

June 26, 2003

Ms. Sandy Abbot
U.S. Fish and Wildlife Service
Ecological Services Office
176 Crogham Spur Road
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Charleston, SC 29407

SUBJECT: BIOLOGICAL ASSESSMENT FOR LICENSE RENEWAL AT V. C. SUMMER
NUCLEAR STATION AND REQUEST FOR INFORMAL CONSULTATION
(TAC NO. MB5227)

Dear Ms. Abbot:

The U.S. Nuclear Regulatory Commission (NRC) staff has prepared the enclosed Biological Assessment to evaluate whether the proposed renewal of the V.C. Summer Nuclear Station (V.C. Summer) operating license for a period of an additional 20 years would have adverse effects on listed species. This Biological Assessment covers the site, which is approximately 909 hectares (2,245 acres) and includes portions of Monticello Reservoir as well as the 193-km- (120-mi-) long transmission line corridor.

The NRC has identified eleven species listed as threatened or endangered under the Federal Endangered Species Act and one Candidate species with the potential to be affected by this action. The primary species of concern is the bald eagle, which has been found within an 8-km (5-mi) radius of V.C. Summer. The staff has determined that the proposed action is not a major construction activity and that it may affect, but is not likely to adversely affect, the bald eagle. No designated critical habitat for any listed species is located near the project area. We are placing this Biological Assessment in our project files and are requesting your concurrence with our determination.

In reaching its conclusion, the NRC staff relied on the information available through local, State, and Federal agencies, on research performed by the NRC staff and contractors, and a current listing of species provided by the South Carolina field office of the Fish and Wildlife Service.

S. Abbot

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If you have any questions regarding this Biological Assessment or the staff's request, please contact the license renewal project manager, Gregory Suber, by telephone at (301) 415-1124 or by e-mail at GXS@nrc.gov.

Sincerely,
/RA/

Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No.: 50-395

Enclosure: As stated

cc w/encl: See next page

S. Abbot

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Accession no.: ML031770358

*See previous concurrence

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Biological Assessment

**Virgil C. Summer Nuclear
Station**

License Renewal Review

Jenkinsville, South Carolina

June 2003

**U.S. Nuclear Regulatory
Commission**

Rockville, Maryland

Biological Assessment of the Effects of the V.C. Summer Power Plant License Renewal on Threatened or Endangered Species

Executive Summary

This Biological Assessment evaluates the potential impacts of the license renewal of the Virgil C. Summer Nuclear Station (V.C. Summer) on Federally listed threatened or endangered species. There will be no major construction, refurbishment, or replacement activities associated with this action. The U.S. Nuclear Regulatory Commission (NRC) has determined that license renewal for V.C. Summer will have no effect on the wood stork, red-cockaded woodpecker, shortnose sturgeon, Carolina heelsplitter, pool sprite, Georgia aster, smooth coneflower, rough-leaved loosestrife, Canby's dropwort, harperella, or relict trillium. The license renewal may affect, but is not likely to adversely affect, the bald eagle.

Project Description

The NRC licenses the operation of domestic nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and NRC implementing regulations. South Carolina Electric & Gas Company (SCE&G) operates V.C. Summer Unit 1 pursuant to NRC Operating License Number NPF-12, which expires August 6, 2022.

SCE&G has prepared an environmental report in conjunction with its application to NRC to renew the V.C. Summer operating license, as provided by the following NRC regulations:

- Title 10, Energy, Code of Federal Regulations (CFR), Part 54, Requirements for Renewal of Operating Licenses for Nuclear Power Plants, Section 54.23, Contents of Application-Environmental Information (10 CFR 54.23) and
- Title 10, Energy, CFR, Part 51, Environmental Protection Requirements for Domestic Licensing and Related Regulatory Functions, Section 51.53, Postconstruction Environmental Reports, Subsection 51.53(c), Operating License Renewal Stage [10 CFR 51.53(c)].

The renewed operating license would allow 20 additional years of plant operation beyond the current V.C. Summer licensed operating period of 40 years.

No major refurbishment or replacement of important systems, structures, or components are expected during the V.C. Summer license renewal period. In addition, no construction activities are expected to be associated with the V.C. Summer license renewal.

Description of Project Area

V.C. Summer is located in Fairfield County, South Carolina, approximately 24 km (15 mi) west of the county seat of Winnsboro and 42 km (26 mi) northwest of Columbia, the State capital (Figure 1). V.C. Summer is a joint project between SGE&G, operator and two-thirds owner, and the South Carolina Public Service Authority (Santee Cooper), owner of the

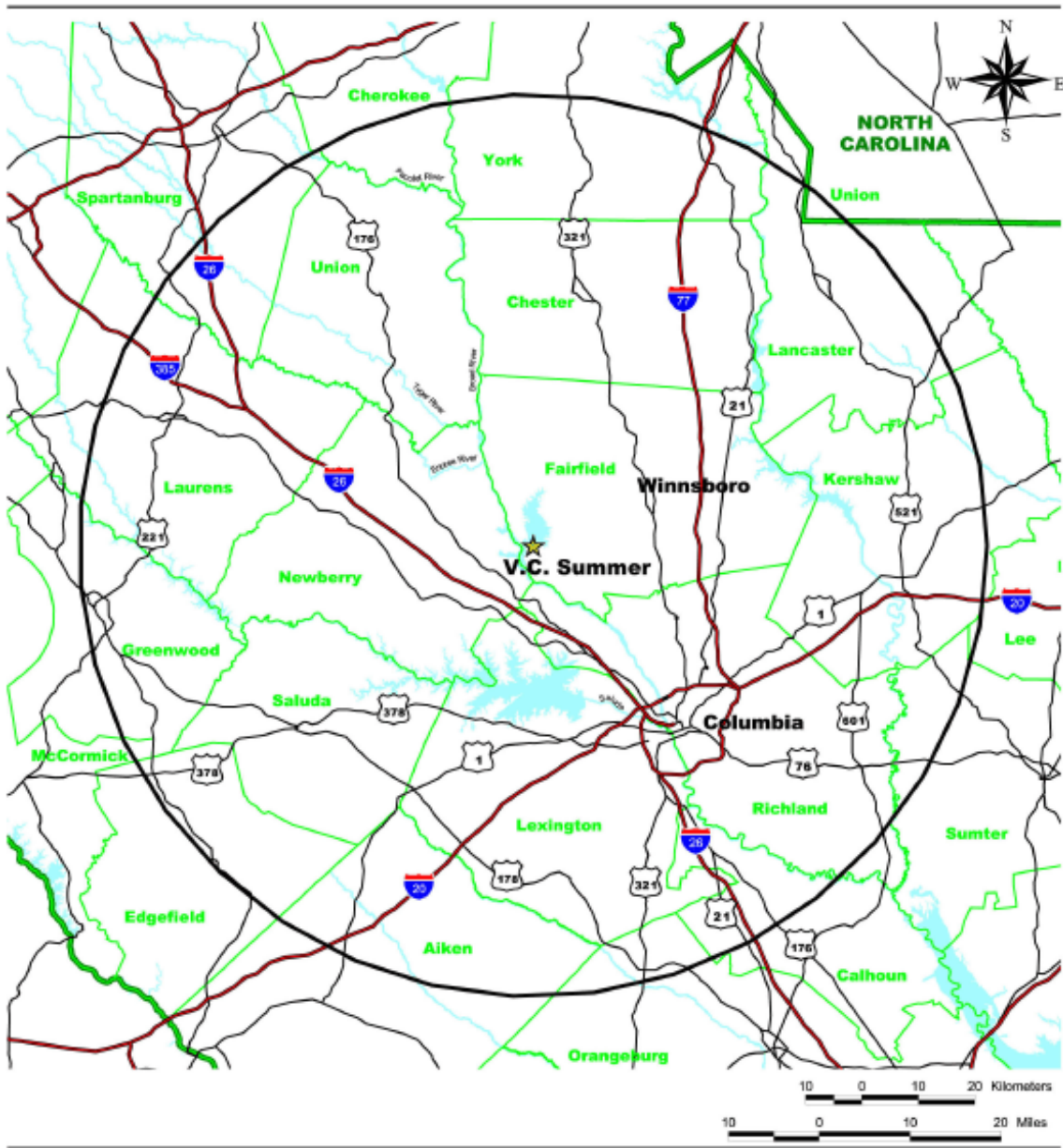
remaining one-third. The site is in a sparsely populated, largely rural area, with forests and small farms comprising the dominant land use. The Broad River flows in a northwest-to-southeast direction approximately 1.6 km (1 mi) west of the site and serves as the boundary between Fairfield County (to the east) and Newberry County (to the west).

The V.C. Summer site covers approximately 909 ha (2245 ac), an area that includes portions of Monticello Reservoir and the Fairfield Pumped Storage Facility (FPSF). Approximately 348 ha (860 ac) are covered by the waters of Monticello Reservoir. A significant portion of the property (approximately 150 ha [370 ac]) consists of generation and maintenance facilities, laydown areas, parking lots, roads, and mowed grass. Some 50 ha (125 ac) are dedicated to transmission line rights-of-way. However, much of the V.C. Summer property consists of forested areas (approximately 360 ha [890 ac]). The primary terrestrial habitats at V.C. Summer are pine forest, deciduous forest, and mixed pine-hardwood forest (SCANA 2000). The pine forests at V.C. Summer include planted pines and naturally vegetated pines. Most of the deciduous forests at the site are located along stream bottoms and surrounding slopes.

Forested areas within the V.C. Summer site are managed by SCANA Services' Forestry Operations group, but timber is not routinely harvested. Parr Reservoir provides some limited freshwater marsh habitat in shallow backwaters, around low-lying islands, and in an area east of the FPSF tailrace that was used in the 1970s for the disposal of dredge spoil. These marshes and adjacent shallows are used by migrating dabbling ducks, including mallard, black duck, and teal. Monticello Reservoir and its subimpoundment also provide resting areas for wintering waterfowl and provide year-round habitat for non-migratory Canada geese.

Terrestrial wildlife species found in the forested portions of the V.C. Summer property are those typically found in the Piedmont forests of South Carolina. Wildlife characteristically found in the pine forests and mixed pine-hardwoods of the Piedmont include toads (e.g., Fowler's toad), lizards (e.g., Carolina anole, fence lizard, various skinks), snakes (e.g., black racer, rat snake, ringneck snake), songbirds (e.g., cardinal, bluejay, towhee, various warblers), birds of prey (e.g., red-tailed hawk, red-shouldered hawk), and a number of mammal species (e.g., gray squirrel, eastern cottontail, raccoon, white-tailed deer).

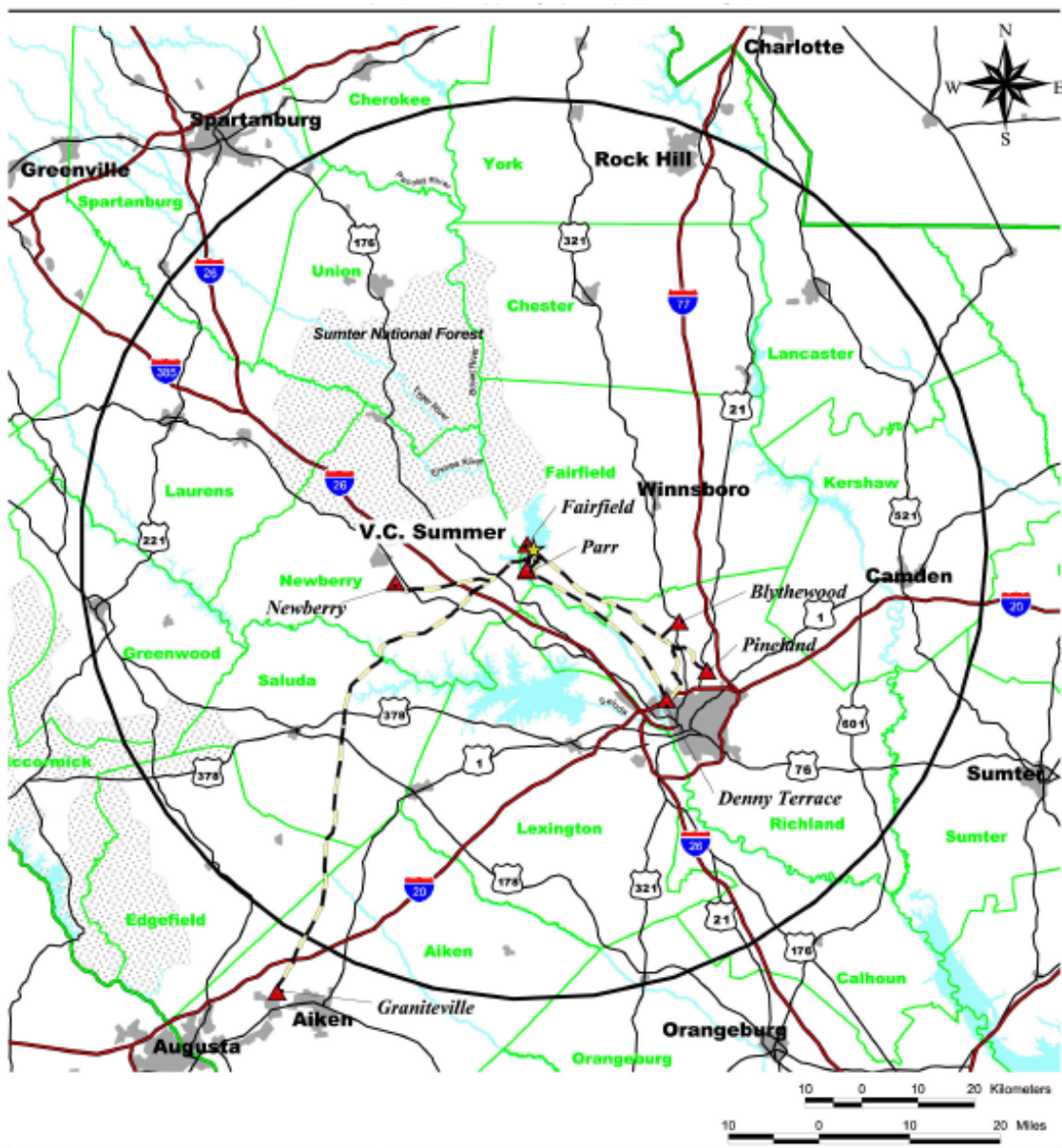
In total, for the specific purpose of connecting V.C. Summer to the transmission system, SCE&G and Santee Cooper constructed approximately 257 km (160 mi) of transmission lines (193 km [120 mi] of corridor) that occupy approximately 809 ha (2000 ac) of corridor. These transmission lines cross the counties of Fairfield, Newberry, Saluda, Aiken, Richland, and Edgefield (Figure 2). The areas are mostly remote, with low population densities. The longer lines cross numerous state and U.S. highways, including Interstate 26 and Interstate 20. SCE&G and Santee Cooper plan to maintain these transmission lines, which are integral to the larger transmission system, indefinitely. These transmission lines are expected to remain a permanent part of the regional transmission system even after V.C. Summer is decommissioned.



- LEGEND**
- ★ V.C. Summer
 - 50 mile radius of V.C. Summer
 - ▬ Interstates
 - ▬ Major roads
 - ▬ County Boundaries
 - ▬ State Boundary
 - ▬ Lakes and Rivers

1. Location of V.C. Summer 80-km (50-mi) Region

Fig
ure



- LEGEND**
- ★ V.C. Summer
 - ▲ Substations
 - Transmission Lines
 - 50 mile radius of V.C. Summer
 - Interstate
 - Major roads
 - County Boundaries
 - State Boundary
 - Lakes and Rivers
 - National Forests
 - Major Urban Areas

Figure 2. Location of V.C. Summer Transmission Lines

Most of the transmission corridors are situated within the Piedmont Physiographic Region, but the southernmost portions of the Summer-Graniteville, Summer-Denny Terrace No. 2, and Summer-Pineland corridors are situated within the Sandhills Physiographic Region. Most of the areas crossed by the transmission corridors are forest lands or agricultural lands (in pasture or row crops). Forest habitats along transmission corridors consist primarily of pine forest, pine-hardwood forest, and bottomland hardwood forest. Transmission corridors that run west from V.C. Summer cross more agricultural lands (mostly pasture) than corridors that run to the east. Conversely, corridors that run to the east cross more forested lands and residential areas (northern suburbs of Columbia) than corridors that run to the west.

No areas designated by the U.S. Fish and Wildlife Service (USFWS) as critical habitat for endangered species exist at the V.C. Summer site or on or adjacent to associated transmission lines. In addition, the transmission corridors do not cross any State or Federal parks, wildlife refuges, or wildlife management areas.

The transmission corridors are maintained by mowing, by trimming of undesirable vegetation from the sides of the corridors, and by use of approved herbicides. Under normal circumstances, the mowing and herbicide schedule follows a three-year cycle. Trees are “side-trimmed” every 10 years by helicopters carrying hydraulically operated saws. Aerial patrols of transmission corridors are conducted four times a year by SCE&G and twice a year by Santee Cooper. Dead and diseased trees at the edges of corridors are removed if it appears that they could fall and strike the transmission lines or support structures.

Periodic mowing in dry, upland portions of transmission corridors creates sunny, open conditions favorable for plants and animals normally found in fire-maintained ecosystems, such as successional grasslands and longleaf pine-wiregrass communities. Permanent and seasonal wetlands along transmission corridors hold potential for harboring a number of other plant species currently listed by the USFWS and South Carolina Department of Natural Resources (SCDNR), including the rough-leaved loosestrife and Canby’s dropwort. Wetlands also provide habitat for several listed animal species, and some species (e.g., the wood stork) are found only in wetlands. Many animal species, however, are highly mobile and utilize more than one habitat type. The transmission corridors provide an open canopy and offer an abundance of herbaceous ground cover. Therefore, they can be natural avenues for movement and foraging by some animals.

Aquatic and riparian communities in the vicinity of V.C. Summer are influenced by the hydrology and water quality of the Broad River and movement of water between the Broad River/Parr Reservoir and Monticello Reservoir. The Broad River originates on the eastern slope of the Blue Ridge Mountains near Lake Lure, North Carolina, and flows 354 km (220 mi) southeast into South Carolina before joining the Saluda River at Columbia, South Carolina, to form the Congaree River. The Congaree River joins the Wateree River approximately 80 km (50 mi) southeast of Columbia, SC to become the Santee River. The Santee River flows southeast 230 km (143 mi) to empty into the Atlantic Ocean. In South Carolina, the Broad River basin encompasses an approximately 7242-km² (4500-mi²)

watershed drained by 7594 km (4719 mi) of streams (SCDHEC 1998). Major tributaries include the Pacolet, Tyger, and Enoree rivers, all of which enter the Broad River from the west. The Broad River Basin in South Carolina is entirely within the Piedmont region, which is an area of gently rolling to hilly terrain with relatively broad stream valleys; elevations range from 115 to 305 m (376 to 1000 ft) above mean sea level (SCDHEC 1998). For most of its length in South Carolina, the Broad River flows through agricultural and forested land, including the Sumter National Forest, which bounds the river for some 48 km (30 mi) above Parr Reservoir.

Parr Reservoir was created in 1914 by damming the Broad River at Parr Shoals, approximately 42 km (26 mi) upstream of the confluence of the Broad and Saluda rivers for Parr Hydro, a small (15 megawatt) run-of-the-river hydroelectric facility. Prior to 1977, the reservoir's surface area was 749 ha (1850 ac) (SCE&G 1978). In 1977, the level of Parr Reservoir was raised by 3 m (9 ft), which increased its surface area to approximately 1781 ha (4400 ac). This modification was necessary to support the development of FPSF, which was built on Frees Creek, a small tributary of the Broad River. In addition, Monticello Reservoir was created to serve as the upper reservoir for FPSF and the cooling water source for V.C. Summer. Parr Reservoir, which had historically been the source of water for Parr Hydro, assumed a dual function, providing a headwater pool for Parr Hydro and a tailwater pool for FPSF. The daily cycle of operation at the FPSF transfers up to 35,771,181 m³ (29,000 acre-feet) per day of water from Parr Reservoir to Monticello Reservoir and back (NRC 1981). Operations vary, depending on the season and system needs. In summer, FPSF generally pumps water from Parr Reservoir to Monticello Reservoir between the hours of 11 pm and 8 am and generates power (by releasing water) between the hours of 10 am and 11 pm. In winter, FPSF generally pumps water from Parr Reservoir to Monticello Reservoir between 11 pm and 6 am and generates between the hours of 6 am and 1 pm. The level of generation varies from one generator up to the maximum output of eight, depending on demand. Maximum output may not be necessary on all days. Pumping is normally done at maximum capacity. FPSF is normally operated seven days a week.

As a result of FPSF operations, Parr Reservoir is subject to daily fluctuations in water level of as much as 3 m (10 ft) (NRC 1981), but the daily average is approximately 1 m (4 ft) (Dames & Moore 1985). These water level fluctuations can expose and then inundate up to 1032 ha (2550 ac) of Parr Reservoir with each cycle of pumpback and generation (release of water). The amount of water pumped from and returned to Parr Reservoir daily represents as much as 88 percent of its total volume (NRC 1981).

V.C. Summer is on the south shore of Monticello Reservoir (Figure 3), which serves as its cooling water source and heat sink. Monticello Reservoir was formed by damming Frees Creek, a small tributary of the Broad River that flowed into Parr Reservoir about 1.9 km (1.2 mi) upstream of the Parr Shoals dam. As previously discussed, Monticello Reservoir was designed to serve both as a cooling pond for V.C. Summer and the upper pool for the FPSF,

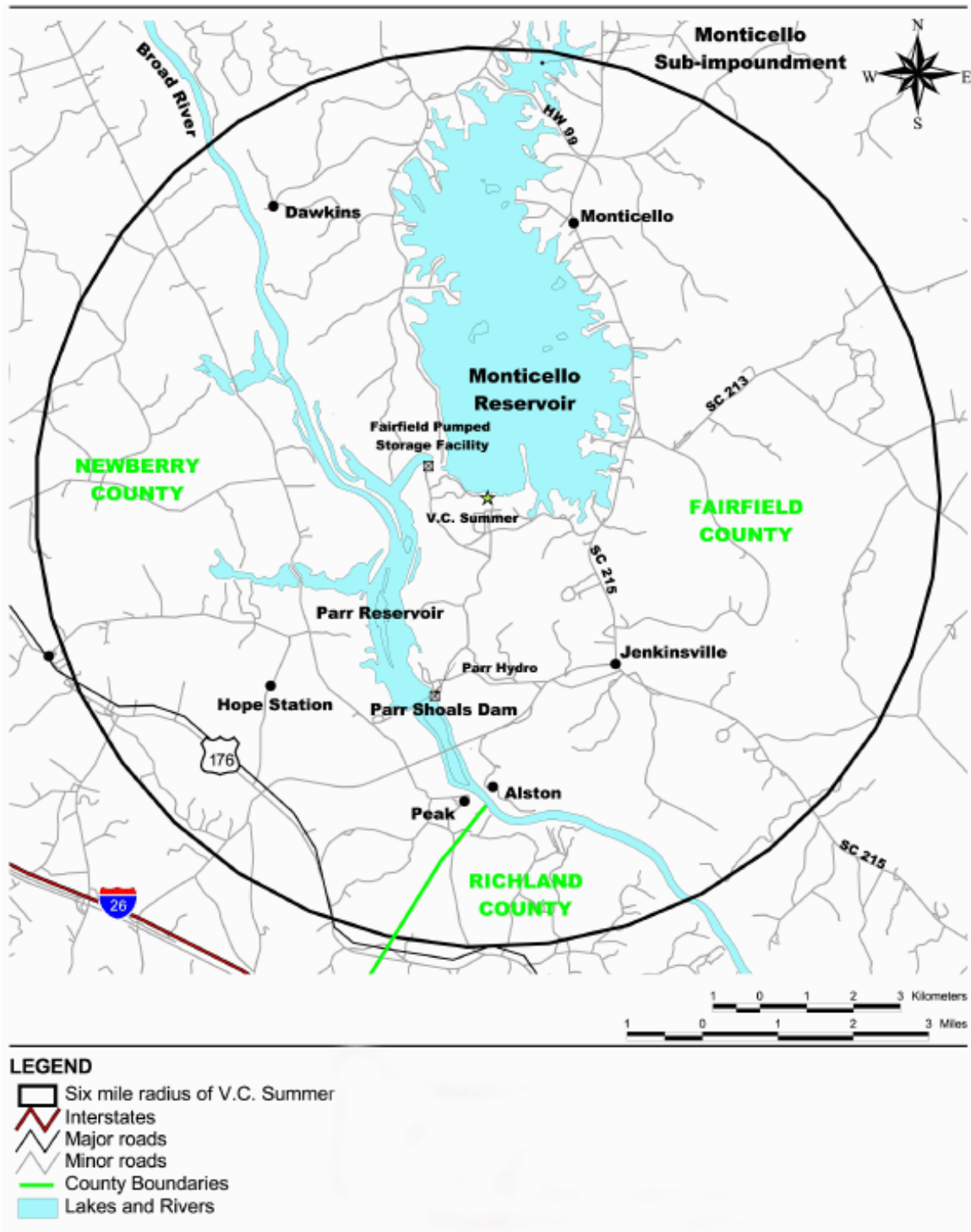


Figure 3 Location of V.C. Summer 10-km (6-mi) Region

with an enlarged Parr Reservoir serving as the lower pool. Water flow from the Frees Creek watershed into the newly created Monticello Reservoir was negligible, and FPSF's pumps were used initially to fill the reservoir with water from Parr Reservoir (NRC 1981). Monticello Reservoir's small watershed drains an area of only 4452 ha (11,000 ac), including the reservoir and its subimpoundment (discussed later in this section).

Monticello Reservoir is approximately 10 km (6 mi) long with a surface area of 2630 ha (6500 ac). The average depth is 18 m (59 ft) and the maximum depth is approximately 38 m (126 ft) (SCDHEC 1998). FPSF operations can cause water levels in Monticello Reservoir to fluctuate as much as 1.4 m (4.5 ft) daily. Daily water level changes vary, depending on system needs. It is currently rated as one of the least eutrophic reservoirs in South Carolina, and is characterized by low nutrient (total phosphorus and total nitrogen) concentrations.

List of Species

In preparing for renewal of its operating license, V.C. Summer assessed a wide variety of potential impacts, including those to ecological resources, in an environmental report that was submitted to the NRC on August 6, 2002, as part of a License Renewal Application. The *Threatened and Endangered Species Field Survey* (SCE&G 2002a) presents the results of field surveys of the V.C. Summer site and associated transmission corridors conducted in late spring (May) and summer (June, July, and August) 2002 to update information in the SCE&G environmental report (SCE&G 2002b) on ecological resources, emphasizing threatened and endangered species. Information obtained during the surveys was used by the NRC in its assessment of the potential impact of the V.C. Summer operation over the license renewal term on threatened and endangered species. This Biological Assessment describes the survey areas, presents a list of potentially occurring species, describes survey techniques, and discusses the results of the surveys.

The NRC has identified 11 species (Table 1) listed as threatened or endangered under the Federal Endangered Species Act and one Candidate species with the potential to be affected by this action based on information received from USFWS during a meeting of NRC and USFWS staff held at the USFWS Charleston Field Office in South Carolina on December 12, 2002. The list was again confirmed in a letter from NRC to USFWS April 16, 2003 (NRC 2002). The South Carolina counties included in the NRC assessment are Fairfield, Newberry, Saluda, Aiken, Richland, and Edgefield.

Additionally, SCE&G conducted field surveys to verify the presence or absence of these species (SCE&G 2002a). Before going into the field, project biologists conducted a literature review to identify species known to occur in the counties crossed by V.C. Summer transmission lines. Previous research for the V.C. Summer environmental report had shown that only one listed species, the bald eagle, was known to occur on the V.C. Summer site and there were no records of threatened and endangered species occurring along the V.C. Summer transmission corridors.

Table 1. Federal Endangered, Threatened, and Candidate Species that potentially occur in the vicinity of the V.C. Summer site or the Counties crossed by transmission lines.

Scientific Name	Common Name	Federal Status ^a	Determination
Invertebrates			
<i>Lasmigona decorata</i>	Carolina heelsplitter	E	No Effect
Fish			
<i>Acipenser brevirostrum</i>	shortnose sturgeon	E	No Effect
Birds			
<i>Haliaeetus leucocephalus</i>	bald eagle	T	Not likely to adversely affect
<i>Myceteria americana</i>	wood stork	E	No Effect
<i>Picoides borealis</i>	red-cockaded woodpecker	E	No Effect
Plants			
<i>Amphianthus pusillus</i>	pool sprite	T	No Effect
<i>Aster georgianus</i>	Georgia aster	C	No Effect
<i>Echinacea laevigata</i>	smooth coneflower	E	No Effect
<i>Lysimachia asperulifolia</i>	rough-leaved loosestrife	E	No Effect
<i>Oxpolis canbyi</i>	Canby's dropwort	E	No Effect
<i>Ptilimnium nodosum</i>	harperella	E	No Effect
<i>Trillium reliquum</i>	relict trillium	E	No Effect

^a E = Endangered; T=Threatened; C = Candidate for listing.
Source: USFWS 2002

The federally listed species known to occur in the counties crossed by V.C. Summer-associated transmission corridors are shown in Table 1. Although this species list was based primarily on information obtained from the USFWS, a number of other sources and authorities were consulted, including *Manual of the Vascular Flora of the Carolinas* (Radford et al. 1973), *Endangered, Threatened, and Rare Vascular Flora of the Savannah River Site* (Knox and Sharitz 1990), *Amphibians and Reptiles of the Carolinas and Virginia* (Martof et al. 1980), *Guide to the Reptiles and Amphibians of the Savannah River Site* (Gibbons and Semlitsch 1991), *South Carolina Bird Life* (Sprunt and Chamberlain 1970), and *Mammals of the Savannah River Site* (Cothran et al. 1991).

Species Survey

The undeveloped portions of the V.C. Summer site were surveyed on foot. The transmission corridors, because of their size, were surveyed by concentrating efforts in areas offering the greatest potential for harboring listed species. Areas of interest were identified using U.S. Geologic Survey (USGS) 7.5 minute topographic maps, county soil maps, and aerial photographs prior to conducting ground surveys. This initial “desk-top” survey allowed biologists to rapidly eliminate from consideration cropland, pastures, and other areas of poor-quality habitat for listed species. Following this phase of the survey, biologists drove to areas of potential interest and conducted surveys on foot. The survey of the V.C. Summer site was conducted in late May 2002. Surveys of the corridors were conducted over the May-August 2002 period (SCE&G 2002a).

Survey techniques are described in detail in the *Threatened and Endangered Species Field Survey* (SCE&G 2002a). The survey techniques for birds, mammals, reptiles, and amphibians were designed to provide information on the occurrence and potential for occurrence of listed species at V.C. Summer and along the transmission corridors. Biologists conducted the survey of the V.C. Summer site by systematic walkover within all natural habitats, such that each habitat type was thoroughly searched. Surveys conducted along the transmission corridors were focused on areas identified, through the examination of aerial photographs and topographic maps, as providing potential habitat for listed animal species. During each survey, wildlife species were identified through actual observations, as well as from tracks, scat, and birdcalls.

Notes regarding species observed, as well as pertinent data regarding habitat quality, weather conditions, time of day, etc., were recorded in a field notebook. No trapping or other collecting activities were conducted, except where slow-moving reptiles or amphibians were captured by hand and released after identification. Because many animal species are mobile and secretive, the absence of a species during a survey is not necessarily conclusive evidence that the species does not use the area in question. Therefore, the *potential* for use of V.C. Summer and transmission corridors by listed wildlife species was also evaluated, based on the quality of habitats observed.

The V.C. Summer site contains substantial acreage of intact forestland (exclusive of planted pines), and an attempt was made to visit all forested sites, especially those featuring steep topography and stream drainages, since these would be expected to support the highest diversity of vascular species. Similarly, portions of transmission corridors with intact forests on one or both sides were presumed most likely to harbor rare plants. A total of 75 locations representing more than 97 km (60 mi) of transmission corridor were surveyed on foot. Most of these sites were chosen based on terrain features (from topo maps), soils (from county soil surveys), land use in the area (from aerial photographs), and existing vegetation (from aerial photographs). Other sites were added due to proximity to known populations of threatened and endangered

species. Several access points were locked/gated and thus inaccessible; these sites generally feature pastureland that otherwise offer little in the way of habitat for rare species.

Enlarged topographic maps developed from USGS quadsheets (7.5 minute series) and a hand-held global positioning system unit were used to record the locations of areas that were searched. Notes were taken at each area searched describing habitats and plant species present. Field surveys involved careful study of all vegetation in each target area. In the case of problematic genera, specimens were collected for further study and placed in a plant press. Specimens collected and preserved during this study are stored at the A.C. Moore Herbarium of the University of South Carolina.

Before fieldwork began, the transmission corridors were evaluated using USGS topographic maps, aerial photographs, soil maps, and other resources. Lengths of corridor that appeared to have potential for supporting a high level of biological diversity or harboring one or more rare species were identified and surveyed.

Species Evaluated

Invertebrates:

***Lasmigona decorata*, Carolina heelsplitter**

Before a 1987 USFWS survey, the Carolina heelsplitter had not been recorded in the state since the mid-19th century (Keferl and Shelly 1988 as cited in USFWS 1993, Keferl 1991 as cited in USFWS 1993). This listed (Endangered) freshwater mussel was historically found in South Carolina in the Pee Dee River system (Clarke 1985 as cited in USFWS 1993, Keferl and Shelly 1988 as cited in USFWS 1993, Keferl 1991 as cited in USFWS 1993). The USFWS conducted intensive surveys between 1987 and 1990 and found only two surviving populations of the Carolina heelsplitter in the Pee Dee River system; the Goose Creek and Lynches River/Flat Creek populations (Keferl 1991 as cited in USFWS 1993). During the USFWS surveys, a total of only 12 live individuals were found in Flat Creek (1987–1990) and two individuals were found in the Lynches River (both found in 1990). Because the Carolina heelsplitter populations have been found only in other tributaries to the Pee Dee River and not in the Broad River system near the V.C. Summer site or transmission lines, the NRC staff has determined that the proposed license renewal would have no effect on the Carolina heelsplitter.

Fish:

***Acipenser brevirostrum*, shortnose sturgeon**

The shortnose sturgeon is listed as Endangered. The shortnose sturgeon historically occurred in the Broad River in Lexington and Newberry counties, but was likely extirpated from that stretch of the Broad River. Passage of this species up the Broad River is blocked by dams (SCE&G 2002a). In South Carolina, the primary factors affecting populations of this species are habitat alteration, due to dredging and dam construction, and pollution. Currently, in South Carolina they inhabit Winyah Bay Rivers, those that drain into Lake Marion, the Santee, Cooper, and Savannah rivers, and the ACE (Ashepoo, Combahee, and Edisto Rivers) Basin. In the latter, shortnose sturgeon are typically found at the freshwater-saltwater interface. The shortnose sturgeon has not been found near the V.C. Summer site or transmission lines. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the shortnose sturgeon.

Birds:

***Haliaeetus leucocephalus*, bald eagle**

The bald eagle is generally associated with lakes, rivers, and coastal areas (USACE 2002). Bald eagles are commonly observed foraging around Monticello Reservoir, the FPSF tailrace canal, Parr Reservoir, and on the Broad River downstream of Parr Shoals dam. The bald eagle is listed as Threatened under the provisions of the Endangered Species Act. The bald eagle was the only listed species observed during the SCE&G field surveys.

There are no recorded bald eagle nests at the V.C. Summer site, but there are six nests within 8 km (5 mi) of the V.C. Summer site, the nearest being approximately 3.2 km (2 mi) from the site (Holling 2001). Four of these six nests are believed to be active nesting sites, while the status of two nests is unknown (SCDNR 2001). There are four bald eagle nesting sites on Parr Reservoir. Three (one active, two unknown status) are within 0.8 km (0.5 mi) of one another, on the western shore of the reservoir, approximately 3.2 km (2 mi) west of V.C. Summer. The fourth is on the Heller's Creek arm of Parr Reservoir, approximately 6 km (4 mi) northwest of V.C. Summer. There is a single bald eagle nesting site on the eastern shore of Monticello Reservoir, approximately 5.6 km (3.5 mi) north of V.C. Summer. There is also a nesting site approximately 3.2 km (2 mi) east of Monticello Reservoir (6 km [4 mi] northeast of V.C. Summer) on a tributary of the Little River. One active bald eagle nest in Saluda County is approximately 0.8 km (0.5 mi) west of the Summer-Graniteville transmission line, and one bald eagle nest in Richland County is located approximately 1.4 km (0.9 mi) south of the Summer-Denny Terrace transmission line (SCDNR 2001). The current status of the

Richland County nest is unknown, but the nest was viable as recently as 1995 (SCDNR 2001).

The *Habitat Management Guidelines for the Bald Eagle in the Southeast Region* (USFWS 1987) prescribes two management zones around eagle nests, night roosts, and shoreline use areas in which the provisions of various laws and their implementing regulations may apply. The two management zones prescribed in the report are “primary” (from 229 to 457 m [750 to 1500 ft]) and “secondary” (from 23 m [75 ft] to 1.6 km [1 mi]) (USFWS 1987). The Habitat Management Guidelines provide recommendations, excluding certain activities within these zones, to minimize impacts to the bald eagle. The V.C. Summer site is located beyond the secondary management zone buffers of the active nests. Consequently, the potential for activities at the V.C. Summer site to disturb breeding/nesting at these nest sites is minimal.

Lehman (2001) summarized the literature regarding raptor electrocutions on power lines and emphasized that nearly all electrocutions in the United States occur on comparatively low-voltage distribution lines supplying individual users and businesses, not transmission lines. Because of their acute vision, maneuverability, and the fact that they migrate neither in flocks nor at night, the likelihood of transmission line collisions involving the eagles is remote. There are no known reports of bald eagle collisions with the V.C. Summer transmission lines or other structures. Based on a review of the literature and the absence of any reported electrocutions associated with the V.C. Summer transmission lines, the staff concludes that potential eagle losses due to transmission line-related electrocutions are highly unlikely. In the event that an electrocuted bald eagle were to be found, SCE&G’s procedures require that a Raptor Incident Report be filed.

Based on the locations of the active eagle nests relative to the V.C. Summer site and associated transmission lines, the potential for disturbance during nesting/breeding, either from activities at the V.C. Summer site or from transmission line maintenance, is highly unlikely. SCE&G’s procedures require that it follow the USFWS Habitat Management Guidelines for the bald eagle in the Southeast Region.

Additionally, a substantial number of bald eagles and other birds are commonly seen foraging at the FPSF as it transfers water from Parr Reservoir to Monticello Reservoir. Likely, the substantial number of bald eagles and other birds foraging at the FPSF indicates that the daily pumping of water creates a preferred foraging area for the birds. It is possible that the current water circulating system of V.C. Summer, more specifically the FPSF, increases the availability of fish. Therefore, based on the available information, the NRC staff makes a finding of “may affect, not likely to adversely affect” the bald eagles for the proposed license renewal.

***Myceteria americana*, wood stork**

The wood stork, listed as Endangered, is known to occur in Aiken County. The Summer-Graniteville transmission line terminates in the northern part of Aiken County more than 80 km (50 mi) from the V.C. Summer site. Although they do not nest in Aiken County, wood storks from the Birdsville Colony (near Millen, Georgia) forage in shallow wetlands on the U.S. Department of Energy's Savannah River Site and in specially constructed ponds on the National Audubon Society's Silver Bluff Sanctuary, near Jackson, South Carolina (DOE 1997; NAS undated). No transmission corridors associated with V.C. Summer cross or approach the Savannah River Site or the Silver Bluff Sanctuary, and wood storks have not been recorded near the V.C. Summer site or its transmission line corridors. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the wood stork.

***Picoides borealis*, red-cockaded woodpecker**

The red-cockaded woodpecker, listed as Endangered, is known to occur in Aiken, Edgefield, Saluda, and Richland counties (SCDNR 2002). Active nest cavities of this cooperative breeder occur in open, mature pine stands with sparse midstory vegetation (USFWS 2002). When the hardwood midstory grows above 5 m (15 ft), cavity abandonment usually occurs (Hooper et al. 1980). Preferred habitat for this species is not found at the V.C. Summer site, nor is it found along the transmission corridors. There is one point on the Summer-Graniteville corridor where the Summer transmission corridor passes through mature, marginally open pine forests. At this location, however, numerous oaks of considerable height are scattered among the pines, significantly decreasing the probability that red-cockaded woodpeckers would occur here. Although the forest adjacent to that location was thoroughly searched during the 2002 field surveys, no active or abandoned nest cavities were found. Because suitable habitat does not occur at the V.C. Summer site or associated transmission lines, the NRC staff has determined that the proposed license renewal would have no effect on the red-cockaded woodpecker.

Plants:

***Aster georgianus*, Georgia aster**

The Georgia aster, a Candidate for listing, is found in dry, open woodlands and disturbed areas, such as roadsides and utility rights-of-way that are regularly mowed. Populations

have been found in Edgefield, Fairfield, and Richland counties (SCDNR 2002). However, there have been no recorded occurrences of this species in or adjacent to the transmission corridors or at the V.C. Summer site (SCDNR 2001). Furthermore, the Georgia aster was not found during the 2002 field surveys. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the Georgia aster.

***Echinacea laevigata*, smooth coneflower**

The smooth coneflower, listed as Endangered, is known to occur in Aiken and Richland counties. There is no known record of smooth coneflower in Fairfield County (SCDNR 2002). Habitat for this perennial herb is open woods, cedar barrens, roadsides, clear cuts, limestone bluffs, and transmission line corridors. Fire or other disturbance, such as well-timed mowing or clearing, is essential to maintaining the open habitat required for this species (USFWS 2002). Considering the absence of truly circumneutral soils on the transmission corridors studied, the absence of apparent habitat on neighboring land, and the fact that fires are practically nonexistent in the transmission corridors, it is highly unlikely that smooth coneflower ever has been a resident of these areas. Although it was sought on open corridors featuring steep, rocky terrain throughout this project area during the 2002 field surveys, there have been no recorded occurrences of this species in or adjacent to the transmission line corridors associated with V.C. Summer or at the site (SCDNR 2001). Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the smooth coneflower.

***Lysimachia asperulifolia*, rough-leaved loosestrife**

The rough-leaved loosestrife is listed as Endangered. Habitat for this perennial herb consists of Carolina bays and the ecotones between longleaf pine uplands and pond pine pocosins. The only known location of the rough-leaved loosestrife within South Carolina is at Fort Jackson in Richland County (USFWS 2002); there are no recorded occurrences of this species in or adjacent to the transmission line corridors associated with V.C. Summer or at the site (SCDNR 2001). Some possibility exists that this species could survive on boggy places under power lines studied in the field survey, but there are only two sites that could reasonably be considered, and neither of them is burned. Portions of the Graniteville transmission corridor would be thought to potentially support loosestrife, but no sandhill seepage bogs were discovered. It is highly unlikely that rough-leaved loosestrife has ever grown anywhere within the study area. Furthermore, rough-leaved loosestrife was not found during the 2002 field surveys. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the rough-leaved loosestrife.

***Oxypolis canbyi*, Canby's dropwort**

Canby's dropwort is listed as Endangered. This perennial plant is known to occur in 11 counties within South Carolina, one of which (Richland) is crossed by V.C. Summer transmission lines (SCDNR 2002). This coastal plain species grows in wet meadows,

wet pineland savannas, ditches, sloughs, and along the edges of cypress-pine ponds (USFWS 2002). There have been no recorded occurrences of this species in or adjacent to the transmission line corridors associated with V.C. Summer or at the site (SCDNR 2001). No Canby's dropwort were found during the 2002 field surveys. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the Canby's dropwort.

Ptilimnium nodosum, harperella

Harperella is listed as endangered. Typical habitat for this annual herb is rocky or gravel shoals, margins of swift-flowing streams, and edges (bays) of intermittent pineland ponds (USFWS 2002). Harperella is known in South Carolina from Aiken and Saluda counties (SCDNR 2002). There is one recorded population of harperella approximately 0.8 km (0.5 mi) west of the Summer-Graniteville transmission line corridor in Saluda County. The most recent observation of this population in the SCDNR database was from 1985 (SCDNR 2001). There are no recorded occurrences of this species in or adjacent to the V.C. Summer-associated transmission corridors or the site (SCDNR 2001). It is of potential occurrence, therefore, in suitable habitat along portions of the Summer-Graniteville line, particularly around Ridge Spring. High ponds occur around State Highway SC 23 in the vicinity of the Graniteville line, but these bays are highly altered, and little resident native vegetation remains. On the other hand, the Graniteville line does not specifically cross any Carolina bays in the region. Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the harperella.

Trillium reliquum, relict trillium

The relict trillium is listed as Endangered. Habitat for this perennial herb is mature, moist, undisturbed hardwood forests (USFWS 2002). Relict trillium is known from Aiken and Edgefield counties (SCDNR 2002). Relict trillium is restricted to sites over mafic rock, within old-growth, intact forest systems. They do respond somewhat positively to disturbance, and may be expected to survive in openings under powerlines if present in adjacent forests. No relict trillium was seen during this survey. The Aiken County locations for this species are much unlike anything else seen in Aiken County under the Graniteville transmission line; it is extremely unlikely that this species ever occurred in the project area. There have been no recorded occurrences of this species in or adjacent to the transmission line corridors associated with V.C. Summer or at the site (SCDNR 2001). Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the relict trillium.

***Amphianthus pulillus*, pool sprite**

The pool sprite, also known as little amphianthus, is listed as Threatened. This aquatic plant occurs in small (usually less than one square meter) shallow pools on the crests and flattened slopes of granite outcrops (USFWS 2002). These pools completely dry out in summer droughts. The pool sprite is known to occur within Saluda County (USFWS 2002; SCDNR 2002), which is crossed by the transmission lines associated with V.C. Summer. This plant 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 set. Transmission corridors featuring granitic rock anywhere within this project were examined for the slightest possibility of occurrence; the best developed “flatrocks” are just south of V.C. Summer. Some boulders were seen elsewhere along power lines in Fairfield County, but none was adequate for supporting this species. It is highly unlikely that pool sprite ever occurred anywhere within the study area. Only one occurrence of this plant is known from Saluda County (USFWS 2002), but there are no recorded occurrences in or adjacent to the V.C. Summer-associated transmission line corridors or at the site (SCDNR 2001). Therefore, the NRC staff has determined that the proposed license renewal would have no effect on the pool sprite.

Conclusions

The NRC has identified 11 species listed as Threatened or Endangered under the Federal Endangered Species Act and one Candidate species with the potential to be affected by the license renewal of V.C. Summer. There will be no major refurbishment, construction, or replacement activities associated with this action. The NRC has determined that license renewal for V.C. Summer will have no effect on the wood stork, red-cockaded woodpecker, shortnose sturgeon, Carolina heelsplitter, pool sprite, Georgia aster, smooth coneflower, rough-leaved loosestrife, Canby’s dropwort, harperella, and relict trillium and may affect, but is not likely to adversely affect, the bald eagle.

References

- 10 CFR Part 51. Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.

- 10 CFR Part 54. Requirements for Renewal of Operating Licenses for Nuclear Power Plants.

Cothran, E. G., M. H. Smith, J. O. Wolff, and J. B. Gentry. 1991. *Mammals of the Savannah River Site* (SRO-NERP-21), Savannah River Ecology Laboratory, Aiken, SC.

Dames & Moore. 1985. Environmental Monitoring Report January 1983-December 1984 for the Virgil C. Summer Nuclear Station for the South Carolina Department of Health and Environmental Control and the Nuclear Regulatory Commission. April.

Endangered Species Act. 16 U.S.C. et seq.

Gibbons, J.W. and R.D. Semlitsch. 1991. *Guide to the Reptiles and Amphibians of the Savannah River Site*. The University of Georgia Press, Athens, Georgia.

Holling, J. 2001. Letter to S.A. Byrne, SCE&G, responding to request for information on listed species and important habitats. SC Department of Natural Resources Heritage Trust Program. February 15.

Hooper, R. G., A. F. Robinson, and J. A. Jackson. 1980. The red-cockaded woodpecker: notes on life history and management. USDA Forest Service General Report SA-GR9.

Knox, J. N. and R. R. Sharitz. 1990. *Endangered, Threatened, and Rare Vascular Flora of the Savannah River Site* (SRO-NERP-20), Savannah River Ecology Laboratory, Aiken, SC.

Lehman, R.N. 2001. Raptor Electrocutation on Power Lines: Current Issues and Outlook. *Wildlife Society Bulletin* 29(3): 804-813.

Martoff, B. S., W. M. Palmer, J. R. Bailey, and J. R. Harrison III. 1980. *Amphibians and Reptiles of the Carolinas and Virginia*. The University of North Carolina Press, Chapel Hill.

National Audubon Society (NAS). Undated. in "Silver Bluff Sanctuary" Available at <http://www.audubonweb.net/SC/audubonsanctuaries.htm>. Accessed May 2, 2002.

Radford, A. E., H. E. Ahles, and C. R. Bull. 1973. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press, Chapel Hill.

SCANA Corporation (SCANA). 2000. Inventory Map - Tract #38, prepared by SCANA Services

Forestry Operations (S. E. Collins). May 18.

South Carolina Department of Health and Environmental Control (SCDHEC). 1998. *Watershed Water Quality Management Strategy: Broad Basin*, Technical Report No. 001-98, Bureau of Water, Columbia, SC.

South Carolina Department of Natural Resources (SCDNR). 2001. South Carolina Rare, Threatened & Endangered Species Inventory.
<http://www.dnr.state.sc.us/heritage/owa/species.login>. Note: This is a protected website that is accessible only through SCDNR authorization.

South Carolina Department of Natural Resources (SCDNR). 2002. South Carolina Rare, Threatened & Endangered Species Inventory (species by county). Available on-line at http://www.dnr.state.sc.us/pls/heritage/county_species.select_county_map. Accessed April 4, 2002.

South Carolina Electric & Gas Company (SCE&G). 1978. *Virgil C. Summer Nuclear Station Operating License Environmental Report* (Volume 1), Amendment 3, South Carolina Electric & Gas Company, Columbia, SC.

South Carolina Electric and Gas Company (SCE&G). 2002b. *Virgil C. Summer Nuclear Station License Renewal Application*. "Appendix E, Environmental Report." Docket Number 50/395; License Number NPF-12. Jenkinsville, SC.

South Carolina Electric & Gas Company (SCE&G). 2002a. *Threatened and Endangered Species Field Survey, V.C. Summer Nuclear Station*. South Carolina Electric & Gas Company, Columbia, SC.

Sprunt, A. and E. B. Chamberlain. 1970. *South Carolina Bird Life*. University of South Carolina Press, Columbia.

U.S. Army Corps of Engineers (USACE). 2002. Threatened & Endangered Species of the Upper Savannah River Basin Southern Bald Eagle. Available on-line at <http://www.sas.usace.army.mil/endspec.htm>. Accessed April 5, 2002.

U.S. Department of Energy (DOE). 1997. *Final Environmental Statement: Shutdown of the River Water System at the Savannah River Site*. (DOE/EIS-0268) DOE Savannah River Operations Office, Aiken, South Carolina.

U.S. Fish and Wildlife Service (USFWS). 1987. *Habitat Management Guidelines for the Bald Eagle in the Southeast Region*. Third Revision.

U.S. Fish and Wildlife Service (USFWS). 2002. *The Endangered Species Program, Threatened and Endangered Animals and Plants (Species Information)*. Available at <http://endangered.fws.gov/wildlife.html>. Accessed May 15, 2002.

U.S. Fish and Wildlife Service (USFWS). 1993. "Carolina heelsplitter revised draft recovery plan available for review." U.S. Fish and Wildlife Service Southeast Region News Release, dated July 2. Available on-line at <http://southeast.fws.gov/news/1996/caroheel.html>. Accessed November 14, 2000.

U.S. Nuclear Regulatory Commission (NRC). 1981. *Final Environmental Statement Related to the Operation of Virgil C. Summer Nuclear Station Unit No. 1*, Office of Nuclear Reactor Regulation, Washington, DC.

U.S. Nuclear Regulatory Commission (NRC). 2002. Letter from NRC to USFWS providing summary of conversation regarding protected species within the area under evaluation for the V.C. Summer plant license renewal (Accession No. ML031060341). April 16, 2003.