BIOLOGICAL ASSESSMENT FOR FEDERALLY PROTECTED SPECIES

TRANSMISSION LINES ASSOCIATED WITH V.C. SUMMER NUCLEAR STATION UNITS 2 AND 3

VARIOUS COUNTIES, SOUTH CAROLINA

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Introduction[1]

The proposed action is a joint project between South Carolina Electric & Gas Company (SCE&G) and the South Carolina Public Service Authority (Santee Cooper). The project consists of constructing two nuclear power units (Unit 2 and Unit 3) and their ancillary development to be jointly owned by SCE&G and Santee Cooper, and operated by SCE&G. Specifically, SCE&G proposes to build and operate two new Westinghouse AP1000 advanced light water reactors at the existing V.C. Summer Nuclear Station (VCSNS) site in Fairfield County, SC. The proposed project also consists of constructing approximately 396 corridor miles of new transmission lines, of which approximately 350.5 corridor miles will be located within existing transmission line rights-of-way (ROW). SCE&G will construct approximately 157 corridor miles of transmission lines, with approximately 151 miles being within existing ROW. Santee Cooper will construct approximately 239 linear miles of transmission lines, with approximately 199.5 miles being within existing ROW.

SCE&G is the principal subsidiary of SCANA Corporation, an energy-based holding company with headquarters in Cayce, South Carolina. Santee Cooper is South Carolina's state-owned electric and water utility, with corporate headquarters in Moncks Corner, South Carolina. SCE&G has been authorized by Santee Cooper to act as their agent in applying for a Section 404 permit for the proposed project. Because of the Federal nexus of applying for a license from the Nuclear Regulatory Commission (NRC) and a Section 404 permit, consultation with the United States Fish and Wildlife Service (USFWS) is required under Section 7 of the Endangered Species Act (ESA) of 1973, as amended.

Project Description

The VCSNS site is located in Fairfield County, South Carolina, approximately 15 miles west of Winnsboro and 26 miles northwest of Columbia. The site is in a sparsely populated, largely rural area, with forests and small farms comprising the dominant land use. The Broad River flows in a northwest-to-southeast direction approximately one (1) mile west of the site and serves as the boundary between Fairfield County (to the east) and Newberry County (to the west). The new plant footprint is located south of VCSNS Unit 1 (the existing facility) and is generally the area that was used for laydown of construction materials and the source of borrow material during the construction of Unit 1. This Biological Assessment (BA) does not address the VCSNS site, as several protected species surveys were conducted between 2002 and 2007 for the nuclear site and are addressed in the Environmental Impact Statement (EIS) prepared by the NRC.

SCE&G will construct four (4) new transmission lines primarily within existing cleared transmission line ROW. These lines will extend from both the existing Unit 1 switchyard (VCS1) and the proposed Unit 2 and 3 switchyard (VCS2) at the VCSNS site to other locations within the state: 1) VCS1-Killian 230kV Line – ties to SCE&G's existing Killian substation, located approximately 1.5 miles south of the intersection of SC Highway 555 and Killian Road in Richland County, SC; 2) VCS2-Lake Murray 230kV Line #2 – ties to SCE&G's existing Lake Murray 230kV substation, adjacent to Saluda Hydro and McMeekin generating stations; 3) VCS2-St. George 230kV Line #1; and 4) VCS2-St. George 230kV Line #2. Lines 3) and 4) will run in separate, existing SCE&G ROW corridors to a location (owned by SCE&G) near SCE&G's existing Lake Murray 230kV substation. These two lines will not tie to the Lake Murray substation, but will converge here and from this point run a common, existing SCE&G ROW corridor until they

[1] Portions of first paragraph are taken from SCE&G Combined Operating License Application (COLA) Part 3-Environmental Report, Revision 1.

reach SCE&G-owned property in St. George, SC, where the future St. George 230kV substation will be constructed. This future substation will be located approximately one mile east of the intersection of Interstate 95 and US Highway 78 in Dorchester County, SC (Figure 1, Appendix A).

Minimal environmental impacts are anticipated from construction of the proposed transmission lines. Of the approximately 157 miles of SCE&G transmission lines that compose this project, approximately 151 miles, or 96%, are located in existing SCE&G transmission line ROW. The remaining approximately six (6) miles (4%) of line will be constructed within new ROW. SCE&G will implement appropriate Best Management Practices (BMPs) during construction which will minimize adverse effects from transmission line construction.

At the request of SCE&G, Palmetto Environmental Consulting, Inc. (PEC), Dr. L.L. Gaddy, and Mr. J. Robert Siler conducted surveys for federally-listed threatened and endangered plant and animal species within corridors containing or proposed to contain transmission lines associated with the proposed Units 2 and 3 project.

Species Descriptions

Shortnose Sturgeon

As shown in Table 1, the shortnose sturgeon is listed by the USFWS for Calhoun, Dorchester, Lexington, Orangeburg, and Richland counties. This species lives mainly in slower moving riverine waters or nearshore marine waters, migrating periodically into faster moving fresh water areas to spawn (Office of Protected Resources 2004). Adults have separate summer and winter areas. No historical or current population dynamics are known for this species (NMFS/NOAA 2010).

Frosted Flatwoods Salamander

The frosted flatwoods salamander is located east of the Appalachicola River Basin. The species occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina (USFWS 1999, USFWS 2009). There are four known populations of frosted flatwoods salamander in South Carolina, and of the counties through which the transmission lines will be located, the USFWS lists this species as occurring only in Orangeburg County. The species inhabits moist soil of longleaf pine (*Pinus palustris*) and slash pine (*P. elliottii*) flatwoods of the southeastern coastal plain. However, not all flatwoods are appropriate habitat, as the species only occurs at sites with seasonal ponds and flatwoods which are usually fire-maintained. Critical habitat has been designated for the frosted flatwoods salamander in Berkeley, Charleston, and Jasper counties, SC (USFWS 2009); however, none of SCE&G's proposed transmission line corridors are located in these counties.

The frosted flatwoods salamander is a slender, small-headed mole salamander. Adult dorsal color ranges from dark black to chocolate black with grayish or silvery network pattern or frosted appearance running along the lateral and dorsal surfaces. Typical breeding sites are isolated wetland depressions, which dry completely on a cyclic basis, thus eliminating fish species. The depressional wetlands are generally dominated by pond cypress (*Taxodium ascendens*) and swamp tupelo (*Nyssa biflora*). The groundcover is typically made up of clumps of sedges and grasses and other herbaceous species. Growing season fires through the breeding ponds are thought to improve breeding habitat for this species.

Smooth Coneflower

Smooth coneflower is historically a plant of prairie-like habitats or oak-savannas maintained by natural or Native American-set fires. Currently, the species primarily occurs in openings in woods, such as cedar barrens, clear cuts, along roadsides, utility line rights-of-way, and on dry limestone bluffs. The coneflower is found on clay soils especially rich in magnesium and calcium (high pH) and is generally associated with Iredell, Mecklenberg, and Brevard Belt soils in the Carolinas and Georgia. The plant does not compete well in densely-shaded forest conditions and prefers open woods and prairie-like environments (Gaddy and Siler 2010).

Bald Eagle

The bald eagle is primarily riparian, associated with rivers, coasts, and lakes, usually nesting near bodies of water where it feeds. Selection of nesting sites varies depending on the species of trees growing in a particular area, but in the Southeast, nests are constructed in dominant or codominant pines or cypress (USFWS 1996a). Many nests are used annually. In South Carolina, bald eagles typically nest from October 1 through May 15. Prior to the species being protected under the ESA, South Carolina had only 13 pairs of bald eagles.

While the bald eagle is no longer listed as federally threatened or endangered, it is still protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA). Under BGEPA, the National Bald Eagle Management Guidelines (USFWS 2007) protect habitat for the species although the protective buffers are smaller than the earlier requirements under the ESA.

Carolina Heelsplitter

The Carolina heelsplitter, a freshwater mussel, can reach up to 4.6 inches in length, 1.6 inches in width, and 2.7 inches in height. Specific aspects of the species life history are unknown (USFWS 2002). The Carolina heelsplitter is usually found in mud, muddy sand, or muddy gravel substrates along stable, well-shaded stream banks. The species has also been found in Mountain Creek (Edgefield County, SC) in a relatively silt-free substrate comprised primarily of a mixture of sand, gravel, and cobble (USFWS 2005). Personal communication with USFWS also revealed that only perennial streams support this species. In South Carolina, the four surviving heelsplitter populations are limited to the Catawba, Pee Dee, and Savannah River systems (USFWS 2005). There are no known records from the Broad River system although surveys were conducted from 1987-1990 (USFWS 1993a).

Pondberry

Pondberry is a dioecious, deciduous shrub with pale yellow flowers. The fruit is a bright red drupe that matures in the fall. Flowering occurs late in February to mid-March; fruiting occurs from August to early October. The leaves have a strong, sassafras-like odor when crushed. Reproduction seems to be primarily vegetative by means of stolons (USFWS 1992).

Pondberry is generally associated with wetland habitats and the margins of sinks, ponds, and other depressions in the more coastal sites. The plants generally grow in shaded areas but may also be found in full sun (USFWS 1991a). However, it does not appear to tolerate dense shade and is absent where shrubs are dense in wetland margins (Gaddy and Siler 2010).

Rough-leaved Loosestrife

Rough-leaved loosestrife is a perennial rhizomatous herb about 10-20 inches tall with yellow

flowers in a raceme (USFWS 1995). Leaves are sessile and in whorls of three to four. The species flowering from late May to early June; seeds form by August but capsules do not dehisce until October (USFWS 1995).

This species usually occurs in the ecotones between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands and on shallow organic soils overlaying sand. It has also been found on deep peat in the low shrub community of large Carolina bays. The grass-shrub ecotone, where loosestrife is found, is fire-maintained, as are the adjacent plant communities (USFWS 1995).

Wood Stork

Wood storks are large, long-legged wading birds. They are white except for black primaries and secondaries and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved (USFWS 1992). Wood storks typically nest in cypress/tupelo gum ponds with standing water. It is a highly colonial species usually nesting in large rookeries and feeding in flocks.

Wood storks are generally associated with freshwater and brackish wetlands, mainly nesting in cypress or mangrove swamps. Feeding habitat consists of narrow tidal creeks, flooded tidal pools, or freshwater marshes. Good feeding sites consist of depressions in marshes or swamps where fish may become concentrated during falling water levels (USFWS 1996b).

Canby's Dropwort

Canby's dropwort is a perennial herb with erect, hollow stems, aromatic foliage and elongate, stoloniferous rhizomes. It has minute white flowers produced in terminal or axillary umbels; sepals may be tinged red. The fruit is a strongly-winged schizocarp. The species flowers from late May through early August and fruits in early fall.

Canby's dropwort grows in coastal plain habitats including wet pineland savannas, wet meadows, sloughs, ditches, and around the edges of cypress-pine ponds. Thriving 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 the species have a medium to high organic content and a high water table (USFWS 1991b).

Red-cockaded Woodpecker (RCW)

Nesting habitat for RCWs consists of open stands of pine with a minimum age of 80 to 120 years, depending on the site. Longleaf pines are most commonly used for nesting, but other species of southern pine may also be used. Dense stands which contain primarily hardwoods or have a dense hardwood understory are avoided. RCW foraging habitat is characterized by pine and pine hardwood stands 30 years old or older with foraging preference for pines 10 inches or larger in diameter (USFWS 1993b).

RCWs are unique in that they excavate cavities for roosting and nesting in living pines, and use living pines almost exclusively for foraging substrate, preferring longleaf pine when available. RCWs require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (i.e., cavity trees) (USFWS 2003). Cavity trees must be in open pine stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. RCWs also require

abundant foraging habitat. Suitable foraging habitat consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, and few or no overstory hardwoods (USFWS 2003).

For purposes of surveying, suitable nesting habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older and that are within 0.5 mile of suitable foraging habitat; suitable foraging habitat consists of a pine or pine/hardwood stand in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years in age or older (USFWS 2003).

Methodology

Prior to beginning field surveys, USFWS and the South Carolina Department of Natural Resources (SCDNR) were contacted to obtain the most current known federally-protected species occurrence information. USFWS provided a GIS layer containing such information (which also generally reflects occurrences included in the SCDNR database), which was overlaid with maps depicting the proposed transmission line corridors. The USFWS layer was cross-referenced with SCDNR's "South Carolina Rare, Threatened and Endangered Species Inventory" database to ensure complete coverage of known protected species occurrences. The USFWS's "South Carolina List of Endangered, Threatened and Candidate Species, July 2010" was used to determine for which species surveys would be conducted for each county that the proposed transmission lines are located. According to agency records and at the time field investigations began, no federally-listed threatened and endangered species were known to occur within or along the margins of any of the transmission corridors in the study area. Sheets 1 through 5 (Appendix B) show all known federally-listed threatened or endangered species occurrences located within two miles of the transmission corridors. The known occurrences are limited to ten occurrences of bald eagle.

Field personnel noted all habitats types that were located within the transmission line corridors and within the vicinity of the corridors using remote sources. The habitat maps were compiled using natural color and infrared imagery of the study area with topographic, soil, and wetland features overlaid on the natural color and infrared imagery.

Potential habitats for all of the potentially-occurring federally-listed species were then plotted on study area mapping before fieldwork began. Field investigations were conducted in those areas where apparent appropriate habitat was contained within or along the margins of the transmission line corridors (Gaddy and Siler, 2010). Eighty-seven (87) field sites containing potential habitat were field investigated, which can be seen on Sheets 1 through 5 (Appendix B). Surveys for the species listed in Table 1 were conducted between October 19 and November 10, 2010. These surveys were conducted at sites where protected species could potentially occur.

Habitat Descriptions

The VCS1-Killian 230 kV line is located almost entirely in the Piedmont province. The extreme southern portion of the Killian Line extends into the Upper Coastal Plain region of Richland County. All of the approximately six (6) miles of proposed new ROW associated with this project is located on the VCS1-Killian line.

The northernmost portion of the VCS2-St. George #1/VCS2-Lake Murray #2 and VCS2-St. George #2 230 kV lines are located in the Piedmont province in Fairfield, Newberry, Richland, and

Lexington counties. From northern Lexington County southward, the St. George lines are located within the Upper and Middle Coastal regions associated with Aiken, Calhoun, Orangeburg, Bamberg, and Dorchester counties. Very short segments of the St. George lines are located within the Lower Coastal Plain region associated with Dorchester and Colleton counties. The majority of the St. George lines are located on existing, cleared ROW. A portion of the existing corridor on which the VCS2-St. George #1/VCS2-Lake Murray #2 line will be constructed in Newberry and Fairfield counties currently contains an existing electric distribution line. The distribution line corridor will be cleared to SCE&G's existing ROW limits to accommodate the proposed transmission line.

The route of the VCS2-Lake Murray #2 230 kV Line is entirely within the Piedmont province of southwestern Fairfield County, northwest Richland County, and northern Lexington County. The VCS2-Lake Murray #2 line is located primarily on existing, cleared ROW.

All of the approximately six (6) miles of proposed new ROW associated with this project is located on the VCS1-Killian line.

Maintained Transmission Line ROW

Approximately 95% of the SCE&G proposed transmission lines consist of maintained cleared ROW where vegetation is controlled to avoid impacting overhead utility lines. These easements are mechanically and/or chemically maintained which results in early successional communities including perennial herbaceous and shrubby vegetation. Land cover types occurring along the existing corridors are the result of vegetation management by the utility provider or landowner.

The majority of the cleared ROW consists of uplands with well drained, sandy soils and includes species in the herbaceous layer such as broom sedge (*Andropogon virginicus*), morning glory (*Opomoea purpurea*), dog fennel (*Eupatorium* spp.), ragweed (*Ambrosia artemisiifolia*), panic grass (*Panicum* spp.), partridge pea (*Cassia occidentalis*), blackberry (*Rubus* spp.), goldenrod (*Solidago* sp.), Johnson grass (*Sorghum halepense*), baccharis (*Baccharis halimifolia*), bahiagrass (*Paspalum notatum*), and thistle (*Circium* sp.).

There are also areas where the maintained, existing ROW is located in low lying, poorly drained soils that includes floodplains, depression wetlands, beaver-impounded wetlands, or seep wetlands. These areas contain species including wool grass (*Scirpus cyperinus*), smartweed (*Polygonum* spp.), cinnamon fern (*Osmunda cinnamomea*), cattail (*Typha latifolia*), netted chain fern (*Woodwardia areolata*), plumegrass (*Saccharum giganteum*), red maple (*Acer rubrum*), black willow (*Salix nigra*), blackberry, giant cane (*Arundinaria gigantea*), and soft rush (*Juncus effusus*).

Oak-hickory Forest

Oak-hickory forest is found throughout the state but is most characteristic of rolling uplands in the Piedmont. Occurring in highly fragmented stands, later successional stages tend to be made up of a diverse assemblage of hardwoods, primarily oaks and hickories, as co-dominants in combination with pines. Understory, shrub and herbaceous layers are present in varying degrees, represented by diverse woody and non-woody species. Vegetation on most sites consists of early- to mid-successional managed stands of pine and pine-hardwood forest. The understory in pure pine stands is often open, but in mixed or older stands, it is dominated by the hardwoods characteristic of the site. Common pine species of the Piedmont include shortleaf (*P. echinata*) and loblolly (*P. taeda*), with the former better adapted to dry, fine textured upland soils and

loblolly achieving maximum growth on deep soils with good moisture and drainage (Facilities Planning & Siting, PLLC, 2008).

Grassland and Early Successional Habitats

A variety of open habitats occupies a considerable portion of upland sites in the Piedmont, including agricultural land, recently abandoned farmland, recently cleared land, and a matrix of managed open pine forest and grassland. Urban and rural yards and open spaces are also included in this habitat type. The vegetation on most sites is oak-hickory forest, although many sites are maintained in early successional stages (Facilities Planning & Siting, PLLC, 2008).

Pine/Hardwood Forest

This classification is used to describe all pine forests throughout the Piedmont and Upper Plain region, including those occupying a variety of soil moisture characteristics except floodplains. The canopy is dominated by one or several species of pine, generally loblolly pine, or longleaf, depending on elevation, soil type and silvicultural history. Dense shrub thickets of hollies (*Ilex* spp.) and wax myrtle (*Morella cerifera*) may be present. A mixture of pine and hardwoods is also common in these ecosystems; common hardwood species consist of water oak, sweet gum, hickory, inkberry (*I. opaca*), and Eastern red-cedar (*Juniperus virginiana*). Higher elevation pine woodlands have abundant grasses and herbaceous cover, particularly when burning is frequent.

Bottomland/Floodplain Forest: This wetland classification is found in deciduous forests adjacent to stream systems that are crossed by the proposed segments of new ROW. Dominant species in these ecosystems have the ability to survive in areas that are either seasonally flooded or covered with water much of the year.

Canopy and shrub species include yellow poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), loblolly pine, sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), swamp tupelo, water oak (*Quercus nigra*), fetterbush (*Lyonia lucida*), inkberry, and sweet gum (*Liquidambar styraciflua*). Dominant species associated with the understory include woolgrass, cinnamon fern, netted chain fern, laurel greenbrier (*Smilax laurifolia*), and jewelweed (*Impatiens capensis*).

Environmental Baseline

Shortnose Sturgeon

Regarding the proposed project, the only waterbodies crossed by the proposed transmission lines that meets the sturgeon's habitat requirement is the Broad River and the Saluda River. However, the USFWS data layer reflects no known occurrences of this species in either river, and therefore, none near the proposed transmission line corridors.

Frosted Flatwoods Salamander

The only areas investigated for this species in the county for which it is listed by USFWS as occurring (Orangeburg County) consisted of small portions of two gum ponds within the existing transmission line ROW. These two gum ponds, being within an existing maintained transmission line ROW, did not contain habitat typically associated with the species (i.e., no adjacent pine flatwoods). No other appropriate habitat for this species exists within the study corridors.

Smooth Coneflower

In all, ten field sites (five Orange, three Mecklenberg, and two Enon soils sites) within the

transmission corridors were visited. Several species known to be associated with dry, high pH soils and smooth coneflower such as Indian grass (*Sorghastrum nutans*), false indigo (*Baptisia cinerea*), and little blue stem (*Schizachyrium scoparium*) were found at these sites, but no smooth coneflower stems or basal leaves were seen during the fieldwork (Gaddy and Siler 2010).

Bald Eagle

Transmission line corridors located within two miles of rivers or large bodies of water were surveyed for bald eagles. No bald eagle nests were observed within or along the fringes of the proposed transmission line corridors, and the USFWS data layer reflects no known occurrences within a one-half mile radius of the proposed project corridors.

There are two known bald eagle nests approximately 1,000 feet from the proposed transmission lines. SCE&G is aware of one recently constructed bald eagle nest that is not reflected on either USFWS's or SCDNR's databases. The nest is located approximately 1,000 feet north of the VCS1-Killian 230kV transmission line corridor, just south of the V.C. Summer Nuclear Station Unit 1's outfall structure on Monticello Reservoir. A second known bald eagle nest is located approximately one mile downstream of the Dreher Shoals Dam on the north bank of the Saluda River. The proposed VCS2-St. George #1 and #2 transmission lines approach no closer than approximately 1,000 feet north of this known nest.

An issue associated with large raptors is their vulnerability to power line electrocution. Their large size, wingspan, and perching make them susceptible to electrocution on certain transmission line designs. Transmission line structures with inadequate spacing between phases (i.e., less than 60 inches of separation between conductors and/or grounded hardware) can cause raptor electrocutions. With this in mind, the USFWS has recommended, under authority of the MBTA and BGEPA, that all new transmission structures be equipped with design features that prevent these electrocutions. Such features typically include designs that (1) make the distance between phase conductors greater than the wingspread of the bird that is landing, perching, or taking off; and (2) increase the distance between grounded hardware (e.g., ground-wires) and an energized conductor to more than the largest bird's wingspread or the distance from the tip of the bill to the tip of the tail. The 230 kV structures that will be used on the VCS1-Killian, VCS2-St. George #1 and #2, and VCS2-Lake Murray #2 230 kV Lines will be "raptor safe" and meet the guidelines recommended in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee 2006); therefore, raptor electrocutions are not anticipated on this project (Facilities Planning & Siting, PLLC, 2008).

Carolina Heelsplitter

Only a short segment of the VCS1-Killian transmission line corridor is located within the Catawba River (Wateree River) basin **and** is located in Fairfield County, the only county the proposed transmission line corridors are located in which the heelsplitter is listed by the USFWS. There are only four perennial stream segments within the Catawba basin which intersect the transmission line corridors. These segments were visually assessed, but no mussels were observed.

Pondberry

Pondberry was not seen during field examination of twenty (20) wetland sites on the VCS2-St. George #1 and #2 transmission corridors and environs. Furthermore, no good habitat for the plant appeared to occur within or along the transmission corridor (Gaddy and Siler 2010).

Rough-leaved Loosestrife

Twenty-six (26) sites were assessed for the presence of rough-leaved loosestrife. Because of the lack of fire and the density of the herbaceous vegetation layer at these sites, no habitat for rough-leaved loosestrife was present (Gaddy and Siler 2010).

Wood Stork

No wood storks or rookeries were observed during fieldwork in Orangeburg County, the only county through which the proposed transmission lines will be located that USFWS has listed as containing wood stork. However, it is feasible that the species may forage in wetlands located within the proposed transmission line corridors.

Canby's Dropwort

Twenty (20) wetland depressions on the VCS2-St. George #1 and #2 corridors were field-checked in early November of 2010. Most of these wetlands were too dry for Canby's dropwort (they had been previously drained for agricultural purposes) or did not harbor pond cypress. Four (4) of these depressions were wet; three (3) were either too wet or too dense to support Canby's dropwort. The fourth contained potential habitat, and was therefore, surveyed for the species. None were found.

Red-cockaded Woodpecker (RCW)

A few stands of potential foraging habitat existed adjacent to the proposed transmission line corridors in counties for which the species is listed as occurring. However, there are no known occurrences of RCWs within two miles of the proposed corridors and no birds were observed during field work.

Determination of Effect

SCE&G's portion of the proposed project will consist of constructing approximately 157 corridor miles of new transmission lines, approximately 151 miles of which will be within existing ROW. The remaining approximately six (6) miles of transmission lines will be constructed on new ROW, an area consisting of approximately 78.6 acres. SCE&G will implement appropriate BMPs during construction which will result in minimizing adverse effects from transmission line construction.

Literature and record searches have been conducted to determine if known occurrences of federally-listed threatened and endangered species occur within SCE&G's proposed transmission line corridors. Based on those searches, field investigations, and the proposed construction plans including implementing BMPs, it has been determined that the proposed project: 1) is not likely to disturb the bald eagle; 2) will have no effect on the shortnose sturgeon and rough-leaved loosestrife; and 2) may affect, but is not likely to adversely affect, the frosted flatwoods salamander, smooth coneflower, Carolina heelsplitter, pondberry, wood stork, Canby's dropwort, and red-cockaded woodpecker.

Table 2 presents those federally-listed threatened and endangered species which were considered for the proposed project, with a determination of effect and justification of each determination.

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USFWS 2009. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Reticulated Flatwoods Salamander; Designation of Critical Habitat for Frosted Flatwoods Salamander and Reticulated Flatwoods Salamander; Final Rule.

Table 1. Federally-Listed Threatened and Endangered Species Considered for the Proposed Project (Source: Gaddy and Siler 2010)

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	CALHOUN	DORCHESTER	FAIRFIELD	LEXINGTON	NEWBERRY	ORANGEBURG	RICHLAND	HABITAT
Acipenser brevirostrum	Shortnose Sturgeon	E	X	X		X		X	X	Large rivers with shoals
Ambystoma cingulatum	Frosted Flatwoods Salamander	T						X		Wet pine flatwoods, isolated wetlands
Echinacea laevigata	Smooth Coneflower	E				X			X	Calcium- & magnesium rich clays in open woods
Haliaeetus leucocephalus	Bald Eagle	BGEPA	X	X	X	X	X	X	X	Large rivers & lakes
Lasmigona decorata	Carolina Heelsplitter	E			X					Small streams
Lindera melissifolia	Pondberry	E		X						Isolated wetlands & their margins
Lysimachia asperulifolia	Rough-leaved Loosestrife	E							X	Fire maintained acidic bogs in the Sandhills
Mycteria americana	Wood Stork	E						X		Cypress-tupelo & other wetlands
Oxypolis canbyi	Canby's dropwort	E		X				X	X	Pond cypress savannahs
Picoides borealis	Red-cockaded Woodpecker	E	X	X		X		X	X	Open, mature, fire-maintained pine woods

Table 2. Determinations of Effect for Federally-Listed Threatened and Endangered Species Considered for the Proposed Project

Species	Determination of Effect	Justification
Shortnose Sturgeon	No effect	No crossings of large river systems
Frosted Flatwoods Salamander	May affect, not likely to adversely affect	Potential habitat found to be unsuitable due to adjacent land use
Smooth Coneflower	May affect, not likely to adversely affect	Potential habitat locations revealed no presence of the species
Bald Eagle	Not likely to disturb	Impacts will be approximately 1,000 feet from known nest locations
Carolina Heelsplitter	May affect, not likely to adversely affect	BMPs will minimize adverse effects to stream systems
Pondberry	May affect, not likely to adversely affect	No good habitat was observed, and no stems were found
Rough-leaved Loosestrife	No effect	No appropriate habitat present
Wood Stork	May affect, not likely to adversely affect	No nesting occurrences observed
Canby's dropwort	May affect, not likely to adversely affect	One appropriate habitat searched, but no stems present
Red-cockaded Woodpecker	May affect, not likely to adversely affect	No suitable nesting habitat to be impacted and none adjacent; fragmented foraging habitat not located near nesting habitat

Appendix A. Inventory of Federally-Listed Endangered and Threatened Species within SCE&G Transmission Line Corridors Associated with the V.C. Summer Nuclear Station Units 2 and 3 Project, prepared by L. L. Gaddy, terra incognita, and J. Robert Siler, Environmental Resources of the Carolinas, November 2010

INVENTORY OF FEDERALLY-LISTED ENDANGERED AND THREATENED SPECIES WITHIN SCE&G TRANSMISSION LINE CORRIDORS ASSOCIATED WITH THE V. C. SUMMER NUCLEAR STATION UNITS 2 AND 3 PROJECT

Prepared by
L. L. Gaddy, terra incognita and J. Robert Siler, Environmental Resources of the Carolinas
for
Pike Energy Solutions, LLC
Charlotte, North Carolina

on behalf of
SOUTH CAROLINA ELECTRIC & GAS COMPANY

November 2010

INTRODUCTION

This report presents the findings of an inventory of federally-listed endangered and threatened species on transmission corridors associated with South Carolina Electric and Gas's V. C. Summer Project. The transmission corridors or "study area" for this investigation included the VCS1-Killian (existing and new), the VCS2-Lake Murray #2, the VCS2-St. George #1 and VCS2-St. George #2 (see Map 1).

METHODOLOGY

A literature and internet review of the federally-listed species potentially-occurring in the study areas for electric power transmission lines associated with the V. C. Summer Project was conducted in October and early November of 2010. Ten federally-listed species are known from the counties through which the transmission lines pass. Table 1 summarizes the status, geography, and ecology of these species. The potentially-occurring species include the Shortnose Sturgeon (*Acipenser brevirostrum*)(endangered), the Bald Eagle (*Haliaeetus leucocephalus*)(threatened), the Red-cockaded Woodpecker (*Picoides borealis*)(endangered), the Wood Stork (*Mycteria americana*)(endangered), the Frosted Flatwoods Salamander (*Ambystoma cingulatum*)(threatened), the Carolina Heelsplitter (*Lasmigona decorata*)(endangered), the smooth coneflower (*Echinacea laevigata*)(endangered), Canby's dropwort (*Oxypolis canbyi*)(endangered), rough-leaved loosestrife (*Lysimachia asperulifolia*)(endangered), and pondberry or southern spicebush (*Lindera melissifolia*)(endangered).

As may be seen in Table 1, habitats of occurrence vary significantly from species to species. The Shortnose Sturgeon is an anadromous species of fish that breeds in the rocky shoals of large rivers. The Bald Eagle nests along or near major rivers and lakes. The Red-cockaded Woodpecker prefers open, mature burned pine woods in the Coastal Plain (Russo and Sweeney, 2000). The Wood Stork nests in cypress-tupelo swamp forests in the Coastal Plain (Murphy, 1995). The Frosted Flatwoods Salamander occurs in wet pine flatwoods and in isolated wetlands bordered by pine flatwoods (U.S. Fish and Wildlife Service, 2010c). The Carolina Heelsplitter is a mollusk found in small rivers and their tributaries (Russo and Sweeney, 2000). Smooth coneflower

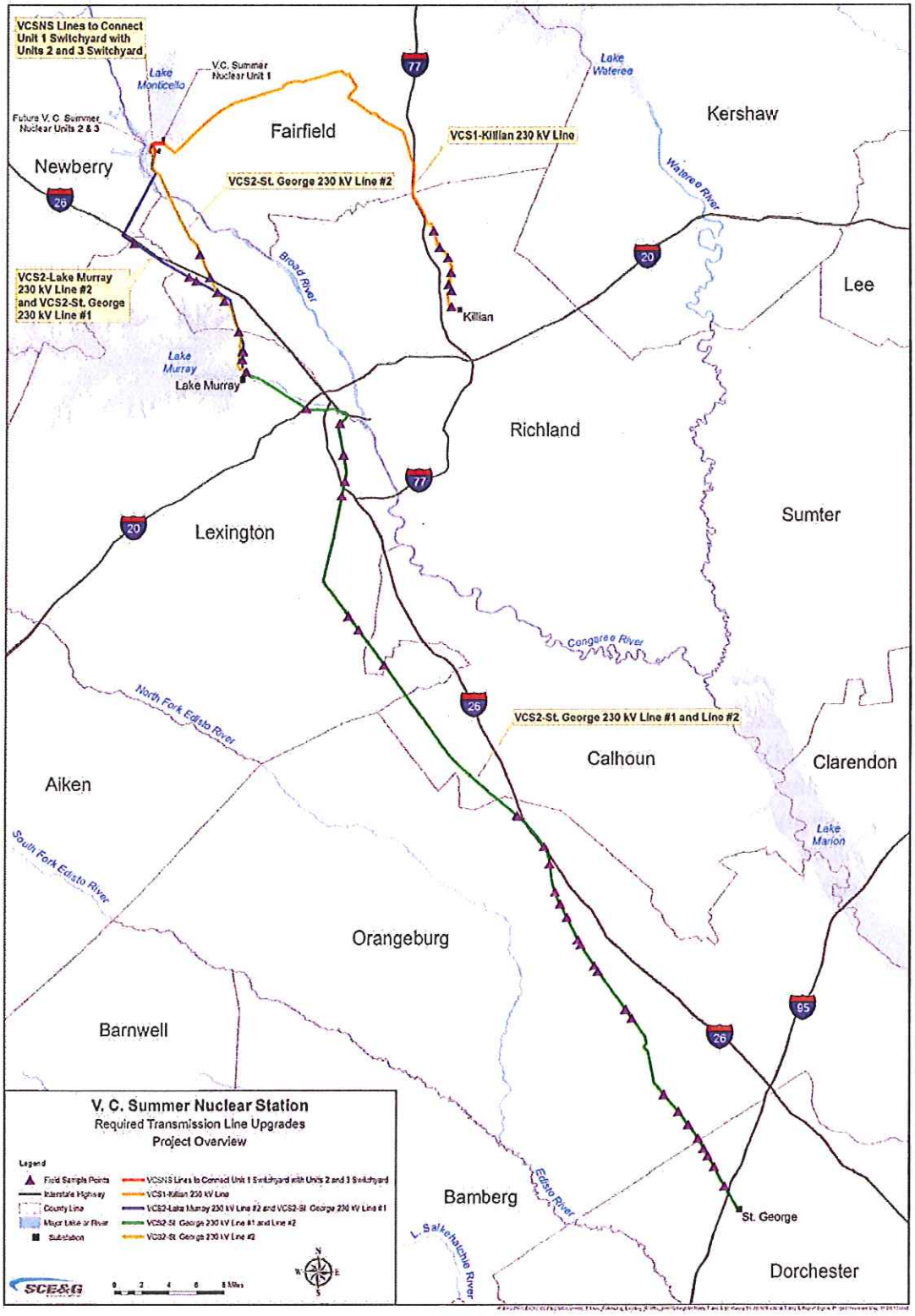
VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
V.C. Summer Nuclear Unit 1
Lake Monticello
Future V.C. Summer Nuclear Units 2 & 3
Newberry
Fairfield
VCS1-Killian 230 kV Line
VCS2-St. George 230 kV Line #2
Lake Wateree
Kershaw
Wateree River
Broad River
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
Killian
Lake Murray
Lake Murray
Lee
Richland
Sumter
Lexington
Congaree River
North Fork Edisto River
VCS2-St. George 230 kV Line #1 and Line #2
Calhoun
Clarendon
Aiken
Lake Marion
South Fork Edisto River
Orangeburg
Barnwell
Bamberg
Edisto River
St. George
L. Salkehatchie River
Dorchester
V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Project Overview
Legend
Field Sample Points
Interstate Highway
County Line
Major Lake or River
Substation
VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
VCS1-Killian 230 kV Line
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
VCS2-St. George 230 kV Line #1 and Line #2
VCS2-St. George 230 kV Line #2
SCE&G
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Table 1. Federally-listed endangered and threatened species potentially-occurring on transmission corridors associated with the V. C. Summer Project.

SCIENTIFIC NAME	COMMON NAME	STATUS	CAL	DOR	FAI	LEX	NEW	OBU	RIC	HABITAT
Acipenser brevirostrum	Shortnose Sturgeon	E	X	X		X		X	X	Large rivers with shoals
Ambystoma cingulatum	Frosted Flatwoods Salamander	T						X		Wet pine flatwoods and isolated wetlands
Echinacea laevigata	Smooth Coneflower	E				X			X	Calcium- and magnesium rich clays in open woods
Haliaeetus leucocephalus	Bald Eagle	BGEPA-T	X	X	X	X	X	X	X	Large rivers and lakes
Lasmigona decora	Carolina Heelsplitter	E			X					Small streams
Lindera melissifolia	Pondberry	E		X						Isolated wetlands and their margins
Lysimachia asperulifolia	Rough-leaved Loosestrife	E							X	Fire maintained acidic bogs in the Sandhills
Mycteria americana	Wood Stork	E							X	Cypress-tupelo and other wetlands
Oxypolis canbyi	Canby's dropwort	E		X				X	X	Pond cypress savannahs
Picoides borealis	Red-cockaded Wood-pecker	E	X	X		X		X	X	Open, mature, fire-maintained pine woods

Counties: CAL-Calhoun; DOR-Dorchester; FAI-Fairfield; LEX-Lexington; NEW-Newberry; OBU-Orangeburg; RIC-Richland.

Status: E-endangered; T-threatened; BGEPA-protected under the special Bald and Golden Eagle Protection Act.

grows in open woods in clayey, high magnesium and high calcium soils (Murdock, 1995; U. S. Fish and Wildlife Service, 2010d; Schafale and Weakley, 1990; Gaddy 1991). Canby's dropwort is a wetland species that is found primarily in isolated pond cypress (*Taxodium ascendens*) savannah-like wetlands (Gaddy 2006; U. S. Fish and Wildlife Service, 2010b). The rough-leaved loosestrife is found in low pH Sandhill wetlands where frequent fire is present (Russo and Sweeney, 2000). The pondberry occurs in and along the margins of isolated wetlands (Russo and Sweeney, 2000; Schafale and Weakley, 1990)—in South Carolina, particularly those associated with limesinks.

The potentially-occurring endangered and threatened species, with the possible exception of the Bald Eagle, are not evenly distributed throughout the counties of the study area. The Shortnose Sturgeon is known only from the Broad River portion of the study area. The Red-cockaded Woodpecker is found primarily in the Coastal Plain, and the Wood Stork only nests in a few coastal counties. Canby's dropwort, a Coastal Plain species, is known from Richland, Orangeburg, and Dorchester Counties, but has never been seen in Lexington and Calhoun Counties. Pondberry has been reported from only Dorchester County. The Frosted Flatwoods Salamander is known only in the study area from an historic record in Orangeburg County, and the bog asphodel is known only from an historic record in Dorchester County. Rough-leaved loosestrife is known only from Richland County, and the smooth coneflower is known only from Richland and Lexington Counties.

Before fieldwork for this inventory began, all U. S. Fish and Wildlife and South Carolina Department of Natural Resources Department records—historical and current— for the above species (S. C. Department of Natural Resources, 2010; U. S. Fish and Wildlife Service, 2010a) were plotted on maps of the transmission corridors in the study area. According to these records, at the time this field inventory began, none of these species was known to occur within or along the margins of any of the transmission corridors in the study area.

Potential habitats for all of the potentially-occurring federally-listed species were also plotted on study area maps before fieldwork began. These potential habitats maps were compiled using natural color imagery of the study area with topographic, soil, and wetland features overlaid on the natural color imagery. Forty-eight field sites (Map 1) harboring potential habitat for the species in Table 1 were field-checked in late October and early November of 2010.

FINDINGS

Field sampling was begun in late October of 2010. In Richland and Lexington Counties, twelve sites were field-checked for the possible presence of the federally-listed (endangered) smooth coneflower (*Echinacea laevigata*), and fifteen sites that had potential habitat for the endangered rough-leaved loosestrife (*Lysimachia asperulifolia*) were visited in Richland, Lexington, and Calhoun Counties. In early November of 2010, twenty Orangeburg and Dorchester County sites were sampled for the possible presence of Canby's dropwort (*Oxypolis canbyi*) and pondberry (*Lindera melissifolia*). Findings are discussed below under species headings.

Smooth Coneflower (*Echinacea laevigata*) (federally-listed as endangered). Smooth coneflower is a rare species in the Aster Family (Asteraceae) and is found from Virginia south to Georgia (Gaddy, 1991). The South Carolina Plant Atlas (S. C. Plant Atlas, 2010) reports smooth coneflower from seven South Carolina counties. The South Carolina Department of Natural Resources (SCDNR, 2010) lists smooth coneflower from Richland County, while the Fish and Wildlife Service's (2010a) list of federal endangered species in S. C. reports the plant from both Richland and Lexington Counties.

The coneflower is found on clay soils especially rich in magnesium and calcium (with high pH) and is generally associated with Iredell, Mecklenberg, and Brevard Belt soils in the Carolinas and Georgia. The plant does not compete well in densely-shaded forest conditions and prefers open woods, roadsides, and prairie-like environments.

An earlier review of soil maps had indicated that some Mecklenberg, Orange, and Enon soils (all soil types with high pH) occurred in Richland, and Lexington Counties (Holsonback and Brewington, 2008; Lawrence, 1976 and 1978) along the VCS2-St. George #2, the VCS2-St. George #1, and the VCS2-Lake Murray #2 transmission lines, between Jenkinsville and Lake Murray. Because these soils types are potential habitats for the coneflower, the sites where they occurred were field-checked in late October of 2010. In all, twelve field sites (seven Orange sites, three Mecklenberg sites, and two Enon sites) within the transmission corridors were checked. Several species known to be associated with dry, high pH soils and smooth coneflower (Gaddy, 1991) such as Indian grass (*Sorghastrum nutans*), false indigo (*Baptisia cinerea*), and little blue stem (*Schizachyrium scoparium*) were found at these sites, but no smooth coneflower stems or basal leaves were seen during the fieldwork.

Rough-leaved Loosestrife (*Lysimachia asperulifolia*) (federally-listed as endangered).

Rough-leaved loosestrife is a North Carolina-South Carolina Sandhill endemic found in bogs and on bog margins in fire-maintained wetlands. It is only known from two counties in South Carolina—Richland and Darlington (S. C. Plant Atlas, 2010). In South Carolina, the plant is closely associated with Johnston soils. The VCS1-Killian transmission corridor (present line and proposed line) crosses seven areas of Johnston soils wetlands in Richland County (DeFrancesco, 1982; Lawrence, 1978) between the Killian Substation and Blythewood. The VCS2-St. George #1 and #2 transmission corridor crosses four major wetlands and three smaller wetlands dominated by Johnston and related soils (Lawrence, 1976) in Lexington County; one Johnston wetland is located near the border of Lexington and Calhoun County. These fifteen sites were field-checked for rough-leaved loosestrife in late October of 2010.

Just north and west of the Killian Substation, the proposed new Killian corridor will cross a large wetland complex on Johnston soils. Most of this area was forested and dominated by swamp tupelo (*Nyssa biflora*), tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), American holly (*Ilex opaca*), sweet gallberry (*Ilex coriacea*), cyrilla or ti-ti (*Cyrilla racemiflora*), bays (*Persea palustris* and *Magnolia virginiana*), fetterbush (*Lyonia lucida*), and ferns (*Osmunda cinnamomea, Osmunda spectabilis var. regalis, and Onoclea sensibilis*). A few small openings were found in these woods, but no rough-leaved loosestrife habitat was present. There were a few openings along the margins of the existing Killian transmission corridor. Here, open peat (*Sphagnum* sp.) bogs were present, but the vegetation here was too thick for the loosestrife and there is no history of fire in the area. The remaining six Johnston sites north to Blythewood were dominated by tulip poplar with one exception, a site with standing water that had been recently broadcast-sprayed with herbicides. None of these site supported habitat for rough-leaved loosestrife.

The VCS2-St. George #1 and #2 corridor crossing of the Johnston wetland bordering Six Mile Creek in Lexington County was very weedy with tearthumb (*Polygonum sagittaum*), spotted knotweed (*Polygonum punctatum*), false nettle (*Boehmeria cylindrica*), and giant plume grass (*Erianthus giganteus*) dominating the right-of-way. The Congaree Creek crossing just to the south was less weedy with giant plumegrass, soft rush (*Juncus effusus*), Virginia meadowbeauty (*Rhexia virginica*), rough-leaved goldenrod (*Solidago rugosa*), other rushes (*Juncus cyperinus* included), beak rushes (*Rhynchospora corniculata* and *Rhynchospora caduca*), and sedges (*Carex* spp.). The crossing of Sandy Run Creek and an associated tributary were similarly weedy. Three pond backwater sites in Lexington County and one pond backwater at the border of Lexington and Calhoun County, all on Johnston or related muck soils, were found to be dominated by giant plume grass, meadowbeauty species (*Rhexia* spp.), and disturbed-site beakrushes and sedges. Because of the lack of fire and the density of the herbaceous vegetation layer at these sites, no habitat for rough-leaved loosestrife was present.

Canby's Dropwort (or Cowbane) (*Oxypolis canbyi*) (federally-listed as endangered).

Canby's dropwort historically ranged from Delaware to Georgia. In South Carolina, it is known from eleven counties, according to the South Carolina Plant Atlas (S. C. Plant Atlas, 2010). In the study area, it has been reported from Richland, Orangeburg, and Dorchester Counties. Although it has been found in open, grassy swamp tupelo gum (*Nyssa biflora*) swamps and in open, disturbed Carolina bays, its most common habitat type is the pond cypress (*Taxodium ascendens*) savannah (Gaddy, 2006). Pond cypress savannahs are found in shallow, isolated wetlands in the Atlantic and Gulf Coastal Plains. Maintained by natural water level fluctuations and periodic fire, these wetlands generally have standing water in the winter and are dry, grassy environments in late summer and fall (Gaddy, 2006).

Twenty-one wetland depressions on the VCS2-St. George #1 and #2 Corridors were field-checked in early November of 2010. Most of these wetlands were too dry for Canby's dropwort (they had been previously drained for agricultural purposes) or did not harbor pond cypress. The corridor, however, does pass through four pond cypress wetlands near the Orangeburg-Dorchester County line. One of the wetlands was a pond cypress savannah with potential habitat for Canby's dropwort. The corridor adjacent to this wetland was searched. Some of the companion plants for Canby's dropwort—*Hypericum fasciculatum, Aristida affinis, Carex striata, Ilex myrtifolia*, etc.—were present in the transmission corridor; however, no Canby's dropwort plants were found in the corridor or in the adjacent wetland. The three other pond cypress wetlands examined were either too wet (two were deep depressions) or too thick (one had a dense canopy of pond cypress and swamp tupelo) to harbor Canby's dropwort. Nevertheless, the corridor adjacent to these three sites was searched for Canby's dropwort, but no plants were found.

The fruit of Canby's dropwort in late autumn.

Pondberry or Southern Spicebush (*Lindera melissifolia*) (federally-listed as endangered).

Pondberry is found from North Carolina south through the Atlantic and Gulf Coastal Plain of South Carolina, Georgia, Florida, Mississippi, Alabama, and Louisiana north to Arkansas and Missouri. The small shrub is known from three counties in South Carolina—Berkeley, Colleton, and Beaufort, according to the South Carolina Plant Atlas (S. C. Plant Atlas, 2010). The U. S. Fish and Wildlife Service (U. S. Fish and Wildlife Service, 2010a) also list it from Dorchester County. Weakley (2010) gives its habitat as "wet flats and depressions". In South Carolina, however, it is strongly associated with isolated depressions and their margins, especially the Honey Hill "limesinks" in Berkeley County. The small shrub is usually found along the margin of the depression in partially open sunlight. It does not appear to tolerate dense shade and is absent where shrubs are dense in wetland margins.

Pondberry was not seen during our field examination of twenty-one wetland sites on the VCS2-St. George #1 and # 2 transmission corridor and environs. Furthermore, no good habitat for the plant appeared to occur within or along the transmission corridor.

Sweet grass (*Muhlenbergia capillaris*) in the VCS2-St. George #1 and #2 Corridor.

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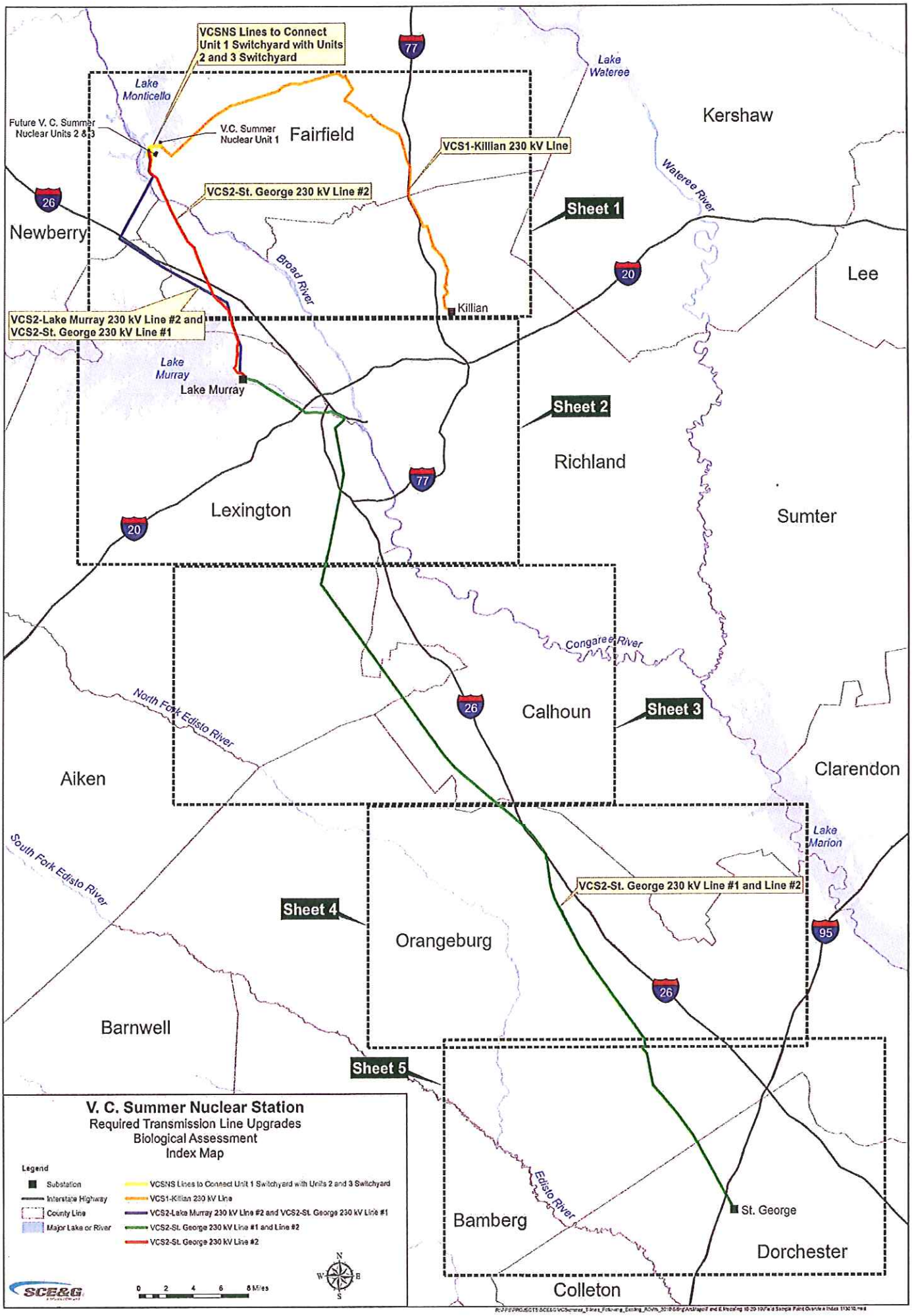
Appendix B. Figures prepared by Pike Energy Solutions, November 2010


VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
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Sheet 1
Newberry
Broad River
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Killian
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
Lake Murray
Lake Murray
Sheet 2
Richland
Lexington
Sumter
Congaree River
North Fork Edisto River
Calhoun
Sheet 3
Aiken
Clarendon
Lake Marion
South Fork Edisto River
VCS2-St. George 230 kV Line #1 and Line #2
Sheet 4
Orangeburg
Barnwell
Sheet 5
Edisto River
Bamberg
St. George
Dorchester
Colleton
V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Index Map
Legend
Substation
Interstate Highway
County Line
Major Lake or River
VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
VCS1-Killian 230 kV Line
VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
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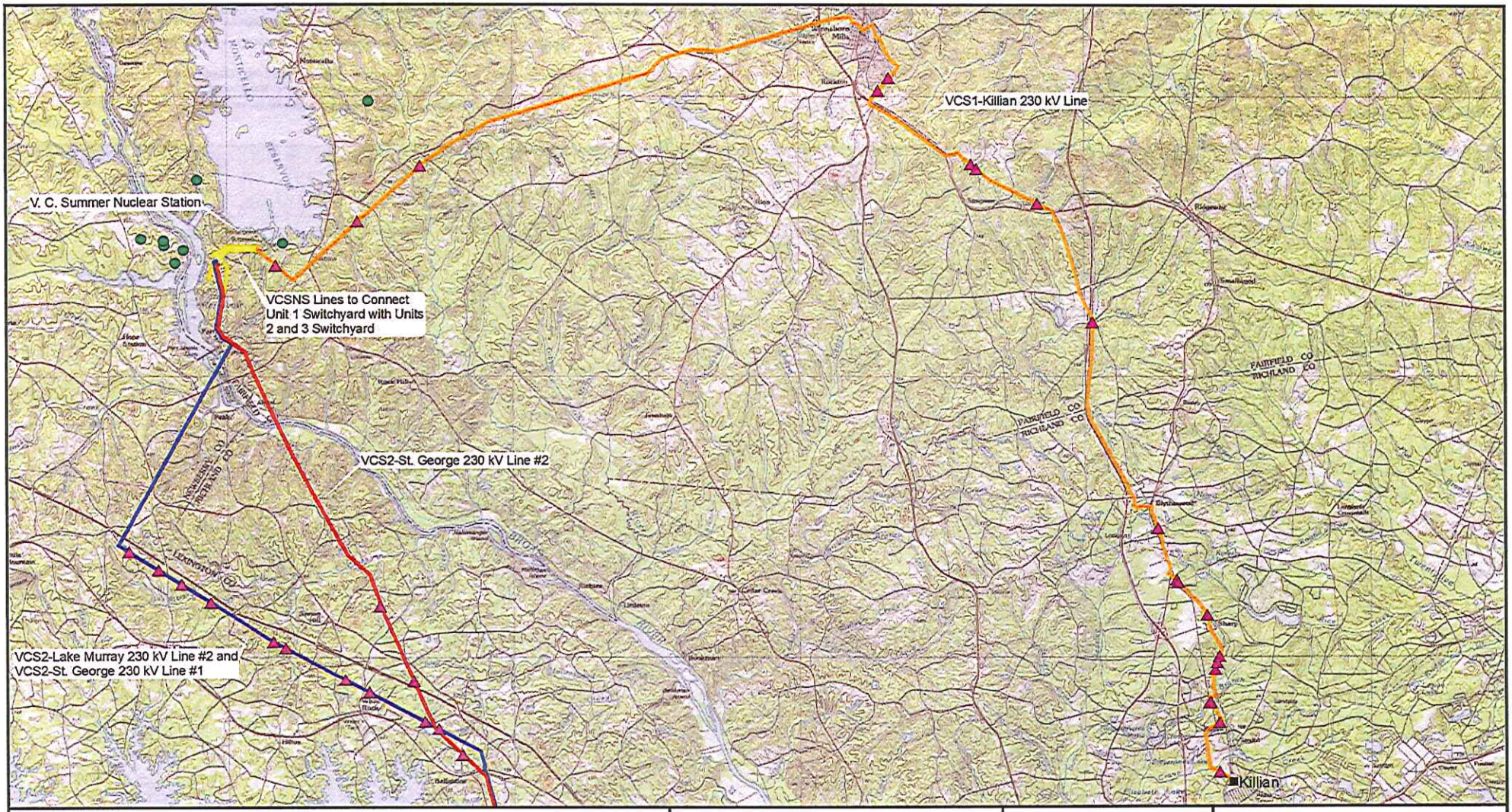

Legend

- Field Sample Point
- Bald Eagle *
- Substation
- VCSNS Lines to Connect Unit 1 Switchyard with Units 2 and 3 Switchyard
- VCS1-Killian 230 kV Line
- VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
- VCS2-St. George 230 kV Line #2

* Source: US Fish and Wildlife Service, SC Department of Natural Resources (Heritage Trust Program), and SCE&G

Note: Recorded protected species occurrences are shown within 2 miles of the transmission line corridors.

N W E S

0 1 2 4 Miles

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 1 of 5

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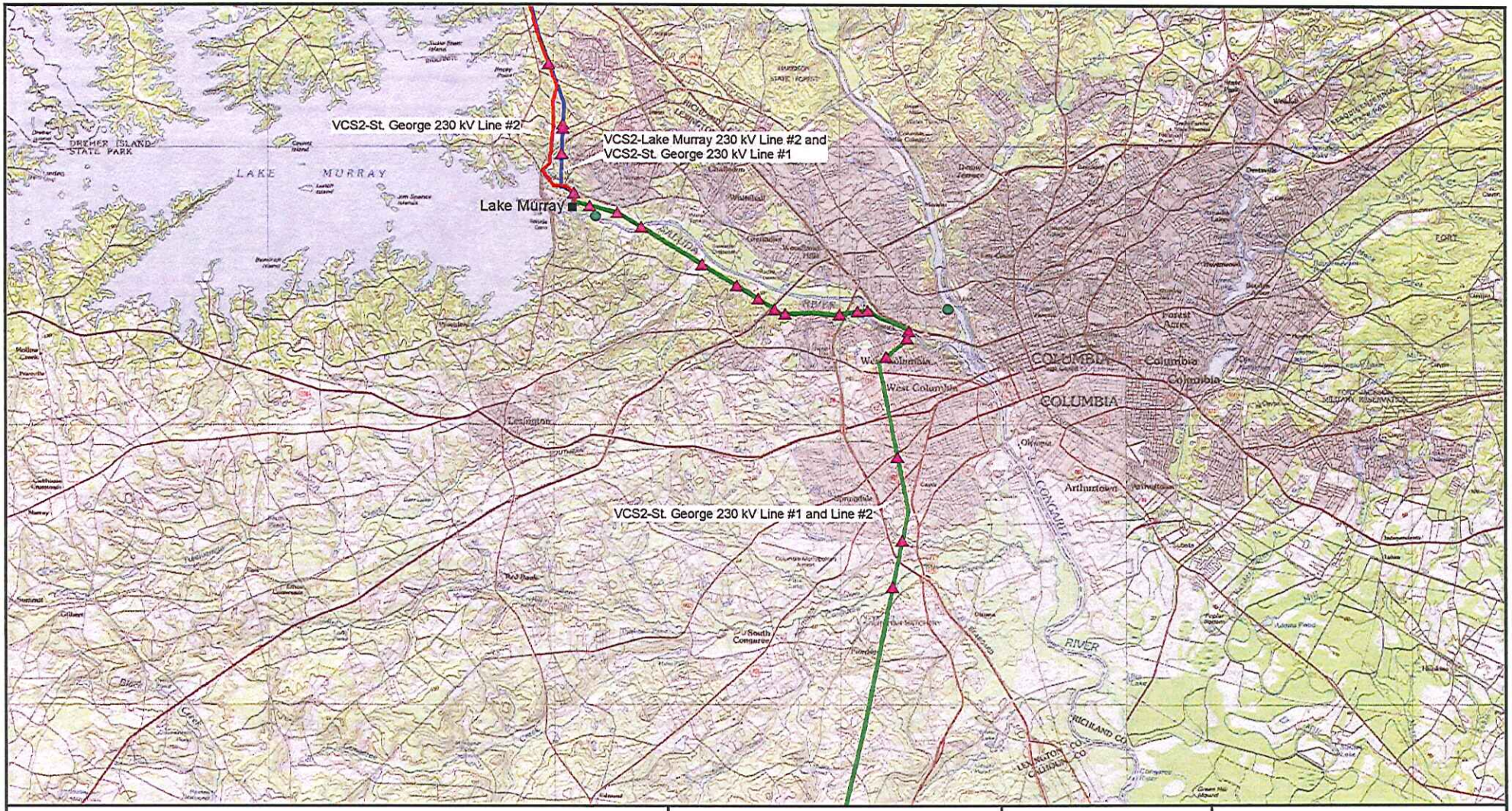

Legend

- Field Sample Point
- Bald Eagle *
- Substation
- VCS2-Lake Murray 230 kV Line #2 and VCS2-St. George 230 kV Line #1
- VCS2-St. George 230 kV Line #1 and Line #2
- VCS2-St. George 230 kV Line #2

* Source: US Fish and Wildlife Service, SC Department of Natural Resources (Heritage Trust Program), and SCE&G

Note: Recorded protected species occurrences are shown within 2 miles of the transmission line corridors.

N W E S

0 1 2 4 Miles

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 2 of 5

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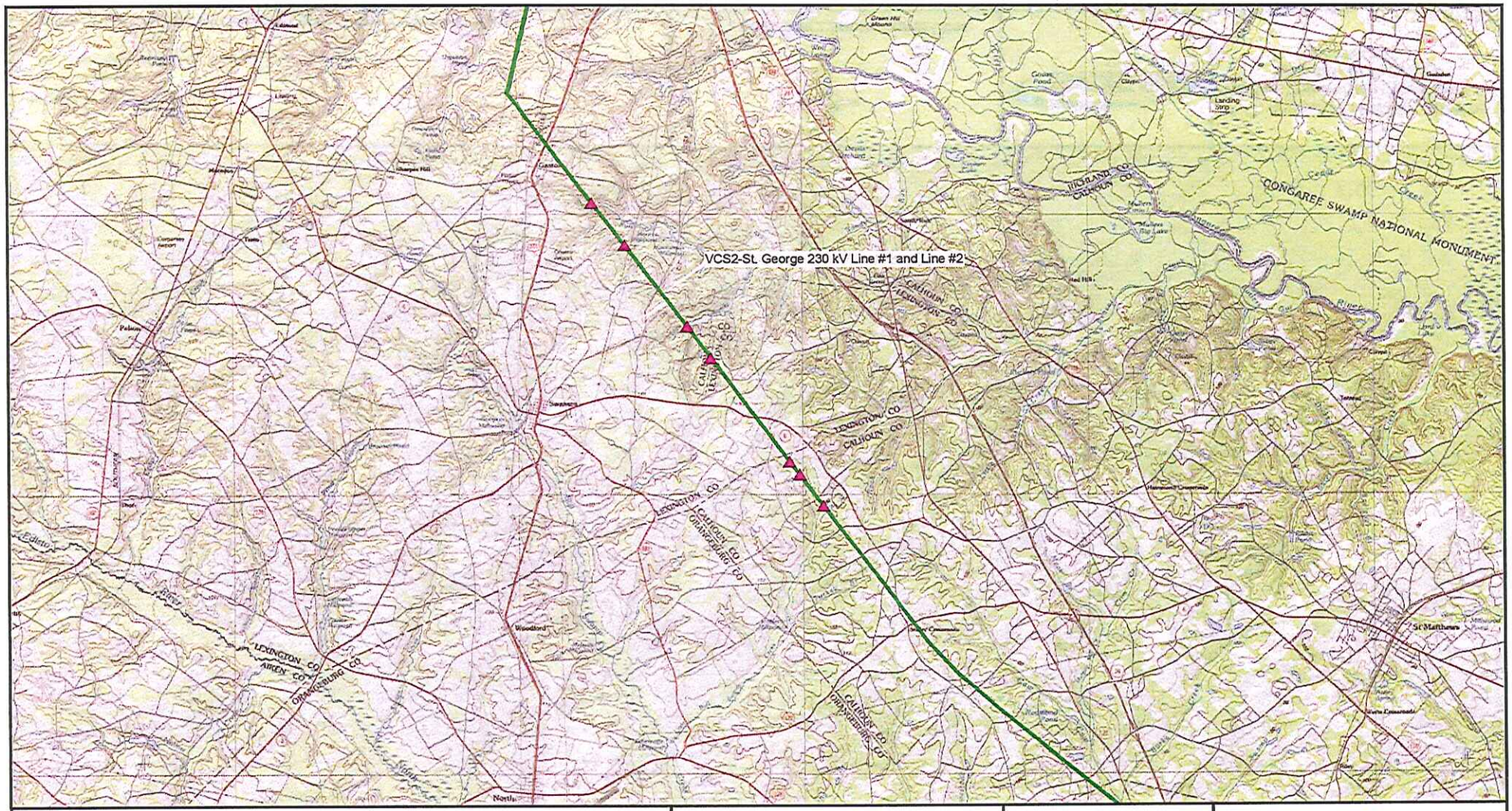

Legend

- Field Sample Point
- VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 3 of 5

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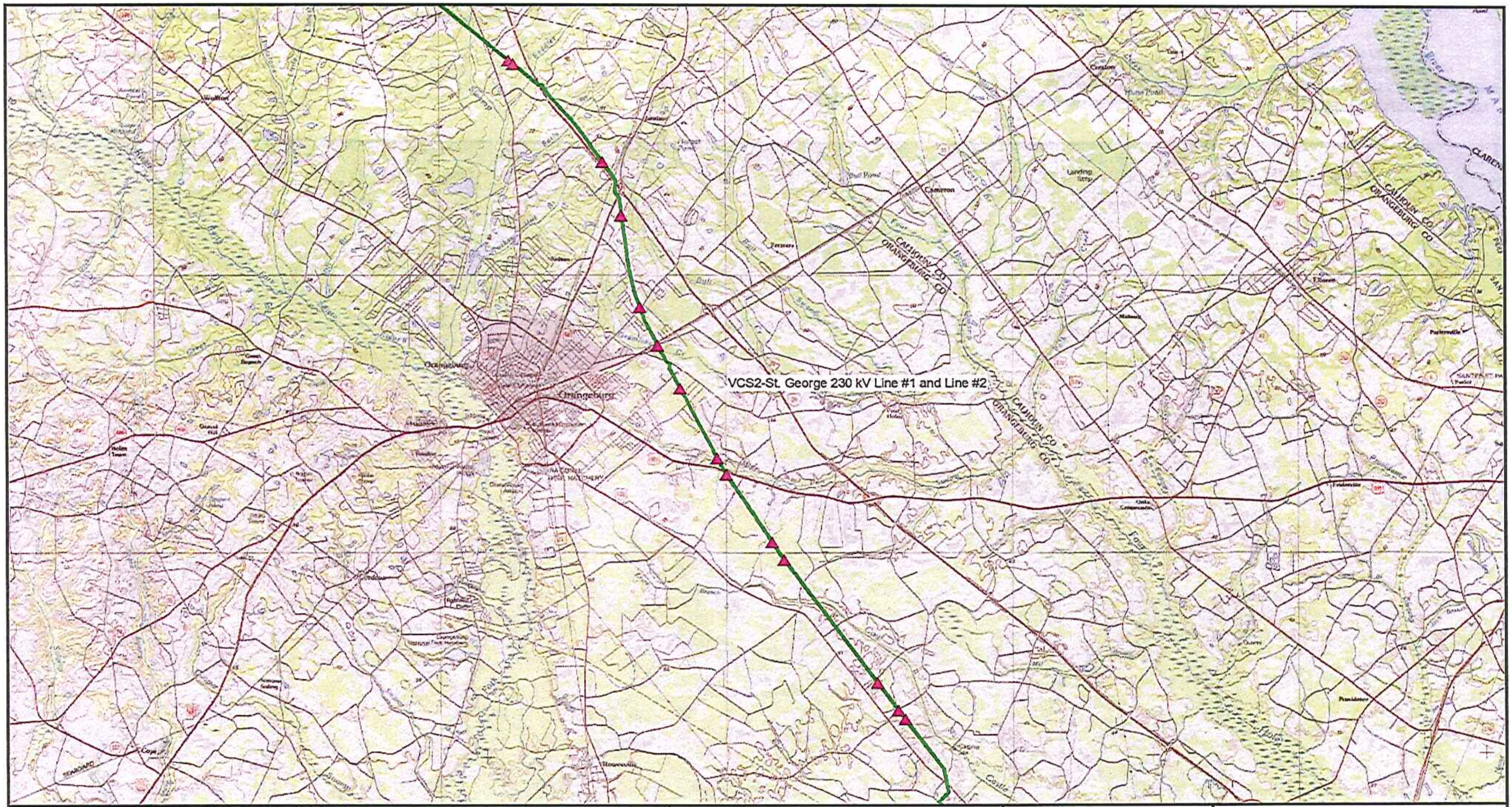

Legend

Field Sample Point

VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

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V. C. Summer Nuclear Station
Required Transmission Line Upgrades
Biological Assessment
Sheet 4 of 5

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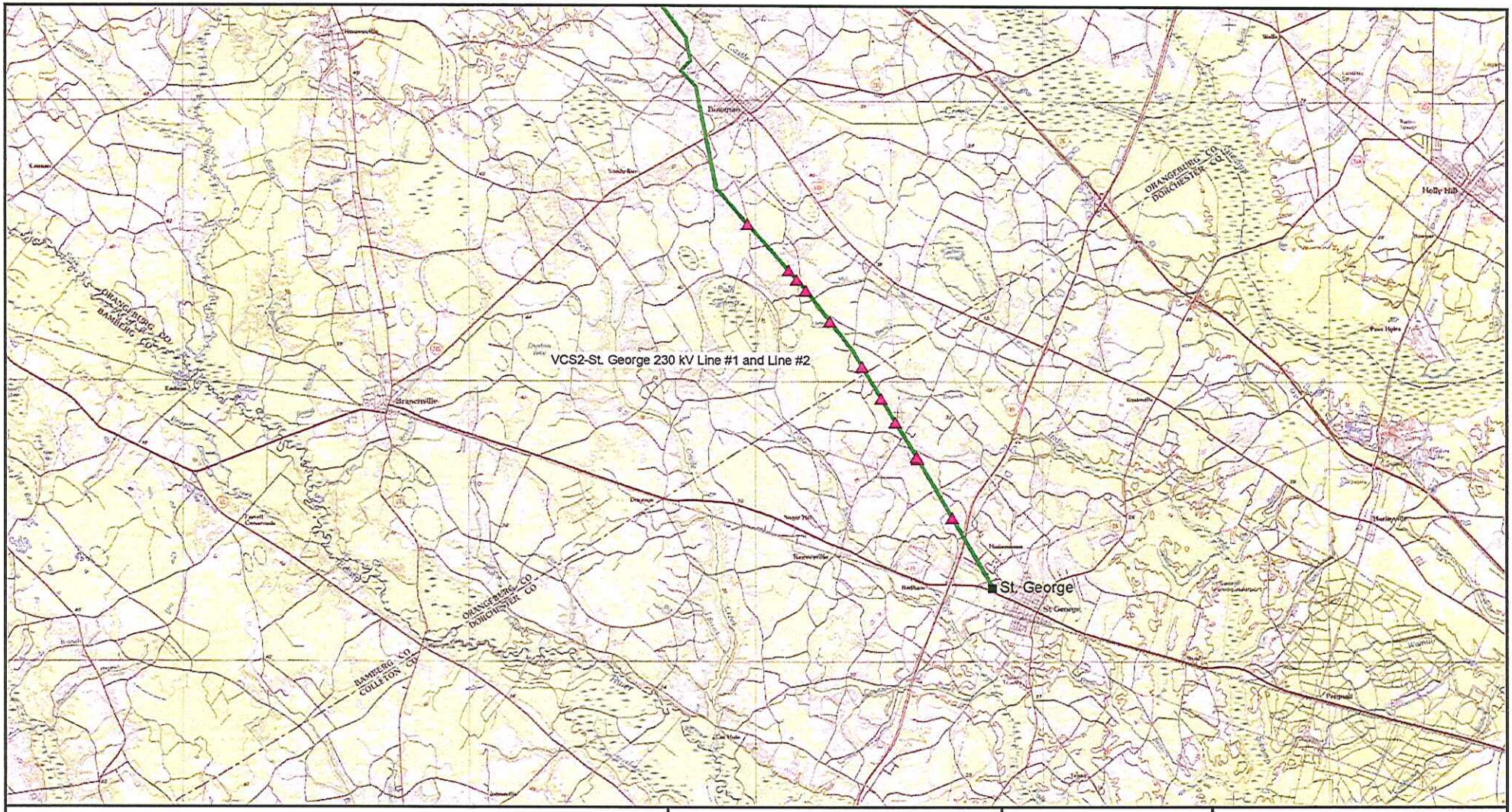

Legend

- Field Sample Point
- Substation
- VCS2-St. George 230 kV Line #1 and Line #2

Note: There are no recorded protected species occurrences within 2 miles of this transmission line corridor.

N W E S

0 1 2 4 Miles

SCE&G A SCANA COMPANY

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Biological Assessment
Sheet 5 of 5

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