

**UPDATED RED-COCKADED WOODPECKER  
AERIAL AND GROUND SURVEY REPORT  
CAPE FEAR CROSSING  
BRUNSWICK AND NEW HANOVER COUNTIES  
NORTH CAROLINA  
STIP Number U-4738**



The North Carolina Department of Transportation  
Division of Highways  
Project Development and Environmental Analysis Unit  
Natural Environment Section

November 2015

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**I. INTRODUCTION**

The North Carolina Department of Transportation (NCDOT) is proposing to construct a roadway and bridge across the Cape Fear River that will connect United States (US) Highway 17 (US 17) in Brunswick County and US Highway 421 (US 421) in New Hanover County (Figure 1). This project is identified in NCDOT's State Transportation Improvement Program (STIP) as U-4738. There are 12 Detailed Study Alternatives (DSA) being analyzed for consideration.

Ground and aerial surveys were conducted by Dr. J. H. Carter III & Associates, Inc. (JCA) to determine the presence/absence of red-cockaded woodpecker (*Picoides borealis*) (RCW) cavity trees as well as bald eagle (*Haliaeetus leucocephalus*) occurrences and/or nest sites in late winter and spring 2014.

JCA originally submitted a U-4738 protected species survey report in June 2014; however, since that time, the project alternatives have been designed to the functional level. With the functional level designs, additional areas (approximately 2,500 acres) located outside the 2014 study area required surveys (Figure 2). In April 2015, ground surveys were conducted in suitable or potentially suitable RCW habitat to determine the presence/ absence of RCWs within the modified one-half mile radius. No additional bald eagle surveys were conducted.

This report assesses project impacts on the federally endangered RCW, pursuant to Section 7 of the Endangered Species Act, as amended.

**II. PROJECT AREA DESCRIPTION**

The proposed project is located in the outer Coastal Plain of southeastern NC (Figure 1). The area has nearly level topography with narrow slopes leading into drainages. Elevations

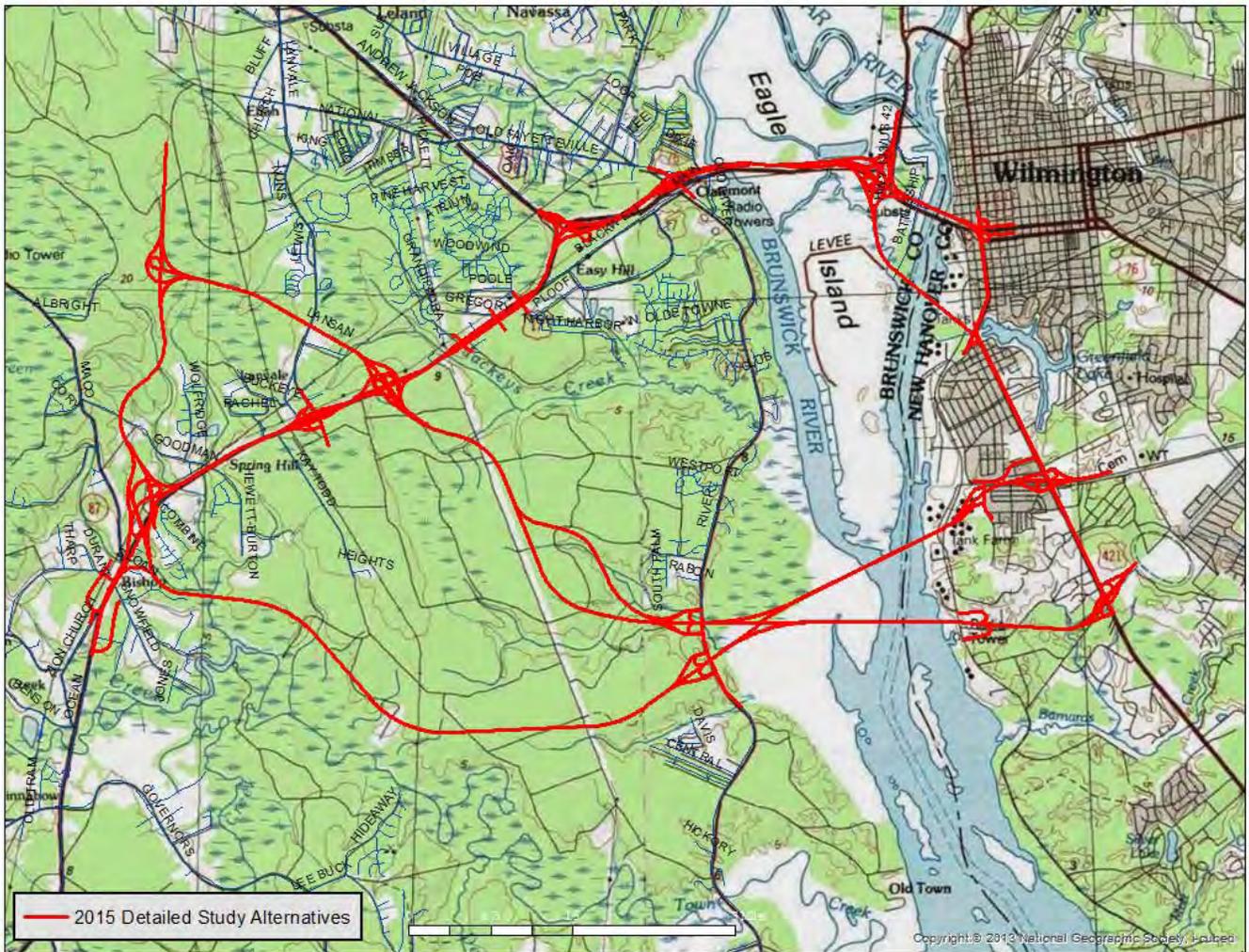


Figure 1. Location of the Detailed Study Alternatives (DSA) for the proposed Cape Fear Crossing highway project (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.

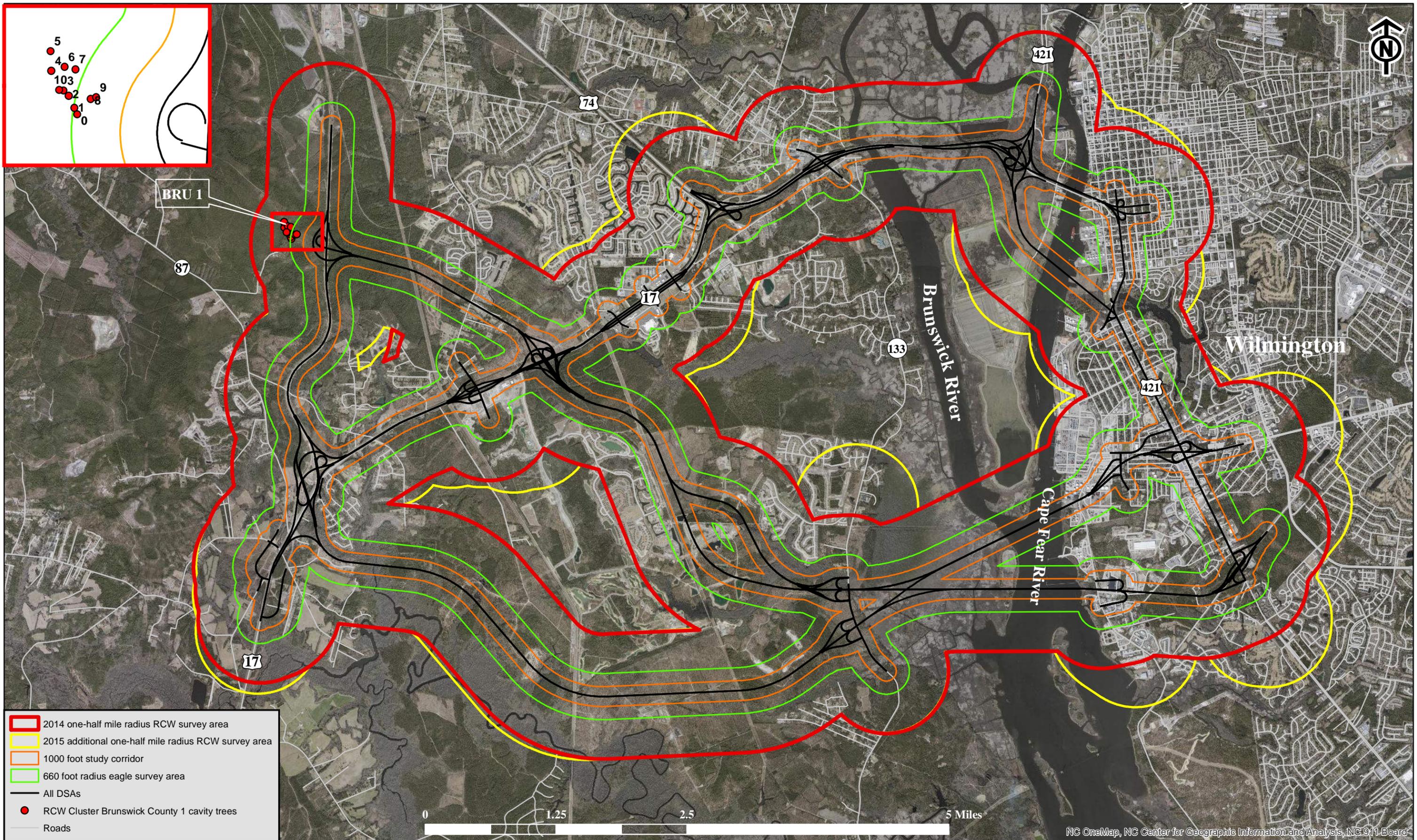


Figure 2. The Detailed Study Alternatives (DSA), the 2014 protected species survey corridors and the 2015 additional red-cockaded woodpecker (RCW) survey areas for the proposed Cape Fear Crossing project (U-4738), Brunswick and New Hanover Counties, North Carolina. Also shown is the location of RCW Cluster Brunswick County (BRU) 1.

range from 0 to 20 feet (ft.) above mean sea level. Major soil types in the project area consisted of Leon-Murville-Mandarin poorly drained fine sands, Torhunta-Croatan-Pantego poorly drained loams, Woodington-Foreston poorly-to-moderately drained loams, Baymeade-Blankton-Norfolk well drained loams and Muckalee-Dorovan-Chowan mixed type mucks in very poorly drained lower floodplains (Weaver 1977 and Barnhill 1986).

The project area is located in the Cape Fear River Basin. Major hydrological features within the survey area include Brunswick and Cape Fear Rivers, Jackey's and Town Creeks, Greenfield Lake and numerous unnamed tributaries.

Natural communities in the project area were classified according to Schafale (2012) and plant nomenclature follows Weakley (2012). Much of the project area has been converted from its historic natural state in which uplands were vegetated with longleaf pine (*Pinus palustris*) communities and pocosins and bays were vegetated with pond pine (*P. serotina*) dominated communities. Loblolly (*P. taeda*) and slash pine (*P. elliottii*) are widely present throughout the project area due to past forestry plantings and regeneration in cut-over sites and old fields. Industrial forestry, drainage and prolonged fire exclusion have altered the natural landscape in much of this portion of the county. Natural swamp, floodplain and marsh vegetative communities along the Cape Fear and Brunswick River have been substantially altered in areal extent, hydrology and species composition by development and other human activities.

Forested habitats were divided into ten vegetative community types: Xeric Sandhill Scrub (Coastal Fringe subtype), Pine-Scrub Oak Sandhill (Coastal Fringe subtype), Mesic Pine Savanna (Coastal Plain subtype), Wet Pine Flatwoods, Wet Pine Savanna, Pond Pine Woodland, High Pocosin, Coastal Plain Small Stream Swamp (Blackwater Subtype), old field and managed Natural Loblolly and Longleaf Pine Forests and pine plantations (Schafale 2012 in part). Non-foraging and unsuitable RCW habitats were also evaluated. Non-foraging and unsuitable habitats consisted of hardwood-pine drains, bays or pocosins devoid of pine trees, marsh and tidal areas next to the Brunswick and Cape Fear Rivers, clear-cuts, agricultural lands, permanently cleared areas, treeless developed areas and road and power line right-of-ways (ROWs).

Xeric Sandhill Scrub (Coastal Fringe subtype) communities had a canopy of longleaf pine and sometimes loblolly pine. These typically occurred on ridges between Carolina Bays. Understory species included live oak (*Quercus virginiana*), sand live oak (*Q. geminata*), turkey

oak (*Q. laevis*) and sand laurel oak (*Q. hemisphaerica*). Ground cover consisted mostly of Carolina wiregrass (*Aristida stricta*) and specialized psammophytes, macrolichens and bare sand.

Pine-Scrub Oak Sandhill (Coastal Fringe subtype) occurred on fine sands, with an overstory consisting of longleaf pine and a mixed scrub oak or xeric hardwood understory/midstory. The ground cover was dominated by Carolina wiregrass and a diversity of herbaceous species.

Mesic Pine Savanna (Coastal Plain subtype) typically had a canopy of longleaf pine with an understory of oaks (*Quercus* spp.), sweetgum (*Liquidambar styraciflua*) and other hardwoods. Undisturbed sites were dominated by Carolina wiregrass, or occasionally bracken fern (*Pteridium aquilinum*), and a very diverse assemblage of herbaceous plants.

Wet Pine Savanna occurred on wet flat areas subject to frequent fire. Pine savannas contained an open to sparse canopy of longleaf pine, sometimes mixed with pond pine. Shrubs such as inkberry (*Ilex glabra*), creeping blueberry (*Vaccinium crassifolium*) and dangleberry (*Gaylussacia frondosa*) were scattered throughout and the herb layer was often very dense and diverse where frequently burned.

Wet Pine Flatwoods typically had a canopy of longleaf pine, sometimes mixed with pond pine. The low shrub layer was often dominated by inkberry, sweetbay (*Magnolia virginiana*), swamp red bay (*Persea palustris*) and switch cane (*Arundinaria tecta*). Ground cover usually consisted of grasses such as Carolina wiregrass.

Pond Pine Woodland had a canopy dominated by pond pine, along with loblolly bay (*Gordonia lasianthus*), sweetbay, red maple (*Acer rubrum*) and occasionally patches of Atlantic white cedar (*Chamaecyparis thyoides*). The dense shrub layer included titi (*Cyrilla racemiflora*), fetterbush (*Lyonia lucida*), sweet gallberry (*Ilex coriacea*), inkberry, swamp red bay and switch cane.

High Pocosins occurred on poorly drained peat deposits and wet sands. They generally had a canopy of pond pine with a dense shrub understory.

Coastal Plain Small Stream Swamp communities occurred along small to medium-sized streams and were predominantly forested with bald cypress (*Taxodium distichum*), swamp blackgum (*Nyssa biflora*), sweetgum, tulip poplar (*Liriodendron tulipifera*), red maple and swamp laurel oak (*Quercus laurifolia*). Understory species included American hornbeam (*Carpinus caroliniana*) and American holly (*Ilex opaca*).

Several Carolina Bays occurred in the project area. Carolina Bays are elliptic wetland depressions from one to several hundred acres in size and were originally vegetated with various hydrophytic communities including pocosin, Wet Pine Flatwoods and Pond Pine Woodland. Most have been drained and converted to other land uses. These vegetative communities occurred on Murville mucky fine sand, Torhunta mucky fine sandy loam and Muckalee loam.

Other communities in the project area most closely matched Cypress-Gum Swamp and Tidal Freshwater Marsh. These communities did not contain a significant pine component and would not be expected to be used for foraging by RCWs. However, they do contain sufficient hardwoods and dead pines to serve as travel or dispersal corridors.

Managed natural loblolly and longleaf forest types occur on mineral soils on sites that have had prior anthropogenic disturbance, primarily farming. The dominant overstory species are loblolly pine and/or longleaf pine, sometimes mixed with hardwoods such as sweetgum, water oak (*Quercus nigra*), other oaks and red maple. The understory/midstory is often tall and dense and consists of hardwood saplings, pine regeneration and vines. Herbaceous groundcover is often sparse unless burned frequently.

Pine Plantation consists of planted pines on various soil types, including wet or drained mineral soils. The overstory is typically all loblolly or slash pine and a dense midstory develops quickly. Sweetgum is often the dominant midstory species, but other mesic hardwoods and tall shrubs also occur. Herbaceous groundcover is often sparse unless burned frequently.

Military Ocean Terminal Sunny Point, located approximately ten miles south of the survey area, is listed as a Significant RCW Support Population for the Mid-Atlantic Coastal Plain Recovery Unit (United States Fish and Wildlife Service (USFWS) 2003).

### **III. SURVEY AREA DESCRIPTION**

Sturgeon Creek lies to the north of the survey area, the Town of Leland and agricultural fields are to the west, Town Creek and its tributaries to the south and the City of Wilmington is to the east. The western two-thirds of the survey area lie in Brunswick County, west of the Cape Fear River and Wilmington (Figure 2). This area has numerous residential and commercial developments surrounded by large areas of land that have been converted to pine plantations, some of which are in the process of being cleared for development. The eastern third of the survey area lies in New Hanover County, which consisted mostly of residential, commercial,

industrial and port developments in Wilmington, along with several undeveloped areas heavily impacted by logging, prolonged fire exclusion and agricultural regimes. Eagle Island, a dredge dispersal island, is located in the Cape Fear River within the survey area. The survey area is currently crossed by US 17 and US 74/76 which spans the Cape Fear River via the Cape Fear Memorial Bridge.

#### **IV. PROJECT DESCRIPTION**

The NCDOT proposes to construct a project known as the Cape Fear Crossing, which would be a fully controlled access facility extending from the vicinity of US 17 Bypass and Interstate (I)-140 in Brunswick County to US 421 in New Hanover County, including a crossing of the Cape Fear River.

According to the *Feasibility Study for the Wilmington Southern Bridge from US 17 Bypass near Bishop to US 421* (NCDOT 2003), the project would serve multiple users, including the Port of Wilmington, the military, commuters and tourists. The purpose of the proposed action is to improve traffic flow and enhance freight movements beginning in the vicinity of US 17 and I-140 in Brunswick County across the Cape Fear River to US 421 near the Port of Wilmington in southern New Hanover County.

The 12 DSA corridors being considered include those with a freeway design and those with standard widening components. Figure 3 depicts all 12 alternatives. Descriptions are as follows:

**Alternative B (freeway design):** Begins with an interchange at future I-140, runs 2.4 miles southeast to an interchange at US 17, continues southeast 3.9 miles to an interchange at NC 133, then runs northeast for 3.5 miles across the Cape Fear River and terminates at Shipyard Boulevard and US 421.

**Alternative C (freeway design):** Begins with an interchange at future I-140, runs 2.4 miles southeast to an interchange at US 17, continues southeast 4.0 miles to an interchange at NC 133, then runs east for 2.6 miles across the Cape Fear River to an interchange at River Road and ends in 1.2 miles at an interchange at US 421 and Independence Boulevard. This alternative will also include upgrading US 421 to Shipyard Boulevard.

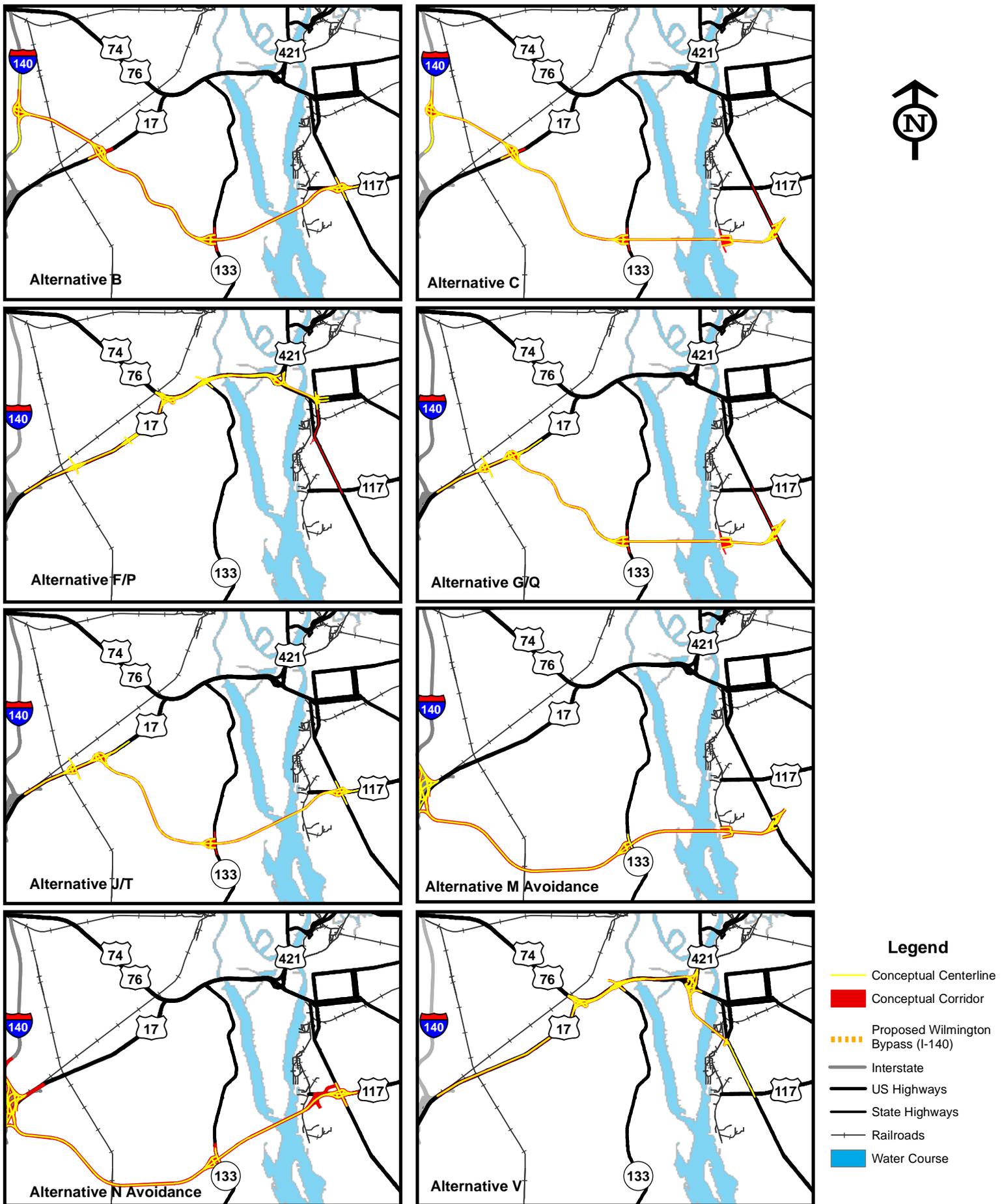


Figure 3. Detailed Study Alternatives B, C, F, G, J, M Avoidance, N Avoidance, P, Q, T, and V for the proposed Cape Fear Crossing (U-4738) project, near Wilmington, Brunswick and New Hanover Counties, North Carolina. Alternatives F, G, J, and V have both freeway and standard widening designs.

**Alternative F (freeway design):** Upgrades existing US 17 to a freeway facility with a new bridge over the Cape Fear River.

**Alternative G (freeway design):** Upgrades existing US 17 for 2.5 miles running northeast to a new interchange with US 17, then continues on new location southeast for 3.9 miles to an interchange at NC 133, then runs east for 3.8 miles crossing the Cape Fear River to terminate at Independence Boulevard and US 421. This alternative will also include upgrading US 421 to Shipyard Boulevard.

**Alternative J (freeway design):** Upgrades existing US 17 for 2.5 miles running northeast to a new interchange with US 17, then runs southeast on new location for 4.0 miles to an interchange at NC 133, then runs northeast for 3.5 miles across the Cape Fear River and terminates at Shipyard Boulevard and US 421.

**Alternative M Avoidance (freeway design):** Begins at the interchange of I-140 and US 17, runs southeast on new location for 6.3 miles to an interchange with NC 133, continues east for 2.6 miles across the Cape Fear River to an interchange at River Road and ends in another 1.2 miles at US 421 and Independence Boulevard. This alternative will also include upgrading US 421 to Shipyard Boulevard.

**Alternative N Avoidance (freeway design):** Begins at the interchange of I-140 and US 17, runs southeast on new location for 6.3 miles to an interchange with NC 133, then runs northeast for 3.6 miles across the Cape Fear River and terminates at Shipyard Boulevard and US 421.

**Alternative P (standard widening):** Same alignment as Alternative F, but includes a standard widening design instead of upgrading to a freeway facility.

**Alternative Q (standard widening):** Same alignment as Alternative G, but includes a standard widening design instead of upgrading to a freeway facility.

**Alternative T (standard widening):** Same alignment as Alternative J, but includes a standard widening design instead of upgrading to a freeway facility.

**Alternative V Freeway (freeway design):** Upgrades US 17 until the US 17/US 421 interchange, then travels south along Eagle Island to terminate at US 421 just north of Port of Wilmington. This alternative will also include upgrading US 421 to Shipyard Boulevard.

**Alternative V Widening:** Same alignment as Alternative V Freeway, but includes a standard widening design instead of upgrading to a freeway facility. This alternative will also include upgrading US 421 to Shipyard Boulevard.

## V. METHODOLOGY

### **BALD EAGLE AND RCW SURVEYS:**

A variety of resources were utilized in preparation for aerial and field surveys, including aerial photographs, topographic maps, soil surveys (Weaver 1977 and Barnhill 1986) and historical RCW cavity tree data and other data from previous surveys by JCA. Digital photographs were taken of previously undocumented RCW cavity trees that were found.

In March 2014, JCA biologists conducted helicopter (Robinson R-44) and ground surveys of the 1,000 ft. DSA corridors and adjacent areas for bald eagle nests and RCW cavity trees (Figure 2). Biologists surveyed 0.5 mile radius and 660 ft. radius around the 1,000 ft. DSA corridors for RCWs and bald eagles (USFWS 2007a), respectively. To ensure 100 percent visual coverage, transects were flown in a grid system (northeast/southwest and northwest/southeast), and spaced 100 to 300 ft. apart depending on stand density. A Trimble GeoXT 2010 series GPS unit was used to track flight lines and RCW cavity tree coordinates were obtained during the aerial survey and plotted on aerial photographs. All known RCW cavity trees were visited on the ground and the activity status of each cavity was updated.

Potential RCW nesting habitat was defined as pine or pine-hardwood stands >60 years of age (USFWS 2003). Commercial and residential areas were checked by vehicle and large forested tracts with potentially suitable habitat were surveyed on foot using parallel transects. Surveys were conducted and transects spaced so that all suitable habitat was viewed at least once.

Habitats not suitable for RCWs were ground checked in order to obtain accurate descriptions and classifications of natural communities within the survey area.

Functional level designs for the project alternatives were available in January 2015. The new project designs modified the one-half mile radius RCW survey area and approximately 2,500 acres of additional area was identified within the survey area. Of that acreage, 525 acres contained suitable or potentially suitable RCW habitat and required RCW surveys. On 6 - 8 April 2015, using

applicable methodology described above, JCA biologist conducted RCW ground surveys in order to determine the presence/ absence of RCWs. No additional bald eagle surveys were conducted.

## **VI. RESULTS AND DISCUSSION**

### **A. RED-COCKADED WOODPECKER**

The RCW is a small, non-migratory woodpecker endemic to mature, fire-maintained pine forests in the southeastern United States, where it was historically common. RCWs measure seven to eight and one half inches long, have a black crown and nape, prominent white cheeks and a black-and-white, horizontally barred back. Adult males have red markings (cockades) above the ear, but the cockades may be difficult to see (USFWS 2003).

Prime nesting habitat includes open, mature southern pine forests dominated by longleaf, loblolly, pond, slash or other southern pine species greater than 60 years of age with little or no mid- or understory development. Pine flatwoods and pine-dominated savannas, which have been maintained by frequent natural fires, serve as ideal nesting and foraging habitat for RCWs. Foraging habitat is comprised of open pine or pine/mixed hardwood stands 30 years of age or older (USFWS 2003).

Nest/roost cavities are excavated into the heartwood of living pine trees that are aged at least 60-80 years (USFWS 2003). These pine trees often have been infected with red-heart fungus (*Phellinus pini*). The RCW excavates resin wells into the cambium around the cavity entrance, resulting in a shiny, resinous buildup around the cavity. An aggregate of cavity trees is called a cluster and may include one to 20+ cavity trees. A cluster is occupied by a group of RCWs typically consisting of a breeding male and female and often one or more helpers, usually male offspring from previous years.

### **B. RCW CLUSTER STATUS**

Active RCW Brunswick (BRU) Cluster 1 was documented within 0.5 mile of the Wilmington Bypass project corridor (R-2633) in the winter of 1992-93 during a survey conducted by JCA for NCDOT (JCA 1992) (Figure 2). When the area was resurveyed by JCA biologists in 2003, the RCW cluster was still active and an after hatching-year male was captured and banded (JCA 2003). A foraging habitat analysis (FHA) was conducted in 1997 and again in 2003 due to time lapse. The midstory from the 2003 FHA was updated in 2009 and USFWS

concluded that the project would have “no effect” on the RCW (G. Jordan, pers. comm., 13 July 2009). In 2014, the cluster was active with a solitary unbanded RCW and contained 11 cavity trees in various stages of completion and suitability (Figure 2 and Table 1). 5 trees contained relic cavities and/or starts (#s 0 - 2 and 5 - 6), 4 had inactive cavities and/or starts (#s 4 and 7, 8 and 10) and 2 (#3 and 9) had active cavities. One new inactive cavity tree was found during the 2014 survey (#10). All cavity trees are >350 ft. from the outermost western edge of the proposed interchange for DSA B and C. Active cavity tree (#9) is located approximately 900 ft. from the outermost western edge of the proposed interchange for DSA B and C. An RCW FHA will be required if DSA B or C is chosen as the Preferred Alternative/ Least Environmentally Damaging Proposed Alternative (LEDPA).

### **C. SUITABLE RCW HABITAT BY BLOCK**

A majority of the proposed project area has been negatively impacted by timber harvesting, fire suppression and residential, commercial and industrial development resulting in very little suitable RCW habitat. The majority of suitable habitat occurred in the northwestern section of the survey area in open stands of mature longleaf pine (Figure 4). However, no RCW cavity trees outside of BRU Cluster 1 were found during the aerial and/ or ground surveys.

For ease of discussion, the survey area was divided into four blocks instead of using project alternatives for descriptions of habitat findings (Figure 4).

#### **Block A: Northwestern section of survey area along I-140 and north of US-17 (Figure 4 and Appendix 1 (Photos 1-4 and 17))**

The majority of this section is managed for timber and contains pine stands of varying ages and RCW habitat suitability with a mostly tall, dense midstory. BRU Cluster 1 contains the most suitable habitat within this block and is located on a sand ridge with moderately dense >75 year old longleaf pine and a sparse-to-moderately dense, low midstory. Some areas within this section contained 20-30 year old loblolly and slash pine with longleaf present on ridges. Pocosin and remnant Carolina bays contained sparse pond pine with a dense, moderate-to-tall midstory that is typically unsuitable for RCWs. Construction is complete for the Wilmington Bypass (R-2633A) from US 17 to US 74/76 (R. Beauregard, pers. comm.).

Table 1. 2014 status of red-cockaded woodpecker (*Picoides borealis*) cavity trees associated with BRU Cluster 1, located within the survey area for the proposed Cape Fear Crossing highway project (U-4738), Brunswick and New Hanover Counties, North Carolina.

Cluster	Cavity Tree Number	Cavity Stage	Cavity Activity	GPS Location*	
				Easting	Northing
BRU 1	0	Healing over start	Relic	694134	52775
	1	Healing over start, enlarged	Relic	694122	52802
	2	Healing over advanced start	Relic	694098	52851
	3	Completed cavity	Active	694076	52872
	4	Completed cavity; snapped	Inactive	694024	52953
	5	Healing over cavity	Relic	694021	53033
	6	Healing over cavity	Relic	694080	52970
	7	Completed cavity	Inactive	694124	52960
	8	Completed cavity, enlarged	Inactive	694188	52840
	9	Completed cavity	Active	694210	52847
	10	Start	Inactive	694058	52875

\* Location is in NAD 1983 State Plane meter

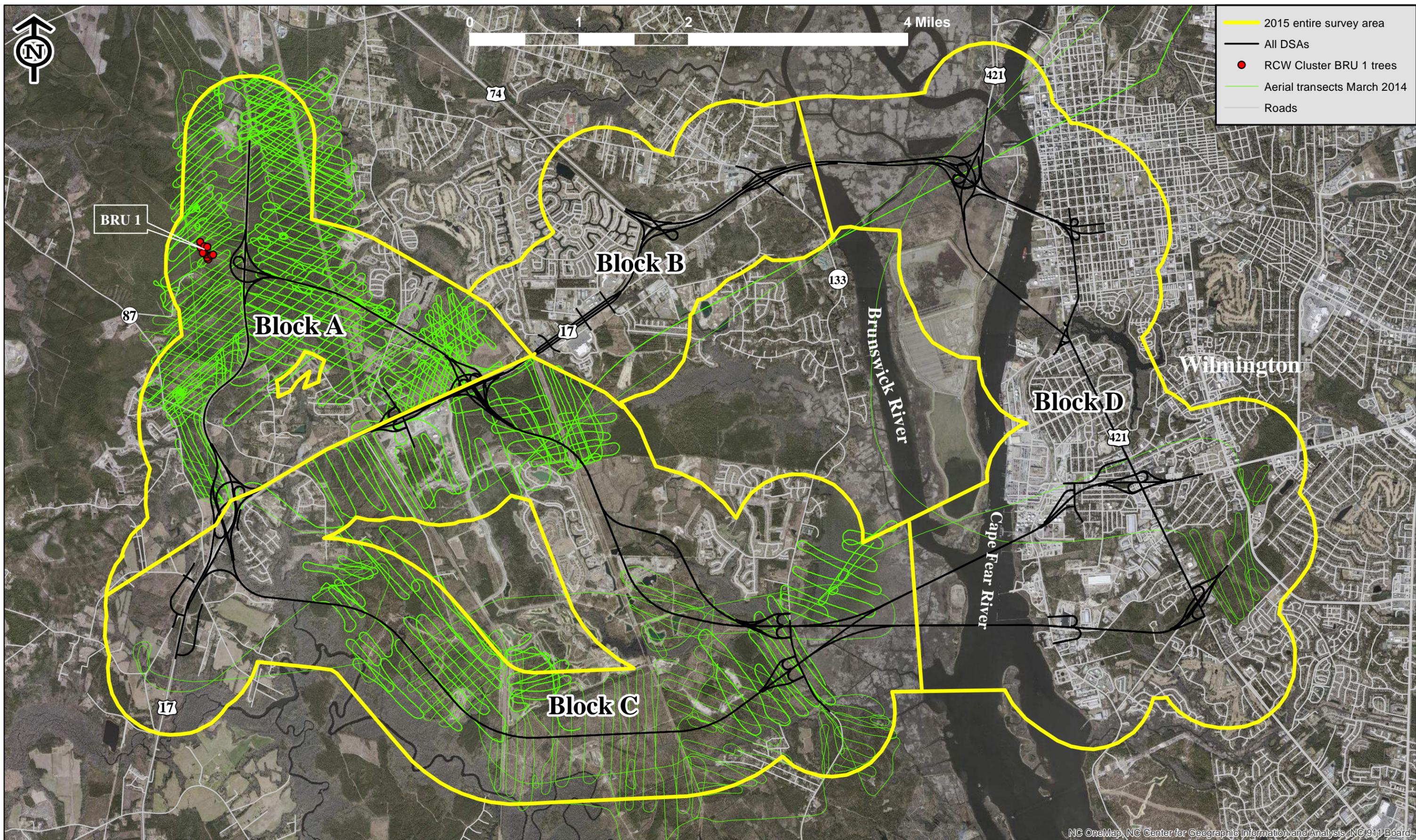


Figure 4. Survey corridors, aerial transects, Detailed Study Alternatives (DSA) and division of habitat blocks for the proposed Cape Fear Crossing project (U-4738), Brunswick and New Hanover Counties, North Carolina.

The area east of the Wilmington Bypass (R-2633A) and west of the Leland railroad exchange contained dense >60 year old longleaf and loblolly pines with a mostly tall, dense midstory.

There were no additional areas surveyed in this section in 2015.

**Block B: West of the Brunswick River along US 17 (Figure 4 and Appendix 1 (Photos 5-8))**

This section was almost entirely comprised of residential and commercial developments along US 17, US 74/76 and NC 133, and contained mostly unsuitable RCW foraging or nesting habitat. Neighborhoods contained sparse to moderately dense longleaf, loblolly or pond pines with a tall, dense midstory. A few stands of uneven-aged (<60 years old) dense mixed pines in the southeastern corner of this block were undeveloped and had a tall, dense midstory.

In 2015, an additional 335 acres in this section were examined for RCWs. The habitat was similar to that described above and no RCW cavity trees were found.

**Block C: Southwestern section of survey area south of US-17 and west of the Cape Fear River (Figure 4 and Appendix 1 (Photos 9-12))**

This section is under rapid development, with stands of suitable RCW foraging and nesting habitat being harvested for timber and the building of new housing developments. The majority of areas along Town Creek contained sparse-to-moderately dense slash and loblolly pine plantations approximately 40-50 years old with a low, dense midstory, that were suitable habitat for foraging RCWs. A section west of the Cape Fear River contained habitat that was dense hardwood mixed with >75 year old moderately dense loblolly pine with a tall, dense midstory. Portions of this property were suitable for RCW foraging habitat, however, these areas were not ideal nesting habitat.

In 2015, an additional 646 acres in this section were examined for RCWs. The habitat was similar to that described above and no RCW cavity trees were found.

**Block D: East of the Brunswick and Cape Fear Rivers, encompassing a portion of downtown Wilmington (Figure 4 and Appendix 1 (Photos 13-16))**

This section consisted almost entirely of residential, commercial and industrial developments associated with downtown and the Port of Wilmington and contained little suitable

RCW foraging or nesting habitat. Most neighborhoods were comprised of sparse to moderately dense longleaf, loblolly or pond pines with an unsuitable tall, dense midstory. Areas next to Greenfield Lake contained suitable moderately dense >60 year old longleaf and loblolly pines with sparse or no midstory. A section of habitat (~320 acres) off US 421 and Independence Boulevard contained a sandy ridge with >75 year old, moderately dense, longleaf pine next to a remnant Carolina bay that had burned in 2014. During the 2015 survey, this area was under construction due to the River Lights residential development and included relocation of River Road between Independence Boulevard and Saunders Road (pers. com Susan Westberry). A few undeveloped areas east of the riverfront contained a scattering of old longleaf pine flattops amidst dense 30-50 year old pines with a tall, dense midstory.

In 2015, an additional 1,272 acres in this section were examined for RCWs. In general, the habitat was similar to that described above, however, there was a stand of <95 year old loblolly pines with a dense understory (approximately 74 acres in size) that was surveyed for RCWs. No RCW cavity trees were found during the survey.

**Biological Determination Indeterminate at this time. If DSA B or C is chosen as the Preferred Alternative/LEDPA, an FHA will need to be conducted. All other DSAs will have no effect on the RCW.**

#### **D. BALD EAGLE**

The bald eagle is a large, North American fish-eagle in the hawk family (Accipitridae). It can range from 27-35 inches in length and averages ten to 12 pounds, with a wingspan that can reach nearly seven ft. Both males and females have dark brown plumage with a pure white head and tail and a large yellow bill. Juveniles are dark brown with white mottles until adult plumage is obtained at age five or six (Buehler 2000).

The bald eagle is found throughout the lower 48 states, Alaska and Canada. It typically inhabits mature conifer forests close to clean bodies of water populated with fish, most often rivers, estuaries, coastlines or large lakes. It feeds primarily on fish, when available, but may also eat other birds and mammals, including carrion. Bald eagles usually nest in the tops of tall conifers located near water. The breeding season varies throughout their range, but generally begins in winter in the Southeast (Buehler 2000).

The bald eagle was removed from the federal list of threatened and endangered wildlife on 8 August 2007 (USFWS 2007b). After de-listing, the Bald and Golden Eagle Protection Act (BGPA) became the primary law protecting bald eagles. The BGPA prohibits the “taking” of bald and golden eagles and provides a definition of “take” that includes disturbance.

Under the National Bald Eagle Management Guidelines (USFWS 2007a), road construction within 660 ft. of a nest during the breeding season should be avoided. No eagles or eagle nests were seen during the aerial survey. There are records of three active bald eagle nests in Brunswick County (two nests along the Cape Fear River approximately seven and 20 miles south of DSA M Avoidance and N Avoidance, and one 11 miles southwest of DSA M) and two active bald eagle nests in New Hanover County (one along the Cape Fear River approximately one mile north of DSA F, P and V and one approximately four miles to the east of DSA F, P and V) (NC Department of Environment and Natural Resources, Natural Heritage Program Data 2014). No bald eagles or bald eagle nests were observed. Therefore, the proposed project will not affect the bald eagle.

## VII. SUMMARY

No RCW cavity trees will be removed or impacted by the proposed project. One active cavity tree (#9) within the BRU Cluster 1 foraging partition is 900 ft. from the outermost western edge of the proposed interchange for DSA B and C. If DSAs B or C is chosen as the Preferred Alternative/LEDPA an FHA will need to be conducted for BRU 1 in order to determine whether there will be an adverse affect on the RCW.

No bald eagles or nests were detected within the 660 ft. radius survey corridor during ground and aerial surveys; therefore, **the project would have no effect on the bald eagle.**

## VIII. LITERATURE CITED

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# **APPENDIX 1**

## **Habitat Photos**



Photo 1. Loblolly pine stand within Block A near BRU Cluster 1, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 2. Loblolly pine stand within Block A near BRU Cluster 1, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 3. Loblolly pine stand within Block A, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 4. Loblolly pine stand within Block A, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 5. Twenty year old loblolly pine plantation within Block B, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 6. Mixed pine and hardwood habitat within Block B, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 7. Loblolly pine stand within Block B, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 8. Loblolly pine stand behind a shopping development within Block B, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 9. Pine-hardwood habitat within Block C, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 10. Sparse pine habitat within Block C, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 11. Longleaf pine habitat being harvested within Block C, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 12. Sparse slash pine plantation within Block C, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 13. Forested residential area within Block D for the proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 14. Fire-excluded Xeric Sandhill Scrub within Block D, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 15. Mesic pine savanna being harvested within Block D, proposed Cape Fear Crossing (U- 4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 16. Mature loblolly pine stand next to Greenfield Lake within Block D, proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.



Photo 17. Longleaf pine habitat located within red-cockaded woodpecker Cluster BRU 1 within Block A of the proposed Cape Fear Crossing (U-4738), near Wilmington, Brunswick and New Hanover Counties, North Carolina.