

**SUPPLEMENTAL INFORMATION TO BIOLOGICAL
ASSESSMENT**

**Virgil C. Summer Nuclear Station
Combined Licenses Application**

**U.S. Nuclear Regulatory Commission Combined Licenses Application
Docket No. 52-027 and 52-028
U. S. Army Corps of Engineers Permit Application
Permit Application No. SAC 2007-1852-SIR**

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) is reviewing an application from South Carolina Electric & Gas (SCE&G) for combined NRC-authorized construction permits and operating licenses (COLs) to build and operate two Westinghouse Electric Company, LLC (Westinghouse) Advanced Passive 1000 (AP1000) pressurized water reactors (Units 2 and 3) on the site of the Virgil C. Summer Nuclear Station (VCSNS) in Fairfield County, South Carolina. The U.S. Army Corps of Engineers (USACE) is reviewing an application from SCE&G for a Department of the Army (DA) Permit pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) to perform site-preparation activities to build the reactors and supporting structures. The USACE is cooperating with NRC to prepare a single environmental impact statement (EIS) under the National Environmental Policy Act of 1969, as amended (NEPA) that meets the requirements of both agencies. The NRC and USACE are referred to as the “review team” for the remainder of this document.

As part of its responsibilities under Section 7 of the Endangered Species Act, the review team prepared a biological assessment (BA) documenting potential impacts on Federally listed threatened or endangered species from the proposed new reactors. The BA was prepared as an appendix to a draft EIS issued in April 2010. FWS concurred with the findings with respect to activities conducted on the VCSNS site. However, FWS did not concur with the findings in the BA regarding the proposed new transmission lines servicing the units (FWS 2010a). Instead, the FWS asked for more precisely defined corridors for the new transmission lines and for targeted surveys for specific species within those corridors. This technical memo serves to provide FWS with the targeted survey results and other updated information provided in response to the FWS request.

The draft EIS defined only approximate routes for the proposed new transmission lines within broadly defined “macro-corridors” connecting the plant site to targeted substations. It described approximate routes for four new transmission lines to be built and operated by SCE&G and two new transmission lines to be built and operated by Santee Cooper (who would also handle power from the new facilities). Since then, SCE&G and Santee Cooper have defined precise corridors for the new transmission lines, as shown in Figure 1.

The complete list of Federally threatened and endangered species, and critical habitat having the potential to occur on or adjacent to the finalized transmission line corridors is presented in Table 1, which constitutes an update to Table 1-1 of the BA. The changes in Table 1 reflect updated database information on recorded occurrences of listed species in specific counties plus changes in the routing of the transmission lines resulting from the definition of finalized corridors. The proposed finalized transmission line routes are shown in Figure 1.

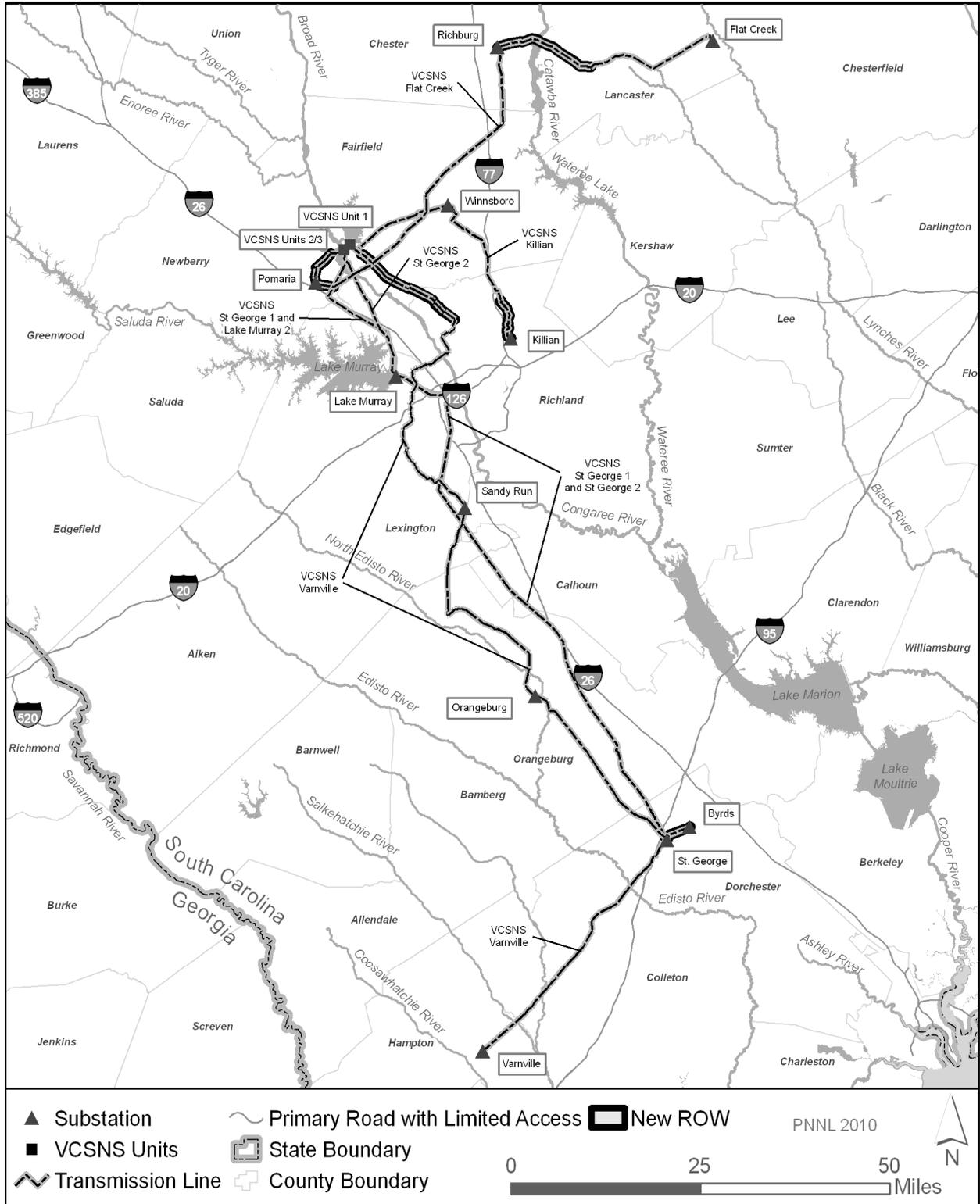


Figure 1. VCSNS Units 2 and 3 Expected New Transmission Line Routes (based on MACTEC 2009 and Pike 2010)

Table 1. Federally Listed Terrestrial and Aquatic Species and Critical Habitat in Counties Crossed by the Proposed Transmission Line Corridors

Scientific Name	Common Name	Legal Status	Counties
Birds			
<i>Mycteria americana</i>	Wood stork	E	Calhoun, Colleton, Dorchester, Hampton, Lexington, Newberry, Richland
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	Calhoun, Chester, Colleton, Dorchester, Hampton, Lexington, Orangeburg, Richland
Amphibians			
<i>Ambystoma cingulatum</i>	Flatwoods salamander	T	Colleton, Orangeburg
Mollusks			
<i>Lasmigona decorata</i>	Carolina heelsplitter	E	Chester, Fairfield, Lancaster, Lexington, Richland, Newberry
Vascular Plants			
<i>Amphianthus pusillus</i>	Pool sprite	T	Lancaster
<i>Echinacea laevigata</i>	Smooth coneflower	E	Lancaster, Lexington, Richland
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E	Lancaster, Lexington
<i>Isoetes melanospora</i>	Black-spored quillwort	E	Lancaster
<i>Lindera melissifolia</i>	Pondberry	E	Colleton, Dorchester
<i>Lysimachia asperulifolia</i>	Rough-leaved loosestrife	E	Richland
<i>Oxypolis canbyi</i>	Canby's dropwort	E	Colleton, Dorchester, Hampton, Orangeburg, Richland
<i>Schwalbea americana</i>	American chaffseed	E	Colleton
Critical Habitat for <i>Lasmigona decorata</i>	Flat Creek	CH	Lancaster

Sources: FWS 2010b; SCDNR 2010a; 67 FR 44502

E = Federally listed as endangered; T = Federally listed as threatened, CH= Critical Habitat

2.0 Project Description

The following paragraphs discuss how the project design has been revised since the BA was completed. The revisions that follow replace the previous proposed transmission system description in Chapter 2 of the BA and the description of the proposed Federal action in Chapter 3 of the BA. Impacts from building and operation of the proposed transmission system on threatened and endangered terrestrial and aquatic species are discussed in the BA and are still applicable with the finalized routes described below.

The addition of Units 2 and 3 to the VCSNS site would require six new 230-kV lines (three for Unit 2, three for Unit 3) (SCE&G 2010a). Routes have been sited for the expected new transmission line corridors and are illustrated in Figure 1.

The planned routes of the new transmission lines are described as follows (SCE&G 2010a):

- VCSNS-Killian – This SCE&G line would be routed from the VCSNS site to the vicinity of Winnsboro and then generally follow the Interstate-77 corridor to connect to the existing Killian substation near Killian, South Carolina, running 37 mi southeast of the plant and northeast of Columbia, South Carolina. Even though 31 mi of the new line would be built entirely within existing SCE&G right-of-way, portions of the right-of-way would have to be cleared of forest vegetation in order to establish a corridor for the new line. All but the final 6 mi of this line would be routed within existing SCE&G corridors. The 6 mi would be built in new right-of-way not adjacent to any existing transmission line right-of-way (SCE&G 2010b). However, portions of the new right-of-way would be located immediately adjacent to existing roads or other utilities.
- VCSNS-Flat Creek – This Santee Cooper line would connect to the existing Winnsboro substation near Winnsboro, then to the existing Richburg switching station near Great Falls, South Carolina, and finally to the existing Flat Creek substation east of Lancaster, South Carolina, running about 72 mi in length (SCE&G 2010b). About 17 mi of new corridor running immediately adjacent to the existing corridor would be required (MACTEC 2009).
- VCSNS-St. George No. 1 and 2 – These SCE&G lines originate at the proposed VCSNS Units 2 and 3 switchyard and run generally south to a proposed new substation near St. George, South Carolina. The St. George No. 1 line would share the existing Parr Hydro-Chapin and Saluda Hydro-Newberry corridors with the new SCE&G Lake Murray No. 2 line to the Lake Murray substation near the eastern shore of Lake Murray. The St. George No. 2 line would run parallel with the existing Lake Murray No. 1 line from the VCSNS Units 2 and 3 switchyard to the Lake Murray substation. The St. George No. 1 and 2 lines would intersect near the Killian substation and run in a common corridor through existing rights-of-way to a proposed substation near St. George, South Carolina (Pike 2010). These transmission lines would be built entirely within existing transmission line rights-of-way (SCE&G 2010b).
- VCSNS-Lake Murray No. 2 – This SCE&G line would connect to the existing Lake Murray switchyard for the McMeekin and Saluda Hydro stations near the eastern boundary of Lake Murray. About 22 mi of new line would be built within the existing Parr Hydro-Chapin and Saluda Hydro-Newberry corridors and would be co-located with the proposed St. George No. 2 line (SCE&G 2010b). Even though the new line would be built entirely within existing SCE&G right-of-way, portions of the right-of-way would have to be cleared of forest vegetation to establish a corridor for the new line.
- VCSNS-Varnville – This 167-mi Santee Cooper line would connect to the existing Pomaria substation, then to Sandy Run substation near Sandy Run, then to the Orangeburg substation in Orangeburg, then to the proposed Byrds substation near St. George, and then to the existing Varnville substation near Varnville, South Carolina, in Hampton County (SCE&G 2010b). About 22 mi of new corridor running immediately adjacent to the existing corridor and about 0.5 mi of entirely new corridor would be required (MACTEC 2009).

SCE&G and Santee Cooper had defined macrocorridors for the proposed transmission lines for the BA but had not yet defined specific rights-of-way within those macrocorridors. Both have now defined specific rights-of-way for each proposed transmission line. To avoid possible

confusion, this technical memo uses the following terms in distinct contexts when discussing transmission lines:

- It uses “route” to refer to the general course of a transmission line over a landscape.
- It uses “right-of-way” to refer to a two-dimensional polygon defined by the legal boundaries of property ownership or an easement for a transmission line.
- It uses “corridor” to refer to a two-dimensional polygon defined by the limits of routine vegetation management for a transmission line.

Right-of-way refers to the entire area under the control or ownership of the utility and corridor refers to the specific and potentially smaller area that would be maintained as appropriate for the transmission lines within it. Thus, right-of-way and corridor might be the same along some sections, but when the two differ, right-of-way would be the more inclusive area with the corridor located within the right-of-way. This technical memo uses “macrocorridor” to refer to the broader polygons for transmission line development mentioned in the BA.

2.1 Terrestrial Impacts

Where the proposed new transmission lines would be accommodated entirely within existing corridors that are currently maintained edge to edge, habitat impacts would be limited to temporary, light disturbance of areas of grassland and scrub already subject to routine maintenance that excludes tall trees (Pike 2010; MACTEC 2009). The review team estimated impacts on forested habitat within the proposed transmission line corridors by overlaying the applicant-provided geographic information system (GIS) layer of the proposed corridors onto U.S. Geological Survey (USGS) land-use land-cover data from 2001 (SCE&G 2010b, c; USGS 2001). Much of the forest habitat requiring clearing lies within proposed new corridors, although some forest cover within existing rights-of-way that is not presently managed edge to edge would also require clearing. In those areas impacts on forests and wetlands would be minimized by implementation of best management practices (BMPs), such as the use of a silt fence and temporary and permanent vegetation stabilization techniques established by the South Carolina Forestry Commission (Pike 2010; MACTEC 2009; SCFC 1994). All work performed by SCE&G and Santee Cooper would be done in compliance with applicable Federal, State, and local laws, regulations, and permit requirements. Impacts on forests and wetlands are summarized in Table 2.

2.2 Aquatic Impacts

Impacts on the waterways associated with transmission line activities include erosion of soils, potential for pollutant discharge from equipment, and temporary disturbance and/or displacement of aquatic biota. Both SCE&G and Santee Cooper would implement BMPs to minimize adverse conditions for aquatic biota and habitats during transmission line installation. Examples of BMPs to minimize impacts on streams and open water include establishment of sediment basins, sediment traps, and silt fences to control and divert runoff away from streams, and maintenance of stream buffers (MACTEC 2008; FP&S 2008). In addition, both Santee Cooper and SCE&G have acknowledged the need for acquiring State and Federal permits and the incorporation of BMPs and Storm Water Pollution Prevention Plans into said permits (MACTEC 2008; FP&S 2008). SCE&G stated that it “will comply with the S.C. Stormwater

Management and Sediment Reduction Act related to water quality protection and will comply with the recommendations of various regulatory agencies, including the S.C. Department of Natural Resources, S.C. Department of Health and Environmental Control, the U.S. Army Corps of Engineers, etc.” (FP&S 2008).

Table 2. Summary of Forest and Wetland Impacts in Proposed Transmission Line Corridors

Transmission Line Route	Total Length (mi)	Total Area (ac)^(a)	Total Forested Area (ac)^(b)	Total Wetland Area (ac)^(c)	Wetland Area in New Right-of-Way (ac)^(c)	Forested Wetland Area to Be Cleared, New and Existing Right-of-Way (ac)^(c)
VCSNS-Killian	37	365	171	31	16.6	15.5
VCSNS-Lake Murray No. 2 and VCSNS-St. George No. 1 common corridor	22	281	175	7.7	0	5.9
VCSNS-St. George No. 2 (between VCSNS site and common corridor with VCSNS-St. George 1)	18	238	158	2.9	0	0.1
VCSNS-St. George No. 1 and St. George No. 2 common corridor (Lake Murray to St. George)	76	1186	495	184	0	15.9
VCSNS-Flat Creek	72	1094	81	12.5	0.8	0.8
VCSNS-Varnville	167	2539	91	354	5.5	5.5

Source: MACTEC 2009; SCE&G 2010a; Pike 2010; USACE 2010|T-Line JD|
(a) Source: USACE 2010.
(b) Wetland areas from USACE (2010)

3.0 Updated Species Determinations

SCE&G and Santee Cooper have performed reconnaissance-level analysis in the proposed new transmission line corridors associated with proposed VCSNS Units 2 and 3 and have conducted targeted field studies of Federally-listed threatened and endangered species in areas identified to have the highest potential for those species to occur (Palmetto 2010; MACTEC 2010). SCE&G and Santee Cooper overlaid their proposed transmission line corridors onto the South Carolina Department of Natural Resources (SCDNR) and FWS occurrence maps to identify potential areas where protected species might occur. This analysis was then cross-referenced with SCDNR’s Rare Threatened and Endangered Species Inventory database to fully capture species that are known to occur in counties where the proposed transmission line corridors would occur (Palmetto 2010; MACTEC 2010). Potential habitat for each Federally listed species with the potential to occur in the project area was mapped using a

combination of infrared imagery, topographic and soils maps, and wetland features to identify survey locations (Palmetto 2010; MACTEC 2010).

SCE&G and Santee Cooper then conducted on-the-ground targeted surveys in September, October, and November 2010 in the specific areas identified as having the highest potential for threatened and endangered species to occur (Palmetto 2010; MACTEC 2010). Additional visual inspection was carried out in representative areas where at least moderate potential for species to occur was identified. The methods are fully described by Palmetto (2010) and MACTEC (2010). No threatened and endangered species were identified by SCDNR from their elemental occurrence database (SCDNR 2010b) to occur within the proposed corridors and none were found during on-the-ground field surveys (Palmetto 2010; MACTEC 2010).

Wood stork (*Mycteria americana*) (Endangered). As described in the BA, a variety of wetlands are used by this species for nesting, feeding, and roosting, and in South Carolina, colony sites are surrounded by extensive palustrine forested wetlands. Wood storks are known to nest in the upper branches of black gum or cypress trees that are located in standing water (swamps). Shallow, open water is required for successful foraging (FWS 1986; Murphy 2006).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that there are no known occurrences of wood stork rookeries in the proposed transmission line corridors (SCDNR 2010b). No wood storks or possible wood stork rookeries were observed in the corridors during targeted field surveys conducted by SCE&G and Santee Cooper in 2010. However, there is foraging habitat present throughout the project area, including within the proposed corridors, and it is likely wood storks could forage incidentally in those areas (Palmetto 2010; MACTEC 2010; SCDNR 2010a). Slight reductions in wood stork foraging habitat are unlikely to noticeably affect wood stork population levels in the region. Both utilities also have procedures in place to meet the guidelines set by the Avian Powerline Interaction Committee (APLIC) to ensure all powerlines associated with the proposed project are “raptor safe” in order to minimize potential impacts on raptors and other large birds (Palmetto 2010; MACTEC 2010). Based on the 2010 survey observations and the information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the wood stork.

Red-cockaded woodpecker (*Picoides borealis*) (Endangered). As described in the BA, red-cockaded woodpecker populations are distributed across the southeastern United States and managed as distinct recovery units. Red-cockaded woodpeckers are dependent on open, mature pine forests and savannahs for prime foraging and nesting habitat. The large, old pines are needed because the birds excavate cavities in the living trees completely within the heartwood to roost and nest in. The cavity trees must be in homogeneous stands of pine with little to no midstory present. Red-cockaded woodpeckers typically require 75 to 200 ac of foraging habitat (large mature pines) with a well-developed herbaceous layer that includes native bunchgrasses and forbs.

When reviewed in 2010, the SCDNR elemental occurrence database indicated that red-cockaded woodpeckers are known to occur in Dorchester and Orangeburg Counties (SCDNR 2010b). There is one recorded occurrence within 0.5 mi of the proposed St. George 1 – St. George 2 transmission line corridor; however, SCDNR stated that it is an extirpated population

(SCDNR 2011). There are two other recorded occurrences of the red-cockaded woodpecker approximately 1 mi away from the proposed transmission line corridors; however, none were observed during targeted field surveys conducted by SCE&G and Santee Cooper in 2010 (Palmetto 2010; MACTEC 2010; SCDNR 2010b). The field surveys for this species included inspection of each tree over 10 inches in diameter at breast height within the proposed new corridor for presence of nesting cavities. Scattered foraging habitat adjacent to the proposed transmission lines is present in corridors in counties where the species is known to occur (Palmetto 2010). There is a recorded red-cockaded woodpecker group located approximately 1 mi from an existing Santee Cooper corridor in Orangeburg County, and the closest recorded groups to the proposed new right-of-way segments are approximately 2 mi from an existing line in Orangeburg County (MACTEC 2010). SCE&G and Santee Cooper identified 15 locations having potential habitat for the red-cockaded woodpecker. They surveyed each of those locations on the ground in September, October, and November of 2010 and concluded that only one location contained suitable foraging habitat for the red-cockaded woodpecker (MACTEC 2010). That location is situated on the proposed new right-of-way for the Santee Cooper VCSNS-Flat Creek line. No red-cockaded woodpeckers were observed during ground surveys and no visible nesting activity was observed (Palmetto 2010; MACTEC 2010). It is expected that red-cockaded woodpeckers could transiently visit areas in or near portions of the transmission line corridors where suitable foraging habitat exists. Because the 2010 survey observations determined no nesting habitat was present in the proposed corridors, but suitable foraging habitat is present along the proposed routes in counties where the red-cockaded woodpecker is known to occur, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the red-cockaded woodpecker.

Flatwoods salamander (*Ambystoma cingulatum*) (Threatened). As described in the BA, flatwoods salamander populations are distributed throughout the lower Southeastern Coastal Plain from southern South Carolina through southern Georgia to northern Florida and southwestern Alabama (Palis 1997). Flatwoods salamander habitat includes generally open-canopied pine savannas and flatwoods of the southeastern coastal plain with cypress swamps present for breeding (Palis 1997).

When reviewed in 2010, the SCDNR elemental occurrence database did not identify any recorded occurrences of flatwoods salamander within 1 mi of any of the proposed transmission line corridors (SCDNR 2010b). Critical habitat for flatwoods salamander in South Carolina has been identified by the FWS in three counties: Jasper, Berkeley, and Charleston Counties, none of which are counties in the project area, nor are they near any of the proposed corridors, (FWS 2008).

Santee Cooper did not conduct ground surveys for the flatwoods salamander because proposed new transmission line corridors do not cross counties where it is likely to occur (MACTEC 2010). However, SCE&G identified four locations within the proposed transmission line corridors having potential habitat for the flatwoods salamander. After visiting those locations during targeted field surveys in September and October of 2010, SCE&G determined that they did not contain suitable habitat (Palmetto 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the flatwoods salamander.

Carolina heelsplitter (*Lasmigona decorata*) (Endangered and Critical Habitat). The Carolina heelsplitter is the sole freshwater mussel within South Carolina that maintains a designation as a Federally listed endangered species, and it is designated as a State species of highest conservation priority. The six known populations of the Carolina heelsplitter within the state are defined by geographic location: (1) Savannah River tributaries in Edgefield and McCormick Counties; (2) Cuffeytown Creek in Greenwood and McCormick Counties; (3) Lynches River and Flat Creek in Chesterfield, Kershaw, and Lancaster Counties; (4) Gills Creek in Lancaster County; (5) Fishing Creek in Chester County; and (6) Bull Run Creek in Chester County (SCDNR 2006; 67 FR 44502).

Historic distribution of this species in South Carolina included the Pee Dee and Savannah drainages and possibly the Saluda drainage. Historic associations included freshwater habitats ranging from small-to-large streams and rivers. The Carolina heelsplitter has been noted to occur in association with substrate ranging from fine to coarse grain size fractions. Occurrences of the Carolina heelsplitter have been correlated with stream habitat complexity characterized as shaded, stable stream banks, and the presence of undercut banks, root wads, and large woody debris.

Designated critical habitat includes 103.2 km of streams and rivers in South Carolina that occur in conjunction with the known populations. The lateral boundaries of the critical habitats for the Carolina heelsplitter are denoted by the ordinary high water mark along channel edges (67 FR 44502). Designated critical habitats for the Carolina heelsplitter do not occur in the vicinity of the VCSNS site, and the species has never been found in the Parr and Monticello reservoirs or in onsite creeks and streams.

The routing of Santee Cooper transmission line corridors for VCSNS Units 2 and 3 is proposed to occur within two South Carolina counties that contain critical habitat for the Carolina heelsplitter: Chester and Lancaster Counties. The VCSNS-Flat Creek line will require a new corridor crossing Fishing Creek Reservoir (Catawba River impoundment) in Lancaster County near drainages known to support the Carolina heelsplitter. The known Gills Creek population is upstream from the location of the proposed new corridor, approximately 15 mi north and 12 mi northeast (MACTEC 2010). However, the existing VCSNS-Flat Creek corridor crosses a portion of Flat Creek in Lancaster County that is listed by FWS as critical habitat (Figure 2), and supports the Lynches River/Flat Creek population of Carolina heelsplitter.

The Carolina heelsplitter is known to occur within 1 mi of the existing VCSNS-Varnville and VCSNS-Flat Creek lines at several locations in Richland and Lancaster Counties (SCDNR 2010b). The Carolina heelsplitter was included in the habitat survey of the 2.44 mi of proposed new VCSNS-Varnville corridor in Parr Reservoir. Survey efforts did not identify the occurrence of Carolina heelsplitter within the 2.44 mi segment of proposed new right-of-way, nor were any noteworthy habitat attributes that may support this species identified (MACTEC 2008, 2009).

GIS-based analysis confirms no spatial overlap in known locations of this species and SCE&G transmission lines (SCDNR 2010b). The Carolina heelsplitter may also occur within waterbodies in Fairfield, Lexington, and Newberry Counties, which will also contain transmission line corridors for VCSNS Units 2 and 3 (Figure 1). A portion of the VCSNS-Killian line falls within Fairfield County, near watersheds associated with Carolina heelsplitter habitat; however,

Pike (2010) reported no occurrences of the heelsplitter associated with this transmission line corridor. In addition, there are no designations for critical habitat, nor are there verified species occurrences within Fairfield, Lexington, and Newberry Counties (FWS 2010b).

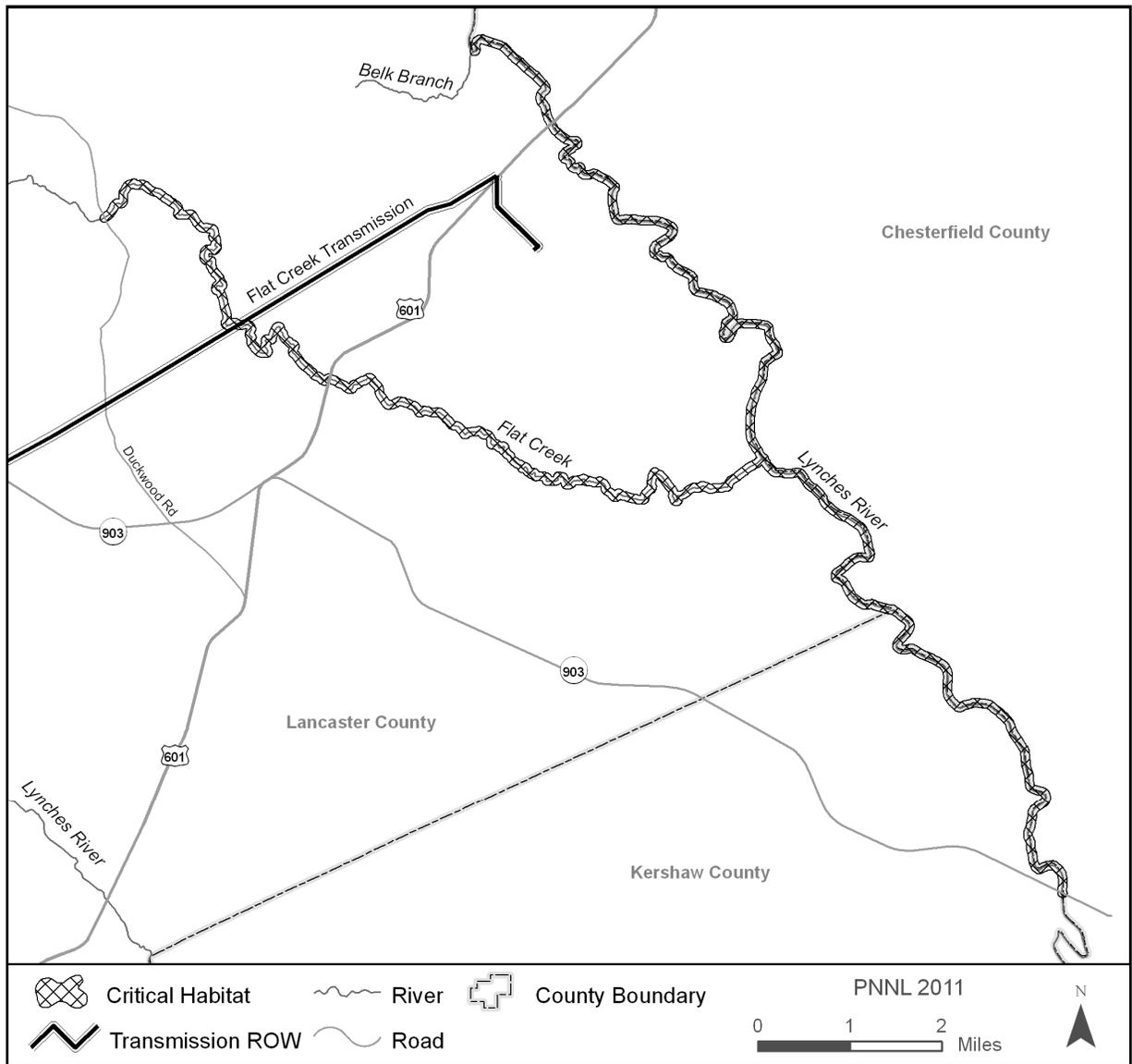


Figure 2. Existing Portion of Santee Cooper VCSNS-Flat Creek Line Crossing of Carolina Heelsplitter Critical Habitat (MACTEC 2010; 67 FR 44502)

The use of BMPs for activities associated with preparation and installation of new transmission line corridors, upgrades to existing corridors and infrastructure, and corridor maintenance is expected to limit potential impacts on this species. Improvements to the existing VCSNS-Flat Creek transmission line corridor crossing Carolina heelsplitter critical habitat will not involve in-water structures. No in-water work will be conducted in Flat Creek during installation, normal maintenance or normal operation. Upgrades to the transmission lines will include placing new transmission poles within established corridor adjacent to and parallel with existing poles, which are 200 ft. away from the banks of Flat Creek on either side. The applicant will not drive

vehicles across Flat Creek, but may work along the shoreline for controlling vegetation. Vegetative management activities near Flat Creek critical habitat will comply with BMPs for corridor vegetation management near streams (Santee Cooper 2006; SCFC n.d.), and BMPs for stormwater management and minimization of erosion and sedimentation (SCDHEC 2003; 2005a; 2005b). Based on the information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the Carolina heelsplitter. In addition, based on the information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, critical habitat for the Carolina heelsplitter in Flat Creek.

Smooth coneflower (*Echinacea laevigata*) (Endangered). As described in the BA, smooth coneflower is found in meadows and open woodlands on basic or near neutral soils, often with eastern redcedar (*Juniperus virginiana*). Questions remain concerning the biology and natural distribution of this species in South Carolina (Nelson 2006). It is rare throughout its range and has sustained significant habitat loss, at least in part due to fire-suppression activities (Porcher and Rayner 2001).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that smooth coneflower is known to occur in the project area in Richland County and may possibly also occur in Lexington County (SCDNR 2010a; FWS 2010b). There is one recorded occurrence within 1 mi of one of the proposed transmission line corridor in Lancaster County (SCDNR 2010b).

As mentioned earlier, both utilities consulted soils maps to identify specific locations within the proposed project area where suitable habitat could be present (Palmetto 2010; MACTEC 2010). SCE&G and Santee Cooper identified 13 locations (10 in the proposed SCE&G transmission line corridors and 3 in the proposed Santee Cooper corridors) having site characteristics (i.e., alkaline soils) capable of supporting smooth coneflower. But no occurrences of smooth coneflower were found during targeted field surveys of the 13 locations conducted in September, October, and November 2010 (which includes part of the flowering season) (Palmetto 2010; MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the smooth coneflower.

Rough-leaved loosestrife (*Lysimachia asperulifolia*) (Endangered). As described in the BA, rough-leaved loosestrife occurs in ecotones between longleaf pine uplands and pond pine pocosins (upland swamps) in moist, sandy, or peaty soils with low vegetation. It has also been found to occur in disturbed areas such as roadside depressions, powerline rights-of-way, firebreaks, and trails (NatureServe 2009).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that rough-leaved loosestrife is known to occur in the project area in Richland County (SCDNR 2010a; FWS 2010b). There were no recorded occurrences of rough-leaved loosestrife in or within 1 mi of any of the proposed transmission line corridors (SCDNR 2010b). SCE&G and Santee Cooper identified 29 sites having high potential for occurrence of rough-leaved loosestrife. No occurrences of rough-leaved loosestrife were found during targeted field surveys of the 29 locations conducted in September, October, and November 2010 (Palmetto 2010;

MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is not likely to adversely affect, the rough-leaved loosestrife.

Canby's dropwort (*Oxypolis canbyi*) (Endangered). As described in the BA, Canby's dropwort grows in wet meadows, wet pine savannahs, shallow pineland ponds, and cypress-pine swamps (NRC 2004).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that Canby's dropwort is known to occur in the project area in Richland County (SCDNR 2010a; FWS 2010). There were no recorded occurrences of Canby's dropwort in or within 1 mi of the proposed transmission line corridors (SCDNR 2010b). The closest known population of this species to the proposed Santee Cooper transmission line corridor occurs approximately 1.5 mi from an existing corridor in Orangeburg County (MACTEC 2010).

Twenty wetland depressions along the VCSNS-St. George No. 1 and No. 2 corridor were identified by reconnaissance studies and were subsequently field-checked in November 2010 (Palmetto 2010). Of the 20 wetland depressions that were field-checked, only one of them contained suitable habitat for Canby's dropwort (Palmetto 2010). The wetland depression was then surveyed for the presence of Canby's dropwort and none was found (Palmetto 2010). The closest known population of Canby's dropwort is approximately 1.5 mi from an existing Santee Cooper corridor in Orangeburg County (MACTEC 2010). Nine sites were identified as having high potential for Canby's dropwort to occur, but those sites were subsequently ground surveyed and found to not contain suitable habitat, or no species present (MACTEC 2010). In addition, limited visual reconnaissance was carried out in areas with moderate potential along existing and new corridors and all areas were found to either have unsuitable habitat or the species was not present (MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, Canby's dropwort.

Pool sprite (*Amphianthus pusillus*) (Threatened). As described in the BA, pool sprite, also known as little amphianthus, occurs in small (usually less than 1 m²) shallow pools on the crests and flattened slopes of granite outcrops and requires ideal moisture and light conditions for successful seed germination (FWS 2008b). Pool sprite is endemic to open flat granite rocks, with enough surface area to allow the development of shallow pools that fill with water during spring rainy periods when the seeds germinate, followed by rapid growth, flowering, and fruit setting (NRC 2003). The entire life span of this delicate plant is only 3 to 4 weeks (FWS 2008).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that pool sprite is known to occur in the project area in Lancaster County (SCDNR 2010a; FWS 2010). There is one recorded occurrence of pool sprite within 1 mi of a proposed transmission line corridor in Lancaster County (SCDNR 2010b).

Biologists reviewed aerial photography to identify granite outcrops along the proposed new right-of-way that might be capable of supporting pool sprite. They subsequently field-verified the outcrops and found that none appeared to contain suitable habitat for pool sprite (MACTEC 2010). Based on the 2010 survey observations and the other information

summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, the pool sprite.

Schweinitz's sunflower (*Helianthus schweinitzii*) (Endangered). As described in the BA, Schweinitz's sunflower is a shade-intolerant perennial herb that produces solitary stems up to 2 m tall and bears yellow flower heads in late summer and early autumn. This species requires full to partial sun and prefers Piedmont longleaf pine forest clearings and edges. Adapted to high-frequency, low-intensity fires, this species occurs mostly in transmission line corridors and along roadsides because fire-suppression activities throughout its range have depleted suitable natural habitat (NatureServe 2009).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that Schweinitz's sunflower is known to occur in the project area in Lancaster County (SCDNR 2010a; FWS 2010b). There were no recorded occurrences of this species in or within any of the proposed transmission line corridors (SCDNR 2010b).

Biologists identified five locations having high potential for Schweinitz's sunflower and subsequently performed ground surveys of each for Schweinitz's sunflower (MACTEC 2010; Palmetto 2010). No Schweinitz's sunflowers were found at any of the locations. In addition, field teams conducted limited visual reconnaissance for this species in other areas having only moderate potential for this species along proposed existing and new right-of-way, but no individuals or suitable habitat were found (MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, Schweinitz's sunflower.

Black-spored quillwort (*Isoetes melanospora*) (Endangered). As described in the BA, black-spored quillwort is a granite outcrop species that is inconspicuous, generally under 8 cm tall. Like the pool sprite, another granite outcrop species, the black-spored quillwort is restricted to shallow, flat-bottomed depressions on granitic outcrops, where water collects after rain. These depressions are less than 1 cm deep and usually contain soil at least 2 cm deep (NatureServe 2009).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that black-spored quillwort is known to occur in the project area in Lancaster County at Forty Acre Rock (SCDNR 2010a; FWS 2010b). There was one recorded occurrence of this species within 1 mi of a proposed transmission line corridor in Lancaster County (SCDNR 2010b).

Biologists used aerial photography to identify granite outcrops in Lancaster County along the proposed new right-of-way. They then conducted field surveys at each potentially favorable location and found that none contained suitable habitat for black-spored quillwort (MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, the black-spored quillwort.

Pondberry (*Lindera melissifolia*) (Endangered). As described in the BA, pondberry is a deciduous aromatic shrub that ranges from 0.5 to 2 m tall and usually grows in clumps in a variety of seasonal wetland habitats throughout the region (NatureServe 2009). Its flowering

period is from late February to mid-March; its fruiting period is from August to early October. Searches for this species can be performed throughout the entire growing season, because masses of yellowish flowers are produced prior to leafing out, making the thicket-forming shrubs conspicuous, and leaves are diagnostic when combined with growth habit and/or fruit (USDA 2009). Habitat alteration and loss are the most considerable threats to this species (NatureServe 2009).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that pondberry is known to occur in the project area in Colleton and Dorchester Counties (SCDNR 2010a; FWS 2010b). There were no recorded occurrences of this species in or within 1 mi of the proposed transmission line corridors (SCDNR 2010b).

Biologists identified six locations having high potential for pondberry and conducted ground surveys at each location (MACTEC 2010). No individuals or suitable habitat were found at any of the locations (MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, pondberry.

American chaffseed (*Schwalbea americana*) (Endangered). As described in the BA, American chaffseed is a monotypic perennial in the figwort family and is found in open pine flatwoods and savannas in moist-to-dry acidic sandy loam soils to sandy peat loams (FWS 1995). Flowering occurs between April and June, which is the best time to survey for this species, but the dark brown stems are distinctive and easy to identify after flowering (FWS 1995).

When reviewed in 2010, the SCDNR elemental occurrence database indicated that American chaffseed is known to occur in the project area in Colleton County (SCDNR 2010a; FWS 2010). There were no recorded occurrences of this species in or within 1 mi of the proposed transmission line corridors (SCDNR 2010b).

Biologists identified four locations in the Santee Cooper proposed transmission line corridors containing potentially suitable habitat for American chaffseed. They then conducted ground surveys at each and did not find any species or suitable habitat (MACTEC 2010). Based on the 2010 survey observations and the other information summarized above, the review team concludes that the proposed action may affect, but is unlikely to adversely affect, American chaffseed.

4.0 Conclusions

Determinations reached by NRC and USACE regarding potential impacts from building and operating the proposed transmission system on the species and critical habitat listed in Table 1 are presented in Table 3.

Table 3. Determinations Reached by NRC and USACE for Federally Listed Species and Critical Habitat Potentially Affected by Building and Operating Proposed VCSNS Units 2 and 3 and Associated Transmission Lines

Scientific Name	Common Name	Status	Determination
Birds			
<i>Mycteria americana</i>	Wood stork	E	May affect; not likely to adversely affect
<i>Picoides borealis</i>	Red-cockaded woodpecker	E	May affect; not likely to adversely affect
Amphibians			
<i>Ambystoma cingulatum</i>	Flatwoods salamander	T	May affect; not likely to adversely affect
Mollusks			
<i>Lasmigona decorata</i>	Carolina heelsplitter	E	May affect, not likely to adversely affect
Vascular Plants			
<i>Amphianthus pusillus</i>	Pool sprite	T	May affect; not likely to adversely affect
<i>Echinacea laevigata</i>	Smooth coneflower	E	May affect; not likely to adversely affect
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E	May affect; not likely to adversely affect
<i>Isoetes melanospora</i>	Black-spored quillwort	E	May affect; not likely to adversely affect
<i>Lindera melissifolia</i>	Pondberry	E	May affect; not likely to adversely affect
<i>Lysimachia asperulifolia</i>	Rough-leaved loosestrife	E	May affect; not likely to adversely affect
<i>Oxypolis canbyi</i>	Canby's Dropwort	E	May affect; not likely to adversely affect
<i>Schwalbea americana</i>	American chaffseed	E	May affect; not likely to adversely affect
Critical Habitat			
for <i>Lasmigona decorata</i>	Flat Creek	CH	May affect; not likely to adversely affect

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