

APPENDIX P

**EASTERN CHANNEL SHOREBIRD
MONITORING PLAN**

SHOREBIRD MONITORING PLAN

Lower Lockwoods Folly River Habitat Restoration Project Phase 1 - Eastern Channel

FEBRUARY 2015



Prepared for:

The Town of Oak Island

Submitted to:

Fish and Wildlife Service
Raleigh Field Office
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1.0 INTRODUCTION

A during- and post-construction shorebird monitoring plan has been developed and implemented from March 2015 through August 31, 2018 by Dial Cordy and Associates Inc. for the Town of Oak Island to monitor shorebird habitat along the oceanfront, Lockwood Folly Inlet shorelines, and Eastern Channel. The plan includes monitoring of piping plover, waterbirds, colonial waterbirds and other shorebirds during and after construction of the proposed project. These monitoring efforts will occur in conjunction with the construction of the Lockwood Folly River Habitat Restoration Project, Phase I Eastern Channel within the oceanfront/inlet/estuarine complex to provide information on shorebird, specifically piping plover, habitat utilization within the project area.

1.1 Project Summary

The project consists of dredging a new 100-foot wide channel within Eastern Channel (between Oak Island and Sheep Island) to a depth of -3 to -15 feet (ft) and placing approximately 201,800 cubic yards (cy) of beach-compatible material on the western beaches of Oak Island (Figure 1). Approximately 3.49 acres of intertidal shoals above the mean lower low water (MLLW) will be dredged. Dredging of Eastern Channel will be performed by a cutterhead dredge pipeline dredge and conveyed to the beach placement areas via a 24-inch reinforced concrete pipeline, existing within the Town of Oak Island's easement.

The beach fill will be placed along two separate reaches. Reach 1 is proposed to be 2,900 linear feet (lf), while Reach 2 is proposed to be 1,500 lf, for a total of 4,400 lf of fill. The beach fill will impact a total of 22.4 acres of intertidal and dry beach area. The beach fill will include a flat berm at an elevation of 7.0 North American Vertical Datum (NAVD), extending seaward to a depth of approximately -7 to -8 ft NAVD, on a 1:20 slope. A 20-foot wide dune with a crest elevation of 10.0 ft NAVD will be restored in front of four properties that installed sandbags during 2014 (6623, 6621, 6617, and 6615 West Beach Drive, Oak Island, North Carolina). There will be a 250 lf taper section at the beginning and end of each reach.

Dredging will likely be conducted from west to east. Likewise, beach fill will be conducted from west to east, and will involve movement of heavy equipment and pipe along the beaches. Once a section is completed, pipe and heavy equipment will be shifted to a new section and the process repeated. Land-based equipment will be brought to the site over public roads, and will enter the beach at existing beach access points along the western end of Oak Island. Existing dunes and vegetation on the beach will be avoided.



Figure 1. Project Area

2.0 PURPOSE AND GOALS

As described in Appendix A – United States Fisheries and Wildlife Service (USFWS) Biological Opinion, the proposed project will destroy approximately 3.49 acres of the approximately 90-acre critical habitat unit. This critical habitat unit is one of 141 designated critical habitat units for wintering piping plovers in the southeastern United States, and the second smallest of the 18 designated critical habitat units in North Carolina. Disturbance to suitable habitat resulting from dredging and placement of sand would affect the ability of an undetermined number of piping plovers to find suitable foraging and roosting habitat during construction and maintenance for an unknown length of time after construction.

The USFWS anticipates that directly and indirectly an unspecified amount of piping plovers in 3.49 acres of critical habitat and along 4,400 lf of shoreline, all at some point, potentially usable by piping plovers, could be taken in the form of habitat loss as a result of this proposed action therefore Reasonable and Prudent Measures necessary to minimize take of piping plovers includes the development of this bird monitoring plan to monitor piping plover, red knot, waterbirds, colonial waterbirds and other shorebirds during and after construction.

3.0 BIRD MONITORING PLAN

This bird monitoring plan was developed to monitor piping plover, red knot, waterbirds, colonial waterbirds, and other shorebirds during and after construction. Monitoring will be conducted for a minimum of three (3) full years past the completion of construction (anticipated to occur May 2015), until the end of the shorebird nesting season (August 31) of the third year after construction (2018). Based on results of the monitoring, continued bird monitoring may also be required during subsequent maintenance events. Post-construction monitoring will be coordinated after the review of at least three years' worth of data and approval by the United States Army Corps of Engineers (USACE), USFWS, North Carolina Division of Coastal Management (NCDCM), and North Carolina Wildlife Resource Commission (NCWRC).

3.1 Schedule

During construction, bird monitoring will be conducted weekly. For at least three years after construction is completed, bimonthly (twice-monthly) bird surveys will be conducted in all intertidal and shoreline areas along Lockwood Folly Inlet. Transects were established to encompass, at a minimum, all intertidal areas in the vicinity of Eastern Channel and Lockwoods Folly Inlet on both sides of the inlet (Oak Island, Sheep Island, and Holden Beach), and the ocean shoreline from Lockwoods Folly Inlet east to approximately 6001 West Beach Drive (or the eastern end of the westernmost sand placement area) (Figure 2).

The following information will be collected, mapped, and reported for each survey area and event:

- Date, location, time of day, weather, and tide cycle when survey was conducted;
- Latitude and longitude of observed piping plover and red knot locations (decimal degrees);
- Any color bands observed on piping plovers or red knots or other birds;
- Behavior (e.g., foraging, roosting, preening, bathing, flying, aggression, walking, courtship, copulation);
- Landscape features(s) where birds are located (e.g., inlet spit, tidal creeks, shoals, lagoon shoreline);
- Habitat features(s) used by birds when observed (e.g., intertidal, fresh wrack, old wrack, dune, mid-beach, vegetation);
- Substrata used by birds (e.g., sand, mud/sand, mud, algal mat); and
- The amount and type of recreational use (e.g., people, dogs on or off leash, vehicles, boats).

3.1.1 Observation Method and Survey Areas

Species observations will be conducted with the use of a spotting scope and binoculars to identify nesting, roosting, foraging, territory establishment, courtship and copulating activities within the survey areas (Figure 2). Observations of breeding sites and nesting pair counts will be included as part of the report documentation, as well as observations and recording of eggs, chicks and fledged individuals.

Table 1 illustrates a representative field data form to be used for documenting bird species use and habitat dependence in the monitored survey areas. The number of species and their associated activities will be accounted for in each of the surveyed habitats. A separate form will be used for each survey area (Survey Area 1 – 5) in conjunction with each survey event (i.e., five forms will be completed for each survey event). The following will also apply:

- Species flying overhead of a surveyed habitat will be reported as flying;
- Birds observed as diving or floating in the nearshore will be reported as utilizing surf zone habitat;
- Banding combinations identified on species of shorebirds and colonial waterbirds, including piping plovers, will be recorded in the notes column to assist in identifying population migration patterns;
- Species observations along the dry beach habitat of the inlet shorelines will extend up to the landward edge of the frontal dune or edge of vegetation, whichever comes first; and
- Bird species observed, but not currently listed as a species will be identified and accounted for under “Other Species.”

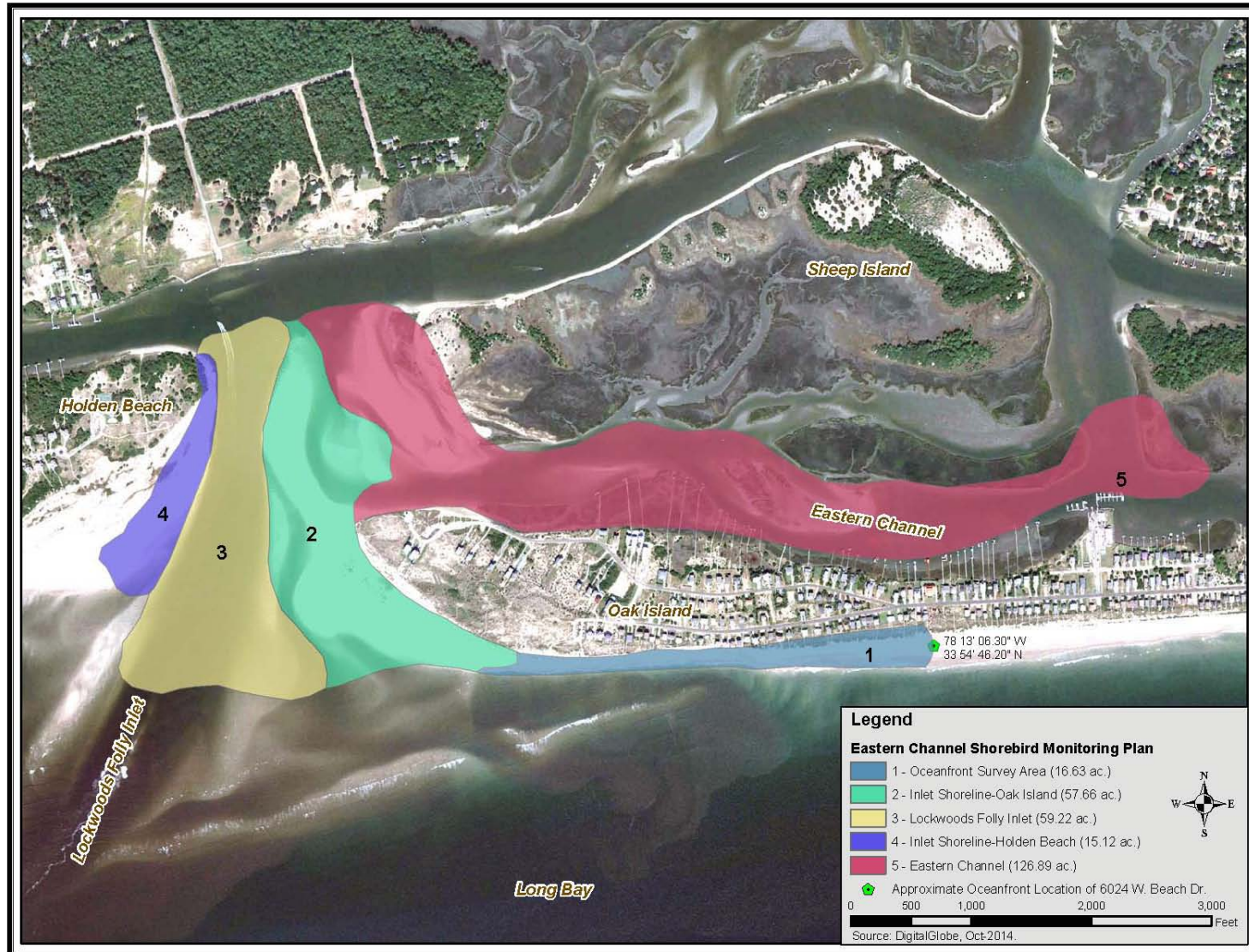


Figure 2. Bird Survey Areas

Table 1. Sample field form. One form will be completed for each survey area for each survey event.

DATE					WEATHER/SKY	Clear	P. Cloudy	Cloudy	Fog	Lt. Rain			
Survey Area	1=OI Beach	2=LWF Shore	3=LWF Inlet	4 = HB Shore	5 = Eastern Channel	WIND SPEED (mph)		0-10	10-15	15-20	>20		
OBSERVER					WIND DIRECTION	N	NE	E	SE	S	SW	W	NW
TIDE: LOW					AIR TEMP. (°F)								
HIGH					WAVE HEIGHT (ft)	0 to 1	1 to 3	3 to 5	4 to 6				
DISTURBANCE SOURCE	Human	Pet	Predator										
DISTURBANCE LEVEL	None	Low	Medium	High									
START TIME													
END TIME													
	SURF			INTERTIDAL			DRY BEACH			Notes: (Nesting, Banding, etc.)			
SPECIES	Feeding	Resting	Flying	Feeding	Resting	Flying	Feeding	Resting	Flying				
Common Loon													
Brown Pelican													
Double-crested Cormorant													
Great Blue Heron													
Great Egret													
Snowy Egret													
Little Blue Heron													
Tricolored Heron													
White Ibis													
Glossy Ibis													
Black-bellied Plover													
Wilson's Plover													
Semipalmated Plover													
Piping Plover													
Killdeer													
American Oystercatcher													
Greater Yellowlegs													
Solitary Sandpiper													
Willet													
Spotted Sandpiper													
Whimbrel													
Marbled Godwit													
Ruddy Turnstone													
Red Knot													
Sanderling													
Semipalmated Sandpiper													
Western Sandpiper													
Least Sandpiper													
Pectoral Sandpiper													
Dunlin													
Short-billed Dowitcher													
Long-billed Dowitcher													
Laughing Gull													
Bonaparte's Gull													
Ring-billed Gull													
Herring Gull													
Lesser Black-backed Gull													
Great Black-backed Gull													
Gull-billed Tern													
Caspian Tern													
Royal Tern													
Sandwich Tern													
Common Tern													
Forster's Tern													
Least Tern													
Black Tern													
Black Skimmer													
Woodstork													
OTHER SPECIES													
Bald Eagle													
Turkey Vulture													

Field observations will be conducted during daylight hours. Surveys will primarily occur during high tide for each event.

Observations along narrow beach habitats will be conducted by walking along the beach. Wider, open areas such as washover habitats will involve walking in a zigzag pattern to observe all birds utilizing the area. Mixed flocks of roosting shorebirds will be surveyed so that all species are accounted for. Surveys will not be conducted during inclement weather conditions (high winds > 20 mph, heavy rains, and/or below freezing conditions). A boat/kayak may be used for accessing shoal transect areas and inlet habitats on Holden Beach. The use of ATV's or similar vehicles will not be used during surveys.

3.2 Reporting

All monitoring information will be provided in standardized form on an Excel spreadsheet. Monitoring results will be submitted annually (datasheets, maps, database) on standard electronic media (e.g., CD, DVD) to the Raleigh Field Office. Information will be submitted to the following address:

Pete Benjamin, Supervisor
Raleigh Field Office
U.S. Fish and Wildlife Service
Post Office Box 33726
Raleigh, NC 27636-3726

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification will be made to the USFWS Law Enforcement Office below. Additional notification will be made to the USFWS Ecological Services Field Office identified above and to the NCWRC at (252) 241-7367. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury.

Tom Chisdock
U.S. Fish and Wildlife Service
160 Zillicoa St.
Asheville, NC 28801

Appendix A

US Fish and Wildlife Service Biological Opinion