SOUTH CAROLINA ELECTRIC & GAS COMPANY

COLUMBIA, SOUTH CAROLINA

SALUDA HYDROELECTRIC PROJECT

FERC PROJECT NO. 516

ENVIRONMENTAL REPORT

EXHIBIT E

DECEMBER 2007

Prepared by:

Kleinschmidt

Energy & Water Resource Consultants

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GLOSSARY

acre-foot (feet)	The amount of water it takes to cover one acre to a depth of one foot, 43,560 cubic feet or 1,233.5 cubic meters
active storage	The volume of water in a reservoir between its minimum operating elevation and its maximum normal operating elevation.
anadromous fish	Fish that live in saltwater habitats most of their lives, but periodically migrate into freshwater to spawn and develop to the juvenile stage (e.g., alewife).
anticline	A fold with strata sloping downward on either side.
aquatic life	Any plants or animals which live at least part of their life cycle in water.
argillic horizon	The horizon of clay accumulation shows evidence of clay illuvation.
baseline	A set of existing environmental conditions upon which comparisons are made during the NEPA process.
benthic	Associated with lake or river bottom or substrate.
benthic macroinvertebrates	Animals without backbones, which are visible to the eye and which live on, under, and around rocks and sediment on the bottoms of lakes, rivers, and streams.
bypass reach	The original water channel of the river that is directly affected by the diversion of water though the penstocks to the generating facilities. This portion of the river, the “bypassed reach” may remain watered or become dewatered.
capacity	The load for which an electric generating unit, other electrical equipment or power line is rated.
Clean Water Act (CWA)	The Federal Water Pollution Control Act of 1972 and subsequent amendments in 1977, 1981, and 1987 (commonly referred to as the Clean Water Act). The Act established a regulatory system for navigable waters in the United States, whether on public or private land. The Act set national policy to eliminate discharge of water pollutants into navigable waters, to regulate discharge of toxic pollutants, and to prohibit discharge of pollutants from point source without permits. Most importantly, it authorized EPA to set water quality criteria for states to use to establish water quality standards.
creel census	Counting and interviewing anglers to determine fishing effort and catch. Usually conducted by a census clerk on systematic regularly scheduled visits to significant fishing areas.

cubic feet per second (cfs)	A measurement of water flow representing one cubic foot of water moving past a given point in one second. One cfs is equal to 0.0283 cubic meters per second and 0.646 mgd.
cultural resources	Includes items, structures, etc. of historical, archaeological, or architectural significance.
dam	A structure constructed across a water body typically used to increase the hydraulic head at hydroelectric generating units. A dam typically reduces the velocity of water in a particular river segment and increases the depth of water by forming an impoundment behind the dam. It also generally serves as a water control structure.
demand	The rate at which electric energy is delivered to or by a system at a given instant or averaged over a designated period, usually expressed in kilowatts or megawatts.
diabase	Dark, fine-textured, igneous rock.
dike	A raised bank, typically earthen, constructed along a waterway to impound the water and to prevent flooding.
dike (geologic term)	A mass of igneous rock that protrudes across the formation of adjacent rock structures.
dissolved oxygen (DO)	Perhaps the most commonly employed measure of water quality. Low DO levels adversely affect fish and other aquatic life. The total absence of DO leads to the development of an anaerobic condition with the eventual development of odor and aesthetic problems.
distribution lines	Power lines, like those in neighborhoods, used to carry moderate voltage electricity which is "stepped down" to household levels by transformers on power poles.
drawdown	The distance the water surface of a reservoir is lowered from a given elevation as the result of releasing water.
energy	Average power production over a stated interval of time, expressed in kilowatt-hours, megawatt-hours, average kilowatts and average megawatts.
eutrophic/eutrophication	Waters with a high concentration of nutrients and a high level of primary production.
exotic species	Those species which are not native to a particular area.
fault	A crack or fracture in the earth's surface.
Federal Energy Regulatory Commission (FERC)	The governing federal agency responsible for overseeing the licensing/relicensing and operation of hydroelectric projects in the United States.

Federal Power Commission (FPC)	Predecessor to FERC.
flow	The volume of water passing a given point per unit time.
flow duration curve	A graphical representation of the percentage of time in the historical record that a flow of any given magnitude has been equaled or exceeded.
forebay	That portion of a hydroelectric project impoundment immediately upstream of the intake to the turbines (see also headwaters).
generation	The process of producing electricity from other forms of energy, such as steam, heat, solar, wind or water. Refers to the amount of electric energy produced, expressed in kilowatt hours.
gross storage	The sum of the dead storage and the live storage volumes of a reservoir, the total amount of water contained in a reservoir at its maximum normal operating elevation.
habitat	The locality or external environment in which a plant or animal normally lives and grows.
head	The distance that water falls in passing through a hydraulic structure or device such as a hydroelectric plant. Gross head is the difference between the headwater and tailwater levels; net head is the gross head minus hydraulic losses such as friction incurred as water passes through the structure; and rated head is the head at which the full-gate discharge of a turbine will produce the rated capacity of the connected generator.
headwater	The waters immediately upstream of a dam. For power dams, also referred to as the water in the impoundment which supplies the turbines (see also forebay).
hydraulic	Relating to water in motion.
hydroelectric plant	A facility at which the turbine generators are driven by falling water.
hydroelectric power	Capturing flowing water to produce electrical energy.
hydroelectric project	The complete development of a hydroelectric power site, including dams, reservoirs, transmission lines, and accessories needed for the maintenance and operation of the powerhouse and any other hydroelectric plant support facilities.
hypolimnetic	The deeper cooler portions of a reservoir or lake that result from stratification.

igneous rock	Rock formed from the cooling and solidification of molten mineral matter.
impoundment	The body of water created by a dam.
Initial Consultation Document (ICD)	A document containing detailed information on a hydroelectric project; the document is used to describe the project and its resources and to start the applicant's consultation process with resource agencies and the public.
kilowatt (kW)	A unit of electrical power equal to 1,000 watts.
lacustrine	Related to standing water, (e.g., a lake).
lapilli	Small, round to angular rock fragments which may have been volcanically ejected in a solid or molten state.
license	FERC authorization to construct a new project or continue operating an existing project. The license contains the operating conditions for a term of 30 to 50 years.
littoral	Associated with shallow (shoreline area) water (e.g., the littoral zone of an impoundment).
load	The total customer demand for electric service at any given time.
lotic	Flowing or actively moving water including rivers and streams.
megawatt (MW)	A unit of electrical power equal to one million watts or 1,000 kW.
metamorphic rock	Rock formed by alterations of igneous and sedimentary rocks under intense heat and pressure.
normal operating conditions	The reservoir elevation approximating an average surface elevation at which a reservoir is kept.
outage	The period during which a generating unit, transmission line, or other facility is out of service.
palustrine forested wetland	Dominated by woody vegetation less than 20 ft tall (i.e., willows, dogwood).
palustrine scrub/shrub wetlands	Comprised of woody vegetation that is 20 ft tall or greater (i.e., American elm, swamp white oak).
peaking operations	A powerplant that is scheduled to operate during peak energy demand.
pegmatite	Coarse-grained granite.

phytoplankton	Algae floating in the water column. These are mostly microscopic single-celled and colonial forms.
piezometer	A device that measures water pressure.
plutonic structures	Large igneous intrusions that are formed deep within the earth's crust.
pool	Refers to the reservoir (impounded body of water).
powerhouse	The building that typically houses electric generating equipment.
probable maximum flood (PMF)	A statistical formula used to calculate a hypothetical flood event that could occur on a particular river basin over a particular duration. This is derived from the probable maximum precipitation over time.
project	One or more hydroelectric plants collectively included in a single Federal Energy Regulatory Commission license. Projects typically consist of a dam, reservoir, powerhouse and appurtenant facilities.
project area	SCE&G lands and waters within the project boundary.
project boundary	A line established by the FERC to enclose the lands, waters and structures needed to operate a licensed hydroelectric project.
project vicinity	Lands and waters within which studies were conducted for baseline environmental data. These lands and waters include the Project area.
recreation area	An area which people use for leisure activities, designated formally or informally.
relicensing	The administrative proceeding in which FERC, in consultation with other federal and state agencies, decide whether and on what terms to issue a new license for an existing hydroelectric project at the expiration of the original license.
reserve capacity	Extra generating capacity available to meet unanticipated demand for power or to generate power in the event of loss of generation.
reservoir	An artificial lake into which water flows and is stored for future use.
resident fishery	Fish that spend their entire life cycle in freshwater, such as trout and bass.

resource agency	Federal, state, or interstate agency with responsibilities in the areas of flood control, navigation, irrigation, recreation, fish or wildlife, water resource management, or cultural or other relevant resources of the state in which a project is or will be located.
riparian area	A specialized form of wetland with characteristic vegetation restricted to areas along, adjacent to or contiguous with rivers and streams. Also, periodically flooded lake and reservoir shore areas, as well as lakes with stable water.
seepage	The amount of water that leaks through a structure, such as a dam.
spawn	The act of fish releasing and fertilizing eggs.
spillway	The section of a dam that is designed to pass water over or through it.
stakeholder	Any individual or organization (government or non-governmental) with an interest in a hydroelectric project.
stock	The existing density of a particular species of fish in an aquatic system.
stratification	A physical and chemical process that results in the formation of distinct layers of water within a lake or reservoir (i.e., epilimnion, metalimnion, and hypolimnion).
streamflow	The rate at which water passes a given point in a stream, usually expressed in cubic feet per second (cfs).
submerged aquatic vegetation	Plants with rigid stems and/or leaves rooted in substrate and generally covered by deep water (greater than 6.6 ft depth), with all of the plant parts covered by water.
synclinal fold axis	A fold in rocks layers, where rock from both sides dips inward towards a center axis
tailrace	The channel located between a hydroelectric powerhouse and the river into which the water is discharged after passing through the turbines.
tailwater	The waters immediately downstream of a dam. For power dams, also referred to as the water discharged from the draft tubes.
tainter gate	A gate with a curved skin or face plate connected with steel arms to an axle. It is usually lifted or lowered by a cable connected to a hook at the top of the gate rotating on the axle as it is moved.

transformer	Equipment vital to the transmission and distribution of electricity designed to increase or decrease voltage.
transmission	The act or process of transporting electric energy in bulk from one point to another in the power system, rather than to individual customers.
transmission lines	Power lines normally used to carry high voltage electricity to substations which then is "stepped down" for distribution to individual customers.
tuff	Rock formed of pyroclastic material.
turbidity	A measure of the extent to which light passing through water is reduced due to suspended materials.
turbine	A machine for generating rotary mechanical power from the energy in a stream of fluid (such as water, steam, or hot gas). Turbines covert the energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.
volt	The unit of electromotive force or electric pressure, akin to water pressure in pounds per square inch.
warmwater fish	Species tolerant of warm water (e.g., bass, perch, pickerel, sucker).
watershed	An entire drainage basin including all living and nonliving components of the system.
wetlands	Lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. Wetlands must have the following three attributes: 1) at least periodically, the land supports predominantly hydrophytes; 2) the substrate is predominantly undrained hydric soil; 3) the substrate is on soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

ACRONYMS

ACOE	US Army Corps of Engineers
ADA	Americans With Disabilities Act
APE	Area of Potential Effect
AR	American Rivers
AVM	Avian Vacuolar Myelinopathy
AW	American Whitewater
CCL	South Carolina Coastal Conservation League
CNP	Congaree National Park
CWA	Clean Water Act
DLA	Draft License Application
DO	Dissolved Oxygen
EPA	U.S. Environmental Protection Agency
ESA	Environmentally Sensitive Area
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
HPMP	Historic Properties Management Plan
ICD	Initial Consultation Document
IFIM	Instream Flow Incremental Methodology
LMA	Lake Murray Association
LMHC	Lake Murray Homeowners Coalition
LSSRAC	Lower Saluda Scenic River Advisory Council
LW	Lake Murray Watch
NAVD	North American Vertical Datum
NGO	Non-Governmental Organization
NIP	Non-Internet Public
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic & Atmospheric Administration
NPS	National Park Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PD	Plant Datum
RCG	Resource Conservation Group

Acronyms (Cont'd)

SCDHEC	South Carolina Department of Health and Environmental Control
RT&E	Rare, Threatened, and Endangered
SCDNR or DNR	South Carolina Department of Natural Resources
SCE&G	South Carolina Electric & Gas Company
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCPRT	South Carolina Department of Parks, Recreation and Tourism
SCWF	South Carolina Wildlife Federation
SHPO	South Carolina State Historic Preservation Office
SMP	Shoreline Management Plan
THPO	Tribal Historic Preservation Officer
TU	Trout Unlimited
TWC	Technical Working Committee
USC	University of South Carolina
USDA	US Department of Agriculture
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey

SOUTH CAROLINA ELECTRIC & GAS COMPANY
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SALUDA HYDROELECTRIC PROJECT
FERC NO. 516

ENVIRONMENTAL REPORT

EXHIBIT E

1.0 INTRODUCTION

The Saluda Hydroelectric Project (Saluda Hydro or Project) (FERC Project No. 516) is an existing licensed hydroelectric project, owned and operated by South Carolina Electric & Gas Company (SCE&G). The Project is located on the Saluda River, in the counties of Lexington, Richland, Newberry and Saluda, South Carolina. The Project consists of an earth fill embankment Dam (Saluda Dam) impounding a 48,000 acre reservoir (at elevation 356.5'[1]), a gated emergency spillway, a back-up Dam, a powerhouse, five concrete intake towers and associated penstocks. Construction of the Project was completed in 1930, and construction of the back-up dam was completed in 2005. A description of Project features is described in detail in Exhibit A.

The original project license was issued by the Federal Power Commission in 1927. The currently effective license was issued by the Federal Energy Regulatory Commission ("FERC" or "Commission") on June 1, 1984 retroactive to 1977, and was due to expire on August 31, 2007. SCE&G requested an extension of the term of the license by letter dated October 3, 2002 and the Commission issued an Order on November 18, 2003 extending the term of the license until August 31, 2010.

[1] All elevation references in Exhibit E are given in North American Vertical Datum 1988 (NAVD 88); conversion to traditional plant datum (PD, used in numerous supporting studies for this license application and frequently referred to as msl) requires the addition of 1.50 feet.

Although SCE&G initiated robust pre-licensing public outreach, educational, and informal scoping efforts in 2004, SCE&G began the official, formal relicensing process in 2005 with the transmittal of its Initial Consultation Document (ICD) to resource agencies and other interested stakeholders for review and comment. Since that date, SCE&G has worked cooperatively with agencies and stakeholders through numerous resource group meetings to do the following: scope studies needed to address issues raised at the Project and develop study reports, conduct agreed upon studies, provide draft copies of study reports to agencies and stakeholders for review and comment, revise study reports to reflect agency comments, and complete follow-up studies deemed necessary to accomplish study goals. Resource group meetings have also served to provide a forum for discussion of Project related concerns among stakeholders. Additional discussions among resource groups will be necessary to facilitate development of enhancement proposals.

1.1 General Description of the Locale

1.1.1 Climate

The Project Area experiences 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 on an average of 40 days during those two months. Annually, temperatures may reach above 90 degrees 73 days out of the year. Temperatures may reach 100 degrees or more on about four or five days. Summer is typically the wettest season, with 1/3 of the total annual rainfall occurring during this time. This is due to the frequent occurrence of showers and thunderstorms throughout the season. Masses of warm, fairly unstable, maritime tropical air typically persist in the atmosphere during the summer. However, the daily weather during the winter, fall, and spring is greatly influenced by the west to east motion of fronts and air masses (USDA, 1976).

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. The earliest killing frost may occur in late October, but occurs more frequently in early November. On about 60 percent of winter days, temperatures reach 32 degrees, and usually fall to 20 degrees or less on about 6

days out of the year (USDA, 1976). Soils occasionally freeze to a depth of 3-5" (USDA, 1962). Significant amounts of snowfall in the Project Area occur infrequently. When they do occur, the snow seldom remains longer than 1 day. Winter rainfall accounts for about 22 percent of the annual total (USDA, 1976).

March brings about heavy rains that gradually fade into a dry period that lasts from late April to June. Thunderstorms occur frequently during the spring, adding greatly to a yearly average rainfall of 46 to 48". The average date of the last freezing temperature in the spring is March 22 (USDA, 1976).

1.1.2 Topography and Geology

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 geologic setting in which the Project is located is described in Paul Rizzo's Foundation Design Basis and Geologic Mapping Report generated in 2005 for the Saluda Dam remediation. The following section describing geology is quoted from the above referenced report:

"Saluda Dam is located along the Eastern Piedmont Fault zone (Hatcher, 1977) in west central South Carolina. This Fault Zone extends from Western Georgia through Virginia… The foundation bedrock at Saluda Dam is composed of metamorphosed mid to upper-level amphibolite grade facies rocks. The foundation lies along the Modoc Shear Zone, a 4-5 km wide fault zone characterized by a steep metamorphic gradient, indication of intense plastic strain, and presence of lenticular granitic bodies (Snoke and Frost, 1990). The fault zone occurs between the southern flank of the Carolina Slate Belt, a zone of greenschist facies metasedimentary and metavolcanic rocks deposited during late Precambrian to Cambrian (630ma), and the northwestern flank of the Kiokee Belt, also known as the Dreher Shoals Terrane (Hibbard et al., 2002). The latter has amphibolite facies metasedimentary and metavolcanic rocks with stratiform masses of plutonic orthogneiss (Secor and Snoke, 1978). The Carolina Slate Belt borders the northeastern terminus of the Dreher Shoals/Kiokee belt outcrop

to the east of Lake Murray… Major lithologies mapped in the foundation of the Saluda Dam are:

- mylonitized quartzo-feldspathic microcline gneiss, or the Lake Murray Gneiss (MGN);
- mylonitized quartz biotite plagioclase schist (QMS);
- hornblende schist (HBS);
- kyanite schist (KS);
- leucocratic schist (LS);
- biotite schist (BS);
- garnetiferous schist (GT);
- quartz biotite plagioclase schist-gneissic phase (GP);
- alkali feldspar granite intrusive (AFG);
- deformed amphibolite (AMP);
- potassium and two-feldspar pegmatites (P);
- mafic (MD) and felsic dikes (FD) (previously mapped as lamprophyre or camptonite dikes by others);
- aplite (A); and
- anatectic granite/plagio-granitic sheets (GS)."

1.1.3 Seismicity and Geologic Stability

Faults and shear zones of various sizes are found around the Project area and tend to run in a northeasterly direction. A number of shear zones have been mapped where gneiss and schist contact each other along the Saluda Dam spillway. There are several significant fault zones that occur in the Project area. These include the Brevard fault zone, and the Towaliga, Goat Rock, Gold Hill, and Jonesboro faults. Furthermore, a series of small faults have been identified along the southeastern edge of Lake Murray in an area of gneissic terrain. These small faults are thought to be a part of the Goat Rock fault system. Most seismic activity takes place along an extension of the Towaliga and Goat rock fault systems; however, there is no remarkable sediment or inclusion displacement (Stone and Webster Engineering Corporation, 1995).

Pertinent seismotectonic regions in the Eastern United States can be broken up into three sectors: the New Madrid faulted zone, the Piedmont and Upper Coastal Plain, and the Charleston Epicentral area. All of these sectors have experienced significant historic earthquakes that have affected the area near the site. The largest earthquake to historically hit the southeastern region was near Charleston, South Carolina on August 31, 1886. This earthquake had an epicenter located approximately 110 miles southeast of the Saluda Dam and a recorded epicentral intensity of X MM and a magnitude of 7.3 on the Richter Scale. Typically, earthquakes that have occurred in the Piedmont have occurred in clusters; however, none of these have been centered near the Project (Stone and Webster Engineering Corporation, 1995).

There is considerable evidence for the presence of ancient faults in the site area. These faults have been dated at about 300 million years old due to the presence of inclusions that cross the faults and Cretaceous sediments that show no marked offset over time (Stone and Webster Engineering Corporation, 1995).

Sinkhole activity in the state of South Carolina is localized due to the geologic composition of the state. The sedimentary limestone that typically causes sinkholes is absent from the Piedmont of South Carolina altogether (SCDNR 2002). Borings that were made in the 1970's show that the most common rock types at the Saluda Dam are biotite gneiss and chlorite biotite schist. None of the rock types encountered while making these borings were soluble in nature. Subsequently, due to the lack of soluble materials, sinkholes are not present in the site area (Stone and Webster Engineering Corporation, 1995).

1.1.4 Soils

The soils of the Project Area are predominantly Ultisols of the Carolina Slate Belt. These soils are described as the highly weathered soils of humid regions, with very low fertility, and a great deal of leeching. Their low fertility makes Ultisols well suited for pasture or forest use (Mead and Hunt, 2000). Due to a subsurface accumulation of illuvial clay, these soils are often reddish or yellowish in nature. The Ultisols of this region generally have an argillic horizon. Due in part to

weathering and climatological influences, Ultisols have a low base saturation, usually less than 35 percent in the lower part of the soil profile.

The predominant soil association of the Project area is the Georgeville-Herndon-Almance association. These soils were mainly developed in residuum, from the fine-grained slate rock of the Carolina Slate Belt (USDA, 1962). They generally have moderate permeability with medium to high available water capacity and medium amounts of runoff (USDA, 1976). The predominant texture class is a silt-loam surface soil, with a clayey subsoil (USDA, 1962). These gently sloping upland soils are highly dissected with drainage ways (Mead and Hunt, 2000; USDA, 1962). Wave action on the exposed shorelines of Lake Murray contributes to soil erosion in some areas, and in areas where bedrock is located close to the surface, soil slumping may occur. However, over the past 20 years, shoreline stabilization projects have been put in place to reduce the effects of such erosion on Project Areas (Mead and Hunt, 2000).

1.1.5 Wetlands

In March 2000, the SCE&G staff delineated wetlands in 31 different locations immediately downstream of the Project dam comprising approximately 55 acres within the Project boundary. The hydrology of these areas varies from an intermittent or seasonal inundation to perennial flow. These are the only wetlands downstream of the Project dam to be delineated.

Maps for the Project Area compiled as part of the National Wetlands Inventory (NWI) depict wetlands within the Project boundary. Wetlands upstream of the Project dam, specifically those around the Lake Murray shoreline, consist primarily of lacustrine fringe communities and submerged aquatic vegetation (SAV). Approximately 363 acres of emergent wetland exist below the 358.5-foot contour (360 Plant Datum [PD]) around the lake, with nearly ninety percent of them occurring in the headwater region of the lake along the Saluda River (Mead and Hunt, 2002a). Wetlands are discussed in further detail in Section 5.1.2.

1.1.6 Vegetative Cover

The Project is located in the Appalachian oak ecosystem. 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 (Mead and Hunt, 2002a). Further discussion on vegetative cover is discussed in Section 5.1.

1.1.7 Land Development

The Watershed Water Quality Assessment for the Saluda River Basin provides a good description of development around the Project Area. It is explained that items contributing to the considerable growth in the area include the widening of both 378 and I-26 toward the Chapin\Pomeria exit, and the continued installation of water and sewer in areas surrounding Lake Murray. Both residential and industrial growth occur in the region and are expected to persist. Several US and state highways serve the Project Area (Bureau of Water, 1998) Further information on land use within the Project Area is included in Section 8.0 of this document.

1.1.8 Demographics

A summary of the demographic profile of Lexington, Newberry, Richland, and Saluda Counties is provided in Exhibit E-2. Population figures from the U.S. Bureau of the Census (2002) indicate that, in 2000, the combined population of the counties was approximately 592,000. This represents a change of about 89,000 people since 1990, or an increase during the 1990s of 17.7 percent (Exhibit E-1). The rest of South Carolina grew by about 436,000 people or 14.6 percent between 1990 and 2000. In 2002, Lexington, Newberry, Richland and Saluda Counties ranked 5th, 27th, 2nd and 42nd, respectively, in population in the state (out of 46 counties). South Carolina's population is expected to increase to 4,458,930 in 2010, and 4,687,920 in 2015.

Exhibit E-1: Study Area Population Trends, 1990-2000: Average Annual Percent Change

COUNTY	1990	2000	PERCENT CHANGE
Lexington	167,611	216,014	28.9
Newberry	33,172	36,108	8.85
Richland	285,720	320,677	12.2
Saluda	16,357	19,181	17.3
TOTAL	**502,860**	**591,980**	**17.7**
Rest of South Carolina	**2,983,843**	**3,420,032**	**14.6**

Source: U.S. Bureau of Census, 2002, reported in FERC 2002.

Exhibit E-2: Demographic Characteristics of Residents of Lexington, Newberry, Richland and Saluda Counties and South Carolina in 2000.

STATISTIC	SOUTH CAROLINA	LEXINGTON	NEWBERRY	RICHLAND	SALUDA
Percent Male	48.6	48.6	48.2	48.3	49.6
Percent 18 - 64	62.7	63.7	61.2	66.0	60.6
Percent High School Graduates[a]	30.0	29.5	33.5	22.8	38.6
Percent College Graduates[a]	27.1	32.7	21.3	39.2	17.8
Persons per Occupied Housing Unit (1990)	2.53	2.56	2.5	2.44	2.65
Percent Urban	60.5	66.3	33.1	87.2	18.7
Percent Rural	39.5	33.7	66.9	12.8	81.3

Sources: U.S. Bureau of Census, 2002 and South Carolina Office of Research and Statistics, 2004, Reported in FERC, 2002.

[a] This information pertains to persons in 2000 over the age of 25

1.1.9 Flooding and Floodplains

Discussion on floodplains is included in Section 5.1.2.

2.0 WATER USE AND QUALITY

Lake Murray covers approximately 78 square miles and is approximately 41 miles long, with a maximum width of 14 miles. At an elevation of 356.5', Lake Murray has a maximum depth of 189 feet. Because of its size and the hydrology of the system, Lake Murray has a long retention time - approximately 417 days. Due to its extensive depth, the lake thermally stratifies each year. This, in turn, affects water quality conditions in Lake Murray and potentially the lower Saluda River (LSR). These water quality conditions have been extensively studied and monitored, as discussed below.

The LSR originates at the base of Saluda Dam and consists of a 10-mile stretch of free flowing river before merging with the Broad River and forming the Congaree River which serves as the boundary between downtown Columbia on the east bank and West Columbia and Cayce on the west bank. Through the cooperation and with the assistance of SCE&G, a significant portion of the lower Saluda River was designated as a State Scenic River Segment in 1991. This was the first such designation in the State of South Carolina. In 1997, SCE&G donated a Scenic River easement to the State of South Carolina over much of the property it owns along the lower Saluda River. Through this donation, a 100 ft wide strip of land is conserved along approximately six miles of riverbank (LSSRAC, 2005). Water depths in the LSR are highly variable and dependent upon streambed morphology and water releases from the Saluda Project, but typically range from 3 to 15 feet. As with depth, stream flow is highly influenced by releases from the Saluda powerhouse.

2.1 Water Uses

Lake Murray and the LSR provide an exceptional source of high quality waters that can be used for both consumptive and non-consumptive uses. The reservoir serves as a source of drinking water and water for industrial uses for the cities of Columbia, West Columbia, Newberry and Saluda, and the surrounding areas. The maximum amounts of water allowed by the FERC for withdrawal by each city are as follows:

- City of Columbia – 100 MGD
- City of West Columbia – 48 MGD
- City of Newberry – 10 MGD
- Saluda County Water and Sewer Authority – 15 MGD

The Saluda Hydroelectric Project functions as a reserve capacity plant, meaning it runs on an "as needed basis." The McMeekin Station[2] consumptively uses an insignificant amount of water, normally only about 35 gallons/minute. Spillway discharges are very infrequent, and with rare exception since 1930, have been only the result of testing the spill gates. There is water loss due to the natural occurrences of evaporation and ground water uptake. The agricultural developments around Lake Murray generally meet their water demands through the uses of farm ponds. However, there is a small amount of water taken up by these operations. There are also small volumes of water withdrawn from Lake Murray by a few landowners for domestic uses. These water withdrawals are allowed by SCE&G's Lake Management department.

The reservoir and the LSR are used extensively by the public for recreational. Fishing accounts for much of the recreational use of the reservoir and LSR. Like many of the waterways in the State, there have been fish consumptive advisories issued by SCDHEC for the lower Saluda. This current fish consumptive advisory is in effect for largemouth bass, bluegill and bowfin (SCDHEC, 2007). Recreational uses are discussed in further detail in the recreation Section 7.0 of this document.

2.2 Water Quality

2.2.1 Water Quality Standards

2.2.1.1 Lake Murray

All waters entering and within Lake Murray are classified as "freshwaters (FW)" (SCDHEC, 2004). FW waters are considered suitable for primary and secondary contact, recreation, and as a drinking water supply, using conventional treatment (based on requirements set forth by SCDHEC). FW waters are also suitable for

[2] As described in Exhibit A, the McMeekin Station is a coal fired power plant located adjacent to the Saluda Hydro powerhouse on the north side of the lower Saluda River. It is operated by SCE&G, but is not part of the Project.

industrial and agricultural uses, fishing, and the survival and propagation of a balanced indigenous aquatic community of flora and fauna.

SCDHEC water quality standards for FW waters (all waters entering and within Lake Murray) include (SCDHEC, 2004):

DO	Daily average not less than 5.0 mg/L with a low of 4.0 mg/L
Fecal Coliform	Not to exceed a geometric mean of 200/100mL, based on five consecutive samples during any 30-day period; nor shall more than 10% of the total samples during any 30-day period exceed 400/100mL
pH	Between 6.0 and 8.5
Temperature	Not to vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses
Turbidity	Not to exceed 50 Nephelometric Turbidity Units (NTUs) (25 NTUs for lakes) provided existing uses are maintained

In addition to the above standards, numeric nutrient criteria exist for lakes of 40 acres or larger, and are based on an ecoregional approach that takes into account the geographic location of the lake within the state (SCDHEC, 2004). Lake Murray is situated in the Piedmont and Southeastern Plains ecoregions of the state. Nutrient criteria for this ecoregion include the following (SCDHEC 2004):

Total Phosphorous	Shall not exceed 0.06 mg/L
Chlorophyll ***a***	Shall not exceed 40 µg/L
Total Nitrogen	Shall not exceed 1.50 mg/L

2.2.1.2 Lower Saluda River

Since 1990, the LSR has been classified by SCDHEC as Trout Put, Grow and Take Waters (TPGT), which are defined as freshwaters suitable for supporting the growth of stocked trout populations and a balanced, indigenous aquatic community of fauna and flora (SCDHEC, 2004).

Until 2002, a site-specific Dissolved Oxygen (DO) standard for the LSR existed, which was a daily average of 5.0 mg/l with no instantaneous

minima. In that same year, the SCDHEC proposed changes to the existing DO site-specific standard for the LSR downstream of the Saluda Dam/Lake Murray. To facilitate development of an effective and attainable standard, SCE&G, working cooperatively with the South Carolina Department of Health and Environmental Control (SCDHEC), South Carolina Department of Natural Resources (SCDNR), and the Environmental Protection Agency (EPA) to develop and implement a number of site-specific studies. These studies were aimed at establishing a scientifically based alternate DO standard for the LSR and included:

1. An in-situ trout growth study (conducted during 2002-2003).
2. Turbine venting modeling.
3. Tailwater modeling.
4. Bio-energetics modeling.

Upon completion of the identified studies, a detailed report was prepared providing the results of scientific investigations necessary to formulate that proposed site-specific standard.

The fish growth study on the LSR indicated that a significant and healthy trout fishery exists on the river. This fishery exists even though DO concentrations on occasion fall for brief periods below 2 mg/L. The fish growth model showed that the good trout growth is due in part to the relatively high average DO concentrations that have occurred in the river due to the aeration system (implemented by SCE&G in 1999), in conjunction with the reduced incidence of high flows due to recent drought years, and a favorable temperature regime. It is estimated that the fishery would do nearly as well during normal hydrologic years using the current aeration system; however, in wet years or in years when the *pool* level of Lake Murray is drawn down for special purposes in September or October, the difference in fish growth might be measurable (i.e., a difference greater than 1/2 ounce or 1/16 inch was considered measurable for fish weighing over 2 pounds and having a length of about 18 inches).

In order to estimate the range of DO conditions the fishery might be exposed to in the future, a turbine aeration model was developed to predict the effects of using various aeration alternatives. This model was then used to predict DO conditions in the river for the years 1990 (wet), 1992 (normal), 1996 (normal with a special drawdown of Lake Murray), and 1999 (dry). The results of the turbine aeration model were summarized as DO metrics (e.g., minimum daily DO, average daily DO, 30-day average DO, etc.) that represented potential measures of DO that could be considered for setting DO standards.

A tailwater hydrodynamic water quality model was calibrated using actual onsite water quality data. A fish bioenergetics model was calibrated using tailwater model results and results of the growth study. The fish bioenergetics model was then used to estimate trout growth for various aeration scenarios for each of the years. The results showed that growth was best correlated to the moving 30-day average DO. This finding is consistent with the recommendations in the EPA criteria document for DO (EPA, 1986).

A central concern was found to be the minimum DO level that occurs with the current aeration system. A minimum DO of 3 mg/L is considered to be protective for trout survival, and this same level likely would be sufficient for other aquatic life that serves as food supply for the fishery. However, a minimum of 4 mg/L has been set by SCDHEC for application to all waters of the State, and SCDHEC made it clear that nothing less than that standard would be accepted. SCE&G had little choice but to propose 4 mg/L as the minimum DO for the site-specific standard.

The results of the scientific studies, in addition to SCDHEC's admonition regarding an acceptable minimum, supported the following site-specific standard for the LSR:

- Instantaneous DO 4 mg/L minimum
- Daily average DO 5 mg/L minimum
- 30 day average DO 5.5 mg/L minimum

These levels of DO were shown to be protective of the fishery and would achieve trout growth objectives equivalent to those that would result from application of the DO standard previously proposed by SCDHEC. After going through extensive state and federal regulatory review and legislative processes the above site specific DO standard was adopted for the LSR in 2004.

In addition to DO, SCDHEC water quality standards for TPGT waters (section of Saluda River downstream of the Saluda Dam) include (SCDHEC, 2004):

Fecal Coliform	Not to exceed a geometric mean of 200/100mL, based on five consecutive samples during any 30-day period; nor shall more than 10% of the total samples during any 30-day period exceed 400/100mL
pH	Between 6.0 and 8.0
Temperature	Not to vary from levels existing under natural conditions, unless determined that some other temperature shall protect the classified uses
Turbidity	Not to exceed 10 Nethelometric Turbidity Units (NTUs) or 10% above natural conditions, provided existing uses are maintained

2.2.2 Past and Ongoing Water Quality Studies

2.2.2.1 Lake Murray

A significant effort has been placed on collecting water quality data in Lake Murray for the past 60 years. Different agencies, including the South Carolina Pollution Control Authority (SCPCA), SCDHEC and U.S. Geological Survey (USGS), have made various water quality measurements for the reservoir during the 1950s, 1960s, and early 1970s. SCDHEC has continued to monitor water quality in both the lake and its tributaries on a monthly basis since 1973. In 1974, EPA included Lake Murray in the National *Eutrophication* Survey, which collected data from specific lakes and reservoirs all over the U.S. Most recently,

SCE&G coordinated with USGS to collect data on Lake Murray from 1990 to 1996, using 13 water quality monitoring stations (12 are located on Lake Murray and one is downstream from the Saluda Dam). SCE&G has continued the water quality monitoring effort since 1996, collecting monthly field samples at all 13 locations and chemical samples twice a year at seven of the stations.

2.2.2.1.1 Comprehensive Assessment of Lake Murray (1974-1975)

In preparation of relicensing for the currently effective FERC license, a comprehensive assessment of Lake Murray was conducted from September 1974 through August 1975. Using a total of 33 stations in and around the lake, 24 physical and chemical factors were sampled and tested during a one-year period. The comprehensive study determined the following:

1. Total alkalinity levels in Lake Murray were low;
2. pH levels were rarely outside of the Class A limits for waters of 6.0 to 8.0 (SCPCA), with pH levels ranging from 5.3 to 9.1 during the 12-month study period;
3. The highest chlorophyll ***a*** levels were found in the upper lake tributary stations;
4. Total phosphorous concentrations were highest in the upper lake, near the inflows/tributaries, and lowest near the Dam, with a mean concentration for the lake of 0.10 mg/L;
5. Fecal and total coliform levels were occasionally high in the Lake, exceeding the standards at some of the upper lake stations on occasion, specifically after periods of heavy run-off in the watershed (storm events);
6. 12 of the 24 trophic status determinations classified the lake to be mesotrophic and 11 of the 24 determinations classified the lake as eutrophic. The comprehensive assessment report stated that, because of the potential for increased shoreline development and additional nutrient

inputs from the watershed and septic systems, Lake Murray will show signs of greater eutrophication.

2.2.2.1.2 Comprehensive Water Quality Report (1974-1998)

SCE&G has worked with SCDHEC and USGS for a number of years monitoring the water quality in Lake Murray. Data collected as a result of this water quality monitoring effort, from 1974 to 1998, was recently compiled into a database prepared to evaluate historical trends in water quality of Lake Murray and its drainage area up to Lake Greenwood. Water quality information was compiled using a specialized computer software program and then put together into a comprehensive water quality report. This report and the underlying database serve as pertinent sources of information about present and past water quality trends. Since Lake Murray serves as an important regional economic and recreational resource, the water quality parameters that have the greatest effect on these economic and recreational activities are considered the most important. Various plots and charts were generated and included in a summary report to aid in the assessment and understanding of the results from these studies. The summary report was contained in the ICD and issued to stakeholders. A copy will be provided in the final application.

2.2.2.1.3 SCDHEC Saluda River Basin Water Quality Reports

The SCDHEC published two reports related to the water quality in the Saluda River basin, including:

1. Watershed Water Quality Management Strategy - Saluda-Edisto Basin, Technical Report No. 003-95, June 1995, Bureau of Water Pollution Control
2. Watershed Water Quality Assessment - Saluda River Basin, Technical Report No. 005-98, December 1998, Bureau of Water

In these reports, seasonal trends and changes in water quality over the entire length of Lake Murray were evaluated. Generally, material differences between upper and lower stations in the lake were apparent. Concentrations of nitrates, phosphates, fecal coliforms, and biochemical oxygen demand (BOD) were typically higher at the upstream lake stations compared to the lower stations (closer to the Dam). This condition could be attributed to the faster flowing waters in the upper lake (convergence of several of the main tributaries into the *headwater*s of the lake) in contrast to the slower moving waters in the lower part of the lake. In addition, sedimentation was most prominent in the upper part of the lake, specifically between Rocky Creek and Blacks Bridge, which are located 19 to 25 miles upstream of the Saluda Dam. This seven-mile stretch of the lake was shown to contain a higher percentage of small particle sediments compared to other sections of the lake, with the exception of the lower part of the Little Saluda embayment (near the Highway 391 bridge).

Both SCDHEC reports are similar; however, the 1998 report identified a greater number of locations in Lake Murray 'not supporting' and 'partially supporting' their designated uses, according to the use-based criteria. Specifically, water quality criteria associated with fully supporting aquatic life and unrestricted recreation were noted as not being fully and continuously met. Exhibit E-4 lists the number of locations in the lake, embayments, inflows, and tailwater and how water uses were supported based on the SCDHEC reports. Within the Lake Murray watershed, 18 locations were labeled as fully supporting their designated uses in 1995 compared to only 9 locations in 1998. Based on the 1998 report, SCDHEC found 7 of the 12 stations on Lake Murray to be either 'not supporting' or 'partially-supporting' their respective water uses. Metals were listed as the cause for 6 of the 7 stations not meeting their designated uses, while nutrients were listed as the cause for 2 of the 7 stations (one station had both metals and nutrients listed as the cause).

2.2.2.1.3.1 Pathogens

Fecal coliform was identified as the cause for impacting recreation at 6 locations in 1995 and 8 locations in 1998 in the inflows/tributaries to the lake and in the tailwater of Saluda Dam. These conditions were all attributed to point and/or non-point sources in the watershed. However, all locations in Lake Murray were found to fully support the recreational use designation based on fecal coliform data.

Fecal coliform is listed as the cause for Total Maximum Daily Loads (TMDL) at three sites in the Lake Murray watershed, including two sites on Bush River and one site on Rawls Creek, which discharges into the LSR downstream of the Dam. Another eight sites are designated as potential TMDL sites, with six of the site designations caused by fecal coliform. There are a total of 51 TMDL-designated sites in the watershed listed on the state 303(d) list. Fecal coliform is the most significant water quality indicator and is responsible for TMDL designation for 21 of the sites. Most of these 21 sites indicate a significant potential concern to recreation where the streams enter Lake Murray (i.e. the headwaters) or the Saluda River. Lake recreational uses may potentially be impacted at the inflow areas from these sites following significant rainfall/runoff events.

2.2.2.1.3.2 Phosphorus

Elevated phosphorous levels are the cause for listing two sites on the state 303(d) list, including the Bush River arm and the Rocky Creek area of Lake Murray. However, neither site is listed as a potential TMDL site despite the high priority listing. Total phosphorous concentrations in Lake Murray tend to be highest in the upstream section of

the lake, near the main tributaries/inflows. The downstream part of the lake, near the Dam *forebay* has historically had the lowest concentrations of total phosphorous. Most of the phosphorous is either utilized by the plants and algae in the lake or settles out onto the bottom of the lake. In general though, total phosphorous concentrations have shown a decreasing trend in the lake, since the mid-1980s (Ruane, 2004).

2.2.2.1.3.3 Trophic Status

Eutrophication refers to the level of nutrients in a lake and the resulting level of productivity by the organisms (*e.g.*, plants and *phytoplankton*) that utilize the nutrients, such as phosphorous and nitrogen. A lake that has low concentrations of nutrients and low levels of productivity (*i.e.* limited algal blooms and plant growth) is referred to as oligotrophic. On the other hand, a lake that is high in nutrients and has levels of productivity (significant algal blooms and plant growth, resulting in poor water clarity) is classified as eutrophic. The mesotrophic classification falls in the middle of oligotrophic and eutrophic, characterizing a lake containing moderate levels of nutrients and moderate productivity.

In the SCDHEC 1995 and 1998 reports, a multiple parameter index was used to assess eutrophication in Lake Murray. The multiple parameter index is based on measurements of water clarity, total phosphorous, total inorganic nitrogen, chlorophyll ***a***, and DO. Based on a baseline assessment in 1980-1981, conditions in the upper lake had improved, with the exception of Rocky Creek and the Bush River section of the lake, which were stated as some of the most eutrophic sites on large lakes in South Carolina. The 1998 report indicated that two upstream locations on the Saluda River arm and the Little Saluda

River arm had improved to intermediate trophic status (*i.e.* mesotrophic). The 1998 report also indicated that all locations between Rocky Creek and the Saluda Dam were some of the least eutrophic sites in the state, with decreased levels of total phosphorous and decreasing trends of nitrogen and BOD.

2.2.2.1.3.4 DO and Temperature

Extensive water quality profiles, including DO and temperature, were performed in Lake Murray throughout the 1990s. As an example, Exhibit E-8 through E-13 illustrate longitudinal contour plots of DO in Lake Murray during the months from May to October of 1998. The plots use DO profiles from seven different locations in the lake, which are plotted at their location relative to the Dam (x-axis) versus elevation or meters above sea-level.

Lake Murray thermally stratifies each year, forming three different layers in the water column during the months of May through October. The water column stratifies because of the change in temperature and density of each layer. The epilimnion is the upper layer of the lake, which is the only one to remain in contact with the surface and is characterized by high DO and temperature levels. The hypolimnion is the bottom layer of the lake that remains isolated from the atmosphere during the stratification period. The hypolimnion contains the coolest waters (down to 11˚C in 1996) and some of the lowest DO waters, even having anoxic conditions (no DO) during September and October. The metalimnion is the middle layer of the water column, which contains the controlling region known as the thermocline. The thermocline is referred to as the waters having the greatest temperature change over depth. This layer is basically the transition layer between the epilimnion and hypolimnion. In Lake Murray, this layer

can have the lowest DO levels, depending on flows entering the lake.

The magnitude of flows or hydrology for each year controls the level of nutrients, algae, and other organic matter that enter the lake. The nutrients, algae, and other organic matter contribute significantly to DO demand, which relates to the amount of oxygen required to decompose the organic matter that is ultimately produced by the nutrients and algae. In addition, sediment oxygen demand can contribute to the DO demand in the lake bottom waters. Sediment oxygen demand can result from several things, one of which is from the deposition of organic matter on the lake bottom.

The water column in the lake becomes thermally stratified during the summer months when the bottom waters do not come into contact with the surface to replenish DO levels, thus eventually becoming void of oxygen or anoxic, depending on annual flows. In a low flow year, for example, the magnitude of nutrient input to the lake would be lower, resulting in a limited DO demand and higher DO levels in the bottom waters of the lake, particularly downstream towards the Dam. Higher flow years would result in an increased loading of nutrients, algae, and organic matter to the lake that would create a high DO demand and lower DO conditions in the bottom of the lake, specifically during the summer months. These effects were most recently noticed in 2003. DO levels at the upstream portion of the lake, where most of the inflows enter, are less dependent on flow conditions. Flow conditions in the watershed primarily control the distribution of the water quality at the upstream portion throughout the lake.

Referencing Exhibits E-8 through E-13, it is readily apparent that DO levels start to decrease in the upper part of the lake in May and June of each year. DO levels are less than 2.0 mg/L in the metalimnion and near the bottom in the upper part of the lake by June of each year. However, DO levels are often lower at different points in the water column compared to near the bottom, which indicates a high DO demand in the water (*e.g.*, nutrients, algae). As previously mentioned, the low DO conditions in the upper lake are caused by the decomposition of algae and other organic matter entering the lake as well as the effects of sediment oxygen demand in the lake bottom. Depending on flow conditions, this poor water quality may cause the same low DO conditions in the metalimnion and hypolimnion throughout the lake, down to the Dam.

In July, DO levels become much more dependent on the annual hydrology, particularly in the Dam forebay. In low flow years, the DO was typically greater than 5.0 mg/L at all depths in the Dam forebay, while normal flow years are marked by reduced DO levels, normally less than 5.0 mg/L at most depths in the forebay. The pattern for DO levels in the Dam forebay during the month of August is similar to July. In low flow years, the DO is normally greater than 3.0 mg/L at all depths, while normal flow years have DO levels less than 3.0 mg/L at nearly all depths of the Dam forebay. This pattern of DO behavior, based on flow conditions, for the months of July and August, indicates that water displacement within the reservoir affects the DO distribution in the reservoir.

In September, the DO in the forebay area is typically 0.5 mg/L or less at most depths during normal flow years. In low flow years, the DO is usually greater than 1.5 mg/L at all depths in the forebay. Finally, in October, the DO in the

hypolimnion of the lake is normally less than 0.5 mg/L at all locations.

2.2.2.1.4 CE-QUAL-W2

As previously stated, in 2002 SCDHEC issued a formal notice that the DO standard for the LSR would be revised. Upon review of the comprehensive water quality report for the Saluda Hydro relicensing, it was shown that phosphorous trend data indicates potential problems with nutrient loading into Lake Murray. In order to comply with a new DO standard, SCE&G sought to evaluate the potential effects that nutrient reduction would have on the DO levels in Lake Murray and the releases from Saluda Hydro. SCE&G proposed a series industry accepted models and studies, including a two-dimensional water quality model, CE-QUAL-W2 (Ruane, 2004). The CE-QUAL-W2 model has been shown to be quite accurate in predicting water quality conditions. It is an extremely useful tool when analyzing the effects that inflow water quality has on the receiving lake water quality, as well as the releases from the lake. After an extensive review of the water quality data gathered for Lake Murray and its inflows by SCDHEC, USGS and SCE&G, a CE-QUAL-W2 model was developed for Lake Murray (Ruane, 2004).

Data was combined and used in the calibration of the model for the year 1996. This calibration year was chosen based upon available data and hydrologic conditions. Moreover, this year does not reflect the effects of the aeration system implemented by SCE&G in 1998, which would hinder the comparison of Lake Murray inflow and outflow data. Temperature, DO, algal levels, and phosphorus were the primary water quality constituents studied using this modeling technique. The model was tested using statistical and graphical analysis, which subsequently showed that it was extremely well calibrated for this year and conditions. The model was then tested for the years 1992 and 1997. Even though the model was not calibrated for these years,

the results were still considered very good. Phosphorus data achieved from conducting the CE-QUAL-W2 model provided more precise and detailed results than did the data from the previous phosphorus studies (Ruane, 2004).

When predicting water quality conditions in Lake Murray using the CE-QUAL-W2 model, results were achieved assuming that the phosphorus concentrations occurring in the inflows to Lake Murray contained the maximum allowable concentrations in compliance with SCDHEC standards. When reducing the phosphorus loads to these maximum allowable levels, the model showed substantial improvements in water quality conditions in Lake Murray. The DO levels in the turbine releases from Saluda Hydro were also shown to increase to such an extent that alternative aeration of the water may not be needed for the DO in the turbine releases consistently to meet state standards for the LSR. Furthermore, it is inferred that as a result of phosphorus reductions, striped bass habitat would be greatly improved, as well as the pH levels on the LSR (Ruane, 2004).

Results from the Lake Murray study were compared to results achieved by modeling projects similar to Saluda Hydro. Data derived from the CE-QUAL-W2 model predicted that the most likely cause for water quality problems in Lake Murray stem from the point source discharges of phosphorus into Ninety-Six Creek and the Bush River. The discharge of phosphorus at these locations is very high. The Saluda River is responsible for 68% of the mean *streamflow* into Lake Murray; however, it only contributes 15% of the total phosphorus load. Strikingly, the other smaller tributaries together only make up 32% of the mean streamflow into Lake Murray but contribute 85% of the total phosphorus load (Exhibit E-5). This means that for the Saluda River inflow, the phosphorus to flow ratio is 0.22 while for the smaller tributaries the phosphorus to flow ration is 2.66, or more than twelve times as great. Another indication that point source pollution is a major contributor to water quality issues in Lake

Murray is that phosphorus discharges from Lake Greenwood are relatively low due to tertiary waste treatment upstream. In turn, model results estimated that 60% of the phosphorus input into Lake Murray occurs as a result of discharge from point sources outside of the Project boundary. Additionally, if those point sources of pollution into Lake Murray met SCDHEC water quality standards, the phosphorus discharges into Lake Murray would be reduced by about 66% (Ruane, 2004).

Reducing phosphorus levels in point source discharges into Lake Murray may be a cost effective and practical way of improving the overall water quality of the lake. A review of projects similar to Saluda Hydro indicates that a reduction in lake phosphorus levels contributed to an increase in the DO levels. The CE-QUAL-W2 model accurately indicates that most of the water quality problems could be solved by implementing point source phosphorus controls (Ruane, 2004).

2.2.2.2 Lower Saluda River

SCE&G began monitoring DO and temperature in the releases from the Project turbines in 1989 and continues the effort to the present day. These monitoring efforts have determined that nutrient loading from the tributaries and the thermal stratification of Lake Murray from May through approximately October of each year result in the depletion of DO levels in the metalimnion and hypolimnion layers of the lake. These anoxic conditions during the summer months in the lake can translate into low DO concentrations in the water released through the Project turbines. The anoxic conditions and low alkalinity levels in the bottom waters of the lake can also result in moderately low pH conditions (pH < 7.0), because of the lack of oxygen and the production of carbon dioxide from the various decomposition processes.

2.2.2.2.1 SCDHEC Reports

The 1995 and 1998 SCDHEC reports indicated that in the Saluda Dam tailwater, the section of the Saluda River immediately below the Project, ratings were 'not supporting' and 'partially supporting' for aquatic life uses at the first station downstream of the Dam. The listed cause for this impairment was the low DO levels measured in the Project releases from the turbines. Conditions at the downstream station were reported to have improved (1998 report) based on a lower percentage of the DO data that were less than the standards. Lower pH levels were also reported as a cause for the 'not supporting' conditions for aquatic life use in the tailwater.

2.2.2.2.2 DO Enhancement of the Project Turbine Releases

In an effort to increase the DO levels in the releases from the Project turbines, SCE&G installed turbine vents and modified operations starting in 1999. Exhibit E-14 illustrates how turbine venting in conjunction with modified operational patterns has improved the project release DO levels since 1999. The median DO concentration of the Project release has increased from 2.7 mg/L (before implementing turbine venting) to 7.2 mg/L (with turbine venting - 1999 to present). Ultimately, this has resulted in less frequent occurrences of DO levels in the release below 5.0 mg/L, from 88% to about 12% of the time. The percentage of time the DO levels from the Project releases were below 3.0 mg/L has decreased from 55% to 3% since turbine venting and modified operations were implemented in 1999.

Daily average DO levels in the Project releases from 1999-2000 were periodically below 4.0 mg/L, particularly on days when flows through the turbines were high. The amount of water that passes through the turbines controls the amount of air drawn into the turbine system. A lower flow or gate setting will allow more air to

be aspirated into the turbine system resulting in a greater degree of DO increase in the Project release.

In May 2005, installation of hub baffles was completed on all 5 Saluda Hydro units in an effort to further enhance turbine aeration, and ultimately, DO conditions in the Project tailrace. Extensive testing of turbine aeration efficiency during Fall 2005 and 2006 yielded variable results; some units demonstrated considerable aeration potential while other resulted in only marginal DO improvements. During the summer of 2007, larger hub baffles were added to unit 5 to additionally aid in the oxygenation of water releases. Failure of some units to achieve additional aeration was attributed to failed or poor head cover seals. Repair of the failed head cover seals on Units 2 and 3 was completed during early-summer 2007, and additional aeration efficiency testing was conducted during the fall of 2007.

In 2005, SCE&G implemented operational protocols that further assist in maintaining enhanced DO levels in the LSR. Specifically, "look up" tables, depicting best operational scenarios to optimize aeration capacity, were developed based on a detailed turbine venting model. These tables provide SCE&G operations and dispatch personnel with detailed information regarding unit combinations and gate settings that optimize aeration efficiency while meeting power demands. To ensure continuing enhancement of DO levels, this model is reviewed on an annual basis and the "look up" tables updated accordingly based on any new pertinent testing or operational data.

2.3 Agency and Public Recommendations Concerning Water Uses and Water Quality

2.3.1 Initial Stage Consultation

On April 29, 2005, SCE&G sent the Initial Consultation Document (ICD) for the Saluda Hydro Project in electronic format to the consulting agencies and various stakeholders for review. The Notice of Intent (NOI) was filed with the Commission simultaneously with the issuance of the ICD. The ICD is included in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

In addition to Issue Identification workshops held October 26-28, 2004, a joint public and agency meeting was held on June 16th, 2005, following the issuance of the ICD (meeting transcripts provided in Volume II). The primary goal of this meeting was to review the upcoming relicensing process with the group, briefly review the background of the Project, and to scope out any initial study requests or discussion topics the group felt should be addressed as a part of the Saluda Hydro relicensing. Many of the comments received during the June meeting were formalized in subsequent letters and during Resource Group meetings.

Supplementing the comments received on the ICD, the Licensee hosted a series of Resource Conservation Group meetings (RCG)'s to discuss the method and scope of the studies necessary for the Saluda Project relicensing (See meeting notes in Volume II). The resource groups were separated by genre, and in-depth issue discussions were limited to those that had a Project nexus.

Summarized below, are the remarks and study requests regarding Water Quality that were provided by stakeholders in comment letters following the issuance of the ICD.

The entities listed in the following paragraphs note their general concern for water quality in the Project area; more specific water quality study requests are listed in the subsequent paragraphs.

In their August 12, 2005 ICD comment letter, South Carolina Parks Recreation and Tourism (SCPRT) requested improved water quality for the lake and river to meet various recreational needs around the Project Area. Similarly, Lower Saluda Scenic River Advisory Council (LSSRAC) recommended in their comment letter, dated August 12, 2005, that studies be performed on Project releases to characterize temperature and DO under various operational scenarios. They also recommended that the extent of impact the Project has on downstream water quality be determined, as well as provide for a plan for a long term monitoring of water quality downstream of the Project.

The U.S. Fish and Wildlife Service (USFWS) recommended (letter dated August 1, 2005) existing water quality data be reviewed for the reservoir, tailrace, and downstream of the reservoir. The USFWS noted that it should be determined based on existing data if additional studies are necessary. Additionally, the Coastal Conservation League (CCL) and American Rivers requested in a joint letter, dated August 10, 2005, that the effects Project operations have on water quality and its relation to the recruitment of fishes (diadromous and riverine) be studied. In their ICD comment letter dated August 1, 2005, the National Marine Fisheries Service (NMFS) requested that water quality information be gathered and a determination be made on the need for additional data collection and analysis.

The South Carolina Wildlife Federation (SCWF) recommended that water quality studies be performed in the Project area in order to relate shoreline uses to water quality (comment letter dated August 15, 2005). The League of Women Voters expressed their concern for water quality in Lake Murray in their ICD comment letter (dated August 14, 2005). They specifically requested that studies be performed on the effect of power boats and jet skis on drinking water quality, and noted that it may be necessary that aforementioned boat usage be curtailed.

The request by the League of Women Voters for a study to evaluate the impacts of jet skis and power boats on drinking water quality was reviewed by the Water Quality TWC on February 21, 2006 (meeting notes attached in Volume II). Several meeting attendees noted that they were unsure of exactly what is being requested and the project nexus. It was noted that some individuals pump drinking water directly from the lake to their homes, and it was assumed that this

is what is being referred to in the request since all water withdrawn for public consumption is treated prior to distribution. The group discussed the fact that SCE&G does not issue permits for individual water withdrawals for consumptive use as part of its current lake use permitting process, nor does SCE&G have the regulatory authority to regulate watercraft usage on the lake.

Other letters that expressed the general concern for the water quality of the Project area include: University of South Carolina (USC)(dated August 12, 2005), the National Park Service (NPS)(dated August 11, 2005), TU (letter dated August 15, 2005), the Lake Murray Association (LMA) (dated August 12, 2005), City of Columbia Parks and Recreation (dated August 11, 2005), and SCDNR (August 11, 2005), American Whitewater (dated August 12, 2005).

Resource Conservation Groups[3] are currently working to resolve agency and stakeholder concerns as they relate to the water quality of the Project area and surrounding areas. They have currently performed a number of water quality studies that directly address different aspects of lake and river water quality that include: temperature, DO, water allocation, nutrients and other pollutants. Specific studies are mentioned in the responses below.

SCPRT recommended in their August 12, 2005 ICD comment letter that water quality concerns as they relate to the trout and striped bass fishery should be considered. Similarly, the USFWS requested in their August 1, 2005 comment letter that studies be performed with respect to the effect that project operations may have on the striped bass fishery in the reservoir. This study request includes the evaluation of current operational scenarios on habitat, and any

[3] The Resource Conservation Groups (RCG) and Technical Working Committees (TWC) are comprised of interested stakeholders committed to working with each other and with SCE&G to identify project issues and to develop recommendations for addressing/resolving the issues. The RCG's and TWC's stakeholders include SCE&G, state and federal agencies, local governments, consultants, non-governmental organizations, homeowner and boat owner groups, and individual private citizens who share a concern for the resources of the Project. Specific details regarding the roles of RCGs and TWCs can be found in the Operating Procedures developed for the Enhanced Traditional Relicensing Process of the Saluda Hydroelectric Project (http://www.saludahydrorelicense.com/documents/OperatingProceduresforRelicensing2005-December14unsh..pdf).

additional enhancements in habitat by the modification of operational scenarios. This study request is also made with the recommendation of an evaluation of the spawning activities of the striped bass within the reservoir.

In a joint letter filed by CCL and American Rivers (letter dated August 10, 2005), these groups also recommended that studies be performed on water quality in the forebay area of Saluda Hydro to help determine the cause of periodic fish kills. SCDNR noted in their ICD comment letter (dated August 11, 2005) that they are interested in investigating whether Project operations could be modified in order to provide cooler water for the late summer months to the river fishery. They also requested that information be developed on how striped bass habitat reductions in the Lake can be forecasted or alleviated by project operations. The Midlands Striper Club noted in their ICD comment letter (dated August 15, 2005) concern for the lake striped bass fishery, as well.

The Water Quality Technical Working Committee (TWC) is currently working on a Water Quality Model that directly addresses the striped bass habitat issues of the Lake. Although final conclusions and recommendations have not yet been attained, the group is looking at possible modifications to Project operations during specific summer and early fall months.

The recommendation is made in the ICD comment letter of the LSSRAC (letter dated August 12, 2005) that a Total Maximum Daily Load (TMDL) be established for Lake Murray. Similarly, Lake Watch requested that an Assimilative Capacity Assessment be performed on Lake Murray to address non-point pollution sources in the creek in cove areas of the Lake. An Assimilative Capacity Assessment is also requested by the Lake Murray Homeowners Coalition (LMHOC) (ICD comment letter dated August 15, 2005). The Lake Murray Association (ICD comment letter dated August 12, 2005) also recommended that a TMDL be performed on areas not meeting current water quality standards and testing of other areas around Lake Murray.

The issue of a TMDL has been and continues to be discussed by the Water Quality TWC. SCDHEC is the regulating authority charged with establishing TMDLs on State waters. As such, SCDHEC has indicates that any recommendations from the TWC with regards to a TMDL would need to be

consistent with their internal schedules and basin planning efforts. Based on SCDHEC's role and authority in developing TMDLs it appears this will not be feasible nor will it occur in the foreseeable future at the Project (Water Quality TWC meeting notes dated May 3, 2006). The group has recognized that they could provide useful information and public awareness that in the future may have an influence by strongly recommending one be performed in order to ensure that point source contributors are in line with current standards.

CCL and American Rivers requested in a joint letter (dated August 10, 2005) that studies should be performed to evaluate the effectiveness of newly implemented oxygenation measures at the Saluda Hydro Project.

SCE&G has been conducting annual meetings with American Rivers, the Coastal Conservation League and resource agencies. The group develops an annual operating plan to optimize DO levels when the Project generates electricity. The operating plan is based on the operations reports for the previous years along with relevant operating and/or testing data acquired during the previous operating season. This plan incorporates the results of DO testing performed in the Project tailrace in the years of 2005, 2006, and 2007. As noted previously, SCE&G has re-sealed several of the units and added larger hub baffles to unit 5 to aid in the oxygenation of water releases.

The USFWS recommended in their ICD comment letter, dated August 1, 2005, performing a Temperature Analysis of the effects of Project releases. The USFWS recommended that the following components be included in this study: "travel distance downstream to effectuate completion of temperature mixing in the Congaree River, and evaluation of the affects [*sic*] to species and habitats within the downstream Congaree National Park, an evaluation of the affects [*sic*] to upstream migrating diadromous fish". It was also recommended by CCL and American Rivers (letter dated August 10, 2005) that the affects that LSR water quality and temperature have on mussel species in the lower Saluda and Congaree rivers be evaluated.

The Water Quality RCG is in the process of conducting a temperature study of the lower Saluda and upper Congaree river reaches. Collectively the group agreed upon a study plan and periodically reviews updates on findings. A full

analysis of temperature results will be available to the TWC in January and final report with any potential recommendations will be included with the Final License Application. This issue is also further discussed in Section 2.4.1 of this document.

CCL and American Rivers jointly requested (letter dated August 10, 2005) that a study be performed on the sediment regimen in the Project area, as well as the Project effects on the sediment regimen of the LSR.

It was proposed, and the group agreed during the February 21, 2006 Water Quality RCG (meeting notes are attached in Volume II), that the sediment regime and sediment transport studies should be discussed in the Fish and Wildlife TWC, namely under the IFIM Analysis.

In their comments to the ICD (letter dated August 12, 2005) the SCPRT requested that flows be provided at the appropriate time for the Congaree National Park. SCDNR explained that they are also interested in the effects the Project has on the Congaree National Park floodplain (comment letter dated August 11, 2005). It is further explained in their comment letter that they would like the unregulated hydrology of the system to be compared to the current hydrologic record. The NPS also noted their interest in the potential Project effects on the Congaree National Park floodplain in their comment letter (dated August 11, 2005); NPS also requested the participation of SCE&G in a "Ecologically Sustainable Water Management" (ESWM) process.

The NPS has opted to evaluate floodplain inundation through their ESWM process, outside of the Saluda Relicensing. SCE&G has been invited to participate in the ESWM Process. The request of the NPS to compare unregulated (Pre-project) hydrology to the current hydrologic record conflicts with what is considered "baseline" with respect to the relicensing of Project No. 516. A Licensee's baseline for addressing Project impacts is considered "conditions as the Project currently exists" and is not required to assess project impacts on a Pre-project baseline case. However in the spirit of a Cooperative Enhanced Licensing Process, SCE&G will continue to exchange information through the ESWM Process and will evaluate through the use of the Operations Model flow

recommendations provided by the NPS. Any recommendations developed on this request will be noted and contained in the Final License Application.

In their August 12, 2005 comment letter, American Whitewater requested that a minimum flow be established for the project that is seasonally variable to support the various needs of the river system. They also noted that minimum flows should support navigational needs of the river, in particular recreational boating.

Minimum flows at the Saluda Hydro Project will be determined in consultation with appropriate agencies during this relicensing process. Such studies as the IFIM, performed in 2007, will also aid in the determination of a minimum flow at Saluda.

American Whitewater recommended (ICD comment letter dated August 12, 2005) that the process of ramping (described as the gradual staged rise of water levels) should be utilized during high use times of the year.

Discussions on ramping are ongoing in the Safety and Recreation RCG's. Information on this topic will be added at the time of the Final License Application.

Lake Watch noted that the installation of the new back-up dam could allow more freeboard with regards to lake level operations (comment letter dated August 15, 2005). They further requested that SCE&G provide information on the facility that may affect the operation of the Project. Lake Watch further requested that information be provided on the weather model and how it is utilized by the company.

In addition, Lake Watch requested that information be provided on the spillway gates (letter dated August 15, 2005); it is noted that information is needed on the conditions required for operation and any requirements with regard to the use of the spillway gates. Lake Watch suggested that a summary of the Probable Maximum Flood Study also is necessary.

The Generation Review TWC was formed to discuss such information requests as those on the weather model, Probable Maximum Flood Study, and back-up dam. Meeting notes from these discussions can be viewed in Volume II.

There were several requests by stakeholders for the development of a hydrologic/hydraulic operations model for the Project. The Lower Saluda Scenic River Advisory Council (LSSRAC) requested in its comments to the ICD (letter dated August 12, 2005) that a computer simulation model be developed for the Project that analyzes inflows, outflows and balances the various interests involved in the Project. This request was also made during initial stage consultation by the following parties: Lake Watch (letter dated August 15, 2005), City of Columbia Parks and Recreation (letter dated August 11, 2005), SCDNR (letter dated August 11, 2005), SCWF (letter dated August 15, 2005).

The CCL and American Rivers (letter dated August 10, 2005) recommended that a study be developed in order to evaluate the effects that alternative reservoir levels have on various resource areas including boating activities, aquatic habitat interactions, and downstream flows. Additionally, the CCL and American Rivers also recommended an assessment of downstream flow needs for incremental inundation of the Congaree National Park.

The CCL and American Rivers further suggested in a their letter that a Low Inflow Protocol Study be performed. They noted that this study would be used to determine how to balance water uses during periods of low inflow. In the letter, it is recommended to observe fisheries and wildlife resources, public water intakes functionality, water quality in the reservoir and LSR, and power generation for potential impacts from low inflow. The LSSRAC noted in their August 12, 2005 letter that water quality within the Project area should be evaluated under extreme low flow scenarios in order to help identify and address inflows that may be causing water quality impairments. It is suggested that this may also help identify critical minimum flows. The City of Columbia Parks and Recreation also requested in their ICD comment letter (dated August 11, 2005) that a Low Inflow Protocol study be performed as a part of the Hydrologic/Hydraulic model.

The City of Columbia Parks and Recreation further requested that evaluations be made of target lake elevations for the Saluda Project. This request is also

echoed in the comment letters of the LSSRAC (dated August 12, 2005), LMA (dated August 12, 2005), and a joint letter issued by CCL and American Rivers (dated August 10, 2005). CCL and American Rivers elaborated that this study should include an evaluation of stakeholder interests with regard to lake levels and that the study should evaluate the effects of reservoir levels on recreational boating, near-shore aquatic habitat, and downstream flow needs. The LMHOC made a similar request in their August 15, 2005 comment letter. They requested that impacts relating to reservoir drawdowns at Lake Murray be studied in order to determine effects on safety, economics, recreation, erosion, and sedimentation. The SCDNR (comment letter dated August 11, 2007) explained that they are interested in reservoir level fluctuations as they have a correlation to available reservoir habitat for fish species that are shallow water nest builders.

In their ICD comment letter dated August 12, 2005 American Whitewater recommended that "pre-project flows and project inflows should be studied and used to inform decisions on flow regulation".

A hydraulic/hydrologic model has been developed as a part of relicensing by the Operation TWC. This model will be used to evaluate the balancing of power generation, lake and river user interests and aquatic life needs in terms of water availability, water allocation and delivery. Analyses will take into account varying inflow conditions, including low inflow years. Inputs to the model are still being determined. It is anticipated that results will be available at the time of the Final License Application.

2.3.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of Water Quality during these meetings is described below. Many items that were requested in the ICD comment letters were also requested during the resource group meetings. This is noted in the responses under Section 2.3.1, Initial Stage Consultation. Only studies not discussed above are discussed in this section.

The stakeholder requests associated with the initial consultation package were discussed in the forum of the Water Quality RCG/TWC. Along with these issues, the request was also made for cooperation with an evaluation of cove water quality on Lake Murray (see meeting notes dated February 21, 2006 in Volume II).

It was explained that the Lake Murray Association (LMA) is in the process of implementing a cove water quality monitoring program, and several coves were selected for sampling. Information on the locations where SCE&G conducted water quality sampling were provided to LMA and SCE&G works in cooperation with LMA in their water quality sampling efforts. Several group members expressed the need for a comparative evaluation of water quality in coves before and after marinas are installed.

2.4 Results of Recommended Studies

2.4.1 Lower Saluda River/Congaree River Temperature Study

In comments issued in response to the ICD, the USFWS requested a study to document the extent of downstream influence of coldwater releases from Saluda Hydro (letter dated August 1, 2005). A study plan was developed and approved by the Water Quality TWC on March 13, 2006 (Appendix E-1). The study objective was to characterize the effects of water releases from the Saluda Hydroelectric Project Dam on the temperature regime of the LSR and Congaree River, including downstream extent of temperature alteration, timing and duration of temperature alteration, and mixing characteristics.

Paired temperature sensors (left and rights side of the channel) were deployed at 7 locations along an approximately 55 mile reach of the lower Saluda and Congaree rivers downstream of Saluda Hydro (extending from the Riverbanks Zoo on the LSR to the Highway 601 Bridge on the Congaree). Sensors also were deployed directly downstream of the Project Dam (to verify data from USGS Gage #02168504) and on the Broad River upstream of the Columbia Diversion Dam. Temperature sensors were deployed in late-March/early-April 2006 and will remain in place through October 2007, as prescribed in the study plan.

Preliminary analyses of temperature data confirm cross-sectional differences in water temperature on the Congaree River downstream of the confluence, with the LSR side of the channel being significantly cooler than the Broad River side. Data collected to date suggests that the coldwater influence of releases of Saluda Hydro extends downstream at least as far as the Interstate-77 Bridge, approximately 3 miles below the Saluda/Broad confluence. Preliminary results of this study were presented to the Water Quality TWC in July 2006 and August 2007 (See July 2006 and August 2007 Meeting Notes, Volume II).

Upon completion of field data collection and data analysis, a final report will be prepared under direction of the Water Quality TWC and included in the final License Application under Appendix E-1.

2.4.2 CE-QUAL-W2 Water Quality Modeling of Lake Murray Summer Striped Bass Habitat

Lake Murray has experienced periodic striped bass mortalities in the vicinity of the Saluda Dam during late-summer and early-fall since at least the early 1970's. This is similarly observed at other reservoirs in the South-Eastern states, including Lake Norman (NC), J. Strom Thurmond Reservoir (GA), Lake Gaston (VA), and Cherokee Reservoir (TN). Since the SCDNR began tracking the magnitude of these episodes in the early 1980's, striped bass "die-offs" have been reported in 1989, 1990, 1991, 1993, 1998, 2005, and 2007 (R. Ahle, SCNDR, Memorandum dated March 24, 2006; SCDNR, Press Release #07-255, September 10, 2007). These die-offs have been attributed to water quality impacts associated with stratification of the lake during the summer months. Specifically, beginning in early-summer, natural thermal gradients establish a strong stratification in Lake Murray, which results in the production of a warm water epilimnion on the surface of the lake, and a cool water hypolimnion in the deeper portions of the lake. Since striped bass prefer cooler water temperatures, they become restricted to the thermal refuges in the hypolimnion zone during this period. During the summer and early fall, DO levels slowly decline in the hypolimnion thus reducing the amount of thermal refuge habitat for striped bass. DO stresses associated with this phenomenon, known as the "temperature-

oxygen squeeze," have been cited as the primary cause for the striped bass mortality events in Lake Murray (Hayes, 1994).

Following the largest documented striped bass kill in 1991 (3,139 fish), the SCDNR speculated that operation of the Saluda Unit 5 may have been a contributing factor to the mortality events. Specifically, it was postulated that operation of Unit 5 might actually reduce the size of thermal refuge areas and increase stress levels on striped bass due to the mid-column depth of the Unit 5 intake (approximately 80ft below typical summer pool of 353.5ft (+/- 3 ft)). In the mid 1990's, SCDNR and SCE&G subsequently agreed to a "last on, first off" operational scenario for Unit 5 aimed at reducing its use during the late summer and early fall. While originally designed to prevent blueback herring entrainment events, it was theorized that the "last on, first off" Unit 5 scenario would also help preserve striped bass refuge habitat and minimize the potential risk of die-offs.

During the current relicensing effort, the SCDNR and other stakeholder requested an evaluation of the factors contributing to observed declines in striped bass summer refuge habitat and resulting fish kills, as well as an analysis of the effectiveness of operational measures undertaken to reduce such events (i.e. the "last on, first off" operating regime for Unit 5). The Water Quality TWC subsequently determined that use of the CE-QUAL-W2 water quality model, which had been previously developed and calibrated to the Lake Murray system (Ruane, 2004), would be the best tool for this purpose.

While still ongoing, preliminary modeling results suggest that striped bass fish kills are likely related to high reservoir inflows, in particular high inflows during the months of March through August. Higher inflows presumably cause the bottom of the lake to warm, which in turn increases the rate of DO depletion. Modeling efforts have also shown that operating Unit 5 in "first on, last off" mode, rather than the current "last-on, first off" mode, helped preserve colder bottom water resulting in increased available refuge habitat for striped bass (i.e. water with temperature <27°C and DO >2.5 mg/L) during some years. Further, maintenance of the Lake Murray summer pool at elevation 356.5 ft was found to marginally enhance or have no effect on preservation of coolwater refuge habitat, with four of the eight years modeled demonstrating slightly increased volumes of water with temperature <27°C and DO >2.5 mg/L. Modeling of the combined

effects the Unit 5 “first on, last off” scenario and the 356.5 ft summer pool elevation yielded similar results, with increased refuge habitat observed in three of the eight years modeled.

The CE-QUAL-W2 water quality modeling efforts are still ongoing and are slated for completion in Winter 2007. Further, a recommended operational protocol is currently being developed and could be recommended to reduce the potential for striped bass die-offs. Upon completion, a final report summarizing the model findings and any subsequent recommendations from the TWC will be prepared and submitted with the Final License Application.

2.5 Existing Measures to be Continued and New Measures Proposed by the Applicant

Will be completed at the time of the Final License Application.

2.6 Water Quality Impacts

Potential Project impacts on water quality will be contained in the Final Application once all studies have been completed and results available for analysis.

2.7 401 Water Quality Certification

SCE&G’s application for 401 Water Quality Certification will be filed with SCDHEC by the time of the issuance of the Final License Application.

Exhibit E-3: Major Wastewater Dischargers and Number of Minor Dischargers in the Watersheds of Lake Murray (downstream from Greenwood Dam)

	MILLION GALLONS/DAY	NUMBER OF MINOR DISCHARGES
Ninety-Six Creek Watershed		12
City of Greenwood/Wilson Creek Plant	12.0	
Bush River Watershed		2
City of Newberry/Bush River Plant	3.22	
Laurens County WRC/Clinton	2.75	
Little River Watershed		10
City of Laurens	4.5	

Little Saluda River Watershed	3
Lake Murray Watershed	3

Exhibit E-4: Number of Locations and How Water Uses Were Supported Based on the 1995 and 1998 SCDHEC Reports

	1995		1998	
	Aquatic Life	**Recreation**	**Aquatic Life**	**Recreation**
Lake Murray				
Fully supporting	5	6	1	6
partially supporting	1, M*		2, M*	
Not supporting			3, M*	
Embayments				
Fully supporting	6	6	4	6
partially supporting				
Not supporting			2, M*, N**	
Selected Inflows				
Fully supporting	6	3	4	3
partially supporting	3, DO	2, FC***	2, M*, DO	2, FC***
Not supporting		4, FC***	3, M*	4, FC***
Tailwater				
Fully supporting	1	2		1
partially supporting		1, FC***	1, DO	2, FC***
Not supporting	2, DO		2, DO, pH, M*	
SUMMARY OF USES & CAUSES				
Fully supporting	18	17	9	16
partially supporting	4	3	5	4
Not supporting	2	4	10	4
Metals	1		11	
Fecal Coliform		7		8
DO	5		3	
Nutrients			1	

*M indicates metals are the cause
**N indicates nutrients are the cause
***FC indicates fecal coliform were the cause

Exhibit E-5: Percent Contributions to the Upper Regions of Lake Murray of Total Phosphorus Loadings and Mean Stream Flows Found Conducting CE-QUAL-W2 Model

(Ruane, 2004)

LAKE MURRAY TRIBUTARY	MEAN STREAMFLOW (percent)	PHOSPHORUS LOAD (percent)	RATIO OF PHOSPHORUS LOAD TO FLOW (percent)
Bush River	4	18	4.5
Little Saluda River	7	12	1.7
Clouds and West Creeks	4	9	2.2
Ninety-Six Creek	5	34	6.8
Little River	7	6	0.9
Saluda River	68	15	0.2
All Other Flows	5	6	1.2

Exhibit E-6: Saluda River From Its Confluence with the Little Saluda River to the Saluda Hydroelectric Project Dam, Including Lake Murray and Mile Markers Showing Distance Upstream from Dam

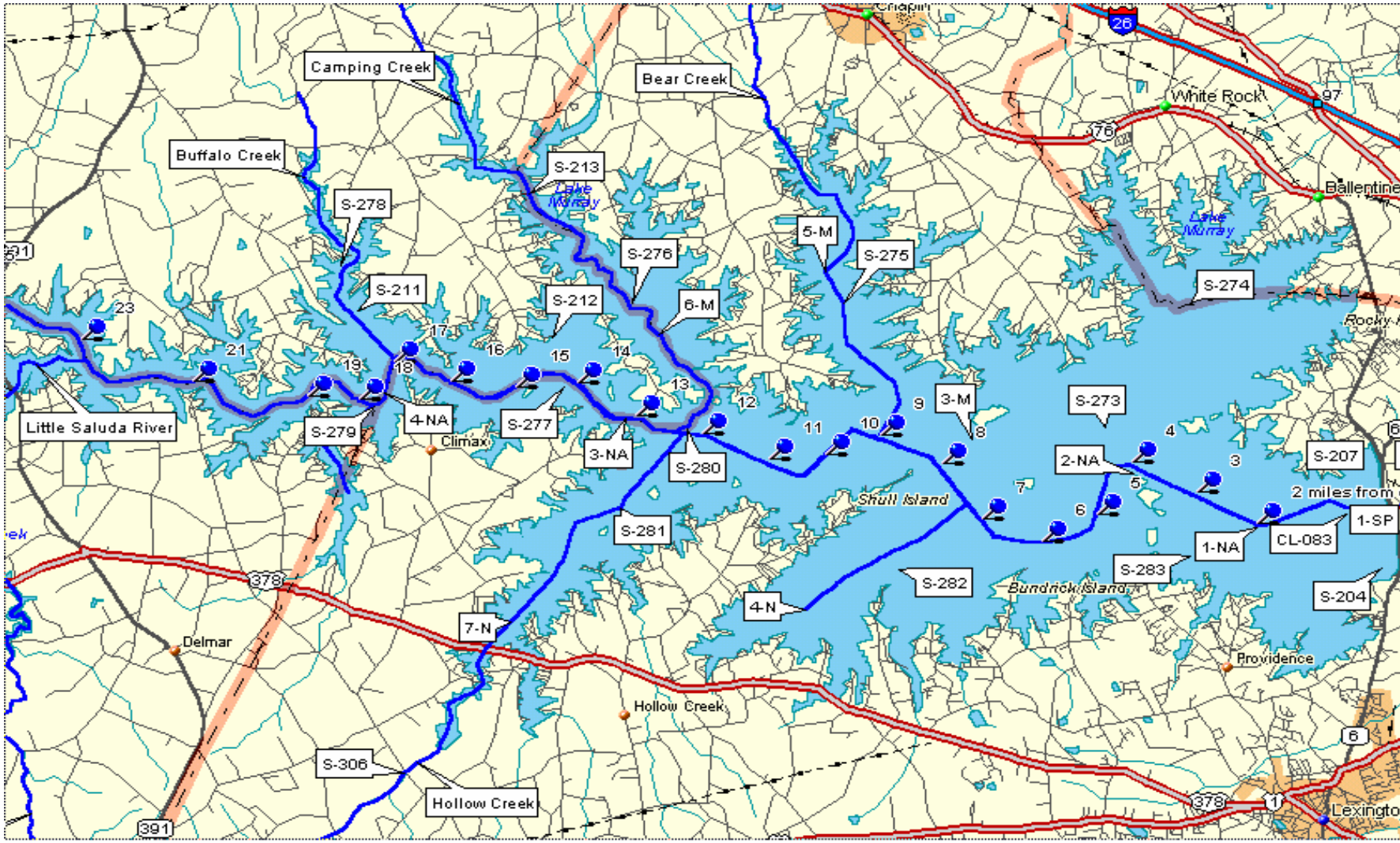


Exhibit E-7: Total Phosphorous Concentrations at the Dam Forebay of Lake Murray – 1972 to 1998

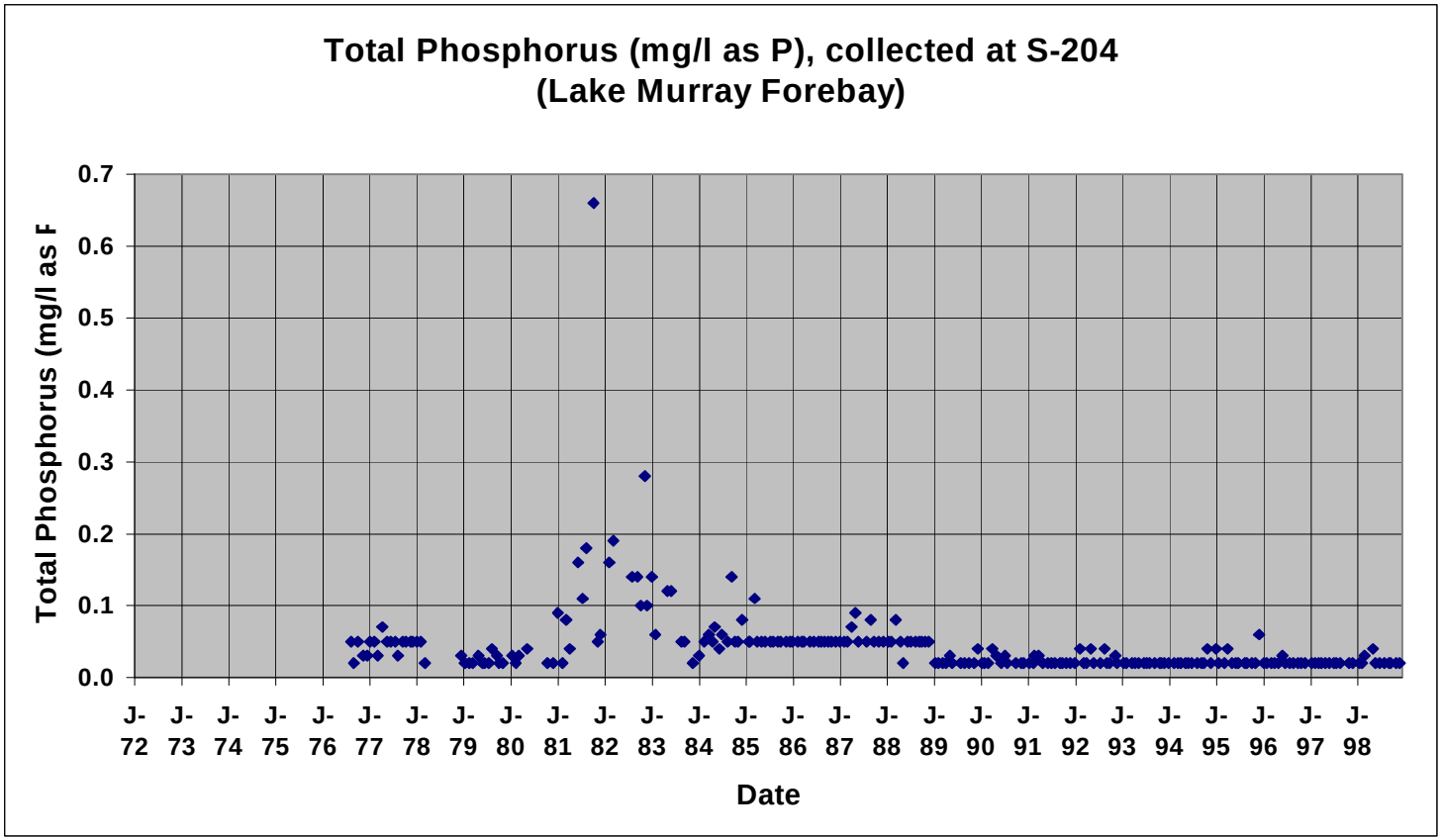


Exhibit E-8: Longitudinal Contour Plot of DO in Lake Murray for May 1998

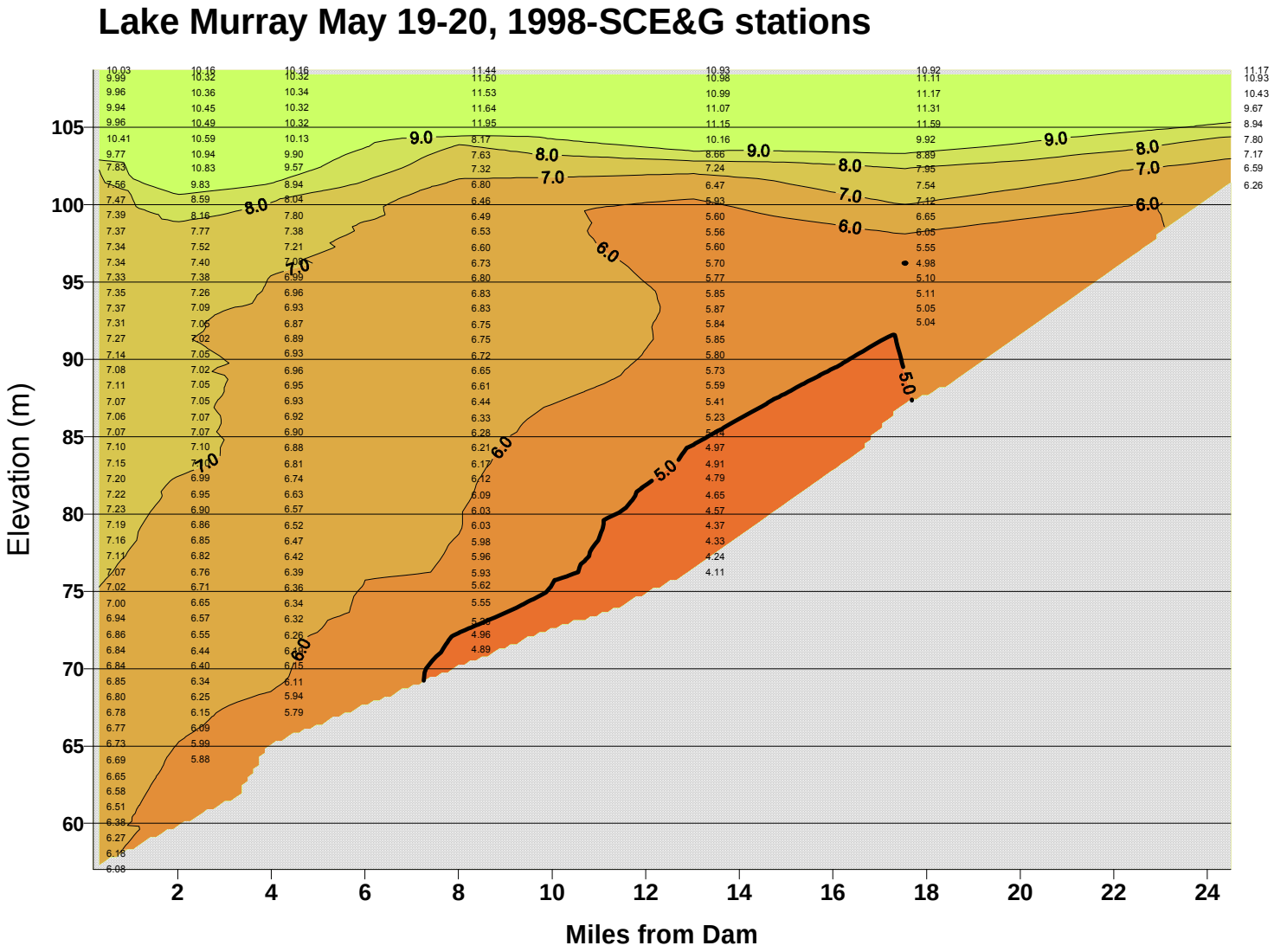


Exhibit E-9: Longitudinal Contour Plot of DO in Lake Murray for June 1998

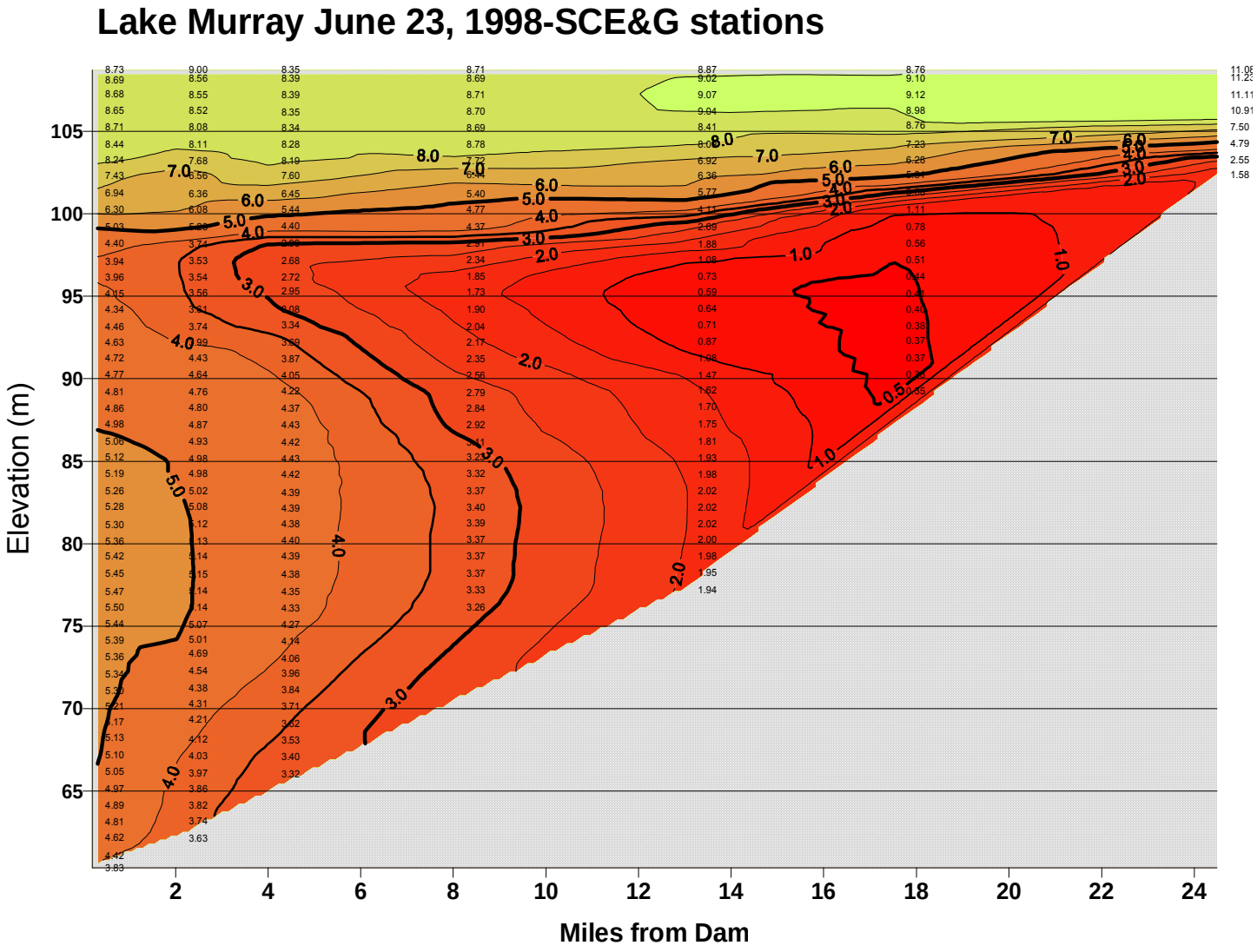


Exhibit E-10: Longitudinal Contour Plot of DO in Lake Murray for July 1998

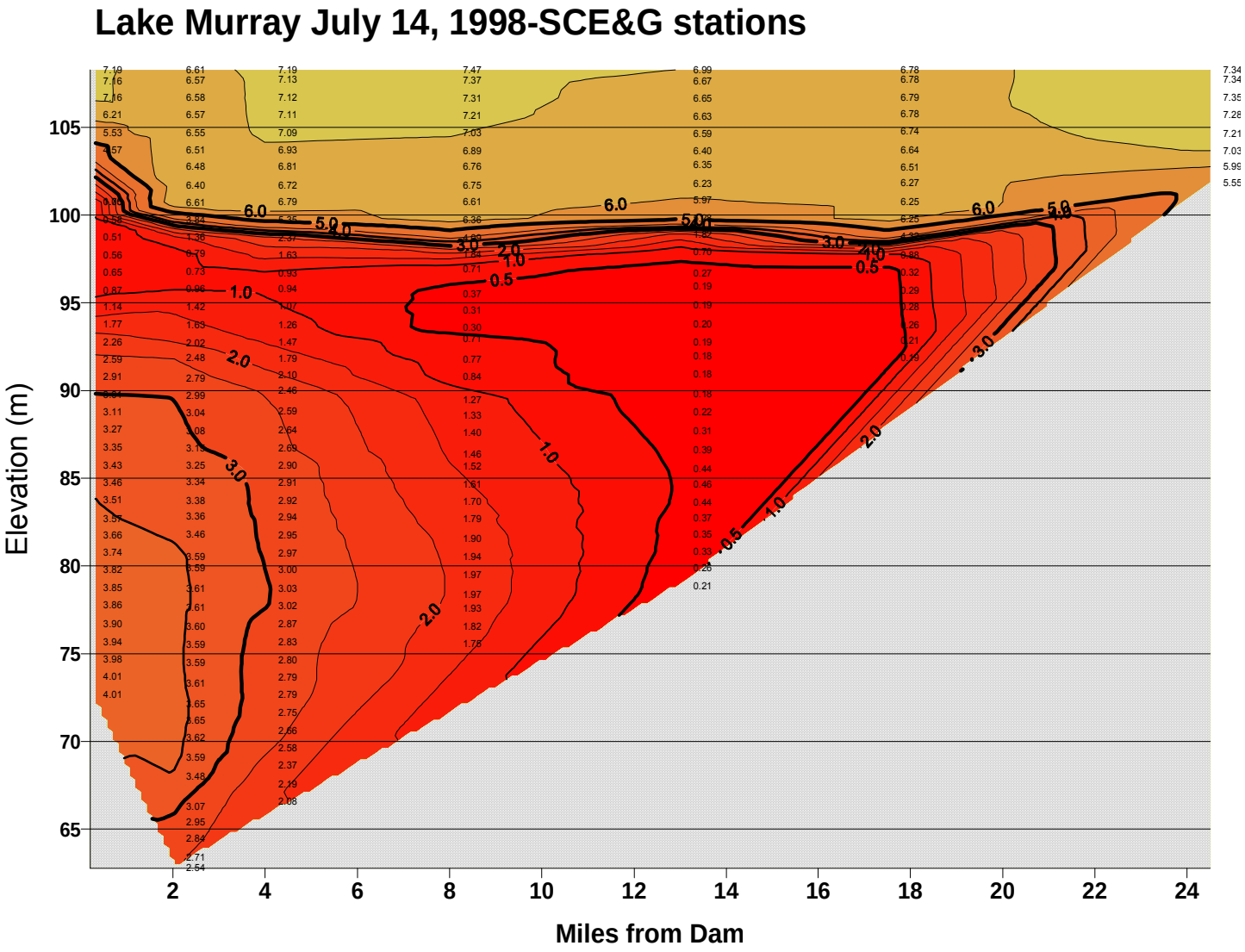


Exhibit E-11: Longitudinal Contour Plot of DO in Lake Murray for August 1998

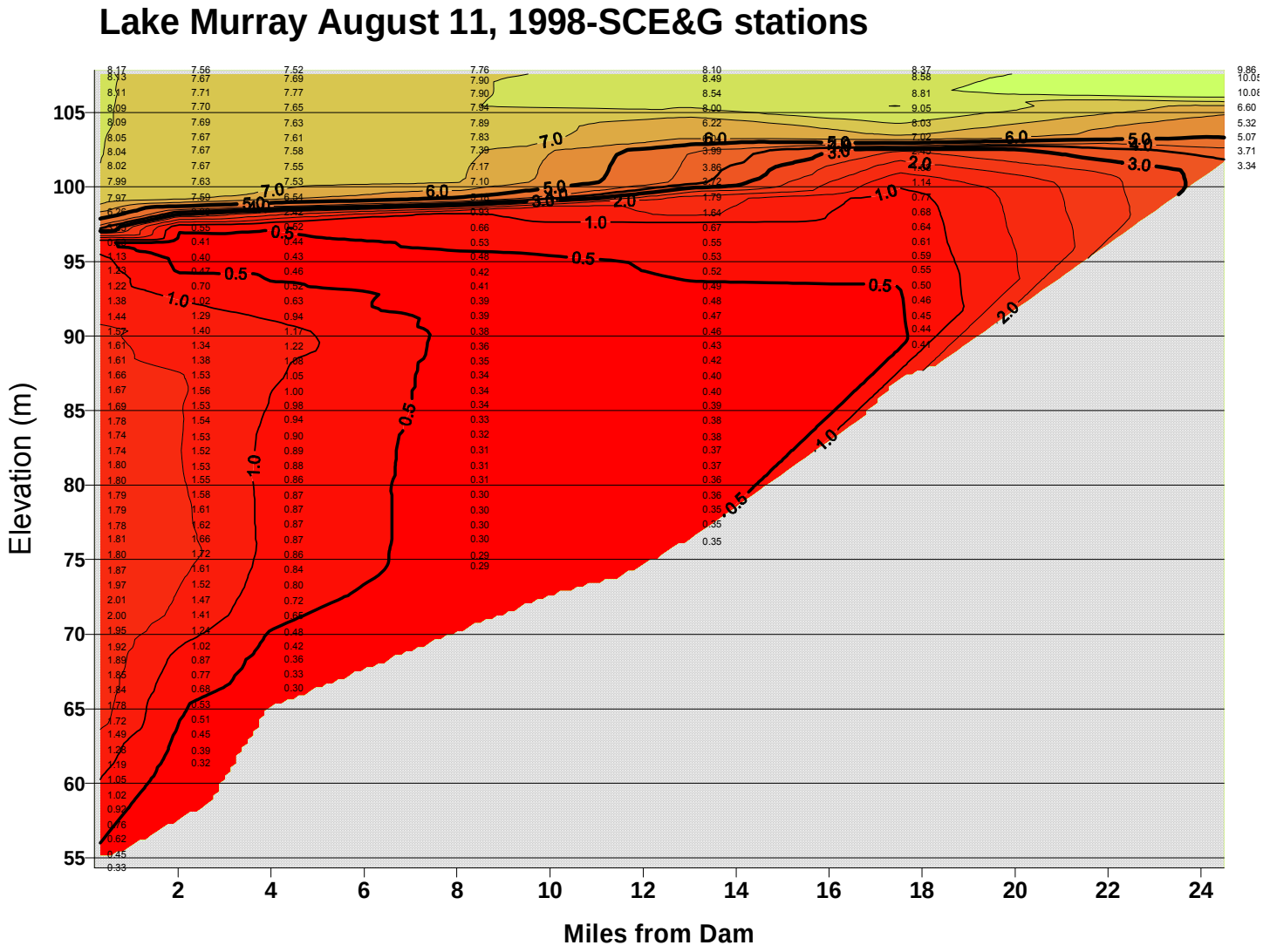


Exhibit E-12: Longitudinal Contour Plot of DO in Lake Murray for September 1998

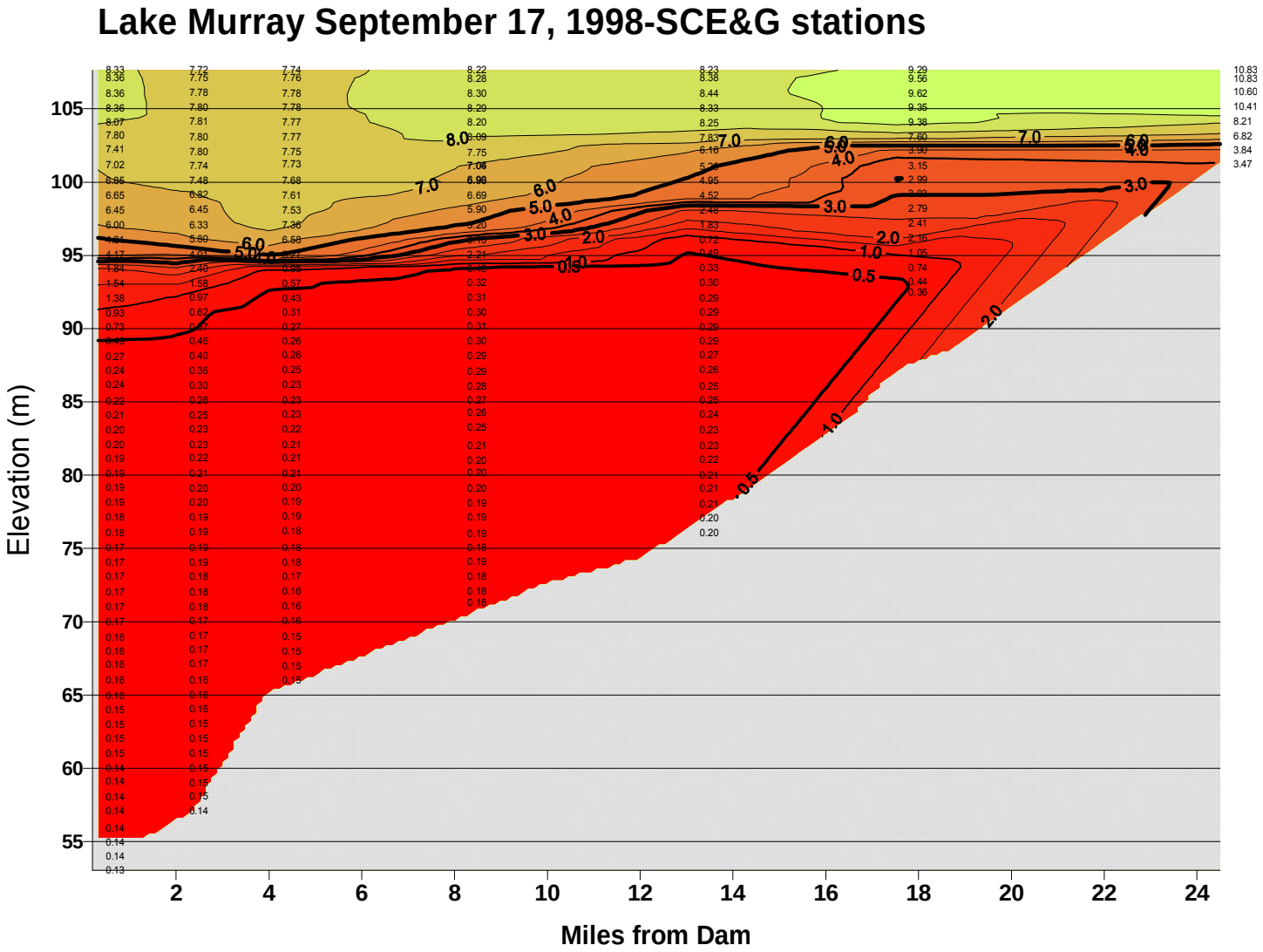


Exhibit E-13: Longitudinal Contour Plot of DO in Lake Murray for October 1998

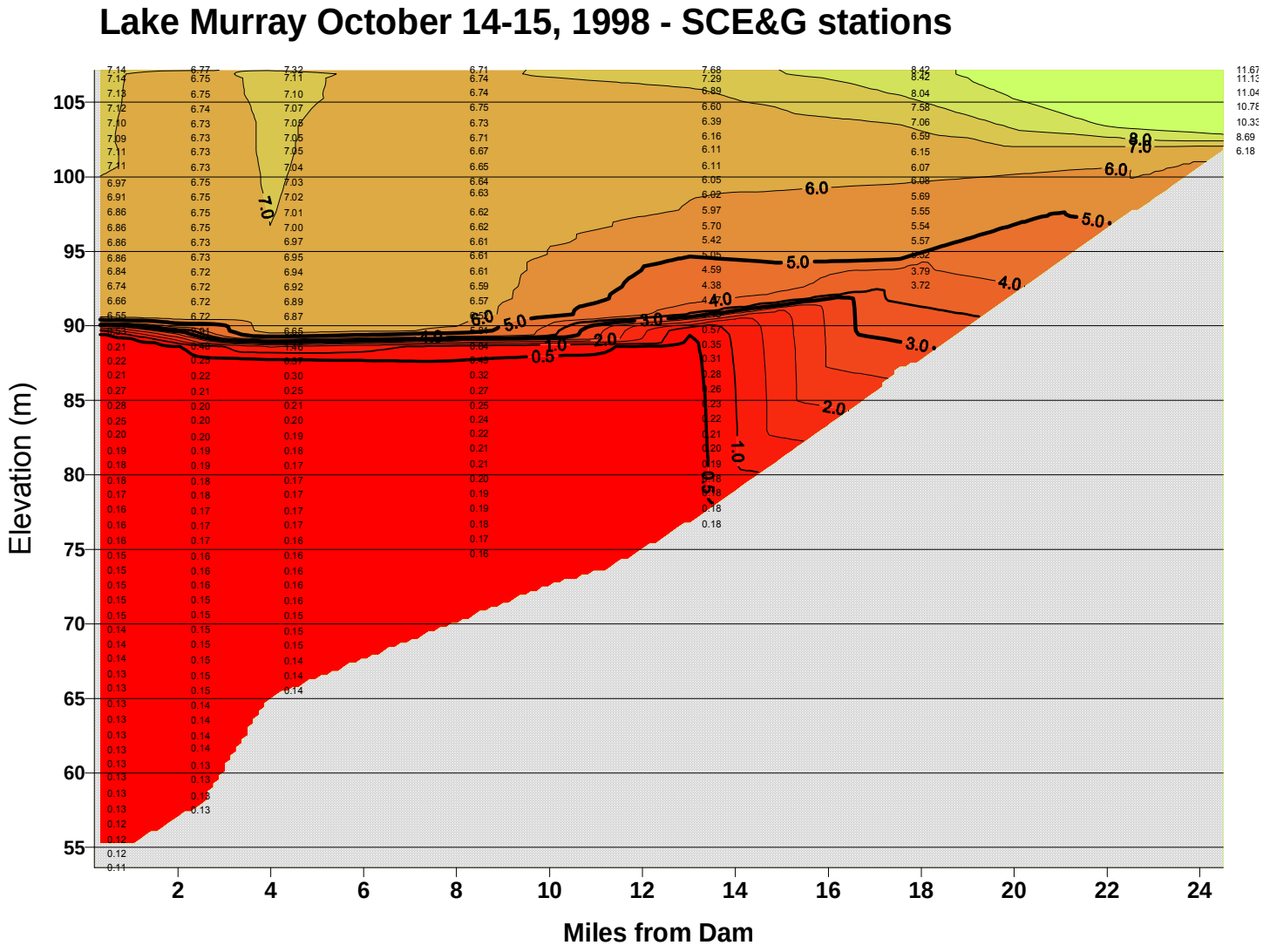
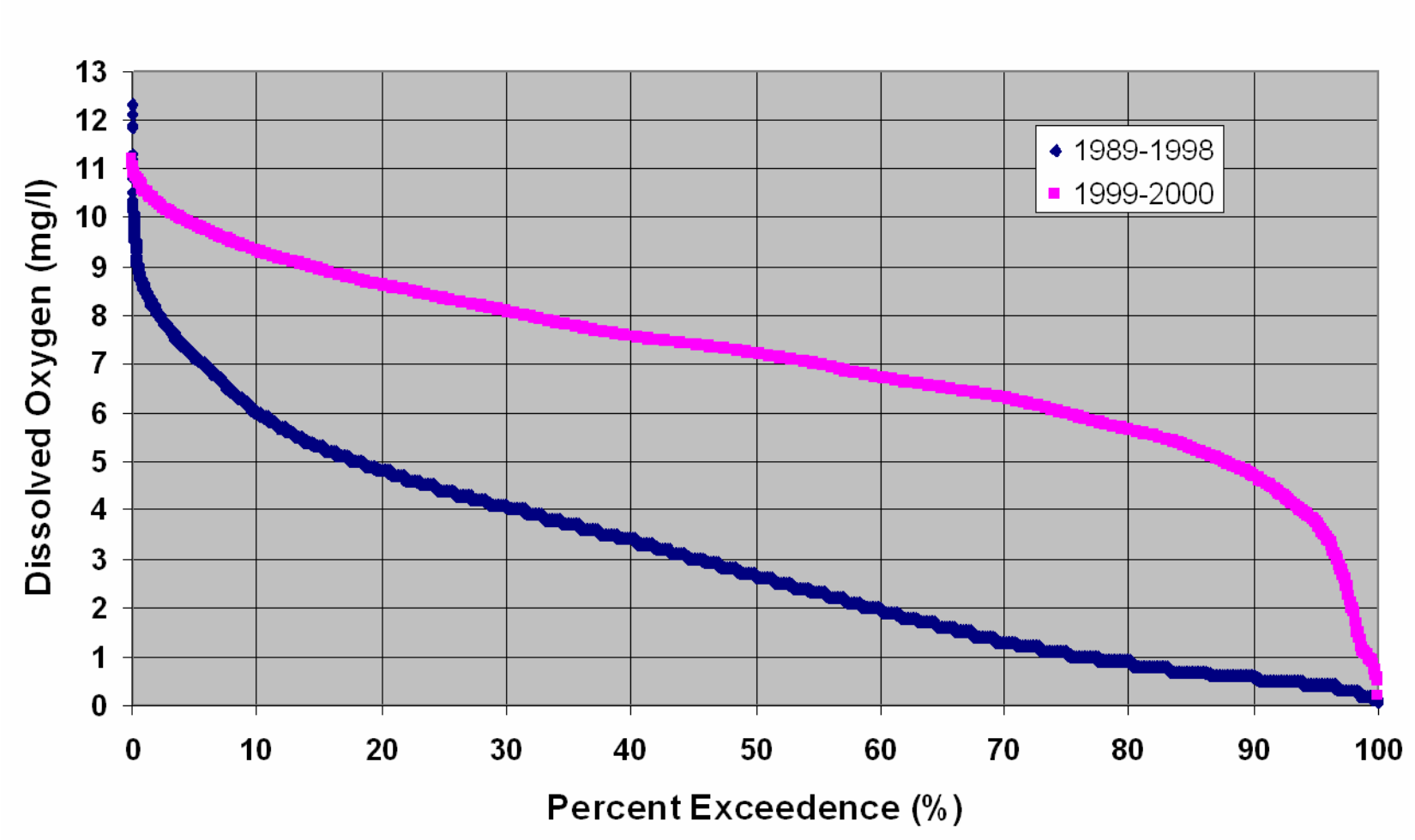


Exhibit E-14: Percent Exceedance for DO in the Saluda Dam Tailwater – All Hourly Data from the Low DO Period (Approximately July 1 – November 15 of each year)



3.0 AQUATIC RESOURCES

The Project area provides an abundance of aquatic habitat. Habitat in Lake Murray varies substantially from shallow coves and *wetlands* to vast open water with an abundance of diverse structure. The lake has a maximum depth of 189 ft at an elevation of 356.5', but also has an extensive, shallow *littoral* fringe (See Descriptions of Environmentally Sensitive Areas, Section 5.1.3, for additional detail). This varied habitat within the Project boundary, including both Lake Murray and the LSR, supports a diverse aquatic community and popular and valuable sport fisheries.

The LSR flows southeasterly through a river corridor that gradually shifts from rural to suburban to urban land uses, and, in general, the river banks and riparian zones are forested. Overall, the river is relative straight, with gentle bends and little sinuosity. The upper segment of the LSR is dominated by well-defined banks, relatively low-gradient pools and glides periodically segmented by short shoals and alluvial riffles. The lowermost segment also contains pools, glides and runs, but exhibits higher gradient, more pronounced riffles, and features ledge and boulder substrates, which reflect down cutting through the piedmont terrace at the fall line. There is some evidence of localized bank erosion and ephemeral alluvial shoaling. Beginning downstream of Riverbanks Zoo, the LSR becomes highly braided, with the lowermost mile becoming backwatered by the Broad River (Isely, et. al, 1995). There are a few scattered islands with pronounced side channels and/or braids in both the upper and lower reaches of the LSR.

3.1 Lake Murray Fishery Resources

The fisheries community of Lake Murray is typical of many reservoirs in the southeastern United States. Approximately forty species representing 12 families have been documented in Lake Murray, seven of which are considered game fish (Hayes and Penny, 1993; Campbell and Dean, 1976; Exhibit E-16). The most sought after game fish include largemouth bass, striped bass, white perch, black crappie, and redear and bluegill sunfish (Hayes and Penny, 2001; Hayes et al., 2002; Hayes, 1994). At least 16 resident species of forage fish occur in the Lake Murray waters, with 10 of these species belonging to either the minnow family (Cyprinidae) or perch family (Percidae). Fish

growth in these waters is generally considered to be excellent and has produced fish of large size setting state records (Mead and Hunt, 2002a).

Threadfin shad are the primary prey species and dominate the clupeid prey base in Lake Murray (Hayes, 1994). The importance of this species as a food source for striped bass has been documented by the SCDNR in food habit studies (Hayes and Penny, 1991). Since threadfin shad are relatively small (rarely exceeding 3 inches) and very prolific, they provide a stable and readily available food source for most predatory species in Lake Murray. Ichthyoplankton studies conducted in the 1990's suggest that threadfin shad make up approximately 80 % of the lake's larval fish densities (Hayes, 1994).

Gizzard shad is the second most abundant clupeid found in Lake Murray and has historically comprised a significant portion of total fish biomass in cove rotenone studies by SCDNR (Hayes and Penny, 1992). Due to the rapid growth rates of gizzard shad, only the larger predatory species can use this species as prey.

Blueback herring have also been documented in Lake Murray since the mid-1980's (Hayes, 1986) and likely contribute significantly to the prey base. Blueback herring are used extensively as bait for striped bass, and a significant commercial bait fishery has developed; although, the SCDNR reports that this fishery is seasonal and does not meet the demand of the market (Hayes, 1990). During the summer months, blueback herring tend to congregate near the Saluda (Lake Murray) Dam searching out cool water habitats. In September 1990, a significant entrainment event of blueback herring occurred at the Saluda Hydro Plant (Hayes, 1994). This entrainment event was attributed to the species' water quality preferences, which placed them in the vicinity of the intake tower for Unit 5. In an effort to prevent future entrainment events, SCE&G installed hydroacoustic transducers near intake tower number 5 during July 1992 to monitor late season movements of blueback herring. When acoustics indicate that blueback herring are congregated near the Unit 5 intake, SCE&G ceases operation of the unit except for emergency operating situations. Since its installation, no significant blueback herring entrainment events have been reported by the SCDNR.

Since its original stocking in 1960, Lake Murray has come to support a significant striped bass fishery. In fact, the striped bass fishery has developed into one of the premier fisheries on the lake, with approximately 1/3 of the angling effort and more than $1.4 million directed towards the species when the last creel survey was conducted in 2000

(Hayes et. al., 2000). Currently, SCDNR limits the number of fish that can be taken from Lake Murray to 5 fish per day per angler, with a minimum length of 21 inches (SCDNR, 2007).

The striped bass fishery in Lake Murray is not a self sustaining fishery and must be maintained through stocking efforts. Since 1971, over 30 million striped bass have been stocked in Lake Murray at rates varying from a low of 8,800 in 1986 to a high of 1,771,761 in 1983. Studies by SCDNR in 1999 found increased striped bass densities despite recent decreases in stocking rates (Hayes et al., 2000).

As previously noted, striped bass die-offs occasionally occur in Lake Murray. Results of the recent water quality modeling efforts, as well as potential alternative operating scenarios aimed at maximizing summer striped bass refuge habitat, are detailed in the Section 2.4.2 (Water Quality).

3.2 Lower Saluda River Fishery Resources

The LSR fishery community is unique in that it provides fishing opportunities for both resident warmwater species, as well as stocked coldwater species (trout). The LSR currently supports a tailrace trout fishery for rainbow and brown trout that is managed by the SCDNR as a Put, Grow and Take fishery. This management approach, which has been employed since the 1960's, is appropriate where trout habitat is marginal but can provide the acceptable growth and survival of enough sub-adult trout to support a fishery (D. Christie, SCDNR, Pers. Comm.). Similarly, the LSR is classified by the SCDHEC for regulatory purposes 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 (SCDHEC, 2004).

Trout are not native to the LSR, and the fishery is maintained through stocking of sub-adult rainbow and brown trout. Presently, the SCDNR stocking program runs from early December until mid-April. The total number of trout stocked annually typically averages around 35,000 but varies annually based primarily on availability of fish from the Walhalla State Fish Hatchery. Approximately two-thirds of the trout stocked annually are rainbow trout (typically 9-10 inches in length), with the remainder being 7-8 inch brown trout (H. Beard, SCDNR, unpublished data). Angler creel surveys conducted in 1995-97

indicated a pronounced seasonal fishery that coincides with the stocking season (H. Beard, SCDNR, Pers. Comm.).

A growth study conducted in 2003 in support of establishment of a site-specific DO standard for the LSR found that growth of trout in the LSR exceeds most other southeastern tailwaters (0.7 percent weight gain per day, 0.67 inches per month) (Kleinschmidt et al., 2003). Further, the study found that 74 of the 441 brown and rainbow trout collected during 2003 were greater than 16 inches in length, suggesting a significant number of carryovers from previous stocking years. The study concluded that the high growth rates and large number of carryovers observed in 2003 could potentially be attributed to higher DO levels since the inception of SCE&G's turbine venting program (Kleinschmidt et al. 2003). Conversely, a recent study begun by SCDNR to evaluate the annual mortality of the stocked trout in the LSR documented slightly less carryover of trout during the spring and summer of 2007 (H. Beard, SCDNR, Pers. Comm.). Disparity between study results suggests that there may be significant variability in carryover from year to year.

The LSR resident warmwater fish community is typical of many southern tailwater systems, and includes an assortment of resident game and non-game species (Crane, 1987; Jöbsis, 1991). Studies conducted as early as 1991 detected approximately 50 species of fish, 48 of which are considered endemic to the region (Jöbsis, 1991). Redbreast sunfish were the most abundant game species collected in the 1991 study. Bluegill were also typically collected in relatively high abundance but abundance was highly variable based on specific habitat types (Jöbsis, 1991). Redbreast sunfish were dominant in the upper sections as compared to the lower and middle sections. LSR redbreast sunfish exhibited slower growth rates when compared to growth rates of other rivers in the southeast (Jöbsis, 1991). However, this is not surprising since coldwater temperatures have been shown to limit growth of warmwater fish in similar watersheds (Ruane et al., 1986).

In 1995, SCE&G implemented a fish sampling program to characterize the fishery resource of the LSR; data gathered by SCE&G suggests some particular trends in terms of the fish community structure. Total catch in 1995 and 1996 was dominated by gizzard shad, with the species representing approximately 25% of the total catch (SCE&G, unpublished data). After 1997, which corresponds to the onset of SCE&G's turbine venting program, a marked decline was observed in the harvest of gizzard shad in the

LSR, while increases in sportfish species were noted (SCE&G, unpublished data). Recent sampling conducted in 2001 - 2002 by the SCDNR support similar trends as those observed in the SCE&G data. Of special note, the SCDNR data suggests a significant increase in the chain pickerel populations. The SCDNR theorized that these increases are due to a significant increase in the aquatic macrophyte community in the LSR over the last few years (personal communication. H. Beard, 2003).

A significant striped bass fishery also exists in the LSR during the late-summer and early-fall months, with angler reports of individual striped bass exceeding 50 pounds (personal Communication, Hal Beard, SCDNR, 2002). Recent telemetry studies by SCDNR suggest that 50% or more of the Santee-Cooper Lakes striped bass population potentially utilizes the LSR for thermal refuge during the late-summer months (D. Christie, SCDNR, Pers. Comm.). Currently, the SCDNR is conducting a striped bass telemetry study to document striped bass movements in the Congaree, Broad and LSR. Additional detail regarding the status of striped bass in the LSR is provided below in the Diadromous Fish Section (Section 3.3).

A fishery management plan for the LSR is currently being revised by the SCDNR. However, a recent SCDNR creel census suggested that the fishery resources of the LSR generate approximately 1.8 million dollars annually to the South Carolina State economy, with the trout fishery being responsible for the majority of the revenues (Beard, 2000).

3.3 Diadromous Fish

Historically, a number of anadromous species occurred in the Saluda River including American shad, striped bass, and Atlantic and shortnose sturgeon (Welch 2000, Newcomb and Fuller 2001). With the exception of three American shad collected by SCE&G in the Spring of 1993 (S. Summer, SCANA Services, Inc., Pers. Comm.), this species has not been detected in the LSR in recent history. Similarly, a gillnetting survey performed as part of the current relicensing (Isely, 2005; 2006), which targeted American shad and blueback herring, yielded no captures of either of these species in the LSR, suggesting that these species do not occur regularly in the LSR or are present in extremely low densities. Additional detail regarding the American shad/blueblack herring gillnetting study are provided in Section 3.9.1.1.

The Saluda Project is thought to be within the historic range of the shortnose sturgeon (Welch 2000, Newcomb and Fuller 2001); however, the species has not been documented from the Saluda River in recent history. Additional details regarding shortnose sturgeon status in the Project vicinity, as well as sturgeon studies performed in support of relicensing, are provided in Section 3.9.1.4 and Section 3.7.

Striped bass are the only known anadromous fish to consistently use the LSR. Individuals from the dam-locked populations in the Santee-Cooper Lakes migrate upstream in early spring and use areas of the LSR in late summer as thermal refuges. LSR anglers have reported catching individuals exceeding 50 pounds (personal Communication, Hal Beard, SCDNR, 2002). SCE&G's 1995–2003 spring electrofishing sampling revealed only sporadic catches of striped bass.

The American eel is the only known catadromous fish reported to inhabit Project waters (Beard, 2002). Electrofishing by SCE&G and SCDNR has yielded only sporadic captures of adult eels (Kleinschmidt, 2005; Kleinschmidt, 2006; personal communication, H. Beard, SCDNR, 2006; S. Summer, SCANA Services, Inc., 2006), which suggests that eel densities in the LSR are likely limited in abundance. Recent eel pot sampling for adult eels, conducted during 2005 and 2006 as part of the current relicensing effort resulted in capture of only one eel (Kleinschmidt, 2005; 2006). Experimental eel ladders designed to capture juvenile in-migrating eels (elvers) were installed at the Project spillway and downstream of the dam and likewise yielded no captures of American eel (Kleinschmidt, unpublished data). Additional detail regarding the American eel studies performed as part of relicensing is provided in Section 3.9.1.2.

Anadromous fish restoration efforts for the Santee Basin appear to focus on restoring runs of anadromous fish primarily up the Congaree and Broad Rivers. The Santee Cooper Basin Diadromous Fish Passage Restoration Plan reports that the Broad River and its tributaries are the highest priority for diadromous fish restoration (USFWS, 2001). The Saluda along with Catawba and Wateree sub-basins are listed as next in priority. The Plan states that the cold hypolimnetic water released through the Saluda Project turbines significantly reduces the ambient LSR water temperature, and thus migrating fish may choose to use the warmer waters of the Broad rather than the Saluda (USFWS, 2001). Furthermore, alteration of the existing thermal regime of the LSR would be an engineering challenge and would likely adversely affect the coldwater trout fishery in the tailwater.

To implement early study requests, on November 10th 2004, SCE&G and Kleinschmidt Associates hosted a meeting with the SCDNR, USFWS, and NOAA fisheries concerning diadromous fish studies. Subsequently, a diadromous fish study plan was developed in conjunction with, and approved by, the above noted resource agencies. The purpose of this study plan is to document the relative abundance and distributions of historically present diadromous fish species on the LSR and the Upper Congaree, as well as the degree to which these species are spawning. Target species included the anadromous American shad, hickory shad and blueback herring, and the catadromous American eel. Results of these studies can be viewed in Section 3.9.1.

3.4 Macroinvertebrates

The benthic macroinvertebrate community of the LSR downstream of Saluda Hydro has been assessed regularly by SCE&G over the past decade (Shealy, 1996a; 1996b; 2001; 2004; 2005; Carnagey Biological, 2006). Recent assessments have shown that biotic conditions (based on metrics such as taxa richness and abundance, EPT Index, EPT abundance, and dominant taxa) improved with increased distance from the Project dam (Shealy, 2004; 2005; Carnagey Biological, 2006). Similarly, North Carolina Biotic Index (NCBI) scores from these studies have generally ranged from "good" to "fair" for lower sites near the Riverbanks Zoo, to "poor" at sites directly below the dam (Shealy, 2004; 2005; Carnagey Biological, 2006). The most recent assessment (Carnagey Biological, 2006), conducted in 2006 as part of the current relicensing, is described in greater detail in Section 3.9.3.

3.5 Freshwater Mussels

Twenty-four recognized freshwater mussel species have been documented as occurring in the Santee River Basin (Alderman, 2006). However, prior to relicensing, little information was available regarding their distribution in the Saluda Project vicinity. A freshwater mussel survey of the LSR, the upper Congaree River, Lake Murray, and selected tributaries was subsequently developed by SCE&G under the direction of the Freshwater Mussels/Macroinvertebrate TWC (See Freshwater Mussel Study Plan; Appendix E-2). The field study documented 15 native freshwater mussel species as occurring in Lake Murray, its tributaries, LSR, and the upper Congaree River (Exhibit E-15). None of the species documented in the study area are federally listed as

threatened or endangered; although 6 are federal species of concern. Additional detail regarding the mussel surveys conducted as part of relicensing is provided in Section 3.9.4.

3.6 Fish Consumption Advisories

Currently, there are no fish consumption advisories issued by SCDHEC for Lake Murray. Due to methylmercury bioaccumulation in fish tissues, there is currently a fish consumptive advisory for the LSR in effect for largemouth bass, bluegill and bowfin (SCDHEC, 2007).

3.7 Threatened and Endangered Species

Shortnose Sturgeon

Much of the Santee Basin, including the portion of the Saluda Basin encompassed by the Saluda Project, is thought to be within the historic range of the federally endangered shortnose sturgeon (Welch 2000, Newcomb and Fuller 2001). Populations of shortnose sturgeon are known to inhabit downstream of the Santee-Cooper dams (lakes Marion and Moultrie) in the lower reaches of the Santee Basin (Collins et al. 2003). An additional dam-locked population of shortnose sturgeon has been documented within and upstream of the Santee-Cooper Lakes, with Lake Marion and its tributaries harboring the most significant population (Collins et al. 2003).

Radio-telemetry studies conducted by the SCDNR have documented migration of Lake Marion shortnose sturgeon as far upstream as the old Granby Lock and Dam on the Congaree River, approximately 11 miles downstream of the Saluda Project (J. Gibbons, SCDNR, Pers. Comm.). Presence of shortnose sturgeon in the vicinity of Granby Lock and Dam was also confirmed by collection of a single specimen during sampling related to relicensing of Duke Energy's Catawba-Wateree Project in March 2004 (Duke Energy 2005). Additionally, in 2006-2007, SCE&G assisted SCDNR with placing additional sonic receivers in the LSR downstream of the Project. Based on tracking information provided by the SCDNR, no sturgeon were monitored moving into the LSR during the 2007 migration season (J. Gibbons, SCDNR, Pers. Comm.).

A gillnetting study targeting shortnose sturgeon was performed by SCE&G as part of the current relicensing effort. Sampling at 4 location in the LSR and upper Congaree River yielded no captures of shortnose sturgeon adults, juveniles, or eggs/larvae (Kleinschmidt, 2007). Additional detail regarding this study is provided in Section 3.9.1.4.

Carolina Heelsplitter

The Carolina heelsplitter is the only South Carolina freshwater mussel currently listed as federally endangered (Price 2005). Although it was once found in large rivers and streams, the Carolina heelsplitter is now restricted to cool, clean, shallow, heavily shaded streams of moderate gradient. Stable streambanks and channels, with pool, riffle and run sequences, little or no fine sediment, and periodic natural flooding, appear to be required for the Carolina heelsplitter (Price 2005).

A freshwater mussel survey of the Lake Murray, its tributaries, and the lower Saluda and upper Congaree rivers was conducted during summer 2006 in support the Saluda Hydro Project relicensing (Alderman 2006). The survey found 15 species of natives mussels to be extant within the study area; however, Carolina heelsplitter was not among the species found. A separate survey conducted in fall 2006 in support of a South Carolina Department of Transportation project found Carolina heelsplitter in Clouds Creek, approximately five miles upstream of Lake Murray (J. Alderman, Pers. Comm.).

3.8 Agency Public Recommendations Concerning Fishery Resources

3.8.1 Initial Stage Consultation

On April 29, 2005, the Initial Consultation Document (ICD) for the Saluda Hydro Project was sent in electronic format to the consulting agencies and stakeholders for review. The Notice of Intent (NOI) also was filed simultaneously with the issuance of the ICD. The ICD is attached in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

Summarized below are the remarks and study requests regarding fishery resources that were provided by stakeholders in comment letters following the issuance of the ICD.

The USFWS (August 1, 2005) and the LSSRAC (August 12, 2005) requested a survey of freshwater mussels in the reservoir, the upper and LSR, and significant tributaries to document the distribution, relative abundance, and reproductive success of populations. They noted that additional targeted surveys should be conducted to determine the presence/absence of federally listed mussels and species of concern. Similarly, the SCDNR (in a letter dated August 16, 2005) requested an evaluation of the present status of mussels in the Project area, including an assessment of their habitat needs and any potential project-related impacts on habitat identified. In addition, the AR/CCL (August 10, 2005) requested a study to evaluate the effects of Project operations on water temperatures and dissolved oxygen, and freshwater mussel populations in the Saluda and Congaree Rivers downstream of the Project. They also suggested that this study should include cumulative impacts analysis of the Saluda Project on mussel stocks of the Santee-Cooper Basin.

As part of the relicensing process, SCE&G in consultation with agencies and NGO's, developed a study plan and performed a mussel survey in the Project Area. Details and results of the survey are included in Section 3.9.4.

The USFWS (August 1, 2005) and the NMFS (August 8, 2005) requested that a comprehensive habitat assessment be included in the license application. In particular, they were interested in qualitative and quantitative data in GIS format of the available and potential spawning, rearing, and foraging habitats (i.e., riffles, shoals, open water, shallow coves, littoral zones) in Lake Murray and the Saluda River (including the lower river reach below the Project) for diadromous and resident fish species. Trout Unlimited (TU) (August 15, 2005) specifically requested that the assessment should include the needs of rainbow and brown trout in this coldwater habitat, in order to be a self sustaining fishery. In addition, the SCDNR (August 16, 2005) requested that a model be developed which describes the decrease in cold-water habitat during particular times of the year, and the contributing factors responsible for this seasonal habitat decline. A summary of water level fluctuations in Lake Murray during March, April, and May

(spring spawning season) was also requested by SCDNR for the period of the current license.

The AR/CCL (August 10, 2005) expressed an interest in evaluating the effects of reservoir level fluctuations on near-shore fish habitat. They noted that Aerial photography and GIS mapping should be used to determine the total area of near-shore habitat affected by incremental levels of drawdown. Additionally, they requested that habitat maps for the reservoir and Saluda River headwaters be developed by evaluating transects perpendicular to the shoreline.

This issue is still in the process of being discussed among Resource Group members. Conclusions on this issue will be noted in the Final License Application. A White Paper to assess the potential for a Self Sustaining Trout Fishery in the LSR has been submitted to the TWC and will be available at the time of the Final License Application.

The USFWS (August 1, 2005), the NMFS (August 8, 2005), TU (August 15, 2005) and the LSSRAC (August 12, 2005) requested that a macroinvertebrate survey be conducted at sites directly below the dam, downstream of the dam, in the Saluda River above the dam, and in major tributaries. It is explained that the goal of the study would be to identify and evaluate macroinvertebrate assemblages, including crayfish and EPT's (*Ephemeroptera*, *Plecoptera*, and *Trichoptera* sp.) to describe and evaluate potential project related effects on benthic resources. A similar request from the SCDNR (August 16, 2005) was made during initial stage consultation in which they were interested in whether invertebrate fauna have increased in either numbers or species diversity as a result of turbine venting, as well as how far downstream invertebrates are potentially impacted. The USFWS suggested for sampling to be conducted during the spring and summer.

SCE&G is currently conducting the second year of the Macroinvertebrate Survey on the LSR. A study plan can be viewed in Appendix E-2. Details regarding the results of this survey will become available in the upcoming months.

The USFWS (August 1, 2005) and the NMFS (August 8, 2005) presented the need for an assessment of project related factors influencing resident and diadromous fish populations due to out-migration and entrainment mortality. It was noted that, "Out-migration (spillway and turbine passage) may be significant in terms of recruitment for river basin populations." USFWS suggested that an out-migration study should include the frequency and characteristics of spillway water releases with respect to potential out-migration by target resident and diadromous fish species at the Project. Further, the SCDNR requested a summary of emergency spillway gate testing protocol to include the frequency, time of year, and any adaptive measures that are employed to reduce fish mortality. In addition, it is recommended that multiple-year limnological studies also be conducted to document monthly changes in dissolved oxygen, temperature, conductivity, turbidity, thermocline development and overturn during normal hydropower operations.

To address the issue of entrainment mortality, the USFWS, the NMFS and the AR/CCL (August 10, 2005) suggested conducting a literature-based study summarizing data collected at similar facilities. It was noted by USFWS that as long as sufficient information is available in the literature, then a site-specific study may not be required. A similar study request from the SCDNR (August 16, 2005) defines the objectives of the desktop study would be to (1) quantify the numbers and sizes of species susceptible to entrainment; (2) estimate associated mortality rates by species; and (3) provide reasonable recommendations for project design and operation upgrades to prevent or minimize fish entrainment and the associated injury/mortality. The USFWS suggested that at a minimum, the entrainment evaluation should also include the top and bottom elevation of the trash racks, as well as the width or spacing of the trash racks, and the mean velocity in front of the intakes across the full range operating scenarios.

As a result of these study requests, a desktop entrainment study was performed at the Project in consultation with resource agencies and stakeholders. Study results are summarized in Section 3.9.2, and the study report is attached in Appendix E-2. In reference to the request by the USFWS, it is noted above that an out-migration study, including the frequency and characteristics of spillway water releases with respect to potential out-migration by target resident and

diadromous fish species at the Project, was requested. The spillway is a man-made structure, constructed for the purpose of releasing water from the reservoir under emergency situations. The spillway is only operated in the event of an emergency and for testing purposes, and is not an option to pass fish.

The USFWS (August 1, 2005) and the NMFS (August 8, 2005), as well as the SCDNR (August 16, 2005) AR/CCL (August 10, 2005), and the LSSRAC (August 12, 2005), requested a comprehensive list and location map detailing all rare, threatened, and endangered species occurring within the Project area. In addition, they explained that management plans need to be developed for all federally protected species (such as the robust redhorse sucker, Carolina redhorse, highfin carpsucker, and shortnose sturgeon) that occur within the Project. They suggested conducting surveys to compare habitat requirements for these species with the available habitat types found within the action area of the Project. Should this comparison reveal overlapping habitat requirements with availability at the site, then, they noted, field surveys should be conducted to confirm presence or absence at the Project.

Consultation on rare, threatened and endangered species is currently being undertaken by the RT&E resources group in consultation with USFWS and other agencies.

The USFWS (August 1, 2005) requested fish community surveys (including small non-game species) be conducted in the Saluda River above and below the reservoir, and in Lake Murray, to supplement and update existing data. Target sampling to confirm the presence or absence of the robust redhorse sucker, Carolina sucker, and highfin carpsucker in the LSR also was requested. The AR/CCL (August 10, 2005) also requested a thorough analysis of historic and current fish populations, and their habitats, in the Saluda and Congaree Rivers and their tributaries. It was noted that the analysis should include an evaluation of diadromous fish habitat lost due to inundation behind the Project dam and an assessment of potential future habitat in the river and its tributaries.

A comprehensive fishery description encompassing approximately 15 years of data of the LSR is presented in Section 3.2. SCE&G and SCDNR continue to collect bi-annual fisheries data in the LSR. In reference to the request for an analysis of habitat lost due to inundation behind the Project dam, SCE&G

considers this request to involve the evaluation of pre-Project conditions, not required under current relicensing guidelines.

The USFWS requested an evaluation of the striped bass population in the reservoir to provide information (1) on the effectiveness of current turbine operations; (2) on potential additional enhancements in association with summer thermocline near the powerhouse; and (3) to determine striped bass spawning behaviors and movements in the spring. The AR/CCL (August 10, 2005) also requested an evaluation of project operations on summer habitat for striped bass in the reservoir forebay. They further suggested that mitigative measures should be determined to reduce or avoid future striped bass kills.

An evaluation of Project operations as it relates to fishery habitat in the reservoir is currently being undertaken by the Water Quality TWC (meeting notes dated November 13, 2006, March 26, 2007, May 22, 2007, and August 7, 2007, located in Volume II). Updated information will be provided as it becomes available.

The USFWS (August 1, 2005) and the NMFS (August 8, 2005) recommended the continuance of diadromous fish surveys in the LSR during the spring 2006 spawning migrations as described in the *2005 Diadromous Fish Studies* plan. They noted that sampling should be conducted for a minimum of two seasons to accurately identify the status of diadromous fish utilization in the LSR. The SCDNR (August 16, 2005) requested information to quantify the present diadromous fish utilization, by numbers and species, in and immediately below the Project. Spawning and nursery habitat for diadromous species in the river and the lake should be identified and quantified. Further, AR/CCL (August 10, 2005) requested that the effects of Project operations on water temperature, and spawning and recruitment of diadromous and riverine fish in the Saluda and Congaree Rivers should be studied. They suggested a cumulative impacts analysis of Project operations on diadromous fish stocks in the Santee-Cooper Basin be conducted. The AR/CCL further requested a study of upstream and downstream diadromous fish passage feasibility (such as fishways, trap & haul facilities, dam removal, spill gates, collection & bypass facilities, turbine intake screens, and reservoir operations) at the Project dam, the use of hatchery operations to augment existing stocks, and how to meet the flow and water quality requirements for these diadromous species. The LSSRAC also

recommends an evaluation of options for diadromous fish restoration to the Project waters. They identified target anadromous species to also study including American shad, hickory shad, blueback herring, striped bass, shortnose sturgeon, and Atlantic sturgeon.

Diadromous fish surveys were contracted by SCE&G for 2005 and 2006. Details regarding the results of these surveys are included in Section 3.9.1. Study reports and study plans are included in Appendix E-2. The diadromous fisheries TWC continues to discuss this issue and information will be provided as it becomes available.

Instream flow studies are requested for the LSR and confluence area by the following agencies: AR and CCL (letter dated August 10, 2005), City of Columbia Parks and Recreation (letter dated August 11, 2005), SCDNR (letter dated August 11, 2005), LSSRAC (letter dated August 12, 2005), NMFS (letter dated August 1, 2005), TU (letter dated August 15, 2005), USFWS (letter dated August 1, 2005). It is noted that the purpose of these studies would be to determine which flow regimens would best meet the needs of the aquatic biota.

In consultation with the agencies and stakeholders involved in the Instream Flows TWC. A study plan was developed and IFIM study was performed on the LSR in May and June of 2007. The final report will be included in the Final License Application. Further, discussion on the IFIM is detailed in Section 3.9.5.

3.8.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of fishery resources during these meetings is described below.

During the Diadromous Fish TWC meeting held on February 22, 2006, the sampling regime for American eels was discussed. The USFWS recommended the use of an eel ramp to sample for elvers due to ineffectiveness of the eel pot sampling. It was noted that water temperatures would stipulate when the ramp needs to be utilized, and discussions continued as to an appropriate location for

the ramp. It was agreed that a site-visit was necessary to investigate the potential locations suitable for ramp placement.

Details regarding the placement and results of the eel ramp are included in Section 3.9.1.3.

In regard to the requests for a mussel survey mentioned above, at the March 8, 2006 Mussels TWC meeting, the USFWS suggested a reconnaissance survey be completed for mussels in Lake Murray and the LSR. In addition, the USFWS further requested for a map depicting sampling sties for the mussel survey, as well as the inclusion of the numbers of alive and dead specimens into the final report.

As part of the relicensing process, SCE&G in consultation with agencies and NGO's, developed a study plan and performed a mussel survey in the Project Area. Details and results of the survey are included in Section 3.9.4.

3.9 Results of Recommended Studies

3.9.1 Diadromous Fish Sampling

SCE&G prepared and issued the Initial Consultation Document (ICD) on April 29, 2005, in order to initiate the relicensing process for the Saluda Hydro Project. The Licensee submitted the document to a number of state and federal resource agencies for their review and comment. In response to the issuance of the ICD, the SCDNR, USFWS, NMFS, LSSARC, and CCL/American Rivers sent comments and study requests regarding their concern about the impact of the Saluda Hydro Project on diadromous fish species (letter dated August 1, 2005) (Also discussed in Section 3.8.1).

Based on these concerns, SCE&G hosted a meeting on November 10, 2004 with several State and Federal resource agencies, NGOs and other stakeholders to discuss the diadromous fish studies that were requested. On February 1, 2005, a diadromous fish study plan developed in conjunction with the agencies was approved (Appendix E-2). The purpose of the study plan was to document the

relative abundance, distributions, and evidence of spawning of historically present diadromous fish species on the LSR and the Upper Congaree. Study Plan target species included the anadromous American shad, hickory shad, blueback herring and shortnose sturgeon, and the catadromous American eel.

Over the past 10 years, the SCDNR, USFWS, and NOAA Fisheries have worked together to develop the "Santee Cooper Basin Diadromous Fish Passage Restoration Plan", which was submitted to the FERC as a Comprehensive Plan under Section 10(a)(2)(a) of the Federal Power Act (USFWS et al. 2001). The plan identified the Saluda River as less than optimal for diadromous fish restoration efforts for a variety of reasons including: the large number of dams in the basin (approximately 13); limited number of river miles available to upstream migrating fish prior to reaching the Saluda Hydro Dam (approximately 10); and the cost and potential biological limitation (i.e., pressure-related impacts to outmigrating fish) of establishing fish passage at the Saluda Hydro Dam. In addition, cold hypolimnetic water released from the Saluda Hydro Dam may cause migrating fish to select the warmer water of the Broad River and not enter the Saluda (USFWS et al. 2001).

Monitoring information collected from two recent studies (Welch 2000, Newcomb and Fuller 2001); suggest that the target species (American shad, hickory shad, blueback herring, and American eel) are among the diadromous fish species that occurred historically in the Saluda-Congaree sub-basin. Shortnose sturgeon and Atlantic sturgeon also occurred historically in the sub-basin; however these species have not been recently documented upstream of the old Granby Lock and Dam (Congaree River). While some limited fish passage above old Granby Lock and Dam may be possible through the abandoned lock or during high flows, passage may be hindered for bottom-oriented species (USFWS et al. 2001) such as sturgeons (Kleinschmidt, 2005).

SCE&G implemented the approved diadromous fish study plan beginning in the spring of 2005 and extending through 2007. The objective of the diadromous fish studies were to:

- Document presence / absence of target diadromous fish species in the LSR and the upper Congaree River during the spring migratory periods;
- Determine the relative abundance and spatial and temporal distributions of species found to be present in the reach; and
- Document spawning of these species in the Saluda River relative to the Congaree River.

The geographic scope for each diadromous fish study focused on the LSR, from downstream of the Saluda Hydro Dam to it's confluence with the Broad River; and the upper Congaree River from it's origin at the confluence of the Saluda and Broad Rivers to Rosewood Boat Landing.

3.9.1.1 2005/2006 Fish Surveys – American Shad, Hickory Shad, and Blueback Herring

Diadromous fish collections were conducted in the spring of 2005 and 2006 (approximately February 1 to June 1 each year) to determine the presence (or absence) of American shad, hickory shad, and blueback herring. The survey utilized a 50 foot by 6 foot sinking gillnet with 2 and 5 inch stretch mesh. The nets were fished for a combined total of 816 net hours. During the 2005 and 2006 spring fish collections, no American shad, hickory shad, or blueback herring were collected. However, a combined total of 3 striped bass were collected in the vicinity of the Rosewood Boat Landing on the Congaree River.

Ichthyoplankton nets were fished in conjunction with the gillnets using a 0.5 m plankton net, equipped with a flowmeter. A total of 24,250 m^3 of water was sampled during the 2005 and 2006 spring fish collections. However, no larvae or juvenile diadromous fish were collected (Isely, 2005; 2006). The 2005 and 2006 Diadromous Fish Summary Reports are presented in Appendix E-2.

3.9.1.2 2005/2006/2007 American Eel Surveys

State and federal agencies also requested studies to document the presence or absence of the American eel in the LSR. SCE&G conducted a two year study to provide insight into the current American eel population for the LSR. Eel pots were baited and allowed to fish undisturbed for two consecutive days each week from February through May of 2005 and 2006. Eel pots were deployed at the following locations to document presence/absence and relative abundance of adult and juvenile American eels:

- LSR downstream of the Saluda Hydro Dam in the vicinity of the USGS gage (gage # 02168504);
- LSR at the mouth of the Saluda Hydro Dam spillway;
- LSR at the mouth of Rawls Creek adjacent to Saluda Shoals Park;
- The mouth of Twelvemile Creek as it enters LSR;
- LSR in the vicinity of the USGS gage (gage # 02169000); and
- The Broad River below the Columbia Diversion Dam.

Eel pots were fished in the LSR for a collective total of 25,215 trap hours during the 2005 and 2006 sampling period, however no American eels were captured (Kleinschmidt 2005; 2006). The 2005 and 2006 American eel survey are presented in Appendix E-2.

Although no eels were captured during this study, SCE&G and the SCDNR have captured American eels along the LSR during standardized fish collections. Hal Beard of SCDNR indicated that during his 2005 fall sampling, he collected three American eels total while electrofishing at ten sites along the LSR (H. Beard, SCDNR, Pers. Comm.). Similarly, Steve Summer of SCANA Services, Inc., noted that he captured one eel during standardized electrofishing conducted during April of 2005 (S. Summer, SCANA Services, Inc., Pers. Comm.). This suggests that the distribution of American eels in the LSR may be fairly low (Kleinschmidt 2006).

3.9.1.3 Saluda Eel Ramp Survey

To further investigate the presence/absence of in-migrating juvenile American eels in the LSR, the USFWS recommended (Meeting Notes – February 22, 2006, Volume II) installing an experimental eel sampling ramp at the Saluda Hydro spillway and at the USGS gage located on the LSR's mainstem downstream of the Saluda Hydro Dam (gage # 02168504). Sampling began in May of 2006 and is scheduled to continue through October of 2007. Eel ramps were constructed of corrugated plastic pipe. A continuous flow was provided using a pump and gravity feed to provide an attraction flow and to protect ascending eels from desiccation. To date, no eels have been collected at either of these sites. The "Evaluation of Usage of the LSR by Inmigrating Juvenile American Eels by Use of An Eel Ramp" is currently being drafted and will be included in the Final Application for New License.

3.9.1.4 2007 Shortnose Sturgeon Survey

Also as part of the approved Study Plan to address diadromous fish species, SCE&G conducted sampling for shortnose sturgeon in the LSR and Upper Congaree Sub-basin. Specific study objectives included:

- To document whether or not shortnose sturgeon are utilizing areas of the Saluda and Congaree rivers downstream of the Saluda Hydro Project;
- If sturgeon are found to be present, to document their relative abundance and spatial and temporal patterns;
- If shortnose sturgeon are present determine whether or not spawning is taking place downstream of the Saluda Hydro Project;
- If possible, characterize usage of this reach of the Saluda and Congaree relative to water quality and habitat data; and
- Cooperate, to the extent feasible, with population genetics and other studies being conducted by the SCDNR to determine the status of shortnose sturgeon in the Santee River Basin.

Gillnetting and ichthyoplankton sampling was conducted during late-winter and spring of 2007 when shortnose sturgeon would be expected to

migrate into the Piedmont rivers to spawn. The following sites were sampled:

- Downstream of the Saluda Hydro Dam in the vicinity of the USGS gage (#02168504);
- The vicinity of SCE&G's Gardendale canoe landing on the LSR;
- Upstream of the old Granby Lock and Dam on the Congaree River; and
- The vicinity of the Rosewood Boat Landing on the Congaree River.

These four sample locations were sampled weekly (one day per week) for adult and juvenile shortnose sturgeon. A 100 ft-long monofilament nets, with alternating 25 ft-long panels of 5-inch and 7-inch stretch mesh and were fished for approximately eight hours a day for a total sampling effort of 344 net hours. No adult shortnose sturgeon were captured during the three month study period from February through April 2007 in the lower Saluda and Congaree Rivers. During ichthyoplankton sampling, a total of 37,054 m^3 of water was sampled during the three month study period. No eggs or juvenile shortnose sturgeon were captured while sampling with the ichthyoplankton nets.

Lack of presence of shortnose sturgeon in the LSR seems to be consistent with their spawning requirements. Adult shortnose sturgeon are known to commence spawning when water temperatures increase to 15˚C. The maximum water temperature recorded during the course of this study was 14˚C and this occurred during late April near the end of the sampling period and near the end of the typical sturgeon spawning period. This data suggests that water temperature conditions in the LSR are likely not suitable for shortnose sturgeon spawning (Kleinschmidt 2007). The 2007 Shortnose Sturgeon Report is presented in Appendix E-2.

3.9.1.5 American Shad Telemetry Study

On November 2, 2006 SCE&G and Kleinschmidt Associates hosted a Diadromous Fish Technical Working Committee meeting to discuss the diadromous fish studies conducted on the lower Saluda, Broad, and Congaree Rivers in 2005 and 2006. It was agreed that because gillnetting efforts did not capture any shad or herring, a telemetry study would be performed. The "American Shad Telemetry Study for the Lower Saluda, Congaree and Broad Rivers" was submitted and accepted by the Diadromous Fish Technical Working Committee on January 23, 2007.

The objective of the American Shad telemetry study is to characterize the movements of migrating American shad in the LSR, Congaree, and Broad Rivers for purposes of determining usage of the LSR downstream of the Saluda Hydro Dam.

Due to low numbers of shad passed at the downstream dams (Pinopolis and St. Stephens), the study was not conducted during the 2007 shad run. Several attempts were made to locate American shad in the lower portions of the Congaree River, but only six American shad were detected in the vicinity of the HWY 601 Bridge. Due to the low numbers of American shad migrating up the Congaree River, the telemetry study was postponed until the 2008 American shad migration season (Kleinschmidt 2007).

If the Study is performed in 2008, approximately 40 – 50 American shad will be collected in the Congaree River in the vicinity of the HWY 601 Bridge during the immigrating spawning season. A Vemco V-9 coded acoustic transmitter will be inserted into each captured American shad, and an array of receivers will be installed in the lower Saluda, Congaree and Broad Rivers. Tagged shad movements will be monitored, summarized and reported in the fall of 2008 and the study findings will be incorporated into the Final License Application.

3.9.2 Saluda Fish Entrainment and Turbine Mortality Analysis

During the first stage consultation of the Saluda relicensing process, the USFWS, SCDNR, and NMFS requested studies to determine the potential impact of project operation on the fishery resources, and recommended that the Licensee assess potential fish entrainment effects on the fishery resources due to project operation. In response to resource agency requests for studies in support of relicensing, SCE&G proposed to develop an entrainment estimate for the project, which would be based on the extensive entrainment database that currently exists from previous hydroelectric relicensing studies. Resource agencies agreed with SCE&G's proposal to determine potential fish entrainment effects through a "desktop analysis" (meeting notes dated February 22, 2006). SCE&G prepared a draft entrainment study plan, which was submitted to the resource agencies on April 17, 2006 and was approved on May 9, 2006. The Saluda Hydro Fish Entrainment Desktop Study Plan is presented in Appendix E-2.

The objective of this study was to characterize and provide an order-of-magnitude estimate of fish entrainment using existing literature and site specific information to:

- develop an entrainment database, applicable to the Saluda Hydro Project;
- calculate and estimate fish entrainment rate(s) (seasonal);
- characterize the anticipated species composition of fish entrainment;
- apply physical and/or biological filters that may affect entrainment; and
- estimate the annual entrainment for the Saluda Hydro Project.

Specifically, resident fish entrainment studies were selected from the entrainment database that was most applicable to the Saluda Hydro Project. Entrainment rate information from the selected studies was consolidated to describe fish entrainment rates on a monthly basis. The entrainment rates were presented in fish per volume of water passed through project turbines (fish/million cubic feet). The data was then grouped by season to determine the entrainment density for each season of the year. The seasonal data from each entrainment study was averaged to develop the seasonal mean entrainment estimate for the Saluda Hydro Project (Kleinschmidt 2006).

Species composition data from the accepted entrainment studies was analyzed and compiled to determine the general species of fish typically entrained at other hydroelectric projects. Accepted species composition data was grouped to yield predicted seasonal estimates of species-specific data for entrained fish at the Saluda Hydro Project. Total fish entrainment for the Saluda Hydro Project was estimated on an annual basis to provide an order-of-magnitude entrainment estimate. (Kleinschmidt 2006).

Due to certain water quality (specifically dissolved oxygen) site-specific characteristics of Lake Murray, entrainment estimates were adjusted by applying a "stratification" filter. Lake stratification when compared with the Saluda Project's intake depth could have an influence on entrainment estimates. Since the intakes for Units 1-4 are located approximately 190 ft. deep and Lake Murray is typically stratified with very little dissolved oxygen in the hypolimnion from July through November, entrainment rates for Units 1-4 were adjusted to for these months. (Kleinschmidt 2006).

Turbine mortality rate data available from source studies for several fish species was used to develop average mortality rates for family/genus-groups. The mortality rates were applied to the entrainment estimates to estimate impacts for the Saluda Hydro Project (Kleinschmidt 2006).

On January 29, 2007 the Saluda Hydro Fish Entrainment and Turbine Mortality Analysis draft report was distributed to the Fish Entrainment Technical Working Committee for review and comment. In this meeting the group concurred that the report and its approach met the study plan guidelines and was scientifically sound. The entrainment estimate provided for the Saluda Hydro Project was considered to be an order of magnitude estimate. The estimate was generated using 24 years of flow data and should account for worst and best case scenarios. The report estimated that, on average, approximately 371,089 fish (without the stratification filter) pass through the turbines on an annual basis and approximately 131,117 fish were estimated to be killed by the Saluda Hydro Project turbines. With the stratification filter, it was estimated that, on average, approximately 232,716 fish pass through turbines on an annual basis and approximately 82,252 fish were estimated to be killed by the Saluda Hydro

Project turbines. For detailed information refer to the Final Saluda Hydro Fish Entrainment and Turbine Mortality Analysis in Appendix E-2.

Trout White Paper

In comments issued in response to the ICD, the Saluda River Chapter of Trout Unlimited requested that SCE&G evaluate the potential for establishment of a self-sustaining trout fishery on the lower Saluda River downstream of the Project. The Instream Flow/Aquatic Habitat TWC subsequently drafted a technical white paper summarizing the spawning requirement of the two trout species currently stocked in the lower Saluda (rainbow and brown trout), and comparing those requirements to conditions in the lower Saluda River. The white paper found that, while existing habitat and water quality in the Saluda River generally provides suitable growing conditions for much of the year for adult brown and rainbow trout, the area is unlikely to support a self-sustaining fishery due to a number of factors, including:

- insufficient spawning and nursery habitat conditions to allow for sufficient amounts of recruitment to compensate for mortality;
- limited survivorship or potential spawning adult to age II and above, potentially due a variety of biotic and abiotic factors including predation, competition, angling exploitation and environmental conditions; and
- marginal spawning and incubation water temperature (brown trout), limited amount and quality of gravel spawning beds for both species, and discontinuous and limited fry and juvenile nursery habitat.

Due the factors mentioned above, the assessment concluded that pursuing a goal of establishing a self-sustaining trout population is likely not an appropriate management strategy for the lower Saluda River. The assessment also recommended that focus be placed on maximizing the potential for the river to maintain a Put-Grow and Take trout fishery in a manner that will ensure increased survival of the river's trout population and growth in the size of the fish.

3.9.3 Macroinvertebrate Assessment of the Lower Saluda River

The SCDNR, LSSRAC, NMFS, TU, and USFWS requested a study to evaluate the status of the macroinvertebrate community in the LSR, following turbine venting at the Project. The Macroinvertebrate Assessment of the lower Saluda River Study Plan (Appendix E-2) was subsequently developed and approved by the Freshwater Mussels/Benthic Macroinvertebrate TWC on August 24, 2006. The study plan calls for sampling of the macroinvertebrate community in 2006 and 2007 during late-summer/early-fall when dissolved oxygen conditions downstream of the Saluda Hydro dam are typically at their most critical.

During 2006, Macroinvertebrate fauna were sampled at five locations in the LSR. Three replicate Hester-Dendy multi-plate samplers were deployed at each location and allowed to colonize for approximately eight weeks. A multi-habitat assessment, following the USEPA *Rapid Bioassessment Protocols for the Use in Streams and Wadeable Rivers* (Barbour et. al. 1999), was also performed at the closest wadeable habitat to each of the Hester-Dendy deployment locations at the beginning and end of the colonization period (Carnagey Biological, 2006). As in previous sample years, regression analysis of the Hester-Dendy data confirmed that biotic factors improved as distance from the Saluda Hydro dam increased. Due to rapid velocity and water level fluctuations from the Project, these results were expected; studies have shown that operation of hydroelectric dams may decrease diversity by reducing habitat availability (Death, 1995; Death and Winterbourn, 1995; Ward and Stanford, 1995; Valentin *et al*., 1995). Analysis of the rapid bioassessment data detected no trends in taxa richness, total abundance, EPT abundance, or percentage of dominant taxon. Detailed information for each sample location is described in the 2006 Macroinvertebrate Assessment Final Report (Carnagey Biological, 2006), which is included as Appendix E-2.

The 2007 macroinvertebrate assessment is currently being conducted, and a draft report summarizing the results will be submitted to agencies in winter 2008.

3.9.4 Freshwater Mussel Survey of Lake Murray and the Lower Saluda and Upper Congaree Rivers

In comments issued in response to the ICD, the SCDNR, USFWS, and other stakeholders requested that a freshwater mussel survey of the Project vicinity be conducted as part of relicensing. A study plan was subsequently developed to determine whether freshwater mussels occur in the Saluda Hydroelectric Project vicinity, and if so, to provide qualitative measure of species diversity, spatial distribution, and abundance. The Freshwater Mussel Study Plan was accepted by the Freshwater Mussel/Aquatic Macroinvertebrate TWC on May 25, 2006 (Appendix E-2).

A total of sixty-five (65) sites were surveyed for the presence of freshwater mussels during the Summer of 2006: twenty-five (25) in Lake Murray, twenty-three (23) in the Lake Murray tributaries, and seventeen (17) downstream of the Project dam in the LSR and upper Congaree River (from the confluence to the Interstate 77 Bridge) (Alderman, 2006). Visual, tactile, snorkel, and SCUBA surveys revealed 15 species to be extant in the study area (Exhibit E-15). None of the species documented from the study area are federally listed as threatened or endangered, although 6 are federal species of concern.

The study detected differences in mussel assemblages between areas upstream and downstream of the Project dam (Alderman, 2006). In Lake Murray and its tributaries, 11 native freshwater mussel species were identified (Exhibit E-15), with the sample area dominated by backwater-adapted species such as Eastern floater and paper pondshell. No mussels were collected in the LSR downstream of the Saluda Dam. However, 9 native species were documented in the upper Congaree River and the confluence area of the Broad and Saluda Rivers. Riverine species such as Carolina slabshell and Roanoke slabshell were dominant in these two areas. Several of the species collected in the upper Congaree River and the confluence area were not collected upstream of the Saluda Dam, which could suggest the need for an anadromous host and or the lack of species specific habitat as a limiting factor. Also noted was the greater abundance of mussels on the Broad River side of the confluence area than on the Saluda River side indicating a limiting factor in this area also.

Additional detail regarding the surveys performed as part of relicensing is provided in the Freshwater Mussel Reconnaissance Survey Final Report (Alderman, 2006), included in Appendix E-2.

Exhibit E-15: Freshwater Mussel Species Documented as Occurring in the Saluda Project Vicinity

(Source: Alderman, 2006)

SPECIES DOCUMENTED IN STUDY AREA				
COMMON NAME	**SPECIES**	**G RANK[1]**	**FEDERAL STATUS[2]**	**AREA OF OCCURANCE[3]**
Roanoke Slabshell	Elliptio roanokensis	G2,G3	SOC	BR, CO
yellow lampmussel	Lampsilis cariosa	G3,G4	SOC	BR, CO
Carolina slabshell	Elliptio congaraea	G4	SOC	CO
Carolina Lance	Elliptio angustata	G4	SOC	LM, LMT, BR, CO
Common Elliptio	Elliptio complanata	G5		LM, LMT, BR, CO, S*
Variable Spike	Elliptio icterina	G4		LMT, CO
Atlantic Spike	Elliptio producta	G4		LM, LMT
Savannah Lilliput	Toxolasma pullus	G3	SOC	LM, LMT
Eastern floater	Pyganodon cataracta	G5		LM, LMT
paper pondshell	Utterbackia imbecillis	G5		LM, LMT
Rayed Pink				
Fatmucket	Lampsilis splendida	G3	SOC	LM, CO
Eastern Creekshell	Villosa delumbis	G4		LM, LMT, BR, CO, S*
Creeper	Strophitus undulatus	G5		S*, CO
Florida pondhorn	Uniomerus carolinianus	G4		LM, LMT
northern lance	Elliptio fisheriana	G4		LM

[1] G1 - Critically Imperiled; G2 - Imperiled; G3 - Vulnerable; G4 - Apparently Secure; G5 - Secure

[2] SOC = Federal Species of Concern

[3] BR = Broad; CO = Congaree; S = Saluda; LM = Lake Murray; LMT = Lake Murray Tributaries

* In Broad River washout area of Saluda/Broad confluence

3.9.5 Lower Saluda River Instream Flow Study

During the Project relicensing process, the USFWS, SCDNR, NMFS, and several Non-governmental Organizations (NGO's) requested an Instream Flow Incremental Methodology Study for the lower Saluda River downstream of the Project (Described in Section 3.8.1.). These agencies and NGO's participated in a Technical Working Committee (TWC) to govern relicensing studies, and were interested in using study data to explore alternatives for protection of instream habitat in the LSR below the Saluda Project. The TWC identified the following issues that this study would provide data for:

- altering the existing regulated flow in the LSR;
- assist in identifying minimum flows that are protective of aquatic habitat;
- provide data that can be used to weigh the effects of managing Lake Murray water levels on downstream habitat; and
- provide data that can be used to weigh the effects of reserve operations on downstream habitat.

The TWC elected to use a Physical Habitat Simulation (PHABSIM) model to quantify these relationships. The model quantified flows that meet habitat requirements to support a balanced aquatic community based on model results representing selected diadromous and resident fish, and aquatic biota (*i.e.* macroinvertebrates). Details were collaboratively scoped between October 2006 and May 2007 through a series of TWC meetings and site visits (see Volume II).[4]

The study area comprised the LSR between Lake Murray and the confluence with the Broad River, (Figure *to be inserted when report is finalized*). Flow in this reach is primarily influenced by releases from the Saluda Project powerhouse, although there are some additional contributions from several small tributaries, which collectively contribute approximately 100 square miles of additional drainage area. Details about the fishery resources, hydrology, and water quality of this reach can be found in Sections 3.1, 2.0,).

Mesohabitat was field-mapped to delineate the relative quantity and spatial distribution of each habitat type in the study area, as a precursor to study site and transect selection. The team defined each mesohabitat type of interest, and assigned specific attributes to each type. The upstream and downstream boundary of each mesohabitat within the study area was delineated and geo-referenced in the field, and the information transferred to a GIS format.

[4] A study team comprised of agency and licensee biologists from the TWC was formed to make technical decisions regarding input parameters and to review study output. Specifically, the team designated: 1) boundaries of the study area, 2) locations of specific representative or critical study sites, 3) locations of study site transects, 4) Habitat Suitability Index (HSI) criteria, and 5) calibration flows and range of flows to be assessed. Some study team members participated in field and analytical activities as feasible.

The study team reviewed the mesohabitat mapping data, defined study reaches, and located study sites and transects within each study reach during a series of site visits in May 2007. Standard PHABSIM data collection and flow modeling procedures (Bovee, 1982, Bovee *et al.* 1998) were used to evaluate habitat suitability, and empirical flow measurements were also obtained to evaluate zone-of-passage hydraulics at a limiting river channel site located at Millrace Rapids. Modeling was based on hydraulic data developed from cross-sectional depth, velocity, and substrate field measurements following Milhouse, *et al.* (1989), using PHABSIM for Windows (V 1.2).

Based on TWC consultation, habitat-discharge relationships were developed for flows ranging from the base flow (approximately 500 cfs) up to approximately 20,000 cfs. A draft report was prepared for study team review and comment, documenting the methods and results (Appendix E-2). The study team reviewed the study on (November 27, 2006); and the report was finalized and provided to the TWC following receipt of input from the study team in November 2007. More discussion of TWC interpretation, results and trends to be available Fall 2007.

3.9.6 Saluda Crayfish White Paper

During initial meetings of the Rare, Threatened and Endangered Species TWC (See march 8, 2006, RT&E Species TWC Meeting Notes; Volume II), USFWS staff expressed interest in the status of the Saluda crayfish (since re-named the Newberry Burrowing Crayfish) in the Project vicinity. The Saluda crayfish is a terrestrial burrowing crayfish of the genus *Distocambarus* that is endemic to South Carolina. As a result of the request, Dr. Arnie Eversole, Professor Emeritus at Clemson University and a regional crayfish expert, was contracted to prepare a brief summarizing the status, ecology, and known occurrences of this species (Eversole, 2006).

Dr. Eversole's (2006) assessment describes habitat for Saluda crayfish as isolated, poorly drained areas where the ground is saturated during the rainy season (November – March), often in association with a perched water table. Sites are generally isolated from floodplains and streams, although some have

been found in low moist areas near the headwaters of streams (colluvial valleys). Soils found in association with Saluda crayfish burrows include Chewacla, Worsham, Toccoa-Cartecay, Enon, and Sedgefield.

According to Dr. Eversole's assessment, the known range of the Saluda crayfish encompasses portions of the Tyger, Enoree, Lower Broad and Saluda River Basins. All known occurrences of the species are from 14 sites in Newberry County, with the closest confirmed Saluda crayfish site (George's Loop) located approximately 1.2 miles from the Saluda Project boundary in a wooded site at the headwaters of a small tributary to Beaverdam Creek.

Additional detail regarding the status and distribution of the Saluda crayfish in the Saluda Project vicinity is provided in the Saluda Crayfish Final White Paper (Eversole, 2006), which is included as Appendix E-2. An analysis of the potential for this species to occur in the Saluda Project Area is included in the Rare, Threatened and Endangered Species Assessment (Draft Assessment included in Appendix E-2) .

3.9.7 2005 Lower Saluda River Crayfish Assessment

In response to a request by the USFWS and in preparation for the relicensing of the Project, SCE&G contracted with Kleinschmidt Associates to perform a crayfish assessment in the LSR in the fall of 2005. The first of these assessments was conducted on October 11, 2005, and assessments continued on a weekly basis through November 15, 2005. During the sampling period a total of 41 crayfish were collected from the LSR. Of those individuals, there were 19 males and 22 females field identified. All of the specimens captured were of two genus', Procambarus and Cambarus; it is believed that only two species were found within those genus', *Cambarus (Depressicambarus) latimanus* and *Procambarus (Scapulicambarus) troglodytes*. A memo issued to the Fish and Wildlife RCG regarding the findings of this survey can be viewed in Appendix E-2.

Exhibit E-16: Fish Species Typical of Lake Murray and the Lower Saluda River

COMMON NAME	SCIENTIFIC NAME	LAKE MURRAY	LOWER SALUDA RIVER
Amiidae			
bowfin	Amia calva	X	X
Anguillidae			
American eel	Anguilla rostrata		X
Aphredoderidae			
pirate perch	Aphredoderus sayanus		X
Atherinidae			
brook silverside	Labidesthes sicculus	X	
Catastomidae			
Northern hog sucker	Hypentelium nigricans		X
creek chubsucker	Erimyzon oblongus		X
spotted sucker	Minytrema melanops	X	X
striped jumprock	Moxostoma rupiscartes		X
silver redhorse	Moxostoma anisurum		X
smallfin redhorse	Moxostoma robustum		X
shorthead redhorse	Moxostoma macrolepidotum	X	X
v-lip redhorse	Moxostoma pappillosum		X
river carpsucker	Carpiodes carpio	X	
Centrarchidae			
black crappie	Pomoxis nigromaculatus	X	X
white crappie	Pomoxis annularis	X	X
bluegill	Lepomis macrochirus	X	X
dollar sunfish	Lepomis marginatus	X	
pumpkinseed	Lepomis gibbosus	X	X
green sunfish	Lepomis cyanellus	X	
Lepomis hybrid	Lepomis sp.	X	
redbreast sunfish	Lepomis auritus	X	X
redear sunfish	Lepomis microlophus	X	X
warmouth	Lepomis gulosus	X	X
largemouth bass	Micropterus salmoides	X	X
smallmouth bass	Micropterus dolomeiu		X
Cluepeidae			
gizzard shad	Dorosoma cepedianum	X	X
threadfin shad	Dorosoma petenense	X	X
blueback herring	Alosa aestivalis	X	X
Cyprinidae			
dusky shiner	Notropis cummingsae		X
spottail shiner	Notropis hudsonius	X	X
rosyface chub	Notropis rubescens		X
sandbar shiner	Notropis scepticus		X
swallowtail shiner	Notropis procne	X	X
yellowfin shiner	Notropis lutipinnis		X
coastal shiner	Notropis petersoni	X	
highfin shiner	Notropis altipinnis		X
ironcolor shiner	Notropis chalybaeus		X
Eastern silvery minnow	Hybognathus regius	X	X
whitefin shiner	Cyprinella nivea		X
thicklip chub	Cyprinella labrosa		X
golden shiner	Notemigonus crysoleucas	X	X
bluehead chub	Nocomis leptocephalus		X

COMMON NAME	SCIENTIFIC NAME	LAKE MURRAY	LOWER SALUDA RIVER
carp	Cyprinus carpio	X	X
Esocidae			
chain pickerel	Esox niger	X	X
Cyprinodontidae			
lined topminnow	Fundulus lineolatus		X
Ictaluridae			
snail bullhead	Ameiurus brunneus	X	X
flat bullhead	Ameiurus platycephalus	X	X
brown bullhead	Ameiurus nebulosus	X	X
yellow bullhead	Ameiurus natalis	X	X
white catfish	Ameiurus catus	X	X
channel catfish	Ictalurus punctatus	X	X
Lepisosteidae			
longnose gar	Lepisosteus osseus	X	X
Moronidae			
white bass	Morone chrysops	X	X
striped bass	Morone saxatilis	X	X
white perch	Morone americana	X	X
Percidae			
carolina darter	Etheostoma collis		X
piedmont darter	Percina crassa		X
tessellated darter	Etheostoma olmstedi	X	X
yellow perch	Perca flavescens	X	X
swamp darter	Etheostoma fusiforme	X	
Poeciliidae			
eastern mosquitofish	Gambusia holbrooki	X	X
Salmonidae			
brown trout	Salmo trutta		X
rainbow trout	Oncorhynchus mykiss		X

4.0 WILDLIFE RESOURCES

4.1 Existing Wildlife Resources

4.1.1 Wildlife Habitats

Although the Lake Murray shoreline continues to undergo development, the project area contains extensive habitats that support diverse and abundant wildlife populations. 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 ft. setback, riparian buffer zones, Environmentally Sensitive Areas (ESAs), Forest and Game Management areas and undeveloped areas of the project. Details regarding the vegetative resources (*i.e.*, wildlife habitats) are presented in Section 5.0.

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-should 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 such as eastern newt, bullfrog, spring peepers, brown and red-bellied water snakes, and mud and musk turtles. Open water areas are often utilized by such species as bald eagle, kingfisher, osprey, and various gulls for foraging. Typical wildlife species for the project area are listed in Exhibits E-20 through E-22.

Lunch Island on Lake Murray is one of the largest pre-migratory roosting sites for purple martins in the United States (Russell and Gathreaux, 1999). 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 (Brown, 1997). This species is unique in that it nests in large colonies and is almost entirely dependant upon man-made structures for nesting (Russell and Gathreaux, 1999). Following the fledging period, purple martins often congregate in large nocturnal roosts of 100,000 or more birds prior to returning southward (Brown, 1997). 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 (Russell and Gathreaux, 1999). It has been estimated that at least 700,000 birds utilize the Lunch Island roost (Russell and Gauthreaux, 1999), prompting SCDNR, and the Columbia Chapter of the National Audubon Society to request that the eastern end of the island be designated as North America's first purple martin sanctuary. SCE&G will work with SCDNR and the Columbia Chapter of the National Audubon Society to accommodate their request and make this designation permanent.

Osprey Nesting Platform Program

In 1996, the Lake Murray Association initiated a program to construct and install osprey nesting platforms around the Lake Murray shoreline (LMA, 2007). These platforms, which were originally constructed of wood but have been replaced with all-metal structures, provide valuable habitat for this species. During the past eleven years of this project, a total of 20 platforms have been erected (13 wooden platforms, 7 metal). The Lake Murray Association also has 3 all-metal platforms available for replacements and future installations. SCE&G has assisted the Lake Murray Association in this endeavor by providing a current total of 6 all-metal platforms. Each year the Lake Murray Association has met its goal

of installing at least 2 platforms (pers. communication with Ken Fox, LMA). General observations of osprey in the area indicate that Lake Murray supports a significant number of individuals. Although it is not currently known how many inhabit the area, during the last couple years (2006-2007) many have been observed sitting on old nest sites and diving for fish.

According to a spring 2007 nesting survey conducted by the LMA, at least 47 active nests, built upon varying structures, were used by breeding osprey within the lake area (Exhibit E-17). Of this number, more than half of the platforms erected by LMA were used by breeding birds, constituting almost 20 percent of the total nests identified. An average of two adult birds and two fledging offspring were documented per nest. Limitations of the survey, cited by LMA, include the extensive shoreline mileage that made it impossible to document all breeding activity around the lake. Regardless, this effort, which includes plotting nest locations on a map, provides valuable baseline data for future monitoring (LMA, 2007).

Exhibit E-17: Results of Spring 2007 Osprey Nesting Survey of Lake Murray Shoreline Conducted by LMA

STRUCTURE	NESTS	ADULTS	FLEDGLINGS
Platforms	9	18	20
Power pole	14	28	28
Tree	24	46	43
Total	47	92	91

Source: (LMA, 2007)

4.2 Rare, Threatened, and Endangered Species

As part of relicensing, SCE&G formed a Rare, Threatened and Endangered Species Technical Working Committee (RT&E TWC) to address Project-related issues related to rare, threatened and endangered species. The RT&E TWC is comprised of representatives from state and federal resource agencies (i.e., SCDNR, NMFS and USFWS), representatives from several NGO's, and other stakeholders.

In response to USFWS's identification of potential RT&E species in the counties that contain the Project (Letter dated August 1, 2005), the TWC performed an assessment of the likelihood that RT&E species or their habitats occur within the Project area (Kleinschmidt, 2007). Many of the species listed by the USFWS occupy coastal plain habitats and as such, are not supported by environments present within the Project boundaries. Of the species identified by USFWS, only the wood stork and bald eagle are known to occur within the Saluda Project Boundary. They are described in greater detail below.

Bald Eagle

The bald eagle was listed as federally-endangered on March 11, 1967, partially due to significant population declines attributed to DDT exposure. Subsequent to the banning of DDT, populations began to increase and the eagle's status was lowered from endangered to threatened on July 12, 1995 (USFWS, 1995a). Today, the species has recovered to the degree that it was recently removed from the Federal Endangered Species List, effective July 2007 (72 FR 37345 37372)(USFWS, 2007). In South Carolina, the number of estimated nesting pairs has increased from 13 in 1977 to 181 in 2003 (Wilde et al., 2003). The bald eagle continues to receive protection under the South Carolina Nongame and Endangered Species Conservation Act as a state endangered species, as well as through the Eagle Protection Act (16 U.S.C.668-668d).

Bald eagles may be found throughout North America, typically around water bodies where they feed primarily on fish and scavenge carrion. Studies suggest reservoirs, especially those associated with hydroelectric facilities, are particularly attractive to foraging bald eagles (Brown 1996). Eagles nest in large trees near water and typically use the same nest for several years, making repairs to it annually (Degraaf and Rudis, 1986). In South Carolina, the distribution of eagle nesting has shifted, from historically being located primarily along the coast, to encompass more inland areas; this expansion has been attributed to the construction of approximately 491,000 acres of large reservoirs in the state since the early 1900's (Wilde et al., 2003).

Bald eagles have likely used Lake Murray for foraging and nesting since its construction in 1930. Eagles utilizing 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 (Wilde et al., 2003). 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 (Wilde et al., 1996). Productivity (young produced) has also increased substantially around the lake from two chicks in 1996 to 10 chicks in the 2002/2003 nesting season (Wilde et al., 2003). According to reports by the Lower Saluda Scenic River Advisory Council, Bald Eagles are also seen along the LSR corridor and have been seen nesting in an area near the confluence of the lower Saluda and the Broad Rivers (LSSRAC, 2005).

Lake Murray was one of four South Carolina reservoirs affected by an outbreak of Avian Vacuolar Myelinopathy (AVM), which was first documented at DeGray Lake, Arkansas in the winter of 1994-1995 (Jeffers, 2000). AVM has been confirmed in birds from 11 reservoirs in five southern states (SC, NC, GA, AR, TX) and has resulted in the death of at least 93 bald eagles, thousands of American coots, and smaller numbers of waterfowl and other species (Wilde et al., 2003; Birrenkott et al., 2004). AVM is thought to be linked to an unknown neurotoxin that causes lesions in the white matter of the brain and the spinal cord. Affected animals demonstrate difficulty flying, swimming and walking (Jeffers, 2000). Evidence suggests that bald eagles contract AVM by preying on afflicted coots and other waterfowl that are unable to evade predators (Wilde et al., 2003).

Researchers suspect that the neurotoxin thought to cause AVM may be the product of a cyanobacteria (blue-green algae) often found growing in association with aquatic vegetation (i.e., *Hydrilla*) (Wilde et al., 2003). Sampling conducted at AVM-affected reservoirs by SDCNR and the University of South Carolina (USC) during 2001 and 2002 found that one particular species of blue-green algae, which is known to produce toxic compounds, had the greatest incidence of colonization at the location with the highest eagle mortality from AVM (Strom Thurmond Lake on the South Carolina/Georgia border). In addition, a recently-published feeding study involving mallards found a cause-effect relationship between ingestion of *Hydrilla* from these sites and AVM infection (Birrenkott et al., 2004).

As part of the Saluda Dam Remediation Project, from 2002 to 2005 SCE&G funded monthly surveys on Lake Murray to monitor for the presence of AVM-affected birds, as well as periodic collections of American coots to screen for the disease. To date, there have been no known occurrences of AVM in the Lake Murray bald eagle population;

however, a low percentage of the coots collected during the winters of 1999 (2 out of 17 collected), 2000 (5 out of 27 collected), and 2003 (1 out of 30 collected) did test positive for the disease, as well as one Canada goose collected during December 2000 (Wilde et al., 2003). Despite the presence of some affected prey species, SCDNR and USC scientists have concluded that, to date, the presence of AVM at Lake Murray does not appear to have resulted in extensive losses of breeding adult bald eagle as both the number and productivity of eagles nesting on Lake Murray have increased from 1996 level (Wilde et al., 2003). It should be noted that the presence of AVM in the lone coot from the 2003 collection was determined only through clinical testing, with no birds displaying obvious neurological impairment, suggesting that AVM was not severe at Lake Murray during the 2002/2003 season (Wilde et al., 2003).

Wood Stork

The wood stork was federally-listed as endangered on February 28, 1984 (USFWS, 1996). The only stork native to North America, wood storks occurred historically throughout the coastal plain of the southeastern U.S. and Texas. The current U.S. breeding population has declined from an estimated 20,000 pairs in the 1930's to between 5,500 to 9,500 in recent years, with declines attributed primarily to loss of suitable foraging and nesting habitat. Currently, nesting of the species in the U.S. is thought to be limited to the coastal plain of South Carolina, Georgia, and Florida (USFWS, 1996).

Wood storks are highly colonial and typically nest in large rookeries and feed in flocks (USFWS, 1996). Typical foraging habitats include narrow tidal creeks, flooded tidal pools, and freshwater marshes and wetlands. Like most other wading birds, storks feed primarily on small fish. However, because wood storks feed by tactilocation (using the sense of touch), depressions where fish become concentrated during periods of falling water levels are particularly attractive sites (USFWS, 1996). Storks typically use tall cypresses or other trees near water for colonial nest sites. Nests are usually located in the upper branches of large trees and several nests are typically located in each tree. Trees used for nesting and roosting typically provide easy access from the air and an abundance of lateral limbs (USFWS, 1996).

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 approximately 1999 (Personal Communication, E. Eudaly, USFWS, August 2004). In 2004, SCE&G, in coordination with the USFWS and SCDNR, developed a long-term study plan to document wood stork usage within the Saluda Project Boundary and in the Project vicinity (SCE&G and Kleinschmidt, 2004a). A summary of this survey effort and preliminary results of two of the five years worth of surveys is provided in Section 4.4.2.

4.3 Agency and Public Recommendations Concerning Wildlife Resources

4.3.1 Initial Stage Consultation

On April 29, 2005, the Initial Consultation Document (ICD) for the Saluda Hydro Project was sent in electronic format to the consulting agencies and stakeholders for review. The Notice of Intent (NOI) was also filed simultaneously with the issuance of the ICD. The ICD is attached in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

Summarized below, are the remarks and study requests regarding wildlife resources that were provided by stakeholders in comment letters following the issuance of the ICD.

In a letter dated August 1, 2005, the USFWS requested information regarding migratory bird species to evaluate migratory bird use at Lake Murray and the Saluda River, as well as riparian ecosystems. More specifically, the USFWS suggested conducting surveys of migratory birds and their habitats to provide baseline information on populations.

Migratory bird surveys are currently being performed at the Project. More discussion on this subject is included under Second Stage consultation.

In addition to the migratory bird surveys, the USFWS in conjunction with CCL/American Rivers, SCDNR, LSSRAC, and NMFS requested studies to

assess the condition of rare, threatened, and endangered (RT&E) species (wood stork and bald eagle) in the Project area, as well as how Project operations may potentially affect these species. They were also interested in gathering information as to how Project operations could be used to protect, restore, or enhance the populations of these listed species. These entities noted that Management Plans should be developed for RT&E species existing in the Project area or under the influence of the Project, including the wood stork and bald eagle.

In a first stage consultation comment letter (dated August 1, 2005), the USFWS also requested that aerial surveys for potential roosting, nesting, and foraging sites for the federally endangered wood stork should continue.

Consultation on RT&E species is currently being undertaken by the RT&E resources group in consultation with USFWS and other agencies. Between February 2005 and November 2006, monthly aerial surveys were conducted to collect additional information on wood stork usage at the Project. Upon meeting with agencies on February 9, 2007 (meeting notes included in Volume II), SCDNR and USFWS agreed that the monthly surveys for wood stork could cease due to the apparently sporadic and infrequent use of the Project Area by this species. It was also noted that only foraging behavior has been documented during their presence in the Project Area; no nesting behavior has been observed. The group noted that other surveys performed in the Project Area (migratory bird surveys and bald eagle surveys) would serve to document any wood stork presence.

4.3.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of wildlife resources during these meetings is described below.

On March 8, 2006, during the Terrestrial TWC meeting, the USFWS provided clarification of their objectives for requesting a migratory bird survey of the Project. In addition to requesting a comprehensive list of all bird species using

the Project area, the USFWS requested for continuation of the wood stork surveys and identification of all bald eagle sites.

Bald Eagle nesting sites have currently been documented by SCE&G and continue to be updated on a regular basis. Due to the sensitive nature of this information, it is not included in this draft License Application.

During the March 8, 2006 Terrestrial TWC meeting, it was noted that the USFWS and the SCDNR both requested information regarding waterfowl usage of Lake Murray. It was noted that since the mid 1970's, Lake Murray waterfowl has declined considerably, which may or may not be correlated with a decreasing aquatic vegetation trend. While previous boat-based surveys on the main lake pool during winter months of 2003-2006 provide information on species distribution, the agencies noted that it has limited value in assessing seasonal and/or annual trends. At the May 3, 2006 Terrestrial Resource TWC meeting, the SCDNR requested for a study plan to be developed which includes conducting five to six waterfowl surveys during winter months on Lake Murray.

On July 26, 2006, the TWC was presented with a Waterfowl Survey Study Plan to address the SCDNR requests. In order to build the waterfowl historical database and provide information on habitat use, it was agreed that the standard aerial surveys would be conducted during winter months for a period of three years, with an interim report being issued after the second year of surveying has been completed. The first series of surveys was conducted during the 2006 to 2007 season, with another survey set currently planned for 2007 to 2008. The 2006 to 2007 survey report can be viewed in Appendix E-3.

At the July 26, 2006 Terrestrial TWC meeting, a comprehensive list of bird species using the Project developed from existing literature sources, including the Columbia Audubon observations from Dreher Island State Park, data compiled by Riverbanks Zoo, the University of South Carolina's observations from Saluda Shoals Park and other areas of the LSR was presented. After distribution and review of the list by the TWC, it was noted that the brown pelican should be added to the list as a species known to use the Project area. With this, it was agreed upon by all RCG members, including the USFWS, that this list would satisfy the migratory bird survey request.

4.4 Results of Recommended Studies

4.4.1 Lake Murray Wintering Waterfowl Survey

In recent years, during their mid-winter waterfowl surveys, SCDNR has noted a declining trend in waterfowl use of Lake Murray (Buddy Baker, SCDNR, Pers. Comm.; See meeting notes). In response to a request for information, 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 seven waterfowl species and over 4,000 individuals in the Project vicinity (Exhibit E-18) (Kennamer, 2007). 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 >100 birds were documented at four locations including 1) an area just west of the SC Hwy 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.

Several conditions were identified during the surveys that may help explain the potential decrease in waterfowl use of the lake reported by SCDNR. Considerable recreational boating was noted, which can create disturbances that deter bird use. Also, waterfowl use of the lake may be influenced by the decrease in aquatic vegetation resulting from SCE&G's aquatic plant control activities. Waterfowl, particularly winter visitors, forage on invasive species of aquatic plants, which have been reduced through multi-year partial reservoir drawdowns and other vegetation controls methods.

Exhibit E-18: Species List Compiled from Waterfowl Aerial Surveys of Lake Murray in 2006-2007

GUILD	COMMON NAME	SCIENTIFIC NAME
Swans		
	Mute Swan	Cygnus olor
Geese		
	Canada Goose	Branta canadensis
Dabbling Ducks		
	Mallard	Anas platyrhynchos
Diving Ducks		
	Ring-Necked Duck	Aythya collaris
	Lesser Scaup	Aythya affinis
	Bufflehead	Bucephala albeola
Rails		
	American Coot	Fulica americana

Source: (Kennamer, 2007)

4.4.2 Wood Stork Surveys

Sighting of the federally endangered wood stork from the Lake Murray vicinity were reported by local residents to the USWFS and other agencies periodically from approximately the late 1990's through 2004 (Terrestrial Resources TWC Notes, March 8, 2006). As part of an order approving and modifying the latest update to the Lake Murray SMP in 2004, the FERC subsequently required SCE&G, in consultation with SCDNR and the USFWS, to designate two areas near Bush River as wood stork "conservation areas" (Item H - FERC Order No. 20040623-3015)(FERC, 2004). The order further required that all other wood stork roosting and foraging habitat identified within the Project boundary remain protected and undeveloped until new evidence is submitted to indicate that protection of these areas is not warranted.

Following issuance of the order, SCE&G initiated consultation with the USFWS and SCDNR, and in late-summer 2004, two aerial reconnaissance surveys of Lake Murray were coordinated through the SCNDR. These surveys documented approximately 60 storks feeding at various locations in the middle Saluda River and the upper portion of Lake Murray, within the Saluda Project Boundary. Additionally, two wading bird nesting sites were observed along the floodplain of the middle Saluda River above the reservoir; Although unoccupied at the time of the surveys, nests observed at these sites were characteristic of wading birds,

including wood storks (Wood Stork Aerial Reconnaissance Survey Report (2004), Appendix E-3). In response to these wood stork sightings and the FERC order, SCE&G coordinated with the SCDNR and USFWS in developing and initiating a multi-year study aimed at documenting wood stork use of the Saluda Hydro Project Boundary and vicinity (Wood Stork Study Plan (2004), Appendix E-3). The study included monthly aerial surveys conducted within suitable habitat in the Saluda Project vicinity during the nesting and post-breeding season of each year (February through November).

After two years of aerial surveys, completed in 2005 and 2006, a total of 20 survey events had been performed. No wood storks were observed during the 2005 surveys. During 2006, a small number of wood storks were observed soaring above the Saluda River upstream of Lake Murray and feeding in nearby wetlands during the late summer months (a single stork during August and an additional 12-16 in September); although none of these observations were from within the Project boundaries. Similarly, no wood stork nesting activity was observed during any surveys. In fact, the two wading bird nesting area identified during the reconnaissance surveys were occupied by great blue herons during both 2005 and 2006 surveys (SCE&G, 2005)(SCE&G, 2007).

The lack of nesting observed during the study was not surprising and consistent with the known life-history of wood storks as a coastal nesting species rather than one that inhabits inland reservoirs (USFWS 1996). Timing of wood stork observations during 2006 (August and September) suggested that these were likely post-dispersal migrants from coastal nesting sites. During the late-summer/early-fall period, when chicks have fledged and adults are no longer tied to the nest site by chick rearing, adult and juvenile wood stork dispersing from nesting colonies often undertake extensive migrations to exploit ephemeral food resources prior to returning to coastal areas for the winter months. In South Carolina and Georgia, young-of-year storks typically fledge during July and August, but return to the nest for an additional 3 to 4 weeks to be fed before finally dispersing from the colony site in August and September (USFWS, 1996). Storks dispersing post-breeding from southern US colonies (Florida, Georgia, and South Carolina) have been documented as far north as North Carolina and as far west as Mississippi and Alabama (USFWS, 1996).

The study also concluded that the notable presence of wood storks in 2004, when 60 foraging individuals were observed in a shallow embayment in the Saluda River Arm of Lake Murray, can likely be attributable to temporary conditions created during construction of the Saluda Backup Dam when lake elevations dropped to levels near elevation 343.5'. During lake drawdown, shallow areas lacking dense aquatic vegetation were created in many coves and embayments, conditions known to be attractive to foraging wood storks (Coulter and Bryan 1993). In addition, these locations were likely the site of concentrated fish numbers, providing superior foraging opportunities. Thus, their occurrence during 2004 was likely an atypical occurrence (SCE&G, 2005)(SCE&G, 2007).

Originally, the survey was scheduled to span a 5-year period, however, due to the limited nature of stork activities observed in the Project vicinity, the USFWS and SCDNR agreed with SCE&G's proposal to discontinue further wood stork surveys on Lake Murray. Further, the agencies determined that continued protection of the areas identified in the FERC order as wood stork "conservation areas" was no longer warranted (Kleinschmidt, 2007).

4.4.3 Resident and Migratory Bird Literature Review

First round consultation comments to the ICD by USFWS requested surveys to evaluate the effects of the project on resident and migratory bird use. In particularly, information was requested on population estimates and habitat utilization of Lake Murray, the Saluda River, and the associated riparian ecosystems (USFWS, 2005). Upon further inquiry by the Licensee regarding study objectives, USFWS agreed that a comprehensive listing of birds using the Project vicinity would satisfy their request for information. In response, SCE&G conducted an extensive literature review utilizing the abundant data sources in the area, which included local avian experts and enthusiasts that maintain active bird count databases for the region. Resources consulted include the University of South Carolina, the local chapter of the Audubon Society (Columbia Audubon), and the Riverbanks Zoo. The USFWS, and the Terrestrial Resource TWC, agreed that this research effort satisfied the request for more information (TWC Meeting Notes dated May 3, 2006 and July 26, 2006).

Results of the literature review tallied a total of 193 different species belonging to 48 families occurring in the Lake Murray and LSR area. Of these numbers, the most commonly represented family was Paridae, consisting largely of warbler species, which are small songbirds. The second most represented family was Anatidae, which are mostly duck species. Of the total number of species documented, about 65% are known to occur both at Lake Murray and the LSR. The remaining species were evenly split between these two locations (19% documented only at Lake Murray, 17% documented only on LSR). The species list compiled for the Saluda Project vicinity is provided in Exhibit E-23.

4.5 USFWS Comments on Impacts on Endangered Species

To be addressed in the Final License Application.

4.6 Existing Measures to be Continued and New Measures Proposed by the Applicant

To be addressed in the Final License Application.

4.7 Anticipated Impacts

To be addressed in the Final License Application.

Exhibit E-19: Federally Listed Species, Candidate Species, and Selected Federal Species of Concern Occurring or Potentially Occurring in the Four County Region Surrounding the Saluda Hydroelectric Project (FERC No. 516)

(Source: Kleinschmidt, 2007)

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS[1]	COUNTIES
Birds			
Bald eagle	Haliaeetus leucocephalus	P	Lexington, Newberry, Richland, Saluda
Red-cockaded woodpecker	Picoides borealis	E	Lexington, Richland, Saluda
Wood stork	Mycteria americana	E	Newberry
Fish			
Robust Redhorse Sucker	Moxostoma robustum	SC	Lexington (possible)
Saluda darter	Etheostoma saludae	SC	Lexington, Richland, Saluda, Newberry
Shortnose sturgeon	Acipenser brevirostrum	E	Lexington (possible), Richland
Invertebrates			
Carolina heelsplitter	Lasmigona decorata	E	Lexington (possible), Newberry (possible), Richland (possible), Saluda (possible)
Saluda crayfish	Distocambarus youngineri	SC	Newberry
Plants			
Canby's dropwort	Oxypolis canbyi	E	Richland
Georgia aster	Aster georgianus	C	Richland
Little amphianthus	Amphianthus pusillus	T	Saluda
Piedmont bishop-weed	Ptilimnium nodosum	E	Saluda
Rough-leaved loosestrife	Lysimachia asperulaefolia	E	Richland
Schweinitz's sunflower	Helianthus schweinitzii	E	Lexington
Rocky Shoal's spider-lily	Hymenocallis coronaria	SC	Lexington, Richland
Smooth coneflower	Echinacea laevigata	E	Lexington (possible), Richland

1 Federal Status – E (listed as Endangered under Endangered Species Act); T (listed as Threatened under Endangered Species Act); C (Candidate for Federal listing); SC (Federal Species of Concern); P (Federally protected).

2 Bald eagle was removed from the list of federally threatened and endangered species on June 28, 2007; however, the species remains federally protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Exhibit E-20: Mammals Commonly Found In and Around Lake Murray

COMMON NAME	SCIENTIFIC NAME
Terrestrial Mammals	
white-tailed deer	Odocoileus virginianus
Raccoon	Procyon lotor
gray squirrel	Sciurus carolinensis
virginia opossum	Didelphis virginiana
Fox	Family *Canidae*
Coyote	Canis latrans
Skunk	Family Mustelidae
Bobcat	Felis rufus
Voles	Family Cricetidae
Shrews	Family Soricidae
Aquatic Mammals	
Beaver	Castor canadensis
river otter	Lutra canadensis
Muskrat	Ondatra zibethicus
Mink	Mustela vison

Exhibit E-21: Reptiles (Terrestrial and Aquatic) and Amphibians Commonly Found In and Around Lake Murray

COMMON NAME	SCIENTIFIC NAME
Terrestrial And Aquatic Reptiles	
Eastern box turtle	Terrapene carolina
painted turtle	Chrysemys sp.
mud turtle	Kinosternon sp.
musk turtle	Sternotherus sp.
snapping turtle	Chelydra serpentina
green anole	Anolis carolinus
Northern fence lizard	Sceloporus undulates hyacinthinus
broadhead skink	Eumeces laticeps
Copperhead	Agkistrodon contortrix
gray rat snake	Elaphe obsolete spiloides
black racer	Coluber constrictor
timber rattlesnake	Crotalus horridus horridus
cottonmouth	Agkistrodon piscivorus
brown water snake	Nerodia taxispilota
redbelly water snake	Nerodia erythrogaster erythrogaster
Amphibians	
Southern toad	Bufo terrestris
Bullfrog	Rana catesbeiana
green frog	Rana clamitans
green treefrog	Hyla cinerea
leopard frog	Rana sp.
marbled salamander	Ambystoma opacum
red salamander	Pseudotrition ruber

Exhibit E-22: Bird Species Commonly Found at Lake Murray

COMMON NAME	SCIENTIFIC NAME OR FAMILY
Waterfowl	
wood duck	Aix sponsa
Canada goose	Branta canadensis
American coot	Fulica Americana
Mallard	Anas platyrhrnchos
American black duck	Anas rubripes
ring-necked duck	Aythya collaris
American anhinga	Anhinga anhinga
double-crested cormorant	Phalacrocorax auritus
herons and egrets	Family Ardeidae
Raptors	
bald eagle	Haliaeetus leucocephalus
Osprey	Pandion haliaetus
great horned owl	Bubo virginianus
red-tailed hawk	Buteo jamaicensis
red-shouldered hawk	Buteo lineatus
Upland Game Birds	
wild turkey	Meleagris gallopavo
northern bobwhite	Colinus virginianus
mourning dove	Zenaida macroura
Songbirds	
Warblers	Family Parulidae
Thrushes	Family Turdidae
American robin	Turdus migratorius
Vireos	Family Vireonidae
Finches	Family Fringillidae
Miscellaneous Birds	
Woodpeckers	Family *Picidae*
Vultures	Family Cathartidae
Gulls	Family *Laridae*
yellow-bellied sapsuckers	Sphyrapicus varius

Exhibit E-23: Results of Literature Review Documenting Bird Species in the Saluda Hydroelectric Project Vicinity

FAMILY	COMMON NAME	SCIENTIFIC NAME	DOCUMENTE OCCURRENCI
Accipitridae	Northern harrier	Circus cyaneus	LM
Anatidae	American wigeon	Anas americana	LM
Anatidae	black duck	Anas rubripes	LM
Anatidae	Bufflehead	Bucephala albeola	LM
Anatidae	common goldeneye	Bucephala clangula	LM
Anatidae	common merganser	Mergus merganser	LM
Anatidae	Gadwall	Anas strepera	LM
Anatidae	lesser scaup	Aythya affinis	LM
Anatidae	northern shoveler	Anas cylpeata	LM

FAMILY	COMMON NAME	SCIENTIFIC NAME	DOCUMENTE OCCURRENCI
Anatidae	Pintail	Anas acuta	LM
Anatidae	Redhead	Aythya americana	LM
Anatidae	ring-neck duck	Aytha americana	LM
Anatidae	ruddy duck	Oxyura jamaicensis	LM
Anatidae	surf scoter	Melanitta perspicillata	LM
Ardeidae	little blue heron	Florida caerula	LM
Caridae	Bonaparte's gull	Larus philadelphia	LM
Ciconiidae	wood stork	Mycteria americana	LM
Emberizidae	white-crowned sparrow	Zonotrichia leucophrys	LM
Fringillidae	pine siskin	Spinus pinus	LM
Fringillidae	purple finch	Carpodacus purpureus	LM
Gaviidae	common loon	Gavia immer	LM
Laridae	caspian tern	Hydroprogne caspia	LM
Laridae	Forster's tern	Sterna forsteri	LM
Motacillidae	American pipit	Anthus rubescens	LM
Parulidae	Louisiana warbler	Seiurus motacilla	LM
Pelecanidae	brown pelican	Pelecanus occidentalis	LM
Pelecanidae	American white pelican	Pelecanus erythrorhynchos	LM
Phasianidae	wild turkey	Meleagris gallopavo	LM
Podicipedidae	horned grebe	Podiceps auritus	LM
Scolopacidae	common snipe	Capella gallinago	LM
Scolopacidae	greater yellow legs	Tringa melanoleuca	LM
Scolopacidae	least sandpiper	Calidris minutilla	LM
Scolopacidae	lesser yellowlegs	Tringa flavipes	LM
Scolopacidae	pectoral sandpiper	Calidris melanotos	LM
Scolopacidae	western sandpiper	Calidris mauri	LM
Scolopacidae	Wilson's snipe	Gallinago delicata	LM
Accipitridae	bald eagle	Haliaeetus leuccocephalus	LM, LSR
Accipitridae	broad-winged hawk	Bueto platypterus	LM, LSR
Accipitridae	Cooper's hawk	Accipter cooperii	LM, LSR
Accipitridae	Osprey	Pandion haliaetus	LM, LSR
Accipitridae	red-shouldered hawk	Bueto lineatus	LM, LSR
Accipitridae	red-tailed hawk	Buteo jamaicensis	LM, LSR
Accipitridae	sharp-shinned hawk	Accipter striatus	LM, LSR
Alcedinidae	belted kingfisher	Megacerle alcyon	LM, LSR
Anatidae	blue-winged teal	Anas discors	LM, LSR
Anatidae	Canada goose	Branta canadensis	LM, LSR
Anatidae	common goldeneye	Bucephala clangula	LM, LSR
Anatidae	green-winged teal	Anas crecca	LM, LSR
Anatidae	hooded merganser	Lophodytes cucullatus	LM, LSR
Anatidae	Mallard	Anas platyrhynchos	LM, LSR
Anatidae	red-breasted merganser	Mergus serrator	LM, LSR
Anatidae	wood duck	Aix sponsa	LM, LSR
Apodidae	chimney swift	Chetura pelagica	LM, LSR
Ardeidae	great blue heron	Ardea herodias	LM, LSR
Ardeidae	great egret	Casmerodius albus	LM, LSR
Ardeidae	green heron	Butorides virescens	LM, LSR
Bombycillidae	cedar waxwing	Bombycilla cedrorum	LM, LSR
Cardinalidae	blue grosbeak	Passerina caerulea	LM, LSR
Cardinalidae	indigo bunting	Passerina cyanea	LM, LSR

FAMILY	COMMON NAME	SCIENTIFIC NAME	DOCUMENTE OCCURRENCI
Cardinalidae	Northern cardinal	Cardinalis cardinalis	LM, LSR
Cardinalidae	rose-breasted sparrow	Pheucticus ludovicianus	LM, LSR
Cathartidae	black vulture	Coragyps atratus	LM, LSR
Cathartidae	turkey vulture	Cathartes aura	LM, LSR
Certhiidae	brown creeper	Certhia familiaris	LM, LSR
Charadriidae	killdeer	Charadruis vociferus	LM, LSR
Columbidae	mourning dove	Zenaida macroura	LM, LSR
Columbidae	rock dove	Columba liva	LM, LSR
Corvidae	American crow	Corvus brachyrhynchos	LM, LSR
Corvidae	blue jay	Cyanocitta cristata	LM, LSR
Corvidae	fish crow	Corvus ossifragus	LM, LSR
Cuculidae	yellow-billed cuckoo	Cocoyzus americanus	LM, LSR
Emberizidae	chipping sparrow	Spizella passerina	LM, LSR
Emberizidae	dark-eyed junco	Junco hyemalis	LM, LSR
Emberizidae	eastern towhee	Pipilo erythrophthalmus	LM, LSR
Emberizidae	field sparrow	Spizella pusilla	LM, LSR
Emberizidae	fox sparrow	Passerella iliaca	LM, LSR
Emberizidae	Savannah sparrow	Passerculus sandwichensis	LM, LSR
Emberizidae	song sparrow	Melsopiza melodi	LM, LSR
Emberizidae	swamp sparrow	Melospiza georgiana	LM, LSR
Emberizidae	white-throated sparrow	Zonotrichia albicollis	LM, LSR
Falconidae	American kestrel	Falco sparverius	LM, LSR
Falconidae	Merlin	Falco columbarius	LM, LSR
Fringillidae	American goldfinch	Spinus tristis	LM, LSR
Fringillidae	house finch	Carpodacus mexicanus	LM, LSR
Hirundinidae	barn swallow	Hirundo rustica	LM, LSR
Hirundinidae	cliff swallow	Petrochelidon pyrrhonota	LM, LSR
Hirundinidae	Northern rough-winged swallow	Stelgidopteryx serripennis	LM, LSR
Hirundinidae	purple martin	Progne subis	LM, LSR
Icteridae	brown-headed cowbird	Molothrus ater	LM, LSR
Icteridae	common grackle	Quiscalus quiscula	LM, LSR
Icteridae	orchard oriole	Icterus spurius	LM, LSR
Icteridae	red-winged blackbird	Agelaius phoeniceus	LM, LSR
Laridae	herring gull	Larus argentatus	LM, LSR
Laridae	ring-billed gull	Larus delawarensis	LM, LSR
Mimidae	brown thrasher	Toxostoma rufum	LM, LSR
Mimidae	gray catbird	Dumetella carolinesis	LM, LSR
Mimidae	Northern mockingbird	Mimus polyglottos	LM, LSR
Paridae	Carolina chickadee	Parus carolinesis	LM, LSR
Paridae	tufted titmouse	Parus bicolor	LM, LSR
Parulidae	American redstart	Setophaga ruticilla	LM, LSR
Parulidae	black and white warbler	Mniotilta varia	LM, LSR
Parulidae	blackburnian warbler	Dendroica fusca	LM, LSR
Parulidae	blackpoll warbler	Dendroica striata	LM, LSR
Parulidae	black-throated blue warbler	Dendroica caerulescens	LM, LSR
Parulidae	black-throated green warbler	Dendroica virens	LM, LSR
Parulidae	blue-winged warbler	Vermivora pinus	LM, LSR
Parulidae	Canada warbler	Wilsonia canadensis	LM, LSR

FAMILY	COMMON NAME	SCIENTIFIC NAME	DOCUMENTE OCCURRENCI
Parulidae	Cape May warbler	Dendroica tigrina	LM, LSR
Parulidae	chestnut-sided warbler	Dendroica pensylvanica	LM, LSR
Parulidae	common yellowthroat	Geothlypis trichas	LM, LSR
Parulidae	golden-winged warbler	Vermivora chrysoptera	LM, LSR
Parulidae	hooded warbler	Wilsonia citrina	LM, LSR
Parulidae	magnolia warbler	Dendroica magnolia	LM, LSR
Parulidae	nothern parula	Parula americana	LM, LSR
Parulidae	ovenbird	Seiurus aurocapillus	LM, LSR
Parulidae	pine warbler	Dendroica pinus	LM, LSR
Parulidae	prairier warbler	Dendroica discolor	LM, LSR
Parulidae	prothonotary warbler	Protonotaria citrea	LM, LSR
Parulidae	Swainson's warbler	Limnothlypis swainsonii	LM, LSR
Parulidae	Tennessee Warbler	Vermivora peregrina	LM, LSR
Parulidae	worm-eating warbler	Helmitheros vermivorus	LM, LSR
Parulidae	yellow warbler	Dendroica petechia	LM, LSR
Parulidae	yellow-brested chat	Icteria virens	LM, LSR
Parulidae	yellow-rumped warbler	Dendroica coronata	LM, LSR
Parulidae	yellow-throated warbler	Dendroica dominica	LM, LSR
Passeridae	house sparrow	Passer domesticus	LM, LSR
Phalacrocoracidae	double-crested cormorant	Phalacrocorax auritus	LM, LSR
Picidae	downy woodpecker	Dendrocopos pubescens	LM, LSR
Picidae	hairy woodpecker	Dendrocopos villosus	LM, LSR
Picidae	northern flicker	Colaptes auratus	LM, LSR
Picidae	pileated woodpecker	Dryocopus pileatus	LM, LSR
Picidae	red-bellied woodpecker	Centurus carolinus	LM, LSR
Picidae	red-headed woodpecker	Melanerpea erythrocephalus	LM, LSR
Picidae	yellow-bellied sapsucker	Sphyrapicus varius	LM, LSR
Podicipedidae	pied-billed grebe	Podilymbus podiceps	LM, LSR
Rallidae	American coot	Fulica americana	LM, LSR
Regulidae	golden-crowned kinglet	Regulus satrapa	LM, LSR
Regulidae	ruby-crowned kinglet	Regulus calendula	LM, LSR
Sittidae	brown-headed nuthatch	Sitta pusilla	LM, LSR
Sittidae	red-breasted nuthatch	Sitta canadensis	LM, LSR
Sittidae	white-breasted nuthatch	Sitta carolinensis	LM, LSR
Strigidae	Eastern screech owl	Megascops asio	LM, LSR
Strigidae	great horned owl	Bubo virginianus	LM, LSR
Sturnidae	european starling	Sturnus vulgaris	LM, LSR
Sylviidae	blue-gray gnatcatcher	Polioptila caerula	LM, LSR
Thraupidae	scarlet tanager	Piranga olivacea	LM, LSR
Thraupidae	summer tanager	piranga rubra	LM, LSR
Trochilidae	ruby-throated hummingbird	Archilochus colubris	LM, LSR
Troglodytidae	carolina wren	Thryothorus ludovicianus	LM, LSR
Troglodytidae	winter wren	Troglodytes troglodytes	LM, LSR
Turdidae	American robin	Turdus migratorius	LM, LSR
Turdidae	eastern bluebird	Sialia sialis	LM, LSR
Turdidae	hermit thrush	Catharus guttatus	LM, LSR
Turdidae	wood thrush	Hylocichla mustelina	LM, LSR
Tyrannidae	Eastern kingbird	Tyrannus tyranus	LM, LSR
Tyrannidae	Eastern phoebe	Sayornis phoebe	LM, LSR

FAMILY	COMMON NAME	SCIENTIFIC NAME	DOCUMENTE OCCURRENCI
Tyrannidae	Eastern wood pewee	Contopus virens	LM, LSR
Tyrannidae	great creasted flycatcher	Myiarchus crinitus	LM, LSR
Vireonidae	blue-headed vireo	Vireo solitarius	LM, LSR
Vireonidae	red-eyed vireo	Vireo olivaceus	LM, LSR
Vireonidae	white-eyed vireo	Vireo griseus	LM, LSR
Accipitridae	Mississippi kite	Ictinia missippiensis	LSR
Anhingidae	anhinga	Anhinga anhinga	LSR
Caprimulgidae	chuck-will's-widow	Caprimulgus carolinensis	LSR
Cardinalidae	painted bunting	Passerina ciris	LSR
Cardinalidae	rose-breasted grosbeak	Pheucticus ludovicianus	LSR
Emberizidae	vesper sparrow	Pooecetes gramineus	LSR
Hirundinidae	tree swallow	Tachycineta bicolor	LSR
Icteridae	Baltimore oriole	Icterus galbula	LSR
Icteridae	eastern meadowlark	Sturnella magna	LSR
Laniidae	loggerhead shrike	Lanius ludovicianus	LSR
Parulidae	bay-breasted warbler	Dendroica castanea	LSR
Parulidae	cerulean warbler	Dendroica cerulea	LSR
Parulidae	Kentucky warbler	Oporornis formosus	LSR
Parulidae	Louisiana waterthrush	Seiurus motacilla	LSR
Parulidae	Nashville warbler	Vermivora ruficapilla	LSR
Parulidae	Northern waterthrush	Seiurus noveboracensis	LSR
Parulidae	orange-crowned warbler	Vermivora celata	LSR
Parulidae	palm warbler	Dendroica palmarum	LSR
Scolopacidae	solitary sandpiper	Tringa solitaria	LSR
Scolopacidae	spotted sandpiper	Actitis macularius	LSR
Strigidae	barred owl	Strix varia	LSR
Trochilidae	rufous hummingbird	Selasphorus rufus	LSR
Troglodytidae	house wren	Troglodytes aedon	LSR
Turdidae	gray-cheeked thrush	Catharus minimus	LSR
Turdidae	Swainson's thrush	Catharus ustulatus	LSR
Turdidae	veery	Catharus fuscescens	LSR
Tyrannidae	acadian flycatcher	Empidonax virescens	LSR
Tyrannidae	least flycatcher	Empidonax minimus	LSR
Tyrannidae	olive-sided flycatcher	Contopus cooperi	LSR
Tyrannidae	yellow-bellied flycatcher	Empidonax flaviventris	LSR
Vireonidae	Philadelphia vireo	Vireo philadelphicus	LSR
Vireonidae	yellow-throated vireo	Vireo flavifrons	LSR

a : LM = Lake Murray; LSR = Lower Saluda River

Sources:

Giovannone, J., Riverbanks Zoo Bird Observation Data: 2005

Giovannone, J., Riverbanks Zoo Bird Observation Data: 2006

Carter, R., Giovannone, J., Griggs, J. 2006 Saluda Shoals Park Bird Observation Data.

Carter, R., Giovannone, J., Griggs, J. 2006 Lake Murray Bird Observation Data.

Pitts, I. Dreher Island State Park Bird Checklist: 2006 Update.

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Columbia Audubon. 2006 Christmas bird Count: Lower Saluda River Observation Area (provided by J. Giovannone).

5.0 BOTANICAL RESOURCES

5.1 Existing Botanical Resources

5.1.1 Upland Habitat

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 4,513.5 acres of Project lands over a shoreline distance of 92.9 miles (Mead and Hunt, 2002a). One of the most common trees is loblolly pine *(see Exhibit E-26 for scientific names)*, coming in early after disturbance of most well-drained sites and dominating for up to 40 years afterwards.

SCE&G manages forest resources on a total of 10,532 acres of its land (within a quarter mile of Lake Murray) according to the South Carolina Forestry Commission's Best Management Practices. In addition, they employ management measures such as selective harvesting of pines and hardwoods, and maintenance of a 100-foot wide shoreline buffer, to protect water quality, wildlife, fishery, and aesthetic values. SCE&G also does not allow logging in certain areas including cliffs, steep slopes, or atypical groups of trees. On private riparian lands sold by SCE&G since 1984, a 75-foot vegetated buffer zone above the 358.5-foot contour is maintained in accordance with current FERC license conditions. In this zone, limited brushing or clearing of specific vegetation is allowed. Consultation and a permit from SCE&G is required to remove any tree or shrub 3 inches or greater in diameter or to trim/limb any tree greater than ten feet tall. Enforcement of buffer zone compliance is by written agreement, with penalties imposed by SCE&G through denial or revocation of dock permits for violators (SCE&G, 1994).

5.1.1.1 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. A mentioned previously, the most common tree species is loblolly pine, which is a quick and dominating colonizer to disturbed, well-drained sites. This tree is also the species of choice for the regional forestry industry, growing rapidly and generating clear, straight wood for a number of uses (Mead and Hunt, 2000).

In areas not managed for pine, succession to deciduous tree species has occurred (Mead and Hunt 2002). Common species of deciduous forests include red maple, sweet gum, several oak species (i.e., white, red, southern red, black, chinkapin), 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. These forested areas cover about 4,513 acres of project lands and are located along about 93 miles of the Lake Murray shoreline. They function mostly in support of forestry, wildlife or game management, and recreation or aesthetic values (Mead and Hunt, 2000 and 2002a).

5.1.1.2 Lower Saluda River

Habitat diversity found in the LSR 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 LSR, especially near the rivers edge (pers observation, A. Stuart, Kleinschmidt, 2003; Mead and Hunt, 2002). Canopy species in this forest type include white oak, southern red oak, shagbark hickory, post oak, winged elm, as well as loblolly pine stands. Some of these stands are in the 100-acre floodplain and are considered jurisdictional wetlands (Mead

and Hunt 2002). The various pine plantations occurring downstream of the Dam range from young rows of planted loblolly pines to older, thinned (merchantable) and un-thinned (natural) pine forests. On the north bank of the Saluda River, bottomland hardwood forest has been delineated, which is a wetland vegetation community and is described in more detail in the wetlands section below.

The forest edge habitat of the LSR, which is located in the transitional area between open and forested cover types, comprises approximately ten percent of the total habitat along the LSR. This cover type is the interface between the forested and field habitats and provides a great deal of vegetative diversity and height class complexity (Colinvaux, 1993).

Open field habitat makes up approximately fifteen percent of the available habitat along the LSR. Open field habitat is limited to those areas that are periodically mowed and maintained and are typically dominated by assorted grasses. These cover areas are confined to a narrow strips in agricultural areas along the river corridor as well as in transmission rights-of-way (pers observation, A. Stuart, Kleinschmidt, 2003).

5.1.1.3 Islands

The 61 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 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. Successional describes a species or community that is ephemeral in that it will be replaced by species that will form the climax community. An abandoned farm field, for example, contains successional species. These species will be replaced by a more stable, long-term community unless regular disturbance such as annual mowing keeps it in an early-successional state. Continued natural and anthropogenic disturbances in the form of wind and wave action, prescribed burning, past agricultural use and present recreational use serve to maintain the open aspect of these islands (Mead and Hunt, 2002a). The herbaceous layer on the open and disturbed islands is dominated by grasses and composites in the autumn, many of which are typical species of old field succession. Old field succession typically occurs when agricultural or farm fields are abandoned and the herbal communities give way to pines, the organic layer of the soil deepens, and the water retaining capacity of the soil increases (Colinvaux, 1993).

The most ecologically distinct island is Lunch Island, located approximately 4.5 miles upstream of the Dam, which has a dense stand of switch cane and abundant pokeberry. As mentioned in more detail in the Wildlife section, this island is home to one of the largest purple martins roosts in the world. 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 (SCE&G, 1994).

The islands provide important wildlife habitat for a number of species and are a major recreational and aesthetic asset for the lake. The islands total approximately 617.7 acres, with a combined shoreline length of 36.9 miles (Mead and Hunt, 2002a).

5.1.2 Description of Wetlands, Floodplains, Impacts and Mitigative Measures

5.1.2.1 Wetlands

According to the National Wetland Inventory (NWI) database, wetland habitats are abundant around the Lake Murray perimeter. The NWI, which is maintained by the USFWS, is a mapping system that provides information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats. NWI maps for the Saluda Project Area document numerous wetlands along the coves and peninsulas of the highly convoluted lake shoreline (*NWI maps – Appendix E-4*).

The wetland habitats represented within the Project area have been classified according to Cowardin et al. (1979), and represent several subsystem/classes. They include *Palustrine* forested, emergent and scrub-shrub wetlands (PFO, PEM, PSS); and *Lacustrine* littoral wetlands (L2)(Cowardin et al., 1979). Each of the NWI wetland types and their general distribution in the Project area are described further below.

Palustrine forested (PFO1) is the most abundant wetland community in the Project area, occupying approximately 1,618 acres below the 358.5-foot contour around the lake (NWI map; Mead and Hunt, 2002a). PFO1 wetlands are characterized by woody vegetation 6 meters tall or taller, and consist primarily of broad-leaved deciduous species (Cowardin et al., 1979). Some forested wetlands around Lake Murray have also been referred to as bottomland hardwoods during various assessments. Typical species include various oaks (i.e., cherrybark, chestnut, willow, water, shumard, and laurel) and sweet gum. The sub-canopy 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, water regime for most areas is semi-permanently flooded. Hydrologic inputs are flooding, streamflow and runoff (Mead and Hunt, 2002a).

Palustrine scrub-shrub (PSS) wetlands occupy the lake fringe, along shallow coves and tributary banks. There are approximately 140 acres of this type of wetland below the 358.5-foot contour around Lake Murray (Mead and Hunt, 2002a). PSS 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 (Mead and Hunt, 2002a). The vegetation community is dominated by woody vegetation less than 6 meters tall, which 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 (Cowardin et al. 1979; NWI maps; Mead and Hunt, 2002a).

Palustrine emergent wetlands (PEM) are located throughout the lower elevations of the shoreline, within coves. The plant communities include erect, rooted, herbaceous hydrophytes (water-loving) species that are present most of the growing season in most years (Cowardin et al, 1979). This vegetation is present particularly along the larger flat regions of the Saluda River and Little Saluda River arms of Lake Murray. Approximately 363 acres of emergent wetland exist below the 358.5-foot contour around the lake, with nearly ninety percent of them occurring in the headwater region of the lake along the Saluda River (Mead and Hunt, 2002a).

Lacustrine littoral wetlands, mostly with unconsolidated bottoms (L2UB), 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, which fall below the waters 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%) as are large stable surfaces for plant and animal attachment (Cowardin et al., 1979).

Only some of the wetlands within the Project have been formally delineated per Army Corps of Engineers (ACOE) specifications. In addition to the described wetland information derived from NWI maps, limited information on wetlands located downstream of the Project Dam

was obtained in support of the back up dam remediation project. In March 2000, the SCE&G staff conducted a wetland delineation immediately downstream of the Project Dam, during which a total of 31 different locations and approximately 55 acres of jurisdictional wetlands were identified (Mead and Hunt, 2002). The different wetland types documented include abandoned borrow pits/quarries that had developed ponded and *palustrine* habitats; a narrow riverine forested wetland; seasonally flooded scrub-shrub habitat; seasonally flooded bottomland hardwoods; and emergent wetlands (Mead and Hunt, 2002a).

Currently, wetlands in the Project area are unlikely to be eligible for State protection, unless new legislation is passed. However, whether or not they receive Federal protection depends on if they represent 'isolated features', which are wetlands without a connection to navigable waters. For the most part, wetlands around the perimeter of Lake Murray that have a surface water connection to the lake (which is a navigable water) will likely be eligible for protection under the Federal Clean Water Act. However, the greater the geographical distance between the wetland and lake, or the more ephemeral the nature of the wetland - the more ambiguous is its jurisdictional status.

Wetlands protection afforded by the State of South Carolina exists only as the Coastal Tidelands and Wetlands Act (S.C. Code Ann. § 48-39-10 – 48-39-360 (2005)), which protects "critical areas" as defined as coastal waters, tidelands, beaches, or beach/dune systems. The State does not protect inland wetlands, many of which, however, are protected by Federal Clean Water Act. One exception to this occurs in the case of isolated wetlands, which can be argued to be exempt from Federal protection based on recent Supreme Court rulings. On January 9, 2007, however, new legislation termed The Isolated Wetlands Protection Act was introduced in the SC Senate. If passed, it would require development of isolated wetlands above a certain size be authorized through a permit from the State Department of Health and Environmental Control before beginning construction. The bill is currently residing in the Senate Committee on Agriculture and Natural Resources.

5.1.2.2 Floodplains

The Saluda Project is not operated as a flood control reservoir. However, in times when tropical storms and hurricanes are predicted to affect inflow to the reservoir, operations of Saluda Hydro are increased to maintain the operating level of Lake Murray (See Exhibit B).

The lower Saluda basin is narrow and the LSR is steeply banked and channelized. After extended operation at high flows, water will top the river bank in many areas. Although this event occurs occasionally, it does not appear sufficient to support a floodplain ecosystem with associated functions. Areas considered floodplain, are few and limited to a few scattered locations where the river bends. According to FEMA data, the lands bordering the LSR are in a zone considered 10-year floodplain, which indicates that the annual chance of flooding along the banks is 10% (*see Appendix E-4 – FEMA profile graphs*). However, this is likely a significant overestimation under current operations, and it may in fact be based on pre-project conditions. Flows associated with the 10-year frequency event are 32,000 cfs; however, due to the Applicant's use of flow forecasting models and the storage capacity of the reservoir, downstream flows are moderated and rarely exceed the maximum plant hydraulic capacity (approximately 20,000 cfs). No downstream flows have exceeded plant capacity (via spillway gate operation) since 1970, with the installation of Unit 5 (which has a rated hydraulic capacity of 6000 cfs).

5.1.2.3 Impacts and Mitigative Measures

To be discussed in Final License Application

5.1.3 Environmentally Sensitive Areas (ESAs)

Various areas within the Project area have been designated as Environmentally Sensitive Areas (ESA) because they offer ecologically significant resources, including botanical. The ESA designation is a resource tool in consideration of

management alternatives and establishment of management objectives (SCE&G, 1994). Originally, ESAs were documented and described in detail by SCE&G in response to an order of the FERC issued in South Carolina Electric & Gas Company, 56 FERC ¶ 62,194 (1991). Since then, the ESAs have been resurveyed and their classifications have been revised (SCE&G, 2006). Because the original inventory provided extensive information on botanical resources of the ESAs, it is used in the descriptions below. A summary of the recent survey and classification system is provided in Section 5.3.2.

In the 1994 inventory undertaken by SCE&G, ESAs below the 358.5-foot high water contour were classified into 11 habitat types (SCE&G, 1994). They included ten vegetated classes, and two unvegetated classes (e.g., shallow shoals and rocky shores having littoral buffer or fishery values). Two of the vegetated classes, islands and bottomland hardwood forests, were described in the preceding section. The remaining vegetated classes are described below. Common vegetation species found in each of the habitat types are listed in Exhibit E-26.

5.1.4 Islands

Described above in Section 5.1.1.3 – *Islands*.

5.1.5 Bottomland Hardwood

Described as PFO1 above in Section 5.1.2 – *Wetlands*.

5.1.6 Mature Hardwood

These areas occur on the forested slopes, primarily on the upper lake, and were described briefly above as upland forested habitat. This habitat has a highly diverse canopy layer, which includes a wide variety of oaks, as well as beech, sweet gum and hickory tree species. The subcanopy layer is also diverse and composed of many shrub species including American holly, flowering dogwood, mountain laurel, fetter bush, wild azalea. Because of the dense upper layers, herbaceous species are scarce (SCE&G, 1994).

5.1.7 Shallow Coves

This ESA type consist of jurisdictional wetlands that include flats and gentle slopes above the 350.5-foot contour and extend down to about 6 feet below the annual mean high-water mark (SCE&G, 1994). They occur immediately below buttonbush and willow flats (described below). Depending on water level, they provide shallow water or exposed shoreline habitat and are usually inundated from late winter through spring. They support distinctly-zoned assemblages of forbs, grasses, sedges, and rushes. These areas provide habitat for several wildlife species and are significant to the recreational fishery, representing most of the suitable spawning and nesting habitat for the resident centrarchids (*i.e.* bass and sunfish).

5.1.8 Buttonbush and Willow Flats

The areas are jurisdictional wetlands that usually occur at or just below the 358.5-foot elevation and are common along the upper margins of shallow coves and other shoreline areas (SCE&G, 1994). They support buttonbush on the lake side, with black willow located behind the buttonbushes. The stability provided by the root systems of the plants growing in this habitat reduces the effects of erosion caused by wave action. Because of this stability, spawning centrarchids use these areas extensively. The structural complexity of these areas also provides a safe haven for larval and juvenile fishes.

5.1.9 Monotypic Stands of Water Tupelo

This forested wetland type is consistently inundated, and located within low wet flats of the upper lake (SCE&G, 1994). The shrub layer in this forest type is lacking and swamp beggar-tick grows on the trunks of the trees at or just above the high water mark. These areas are relatively limited, and are unique because they represent most northern occurrence of water tupelo known to exist in the Saluda River basin.

5.1.10 Exposed Bar

These areas of Lake Murray occur in the upper lake and are typically associated with the riverine islands (SCE&G, 1994). They are remnants of the old river system and consist primarily of sand and heavier materials deposited during flood events along the river banks before the Saluda River was impounded. These areas are inundated during most of the year and are usually exposed only during the winter months, which classify them as wetlands under the NWI mapping system. Graminoid plants typically tend to dominate the plant community structure of the exposed bars. The more protected downstream bar areas offer favorable spawning locations for nest-building bass, crappie, and sunfishes.

5.1.11 Wet Flats

This ESA type exists in the upper lake between the bottomland hardwoods and shallow coves and have two distinct forest cover types depending on elevation (low wet flats *vs.* higher flats) (SCE&G, 1994). Both types are jurisdictional wetlands. The wet flats provide important wildlife habitat for the lake ecosystem and, when submerged, are prime feeding areas for migratory waterfowl. During high-water periods, they are also an important source of course particulate organic matter for the lake, which forms an important supplement to fine and dissolved sources of nutrients supplied by tributary creeks and rivers.

5.1.12 Purple Martin Roost

This ESA is designated as such because it serves as a significant island roosting location for this bird species. It is described in more detail in Section 4.0 – *Wildlife*. It contains vegetation similar to other open islands in addition to a dense stand of switch cane and abundant pokeberry (SCE&G, 1994).

5.1.13 Invasive Aquatic Plants

Invasive aquatic plants have been problematic in Lake Murray and the LSR for a number of years. In order to keep track of plant abundance and distributions, quantitative data on aquatic plants has been collected through aerial surveys and summarized in distribution maps. In the early 1990's, Brazilian elodea (*Egeria densa*) was the primary aquatic plant of concern on Lake Murray (Aulbach-Smith, 1998a). Slender naiad (*Najas minor*) presented problems as well, however a shift of concern occurred upon the discovery of hydrilla in 1993. Hydrilla is an exotic plant that was introduced into the United States in the 1960's through the aquarium trade. Presently, millions of dollars are spent every year in order to control this noxious weed. The variety of hydrilla that occurs in Lake Murray, *Hydrilla verticillata*, reproduces vegetatively. Boat traffic and waterfowl also contribute to the spread of populations throughout bodies of water (Access Washington, 2004).

Aquatic plant control methods on Lake Murray have varied in form and cost over the years. Approximately 1.5 million dollars has been spent on aquatic plant control methods from 1993, when hydrilla was first discovered on Lake Murray, to 2002 (SCDNR, 2005). Methods have included herbicide applications, drawdowns, and the stocking of grass carp, which combined have virtually eliminated the hydrilla population. Of the 6,645 acres of hydrilla on Lake Murray in 2002, 2,700 were controlled by the 2003 drawdown. The additional acres were controlled by grass carp during the 2004 and 2005 growing seasons (Aulbach, 2006). Herbicides Komeen and Renovate have been used in the past to address Hydrilla and Water Primrose, respectively. And in fact, SCDNR's treatment of moderate to heavy infestations of hydrilla with Komeen has played an important role in reducing the acreage (Aulbach-Smith, 1998b). The most recent survey produced no evidence of Hydrilla within Lake Murray. (Aulbach, 2006)

5.1.13.1 Lake Murray

Aquatic plant surveys have been conducted by boat and by plane on Lake Murray on a periodic basis since the early 1990's. There are

several invasive aquatic plant species that are under observation on Lake Murray. These include hydrilla (*Hydrilla verticillata)*, Eurasian water milfoil (*Myriophyllum spicatum*), and several species of pondweed (*Potamogeton pusillus, P. crispus, and P. illinoensis, P. diversifolius*) (Aulbach-Smith, 1998a). Hydrilla populations have declined in Lake Murray due to the introduction of triploid Chinese grass carp into the Lake in 2003 (SCDNR, 2005). The diet of grass carp is almost exclusively aquatic plants and they can help tremendously in the reduction of invasive plant species (Aulbach, 2001b). As of the 2006 survey, the hydrilla appears to be well controlled on Lake Murray with no direct evidence of this species being observed. Eurasian milfoil, although once a cause for concern on Lake Murray, does not currently appear to be a problem through numerous pesticide applications. Several species of pondweed are present; however, colonies have been reduced due to consumption by grass carp. Small patches of Illinois pondweed (*P. illinoensis*) and variable-leaf pondweed (*P. diversifolius*) were noted during the 2006 survey (Aulbach, 2006).

Water primrose (*Ludwigia hexapetala*) was observed to affect over 54 miles of shoreline on Lake Murray in 2005. However, the 2006 survey indicated that levels of water primrose have been substantially reduced from the previous year. It is hypothesized that both grass carp and the increase of water levels from the drawdown state have contributed to the acreage reduction of water primrose (Aulbach, 2006).

5.1.13.2 Lower Saluda River

The majority of aquatic vascular plants on the LSR are introduced species. Seasonal changes and water fluctuations in the LSR tend to cause a reduction in the numbers of aquatic plants present in the river channel. However, Brazilian elodea is one *exotic species* that is continuing to expand, and is also becoming more common in the rocky shoals. There is concern that Brazilian elodea may crowd out riverweed, a native plant, that usually resides in the rocky shoals. Parrot's feather (*Myriophyllum aquaticum*) grows sporadically amongst Brazilian elodia (Aulbach, 2003). Aquatic plants such as Asian dayflower (*Murdannia*

keisak) and water primrose (*Ludwigia uruguayensis*) are present in the shallow backwaters downstream from the confluence with the emergency spillway (see Appendix E-4 *Aquatic Macrophytes of the LSR*) (Aulbach, 2001a).

5.1.14 Rare, Threatened, and Endangered Species

In comments issued in response to the ICD, the USFWS provided a list of all known rare, threatened and endangered (RT&E) species occurring in the four-county region surrounding the Project (See letter dated August 1, 2005). In addition to threatened and endangered species, this list also included species that are candidates for federal listing and federal species of concern. Among the list of identified RT&E species were several plant species that were identified as potentially-occurring in the Project area. They are listed in Exhibit E-24.

Exhibit E-24: Results of Assessment of Rare, Threatened, and Endangered Plant Species Within the Saluda Hydroelectric Project Area

COMMON NAME (SCIENTIFIC NAME)	FEDERAL STATUS*	COUNTY	TYPICAL HABITAT	STATUS IN PROJECT AREA
Canby's dropwort *Oxypolis canbyi)*	E	Richland	coastal plains	No known populations; Habitat lacking.
Georgia aster (Aster georgianus)	C	Richland	well illuminated, dry oak-pine flatwoods and uplands, disturbed	No known populations; Potential to occur
Little amphianthus (Amphianthus pusillus)	T	Saluda	eroded depressions/quarry pools on flat-to-doming granitic outcrops	No known populations; Habitat lacking.
Piedmont bishop-weed *(Ptilimnium nodosum)*	E	Saluda	Rocky/gravel shoals, margins of clear, swift-flowing streams; and edges of intermittent pineland ponds in the coastal plain	No known populations Unlikely to occur based on surveys
Rough-leaved loosestrife (Lysimachia asperulaefolia)	E	Richland	Pine pocosin and Carolina bay	No known populations Habitat lacking.
Schweinitz's sunflower (Helianthus schweinitzii)	E	Lexington	Well illuminated situations with shallow, poor, clayey and/or rocky soils (roadsides, pastures, etc.)	No known populations Habitat lacking.
Shoal's spider-lily (Hymenocallis coronaria)	SC	Lexington, Richland	Rocky shoals and bedrock outcrops	No viable populations known Unlikely to occur based on surveys
Smooth coneflower (Echinacea laevigata)	E	Lexington (possible), Richland	Xeric hardpan forests, diabase glades or dolomite woodlands	No known populations Unlikely to occur based on surveys

Source (SCE&G, 2007)
* Federal Status – E (listed as Endangered under Endangered Species Act); T (listed as Threatened under Endangered Species Act); C (Candidate for Federal listing); SC (Federal Species of Concern); P (Federally protected).

In 2007, in response to the USFWS's request for a literature-based assessment, the Licensee produced a report on RT&E species' requirements and the availability of their habitats in the Project area (SCE&G, 2007). According to this assessment, SCDNR has determined that most plants identified by USFWS are unlikely to occur in the Project boundaries because their required habitat is either limited or lacking altogether in the Project area, and/or field surveys for their presence were negative (see Exhibit E-24). This conclusion, that the Project area lacks suitable habitat for federally listed species, was supported by an assessment of the Saluda Dam remediation project areas (ARM, 2001). More information on surveys for RSSL is provided in Section 5.3.1, below. The Draft RT&E assessment is also provided in Appendix *E-2.*

5.2 Agency and Public Recommendations Concerning Botanical Resources

5.2.1 Initial Stage Consultation

On April 29, 2005, the Initial Consultation Document (ICD) for the Saluda Hydro Project was sent in electronic format to the consulting agencies and stakeholders for review. The Notice of Intent (NOI) was also filed simultaneously with the issuance of the ICD. The ICD is attached in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

Summarized below, are the remarks and study requests regarding botanical resources that were provided by stakeholders in comment letters following the issuance of the ICD.

During initial consultation, in a joint letter from the CCL and American Rivers (dated August 10th, 2005), it was requested that a Floodplain Flow Evaluation be performed to "assess stream flows needed for incremental levels of floodplain inundation for the Congaree River including the Congaree National Park". It was noted that a central part of this study included a inventory of floodplain vegetation that would provide a good representation of the existing flora along the "affected river reaches". It is also noted that the evaluation should identify the flow regimens and releases from Saluda Hydro that will "fully support" the hydrologic

needs of the downstream floodplain, their flora, and fauna. Similarly, the LSSRAC requested in their letter dated August 12, 2005 that a Floodplain Vegetation Assessment be performed. It is described that the floodplain communities be assessed on the reaches of the lower Saluda and Congaree rivers, and the floodplain area of the Congaree National Park.

The extent of Project impact on the downstream areas of the Congaree National Park is still being discussed by the TWC at this time.

The LSSRAC also noted in their August 12, 2005 letter that " the ICD indicates that there is little information on the habitats, botanical species, and environmentally sensitive areas (ESA) of the LSR corridor; therefore, we think that additional inventory, assessment, and conservation planning for these resources is needed on the river". This suggestion was also made by the SCDNR in their letter dated August 11, 2005.

The TWC is still in the process of evaluating this study request. More information will be provided once the TWC has thoroughly discussed this issue.

Both the SCDNR and the Newberry County Government expressed concern for invasive aquatic species in their ICD comment letters. In a letter dated August 15, 2005, Newberry county requested that more information be provided to lake users on weed control methods. The SCDNR noted in their letter (August 11, 2005) that "information such as species composition, location, and acreage of aquatic plants in the project is needed to develop an aquatic plant management plan". This is detailed further below, under second stage consultation.

Concern for Rare, Threatened or Endangered plant species is expressed in the comment letters of several agencies/organizations. Information on the locations of rare and federally threatened and endangered species occurring within the Project area is requested in the SCDNR (August 11, 2005), USFWS (August 1, 2005), and LSSRAC (August 12, 2005) comment letters. This includes plant as well as wildlife species. Particular plant species of concern were further explored during the relicensing meetings of second stage consultation, primarily the Rocky Shoals Spider Lily (RSSL). This is detailed further below.

5.2.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of botanical resources during these meetings is described below.

As referenced in the comment letters of SCDNR (August 11, 2005), USFWS (August 1, 2005), and LSSRAC (August 12, 2005) the issue of RT&E plant species focused primarily on one species, the Rocky Shoals Spider Lily (RSSL).

During the March 8, 2006 Fish and Wildlife TWC meeting (meeting notes in Volume II) the Coastal Conservation League/American Rivers asked that a RSSL survey be performed to document the populations and examine potential impacts from Project operations. To accommodate this request, a float trip was organized for May 31, 2006 and attended by agency, Kleinschmidt, and SCE&G personnel. Survey results were written up in memo form and can be viewed in Appendix E-4. Results are discussed in Section 5.3.1.

On February 9, 2006, the USFWS, SCDNR and Newberry County requested during a Resource Group Meeting that an Aquatic Plant Management Plan be developed.

It was agreed that the plan would be handled under the Aquatic Plant Management Council and that a Memorandum of Understanding (MOU) would be developed between SCDNR and SCE&G (See Meeting Notes from February 9, 2006 under Appendix E-4).

5.3 Results of Recommended Studies

5.3.1 Rocky Shoals Spider Lily Survey

According to a May 2006 float survey conducted in the Project area, no habitat for the RSSL (Rocky Shoals Spider Lily) exists within the Project area (Rocky Shoals Spider Lily Survey Memo, Appendix E-4). This species inhabits rocky shoals and bedrock outcrops where it can anchor its roots and bulbs within

flowing water. Such habitat is not expected to exist within a lacustrine system, and no plants of this species have been observed within the area of the project reservoir.

However, the RSSL is known to inhabit the LSR. On May 31, 2006, members of the Rare, Threatened, and Endangered Species TWC conducted a survey of the LSR for presence of the RSSL. The survey was conducted by canoe, and foot where necessary, along the entire reach from the base of the Project to the Senate Street Landing on the Congaree River. Two suspected RSSL plants were found in the Ocean Boulevard Rapid area, but they were stunted and lacking blooms and determined not to represent a viable and sustainable population. A more vigorous group of RSSL plants were identified at the confluence of the Saluda and Congaree rivers. They are currently being monitored by the City of Columbia under a enhancement plan developed as part of relicensing of the Columbia Hydroelectric Project (FERC# 1895) (Kleinschmidt Associates, 1998) (RTE TWC memo, 2006, Appendix E-4).

5.3.2 Mapping of Environmentally Sensitive Areas

Environmentally Sensitive Areas were first inventoried during a shoreline survey by SCE&G in 1994. This information was intended to provide SCE&G with information useful for assessing the Lake's resources and preparing recommendation to ensure protection of the environmental qualities of the Lake (SCE&G, 1999). SCE&G reviewed the inventory and decided that emphasis should be placed on the 'shallow cove' and button bush and willow flats' classifications because they were most important in providing habitat for a number of wildlife species and are of primary importance to the recreational fisher. They represent the majority of suitable spawning and nesting habitat for most resident fish and wildlife (SCE&G, 1999).

In 2005, in response to an order of the FERC dated June 23, 2004 (South Carolina Electric & Gas Company, 107 FERC ¶ 62,273 (2004)) requiring that the licensee update the list of ESAs at the Saluda Project (ordering paragraph 'D'), SCE&G submitted an updated set of maps documenting ESAs. The maps reflected the ESAs identified during surveys of Lake Murray that were conducted

by SCE&G and SCDNR representatives (USFWS was invited but could not attend) between May and September of 2005. Mileage for the surveyed ESAs are provided in Exhibit E-25.

Exhibit E-25: Statistics for ESAs in Saluda Hydroelectric Project Boundary

ESA	FREQUENCY	LENGTH (FEET)	LENGTH (MILES)
Bottomland Hardwood	9	6,801.6	1.29
Button Bush - Continuous	417	152,195.5	28.82
Button Bush - Intermittent	137	24,244.9	4.59
Shallow Cove	50	32,889.1	6.23
Wet Flat	1	55.1	0.01
Total	614	216,186.2	40.9

Source (SCE&G GIS, May 4, 2007)

During the current relicensing process, the Lake and Land Management TWC further refined the ESA classifications and developed descriptions for each aimed at facilitating identification of areas requiring ESA designation. They consist of the following classifications:

- Continuous Vegetated Shoreline - Continuous vegetated linear shoreline at least 66 feet in length with vegetation greater than 5 feet wide measured perpendicular to the shoreline. This class can have gaps that are at least 8 to 20 feet in length with little or no vegetation below the normal high water mark (358.5-ft contour). Areas with gaps larger than 20 feet in length are termed “breaks” and will not be considered vegetated shoreline;
- Intermittent Vegetated Shoreline - Linear shoreline coverage of vegetation at least 66 feet in length where 16 to 40 percent of the total linear footage is gap; (*to be revisited by SCE&G and Resource Groups)*
- Shallow Coves with Stream Confluence - Includes areas where streams enter the lake and form coves where lake water is predominately above the 353.5 foot contour line. The upgradient portion of shallow coves is

typically vegetated with buttonbush and willow. Where this overlap occurs, shoreline will be given a vegetative shoreline classification; and

- Bottomland Hardwood and Wet Flats - Continuous linear shoreline coverage of bottomland hardwood (excluding sweetgum) and wet flats at least 66 feet in length (see Section 5.1.2 & 5.1.11 for definitions of Bottomland Hardwood and Wet Flats).

5.4 USFWS Comments on Impacts on Endangered Species

Will be discussed in Final License Application.

5.5 Existing Measures to be Continued and New Measures Proposed by the Applicant

Will be discussed in Final License Application.

5.6 Anticipated Impacts

To be addressed in the Final License Application.

Exhibit E-26: Listing of Botanical Species Found Within the Saluda Project Area

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
American beech	Fagus grandifolia.	X							X				X
American elm	Ulmus americana	X				X		X			X		
American holly	Ilex opaca					X		X	X				
American hornbeam	Carpinus caroliniana					X							
Arrowwood	Viburnum dentatum												X
Asian dayflower*	Murdannia keisak												X
Asters	Aster sp.							X					
Barnyard grass	Echinochloa crusgalli		X	X			X	X					
Beggar-tick	Bidens frondosa		X	X	X								
Bermuda grass	Cynodon dactylon							X					
Black cherry	Prunus serotina	X						X					
Black highbush blueberry	Vaccinium atrococcum							X					
Black oak	Q. velutina	X						X					
Black walnut	Juglans nigra												X
Black willow	Salix nigra				X			X					
Blackberries	Rubus sp.							X					
Blueberry	Vaccinium sp.								X				
Blue-flowered eryngium	Eryngium prostratum			X	X								
Blunt spikerush	Eleocharis obtusa			X									
Bosc's bluet	Hedyotis boscii		X	X	X								
Box elder	Acer negundo	X											X
Brazilian elodea*	Egeria densa	X											X
Brittle waternymph*	Najas minor	X											
Butterweed	Senecio glabellus										X		
Buttonbush	Cephalanthus occidentalis				X			X			X		
Camphor weed	Heterotheca subaxillaris							X					
Catbriars	Smilax bona-nox							X					
Catbriars	S. rotundifolia							X					
Catbriars	S. glauca							X					
Cedar	Juniperus silicicola												X

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
Cherry	Prunus sp.												X
Cherrybark oak	Quercus falcata var. pagodaefolia					X							
Cherrybark oak	Quercus pagoda							X					
Chickweed	Stellaria media												X
chinkapin oak	Q. muhlenbergii	X							X				
Christmas fern	Polystichum acrostichoides								X				
Clearweed	Pilea pumila												X
Cockle-bur	Xanthium strumarium		X	X	X								
Kentucky Bluegrass	Poa pratensis												X
Bentgrass	Gramineae sp.												X
Fescue	Festuca sp.												X
Cottonwood	Populus deltoides							X					X
Crab-apple	Malus Angustifolia							X					
Creeping burhead	Echinodorus cordifolius				X								
Creeping fimbry	Fimbristylis autumnalis		X										
Creeping primrose	Ludwigia palustris		X	X			X				X		
Creeping rush	Juncus repens		X	X									
Daisy	Erigeron sp.												X
Dandelion	Taraxacum offinciniale												X
Deciduous holly	Ilex decidua					X		X			X		
Ditch stonecrop	Penthorum sedoides										X		
Dogwood	Cornus sp.												X
Dog fennel	Eupatorium capillifolium							X					
Dwarf bulrush	Hemicarpha micrantha		X				X						
Dwarf crabgrass	Digitaria serotina		X	X									
Eastern false-willow	Baccharis halimifolia							X					
Ebony spleenwort	Asplenium platyneuron								X				
Eclipta	Eclipta alba		X	X	X								
Elder	Sambucus canadensis												X
Elm	Ulmus sp.												X
English ivy	Hedera helix							X					
Eryngium	Eryngium prostratum		X										
Eurasian Water Milfoil*	Myriophyllum spicatum	X											

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
Fall panic	Panicum dichotomiflorum		X	X									
False pimpernel	Linderina dubia									X			
Fetterwood	Leucothoe fontanesiana								X				
Fireweed	Erechtites hieracifolia				X						X		
Flatedge spp.	Cyperus polystachyos						X						
Flatedge spp.	C. strigosus						X	X					
Flatedge spp.	C. erythrorhizos			X			X	X					
Flatedge spp.	C. flavescens						X						
Flatsedges	C. iria			X									
Flatsedges	C. compressus			X									
Flatsedges	C. haspan			X									
Flatsedge	Cyoerus sp.		X								X		
Fleabane	Erigeron annuus												X
Flowering dogwood	Cornus florida	X							X				
Goldenrod	Solidago odora							X					
Green ash	Fraxinus pennsylvanica	X						X			X		
Harbor sweet gum	Liquidambar sp.										X		
Honeysuckle	Gaylussacia sp.							X					X
Hop hornbeam	Ostraya virginiana	X							X				
Horse-nettle	Solanum carolinense												X
Japanese honeysuckle	Lonicera japonica							X					X
Hydrilla*	Hydrilla verticillata	X											
Johnson grass	Sorghum halepense							X					
Juniper-leaf	Polypremum procumbens		X	X	X								
Laurel oak	Quercus laurifolia					X							
Least spikerush	E. acicularis			X	X								
Lespedeza	Lespedeza intermedia							X					
Loblolly pine	Pinus taeda	X						X	X		X		X
Maple	Acer sp.												X
Mistletoe	Phoradendron serotinum							X					
Mockernut hickory	C. tomentosa	X											
Mountain laurel	Kalmia latifolia								X				
Muscadine grape	Vitis rotundifolia							X					
Mustards	Brassia sp.												X

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
Oak various spp.	quercus sp.												X
Overcup oak	Quercus lyrata				X			X			X		
Panic grasses	Panicum dichotomiflorum				X								
Panic grasses	P. rigidulum				X								
Panic grasses	P. scoparium				X								
Panic grasses	Dichanthelium sp.							X					
Panic grasses	Panicum sp.										X		
Parasitic mistletoe	Phoradendron serotinum										X		
Parrot's feather*	Myriophyllum aquaticum												X
Passion flower	Passiflora incarnata							X					
Pepper	Ampelopsis arborea							X					
Persimmon	Diospyros virginiana				X			X					
Pignut hickory	C. glabra	X											
Plume grass	Erianthus sp.							X					
Poison ivy	Toxicodendron radicans												X
Pokeberry	Phytolacca americana							X					
Pokeweed	Phytolacca americana												X
Pondweed *sp*. *	Potamogeton crispus	X											
Pondweed *sp*. *	Potamogeton illinoensis	X											
Pondweed *sp*. *	Potamogeton pusillus	X											
Post oak	Quercus stellata							X					
Purple-top tridens	Tridens favus							X					
Rabbit tobacco	Gnaphalium obtusifolium							X					
Rattle bush	Sesbania punicea							X					
Red cedar	Juniperus virginiana							X	X				
Red maple	Acer rubrum	X				X		X	X		X		
Red oak	Q. rubra	X							X				X
Redbud	Cercis canadensis	X											
Red-top panic grass	Panicum rigidulum		X	X			X	X					
River birch	Betula nigra	X						X					
River seedbox	Ludwigia leptocarpa							X					
Rushes	Juncus sp.						X						
Sassafrass	Sassafras albidum												X
Sedges	Carex sp.					X							
Shagbark hickory	Carya ovata	X							X				
Shortleaf pine	P. echinata	X						X					X

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
Shortleaf pine	Pinus taeda							X					
Shumard oak	Quercus shumardii					X							
Slender fimbry	Fimbristylis autumnalis			X			X	X					
Slender St. John's-wort	Hypericum mutilum							X					
Smart weeds	Polygonum sp.										X		
Smartweed	Polygonum pennsylvanicum		X	X	X								
Smooth sumac	Rhus glabra							X					
Sourwood	Oxydendron arboreum	X							X				
Southern red oak	Quercus falcata	X						X	X				
Spikerush	Eleocharis sp.		X	X									
Spikerush	E. baldwinii				X								
Spiny amaranth	Amaranthus Spinosus												X
Spotted wintergreen	Chimaphila maculata								X				
St. Andrew's-cross	Ascyrum hypericoides					X							
Stalkless yellowcress	Rorippa sessiliflora			X									
Sugarberry	Celtis laevigata							X			X		
Sunflower	Helianthus annuus												X
Swamp beggar-tick	Bidens discoidea									X			
Swamp chestnut oak	Quercus michauxii					X			X				
Swamp dogwood	Cornus foemina					X							
Sweet gum	Liquidambar styraciflua	X			X	X		X	X		X		
Switch cane	Arundinaria gigantea					X		X	X		X		
Sycamore	Platanus occidentalis				X			X			X		X
Teal lovegrass	Eragrostis hypnoides			X			X	X			X		
Throughworts	Eupatorium sp.							X					
Toothcup	Rotala ramosior		X	X	X		X	X					
Tridens	Tridens flavus							X					
Triple-awn grass	Aristida sp.							X					
Trumpet creeper	Campsis radicans										X		
Trumpet vine	Campsis radicans							X					
Tulip poplar	Liriodendron tulipifera	X									X		
Vetch	Vicia sp							X					X

SPECIES COMMON NAME	SPECIES LATIN NAME	LAKE MURRAY	SHALLOW COVES	SHALLOW SHOALS	BUTTONBUSH AND WILLOW FLATS	BOTTOMLAND HARDWOOD	EXPOSED BARS	ISLANDS	MATURED HARDWOOD FORESTS	WATER TUPELO STANDS	WET FLATS	ROCKY SHORES	LOWER SALUDA RIVER
Violets	Viola sp.												X
Virginia creeper	Parthenocissus quinquefolia												X
Walnut	Juglans sp.												X
Water hickory	Carya aquatica	X						X			X		
Water oak	Quercus nigra	X				X		X					
Water primrose*	Ludwigia hexapetala				X								X
Water tupelo	Nyssa aquatica									X	X		
Water willow	Justicia americana				X								
Wax myrtle	Myrica cerifera	X											X
White oak	Quercus alba	X							X				X
Wild azalea	Rhododendron canescens	X							X				
Wild ginger	Hexastylis arifolia								X				
Wild oat	Avena sativa												X
Willow	Salix sp.												X
Willow oak	Quercus phellos	X				X		X			X		
Winged sumac	Rhus copallina							X					
Wood sage	Teucrium scorodonia												X

*Indicates an invasive aquatic plant species

6.0 HISTORICAL AND CULTURAL RESOURCES

6.1 Consultation with SHPO and NPS

The Licensee has conducted numerous cultural resources surveys within the Project boundary in recent years, in association with the Saluda Dam Remediation Project and proposed relicensing of the Project. These studies have included Trinkley and Southerland (2001), Hendrix and Bailey (2003), Lansdell and Bailey (2003), Norris et al. (2005), and Green et al. (2007). Together, these studies constitute partial compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. The most recent of these, Norris et al. (2005) and Green et al. (2007), represent the most comprehensive survey of cultural resources within the Area of Potential Effect (APE).

The results of these surveys were submitted for review to the South Carolina State Historic Preservation Office (SHPO) and the Tribal Historic Preservation Officer (THPO) for the Catawba Indian Nation. Green et al. (2007) contained the final recommendations for National Register of Historic Places (NRHP) eligibility, based on Phase II testing, of all known cultural resources within the APE. This report also included recommendations regarding the potential for the known historic properties within the APE to be affected by Project operations.

6.2 Identification of Sites Listed in or Eligible for Nomination to the National Register of Historic Places

Norris et al. (2005) and Green et al. (2007) provide the most recent and comprehensive list of known historic properties at the Saluda Project. Norris et al. (2005) was a reconnaissance study, designed to identify high potential areas along the shore of Lake Murray, and along the banks of the Saluda River, Bush River, Little Saluda River, and various tributaries within the Project boundary, together with the LSR below the Project dam.

The APE for the reconnaissance survey was determined to be all areas around Lake Murray extending 50 feet from the maximum pool elevation (358.5 feet) or to the Project boundary, whichever was greater. Along the rivers, the APE was determined to be 50

feet from the river bank or to the Project boundary, whichever was greater. The APE for above-ground resources was determined to be 500 feet from the maximum pool elevation or the river bank, or 500 feet, whichever was greater.

The Stage I study identified 184 discrete portions of shoreline and river bank, a total of approximately 89 miles, along with 139 islands in Lake Murray (totaling 735 acres) and seven islands (totaling 19 acres) in the LSR below the dam, as having a high potential to contain intact archaeological resources. Within those areas, the study identified 42 previously recorded archaeological sites and 40 newly recorded archaeological sites. The purpose of the archaeological portions of the Stage I study was not to make recommendations of eligibility for the NRHP, but to identify sites and areas of high potential, and to begin an assessment of those areas that appeared to be affected by Project operations, primarily in the form of erosion.

The Stage I study also included an intensive historical and architectural survey. Research conducted in association with the Stage I study identified 22 previously recorded historic architectural resources within the APE. Three of these were listed on the NRHP, three had previously been recommended eligible for the NRHP, and one had previously been recommended potentially eligible for the NRHP; the remaining fifteen had been determined not eligible for the NRHP. Of the previously recorded historic architectural resources that had been determined eligible for the NRHP, only the Saluda Dam Complex had the potential to be affected by Project operations, through such possible actions as alteration or demolition; no such actions are currently planned.

In addition, the Stage I study identified eight previously unrecorded historic architectural resources. Seven of these buildings were recommended not eligible for the NRHP, and one was recommended eligible for the NRHP. The study recommended further that Project operations would not affect this property.

During the Stage II study, Green et al. (2007) studied those areas that were recommended in Norris et al. (2005) as high potential, with the exception of those areas of shoreline and river bank, and islands that were either inundated, to which landowners denied access, or were not being affected by Project operations. The SHPO concurred in this revision to the scope of work. Green et al. (2007) thus studied 175 discrete portions of shoreline and river bank, a total of approximately 85 miles, 125 islands in

Lake Murray (approximately 730 acres), and two islands in the LSR (approximately 12.5 acres).

Within these areas of high potential, Green et al. (2007) identified 156 archaeological sites and 42 isolated finds. Three sites were recommended eligible for the National Register of Historic Places (NRHP), and 17 sites were recommended potentially eligible for the NRHP. Of the 17 sites which were recommended potentially eligible for the NRHP, 10 were identified as being affected by Project-related erosion; the remaining seven potentially eligible sites were found not to be affected by erosion. Of the three sites which were recommend eligible for the NRHP, one is currently not being affected by Project operations. One eligible site is being marginally affected, but no additional work is recommended. The third eligible site, according to Green et al. (2007:iii), "is a unique cultural resource," and is subject to Project-related erosion.

In a letter dated June 29, 2007, the SHPO concurred in the recommendations regarding NRHP eligibility and the potential for the known historic properties to be affected by Project operations. In a letter dated July 25, 2007, the THPO for the Catawba Indian Nation indicated that the Catawba Indian Nation concurred in the recommendations contained in the report.

6.3 Agency Mitigation Recommendations and Licensee's Proposals

In her letter of July 25, 2007, the THPO of the Catawba Indian Nation concurred in the recommendations of the Stage II study report. She had no further recommendations or questions regarding mitigation.

In his letter of June 29, 2007, the representative of the SHPO also concurred with the recommendations made in the Stage II study report. In particular, the SHPO agreed that one NRHP eligible archaeological site is being adversely affected by Project operations, particularly erosion. The SHPO recommended consultation among all stakeholders to determine a strategy for mitigating these adverse effects; the SHPO did not, however, recommend any specific mitigation strategy.

In consultation with the SHPO, the Licensee has developed a mitigation strategy for this archaeological site. This mitigation will include a data recovery study of the site. Data

recovery will include full excavation of the site to identify all information that the site contains. It is expected that the data recovery for the archaeological site will be complete prior to license issuance.

6.4 Existing Measures to be Continued and New Measures Proposed by the Applicant

In advance of a Programmatic Agreement, the Licensee proposes to prepare a Historic Properties Management Plan (HPMP) for the Saluda Project. The Licensee will use the information gained during the various cultural resources surveys of the Project to prepare the HPMP. The HPMP will be prepared in accordance with the *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* (FERC 2002). The Licensee will summarize the information gained from the surveys in the body of the HPMP, and this information will establish the basis for making recommendations regarding the effects of any known and potential actions at the Project. In addition, the Licensee will outline the known actions proposed for the future, if any, that have the potential to affect historic properties and will recommend an appropriate mitigation strategy for those future actions that are expected to affect historic properties. Finally, the Licensee will include management guidelines for the unanticipated discovery of historic properties by actions that it may take in the future.

In addition to the one archaeological site which is currently being affected and for which data recovery will be performed, the Project contains other eligible and potentially eligible historic properties including archaeological sites and the Project facilities. The HPMP will recommend in part that these properties be monitored on a regular basis. The monitoring will identify any new threats to these properties from erosion, vandalism, and other sources.

6.5 Survey and Salvage

6.5.1 Schedule

The Licensee proposes to prepare the HPMP in advance of the Programmatic Agreement and in advance of the issuance of a new license. After submitting the draft HPMP to the SHPO, the tribes, and other interested parties, the Licensee

expects to file a final HPMP with the Commission as part of the new license application.

The Licensee also proposes to complete the data recovery of one archaeological site that is threatened by erosion prior to license issuance. The data recovery is expected to be completed by July, 2008.

6.5.2 Cost and Financing

To be addressed in the Final License Application.

7.0 RECREATIONAL RESOURCES

Lake Murray, the LSR, and the four surrounding counties (Richland, Lexington, Saluda, and Newberry) make up one complete tourism region defined as the Capital City/Lake Murray Country region by the South Carolina Department of Parks, Recreation and Tourism (SCPRT). This region of the state is home to many state, local, and municipal parks, which provide a wide range of water and land-based recreation opportunities including hiking, biking, swimming, boating, and angling. This area of the state sees 2.8 million visitors annually, almost half a million of which come to the area exclusively for recreation activities (SCBCB, 2005a).

The Saluda Hydro Project, which includes Lake Murray and a portion of the LSR, which flows from Saluda Dam to the confluence of the Broad River, provides both passive and active outdoor recreation opportunities, including scenic viewing, picnicking, boating, bird watching, fishing, golfing, hunting, and camping. Other water sports that are available include wake boarding, knee boarding, waterskiing, hydrofoiling, parasailing, and swimming.

Lake Murray supports an active recreational fishery and is an important boating resource. The lake is host to numerous national and local fishing tournaments annually, and is stocked with striped bass each spring by the SCDNR. Surplus bluegill and largemouth bass reared at the SCDNR hatcheries are occasionally stocked as well. Between 2003 and 2006, an average of 27 permits were granted for fishing tournaments on Lake Murray (SCE&G, 2007). The lake supports substantial boating activity, which includes both power boats, canoes and kayaks, and sail boats. Lake Murray is the site of 6-8 sailing regattas annually (Mead and Hunt, 2002b) and an average of approximately 30 regatta permits were granted annually for Lake Murray between 2003 and 2006 (SCE&G, 2007). In addition, the lake is used as a focal point for holiday and tourist events such as the annual Lake Murray Poker Run and the Independence Day celebrations.

The LSR extends 11 miles from the outflow of the Saluda Dam to its confluence with the Broad River to form the Congaree River near downtown Columbia. Similar to the Lake, the LSR also supports an active recreational fishery. The cold waters of the river support a trout and striped bass fishery and offer a range of paddling experiences from flat water to whitewater with class II to V rapids.

7.1 Regional Resources

The region surrounding the Saluda Hydro Project includes portions of the Sumter National Forest, Dreher Island State Park; Sesquicentennial State Park, Harbison State Forest, and Congaree Swamp National Park. Of these parks and forest, only Dreher Island State Park is within the Project boundary. Numerous trails, game management sites, and state heritage preserves are also located in close proximity to the Project. In addition, several local, county, and municipal parks are located within close proximity to the Project or provide access to project waters.

Sumter National Forest consists of approximately 360,000 acres, partially located in Newberry and Saluda Counties (SCPRT, 2002). Portions of the forest are designated wildlife management areas where hunting is permitted. The forest also provides campgrounds, hunting camps, picnic areas, boating sites, rifle ranges, swimming areas, and 360 miles of trails. Dreher Island State Park is one of two state parks within the Lake Murray Country region. It is 348 acres in size and is located on Lake Murray in the community of Prosperity. The park provides campsites, cabins, trails, picnic areas, playgrounds, a marina, and boat access to Lake Murray (Kleinschmidt, 2007a). Sesquicentennial State Park, located in the City of Columbia, is 1,419 acres in size and offers campsites, trails, and fishing and picnicking opportunities (SCPRT, 2007). Harbison State Forest, also in the City of Columbia, is a 2,176 acre tract that provides hiking, mountain biking, picnicking, an environmental center and event center, and canoe launching on the Broad River, above the confluence with the LSR (SCFC, 2007). At 22,000 acres, Congaree Swamp National Park, approximately 25 miles downstream of the confluence, is reported to be the largest remaining tract of old-growth bottomland hardwood forest remaining in the U.S. It is a congressionally designated wilderness area that provides 18 miles of hiking trails, a 2.3 mile boardwalk, and a canoe trail (NPS, 2007a).

Other popular trails nearby include the 0.5 mile trail in Lexington County at the Riverbanks Zoo and Botanical Gardens; a 2.5 mile riverfront trail at Riverfront Park in Columbia (connected by the Three Rivers Greenway described above); the 11.5 mile Sesquicentennial Trail in Richland County; the 7.5 mile Lynches Woods trail in Newberry County; and the 2.3 mile Boardwalk Loop in Richland County at the Congaree Swamp National Park (SCPRT, 2002).

Several state heritage preserves, offering unique cultural or natural resource features, that are open to the public are also located within proximity of the Project (SCPRT, 2002). Congaree Creek Heritage Preserve is located in Lexington County, is open year-round to the public, covers 627 acres, and offers the 6-mile Guignard Brickworks Loop Trail and canoe trails on the Congaree Creek and the Congaree River (SCDNR, 2007a). Also in Lexington County are Shealy's Pond Heritage Preserve, a 62 acre site, and Peachtree Rock Heritage Preserve, a 460 acre site (SCDNR, 2007b and SCDNR, 2007c). Both preserves are open year-round for hiking and sightseeing. A third site, Nipper Creek, is open by appointment only. Nipper Creek is in Richland County and 90 acres in size (SCDNR, 2007d).

There are several local, county and municipal parks in the area surrounding Lake Murray and the LSR. These parks include, but are not limited to: Crooked Creek Park and Guignard Park in Cayce; Virginia Hylton Park in Lexington; and St. Andrews Park and Seven Oaks Park in Columbia (ICRC, 2007a; RCRC, 2007). These parks provide a wide variety of recreation opportunities such as picnic facilities, playgrounds, sports fields, and trails.

One county park provides access to the LSR. Saluda Shoals Park, managed by the Irmo Chapin Recreation Commission, covers 300 acres on the river's north shore, approximately 2 miles downstream of Saluda Dam. The park provides multiple facilities such as picnic areas and pavilions, hiking trails, playgrounds, a splash park, a visitor's center and an environmental center, a boat ramp (for motorized and carry-in access), a separate canoe and kayak launch area, fishing piers, a dog park, multiple trails, concessions, and canoe/kayak rentals. The site is open year round, from 7:00 am to sunset, and also provides coded gate entry to the park 24-hours a day for angling access. The park is staffed and charges a fee for entrance, though annual passes are also available (ICRC, 2007b).

Riverbanks Zoo, located in Columbia, while not providing direct formal access to the LSR, is located on its shores and provides a pedestrian bridge, which traverses the river, connecting the Zoo to the Riverbanks Botanical Gardens. The Zoo also has an adjacent picnic area on the shores of the LSR that provides informal hand-carry and shoreline access to the river (Riverbanks Zoo and Garden, 2007).

There are no federally designated wilderness areas nor wild and scenic rivers in the vicinity of the Project; however, a portion of the LSR below the Saluda Dam is designated by the South Carolina General Assembly (SC Code of Laws Title 49, Chapter 29 South Carolina Scenic Rivers Act) as a State Scenic River (SC Legislature, 1989). Approximately 10 miles of the river hold this special designation, which begins approximately 1 mile downstream of the Dam and extends to the confluence with the Broad River. It is managed by the SCDNR in compliance with the South Carolina Scenic Rivers Act. SCE&G made the donation of scenic easements over properties it owns along the LSR and below, which allowed the State Scenic River designation, and was approved by the Commission in the late 1980's.

Segments of both the LSR and the Congaree River are also listed on the Nationwide Rivers Inventory (NRI) by the National Park Service. The NRI is a listing of more than 3,400 free-flowing river segments in the United States that are believed to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance. The LSR from the dam to rivermile 3 is so designated because it "affords scenic wilderness experience in urban areas; diversified flora and fauna" (NPS, 2007b).

7.2 Project Resources

Within the project boundary, there are approximately 130 public, commercial, and private recreation sites[5] 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. Twenty-three sites within the project boundary are informal sites that are primarily used for bank fishing. There are a total of 20 SCE&G-owned public access sites, including two sites on the LSR located outside the project boundary which are leased to the Riverbanks Zoo and Botanical Gardens, that function primarily as lake or river access, providing opportunity for boat launches, shoreline angling, picnicking, and swimming. Collectively, these sites include three designated

[5] For purposes of this DLA, public recreation sites refer to sites that are open to the public without discrimination, and which are operated by federal, state, and local agencies and/or SCE&G. A commercial site refers to a site operated by a business for profit. A private site refers to a site open only to specific individuals via membership or residency requirements.

swimming areas, 15 boat launches, six fishing piers, and one campground. Restroom facilities are provided at 9 of the 20 sites, and picnic tables are provided at 12 sites.

7.2.1 Lake Murray

7.2.1.1 Public Access Sites

SCE&G owns 15 formal public access sites on Lake Murray and has set aside 64 undeveloped, SCE&G-owned islands in Lake Murray to be available for public recreation. Of the 15 formal recreation sites, SCE&G operates 13 of them, and leases the remaining two sites, Dreher Island State Park and Larry L. Koon Boat Landing, to others as public recreation areas. Exhibit E-27 provides a listing of the formal public access areas and a summary of the facilities and opportunities available at each. Exhibit E-34 presents the location of the sites, which are dispersed around the Lake. With the exception of Dreher Island State Park, all sites are operated for day-use.

The following section provides a description of each formal public recreation site at Lake Murray (Kleinschmidt, 2007a), as well as a general assessment of the site's ability to comply with accessibility standards set forth in the Americans with Disabilities Act (ADA) (1990), site conditions reported in the 2006 Recreation Assessment public access site user survey (Kleinschmidt, 2007a), and recommendations for improvements and additional facilities needed for the accommodation of existing and potential future use levels (Kleinschmidt, 2007a).

Exhibit E-27: Lake Murray Public Recreation Site Summary

SITE	SIZE (IN ACRES)	BOAT LAUNCH	FISHING DOCKS/ PIERS	PICNIC TABLES	CAMP SITES	RESTROOMS	SWIMMING AREA
Dam Site	6.8	×	×	×		×	
Parksite	17.9			×		×	×
Larry L. Koon Boat Landing	2.2	×		×		×	
Shull Island	0.4	×					
Murray Shores	1.6	×		×		×	
River Bend	11.6	×	×	×		×	
Higgins Bridge	1.1	×					
Kempson Bridge	1.1	×	×				
Lake Murray Estates Park	5.0	×	×	×			
Macedonia Church	5.3			×			
Sunset	2.3	×	×	×		×	
Rocky Point	1.7	×		×			
Bundrick Island	87.9						
Dreher Island State Park	348.0	×		×	×	×	×
Hilton	4.4	×	×	×		×	

Dam Site (Photo 7-1) is a staffed day use area, providing lake access for boating and fishing, and picnicking. The site is located on the northern end of Saluda Dam; and is accessible from Route 6. It is a large seasonal site providing parking for vehicles with and without trailers, picnic tables, grills, shoreline access, a fishing pier, and restrooms. This site provides ADA compliant parking, however, facilities such as restrooms, fishing piers, and courtesy docks within the park do not meet ADA standards. The majority of individuals interviewed at this site during the 2006 Recreation Assessment (Kleinschmidt, 2007a) indicated this site was in very good to excellent condition. Among the recommended improvements were additional lighting and boat docks and improved restroom facilities and maintenance, such as trash pickup.

Parksite (Photo 7-2) is located on the southern end of Saluda Dam, also off Route 6. This is a seasonally-staffed, day use site, designed primarily for swimming, picnicking, and sightseeing. Newly renovated in July 2006, Parksite offers picnic tables and shelters, grills and firepits, a concession stand, scenic overlook, a designated swimming area, ADA compliant restrooms and paths, and parking, including spaces compliant with the ADA. The majority respondents interviewed at this site rated the condition to be very good to excellent. Among the recommendations made for this site were improvements to aesthetics and maintenance of the swimming area. However, portions of the site were still under construction throughout much of the 2006 recreation season and the beach area was closed until later in the season, due to ongoing construction, low water, and other safety issues.

Larry L. Koon Boat Landing (Photo 7-3) is located on the southern shore of Lake Murray, on Shull Island. The site is accessible from Shull Island Road, is open year round and is unstaffed; there are no entrance fees for this site. This site is a day use site primarily used for boat access and picnicking and features picnic tables, grills, and a firepit/ring. There is parking for both vehicles and vehicles with trailers, including ADA compliant spaces, and the boat launch is compliant with ADA standards. Of those interviewed at Larry Koon, half rated the site as excellent and 28 percent rated the site as very good. Recommendations for this site

included an expanded parking area, additional and/or improved restrooms, and maintenance activities such as trash removal.

Shull Island (Photo 7-4) is located on the southern shore of Lake Murray, on Shull Island and adjacent to Larry L. Koon Boat Landing, generally serving as overflow when parking at Larry Koon is full. Shull Island is leased to the Lexington County Recreation Commission, but is owned and operated by SCE&G. The site features a gravel parking area and a concrete ramp. Parking also occurs below the high water line when lake levels are low. Due to its informal nature, this site is not ADA compliant. A majority of survey respondents stated that the site was in either very good or excellent condition and recommended restrooms, expanded parking, and improvements to the boat launch.

Bundrick Island (Photo 7-5) is an undeveloped recreation area that is used primarily by boaters. Vehicular access is gated and there is no parking associated with this site. Entrance is permitted by foot or bicycle from Brady Porth Road. This site is located on a peninsula and is used for picnicking, informal camping, and swimming. SCE&G permits use of the site by organized groups such as the Boy Scouts and will unlock the gate to allow for vehicular access for these purposes under prior arrangement. Half of respondents at this site reported that Bundrick Island is in very good to excellent condition. Trash cans, restrooms, and maintenance activities were cited most often as being needed.

Murray Shores (Photo7-6) is located on the southern shore of the lake and is an unstaffed, year-round, day use boat launch facility that also has picnic tables, grills and a firepit/ring, portable restrooms, and provides shoreline access for fishing. This site does not have designated ADA compliant parking nor are its facilities compatible with ADA standards. The majority of respondents stated that the site is in good to excellent condition. Although this site provides portable restroom facilities, restrooms were recommended for this site, as was lighting.

River Bend is a day use site located on the lake's southern shore (Photo 7-7) on River Bend Point, and is accessible via River Bend Point Road.

The site is used primarily for boat access to the lake and provides parking, picnic tables, a grill, restrooms, a boat launch, and a fishing pier. There are no parking spaces identified as ADA compliant and no facilities at this site meet ADA standards for accessibility. Over half of respondents indicated they considered River Bend to be in good to excellent condition. Improved or additional lighting and restrooms were recommended most often.

Higgins Bridge (Photo 7-8) is located on the far western shore of Lake Murray on the upper Saluda River, at the headwaters of the lake. It is a day use site with gravel parking and a paved boat ramp. Due to its informal nature, none of the facilities at this site are compliant with the ADA. Almost half of the individuals providing a condition rating for this site considered it to be in good condition, while 38 percent considered the site to be in very good to excellent condition. Restrooms, picnic tables, and trash cans were indicated as the most needed improvements. This site was also identified as needing improvements to the existing boat launch for access at times of low water.

Kempson Bridge (Photo 7-9) is also located on the headwaters of Lake Murray on the upper Saluda River. Newly renovated in 2006, Kempson Bridge features parking for vehicles with trailers, a fishing pier, and boat ramp. The site is open year round, is unstaffed, and is a day use site providing boat access and shoreline fishing. Though some parking spaces are identified as ADA, the boat ramp and fishing pier do not meet ADA standards for accessibility. All of the individuals at this site rate it in good to excellent condition; though approximately 60 percent indicated need for additional and improved facilities such as trash cans and restrooms.

Lake Murray Estates Park (Photo 7-10) is located on the southern shore of Lake Murray, at the end of Ruby River Road, in a residential subdivision. It is an unstaffed, year-round day use site featuring a boat ramp, parking for vehicles with trailers, a fishing pier, and picnic tables. None of the facilities at this site are compliant with the ADA. Over 90 percent of respondents interviewed here stated Lake Murray Estates Park

to be in good to excellent condition. However, the majority of individuals stating a need for additional facilities (95 percent) interviewed indicated a need for restrooms.

Macedonia Church (Photo 7-11) is located adjacent to the Macedonia Lutheran Church, on the northern shore of the lake. There are some facilities associated with the church, such as an outdoor chapel, as well as picnic tables. This site is a used primarily for shoreline fishing. Seventy-five percent of respondents stated that the site was excellent and respondents indicated a need for restrooms and maintenance activities. There is no ADA compliant parking or facilities at this site.

Sunset (Photo 7-12) is an unstaffed, day use site located on the northern shore of the lake, off Sunset Road. This site features a picnic table, firepits/rings, portable toilets, a fishing pier, boat ramp, and shoreline access. None of the facilities at this site are compliant with the ADA. All of the individuals rating this site stated that Sunset was in good to excellent condition. Among the recommendations for additional facilities or improvements were trash cans, restrooms, and a designated swimming area.

Rocky Point (Photo 7-13) is located on the northern shore of the lake, accessible from Rocky Ramp Road. Parking occurs roadside and the site offers a boat ramp and a covered picnic table. This site receives very little use; only two individuals were interviewed here during the 2006 Recreation Assessment (Kleinschmidt, 2007a). Both stated the site is in good condition.

Dreher Island State Park is operated by the SCPRT and encompasses all of Dreher Island (Photo 7-14) on the northern shore of the lake. This is a staffed, year-round park providing opportunities for day use and overnight activities. The park supports a wide array of recreation facilities such as tent and RV campsites and a designated primitive camping area, villas, shoreline access, beaches, three boat ramps (including a tournament ramp), playgrounds, picnic shelters and tables, fire rings, hiking and biking trails, a tackle shop, a marina, and a visitor's center. The site has

many facilities, which are compliant with the ADA including parking, camp sites, restrooms and shower facilities, and boat launch, among others. Ninety-one percent of the individuals who provided a condition rating for this site stated that Dreher Island State Park is in very good to excellent condition. Additional restrooms and swimming areas and maintenance activities were the most recommended improvements.

Hilton (Photo 7-15) is located on the northern shore of Lake Murray, off of Cove Launch Road. The site is an unstaffed, day use site with a 2-lane boat launch, a fishing pier, picnic tables, and restrooms. Although there is an ADA designated parking, there are no ADA compliant facilities at this site. The majority of respondents stated the site is in excellent condition. Trash cans and improvements to the existing boat launch were the most recommended measures for this site.

In addition to the public access sites owned and/or managed by SCE&G, SCE&G allows access to 64 islands in Lake Murray for recreational day use purposes such as picnicking and swimming. Collectively, the islands that SCE&G has set aside for recreational use encompasses 220 acres of land and are accessible by boat only. Among them is Lunch Island, also known as Doolittle Island or Bomb Island. The island is proposed to become North America's first officially designated purple martin sanctuary where thousands of birds can be observed by visitors.

SCE&G also leases 54.6 acres of land to the Indian Waters Council, Boy Scouts of America, Inc. The property is called Camp Barstow and has campsites, athletic and activity fields, staff quarters, an adult lodge, an adult training field, a training shelter, a swimming area, a boat dock, an ecology shelter, and a dining hall. Other facilities include rifle and archery ranges, a volleyball court, a climbing/rappelling tower, a handicraft shelter, and a barrier-free campsite.

7.2.1.2 Commercial Sites

Commercial sites in the Project boundary include marinas, campgrounds, restaurants, and hotels and resorts. Commercial operations sites offer

significant public access and support services, such as marina services, restaurants, etc. Lake tours are also offered on a double decked, 65 foot tour boat, the Southern Patriot.

In general, marinas are dispersed along the lake and provide access to all portions of the lake. They typically provide boat ramps and launching facilities, fuel services, groceries and food, boat sales, rentals and/or repair, bait and tackle, and boat storage. There are currently 31 public marinas operating on Lake Murray (Exhibit E-28). Most of these sites are commercially operated, with the notable exception of the marina at Dreher Island State Park. Because these are commercial ventures, they are subject to changing hands frequently.

Exhibit E-28: Marinas on Lake Murray

MARINA NAME	MULTI SLIPS	RAMP	DOCK	BAIT AND/OR TACKLE	DRY STORAGE	FUEL	RESTAURANT	FOOD	LODGING	PUMP-OUT FACILITIES	CAMPING
Acapulco, USA	9	×	×						×		
Adams Campground	6	×	×				×				×
Agnew Lake Services	22	×	×							×	
Barn	9	×	×	×		×		×			×
Dreher Island State Park	54	×	×	×		×		×	×		×
Blacks Bridge Marina	3	×	×	×				×			
Bucks	2	×	×				×	×			
Captain's Choice Marina	7	×	×								
Crayne's Landing	2	×	×	×				×			
Dano's	2	×	×				×				
Eptings Landing	1	×	×	×							×
Holiday Shores Point	2	×	×								
Holland's Landing	64	×	×	×		×	×	×	×		×
Jacob J. Meetze	1	×	×								×
Jakes Landing	152	×	×	×	×	×		×	×	×	

MARINA NAME	MULTI SLIPS	RAMP	DOCK	BAIT AND/OR TACKLE	DRY STORAGE	FUEL	RESTAURANT	FOOD	LODGING	PUMP-OUT FACILITIES	CAMPING
Johnny Shealy		×	×								×
Lake Murray Marina	205	×	×			×	×			×	
Lighthouse Marina	140	×	×		×	×	×	×		×	
Little River Marina	2	×	×	×		×		×			
Little River Landing	2	×		×				×			
Marshall's Marina	20	×	×								
P-L Landing	5	×	×						×		
Putnams Landing	46	×	×	×		×		×	×		
Riverwinds Landing	11	×	×	×				×	×		
Roys Landing	1	×	×								
Saluda River Resort		×		×				×	×		×
Siesta Cove	20	×	×	×				×	×		×
Southshore Marina	105	×	×	×	×	×		×		×	
Spinners Marina	41	×	×	×				×	×		

7.2.1.3 Private Sites

Fifty-eight sites around the lake are operated privately and are available to limited membership. Many of the private marinas and landings exist in conjunction with subdivisions located around the lake, private clubs, or condo associations. These sites are important in that they provide access for specific types of opportunities (*e.g.,* sailing clubs), and to a large number of people at various locations around the lake. In addition, SCE&G's parent company, SCANA, owns and operates an 18 acre site on Pine Island, which is open to SCANA employees and their guests. The island supports a conference center, swimming pool and beach, picnic area with shelters, marina, and tennis courts.

7.2.2 Saluda River

7.2.2.1 Public Access Sites

There are several formal and informal public access sites on the LSR, providing a range of water and land based recreation opportunities (Kleinschmidt, 2007a). Boating access for motorized water-craft is limited to the two most upstream access sites, Saluda Shoals Park and Metts Landing, while carry-in access is available at these sites plus Gardendale and Mill Race A (upstream of Riverbanks Zoo and outside of the project boundary) and Mill Race B (downstream of Riverbanks Zoo and outside of the project boundary). Shoreline access for angling and swimming, sunbathing, sightseeing, and/or picnicking is available at all public access sites on the LSR. Exhibit E-29 provides a listing of the available public recreation sites on the LSR and the amenities available at each, while Exhibit E-35 shows the locations of these sites on the river.

Exhibit E-29: Lower Saluda River Public Recreation Site Summary

SITE	SIZE (IN ACRES)	BOAT LAUNCH	FISHING DOCKS/ PIERS	PICNIC TABLES	CAMP SITES	RESTROOMS	SWIMMING AREA
Mill Race A	0.4						
Mill Race B	0.5						
Gardendale	4.6	×					
Saluda Shoals Park	240.0	×	×	×		×	×
James R. Metts Landing	1.0	×					

As discussed above, Saluda Shoals Park, the largest site on the river, is managed by the Irmo Chapin Recreation Commission. It is a large park providing multiple facilities in various sites around the park , which support picnicking, hiking, boating, fishing and swimming, among other activities. This site has multiple picnic areas and pavilions, playgrounds, a splash park, a visitor's center and an environmental education center, a boat ramp, dog park, multiple trails, concessions, and canoe/kayak rentals. Many of the facilities at Saluda Shoals Park are ADA compliant, including picnic facilities, restrooms, parking, and trails. Over three-quarters of respondents interviewed stated that this site is in excellent condition. A wide variety of recommendations were made for Saluda Shoals Park, however. Among them were a designated swimming area, additional picnic tables, and improved trails.

James R. Metts Landing, also known as Hope Ferry Landing, is located across the river from Saluda Shoals Park on the southern shore of the LSR. The site provides both motorized and non-motorized access to the river. The site is unstaffed, is managed for day use only, and does not provide ADA compliant facilities though there are ADA designated parking spaces. Nearly 50 percent of the individuals rating the condition of Metts Landing stated the site is in very good condition; 34 percent reported that the site is in excellent condition. Among the recommendations for this site were restrooms and improved parking.

Gardendale is located on the north shore of the LSR, approximately 6 miles downstream of the dam. The site provides a gravel parking area, carry-in river access, and a multi-purpose trail about one mile long . None of the facilities are compliant with the ADA. Seventy-two percent of the respondents surveyed at this site stated that it is in good to very good condition. Fifty percent respondents who suggested additional facilities are needed cited a need for restroom facilities. An improved boat launch and maintenance activities were also suggested for this site.

Mill Race A and B are not formal recreation sites and are located outside of the project boundary. These sites are located on the north shore of the LSR, approximately 9 miles downstream of the dam. Mill Race A is

upstream of the Riverbanks Zoo and Mill Race B is downstream of the Zoo. The City of Columbia manages the Zoo and leases the property. The sites border the popular Mill Race rapid, where boaters access Class II to Class V whitewater, depending on flow (Photo 7-16 & 7-17). Mill Race A, at the bottom of Mill Race rapid, has paved parking associated with the Zoo. Mill Race B, which is located just above the confluence with the Broad River and is just above Shandon rapids, is adjacent to a gravel parking area that also provides overflow parking for the Zoo. Use of both of these areas are primarily by individuals gaining access to the rocky outcroppings of the rapids for sun bathing, picnicking, kayaking, fishing, and other leisure activities. There are no formal facilities to support this use.

Forty-three percent of the individuals who rated Mill Race A reported the site to be in good condition. Of the individuals indicating a need for additional facilities, 30 percent suggested restroom facilities and 42 percent suggested trashcans. For users of Mill Race B, 40 percent of the respondents stated that the site is in good condition; while 41 percent indicated it was in very good to excellent condition. Restrooms and trash cans were cited as the most needed improvements.

7.2.2.2 Commercial Sites

There are no commercial ventures that provide access to the LSR, however, there are several operators that provide services for recreation activities on the river. Adventure Carolina provides several paddling options on the LSR including a whitewater kayaking class and canoe, kayak, and tube rentals. Calm Water Kayak Tours offers 4-hour guided kayak trips and lessons along the LSR. Palmetto Outdoor offers tube and kayak rentals and whitewater rafting on the LSR. Kayak and canoe rentals are also offered at Saluda Shoals Park. Organized trips are also offered on the LSR through non-profit organizations and clubs such as Canoeing for Kids and Palmetto Paddlers.

7.2.2.3 Private Sites

There are a few private access sites, which serve specialty groups and private interests. Trout Unlimited has exclusive access to a residential neighborhood, River's Edge Estates, on the south shore of the river by the I-26 bridge. This site has a small parking area, angling access trail, and fishing platform for use by neighborhood residents and TU members. Access to the site is by parking permit only (personal communication, Mike Waddell, Trout Unlimited, May 16, 2007). Canoeing for Kids also has a private access site, primarily for leading canoeing, kayaking and rafting trips on the LSR. The site is located on the south shore of the river in proximity to the I-20 bridge (Canoeing for Kids, 2007). Cornerstone Presbyterian Church, located off of Bush River Road, owns waterfront property adjacent to Rawls Creek and allows river access from its property to members of the congregation (SCDAP, 2000). In addition, there are several neighborhoods, residences, and cottages, generally on the south shore of the river, through which property owners can gain access to the river.

7.3 Existing and Potential Recreation Use

Lake Murray and the LSR are a destination for nearby residents and tourists alike. The Lake offers boating, fishing, and other water-based activities, as well as golf, hiking, dining and shopping at shore and near-shore parks, marinas, restaurants, and businesses. There are many special events such as fishing tournaments, sailing regattas, the Lake Murray Poker Run, the Lake Murray Dam Run, and the lake-wide Independence Day celebration that draw locals and tourists to the lake community. The LSR offers a wilderness experience in an urban setting, providing opportunities for angling, flatwater and whitewater boating, tubing, swimming and sunbathing. Paddling events such as the "Millrace Massacre" and the "Iceman Challenge", Canoeing for Kids, and Olympic kayak training are also held on the LSR.

SCPRT reports that approximately 90 percent of participation in outdoor recreation occurs in an area close to a resident's home for day to day activities (SCPRT, 2002). Activities that require special environments, such as boating and fishing, generally occur

within a region of slightly greater proportions around a resident's home, but still nearby to their residence. At the Saluda Project, a majority of the recreation activity occurring at the Project is attributed to residents of nearby local communities; either shoreline property owners or individuals residing in Columbia, Irmo, Lexington, Gilbert, Newberry, Prosperity and Chapin, and other communities surrounding the lake and the LSR. A smaller portion of recreational use at the Project is attributed to a more regional population from the outskirts of Richland, Lexington, Saluda, and Newberry Counties (Kleinschmidt, 2007a).

7.3.1 Existing Recreation Use

The Saluda Project supported approximately 695,000 recreation days within the project boundary during the 2006 peak recreation season, defined as April 1st and September 30th in the 2003 FERC Form 80 Report on Recreational Resources (Exhibit E-30). Lake Murray experienced approximately 463,000 recreation days during this time period (67 percent of total use), while the LSR experienced a total of approximately 232,000 recreation days during the peak recreation season (33 percent of total use). Weekday use accounts for 17 percent of total use; 37 percent of total use occurs on weekends; and 46 percent of total use occurs on holidays. June and July account for the majority (41 percent) of total use during this time period (Kleinschmidt, 2007a and Kleinschmidt, 2007b). Total use reported in the 2003 FERC Form 80 was 1,250,000 recreation days annually; while the 1997 FERC Form 80 reported 1,200,000 recreation days annually at the Project (SCE&G, 2003 and SCE&G, 1997).

The most used Lake Murray sites during the 2006 recreation season were Dreher Island State Park (116,680 recreation days or 25 percent of total use),[6] Bundrick Island (94,580 recreation days or 20 percent of total use), Dam Site

[6] Dreher Island accounted for an estimated 78,750 patrons during the 2006 study period (personal communication, Ashley Berry, Manager, Dreher Island State Park, October 5, 2006). Approximately 77 percent of the total use at the park is attributed to day use and 23 percent is attributed to overnight visitation (camping and villa rentals). The park is a popular location for hosting fishing tournaments on the lake; during fiscal year 2005-2006, 63 fishing tournaments were hosted at the park.

(54,460 recreation days or 12 percent of total use), and Larry Koon (54,080 recreation days or 12 percent of total use). The sites with the least amount of use, equal to or less than 1 percent of total use, were Rocky Point (330 recreation days), Higgins Bridge (3,090 recreation days), and Kempson Bridge (5,620 recreation days) (Kleinschmidt, 2007a and Kleinschmidt, 2007b).

Because all of the recreation sites surveyed during the 2006 Recreation Assessment (Kleinschmidt, 2007a) provide access to Lake Murray, it is not surprising that the majority of activities that individuals participate in at these sites are water-based recreation activities (80 percent). Fishing, either from a boat or the bank, is by far the most participated in activity by users of Lake Murray sites (53 percent of total use). After fishing, motor boating (14 percent of total use), swimming (8 percent of total use), and picnicking (5 percent of total use) are popular activities. These sites also support limited land-based activities such as walking/hiking, sightseeing and picnicking (Kleinschmidt, 2007a).

Exhibit E-30: Estimate of Recreation Days for Lake Murray and Lower Saluda River Sites by Month and Day Type, April 1 through September 30, 2006

	LAKE MURRAY SITES	LOWER SALUDA RIVER SITES	MILL RACE SITES[A]	TOTAL
April				
Weekdays	42,840	17,400	5,570	65,810
Weekends	35,240	6,390	2,880	44,510
Holidays	0	0	0	0
Total	**78,080**	**23,790**	**8,450**	**110,320**
May				
Weekdays	31,100	16,180	3,190	50,470
Weekends	37,400	5,720	4,600	47,720
Holidays	20,220	4,440	1,570	26,230
Total	**88,720**	**26,340**	**9,360**	**124,420**
June				
Weekdays	52,800	23,850	13,390	90,040
Weekends	43,440	8,760	6,910	59,110
Holidays	0	0	0	0
Total	**96,240**	**32,610**	**20,300**	**149,150**
July				
Weekdays	34,300	22,780	4,200	61,280
Weekends	29,860	11,390	5,530	46,780
Holidays	20,950	6,500	1,690	29,140
Total	**85,110**	**40,670**	**11,420**	**137,200**
August				
Weekdays	26,170	8,180	3,360	37,710

	LAKE MURRAY SITES	LOWER SALUDA RIVER SITES	MILL RACE SITES[A]	TOTAL
Weekends	30,270	13,350	2,790	46,410
Holidays	0	0	0	0
Total	**56,440**	**21,530**	**6,150**	**84,120**
September				
Weekdays	20,310	16,310	1,790	38,410
Weekends	24,430	5,770	2,580	32,780
Holidays	13,210	4,480	880	18,570
Total	**57,950**	**26,560**	**5,250**	**89,760**
Total				
Weekdays	207,520	104,700	31,500	343,720
Weekends	200,640	51,380	25,290	277,310
Holidays	54,380	15,420	4,140	73,940
TOTAL	**462,540**	**171,500**	**60,930**	**694,970**

[a] Outside the project boundary.

The LSR supported an estimated 232,430 recreation days during the 2006 recreation season total, 171,500 recreation days within the project boundary and roughly 60,900 recreation days outside the project boundary at the Mill Race sites. The most used sites were Saluda Shoals Park (135,050 recreation days or 58 percent of total use on the LSR), Mill Race B (37,950 recreation days or 16 percent of total use), Metts Landing (24,520 recreation days or 11 percent of total use) and Mill Race A (22,980 recreation days or 10 percent of total use). The site with the least amount of use was Gardendale (11,930 recreation days or 5 percent of total use) (Kleinschmidt, 2007a and Kleinschmidt, 2007b).

Activities participated in by users of the LSR sites were varied. A higher percentage of individuals recreating at LSR sites participate in land-based activities as compared with Lake Murray recreation sites. Activities participated in at individual sites are dependent upon the support facilities provided and both shoreline and boat access are provided on the LSR. About half of the activities that individuals participate in at these sites are water-based recreation activities (51 percent). As with the Lake Murray sites, fishing, either wading or from a boat, pier, or the bank, is the most participated in activity at LSR sites (21 percent of total use). Canoeing and kayaking, both flatwater and whitewater, comprise 20 percent of total use, making paddling the second most popular activity. Sightseeing/wildlife viewing is the third most popular activity on the LSR (13 percent of total use), followed by hiking/walking (12 percent of total use) (Kleinschmidt, 2007a).

7.3.2 Future Recreation Use

Because of the association of locality with recreation participation, population growth is typically a good indicator of future recreational use. Cordell et al. (2004) reports that "(p)opulation has been, is, and will be the major driver of outdoor recreation participation growth in this country." In fact, between 1960 and 2000, the population of southern states grew more rapidly than any other region in the United States (Cordell and Tarrant, 2002). The population of the counties around the lake (Richland, Newberry, Saluda, and Lexington) increased by 4.1 percent between 2000 and 2005 and is projected to increase by another 24.0 percent by the year 2030 (SCBCB, 2005b). For counties surrounding the LSR – Richland and Lexington – population is expected to increase by 31.3 percent from 2005 to 2030, with Lexington County having the fastest population growth of the area, at 41.6 percent from 2005 to 2030 (SCBCB, 2005b). If participation in recreation increases at a similar rate, one can expect to see significant increased demand for recreation opportunities in the future, including at those sites that are estimated to be reaching capacity and, in a few cases, exceeding capacity under current use levels.

Population in the four counties surrounding the Project is expected to increase by an average of approximately 4.4 percent for each of the five year periods over the next 25 years for a total increase of 24.0 percent from 2005 to 2030 (SCBCB, 2005b). Estimated recreation use stemming from public access sites on Lake Murray and the LSR could total almost 860,000 recreation days during the recreation season (April 1st through September 30th) in the year 2030 -- an increase of approximately 165,000 recreation days (24 percent) over 2006 levels (Exhibit E-31). Use of Lake Murray public access sites could increase by roughly 110,000 recreation days by the year 2030 and use of LSR access sites could increase by approximately 55,000 recreation days in the same time period. Applying current outdoor recreation trends and existing public recreation facilities, fishing may likely continue to be the dominant activity at the Project in the year 2030 (Kleinschmidt, 2007a and Kleinschmidt, 2007b).

Exhibit E-31: Estimated Future Recreation Days for the Saluda Project (April 1 through September 30)

		ESTIMATED FUTURE PARTICIPATION				
	USE ESTIMATES (2006)	2010	2015	2020	2025	2030
Population Growth Rates		4.87%	4.62%	4.37%	4.19%	3.68%
Lake Murray Sites	462,540	485,070	507,480	529,650	551,840	572,150
Lower Saluda River Sites	171,500	179,850	188,160	196,380	204,610	212,140
Mill Race Sites	60,930	63,900	66,850	69,770	72,690	75,370
TOTAL	**694,970**	**728,820**	**762,490**	**795,810**	**829,150**	**859,660**

7.4 Adequacy of Existing Recreation Sites to Accommodate Existing and Potential Future Recreational Use

The capacity and typical use density of public recreation sites around the lake and on the LSR were estimated during the 2006 recreation season from Memorial Day through September 30. Public recreation sites at the project are generally well used with several sites reportedly being used at their design capacity, particularly on weekends and holidays[7] (Kleinschmidt, 2007a). The capacity at which public access sites are currently used was estimated for all sites with the exception of Bundrick Island, which does not have a parking area, and which is used mainly by boaters.

Results suggest that Dam Site, Parksite, Rocky Point and Dreher Island State Park 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, Riverbend, Higgins Bridge, and Kempson Bridge, are currently used at rates approaching capacity, though this trend was only observed on holidays for Riverbend and Kempson Bridge.

The remaining seven sites were observed to be used at rates that regularly meet or exceed their design capacities on some or all day types. Larry Koon and Shull Island

[7] For the purposes of this DLA, sites were considered to be utilized within their design capacities if parking areas were less than 75 percent full on weekends. Use is considered to be approaching capacity if parking areas were between 75 and 99 percent full on weekends. Use is considered to be exceeding capacity if parking areas were greater than 99 percent full on weekends.

are used beyond their capacities, regardless of day type. Lake Murray Estates Park is utilized at rates that exceed its capacity on weekends. 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.

Exhibit E-32: Recreation Site Capacity (Percent Use Capacity for May 27 through September 30, 2006)

PUBLIC ACCESS SITES	MAXIMUM AVERAGE HOURLY VEHICLE COUNT	TOTAL NUMBER OF PARKING SPACES	PERCENT CAPACITY
DAM			
Weekdays	21	181	12%
Weekends	70	181	39%
Holidays	68	181	38%
TOTAL	**53**	**181**	**29%**
PARKSITE			
Weekdays	2	343	1%
Weekends	11	343	3%
Holidays	13	343	4%
TOTAL	**9**	**343**	**2%**
LARRY KOON			
Weekdays	100	49	205%
Weekends	75	49	153%
Holidays	80	49	163%
TOTAL	**85**	**49**	**174%**
SHULL ISLAND			
Weekdays	27	8	331%
Weekends	32	8	397%
Holidays	31	8	381%
TOTAL	**30**	**8**	**370%**
MURRAY SHORES			
Weekdays	15	50	29%
Weekends	34	50	68%
Holidays	63	50	126%
TOTAL	**37**	**50**	**74%**
RIVERBEND			
Weekdays	17	84	20%
Weekends	44	84	52%
Holidays	72	84	86%
TOTAL	44	84	53%
HIGGINS BRIDGE			
Weekdays	3	8	33%
Weekends	6	8	75%
Holidays	5	8	67%

PUBLIC ACCESS SITES	MAXIMUM AVERAGE HOURLY VEHICLE COUNT	TOTAL NUMBER OF PARKING SPACES	PERCENT CAPACITY
TOTAL	**5**	**8**	**58%**
KEMPSON BRIDGE			
Weekdays	5	16	31%
Weekends	5	16	31%
Holidays	15	16	94%
TOTAL	**8**	**16**	**52%**
LAKE MURRAY ESTATES PARK			
Weekdays	11	22	51%
Weekends	37	22	167%
Holidays	18	22	80%
TOTAL	**22**	**22**	**99%**
MACEDONIA CHURCH			
Weekdays	23	12	194%
Weekends	14	12	119%
Holidays	8	12	67%
TOTAL	**15**	**12**	**127%**
SUNSET			
Weekdays	4	28	14%
Weekends	31	28	110%
Holidays	56	28	200%
TOTAL	**30**	**28**	**108%**
ROCKY POINT			
Weekdays	2	3	67%
Weekends	1	3	17%
Holidays	1	3	33%
TOTAL	**1**	**3**	**39%**
DREHER ISLAND STATE PARK			
Weekdays	56	619	9%
Weekends	150	619	24%
Holidays	152	619	25%
TOTAL	**119**	**619**	**19%**
HILTON			
Weekdays	20	37	54%
Weekends	39	37	106%
Holidays	37	37	100%
TOTAL	**32**	**37**	**87%**
SALUDA SHOALS PARK			
Weekdays	139	463	30%
Weekends	138	463	30%
Holidays	131	463	28%
TOTAL	**136**	**463**	**29%**
METT'S LANDING			
Weekdays	19	25	75%
Weekends	27	25	109%
Holidays	21	25	84%
TOTAL	**22**	**25**	**89%**
GARDENDALE			

PUBLIC ACCESS SITES	MAXIMUM AVERAGE HOURLY VEHICLE COUNT	TOTAL NUMBER OF PARKING SPACES	PERCENT CAPACITY
Weekdays	10	40	24%
Weekends	43	40	108%
Holidays	13	40	33%
TOTAL	**22**	**40**	**55%**
MILLRACE A			
Weekdays	34	45	76%
Weekends	62	45	138%
Holidays	30	45	66%
TOTAL	**42**	**45**	**93%**
MILLRACE B			
Weekdays	32	64	50%
Weekends	79	64	124%
Holidays	44	64	68%
TOTAL	**52**	**64**	**81%**

In addition to the capacity at which recreation sites along Lake Murray are being used, a boating density study was undertaken in 2007 (Kleinschmidt, 2007c) to identify the area available for recreational boating on Lake Murray by lake segment (Exhibit E-36), assess boat densities occurring under normal (weekend) and peak (holiday) use conditions, and determine whether recreational boat use of Lake Murray is currently above, below, or at a desirable, or optimal, level.

Results of the boating density study (Kleinschmidt, 2007c) show that Lake Murray is currently utilized well below its recreational boating capacity (Exhibit E-33). Weekend percent capacity only exceeds 20 percent in Segment 2. Six segments (1, 6, 7, 8, 10, and 12) had weekend percent capacities between 10 percent and 20 percent, with the remaining five segments (3, 4, 5, 9, and 11) being below 10 percent capacity on weekends. Percent capacity averaged about 12 percent on weekends across the entire reservoir. Holiday use, which is the peak use time for the reservoir, was higher in most segments, leading to higher percent capacities on holidays. Four segments (1, 2, 10, and 12) had percent capacities over 20 percent, with Segment 1 having the highest percent capacity (26 percent). Six segments (3, 5, 6, 7, 8, and 11) had percent capacities between 10 percent and 20 percent. The remaining two segments (4 and 9) were still below 10 percent capacity on holidays. Percent capacity averaged about 16 percent on holidays across the entire reservoir.

Exhibit E-33: Estimated Recreational Boating Carrying Capacity and Average Use Densities

		WEEKEND		HOLIDAY	
SEGMENT	OPTIMUM RECREATIONAL BOATING CAPACITY[a]	AVERAGE PEAK USE[b]	PERCENT CAPACITY[c]	AVERAGE PEAK USE[d]	PERCENT CAPACITY[e]
1	916	112	12%	242	26%
2	635	138	22%	156	25%
3	1,379	121	9%	153	11%
4	742	42	6%	53	7%
5	579	43	7%	74	13%
6	267	49	18%	50	19%
7	371	56	15%	53	14%
8	368	39	11%	58	16%
9	379	26	7%	18	5%
10	491	75	15%	111	23%
11	298	19	6%	42	14%
12	150	25	17%	36	24%

[a] ((usable acreage/use factor) * boating activity distribution) summed for all activities per lake segment
[b] derived from aerial count estimates adjusted by population growth estimates
[c] (average peak weekend use/optimum recreational boating capacity) * 100
[d] derived from aerial count estimates adjusted by population growth estimates
[e] (average peak holiday use/optimum recreational boating capacity)* 100

7.5 Recreation Management

Recreation activities within the Saluda Hydro project boundary are managed by a combination of state agencies, local governments, and SCE&G. Generally, within each recreation site, the site operator is responsible for management. However, boating, fishing, and hunting regulations and enforcement in South Carolina are the responsibility of the SCDNR.

SCDNR requires that all boat operators under the age of 16 complete a boating course approved by the Department to operate any watercraft with a 15 hp motor or greater unless accompanied by an adult 18 years old or older. SCDNR also regulates watercraft use within 50 feet of docks, piers, moored vessels, or people in the water; wake jumping; registration and titling; required boater equipment; hours of operation; and enforcement.

With respect to fishing, SCDNR regulates fishing methods and devices; creel limits; selling and importing species; licensing; and enforcement. SCDNR also regulates

hunting, including waterfowl hunting that may occur within the Project area. SCDNR regulates hunting methods and bag limits; licensing and enforcement; and sets allowable seasons for each species.

SCE&G currently maintains a number of safety measures at the Project. With respect to recreational use of the Project and safety concerns, the FERC conducts annual inspections of the Project and requires independent safety inspections. SCE&G performs regular Project inspections and provides a siren warning system for downstream flow releases, warning and information signs posted at public access sites on the lake and river and along the river shoreline, river staff gages and river level markings on bridge abutments, an electronic notification system for project operations, and website posting of current conditions and planned operations, educational materials and website links to safety information.

As discussed in Exhibit H, SCE&G maintains a warning system on the LSR to warn river users of sudden changes in water level. Sirens and strobes are located at Metts Landing, upstream of Riverbanks Zoo and Botanical Gardens, and downstream of the Zoo and are activated by float switches. Sirens and strobes are active 24 hours per day and cover an area 1,500 feet upstream and downstream of the Zoo sirens, and 500 feet upstream and downstream of the Metts Landing siren (S&ME, 2004). The LSSRAC and American Whitewater, with assistance from SCE&G, established a series of color-coded river markers, positioned along the LSR, to provide information associated with rising water levels. SCE&G also manages an electronic call system via email and telephone that alerts selected individuals about sudden changes in water levels on the LSR. SCE&G's website provides information on current water level conditions (with a date and time stamp) and planned operations. SCE&G's website also provides links to such information as a Hazardous Waters Safety Bulletin, SCDNR Boating Safety, SCDNR Stream Data, American Whitewater Safety Code, and the USGS gage below Lake Murray Dam. Buoys, signs, and fences are placed throughout the Project as part of the Public Safety Plan on file with the FERC.

7.6 Agency and Public Recommendations Concerning Recreational Resources

7.6.1 Initial Stage Consultation

On April 29, 2005, the Initial Consultation Document (ICD) for the Saluda Hydro Project was sent in electronic format to the consulting agencies and stakeholders for review. The Notice of Intent (NOI) was also filed simultaneously with the issuance of the ICD. The ICD is attached in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

Summarized below, are the remarks and study requests regarding Recreation that were provided by stakeholders in comment letters following the issuance of the ICD.

The SCDNR, by letter dated August 11, 2005, requested a Recreational Uses and Needs Study be preformed on Lake Murray. It is identified that this request is made in order to evaluate present recreation in the Project area, as well as future recreational uses. This study request also involves the evaluation of the best locations for future access points and what type of access is necessary. This request was also made in a joint ICD comment letter submitted by CCL and American Rivers (letter dated August 10, 2005), City of Columbia Parks and Recreation (letter dated August 11, 2005), the LMA (letter dated August 12, 2005), the SCWF (letter dated August 15, 2005), the LSSRAC (letter dated August 12, 2005), South Carolina Parks Recreation and Tourism (SCPRT)(letter dated August 12, 2005), TU (letter dated August 15, 2005), and Lake Watch (letter dated August 15, 2005). SCDNR further recommended the location and property for a large, multi-lane boating event site should be explored and a description of public recreation sites that includes information capacity and handicapped accessibility be provided. SCPRT requested a “build out” scenario be used to identify the volume of use based on future development proposed in the shoreline management plan.

Through agency consultation and in working with the Recreation RCG and TWC, a Recreation Assessment was developed for the Project Area. Additional details

regarding this study can be viewed above, and a full report is attached in Appendix E-6.

In their letter dated August 12, 2005, SCPRT requested a Boat Carrying Capacity Study be performed on Lake Murray. They recommended this study provide information on how the "build out" will affect boating carrying capacity, water quality, and fish and wildlife habitat. As a part of the process, SCPRT recommended that this study include an inventory of current and future residential docks, public and private marinas, dry storage, and other boat access opportunities. Similarly, Lake Murray Homeowners Coalition (letter dated August 15, 2005) requested that a "Total Build-out Study" be performed to assess areas that are not conducive to development.

A Boat Density Study was preformed on Lake Murray through consultation with stakeholders and resources groups. Details regarding this particular study are included above. The study report can also be viewed in Appendix E-6.

CCL and American Rivers, in a joint letter filed August 10, 2005, requested that a Recreation Flow Study be performed on the LSR. It is recommended that this study be performed to evaluate the effects Project operations have on instream flow and the recreation that occurs on the Saluda and at the confluence area. CCL/American Rivers requested flow levels that best benefit anglers, paddlers and swimmers be evaluated, as well as safety during recreational activity. City of Columbia Parks and Recreation (letter dated August 11, 2005), SCDNR (letter dated August 11, 2005) and the LSSRAC (dated August 12, 2005) requested in their ICD comment letters this study be performed, however LSSRAC additionally requested the optimal recreation experiences for anglers and boaters of different experience levels be evaluated. SCPRT made a similar request for this study in their comment letter dated August 12, 2005. In reference to the identification of recreational opportunities on Lake Murray, SCPRT also requested in their above stated comment letter that paddling opportunities in its tributary and tributary arms be investigated. The Lake Murray Association requested (comment letter dated August 12, 2005) downstream flows *not* be released for recreational activities during the drought or late summer.

Through consultation with the Recreation TWC, a Recreational Flow Assessment was performed on the LSR in early summer of 2007. Results of this assessment will be used to aid in flow discussions with any recommendations for recreational flows contained in the Final Application.

Similarly, American Whitewater (letter dated August 12, 2005) and the City of Columbia Parks and Recreation (letter dated August 11, 2005) requested that a Ramping Study be performed on the LSR. It is requested that this study include the study of staged releases at Saluda Hydro to potentially be implemented during high use recreational periods. This was also mentioned in the comment letter of the LSSRAC (letter dated August 12, 2005) and TU (letter dated August 15, 2005).

The issue of ramping is currently being discussed by the Safety and Recreation RCG's.

American Whitewater, in their letter dated August 12, 2005, noted they believed the spillway should be studied for its value as a recreational resources. It was recommended these methods include "at a minimum an on-water single flow whitewater boating feasibility study, possibly followed by a controlled whitewater flow study", (August 12, 2005, ICD Comment letter).

It is SCE&G's position that allowing the spillway to be used in this manner is not a reasonable or safe option at this Project. SCE&G believes that the individual risk would be too great and that the spillway should be operated only under emergency and testing purposes.

Also requested by American Whitewater in the ICD comment letter dated August 12, 2005, is the upgrade and repair of all existing access points. SCPRT similarly noted that they would like to see the continuation of existing access points along the LSR (ICD comment letter dated August 12, 2005).

SCPRT, in their letter dated August 12, 2005, requested acreage be added to the small recreation access sites in the Project area. SCPRT recommended that this should be accomplished in order to provide for future recreational needs and additional shore based recreation.

A recommendation was made by SCPRT in their ICD comment letter (dated August 12, 2005) that the islands in Lake Murray and the LSR be protected and a plan should be developed to accomplish this. SCPRT justified this in their statement that "population growth and increasing boat use may severely affect these recreational resources over the term of the license".

A specific interest SCPRT expressed in their ICD comments (letter dated August 12, 2005) is for the permanent protection of Dreher Island State Recreation Area. They additionally requested protection be given to a new state park property with significant associated shoreline in the Lexington or Saluda area of the Project.

SCPRT noted in their ICD comments (letter dated August 12, 2005) that they would like SCE&G to continue to participate in the implementation of the Lower Saluda River Corridor Plan and Update. This includes such specific aspects as recreational access at Sandy Beach, I-20, and I -26, as well as a take out above Mill Race Rapids and the development of the Saluda River greenway and Three Rivers Greenway. A take-out above Mill Race Rapids is also requested by American Whitewater in their August 12, 2005 ICD comment letter.

Regarding the requests listed above, the Recreational RCG is currently in discussions regarding future access points, as well as other facilities around the Project area. A draft recreational plan is currently being developed through the Recreation RCG and, once completed, will be provided as part of a comprehensive Protection, Mitigation and Enhancement Package.

In their ICD comment letter (dated August 12, 2005), American Whitewater requested scheduled flow releases be studied and provided for activities such as whitewater boating, special events, and rescue training.

SCE&G has been working with entities to provide flows for particular events for the past several years. These events currently include releases for Columbia Fire Department Swiftwater Rescue Training, as well as special recreational events such as Canoeing for Kids and Kayaking Championships. SCE&G has indicated that they will continue to work with these organizations in the future to provide flows when feasible.

It is also recommended by SCPRT (ICD comment letter dated August 12, 2005) an evaluation of the waterfowl hunting areas around Lake Murray be performed. In their ICD comment letter they noted concern that the remaining areas for waterfowl hunting are dwindling. SCDNR also recommended consideration be given to a designated waterfowl hunting area (letter dated August 11, 2005).

SCE&G is currently working with SCDNR to locate a suitable habitat area for waterfowl in the Project vicinity.

In their ICD comment letter, (dated August 12, 2005) SCPRT requested that an "[i]nteractive process to periodically review recreation needs and adjust resources associated with the [P]roject" be developed.

There are current discussions among the Recreation and Safety RCG's to continue Safety meetings on a periodic basis beyond relicensing. Recreation at the project will continue to be evaluated through the filing of the FERC Form 80 recreation report once the license is issued.

ICD comment letters suggested that the implementation of additional water level rise safety warning systems is necessary. The letters also mention the need for an investigation of possible new alternatives for warning systems, such as an online and phone communication system. The entities that requested this item included the CCL and American Rivers (letter dated August 10, 2005), Lake Watch (letter dated August 15, 2005), LSSRAC (letter dated August 12, 2005), SCDNR (letter dated August 12, 2005), SCPRT (letter dated (letter dated August 12, 2005), League of Women Voters (letter dated August 14, 2005), SCWF (letter dated August 15, 2005), American Whitewater (letter dated August 12, 2005), and TU (letter dated August 15, 2005). Those groups who noted the particular request to study options on a Public Information System regarding river flows included: CCL and American Rivers, Lake Watch, City of Columbia Parks and Recreation (letter dated August 11, 2005), Newberry County Gov. (letter dated August 15, 2005), and the River Runner Outdoor Center (letter dated August 16, 2005).

SCE&G has been working with stakeholders to address the issues mentioned above. Since 2005, SCE&G has introduced a public information website on Saluda Hydro planned releases for Lake level management, as well as testing an emergency call-down notification system. The website provides as up-to-date as possible planned release (excluding emergency reserve calls) information from Saluda Hydro and can be viewed at http://www.sceg.com/en/my-community/lower-saluda-river . The call down system (which has been currently operating on a trial basis) is designed to alert those who have requested to be involved in the program when a release from Saluda Hydro has been initiated, planned or otherwise. It does so by activation of a phone message as well as an email message. SCE&G is continuing to work with stakeholders on this issue. Also, SCE&G is currently evaluating additional sirens and strobe locations along the 10 mile stretch of the LSR.

Lake Watch (letter dated August 15, 2005) requested that a dispute resolution study be performed during the relicensing process. Lake Watch explained in their ICD comment letter that this study be performed to determine how to best improve communication with the public in resolving disputes or complaints.

SCE&G uses a variety of communications tools to provide the public with timely information concerning lake and river issues. The company's web site has various sections that address lake issues and who to contact with questions. Also on the site is a link to the company's speakers bureau in which the general public can request speakers on a variety of topics, including lake and river management. In 2007, the company added a section to the site on the Lower Saluda River. This site includes a listing of planned generation, the current conditions at Saluda Hydro (i.e. what level it is generating) and links to various resources on river and boating safety. A weekly email report on Saluda operations and the lake is sent to a large list of external stakeholders to provide information to disseminate to interested parties. The Public Affairs group also provides timely news items to local media through press release.

7.6.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of Recreation during these meetings is described below. Many items that were requested in the ICD comment letters were also requested during the RCG meetings. This is noted in the responses under 7.6.1, Initial Stage Consultation. Only additional studies, not discussed above, are included in this section.

The Recreation and Safety RCGs collectively developed and edited Work Plans that illustrate the issues that have been identified through consecutive meetings. The items discussed in the Work Plan are continuing to be discussed by the resources groups at this time. The Work Plans can be viewed in Appendix E-7 and contain many of the issues identified in ICD comment letters.

Items that were identified by the RCG as issues that were not identified during the Initial Stage Consultation are described below. The RCG noted that recreational activities need to be protected and enhanced for future use in the Project Area. This includes security at recreation facilities and sufficient egress points on the LSR.

The RCG also identified that the conservation of land for future recreation as an important issue. Therefore, in addition to the issues listed under the initial consultation, the RCG identifies that providing wildlife areas is an important recreational value. The Work Plan notes that a possible resolution to this is the conservation of large tracts of land within the PBL into easements. Additionally, the group indicates that they would like reconsideration of Two Bird Cove and Hurricane Hole Cove (presently designated as special recreation areas) classifications. The RCG also endorses the use of adaptive management for future recreation planning.

The Recreation RCG identifies in the Work Plan that LSR flows are a recreation concern. It is identified in the Work Plan that safe recreational opportunities should be available through scheduled flow releases. It is requested in the Work Plan that consideration be given to a take out area for small trailered boats at in

the Gardendale area above 126. It is also noted that the impacts that Lake levels have on recreation is an issue to be reviewed. *The Work Plan identifies a possible resolution to this issue may be the identification of a reliable lake level that will provide year-round recreational access to lake users.*

In the Safety RCG, Lake Watch representatives sought a review of the shoal marker program on Lake Murray. They noted that low lake levels could possibly negate the usefulness of the buoys.

The group discussed this item originally on February 14, 2006 (meeting notes included in Volume II) and an additional meeting was held on July 31, 2007 to discuss this item specifically. The Safety RCG is continuing to work to resolve this issue at this time.

The resource group also expressed concern about amphibious aircraft on the lake, as well as other non-traditional vehicles, and the possible safety issues that could result. They also discussed the dangers that powerlines pose to sailboat navigation.

The resource group discussed these issues on October 24th, 2006 (meeting notes located in Volume II). Resource group members deemed that problems posed by power lines should be described/confirmed by the sailboating community. Resource group member Steve Bell of Lake Watch volunteered to contact Winward Point Yacht club in order to see if this was a issue of concern. The group noted that issues regarding amphibious aircraft, as well as other non-traditional vehicles (submarines, etc.) could be addressed in the ongoing Safety meetings that occur after relicensing if they became a problem in the future.

7.7 Recreation Needs Identified in Management Plans

7.7.1 South Carolina State Comprehensive Outdoor Recreation Plan (2002)

The 2002 State Comprehensive Outdoor Recreation Plan (SCORP) is South Carolina's official comprehensive outdoor recreation plan. This five-year plan

serves as a guide to federal, state, and local governmental agencies and the private sector involved in recreation and natural resources planning and development. The six main goals of the SCORP are to do the following: continue a planning process for the administration of outdoor recreation opportunities, provide a comprehensive system of public and private recreation lands and sites, provide opportunities for enjoyment of historic and natural heritage opportunities, provide opportunities for outdoor recreation and improved quality of life to all segments of the population, encourage cooperative efforts to meet recreation needs, and encourage sustainable development.

While there are no recommendations specific to the Saluda Project, the SCORP does identify 11 state-wide management priorities for recreation development. Detailed recommendations within each of the 11 major issue categories are outlined in the SCORP. Among those pertinent to the Project are:

- Hydropower Projects - The SCDNR, SCPRT, and others will continue to encourage utility companies to conserve open space on lakes and rivers associated with hydropower projects;
- Scenic Rivers - The SCDNR will continue to work with landowners and communities in designating significant rivers as state scenic rivers and work toward conservation of these resources;
- Multiple Use Urban Trail Resources - The Cities of Columbia, West Columbia and Cayce will continue development of the Three Rivers Greenway. The Irmo-Chapin Recreation Commission and partners will extend trails from Saluda Shoals Park along the LSR;
- Canoe Trails - The Lower Saluda Scenic River Advisory Council will seek to establish additional canoe/kayak access on the Lower Saluda above Riverbanks Zoo;
- Implementing Existing Plans - Lower Saluda Corridor Plan - The Lower Saluda Scenic Advisory Committee, SCDNR, SCPRT, and others will continue to work together to implement the corridor plan. The coalition is working with SCE&G to improve safety and protect the scenic qualities of the river. The Irmo-Chapin Recreation Commission will continue to develop the Saluda Shoals Regional Park. SCE&G, Trout Unlimited, SCDNR, and DHEC will work toward improvements in the water quality of

the river. Establishment of a public greenway has been recommended through a planning charrette update of the plan; and

- Public/Private Partnerships – Public agencies will seek additional corporate partnerships for new and expanded recreation and educational facilities. SCE&G, SCPRT, and SCDNR will consider a partnership for public open space and natural resources protection on Lake Murray.

7.7.2 The Lower Saluda River Corridor Plan (1990) and Update (2000)

The Lower Saluda River Corridor Plan (1990) is comprised of two main components: a) recommendations for the LSR and b) a visual Master Plan for the corridor, which identifies several parks or points of access in the corridor. The recommendations for the corridor made in the original plan included but were not limited to: patrolling, staffing and law enforcement access; ADA accessibility; linear trails; develop various additional access sites along the LSR; improve maintenance activities; develop and improve a river warning system; and develop public education materials.

The Lower Saluda River Corridor Plan was updated in 2000. The Plan revisits the recommendations and proposals made in the original plan. A key issue raised in the Update was the need to work closely with SCE&G to maintain a higher minimum flows; provide water quality to support the fishery habitat year round; and increase the safety of water releases. In addition, recommendations for the transfer of management responsibilities for the recreational facilities on the north side of the Saluda River from SCE&G to the greenways management group was recommended. SCE&G would be expected to provide some form of financial remuneration to the group for the management of these facilities including maintenance, utilities, and coordination with law enforcement.

Featured prominently in the Update is the Three Rivers Greenway, which includes the Saluda Riverwalk and is identified as providing a 12-mile linear park system along the Broad, Congaree and Saluda Rivers. The Update of the concept plan also includes proposed additional or continued improvements including, but not limited to, implementation of the Three Rivers Greenway Trail,

including the development of a new take-out at Stacy's Ledge; construction of an improved portage trail at Mill Race Rapids, and improvements to Metts Landing.

7.7.3 The Three Rivers Greenway Plan

The River Alliance[8] is spearheading the Three Rivers Greenway Project, a 12-mile linear park that would include sections of shoreline along the Saluda, Broad, and Congaree Rivers, as discussed above. A portion of the Three Rivers Greenway, the Saluda Riverwalk, would encompass lands along the LSR from the I-26 bridge to the confluence with the Broad River. Among the access and improvements for the LSR proposed as part of the Saluda Riverwalk are a pedestrian bridge connecting Richland and Lexington Counties, a continuous trail along the northern shore of the river, and a park at the site of Mill Race rapids that would include trash receptacles, picnic tables, bathrooms and a ranger and rescue station. This portion of the Three Rivers Greenway is still under development.

7.7.4 Expanding the Experience: Trails for South Carolina. The South Carolina State Trails Plan (2002)

The State Trails Plan was developed to promote coordination between state agencies, advocates, and the public with respect to trail acquisition and development, assist resource managers in the decision making processes that affect trails development such as grant funds, and to promote the state as a leader in trails development, tourism and recreation. The goals of the Plan include: developing an interconnected network of trails across the state and encourage connectivity of existing trails; promoting sustainable trails development that minimize effects to the surrounding environment while maintaining longevity; developing trails to provide access to tourism destinations

[8] According to their website "[t]he River Alliance is a non-profit public sector/private sector partnership, incorporated in 1995 as a South Carolina Non-Profit Public Benefit Corporation". Their mission is to provide access for residents to the rivers that are in their community. They have made specific contributions to the Three Rivers Greenway Project. More information can be found at http://www.riveralliance.org/.

and points of interest; encouraging multiple use of trails in the state; promoting public use and access; and encouraging trails for fun, economic development, and health benefits.

Existing and proposed trails for the state are identified by county. In Richland County, the LSR is identified as a canoe trail. Proposed trails in Richland County include the Three Rivers Greenway. Proposed trails for Lexington County include an extension of the Saluda Shoals Greenway, a Saluda Shoals Horse trail, and an 8 mile trail connecting Saluda Shoals Park to the Riverbanks Zoo. There are no trails proposed for Newberry and Saluda Counties within proximity of the Project.

7.8 Measures or Facilities Recommended by Agencies

Comments on the Project ICD and relicensing resource group meetings identified issues and recommendations associated with existing and potential future recreational use of project lands and waters (also discussed in detail in Section 7.6.1). Among the recommendations made by agencies and stakeholders through the consultation process are the following:

- creation of public access sites and greenway trail concepts as proposed in the Three Rivers Greenway which include a continuous trail along the northern shore of the river (Saluda Riverwalk), and a park at the site of Mill Race rapids;
- development of public access sites and greenway trail concepts as proposed in the Lower Saluda River Corridor Plans of 1990 and 2000, which include implementation of the Three Rivers Greenway, improvements to Saluda Shoals Park, improvements to Metts Landing including additional parking and facilities, improvements to Gardendale including parking and restrooms, a new fishing pier below I-20, a carry-in boat launch just below I-26, a new access site(s) and portage trail at Stacy's Ledge, and an improved portage trail around Mill Race rapids on the south shore of the river;
- creation of a state park on the south side of the reservoir;
- creation of a multi-lane boating facility that can accommodate large tournaments;
- development of a boat ramp for small trailered boats at Gardendale or further downstream, above I-26;

- development of a take out above Mill Race Rapids;
- acquire lands adjacent to existing recreation sites to the extent possible to allow for future expansion;
- provide a designated waterfowl hunting area on Lake Murray;
- reconsider special recreation designation areas classification (e.g., Two Bird Cove and Hurricane Hole); and
- scheduled flow releases to support on-water recreation activities such as wade angling and whitewater canoeing/kayaking.

It is expected that improvements to existing access and opportunities and the provision of additional sites and opportunities at Lake Murray and along the LSR will contribute to the Project's ability to support recreational use of the lake and river. It is not clear, however, if these improvements will redistribute existing use to other sites, contribute to increased use of the area, or both. Irrespective, given that existing use capacities are typically exceeded on peak weekends at about half of the Lake Murray sites and at the majority of LSR sites, improvements to existing access sites and the addition of new access sites will enhance the recreation experience for all patrons.

With respect to the provision of scheduled flow releases for recreation on the LSR, the most popular among the water-based activities are whitewater canoeing/kayaking, fishing (from a boat, from shore or wade angling), swimming, tubing and rock-hopping (sun-bathing and picnicking on the rocky outcroppings of the LSR at low water). To some degree, any number or all of the most popular on-water activities are available at flows of 4,000 cfs and less. Boating activities are generally available at flows of between 1,000 cfs and 4,000 cfs, whereas, non-boating on-water activities, such as swimming and wade angling, are best suited for flows of 1,000 cfs or less (Kleinschmidt, 2007d).

Under existing operating protocols, daily average flows of less than 1,000 cfs are generally available 38 percent of the time year-round, whereas flows of less than 4,000 cfs, daily average, are generally available 83 percent of the time year-round. Higher flows, for whitewater activities such as canoeing/kayaking and rafting, of 12,000 cfs or greater are generally only available approximately 2 percent of the time year-round on a daily average basis. However, daily average flows represent a range of flows provided on a daily basis and peak flows of 12,000 cfs and higher for specific durations are provided much more often than 2 percent of the time year-round (Kleinschmidt, 2007d).

Any consideration for a scheduled recreational flow release will include the effects of such an operational modification to the Project's ability to generate power, potential environmental effects associated with a prescribed flow release, and safety issues such as the rate of increase in river stage.

7.9 Existing Measures to be Continued and New Measures Proposed by the Applicant

Resource groups are still engaging in discussions regarding proposed measures and/or changes. A draft Recreational Plan is being developed and planned for release to the Recreational TWC in the winter of 2008. The Recreational Plan will detail recommendations for improvements, additional facilities and flow releases for special events. The Recreation Plan will be further detailed based on stakeholder input and provided in the Final License Application.

7.10 Designated Waters and Project Lands

As discussed in Section 7.1, there are no federally designated wilderness areas nor wild and scenic rivers in the vicinity of the Project; however, a portion of the LSR below the Saluda Dam is designated by the South Carolina General Assembly (SC Code of Laws Title 49, Chapter 29 South Carolina Scenic Rivers Act) as a State Scenic River (SC Legislature, 1989). Segments of both the LSR and the Congaree River are also listed on the Nationwide Rivers Inventory (NRI) by the National Park Service. View Section 7.1 for further detail regarding these classifications.

7.11 Recreational Resources Photographs

Photo 7-1: Damsite

Photo 7-2: Parksite

Photo 7-3: Larry Koon

Photo 7-4: Shull Island

Photo 7-5: Bundrick Island

Photo 7-6: Murray Shores

Photo 7-7: River Bend

Photo 7-8: Higgins Bridge

Photo 7-9: Kempson Bridge

Photo 7-10: Lake Murray Estates Park

Photo 7-11: Macedonia Church

Photo 7-12: Sunset

Photo 7-13: Rocky Point

Photo 7-14: Dreher Island State Park

Photo 7-15: Hilton

Photo 7-16: Mill Race A

Photo 7-17: Mill Race B

7.12 Recreation Figures

Exhibit E-34: Lake Murray Recreation Sites

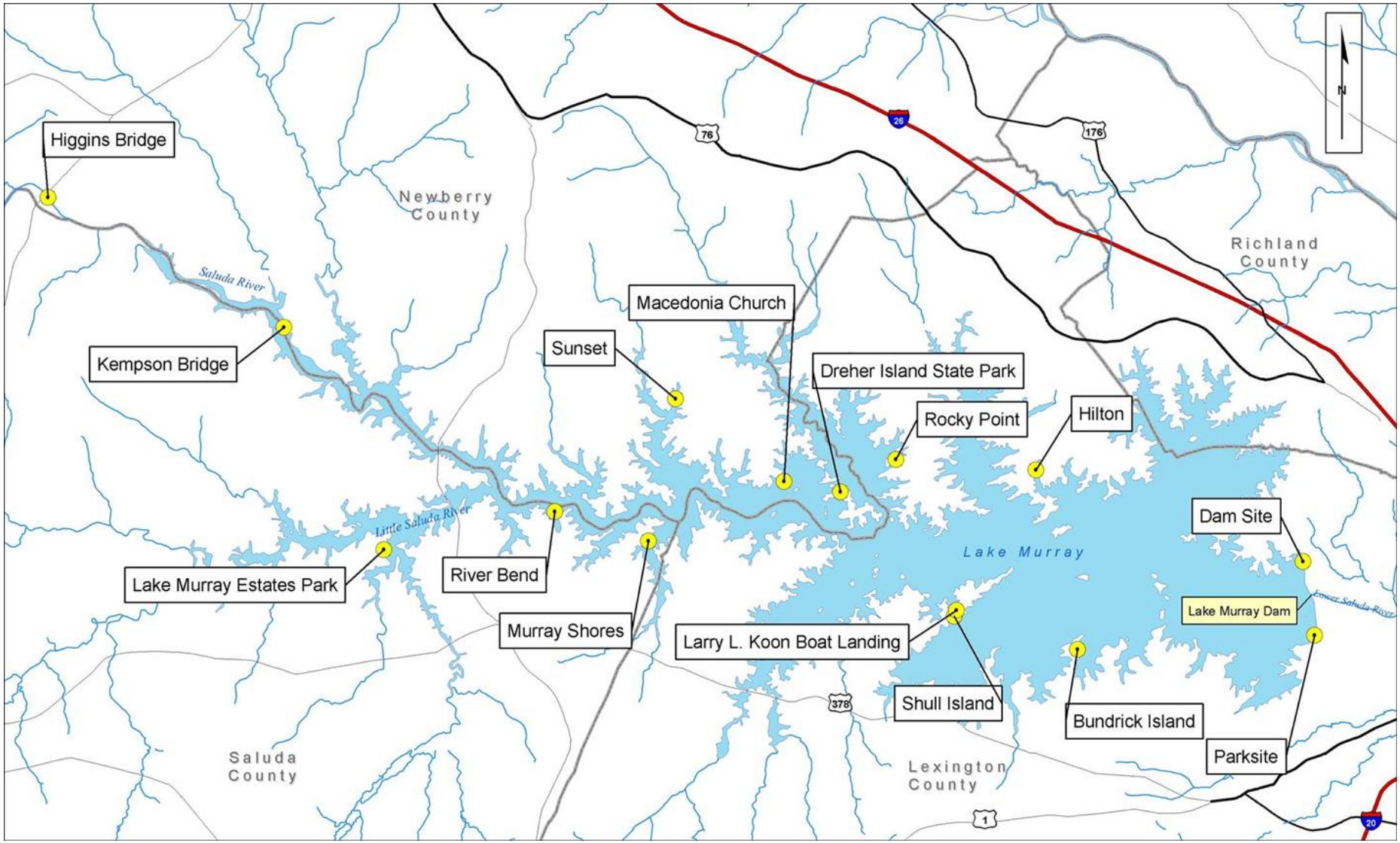


Exhibit E-35: Lower Saluda River Recreation Sites

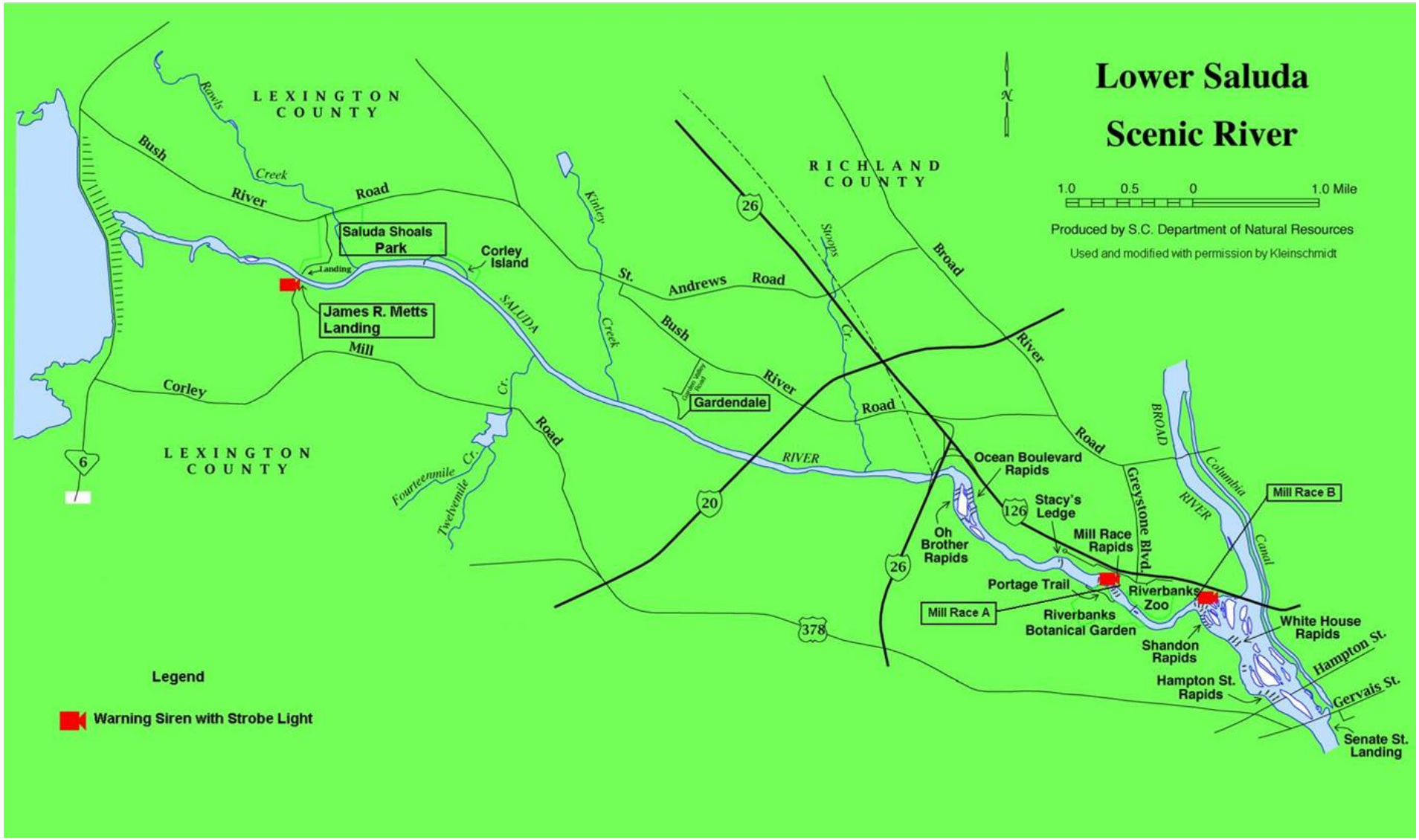
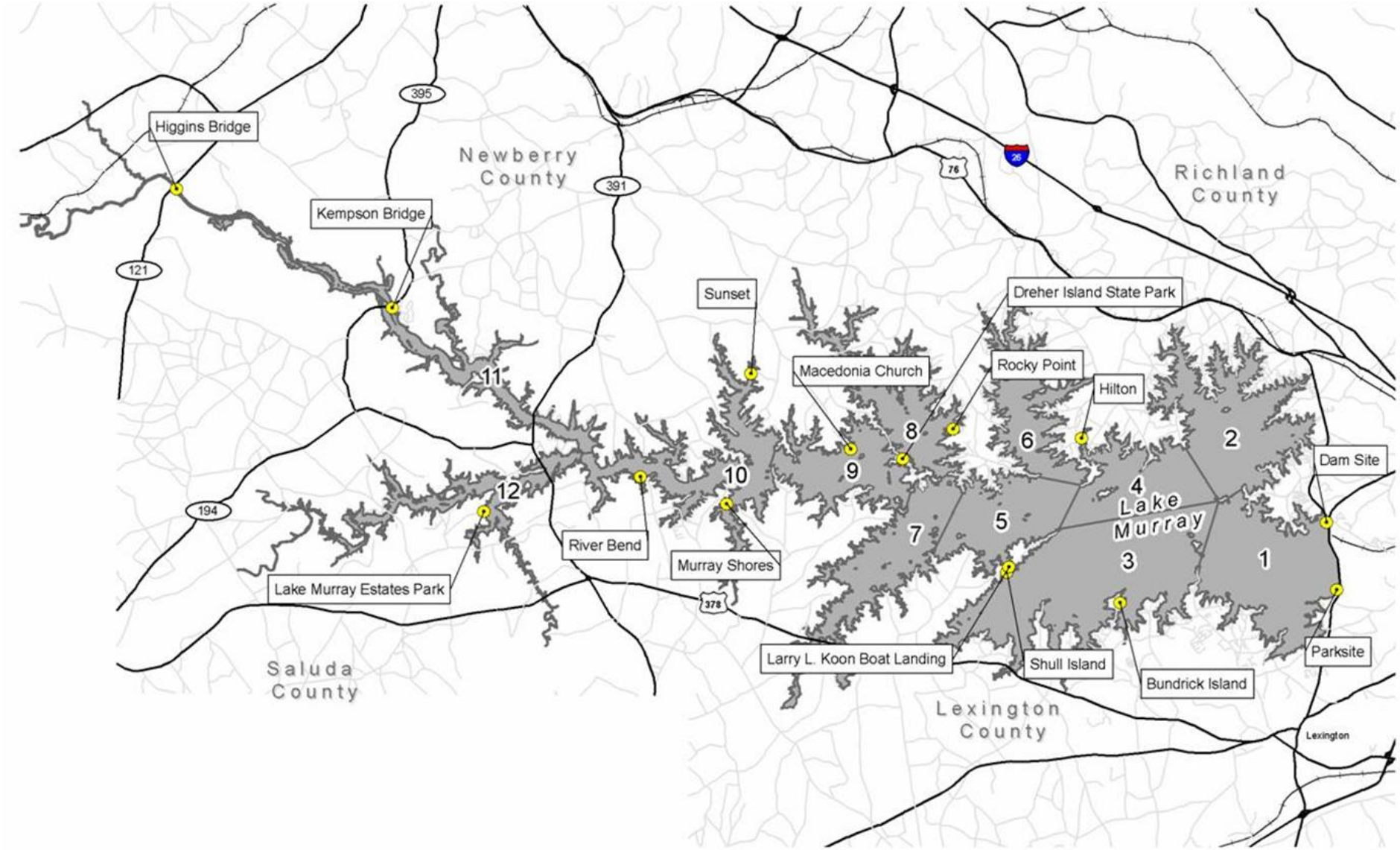


Exhibit E-36: Segments of Lake Murray Used for the Boating Density Analysis



8.0 LAND MANAGEMENT AND AESTHETICS

The Saluda Project is located in the Santee River Basin in the Piedmont region of South Carolina, near the City of Columbia. The Santee River Basin is comprised of the Santee, Congaree, Catawba-Wateree, Broad and Saluda Rivers.

8.1 Existing Development, Land Use, and Aesthetics

8.1.1 Development and Land Use

8.1.1.1 Region

The Project lies within Richland, Lexington, Newberry and Saluda Counties in South Carolina, with Lexington County having more Project property than any other of the counties (*Project Location Map, Exhibit A-1)*. At 756 square miles in size, Richland County is the largest of the four counties, followed by Lexington County (699 square miles), Newberry County (631 square miles) and Saluda County (452 square miles) (South Carolina Association of Counties, 2004). Richland and Lexington Counties are among the most densely populated counties in the sate, ranking 2nd and 5th respectively out of 46 counties total (Ibid).

Richland County supports the University of South Carolina and Fort Jackson, the largest army-training military facility in the U.S. The county is viewed as being in the head of South Carolina's transportation hub (Richland County, 2003). It is served by three interstate highway systems, eight additional major U.S. highways, five passenger airlines, and bus and passenger rail services (South Carolina Association of counties, 2004). The City of Columbia is the county seat, and also the state capital.

The City of West Columbia is located in Lexington County, where a majority of Project lands and Lake Murray lie. Lexington County is served by several major transportation routes connected to the capital city (South

Carolina Association of Counties, 2004). The City of Lexington is the county seat.

Saluda and Newberry Counties are home to the southwestern and northwestern reaches of Lake Murray, respectively. Large tracts of the Sumter National Forest are located in both counties but are not part of the Project. The Long Canoe Ranger District occupies the most western reaches of Saluda County and the Enoree Ranger District occupies the northern portion of Newberry County. Transportation infrastructure in the counties is substantial, though as between Saluda and Newberry counties, only Newberry County has a major highway system running through it. The communities of Saluda and Newberry serve as the county seats for these two counties.

Richland, Lexington and Newberry Counties all have zoning and / or land use plans in place to guide development in unincorporated areas. Incorporated communities in these counties generally maintain separate zoning requirements. There is no zoning or land use plan in place for Saluda County, though incorporated areas within the county do have zoning.

8.1.1.2 Project Area

Land use in the vicinity of the Project is influenced by topography, soil characteristics, and allowable uses of land and water resources. Social and economic factors such as employment, population and development also influence land use patterns.

Land use within the Project boundary is subject to various state, federal, and local regulations in addition to SCE&G's Shoreline Management Program (Program). The Program identifies the major land uses around the lake and the location of environmentally sensitive areas, and is designed to balance competing demands for and uses of limited shoreline resources. Specifically, the Program provides strategies regarding the management and permitting of shoreline activities and facilities within the

Project boundary, and is based on management practices established by SCE&G over the years.

SCE&G developed its shoreline permitting program in 1975, and added land use component to the program in 1980. The Shoreline Management Plan (SMP) has been updated every five years in consultation with relevant federal, state and local agencies. The most recent plan was submitted to FERC on February 1, 2000 and was approved by FERC with modifications on June 23, 2004 (107 FERC ¶ 62,273) and further clarified and modified on October 28, 2004 (109 FERC ¶ 61,083).

As part of the relicensing process, SCE&G agreed to review lands within the project boundary and potentially revise their classifications. This process is referred to as "rebalancing." Item 40 and ordering paragraph F of the order approving and modifying the updated Lake Murray SMP recommends " 'rebalancing' project lands through reclassification to better protect undeveloped areas of Lake Murray's shoreline" during relicensing (South Carolina Electric & Gas Company, 107 FERC ¶ 62,273). Through rebalancing, land use classifications were consolidated to simplify the SMP and clarify its intent, while adhering to the historical management prescriptions agreed to and developed with agencies and stakeholders. The outcome of rebalancing includes a revised SMP that consolidates previous documents and provides comprehensive guidance for the management of project lands on the Lake Murray shoreline.

In the Draft SMP, currently being reviewed by the Lake and Land Management TWC, there are four distinct land management classifications: Multi-Purpose, Public Recreation, Natural Areas, and Project Operations. These draft land management classifications and their associated management prescriptions are provided below. Final land management classifications and prescriptions will be discussed in more depth in the Final SMP (SCE&G, 2007).

Multi Purpose

Includes Easement Properties, Commercial Prescriptions, the 75-foot Setback, and Future Development Prescriptions.

Public Recreation

Public lands devoted to public recreation include developed parklands, properties set aside for future recreational development, and publicly available islands owned by SCE&G. SCE&G manages the areas individually based on the specific, designated recreational activities including swimming, picnicking, boat launching, etc.

Natural Areas

Natural Areas are not available for sale and docks, excavations, and other potentially damaging shoreline activity is not permitted in these areas. Additional measures have been implemented to protect Natural Areas.

Project Operations

Properties classified as Project Operation contain project works critical to the operation of the Saluda Project. Public access to these lands is restricted for reasons of safety and security.

A supporting component of the SMP, which provides specific guidance and specifications for development and activities along the shoreline, is SCE&G's Shoreline Permitting Program. The Permitting Program allows SCE&G to monitor construction, water withdrawals, maintenance and placement of docks, boat lifts, boat ramps, excavation, seawalls, rip rap, vegetation clearing and other shoreline developments/activities (SCE&G, 2007). SCE&G provides a detailed permitting handbook that contains the permitting processes and specifications for various shoreline developments. Permitting fees are assessed for most structures to help

defray some of the costs of the program management. The permitting program and associated fees are available on SCE&G's Project website.

8.1.2 Aesthetics

FERC's Final Environmental Assessment for the Saluda Dam Seismic Remediation provided an excellent summary of the aesthetic characteristics of the Saluda Project (FERC, 2002). Except where noted, the information reported in this section is taken directly from that document.

The Saluda Project is located in an area of low, rolling hills between 300 and 1000 feet above sea level and has a local relief of approximately 100 feet. The lake is characterized by multitudes of irregularly shaped peninsulas and numerous inlets and islands, most of which are heavily forested.

At about 48,000 acres, Lake Murray is the fifth largest lake in South Carolina, following Lakes Marion, Thurmond, Hartwell and Moultrie (SCPRT, 2002 in FERC, 2002). It is located in close proximity to South Carolina's capital city and it supports a significant recreation industry. Since its development, the lake has become a natural draw for residents and tourists alike. The early 1970s saw a marked increase in development pressure on the lake, and today much of the lake is developed, primarily for residential use (FERC, 2003). Parkland, protected lands, and 75-foot setback areas around the lake provide a natural buffer between Project waters and homes constructed after the buffer policy was implemented in 1981 (16 FERC ¶ 62,479) (Although the original buffer requirement as approved by the Commission was fifty (50) feet, few if any properties had only a 50 foot buffer imposed). Shoreline development consists primarily of residences, docks, gazebos and boat lifts, and in some places, particularly prior to the implementation of the first SMP, clearing has resulted in some areas having a maintained and manicured appearance.

The eastern half of the lake comprises the main body of the reservoir and has an expansive viewshed over miles of open water and a few large inlets. The majority of the shoreline in this area is tree covered and interspersed with extensive shoreline 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 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 five large intake towers are clearly visible from the main body of the reservoir. With the extended viewshed of the main body of the reservoir and the tree-covered shoreline, these manmade structures do not detract significantly from the overall visual character of the reservoir.

The western half of the lake is more riverine in nature than the main body of the reservoir and branches out into narrow arms that extend up into many drainage ways and creeks that enter the reservoir. Viewsheds in this area are varied and shortened by the encroaching shoreline and the increased number of small coves, creek beds, and drainage ways. Overall, the shoreline contains less intensive development and more trees and vegetation than the main body of the reservoir. 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.

The downstream area affected by the Project includes the north and south side of the river downstream of the existing Dam. The north side of the river is disturbed by existing development, primarily the Project powerhouse, McMeekin Station and various appurtenant facilities. The south side of the river is disturbed by an ash landfill and wastewater pond associated with McMeekin Station, a Training Center and borrow area used during the Saluda Dam Remediation Project. The area downstream of the Dam is primarily not visible from Highway 6, a state highway with north and southbound lanes, as it crosses over the original Dam due to the construction of the new Back-up Dam. Views of the open water, the Project's intake structures and distant shoreline of the reservoir as well as the City skyline on clear days are prominent from the highway and create a generally pleasing viewshed. Motorists have somewhat fleeting views of the areas upstream of the Dam as they drive on Highway 6. Given the relatively limited, fleeting views of the downstream area and its partially developed nature, the aesthetic quality of the downstream area is considered to be moderate.

During normal water levels, portions of the lake bottom along the periphery of the reservoir shoreline and islands and bars are exposed. At elevation 348.5, the reservoir has a surface area of about 40,000 acres and about 8,000 acres of lake bottom is exposed. The lake bottom appears as a dark band of substrate around the periphery of the reservoir and around islands and bars. Exposed aquatic vegetation, tree stumps and woody debris are present throughout much of the dewatered area. In general, the shoreline around the main body of the reservoir, including the back ends of small coves, is gently slopes. The shoreline along upper reaches of the lake, including the longer, narrower coves and inlets tend to have more steep slopes (SCE&G Tommy Boozer, personal communication).

The LSR is classified as a State Scenic River and is detailed in the Lower Saluda River Corridor Plan (lower Saluda RiverTF, 1990). This plan was developed by a committee assembled to address the preservation and enhancement of the LSR's natural, cultural and recreational features. This committee was originally developed in 1988 and outlined a set of formal goals, as listed below:

- Enhance existing and potential recreational, natural, and cultural values.
- Examine potential impacts of anticipated growth
- Develop management alternatives to guide future corridor planning
- Study use patterns and make recommendations regarding safety issues.

The Lower Saluda River Corridor Plan is primarily broken into two parts. Part A consists of over 70 recommendations developed by the committee and are regarding items such as access and facilities, historic and archaeological sites, law enforcement, litter, resource protection, tourism, and user safety. The second section of the plan, Part B, is the detailed visual plan for the river that contains conceptual plans for future park sites, as well as future ingress/egress points. In summary, this plan focuses on maintaining the integrity and natural environment of the Saluda River corridor, while balancing the continued development of the area (lower Saluda RiverTF, 1990). An update to this plan was developed in 2000, and is to be used in conjunction with the original document. Although many of the recommendations included in the plan are outside of the purview of the FERC relicensing, any access or facilities

incorporated as a result of the relicensing will be consistent with the Lower Saluda River Corridor Plan, and its update.

8.2 Agency and Public Recommendations Concerning Land Use

8.2.1 Initial Stage Consultation

On April 29, 2005, the Initial Consultation Document (ICD) for the Saluda Hydro Project was sent in electronic format to the consulting agencies and stakeholders for review. The Notice of Intent (NOI) was also filed simultaneously with the issuance of the ICD. The ICD is attached in Volume II. Study requests and comments on the ICD were due by August 1, 2005, and can be viewed in Volume II.

Summarized below, are the remarks and study requests regarding Land Use and Aesthetics that were provided by stakeholders in comment letters following the issuance of the ICD.

In their August 11, 2005 ICD comment letter provided during initial consultation, the SCDNR requested that a rebalancing of the developmental and non-developmental status of project lands occur (See Volume II for comment letter). The USFWS also called for an evaluation of land use at the Project in their August 1, 2005 ICD comment letter (Volume II).

This activity is also requested in the August 12, 2005 ICD comment letter provided by the LSSRAC (See Volume II). In the above stated comment letter provided by the LSSRAC it is noted that they “recommend that an inventory of land ownership around the Project boundary be conducted to determine the feasibility of aggregating desirable parcels for parks, open spaces, other recreation, habitat preservation, and viewshed protection”.

There is also concern shown by Lake Watch for the future development lands in their August 15, 2005 letter noting that “Project land classifications are heavily weighted towards development, with most of the protected areas located in the upper most tributaries” (Volume II).

The South Carolina Wildlife Federation (SCWF) stated in their ICD comment letter (letter dated August 15, 2005) that they are also concerned with the wildlife habitats around the Project area. They recommended that "areas with high natural resource values should be set aside and protected for the conservation of wildlife and their natural habitat".

In an ICD comment letter, dated August 12, 2005, the SCPRT recommended that the current Project lands be reviewed in consultation with resources agencies and stakeholders. It is also expressed that the current allocation of Project lands raises concern that there is not enough land allocated for future recreational needs.

The CCL/American Rivers, in a joint letter dated August 10, 2005, also requested that the land classifications be reviewed at the Project. It is noted in the above mentioned letter that this is to "ensure that an adequate balance of shoreline uses is achieved in the future".

Project lands are currently a topic of discussion for the Lake and Land Management RCG and TWC. They have to date completed a Project lands rebalancing exercise in February and April of 2007. More discussions on the results of the rebalancing exercise are to ensue in the following months.

Several agencies and non-governmental organizations (NGOs) called for an update of the SMP in their comment letters responding to the ICD. The USFWS in their ICD comment letter dated August 1, 2005, requested that the SMP be updated and revised in consultation with the state and federal resource agencies.

The request to review and update the SMP was also made by Lake Watch in their August 15, 2005 ICD comment letter. They noted that "there are many problems with the existing shoreline plan that need to be addressed in the relicensing process". Lake Watch also outlined the particular sections of the SMP that they believe need to be addressed. These sections include docks, commercial and private marinas, erosion and sedimentary control, excavation, permitting application process, public education, and buffer zone restoration.

The Lake and Land Management TWC has systematically reviewed the individual sections of the SMP and has made subsequent recommendations concerning the various subjects included therein. A new SMP is in the process of being developed. Meeting notes regarding the TWC's update of the SMP can be viewed in Volume II.

In their letters responding to the ICD the Lake Murray Homeowners Coalition (LMHOC) (letter dated August 15, 2005) and Lake Watch (letter dated August 15, 2005) requested that a shoreline development impacts study be performed. LMHOC explained further in their ICD comment letter that development impacts should be studied as they related to fish and wildlife habitat, recreation, water quality and safety.

As discussed previously, the Lake and Land Management TWC has to date completed a Project lands rebalancing exercise in February and April of 2007. Meetings to discuss the results of the rebalancing exercises are scheduled to start in November of 2007. During this process resource agencies and stakeholder representatives assessed various characteristics of the shoreline in order to make recommendations on land uses and classifications. Shoreline development and its impacts are directly taken into account during the rebalancing, as well as environmental and recreational resources.

Subsequent to their review of the ICD, several entities noted that they would like to see the buffer zones and environmentally sensitive areas identified and mapped. The Lake Murray Association (letter dated August 12, 2005) and the Newberry County Government (letter dated August 15, 2005) both recommended this in their comment letters responding to the ICD. The SCWF (letter dated August 15, 2005) also recommended that these areas be identified and mapped. However, the SCWF further requested that a form of monitoring, protection and re-establishment after misuse be discussed.

SCE&G has updated their shoreline maps to include all ESA's and buffer zones. This information is contained in a GIS database and has been submitted to the SCDNR and USFWS. Further, these maps will be included in the new SMP being developed in the relicensing process. Further monitoring of shoreline buffer zones and ESA's is done on a periodic basis by SCE&G shoreline

management, which includes photo and video documentation of ESA's within the PBL.

In their August 15, 2005 comment letter, Newberry County Government recommended that the Base Flood Elevations be identified on a lake map. They explained that "this action will reduce the risk of property owners building in the flood zones associated with the Project boundary".

This is not a relicensing nor project related issue since county zoning ordinances dictate building requirements. Therefore, this is not being addressed during the relicensing.

Upon review of the ICD, the LSSRAC recommended in their August 12, 2005 comment letter that an inventory of the ESA's on the LSR be performed. Specifically, they state that "[c]onsiderable effort and attention has been directed to Lake Murray shoreline management and the classification of environmentally sensitive areas on the lake. However, the ICD indicates that there is very little information on the natural/sensitive areas of ecologically significant resources along the lower Saluda River; therefore, we think that additional inventory, assessment, and conservation planning for these resources is needed".

In contrast to the shoreline of Lake Murray, in which the Project boundary encompasses significant areas above the high water mark, there are no such lands included in the Project boundary within the LSR corridor, as SCE&G typically only retains flowage rights below the Project. Therefore the ESA classification as they pertain to Lake Murray are not applicable to the LSR.

Lake Watch requested, in their subsequent comments to the ICD issuance, that a study be considered to evaluate the existing aesthetic resources (letter dated August 15, 2005) on Lake Murray. Lake Watch noted that this study should be related to development, as they estimate that 95% of the Lake shoreline will be developed based on current land use designations.

During Project land rebalancing exercises Aesthetics were considered during the scoring process. Lands were judged according to the degree which the shoreline was naturally vegetated. This would include land cover such as pine, hardwood, bottomland hardwood forests, and natural rocky points. Meeting notes can be viewed in Volume II (dated December 20, 2006).

8.2.2 Second Stage Consultation

As detailed above, a series of RCG meetings were held as a part of second stage consultation. Consultation in the area of Land Use and Aesthetics during these meetings is described below. Many items that were requested in the ICD comment letters were also requested during the resource group meetings. This is noted in the responses under Section 8.2.1, Initial Stage Consultation. Only additional studies, not discussed above, are included in this section.

In the February 9, 2006 Lake and Land Management RCG meeting, it was discussed that the SCDNR had requested that intermittent and perennial streams be mapped and their associated 75' buffer zone.

SCE&G has since mapped all of the environmentally sensitive areas, intermittent and perennial streams and buffers into a GIS database and are made available in the SMP.

Lake Watch requested in the February 9, 2006 Lake and Land Management RCG meeting that a technical committee be formed to identify and review all of the Federal and State regulations that have a nexus to the management of the Project and associated lands. It was also recommended that this group meet with FERC staff in order to clarify FERC regulations and requirements.

On April 20, 2006, SCE&G hosted a Quarterly Public Meeting to address this subject. The FERC Representative for the Saluda Project, Allan Creamer, was available for a relicensing question and answer session (meeting notes are contained in Volume II).

Similarly, Lake Watch also requested in the February 9, 2006 Lake and Land RCG meeting that Tennessee Valley Authority (TVA) and ACOE studies on shoreline development be reviewed.

During the relicensing meetings, the group reviewed TVA and ACOE guidelines when they felt it necessary to aid in the development of various shoreline management goals. On May 8, 2006 the TWC reviewed TVA and Corps guidelines for bank stabilization while discussing what guidelines on Lake Murray should entail (meeting notes are contained in Volume II).

In their comments for the February 9, 2006 Lake and Land Management RCG meeting, the SCDNR requested that management restrictions be developed and placed in the SMP that limit encroachments around ESAs.

On March 28, 2006 the Lake and Land Management Technical Working Committee (TWC) (a sub-committee of the RCG) discussed the implementation of a buffer zone around continuous ESAs. The TWC requested that SCE&G consider implementation of 15 ft buffer on either side adjacent to continuous ESA on easement and future development property. SCDNR noted that this would be acceptable, as they had originally requested that a 50 ft. buffer be implemented on either side of an ESA (meeting notes are contained in Volume II).

At the November 1, 2005 Lake and Land RCG meeting, Lake Watch requested that a Communications/Procedural TWC be developed. Lake Watch noted that its purpose would be to study how those parties involved in the relicensing process could better work together and communicate to work towards various goals and objectives.

The RCG discussed this issue and it was concluded that if increased communication between group was needed then joint group meetings would be held (See November 1, 2005 meeting notes in Volume II). SCE&G also developed Operating Procedures on September 5, 2005 that were reviewed and commented on by the stakeholders and subsequently finalized in December of 2005 (Volume II).

8.3 Applicant Proposed Mitigation

Resource Groups are still in the process of discussing potential mitigation. Proposals will be made at the time of the Final License Application.

8.4 Applicant's Policy Regarding Shoreline Development

As described previously, after issuance in 1984 of the presently effective license, SCE&G began requiring that private property owners who bought land within the Project boundary maintain a 75-foot-wide vegetated setback located between the lake's high water mark (358.5-foot contour interval) and back property development. These setback lands are maintained as vegetated areas intended to protect and enhance the Project's scenic, recreational and environmental values in the area bordering the Lake Murray shoreline. Owners of adjoining lands are allowed to travel by foot to the lake through the setback, but are not permitted to encroach with improvements, place any water-oriented encroachments (docks, ramps, etc.), change the contour of the land, or post the property, without written consent from SCE&G.

Potentially approved developments on the shore are addressed through SCE&G's permitting program, which defines criteria and specifications for any structures placed within the setback or below the high water mark (358.5-ft contour). SCE&G operates its shoreline permitting activities under a general permit issued by the ACOE and the SCDHEC. The program is designed to ensure that uses within the Project boundary, including along the shoreline, are consistent with the purposes of protecting or enhancing the scenic, recreational, and environmental values of the project.

In addition, as explained previously, SCE&G has identified a 'Natural areas' land use classification. These lands warrant special protection because they provide important habitat wildlife, have cultural and/or historical significance, or are environmentally sensitive areas. Several of these areas exist below the high water mark and along the shoreline, particularly in the case of ESAs. Natural Areas are not available for sale, nor are docks, excavations, or shoreline activity permitted in these areas. ESAs have a 50-foot natural buffer zone designated around them. In areas that lack ESAs, there is a 25-foot natural buffer zone above the 358.5-foot high water contour. SCE&G prohibits

clearing of vegetation within ESAs, below the 358.5-foot contour, or within buffer zones associated with these areas.

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AQUATICS – MEETING NOTES/EMAILS/WRITTEN CORRESPONDENCE

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WILDLIFE – MEETING NOTES/EMAILS/WRITTEN CORRESPONDENCE

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Macroinvertebrate Assessment Study Plan (2006)
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Shortnose Sturgeon Study Plan (2005)
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Lake Murray Wintering Waterfowl Survey Report (2006-07)
Lake Murray Wintering Waterfowl Surveys Study Plan (2006)
SCDNR Memo On Wood Stork Nesting Colonies (2005)
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Lake Murray Hydrilla Report (2005)
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National Wetlands Inventory – Index
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Rocky Shoals Spider Lily Survey Memo (2006-05)

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CULTURAL

Stage I Archaeology Report (TRC, 2005) (*NIP*)
Stage II Archaeology Report (S&ME, 2007) (*NIP*)

Due to the sensitive nature of the contents of these documents, they are considered Privileged, and are not for public dissemination

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