SOUTH CAROLINA ELECTRIC & GAS COMPANY

COLUMBIA, SOUTH CAROLINA

SALUDA HYDROELECTRIC PROJECT

(FERC NO. 516)

RARE, THREATENED AND ENDANGERED SPECIES ASSESSMENT

MARCH 2008

Prepared by:

Kleinschmidt

Energy & Water Resource Consultants

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1.0 INTRODUCTION

The Saluda Hydro Project (Project) is a 202.6 megawatt (MW) licensed hydroelectric facility located on the Saluda River in Lexington, Newberry, Richland, and Saluda counties of South Carolina (Figure 1), and is owned and operated by South Carolina Electric & Gas (SCE&G or Licensee). The project consists of Lake Murray, the Saluda Dam, the new back-up Saluda Berm, spillway, powerhouse, intakes, and penstocks. The Project is currently licensed by the Federal Energy Regulatory Commission (FERC No. 516) and the present license is due to expire in the year 2010.

To initiate the relicensing process, SCE&G prepared and issued the Initial Consultation Document (ICD) on April 29, 2005. The Licensee submitted the document to a number of state and federal resource agencies for their review and comment. In response to the ICD, the United States Fish and Wildlife Service (USFWS), South Carolina Department of Natural Resources (SCDNR), National Marine Fisheries Service (NMFS), and several Non-governmental Organizations (NGO's) requested a number of studies to assess the potential impacts of Project operations on natural resources, including an assessment of potential impacts to rare, threatened and endangered species (RT&E).

1.1 Consultation History

In response to the ICD, the USFWS provided a list of all known rare, threatened and endangered species occurring in the four county region surrounding the Project (See letter dated August 1, 2005; Appendix A). NMFS provided a listing of species of concern and candidate species on November 7, 2007. This included the revised listing that was placed in the Federal Register on October 17, 2006. These lists included all

known species that are currently listed as federally endangered or threatened species, species that are candidates for federal listing, as well as federal species of concern. The USFWS suggested that the Licensee conduct a literature-based review to determine habitat requirements for these species and also to compare these requirements with available habitat types in the Project area. The USFWS and NMFS indicated that field surveys for these species should be performed if suitable habitat is found to exist in the Project area.

As part of relicensing, SCE&G formed a Rare, Threatened and Endangered Species Technical Working Committee (RT&E TWC) to determine any impacts to rare, threatened and endangered species with respect to continued operation of the Project. 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. The RT&E TWC has met four times thus far during relicensing to discuss the status of RT&E species occurring in the Project vicinity as well as potential strategies for addressing issues related to these RT&E species. A comprehensive listing of RT&E TWC meetings held to date is provided in Table 1.

1.2 Species Included in Assessment

This assessment includes 12 species identified by the USFWS and NMFS as occurring or potentially occurring in the four counties surrounding the Project that are either federally listed as threatened or endangered or are candidates for federal listing (See USFWS letter dated August 1, 2005 and NMFS letter November 7, 2007). In addition, the assessment includes six federal species of concern which were identified by either state or federal agency representatives during the consultation process as potentially occurring in the Project area or otherwise being of conservation concern. Bald eagle, which was recently de-listed under the Endangered Species Act (ESA) of 1973, is included in this assessment because of its protection under the Bald and Golden Eagle Protection Act of 1938. Finally, the assessment includes two species that are state listed as threatened or endangered, but are not listed at the federal level. Species covered by this assessment are summarized in Table 2.

Table 1: Federally and State Threatened and Endangered Species, Federal 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)

COMMON NAME	*SCIENTIFIC NAME*	FEDERAL STATUS[1]	STATE STATUS[2]	DOCUMENTED IN PROJECT AREA	COUNTIES[3]
		Birds			
Bald eagle	*Haliaeetus leucocephalus*	P[4]	E	X	Lexington, Newberry, Richland, Saluda
Red-cockaded woodpecker	*Picoides borealis*	E	E		Lexington, Richland, Saluda
Wood stork	*Mycteria americana*	E	E	X	Newberry
		Amphibians			
Pine Barrens tree frog	*Hyla andersonii*		T		Richland
		Mammals			
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*		E		Richland
		Fish			
Blueback herring	*Alosa aestivalis*	SC			
Alewife	*Alosa pseudoharengus*	SC			
Atlantic sturgeon	*Acipenser oxyrhynchus*	C			
Robust Redhorse Sucker	*Moxostoma robustum*	SC			Lexington (possible)
Saluda darter	*Etheostoma saludae*	SC	SC	X	Lexington, Richland, Saluda, Newberry
Shortnose sturgeon	*Acipenser brevirostrum*	E	E		Lexington (possible), Richland

COMMON NAME	*SCIENTIFIC NAME*	FEDERAL STATUS[1]	STATE STATUS[2]	DOCUMENTED IN PROJECT AREA	COUNTIES[3]
		Invertebrates			
Carolina heelsplitter	*Lasmigona decorata*	E	E		Lexington (possible), Newberry (possible), Richland (possible), Saluda (possible)
Saluda crayfish	*Distocambarus youngineri*	SC	SC		Newberry
		Plants			
Canby's dropwort	*Oxypolis canbyi*	E	E		Richland
Georgia aster	*Aster georgianus*	C	SC		Richland
Little amphianthus	*Amphianthus pusillus*	T	T		Saluda
Piedmont bishop-weed	*Ptilimnium nodosum*	E	E		Saluda
Rough-leaved loosestrife	*Lysimachia asperulaefolia*	E	E		Richland
Schweinitz's sunflower	*Helianthus schweinitzii*	E	E		Lexington
Rocky Shoal's spider-lily	*Hymenocallis coronaria*	SC			Lexington, Richland
Smooth coneflower	*Echinacea laevigata*	E	E		Lexington (possible), Richland

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

2 State Status - E (State-listed as Endangered); T (State-listed as Threatened); SC (State species of concern).

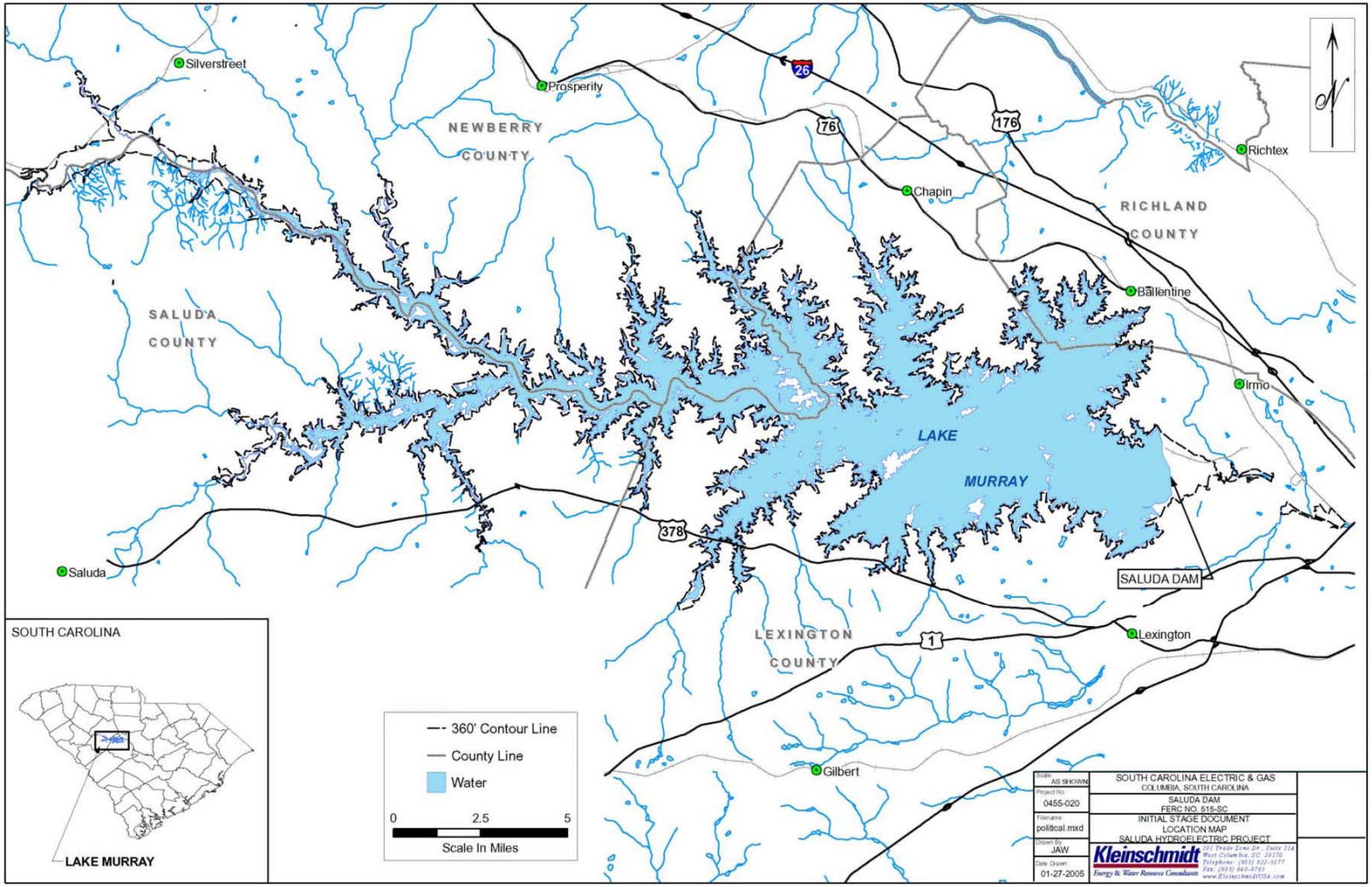
3 Counties of occurrence based on a combination of USFWS and SCDNR county listings.

4 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.

Table 2: Summary of Saluda Hydro Relicensing Rare, Threatened and Endangered Species Technical Working Committee Meetings

MEETING DATE	LOCATION	TOPICS DISCUSSED
July 26, 2006	SCE&G Offices at Carolina Research Park, Columbia, SC	Rocky Shoals Spider Lily, Species tracking
May 3, 2006	SCE&G Offices at Carolina Research Park, Columbia, SC	Wood Stork, Species tracking
March 8, 2006	SCE&G Lake Murray Training Center, Columbia, SC	Status of key species, strategies for addressing species in relicensing
October 30, 2007	SCE&G Environmental Offices, Columbia, SC	Review of draft Rare, Threatened and Endangered Species Assessment

Figure 1: Location Map for the Saluda Hydroelectric Project (FERC No. 516)



2.0 SPECIES DESCRIPTIONS AND ANALYSES

2.1 Bald Eagle

Bald eagles may be found throughout North America, typically around water where they feed primarily on fish and scavenge carrion. The species thrives around bodies of water where adequate food exists and human disturbance is limited. Eagles nest in large trees and typically use the same nest for several years, making repairs to it annually (Degraaf and Rudis, 1986).

Status in the Project Area

Foraging habitat for bald eagle is abundant in the Project area, and bald eagle sightings are common around both Lake Murray and the lower Saluda River. In addition, there are seven active, documented bald eagle nests on Lake Murray as well as one active nest on the lower Saluda River (T. Murphy, SCDNR, unpublished data).

Determination of Effect

Bald eagles inhabiting Lake Murray and the lower Saluda River[1] (LSR) are well habituated to and tolerant of the presence of human activity; thus continued use of the reservoir and river for recreation are not expected to result in any negative effects to eagle foraging. Continued operation of the Project is likewise not likely to result in negative effects on eagle nesting. SCDNR endangered species staff annually provide SCE&G Lake Management staff with updated information regarding the location and status of nests in the Lake Murray and LSR vicinity. SCE&G utilized this information to minimize potential impacts of various shoreline management activities on eagle nests. Specifically, SCE&G refrains from issuing shoreline permits for activities within 660 ft of an active nest during the nesting season (September through May) and 330 ft during the non-nesting season (T. Boozer, SCANA Services, Pers. Comm.). This policy is in

[1] Lower Saluda River refers to the Saluda River from downstream of the Saluda Hydro Dam to the confluence of the Saluda and Broad rivers.

adherence to the USFWS habitat guidelines for nesting bald eagles. SCE&G also frequently consults with USFWS Ecological Services staff regarding proposed activities in the vicinity of known nests.

2.2 Red-Cockaded Woodpecker

The red-cockaded woodpecker (RCW) is endemic to open, mature, and old growth pine ecosystems in the southeastern United States (USFWS, 2003). Over 97% of the pre-colonial era RCW population has been eradicated, leaving only roughly 14,000 RCWs living in about 5,600 colonies scattered across eleven states, including South Carolina. RCW decline is generally attributed to a loss of suitable nesting and foraging habitats, including longleaf pine systems, due to logging, agriculture, fire suppression, and other factors (USFWS, 2003). Suitable nesting habitat generally consists of open pine forests and savannahs with large, older pines and minimal hardwood midstory or overstory. Living trees, especially older trees that are susceptible to red-heart disease making them more easily excavated, provide the RCWs preferred nesting cavities. Suitable foraging habitat consists of open-canopy, mature pine forests with low densities of small pines, little midstory vegetation, limited hardwood overstory, and abundant bunchgrass and forb groundcover (USFWS, 2003).

Status in the Project Area

There are no known reports of red-cockaded woodpeckers in areas surrounding Lake Murray or the lower Saluda River. Further, there is no known longleaf pine savanna habitat in the Project vicinity.

Determination of Effect

Based on the lack of suitable habitat, it is very unlikely that this species occurs in the Project vicinity and thus would not be affected by continued operation of the Project.

2.3 Wood Stork

Wood storks are colonial waterbirds that typically nest in large rookeries and feed in flocks (USFWS, 1997). Typical foraging habitats include narrow tidal creeks, flooded tidal pools, freshwater marshes, and freshwater wetlands. Like most other wading birds, storks feed primarily on small fish. However, because wood storks feed by tactilocation, depressions where fish become concentrated during periods of falling water levels are particularly attractive sites (USFWS, 1997). 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 there are typically several nests in each tree. Trees utilized for nesting and roosting typically provide easy access from the air and an abundance of lateral limbs (USFWS, 1997). 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, 1997).

Status in the Project Area

Although they are primarily birds of freshwater and brackish wetlands along the coastal plain, wood storks were reported from several locations in the Lake Murray area in recent years. Specifically, a local resident reported observing wood storks feeding at several locations in the Bush River and Big Creek embayments of upper Lake Murray from approximately 2000 to 2004. In addition, approximately 60 storks were observed feeding at various locations in the middle Saluda River and the upper portion of Lake Murray, during an aerial survey for bald eagles performed by the SCDNR in early August 2004. In response to these sightings, SCE&G, in coordination with the USFWS and SCDNR, conducted an aerial reconnaissance survey in the upper portions of Lake Murray on August 27, 2004. During this survey, biologists from SCDNR and Kleinschmidt documented approximately 60 wood storks foraging within the Project boundary, as well as two potential nesting sites along the floodplain of the middle Saluda River (Tosity Creek and Silverstreet).

Under the current FERC operating license, SCE&G is required to submit 5 year updates to the Lake Murray Shoreline Management Plan (FERC Order ¶ 61,332, June 1, 1984). In an order approving and amending SCE&G's most recent update, submitted on

February 1, 2000, the FERC requested that SCE&G designate the two identified wood stork "roosting and foraging habitats" near Bush River as "conservation areas" (FERC Order No. 20040623-3015). Further, the order required that these areas, as well as all other wood stork roosting and foraging habitat identified within the Project boundary, remain protected and undeveloped until evidence is submitted to indicate that protection of these areas is not warranted. In response to the wood stork sightings on Lake Murray and the subsequent FERC order, SCE&G initiated consultation efforts with the SCDNR and USFWS and developed a study plan aimed at documenting where and under what conditions wood storks were utilizing habitats within the Project boundary and in the Project vicinity (Kleinschmidt, 2004).

In accordance with the Lake Murray Wood Stork Study Plan (Kleinschmidt 2004), aerial surveys were performed monthly during February through November of 2005 and 2006. No wood storks were observed during more than 13 hours of aerial surveys during 2005 (Kleinschmidt, 2005). A limited number of storks were observed in the Project area during August and September of the 2006 survey season (Kleinschmidt, 2007a). Specifically, a single juvenile wood stork was observed soaring above the Saluda River upstream of Lake Murray during the August survey. An additional 10 – 12 wood storks were observed in the same general area during the September 15, 2006 survey: 6 foraging in a farm pond off of the Saluda mainstem just downstream of the Highway 121 bridge, and 4 to 6 (4 confirmed, 2 suspected) soaring and feeding in wetlands adjacent to the wood chipping plant near Silverstreet.

The surveys likewise failed to document nesting of wood storks within the study area. Study results found the Tosity Creek or Silverstreet sites, which were identified as being potential wood stork nesting areas during reconnaissance surveys and associated agency consultation, to be great blue heron nests, with both nesting adults and pre-flight juveniles observed during both 2005 and 2006 (Kleinschmidt, 2005; 2007a). The lack of nesting in the study area is consistent with the known life-history of wood storks as a coastal nesting species (USFWS, 1997). In South Carolina, all nesting colony sites currently known are located in the coastal plain, and primarily in the coastal counties (Murphy, 2005).

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, 1997). 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, 1997).

SCE&G met with representatives from the USFWS and SCDNR via conference call on February 8, 2007, to discuss the status of wood stork monitoring on Lake Murray. Both SCDNR and USFWS concurred with the findings of the 2006 Wood Stork Monitoring Report (Kleinschmidt, 2007a), agreeing that no nesting of wood stork in the Project area was evident based on study results. Due to the limited nature of stork activities observed in the Project vicinity, the agencies concurred with recommendations to discontinue further wood stork surveys on Lake Murray and that continued protection of the areas identified in the FERC order as wood stork "conservation areas" was no longer warranted or necessary.

Determination of Effect

Wood stork usage of the Saluda Project area appears sporadic and extremely limited in nature and thus is unlikely to be affected by operation of the Project.

2.4 Rafinesque's Big-eared Bat

Rafinesque's big eared bat is a colonial bat species native to the southeastern U.S. Two subspecies are recognized in South Carolina, *C. rafinesquii rafinesqii* in the mountains *and C. r. macrotis* along the Coastal Plain (Bunch et al., 2005). Rafinesque's big-eared bat is nocturnal, feeding by echolocation, primarily on moths. Coastal plain

and sandhills populations of the species utilize I-beam and T-beam bridges for roosting. Roosting in mountainous regions of the state occurs in large hollow trees (typically large tulip poplars), abandoned buildings and mines, rock shelters, and caves. Habitat in the Blue Ridge Mountains includes rock outcrops, mesic and cove hardwood forests, forested bottomlands, bottomland agricultural fields, dry deciduous forests, pine woodlands, and forested riparian areas. Coastal zone and sandhills habitats include black gum stands, bald cypress swap forests, maritime forests, and mature hardwood and mixed forests (Bunch et al., 2005).

Status in Project Area

The range of Rafinesque's big-eared bat in South Carolina includes the coastal plain and sandhills regions and the extreme northwestern Blue Ridge, with the piedmont representing a gap in the species' distribution (Bunch et al., 2005). As such, it is extremely unlikely that this species would occur in the Project vicinity.

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.5 Pine Barren Tree Frog

The pine barrens tree frog inhabits the swamps, bogs, and acidic brownwater streams of the New Jersey Pine Barrens, as well as the pocosins (shrub bogs) of the Carolinas (Conant and Collins, 1991). This species is intolerant of closed-canopy conditions and is restricted to localized wetlands such as hillside seepage bogs within dry uplands, pine barrens, and headwater swamps and disperses along drainages within these areas (NatureServe, 2007). Non-breeding habitat generally is in pine-oak areas adjacent to breeding habitat. Important egg-laying and larval habitats include open cedar swamps and sphagnaceous, shrubby, acidic, seepage bogs on hillsides below pine-oak ridges.

For southeastern populations, typical habitats are characterized by the topography, soils, and vegetation of the Carolina Sandhills, with pocosin or evergreen shrub swamps established along seeps and small streams within the surrounding longleaf pine-oak forest. Breeding habitat in South Carolina has been described as low vegetation with dense growth of Sphagnum mosses. Cely and Sorrow (1983) found that occurrences in South Carolina appeared to be restricted to the Fall Line Sandhills, at elevations ranging between 61 and 122 m.

Status in Project Area

The area surrounding the Project lacks the Carolina sandhills habitat and associated bogs and pocosins required by this species; therefore it is extremely unlikely that Pine Barren tree frog would occur in the Project vicinity.

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.6 Shortnose Sturgeon

Much of the Santee Basin, including the portion of the Saluda Basin encompassed by the Project, is thought to be within the historic range of the shortnose sturgeon (Welch, 2000; Newcomb and Fuller; 2001). In the Santee Basin, the shortnose sturgeon is believed to be amphidromous, migrating between freshwater and mesohaline reaches, and ascending to inland riverine reaches on annual spawning runs (NMFS, 1998a; Cooke et al., 2003). In northern rivers, migratory spawning runs of this species usually occur in early February to mid-March when water temperatures approach 9 – 14° C (Kynard, 1997). In southern rivers, spawning runs may occur as late as mid-April (S. Bolden, NMFS, Personal Communication, 2007). Shortnose sturgeon spawning has been documented in the Congaree River near Columbia over substrates of sand, gravel and rock, at temperatures ranging from 9.7-15.6°C, and dissolved oxygen concentrations of 10.6-12.5 mg/L (Collins et al., 2003). Shortly after spawning, shortnose sturgeon larvae

begin movements downstream, and young of the year may remain in freshwater reaches for their first year of life before moving downstream as juveniles to lower river reaches near the saltwater interface (Kynard, 1997).

Status in the Project Area

Population groups of shortnose sturgeon are known from downstream of the Santee-Cooper dams (lakes Marion and Moultrie) in the lower reaches of the Santee-Cooper basin (Collins et al., 2003). An additional dam-locked spawning 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, and an upstream spawning site located in the upper Congaree River. Radio-telemetry studies conducted by the SCDNR have documented migration of Lake Marion shortnose sturgeon as far upstream as the Gervais Street Bridge on the Congaree River, which is adjacent to the City of Columbia and just downstream of the confluence of the Broad and Saluda rivers (J. Gibbons, SCDNR, Pers. Comm.). NMFS considers the potential present range of shortnose sturgeon to include all accessible waters below the Saluda, Wateree, and Columbia Dams (P. Brownell, NMFS, Personal communication).

In response to anadromous fish studies requested by the NMFS and SCDNR during the initial stages of the Saluda Project relicensing, SCE&G developed and implemented a Shortnose Sturgeon Study Plan (Kleinschmidt, 2006a). The primary objective of this study was to document whether or not shortnose sturgeon are utilizing areas of the lower Saluda and upper Congaree rivers downstream of the Project. Implemented during the 2007 migratory season, the study includes gillnet sampling for adult and juvenile sturgeon, as well as D-net samples for eggs and larvae, at four downstream locations: two in the lower Saluda and two in the upper Congaree (immediately upstream and downstream of the Granby Lock and Dam). Approximately 400 hours of gillnetting during the 2007 season resulted in no captures of adult or juvenile sturgeon; likewise, no eggs or larval sturgeon were captured during the sampling period (Kleinschmidt, 2007b).

Determination of Effect

Initial study results suggest that shortnose sturgeon are absent from accessible areas immediately downstream of the Project or are present in extremely low numbers. These findings are consistent with preliminary results of telemetry studies being conducted by the SCDNR, which found that none of the Lake Marion sturgeon implanted with sonic transmitters were detected in the LSR despite the presence of a receiver array (J. Gibbons, SCDNR, Pers. Comm.). Available study data is likely insufficient to determine or rule out potential effects of project operations on shortnose sturgeon movements and habitat use in accessible reaches of the Saluda River.

2.7 Atlantic sturgeon

The Atlantic sturgeon is a large (up to 5.5m), long-lived (up to 60 years) anadromous species native to Atlantic Coast drainages from Labrador to Florida (Marcy et al., 2005). Atlantic sturgeon is currently considered by the USFWS as a candidate for federal listing as threatened or endangered (71 R 61022). Stocks of the species are considered imperiled, primarily due to overharvesting for flesh and eggs (caviar) during the early – to – mid-20th Century, and secondarily, due to habitat degradation and blockage of access to historical spawning grounds (NMFS, 1998b). In the Santee Basin, Atlantic sturgeon were historically present at least as far inland as the fall line (Newcomb and Fuller, 2001).

The Atlantic sturgeon is considered estuarine anadromous, spending most of it life in estuarine and ocean environments and undertaking spawning migrations into riverine systems during late-winter and spring months (NMFS, 1998b; Marcy et al, 2005). In southeastern rivers, female Atlantic sturgeon reach sexual maturity at age 7 to 19 and spawn only once in a 2 to 6 year period (NMFS, 1998b). Males of the species reach maturity between age 8 and 12 years (Marcy et al., 2005). Spawning typically occurs over hard bottoms of clay, rubble, or gravel, with running water and temperatures of 14 - 24°C. After spawning, females typically return to estuarine environments within 4 to 6 weeks, while males may remain in the river through the fall. Juveniles of this species

remain in the natal rivers for 3 to 5 years before migrating to the ocean (Marcy et al., 2005).

Status in the Project Area

The status of Atlantic sturgeon upstream from the Santee Cooper Dams is uncertain; however three adults have been recovered upstream from the dams in recent years (P. Brownell, NMFS, Pers. Comm.). Like shortnose sturgeon, Atlantic sturgeon were historically present at least as far inland as the fall line (Newcomb and Fuller, 2001). Current upstream distribution in the Santee Basin is likely limited by the lack of passage for Atlantic sturgeon at the Santee Cooper Dams (P. Brownell, NMFS, Pers. Comm.). As with shortnose sturgeon, NMFS considers the potential present range of Atlantic sturgeon to include all accessible waters below the Saluda, Wateree, and Columbia Dams (P. Brownell, NMFS, Personal communication).

Determination of Effect

As previously noted regarding shortnose sturgeon, results of gillnetting and D-shaped egg net surveys conducted in the LSR suggest that Atlantic sturgeon are absent from accessible areas immediately downstream of the Saluda Hydro Project. These findings are consistent with the preliminary results of telemetry studies being conducted by the SCDNR, which found that none of the Lake Marion sturgeon implanted with sonic transmitters were detected in the LSR despite the presence of a receiver array (J. Gibbons, SCDNR, Pers. Comm.). Available study data is insufficient to determine or rule out potential effects of project operations on Atlantic sturgeon movements and habitat use in accessible reaches of the Saluda River.

2.8 Alewife and Blueback Herring

Alewife and blueback herring collectively range from Labrador to Florida, and overlap in distribution from South Carolina to Nova Scotia (Bigelow and Schroeder, 1953). They are sometimes colloquially referred to as “river herring” although they have

distinct traits and appearance. Spawning is usually separated for these species in rivers by both space and time.

Adults of both of these anadromous species generally return to native rivers each spring to spawn (Pardue, 1983). Alewife generally spawn in slow-flowing river reaches or in ponds and lakes (Loesch, 1987), while blueback herring prefer to spawn in relatively swift flow (Loesch, 1987). When further upstream migration is blocked, spawning may occur for both species at the same location, for example below a dam. However, the alewife favor shore-bank eddies or deep pools, while bluebacks concentrate in the main stream flow. Alewives tend to spawn at cooler water temperatures (5-10^{o}C) than blueback herring (10-15^{o}C). This tends to put them 3 to 4 weeks apart in a given locality within their overlapping range (Loesch, 1987). Adults broadcast spawn (*i.e*. no nests), and eggs are transported downstream planktonically. After hatching, juveniles occupy estuarine or low-gradient relatively shallow freshwater habitats (*i.e*. not riffles or fast runs) during the remainder of summer, until emigration from freshwater begins in late summer or early fall. Juvenile alewives hatched in ponds and lakes generally remain within the pond until cued to begin emigration.

Status in Project Area

In South Carolina, alewife have not been recorded south of the Pee Dee River since approximately 1950 (P. Brownell, NMFS, Pers. Comm.; NOAA Fisheries, 2007). Blueback herring runs in the Santee are among the highest of Atlantic coast river basins (P. Brownell, NMFS, Pers. Comm.). However, gillnetting effort conducted during the 2005 and 2006 migratory seasons in support of the current relicensing yielded no captures of blueback herring in the LSR (Isely, 2006a; Isley, 2006b). Periodic electrofishing by SCDNR and SCE&G environmental staff have likewise yielded no blueback herring captures (H. Beard, SCDNR, Pers. Comm.; S. Summer, SCANA Services, Pers. Comm.). These data suggest that blueback herring entering the Santee system are either not utilizing the LSR or are utilizing it in extremely low numbers.

Determination of Effect

Alewife and blueback herring have not been documented in the LSR in recent history. Therefore continued operation of the Project is expected to result in No Effect on these species.

2.9 Robust Redhorse Sucker

The robust redhorse is a large, heavy-bodied sucker which was presumed extinct until being "rediscovered" during the initial stages of relicensing at Georgia Power's Sinclair Hydroelectric Project (FERC No. 1951). Fisheries scientists knew little about its life history and habitat requirements. As a result, Georgia Power Company, along with state and federal resource agencies, other hydropower interests, and the Georgia Wildlife Federation, formed the Robust Redhorse Conservation Committee (RRCC) in 1995 to guide recovery efforts for the species in lieu of listing under the ESA. Subsequent research has produced valuable information about the robust redhorse and its habitat requirements. However, much research is still needed, as little is known about the habitat preferences of juvenile robust redhorse.

Based on recent studies, it appears that adult robust redhorse typically inhabit areas of the river where the current is moderately swift. Preferred habitat is riffle areas or in/near outside bends, where depths are greater and accumulations of logs and other woody debris are present (Evans, 1997). Spawning typically occurs at water temperatures from 18 – 24° C, usually over gravel substrate in both deep and shallow water (Hendricks, 1998).

Status in the Project Area

There are no known collections of robust redhorse from the lower Saluda River. Juvenile robust redhorse have been stocked by the SCDNR in the adjacent Broad River Basin below the Neal Shoals dam and below the Parr Shoals dam. In addition to stocking in the Broad River, juvenile robust redhorse have also been stocked by SCDNR in the Wateree River in the Santee Basin (SCDNR, 2005).

Determination of Effect

Due to lack of occurrence of this species in the Project area, continued operation of the Saluda Hydro Project is likely to result in No Effect on this species.

2.10 Saluda Crayfish

The Saluda crayfish is a terrestrial burrowing crayfish of the genus *Distocambarus* and is endemic to South Carolina (Eversole and Welch, 2006). Although knowledge of its habitat requirements is limited, the Saluda crayfish typically has been found in poorly drained areas where the ground is saturated during the rainy season (November – March) (Eversole and Welch, 2006; Hobbs and Carlson, 1985). Saluda crayfish have been documented from a range of site types including; low, moist woodlands; a machine-maintained powerline; and a manicured lawn. Sites are generally isolated from floodplains and streams, although some have been found in low moist areas near the headwaters of streams (colluvial valleys). Analyses performed by Eversole (Welch and Eversole, 2002) found a close association between occurrence of Saluda Crayfish and the presence of a perched water-table, as well as presence of Chewacla, Worsham, Toccoa-Cartecay, Enon, and Sedgefield soil types (Eversole and Welch, 2006).

Status in the Project Area

Currently, the Saluda crayfish is known from only 14 sites, all of which are located in Newberry County (Eversole and Welch, 2006). The known range of the species encompasses portions of the Tyger, Enoree, Lower Broad, and Saluda River basins. The closest confirmed Saluda crayfish site to the Project area (Georges Loop) is approximately 1.2 miles from the Project boundary in a wooded site at the headwaters of a small tributary to Beaverdam Creek (approximately 0.3 miles south of the State Secondary Road 83 crossing at Beaverdam Creek) (Eversole and Welch, 2006). An analysis of soil types occurring within 2 miles of this site was performed using USDA digital soils data (USDA, 2007). A custom soils report for the area revealed limited areas of Tocoa and Cartecay sandy loams along the Saluda River floodplain, upstream of the

Project reservoir, but within the Project boundary. Although extremely limited in extent (< 6% of the total area), these data suggest that, at least from a soils standpoint, some habitat for Saluda crayfish may exist within the Project.

Determination of Effect

Populations of Saluda crayfish potentially occurring within the Project boundary are unlikely to be directly affected by continued operation of the Project, as the areas identified as potential habitat are located upstream of the influence of the Lake Murray pool. In addition, these areas are currently designated as "forest and game management" lands and thus would not be subject to shoreline activities, such as dock building.

2.11 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 (USFWS, 1996).

Status in the Project Area

A freshwater mussel survey of Lake Murray, its tributaries, and the lower Saluda and upper Congaree rivers was conducted during the summer of 2006 in support of the Saluda Hydro Project relicensing (Alderman, 2006). The survey found 15 species of native freshwater mussels within the study area; however, Carolina heelsplitter was not among the species found. Live specimens and relict shells of the species have been documented in Red Bank Creek, just south of the City of Saluda, near the highway 65 and highway 107 road crossings (T. Savidge, Pers. Comm.; L. Zimmerman, USFWS, Pers. Comm.). Red Bank Creek enters the Little Saluda River approximately 7.5 miles upstream of Lake Murray pool.

Determination of Effect

Since Carolina heelsplitter has not been documented in the Project area, continued operation of the Project is expected to result in No Effect on the species.

2.12 Canby's Dropwort

Canby's dropwort is a perennial plant that grows in coastal plain habitats including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds (USFWS, 1990a). The healthiest populations seem to occur in open bays or ponds, which are wet most of the year and have little or no canopy cover. Ideal soils for Canby's dropwort have a medium to high organic content and a high water table. They are also acidic, deep, and poorly drained.

Status in the Project Area

Canby's dropwort is a coastal plain species and thus would not be expected to occur in the Project area.

Determination of Effect

Because Canby's dropwort is not expected to occur in the Project area, continued operation of the Project would likely result in No Effect on the species.

2.13 Georgia Aster

Georgia aster is a relict species of post oak savanna/prairie communities that existed in the southeast prior to widespread fire suppression and extirpation of large native grazing animals (USFWS, 2001). Typical habitat consists of dry oak-pine flatwoods and uplands in the piedmont of North Carolina, South Carolina, Georgia, and Alabama. Georgia aster occupies a variety of dry, upland habitats. The primary controlling factor appears to be the availability of light. The species is a good competitor with other early successional species, but tends to decline when shaded by woody

species. Populations can persist for some undetermined length of time in the shade, but these rarely flower, and reproduce only by rhizomatous expansion. Soils vary from sand to heavy clay, with pH ranging from 4.4 to 6.8 (USFWS, 2001).

Status in the Project Area

There are no populations of Georgia aster known in the Project area. However, consultation with SCDNR Heritage Program staff revealed that some potential exists for this species to occur in frequently disturbed sites, such as transmission line rights-of-way and frequently mowed road shoulders (B. Pittman, SCDNR, Pers. Comm.).

Determination of Effect

Populations of Georgia aster potentially inhabiting the Project area could be affected by use of herbicides during roadside and transmission line right-of-way maintenance. Routine mowing of these areas would not be expected to result in negative effects, as mowing is generally thought to benefit this species by removing woody competitors (USFWS, 2001).

2.14 Little Amphianthus

Little amphianthus is a rooted aquatic plant restricted to eroded depressions on flat-to-doming granitic (either granite or granite-gneiss) outcrops (USFWS, 1993). These outcrops are similar in appearance, but may differ geologically as igneous, quartzitic, gneissic, or porphyritic granite. These endemics typically occur in shallow flat-bottomed pools found on the crest and flattened slopes of unquarried outcrops. The pools range in size from 0.3 square meters to 10 square meters; the vast majority of these pools range from 0.5 to 1 square meter. The pools retain water for several weeks following heavy rains and may completely dry during summer droughts. They are usually several meters in diameter and are circular or irregularly-shaped, due to the coalescence of adjacent pools. This species is typically found in association with two other granite outcrop species: black-spored quillwort (*Isoetes melanospora*) and mat-forming quillwort (*Isoetes*

tegetiformans), all of which are restricted to the Piedmont physiographic province of the southeastern U.S. (USFWS, 1993).

Status in the Project Area

There are no populations of this species known in the Project area. Further, consultation with SCDNR Heritage Program staff confirmed that occurrence of this species in the Piedmont of South Carolina is restricted to eroded pools on flat or domed granitic outcrops, and that suitable habitat for the species likely does not occur within the Project vicinity (B. Pittman, SCDNR, Pers. Comm.).

Determination of Effect

Continued operation of the Saluda Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.15 Piedmont Bishop-Weed

Piedmont bishop-weed (also know as harperella) is a slender, erect annual herb (up to 47 in. in height), with hollow quill-shaped leaves, and clusters of small white flowers that bloom in July and August (USFWS, 1990b). It typically occurs in two habitat types: (1) rocky or gravel shoals and margins of clear, swift-flowing stream sections; and (2) edges of intermittent pineland ponds in the coastal plain. In both habitats, occurrence is limited to a narrow range of water depths, as the species is intolerant of both dry conditions and deeper water. In addition, harperella appears to be particularly dependant on moderately intensive spring floods for germination, seed dispersal, and control of competing species. It is readily eliminated from its habitat by alterations of the water regime, which result from impoundments, water withdrawal, and drainage, or deepening of ponds. Other factors such as siltation, pollution, and shoreline development have also been cited as threats to harperella populations (USFWS, 1990b).

Status in the Project Area

Potential habitat for Piedmont bishop-weed is restricted to gravel shoal areas of the lower Saluda River; however, numerous aquatic vegetation surveys conducted on the lower Saluda in recent decades have failed to document the species. Although aimed at documenting the extent of invasive aquatic species in the river, these surveys would have documented Piedmont bishop-weed, if it were present (C. Aulbach, South Carolina Botanical Services, Pers. Comm.).

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.16 Rough-Leaved Loosestrife

Rough-leaved Loosestrife generally occurs in the ecotones or edges between longleaf pine uplands and pond pine pocosins (areas of dense shrub and vine growth usually on a wet, peaty, poorly drained soil), on moist to seasonally saturated sands, and on shallow organic soils overlaying sand (USFWS, 1995a). Rough-leaf loosestrife has also been found on deep peat in the low shrub community of large Carolina bays (shallow, elliptical, poorly drained depressions of unknown origin). The grass-shrub ecotone, where rough-leaf loosestrife is found, is fire-maintained, as are the adjacent plant communities (longleaf pine - scrub oak, savanna, flatwoods, and pocosin). Suppression of naturally occurring fire in these ecotones, results in shrubs increasing in density and height and expanding to eliminate the open edges required by this plant.

Status in the Project Area

The pine pocosin and Carolina bay environments required by this species do not occur in the Piedmont; therefore, rough-leaved loosestrife is extremely unlikely to occur in the Project vicinity.

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.17 Schweinitz's Sunflower

Schweinitz's Sunflower is believed to have formerly occupied prairie like habitats or Post Oak - Blackjack Oak savannas that were maintained by fire (USFWS, 1994). Current habitats include roadsides, power line clearings, old pastures, woodland openings, and other sunny or semi-sunny situations. Schweinitz's sunflower is known from a variety of soil types but is generally found growing on shallow, poor, clayey and/or rocky soils, especially those derived from mafic rocks. In the few sites where Schweinitz's sunflower occurs in relatively natural vegetation, the natural community is considered a xeric hardpan forest.

Status in the Project Area

There are no populations of Schweinitz's sunflower known from the Project area. Further, consultation with SCDNR Heritage Program staff revealed that suitable habitat for the species likely does not occur in the Project vicinity (B. Pittman, SCDNR, Pers. Comm.).

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

2.18 Rocky Shoals Spider Lily

Rocky shoals spider lily (RSSL), also referred to as Cahaba lily, is a perennial that typically inhabits large streams and rivers at or above the fall line. These areas usually consist of rocky shoals and bedrock outcrops, substrates which provide anchor points for

the RSSL's roots and bulbs (Patrick et al., 1995). RSSL grows best in constantly flowing water with relatively low sediment loads and water depths (to bulb) of 4 to 12 inches (Aulbach-Smith, 1998).

Status in the Project Area

Personnel for the USFWS, SCDNR, and other member of the RT&E TWC surveyed the LSR downstream of the Project for presence of rocky shoals spider lily (RSSL) on May 30th, 2006 (Kleinschmidt, 2006b). Two suspected RSSL plants were observed in the Ocean Boulevard Rapid area of the lower Saluda, just downstream of Interstate 26. Although the survey was conducted in May (when the plant is expected to bloom), the suspected plants were not in bloom. The plants also appeared stunted when compared to the extensive RSSL population located farther downstream in the confluence of the Saluda and Broad rivers, which the group also examined. Because of these factors, the suspected plants were not positively identified as RSSL.

Determination of Effect

No viable populations of RSSL were documented in the lower Saluda River immediately downstream of the Project during the May 2006 survey. However, the extensive population located at the confluence of the lower Saluda and Broad rivers is potentially influenced by Project operations under certain flow conditions (i.e., high flows from the Saluda and lower flow from the Broad). It should be noted that this population is currently managed according to a management and monitoring plan developed during relicensing of the Columbia Hydro Project (FERC No. 1895), which is located on the Broad River in the immediate confluence area.

2.19 Smooth Coneflower

Smooth coneflower is typically found in open woods, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina),

and marble (in South Carolina and Georgia) (USFWS, 1995b). Smooth coneflower occurs in plant communities that have been described as xeric hardpan forests, diabase glades, or dolomite woodlands. Optimal sites are characterized by abundant sunlight and little competition in the herbaceous layer. Natural fires, as well as large herbivores, historically influenced the vegetation in this species' range. Many of the herbs associated with smooth coneflower are also sun-loving species that depend on periodic disturbances to reduce the shade and competition of woody plants.

Status in the Project Area

There are no known populations of smooth coneflower known in the Project area. Further, the diabase glade habitat required by this species is not known to occur in areas around Lake Murray or in the lower Saluda River. Consultation with SCDNR Heritage Program staff confirmed that suitable habitat for smooth coneflower is unlikely to occur in the areas around Lake Murray or the lower Saluda River (B. Pittman, SCDNR, Pers. Comm.).

Determination of Effect

Continued operation of the Project is expected to result in No Effect on this species due to lack of occurrence in the Project area.

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APPENDIX A

CORRESPONDENCE

United States Fish & Wildlife Service Letter Commenting on Initial Consultation Document and Requesting Rare, Threatened and Endangered Species Assessment

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

August 1, 2005

Mr. James M. Landreth
Vice President
Fossil & Hydro Operations
South Carolina Electric & Gas
111 Research Drive
Columbia, South Carolina 29203

Re: First Stage Consultation Comments and Request for Studies, Saluda Hydroelectric Project, FERC No. 516, Richland, Lexington, Newberry, Saluda Counties, South Carolina

Dear Mr. Landreth,

The U.S. Fish and Wildlife Service (Service) has reviewed the May 20, 2005, Initial Consultation Document (ICD) for the Saluda Hydroelectric Project, FERC No. 516. This document identifies our information needs and study requests for the first stage consultation for the relicensing of the project. The following comments are submitted in accordance with the provisions of the Fish and Wildlife Coordination Act, as amended (16 U.S.C.§§ 661-667e); Section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. §§1531-1543); the Federal Power Act (16 U.S.C.§ 791 et seq.); the Migratory Bird Treaty Act (16 U.S.C. §§1536, 1538); the National Environmental Policy Act (42 U.S.C.§ 4321 et seq.); the Clean Water Act (33 U.S.C. §1251 et seq.); and the Electric Consumers Protection Act of 1986 (Pub. L. No. 99-495, 100 Stat. 1243).

I. Saluda Hydroelectric Project

The Saluda Hydroelectric Project, FERC No. 516, constructed in 1930, consists of Lake Murray, the Saluda Dam, the new back-up Saluda Berm, spillway, powerhouse, intakes, and penstocks. Lake Murray is a large reservoir, approximately 41 miles in length and 14 miles at it's widest point. It contains a surface water area of 48,000 acres and 691 shoreline miles. The Saluda Dam is approximately one and a half miles in length. The south side of the dam contains a spillway

with six Tainter gates and a 2,900 foot long man-made spillway channel. In 2002 the applicant began a seismic remediation resulting in the Saluda Berm, a Roller Compacted Concrete and Rock Fill Dam along the downstream toe of the existing dam. The remediation was necessary to stabilize the dam during a seismic event. The Saluda powerhouse contains four generators with a fifth exterior unit, and five intakes and five penstocks. The hydraulic capacity of all five units at normal gate opening is 18,000 cubic feet per second (cfs). Units 1 through 4 contain a hydraulic capacity of 3,000 cfs and unit 5 contains a hydraulic capacity of 6,000 cfs. The project has a licensed capacity of 202.6 MW.

II. Project Resources

The Saluda River joins the Broad River to form the Congaree River which flows to the Santee-Cooper Hydroelectric Project and on to the Santee River. The Saluda sub-basin is one of four basins that form the Santee Basin which encompasses most rivers within South Carolina. The Saluda sub-basin includes over 220 miles of river and 63,000 surface acres, and contains more than 13 dams. The Saluda Hydroelectric Project impounds approximately 41 miles of the Saluda River and its associated tributaries, inundating significant shoals and riffles complexes, and associated riparian and floodplain habitats. It is the first dam encountered on the Saluda River by upstream migrating fish. Below the Saluda Dam there is a 10 mile regulated reach to its confluence with the Broad River. This reach of river is located within the fall zone and is characterized by bedrock and rocky shoal habitat. Currently this 10 mile reach is the only rocky shoal habitat accessible in the Saluda River by migrating fish. Rocky shoal habitats are unique, considering the majority in the Santee Basin has been impounded by hydroelectric projects. Rocky shoals provide habitat for shoal-dependent species including the rocky shoal spider lily, a federal species of concern, and spawning habitat for anadromous fishes such as the American shad, hickory shad, and shortnose and Atlantic sturgeon.

The Saluda Hydroelectric Project and the other twelve projects within the Saluda basin have cumulatively affected and significantly fragmented the river system, altered flows, bedload movements, water chemistry, and aquatic and upland habitat. The Saluda Dam impedes the upstream migration of migratory fish and separates these fish from important spawning and rearing habitats. The water temperature and flow below the Saluda Dam have been altered by the hypolimnetic releases and varied discharges.

III. Fish and Wildlife Service Management Goals

The Service's general management goals and objectives for the Saluda River and Lake Murray are to protect and enhance a balanced, diverse fish community and the diversity of aquatic habitats on which that community depends, as well as to restore habitats for diadromous fish, migratory and riverine game and non-game fish species, and freshwater mussels. Further goals include the recovery of diadromous fish populations of the Santee Basin (which includes the Saluda sub-basin) to levels that provide enhanced economic, social and ecological values and the protection and recovery of endangered species. An Interagency *Santee-Cooper Basin*

Diadromous Fish Passage and Restoration Plan which identifies these resource goals has been accepted by the FERC as a Comprehensive Plan under Section 10(a)(2)(a) of the Federal Power Act and FERC Order No. 481-A. The Saluda Hydroelectric Project and other hydroelectric projects have disproportionately eliminated and cumulatively affected riffle and shoal habitats in the Saluda River watershed. Therefore, restoration, protection and/or enhancement of certain habitats types (i.e., riffles and shoals) are priority goals for the Service. Identification of opportunities for the protection and enhancement of valuable wildlife habitat and enhancing potential use of public trust waters for recreation are additional resource goals of the Service.

IV. Studies Requests for Relicensing

1. Comprehensive Habitat Assessment

Provide quantitative and qualitative data in GIS format of the available and potential spawning, rearing and foraging habitats (i.e., riffles/shoals, open water habitat, shallow cove areas, littoral zones) in Lake Murray, Saluda River, and Lower Saluda River below the project, including tributaries for diadromous and resident fish species.

Justification. Information is needed on the existing available diadromous and resident fisheries spawning, rearing, and foraging habitat and candidate areas for restoration upstream, downstream and within the project. This information will aid in the assessment of project impacts on aquatic resources, determination of the need for fish passage, possible development of fish species target numbers, potential habitat restoration areas, and alternative mitigation alternatives.

2. Instream Flow Study

The Service is concerned about the effects of project operation on downstream flows in terms of water quantity (timing and delivery) and water quality (dissolved oxygen, pH, temperature, nutrients, suspended solids). We recommend a comprehensive instream flow study in the lower Saluda River.

(1) The study should utilize standard methods including Instream Flow Incremental Methodology, Physical Habitat Simulation (PHABSIM), Indicators of Hydrologic Alteration (IHA), and/or others to evaluate the project effects on aquatic and riparian communities. The Service is looking forward to participating in an interagency team to determine detailed study plans which consider target species and/or habitat guilds, habitat suitability indices, location of study reaches and placement of transects.

(2) Explore and analyze potential operational scenarios involving ramping of discharges to dampen the affects of peaking and load following operations on downstream habitats.

(3) Evaluate the affects of project operations on sediment transport and riparian erosion in the 10 mile reach of the lower Saluda River.

Justification. An instream flow study is needed to determine the affects of project operations at the Saluda Dam on the aquatic habitat and resources in the downstream 10 mile reach of the lower Saluda River. This reach consists of rocky shoal habitat important to a variety of species including a put-grow-and-take trout fishery, and resident and shoal-dependent species. It is also potential high quality anadromous fish spawning habitat. This information is necessary to develop potential enhancement and mitigation measures.

3. Mussel Surveys

Survey the reservoir, the upper Saluda River and lower Saluda River and significant tributaries for freshwater mussels to document the distribution, relative abundance, and reproductive success of populations. Additional targeted surveys should determine the presence/absence of federally listed mussels and federal species of concern.

Justification. The license application is required to discuss fish, wildlife, and botanical resources in the vicinity of the project and the impact of the project on those resources § 4.51(f)(3). Information is needed regarding the identification and status of mussel populations at the project. The Saluda Hydroelectric Project impounds a significant portion of the Saluda River which has effectively reduced the amount of free-flowing reaches and has significantly fragmented habitats. This information is necessary to develop potential enhancement and mitigation measures.

4. Macrobenthic Invertebrate Study

Identify and evaluate macrobenthic invertebrate assemblages in the lower and upper Saluda River including crayfish and EPT's (*Ephemeroptera, Plecoptera, Trichoptera)* to describe and evaluate project related effects on benthic resources. Sampling should occur in spring and summer and sites should be located directly below the dam, downstream of the dam, major tributaries, and in Saluda River above the reservoir.

Justification. Basic information regarding the identification of project related fish and wildlife resources is required under 18CFR4.51. Macrobenthic invertebrates due to their sedentary nature provide basic information on local long term and short term conditions such as potential affects from project operations or other environmental stressors. Status of macrobenthic populations can also provide information on fish communities. These study results will provide information on the health and status of invertebrates and fisheries communities at the project.

5. Water Quality

The Services' goal is to insure that water quality of the reservoir, and tailwater meet all standards set by the State for the designated surface water classification. The Service is also interested in ensuring that project operations do not cause the concentration of toxic and other deleterious substances in fish to rise above State standards, Food and Drug Administration action levels, or U.S. Environmental Protection Agency screening values for the protection of human health. We seek to ensure that project operations such as cleaning of trashracks, does not create water quality problems. We are interested in optimizing water quality for selected target species, and want to assist in the design of appropriate mitigation for project impacts.

Water quality information concentrating on dissolved oxygen and temperature in the reservoir, tailrace, and downstream area is necessary. Available existing water quality data should be reviewed to determine the need for additional sampling. If additional sampling is necessary, seasonal samples should be taken diurnally (early morning and late afternoons) and should adequately cover the water column.

Justification. Adequate water quality conditions are necessary for the continual existence of aquatic biota. Historically, water quality concerns have been in the lower Saluda River, tributaries, and in the area of the thermocline near the dam. The lower Saluda River has had a history of low dissolved oxygen levels from project dishcharges, tributaries to the project have been major contributors of pollutants, and low dissolved oxygen conditions near the dam have resulted in fish kills. Water quality reports including the enhancement measure that address these issues should be updated for the project.

6. Entrainment and Out-migration Study

An evaluation of existing and potential resident and diadromous fish out-migration and entrainment/mortality at the dam is needed to assess project-related factors influencing fish populations. Out-migration (spillway and turbine passage) may be significant in terms of recruitment for river basin populations. An understanding of existing and potential out-migration and turbine passage is needed in connection with diadromous fish passage feasibility analyses at the project. The status of entrainment relative to striped bass, blueback herring, the catadromous American eel, and potential anadromous species needs to be evaluated.

The 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 dams. Limnological studies should be included that document monthly changes in dissolved oxygen, temperature, conductivity, turbidity, thermocline development and overturn under normal hydropower operations. This study element should include multiple years of data to help provide an understanding of limnology and

habitat conditions likely to be encountered by out-migrating adult, juvenile, and egg/larval fish life stages at the project dams.

A literature-based study summarizing entrainment mortality studies on similar projects should be conducted. It is conceivable that a sufficient database exists on similar sites with similar turbines from which to draw reasonable conclusions relative to entrainment and mortality in lieu of conducting a site-specific study. The Service is amenable to exploring the possibility of this approach however there is a distinct possibility that site-specific studies utilizing recovery netting and appropriately designed mortality studies may be necessary. The top and bottom elevation of the trashracks, the width of the trashracks, or the clear spacing for all of the trashracks should be described. Also, provide the mean velocities in front of the intakes across the full range of operating conditions. These are the minimum data needed to determine if fish impingement and entrainment may be considered a problem at the project.

Justification. The cumulative loss of fish from entrainment and mortality at the project is a concern. An estimate of these losses at this project is necessary to determine the type and extent of mitigation (avoidance, minimization, compensation) necessary to off-set loss of public trust resources. Additionally, an analysis of the potential entrainment of diadromous species (adults and juvenile out-migrants) is necessary for the Service's evaluation of potential fish passage at the project.

7. Land Use and Shoreline Management Plan

The Land Use and Shoreline Management Plan (LUSMP) should be updated and revised in concert with the state and federal natural resource agencies as required in the Federal Energy Regulatory Commission Orders of June 23, 2004, and October 28, 2004. We request a thorough analysis of land use at the project, particularly including determination of the amount of land developed in the lower, middle, and upper areas of the reservoir.

Justification. The Service is interested in collaboratively working to resolve issues surrounding the Land Use and Shoreline Management Plan as expressed in our numerous correspondences to SCEG in the last decade. It is imperative that issues including shoreline buffers, fringeland sales, environmentally sensitive areas, erosion areas, woody debris, and rebalancing of land use designations be resolved in the new license.

8. Rare, Threatened, and Endangered Species

Provide a comprehensive list and location map of all rare species, and federally threatened and endangered species within the project area. Develop management plans for all federally protected species that occur within the project to be included with the license application.

Rare species that may occur in the project area include the robust redhorse sucker, Carolina redhorse, and the highfin carpsucker. Additionally, the Service recently was petitioned to consider listing the American eel under the Endangered Species Act (ESA). A 90 Day Finding period has determined that substantial evidence exists to warrant further consideration. You should be aware that the American eel could potentially be listed under the ESA in the near future.

Enclosed is a list of species from Richland, Lexington, Newberry, and Saluda Counties in South Carolina, that are on the *Federal List of Endangered and Threatened Wildlife and Plants* or constitutes species of Federal concern that may occur in the project impact area. We recommend surveying the project area for these species prior to any further planning. The Services recognize that species of Federal concern are not legally protected under the Act and are not subject to any of its provisions, including Section 7, unless they are formally proposed or listed as endangered or threatened. We are including these species in our response to give you advance notification. The presence or absence of these species in the project boundary and the area of effect of the project operation should be addressed in any environmental document prepared for this project.

County	Common Name	Scientific Name	Status	Occurrence
Lexington				
	Bald eagle	Haliaeetus leucocephalus	T	Known
	Carolina heelsplitter	Lasmigona decorata	E	Possible
	Red-cockaded woodpecker	Picoides borealis	E	Known
	Shortnose sturgeon	Acipenser brevirostrum*	E	Possible
	Smooth coneflower	Echinacea laevigata	E	Possible
	Schweinitz's sunflower	Helianthus schweinitzii	E	Known
	Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
	Dwarf aster	Aster mirabilis	SC	Possible
	Shoal's spider-lily	Hymenocallis coronaria	SC	Known
	Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
	Piedmont cowbane	Oxypolis ternata	SC	Known
	Wire-leaved dropseed	Sporobolus teretifolius	SC	Known
	Pickering's morning-glory	Stylisma pickeringii var. pickeringii	SC	Known
	Rayner's blueberry	Vaccinium crassifolium ssp sempervirens	SC	Known
	Bachman's sparrow	Aimophia aestivalis	SC	Known
	Henslow's sparrow	Ammodramus henslowii	SC	Known

	American kestrel	Falco sparverius	SC	Possible
	Loggerhead shrike	Lanius ludovicianus	SC	Possible
	Painted bunting	Passerina ciris ciris	SC	Possible
	Southern hognose snake	Heterodon simus	SC	Possible
	Robust Redhorse Sucker	Moxostoma robustum	SC	Possible
Newberry				
	Bald eagle	Haliaeetus leucocephalus	T	Known
	Carolina heelsplitter	Lasmigona decorata	E	Possible
	Butternut	Juglans cinerea	SC	Possible
	Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
	Biltmore green briar	Smilax biltmoreana	SC	Known
	Sweet pinesap	Monotropsis odorata	SC	Known
	Bachman's sparrow	Aimophia aestivalis	SC	Known
	Henslow's sparrow	Ammodramus henslowii	SC	Known
	American kestrel	Falco sparverius	SC	Possible
	Loggerhead shrike	Lanius ludovicianus	SC	Possible
	Saluda crayfish	Distocambarus youngineri	SC	Known
Richland				
	Bald eagle	Haliaeetus leucocephalus	T	Known
	Red-cockaded woodpecker	Picoides borealis	E	Known
	Shortnose sturgeon	Acipenser brevirostrum*	E	Known
	Smooth coneflower	Echinacea laevigata	E	Known
	Rough-leaved loosestrife	Lysimachia asperulaefolia	E	Known
	Canby's dropwort	Oxypolis canbyi	E	Known
	Carolina heelsplitter	Lasmigona decorata	E	Possible
	Georgia aster	Aster georgianus	C	Known
	Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
	Sandhills milk-vetch	Astragalus michauxii	SC	Known
	Purple balduina	Balduina atropurpurea	SC	Known
	Shoals spider-lily	Hymenocallis coronaria	SC	Known
	Creeping St. John's wort	Hypericum adpressum	SC	Known
	Bog spicebush	Lindera subcoriacea	SC	Known
	Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
	Carolina bogmint	Macbridea caroliniana	SC	Known
	Algae-like pondweed	Potamogeton confervoides	SC	known
	False coco	Pteroglossaspis ecristata	SC	Known
	Awned meadowbeauty	Rhexia aristosa	SC	Known

Reclined meadow-rue	Thalictrum subrotundum	SC	Known
White false-asphodel	Tofieldia glabra	SC	Known
Rayner's blueberry	Vaccinium crassifolium ssp. empervirens	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Known
Loggerhead shrike	Lanius ludovicianus	SC	Known
Painted bunting	Passerina ciris ciris	SC	Possible
Carolina darter	Etheostoma collis	SC	Known
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known
Southern hognose snake	Heterodon simus	SC	Known

Saluda

Bald eagle	Haliaeetus leucocephalus	T	Known
Red-cockaded woodpecker	Picoides borealis	E	Known
Carolina heelsplitter	Lasmigona decorata	E	Possible
Piedmont bishop-weed	Ptilimnium nodosum	E	Known
Little amphianthus	Amphianthus pusillus	T	Known
Dwarf burhead	Echinodorus parvulus	SC	Known
Creeping St. John's wort	Hypericum adpressum	SC	Known
Prairie birdsfoot-trefoil	Lotus purshianus var. helleri	SC	Possible
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Savannah lilliput	Toxolasma pullus	SC	Known
Southern hognose snake	Heterodon simus	SC	Known

We recommend that surveys be conducted by comparing the habitat requirements for these species with available habitat types within the action area of the project. "Action area" is defined at 50 CFR § 402.02 as "...all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." Field surveys for the species should be performed if habitat requirements overlap with that available at the project site. Surveys for protected plant species must be conducted by a qualified biologist during the flowering or fruiting period(s) of the species. We welcome the opportunity to assist with the design of studies, sampling schemes, methodology, and target areas for the above species, as well as analysis of the "effects of the action," (as

defined by 50 CFR § 402.02) on any listed species including consideration of direct, indirect, and cumulative effects.

We also recommend contacting the S.C. Department of Natural Resources (SCDNR), Data Manager, Wildlife Diversity Section, Columbia, S.C. 29202 concerning known populations of federal and/or state endangered or threatened species, and other sensitive species in the project area. Additional habitat information may also be available from SCDNR. NOAA Fisheries endangered species office in St. Petersburg, Florida should be contacted relative to shortnose sturgeon which may occur in the action area.

9. Migratory Bird Surveys

Evaluate the effects of the project on migratory bird use at Lake Murray and the Saluda River and riparian ecosystems. Surveys of migratory birds and their habitats should begin in the Fall of 2005 to provide baseline information on populations.

Continue aerial surveys for potential roosting, nesting, and foraging sites for the federally endangered woodstork.

Justification. Migratory birds, particularly neo-tropical migrants, utilize the Saluda River ecosystem for wintering habitat. These species have potentially been adversely affected by the project by the decrease in available wetlands and floodplain habitat, loss of foraging habitat, and alteration of riparian habitat. Information on population estimates and habitat utilization are needed to determine potential enhancement measures.

10. Fish Community Surveys

Conduct fish community surveys including small non-game species in the Saluda River above and below the reservoir as well as in Lake Murray, to supplement existing fish community data and/or replace dated information. Specific sampling focused on determining presence or absence of the rare robust redhorse sucker, Carolina sucker, and the highfin carpsucker should be conducted in the lower Saluda River.

Justification. Information is needed on the status of fish communities in the reservoir as well as the Saluda River above and below the reservoir for game and non-game fish species. River impoundments and reservoirs fragment fisheries communities and impede migration patterns. The inundation of project tributaries in conjunction with such a large reservoir also fragments populations within the reservoir and tributaries. Data gathered as part of relicensing should be compared to historically gathered data for comparison. These study results will provide information on the status of reservoir and riverine communities.

11. Temperature Analysis – Downstream Affects

Provide an analysis of the effects of the temperature of discharges from the Saluda Dam on downstream habitats including: (1) An analysis that determines the travel distance downstream to effectuate completion of temperature mixing in the Congaree River; (2) an evaluation of the affects to species and habitats within the downstream Congaree National Park; (3) an evaluation of the affects to upstream migrating diadromous fish.

Justification. The Saluda Dam typically discharges hypolimnetic water which is cooler than water in adjacent watersheds. We are interested in determining how far the cooler water travels before completely mixing with the ambient water temperatures from the Broad and Congaree Rivers, and how these cooler temperatures may affect downstream habitats, particularly in the Congaree National Park. We are also interested as to how these cooler discharges affect diadromous species during their upstream migration from the Santee-Cooper Hydroelectric Project.

12. Striped Bass Evaluations

Provide and evaluation project operations on the reservoir striped bass population, particularly regarding: (1) the effectiveness of current turbine operations, (2) potential additional enhancements in association with the summer thermocline near the powerhouse; and (3) determine if striped bass migrate upstream of the project within the Saluda River during the spring spawning season, and if and where spawning activities occur.

Justification. The reservoir striped bass fishery is an important recreational fishery at Lake Murray. The status of the fishery needs to be described and any potential enhancements identified.

13. Diadromous Fish Surveys

Continue diadromous fish surveys in the lower Saluda River during the spring 2006 spawning migrations as outlined in the *2005 Diadromous Fish Studies* study plan. This plan was developed in the fall of 2004 in concert with state and federal natural resource agencies as an "early start" study for project relicensing.

Justification. There are 10 miles of riverine reach below Saluda Dam to its confluence with the Broad and Congaree Rivers. Currently, diadromous fish are passed upstream of the Santee Cooper Hydroelectric Project and migrate up the Congaree, Broad, and Wateree Rivers. The 10 miles below the Saluda project contains potential high quality spawning habitat for American shad, hickory shad, blueback herring, shortnose sturgeon and Atlantic sturgeon. The shortnose sturgeon is a federally listed endangered species and all federal agencies (including the FERC) are responsible for undertaking actions toward its recovery under Section 7(a)(1) of the Endangered Species Act (16 U.S.C. 1531-1543). These surveys will determine if diadromous fish are utilizing the lower Saluda River. This information will aid the Service in developing potential enhancement measures for the lower Saluda and/or determining if fish passage is warranted at the project. We believe it is necessary to conduct sampling for two seasons at a minimum to accurately identify the status of diadromous fish utilization in the lower Saluda River.

V. Information Requests for Relicensing

1. Existing Studies and Data

Please provide copies of the existing environmental studies conducted at the Saluda Hydroelectric Project by SCE&G contractors and the South Carolina Department of Natural Resources that are referenced in the literature cited section of the Initial Consultation Document. These may be provided as hard copies or via CD (preferable).

2. Project Operations

Provide a detailed description of current and past project operations pursuant to existing license conditions. This analysis should include the frequency, magnitude, and duration of turbine discharges, spills, and reservoir drawdowns.

3. Dissolved Oxygen Concentrations in Lower Saluda River

Provide an updated report on the status of dissolved oxygen concentrations in the lower Saluda River and the efficacy of existing enhancement measures.

We appreciate the opportunity to comment on the Initial Consultation Document for the relicensing of the Saluda Hydroelectric Project. We look forward to further coordination throughout the relicensing process. If you have any questions or need further information please contact Ms. Amanda Hill of my staff at (843) 727-4707 ext. 303.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/AKH

APPENDIX B

Species of Highest Conservation Concern from South Carolina's Comprehensive Wildlife Conservation Strategy (CWCS) Potentially Occurring in Lexington, Newberry, Richland and Saluda Counties, South Carolina

Here are the Species of Greatest Conservation Need from South Carolina's Comprehensive Wildlife Conservation Strategy (CWCS) that could potentially occur in Lexington, Newberry, Richland and Saluda Counties, South Carolina.

Even though the species in the strategy are divided into Highest, High and Moderate Priority, all of them are considered species of concern in the state. Those with moderate priority are given the same amount of consideration as those of highest. However, please understand that unless they are also given federal or state status, there are no laws governing how we deal with these organisms. The species of concern are identified based on criteria identified in the CWCS, but all of them bear watching. At your request, I have only identified species of the highest priority that occur in the counties identified above.

Plant species were not included in the CWCS as this was a plan for wildlife species. The only information we have concerning plants is included in the list of Threatened and Endangered Species, which can be found on the SCDNR website (https://www.dnr.sc.gov/pls/heritage/county_species.select_county_map).

Highest Priority Species from SC's Comprehensive Wildlife Conservation Strategy		**Counties of Potential Occurrence**			
Common Name	**Scientific Name**	**Lexington**	**Newberry**	**Richland**	**Saluda**
Mammals: No highest priority mammal species are known to occur in these counties at this time					
Birds					
American Bittern	*Botaurus lentiginosus*	X	X	X	X
American Coot	*Fulica americana*	X	X	X	X
American Kestrel	*Falco sparverius paulus*	X	X	X	X
Bachman's Sparrow	*Aimophila aestivalis*	X	X	X	X
Brown-headed Nuthatch	*Sitta pusilla*	X	X	X	X
Common Ground-dove	*Columbina passerine*	X		X	
Eastern Meadowlark	*Sturnella magna*	X	X	X	X
Eastern Wood Peewee	*Contopus virens*	X	X	X	X
Field Sparrow	*Spizella pusilla*	X	X	X	X
Grasshopper Sparrow	*Ammodramus savannarum*	X	X	X	X
Kentucky Warbler	*Oporornis formosus*	X	X	X	X
King Rail	*Rallus elegans*	X		X	
Least Bittern	*Ixobrychus exilis*	X	X	X	X
Lesser Scaup	*Aythya affinis*	X	X	X	X
Little Blue Heron	*Egretta caerulea*	X	X	X	X
Loggerhead Shrike	*Lanius ludovicianus*	X	X	X	X
Mallard	*Anas platyrhyncos*	X	X	X	X
Northern Bobwhite	*Colinus virginianus*	X	X	X	X
Pied-billed Grebe	*Podilymbus podiceps*	X	X	X	X
Prairie Warbler	*Dendroica discolor*	X	X	X	X
Rusty Blackbird	*Euphagus carolinus*	X	X	X	X
Swainson's Warbler	*Limnothlypis swainsonii*	X		X	
White Ibis	*Eudocimus albus*	X	X	X	X
Wood Thrush	*Hylocichla mustelina*	X	X	X	X
Wilson's Snipe	*Gallinago gallinago*	X	X	X	X
Yellow-crowned Night-heron	*Nyctanassa violacea*	X	X	X	X

Highest Priority Species from SC's Comprehensive Wildlife Conservation Strategy		Counties of Potential Occurrence			
Common Name	**Scientific Name**	**Lexington**	**Newberry**	**Richland**	**Saluda**
Reptiles and Amphibians					
Coral Snake	*Micrurus fulvius*	X		X	
Southern Hognose Snake	*Heterodon simus*	X		X	
Tiger Salamander	*Ambystoma tigrinum*	X		X	
Freshwater Fishes: Currently, no priority diadramous fishes are known to occur in these counties.					
Redeye Bass	*Micropterus coosae*	X	X	X	X
Saluda Darter	*Etheostoma saludae*	X	X	X	X
Freshwater Mussels					
Creeper	*Strophitus undulatus*	X	X	X	X
Savannah Lilliput	*Toxolasma pullus*	X	X	X	X
Crayfish: All below are terrestrial burrowing crayfish					
A Crayfish	*Distocambarus hunteri*		X		
A Crayfish	*Distocambarus youngineri*		X		
Mimic Crayfish	*Distocambarus carlsoni*		X		X
Freshwater Snails					
Savannah Pebblesnail	*Somatogyrus* spp.	X	X	X	X