

PIPING PLOVER (*Charadrius melodus*) MONITORING AT
CAPE LOOKOUT NATIONAL SEASHORE

2013 SUMMARY REPORT



Portsmouth Flats on North Core Banks, April 2013. NPS Photo 2013

NATIONAL PARK SERVICE
CAPE LOOKOUT NATIONAL SEASHORE
131 CHARLES STREET
HARKERS ISLAND, NC 28531

Abstract

A total of 45 pairs of piping plovers were recorded at Cape Lookout National Seashore (CALO) in 2013. The birds at CALO accounted for 80% of the nesting pairs in North Carolina. Thirty-three pairs nested on North Core Banks and eleven pairs on South Core Banks. Egg-laying was initiated on April 18th and a total of 52 nests were documented. Thirty nests hatched and 47 chicks fledged. Productivity was 1.04 chicks fledged per nesting pair. Two broods foraged on the oceanside in 2013.

Introduction

The piping plover is listed as a federal threatened species by the U.S. Fish and Wildlife Service. Piping plover monitoring at CALO began with a baseline study in 1989. The park is a significant nesting area, containing 80% of the nesting pairs in the state of North Carolina. CALO is also an important wintering and migratory site. There are three designated wintering critical habitat units within the seashore. Monitoring focuses on documenting reproductive success, implementing methods to increase the productivity of this threatened species, and non-breeding use surveys. This report contains a summary of monitoring results for 2013, comparisons to results from previous years and discussions based on long-term monitoring of piping plovers at CALO.

Site Description

Cape Lookout National Seashore is located in the southern Outer Banks of North Carolina between Beaufort and Ocracoke Inlets. With the natural reopening of Old Drum Inlet in August 2011 the seashore was divided into four barrier islands for the 2013 breeding season. The northernmost island, North Core Banks (NCB) was approximately 23 miles long, extending from Ocracoke Inlet to Ophelia Inlet, and includes the Middle Core Bank (MCB) section from Old Drum Inlet to Ophelia Inlet. South Core Banks (SCB) extends southward from Ophelia Inlet to almost 24 miles to Barden Inlet. The Core Banks have a northeast to southwest orientation and exhibit a low profile landscape. The third island, Shackleford Banks (SB) is nine miles long and has an east-west orientation with a higher dune system and larger areas of vegetation. All islands in the park are subject to constant and dramatic change by the actions of wind and waves.

Methods

Bird sanctuary signs were used to close all known piping plover nesting habitat to pedestrian and vehicular entry by April 1. Beginning in early April, nesting areas were surveyed daily for territorial pairs and nests. Potential habitat outside posted areas was monitored and posted as necessary with a minimum 150 foot buffer distance from scrapes and nests. Locations of nests were recorded and nests were monitored daily until they hatched or were lost. The Interim Protected species Management Plan/ Environmental Assessment, March 2006, developed for CALO provides guidance for monitoring and management (National Park Service 2006).

Nests were protected with predator exclosures if the topography of the location was suitable and monitoring was sufficient. Exclosures were circular, 10 feet in diameter, made of 4"x 2" mesh wire fence anchored with steel rebar and were topped with 3/4" mesh bird netting. Because of high rates of losses to raccoons, nest exclosures were sometimes constructed before the clutch was complete.

After nests hatched, broods were monitored daily until the chicks fledged or were lost. Any ocean beach foraging areas were closed to vehicle traffic while the chicks were present.

Counts of wintering and migrating piping plovers were made monthly from August to March. The counts were made near the 15th of each month in the non-nesting season. The ocean beach, inlets and soundside sandy beaches were surveyed. Banded birds were searched for more frequently during the fall migration.

Results

Nesting Pairs

A total of 45 pairs of piping plovers attempted nesting at CALO in 2013 (Table 1 & 2). Thirty-three pairs nested on North Core Banks (NCB), and eleven pairs on South Core Banks (SCB), Appendix 1. Birds nested in five distinct areas and a pair nest scraped at Power Squadron Spit (Figure 1). Appendix 1 shows the results of the June census window pair count. The four mile area around Ophelia Inlet contained the highest number of nesting pairs. The birds at CALO accounted for 80% of the nesting pairs in North Carolina in 2013.

Table 1. Number of Pairs by Occupied Nesting Areas

ISLAND	NESTING AREA	NUMBER OF PAIRS
North Core Banks	Portsmouth Flats	13
North Core Banks	Old Drum Inlet	4
North Core Banks	New Drum Inlet	11
North Core Banks	Ophelia Island	6
South Core Banks	Plover/Ophelia Inlet	11

Table 2. Piping Plover Breeding Pairs at Cape Lookout National Seashore 1989-2013

	1989	1992	1993	1994	1995	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ocracoke Inlet	0	2	0	2	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Portsmouth Flats	14	8	9	7	8	17	15	9	11	9	8	6	4	6	8	14	14	12	13	12	19	13
Kathryn-Jane Flats	7	11	9	12	11	10	8	2	1	1	2	1	1	2	1	3	0	1	0	0	0	0
Old Drum Inlet	3	2	1	1	2	1	1	0	0	0	0	1	0	0	0	0	2	3	6	8	8	4
New Drum Inlet (NCB/MCB) Mile 21 to 22	4	5	9	10	6	3	2	3	1	2	2	2	2	3	3	5	6	5	8	8	10	11
New Drum Inlet (SCB)/ Ophelia Island Mile 22 to 23	3	3	4	5	4	2	3	3	2	3	2	2	2	2	2	2	2	2	2	2	5	6
Plover Inlet/ Ophelia Inlet Mile 23 to 24	0	0	0	0	0	1	1	1	1	1	1	1	4	8	15	17	18	11	11	8	8	11
Cape Point	0	0	0	0	0	0	0	1	0	0	0	0	0	4	3	2	3	2	2	1	0	0
Power Squadron Spit	3	2	3	2	2	1	2	1	0	0	0	1	0	1	1	2	1	1	1	1	0	0
Shackleford Banks														1	0	0	0	0	0	0	0	0
CALO Total	34	33	35	39	35	36	32	21	16	16	15	14	13	27	33	45	46	37	43	41	51	45

Nests

There were 52 nesting attempts made in 2013 (Appendix 2). The earliest nest initiation was on April 18th and the latest was on June 20th. Thirty-nine nests were on NCB and thirteen were on SCB. Of the 52 nests, eight were re-nests. Thirty nests hatched and 47 chicks fledged from 23 different broods. The average clutch size was 3.33 eggs and 97 of 173 known eggs hatched. Productivity for CALO was 1.04 chicks fledged per nesting pair (Table 3 & Appendix 3). Refer to Figures 2-5 for detailed maps of nests and nesting sites, (2012 DOQQ base layers).

Table 3. Piping Plover Nesting Success at CALO 2000-2013

Year	# Nests	# Pairs	# Eggs	Nests Hatched		Eggs Hatched		Chicks Fledged		Fledge Rate Chicks/pair)
				#	%	#	%	#	%	
2000	18	16	65	12	67%	43	66%	8	19%	0.5
2001	19	16	64	8	42%	24	38%	5	21%	0.31
2002	20	15	65	13	65%	43	66%	4	9%	0.27
2003	15	14	55	7	47%	23	42%	6	26%	0.43
2004	13	13	44	11	85%	37	84%	12	32%	0.92
2005	31	27	105	24	77%	69	66%	23	33%	0.85
2006	37	33	125	29	78%	87	70%	29	33%	0.88
2007	58	45	173	29	50%	79	46%	11	14%	0.24
2008	57	46	179	31	54%	88	49%	9	10%	0.20
2009	45	36	145	24	53%	83	57%	30	36%	0.83
2010	58	43	204	34	59%	98	48%	31	32%	0.72
2011	48	41	157	35	73%	102	65%	37	36%	0.90
2012	66	51	207	36	54%	98	47%	29	30%	0.57
2013	52	45	173	30	58%	97	56%	47	48%	1.04

Predator Exclosures

In 2013, predator exclosures were used to protect 25 (48%) nests. Of the nests with exclosures 20 (80%) hatched. Five nests with predator exclosures didn't hatch. Two were lost to weather (flooding/wind), two were abandoned and one was lost to unknown cause. Predator exclosures were not used on 27 (52%) nests due mainly to the inaccessibility of MCB. Of the nests without exclosures 10 hatched (37%). Twenty-two nests didn't hatch; twelve were lost unknown reasons, four were lost to weather, three were abandoned, two to ghost crabs, and one nest was lost to raccoon predation (Appendix 1). Table 4 shows likely causes of nest losses for all nests. The predator column includes two ghost crabs losses and one raccoon loss. There were no observations of raccoons circling or digging at predator exclosures on SCB or NCB.

Table 4. Likely Causes of Piping Plover Nest Losses in 2013.

NESTING AREA	# NESTS	# LOST	PREDATORS	STORM	ABANDONED	UNKNOWN
Portsmouth Flats	12	4	0	2	0	2
Old Drum Inlet (NCB)	5	2	0	0	1	1
New Drum Inlet (NCB)	14	5	2	0	0	3
Ophelia Island (NCB)	8	7	1	1	0	5
Plover Inlet (Mile 23.6)	13	4	0	1	2	1
Total	52	22	3	4	3	12

Beach Closures and Brood Foraging

The area between Ophelia Inlet and Ramp 24, 1 mile in length, was completely closed to vehicles (except for NPS monitors) from May 24th to August 5th. A second ocean beach closure to vehicles was posted at Portsmouth Flats from mile 3.8 to mile 3.0, from June 17th to July 7th for three chicks that foraged on the ocean beach. The closures began the day of expected hatch of the first nest at Ophelia Inlet (SCB) or when chicks were present on the ocean beach and remained in place until the last chick was fledged, confirmed lost, or moved out of area. The middle core banks section was closed to motor vehicle use from April 1st until August 31st in accordance with the Interim Protected Species Management Plan when Old Drum Inlet is open (National Park Service, 2006).

Two broods foraged on the ocean beach in 2013. One of these broods (SCB nest 11) was observed foraging on the oceanside/ inlet beach and soundside at Ophelia Inlet at the north end of SCB. The other brood (NCB nest 13) foraged on both the oceanside and wet dune area on Portsmouth Flats. This brood was observed in the dunes in the morning and then at ocean surf zone in the afternoon of the same day on several occasions while the closure was in place. All other chicks foraged on soundside beach, sand flats, mudflats and ephemeral pools in areas closed to vehicles and in most cases all entry.

Non-nesting Piping Plover Surveys

Surveys in 2013 covered the entire seashore from January to December with the exception of the three mile Middle Core Banks section. Hurricane Irene re-opened Old Drum Inlet in late August 2011 making access and monitoring difficult. We were able to census MCB during fall migration in August and September. The government shutdown in October prevented surveys on SCB and SB. Table 5 below list this year's counts. Appendix 4 lists non-nesting counts from 2006-2013.

Table 5. Non-Nesting Piping Plover Counts at Cape Lookout National Seashore, 2013.

	January	February	March	August	September	October	November	December
NCB	?	4	5	93*	115*	17	6	16
SCB	4	0	9	6	15	na	5	3
SB	3	10	4	15	23	na	5	4
Total	≥7	14	18	114	153	≥17	16	19

*Includes MCB

Banded Piping Plovers

Sixty six observations of 30 individual non-breeding banded birds were made in the park in 2013, Appendix 5. Birds were re-sighted from the Great Plains, Great Lakes, and Atlantic Coast populations. Birds were banded from Michigan, Massachusetts, New York, New Jersey, Georgia, North Dakota, and New Brunswick Canada were re-sighted during migration and over wintering. No banded birds were seen breeding in the seashore in 2013.

Discussion

Nesting Habitat

The habitat at New Drum Flats and Old Drum Flats/Inlet continued to provide excellent nesting and foraging opportunities in the breeding season. Hurricane Irene in 2011 reopened Old Drum Inlet and temporally over washed New Drum Flats, scouring the vegetation and opening bare sandy habitat at these sites. On the north end of SCB, erosion from Hurricane Irene removed 0.3 mile of island off the north tip making Ophelia Inlet much wider. The remaining nesting habitat was much improved after the storm. The storm surge and over wash removed most of the vegetation, created big sand flats, ponds and mudflats. Hurricane Sandy in late 2012 also scoured the habitat and maintained good conditions for nesting. This high quality nesting habitat from Old Drum to Plover Inlet contained 71% (32 pairs) of the nesting pairs in 2013. Portsmouth Flats, another important area, continued to provide nesting habitat on NCB for 13 pairs (29%). The north tip of NCB at Ocracoke Inlet continued to erode and there was little nesting habitat available. There was a single male scraping, but there was no nest in 2013. The habitat at Kathryn-Jane flats, Cape Point and Power Squadron spit did not attract and hold nesting pairs in 2013. Though there was a pair nest scraping at Power Squadron spit during the June census they did not nest and left the site shortly after the census week.

Pair Numbers

The number of breeding pairs in the seashore decreased from 51 in 2012 to 45 in 2013. This may be the result of the relative low productivity last year (Appendix 3). In particular the pair numbers at Portsmouth Flats dropped from 19 pairs in 2012 to 13 pairs in 2013. Only two chicks fledged from Portsmouth Flats in 2012.

Nest Success

2013 brought moderate hatch success for piping plover nests in the park, only 58% of the nests and 56% of the eggs hatched successfully. Four (18%) nests were lost to flooding or wind. The three predator related nest losses accounted for 14 % of total losses. Raccoon predation took one nest and two were lost to ghost crab predation. Three (14%) nests were abandoned. Twelve (54%) nests losses were recorded as unknown. This unknown nest loss rate reflects the decreased monitoring ability on MCB due to inaccessibility.

In 2013, predator exclosures use was low. Only 25 nests or 48% of nests received predator exclosures. These 25 nests with predator exclosures had 20 nests hatch and a 80% hatch success. Predator exclosures use on MCB was low (7) due to uncertainty of monitoring ability. MCB had 20 nests without predator exclosures and 13 nests hatched for a total hatch success of 48%.

Predator exclosures have generally been effective in increasing hatch success. From 1997-2013, 69% of the nests protected with exclosures hatched, compared with a 41% hatch rate of the nests left unprotected.

Fledging Success

The fledging success for piping plovers at CALO was 1.04 chicks fledged per nesting pair in 2013 (Appendix 3, Chart 2). The actually number of chicks fledged were 47 fledglings. This is the highest productivity recorded at CALO and the first time the fledge success rate reached greater than 1.0. The average fledge rate from 2000-2013 is 0.62 chicks per breeding pair (Table 3).

The MCB section of NCB produced the majority of the fledglings and although hatch success was low on MCB nests without predator exclosures, the fledging success was relatively high. Of the 21 pairs that nested on MCB they produced 18 fledglings, 0.86 productivity. Individual nesting sites varied in productivity. At The Old Drum Flats/Inlet nesting site four pairs produced eight fledglings for a productivity of 2.00. The New Drum flats site had 12 pairs and fledged 8 chicks for a productivity of 0.73. The Ophelia Island site produced two fledglings from six pairs for a productivity rate of 0.33. At the Plover Inlet site, 13 fledglings were produced from 11 pairs for a fledge success of 1.18. Portsmouth Flats had the highest productivity rate of 1.23 on record for

that site with 16 chicks fledged from 13 pairs. Ocracoke Inlet, Cape Point, Power Squadron Spit, and Kathryn-Jane Flats had no nests in 2013. Site by site reproductive successes for 2013 can be compared in Table 6.

Oceanside foraging areas contributed to fledgling success in 2013. At Portsmouth Flats three chicks from one brood foraged back and forth from the wet dunes to the oceanside and fledged. At the Plover Inlet site one brood foraged on both the oceanside and soundside, with one chick fledging. Chicks at the above areas received ocean beach closures.

Table 6. Differences in Reproductive Success between Major Nesting Areas in 2013.

Nesting Area	Hatch Success	Fledge Success
Portsmouth Flats	62%	1.23 chicks per pair
Old Drum Flats/Inlet	60%	2.00 chicks per pair
New Drum Flats	64%	0.73 chicks per pair
Ophelia Island	12%	0.33 chicks per pair
Plover Inlet	69%	1.18 chicks per pair

Predators

There were wild canine tracks on SCB in the Cape Point and Power Squadron Spit area in the summer. They appeared to be fox or coyote tracks. This may partial explain the lack of piping plover pairs at these sites. Fox predation events were recorded at other shorebird nests on Shackleford Banks. Raccoon and feral cat tracks at nest sites continue to be a concern. One nest without a predator exclosures was taken by raccoon. In 2013 no attempts were made to dig into predator exclosures by raccoons or other mammals.

Human Disturbance

Posted closures for bird nesting areas were not always respected by park visitors. Law enforcement rangers issued four citations for pedestrians in bird nesting areas and three citations for vehicles in bird areas in 2013.

Dogs were also a potential source of disturbance to nesting birds. Resource management staff documented 182 dogs on leash and 42 dogs off leash in 2013. This survey revealed 81% of dogs were on leash and 19% were off leash. The survey period was from April through September and did not cover all dog sightings in the seashore. Law enforcement rangers issued 24 dog off leash citations, 8 written warnings, and 248 verbal warnings in 2013.

Non-nesting piping plovers

CALO continues to be an important migration stopover location and wintering site for piping plovers. Figure 6 illustrates non-breeding piping plover observations and critical habitat units. In 2013, 429 birds were recorded during 138 observations of piping plovers in the seashore during the non-nesting season. The area on NCB near Ocracoke Inlet again had high numbers of birds in spring and fall migrations. The area from Old Drum Inlet flats to Ophelia Inlet also had high numbers of birds counted in August and September. On NCB, 93 piping plovers were counted on the August 15th count and 115 on the September 15th count. Sixteen banded piping plovers from the endangered Great Lakes population were re-sighted in 2013. In addition four birds banded in Massachusetts, three banded in New York, three banded in New Jersey, one banded in Georgia, one banded in North Dakota, one banded in New Brunswick Canada, and one unknown banded birds were re-sighted in 2013.

US Fish and Wildlife Service Biological Opinion

The USFWS provided CALO a biological opinion that included four performance measures for the Interim Protected Species Management Plan. Forty five breeding pairs were found in CALO in 2013 surpassing the target of 25 or more pairs of performance measure one. Forty five pairs produced 52 nests (1.15 nest per pair) surpassing the target of at least one nest per breeding pair of performance measure two. The 45 nesting pairs produced 47 fledglings for a fledge rate of 1.04, which is above the target of 0.75 of performance measure three. The fledge rate is still below the 1996 USFWS recovery plan goal of 1.50 (USFWS 1996). Winter plover surveys at CALO were conducted at least once monthly from August until March to meet performance measure four.

Literature Cited

National Park Service. 2006. Interim Protected Species Management Plan/
Environmental Assessment. Cape Lookout National Seashore, North Carolina.

U.S. Fish and Wildlife Service. 1996. Piping Plover (*Charadrius melodus*) Atlantic Coast Population Revised Recovery Plan. Regional Office, Hadely, Massachusetts.

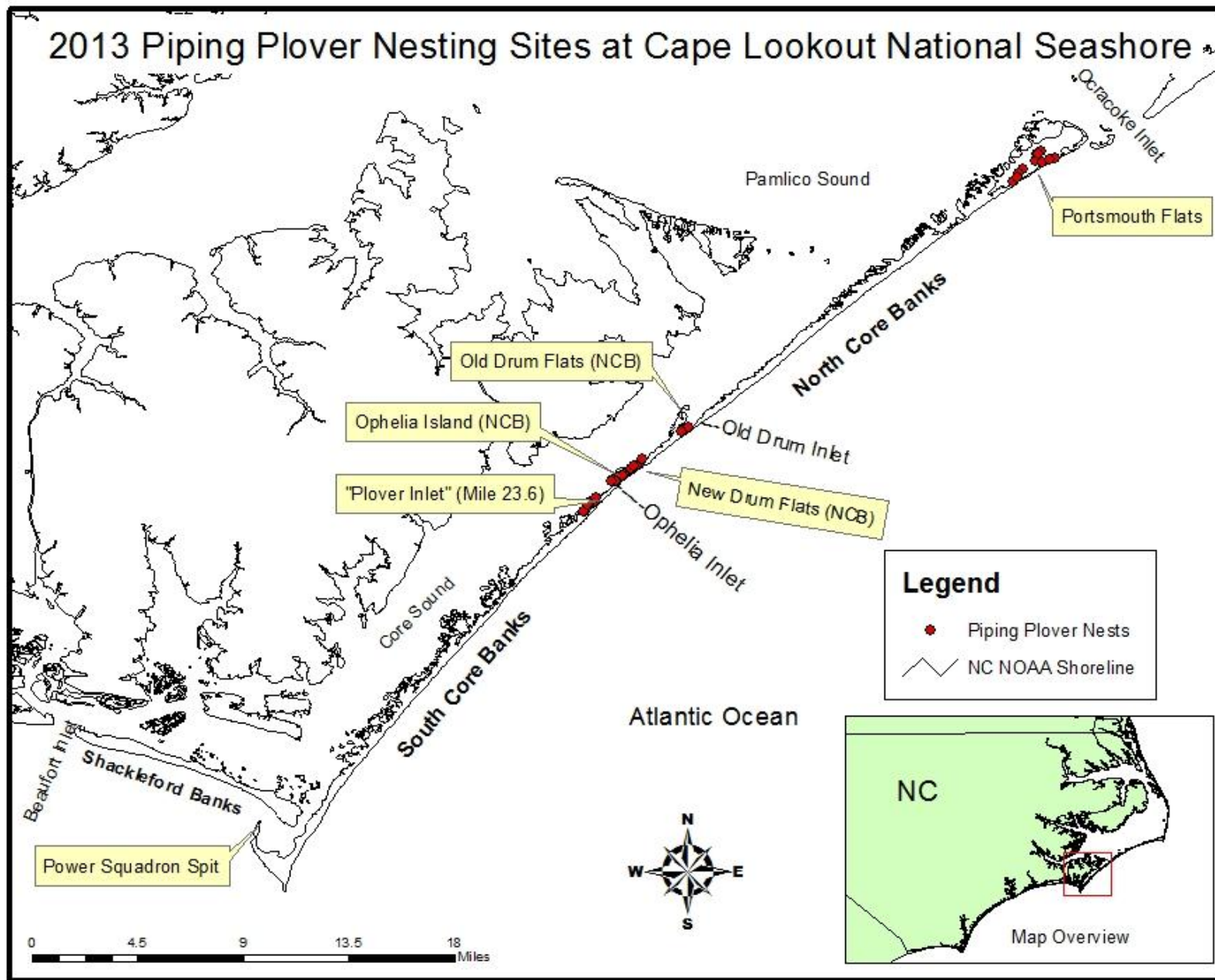


Figure 1. Map of 2013 Occupied Piping Plover Nesting Sites at Cape Lookout National Seashore.

Appendix 1- 2013 PIPING PLOVER WINDOW CENSUS

2013 Piping Plover breeding census results: June 1-9

North Core Banks: 33 pairs, 2 single

Ocracoke Inlet 1 single male

Portsmouth Flats 14 pairs

Old Drum Inlet 4 pairs, 1 single male

New Drum Inlet 10 pairs

Ophelia Island 5 pairs

South Core Banks: 10 pairs

Plover Inlet 9 Pairs

Power Squadron Spit 1 Pair

Shackleford Banks: 0 piping plovers

Cape Lookout National Seashore: 43 pairs, 2 single birds

Appendix 2- 2013 PIPING PLOVER NEST DATA

NORTH CORE BANKS 2013

Nest #	Pair #	MILE	DATE FOUND	CLUTCH SIZE	EXCLOSURE	HATCH DATE	EGGS HATCHED	# FLEDGED	COMMENTS (abbreviated)
1	1	22.56	24-Apr	3	N/A	N/A	0	0	nest failed 5/8, unknown, nest cup weathered away
2	2	22.4	24-Apr	4	N/A	N/A	0	0	nest failed 5/8, unknown, 0 eggs, 4/26 nest had 3 eggs missing, unknown cause
3	3	21.75	24-Apr	4	10-May	20-May	4	1	chick fledged on 6/15 at day 26, foraged in soundside cove
4	4	21.65	24-Apr	4	10-May	20-May	3	1	chick fledged on 6/15 at day 26, foraged on soundside
5	5	19.25	26-Apr	3	10-May	22-May	3	3	chicks fledged on 6/16 at day 25, foraged on mudflat
6	6	21.78	28-Apr	4	N/A	N/A	0	0	failed 5/8, Unknown, 0 eggs, nest cup weathered away
7	7	22.2	28-Apr	4	N/A	20-May	3	2	chicks fledged on 6/15 at day 26, foraged at crosswalk on soundside
8	8	21.99	28-Apr	4	10-May	27-May	4	2	day 25 fledge, assumed fledged after 6/21, saw chicks flap wings on 6/23
9	9	21.74	28-Apr	2	N/A	N/A	0	0	failed 5/8, unknown, 0 eggs, nest cup weathered away
10	10	2.2	28-Apr	4	30-Apr	27-May	4	3	chicks fledged on 6/20 at day 24, foraged at pond 3 and along dune/vegetation line
11	11	2.2	28-Apr	4	30-Apr	29-May	4	2	chicks fledged on 6/20 at day 22, foraged at pond 3 and along dune/vegetation line
12	12	2.1	30-Apr	4	11-May	4-Jun	3	3	chicks fledged on 7/4 at day 30
13	13	3.53	5-May	4	21-May	7-Jun	4	3	6/17 to 7/7 beach closure erected at mile 3.0 to 3.8 - chicks on beach and moved back and forth from dunes to beach, fledged on 7/7 at day 30
14	14	2.3	5-May	4	11-May	4-Jun	3	3	2 inches sand removed from buried nest on 5/15, 1 egg broken, fledged on 7/4 at day 30
15	15	19.28	28-Apr	3	10-May	22-May	3	2	chicks fledged on 6/16 at day 25
16	2	22.38	10-May	1	N/A	N/A	0	0	failed 5/22, 0 eggs, depredated - raccoon tracks facing nest cup
17	16	19.36	14-May	3	N/A	N/A	0	0	failed 5/18, 0 eggs, unknown
18	17	19.09	14-May	3	N/A	N/A	0	0	failed 5/22, 3 eggs, abandoned maybe

19	18	1.72	17-May	4	N/A	N/A	0	0	failed 6/8, nest sanded from TS Andrea 6/7
20	19	22.24	17-May	4	N/A	26-May	4	0	brood lost shortly after hatch, no chicks ever seen, no signs of nest predation
21	20	21.42	17-May	2	N/A	N/A	0	0	failed 5/22, unknown - no predator tracks
22	21	21.56	17-May	4	26-May	15-Jun	4	1	chick fledged on 7/15 at day 30, forage mudflat
23	1	22.57	17-May	4	N/A	N/A	0	0	was not able to check at expected hatch date of 6/20 , no 0 eggs on 6/23 and no chicks in area
24	9	21.74	17-May	3	N/A	N/A	0	0	failed 5/22, depredated - ghost crab
25	6	21.78	25-May	4	26-May	15-Jun	2	1	chick fledged on 7/14 at day 29, foraged on mudflat
26	22	21.26	26-May	3	N/A	21-May	3	2	missed nest, chicks 3-5 days old, chicks fledged on 6/15 at day 25
27	23	2.21	27-May	4	3-Jun	N/A	0	0	6/14- 3 eggs lost from TS Andrea, 1 egg on top of sand ~1-2" of sand deposited in enclosure
28	16	19.38	27-May	4	N/A	23-Jun	3	3	assumed day 25 fledge on 7/19
29	24	2.2	29-May	3	N/A	23-May	3	2	missed nest, chicks 6-7 days old, scrap/nest cup found on 5/25, pond 3, fledge on 6/20 at day 28
30	25	2.93	31-May	4	5-Jun	N/A	0	0	nest cup empty on 6/24, adult behavior does not suggest chicks
31	26	3.19	31-May	4	3-Jun	23-Jun	3	0	chicks lost -unknown
32	27	22.12	31-May	3	N/A	N/A	0	0	failed 6/15 - depredation - ghost crab hole at nest; lost an egg, during TS Andrea 6/7
33	28	22.63	1-Jun	2	N/A	N/A	0	0	failed 6/9, 0 eggs, nest cup empty; raccoon tracks up to nest area
34	29	22.68	1-Jun	3	N/A	N/A	0	0	failed 6/15, unknown, raccoon tracks nearby
35	30	3.28	5-Jun	4	N/A	N/A	0	0	failed 6/10, 0 eggs, nest cup sanded over , feline tracks in area
36	31	22.6	15-Jun	2	N/A	N/A	0	0	fail by 7/3, 25-30 mph winds and heavy rain on 6/28-7/1
37	32	21.59	15-Jun	4	N/A	11-Jul	4	0	last saw chicks on 7/16, unknown loss
38	19	22.25	5-Jul	2	N/A	29-Jun	2	0	missed nest, found 2 chicks at 6-7 days old, last saw chick on 7/15- unknown loss
39	33	1.93	8-Jul	4	9-Jul	15-Jul	4	0	7/17 chick skull found nearby ghost crab hole, last saw chick on 7/18-loss unknown

33 nesting pairs, 39 nests, 21 hatched nests, 34 chicks fledged

SOUTH CORE BANKS 2013

Nest #	Pair #	MILE	DATE FOUND	CLUTCH SIZE	EXCLOSURE	HATCH DATE	EGGS HATCHED	# FLEDGED	COMMENTS (abbreviated)
1	1	23.78	18-Apr	4	25-Apr	N/A	0	0	nest abandoned on 5/24, eggs sanded in
2	2	23.85	18-Apr	3	25-Apr	26-May	3	0	chicks failed by 6/9, no observations 6/5-6/8, chick loss unknown
3	3	23.9	28-Apr	3	N/A	N/A	0	0	nest failed 5/8, unknown
4	4	23.68	30-Apr	4	2-May	23-May	4	3	fledged on 6/18 at day 28
5	5	24.16	30-Apr	3	2-May	29-May	3	3	foraged at crosswalk mudflat and to the south, fledged on 6/27 at day 29
6	6	24.24	30-Apr	3	2-May	N/A	0	0	nest abandoned on 5/18, eggs sanded in
7	7	24.26	8-May	4	10-May	31-May	4	1	Fledged on 6/29 at day 29
8	8	23.69	17-May	3	21-May	6-Jun	3	2	Fledged on 7/3 at day 27
9	9	23.58	26-May	3	27-May	N/A	0	0	eggs blown out of nest cup 6/11-6/14
10	10	23.68	17-Jun	2	N/A	UNK	2	1	missed nest, found chicks after hatch, fledged on 7/7
11	9	23.49	17-Jun	4	24-Jun	14-Jul	4	1	foraged on ocean shoreline at inlet and soundside, fledged on 8/5 at day 22
12	3	23.9	30-Jun	2	N/A	UNK	2	2	missed nest, found 2 chicks after hatch, fledged on 7/19
13	11	23.9	22-Jul	2	N/A	UNK	2	0	nest initiation was 6/20, missed nest, found 2 chicks after hatch at 5 days old

11 nesting pairs, 13 nests, 9 hatched nests, 13 chicks fledged

Appendix 3. Chart 1 Piping Plover Nesting and Chart 2 Piping Plover Productivity.

Chart 1. Piping Plover Nesting at Cape Lookout National Seashore

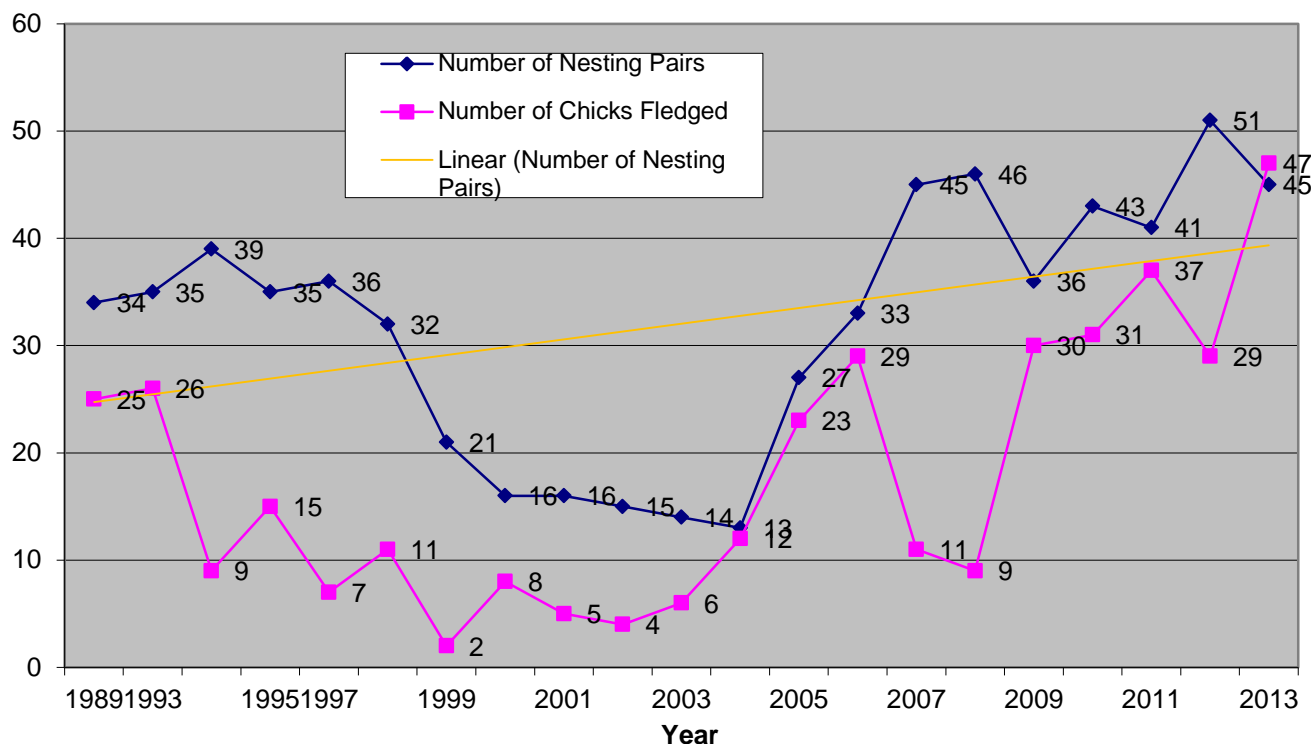


Chart 2. Piping Plover Productivity at Cape Lookout National Seashore

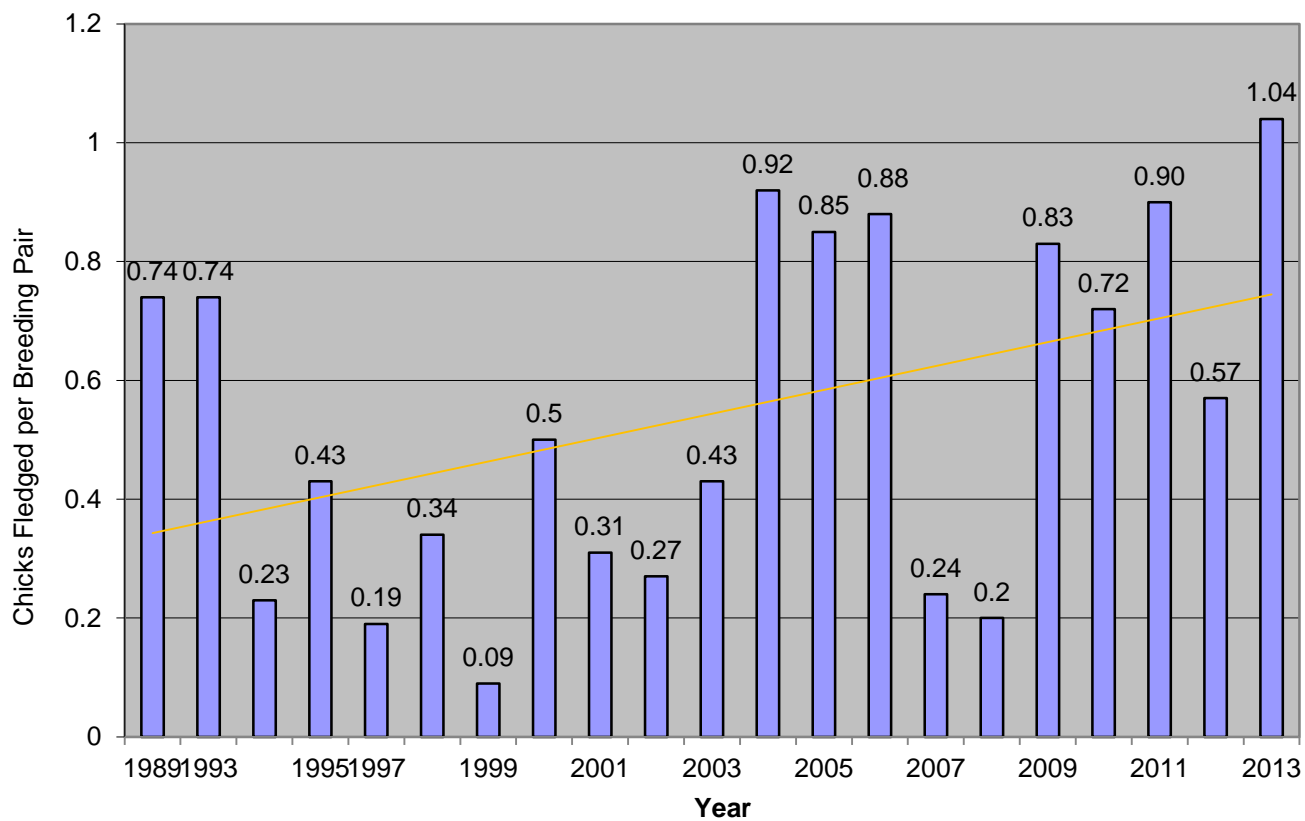
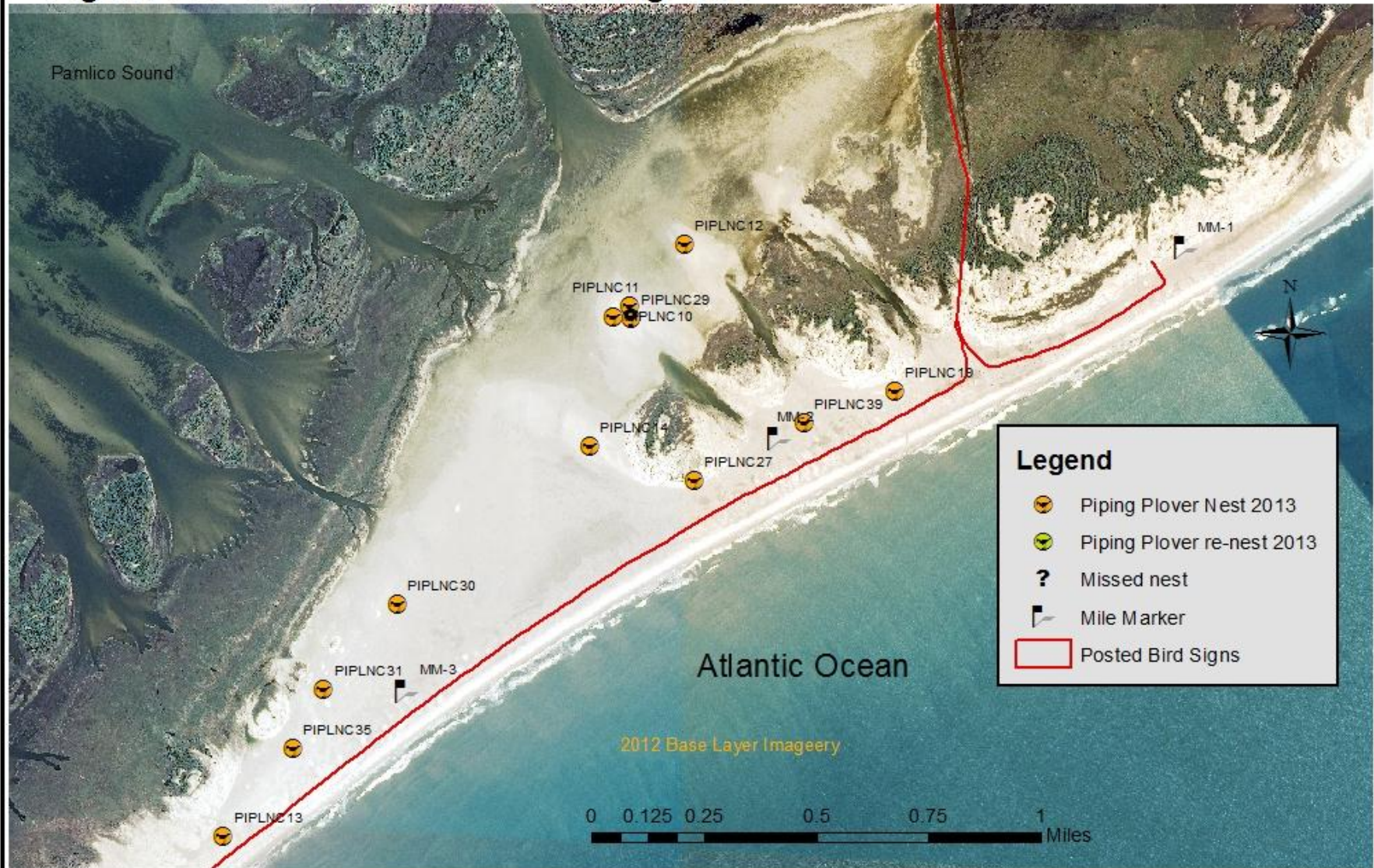




Figure 2. Portsmouth Flats Nesting Site



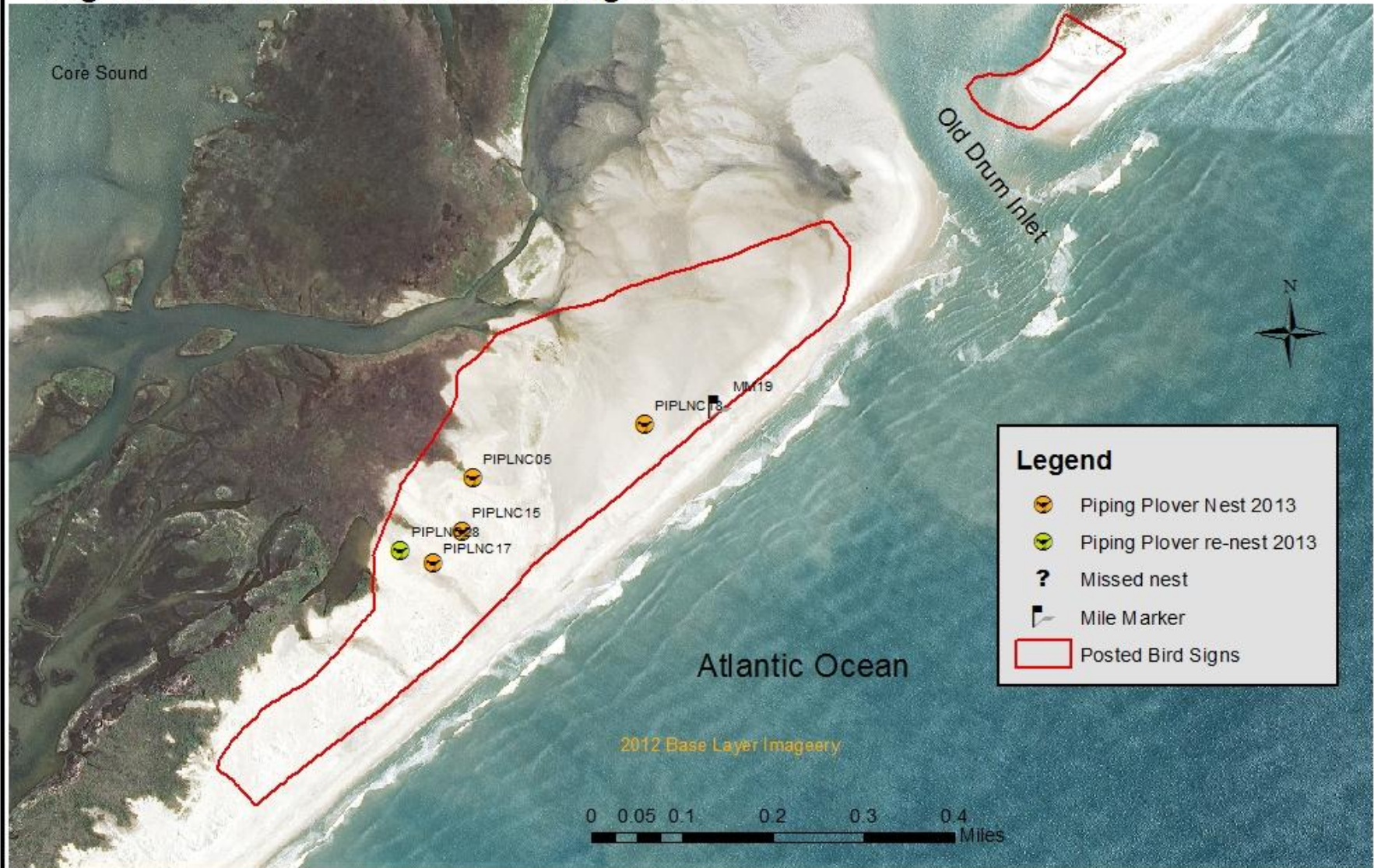
Produced by Natural Resource Management Office

November 2013

FILE: PIPL_2013_nests.mxd



Figure 3. Old Drum Inlet Nesting Site



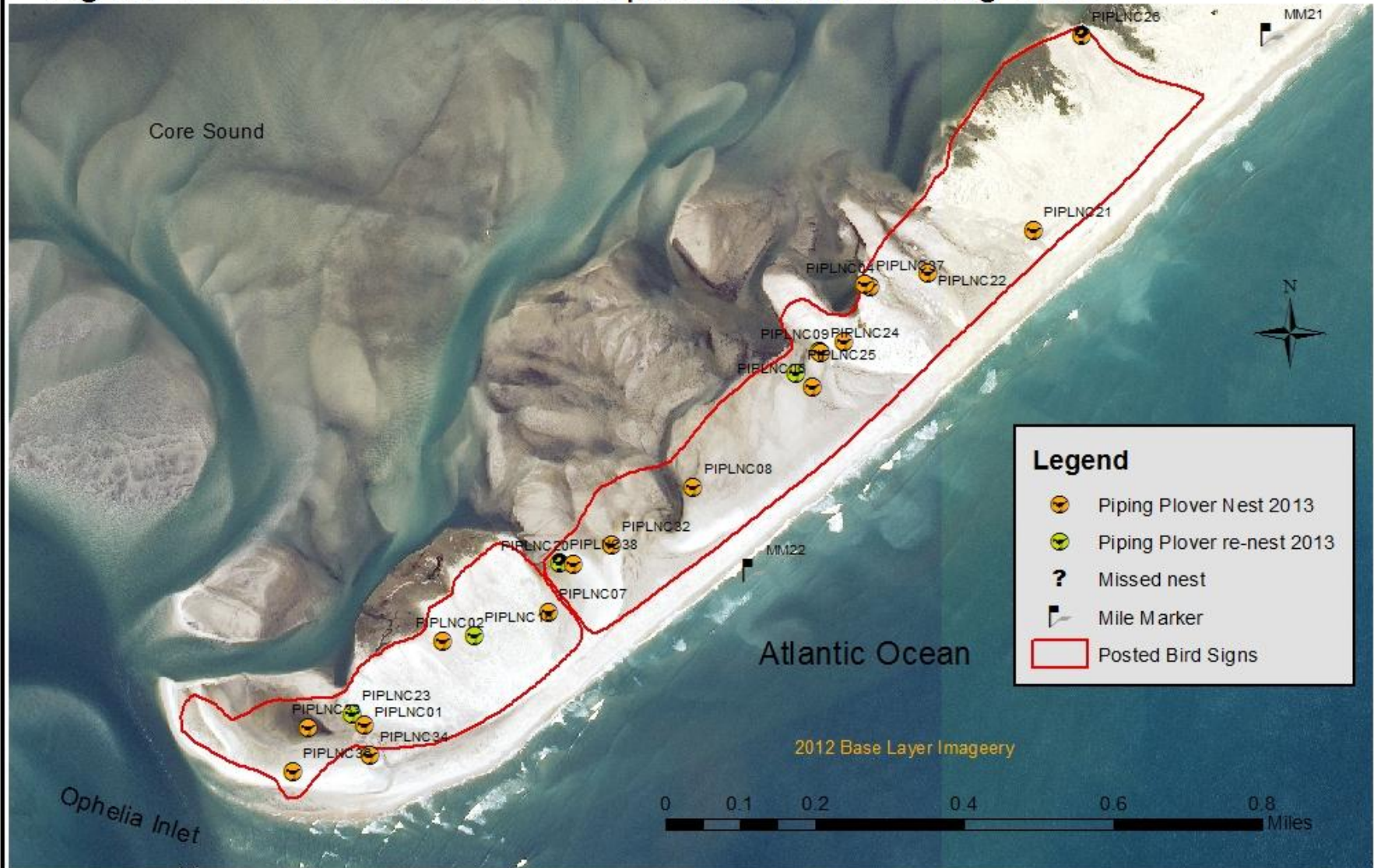
Produced by Natural Resource Management Office

November 2013

FILE: PIPL_2013_nests.mxd



Figure 4. New Drum Flats and Ophelia Island Nesting Sites



Produced by Natural Resource Management Office

November 2013

FILE: PIPL_2013_nests.mxd



Figure 5. Plover Inlet Nesting Site.



Appendix 4. Monthly counts of non-nesting piping plovers 2007-2013

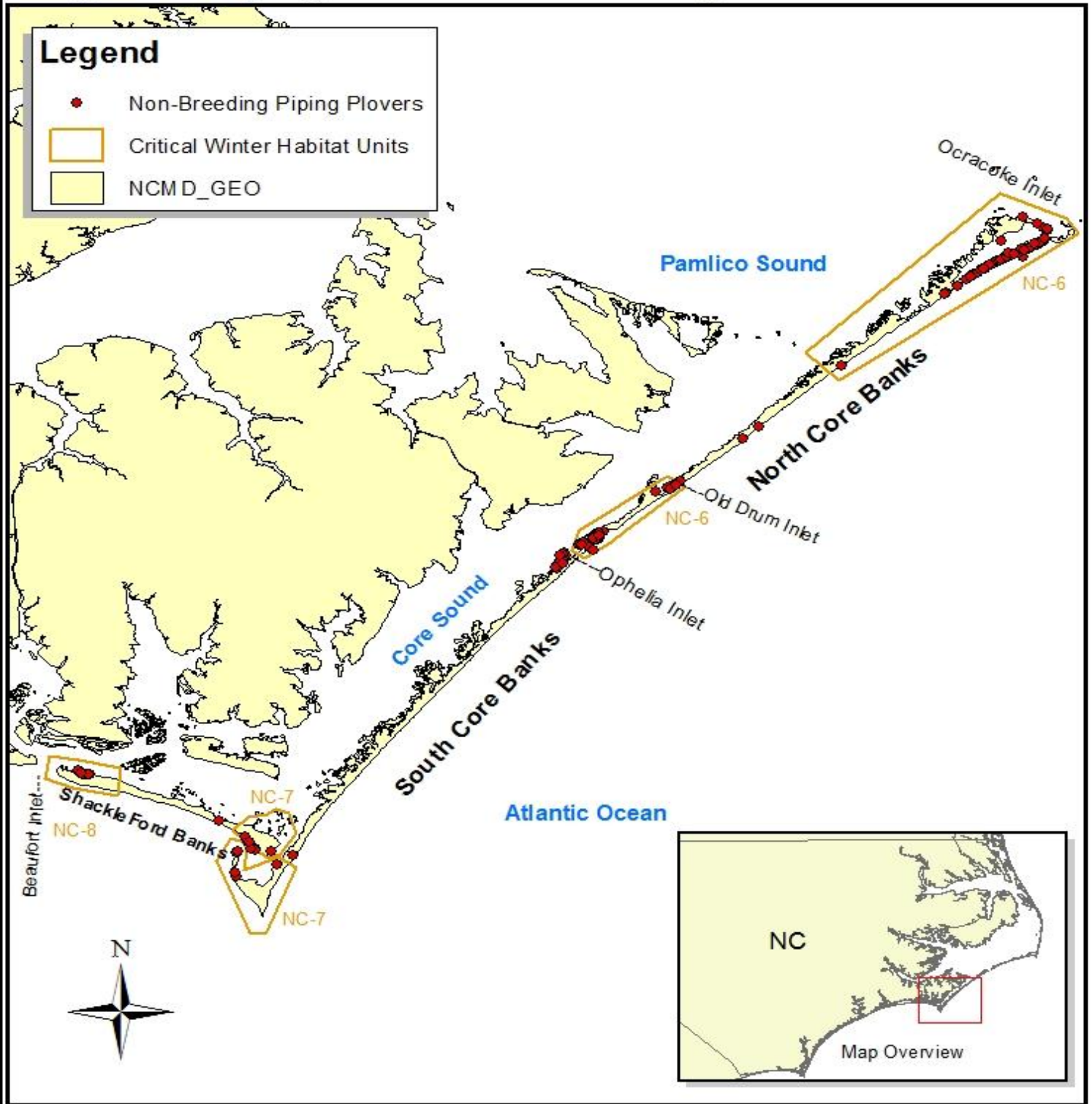
Date	North Core Banks	South Core Banks	Shackleford Banks	CALO Total
August-07	46	46	11	103
September-07	52	27	2	81
October-07	18	26	17	61
November-07	12	8	22	42
December-07	10	9	14	33
January-08	0	2	11	13
February-08	0	6	10	16
March-08	6	6	10	22
August-08	41	28	17	86
September-08	16	20	10	46
October-08	25	9	20	54
November-08	11	4	9	24
December-08	9	7	8	24
January-09	6	18	13	37
February-09	2	9	12	23
March-09	10	17	?	≥27
August-09	83	26	2	111
September-09	144	33	10	187
October-09	22	19	13	54
November-09	18	12	12	42
December-09	12	14	23	49
January-10	17	8	11	36
February-10	8	5	11	24
March-10		10	6	≥16
August-10	125	23	4	152
September-10	70	32	17	119
October-10	35	13	4	52
November-10	8	19	9	36
December-10	4	3	6	13
January-11	6	2	7	15
February-11	7	0	8	15
March-11	12	8	13	33
August-11	81	26	0	107
September-11	29	8	20	57
October-11	26	19	6	51
November-11	7	3	11	21
December-11	2	4	11	17
January-12	0	2	5	7
February-12	0	2	10	12
March-12	5	1	?	≥6
August-12	82	32	4	118
September-12	112	7	9	128
October-12	0	3	12	15
November-12	3	7	5	15
December-12	6	6	2	14
January-13	?	4	3	7
February-13	4	0	10	14
March-13	5	9	4	18
August-13	93	6	15	114
September-13	115	15	23	153
October-13	17	?	?	≥17
November-13	6	5	5	16
December-13	12	3	4	19

Appendix 5. Banded Piping Plover Observations at CALO in 2013

Initial Date	Upper Left Leg	Lower Left Leg	Upper Right Leg	Lower Right Leg	Island	Comments: population, state, park code, (other re-sight dates at CALO)
1/19/2013	orange	yellow	metal	orange/yellow	SB	Great Lakes, MI, SLBE (4/23 & 5/9 SB)
7/26/2013	metal	red	orange flag	blue/blue	MCB	Great Lakes, Unk (7/26-9/13)
7/27/2013	none	blue	orange flag	yellow/black	MCB	Great Lakes, Unk
7/27/2013	green flag 97	none	orange	none	MCB	NY, FIRE (7/27-9/13)
7/30/2013	orange flag	metal	green/blue	none	NCB	Great Lakes, Unk
8/3/2013	dark blue	none	light blue	none	NCB	Sampson's Island, MA
8/3/2013	orange flag	red	metal	light green	NCB	Great Lakes, MI, SLBE (8/3-8/31)
8/5/2013	blue/black	none	blue/green	none	NCB	Avalon, NJ (8/5-9/9)
8/15/2013	orange	white	metal	white	NCB	Great Lakes, Unk
8/16/2013	orange	none	metal	orange/yellow	SB	Great Lakes (8/16-12/15)
8/26/2013	metal	none	white flag (EP)	none	NCB	New Brunswick, Canada (8/26-11/12)
8/30/2013	black	none	yellow	none	MCB	Sandwich, MA
8/31/2013	green/orange	none	green/orange	none	NCB	Stone Harbor, NJ (8/31-9/9)
8/31/2013	blue	none	orange	none	NCB	Dennis, MA
9/7/2013	Unk	Unk	orange flag	blue/yellow	MCB	Great Lakes, Unk
9/9/2013	yellow	none	black	none	NCB	Sampson's Island, MA
9/13/2013	metal	black	orange flag	yellow/black	MCB	Great Lakes, Whitefish Point, MI
9/13/2013	orange	none	metal	yellow/orange	MCB	Great Lakes, MI, SLBE
9/13/2013	metal	none	orange	blue	MCB	Great Lakes, MI
9/13/2013	orange flag	blue/green	none	white?	MCB	Great Lakes
9/13/2013	orange	Blue (05)	metal	blue/orange/blue	MCB	Great Lakes, MI
9/21/2013	green flag 82	none	orange	none	MCB	NY, FIRE
9/21/2013	metal	red	orange	red	MCB	Great Lakes
9/21/2013	green flag	green/orange	none	yellow/green	MCB	Georgia, January 2013
11/14/2013	metal	none	yellow flag H34	none	SB	Lake Sakakawea, ND
11/15/2013	metal	light blue	orange	light blue/orange	SCB	Great Lakes, MI
11/15/2013	metal	pink/blue	none	blue	SCB	Unknown
12/13/2013	orange	none	metal	green	NCB	Great Lakes



Figure 6. Piping Plover Non-Breeding Observations 2013



0 1.5 3 6 9 12 Miles

Produced by Natural Resource Management Office

December 2013

FILE: PP_NB_13