

Biological Assessment
(for species under the jurisdiction of
Fish and Wildlife Service)

Brunswick Steam Electric Plant, Units 1 and 2
License Renewal Review

August 2005

Docket Numbers

50-325

50-324

U.S. Nuclear Regulatory Commission
Rockville, Maryland

**Biological Assessment of the Potential Effects on Endangered or
Threatened Species from the Proposed License Renewal for the
Brunswick Steam Electric Plant, Units 1 and 2
(for species under the jurisdiction of
Fish and Wildlife Service)**

1.0 Introduction

The U.S. Nuclear Regulatory Commission (NRC) licenses the operation of domestic nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and NRC implementing regulations. The Carolina Power & Light Company (CP&L), now doing business as Progress Energy Carolinas, Inc., operates Brunswick Steam Electric Plant, Units 1 and 2 (BSEP) in southeastern North Carolina under Operating Licenses (OLs) DPR-62 and DPR-71, respectively. The OL for Unit 1 will expire September 8, 2016, and the Unit 2 license will expire December 27, 2014. CP&L has applied to renew the operating licenses for BSEP. If approved by the NRC, the renewed OLs would allow up to 20 additional years of plant operation beyond the current licensed operating term.

In letters dated December 29, 2004, the staff requested comments from the U.S. Fish and Wildlife Service (FWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) on the license renewal application for BSEP (NRC 2004a, b). Specifically, the staff requested a list of species and information on protected, proposed, and candidate species and critical habitat that may be in the vicinity of BSEP and its associated transmission line rights-of-way. In a letter from the FWS dated February 3, 2005 (FWS 2005a), the staff was directed to an FWS website (<http://nc-es.fws.gov/es>) for a list of species to include in this biological assessment (BA). NMFS provided a list of Federally protected species under their jurisdiction in a letter dated February 4, 2005 (NMFS 2005a). A total of 16 terrestrial and 20 aquatic species, Federally listed as endangered, threatened, candidates for listing, or species of concern, occur or potentially occur in the counties within which the BSEP site and its transmission line rights-of-way are located or in the Cape Fear River. The Cape Fear River serves as the source of cooling water for BSEP. Of the 36 identified species, 23 are under full or partial FWS jurisdiction.

2.0 The Proposed Federal Action

The proposed Federal action is renewal of the OLs for BSEP Units 1 and 2. BSEP is located in Brunswick County in southeastern North Carolina, near the mouth of the Cape Fear River. Wilmington, North Carolina is approximately 15 mi north of the BSEP site, and Myrtle Beach, South Carolina is approximately 50 mi to the southwest. By letter dated October 20, 2004, CP&L submitted an application to the NRC to renew these OLs for an additional 20 years of operation (i.e., until September 2036 for Unit 1 and December 2034 for Unit 2).

No major refurbishment or replacement of important systems, structures, or components are expected during the 20-year BSEP license renewal term. In addition, no construction activities are expected to be associated with license renewal. If the NRC approves the license renewal application, the reactors and support facilities, including the cooling system, would be expected to continue to be operated and maintained until the renewed licenses expire in the mid-2030s. Continued maintenance activities on the transmission line rights-of-way that are used to connect BSEP to the electric power grid also would be required if the proposed action is approved. Ongoing right-of-way surveillance and maintenance activities along BSEP transmission lines include routine aerial and ground inspections as well as activities associated with vegetation management.

Pursuant to 10 CFR 54.23 and 51.53(c), CP&L submitted an Environmental Report (ER) (CP&L 2004) in which CP&L analyzed the environmental impacts associated with the proposed license renewal action, considered alternatives to the proposed action, and evaluated mitigation measures for reducing adverse environmental effects. The NRC is using this ER, as well as its own analysis as the basis of a supplemental environmental impact statement, a plant-specific supplement to NUREG-1437, *Generic Environmental Impact Statement for License Renewal of Nuclear Plants*. This BA was prepared to evaluate the potential impacts to species protected under the Endangered Species Act of operating BSEP, Units 1 and 2 for an additional 20 years beyond the current license term for each unit.

3.0 The Plant and Associated Transmission Line System

3.1 Reactor Systems

BSEP uses boiling water reactors (BWRs) and steam-driven turbine generators manufactured by General Electric. As originally built and operated, each of the BSEP units had a design rating of 2436 megawatts-thermal (MW(t)). Since 1996, the NRC has approved two power uprates. Each unit is now licensed to operate at 2923 MW(t), 20 percent over the original licensed maximum power level.

Each reactor's primary containment is a pressure suppression system consisting of a drywell, a pressure-suppression chamber storing a large volume of water, a connecting vent system between the drywell and the suppression pool, a vacuum relief system, isolation valves, containment cooling systems, and other service equipment.

3.2 Cooling and Auxiliary Water Systems

Cooling water for BSEP is obtained from the lower Cape Fear River and discharged to the Atlantic Ocean. Water passes from the lower Cape Fear estuary through screens in a diversion structure used to limit the entrainment of biota into the intake canal. The 3-mi intake canal flows via gravity from the screens at the Cape Fear River to the plant. At the plant, cooling water is drawn through a combination of eight bays (four for each unit). Each bay has a trash rack, traveling screens, and an intake pump. For each unit, two bays have fine mesh (1mm)

screens and the other two bays have half fine mesh and half coarse mesh (3/8 in.) screens. Typically, each unit operates utilizing two of the fine mesh bays and one of the half fine/half coarse bays. Organisms impinged on the traveling screens are washed into a trough that leads to a holding basin before being released to Walden Creek, which is part of the Cape Fear River watershed. The daily maximum intake by BSEP is limited to 2210 cubic feet per second (cfs) during April through November and to 1844 cfs during December through March.

Chlorine is injected into the circulating water intake system to prevent biofouling. Total residual chlorine is monitored under terms of the plant's National Pollutant Discharge Elimination System (NPDES) permit before the effluent is pumped into the ocean. After passing through the plant, the discharge water is released into a 6-mi-long canal that flows by gravity out to Caswell Beach (Figure 1). At Caswell Beach the effluent is pumped 2000 ft offshore into the Atlantic Ocean.

BSEP receives potable and processed water from the Brunswick County Public Utilities. CP&L reports that from 1996 through 2001, BSEP's water imports averaged 0.23 million gallons per day (MGD). The source of the majority of water imported from Brunswick County Public Utilities is surface water from the lower Cape Fear River. BSEP operates one groundwater well onsite to supply water to the biological laboratory. The well has a rated capacity of 30 gallons per minute (gpm), but the actual use is far less than the rated capacity.

3.3 Electrical Transmission System

The eight 230-kV transmission lines constructed to connect the BSEP to the transmission system were described in the Final Environmental Statement (FES) for operation of BSEP Units 1 and 2 (AEC 1974). These lines included two lines to the Delco and Barnard Creek substations and lines to the Fayetteville, Wallace, and Jacksonville substations. In addition, 31 mi of new transmission line were constructed after initial licensing to connect BSEP to the Weatherspoon Substation.

The two lines to Barnard Creek Substation have been extended to the Castle Hayne Substation and Wilmington Corning Switching Station, located about 12 mi to the north of the Barnard Creek Substation. Both the Castle Hayne and the Wilmington Corning lines are considered in this BA in their entirety. The original Fayetteville line now connects to the grid at the Whiteville Substation. However, because the Fayetteville line, which was built to connect BSEP to the grid, remains in existence, the full extent of the original line is considered in this BA.

The transmission lines are shown in Figure 2. In total, about 390 mi of transmission lines in about 260 mi of rights-of-way are considered in this BA. The rights-of-way cover approximately 4690 ac. The length of each line and the area covered by the rights-of-way associated with the line are listed in Table 1. In estimating the rights-of-way for each line, the total area in shared rights-of-way was distributed equally among the lines within the right-of-way.

CP&L employs an integrated vegetation management approach that includes both mechanical and chemical control methods. This allows them to design the maintenance practices to fit the

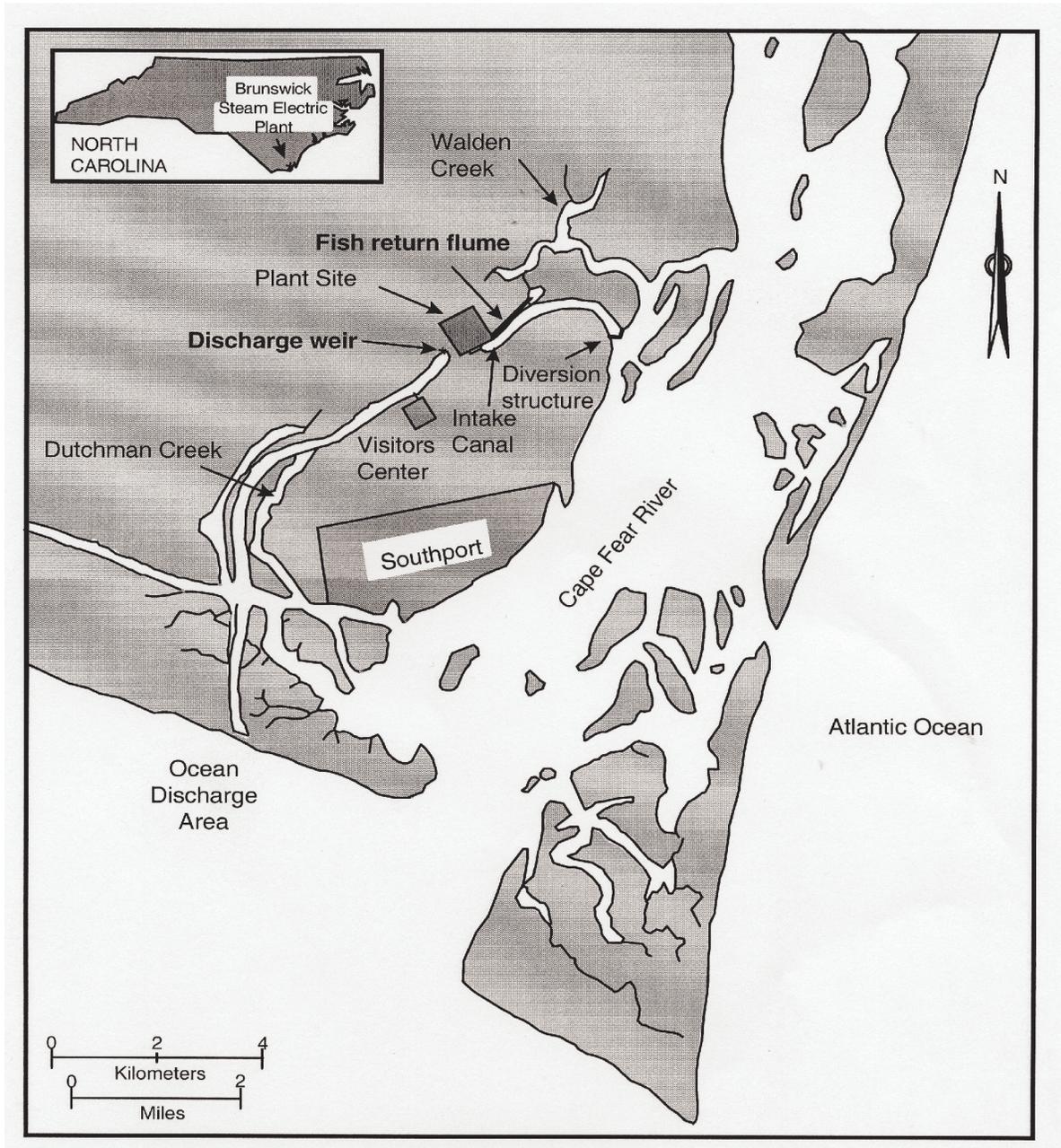
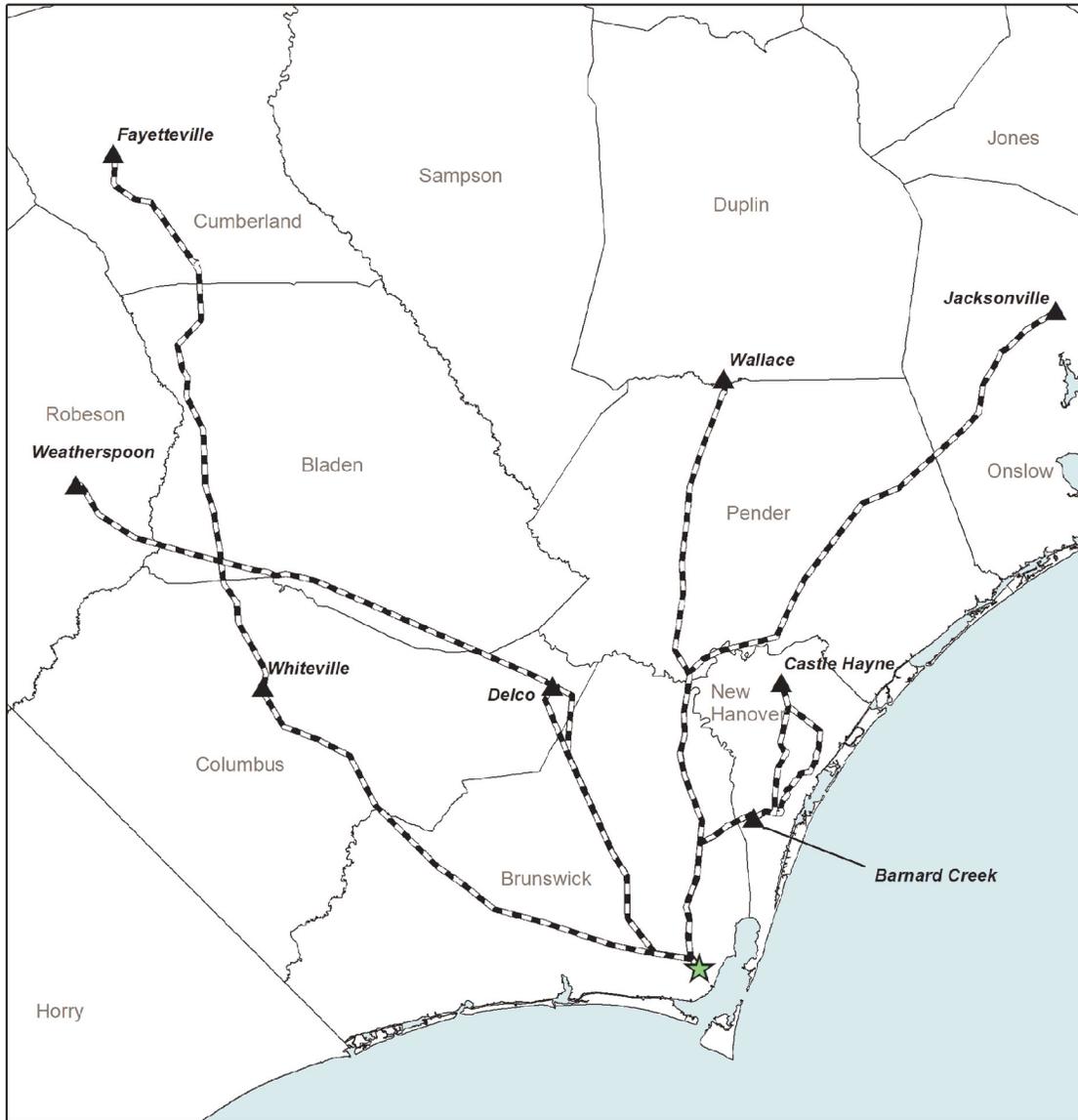


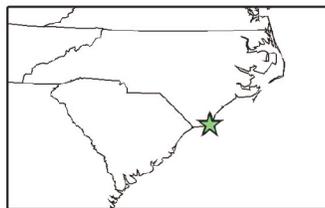
Figure 1. Location of Brunswick Steam Electric Plant, Units 1 and 2 (PEC 2003)

different kinds of terrain and soils that are crossed by the transmission lines. Mechanical methods include pruning, felling, mowing, and hand trimming. Chemical methods include the use of tree growth regulators to slow the growth of fast-growing trees, and U.S. Environmental Protection Agency (EPA)-approved herbicides to control undesirable woody vegetation that regrows after mowing. Over time, the combination of mowing and herbicides results in a



Legend

- ★ BSEP
- ▲ 230 Kv Substations
- Transmission Lines
- County



0 10 20 30 Miles

0 5 10 20 30 40 Kilometers



**BRUNSWICK STEAM ELECTRIC PLANT
Transmission Line Map**

mrs 8/3/05

Figure 2. BSEP Transmission Line Map

Table 1. Brunswick Nuclear Power Plant, Units 1 and 2 Transmission Lines

Substation	Approximate Line Length	Estimated Right- of-Way Area
	Miles	Acres
Fayetteville	103	900
Weatherspoon	31	460
Delco East	31	320
Delco West	31	300
Wallace	55	720
Jacksonville	75	940
Castle Hayne East	35	650
Wilmington Corning Switching Station	27	400
Total	388	4690

community dominated by low-growing, non-woody plants, such as grasses and herbaceous plants that require less maintenance but still provide food and cover for wildlife (CP&L 2004).

4.0 Environmental Setting

BSEP is located in Brunswick County, in southeastern North Carolina, near the mouth of the Cape Fear River. The area within a 6-mi radius of the plant includes the town of Southport, the community of Boiling Spring Lakes, and the resort communities of Caswell Beach, Oak Island, and Bald Head Island. Wilmington, North Carolina, lies approximately 15 mi north of the BSEP site, and Myrtle Beach, South Carolina, lies approximately 50 mi to the southwest along the coast. The Military Ocean Terminal Sunny Point is situated immediately north of the BSEP site. Figure 3 shows the site location and features in the surrounding area.

Cooling water for BSEP is drawn from the Cape Fear River by way of a 3-mi-long intake canal that passes from the river to BSEP. After passing through the plant's condensers, the heated water travels through a 6-mi-long discharge canal to Caswell Beach where it is pumped 2000 ft offshore through large submerged pipes into the Atlantic Ocean.

4.1 Terrestrial Resources

The BSEP site is located within the mid-Atlantic coastal plain ecoregion (Griffith et al. 2002), which in pre-European settlement times was dominated by longleaf pine (*Pinus palustris*) with patches of oak (*Quercus* spp.), gum (*Nyssa* spp.), and cypress (*Taxodium* spp.) (Griffith et al.

2002). The BSEP site is within the Carolina flatwoods sub-region, which includes a wide variety of community types including pine flatwoods, pine savannas, freshwater marshes, pond pine

Figure 3. BSEP Location and Surrounding Area, 50-mi Radius

woodlands, pocosins, Carolina bays, and some sandhill communities (Griffith et al. 2002). The transmission lines cross other sub-region types including mid-Atlantic floodplains and low terraces, and non-riverine swamps and peatlands. The region is a significant center of endemic biota (Hall et al. 1999). Although there is still a substantial amount of native habitat in the vicinity of the BSEP site, much of it has been converted to other uses, including loblolly pine (*Pinus taeda*) plantations and croplands of corn, soybeans, and tobacco.

The environment on the BSEP site includes waterways, such as the Cape Fear River, Dutchman Creek, and Nancy Creek; saline and brackish marshes; coastal dunes; and uplands (AEC 1974). Most upland portions of the BSEP site have been replanted with loblolly pine. Terrestrial and wetland communities in the vicinity of BSEP include pine savannas, longleaf pine/wiregrass (*Aristida stricta*) communities, pine-hardwood forests, pocosins, dune-strand communities, and salt marshes (CP&L 2004).

Loblolly pine is the principal pine species in the pine-hardwood forests in the vicinity of BSEP. Important hardwoods include sweet gum (*Liquidamba styraciflua*), blackgum (*Nyssa sylvatica*), hickory (*Carya* spp.), and oaks. Along the ancient dunes, which tend to be well drained, the forests are dominated by longleaf pine, turkey oak (*Quercus laevis*), and wiregrass. Remnant pine savannas occur in periodically flooded areas; these are characterized by an open canopy of longleaf pine or pond pine (*P. serotina*) with a dense ground cover of herbs and shrubs. A relatively unique community type in the area are pocosins. These are wetland depressions vegetated with dense stands of various evergreen shrubs and small trees such as red bay (*Persea borbonia*) and sweet bay (*Magnolia virginiana*) (CP&L 2004).

Sparse stands of grass dominated by sea oats (*Uniola paniculata*) characterize the seaward side of the dune-strand communities found at the interface between the sea and land. Because of the wind and salt spray, plants are primarily found on the landward side of the dunes. Relatively dense herbaceous shrub communities dominated by sabal palm (*Sabal palmetto*) and live oak (*Q. virginiana*) develop in these more protected areas (CP&L 2004).

Cordgrass (*Spartina alterniflora*) and needlerush (*Juncus roemerianus*) are the dominant species in the salt marshes at the BSEP site. The marshes represent habitat for many important aquatic organisms that are preyed upon by a variety of terrestrial wildlife species (CP&L 2004).

Wildlife species in the vicinity of BSEP are typical of those found in the southeastern Coastal Plain. The upland communities support many species of birds, including hawks, woodpeckers, warblers, and sparrows; mammals such as white-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), squirrels (*Sciurus* spp.), skunk (*Mephitis mephitis*), and bobcat (*Lynx rufus*); as well as a variety of snakes, toads, frogs and lizards. Wetlands such as the salt-marshes provide habitat for the American alligator (*Alligator mississippiensis*), raccoon (*Procyon lotor*), river otter (*Lontra canadensis*), and many species of wading birds (CP&L 2004).

There are eight transmission lines that were constructed to connect BSEP to the transmission system. The transmission line to the Barnard Creek substation crosses the Cape Fear River near the top of the estuary. The Whiteville transmission line crosses several pocosins and Green Swamp, which has been designated a National Natural Landmark (NPS 2005). The Whiteville transmission line also passes about 1 mi west of Lake Waccamaw State Park and approximately 2 mi south of Lake Waccamaw. The Holly Shelter Game Land in the Holly Shelter swamp is crossed by the Jacksonville transmission line. In northwest Pender County, the Wallace transmission line crosses the B. W. Wells Savannah, a 117-ac remnant of wetland savannah that supports 170 native plant species, some of which are considered rare (NCCLT 2001). The transmission line rights-of-ways do not cross any Federal or State parks. CP&L has partnered with the North Carolina Coastal Land Trust, the Conservation Trust for North Carolina, the Nature Conservancy, North Carolina Wild Flower Preservation Society, and the North Carolina Natural Heritage Program (NCNHP) to preserve unique and rare species within the transmission line rights-of way.

4.2 Aquatic Resources

BSEP is surrounded by a diverse and complex aquatic ecosystem. Aquatic habitat types surrounding the plant include salt marshes, the river channel/estuary, and offshore regions (CP&L 1980). The plant is situated approximately 5.7 mi upstream from the mouth of the Cape Fear River (CP&L 1985). BSEP's cooling system draws water predominantly from the surface layer of the Cape Fear River ship channel through a 3-mi-long intake channel. Water is discharged to the Atlantic Ocean after flowing through a 6-mi discharge canal. The water is pumped approximately 2000 ft offshore through submerged pipes to the point of discharge (CP&L 1979).

The Cape Fear River is estuarine at the point where water is drawn into the intake canal. Estuaries are partially enclosed coastal areas where freshwater and saltwater mix. These areas are under tidal influence, but they are protected from the full force of the ocean by barrier islands, salt marshes, or other land forms. The species found in estuaries are specially adapted for life in this transitional area. Estuaries are considered to be among the most productive areas on earth (EPA 2005).

The region surrounding the BSEP intake canal entrance, just downstream of Sunny Point, is in an area that experiences a large tidal exchange (CP&L 1985). Salinity is influenced primarily by tidal conditions and the rate of freshwater inflow. A salinity gradient exists where runoff from the Cape Fear River mixes with water from the Atlantic Ocean. From Sunny Point upstream to Wilmington, the water is often two-layered, with the less-dense freshwater moving downstream over the more-dense seawater (CP&L 1980). Downstream from Sunny Point, the water is more uniformly mixed because of complex water circulation patterns, vigorous tidal action, and high exchange rates with the ocean. This portion of the estuary is shallow and irregular in shape, with many islands and channels that enhance mixing (CP&L 1980, 1985). Because the freshwater inflow from the Cape Fear River and its tributaries is highly variable, salinities at the intake may range from nearly 0 to 32 parts per thousand (ppt) (AEC 1974). During periods of

average freshwater inflow, salinities near Sunny Point are generally in the range of 8 to 15 ppt (CP&L 1980). Minimum salinities are generally recorded in winter, and maximum salinities are generally recorded in late summer (CP&L 1985). Water temperatures in the estuary are influenced largely by changes in season, with the warmest temperatures (as high as 103EF) observed during late summer (CP&L 1985).

The Cape Fear Estuary serves as a nursery area for fish and shellfish larvae and juveniles. Some species, such as anchovy (*Anchoa* spp.) and gobies (*Gobionellus* spp., *Gobiosoma* spp.) spawn in the estuary, while others, such as Atlantic menhaden (*Brevoortia tyrannus*), spot (*Leiostomus xanthurus*), croaker (*Micropogonias undulatus*), and pinfish (*Lagodon rhomboides*) spawn in the ocean (PEC 2003). Salinity and temperature influence the spatial and seasonal distribution of these estuarine species (CP&L 1985). The ebb and flow of water in the estuary also contribute to the transport and/or retention of larvae and other organisms throughout the estuary (CP&L 1980).

Many species that inhabit waters in the vicinity of the BSEP have commercial or recreational value. Brown shrimp (*Farfantepenaeus aztecus*), pink shrimp (*F. duorarum*), and white shrimp (*Litopenaeus setiferus*) inhabit salt marshes, including Snow's Marsh, which borders the intake canal (CP&L 1980). The shrimp spawn in offshore waters and the post-larvae are recruited into the estuary where they find food and protection. As the shrimp mature, they migrate to deeper waters where commercial fishermen harvest them (AEC 1974). Croaker, an important food fish and sport fish, is another inhabitant of the salt marsh, including Snow's Creek (AEC 1974). Croaker spawn in the ocean during fall and winter. The young spend their first year in the low-salinity regions of the estuary and then move to the ocean. Examples of other species found in salt marshes near BSEP include blackcheek tonguefish (*Symphurus plagiusa*), striped anchovy (*Anchoa hepsetus*), Atlantic menhaden, and pinfish (AEC 1974).

In the river channel and estuary, developing larvae of brown, pink, and white shrimp, as well as blue crab (*Callinectes* spp.) can be found (AEC 1974). This portion of the estuary also supports the larvae of anchovy, croaker, gobies, spot, blackcheek tonguefish, Atlantic menhaden, and striped mullet (*Mugil cephalus*) (AEC 1974). The estuary supports larval fish year-round, although the species composition varies by season. Important adult fish using the estuary include gray sea trout (*Cynoscion regalis*), spot, croaker, bay anchovy (*Anchoa mitchilli*), summer flounder (*Paralichthys dentatus*), windowpane (*Scophthalmus aquosus*), American shad (*Alosa sapidissima*), alewife (*Alosa pseudoharengus*), and blue backed herring (*Alosa aestivalis*) (AEC 1974).

The heated effluent is discharged into the offshore region at Oak Island. Larvae of shrimp, anchovies, gobies, spot, croaker, gray seatrout, pinfish, and menhaden have been recorded in this region (AEC 1974). Adults with some commercial value captured in this area include brown, pink, and white shrimp, blue crab, anchovy, spot, king fish (*Mentacirrhus americanus*), croaker, thread herring (*Opisthonema oglinum*), bluefish (*Pomatomus saltatrix*), drum (*Stellifer*

lanceolatus), and sole (*Symphurus plagiusa*). Benthic organisms found in the mud and sand of this offshore area include the snail (*Retusa canaliculata*), brittle star (*Ophiophragum* spp.), and polychaete worms (AEC 1974).

5.0 Evaluation of Threatened and Endangered Species

5.1 Terrestrial Species

A total of 16 Federally listed terrestrial species have been identified from counties traversed by BSEP transmission line rights-of-way. Federally listed terrestrial species reported to occur from Brunswick, Bladen, Columbus, New Hanover, Onslow, Pender, Cumberland, or Robeson Counties include the bald eagle (*Haliaeetus leucocephalus*), red-cockaded woodpecker (*Picoides borealis*), piping plover (*Charadrius melodus*), wood stork (*Mycteria americana*), American chaffseed (*Schwalbea americana*), rough-leaf loosestrife (*Lysimachia asperulaefolia*), golden sedge (*Carex lutea*), pondberry (*Lindera melissifolia*), sea beach amaranth (*Amaranthus pumilus*), Hirst's panic grass (*Panicum hirstii*), Michaux's sumac (*Rhus michauxii*), Cooley's meadowrue (*Thalictrum cooleyii*), small whorled pogonia (*Isotria medeoloides*), Saint Francis' satyr (*Neonympha mitchellii francisci*), and the American alligator. Also, there have been historical records of the eastern cougar (*Puma concolor cougar*) in the vicinity of BSEP.

Habitat for some of the Federally listed species could potentially be found within or traversed by BSEP transmission line rights-of-way; however, there is no critical habitat for any of the Federally listed species on the BSEP site or on the associated transmission line rights-of-way. There are known populations of the rough-leaf loosestrife, golden sedge, and Cooley's meadowrue within the BSEP transmission line rights-of-way. These sites are managed in cooperation with the N.C. Department of Environment, Health and Natural Resources (NCDEHNR). Red-cockaded woodpeckers are known to inhabit the Military Ocean Port Sunny Point, which is adjacent to BSEP, and additional habitat is located in the vicinity of the BSEP as well as along several of the transmission line rights-of-way. Wood storks and bald eagles are occasionally seen foraging at the bypass return pond on BSEP but have not been recorded nesting in the vicinity of BSEP or its transmission line rights-of-way. The American alligator is widespread in Walden Creek and has been seen near the transmission line rights-of-way and the intake and discharge canals. This species is not biologically endangered or threatened, but is listed strictly because of similarity in appearance with other threatened crocodylian species.

CP&L monitors and records occurrences and populations of Federally listed and State-sensitive terrestrial species on the BSEP site and within transmission line rights-of-way. In addition, CP&L directs its contract personnel and consults with appropriate Federal and State agencies to develop and implement restrictions and safeguards to protect threatened and endangered species on the BSEP site and the associated transmission line rights-of-way (BSEP 2003, 2005a).

CP&L and NCDEHNR signed a Memorandum of Understanding in 1993 to preserve and protect rare, threatened, and endangered species and sensitive natural areas occurring on

transmission line rights-of-way (CP&L and NCDEHNR 1993). The company manages rare plant species on its transmission line rights-of-way through several Best Management Practices (BSEP 2005a). CP&L and contractor personnel that are involved in transmission line maintenance activities must complete *Environmental Training: Endangered Species* (BSEP 2003). These personnel are responsible for familiarizing themselves with any identified rare plants in their work area. They must comply with rare plant signs posted within or along the right-of-way. CP&L personnel also install, maintain, and monitor stakes and signs that are posted at the known rare plant locations (BSEP 2005a). The use of herbicides, heavy equipment, and mowing is prohibited in areas with known populations of rare plants during the active, “above-ground” period of the plant’s growing cycle. Therefore, maintenance activities are normally conducted in the fall and winter, after frost, in those segments of transmission lines that contain rare plants (BSEP 2003).

The NRC has reviewed life histories information for all the terrestrial threatened, endangered, and candidate species that have been identified in the vicinity of BSEP or the transmission line rights-of-way. The staff has also reviewed information provided by CP&L, FWS, and NCNHP regarding threatened and endangered species in the vicinity of the BSEP site and associated transmission line rights-of-way. The NRC has determined that the proposed action would either have *no effect* or *may affect, not likely to adversely affect* the terrestrial threatened, endangered, and candidate species. Terrestrial species that are listed as threatened or endangered by the FWS and have potential to occur in the vicinity of the BSEP site or along the transmission line rights-of-way are presented in Table 2. The basis for each determination is discussed in the following paragraphs.

Table 2 Federally Listed Terrestrial Species Reported From Counties Associated with BSEP and Its Transmission Line Rights-of Way

Species	Common Name	Federal Status ^(a)	Counties	Determination
REPTILES				
<i>Alligator mississippiensis</i>	American alligator	T(S/A)	Bladen, Brunswick, Columbus, Cumberland, New Hanover, Pender, Robeson	May affect, not likely to adversely affect
MAMMALS				
<i>Puma concolor cougar</i>	eastern cougar	E	Brunswick ^(b) , Onslow ^(b)	No effect
BIRDS				
<i>Charadrius melodus</i>	piping plover	T	Brunswick, New Hanover, Onslow, Pender	No effect
<i>Haliaeetus leucocephalus</i>	bald eagle	T	Bladen ^(c) Brunswick, Columbus ^(c) , Onslow	May affect, not likely to adversely affect

Table 2. (contd)

Species	Common Name	Federal Status ^(a)	Counties	Determination
<i>Mycteria americana</i>	wood stork	E	Brunswick	May affect, not likely to adversely affect
<i>Picoides borealis</i>	red cockaded woodpecker	E	Bladen, Brunswick, Columbus, Cumberland, New Hanover, Onslow, Pender, Robeson	May affect, not likely to adversely affect
INVERTEBRATES				
<i>Neonympha mitchellii francisci</i>	Saint Francis' satyr	E	Cumberland	May affect, not likely to adversely affect
PLANTS				
<i>Amaranthus pumilus</i>	seabeach amaranth	T	Brunswick, New Hanover, Onslow, Pender	No effect
<i>Carex lutea</i>	golden sedge	E	Onslow, Pender	May affect, not likely to adversely affect
<i>Dichantherium hirstii</i>	Hirst's panic grass	C	Onslow	May affect, not likely to adversely affect
<i>Isotria medeoloides</i>	small whorled pogonia	T	Cumberland ^(d)	No effect
<i>Lindera melissifolia</i>	pondberry or southern spicebush	E	Cumberland, Bladen ^(b)	May affect, not likely to adversely affect
<i>Lysimachia asperulifolia</i>	rough-leaf loosestrife	E	Bladen, Brunswick, Columbus ^(b) , Cumberland, New Hanover, Onslow, Pender	May affect, not likely to adversely affect
<i>Rhus michauxii</i>	Michaux's sumac	E	Cumberland, Robeson	May affect, not likely to adversely affect
<i>Schwalbea americana</i>	American chaffseed	E	Bladen ^(b) , Cumberland, Pender ^(b)	May affect, not likely to adversely affect
<i>Thalictrum cooleyi</i>	Cooley's meadowrue	E	Brunswick, Columbus, New Hanover ^(e) , Onslow, Pender	May affect, not likely to adversely affect

(a) E - endangered, T - Threatened, T(S/A) -threatened due to similarity of appearance, C - candidate.

(b) Historic record at least 20, maybe >50, years old.

(c) Recorded in state database but not FWS listing.

(d) Obscure record in State database - not in FWS listing.

(e) Obscure record.

Based on: FWS 2005b; NCNHP 2004a

American Alligator

The American alligator is listed by FWS as threatened because of its similarity of appearance with other threatened crocodylian species. This species is not biologically endangered or threatened and is not subject to Section 7 consultation. They are found in freshwater wetland areas throughout southeastern North Carolina (NCNHP 2005a). In the vicinity of BSEP, the American alligator is widespread in Walden Creek and the intake and discharge canals, and it has also been seen along the Fayetteville and Wallace transmission line rights-of-way. The proposed activities (continued maintenance of the transmission line right-of-way and the intake and discharge canals) would not result in detectable modifications of the freshwater systems and would not alter habitat quality in the surrounding areas. Therefore, the NRC concludes that the proposed license renewal of BSEP may affect, but is not likely to adversely affect the American alligator.

Eastern Cougar

The eastern cougar is listed by FWS as endangered. This large cat formerly ranged throughout the eastern United States and Canada but was driven to near extinction during the 1800s. It may be extirpated from North Carolina (FWS 2005c) and may be extinct throughout its former range (NatureServe 2005). It has not been reported from Brunswick or any of the surrounding counties for over 20 years, and is not likely to occur near BSEP or within its transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term would have no effect on the eastern cougar.

Piping Plover

The piping plover is listed by FWS as threatened. This small shorebird breeds along the Atlantic coast from Newfoundland to North Carolina, as well as along the great lakes and on river sandbars in the upper great plains (FWS 2005d). It winters along the Atlantic and Gulf coasts from North Carolina to Mexico. FWS has designated portions of the Atlantic coastal beaches in Brunswick, Hanover, Pender, and Onslow counties as critical habitat for the piping plover (66 FR 36038). Critical habitat does not occur at BSEP or adjacent to associated transmission line rights-of-way (CP&L 2004). Suitable nesting or foraging habitat is not known to occur at the BSEP site or along the transmission line rights-of-way.

The staff visited the site and reviewed the life history and critical habitat information of the piping plover. Based on this information, along with information obtained from NCNHP on the known occurrences of piping plovers, the staff determined that suitable nesting and foraging habitat is not present at the BSEP site or along the transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term would have no effect on the piping plover.

Bald Eagle

The bald eagle, found throughout the United States, is listed by FWS as threatened. It was proposed for delisting on July 6, 1999 (64 FR 36453), but a decision on whether to delist the bald eagle is still pending. Bald eagle nests are large often measuring 6 ft across (FWS 2005e). Nest trees are usually large diameter trees characterized by open branching and stout limbs. Because fish is the primary food source, the majority of nest sites are within 0.5 mi of a body of water, such as coastal shorelines, bays, rivers, lakes, farm ponds, or dammed rivers (i.e., beaver dams, log jams, etc.), and have an unobstructed view of the water. Winter foraging areas are usually located near open water on rivers, lakes, reservoirs, and bays where fish and waterfowl are abundant, or in areas with little or no water (i.e., rangelands, barren land, tundra, suburban areas, etc.) where other prey species (e.g., rabbit, rodents, deer, carrion) are abundant.

Bald eagles have been periodically observed near BSEP and along the transmission line rights-of-way, but there are no known nesting locations near BSEP. In the last fifteen years, there have only been two confirmed nest sites within 20 mi of BSEP in Brunswick County.

Field personnel are required to take training to become familiar with threatened and endangered species that are in the vicinity of BSEP and the transmission line rights-of-way. This training includes familiarizing personnel with the characteristics of the bald eagle and how to identify potential bald eagle nests (BSEP 2003). CP&L field personnel are required to report any potential nests and CP&L maintains a policy of “do not disturb nests, whether active or inactive” (BSEP 2003).

The staff visited the site and reviewed the life history information on the bald eagle. Based on this information, information obtained from NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, bald eagles.

Wood Stork

The wood stork is listed by FWS as endangered. It inhabits freshwater and brackish wetlands, and normally nests in cypress or mangrove swamps. Because of its unique feeding technique (tacto-location), it typically requires higher prey concentrations than other wading birds and tends to rely on depressions in marshes or swamps where prey can become concentrated during periods of falling water levels. Breeding colonies are located in Florida, Georgia, and South Carolina (FWS 1997). Every summer since the 1980s, between 15 and 100 individuals have frequented the area around Sunset Beach, North Carolina, which is approximately 30 mi southwest of BSEP. This non-breeding colony represents the northernmost extent of this species range and is the only known colony of wood storks in North Carolina (FWS 2005f).

This species has been periodically observed foraging in the bypass return pond on the BSEP site. It has not been observed along the transmission line rights-of-way which are at least 15 mi from the Sunset Beach colony.

The staff visited the site and reviewed the life history of the wood stork. Based on this information, information obtained from NCNHP, and the fact that the wood stork is known to occasionally forage near the BSEP site, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the wood stork.

Red-Cockaded Woodpecker

The red-cockaded woodpecker is listed by FWS as endangered. It occurs throughout the southeastern United States, and has been observed near the BSEP site and in all of the counties crossed by the BSEP transmission line rights-of-way. In eastern North Carolina, it is found in mature pine forests (generally longleaf pine) with sparse understory vegetation. It requires open stands of pines, with trees over 80 years old for nesting (FWS 1993a). As of 2003, there were nine active red-cockaded woodpecker nesting groups on the Military Ocean Terminal Sunny Point, and it is thought that the facility could support as many as 17 nesting groups (FWS 2003). Suitable nesting habitat for this species is not found at BSEP (CP&L 2004), but birds may forage in the vicinity of the plant and could nest or forage near many of the transmission line rights-of-way. Any facility expansion involving removal of mature longleaf pine would require surveys for this species to ensure that no red-cockaded woodpeckers or trees with their nest-cavities would be harmed (CP&L 2004).

Field personnel are required to take training to become familiar with threatened and endangered species that are in the vicinity of BSEP and the transmission line rights-of-way. This training includes familiarizing personnel with the characteristics of the red-cockaded woodpecker and how to identify potential red-cockaded woodpecker nests (BSEP 2003). CP&L field personnel are required to report any potential nests and CP&L maintains a policy of “do not disturb nests, whether active or inactive” (BSEP 2003).

The staff visited the site and reviewed the life history information about the red-cockaded woodpecker. Based on this information, information obtained from NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, red-cockaded woodpeckers.

Saint Francis' Satyr Butterfly

The Saint Francis' satyr butterfly is listed by FWS as endangered. It occurs in a single meta-population in the sandhills of Cumberland and Hoke Counties, North Carolina (FWS 2005g). Habitat consists primarily of wet meadows dominated by sedges (*Carex* spp.) and other wetland graminoids (FWS 1996a). The species has been observed in a variety of other wetland areas,

including areas with pitcher plants and the endangered rough-leaf loosestrife, but it is not known if the Saint Francis' satyr uses these habitats for any part of its life cycle other than a travel corridor. Although suitable habitat for the Saint Francis' satyr potentially could occur within or near the Brunswick-to-Fayetteville transmission line right-of-way, the NCNHP does not have record of this species within at least 8 mi of the right-of-way.

The staff visited the site and reviewed the life history of the Saint Francis' satyr butterfly. Based on this information, information obtained from NCNHP, and the fact that wetland areas with pitcher plants and rough-leaf loosestrife are known to occur in the BSEP transmission line rights-of-way, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, Saint Francis' satyr butterfly.

Seabeach Amaranth

The seabeach amaranth is listed by FWS as threatened. It is an annual plant that inhabits open sand areas on Atlantic ocean beaches, originally from Massachusetts to South Carolina, but is now restricted to approximately 55 populations in South Carolina, North Carolina, and New York state (FWS 1996b). Between 60 and 70 percent of the surviving populations are in North Carolina, including some in Brunswick, New Hanover, Onslow, and Pender Counties (FWS 2005h; NCNHP 2005a). All populations are strictly coastal, and seabeach amaranth often co-occurs in the same areas as the piping plover (FWS 1996b). There are no known populations near the BSEP site, and it is unlikely that there is any suitable habitat at the BSEP site or near any of the transmission rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term would have no effect on the seabeach amaranth.

Golden Sedge

The golden sedge is listed by FWS as endangered and is only found in Pender and Onslow Counties, North Carolina. This species was first discovered in 1991, but was not formally described until 1994 (67 FR 3120); therefore, relatively little is known about its ecology. Golden sedge is a perennial found in a rare habitat type of coastal savanna underlain by calcareous (limestone) deposits (FWS 2002a). At the time it was listed as endangered, there were only eight known populations of golden sedge, all within a 2-mi radius of each other. Several additional populations have been found since the publication of the final listing determination (NCNHP 2005b). In 1996, a single population of golden sedge was recorded along the Jacksonville transmission line right-of-way in Onslow County. Since that time, additional populations have been noted, and data provided by the NCNHP indicates the presence of three populations within the Jacksonville transmission line right-of-way and three others within 0.5 mi of that right-of-way in Onslow and Pender Counties. The populations in the Jacksonville right-of-way are protected by CP&L under an agreement with the NCNHP. In addition, field personnel are required to take *Environmental Training: Endangered Species* to become familiar with threatened and endangered species that are in the vicinity of BSEP and the transmission line rights-of-way and to become familiar with CP&Ls Best Management Practices

related to protecting rare plants in CP&L rights-of-way. These Best Management Practices include scheduling activities outside the growing season for rare plants, avoiding the use of heavy equipment in areas with rare plants at all times, and not using herbicides in areas where rare plants have been identified (BSEP 2005a).

The staff visited the site and reviewed the life history information about the golden sedge. Based on this information, information obtained from NCNHP, and information obtained from BSEP on transmission line rights-of-way maintenance procedures and Best Management Practices, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, golden sedge.

Hirst's Panic Grass

The Hirst's panic grass is currently a candidate for protection . It is currently known from only three sites, one in Delaware and two in North Carolina; there are two sites in New Jersey where it has not been seen in 10 to 20 years (FWS 2002b). Hirst's panic grass inhabits coastal plain intermittent ponds in wet savanna or pine barren habitats. The species relies on periods of standing water to help minimize competition from other species. The two known populations in North Carolina are both located on Camp LeJeune Marine Corps Base in Onslow County. The known populations of Hirst's panic grass are at least 7 mi from the nearest BSEP transmission line rights-of-way, but suitable habitat may be found within or near the rights-of-way.

The staff visited the site and reviewed the life history of Hirst's panic grass. Based on this information, along with information obtained from NCNHP on the species distribution, the staff determined that suitable habitat could be found within the transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, Hirst's panic grass.

Small Whorled Pogonia

The small whorled pogonia is listed by FWS as threatened and by the NCNHP (NCNHP 2005a) as occurring in Cumberland County based on an obscure record. The FWS does not include this species in its county listings (FWS 2005i). This species occurs in very small populations that are widely distributed from southern Maine and New Hampshire south through Virginia, to northern Georgia and Eastern Tennessee, with outlying populations occurring in a number of states west to Michigan and Illinois (FWS 1992). In the southern portion of its range, the small whorled pogonia is normally found in white pine (*P. strobus*)/mixed deciduous forests, and it appears to be somewhat shade intolerant (FWS 1992). All of the known populations of the small whorled pogonia in North Carolina or South Carolina are located on the far western end of each state, and no known populations are located within 150 mi of BSEP or associated transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term would have no effect on the small whorled pogonia.

Pondberry (southern spicebush)

The pondberry or southern spicebush is listed by FWS as endangered. It is a shrub that occurs in wetland habitats such as bottomland, and the margins of sinks, ponds, and other depressions. It normally grows in shaded areas but may also be found in full sun (FWS 2005j). It occurs in widely scattered sites along an arc from southeastern North Carolina through Georgia and Mississippi to Arkansas and southern Missouri (FWS 1993b). It is known from three sites in North Carolina, including one population in Bladen County. Suitable habitat could be found within several of the rights-of-way, but the NCNHP data do not include records of it occurring within at least 1 mi of the nearest BSEP transmission line right-of-way.

The staff visited the site and reviewed the life history of the pondberry. Based on this information, along with information obtained from NCNHP on the species distribution, the staff determined that suitable habitat could be found within the transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, pondberry.

Rough-Leaf Loosestrife

The rough-leaf loosestrife is listed by FWS as endangered. It is a perennial herb that occurs in pocosins in the coastal plain and sandhills of North Carolina (FWS 2005k). Habitat is generally in the ecotone between longleaf pine or oak savannas and wetter, shrubby areas where moist sandy or peaty soils occur, and where low vegetation allows abundant sunlight to penetrate to the soil surface (FWS 1995a). This grass-shrub ecotone naturally would be fire maintained; therefore, the species appears to benefit from some periodic disturbance. Eight populations of rough-leaf loosestrife are known from Brunswick County; one occurs in a BSEP transmission line right-of-way north of BSEP in the Boiling Spring Lakes area (i.e., the right-of-way that contains the Castle Hayne East, Wilmington Corning, Wallace, and Jacksonville transmission lines). Several populations are associated with the Wallace and Jacksonville transmission line rights-of-way in Pender County (CP&L 2004) and one population is known near the end of the Fayetteville transmission line. These populations are protected and managed by CP&L under an agreement with the NCNHP. It is likely that there are additional areas with suitable habitat for this species near the BSEP site and several of the transmission line rights-of-way.

Field personnel are required to take training to become familiar with threatened and endangered species that are in the vicinity of BSEP and the transmission line rights-of-way and to become familiar with CP&Ls Best Management Practices related to protecting rare plants in CP&L power line rights-of-way. These Best Management Practices include scheduling activities outside the growing season for rare plants, avoiding the use of heavy equipment in areas with rare plants at all times, and not using herbicides in areas with rare plants (BSEP 2003a, 2005a).

The staff visited the site and reviewed the life history information about the rough-leaf loosestrife. Based on this information, information obtained from NCNHP, and information obtained from BSEP on transmission line rights-of-way maintenance procedures and Best Management Practices, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the rough-leaf loosestrife.

Michaux's Sumac

The Michaux's sumac is listed by FWS as endangered. It is a shrub that inhabits a variety of soil types that may range from sandy, acidic soils to clayey, circumneutral soils (NatureServe 2005). It survives best in areas that are subjected to some form of disturbance that provides open space. At least 12 populations in North Carolina are on highway rights-of-way, road clearings, or on the edges of artificial clearings (FWS 2005). There are an estimated 31 populations remaining in North Carolina, spread over eight counties, including one population in Robeson County, which contains the terminus of the Weatherspoon transmission line. The known population in Robeson County is not within 2 mi of the Witherspoon transmission line right of way. However, there is a potential for suitable habitat to occur within or near the Weatherspoon transmission line right-of-way.

The staff visited the site and reviewed the life history of Michaux's sumac. Based on this information, along with information obtained from NCNHP on the species distribution, the staff determined that suitable habitat could be found within the transmission line rights-of-way. Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the Michaux's sumac.

American Chaffseed

The American chaffseed is listed by FWS as endangered. Of the 72 known extant populations, 18 are located in North Carolina. However, 17 of those populations are on Fort Bragg in Cumberland and Hoke Counties. The other extant population in North Carolina is along a roadside in Moore County (FWS 1995b). Historically, the species has been reported in Bladen and Pender Counties, but has not been observed in these counties for at least 20 years (NCNHP 2005a). The American chaffseed is a hemiparasitic plant that occurs in sandy, acidic, seasonally moist, to dry soils. It is generally found in habitats described as open, moist, pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems. It is dependent on factors such as fire, mowing, or fluctuating water tables to maintain the open to partly-open conditions that it requires (FWS 1995b). No populations have been recorded near the BSEP site or along the transmission line rights-of-way, or anywhere in the counties containing these rights-of-way for at least 20 years. However, suitable habitat potentially exists in these areas.

The staff visited the site and reviewed the life history of American chaffseed. Based on this information, along with information obtained from NCNHP on the species distribution, the staff determined that suitable habitat could be found within the transmission line rights-of-way.

Therefore, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the American chaffseed.

Cooley's Meadowrue

The Cooley's meadowrue is listed by FWS as endangered; there are approximately 11 known populations in North Carolina, all in Brunswick, Columbus, Onslow, and Pender Counties, and one very small population in northern Florida (FWS 1994, 2005m). The populations in North Carolina are in two clusters; there are six sites within 4 mi of each other in Pender and Onslow Counties, and five sites within 8 mi of each other in Brunswick and Columbus Counties.

Cooley's meadowrue is a perennial herb that grows in circumneutral soils in wet pine savannas or grass-sedge bogs, often at the border of intermittent drainages or swamp forests. It is often associated with some type of disturbance such as clearings, edges of frequently burned savannas, and powerline or highway rights-of-way that are maintained by fire or mowing (NatureServe 2005). The species typically occupies a narrow hydrological niche, where soil is moist to saturated, but water does not stand above the soil surface (NatureServe 2005).

Cooley's meadowrue is potentially affected by transmission line rights-of-way maintenance. Several populations have been found in or near the Jacksonville right-of-way in Onslow County. The populations within the right-of-way are protected by CP&L under an agreement with the NCNHP. Several other populations have been observed near, but not within the Fayetteville transmission right-of-way in western Brunswick County. It is likely that there are additional areas of suitable habitat along several of the transmission line rights-of-way.

Field personnel are required to take training to become familiar with threatened and endangered species that are in the vicinity of BSEP and the transmission line rights-of-way and to become familiar with CP&Ls Best Management Practices related to protecting rare plants in CP&L transmission line rights-of-way. These Best Management Practices include scheduling activities outside the growing season for rare plants, avoiding the use of heavy equipment in areas with rare plants at all times, and not using herbicides in areas with rare plants (BSEP 2003a, 2005a).

The staff visited the site and reviewed the life history information about the Cooley's meadowrue. Based on this information, information obtained from NCNHP, and information obtained from BSEP on transmission line rights-of-way maintenance procedures and Best Management Practices, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the Cooley's meadowrue.

5.2 Aquatic Species

A total of seven Federally listed threatened or endangered aquatic species under either full or partial FWS jurisdiction were identified as having the potential to be present in North Carolina waters in the vicinity of BSEP and its associated transmission line rights-of-way (NMFS 2005a; FWS 2005a). There is no critical habitat for any of the Federally listed species at the BSEP site or near the associated transmission line rights-of-way. These include the West Indian manatee

(*Trichechus manatus*), five sea turtles (loggerhead turtle [*Caretta caretta*], green turtle [*Chelonia mydas*], leatherback turtle [*Dermochelys coriacea*], hawksbill turtle [*Eretmochelys imbricata*], and Kemp's ridley turtle [*Lepidochelys kempii*]), and a fish, the Waccamaw silverside (*Menidia extensa*) (Table 3). NMFS and the FWS share jurisdiction for the sea turtles, with NMFS having responsibility in the marine environment and FWS on nesting beaches.

The NRC has reviewed life histories information for all the aquatic threatened or endangered species that have been identified in the vicinity of BSEP or the transmission line rights-of-way. The staff has also reviewed information provided by CP&L, FWS, NMFS, and the NCNHP regarding threatened and endangered species in the vicinity of BSEP (CP&L 2004; NCNHP 2004b; NMFS 2005a, b, and c; FWS 2005b). The NRC has determined that the proposed action would either have *no effect* or *may affect, not likely to adversely affect* the endangered or threatened species. The basis for each determination is discussed in the following paragraphs.

Table 3 Federally Listed Aquatic Species Reported from Counties Associated with BSEP and Its Transmission Line Rights-of Way

Species	Common Name	Federal Status ^(a)	Counties	Determination
MAMMALS				
<i>Trichechus manatus</i>	West Indian manatee	E	Brunswick, New Hanover, Onslow, Pender	May affect, not likely to adversely affect
REPTILES				
<i>Caretta caretta</i>	loggerhead turtle	T ^(b)	Brunswick, New Hanover, Onslow, Pender	May affect, not likely to adversely affect
<i>Chelonia mydas</i>	green turtle	T ^(b,c)	Brunswick, New Hanover, Onslow	May affect, not likely to adversely affect
<i>Dermochelys coriacea</i>	leatherback turtle	E ^{2(b)}	Brunswick, Onslow	May affect, not likely to adversely affect
<i>Eretmochelys imbricata</i>	hawksbill turtle	E ^(b)	(NC) ^(d)	May affect, not likely to adversely affect
<i>Lepidochelys kempii</i>	Kemp's ridley turtle	E ^(b)	Brunswick	May affect, not likely to adversely affect
FISH				
<i>Menidia extensa</i>	Waccamaw silverside	T	Columbus	No effect

(a) E - endangered, T- threatened.

(b) Nesting areas are under FWS jurisdiction, otherwise the species is under NMFS jurisdiction.

(c) Green turtles are listed as threatened, except for breeding populations of green turtles in Florida and on the Pacific Coast of Mexico, which are listed as endangered.

(d) (NC) - County-level listings are not available; the species has Federal listing status in North Carolina

West Indian Manatee

The West Indian manatee is a Federally listed endangered species. These large mammals may be found as far north as Virginia along the Atlantic coast. At least two manatees have been observed in the Cape Fear Estuary, but none have been documented at the BSEP site (CP&L 1998; PEC 2005). They may inhabit both salt and fresh water, generally between 5 and 20 ft deep (FWS 2005n). The diversion structure with turtle-blocker panels installed at the entrance to the intake canal should minimize the potential for manatee entry into the canal.

The staff visited the site and reviewed the life history information on the West Indian manatee. Based on this information, information obtained from NCNHP and FWS, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the West Indian manatee.

Waccamaw Silverside

The Waccamaw silverside, which is Federally listed as a threatened species, is known only from Lake Waccamaw in Columbus County. Therefore, it is not expected to occur at the BSEP site (FWS 2005o). The Fayetteville transmission line passes approximately 2 mi south of Lake Waccamaw, but maintenance and operation of that transmission right-of-way has no impact on the lake.

The staff visited the site and reviewed the life history information on the Waccamaw silverside. Based on this information, information obtained from NCWRC, FWS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term would have no effect on the Waccamaw silverside.

Sea Turtles

NMFS and the FWS share jurisdiction for the sea turtles, with NMFS having responsibility in the marine environment and FWS on nesting beaches. A Biological Opinion issued by the NMFS in 2000 addressed impacts to sea turtles specifically resulting from BSEP operation (NMFS 2002). There are no known suitable nesting beaches on the BSEP site or associated transmission line rights-of-way; therefore, Section 7 consultation with FWS has not been required.

Loggerhead Turtle

The loggerhead turtle is listed by the FWS as threatened. The loggerhead may be found hundreds of miles out to sea, as well as in inshore areas such as bays, lagoons, salt marshes, creeks, ship canals, and the mouths of large rivers. Loggerhead turtles were the most common species observed at the BSEP in 2004; 69 percent of the sea turtles handled were loggerheads

The species also nests on suitable beaches suitable for nesting from North Carolina to Florida, with primary nesting beaches found in Florida (FWS 2005p). Nesting season is generally between May and November.. Loggerhead turtle nesting in North Carolina occurs only on the Atlantic Coast beaches, and does not occur in the Cape Fear River estuary or anywhere near the BSEP site or associated transmission line rights-of-way.

The staff visited the site and reviewed the life history information on the loggerhead turtle. Based on this information, information obtained from NCWRC, FWS, NMFS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the loggerhead turtle.

Green Turtle

The green turtle is listed by the FWS as threatened. In eastern North America, this species is found from Massachusetts to Mexico. Green turtles are generally found in shallow waters inside reefs, bays, and inlets and are attracted to lagoons and shoals with an abundance of marine grass and algae. Approximately 12 percent of the sea turtles handled at the BSEP in 2004 were green turtles. Nesting in the continental United States is limited to between 300 and 1000 nests annually on Florida's east coast (FWS 2005q).

The staff visited the site and reviewed the life history information on the green turtle. Based on this information, information obtained from NCWRC, FWS, NMFS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, green turtles.

Leatherback Turtle

The leatherback turtle is listed as endangered by the FWS. The species rarely enters the estuary. Only historical sightings of the leatherback (last observed more than 20 years ago) have been documented in Brunswick County (NHP 2004b). Nesting in the United States occurs mainly in Florida, but has also occurred in Georgia, South Carolina, and North Carolina. No nests have been observed at the BSEP site.

The staff visited the site and reviewed the life history information on the leatherback turtle. Based on this information, information obtained from NCWRC, FWS, NMFS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the leatherback turtle.

Hawksbill Turtle

The hawksbill is listed as endangered by the FWS. In the continental United States, nesting is restricted to the southeast coast of Florida and the Florida Keys (NMFS 2005b). The hawksbill turtle has been reported from all the eastern seaboard, but sightings north of Florida are rare. This species has not been documented at the BSEP site.

The staff visited the site and reviewed the life history information on the hawksbill turtle. Based on this information, information obtained from NCWRC, FWS, NMFS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the hawksbill turtle.

Kemp's Ridley Turtle

The Kemp's ridley turtle is listed by the FWS as endangered. Nesting occurs in Tamaulipas Mexico, and sometimes in Texas. Adults of this species are found primarily in the Gulf of Mexico, but immature turtles are found along the Atlantic coast as far north as Canada (FWS 2005r). The Kemp's ridley turtle is found in shallow coastal waters, often in association with red mangrove shorelines (FWS 2005r). Nearly 19 percent of the sea turtles handled at BSEP in 2004 were Kemp's ridley turtles.

The staff visited the site and reviewed the life history information on the Kemp's ridley turtle. Based on this information, information obtained from NCWRC, FWS, NMFS, and NCNHP, and information obtained from BSEP on endangered and threatened species procedures, the staff concludes that continued operation of BSEP over the 20-year license renewal term may affect, but is not likely to adversely affect, the Kemp's ridley turtle.

6.0 Conclusions

The staff has identified 12 terrestrial and 6 aquatic Federally listed endangered, threatened, and candidate species that are under full or partial FWS jurisdiction that have a reasonable potential to occur in the vicinity of BSEP or along the transmission line rights-of-way, and therefore may be affected by continued operations of BSEP and maintenance of the associated transmission line rights-of-way. Additionally, the staff identified four other Federally listed terrestrial species and one Federally listed aquatic species that have been reported to occur in the counties containing BSEP or associated transmission rights-of-way. However, because of known habitat requirements, these species are not likely to be found near BSEP or its associated transmission line rights-of-way and, therefore, would not be affected by continued operations at BSEP. CP&L has procedures in place to protect endangered or threatened species, if they are encountered at the plant site or along transmission line rights-of-way, and provides training for employees on these procedures (BSEP 2003, 2005a). In 1993, CP&L signed a Memorandum of Understanding with the NCDEHNR to preserve and protect rare, threatened, and endangered species and sensitive natural areas occurring on transmission line rights-of-way (CP&L and NCDEHNR 1993). CP&L also maintains Best Management Practices for Management of Rare Plants on its rights-of-way (BSEP 2005a).

The NRC staff has analyzed the species that are likely to be in the vicinity of BSEP or the associated transmission lines, the known distributions and records of those species, the ecological impacts of the operation of BSEP and the operation and maintenance of the associated transmission rights-of-way, the effects of these practices on the species potentially present, and the mitigation measures that CP&L has already implemented. Based on this analysis, the staff has determined that continued operation of BSEP and its associated transmission lines for an additional 20 years would not have an adverse impact on any threatened or endangered species.

7.0 References

10 CFR Part 51. Code of Federal Regulations, Title 10, *Energy*, Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.”

10 CFR Part 54. Code of Federal Regulations, Title 10, *Energy*, Part 54, “Requirements for Renewal of Operating Licenses for Nuclear Power Plants.”

64 FR 36453. July 6, 1999. “Endangered and Threatened Wildlife and Plants; Proposed Rule To Remove the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife; Proposed Rule.” *Federal Register*, U.S. Fish and Wildlife Service.

66 FR 36038. July 9, 2001. “Endangered and Threatened Wildlife and Plants; Final Determinations of Critical Habitat for Wintering Piping Plovers; Final Rule.” *Federal Register*, U.S. Fish and Wildlife Service.

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