CAPE HATTERAS NATIONAL SEASHORE
PIPING PLOVER (*CHARADRIUS MELODUS)* MONITORING
2013 ANNUAL REPORT

National Park Service
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ABSTRACT

In 2013, nine Piping Plover (PIPL) pairs and nine nests were identified. Seven PIPL chicks successfully fledged resulting in a fledge rate of 0.78 chicks per breeding pair. The first PIPL nest of the season was discovered on April 21, 2013. The 2013 breeding season was the second breeding season that Cape Hatteras National Seashore (CAHA) was managing under the requirements of the final Cape Hatteras National Seashore Off-Road Vehicle Management Plan and Special Regulation (2012, ORVMP).

INTRODUCTION

PIPL monitoring at CAHA began in 1985. Monitoring has focused on identifying nesting habitat, locating and protecting PIPL breeding territories and nests, and determining nest and brood success. This report contains a summary of monitoring results for the 2013 breeding season, comparisons to results from previous years, and the resource management activities undertaken for PIPL in 2013.

ORV Management Plan

On February 15, 2012 the ORVMP was enacted at CAHA. It was developed from 2007-2012 and was accompanied by a special regulation detailing requirements for off-road vehicle (ORV) use at CAHA. A copy of the ORVMP and other related documents are available electronically at http://parkplanning.nps.gov/caha. The ORVMP includes establishment of pre-nesting closures and buffer requirements for nesting birds and chicks as well as the requirement for an ORV permit to drive on CAHA beaches.

The Record of Decision indicates that CAHA will "conduct a systematic review of data, annual reports, and other information every five years, after a major hurricane, or if necessitated by a significant change in protected species status (e.g. listing or de-listing), in order to evaluate the effectiveness of management actions in making progress toward the accomplishment of stated objectives". As part of the Reporting Requirements of the Biological Opinion (BO) for the Off-road Vehicle Management Plan (November 15, 2010), "an annual report detailing the monitoring and survey data collected during the preceding breeding season (as described in alternative F, in addition to the additional information required in the… Terms and Conditions) and summarizing all piping plover, seabeach amaranth, and sea turtle data must be provided to the US Fish and Wildlife Service (USFWS), Ecological Services Office by January 31 of each year for review and comment".

METHODS

Closures

While pre-nesting closures minimize disturbance in potential breeding areas, they also enable birds to establish territories and nest in their preferred habitat. Because CAHA's shoreline is dynamic in nature, a habitat evaluation was conducted from January 28 - February 8, 2013, prior to the onset of the breeding season. This evaluation, along with maps of historic nesting locations, was used to determine the boundaries for the pre-nesting closures (Appendix A, Maps 1-4). These sites were then posted with symbolic fencing consisting of wooden posts, bird usage signs prohibiting entry, string, and flagging tape by March 15, 2013, as required by the ORVMP.

Bodie Spit, Cape Point, South Beach, North Ocracoke, and South Point all contained potential and/or historic nesting habitat for PIPLs.

The pre-nesting closures were modified throughout the season in order to meet the buffer requirements of the ORVMP and to provide adequate protection for nesting birds and broods. Buffers for PIPLs include a 75 m buffer for breeding behaviors and for nests. This buffer is expanded to 1000m and 300 m for ORVs and pedestrians, respectively, for unfledged chicks. A closure was modified when breeding behavior (territorial behavior, courtship, or mating) was observed close to the edge or outside of a closure or if a scrape, nest or chick was located with inadequate buffers.

Monitoring

Field staff began monitoring for PIPL arrival and breeding behavior in early March. After a nest was located, a predator exclosure was installed when the nest contained three or more eggs. Predator exclosures have been used at CAHA since 1994 to reduce impacts from predators on nesting plovers. Exclosures are circular in shape (roughly ten feet in diameter), made of two inch by four inch welded-wire fence anchored by steel rebar and topped with a three-quarter inch mesh bird netting. Exclosures were installed following the guidelines established in the USFWS' Piping Plover Recovery Plan (USFWS 1996, **Appendix F**). If a nest was discovered prior to clutch completion (i.e. less than four eggs), predator exclosures were, in general, installed when there were three eggs present because of the high rates of egg predation in the past. Thereafter, the nest was briefly approached once weekly to inspect the exclosure, verify the number of eggs, and check for predator tracks.

The nests were also monitored daily, from a distance, to document incubation, nest abandonment, and/or to detect other potential problems. Morning and evening monitoring began five to seven days prior to when nests were expected hatch. After hatching, broods were monitored regularly in the morning in the afternoon until the chicks fledged or were determined to be lost. Observers documented: brood status, behavior, individual bird and/or brood movements, human disturbance, predator interactions, or other significant environmental events. A grid system with points located 75 meters apart was established at the beginning of the breeding season to aid staff in obtaining more accurate locations for chicks and to document brood movements.

Predator Control

Because mammalian predation is a major factor in PIPL nest loss and chick mortality at CAHA, predator control was conducted to target predators near nests and chicks. Trapping was conducted in all districts. When technicians walked through areas they documented and reported any signs (prints, scat, etc.) of predators they observed. If predator sign was found in a closure, trapping efforts were increased in that area. Traps were installed in the vicinity of the closure with the intent of targeting the specific predator in that area.

Winter Closures

Winter closures are established to provide a relatively undisturbed area for migratory and over-wintering PIPL. In the fall and to a lesser degree in the spring large numbers of PIPL migrate

through CAHA. Winter closures were established upon removal of the pre-nesting closures at Bodie Spit and South Point.

The winter closures are closed to ORVs however portions of them remain open to pedestrians. Permanent Vehicle Free Areas (VFAs), especially those at Cape Point/South Beach and North Ocracoke, provide relatively undisturbed areas for migratory and over-wintering PIPL in addition the winter closures at Bodie Spit and South Point.

Migrating and Wintering Piping Plovers

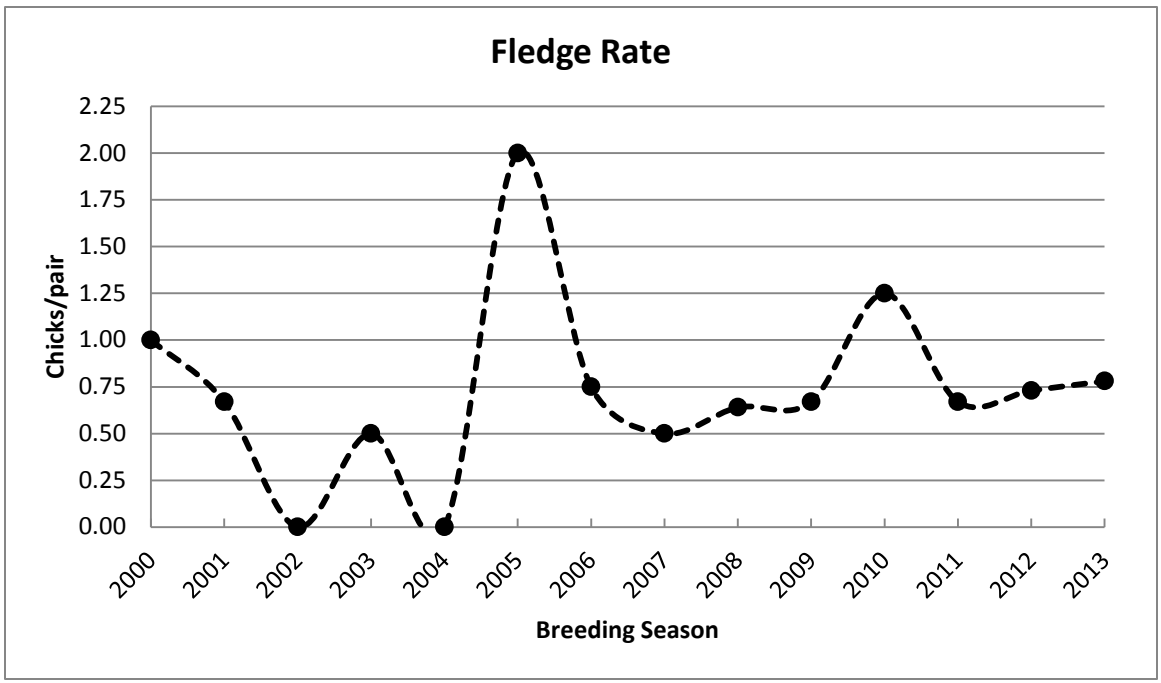
Surveys for the Southeast Coast Inventory Monitoring Network Migratory and Wintering Shorebird Monitoring Study (Byrne *et al*, 2009) were conducted weekly from April 2012 through March 2013. No surveys were conducted in June when all the PIPL present are assumed to be breeders and not migrants. The sampling regime consisted of a two-tiered sampling approach consisting of high-intensity and low-intensity sampling units. The high-intensity sites were sampled on a weekly basis whereas the low-intensity sampling units were sampled on a monthly basis. Semi-permanent transect locations were established along the entire ocean shoreline. The majority of transects were one mile in length and were numbered Park Mile 0 through Park Mile 74. Some transects at the spits and Cape Point, varied in length due to the constantly changing shorelines. The spits and Cape Point also required more than one transect because of the width of the beach that needed to be surveyed (Appendix A, Map 6). All target species including PIPL, American oystercatchers, Wilson's plovers, red knots, black-necked stilts, whimbrels, and sanderlings were documented. The goal of these surveys is to determine areas of consistent use by the target species and to consistently and systematically collect data that park managers can utilize when making management decisions.

RESULTS AND DISCUSSION

Nest and Brood Success

Nine breeding pairs were identified during the nesting season which is a decrease from 2012 and the lowest since 2009. No nests were lost or abandoned. In 2013, nesting occurred at only two sites: Cape Point and South Point on Ocracoke (Appendix A, Maps 2 and 4).

Figure 1. Piping plover fledge rate (chicks/pair).



The first nest of the 2013 breeding season was discovered on April 21, 2013. The average incubation period was 28 days and ranged from 25 to 31 days. Incubation period begins when the last egg of the clutch is observed or on the second day after the penultimate egg is initially observed, whichever is earliest. The incubation period ends when the first chick is observed completely free of its shell. Three of nine broods produced fledglings and seven chicks fledged (Table 3). Age at fledging varied from 31 to 34 days for an average fledge time of 32 days.

In 2013 the nine breeding pairs produced nine known nests of which all nests successfully hatched at least one chick. Of the 36 eggs laid, 28 hatched for a hatch rate of 78%. No nests were lost prior to hatching and 21 chicks (67%) were lost prior to fledging (Table 1). Seven chicks fledged from nine breeding pairs for a fledge rate of 0.78 chicks per breeding pair (Figure 1).

Table 1. PIPL Nest and Chick Success in 2013.

Location	Breeding Pairs	Total Nests	Nests Hatched	Nests Lost/ Abandoned	Total Eggs	Total Eggs Hatched	Total Chicks Fledged	Total Chicks Lost
Bodie Island Spit	0	NA	NA	NA	NA	NA	NA	NA
Cape Point	7	7	7	0	28	22	7	15
South Beach	0	NA	NA	NA	NA	NA	NA	NA
North Ocracoke	0	NA	NA	NA	NA	NA	NA	NA
South Point	2	2	2	0	8	6	0	6
TOTAL:	9	9	9	0	36	28	7	21

Since 1999, fledge rates have ranged from 0.0 to 2.0 chicks/pair at CAHA. The mean rate from1999-2012 was 0.75 chicks/pair and in 2013 the fledge rate was slightly above the mean at 0.78 chicks/pair.

Chick loss, as in past years, was difficult to document. The majority of chick mortality occurred within seven days post hatching. At Cape Point all seven nests hatched and of the 22 chicks, 15 were lost prior to fledging due to unknown reasons. On South Point both nests hatched with none of the six chicks surviving to fledging due to unknown reasons.

Predator Exclosures

As in previous years, predator exclosures were used to protect the nests. After predator exclosures were installed, the nest was observed until one of the pair returned to the nest and resumed incubation. The average elapsed time before a bird accepted the exclosure was 39 minutes and ranged from 10 to 180 minutes. Because not all nests are continuously incubated at the three-egg stage, longer return times can be expected for these nests.

Chick Movement

During the daily observations, resource management staff documented foraging locations for all PIPL chicks after hatching (Appendix A, Map 6). Since chicks were not observed dawn to dusk nor can they be observed in the hours after dark, actual territories may be larger than depicted. A grid system with points located 75 meters apart was established at the beginning of the breeding season to aid staff in obtaining more accurate locations for chicks. When chicks were observed,

their locations were documented relative to the grid points. The individual brood foraging areas designate the area in which the brood was observed on any given day until they fledged or were determined to be lost. The average distance travelled by chicks was 704 m and ranged from 358-1039 m. The estimated size of the foraging areas was 10.2 hectares and ranged from 4.1 to 14.7 hectares. When chicks were lost soon after hatching, no foraging territory outside the immediate vicinity of the nest could be established.

Human Disturbance

Human disturbance, direct or indirect, can lead to the abandonment of nests or loss of chicks. Throughout the 2013 season, field staff documented 78 pedestrian, five ORV, and four dog, boat or horse intrusions in closures with nesting shorebirds. The numbers are conservative since sites are not monitored continuously, weather erases tracks, and staff did not disturb an incubating pair or young in order to document disturbance. These numbers indicate violations to closures specifically containing nesting PIPLs or habitat protected for PIPLs. It is important to note that most of the closures contained multiple species, including least terns, American oystercatchers, and PIPLs. Most illegal entries were not witnessed, but documented based on vehicle, pedestrian, or dog tracks left in the sand. Human disturbance was not documented to be a major factor for the loss of nests or chicks in 2013 at CAHA.

Non-breeding Surveys & Winter Monitoring

The non-breeding PIPL monitoring protocol was developed to document trends over time and to document the habitat type in which PIPL and other shorebirds are most frequently found. Documenting the habitat type in which the PIPL are observed will assist CAHA staff in determining which areas need to be protected to minimize disturbance to migratory and wintering PIPL.

Staff surveyed 20-22 transects on a weekly basis for non-breeding PIPL use at CAHA. The time period covered in this report is April 2012 through March 2013 during which 82 observations were noted. Although it appears that many observations are occurring outside of closures this is a result of the fact that transects are not surveyed if they fall within a pre-nesting or breeding closure. The pre-nesting and breeding closures more than likely contain migrants as well as breeding birds but in order to minimize disturbance to our breeding birds, these transects are not surveyed if pre-nesting or breeding closures are in place. During the breeding season, the emphasis is on minimizing disturbance to breeding birds. The peak spring migration occurred in March 2013 and peak fall migration occurred during September, 2013 (30 total: nine Bodie Island, nine South Hatteras, 12 Ocracoke) when the majority of the migrants observed were documented on Ocracoke.

CAHA staff documented the habitat type in which migratory and wintering PIPL were observed from April 2012 to March 2013. Of the 82 PIPL observations, 42 were in foreshore habitat, 29 were in mud flat/algal flat habitat, seven were in the backshore, three were in the wrack line and one was in "other" habitat.

REFERENCES

Byrne, M. W., J. C. DeVivo, J. M. Maxfield, C. J. Wright, and E. Thompson. 2009. Methods for monitoring migratory and wintering shorebirds in Southeast Coast Network Parks. Natural Resource Report NPS/SECN/NRR-2009/107. National Park Service, Fort Collins, Colorado.

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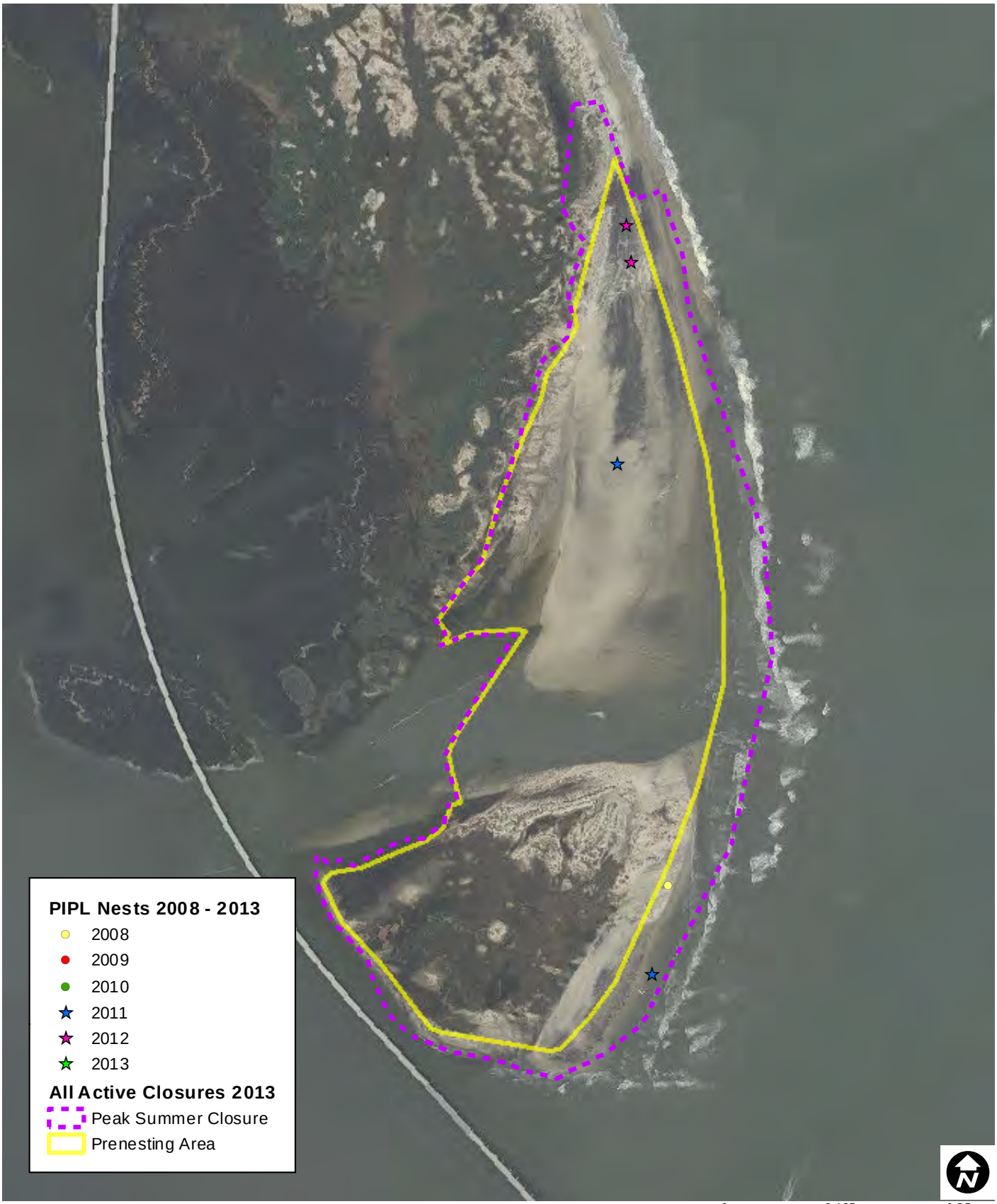
U. S. Fish and Wildlife Service. 2010. Biological opinion the Off-Road Vehicle Management Plan for Cape Hatteras National Seashore, Dare and Hyde Counties, North Carolina. U. S. Fish and Wildlife Service, Raleigh Field Office, Raleigh, NC. 156 pp.

APPENDICES

APPENDIX A: MAPS

Map 1: Bodie Island Spit PIPL Nesting Activity, 2007-2013
Map 2: Cape Point and South Beach PIPL Nesting Activity, 2007-2013
Map 3: North Ocracoke PIPL Nesting Activity, 2007-2013
Map 4: South Point Ocracoke PIPL Nesting Activity, 2007-2013
Map 5: Wintering and Migratory PIPL Monitoring Transects, 2011-2013
Map 6: PIPL Chick Foraging Areas, 2013

Map 1: Bodie Island Spit PIPL Nesting Activity, 2008 - 2013



NAD 83 UTM Zone 18N

Imagery: October 2013

Map 2: Cape Point PIPL Nesting Activity, 2008 - 2013

NAD 83 UTM Zone 18N

Imagery Date: October 2012

Map 3: North Ocracoke PIPL Nesting Activity, 2008 - 2013

NAD 83 UTM Zone 18N

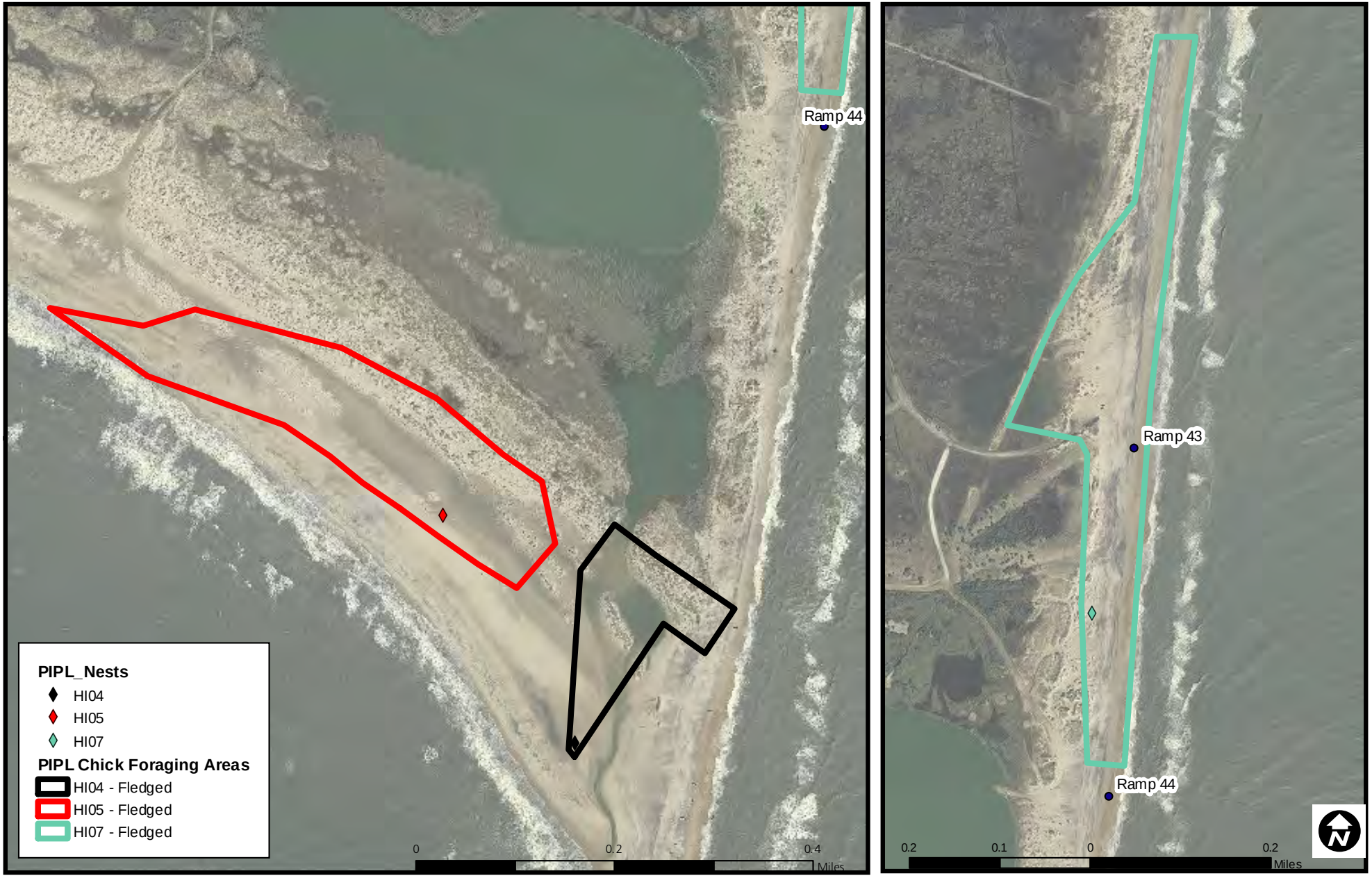
Imagery Date: October 2012

Map 4: South Point PIPL Nesting Activity, 2008 - 2013

NAD 83 UTM Zone 18N

Imagery Date: October 2012

Map 5: PIPL Chick Foraging Areas, 2013



NAD 83 UTM Zone 18N

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North Carolina

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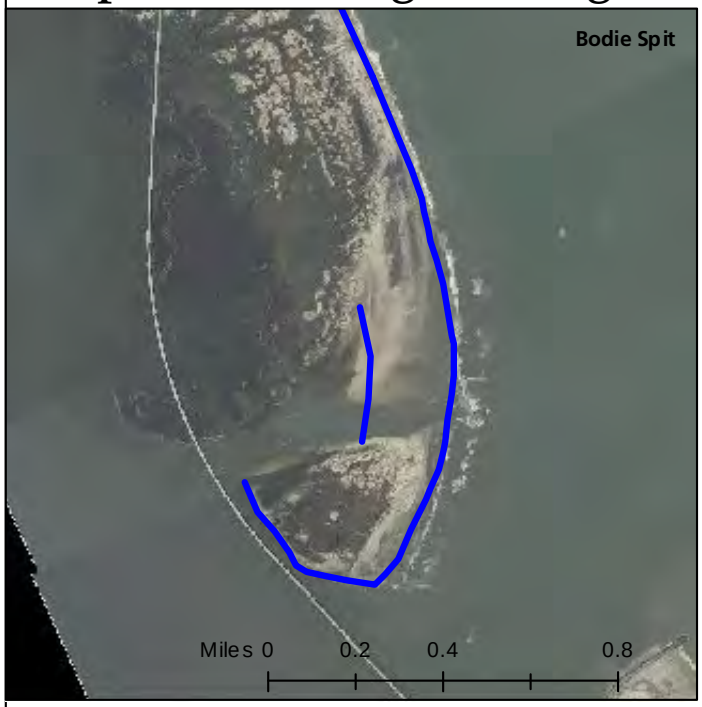
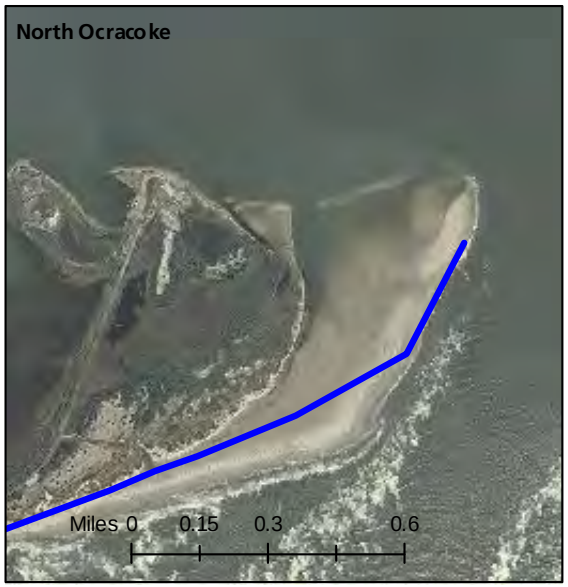
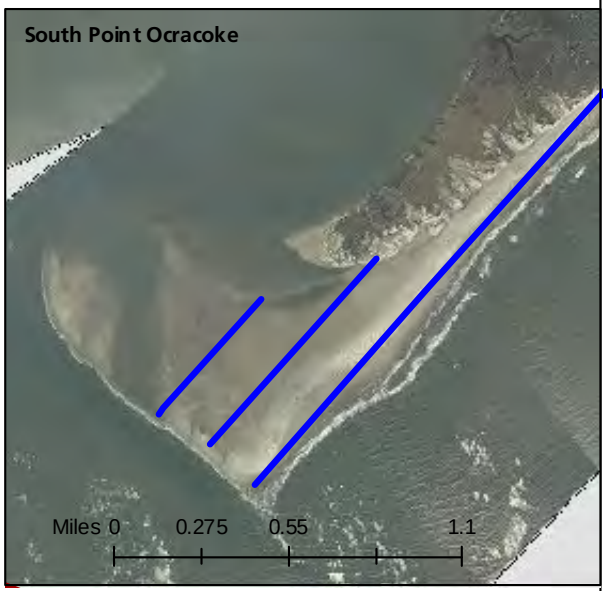
Map 6: Wintering and Migratory PIPL Monitoring Transects, 2012 - 2013







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