

May 20, 2016

Mr. Barry Jurs
Economic Development Director
Berkeley County
1003 Highway 52
Moncks Corner, SC 29461



**Subject: Protected Species Biological Assessment
 Volvo Interchange Properties
 Berkeley and Dorchester Counties, South Carolina
 Amec Foster Wheeler Project No. 6250-15-0096**

Dear Mr. Jurs,

Amec Foster Wheeler Environment and Infrastructure, Inc. (Amec Foster Wheeler) is pleased to submit this report regarding the protected species assessment for properties and SCDOT right of way associated with the construction of an interchange on interstate I-26 for access to the Volvo Cars manufacturing complex and the Camp Hall Commerce Park, located near Ridgeville, Berkeley County, South Carolina (Figure 1).

Berkeley County and the South Carolina Department of Commerce (SCDOC) are in the process of developing the Volvo Cars Manufacturing complex and associated infrastructure on the Camp Hall Commerce Park property near Ridgeville, SC. The proposed interchange study area consists of 118.95 acres owned by the South Carolina Department of Transportation. The majority of the site is located in Berkeley County except for a small property in the northwestern side of the study area that is in Dorchester County.

Introduction

Plants and animals listed as federally threatened and endangered are protected under the Endangered Species Act (P.L. 92-205) (ESA) which is administered and enforced by the United States Fish and Wildlife Service (USFWS). The bald eagle is federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. This biological assessment documents the results of a literature search and an on-site habitat assessment for federally endangered and threatened species and the bald eagle for the Volvo Interchange Properties in Berkeley and Dorchester Counties, South Carolina.

Species to be Considered

A current list of federally endangered and threatened species for Berkeley and Dorchester Counties was compiled from the USFWS Charleston Field Office website in April 2016 and the USFWS Information Planning and Conservation System (IPAC) (April 2016). The list is in Table 1. The South Carolina Rare and Endangered Species Inventory website, a Geographic Information System natural resources data layer that includes the locations of all documented occurrences of federally endangered or threatened species, was reviewed for known occurrences of such species on or proximate to the subject project.

Table 1. Current list of federally endangered, threatened, and candidate species in Berkeley and Dorchester Counties, South Carolina (USFWS 2016) and their habitat types.

Common Name	Scientific Name	Status	General Habitat Type
West Indian manatee	<i>Trichechus manatus</i>	E	coastal waters
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	T, CH	pine areas maintained in an open state by fire with isolated ponds for breeding sites
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	coastlines, rivers, large lakes or streams
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	mature pine forests
Wood stork	<i>Mycteria americana</i>	E	marshes, swamps, lagoons, ponds, flooded fields; depressions in marshes are important during drought; also occurs in brackish wetlands
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	E	major river systems along the eastern seaboard
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	E	major river systems along the eastern seaboard
Pondberry	<i>Lindera melissifolia</i>	E	swamp and pond margins, sandy sinks, swampy depressions, wet flats
Canby's dropwort	<i>Oxypolis canbyi</i>	E	pond-cypress savannahs dominated by grasses, sedges or ditches next to bays; borders and shallows of cypress-pond pine ponds and sloughs
American chaffseed	<i>Schwalbea americana</i>	E	fire maintained open pine forest

E Federally endangered

T Federally threatened

CH Critical habitat

BGEPA Federally protected under the Bald and Golden Eagle Protection Act

Methodology

Amec Foster Wheeler conducted a literature search, desktop habitat assessment and on-site ground-truthing to determine the likelihood of the presence or absence of each of the above listed species. The above list was used as the baseline for the on-site habitat assessment and survey. Aerial photography and ground-truthing was used to generalize habitat types on the site. General habitat types located on the properties are described below in the Habitats section. On-site field work was conducted on April 26-27, 2016.

Habitat

The following is a summary of the observed plant communities encountered during field investigations on interchange study area.

Young Loblolly Pine Plantation

The plant community within young loblolly pine stands is dominated by young (less than 5 years old) loblolly pine (*Pinus taeda*) and hardwood species in the sapling stage, including sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), diamond-leaf oak (*Quercus laurifolia*), water oak (*Quercus nigra*), and willow oak (*Quercus phellos*). Numerous shrub species are common

including sweetbay (*Magnolia virginiana*), wax myrtle (*Morella cerifera*), blackberry (*Rubus spp.*), fetterbush (*Lyonia lucida*), common sweetleaf (*Symplocos tinctoria*), sweet pepperbush (*Clethra alnifolia*), inkberry (*Ilex glabra*), redbay (*Persea borbonia*), and highbush blueberry (*Vaccinium corymbosum*). The herbaceous stratum is generally sparsely vegetated, but can contain bracken fern (*Pteridium aquilinum*), cinnamon fern (*Osmundastrum cinnamomeum*), royal fern (*Osmunda regalis*), giant cane (*Arundinaria gigantea*), and slender woodoats (*Chasmanthium laxum*).

5-20 Year Old Loblolly Pine Plantation

Older stands of loblolly pine consist of an overstory dominated by loblolly pine. The understory includes hardwood saplings, including water oak, red maple, sweet gum, willow oak, black gum (*Nyssa sylvatica*), and black cherry (*Prunus serotina*). The shrub layer is abundant, composed of wax myrtle, ink berry, American holly (*Ilex opaca*), sweet pepper bush, fetterbush, and blueberry (*Vaccinium sp.*). The herbaceous stratum contains cinnamon fern, royal fern, giant cane (*Arundinaria gigantea*), and slender woodoats.

Mixed Pine/Hardwood Forest

The overstory consists of loblolly pine as well as hardwood species including sweetgum, red maple, water oak, diamond-leaf oak, willow oak, and black gum. The understory is dominated by hardwoods in the sapling stage including water oak, red maple, sweet gum, black gum, and black cherry as well as shrub species such as sweet pepperbush, inkberry, redbay, and wax myrtle, highbush blueberry, fetterbush, and sweetbay. The herbaceous stratum is nearly nonexistent, although where present included sedges (*Carex sp.*) and velvet panicum (*Dichanthelium scoparium*). Vine species included yellow jasmine (*Gelsemium sempervirens*), muscadine (*Vitis rotundifolia*), and roundleaf greenbrier (*Smilax rotundifolia*).

Literature Search and On-site Survey Results

West Indian manatee

The West Indian manatee was listed as endangered on March 11, 1967 (USFWS 1967). It is a large gray or brown aquatic mammal averaging 10 feet long and weighing about 1,000 pounds (USFWS 1992a). During the winter months, the United States' manatee population confines itself to the coastal waters of the southern half of peninsular Florida and to springs and warm water outfalls as far north as southeast Georgia. During the summer months, they may migrate as far north as coastal Virginia on the east coast and the Louisiana coast on the Gulf of Mexico (USFWS 1992a). The West Indian manatee inhabits both salt and fresh water and may be encountered in canals, rivers, estuarine habitats, and saltwater bays (USFWS 1992a).

None of the habitat types supporting West Indian manatee occur on the properties.

Frosted flatwoods salamander

The flatwoods salamander was listed as threatened on April 1, 1999 (USFWS 1999b). In 2009 the flatwoods salamander was divided into two distinct species: the frosted flatwoods salamander (*Ambystoma cingulatum*) and the reticulated flatwoods salamander (*Ambystoma bishopi*) due to a recognized taxonomic reclassification (USFWS 2009). The frosted flatwoods

salamander is located east of the Apalachicola River Basin. Critical habitat (CH) has been designated for the frosted flatwoods salamander in Berkeley, Charleston, and Jasper counties, SC (USFWS 2009) but the closest designated CH is over 20 miles away on the Francis Marion National Forest (FMNF). The frosted flatwoods salamander occurs in isolated populations scattered across the lower southeastern Coastal Plain in Florida, Georgia, and South Carolina (USFWS 1999b, USFWS 2009). There are four known populations of frosted flatwoods salamander in South Carolina (USFWS 2009) with the closest population over 20 miles away on the FMNF.

It is a slender, small-headed mole salamander. Adult dorsal color ranges from dark black to chocolate black with grayish or silvery network pattern or frosted appearance running along the lateral and dorsal surfaces. Aquatic larvae are long and slender, broad-headed and bushy-gilled, with white bellies and yellow stripes on the sides (Palis 1995).

Typical breeding sites are isolated wetland depressions, which dry completely on a cyclic basis, thus eliminating fish species. The isolated ponds are typically small with an open canopy allowing grasses and sedges to grow on the edge where adult salamanders will lay their eggs in the fall. During the non-breeding season, the fossorial adults return to the upland pine areas that are maintained by frequent fire.

The habitats on these properties do not meet the criteria for frosted flatwoods salamander because there are no depressional wetlands (i.e., ponds) on these properties. In addition, the upland pine habitat has not been burned or allowed to mature and will not support the adults.

Bald eagle

The bald eagle was listed as endangered on March 11, 1967 (USFWS 1967). The species was reclassified from endangered to threatened throughout the lower 48 states on July 12, 1995 (USFWS 1995). It was proposed to be removed from the federal endangered species list on July 6, 1999 (USFWS 1999a). On July 9, 2007, the bald eagle was removed from the endangered species list (USFWS 2007). The bald eagle is still federally protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

The bald eagle, with a wingspread of about seven feet, is mainly dark brown and adults have a pure white head and tail. The bald eagle feeds primarily on fish but also takes a variety of bird, mammals, and turtles when fish are not readily available (USFWS 1992a). It nests in large, sturdy trees with open canopies typically near large open water bodies. Many nests are used annually. It has been documented that egg laying for the bald eagle peaks in late December in the South. The nesting season in the Southeast extends from October to May 15.

These properties do not contain the large overstory trees for nesting and there is no open water for foraging eagles.

Red-cockaded woodpecker (RCW)

In 1970, the RCW was officially listed as endangered (USFWS 2003). With passage of the ESA in 1973, the RCW received the protection afforded listed species under the ESA. The endangered status of the RCW primarily is due to four environmental factors that have been shown to limit its numbers: (1) hardwood encroachment; (2) a shortage of suitable cavity trees;

(3) loss and fragmentation of habitat, and (4) demographic isolation (Conner and Rudolph 1991, Walters 1991, Rudolph and Conner 1994).

The RCW is endemic to pine forests of the southeast (Ligon 1970). RCWs are territorial, non-migratory, cooperative breeders (Lennartz et al. 1987). RCWs are unique in that they excavate cavities for roosting and nesting in living pines (USFWS 2003) and use living pines almost exclusively for foraging substrate, preferring longleaf pine when available (Walters 1991). RCWs require open pine woodlands and savannahs with large old pines for nesting and roosting habitat (i.e., cavity trees). Cavity trees must be in open pine stands with little or no hardwood midstory and few or no over-story hardwoods. For purposes of surveying, suitable nesting habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older and that are within 0.5 mile of suitable foraging habitat. For the purposes of surveying, suitable foraging habitat consists of a pine or pine/hardwood stand in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years in age or older. (USFWS 2003)

The pine habitat on these properties does not constitute suitable nesting or foraging habitat for the RCW because it is less than 30 years of age and non-contiguous with suitable habitat.

Wood stork

The U.S. breeding population of the wood stork was listed as endangered on February 28, 1984 (USFWS 1992a). The U.S. breeding population was down-listed to threatened and established as a distinct population segment on July 30, 2014. Wood storks are large, long-legged wading birds. They are white except for black primaries and secondaries and a short black tail. The head and neck are largely unfeathered and dark gray in color. The bill is black, thick at the base, and slightly decurved (USFWS 1992a).

Wood storks have been seen in South Carolina during every month of the year. However they are uncommon from December through mid-March (USFWS 1996). They typically nest in cypress/tupelo gum ponds with standing water. It is a highly colonial species usually nesting in large rookeries and feeding in flocks. The wood stork forages in a wide variety of shallow wetlands, wherever prey concentration reach high enough densities, in water that is shallow and open enough for the birds to be successful in their hunting efforts (Ogden et al. 1978, Browder 1984). Nesting wood storks generally use foraging sites that are located within 31 miles flight range of the colony (USFWS 1996).

The onsite wetlands/ditches within the project boundaries could provide minimal suitable foraging habitat for wood stork, however foraging habitat is not the limiting factor for the wood stork.

Shortnose sturgeon

The shortnose sturgeon was listed as endangered on March 11, 1967 (32 FR 4001). It is an anadromous fish that spawns in the coastal rivers along the east coast of North America from the St. John River in Canada to the St. Johns River in Florida. In South Carolina, the species is present in the Waccamaw, Pee Dee, Black (Winyah Bay system), Santee, Cooper, Ashepoo, Combahee, Edisto, and Savannah Rivers (NMFS 1998). The shortnose sturgeon prefers the

nearshore marine, estuarine and riverine habitat of large river systems (NMFS/NOAA 2012). Adults have separate summer and winter areas.

There is no suitable habitat for the shortnose sturgeon on-site.

Atlantic sturgeon

The Carolina and the South Atlantic Distinct Population Segments (DPS) of the Atlantic sturgeon were listed as endangered in February 2012 (NOAA 2012). A DPS is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species (NOAA 2012).

The Atlantic sturgeon is a long-lived, estuarine dependent, anadromous fish. Spawning adults migrate upriver in spring, beginning in February-March in the south. Adults spawn in freshwater of large rivers and migrate into estuarine and marine waters where they spend most of their lives. They spawn in moderately flowing water (46-76 cm/s) in deep parts of large rivers.

There is no suitable habitat for the Atlantic sturgeon on-site.

Canby's dropwort

Canby's dropwort was listed as endangered on February 25, 1991 (USFWS 1991). It is a perennial herb with erect, hollow stems, aromatic foliage and elongate, stoloniferous rhizomes. It has minute white flowers produced in terminal or axillary umbels; sepals may be tinged red. The fruit is a strongly-winged schizocarp. The species flowers from May through early August and fruits in early fall (USFWS 1991).

This species occurs in pond cypress savannas, shallows and edges of cypress/pond pine sloughs, and wet pine savannas. The healthiest populations seem to occur in open bays or ponds which are wet most of the year and have little or no canopy cover.

There is no suitable habitat on these properties for Canby's dropwort.

Pondberry

Pondberry was listed as endangered on July 31, 1986 (USFWS 1986). Pondberry is a dioecious, deciduous shrub with pale yellow flowers. The fruit is a bright red drupe that matures in the fall. Flowering occurs late in February to mid-March; fruiting occurs from August to early October. The leaves have a strong, sassafras-like odor when crushed. Reproduction seems to be primarily vegetative by means of stolons (USFWS 1992a).

Pondberry is found in shallow depression ponds of the sandhills, along margins of cypress ponds in the pineland coastal areas of South Carolina, and in seasonally wet, low areas among bottomland hardwoods in interior areas.

There is no suitable habitat on these properties for this pondberry.

American chaffseed

American chaffseed was listed as endangered on September 29, 1992 (USFWS 1992b). It is a perennial, erect herb in the figwort family with large, purplish-yellow tubular flowers. The fruit is a long and narrow capsule, enclosed in a loose-fitting sac-like structure that provides the basis for the common name, chaffseed (Musselman and Mann 1978 *in* USFWS 1992b). Flowering occurs from April to June (USFWS 1992a).

American chaffseed occurs in sandy acidic, seasonally moist to dry soils (USFWS 1992a). It typically occurs in fire-maintained ecosystems, such as the longleaf pine-wiregrass ecosystem of the southeastern coastal plain, open, moist pine flatwoods, and fire-maintained savannas. American chaffseed seems to require fire for persistence. One of the most serious threats to its continued existence is fire-suppression (USFWS 1992a).

Due to lack of fire management, there is no suitable habitat on these properties for American chaffseed.

Summary

Based on review of the literature, aerial photography, and on-site assessments it is our determination that the proposed project will (1) have no effect on the West Indian manatee, bald eagle, frosted flatwoods salamander, RCW, Atlantic sturgeon, short-nose sturgeon, Canby's dropwort, pondberry, and American chaffseed, and (2) may affect, but not likely to adversely affect the wood stork.

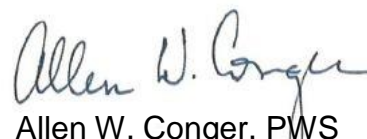
Closing

Should you have any questions or comments, please feel free to contact Brendon Kelly at 803-798-1200 or brendon.kelly@amecfw.com.

Amec Foster Wheeler Environment and Infrastructure, Inc.



Brendon P. Kelly
Staff Environmental Scientist



Allen W. Conger, PWS
Principal Scientist

Attachments: References
 Figure 1: Site Location Map
 Figure 2: Aerial Photography Map

Literature Cited

- Browder, J.S. 1984. Wood stork feeding areas in southwest Florida. *Florida Field Naturalist* 12:81-96.
- Conner, R.N. and D.C. Rudolph. 1991. Forest habitat loss, fragmentation, and red-cockaded woodpecker populations. *Wilson Bull.* 103:446-457.
- Lennartz, M.R., R.G. Hooper, and R.F. Harlow. 1987. Sociality and cooperative breeding in red-cockaded woodpeckers (*Picoides borealis*). *Behav. Ecol. Sociobiol.* 20:77-78.
- Ligon, J.D. 1970. Behavior and breeding biology of the Red-cockaded Woodpecker. *Auk* 87:255-278.
- NatureServe. 2014. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: July 2, 2014).
- NMFS. 1998. Recovery Plan for the Shortnose Sturgeon (*Acipenser brevirostrum*). Prepared by the Shortnose Sturgeon Recovery Team for the National Marine Fisheries Service, Silver Spring, Maryland. 104 pages.
- NMFS/NOAA. 2012. Shortnose Sturgeon (*Acipenser brevirostrum*). www.nmfs.noaa.gov/pr/species/fish/Shortnose_sturgeon.html. (Accessed: July 2, 2014).
- NOAA. 2012. Endangered and Threatened Wildlife and Plants; Final Listing Determinations for Two Distinct Population Segments of Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*) in the Southeast. FR Vol. 77, No. 24, February 6, 2012.
- Ogden, J.C., J.A. Kushlan, and J.T. Tilmant. 1978. The food habits and nesting success of wood storks in Everglades National Park in 1974. *Natl. Park Serv. Nat. Resour. Rep.* No. 16.
- Palis, J. 1995. Larval growth, development, and metamorphosis of *Ambystoma cingulatum* on the Gulf Coastal Plain of Florida. *Florida Scientist* 58:352-358.
- Rudolph, D.C. and R.N. Conner. 1994. Forest fragmentation and red-cockaded woodpecker population: an analysis at intermediate scale. *J. Field Ornithol.* 65(3):365-375.
- SCDNR. 2016. South Carolina Rare, Threatened, and Endangered Species Inventory, January 2006. Accessed May 2016.
- USFWS. 1967. Endangered Species List - 1967. 32 FR 4001.
- USFWS. 1986. Determination of Endangered Status for *Lindera melissifolia*. 51 FR (147): 27495-27500.
- USFWS. 1991. Endangered and Threatened Wildlife and Plants; Determination of *Oxypolis canbyi* (Canby's Dropwort) to be an Endangered Species. *Federal Register* 51 (37):6690-6693.

USFWS. 1992a. Endangered and Threatened Species of the Southeastern United States (The Red Book).

USFWS. 1992b. Endangered and Threatened Wildlife and Plants; Endangered Status for *Schwalbea americana* (American chaffseed); 57 FR 44703-44708.

USFWS. 1995. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify the Bald Eagle from Endangered to Threatened in all of the Lower 48 States. 50 FR 35999-36010.

USFWS. 1996. Revised recovery plan for the U.S. breeding population of the wood stork. U.S. Fish and Wildlife Service. Atlanta, GA. 41 pp.

USFWS. 1999a. 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. 50 FR 36453-36464.

USFWS. 1999b. Endangered and Threatened Wildlife and Plants; Final Rule to List the Flatwoods Salamander as a Threatened Species. 64 FR 15691-15704.

USFWS. 2003. Recovery plan for the red-cockaded woodpecker (*Picoides borealis*): second revision. U.S. Fish and Wildlife Service, Atlanta, GA. 296 pp.

USFWS. 2007. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States from the List of Endangered and Threatened Wildlife; Final Rule; Endangered and Threatened Wildlife and Plants; Draft post-Delisting and Monitoring Plan for the Bald Eagle (*Haliaeetus leucocephalus*) and Proposed Information Collection; Notice. FR Vol. 72, No. 130, July 9, 2007.

USFWS. 2009. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for Reticulated Flatwoods Salamander; Designation of Critical Habitat for Frosted Flatwoods Salamander and Reticulated Flatwoods Salamander; Final Rule. 74 FR 6699-6774.

USFWS. 2015. South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Berkeley County, February 10, 2015. Accessed May 2016.
http://www.fws.gov/charleston/pdf/Endangered/species_by_county/berkeley_county.pdf

USFWS. 2014. Endangered and Threatened Wildlife and Plants; Reclassification of the U.S. Breeding Population of the Wood Stork from Endangered to Threatened. Final Rule. FR. Vol. 79, No. 125, June 30, 2014.

Walters, J.R. 1991. Application of ecological principles to the management of endangered species: the case of the red-cockaded woodpecker. Ann. Rev. Ecol. Syst. 22:505-523.



Figure 2. Aerial Map

Volvo Interchange

Berkeley & Dorchester County, South Carolina

Legend

- Project Boundary
- Interstate
- Roads



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Job No. 6250160096

Drawn: BWS

Reviewed: BPK

Date: 08/08/2016

The map shown here has been created with all due and reasonable care and is strictly for use with Amec Foster Wheeler project number 6250160096. Amec Foster Wheeler assumes no liability, direct or indirect, whatsoever for any such third party or unintended use.

