NATURAL RESOURCES TECHNICAL REPORT

Replace Bridge 640013 (Cape Fear Memorial Bridge) on US 421 over the Cape Fear River
New Hanover and Brunswick Counties, North Carolina

STIP HB-0039
WBS Element No. 50603.1.1

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Division 3

October 2023

1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) proposes to replace bridge number 640013 (Cape Fear Memorial Bridge) on US 421 over the Cape Fear (STIP HB-0039) in New Hanover and Brunswick Counties (Figures 1 and 2). The following Natural Resources Technical Report (NRTR) has been prepared to assist in the preparation of the appropriate environmental documentation.

2.0 METHODOLOGY

All work was conducted in accordance with the NCDOT Environmental Coordination and Permitting's Preparing Natural Resources Technical Reports Procedure and the latest NRTR Template September 2021. Field work was conducted on September 6, 2023. Water resources identified in the study area were verified by the U.S. Army Corps of Engineers (USACE) and the North Carolina Division of Water Resources (NCDWR) previously for TIP U-4738. The principal personnel contributing to the field work and document is provided in the appendix.

3.0 TERRESTRIAL COMMUNITIES

Four terrestrial communities were identified in the study area. Figure 4 shows the location and extent of these terrestrial communities. Terrestrial community data are presented in the context of total coverage of each type within the study area (Table 1).

Table 1. Coverage of terrestrial communities in the study area

Community	Dominant Species (scientific name)	Coverage (ac.)
Maintained/Disturbed	Red maple (*Acer rubrum*) Wax myrtle (*Morella cerifera*) Dog fennel (*Eupatorium capillifolium*)	144.5
Estuarine Woody Wetland	Loblolly pine (*Pinus taeda*) Willow oak (*Quercus phallos*) Wax myrtle (*Morella cerifera*)	66.0
Mesic Pine Flatwood	Loblolly pine (*Pinus taeda*) Sweetgum (*Liquidambar styraciflua*) Red maple (*Acer rubrum*)	19.1
Salt/Brackish Marsh	Black needle rush (*Juncus gerardii*) Smooth cordgrass (*Spartina alterniflora*) Common reed (*Phragmites australis*)	15.5
	Total	**245.1**

4.0 PROTECTED SPECIES

4.1 Endangered Species Act Protected Species

The United States Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS) list the following federally protected species within the study area, under the Endangered Species Act (ESA) (Table 2). For each species, a discussion of the presence or absence of habitat is included below.

Table 2. ESA federally protected species within the Study Area[1]

Scientific Name	Common Name	Federal Status	Jurisdiction	Habitat Present	Biological Conclusion
Myotis septentrionalis	Northern long-eared bat	E	USFWS	Yes	MA-LAA
Perimytois subflavus	Tricolored bat	PE	USFWS	TBD	Unresolved
Trichechus manatus	West Indian manatee	T	USFWS	Yes	MA-NLAA
Charadrius melodus	Piping plover	T	USFWS	No	NE
Calidris canutus rufa	Red knot	T	USFWS	No	NE
Picoides borealis	Red-cockaded woodpecker	E	USFWS	Yes	MA-NLAA
Alligator mississippiensis	American alligator	T(S/A)	USFWS	Yes	NR
Chelonia mydas	Green sea turtle	T	USFWS/NMFS	No	NE
Lepidochelys kempii	Kemp's Ridley sea turtle	E	USFWS/NMFS	No	NE
Dermochelys coriacea	Leatherback sea turtle	E	USFWS/NMFS	No	NE
Caretta caretta	Loggerhead sea turtle	T	USFWS/NMFS	No	NE
Acipenser brevirostrum	Shortnose sturgeon	E	NMFS	Yes	Unresolved
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon	E	NMFS	Yes	Unresolved
Planorbella magnifica	Magnificent ramshorn	E	USFWS	No	NE
Thalictrum cooleyi	Cooley's meadowrue	E	USFWS	Yes	NE
Lysimachia asperulaefolia	Rough-leaved loosestrife	E	USFWS	Yes	NE

[1] IPaC data checked on October 31, 2023
E – Endangered
PE – Proposed Endangered
T – Threatened
T(S/A) – Threatened due to Similarity of Appearance

MA-LAA – May Affect – Likely to Adversely Affect
MA-NLAA – May Affect – Not Likely to Adversely Affect
NE – No Effect
NR – Not Required

Northern Long-eared Bat
USFWS optimal survey window: April 15 – September 15

The US Fish and Wildlife Service has issued a programmatic biological opinion (PBO) in conjunction with the Federal Highway Administration (FHWA), the US Army Corps of Engineers (USACE), and NCDOT for the northern long-eared bat (NLEB) (*Myotis septentrionalis*) in eastern North Carolina. The PBO covers the entire NCDOT program in Divisions 1-8, including all NCDOT projects and activities. Although this programmatic covers Divisions 1-8, The USFWS only considers NLEBs to be known or potentially found in 30 counties within Divisions 1-8. NCDOT, FHWA, and USACE have agreed to two conservation measures which will avoid/minimize mortality of NLEBs. These conservation measures only apply to the 30 current known/potential counties shown on Figure 2 of the PBO at this time. The programmatic determination for NLEB for the NCDOT program is May Affect, Likely to Adversely Affect. The PBO will ensure compliance with Section 7 of the Endangered Species Act for ten years (effective through December 31, 2030) for all NCDOT projects with a federal nexus in Divisions 1-8, which includes New Hanover and Brunswick Counties, where this project is located.

Tricolored Bat
USFWS optimal survey window: Year-round

On September 13, 2022, the U.S. Fish and Wildlife Service announced a proposal to list the tricolored bat (*Perimyotis subflavus* - PESU) as endangered under the Endangered Species Act. Given the proposal to list PESU as Federally Endangered, NCDOT is initiating a conference programmatic consultation to address impacts to this species. USFWS has not provided an official effective listing date, but it is anticipated to occur in the second half of 2023. Construction activities for this project will not take place until Endangered Species Act compliance is satisfied for PESU once listed. Upon listing, USFWS is expected to provide habitat descriptions and an area of influence/distribution range for PESU. When this information is provided, NCDOT will be able to make informed determinations on habitat that could be impacted by NCDOT actions.

West Indian Manatee
USFWS optimal survey window: Year-round

Biological Conclusion: No Effect

West Indian manatees are found in canals, sluggish rivers, estuarine habitats, and saltwater bays. They utilize freshwater and marine habitats, mainly feeding on aquatic vegetation. The Cape Fear River is located in the study area, therefore, habitat for the West Indian manatee is present. A review of NCNHP records on

September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Piping Plover
USFWS optimal survey window: Year-round

Biological Conclusion: No Effect

The piping plover is found in sand and/or mud flats with no or very sparse emergent vegetation. Habitat was not found within the study area. A review of NCNHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Red Knot
USFWS optimal survey window: Year-round

Biological Conclusion: No Effect

The red knot is commonly found along sandy, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks. Ephemeral features such as sand spits, islets, shoals, and sandbars, often associated with inlets can be important habitat for roosting. No habitat is found within the study area. A review of NCNHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Red-cockaded Woodpecker
USFWS optimal survey window: November – early March

Biological Conclusion: May Affect – Not Likely to Adversely Affect

Suitable habitat for red-cockaded woodpecker is found in some areas of the study area. A survey conducted by J. H. Carter and Associated in 2014 found one cluster of red-cockaded woodpecker within one mile of the study are. No cavity trees were observed during the site visit on September 6, 2023.

American Alligator
USFWS optimal survey window: Year-round (only warm days in winter)

Biological Conclusion: No Effect

The American alligator is found in rivers, streams, canals, lakes, swamps, and coastal marshes. The American alligator remains on the protected species list due to its similarity in appearance to the Endangered American crocodile. Habitat for American alligator was not found within the study area. A review of NCNHP records on September 11, 2023, indicates extant occurrence of the species within 1.0 mile of the study area, observed in 2018.

Green Sea Turtle
USFWS optimal survey window: April – August for beach surveys

Biological Conclusion: No Effect

Green sea turtles can be found in shallow waters. They are attracted to lagoons, reefs, bays, mangrove swamps and inlets where an abundance of marine grasses can be found. Habitat was not found within the study area. A review of NCNHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Kemp's Ridley Sea Turtle
USFWS optimal survey window: April – August for beach surveys

Biological Conclusion: No Effect

The Kemp's Ridley sea turtle prefers beach sections that are backed up by extensive swamps or large bodies of open water having seasonal narrow ocean connections and a well-defined elevated dune area. Habitat was not found within the study area. A review of NCNHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Leatherback Sea Turtle
USFWS optimal survey window: April – August for beach surveys

Biological Conclusion: No Effect

Leatherback sea turtles inhabit tropical waters, nesting on sandy beaches backed with vegetation in the proximity of deep water. Beaches with a relatively steep slope are usually preferred. Habitat was not found within the study area. The species was not identified in the study area. A review of NHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Loggerhead Sea Turtle
USFWS optimal survey window: April – August for beach surveys

Biological Conclusion: No Effect

The loggerhead sea turtle nests on isolated beaches characterized by fine-grained sediments. In near shore areas, loggerheads have been observed in bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. No known habitat is found within the study area. A review of NCNHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Magnificent Ramshorn
USFWS optimal survey window: April - May

Biological Conclusion: No Effect

The magnificent ramshorn is found in still or slow-flowing aquatic habitats, and lays eggs on spatterdock and lily pads. The species prefers freshwater bodies with pH within the range of 6.8–7.5. Habitat was not found within the study area. A review of NHP records on September 11, 2023, indicates occurrence of the species within 1.0 mile of the study area in 1908; it has since been defined as extirpated. The project area is located within designated critical habitat.

Cooley's Meadowrue
USFWS optimal survey window: mid-June-early July

Biological Conclusion: No Effect

Cooley's meadowrue occurs in circumneutral soils in sunny, moist to wet grass-sedge bogs, wet-pine savannas over calcareous clays, and savannah-like areas. This species is also found along plowed firebreaks, roadside ditches and rights-of-way, forest clearings dominated by grass or sedge, and power line or utility rights-of-way. Habitat for Cooley's meadowrue exists within the study area along roadside ditches and rights-of-way. A review of NHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

Rough-leaved Loosestrife
USFWS optimal survey window: mid-May – June

Biological Conclusion: No Effect

Habitat for rough-leaved loosestrife was found in the study area in the form of e roadside depressions, maintained utility line and rights-of-way. Rough-laved loosestrife was not found in the study area. A review of NHP records on September 11, 2023, indicates no known occurrences of the species within 1.0 mile of the study area.

4.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act is enforced by the USFWS. Golden eagles do not nest in North Carolina. Habitat for the bald eagle primarily consists of mature forests in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

A desktop-GIS assessment of the project study area, as well as the area within a 1.0-mile radius of the project limits, was performed on September 5, 2023, using 2023 color aerials. Water bodies large enough or sufficiently open to be considered potential feeding sources were identified. Since there was foraging habitat within the review area, a survey of the project study area and the area within 660 feet of the project limits was conducted.

Additionally, a review of the NCNHP database on September 11, 2023, revealed no known occurrences of this species within 1.0 mile of the project study area. It has been determined that this project will not affect this species.

4.3 Essential Fish Habitat

The NMFS has identified Cape Fear River as an Essential Fish Habitat. Table 3 lists the fish species that may occur in the study area that are managed by NMFS, including the life stages which are reported to occur.

Table 3. Managed fish species reported to occur in the study area

Species	Life Stage
Summer flounder	Larva, Juvenile, Adult
Bluefish	Juvenile, Adult
Atlantic butterfish	Adult

The bridge replacement could include footings to be placed within designated EFH.

5.0 WATER RESOURCES

Water resources in the study area are part of the Cape Fear River basin [U.S. Geological Survey (USGS) Hydrologic Unit Code 03030005. One stream was identified in the study area (Table 4). The location of this stream is shown on Figure 3.

Table 4. Streams in the study area

Stream Name	Map ID	NCDWR Index Number	Best Usage Classification	Bank Height (ft)	Bankfull width (ft)	Depth (in)
Cape Fear River	Cape Fear River	18-(71)	SC	12	850-1100	20+

The Cape Fear River has not been designated as an Outstanding Resource Water (ORW). There are no designated High Quality Waters (HQW) or water supply watersheds (WS-I or WS-II) within, or within 1.0 mile downstream of the study area. The portion of the Cape Fear River (AU segments 18-(71)a2a and 18-(71)a2b) within the project study area was identified on the North Carolina 2022 Final 303(d) list. The Brunswick River (AU segments 18-77a, and 18-77b), and Alligator Creek (AU Segment 29-33-1-1) located within a mile of the project study area were identified on the Final 2022 303(d) list.

6.0 REGULATORY CONSIDERATIONS

6.1 Clean Water Act Waters of the U.S.

One stream was identified in the study area (Table 6). The location of this stream is shown on Figure 3. North Carolina Stream Assessment Method (NCSAM) and North carolina Division of Water Resources (NCDWR) stream identification forms were not completed for the Cape Fear River. The Cape Fear River is designated as a warm water stream for the purposes of stream mitigation.

Table 5. Status of streams in the study area

Map ID	Length (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer
Cape Fear River	730	Perennial	Yes	Not Subject
Total	**730**			

Three wetlands were identified within the study area (Table 6). The location of these wetlands is shown on Figure 3. All wetlands in the study area are located within the Cape Fear River basin, USGS Hydrologic Unit Code 03030005.

Table 6. Characteristics of wetlands in the study area

Map ID	NCWAM Classification	Forested	NCWAM Rating	Hydrologic Classification	404/401 or 401	Area (ac.) in Study Area
8WA	Salt/Brackish Marsh	N	High	Tidal	404/401	2.49
9WA	Salt/Brackish Marsh	N	High	Tidal	404/401	13.14
9WB	Estuarine Woody Wetland	Y	High	Tidal	404/401	66.03
					Total	**81.66**

6.2 Construction Moratoria

The Cape Fear River has been designated as an anadromous fish spawning area by the North Carolina Division of Marine Fisheries (NCDMF) and the North Carolina Wildlife Resource Commission (NCWRC). Also, the Cape Fear River is identified as a primary nursery area by NCDMF. The Cape Fear River is also identified as a sturgeon spawning water by NMFS. An in-water construction moratorium is in effect from February 1 through June 30 for these waters.

6.3 N.C. River Basin Buffer Rules

Streamside riparian zones within the study area are not protected under provisions of the buffer rules administered by NCDWR.

6.4 Rivers and Harbors Act Section 10 Navigable Waters

The Cape Fear River has been designated by the United States Army Corp of Engineers (USACE) as a Navigable Water under Section 10 of the Rivers and Harbors Act.

6.5 Coastal Area Management Act Areas of Environmental Concern

Coastal Area Management Act (CAMA) Areas of Environmental Concern (AEC) were identified in the study area. All features identified as AECs are identified on Figure 3.

6.6 Coastal Barrier Resources System

No Coastal Barrier Resources System (CBRS) units exist within the study area.

7.0 REFERENCES

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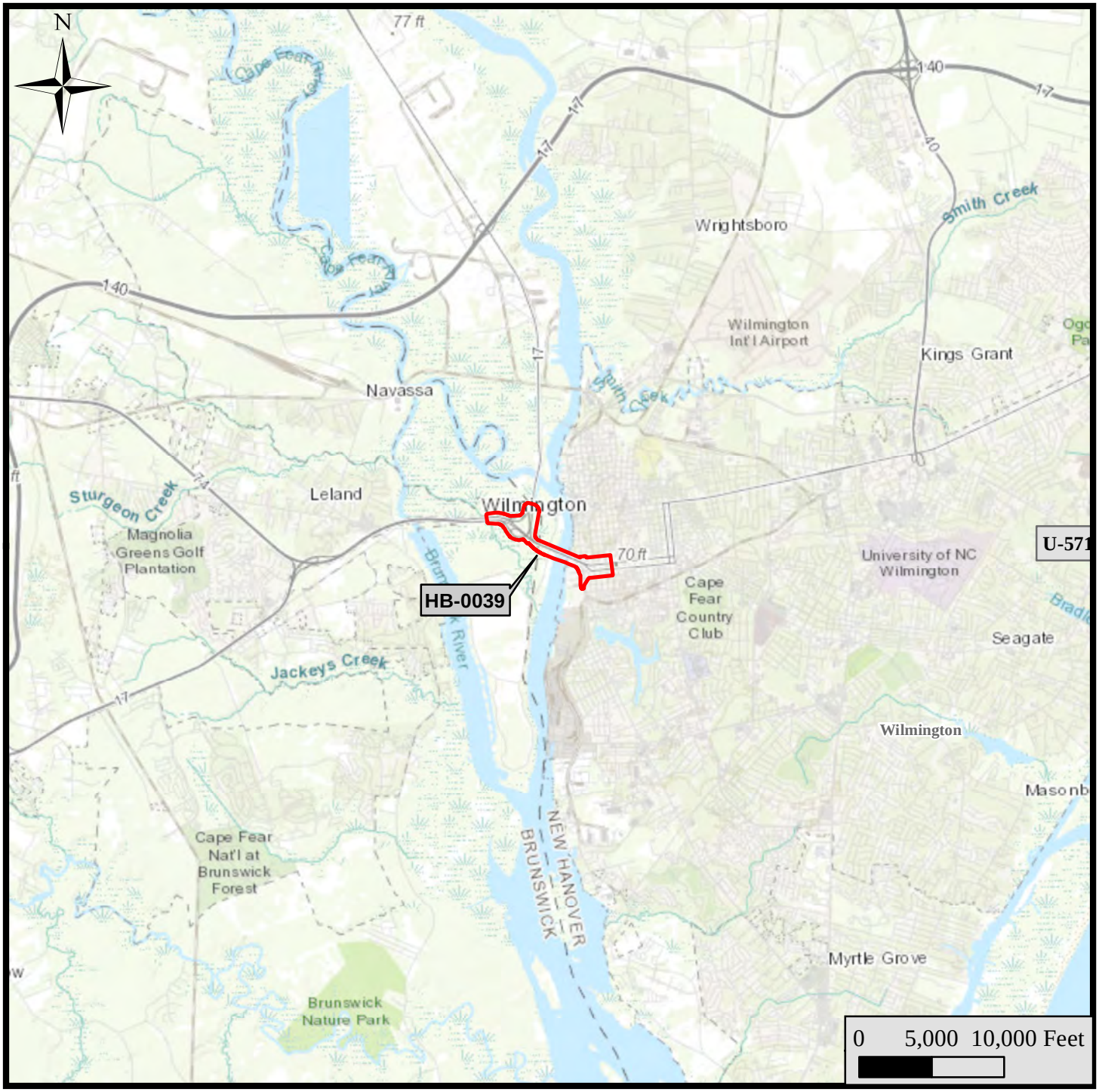
Qualifications of Contributors

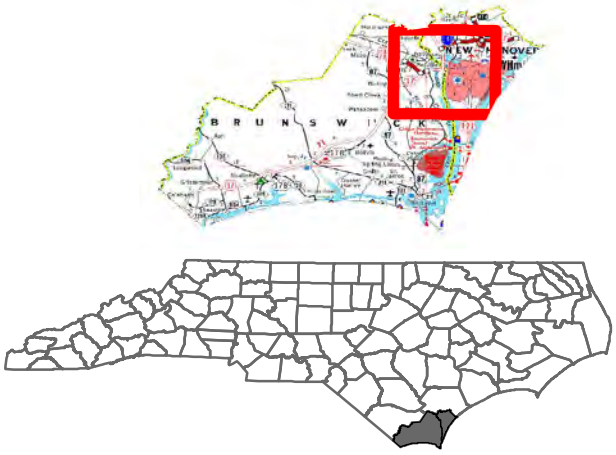
Principal Investigator: Vickie Miller
Education: B.S. Environmental Science, UNCA, 1997
M.S. Natural Resource Management, NCSU, 2005
Experience: Senior Project Manager, HDR, 2005-Present
Environmental Scientist, URS, 2001-2005
Responsibilities: Natural resource investigation, protected species surveys, wetland delineation, surface water identification

Investigator: Sara Easterly
Education: M.S. Environmental Health Science, East Tennessee State University, 1995
B.A. Biology, Carson Newman College, 1986
Experience: Senior Environmental Scientist, HDR, 2012-Present
Environmental Specialist, NCDOT, 2006-2012
Environmental, Health & Safety Specialist, ARCADIS, 2000-2006
Environmental Specialist, TH&P, 1995-2000
Responsibilities: Natural resource investigation, protected species surveys, wetland delineation, surface water identification

Investigator: Jackson Garvey
Education: B.S. Natural Resources –Ecosystem Assessment, NCSU, 2017
Experience: Environmental Scientist, HDR, 2017-Present
Environmental Intern, HDR, 2016-2017
Responsibilities: Wetland and stream delineations, protected species surveys, natural community assessment, GPS, and GIS mapping

Investigator: Raegan Robinson
Education: B.S. Zoology, North Carolina State University, 2020-Present
Experience: Environmental Intern, HDR, 2022-Present
Responsibilities: Assisting wetland and stream delineations, protected species surveys, and document preparation.

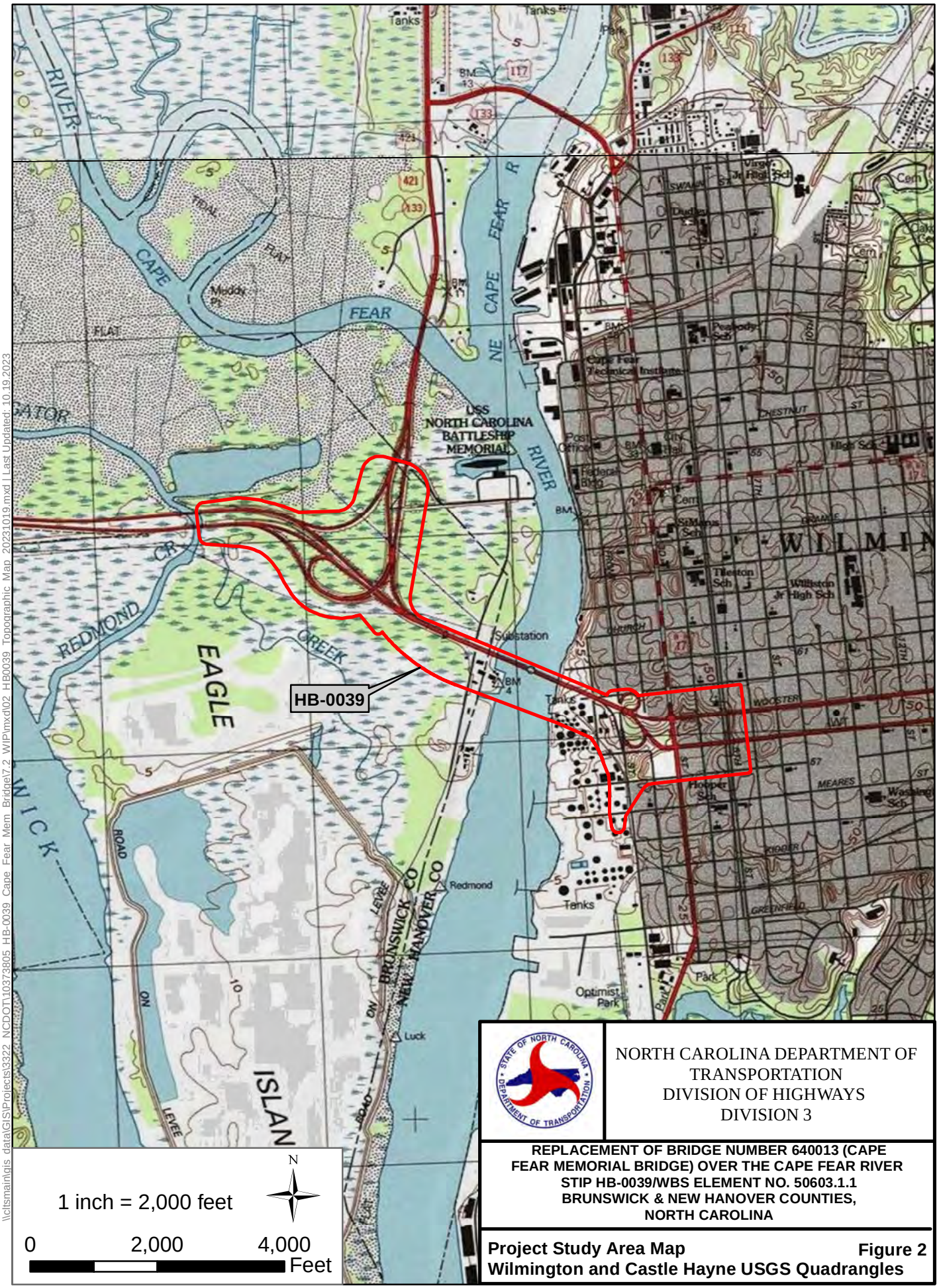




NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DIVISION 3

REPLACEMENT OF BRIDGE NUMBER 640013 (CAPE FEAR MEMORIAL BRIDGE) OVER THE CAPE FEAR RIVER STIP HB-0039/WBS ELEMENT NO. 50603.1.1 BRUNSWICK & NEW HANOVER COUNTIES, NORTH CAROLINA

Vicinity Map **Figure 1**



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Project Study Area Map **Figure 2**
Wilmington and Castle Hayne USGS Quadrangles

LEGEND

HB-0039 Study Area

Cape Fear River

Wetlands

404/CAMA Wetland

404 Wetland

0 Feet 300

9WB 74 421 9WA 9WB 9WA 9WB 9WA 9WB 9WB 9WA 9WB 9WA 8WA 17 74 421 8WA 8WA 9WB 9WB 9WA 9WB 9WB 9WB 9WB 9WA 8WA 9WA 9WB 9WA 9WA 17 Bus

Alligator Creek

USS North Carolina Rd

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Jurisdictional Features Map

LEGEND

HB-0039 Study Area

Cape Fear River

Wetlands

404/CAMA Wetland

404 Wetland

0 Feet 300

9WA

9WB

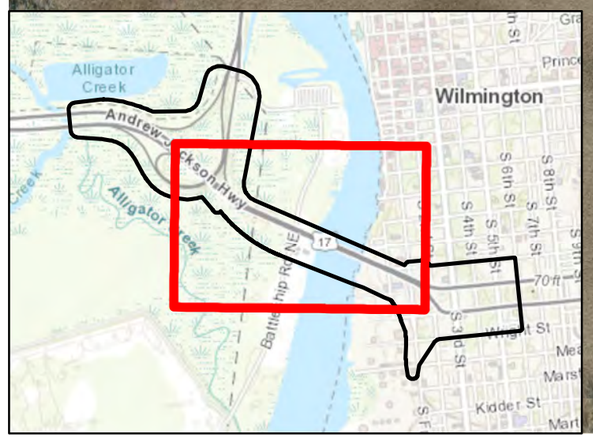
17 Bus

Battleship Rd NE

Surry St

S Front St

Cape Fear River



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Jurisdictional Features Map

LEGEND

HB-0039 Study Area

Cape Fear River

Wetlands

404/CAMA Wetland

404 Wetland

0 Feet 300

Surry St

S Front St

S 2nd St

S 3rd St

S 4th St

S 5th St

S 6th St

Queen St

Wooster St

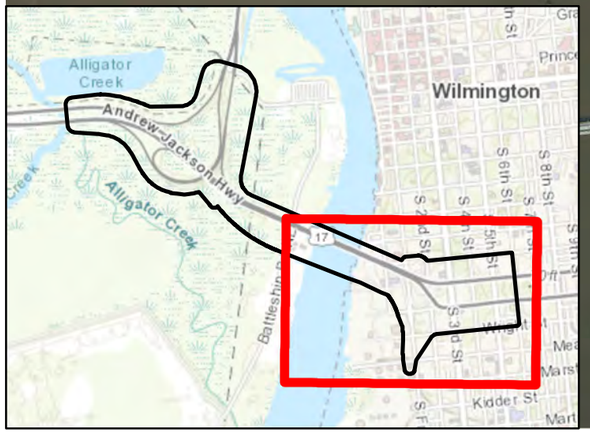
Dawson St

Wright St

Meares St

17 Bus

Cape Fear River



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Jurisdictional Features Map

LEGEND

HB-0039 Study Area

Community Type

- Estuarine Woody Wetland
- Maintained/Disturbed
- Mesic Pine Flatwoods
- Open Water
- Salt/Brackish Marsh

0 Feet 300

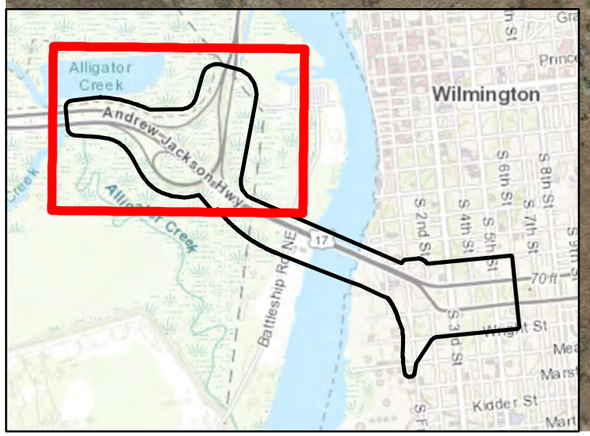
74 421

USS North Carolina Rd

17 74 421

Alligator Creek

17 Bus



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BRUNSWICK & NEW HANOVER COUNTIES, NORTH CAROLINA

Terrestrial Communities Map

LEGEND

HB-0039 Study Area

Community Type

- Estuarine Woody Wetland
- Maintained/Disturbed
- Mesic Pine Flatwoods
- Open Water
- Salt/Brackish Marsh

0 Feet 300

Battleship Rd NE

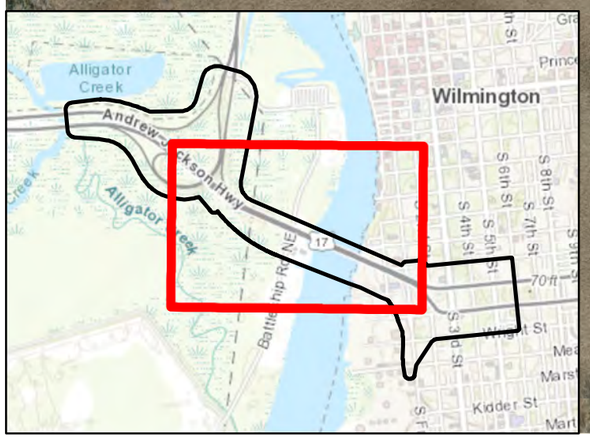
17 Bus

Surry St

S Front St

17 Bus

Cape Fear River



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Terrestrial Communities Map

LEGEND

HB-0039 Study Area

Community Type

Estuarine Woody Wetland

Maintained/Disturbed

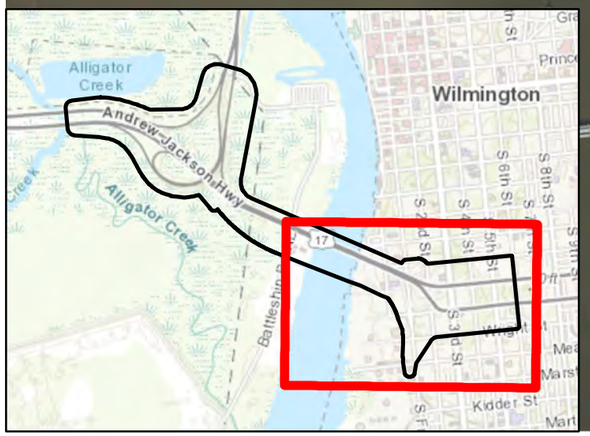
Mesic Pine Flatwoods

Open Water

Salt/Brackish Marsh

0 Feet 300

Surry St
S Front St
S 2nd St
S 3rd St
S 4th St
S 5th St
S 6th St
Queen St
Wooster St
Dawson St
Wright St
Meares St
17 Bus
Cape Fear River



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DIVISION 3

REPLACEMENT OF BRIDGE NUMBER 640013 (CAPE FEAR MEMORIAL BRIDGE) OVER THE CAPE FEAR RIVER
STIP HB-0039/WBS ELEMENT NO. 50603.1.1
BRUNSWICK & NEW HANOVER COUNTIES, NORTH CAROLINA

Terrestrial Communities Map