following environmental measures proposed by SCE&G, as modified by staff, in any license issued for the project.

Water Resources

- Implement the final Normal Reservoir Operating Guidelines (appendix A-14 of Saluda Settlement) that would operate Lake Murray between elevations 356.5 and 352.5 feet based on a guide curve with a target elevation of 356.5 feet from March 1 through September 1 and a gradual decrease to 354.5 feet on December 1 and then to 352.5 feet by December 31 and increase to 356.5 feet by March 1; maintain a maximum operating pool elevation of 358.5 feet and a minimum operation pool elevation of 343.5 feet for periodic maintenance activities.
- Implement the Flow Release Program (appendix A-11 of Saluda Settlement) that would, in normal years, release from the project powerhouse into the lower Saluda River a minimum flow of 700 cfs from January 1 through

- March 31; provide the striped bass release flows⁴² as target release flows, with a 1,000-cfs minimum flow release from April 1 through May 10; a 1,000-cfs minimum flow release from May 11 through May 31; and a 700-cfs minimum flow release from June 1 through December 31.
- Implement a final Low Inflow Protocol (appendix A-13 of Saluda Settlement) that would be triggered by an unspecified drop in the reservoir elevation and would use 14-day flow averaging. During low inflow operations, the above minimum flow releases from the project powerhouse to the Saluda River would be modified as follows:
 - January 1 through March 31, provide a target flow release of 500 cfs and a minimum flow release of 400 cfs;
 - April 1 through May 10: if 14-day average inflow is greater than the striped bass requested flow release, provide the striped bass flow release as a target flow release with a 1,000-cfs minimum; if 14-day average inflow is less than the striped bass requested flow release, provide a 1,000-cfs minimum flow release; if 14-day average inflow is less than 1,000 cfs, provide a 700-cfs minimum flow release; if 14-day average inflow is less than 700 cfs, provide a target flow release of 500 cfs and a minimum flow release of 400 cfs;
 - May 11 through May 31, provide a target flow release of 700 or 500 cfs, depending on inflow as described above, and a minimum flow release of 400 cfs; and
 - June 1 through December 31, provide a target flow release of 500 cfs and a minimum flow release of 400 cfs.
 - Implement the Reservoir Drawdown Plan (appendix A-12 of Saluda Settlement).
 - Install new runners and upgrade all five generating units to improve DO in flows released from the project into the lower Saluda River.
 - Develop and implement an operational compliance monitoring plan.

⁴² The striped bass flows would range from 1,000 to 2,700 cfs, depending on the average daily flow reported at the upstream USGS Alston Gage No. 0216100, located on the Broad River at Alston, South Carolina.

Aquatic Resources

- Implement the final Macroinvertebrate Program (appendix A-3 of Saluda Settlement) that calls for continued macroinvertebrate sampling in the lower Saluda River.
- Implement the final Mussel Program (appendix A-4 of Saluda Settlement) to restore freshwater mussels in the lower Saluda River.
- One year after the Unit 5 upgrades are made, SCE&G consult with state and federal agencies and other stakeholders to determine how best to operate Unit 5 to aid in the preservation of coolwater habitat for both the reservoir and riverine fishes.
- Continue implementing Unit 5 hydroacoustic monitoring to minimize fish entrainment.
- Implement the measures of the Santee Basin Accord directly related to project operations (appendix A-5 of the Saluda Settlement) including the proposed minimum flows from the project, the new guide curve for Lake Murray, and the Low Inflow Protocol.
- Implement the measures in the Sturgeon Program directly related to project operations (appendix A-6 of the Saluda Settlement), including the telemetry and water quality monitoring studies.
- Implement the measures in the Trout Program directly related to project operations (appendix A-7 of the Saluda Settlement), including: (1) the assessment of qualitative changes in trout habitat as a result of proposed minimum flow releases and DO enhancements; (2) investigation of existing trout reproductive success in the lower Saluda River under proposed operations; and (3) determining growth rates of trout after implementation of the proposed instream flows.
- Implement the lower Saluda River Fish Monitoring Program (appendix A-8 of the Saluda Settlement).

Terrestrial Resources

- Implement the final T&E Program (appendix A-9 of Saluda Settlement) including formal management plans for bald eagles and rocky shoals spider lily.

- Coordinate with the South Carolina DNR Aquatic Nuisance Species Program and the South Carolina Aquatic Plant Management Council to manage invasive aquatic plants in the project area.
- Designate Lunch Island (Bomb Island) as a protected habitat for purple martins.
- Lease about 1,100 acres of Forest Management land between the project boundary and the 360-foot-contour elevation to South Carolina DNR to be placed and maintained in the Wildlife Management Area Program, as determined by South Carolina DNR.

Threatened and Endangered Species

- Implement the final T&E Program (appendix A-9 of Saluda Settlement) including reporting future occurrences of wood stork to FWS and South Carolina DNR.
- Publish and make available the *Plant and Animal* brochure addressing life history, conservation status, and habitat needs of species known to occur in the project area, including the shortnose sturgeon, bald eagle, wood stork, rocky shoals spider lily, and purple martin.

Recreation, Land Use, and Aesthetics

- Implement the final Recreation Plan (appendix A-2 of Saluda Settlement) to address future recreational use and capacity concerns, improvements to existing recreation sites, and monitoring public access needs.
- As part of the final Recreation Plan, improve facilities and accessibility at the Larry Koon boat landing, Shull Island, Murray Shores, River Bend, Sunset, Hilton, Dam Site – Irmo side, Higgins Bridge, Kempson Bridge, Lake Murray Estates Park, Metts Landing, and Gardendale public access areas.
- Within 10 years of license issuance, develop recreational facilities at Cloud's Creek (including gravel parking and carry-in), Little Saluda Point (including additional acreage for future expansion, accessible fishing piers, and a walking path), Old Corley Bridge Road canoe access (including gravel parking, carry-in, and signage), Twelve-Mile Creek (including potential leasing), and Candi Lane (including leasing).
- Set aside project lands for future recreation use at 19 locations (some of these lands are adjacent to existing public access areas).

- Provide recreational flow releases in the lower Saluda River of about 45,000 acre-feet of water; including target flows of between 700 and 1,000 cfs for 33 days annually for wade angling; target flows of between 2,000 and 10,000 cfs for 19 days annually for whitewater boating activities, including kayaking events, and rafting; and between 8,000 and 15,000 cfs for 11 days annually for swift water rescue training.
- Implement the final Warning Siren Enhancement Plan (appendix A-1 of Saluda Settlement) for additional warning sirens and strobe lights along the lower Saluda River.
- Implement the final SMP (appendix A-15 of Saluda Settlement), including the Woody Debris Plan (appendix A of the SMP), the Buffer Plan (appendix B of the SMP), and the Sedimentation and Erosion Control Plan (appendix C of the SMP).

Cultural Resources

- Implement the final HPMP (appendix A-17 of Saluda Settlement).

Additional Measures and Modifications Recommended by Staff

In addition to SCE&G's proposed measures listed above, we recommend the following modifications to SCE&G's proposed measures and additional staff-recommended measures in any license issued for the Saluda Project:

- Modify SCE&G's final Low Inflow Protocol (appendix A-13 of Saluda Settlement) to trigger implementation of reduced flow to the lower Saluda River by a 2-foot drop in reservoir elevation.
- Modify SCE&G's final Mussel Program to: (1) include provisions that any mussels found on the Saluda River side of the Congaree River during monitoring be tagged and relocated to the Broad River side of the river as a one-time event; should larger than expected numbers of mussels be captured, such that tagging and relocation of all of the captured mussels would be difficult or infeasible, SCE&G should consult with the Working Group to determine whether modifications to this tagging and relocation program should be made; (2) provide that four locations with freshwater mussels on the Broad River side of the Congaree River be identified for tagging and monitoring by SCE&G in consultation with the other entities comprising the Working Group, with the caveat that, if less than four suitable monitoring locations are found, this monitoring could occur with less than four locations; (3) monitor these locations annually for 5 consecutive years; after 5 years, SCE&G, in consultation with the other entities in the Working Group, should

file a report with the Commission that reviews the monitoring results and includes any recommendations made by SCE&G or other Working Group entities for future conservation and mitigation actions. If any of those measures would involve changes to the license, SCE&G should also file those proposed measures for Commission approval; and (4) modify the Mussel Program to remove the provision requiring that SCE&G provide \$75,000 to the FWS for its mussel experimental studies and restoration/reintroduction activities.

- Modify SCE&G's Fish Monitoring Program (appendix A-8 of the Saluda Settlement), by requiring that SCE&G report the monitoring results to the Commission and the resource agencies for a period of 5 years after each unit upgrade.
- Provide information to the public about how to identify snakeheads and report snakehead captures, and consult with the resource agencies regarding further monitoring and control measures if snakeheads or other exotic invasive species are detected in the project area.
- Modify SCE&G's final SMP to: (1) include a provision to require SCE&G, after consultation with settlement parties and Cloud's Creek Properties, LLC, to develop procedures to allow existing structures to remain within the SMP's buffer zone (i.e., a grandfather clause); (2) file an annual report documenting the permits granted for dock facilities that exceed 10 slips, including the location, type, and number of authorized slips for each facility; (3) annually file a revised exhibit G, for Commission approval, that includes all newly acquired buffer zone lands; and (4) continue to provide overnight anchoring at Hurricane Cove and Two Bird Cove.
- Include NPS as a participant on the adaptive management team.
- Reservation of authority for Interior and NMFS to prescribe fishways.

We discuss our rationale for the measures we recommend as part of the staff alternative below, and measures that we do not recommend are discussed in the following section.⁴³

⁴³ When requested by Interior or NMFS, the Commission's practice is to include a license condition reserving its authority to require fishways that may be prescribed by the Secretaries of the Interior or Commerce; therefore, we do not include a discussion of this matter below.

Reservoir Levels and Minimum Flow

The Saluda Project uses waters of the Saluda River and its tributaries to generate electricity. SCE&G currently operates the project to manage Lake Murray water surface levels on a seasonal basis attempting to keep the elevation above the minimum level required for municipal water withdrawal and voluntarily providing a minimum flow of 180 cfs to the lower Saluda River. Key issues during the Settlement negotiation concerned lake levels that would ensure accessibility of public and private docks for recreational activities, and downstream flows that would improve the aquatic habitat for trout and striped bass in the lower Saluda River. To address these concerns, SCE&G proposes to implement a new guide curve for Lake Murray that would maintain the reservoir at generally higher levels during the year than under current operations, implement a Reservoir Drawdown Plan to reduce the frequency and occurrence of drawdowns, and increase minimum flows to the lower Saluda River. This new guide curve (Normal Reservoir Operating Guidelines), Reservoir Drawdown Plan, and flow regime (Flow Regime Plan) are supported by all the signatories to the Saluda Settlement as well as Interior.

Our analysis in section 3.3.2.2, *Aquatic Resources*, concludes that these proposed higher reservoir levels would benefit aquatic resources, as more aquatic habitat would be maintained (less dewatering would occur) throughout the year and access to public and private docks during the recreation season would be maintained, compared to existing operations that allow drawdowns of up to 6 feet from full pool levels during March to September, and up to 10 feet during the remainder of the year. Reducing drawdowns during the March to September growing season would be particularly beneficial, because these months include the normal spawning and rearing periods for most of the resident reservoir fish species, and maintaining more aquatic habitat in the reservoir littoral zone would benefit these species. Under proposed operations, a growing season drawdown to elevation 356.5 feet would result in a reservoir area of about 48,000 acres, which would inundate about 4,000 more acres of shallow (less than 4 feet deep) littoral zone habitat, and result in an increase in overall wetted habitat within the lake of about 9 percent.

The proposed winter drawdown of no more than 6 feet below maximum pool level (to elevation 352.5 feet) would maintain a reservoir area of about 44,000 acres, compared to existing operations of up to a 10-foot drawdown (to elevation 348.5 feet), resulting in a reservoir area of about 40,000 acres. Thus, the proposed guide curve would maintain an additional 4,000 acres of aquatic habitat during the winter period, which would act to protect shoreline littoral habitat and bordering wetlands, which are important habitat for shoreline species. Protection of this shoreline habitat over the winter period also would benefit both invertebrate and vertebrate aquatic species.

An overall objective of the proposed increased minimum flows would be to provide 80 percent of the maximum available WUA, an index of aquatic habitat. We reviewed the results of SCE&G's IFIM study, conducted at multiple study sites in the lower Saluda River extending from the project tailrace downstream to just above the confluence with the Broad River. Our analysis concluded that the proposed minimum flows of between 700 and 1,000 cfs would provide about 80 percent of the maximum WUA for a majority of the species and life stages evaluated, and thus would provide adequate protection and enhancement of aquatic habitat in the lower Saluda River.

Striped bass were initially not an evaluation species for the IFIM study, but striped bass adult habitat was evaluated as an additional life stage for analysis by Kleinschmidt (2008), because adult striped bass use the lower Saluda River as a thermal refuge during the summer months. The additional IFIM analysis indicated that pool habitat in the lower Saluda River would remain highly suitable for adult striped bass holding at all river flows, and that run habitat (which would also provide suitable adult striped bass holding habitat) would meet the 80-percent-of-maximum-WUA target at flows of 2,000 to 4,000 cfs. Although this range of flows is higher than the proposed minimum flows, existing pool habitat, which comprises a high percentage of the habitat in some parts of the lower Saluda River, would be adequately protected at the proposed minimum flows. Based on this information and on the hydrology of the lower Saluda and Broad rivers, the proposed enhancement flows would provide adequate striped bass spawning conditions in the Congaree River. However, in the event these flows are not adequate, they would be reviewed on an annual basis by the adaptive management team, and recommendations would be made to the Commission for adjusting the minimum flows to provide more optimum habitat. Implementation of the new guide curve would cost about \$52,680 annually, and the minimum flow releases would cost about \$856,420 annually. We find that the benefits of implementing the new guide curve and minimum flow releases would be worth these costs.

Maintenance, Emergency, and Low Inflow Protocol

The project area has undergone severe drought conditions over the past several years that have affected both the recreational use of Lake Murray and the aquatic habitat in the lower Saluda River. SCE&G proposes to implement a Low Inflow Protocol that would be triggered by a 1-foot drop below the proposed reservoir guide curve elevation and 14-day inflow averaging. Both the 1-foot drop below the guide curve and the inflow criteria would have to be met to trigger the protocol. Once the protocol was triggered and alternative minimum flows released, regular (i.e., non-Low-Inflow-Protocol) minimum flow releases would resume when the inflow criteria under the 14-day-averaging trigger are met, even if the reservoir levels would still be below the trigger reservoir elevation. During low inflow, the proposed minimum flow releases would be reduced to a target flow release as low as 500 cfs, and to an absolute minimum flow release of 400 cfs, depending on season and inflow. The Low Inflow Protocol is

supported by the signatories to the Saluda Settlement and other commenting entities, but the parties have not agreed on the appropriate reservoir trigger level (below guide curve elevation) for implementation. Although SCE&G proposes a 1-foot trigger, other entities have recommended triggers of 6 inches, 2 feet, and 4 feet. The parties agreed to let the Commission determine the appropriate trigger level through the National Environmental Policy Act process.

The overall objective of the Low Inflow Protocol is to provide a balance between potential adverse effects on Lake Murray levels and to instream flows in the lower Saluda River, in the event drought conditions occur and inflow to Lake Murray is not sufficient to maintain both the proposed guide curve lake levels and proposed instream flows in the lower Saluda River. In section 3.3.1.2, we conclude that a 2-foot trigger would provide an adequate balance between maintaining Lake Murray levels and instream flows in the lower Saluda River. Our analysis found that, on average over a 28-year modeled period, a 1-foot trigger maintains higher reservoir levels than a 2-foot trigger, but the differences are small – about 0.25 foot (3 inches). Differences in downstream flow releases are also small. Differences in reservoir water levels become greater (up to 0.5 foot) when only dry years are modeled, as do flow releases downstream.

South Carolina DNR supports a 2-foot trigger, and by letter filed November 10, 2009, provided an analysis of the potential effects on lower Saluda River aquatic habitat of alternative trigger levels for the Low Inflow Protocol, using the results of SCE&G's IFIM study. South Carolina DNR assessed the WUA (an index of habitat) that would be provided for the evaluation species included in the IFIM study if downstream flow releases were reduced from 700 to 400 cfs. A flow of 400 cfs would be the absolute minimum flow that would be provided during implementation of the Low Inflow Protocol and thus would represent the worst-case scenario. This analysis showed that for the total species/life stages analyzed at the 10 study sites in the lower Saluda River, 80 species/life stages showed a decrease in WUA while 38 showed an increase in WUA, indicating that a majority of species/life stages would experience reduced habitat availability at the lowest minimum flow release that would occur under the Low Inflow Protocol. While this may represent the worst-case scenario, it would nonetheless be an impact that could occur anytime the Low Inflow Protocol is implemented and the minimum flow would need to decrease to 400 cfs. In addition, during drought conditions, with or without the Low Inflow Protocol, water management could affect many different resources as there would only be a finite amount of water available for use by all entities.

Based on the modeling of 28 water years previously discussed, a Low Inflow Protocol with a 1-foot trigger would be expected to occur about 61 percent of the time. A Low Inflow Protocol with a 2-foot trigger, however, would be expected to occur about 36 percent of the time. Thus, adverse impacts on aquatic resources in the lower

Saluda River could occur much more often with a 1-foot trigger, compared to a 2-foot trigger, while lake levels would only experience, on average, an additional drawdown of 0.25 foot (3 inches) with a 2-foot trigger. An additional drawdown of 3 inches would likely have an imperceptible impact on shoreline aquatic resources in Lake Murray, and may be within the range of fluctuation normally seen with typical operations and as a result of wave action. The purpose of the Low Inflow Protocol, as stated in the Saluda Settlement, is “to provide operational guidance for *abnormal operating situations* caused by maintenance activities, emergency situations (including high inflow or flood events), and *periods of sustained low inflow or drought conditions*” (emphasis added). A Low Inflow Protocol with a 1-foot trigger that would be expected to occur in about 61 percent of the years would be too frequent to meet the definition of “abnormal operating scenarios” or “sustained low inflow or drought conditions.” However, a Low Inflow Protocol that would occur in only about a third of the years (a 2-foot trigger), would better meet the definition stated in the Saluda Settlement, and would provide a better balance of potential adverse effects on aquatic resources in Lake Murray and in the lower Saluda River. For these reasons, we recommend that the Low Inflow Protocol with a 2-foot reservoir trigger be made a requirement of the license. Implementation of the Low Inflow Protocol with a 2-foot trigger would result in a benefit of \$6,290 annually as compared the \$16,000-benefit if implementing the Low Inflow Protocol with a 1-foot trigger. We find that the environmental benefits of a 2-foot trigger would be worth the reduced economic benefit.

Freshwater Mussels

Freshwater mussel populations are no longer present in the lower Saluda River, most likely because the colder temperatures resulting from project operations that release cooler waters from the powerhouse that support the popular trout fishery and provide a coolwater refuge for striped bass. However, mussel populations persist in the Congaree River but in low diversity and abundance. To enhance the Congaree River mussel populations, SCE&G proposes a freshwater Mussel Program that would include:

- Formation of a Saluda Hydro Freshwater Mussel Working Group to provide technical expertise and to oversee the mussel program;
- Phase I surveys for Savannah lilliput in upper Lake Murray, and for baseline characterization (using current conditions) of mussel populations in the Congaree River to a point 16 miles downstream of the Saluda River/Broad River confluence (1 to 2 years after license issuance);
- Phase II surveys and activities, including: (a) follow-up survey of the Congaree river 10 years after implementation of proposed minimum flows in the lower Saluda River; (b) contribution of \$75,000 to FWS for mussel experimental studies and restoration/reintroduction activities; and (c) in-kind

services to assist in mussel culture efforts by collecting mussel brood stock and host fish; and

- Phase III surveys a minimum of 5 years after initiation of mussel reintroductions, to assess the success of mussel restoration/reintroduction efforts.

The Mussel Program is supported by the Settlement parties, and by Interior (not a Settlement party), but Interior also provided specific recommendations for a freshwater mussel mitigation program in its initial section 10(j) recommendations. SCE&G stated that it was in general agreement with Interior's initial recommendations, but questioned the justification for some elements of the Interior program, including: (1) the length of the Congaree River that should be investigated (20 miles for Interior vs. 11 to 12 miles as stated by SCE&G in its response to Interior's recommendations); (2) the extent of mussel tagging on the four identified mussel communities on the Congaree River, where Interior appears to recommend that *all* mussels be tagged and monitored; (3) the need to translocate all the mussels from the Saluda River side to the Broad River side of the Congaree River; (4) the requirement that SCE&G develop a mussel propagation facility on the river (in the settlement, SCE&G stated it would provide funding to FWS to initiate mussel propagation efforts); and (5) the need for continuing monitoring for the life of the license. In the draft EA (section 3.3.2.2, *Aquatic Resources*), we analyzed these areas of disagreement on the Mussel Program and concluded that it would be appropriate to monitor to a point 16 miles downstream of the confluence of the Saluda and Broad rivers, and to tag, relocate, and monitor a subset of mussels, with the duration and frequency of monitoring to be determined by the Working Group based on the monitoring results.

Following issuance of the draft EA, in which we concluded that some of Interior's recommendations regarding its freshwater mussel mitigation program were inconsistent with section 10(j) of the FPA, Commission and Interior staffs met on

April 29, 2010 in Columbia to resolve inconsistencies related to Interior's section 10(j) recommendations. During the meeting Commission and Interior staffs reached agreement regarding the freshwater mussel mitigation program, and on May 7, 2010, Interior filed revised section 10(j) recommendations. These revised recommendations include:

- Forming a Saluda Hydro Freshwater Mussel Working Group consistent with the provisions of the Mussel Program;
- Conducting a baseline survey for freshwater mussels in the Congaree River from the confluence of the Saluda and Broad rivers to 16 miles downstream, within 1 year of license issuance, similar to the provisions of the Mussel Program;

- Tagging any freshwater mussels found on the Saluda River side of the Congaree River during the survey and relocate to the Broad River side of the river (one-time action), which Interior anticipates would involve only small numbers of mussels, but should larger numbers be encountered the Working Group would determine the best course of action; and
- Identifying four locations with concentrations of freshwater mussels on the Broad River side of the Congaree River for tagging and monitoring by the Working Group and monitoring these locations annually for 5 consecutive years; after 5 years, the Working Group should review the monitoring results and provide recommendations for future conservation and mitigation actions.

With regard to Interior's recommendation that SCE&G consult with the Working Group to determine whether modifications to this tagging and relocation program should be made in the event large numbers of mussels are captured, we find this to be a reasonable revision to the Mussel Program. Consultation with the Working Group would add no additional cost to the Mussel Program. Therefore, we recommend that the Mussel Program be modified to include this consultation provision.

Interior's recommendation that four locations with freshwater mussels be identified for tagging and monitoring on the Broad River side of the Congaree River would be beneficial for evaluating the success of the enhancement measures to be provided under any new license. The Mussel Program includes provisions for monitoring mussels in the Congaree River, and tagging and monitoring mussels in four locations would be one metric for measuring the response of mussel populations to the proposed changes in the flow regime from the project, and any other provisions of the Mussel Program. One caveat to this program, however, should be that, if less than four suitable monitoring locations are found, this monitoring could occur with less than four locations. We find this monitoring program to be a reasonable measure for evaluating the response of the mussel populations to the proposed enhancements, and would not add to the costs of the Mussel Program, which already includes mussel monitoring as one of its provisions.

Interior also recommends that these locations be monitored annually for 5 consecutive years, and that after 5 years, the Working Group should review the monitoring results and provide recommendations for future conservation and mitigation actions. This would be a reasonable monitoring interval and is consistent with our previous conclusion that the frequency of monitoring may also be best determined by the experts within the Working Group, although annual monitoring would appear to be a reasonable frequency. Upon completion of the 5 years of monitoring, SCE&G should consult with the other entities in the Working Group, and file a report with the Commission that summarizes the monitoring results and includes any recommendations made by SCE&G or other Working Group entities for future conservation and

mitigation measures. If any of those measures would involve changes to the license, SCE&G should also file those proposed measures for Commission approval. This additional reporting requirement at the end of the 5-year monitoring program would add only minor costs to the overall Mussel Program and therefore, we recommend it.

The remaining part of the Mussel Program that we do not recommend (i.e., a provision to provide \$75,000 to FWS) is discussed in the *Measures Not Recommended by Staff* section below.

Shortnose Sturgeon Protection

The Saluda Settlement includes a Sturgeon Program (appendix A-6). Under this program, SCE&G would: (a) provide the DO enhancements and instream flows to the lower Saluda River already proposed as part of the Saluda Settlement; (b) establish a Sturgeon Technical Advisory Team with NMFS, FWS, and South Carolina DNR; and (c) conduct several agency-recommended studies on shortnose sturgeon, as part of the studies to be conducted under the Santee Basin Accord. These studies would provide support to a long-term sturgeon recovery effort in the Santee River Basin.

Our analysis in section 3.3.2.2, *Aquatic Resources*, found that the overall objective for developing the Sturgeon Program was to design measures to mitigate any continuing impact of project operations on the species. Project-specific measures (DO enhancements and instream flows) would be provided under other parts of the Saluda Settlement and would satisfy the objective of the Sturgeon Program to improve habitat for the species. Two of the studies to be provided under the Sturgeon Program, the telemetry and water quality monitoring studies, would focus on assessing the effects of project operations on the shortnose sturgeon, and should be made a requirement of any license issued. A third study, a survey of detailed physical habitat in the lower Saluda River, would only be conducted if shortnose sturgeon are observed to use the river during the telemetry study. This habitat survey study would not be directly related to project operations but instead would be more related to identifying and categorizing shortnose sturgeon habitat as part of any future restoration efforts. That study we do not recommend be made a requirement of the license, although SCE&G would be free to conduct that study outside of the license, if it was triggered in the future. We estimate that the annual cost for the parts of the Sturgeon Program that we do recommend would be \$19,120, which is a reasonable cost for protecting and enhancing this federally listed species.

We assess the overall effects of the project on shortnose sturgeon in section 3.3.4, *Threatened and Endangered Species*, and conclude that continued operation of the project would adversely affect the shortnose sturgeon, based on effects on habitat. We will be requesting formal consultation with NMFS under section 7 of the ESA.

Trout Protection and Enhancement

The lower Saluda River supports an important and popular trout fishery made possible by the coldwater releases from the Saluda dam and trout stocking by South Carolina DNR. The Saluda Settlement includes a Trout Program for the lower Saluda River, which includes a number of studies that would be conducted to identify ways to enhance or manage the trout fishery in the river. The program also calls for the release of waters from the project that would meet state water quality standards, and the formation of an advisory committee to guide the program. The Trout Program would be funded by SCE&G with SCE&G providing \$30,000 to South Carolina DNR for a trout mortality study to be conducted by South Carolina DNR. The specific trout studies would be conducted in concert with other studies provided for under the Saluda Settlement, and an annual report on all trout studies would be prepared by SCE&G for submittal to the advisory committee.

Our analysis in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, found that the Trout Program for the lower Saluda River would be a useful program to gather additional data on the existing trout populations in the river, whether proposed instream flow and DO enhancements are having any effect on those populations, and whether a naturally reproducing trout population would be a reasonable management goal. This would be a cooperative program with South Carolina DNR. Some parts of the Trout Program would be associated with assessing the effects of project operations and proposed enhancement measures, but other parts of the program are more designed as research projects that would assist South Carolina DNR in its fisheries management of the lower Saluda River.

The three parts of the Trout Program that would be directly associated with project operations include: (1) the assessment of qualitative changes in trout habitat as a result of proposed minimum flow releases and DO enhancements; (2) investigation of existing trout reproductive success in the lower Saluda River under proposed operations; and (3) determining growth rates of trout after implementation of the proposed instream flows. These investigations should be included as license conditions, as they would help identify project effects on the trout fishery. We estimate that the annual cost for the parts of the Trout Program that we do recommend to be \$1,610, which is a reasonable cost for protecting and enhancing this valuable fishery.

The remaining two parts of the Trout Program that we do not recommend are discussed in the *Measures Not Recommended by Staff* section below.

Lower Saluda River Fish Community Monitoring Program

Appendix A-8 of the Saluda Settlement provides for continuation of the Fish Monitoring Program on the lower Saluda River, which SCE&G has conducted since the 1990s. Sampling would be conducted in spring and fall using electrofishing gear, and

all fish would be identified to the lowest taxonomic level, measured, weighed and released.

Our analysis in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, found that this sampling would continue to provide a long-term database on fishery resources in the lower Saluda River, and could be useful in identifying long-term trends in the fishery as well as documenting any changes in the fish community following changes in minimum flow releases or other operations (e.g., the proposed upgrade of the generating units). This Fish Monitoring Program, as proposed, does not require an annual report to any regulatory agency. These fish collections, along with an annual report to the Commission and other agencies and interested parties, however, would be a useful tool for assessing the benefits of new measures implemented under a new license. We recommend adding a reporting requirement to the Fish Monitoring Program, which should be made a requirement of any new license issued for the project. The reporting period should be for a period of 5 years after each unit upgrade.

We estimate that the monitoring program described above would have an annual cost of \$30,910, with an additional cost of \$5,000 per year to add the reporting requirement. We conclude this would be a reasonable cost for providing data on the lower Saluda River fish community's response to proposed changes in project operations.

Adaptive Management Team

The Saluda Settlement includes an adaptive management team that would consist of SCE&G, state and federal resource agencies, and other relicensing stakeholders with relevant experience and interests. The Saluda Settlement also states that all members of this team must be signatories to the Saluda Settlement. In our analysis in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, we concluded that, based on available information and on hydrology of the lower Saluda and Broad rivers, the proposed enhancement flows would provide adequate striped bass spawning conditions in the Congaree River. However, we noted that, in the event these flows are not adequate, they would be reviewed on an annual basis by the adaptive management team and potentially adjusted to provide more optimum habitat.⁴⁴

In its comments on the draft EA, NPS requests that the Commission require SCE&G to include NPS as a participant on the adaptive management team despite the fact that NPS is not a signatory to the Saluda Settlement. It also comments that the

⁴⁴ We note that any "adjustments" to operational license conditions beyond that expressly permitted by any license issued for the project would require Commission approval prior to implementation.

overall adaptive management program should be focused on a wider range of environmental factors and not limited to striped bass. We find that it would be appropriate for NPS to be a member of the adaptive management team because it is a federal resource agency that has responsibility for managing important resources on the Congaree River (Congaree National Park), and its presence would be important to ensure that the resources of Congaree National Park are considered in any review and adjustment of minimum flows released from the project. Inclusion of NPS on the adaptive management team could be beneficial to the interests of the park at little or no additional cost. However, we defer to the adaptive management team the decision on the range of environmental factors to be considered and discussed beyond that related to project operational effects on striped bass as proposed under the Saluda Settlement.

Fish Entrainment

Continued operation of the project would result in some fish entrainment through the turbine generators with associated mortality of a portion of the fish entrained. Under section 3.4 of appendix A of the Saluda Settlement, SCE&G would formalize its ongoing entrainment program for Unit 5 by operating the Unit 5 hydroacoustic monitoring equipment, in addition to implementing Unit 5 operational modifications, from July through October, or for other periods agreed to with South Carolina DNR.

Our analysis in section 3.3.2.2, *Aquatic Resources, Environmental Effects*, found that formalizing Unit 5 hydroacoustic (or other equipment) monitoring, along with the operational modifications to minimize fish entrainment, would be an appropriate measure for mitigating fish entrainment effects at the project. These measures would be worth the annual cost of \$10,150. Therefore, we recommend that such measures be made a requirement of any license issued.

Invasive Species Management

Snakeheads are freshwater fish in the family *Channidae* that are native to Africa and Asia, and are considered in the United States to be injurious, invasive species because they are known to be voracious predators with the potential to adversely affect native fishes. Interior states that the northern snakehead has been documented in Lake Wylie, North Carolina, which is part of the Catawba-Wateree Project in the Santee River Basin. Interior is concerned that the northern snakehead may spread within the Santee River Basin and adversely affect the important existing sport fishery within the basin. Thus, Interior recommends that SCE&G develop a program to monitor and detect northern snakeheads and other injurious fishes in the project vicinity; take coordinated actions to control the spread of the species; assist anglers in correctly identifying northern snakeheads by posting flyers that illustrate the difference between a bowfin and a northern snakehead at locations around Lake Murray; and encourage

anglers to report all snakehead captures. SCE&G does not propose any specific measures for the control of snakeheads or other aquatic invasive species.

Our analysis (as shown in section 3.3.2.2, *Aquatic Resources*) finds that there are no known populations of snakeheads in the project area. Most snakehead introductions in the United States are believed to be the result of illegal releases from pet owners, and as a result they have been banned from import and interstate transport without a permit from FWS, as cited in Interior's letter filed on September 25, 2009.

Our review suggests that because snakeheads do not occur in the project area at this time, it would be premature to include Interior's recommendation to implement a control program as a license condition.⁴⁵ However, requiring SCE&G to provide information to the public about how to identify snakeheads and to report any snakehead captures would be a reasonable measure to ensure that, should snakeheads become established in the project area, their presence would be detected. This public education program could be provided as a stand-alone program or as part of any other public education program conducted by SCE&G. We estimate the cost of a public education program for snakehead and terrestrial invasive species (see below) to be approximately \$1,000 annually, and if required, consultations would cost approximately \$800 annually. This would be a reasonable cost for a program to detect when invasive species such as the snakehead appear in the project area.

Interior also recommends that SCE&G consult with Interior in the development of a terrestrial and aquatic invasive species management plan. The recommended plan would include: (1) baseline surveys to identify the range and extent of terrestrial invasive plant species within the project boundary; (2) methods for managing invasive species (such as mechanical removal, mowing, herbicide treatment, etc.); (3) a requirement that applicant staff involved in herbicide use be trained as certified herbicide applicators; (4) a schedule of surveys and management; and (5) estimated costs for management.

In section 3, we found that Interior's recommendation for a separate terrestrial and aquatic invasive species management plan would be redundant and unnecessary in light of the applicant's proposal, as it relates to aquatic invasive plants. SCE&G's proposal would include assisting in the development and implementation of the Council's annual plan. This annual plan would not be included as part of any license issued for the project; however, when implemented by the Council, it would provide sufficient aquatic invasive species management. Interior's recommended cograss

⁴⁵ However, SCE&G and the resource agencies should consult regarding further monitoring and control measures. In addition, SCE&G's other proposed monitoring programs, such as the Fish Monitoring Program in the lower Saluda River, would indirectly provide for some of the monitoring recommended by Interior.

program, which would include baseline surveys and developing a monitoring and control plan for the species, does not appear to be necessary at this time because cogongrass has yet to be discovered in the project boundary. However, it could become established in the project area over the course of any new license. Thus, we recommend that SCE&G develop a public education program on cogongrass and other terrestrial invasive plants and aquatic species that may spread to the project area, and consult annually with South Carolina DNR's Aquatic Nuisance Species Program, the Council, and Interior regarding the occurrence of these invasive plant and animal species in the project area, so that SCE&G can determine appropriate control measures if or when these species appear within the project boundary. SCE&G's development of a public education program would address issues raised by Interior, would track the occurrence of invasive terrestrial and aquatic species in the project area, and would be worth the nominal costs for developing and implementing the program.

Installation of New Runners and Upgrading Turbine Units

Operation of the five units at the Saluda powerhouse affects the water temperature and DO levels in both Lake Murray and in the lower Saluda River, as described in section 3.3.1.1, *Water Quality*. There are benefits in releasing cooler waters into the lower Saluda River, because the cooler waters support the existing and popular put, grow, and take trout fishery and provide a coolwater refuge for striped bass from the Congaree River. Likewise, maintaining the coolwater pool of water in the Lake Murray hypolimnion provides a coolwater refuge for striped bass (which can be stressed by high water temperatures). At the same time, releases from the Saluda powerhouse must meet state water quality standards for DO for the protection of aquatic resources in the lower Saluda River, and SCE&G proposes to upgrade Unit 5 (and other units if required based on an adaptive management plan) and continue DO enhancement measures to meet state standards. Thus, operation of the Saluda powerhouse is somewhat of a balancing act for the protection of aquatic resources in both Lake Murray and the lower Saluda River.

The DO enhancement measures are supported by the Settlement parties as well as Interior and South Carolina DNR.⁴⁶ It would be appropriate for SCE&G and resource agencies to consult, both before and after Unit 5 upgrades are completed, to determine how best to operate the unit to benefit both the reservoir and lower Saluda

⁴⁶ South Carolina DNR is the state resource agency responsible for protecting fish and wildlife resources. South Carolina DHEC is the state agency responsible for protecting water quality.

River fisheries.⁴⁷ New information that would become available during any current studies and after monitoring of Unit 5 operations after its upgrade, may allow SCE&G and the agencies to make a better informed decision on how best to operate the unit and how to proceed with the remaining turbine upgrades to achieve compliance with state water quality standards for DO. We conservatively estimate the annual cost of implementing the program to install new runners and upgrade turbine units to improve DO in the lower Saluda River to include upgrades at all 5 units. Under this assumption, the annual cost would be \$1,248,570 and would be the single most costly measure included in the Saluda Settlement. For the reasons given, we consider the benefits of implementing the DO enhancements to be worth this cost.

Recreation Plan, Facilities, and Boating Flows

The Saluda Project includes some of the most important recreational resources in the region. To address recreational needs at the project, SCE&G proposes to implement a final Recreation Plan, which we describe in detail in section 3.3.5.2, *Recreation, Land Use and Aesthetics, Environmental Effects*. The Recreation Plan includes measures for: (a) improving existing public recreation facilities owned by SCE&G; (b) developing 10 new recreation facilities within the next 10 years; (c) designating 19 parcels of land for future recreation development; (d) management procedures and monitoring measures to identify recreation needs in the future; (e) providing recreational flow releases and swift water training flow releases; and (f) improving the recreational warning system in the lower Saluda River. The Recreation Plan is supported by the Settlement parties as well as Interior. The Recreation Plan would provide a framework for SCE&G to implement the recreational improvements discussed in section 3.3.5.2 in coordination with the Recreation Resource Conservation Group. The Recreation Plan would help SCE&G and other stakeholders identify and provide for future public access to project lands and waters to accommodate population growth, commercial businesses, tourism, development, and changing patterns of recreation use. We recommend that SCE&G implement the final Recreation Plan. The cost to monitor recreation demand, upgrade and maintain existing facilities, and develop new facilities would be about \$764,760 annually. The cost to provide the recreational boating and swift water training flows and the Warning Siren Enhancement Program, which would enhance user safety, would be an additional \$603,120 annually. We consider the benefits of implementing the measures included in the Recreation Plan to be worth this cost.

⁴⁷ SCE&G reports (letter from J.M. Landreth, Vice President Fossil & Hydro Operations, SCE&G, to K.D. Bose, Secretary, FERC, May 7, 2010) that the company has recently been discussing alternative Unit 5 operating scenarios with stakeholders, and that it is considering operating the unit in a first-on and last-off mode later in the year when fish densities are lowest near the intake towers. SCE&G is planning to continue these investigations off-license.

We do not recommend that the improvements to Candi Lane be conducted sooner than what is proposed in the Recreation Plan, as requested by American Whitewater. There is no evidence the improvements are imminently needed.

Shoreline Management Plan

As described in section 3.3.5, *Recreation, Land Use, and Aesthetics*, SCE&G proposes to reclassify about 185 shoreline miles (about 5,247 acres of land within the project boundary and about 3,900 acres of non-project lands) from Future Development to Public Recreation, Forest Management, and Natural Areas. Signatories to the Saluda Settlement and Interior support the revised SMP as a means to protect water quality, aquatic habitat, fisheries, wildlife areas, and the recreational experience on Lake Murray and along the lower Saluda River. Only one comment in response to the Saluda Settlement expressed concern that the regulations under the SMP are too rigid and are adversely affecting development opportunities.

In section 3.3.7, *Socioeconomics Resources*, we note that the loss of land classified as Future Development would likely reduce the taxable value of those properties, thereby reducing the counties' ability to increase tax revenues associated with those properties. We also note that increased tax revenue associated with developing more shoreline properties would not necessarily offset the additional costs to the counties or communities that provide services to those properties and residents. That would depend in large measure on the nature of the development, the types of residents that are attracted, the level of services provided by local governments, and the tax structure. At the same time, we note that the creation of the SMP was a public process that included counties, state agencies, homeowner groups, SCE&G, the public, and others. These representatives provided input for the parameters, shoreline classifications, and regulations that make up the SMP and conducted studies to determine a reasonable balance among the environmental and development interests.

In response to the draft EA, SCE&G and South Carolina DNR both requested that SCE&G be allowed to permit multi-slip facilities of up to 80 slips on lands classified as Future Development, without Commission approval. In support of their request, the parties noted that the Commission had made such allowances for another project with similar circumstances. Upon review of this new information, we determined that the proposed SMP contains the necessary requirements and resource protection guidelines to offset any potential adverse effects that may occur on resources as a result of the issuance of multi-slip permits. Therefore, we recommend that paragraphs B and D of the Commission's use and occupancy article be waived so that SCE&G would be allowed to permit up to 80 slips, as provided for in the proposed SMP.

We note that the proposed SMP does not contain procedures on how to: (1) manage existing structures in the 75-foot or 100-foot buffer zone; (2) amend the license to include any newly acquired buffer zone lands under the SMP; and (3) notify the Commission of the number of permits granted for facilities exceeding 10 slips. In addition, the SMP does not specifically allow for the continuation of overnight anchoring at Hurricane Cove and Two Bird Cove, as required by the Commission under the current license. Therefore, we recommend that SCE&G implement the final SMP, but with the following modifications: (1) include a provision to require SCE&G, after consultation with settlement parties and Cloud's Creek Properties, LLC, to (a) develop procedures to identify structures existing in the buffer zone and (b) include procedures and guidelines on how the existing structures would be managed and maintained within the SMP's buffer zone and when such structure could not be rebuilt or replaced (i.e., a grandfather clause); (2) annually file a revised exhibit G for Commission approval that includes all newly acquired buffer zone lands for that year and the associated acreage; (3) file an annual report, for Commission approval, that documents the number of permits granted that exceed 10 slips, and for each permit, include the type of permit issued, the location of the multi-slip facility, the number of authorized slips, and the date the permit was issued; and (4) continue to provide overnight anchoring at Hurricane Cove and Two Bird Cove. Implementation of the revised SMP would cost about \$641,600 annually. We consider the benefits of implementing the revised plan to be worth this cost.

We do not recommend the less restrictive shoreline classifications (relative to the proposed SMP) to enable landowners to apply for multi-slip boat dock facilities, as recommended by Beth Trump and Coleman Parks. We determined, as discussed in section 3.3.5.2, that the greater restrictions on the project lands adjacent to those of the landowners is needed for the protection of terrestrial and recreational resources.

We also do not recommend requests by Beth Trump, John Frick, and Robert Sellers to eliminate the SMP's proposed uniform buffer zone requirements. We determined, as discussed in section 3.3.5.2, that creating a uniform buffer zone on lands classified as Forest Management or Future Development would protect terrestrial and recreation resources from future development in these areas. To create such a uniform buffer zone, the proposed SMP requires that private lands either be deeded or sold to SCE&G but only if the landowner requests a boat dock permit and is granted one by SCE&G. SCE&G does not hold all rights necessary to create a uniform buffer zone. This provision gives the landowner the option of giving the necessary rights to SCE&G to create the buffer zone in exchange for a boat permit. We find that this provision of the SMP provides a reasonable limitation on the exercise of private property rights (for purposes of protecting terrestrial and recreation resources) in exchange for permission to enter and construct on project lands and waters (to build a boat dock), which are managed on behalf of the broader public interest.

Cultural Resources

Implementation of the proposed final HPMP as part of the Saluda Settlement would ensure that any adverse effects on National-Register eligible components of the project would be properly identified and resolved through consultation with the SHPO. We recommend implementation of the HPMP and the development of a PA to complete section 106 consultations with the SHPO, SCE&G, Catawba Indian Nation, and the Eastern Band of Cherokee Indians. The annual cost of implementing the HPMP would be about \$41,800, and we find the benefits of implementing it would be worth this cost.

Measures Not Recommended by Staff

Staff finds that some of the measures proposed by SCE&G and recommended by other interested parties would not contribute to the best comprehensive use of the Saluda River water resources, do not exhibit a sufficient relationship to project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discussion presents the basis for staff's conclusion not to recommend certain measures, or to modify some of the measures proposed by SCE&G and recommended by the Settlement parties.

Monitoring Minimum Flows and Water Levels in and Adjacent to the Congaree National Park

In section 3.3.1.2 of the draft EA, we discuss gaging in the project areas. NPS recommends that SCE&G provide funding to assist USGS with gages in and adjacent to the Congaree National Park to monitor effects of the new flow regime in the lower Saluda River on surface and groundwater in the park.

As described in section 3.3.1.2, we find that gages in and around the Congaree National Park, as recommended by NPS, are not needed for the following reasons: (1) compared to historical conditions that have existed for the past 80 years, there would be limited, if any, effects on groundwater levels of the floodplain or the root zone in the Congaree National Park from conditions proposed in the Saluda Settlement and by other parties and (2) the majority of flow in the Congaree River near the National Park is from the Broad River and other watersheds that are not controlled by the project. Therefore, we conclude that gaging near the Congaree National Park is not warranted because there is no direct association with project effects. We conclude that the staff alternative would not require the NPS-recommended gages or funding for them as part of any requirement for a new license for the project.

Mussel Program

We analyzed the proposed funding provision of the Mussel Program (i.e., contribution of \$75,000 to FWS for mussel experimental studies, and

restoration/reintroduction activities) in the draft EA, and concluded that this funding provision should not be made a requirement of any new license issued for the project. This funding would not have a direct relationship to the project, in that it would not be used for directly mitigating any effects of project operation. Therefore, we do not include this portion of the Mussel Program under the recommended staff alternative.

Diadromous Fish Restoration

SCE&G has been an active participant in the Santee Basin Accord with the objective of addressing diadromous fish protection, enhancement, and restoration in the Santee River Basin for several of its hydropower projects in the Basin. The Santee Basin Accord supports the Fish Passage Plan (2001), which has been accepted as a comprehensive plan by the Commission. The Santee Basin Accord is also an agreement to implement a 10-year action plan for restoration and enhancement of diadromous fish in the Santee River Basin, which would involve a number of activities and biological studies, including developing biological triggers for future installation of fish passage facilities at certain projects in the basin. Under the Santee Basin Accord, SCE&G would incorporate into its relicensing proposal for the Saluda Project, any agreements reached with the agencies for limits on reservoir elevations, instream flow releases, high or low inflow protocols, and any reservation of authority or fishway prescriptions developed by Interior pursuant to section 18 of the FPA. SCE&G would also conduct a number of studies at its Parr and Neal Shoals hydroelectric projects, related primarily to potential development of fish passage at those projects. In addition, SCE&G would contribute \$200,000 annually to support the activities under the 10-year action plan, which officially commenced on April 15, 2008, and would provide other in-kind support services and technical/scientific input to program development. As part of this 10-year action plan, SCE&G would provide funding for 5 years of shortnose sturgeon research.

While this is an important program to assist in the restoration of diadromous fish to the Santee River Basin, SCE&G's current and future participation in the Santee Basin Accord has little to do with the Saluda Project, other than the agreement to include any operational measures to protect fisheries (reservoir elevations, instream flows) in its relicensing proposal. SCE&G has done that with its filing of the Saluda Settlement, and its proposal to increase minimum flows from the project, implement a new guide curve for Lake Murray, and adopt a Low Inflow Protocol, which we recommend as discussed above. However, other measures to be provided by SCE&G under the Santee Basin Accord relate to other licensed projects and to the provision of general funding to support the 10-year action plan. The funding is not proposed to support any measure specifically tied to the Saluda Project. Therefore, we do not recommend that SCE&G's continued participation in the Santee Basin Accord, related to measures that are not directly associated with the Saluda Project, be made a requirement of any Saluda Project

license, although SCE&G would be free to participate in the Santee Basin Accord and provide those measures outside of the license.

Trout Protection and Enhancement

In the previous section, we describe those portions of the Trout Program that we recommend be made requirements of the license. Here we discuss the three remaining portions of the program that we do not recommend, including two study/goals and a provision for funding a study.

SCE&G proposes the following two study/goals objectives under the Trout Program: (1) an assessment of the relative contribution to the fishery of brown and rainbow trout and native warmwater species and (2) an evaluation of the potential for a naturally reproducing trout population as a South Carolina DNR management goal. As discussed in section 3 of this EA, there is no relationship between the project and the two study goals/objectives, because the results of the studies would not produce any information that could be used to evaluate and address project operational effects, or assist in the development of mitigation measures related to project effects. We, therefore, have no justification for recommending that these two study goals/objectives be included in the Trout Program.

With regard to the funding provision, SCE&G proposes to provide South Carolina DNR with \$30,000 to conduct a trout mortality study. As discussed in section 3 of this EA, the trout mortality study is not specific in its objectives or methodology; therefore, we find no relationship between conducting the mortality study and the proposed project. In addition, we find no need or basis for recommending that SCE&G conduct a trout mortality study. We, therefore, have no justification for recommending that SCE&G provide funding to South Carolina DNR to conduct a trout mortality study.

Notwithstanding our findings, SCE&G would be free to participate in these three parts of the Trout Program discussed above that are outside of the license.

Fish Entrainment

In the previous section, we describe that portion of the entrainment program that we recommend be made a requirement of the license (i.e., Unit 5 operational changes and the Unit 5 hydroacoustic monitoring). The Saluda Settlement would also address other entrainment effects at the project by providing monetary compensation for fish lost during an entrainment event, as well as for paying South Carolina DNR staff time to investigate the fish kill. Generally, mitigation for fish losses at a project should be in the form of specific measures to reduce or prevent entrainment (such as Unit 5 hydroacoustic monitoring and operational changes) or to otherwise enhance resources affected by the project, and not simply monetary compensation to the state resource agency for fish lost by entrainment. As we discuss in section 3, the provision for

compensation has not been related to a specific measure that would benefit the fishery resources affected by project operations. Therefore, we are unable to establish how providing compensatory funding to the agency would fulfill the project purpose of fishery enhancement. Thus, we do not recommend that this provision of the Saluda Settlement be made a requirement of any license issued.

Shoreline Management Plan

SCE&G's proposed SMP would reclassify about 185 miles of shoreline owned by SCE&G from Future Development to Public Recreation, Forest Management, and Natural Areas to protect wildlife habitat and enhance recreational experiences. Coleman Parks, representative of Advanced Land and Timber, LLC, and Beth Trump, agent for Cloud's Creek Properties, LLC, expressed dissatisfaction in the proposed changes from the existing classifications to more stringent classifications. Both claim that the revisions to the SMP shoreline classifications would restrict their ability to develop their lands. We do not recommend the less restrictive shoreline classifications, as requested by Beth Trump and Coleman Parks. We determined, as discussed in section 3.3.5.2, that the greater restrictions on the project lands adjacent to those of the landowners are needed for the protection of terrestrial and recreational resources.

SCE&G proposes to establish a uniform buffer zone on shoreline lands classified as Forest Management or Future Development. Beth Trump; John Frick; and Robert Sellers representative of CRW Investments, Inc. requested that SCE&G's uniform buffer zone be eliminated from the proposed SMP.

We do not recommend the requests to eliminate the SMP's proposed uniform buffer zone requirements. We determined, as discussed in section 3.3.5.2, that creating a uniform buffer zone on lands classified as Forest Management or Future Development would protect terrestrial and recreation resources from future development in these areas. To create such a uniform buffer zone, the proposed SMP requires that private lands either be deeded or sold to SCE&G, but only if the landowner requests a boat dock permit and is granted one by SCE&G. SCE&G does not hold all rights necessary to create a uniform buffer zone. This provision gives the landowner the option of giving the necessary rights to SCE&G to create the buffer zone in exchange for a boat permit. We find that this provision of the SMP provides a reasonable limitation on the exercise of private property rights (for purposes of protecting terrestrial and recreation resources) in exchange for permission to enter and construct on project lands and waters (to build a boat dock), which are managed on behalf of the broader public interest.

5.3 UNAVOIDABLE ADVERSE EFFECTS

The higher pool elevations throughout the year under the new operating guidelines would result in greater sediment accumulation near the points of entry of the upper Saluda River and tributaries into Lake Murray, compared to present conditions.

Periodic and special lake drawdowns are planned to limit water quality problems, foster mobilization of accumulated sediment, and limit the growth of additional aquatic vegetation. Nevertheless, it is likely that the long-term rate of net sediment accumulation in these areas will increase slightly compared to current rates. Continued operation of the Saluda Project would also result in some entrainment of resident fish, but entrainment would be minimized through the use of hydroacoustic monitoring that would indicate when operation of Unit 5, the unit at which most entrainment occurs, should be curtailed. The conversion of the lower Saluda River from a warmwater to a coldwater stream would persist as long as cold water is released from the project.

5.4 RECOMMENDATIONS OF FISH AND WILDLIFE AGENCIES

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. In response to our Ready for Environmental Analysis notice, the following fish and wildlife agencies submitted recommendations for the project: Interior (letter filed September 25, 2009), NMFS (letter filed September 29, 2009), and South Carolina DNR (letter filed October 2, 2009).

Section 10(j) of the FPA states that, whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In the draft EA, of the 13 fish and wildlife agency recommendations that we considered to be within the scope of section 10(j), we included 11 and did not include 2 measures recommended by Interior. However, as discussed below, we have resolved the differences for the two 10(j) recommendations made by Interior (i.e., the 4-foot trigger, and portions of Interior's Freshwater Mussel Mitigation Plan) that were inconsistent with the FPA.

To resolve the inconsistencies described in the draft EA between Interior's recommendations and the purposes and requirements of the FPA or other applicable law, Commission staff conducted a section 10(j) meeting with representatives from Interior (FWS) on April 29, 2010, in Columbia. The recommendations discussed included: (1) operate the project using a Low Inflow Protocol when lake levels in Lake Murray fall 4 feet below the target reservoir levels and (2) mitigate for the impacts of the operation of the project to freshwater mussel populations in the lower Saluda River

and the Congaree River following the Freshwater Mussel Mitigation Plan that Interior filed with its Terms, Conditions, and Recommendations.⁴⁸

As a result of the section 10(j) meeting, on May 17, 2010, Interior filed revised section 10(j) recommendations. For the Low Inflow Protocol, Interior indicated that, while it supports a 4-foot trigger, it agrees with staff's conclusion reached in the draft EA that the Low Inflow Protocol should be triggered when lake levels in Lake Murray fall 2 feet below the target reservoir levels. Interior provided the following revised recommendations for the Mussel Program:

- Formation of a Saluda Hydro Freshwater Mussel Working Group, similar to the provisions of the Mussel Program in the Saluda Settlement;
- Conduct a baseline survey for freshwater mussels in the Congaree River from the confluence of the Saluda and Broad rivers to a point 16 miles downstream, within 1 year of license issuance, similar to the provisions of the Mussel Program;
- Tag any freshwater mussels found on the Saluda River side of the Congaree River during the survey and relocate them to the Broad River side of the river (one-time action), which Interior anticipates would involve only small numbers of mussels, but should larger numbers be encountered the Working Group would determine the best course of action;
- Identify four locations with a concentration of freshwater mussels on the Broad River side of the Congaree River for mussel tagging and monitoring by the Working Group and monitor these locations annually for five consecutive years; after 5 years, the Working Group should review the monitoring results and provide recommendations for future conservation and mitigation actions.

We assess these revised section 10(j) recommendations in section 3.3.2.2, *Environmental Effects*, and adopt all of them as part of the Staff Alternative discussed in section 5; therefore, no inconsistencies remain.

Table 18 lists the federal and state recommendations filed subject to section 10(j), and whether the recommendations are adopted under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and in the previous section.

⁴⁸ Commission staff filed a summary of the discussions on May 7, 2010.

Table 18. Fish and wildlife agency recommendations for the Saluda Hydroelectric Project (Source: Staff).

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
1. Provide minimum flows of 700 cfs from January 1 to March 31; striped bass enhancement flows, ranging from 1,000 to 2,700 cfs from April 1 to May 10 when daily average flows in the Broad River are between 2,500 and 8,000 cfs; 1,000 cfs from May 11 to May 31; and 700 cfs from June 1 to December 31.	Interior, South Carolina DNR, NMFS ⁴⁹	Yes	\$856,420	Yes

⁴⁹ NMFS is not a signatory to the Settlement, although it states that its recommended flows are consistent with appendix A-11 of the Settlement. Their recommended striped bass spawning flows were unspecified during the period from April 1 to May 10, although NMFS recommends that these spawning flows should be 1,000 cfs plus special flow adjustments to achieve 30 percent of the flows in the Congaree and Broad rivers as reported at the USGS gage located on the Broad River in Alston, South Carolina. The Settlement Agreement and the Interior and South Carolina DNR flow recommendations state that the striped bass flows should be the lesser of 45 percent of the previous day average flow in the Broad River at the Alston gage, or the balance to achieve a flow of 9,000 cfs in the Congaree River. Based on discussion in appendix A-11 of the Saluda Settlement, if the Saluda River contributes about 30 percent of the flow of the Congaree River at Columbia, this would achieve the target of 45 percent of the Broad River flow at the Alston gage.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
2. Operate the project using a guide curve that maintains Lake Murray target water levels as follows: January 1, 352.5 feet rising to 356.5 feet by March 1, with drawdown beginning September 1 to 354.5 feet by December 1, and 352.5 feet by December 31.	Interior, South Carolina DNR	Yes	\$52,680	Yes
3. Operate the project using a Low Inflow Protocol when droughts or low river inflows to the project occur. The Low Inflow Protocol operational mode would be initiated when inflows are less than required minimum flow releases and lake levels in Lake Murray fall 2 feet below the target reservoir levels.	South Carolina DNR, Interior	Yes	-\$6,290 (energy gain)	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
4. Implement the SMP for the project that is described in appendix A-15 of the Saluda Settlement and the following three integral components of the SMP: (a) Woody Debris Plan; (b) Buffer Plan; and (c) Sediment and Erosion Management Plan.	Interior, South Carolina DNR	Yes	\$641,600	Yes
5. Implement the T&E Program that is described in appendix A-9 of the Saluda Settlement.	Interior, South Carolina DNR	Yes	\$18,540	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
6. Develop, in consultation with Interior, a terrestrial and aquatic invasive species management plan that would include several components, including a program to monitor, detect, and control the spread of snakeheads and cogongrass.	Interior	No (Not a specific measure to protect fish and wildlife resources)	\$42,850	No; however, the staff alternative includes provisions for invasive plant and fish measures at the project, including a public education program on identifying and reporting any snakeheads or cogongrass detected at the project.
7. Implement the Macroinvertebrate Program described in appendix A-3 of the Saluda Settlement.	Interior, ⁵⁰ South Carolina DNR	Yes	\$12,660	Yes

⁵⁰ Interior also recommends that each 2-year monitoring report be submitted to FWS for review and comment prior to submission of the reports to the Commission. The Reservoir Drawdown Program described in appendix A-12 of the Saluda Settlement, requires the monitoring reports to be submitted to FWS for review and comment.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
8. Implement the Reservoir Drawdown Program described in appendix A-12 of the Saluda Settlement, for lake management, water quality, aquatic plant control, and fisheries management. Interior requests that it be included in any Adaptive Management Committee reviewing reservoir drawdowns.	Interior, South Carolina DNR	Yes	\$0	Yes
9. Conduct semi-annual electrofishing sampling in the lower Saluda River as described in the Fish Monitoring Program in appendix A-8 of the Saluda Settlement. Interior requests it be given the 5-year fish sampling results for its review.	Interior, South Carolina DNR	No (Collecting fish data is not a specific measure to protect fish and wildlife resources)	\$30,910	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
10. Implement the upgrading schedule for generating unit runners at the Saluda Project as described on pages A-5 through A-7 of the Saluda Settlement, to enhance DO levels downstream of the project.	Interior, South Carolina DNR	Yes	\$1,248,570	Yes
11. Implement the Mussel Program for the lower Saluda River and Congaree River as shown in appendix A-4 of the Saluda Settlement. South Carolina DNR recommends the mussel plan be implemented and that it be included in research and enhancement efforts for mussels. ⁵¹	South Carolina DNR, NMFS	Yes (Measures to protect and enhance mussels are within 10(j) but the mussel program funding provisions are outside the scope of 10(j) because they are not specific measures to protect fish and wildlife resources)	\$7,280	Yes (except funding provisions are not adopted)

⁵¹ South Carolina DNR is a signatory to the Saluda Settlement and is a member of the Working Group. Thus, the agency would be actively involved in issues regarding the Mussel Program.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
12. Implement a revised Mussel Program similar to appendix A-4 of the Saluda Settlement, with the addition of tagging and relocating mussels from the Saluda River side to the Broad River side of the Congaree River, and establishing four locations with mussels on the Congaree River for a 5-year monitoring program.	Interior	Yes	Essentially the same cost as item 12	Yes
13. Continue restoration efforts for diadromous fish in the Santee River Basin as part of the Santee Basin Accord (see appendix A-5 of the Saluda Settlement).	South Carolina DNR	No (Not a specific measure to protect fish and wildlife resources)	\$122,870	Yes, in that we recommend operational measures that would provide for enhancement of diadromous fish resources (i.e., shortnose sturgeon habitat) consistent with the objectives of the Santee Basin Accord; however, we do not recommend the Accord's research or funding provisions.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
14. Implement the Sturgeon Program (see appendix A-6 of the Saluda Settlement).	South Carolina DNR, NMFS	No (A study to collect fish data is not a specific measure to protect fish and wildlife resources)	\$19,120	Yes, in that we recommend operational measures that would provide for enhancement of shortnose sturgeon habitat affected by the project consistent with the Sturgeon Program's goals; however, we do not recommend the Sturgeon Program's contemplated studies related to resource management.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
15. Implement the Trout Program (see appendix A-7 of the Saluda Settlement).	South Carolina DNR	No (Collection of fish data and conducting research are not specific measures to protect fish and wildlife resources)	\$4,090	Yes, in that we recommend operational measures that would enhance trout and trout habitat consistent with the Trout Program's goals; however, we do not recommend the Trout Program's resource management provisions.
16. Develop and distribute a brochure to educate the public about rare plant and animal species of interest that are associated with the lower Saluda River and Lake Murray.	South Carolina DNR	No (Preparing a brochure is not a specific measure to protect fish and wildlife resources)	\$1,960	Yes
17. Provide compensation to South Carolina DNR for fish entrainment as part of the Entrainment Program (see page 4-4 of the Saluda Settlement).	South Carolina DNR	No (Compensation for fish losses is not a specific measure to protect fish and wildlife resources)	Varies – the amount depends on the size of a fish kill.	No; however, as noted below, we do recommend a measure designed to reduce fish entrainment at the project.

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
18. Continue to operate the Entrainment Program described in the Saluda Settlement (page 4-4) to monitor and modify Unit 5 operations to minimize fish entrainment.	South Carolina DNR	Yes	\$10,150	Yes
19. Designate and protect Lunch Island (also known as Bomb Island) as a protected area for purple martin (see page A-5 of the Saluda Settlement)	South Carolina DNR	Yes	\$0	Yes
20. Implement the leasing of about 1,100 acres of project Forest Management lands (as described in the Saluda Settlement on page A-11) to South Carolina DNR to enhance waterfowl habitat and create additional opportunities for hunting waterfowl.	South Carolina DNR	No (Leasing land is not a specific measure to protect fish and wildlife resources)	\$0	Yes

Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted?
21. Recommend SCE&G coordinate with the South Carolina DNR Aquatic Nuisance Species Program and the South Carolina Aquatic Plant Management Council to manage invasive plants in Lake Murray (as described in the Saluda Settlement on page A-11).	South Carolina DNR	No (Coordinating a program is not a specific measure to protect fish and wildlife resources)	\$27,620	Yes
22. After completion of Unit 5 upgrades, evaluate Unit 5 operational scenarios (e.g., first-on and first-off schedule) to aid in preservation of cool-water refuge habitat for benefit of reservoir and riverine fisheries (as described in the Saluda Settlement, appendix A, section 4.3 on page A-7).	South Carolina DNR	Yes	\$0	Yes

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed 25 comprehensive plans that are applicable to the Saluda Project, located in South Carolina.⁵² No inconsistencies were found.

⁵² (1) Atlantic States Marine Fisheries Commission. 1996. Interstate fishery management plan for weakfish. (Report No. 27). May 1996; (2) Atlantic States Marine Fisheries Commission. 1998. Amendment 1 to the Interstate Fishery Management Plan for Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*). (Report No. 31). July 1998; (3) Atlantic States Marine Fisheries Commission. 1998. Interstate fishery management plan for Atlantic striped bass. (Report No. 34). January 1998; (4) Atlantic States Marine Fisheries Commission. 1999. Amendment 1 to the Interstate Fishery Management Plan for shad and river herring. (Report No. 35). April 1999; (5) 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; (6) Atlantic States Marine Fisheries Commission. 2000. Interstate Fishery Management Plan for American eel (*Anguilla rostrata*). (Report No. 36). April 2000; (7) Forest Service. 2004. Sumter National Forest revised land and resource management plan. Department of Agriculture, Columbia, South Carolina. January 2004; (8) 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; (9) National Park Service. 1982. The nationwide rivers inventory. Department of the Interior, Washington, D.C. January 1982; (10) South Carolina Department of Health and Environmental Control. 1985. Water classifications and standards, and classified waters. Columbia, South Carolina. June 1985. 58 pp; (11) South Carolina Department of Health and Environmental Control. 1988. Statewide water quality assessment, FY 1986-1987: a report to Congress pursuant to Section 305(b) of the Clean Water Act. Columbia, South Carolina. May 1988. 165 pp; (12) 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. 83 pp; (13) 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. 227 pp; (14) South Carolina Department of Parks, Recreation, & Tourism. 2008. South Carolina State Comprehensive Outdoor Recreation Plan (SCORP). Columbia, South Carolina. April 22, 2008; (15) South Carolina Department of Parks, Recreation, & Tourism. 2002. The South Carolina State Trails Plan. Columbia, South Carolina. 2002; (16) South

Carolina Department of Natural Resources. 2004. South Carolina Water Plan-Second Edition. Columbia, South Carolina. January 2004; (17) South Carolina Department of Natural Resources. 2000. Lower Saluda Scenic River Corridor Plan update. Columbia, South Carolina. December 2000; (18) 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. 30 pp; (19) 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; (20) South Carolina Water Resources Commission. National Park Service. 1988. South Carolina rivers assessment. Columbia, South Carolina. September 1988. 249 pp; (21) South Carolina Wildlife and Marine Resources Department. 1989. South Carolina instream flow studies: a status report. Columbia, South Carolina. June 1, 1989; (22) U.S. Fish and Wildlife Service, National Marine Fisheries Service, and South Carolina Department of Natural Resources. 2001. Santee-Cooper Basin diadromous fish passage restoration plan. Charleston, South Carolina. August 28, 2001. 50 pp; (23) U.S. Fish and Wildlife Service, National Marine Fisheries Service, North Carolina Wildlife Resources Commission, and South Carolina Department of Natural Resources. 2006; (24) U.S. Fish and Wildlife Service. Canadian Wildlife Service. 1986. North American waterfowl management plan. Department of the Interior. Environment Canada. May 1986; and (25) U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, DC.

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6.0 FINDING OF NO SIGNIFICANT IMPACT

Continuing to operate the Saluda Project with our recommended measures would ensure higher lake levels in Lake Murray while providing increased minimum flows to the lower Saluda River that would benefit fisheries resources and recreational use.

On the basis of our independent analysis, we find that the issuance of a license for the Saluda Project, with our recommended environmental measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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7.0 LITERATURE CITED

- Aulbach, C.A. 2007. Baseline Survey of Aquatic Plants Lake Murray, South Carolina. December.
- Collins, M.R., D. Cooke, B. Post, J. Crane, J. Bulak, T. I. J. Smith, T. Grieg, and J.M. Quattro. 2003. Shortnose sturgeon in the Santee Cooper Reservoir System, South Carolina. Transactions of the American Fisheries Society. Volume 132. Pages 1244-1250.
- Conrads, P.A., Feaster, T.D., and L.G. Harrleson. 2008. The Effects of the Saluda Dam on Surface-Water and Ground-Water Hydrology of the Congaree National Park Flood Plain, South Carolina. Scientific Investigations Report 2008-5170. U.S. Department of the Interior. Reston, VA.
- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Dep. Interior, Fish and Wildl. Serv. FWS/OBS - 79/31.
- Crance, J.H. 1986. Habitat suitability index models and instream flow suitability curves: shortnose sturgeon. U.S. Fish Wild. Serv. Biol. Rep. 82(10.129). 31pp.
- Environmental Research Center, Inc. 1976. Environmental Inventory of Lake Murray, South Carolina – Volumes I and II. Prepared for SCE&G. January.
- FERC(Federal Energy Regulatory Commission). 2007. Final Environmental Impact Statement for Hydropower Licensing – Santee Cooper Hydroelectric Project, FERC Project No. 199-205. South Carolina. Office of Energy Projects, Washington, DC.
- FERC. 2006. Environmental Assessment for Hydropower Relicensing. Osage Project FERC No. 459-128. August 8.
- FWS (U.S. Fish and Wildlife Service). 2007. National Bald Eagle Management Guidelines. May.
- Kleinschmidt. 2008a. Saluda Hydroelectric Project, FERC No. 516, Draft Report on Instream Flow Studies. Prepared for SCE&G, March 2008.
- Kleinschmidt. 2008b. Saluda Hydroelectric Project, FERC No. 516, Downstream Water Temperature Study Draft Report. Prepared for SCE&G, May 2008.
- McCord, J.W. Undated. Sturgeons. South Carolina DNR. 20 pp.

- Michael, H.J., K. J. Boyle, and R. Bouchard. 1996. Water Quality Affects Property Prices: A Case Study of Selected Maine Lakes. University of Maine. Maine Agricultural and Forest Experiment Station. Miscellaneous Report 398. February.
- NMFS (National Marine Fisheries Service). 1998. Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 104 pages.
- North American Electric Reliability Council. 2009. 2009 Long-term reliability assessment, 2009-2018. Princeton, NJ. October.
- Plewa, T.M. and Graft, W.L. 2005. Hydrologic Variation of the Congaree River near Congaree National Park, South Carolina. For the U.S. Department of Agriculture, National Park Service. University of South Carolina. Columbia, SC.
- Pressing, J., D.W. Marcouiller, G.P. Green, S.C. Deller, and N.R. Sumathi. 1996. Recreational homeowners and regional development: A comparison of two Northern Wisconsin counties, part 2. University of Wisconsin, Department of Agricultural and Applied Economics, Center for Community Economic Development. University of Wisconsin – Extension Staff Paper Number 96.4. August. (not seen, as cited in FERC, 2006)
- Raleigh, R.F., L.D. Zuckerman, and P.C. Nelson. 1986. Habitat suitability index models and instream flow suitability curves: Brown trout (revised). U.S. Fish Wild. Serv. FWS/OBS-82/10.124. 65 pp.
- Raleigh, R.F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984. Habitat suitability information: Rainbow trout. U.S. Fish Wild. Serv. FWS/OBS-82/10.60. 64 pp.
- Savannah River Ecology Laboratory. 2008. Waterfowl Aerial Surveys of Lake Murray, South Carolina: 2007–2008 Report. Prepared and edited by: R. A. Kennamer. April.
- SCE&G (South Carolina Gas and Electric Company). 2009a. Comprehensive Relicensing Settlement Agreement (Saluda Settlement). July 31.
- SCE&G. 2009b. Response to clarification of response to original response to additional information request. Letter from J.M. Landreth, Vice President, Fossil/Hydro Technical Services, SCE&G, to K.D. Bose, Secretary, FERC. November 20.

- SCE&G. 2008. Application for new license for the Saluda Hydroelectric Project, FERC No. 516. August 28.
- Schueler, T. R. and H. K. Holland, editors. 2000. The Practice of Watershed Protection. Center for Watershed Protection, 8391 Main Street, Ellicott City, MD, 21043. (not seen, as cited in FERC, 2006)
- South Carolina DHEC (South Carolina Department of Health and Environmental Control). 2008. The State of South Carolina's 2008 Integrated Report Part I : Listing of Impaired Waters. (With approval letter from the U.S. Environmental Protection Agency). Accessed on November 19, 2009.
http://www.scdhec.gov/environment/water/tmdl/docs/tmdl_08-303d.pdf
- South Carolina DHEC. 2004. Water Classification and Standards, (R.61-68) and Classified Waters (R.61-69). Bureau of Water; June 25, 2004.
- South Carolina DHEC. 1998. Watershed Water Quality Assessment – Saluda River Basin. Technical Report No. 005-98 (December 1998).
- South Carolina DHEC. 1995. Watershed Water Quality Management Strategy – Saluda-Edisto Basin. Technical Report No. 003-95.
- South Carolina DNR (South Carolina Department of Natural Resources). 2010. Aquatic Nuisance Species Program. Lake Murray Aquatic Plant Management Activities website. <http://www.dnr.sc.gov/invasiveweeds/lkmurray.html> Accessed March 9, 2010.
- South Carolina DNR . 2009a. South Carolina Electric and Gas Company Saluda Project (P-516-459) Recommendations Regarding Lake-level Trigger for Low Inflow Protocol, dated September 22. Columbia, SC.
- South Carolina DNR. 2009b. South Carolina DNR Managed Lands website. <https://www.dnr.sc.gov/mlands/lookup/>. Accessed November 30, 2009.
- Spalatro, F. and B. Provencher. 2000. Analysis of Minimum Frontage Zoning to Preserve Lakefront Amenities. February, 2000. (not seen, as cited in FERC, 2006)
- U.S. Bureau of the Census. 2009a. Columbia (city) QuickFacts from the U.S. Census Bureau. Available at: <http://quickfacts.census.gov/qfd/states/45/4516000.html>. Accessed December 1, 2009.
- U.S. Bureau of the Census. 2009b. Lexington County QuickFacts from the U.S. Census Bureau. Available at:

- <http://quickfacts.census.gov/qfd/states/45/45063.html>. Accessed December 1, 2009.
- U.S. Bureau of the Census. 2009c. Newberry County QuickFacts from the U.S. Census Bureau. Available at: <http://quickfacts.census.gov/qfd/states/45/45071.html>. Accessed December 1, 2009.
- U.S. Bureau of the Census. 2009d. Richland County QuickFacts from the U.S. Census Bureau. Available at: <http://quickfacts.census.gov/qfd/states/45/45079.html>. Accessed December 1, 2009.
- U.S. Bureau of the Census. 2009e. Saluda County QuickFacts from the U.S. Census Bureau. Available at: <http://quickfacts.census.gov/qfd/states/45/45081.html>. Accessed December 1, 2009.
- U.S. Bureau of the Census. 2000. Quick Tables—American FactFinder. DP-3, profile of selected economic characteristics. 2000. Available at: http://factfinder.census.gov/servlet/QTTable?_bm=y&-context=qt&-qr_name=DEC_2000_SF3_U_DP3&-ds_name=DEC_2000_SF3_U&-tree_id=403&-all_geo_types=N&-redoLog=true&-caller=geoselect&-geo_id=04000US45&-geo_id=05000US45063&-geo_id=05000US45071&-geo_id=05000US45079&-geo_id=05000US45081&-search_results=05000US45081&-format=&-lang=en. Accessed December 1, 2009.
- USGS (U.S. Geological Survey). 2010. Saluda River water temperature data. <http://waterdata.usgs.gov/>. Accessed May 27, 2010.

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APPENDIX A

STAFF RESPONSES TO COMMENTS

The draft environmental assessment (EA) was issued on March 24, 2010, and comments on the EA were due on May 11, 2010.

In this appendix, we⁵³ summarize the comments received, including the comments provided at the public meeting held in Columbia, South Carolina, on April 29, 2010; provide responses to those comments; and indicate, where appropriate, how we modified the text in the final EA. We grouped the comment summaries and responses by topic for convenience.

The following entities filed comments pertaining to the project.

<u>Commenting Entity</u>	<u>Filing Date</u>
National Marine Fisheries Service (NMFS)	April 26, 2010
Al Billings	April 26, 2010
John Frick	April 30 and May 3, 2010
South Carolina Electric and Gas Company (SCE&G)	May 7, 2010
U.S. Department of the Interior, Fish and Wildlife Service (FWS)	May 7, 2010
South Carolina Department of Natural Resources (South Carolina DNR)	May 7, 2010
American Whitewater	May 10, 2010
U.S. Department of the Interior, National Park Service (NPS)	May 10, 2010
Steve Bell, Lake Murray Watch	May 11, 2010
Coleman Parks, Advance Land and Timber, LLC	May 11 and 12, 2010
Dave Landis, The Lake Murray Association, Inc.	May 11, 2010
Robert Sellers, CRW Investments, Inc.	May 13, 2010
Beth Trump, Cloud's Creek Properties, LLC	May 14, 2010

A number of comments were made at the public meeting held in Columbia on April 29, 2010. The following characterizes these comments. Bill Argentieri of SCE&G and other speakers commended the Commission's staff on their thorough evaluation and consideration of the issues related to the relicensing of the Saluda Hydroelectric Project, as discussed in the draft EA. Mr. Argentieri noted that SCE&G will be filing written comments, but that SCE&G had two main comments regarding the EA. The first was that SCE&G respectfully requests that prior to making a final recommendation for a 1-foot or

⁵³In this section “we,” “us,” and “our” mean the Commission staff.

2-foot trigger for the Low Inflow Protocol, the staff evaluate and incorporate as part of their analysis the information filed by SCE&G on September 22, 2009. The second comment was a request that the Commission staff re-evaluate and revise the recommendation in the EA that SCE&G must obtain Commission approval prior to permitting multi-slip facilities that are greater than 10 slips, regardless of shoreline footage or the type of multi-slip facility. SCE&G believes that this 10-slip issue would be best handled under the Shoreline Management Plan (SMP) and its Permitting Handbook. SCE&G raised these same issues in its written comments that we respond to below.

Reed Bull of the Midlands Striper Club stated his support for South Carolina DNR and the 2-foot trigger for the Low Inflow Protocol, and noted that this should help striped bass reproduction during the months of April and May. Dave Landis and Joy Downs of the Lake Murray Association commended SCE&G for its hard work in conducting the relicensing process, stated that the Commission worked in a fair and expeditious manner in preparing the EA, but requested that the Commission reconsider their recommendation for a 2-foot trigger for the Low Inflow Protocol. The Lake Murray Association supports SCE&G in its proposal for a 1-foot trigger, and also supports SCE&G in its recommendation regarding the permitting of multi-slip facilities. Bob Keener, a homeowner on Lake Murray, also commended SCE&G and its consultants for a good job during the relicensing process, and also expressed concerns about the 2-foot trigger recommended by Commission staff in the EA, and particularly the 4-foot trigger recommended by FWS that was brought up “at the last minute, relatively speaking, very late in the process.”

Dick Christie of South Carolina DNR stated his appreciation for Commission staff’s work on the EA, noted that they would be filing written comments, but that South Carolina DNR is in agreement with most of the staff recommendations contained in the EA. John Frick spoke that he would like to see the lake preserved but had several comments about how SCE&G has managed the lake through the years. He is also upset with SCE&G’s method of making “land purchase” a prerequisite for obtaining a dock permit. Beth Trump of Cloud’s Creek Properties, which owns 35 acres adjoining Lake Murray, objected to SCE&G’s recent reclassification of lake shoreline near her property from “future development” to “forest management,” which she stated would limit her ability to place docks and increase the width of the shoreline buffer to 100 feet, essentially causing a “taking” of Cloud’s Creek land. Cheryl Nulman, a Lake Murray resident, asked how the Low Inflow Protocol trigger would work, and commented that the EA failed to consider the impact of lake drawdowns on several and perhaps hundreds of people who use the lake for a drinking water supply. She also expressed concern about water quality in the lake related to shoreline and dock development because she noted that the appropriate silt control fences and other control measures were not being used at development sites. Regis Parsons questioned the meaning of the “special recreation” classification of Two Bird Cove and Hurricane Hull Cove, and Karl Sundius commented that since designation of those two coves, the coves have become a hotspot

for partying, resulting in water quality problems and the loss of those coves as areas of quiet solitude.

The issues raised at the public meetings are also issues discussed in the comment letters filed in response to the draft EA, and we provide responses to the written comments in this appendix.

PROJECT OPERATIONS

Comment 1: SCE&G comments that the EA should clarify that the proposed operations of Unit 5 as first-on/last-off would not occur until after the Unit 5 upgrades are complete. Furthermore, SCE&G states that it should not be mandated to operate Unit 5 in any specific manner, and that instead the Commission should allow SCE&G and the stakeholders to negotiate how Unit 5 should operate in off-license discussions.

Response: We have modified the final EA to clarify the operation of Unit 5 throughout the EA. SCE&G would be free to negotiate changes in Unit 5 operations with the stakeholders, but any changes in project operation from that specified in a license would require prior Commission approval.

Comment 2: SCE&G requests that the staff analysis of the Low Inflow Protocol include information that SCE&G filed on September 22, 2009 (justification for a 1-foot trigger), regarding the balancing of upstream and downstream resources in terms of percentage of target flow volume released versus percentage of target storage volume in the reservoir. SCE&G also clarifies its definition of abnormal operating situations and sustained low inflow or drought conditions, and that it believes a 1-foot trigger for the Low Inflow Protocol would be the most equitable balance between water stored in Lake Murray and water released into the lower Saluda River during low inflow conditions.

Response: Our analysis (as shown beginning on page 42 of the draft EA and in figures 4 and 5) used the information filed by SCE&G on September 22, 2009. However, we referenced these figures to the wrong citation in section 7.0, *Literature Cited* of the draft EA. We corrected the citations in the final EA. We appreciate SCE&G's additional input regarding the Low Inflow Protocol trigger, but our conclusion remains the same, that a 2-foot trigger would provide the most equitable balance for protection of aquatic resources in both Lake Murray and in the lower Saluda River.

AQUATIC RESOURCES

Comment 3: Mr. Al Billings supports SCE&G's proposal to reduce flow releases from the dam when lake levels drop 1 foot during drought conditions (1-foot trigger for Low Inflow Protocol). He comments that any demands placed on the operation of the dam to maintain exceptionally high lake levels with the possibility of drastic drops in the lake

levels can and will have severe negative effects on fish and wildlife and water quality on the lake and its associated wetlands.

Response: We acknowledge Mr. Billing's concern; however, our analysis in section 3 demonstrates that the difference in lake levels under a 2-foot trigger versus Mr. Billing's recommended 1-foot trigger would be about 3 inches lower for a 2-foot trigger, overall, based on modeling conducted by SCE&G. This information indicates that drastic drops in lake levels would not occur with a properly designed Low Inflow Protocol, which would concomitantly reduce downstream flow releases as inflow to Lake Murray is reduced. These reductions in flow releases would act to slow any drawdowns in the lake level. We also find that the effects on aquatic resources in the reservoir under the 2-foot trigger would not be substantially greater than with a 1-foot trigger, because of this minor difference (about 3 inches) in resulting reservoir levels. Some additional dewatering of the shoreline littoral zone and wetlands may occur, but the small difference in reservoir levels may be imperceptible due to normal wave action on the reservoir.

Comment 4: American Whitewater supports the proposed lake guide curve levels, and comments that it finds the 2-foot trigger acceptable, even though it would prefer a 3-foot compromise trigger, with a 4-foot trigger best for the resources above and below the dam.

Response: As we previously responded, we conclude that a 2-foot trigger would provide the most equitable balance for protecting aquatic resources in both Lake Murray and in the lower Saluda River.

Comment 5: FWS revised its recommendations for freshwater mussel mitigation for the project, as we describe in section 3.3.2.2, *Environmental Effects*, and in section 5.4, *Recommendations of Fish and Wildlife Agencies*.

Response: FWS revised its mussel mitigation recommendation as a result of section 10(j) discussions with us on April 29, 2010, and we adopt FWS' recommendation under the staff alternative. We have modified the EA to reflect the revised FWS recommendation.

Comment 6: FWS revised its recommendation for a 4-foot trigger for the Low Inflow Protocol by stating that, while it believes that a 4-foot trigger would provide better protection to aquatic resources in the lower Saluda River, it is agreeable to our alternative of implementing a 2-foot trigger for the Low Inflow Protocol.

Response: FWS revised its Low Inflow Protocol trigger recommendation as a result of section 10(j) discussions with us on April 29, 2010, and we adopt the new FWS recommendation. We have modified the EA to reflect the revised FWS recommendation.

Comment 7: Lake Murray Watch supports SCE&G's proposal to implement a 1-foot trigger for the Low Inflow Protocol, based on potential adverse effects on aquatic resources in the Lake Murray littoral zone. Lake Murray Watch believes a 2-foot trigger would dewater 100 percent of the littoral zone around Lake Murray. Furthermore, Lake

Murray Watch states that, under a 2-foot trigger, while the littoral zone around Lake Murray is being dewatered, the lower Saluda River would be enjoying flows representing, in some cases, 100 percent of weighted usable area (WUA).

Response: Our analysis of the alternatives for a Low Inflow Protocol trigger finds that, on average, a 2-foot trigger would result in Lake Murray water levels being about 3 inches lower than a 1-foot trigger, based on modeling of 28 water years of data. We also conclude that a 2-foot trigger would not result in 100 percent dewatering of the littoral zone in Lake Murray. At the same time, the effects on downstream flow releases would be reduced whenever the Low Inflow Protocol is implemented, resulting in reductions in habitat value (WUA) in the lower Saluda River to less than 100 percent of WUA.

Comment 8: The National Park Service (NPS) requests that the Commission require SCE&G to include NPS as a participant on the adaptive management team despite the fact that NPS is not a signatory to the Saluda Settlement. It also comments that the overall adaptive management program should be focused on a wider range of environmental factors and not limited to striped bass.

Response: We agree that it would be beneficial for NPS to be a member of the adaptive management team, and we have modified the EA to reflect that recommendation. In regard to expanding the overall adaptive management program, we defer that decision to the adaptive management team on whether expansion of the range of environmental factors is needed.

Comment 9: NPS requests that the Commission require SCE&G to assist with funding a long-term water level monitoring program in cooperation with the U.S. Geological Survey (USGS) to document the effects of the project's new flow regime on surface and groundwater resources within and adjacent to the Congaree National Park.

Response: As described in section 3.3.1.2 of the draft EA, SCE&G currently provides funding of USGS gages in the project area, and we conclude that these gages are sufficient to ensure compliance with minimum flows, striped bass enhancement flows, Lake Murray water level requirements, and other related measures proposed for the project. Our analysis also indicates that, compared to historical conditions that have existed for the past 80 years, there would be limited, if any, effects on groundwater levels of the floodplain or the root zone in the Congaree National Park, from conditions proposed in the Saluda Settlement and by other parties. In addition, at the Congaree River near the Congaree National Park, the majority of the flow in the river is from the Broad River and other watersheds that are not controlled by the project. Therefore, we conclude that funding of long-term water level monitoring near the Congaree National Park should not be a requirement of any license issued for the project.

Comment 10: NPS comments that long-term data are required to fully evaluate the relationship between changes to groundwater levels from existing operations and its effect on the root zone and vegetative structure of the Congaree River floodplain.

Response: Our analysis indicates, as stated in the previous response to this issue, that, there would be limited, if any, effects of the project on groundwater levels of the floodplain or the root zone in the Congaree National Park from conditions proposed in the Saluda Settlement and by other parties. Therefore, the possible project operational changes as described in the recommended alternative for the project would have a very minor effect on this relationship. Thus, we are not recommending the collection of long-term data to evaluate the relationship.

Comment 11: NPS comments that the American eel has been confirmed to be present within Congaree National Park and requests that the EA text on page 56 be clarified.

Response: We have made the requested change in the EA.

Comment 12: South Carolina DNR comments that the mussel program is identified as one of 16 measures of SCE&G's to be implemented and also lists it as a staff-modified measure. South Carolina DNR suggests that this error be corrected.

Response: We have made some clarification to this text, but the text correctly describes that, while we are recommending the Mussel Program, we are also recommending some modifications to this program.

Comment 13: South Carolina DNR notes that white perch has recently been designated a rough fish by the South Carolina legislature and therefore its inclusion in the list of game fish is incorrect and should be removed.

Response: We have made the requested change in the EA.

TERRESTRIAL RESOURCES

Comment 14: NPS comments that it is interested in additional invasive aquatic species besides the two (snakeheads and cogongrass) identified in the EA. Specifically, it indicates that other species of particular interest to the Congaree National Park include: water hyacinth, common salvinia, and giant salvinia.

Response: As part of staff's recommended alternative, we include a provision for SCE&G to consult annually with South Carolina DNR and Interior regarding the spread of cogongrass and other terrestrial invasive plants so that SCE&G can determine appropriate control measures if or when these species are determined to occur within the project boundary. In addition, SCE&G would assist in the development and implementation of the South Carolina Aquatic Plant Management Council's annual plan. If, in the course of this consultation these resource agencies determine that the species mentioned by NPS are of concern within the project boundary, under the recommended alternative, SCE&G would work with these agencies to determine appropriate control

measures. However, because the project does not affect the Congaree National Park, SCE&G would not be required to monitor or control invasive species in the park.

THREATENED AND ENDANGERED SPECIES

Comment 15: NMFS does not concur with the Commission staff's determination in the EA that the project "may affect but is not likely to adversely affect" the endangered shortnose sturgeon. NMFS states that it has determined that current and proposed project operations are and would adversely affect the shortnose sturgeon. Furthermore, NMFS states that formal section 7 consultation is required, and that a Biological Assessment (BA) should be prepared by us to address a number of potential effects on the sturgeon that are itemized in 24 bullets contained in the NMFS letter.

Response: We have made modifications to the final EA that further assess the issues raised by NMFS. We now conclude that continued project operation may adversely affect the endangered shortnose sturgeon, and we will be requesting formal consultation with NMFS. The final EA is our BA for the shortnose sturgeon. Please see revised section 3.3.4, *Threatened and Endangered Species*.

Comment 16: American Whitewater comments that the last minute intervention, concerning sturgeon, by an entity that has not participated in this project is ill-conceived, and that the studies put in place by the agencies and stakeholders are extensive and would address any needs of sturgeon.

Response: American Whitewater did not specify the entity making "the last minute intervention," but we assume they are referring to the April 23, 2010, letter from NMFS, which recommends formal consultations between the Commission and NMFS regarding the endangered shortnose sturgeon, and the preparation of a BA by us. See our response to the NMFS letter.

Comment 17: SCE&G requests that references to radiotelemetry to monitor movement of sturgeon in the Congaree, lower Broad, and Saluda Rivers be revised to say "telemetry" to be consistent with the language used in the Sturgeon Protection and Adaptive Management Plan.

Response: We have made the requested changes in the EA.

Comment 18: FWS concurs with our determination in the draft EA that the proposed construction, operation, and maintenance of the project, with our-recommended measures, is "not likely to adversely affect" the endangered wood stork.

Response: We have noted FWS concurrence with our determination in the final EA.

RECREATION, LAND USE, AND AESTHETICS

Comment 19: American Whitewater suggests that the planned improvements to the Candi Lane take out (for the safe exit of recreational floaters) be addressed soon because the improvements are critical to river safety.

Response: We acknowledge the American Whitewater comment, and appreciate its concern around safe boating access in the lower Saluda River. The Recreation Plan, as filed as part of the Settlement, includes Candi Lane as a future recreation site; however, there is no evidence that improvements are imminently needed.

Comment 20: American Whitewater supports the decision of the Safety Technical Working Committee to continue to work on safety issues and expand the warning system for recreational visitors.

Response: We acknowledge the American Whitewater comment and its support of continued safety for recreational visitors. We make note of this support and revise the EA accordingly.

Comment 21: SCE&G notes that according to appendix A-1 of the Settlement Agreement, Phase 3, the installation of strobe lights and additional sirens included in the Public Safety and Recreational Warning System, would be implemented within 2 years after the installation of Phase 2 is complete, not within 1 year of license issuance as noted in the draft EA. It requests that all references to the timing of installation be corrected.

Response: We have revised the EA to correct this information.

Comment 22: SCE&G clarified the number of new recreational facilities it is proposing to develop in the Recreation Plan filed as part of the Settlement Agreement. SCE&G notes that it intends to develop or improve five future recreation sites (Cloud's Creek, Little Saluda Point, Old Corley Bridge Road, Twelve Mile Creek, and Candi Lane) within the next 10 years. In addition, as described in table 5-1 of the proposed Recreation Plan, SCE&G would designate nine new recreational facilities within the next 10 years to keep pace with the growth in recreational demand. Finally, SCE&G notes that details about the number of existing or new recreation sites are not found in the SMP; rather they are included in the Recreation Plan filed as part of the Settlement Agreement.

Response: We stated in the draft EA that SCE&G would develop 10 new recreation facilities in the next 10 years; however the Recreation Plan filed as part of the Settlement Agreement clearly specifies development of 9 new facilities and improvement at 5 other future recreation sites within the next 10 years. We have revised the EA to clarify this information.

Comment 23: SCE&G comments that it does not propose to provide improvements or barrier-free access at Two Bird Cove and Hurricane Cove and requests that the EA be revised to be consistent with its proposed measures.

Response: We have clarified SCE&G's intent relative to these two areas located in the lake in the final EA.

Comment 24: SCE&G notes in its comments on the proposed environmental enhancement measures for Recreation and Land Use, that neither parking nor gravel parking and carry-in at Little Saluda Point and Candi Lane, respectively, were identified in the Recreation Plan for immediate development. Both measures were categorized as

“recommended improvements not incorporated at this time.” SCE&G notes that these improvements are included in the Recreation Plan for future consultation once an expressed need has been demonstrated. SCE&G requests that parking and carry-in improvements at Little Saluda Point and parking improvements at Candi Lane be removed from the enhancement measures.

Response: We acknowledge SCE&G’s request to remove these enhancement measures based on information provided in its comments, and we have revised the EA accordingly.

Comment 25: NPS requests that the EA be modified to indicate that the Congaree River Blue Trail does not “pass through” the Congaree National Park and that the lower end of this recreation trail is the park boundary.

Response: We have revised the EA to indicate that the Blue Trail passes along, not through, the Congaree National Park.

Comment 26: Coleman Parks and Beth Trump made comments related to SCE&G’s SMP shoreline classifications. Generally, these comments related to their dissatisfaction with the proposed changes in shoreline classification from the existing classifications to more stringent classifications.

Response: We have addressed these comments in the final EA and determined that the reclassification of fringeland that fronts their property would enhance the recreation and aesthetics of the area, and do not recommend that the classifications revert back to the less stringent classifications.

Comment 27: Beth Trump and Robert Sellers questioned SCE&G’s proposed SMP requirement to “deed” property to establish a buffer zone of 75 feet for lands designated as Future Development and 100 feet for lands designated as Forest Management in order to obtain a dock permit. John Frick also questioned SCE&G’s proposed SMP requirement for lands classified as Future Development, that if the distance from the 306-foot Plant Datum contour to the project boundary line is greater than 75 feet (the buffer zone), the property owner wanting to obtain a dock permit would be required to purchase the land between the 75-foot buffer zone and the project boundary line. These comments relate to the dissatisfaction of the property owner.

Response: The establishment of a buffer zone would minimize erosion and non-point-source pollutants, conserve shoreline fish and wildlife habitat, and preserve aesthetics. We determined that SCE&G’s proposals are reasonable limitation on the exercise of private property rights in exchange for permission to enter and construct on project lands and waters, which are managed on behalf of the broader public interest.

Because some land use classification would require a wider buffer zone for a boat permit than is currently required under the existing SMP, there is a possibility that existing structures would be located in the proposed 75-foot and 100-foot buffer zones. We recommend that SCE&G develop procedures to: (1) identify existing structures within the buffer zone; (2) manage and maintain the structures; and (3) determine when such

structure could not be rebuilt or replaced. The EA has been revised to reflect this information.

Comment 28: SCE&G requests that the Commission re-evaluate and revise the requirement that it obtain Commission approval prior to permitting multi-slip facilities greater than 10 slips regardless of shoreline footage of the type of multi-slip facility.

Response: Upon consideration of the additional information that SCE&G provided with its comment, we now recommend that paragraphs B and D of the Commission's use and occupancy article⁵⁴ be waived and recommend that it be allowed to permit facilities containing up to 80 boat slips.

OTHER

Comment 29: American Whitewater suggests that the Commission prepare an EIS to fully examine all possible impacts on all river resources in order to properly maintain and protect the river.

Response: Our EA fully examines all issues related to the proposed relicensing of the Saluda Project, and concludes that issuing a new license for the project with the staff-recommended measures would not be a major federal action significantly affecting the quality of the human environment. Therefore, an EIS is not required.

Comment 30: NPS previously identified additional park-specific management plans that are applicable to the project and should be included in section 5.5, *Consistency with Comprehensive Plans*. These plans include: (1) the Congaree National Park General Management Plan; (2) the Congaree National Park Resource Management Plan; (3) the Congaree Nation Park Water Resources Management Plan; and (4) a final report resulting from the Ecologically Sustainable Water Management Process.

Response: We consider the consistency of the measures in the staff alternative to the goals and purposes of the relevant comprehensive plans to make sure that we are not in conflict with any federal, state, or local comprehensive plan approved by the Commission. None of the documents that NPS filed with the Commission on May 8, 2009, are considered comprehensive plans, as stated in the letter issued on January 29, 2010. Therefore, we have not added the documents to the identified list of relevant comprehensive plans.

Comment 31: SCE&G requests that several names in the draft EA were incorrect and should be changes as follows: Old Corey Bridge Road to Old Corley Bridge Road, and Rosemont to Rosewood.

Response: We have revised the EA accordingly.

⁵⁴ The article is also referred to as the standard land use article.

Comment 32: South Carolina DNR points out that in section 3.3.5.2 that we misstate the flow regime for striped bass. The text should read, “1,000 to 2,700 cfs.”

Response: We have revised the EA accordingly.

Comment 33: South Carolina DNR points out that the future acreage for the Lower Saluda River shown in table 11 should be 320.2 acres as specified on page 6.4 of the Saluda Settlement.

Response: We have revised the EA accordingly.

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Document Content(s)

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