Summary of Piping Plover and Other Shorebird Breeding Success
Nauset and Skaket Beaches, Orleans, Massachusetts
2008

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ABSTRACT

Piping Plover (*Charadrius melodus*) nesting and brood rearing and Least Tern (*Sterna antillarum*) colonies were monitored at 3 separate areas in Orleans: Nauset Spit (Heights), Nauset Beach Orleans and Skaket Beach.

A total of twenty seven (27) pairs were monitored at the two ocean sites and a single (1) pair was monitored at Skaket. This total is an increase of five (5) pairs over 2007.

Across all Orleans beaches, overall hatching success was 0.61. Fledging success was 0.67. A total of 54 chicks fledged. Productivity was 1.93. A total of 40 nests were initiated during the 2008 breeding season. Fourteen (14) nests were successful on their first attempt. Ten (10) nests were successful on their second attempt. Exclosed nests had a 15% loss. Unexclosed nests had a 92% loss.

The first vehicle closure occurred on 5.31.08. By 8.15.08 all Orleans beaches were open to vehicle traffic.

INTRODUCTION

Nauset Beach is owned and managed by the Town of Orleans and is located on the Atlantic Ocean. **Nauset Beach** is comprised of **Nauset Spit (Heights)** (north of the public beach) and **Nauset Beach Orleans** (south of the public beach). A section of Nauset Beach Orleans called **Pochet** is located just south of the public beach. **Skaket Beach**, located on Cape Cod Bay, is owned in part by the Town of Orleans. Other ownership includes the State of MA and private property. The entire Skaket area is monitored by Orleans Parks and Beaches and, in the case of private property, was monitored with permission.

Piping Plovers (*Charadrius melodus*) and Least Terns (*Sterna antillarum*) nest on these beaches as do the occasional American Oystercatchers (*Haematopus palliatus*) and Common Terns (*Sterna hirundo*). Piping Plovers, Least Terns, Common Terns, American Oystercatchers, Roseate and Arctic terns as well as Black Skimmers are typically seen among staging migratory birds.

In 1986, when the plover was federally listed as a threatened species, the Town of Orleans initiated active management and protective measures to protect these breeding birds. Included in this report are the Massachusetts Census Forms for Piping Plovers, American Oystercatchers, Least and Common Terns.

A total of twenty eight (28) breeding piping plover pairs nested on Orleans Beaches in 2008. Of these, twenty two (22) pairs nested on Nauset Spit. Within the Nauset Beach Orleans area, three (3) pairs nested and a fourth pair scraped but never nested at the Pochet washover area. One (1) nest was established at Nauset Beach Orleans. One (1) pair nested at Skaket Beach.

STUDY AREAS AND MANAGEMENT

Since 1990 data has been gathered on piping plovers nesting at 3 different areas within Nauset Beach. This year, 2008, saw the addition of a successful nesting pair at Skaket Beach, on the Cape Cod Bay side of Orleans.

Nauset Spit (Heights)

Nauset Spit is approximately 1.8 miles long. ORV traffic is allowed and limited to Orleans residents. Symbolic fencing, which consists of clearly signed 6' posts and 5' stakes connected with string, surrounds nesting habitat. Several walkways are in place for access to and from Nauset Cove. During 2008 this fencing with signage was completed by late April. To prevent chick mortality, areas with chicks due to hatch within two (2) days were closed off to vehicles by means of barriers consisting of a number of well signed posts. Several 6' posts were placed in a row from the symbolic fencing to the tide line. This barrier remained in place for 25 days or until the chicks fledged. The first vehicle closure occurred on 5.31.08. The Spit was re-opened to vehicular traffic in stages, as chicks fledged. It was completely re-opened to vehicles on 8.15.08. Dog restrictions remain in place until September 15.

West of Nauset Spit is New Island, which is under the jurisdiction of the National Park Service. New Island, due to its location, is heavily monitored by Orleans. It is, however, reported by Cape Cod National Seashore, Wellfleet. Piping Plover pair #16 laid a nest on Nauset Spit starting 5.31.08. On 6.5.08 that three (3) egg nest was predated. On 6.19.08 a four (4) egg plover nest was located on New Island. This nest was attributed to pair #16. Therefore, although located on National Park Service property, the nest is included in this summary. It was not exclosed, as it could not be monitored daily.

Nauset Beach Orleans

Nauset Beach Orleans is located south of Nauset Spit and is 4.4 miles long. This beach is open to Orleans residents and to the general public. In addition, a handful of privately owned camps are found along the access road. Access to Nauset Beach Orleans requires purchase of a sticker. Purchasers are also required to view and informational video on rules, regulations and safety. Symbolic fencing and signage was used across this beach. Nesting habitat appears to be limited more each year due to narrowing of beachfront and increasing washover.

Pochet

Pochet, the northernmost section of Nauset Beach Orleans, is located south of Nauset Spit and south of the gated entrance for all ORVs. Within the Pochet area, a washover of approximately 855' north to south and 789' east to west has historically provided pristine habitat for piping plovers and least terns. Recent frequency of astronomical spring tide/storm washovers has clearly reduced nesting potential at this site, while foraging habitat remains excellent. Nesting data for Pochet area is included in Nauset Beach Orleans results.

Skaket Beach

Skaket Beach is owned in part by the town of Orleans, also by the state of MA and by private property owners. On the private beach the town of Orleans purchased walking rights as part of the Skaket Beach Sea Path. Property owners where plovers nested this season willingly gave the Town permission to erect symbolic fencing to protect the plovers.

METHODS

Pre-season Activities

To ensure protection of nesting Piping Plovers and in compliance with the Federal and State Endangered Species Act, dogs were prohibited on Nauset Spit from March 15 until September 15. From a point south of the Nauset Beach parking lot to Trail #1, dogs were prohibited from May 15 until Labor Day. From a point south of Trail #1 to the Chatham inlet dogs must be on a leash at all times between May 15 and Labor Day, unless below the high tide mark. Dogs were prohibited on Skaket Beach from the Friday before Memorial Day until Columbus Day. Signs were installed to inform beach-goers of these restrictions. A press release was submitted to local media.

Symbolic fencing was in place by late April on all beaches which provide habitat for Piping Plovers. ORV corridors become open to permit holding visitors on May 1. Various plover and tern informational and regulatory signs were posted at the entrance of most beaches and at the nesting sites. Many of these areas had to be re-posted and/or re-strung after severe storms as well as in response to vandalism. Kites are prohibited within 200 yards of nesting areas.

Nesting Season Management and Monitoring

Observations of piping plovers began March 28 and continued through August 13, when the last piping plover chicks fledged. In March and early April most areas were visited 3-4 times a week, with the exception of North Beach Orleans south of Pochet, which was monitored 1-2 times a week. By late April monitoring occurred approximately once daily. Pairing and territory selection behaviors were documented in log reports. Due to limited staffing, some areas could not be monitored every day.

Nest locations were identified on maps and described in logs; scrapes were logged and marked on site. Symbolic fencing was extended to protect any nests initiated outside of existing protected area. Much effort went into locating nests prior to completion in order to better predict hatching dates. Predator tracks were reported in the log.

Predator exclosures fitting the design outlined in Table 1 were installed when a clutch reached three (3) eggs or was complete. In the case of incomplete clutches, some exclosures were installed with permission from MDFW. Skaket Beach nest was not exclosed as it could not be monitored on a daily basis.

Sections of beach near nests were closed to vehicular traffic approximately two (2) days prior to predicted hatch date of those nests. 4WD and all terrain vehicles were used to access sites in all areas until chicks began to hatch. After hatching began, ATVs were used exclusively.

RESULTS AND DISCUSSION

Seasonal Chronology

Plovers were first observed on Orleans beaches on March 28. Most beaches had plovers present by mid-April. Egg laying began in late April, with the first nest (2 eggs) found 5.1.08. The first chicks hatched on 6.6.08. The last nest was initiated on 6.19, completed (3 eggs) on 6.23.08 and hatched on 7.18.08. Hatching dates ranged from 6.6.08 to 7.18.08. Fledge dates ranged from 7.2.08 to 8.9.08.

By comparison, the first nest of 2007 was found on 5.6.07 with 2 eggs. The first nest hatched on 6.9.07 and fledged three chicks on 7.2.07. The final nest was found on 6.30.07 with a complete clutch of 4 eggs. Hatching dates ranged from 6.9.07 to 7.10.07. Fledge dates ranged from 7.2.07 to 8.4.07.

Nesting Pairs

Twenty eight (28) nesting pairs of piping plovers were monitored on Orleans beaches in 2008. The number of nesting pairs in Orleans increased by five (5) pairs since 2007. Nauset Spit had 22 pairs, an increase of 5 pairs. Nauset Beach Orleans (including the Pochet area) had 5 pairs, a decrease of 1 pair. Skaket Beach had not previously reported a nesting pair. One Nauset Spit pair re-nested on New Island, which is under National Park Service jurisdiction, but was monitored and reported by Orleans, as that pair's first nest had been on Nauset Spit.

Nest Loss

Nest loss is a measure of how likely a given nest is to fail at hatching out at least one chick and is defined as the number of failed nesting attempts divided by the total number of nesting attempts. Nest loss for all Orleans nesting pairs was 0.40. Nest loss on Nauset Spit was 0.39. Nest loss on Nauset Beach Orleans was 0.50. Skaket Beach had no loss of nests.

Hatching Success

Hatching success is a measure of how likely an egg is to hatch and is defined as the number of eggs hatched divided by the total number of eggs laid for all pairs. Hatching success for all sites combined was 0.61. For Nauset Spit, hatching success was 0.62. Hatching success at Nauset Beach Orleans was only 0.48. Skaket Beach had a 1.00 hatching success.

Fledging Success

Fledging success is a measure of how likely a chick is to survive to fledging and is defined as the number of chicks that fledged divided by the total number of chicks to hatch out. Fledging success for all areas was 0.67. For Nauset Spit, fledging success was 0.60. Fledging success at both Nauset Beach Orleans and Skaket Beach was 1.00.

Productivity

Productivity is an overall measure of success for the nesting season that is defined as the average number of chicks fledged per pair of adults. Productivity for all areas was 1.93. This was an increase from a productivity of 1.13 in 2007. Productivity on Nauset Spit was 1.82 chicks per pair, as compared to a 2007 productivity of 1.18. Productivity at Nauset Beach Orleans was 2.00 chicks per pair, up from a productivity of only 1.00 chicks per pair in 2007. Skaket Beach had a productivity of 4.00 chicks per pair; again, a site with no previous nesting data.

Predators

Crows, coyotes, gulls and raptors (kestrels, harriers, merlins) were all observed hunting plover and tern nesting habitat. Tracks of crows, coyotes, fox, gulls, skunks, opossum and raccoon were recorded in and around nesting areas. No evidence of feral cats was observed. Predation was the leading cause of plover nest loss. When supported by evidence, in particular tracks leading up to a nesting scrape, loss of eggs was attributed to specific predator types

An interesting case of predation was documented on 7.18.08. Coyote tracks and evidence of digging were found around an exclosed nest on Nauset Spit. Two eggs were missing and both adults were protecting the final egg. This egg hatched the following day. It is suspected that the first two chicks hatched and were coyote predated upon exiting the exclosure. This is the only case of chick predation *without chick remains* with supporting evidence.

Predator Exclosures

Exclosures resulted in a high degree of success at protecting nests. 92% of all unexclosed nests were lost to all named causes. Of those nests, 92% were lost to predation. In contrast, only 15% of exclosed nests were lost to all named causes. Only one exclosed nest experienced predation due to the eggs being washed from the exclosure.

Abandonment of Exclosed Nests

Only one nest abandonment was observed. A full clutch nest was located and exclosed on 6.22.08. Exclosure was accepted. This nest was being incubated with two (2) adults observed. Both adults were last seen on 6.29.08. The remaining parent was last observed 7.05.08. Supposition was that one adult may have been lost, leaving a lone parent which eventually was forced to abandon the clutch.

Chick Mortality

On 6.28.08, one chick was found dead in the scrape within a couple of hours of hatching. Parents were still brooding and attempting to protect the chick. The parents stopped their protective behavior of this chick by the following day. Other chicks in that brood survived, and two of the three fledged. No other chick mortality was directly observed.

Adult Mortality

No adult mortality was observed. Abandonment of the full clutch at Nauset Beach Orleans raised a question of adult mortality (*See Abandonment of Exclosed Nests.*)

Feeding Activity

Due to staffing limitations, most areas could only be observed once daily, weather permitting. Consequently, feeding patterns were not obvious. Tide, temperature, wind and human activity all appeared to affect some plover feeding behaviors. At the southern/mid area of Nauset Spit, a few families in close proximity to each other appeared to have the habit of morning-feeding on the ocean side until it either became too hot or until numbers of walkers appeared on the beach. They then moved to the west side, to the wrack line and mud flats. At Pochet one (1) family fed on the ocean side almost exclusively. The other two (2) Pochet families mingled and seemed to prefer the west side of the overwash. It also appeared that certain plover families selected certain habitats as their primary feeding resource and just stuck with it, whether cobbly ground, dunes or wrack line, with visits to mudflats. Often monitors drew conclusions about where to look for plovers based on their individual family patterns, which differed significantly.

Off-road Vehicle Closures

Vehicles were prohibited from sections of Nauset Spit from 5.31.08 until 8.15.08. The extent of the area closed to vehicles is outlined in Table 3. There were no known violations of the closure, nor was any evidence found to suggest that vehicles had entered the closed area.

Vehicles were prohibited from Nauset Beach Orleans from 6.16.08 until 7.24.08. Private camp owners were provided escorts at pre-set times past the Pochet area when unfledged broods were still present. In addition, Cape Cod Mosquito Control and researchers from the Cape Cod National Seashore were given special escorts to conduct work on the Pleasant Bay side of Nauset Beach Orleans only. All vehicles allowed on Nauset Beach Orleans during the vehicle closure period were required to travel only on the access road and no further north than Trail #1.

Dog Activity

Dogs were not a big problem in Orleans. There were approximately eight (8) cases of dogs, leashed and unleashed, sighted on Nauset Spit during the plover season. At Pochet there is a walkway and some beach area which is owned by the Pochet Association. Monitors observed a few occasions when dogs were appropriately walked on leash through this area, then were walked beyond their private area once they got to the beachfront. In the restricted Pochet area only three or four dogs were observed during the season. At Skaket there were three or four incidences of unleashed dogs, but no problems. Many dog tracks were observed, however, during the brief opportunities to monitor that beach.

Nauset Beach Orleans was infrequently monitored due to time constraints; therefore information about dogs in that location is unavailable. Overall, there were no observed incidents of dogs causing problems for plovers.

OTHER SHOREBIRDS

Least Terns

Least terns returned to Orleans during the third week of May. Egg laying began 5.23.08. Egg laying continued through early August. Due to narrow beaches and astronomical tides, many nests were lost to overwash. Even more appeared to be lost to predators. Nest abandonment was fairly common as well. Productivity was low to average, with relatively good success at the Pochet colony. Though the Pochet colony was host to only 7 pairs, they fledged an average of 1 chick per pair. By contrast, all Nauset Spit colonies combined hosted 36 pairs, but only 5-10 chicks are estimated to have fledged.

Common Terns

One pair of Common Terns nested on Nauset Spit. A three (3) egg nest was located on 6.29.08. It was reported lost to unknown predator on 7.2.08. At least one adult frequented the area for the next few days. This pair made no attempt to re-nest.

American Oystercatchers

One American Oystercatcher pair nested on Nauset Spit. This pair showed up on Nauset Spit relatively late in the season. The pair was first observed only a week prior to monitors locating the nest, well past the census period. The two (2) egg nest was located on 6.25.08 and was reported lost to an unknown predator on 7.7.08. The pair remained in the area for some time but did not attempt to re-nest.

Other Shorebirds

No other shorebirds were observed nesting.

HISTORY OF MANAGEMENT RESULTS

Trends over the past ten years have shown generally positive results in the status of the Piping Plover. The number of nesting pairs in 2008 was the highest recorded in the past decade (Figure 1). Numbers of pairs declined slightly until 2003, but have increased since. Productivity has been a bit more erratic (Figure 2), but has been above 1.00 since 2004. Productivity for 2008 was the highest recorded in the past decade.

CONCLUSIONS

Piping Plovers, Least Terns and other colonial nesting birds are heavily predated on Orleans Beaches. Despite an increase in Piping Plover numbers/nesting attempts and despite best use of exclosures under present regulations for Orleans, statistics indicate that predators continue to significantly reduce nesting success.

It also appears that acceptable nesting habitat on Orleans beaches is diminishing due to erosion/washover, most noticeably in the Pochet area.

Monitoring efforts in 2008 were effective, yet could be improved with more staff. Experienced monitors and well trained law enforcement personnel would provide greater protection for nesting birds as well as more effective law enforcement and improved communication with the public.

Public relations remain an ongoing challenge due in particular to vehicle restrictions.

Overall the 2008 Piping Plover and Least Tern nesting season on Orleans beaches was a conservation success. Changes are being recommended and implemented to make the 2009 season even more successful.

MANAGEMENT RECOMMENDATIONS

Based on experiences in the field and results of this year's conservation management efforts, several areas have been identified in which efforts can be improved. Management recommendations are recommended at both state and town level.

State

- Due to frequency of predation of incomplete clutches, and having had no instances of nest abandonment due to exclosure, management recommends a policy of early installation of exclosures, providing staff is experienced.
- Management recommends use of electric fencing for tern colonies.
- Management recommends development of written protocol regarding cases of plover and tern mortality.
- Management recommends sporadic beach grass planting in and around the Pochet overwash and other frequently overwashed areas to initiate restoration of compromised nesting habitat.

Town

- Management recommends instituting an annual practice of providing clear written communication explaining restrictions on dog walking and kite flying to property owners who abut/overlook Nauset Spit. This letter would be directed to property owners with a request to convey the information to anyone who uses their properties during plover season. Also recommend a similar letter defining dog control for Pochet property owners.

- Management recommends increased signage at western edge of Pochet washover, visible to visitors who arrive by boat.
- Management recommends an increase in Monitor staff to identify nests even more effectively, exclose as early as possible, increase interaction with public/dogs and to better observe predators.
- Management recommends increased patrol of Nauset Spit beyond the vehicle barrier by law enforcement, providing law enforcement agents are adequately trained to spot chicks.
- Management recommends placement of dog signs (Attention Boat Owners: Dogs Not Allowed on Nauset Spit 4.14 - 9.15) at town landings in Orleans and Eastham; also installation of standard dog signage at Skaket Beach.
- Management recommends adjusting dates of dog restrictions at Nauset Beach Orleans and Nauset Spit for consistency to better protect the birds and for clarity for the public.
- Management is designing an updated Monitor Log Book as well as a Pocket Field Guide for next season, to facilitate improved monitoring and data gathering.

TABLES

Table 1. Design of standard predator exclosures.

Shape	circular
Diameter/Length of side	10 ft
Size of wire mesh	2x4 in
Total height Height above ground Depth buried	4 ft 3.5 ft 0.5 ft
Cover material	Mesh netting
Cover spacing/Mesh size	3/4 in

Table 2. Measures of piping plover nesting success.

Area	Nesting Pairs	Total Nesting Attempts	Failed Attempts to Hatch	Nest Loss (Failed/Total Attempts)	Total Eggs Laid	Total Eggs Hatched	Hatching Success	Total Chicks Fledged	Fledging Success	Productivity (Chicks Fledged/Pair)
Nauset Spit (Heights)	22	33	13	0.39	108	67	0.62	40	0.60	1.82
Nauset Beach Orleans	5	6	3	0.50	21	10	0.48	10	1.00	2.00
Skaket Beach	1	1	0	0.00	4	4	1.00	4	1.00	4.00
Total	28	40	16	0.40	133	81	0.61	54	0.67	1.93

Table 3. Nest loss for all nests by cause.

Site	Nests			Cause	Per Site	
	Total	Lost	% Lost		Lost	% Lost
Nauset Spit (Heights)	33	13	39%	Overwash	2.5	19%
				Sanded over	1	8%
				Predation (Net)	9.5	73%
				Predation types		
				Crow (not excl)	1	11%
				Crow (excl) - see note	0.5	5%
				Coyote (not excl)	1	11%
				Unknown predator (not excl)	7	74%
Nauset Beach (Orleans)	6	3	50%	Abandonment (excl) - unknown reason	1	33%
				Predation (Net)	2	67%
				Predation types		
				Gull (not excl)	1	50%
				Unknown predator (not excl)	1	50%
Skaket Beach	1	0	0%	No failures	0	0%
Total	40	16	40%	Abandonment (excl) - unknown reason	1	6%
				Overwash	3	16%
				Sanded over	1	6%
				Predation (Net)	11.5	72%
				Predation types		
				Crow (not excl)	1	9%
				Crow (excl) - see note	0.5	4%
				Coyote (not excl)	1	9%
				Gull (not excl)	1	9%
				Unknown predator (not excl)	8	70%

Table 4. Nest loss for exclosed vs. unexclosed nests by cause.

Status	Nests			Cause	Per Site	
	Total	Lost	% Lost		Lost	% Lost
Exclosed	27	4	15%	Abandonment (excl) - unknown reason	1	25%
				Overwash	1.5	38%
				Sanded over	1	25%
				Predation (Net)	0.5	13%
				Predation types		
				Crow	0.5	100%
Unexclosed	13	12	92%	Overwash	1	8%
				Predation (Net)	11	92%
				Predation types		
				Crow	1	9%
				Coyote	1	9%
				Gull	1	9%
				Unknown predator	8	73%

Table 5. Egg loss by cause.

Site	No. Nests	Eggs Laid	Eggs Hatched	Eggs Lost	% Lost	Cause	Eggs Lost	% Lost
Nauset Spit (Heights)	33	108	67	41	38%	Overwash	8	20%
						Sanded over	4	10%
						Non-viable	5	12%
						Predation (Net)	24	59%
						Predation types		
						Crow (not excl)	5	21%
						Crow (excl) - see note	2	8%
						Coyote (not excl)	2	8%
						Unknown predator (not excl)	15	63%
Nauset Beach (Orleans)	6	21	10	11	52%	Abandonment (excl) - unknown reason	4	36%
						Non-viable	2	18%
						Predation (Net)	5	45%
						Predation types		
						Gull (not excl)	1	20%
						Unknown predator (not excl)	4	80%
Skaket Beach	1	4	4	0	0%	No failures	0	0%
Total	40	133	81	52	39%	Abandonment (excl) - unknown reason	4	8%
						Overwash	8	15%
						Sanded over	4	8%
						Non-viable	7	13%
						Predation (Net)	29	56%
						Predation types		
						Crow (not excl)	5	17%
						Crow (excl) - see note	2	7%
						Coyote (not excl)	2	7%
						Gull (not excl)	1	3%
						Unknown predator (not excl)	19	66%

Table 6. Nest Summary for all pairs in Orleans, MA.

Nest #	Nest Location	Date Found	# of Eggs when Found	Date Lost	Full Clutch Date	# of Eggs when Complete/Lost	Date Exclosed	# of Eggs when Exclosed	Projected Hatch Date	Date Hatched	# of Eggs Hatched	Projected Fledge Date	Date Fledged	Chicks Fledged	Reason Nest Lost
NS-1A	Nauset Spit, Area 3, 2 posts N	05/01/08	2	05/11/08	05/07/08	4	05/07/08	4	06/03/08	N/A	0	N/A	N/A	0	tide/crow
NS-1B	Nauset Spit, Area 3, 2 posts, 1-2 stakes N	05/21/08	1	N/A	05/27/08	4	06/06/08	1	06/23/08	06/22/08	1	07/16/08	07/16/08	1	3 eggs lost to crow on 05/29/08.
NS-2A	Nauset Spit, Area 3, 2 posts, 2 stakes N	05/01/08	3	05/05/08	N/A	3	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-2B	Nauset Spit, Area 4 post, peak of dune	05/20/08	2	06/05/08	?	2	N/A	N/A	?	N/A	0	N/A	N/A	0	coyote
NS-2C	Nauset Spit, Area 4, 3/4 N to first stake, W of roots, base of dune	06/12/08	1	N/A	06/15/08	3	06/16/08	3	07/13/08	07/12/08	3	08/05/08	N/A	0	2 chicks disappeared on 07/19/08. 1 chick disappeared on 07/25/08 or 07/26/08 following cold, rainy weather.
NS-3A	Nauset Spit, Area 5, 1 stake S	05/01/08	2	N/A	05/05/08	4	05/06/08	4	06/01/08	06/06/08	4	06/30/08	07/04/08	4	
NS-4A	Nauset Spit, Area 5, 2 posts N	05/05/08	3	05/11/08	05/06/08	4	05/06/08	4	06/02/08	N/A	0	N/A	N/A	0	tide
NS-4B	Nauset Spit, Area 5, 2 posts-3 stakes N	05/21/08	1	05/23/08	N/A	1	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-4C	Nauset Spit, Area 5, 1 stake S of Area 5, 14 paces from fence	06/10/08	1	N/A	06/14/08	4	06/12/08	3	07/11/08	07/09/08	4	08/02/08	08/02/08	2	2 chicks disappeared around 07/25/08 following cold, rainy weather.
NS-5A	Nauset Spit, Area 1, 1 post-2 stakes N	05/06/08	1	05/11/08	N/A	2	N/A	N/A	N/A	N/A	0	N/A	N/A	0	tide
NS-5B	Nauset Spit, Area 2,3 posts N, 3/4 to first stake N along old fence line	06/08/08	3	N/A	?	3	06/09/08	3	?	07/04/08	3	07/28/08	07/29/08	3	
NS-6A	Nauset Spit, Area 4, posts-2 stakes N	05/07/08	3	05/13/08	05/07/08	4	05/07/08	4	06/03/08	N/A	0	N/A	N/A	0	high winds
NS-6B	Nauset Spit, Area 4, Washout N of NS-6A, 8 paces W of roots, NW of sea green bottle	05/25/08	1	N/A	05/30/08	4	05/31/08	4	06/26/08	06/26/08	4	07/20/08	N/A	0	All eggs appear to have hatched as of 06/27/08, but no chicks were seen after this date.
NS-7A	Nauset Spit, Area 7, 1 post N	05/08/08	1	N/A	05/14/08	4	05/14/08	4	06/10/08	06/11/08	4	07/05/08	07/06/08	4	1 runt fledged 07/13/08.
NS-8A	Nauset Spit, Area 8, 1 stake S	05/19/08	4	N/A	?	4	05/19/08	4	?	06/10/08	3	07/04/08	07/05/08	3	1 egg did not hatch.
NS-9A	Nauset Spit, Area 3, 1 post S	05/20/08	1	05/23/08	N/A	1	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-9B	Nauset Spit, Area 2, 3 posts N, W side in overwash	05/29/08	1	N/A	06/03/08	4	06/05/08	4	06/30/08	06/26/08	4	07/20/08	07/24/08	4	
NS-10A	Nauset Spit, Area 10, N of walkway	05/21/08	1	05/24/08	N/A	1	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-10B	Nauset Spit, Area 11, 20 paces S of post marked by orange sneaker at N tip	05/26/08	1	N/A	06/03/08	4	06/03/08	4	06/30/08	06/28/08	4	07/22/08	07/23/08	1	1 chick was found dead in the scrape on 06/28/08, collected and sent for necropsy. 1 chick disappeared on 07/06/08.
NS-11A	Nauset Spit, Area 2, 2 posts N	05/25/08	2	N/A	05/28/08	4	05/29/08	4	06/24/08	06/24/08	3	07/18/08	07/20/08	3	1 egg did not hatch.
NS-12A	Nauset Spit, Area 6, 2 stakes N, 10 paces E of large root	05/25/08	3	N/A	?	3	05/26/08	3	?	06/26/08	3	07/14/08	07/14/08	3	
NS-13A	Nauset Spit, Area 5, 3 stakes N, bait bag on stake, edge of grass at base of dune	05/25/08	1	N/A	05/31/08	4	05/29/08	3	06/27/08	06/26/08	3	07/20/08	07/20/08	2	1 egg did not hatch. 1 chick disappeared on 06/28/08.
NS-14A	Nauset Spit, Area 5, W side, 2 stakes N of a sign labelled 9, dead root on top of dune	05/25/08	4	N/A	?	4	05/26/08	4	?	06/21/08	4	07/15/08	07/15/08	3	1 chick disappeared on 06/24/08. 2 chicks disappeared on 07/06/08. 1 chick disappeared on 07/10/08.
NS-15A	Nauset Spit, Area 3, 2 posts, 3 stakes N	05/29/08	1	N/A	06/04/08	4	06/05/08	4	07/01/08	06/28/08	4	07/22/08	07/24/08	1	1 disappeared on 07/10/08.
NS-16A	Nauset Spit, Area 4, 1 sunken post S of NS-6A, 24 paces W of post	05/31/08	1	06/05/08	N/A	3	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-16B	New Island, S of oystercatcher nest	06/19/08	4	06/25/08	?	4	N/A	N/A	?	N/A	0	N/A	N/A	0	unknown predator
NS-17A	Nauset Spit, Area 8, 1 post, 2 stakes S of walkway, 37 paces W	05/31/08	2	N/A	06/05/08	4	06/04/08	3	07/02/08	06/28/08	3	07/22/08	07/22/08	1	1 egg did not hatch. 1 chick disappeared on 07/05/08.
NS-18A	Nauset Spit, Area 9, 2 posts, 3 stakes N, 28 paces W, just beyond log	05/31/08	2	N/A	06/03/08	4	06/03/08	4	06/30/08	06/28/08	3	07/22/08	07/22/08	2	1 egg did not hatch. 1 chick disappeared on 07/02/08.
NS-19A	Nauset Spit, Area 10, 4 stakes N, N of brown log, 10 paces in from fencing	06/12/08	1	06/16/08	N/A	2	N/A	N/A	N/A	N/A	0	N/A	N/A	0	unknown predator
NS-20A	Nauset Beach, Area 7, E face of dunes	06/17/08	2	N/A	06/20/08	4	06/18/08	3	07/17/08	07/14/08	4	08/07/08	N/A	0	1 chick disappeared on 07/25/08 following cold, rainy weather. 1 chick disappeared on 08/03/08. 1 chick disappeared on 08/06/08, and we cannot confirm that any fledged.
NS-21A	Nauset Beach, Area 11, W of NS-10B, from stump in center of fencing, look toward post with 2 signs	06/19/08	2	N/A	06/22/08	3	06/25/08	3	07/19/08	07/16/08	3	08/09/08	08/09/08	1	1 chick fledged on 08/09/08. 2 chicks were developmentally stunted and disappeared on 08/11/08.
PB-1A	Public Beach, N of public beach, S of Asphnet walkway	05/18/08	1	05/23/08	N/A	2	N/A	N/A	N/A	N/A	0	N/A	N/A	0	crow
PB-1B	Public Beach, Center of Asphnet area	06/19/08	1	N/A	06/23/08	3	06/23/08	3	07/20/08	07/18/08	3	08/11/08	N/A	0	Coyote tracks/digging around exclosure, 2 eggs must have hatched on 07/18/08 and been predated immediately. 1 chick disappeared on 07/30/08.
P-1A	Pochet, Center of Pochet washover	05/02/08	3	05/05/08	05/04/08	4	N/A	N/A	05/31/08	N/A	0	N/A	N/A	0	unknown predator
P-1B	Pochet, S of Pochet washover, W of road	05/16/08	1	N/A	05/22/08	4	05/21/08	3	06/18/08	06/18/08	2	07/12/08	07/12/08	2	2 eggs did not hatch.
P-2A	Pochet, S of Pochet washover, in dunes	05/13/08	1	05/15/08	N/A	1	N/A	N/A	N/A	N/A	0	N/A	N/A	0	gull
P-2B	Pochet, Same location as P-2A	05/24/08	1	N/A	05/29/08	4	05/29/08	4	06/25/08	06/25/08	4	07/19/08	07/20/08	4	
P-3A	Pochet, N of Pochet washover, E of road	05/16/08	1	N/A	05/22/08	4	05/21/08	3	06/18/08	06/18/08	4	07/12/08	07/12/08	4	
NB-1A	North Beach, between Cut #2 and Cut #3, N of large sand slide	06/22/08	4	07/06/08	?	4	06/22/08	4	?	N/A	0	N/A	N/A	0	2 adults last seen 06/29/08. 1 adult last seen 07/05/08. No adults or fresh tracks seen since.
SB-1A	Skaket Beach, S of state beach, S of private property walkway, on private property	06/04/08	4	N/A	?	4	N/A	N/A	?	06/08/08	4	07/02/08	07/02/08	4	
NSOC-1A	Nauset Spit, Area 9, between Area 9 post and first stake, 23 paces in from fencing	06/25/08	2	07/07/08	?	2	N/A	N/A	?	N/A	0	N/A	N/A	0	unknown predator

Table 7. Nauset Spit (Heights) vehicle closures.

Date	Time	Closure/Opening	Total Length Closed	Length Open to Vehicles
05/31/08	03:00:00 PM	1.2 mi closed	1.2 mi	0.6
06/22/08	09:00:00 AM	0.3 mi closed	1.5 mi	0.3
07/31/08	09:00:00 AM	0.6 mi reopened	0.9 mi	0.9
08/08/08	09:00:00 AM	0.8 mi reopened	1.7 mi	0.1
08/15/08	09:00:00 AM	0.1 mi reopened	0 mi	1.8

Table 8. Nauset Beach Orleans closures and vehicle escorts.

Date	Name	Check On Time	Check Off Time
06/16/08	Nauset Beach (Orleans) closed to vehicle traffic at 12:01 AM		
06/18/08	Cape Cod National Seashore	9:00 AM	11:00 AM
06/23/08	Cape Cod Mosquito Control	9:00 AM	12:00 PM
06/25/08	Orleans Camp 8		9:30 AM
	Chatham Camp 1	9:00 AM	
	Chatham Camp 1		9:30 AM
06/26/08-07/14/08	Escorts halted due to presence of three broods of chicks		
07/15/08	Cape Cod National Seashore	9:00 AM	11:00 AM
	Cape Cod Mosquito Control	9:00 AM	11:00 AM
07/16/08	Orleans Camp 5	9:00 AM	5:30 PM
	Pochet	9:00 AM	5:30 PM
07/19/08	Orleans Camp 2	9:00 AM	
	Orleans Camp 7	9:00 AM	
	Chatham Camp 1	9:00 AM	
07/20/08	Orleans Camp 2	5:00 PM	9:30 AM
	Orleans Camp 7		5:30 PM
	Chatham Camp 1		5:30 PM
07/21/08	Orleans Camp 2		9:30 AM
07/24/08	Nauset Beach (Orleans) reopened to vehicle traffic at 9:00 AM		

FIGURES

Figure 1. Total number of nesting pairs of Piping Plovers over the past decade in Orleans, MA.

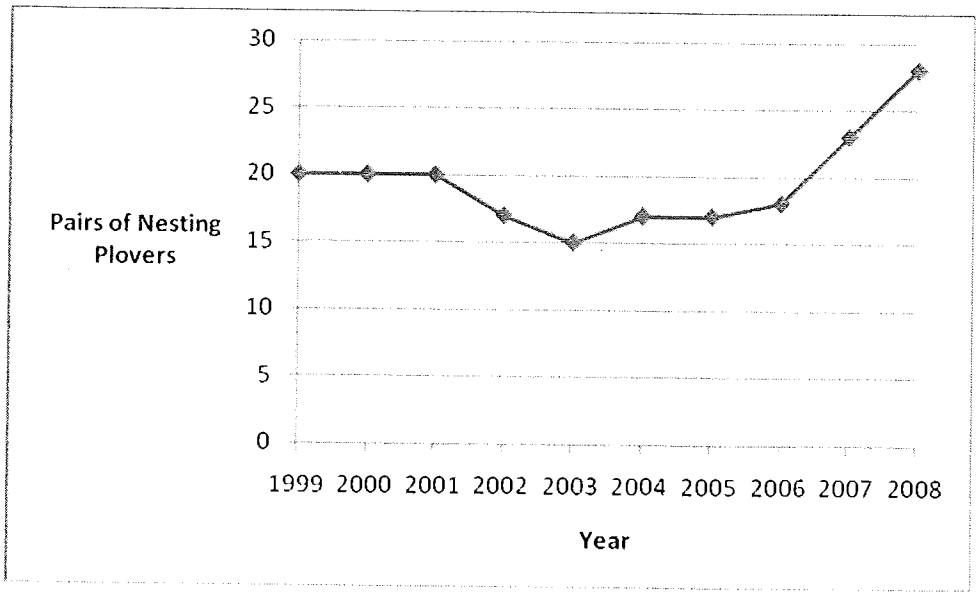
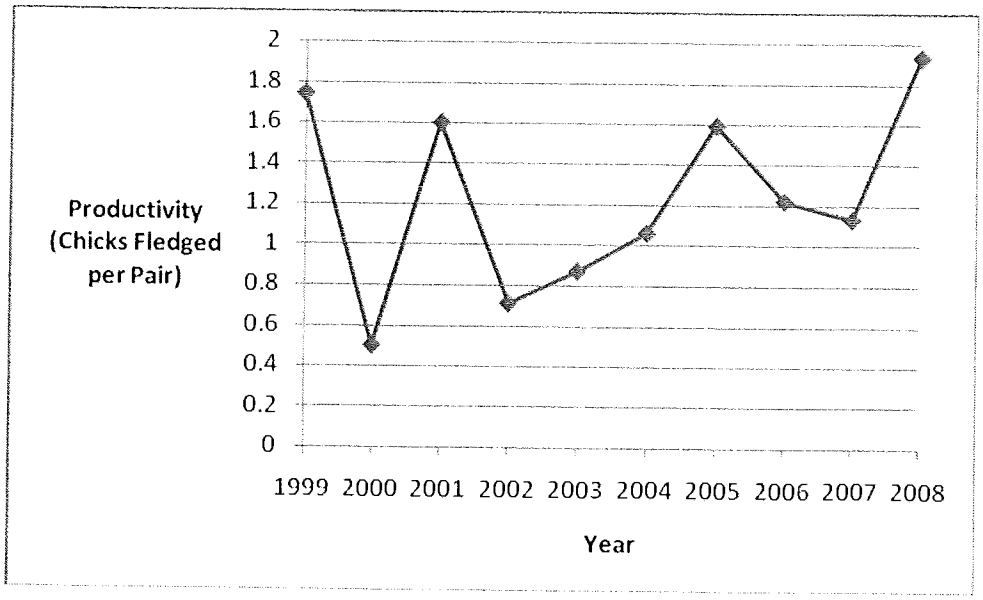


Figure 2. Productivity of Piping Plovers over the past decade in Orleans, MA.

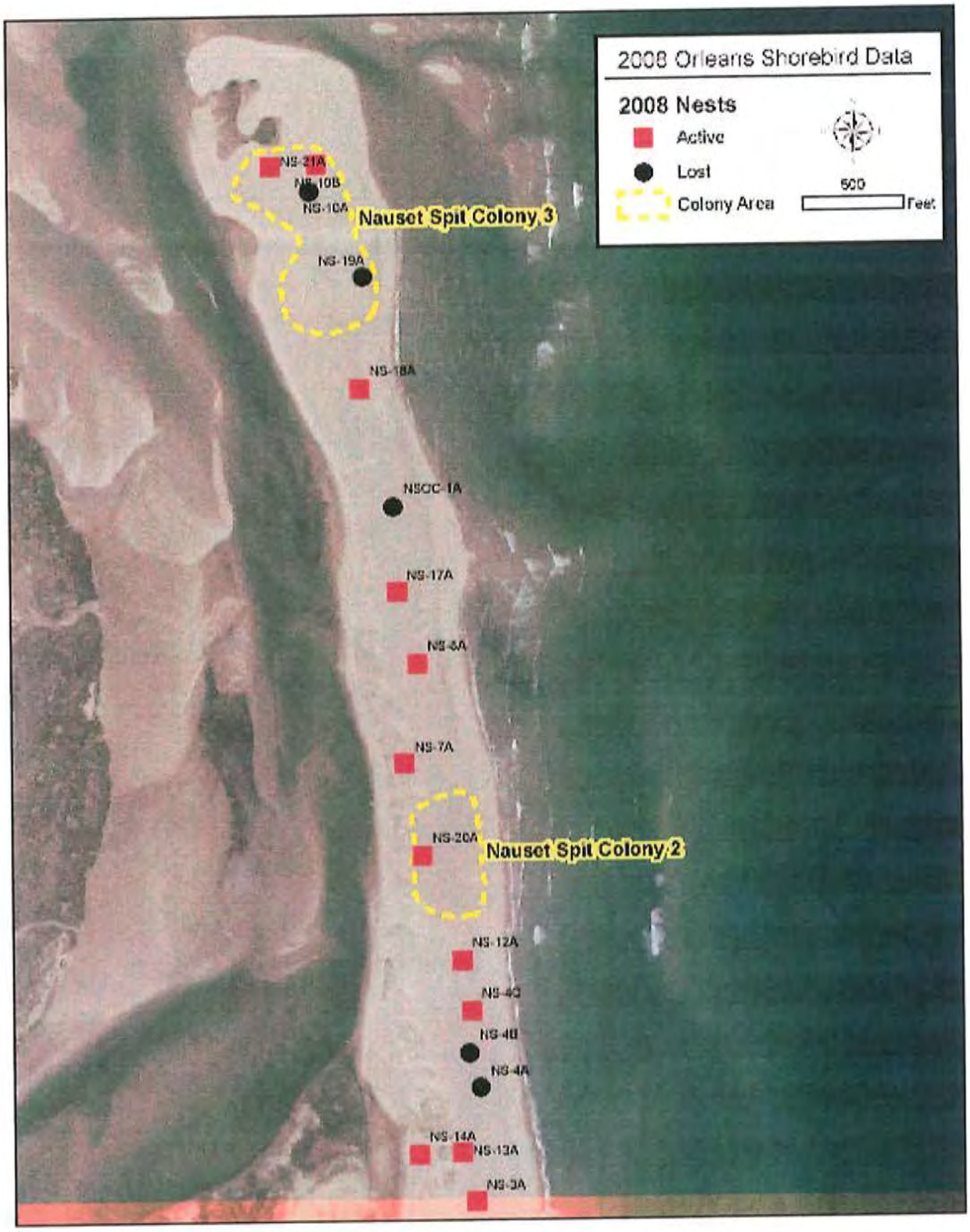


MAPS

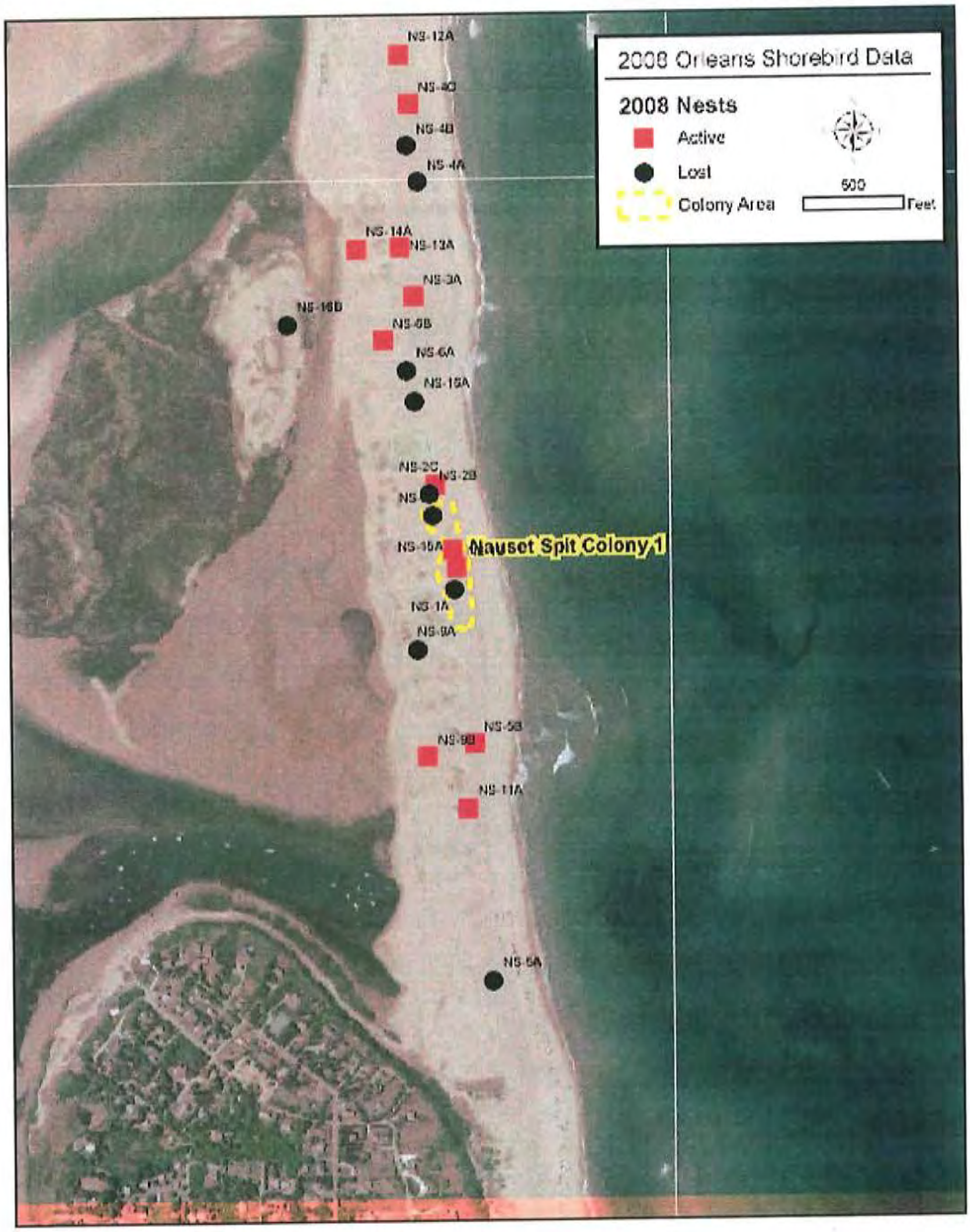
GPS point readings were taken for all Piping Plover nests and the American Oystercatcher nest. GPS-mapped polygons were created for all tern colonies. For point readings, all nests are Piping Plover nests with the exception of **NSOC-1A** in Map 1, which corresponds to the American Oystercatcher nest on Nauset Spit. Piping Plover nests were given a number and letter combination consistent with the pair and nesting attempts reported on the Massachusetts Piping Plover Census forms. Nests are prefixed with letters to designate the area:

- **NS** denotes nests from Nauset Spit (Heights)
- **PB** denotes nests from Public Beach, the area from the Nauset Beach Parking north to the vehicle access point for Nauset Spit. Data for this area was grouped with Nauset Spit for purposes of this report.
- **P** denotes nests from Pochet, the area from Nauset Beach parking lot south to ORV Trail #1. Data for this area was grouped with Nauset Beach Orleans for purposes of this report.
- **NB** denotes nests from Nauset Beach Orleans, the area south of ORV Trail #1 south to the Chatham-Orleans town line.
- **SB** denotes nests from Skaket Beach, a new area reporting nesting data on the Cape Cod Bay side of Orleans, MA.

Map 1. Northern half of Nauset Spit (Heights)

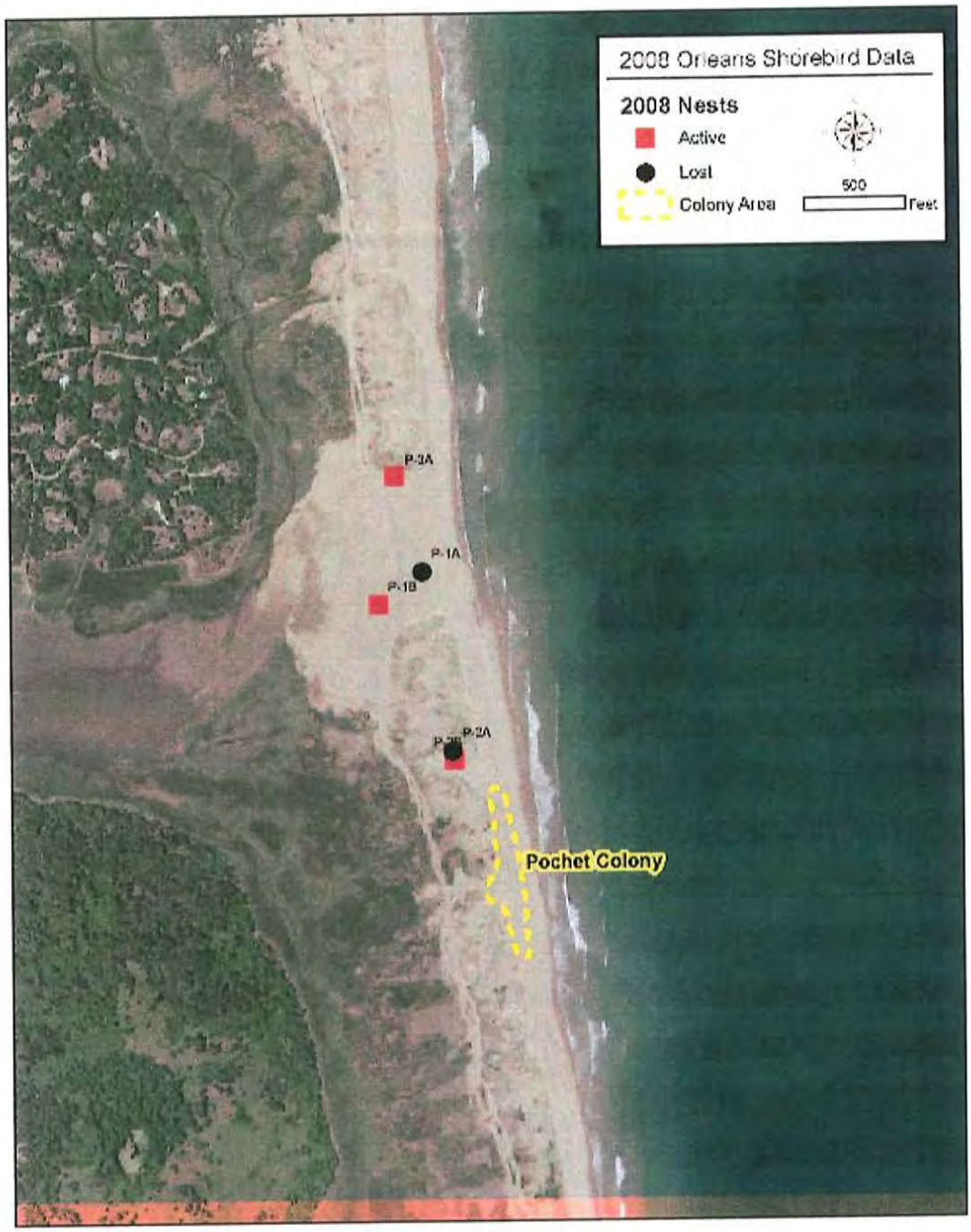


Map 2. Southern half of Nauset Spit (Heights)



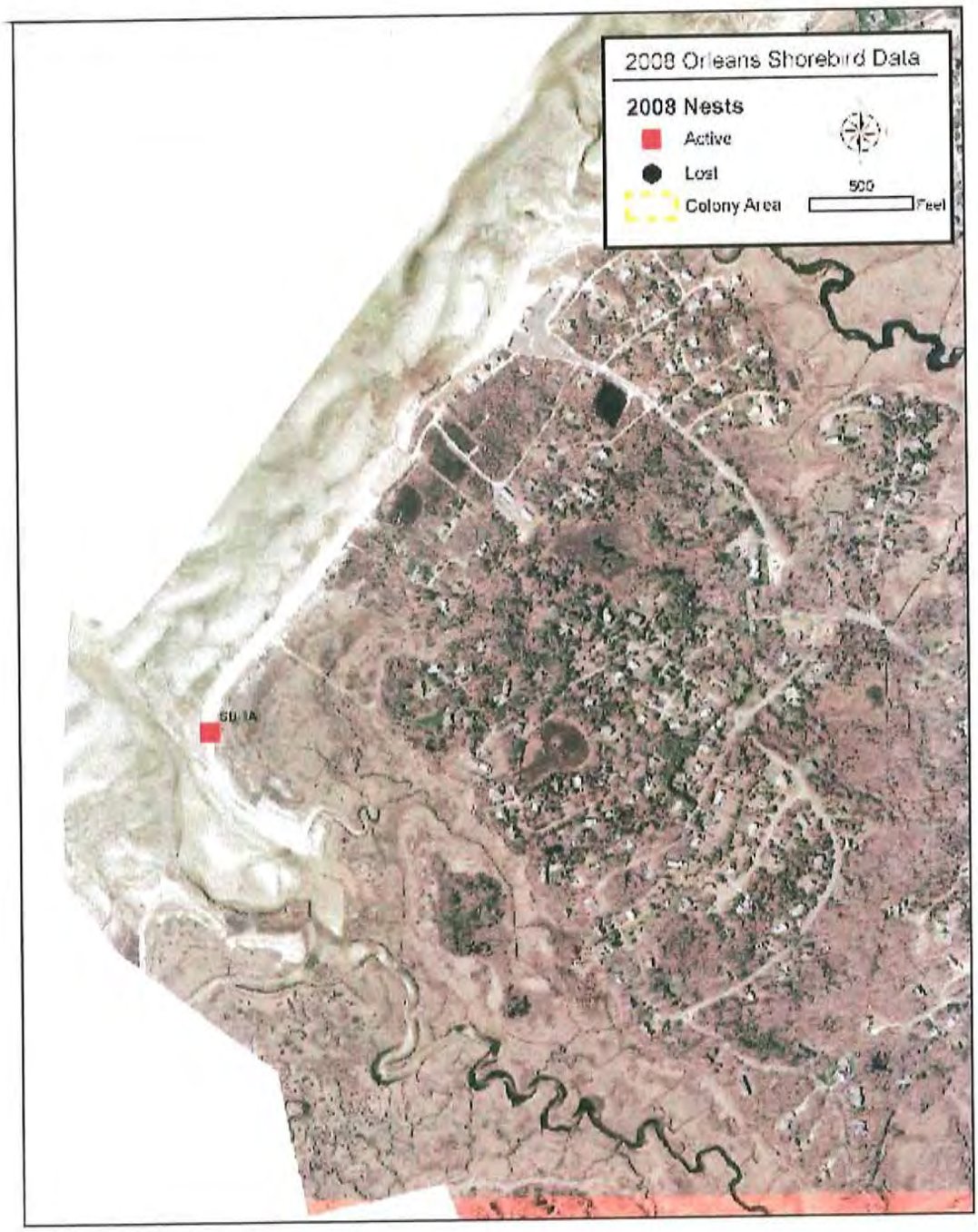
Map 3. Public Beach: a section of Nauset Spit (Heights)

Map 4. Pochet: a section of Nauset Beach Orleans



Map 5. Nauset Beach Orleans

Map 6. Skaket Beach (Cape Cod Bay side of Orleans, MA.)



MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Site Name: Nauset Spit (Heights)

Town: Orleans, MA

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson, Erin Connick

Agency: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	20	21
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All known pairs nested. The census reflects our best estimate of number of pairs given the disappearance of pair number 19 and the appearance of nearby pair number 21 too soon to have been a renest of pair 19. In addition, it is worth noting that pair 16 renested on nearby New Island (NPS), but is being reported only by the Town of Orleans to avoid a potential recount.

List pairs <u>not</u> present during Index Count:
Pair 21 was not found until after the census period had ended and number had been reported to the state.

Month	Average # of visits to site per week
April	4-5
May	6-7
June	6-7
July	6-7

Indicate type(s) of exclosure design(s) used:

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was altered as nests were discovered to provide adequate protection.
Nests were exclosed at three to four eggs or when completed (in the case of clutches completed at fewer than three eggs).
Dogs are prohibited from the beach from March 15th through September 15th. Signs were placed at the tip of Nauset Spit to notify boaters.
Offroad vehicle traffic was prohibited from areas with active broods from May 31st until August 15th, with the length of the closed area changing as broods hatched or fledged.

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*
[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) Year: 2008 Observer(s): F. Fulcher, S. Struble, E. Hogan, F. Johnson, L. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
1	A	4	0	0	05/01/08	2	05/07/08	05/11/08	Y	A	05/07/08
1	B	4	1	1	05/21/08	1	05/27/08	06/22/08	Y	A	06/06/08
2	A	3	0	0	05/01/08	3	N/A	05/05/08	N	N/A	N/A
2	B	2	0	0	05/20/08	2	?	06/05/08	N	N/A	N/A
2	C	3	3	0	06/12/08	1	06/15/08	07/12/08	Y	A	06/16/08
3	A	4	4	4	05/01/08	2	05/05/08	06/06/08	Y	A	05/06/08
4	A	4	0	0	05/05/08	3	05/06/08	05/11/08	Y	A	05/06/08
4	B	1	0	0	05/21/08	1	N/A	05/23/08	N	N/A	N/A
4	C	4	4	2	06/10/08	1	06/14/08	07/09/08	Y	A	06/12/08
5	A	2	0	0	05/06/08	1	N/A	05/11/08	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
	Refer to pages 6-8 of the Nauset Spit (Heights) census forms for egg mortality information.		Refer to pages 6-8 of the Nauset Spit (Heights) census form for chick mortality information.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Orleans HCP page a329

Site Name: Nauset Spit (Heights) Year: 2008 Observer(s): F. Fulcher, S. Struble, E. Hogan, F. Johnson, L. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
5	B	3	3	3	06/08/08	3	?	07/04/08	Y	A	06/09/08
6	A	4	0	0	05/07/08	3	05/07/08	05/13/08	Y	A	05/07/08
6	B	4	4	0	05/25/08	1	05/30/08	06/26/08	Y	A	05/31/08
7	A	4	4	4	05/08/08	1	05/14/08	06/11/08	Y	A	05/14/08
8	A	4	3	3	05/19/08	4	?	06/10/08	Y	A	05/19/08
9	A	1	0	0	05/20/08	1	N/A	05/23/08	N	N/A	N/A
9	B	4	4	4	05/29/08	1	06/03/08	06/26/08	Y	A	06/05/08
10	A	1	0	0	05/21/08	1	N/A	05/24/08	N	N/A	N/A
10	B	4	4	2	05/26/08	1	06/03/08	06/28/08	Y	A	06/03/08
11	A	4	3	3	05/25/08	2	05/28/08	06/24/08	Y	A	05/29/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
	Refer to pages 6-8 of the Nauset Spit (Heights) census forms for egg mortality information.		Refer to pages 6-8 of the Nauset Spit (Heights) census form for chick mortality information.

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Orleans HCP page a330

Site Name: Nauset Spit (Heights) Year: 2008 Observer(s): P. Pulcher, S. Struble, E. Hogan, P. Johnson, E. Comick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
12	A	3	3	3	05/25/08	3	?	06/20/08	Y	A	05/26/08
13	A	4	3	2	05/25/08	1	05/31/08	06/26/08	Y	A	05/29/08
14	A	4	4	3	05/25/08	4	?	06/21/08	Y	A	05/26/08
15	A	4	4	1	05/29/08	1	06/04/08	06/28/08	Y	A	06/05/08
16	A	3	0	0	05/31/08	1	N/A	06/05/08	N	N/A	N/A
16	B	4	0	0	06/19/08	4	?	06/25/08	N	N/A	N/A
17	A	4	3	2	05/31/08	2	06/05/08	06/28/08	Y	A	06/04/08
18	A	4	3	2	05/31/08	2	06/03/08	06/28/08	Y	A	06/03/08
19	A	2	0	0	06/12/08	1	N/A	06/16/08	N	N/A	N/A
20	A	4	4	2	06/17/08	2	06/20/08	07/14/08	Y	A	06/18/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
	Refer to pages 6-8 of the Nauset Spit (Heights) census forms for egg mortality information.		Refer to pages 6-8 of the Nauset Spit (Heights) census form for chick mortality information.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Orleans HCP page a331

Site Name: Nauset Spit (Heights) Year: 2008 Observer(s): P. Pulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
21	A	3	3	1	06/19/08	2	06/22/08	07/16/08	Y	A	06/25/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
	Refer to pages 6-8 of the Nauset Spit (Heights) census forms for egg mortality information.		Refer to pages 6-8 of the Nauset Spit (Heights) census form for chick mortality information.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	On 05/11/08, the nest had been washed away following storm tides. On 05/12/08, the remains of two eggs were found near the exclosure, with crow tracks leading up to them. For reporting purposes, two eggs have been attributed to loss by tide, while two others are considered to have been recovered, only to have been predated by a crow.	1A	Did not make it to hatching.
1B	On 05/29/08, crow tracks were observed up to the scrape, and three of the eggs were missing. Remains of two eggs were found nearby. The remaining fourth egg was recovered.	1B	Did not make it to hatching.
2A	On 05/05/08, the nest had disappeared. Loss attributed to depredation by an unknown predator.	2A	Did not make it to hatching.
2B	On 06/05/08, coyote tracks were observed up to the scrape, and all eggs were missing. Remains of one egg were found nearby.	2B	Did not make it to hatching.
2C	No egg mortality.	2C	Two chicks disappeared on 07/19/08. One chick disappeared on 07/25/08 or 07/26/08 following cold, rainy weather.
3A	No egg mortality.	3A	No chick mortality.
4A	On 05/11/08, the nest had been washed away following storm tides.	4A	Did not make it to hatching.
4B	On 05/23/08, unidentifiable predator tracks were observed leading up to the scrape. All eggs were missing. Tracks were roughly the size of coyote tracks, but were not defined well enough to be identified.	4B	Did not make it to hatching.
4C	No egg mortality.	4C	Two chicks disappeared around 07/25/08 following cold, rainy weather.
5A	On 05/11/08, the nest had been washed away following storm tides.	5A	Did not make it to hatching.
5B	No egg mortality.	5B	No chick mortality
6A	On 05/13/08, the nest was severely sanded over due to extreme high winds. Adults had abandoned the nest.	6A	Did not make it to hatching.

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Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
6B	No egg mortality.	6B	All eggs appear to have hatched as of 06/27/08, but no chicks were seen after this date.
7A	No egg mortality.	7A	No chick mortality.
8A	One egg did not hatch.	8A	No chick mortality.
9A	On 05/23/08, unidentifiable predator tracks were observed leading up to the scrape. All eggs were missing. Tracks were roughly the size of coyote tracks, but were not defined well enough to be identified.	9A	Did not make it to hatching.
9B	No egg mortality.	9B	No chick mortality.
10A	On 05/24/08, unidentifiable predator tracks were observed leading up to the scrape. All eggs were missing. Tracks were roughly the size of coyote tracks, but were not defined well enough to be identified.	10A	Did not make it to hatching.
10B	No egg mortality.	10B	One chick was found dead in the scrape on 06/28/08 with a live chick still in the scrape and an adult incubating both the live and dead chicks. The dead chick appeared to have a patch of exposed muscle on its chest. It was collected and sent for necropsy. One chick disappeared on 07/06/08.
11A	One egg did not hatch.	11A	No chick mortality.
12A	No egg mortality.	12A	No chick mortality.
13A	One egg did not hatch.	13A	One chick disappeared on 06/28/08.
14A	No egg mortality.	14A	One chick disappeared on 06/24/08.
15A	No egg mortality.	15A	Two chicks disappeared on 07/06/08. One chick disappeared on 07/10/08.
16A	On 06/05/08, all eggs were missing from the scrape. A variety of predator tracks, including crow and possum, were observed around the scrape. An intact egg was found nearby, but the adults did not attempt to recover this. Loss attributed to depredation by an unknown predator.	16A	Did not make it to hatching.
16B	On 06/25/08, the nest had disappeared. Loss attributed to depredation by an unknown predator.	16B	Did not make it to hatching.
17A	One egg did not hatch	17A	One chick disappeared on 07/09/08.

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Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
18A	One egg did not hatch.	18A	One chick disappeared on 07/02/08.
19A	On 06/16/08, the nest had disappeared. Loss attributed to depredation by an unknown predator.	19A	Did not make it to hatching.
20A	No egg mortality.	20A	One chick disappeared on 07/25/08 following cold, rainy weather. One chick disappeared on 08/03/08. Two chicks disappeared on 08/06/08 at 24 days of age, and we cannot confirm that any fledged.
21A	No egg mortality.	21A	Two chicks were developmentally stunted and disappeared on 08/11/08. Despite being 27 days of age, the two chicks that disappeared were confirmed as unable to fly on 08/10/08. We do not feel that there was any chance they fledged.

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MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Site Name: Nauset Spit (Heights), Public Beach

Town: Orleans, MA

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson, Erin Connick

Agency: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	1	1
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All known pairs nested.

List pairs not present during Index Count:
All pairs were present during the census period.

Month	Average # of visits to site per week
April	4-5
May	6-7
June	6-7
July	6-7

Indicate type(s) of exclosure design(s) used:

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was altered as nests were discovered to provide adequate protection.
Nests were exclosed at three to four eggs or when completed (in the case of clutches completed at fewer than three eggs).
Dogs are prohibited from the beach from March 15th through September 15th.

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*
[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights), Public Beach Year: 2008 Observer(s): P. Pulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
1	A	2	0	0	05/18/08	1	N/A	05/23/08	N	N/A	N/A
1	B	3	3	0	06/19/08	1	06/23/08	07/18/08	Y	A	06/23/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	On 05/23/08, crow tracks were observed leading directly up to the scrape, and all eggs were missing.	1A	Did not make it to hatching.
1B	No egg mortality.	1B	Coyote tracks/digging were observed around the exclosure on 07/18/08 with two eggs missing, but evidence did not suggest that the coyote got inside the exclosure. Two eggs must have hatched on 07/18/08 and been predated immediately. The third chick disappeared on 07/30/08.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

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MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson, Erin Connick

Site Name: Nauset Beach (Orleans), Pochet Washover

Agency: Orleans Parks & Beaches

Town: Orleans, MA

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	4	4
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
A fourth pair was present and actively scraping during the census period, but no nest was ever found. Both a male and female were seen several times over a two week period the included the census period, and their behavior was indicative of courtship.

List pairs not present during Index Count:
All pairs were present during the census period.

Month	Average # of visits to site per week
April	4-5
May	6-7
June	6-7
July	6-7

Indicate type(s) of exclosure design(s) used:

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was altered as nests were discovered to provide adequate protection.
Nests were exclosed at three to four eggs or when completed (in the case of clutches completed at fewer than three eggs).
Dogs are prohibited from the beach from May 15th through Labor Day.
Offroad vehicle traffic was prohibited from June 16th until July 24th except for authorized vehicle escorts.
Vehicle escorts were prohibited from June 26th until July 14th due to the presence of three active broods.

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*
[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Beach (Orleans), Pochet Washover Year: 2008 Observer(s): P. Pulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
1	A	4	0	0	05/02/08	3	05/04/08	05/05/08	N	N/A	N/A
1	B	4	2	2	05/16/08	1	05/22/08	06/18/08	Y	A	05/21/08
2	A	1	0	0	05/13/08	1	N/A	05/15/08	N	N/A	N/A
2	B	4	4	4	05/24/08.	1	05/29/08	06/25/08	Y	A	05/29/08
3	A	4	4	4	05/16/08	1	05/22/08	06/18/08	Y	A	05/21/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence
1A	On 05/05/08, the nest had disappeared. Loss attributed to depredation by an unknown predator.
1B	Two eggs did not hatch.
2A	On 05/15/08, gull tracks were observed leading directly up to the scrape, all eggs were missing.
2B	No egg mortality.
3A	No egg mortality.

Nest No.	Cause of chick mortality/Evidence
1A	Did not make it to hatching.
1B	No chick mortality.
2A	Did not make it to hatching.
2B	No chick mortality.
3A	No chick mortality.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Orleans HCP page 8339

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Site Name: Nauset Beach (Orleans), North Beach

Town: Orleans, MA

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson, Erin Connick

Agency: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	1	1
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All known pairs nested.

List pairs not present during Index Count:
All pairs were present during the census period.

Month	Average # of visits to site per week
April	3
May	3
June	3
July	6-7

Indicate type(s) of exclosure design(s) used:

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was altered as nests were discovered to provide adequate protection.
Nests were exclosed at three to four eggs or when completed (in the case of clutches completed at fewer than three eggs).
Dogs must be on a leash at all times from May 15th through Labor Day unless below the high tide mark.
Offroad vehicle traffic was prohibited from June 16th until July 24th.

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*
[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Beach (Orleans), North Beach Year: 2008 Observer(s): T. Pulcher, S. Struble, E. Hogan, F. Johnson, L. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
1	A	4	0	0	06/22/08	4	?	07/06/08	Y	A	06/22/08

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	2 adults last seen 06/29/08. 1 adult last seen 07/05/08. No adults or fresh tracks seen since. Nest abandoned for unknown reasons. It is important to note that the pair was receptive to the exclosure, so abandonment was most likely not due to our exclosing of the nest.	1A	No chicks ever hatched out.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

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MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Site Name: Skaket Beach

Town: Orleans, MA

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson, Erin Connick

Agency: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	1	1
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All known pairs nested.

List pairs not present during Index Count:
All pairs were present during the census period.

Month	Average # of visits to site per week
April	0
May	0
June	5-7
July	1

Indicate type(s) of exclosure design(s) used:

Exclosure Design	A	B	C
Shape			
Diameter/Length of side			
Size of wire mesh			
Total Height			
Height above ground:			
Depth buried:			
Cover material			
Cover spacing/Mesh size			

Other management undertaken or needed/Remarks:
Symbolic fencing was used to delineate the nesting area when the nest was discovered.
Exclosures were not used at this location, as we were unsure of our ability to check the nest every day. In addition, the nest was discovered late in the incubation period and hatched soon after discovery.
Signs indicate dogs are prohibited from the beach from the Friday before Memorial day until Columbus Day, though there were many tracks and several dogs seen in the area. There was no evidence dogs had been inside the symbolic fencing.

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*

[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Skaket Beach Year: 2008 Observer(s): P. Pulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
1	A	4	4	4	06/04/08	4	?	06/08/08	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	No egg mortality.	1A	No chick mortality.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Orleans HCP page 2349

Massachusetts Tern Census Form, Year 2008

Colony Site Name: Nauset Spit (Heights)

Subcolony ID: Colony 1

Town: Orleans, MA

Ownership: Town of Orleans

Observer/Agency: Orleans Parks & Beaches

Street: 18 Bay Ridge Lane, PO Box 122

Town, State, & Zip: Orleans, MA 02653

E-mail: pfulch@town.orleans.ma.us

Telephone: 508-240-3775

⇨⇨ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇦⇦

Species Code	A-Count				B-Count				P	Remarks: (*e.g.*, evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/11/08	0								
COTE	06/11/08	0								
ARTE	06/11/08	0								
LETE	06/11/08	2	A C	H C					0	Predator tracks seen: coyote, possum Dead chick found 07/16 – hit by tide, may not even be from this area.
LAGU	06/11/08	0								
BLSK	06/11/08	0								
OTHER _____										

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337. Telephone: (508) 389-6372 / Fax: (508) 389-7891 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

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Massachusetts Tern Census Form, Year 2008

Colony Site Name: Nauset Spit (Heights)

Subcolony ID: Colony 2

Town: Orleans, MA

Ownership: Town of Orleans

Observer/Agency: Orleans Parks & Beaches

Street: 18 Bay Ridge Lane, PO Box 122

Town, State, & Zip: Orleans, MA 02653

E-mail: pfulch@town.orleans.ma.us

Telephone: 508-240-3775

⇨⇨ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇦⇦

Species Code	A-Count				B-Count				P	Remarks: (*e.g.*, evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/11/08	0								
COTE	06/11/08	0								
ARTE	06/11/08	0								
LETE	06/11/08	4	A C	H C					1	Hit by tides on 06/05 prior to census, some pairs moved to Colony 3 Predator tracks seen: coyote (heavy coyote tracks on 06/05) Only estimating a few chicks fledged
LAGU	06/11/08	0								
BLSK	06/11/08	0								
OTHER _____										

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337.
Telephone: (508) 389-6372 / Fax: (508) 389-7891 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Orleans HCP page a345

Massachusetts Tern Census Form, *Year 2008*

Colony Site Name: Nauset Spit (Heights)

Subcolony ID: Colony 3

Town: Orleans, MA

Ownership: Town of Orleans

Observer/Agency: Orleans Parks & Beaches

Street: 18 Bay Ridge Lane, PO Box 122

Town, State, & Zip: Orleans, MA 02653

E-mail: pfulch@town.orleans.ma.us

Telephone: 508-240-3775

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⇨⇨ PLEASE: (1) provide a **map** outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇦⇦

Species Code	A-Count				B-Count				P	**Remarks:** (*e.g.*, evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/11/08	0								
COTE	06/29/08	1	A C	H C					0	Found 06/29 Predated by unknown predator 07/02 (coyote tracks common in area)
ARTE	06/11/08	0								
LETE	06/11/08	30	N C	H C					1	First nest of the season: 05/23 First chick seen: 06/29, First fledged chick seen: 07/16 Coyote tracks common in area
LAGU	06/11/08	0								
BLSK	06/11/08	0								
OTHER _____										

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337. Telephone: (508) 389-6372 / Fax: (508) 389-7891 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Massachusetts Tern Census Form, *Year 2008*

Colony Site Name: Nauset Beach (Orleans) – Pochet Washover

Subcolony ID: N/A

Town: Orleans, MA

Ownership: Town of Orleans

Observer/Agency: Orleans Parks & Beaches

Street: 18 Bay Ridge Lane, PO Box 122

Town, State, & Zip: Orleans, MA 02653

E-mail: pfulch@town.orleans.ma.us

Telephone: 508-240-3775

⇨⇨ PLEASE: (1) provide a map outlining the location of the colony, and (2) read the instructions on the reverse of this form before filling out. ⇦⇦

Species Code	A-Count				B-Count				P	Remarks: (*e.g.*, evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST	06/11/08	0								
COTE	06/11/08	0								
ARTE	06/11/08	0								
LETE	06/11/08	7	A C	H C					2	Hit by tides on 06/5 prior to census, did not adversely affect colony size Predator tracks seen: coyote, possum Date of first nest: 05/30, Date of first chick seen: 07/06 (2 chicks) Good productivity, estimating 1 chick per pair
LAGU	06/11/08	0								
BLSK	06/11/08	0								
OTHER _____										

Please forward completed form(s) no later than July 31 to Tern Census, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337.
Telephone: (508) 389-6372 / Fax: (508) 389-7891 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Orleans HCP page a347

Instructions for completing the Massachusetts Tern Census Form

For census methodologies consult the *Massachusetts Tern & Plover Handbook: a manual for stewards.*

Complete a separate form for each colony visited, even if no birds are found. Attach a map (USGS topo, aerial photograph, or careful hand-drawing that includes landmarks) for each active site, outlining the precise location of the nesting colony (or subcolonies).

Species Codes:

ROST = Roseate Tern
COTE = Common Tern
ARTE = Arctic Tern
LETE = Least Tern
LAGU = Laughing Gull
BLSK = Black Skimmer

Other Codes:

M = Method of Survey

NC = Nest* Count (1 nest or 1 incubating adult = 1 pair)
EC = Partial Nest Count (extrapolated)
AC = Adult** Count (# individuals in the nesting area multiplied by 0.8 = estimated number of pairs)

Q = Quality of Survey

LC = Low Confidence
RC = Reasonable Confidence
HC = High Confidence

P = Productivity*** Estimate

0 = No fledglings produced
1 = Poor
2 = Fair to Good
3 = Excellent

*Nests (or scrapes) should contain at least one egg in order to be counted. A nest should be counted if it is apparent that eggs have hatched and/or the chicks are away from the nest. Do not count empty scrapes or nests that are obviously abandoned. Remember, nests (or incubating adults) represent pairs and all results should be expressed as "numbers of pairs".

**If adults are present at the site but are not found or suspected to be nesting (*e.g.*, if they are simply resting or feeding in the area), they should not be counted as nesting pairs.

***Productive nests are those that produce fledglings.

REMINDER: REPORT ALL NEGATIVE RESULTS

(**Negative results** are important to document visitation of a site even though no nesting birds may have been found.)

Species Code	A-Count All "A-Counts" are taken **within** the census window of **June 5 - 20**	B-Count All "B-Counts" are taken **outside** the census window; **after June 20**
ROST	Time as closely as possible to the date of first hatch, approximately 23 days after the first eggs are laid.	Time exactly 25 days after first count.
COTE	Time as closely as possible to the date of first hatch, approximately 23 days after the first eggs are laid (usually 6-8 days before **ROST**).	No "B-Count" is required.
ARTE	Time census to coincide with that of the other species in colony such as **COTE** or **LETE**.	Another census should be taken to reflect any additional pairs that appear after June 20.
LETE	Visit colony frequently during the count period and report maximum number of nests/incubating birds counted on any one day.	Conduct a "B-Count" if there is a significant change in numbers from the "A-Count".
LAGU	Time count coincident with **COTE** count.	No "B-Count" is required.
BLSK	Time count coincident with **COTE** count.	Another census should be taken to reflect any additional pairs that appear after June 20.

Town of Orleans

Addendum to 2008 Tern Census

Following the census counts for Nauset Spit of Colonies 1, 2, and 3, locations of colonies shifted with predation and loss due to tide. Additional counts were conducted within the census window and yielded similar numbers. The colonies slowly spread out, until they were no longer were three distinct colonies. Numbers of least terns eventually began increasing, but the increase coincided with a decrease in number of least terns at Coast Guard Beach. We are not counting additional least terns, as their numbers should be reflected in the A Count from Coast Guard Beach. Productivity across the entire spit is estimated at only 5-10 fledged chicks, a compilation of the productivity noted on census forms for Colony 2 and Colony 3.

MASSACHUSETTS AMERICAN OYSTERCATCHER CENSUS FORM

Year: 2008

Site Name: Nauset Spit (Heights)

Town: Orleans, MA

Ownership: Town of Orleans

⇨ ***Please attach a map of this site that shows locations of all breeding pairs and nests.***

Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Affiliation: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122

Orleans, MA 02653-0122

Telephone: 508-240-3775 E-mail: pfulch@town.orleans.ma.us

Total breeding pairs: 1 Total chicks fledged (30 days of age or able to fly): 0

Max number(s) of post-breeding birds (adults and fledged young) / date observed: 2 adults observed on 07/12/08

Please indicate which, if any, Oystercatcher nests, broods, or important habitat areas were not adequately protected from human disturbance or off-road vehicles by existing management for Piping Plovers and terns.

All nesting pairs nested within areas protected for Piping Plovers and terns.

Comments; management undertaken/needed; clarification of census data:

Send forms to: Coastal Waterbirds, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2008 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson, E. Connick

Pair No.	Nest No.	No. eggs laid	No. eggs hatched	No. chicks fledged	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed	First date chick(s) observed	Last date chick(s) observed
1	A	2	0	0	06/25/08	2	?	07/07/08	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets of necessary.*
[d] *Oystercatchers are considered "fledged" if they are ≥ 30 days old or are observed in flight for ≥ 50ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Cause of chick mortality/Evidence
1A	On 07/07/08, the nest was gone. Loss is attributed to depredation by an unknown predator	Nest did not make it to hatching.

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2009

Site Name: Nauset Spit (Heights)

Town: Orleans, MA

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and pairs that did not nest.***

Observer(s): Paul Fulcher, Stephen Struble, Elizabeth Hogan, Patricia Johnson

Agency: Orleans Parks & Beaches

Address: 18 Bay Ridge Lane, PO Box 122
Orleans, MA 02653-0122

Telephone: 508-240-3775

E-mail: pfulch@town.orleans.ma.us

Census Results:	**Index Count[a]**	**Total Count[b]**
No. of Pairs	22	22
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All known pairs nested.

List pairs not present during Index Count:
All pairs were present during the census period.

Month	**Average # of visits to site per week**
April	4-5
May	7
June	7
July	7

Indicate type(s) of exclosure design(s) used:

Exclosure Design	**A**	**B**	**C**
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was altered as nests were discovered to provide adequate protection.
Nests were exclosed at three to four eggs or when completed (in the case of clutches completed at fewer than three eggs).
Dogs are prohibited from the beach from March 15th through September 15th. Signs were placed at the tip of Nauset Spit to notify boaters.
Offroad vehicle traffic was prohibited from areas with active broods from May 30th until August 16th, with the length of the closed area changing as broods hatched or fledged.

Orleans Code 2552

[a] *The Index Count includes those pairs seen during the Index Count period (1-9 June) and also those that may have been missed during the Index Count, but that must have been present then (based on laying or hatching dates).*

[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B...)	Date installed
1	**A** (NS1A)	3	3	2	05/01/09	1	05/07/09	06/02/09	Y	A	05/08/09
2	**A** (NS2A)	4	4	3	05/01/09	1	05/07/09	06/02/09	Y	A	05/08/09
3	**A** (NS3A)	4	4	2	05/03/09	2	05/07/09	06/02/09	Y	A	05/08/09
4	**A** (NS4A)	4	4	2	05/03/09	1	05/10/09	06/06/09	Y	A	05/08/09
5	**A** (NS5A)	1	0	0	05/04/09	1	N/A	05/08/09	N	N/A	N/A
5	**B** (NS11A)	4	4	3	05/12/09	1	05/18/09	06/14/09	Y	A	05/19/09
6	**A** (NS6A)	3	0	0	05/05/09	1	N/A	05/10/09	N	N/A	N/A
6	**B** (NS12A)	2	0	0	05/13/09	1	N/A	05/21/09	N	N/A	N/A
6	**C** (NS22A)	4	0	0	05/26/09	1	06/01/09	06/22/09	Y	A	05/30/09
7	**A** (NS7A)	4	4	1	05/08/09	2	05/11/09	06/07/09	Y	A	05/11/09

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
8	**A** (NS8A)	1	0	0	05/08/09	1	N/A	05/10/09	N	N/A	N/A
8	**B** (NS13A)	3	3	0	05/13/09	1	05/16/09	06/15/09	Y	A	05/16/09
9	**A** (NS9A)	4	4	1	05/10/09	3	05/12/09	06/09/09	Y	A	05/11/09
10	**A** (NS10A)	4	4	0	05/12/09	1	05/19/09	06/13/09	Y	A	05/16/09
11	**A** (NS14A)	2	0	0	05/16/09	1	N/A	05/19/09	N	N/A	N/A
11	**B** (NS20A)	4	0	0	05/26/09	1	06/01/09	06/22/09	Y	A	05/30/09
12	**A** (NS15A)	1	0	0	05/20/09	1	N/A	05/22/09	N	N/A	N/A
12	**B** (NS25A)	4	0	0	05/29/09	3	05/30/09	06/22/09	Y	A	05/30/09
13	**A** (NS16A)	2	0	0	05/20/09	1	N/A	05/24/09	N	N/A	N/A
13	**B** (NS21A)	4	0	0	05/26/09	2	06/01/09	06/22/09	Y	A	05/30/09

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
14	**A** (NS17A)	4	0	0	05/20/09	2	05/26/09	06/04/09	Y	A	05/25/09
14	**B** (NS28A)	2	0	0	06/12/09	1	N/A	06/15/09	N	N/A	N/A
14	**C** (NS31A)	3	0	0	06/20/09	2	N/A	06/22/09	Y	A	06/21/09
15	**A** (NS18A)	4	0	0	05/22/09	3	05/25/09	06/21/09	Y	A	05/22/09
16	**A** (NS19A)	3	0	0	05/22/09	3	?	06/14/09	Y	A	05/22/09
17	**A** (NS23A)	4	4	2	05/28/09	1	06/04/09	06/30/09	Y	A	06/02/09
18	**A** (NS24A)	4	0	0	05/29/09	1	06/01/09	06/22/09	Y	A	06/02/09
19	**A** (NS26A)	4	4	1	06/05/09	4	unknown	06/14/09	Y	A	06/07/09
20	**A** (NS27A)	3	3	2	06/09/09	1	06/14/09	07/11/09	Y	A	06/17/09
21	**A** (NS29A)	4	4	2	06/17/09	1	06/22/09	07/17/09	Y	A	06/20/09

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure		
									Y/N	Design (A, B…)	Date installed
22	**A** (NS30A)	1	0	0	06/17/09	1	N/A	06/18/09	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	All eggs hatched.	**1A**	Unknown. One chick disappeared on 06/21/09.
2A	All eggs hatched.	**2A**	Unknown. One chick disappeared on 06/11/09. Though the remaining three chicks reached 25 days old, they were never seen in flight. We lost track of them at 28 days.
3A	All eggs hatched.	**3A**	On 06/05/09, one chick disappeared. On 06/25/09, one chick was found dead, likely hit by high storm tides on 06/22/09. Though the remaining two chicks reached 25 days old, they were never seen in flight. We lost track of them at 31 days.
4A	All eggs hatched.	**4A**	Unknown. On 06/11/09, one chick disappeared. A second chick disappeared on 06/21/09.
5A	Unknown. On 05/08/09, after two days of rain, the nest was gone.	**5A**	This clutch did not hatch.
5B	All eggs hatched.	**5B**	Unknown. One chick disappeared on 06/21/09.
6A	On 05/11/09, gull tracks were observed up to the nest, and the eggs were gone.	**6A**	This clutch did not hatch.
6B	Unknown. On 05/21/09, the eggs were gone.	**6B**	This clutch did not hatch.
6C	This nest was lost during a two-day storm on 06/22/09.	**6C**	This clutch did not hatch.
7A	All eggs hatched.	**7A**	One chick disappeared on 06/11/09. A second chick disappeared on 06/21/09. A third chick disappeared during a two-day storm beginning on 06/22/09.
8A	Unknown. On 05/10/09, the eggs were gone.	**8A**	This clutch did not hatch.
8B	All eggs hatched.	**8B**	All chicks were missing following a two day storm beginning on 06/22/09.
9A	All eggs hatched.	**9A**	On 06/11/09, one chick disappeared. On 06/28/09, a second chick disappeared. On 07/01/09, a herring gull was observed catching and flying away with a third chick.
10A	All eggs hatched.	**10A**	All chicks disappeared during a two-day storm beginning on 06/22/09.
11A	Unknown. On 05/19/09, the eggs were gone.	**11A**	This clutch did not hatch.
11B	This nest was lost during a two-day storm beginning on 06/22/09.	**11B**	This clutch did not hatch.
12A	Unknown. On 05/22/09, the eggs were gone.	**12A**	This clutch did not hatch.

Send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. Telephone: (508) 792-7270 x. 150 / Fax: (508) 792-7275

Site Name: Nauset Spit (Heights) Year: 2009 Observer(s): P. Fulcher, S. Struble, E. Hogan, P. Johnson

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
12B	This nest was lost during a two-day storm beginning on 06/22/09.	**12B**	This clutch did not hatch.
13A	On 05/24/09, gull tracks were observed up to the nest, and the eggs were gone.	**13A**	This clutch did not hatch.
13B	This nest was lost during a two-day storm beginning on 06/22/09.	**13B**	This clutch did not hatch.
14A	On 06/04/09, a crow tore through the netting across the top and entered the exclosure, predating all eggs.	**14A**	This clutch did not hatch.
14B	On 06/15/09, gull tracks were observed up to the nest, and the eggs were gone.	**14B**	This clutch did not hatch.
14C	This nest was lost during a two-day storm beginning on 06/22/09.	**14C**	This clutch did not hatch.
15A	All eggs are believed to have hatched.	**15A**	This clutch had hatched 3 eggs on 06/21/09. A two day storm prevented monitoring for the next two days. All eggs appear to have hatched, though the chicks were not seen after the storm.
16A	On 06/14/09, no bird adult was observed incubating the nest. Subsequent observations suggested the nest was abandoned.	**16A**	This clutch did not hatch.
17A	All eggs hatched.	**17A**	Although all eggs appear to have hatched, we only confirmed three chicks. On 07/12/09, a second chick disappeared.
18A	This nest was lost during a two-day storm beginning on 06/22/09.	**18A**	This clutch did not hatch.
19A	All eggs hatched.	**19A**	Three chicks disappeared during a two-day storm beginning on 06/22/09.
20A	All eggs appear to have hatched.	**20A**	On 07/11/09, one egg was found missing and crow tracks circled the exclosure. The other two eggs were in the process of hatching. The first chick probably hatched but was predated upon leaving the exclosure. The other two eggs hatched and fledged.
21A	All eggs hatched.	**21A**	On 07/23/09, one chick disappeared. On 07/29/09, a second chick disappeared.
22A	On 06/18/09, tides had washed this nest over.	**22A**	This clutch did not hatch.

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MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2010

Site Name: Nauset Spit (Heights)

Town: Orleans

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and any pairs that did not nest.***

Observer(s): Elizabeth Hogan, Pat Johnson, Stephen Struble

Agency: Town of Orleans Parks & Beaches

Address: 18 Bay Ridge Lane
Orleans, MA 02653

Telephone: 508-240-3775

E-mail: pfulcher@town.orleans.ma.us

Census Results:	**Index Count[a]**	**Total Count[b]**
No. of Pairs	19	21
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:

All known pairs nested. Two pairs were estimated to have arrived after the census, though exact pair numbers are difficult, as numbers were reassigned as we reevaluated potential renesting.

List pairs not present during Index Count:
We estimate that two pairs were not present during the census period.

Month	**Approx. # of visits to site per period**
Apr. 1- 15:	15
Apr. 16-30:	15
May 1-15:	15
May 16-31:	16
June 1-15:	15
June 16-30:	15
July 1-15:	15
July 16-31:	16

***Indicate type(s) of exclosure design(s) used*:**

Exclosure Design	**A**	**B**	**C**
Shape	circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2 in x 4 in		
Total Height	4 ft		
Height above ground:	3 ft 8 in		
Depth buried:	4 in		
Cover material	bird netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:
Sites visited on daily basis throughout nesting season. Potential nesting habitat fenced using symbolic fencing prior to nesting period. Nests were exclosed at 3 eggs once active incubation was observed. Vehicles prohibited within 0.1 mi of unfledged broods, beginning on June 6th and ending on August 18th with the full extent of closure varying within that time. Dogs prohibited on beach from March 15th through September 15th.

[a] *The Index Count should include not only pairs observed during the Index Count period (June 1-9), but also pairs later determined to have been present during that period based on laying or hatching dates.*

[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
1	A (NS1)	1	0	0	05/01	1	N/A	05/03	N	N/A	N/A
1	B (NS23)	2	0	0	05/22	2	N/A	05/22	N	N/A	N/A
1	C (NS27)	4	4	1	05/28	2	05/31	06/25	Y	A	05/30
2	A (NS2)	4	0	0	05/01	1	05/09	05/27	Y	A	05/07
2	B (NS31)	2	2	1	06/16	2	?	07/16	Y	A	06/20
3	A (NS3)	1	0	0	05/01	1	N/A	05/02	N	N/A	N/A
3	B(NS10)	1	0	0	05/11	1	N/A	05/13	N	N/A	N/A
4	A (NS4)	1	0	0	05/02	1	N/A	05/03	N	N/A	N/A
4	B (NS13)	1	0	0	05/13	1	N/A	05/20	Y	A	05/18
4	C (NS28)	4	0	0	05/28	2	06/01	06/02	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	Unknown.	1A	Eggs lost.
1B	Found already abandoned, cause unknown.	1B	Eggs lost.
1C	All eggs hatched.	1C	One chick disappeared on 6/27. One chick disappeared on 7/2. One chick disappeared on 7/3.
2A	Abandoned by parents, cause unknown. Suspected mortality of one adult, as a single bird was seen in the area following abandonment, but we have no evidence.	2A	Eggs lost.
2B	All eggs hatched.	2B	One chick disappeared on 8/3. Remaining chick considered fledged, but appeared slightly underdeveloped and showed no signs of flight before disappearing.
3A	Crow tracks near scrape.	3A	Eggs lost.
3B	Unknown.	3B	Eggs lost.
4A	Unknown.	4A	Eggs lost.
4B	Abandoned following storm.	4B	Eggs lost.
4C	Unknown.	4C	Eggs lost.

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Site Name: Nauset Spit (Heights) **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
5	A (NS5)	4	0	0	05/02	1	05/10	06/16	Y	A	05/07
5	B (NS25)	4	4	1	05/23	1	05/30	06/23	Y	A	05/27
6	A (NS6)	4	4	2	05/02	1	05/10	06/07	Y	A	05/10
7	A (NS7)	4	0	0	05/04	1	05/11	05/20	Y	A	05/11
7	B (NS33)	2	0	0	06/19	2	N/A	06/18	N	N/A	N/A
8	A (NS8)	4	3	1	05/04	1	05/10	06/09	Y	A	05/10
9	A (NS9)	1	0	0	05/05	1	N/A	05/13	N	N/A	N/A
9	B (NS21)	3	3	2	05/20	1	05/25	06/23	Y	A	05/25
10	A (NS11)	1	0	0	05/11	1	N/A	05/13	N	N/A	N/A
11	A (NS12)	2	0	0	05/11	2	N/A	05/13	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
5A	Unknown.	5A	Eggs lost.
5B	All eggs hatched.	5B	One chick disappeared on 7/10. Two more chicks disappeared on 7/11.
6A	All eggs hatched.	6A	Two chicks disappeared on 6/15.
7A	Eggs sanded over following storm.	7A	Eggs lost.
7B	Found with 2 egg shells already predated. Both canid and possum tracks nearby.	7B	Eggs lost.
8A	All eggs hatched.	8A	Three chicks disappeared on 6/14.
9A	Unknown. Gull and canid tracks in area.	9A	Eggs lost.
9B	All eggs hatched.	9B	One chick disappeared on 7/1.
10A	Unknown.	10A	Eggs lost.
11A	Gull tracks near scrape.	11A	Eggs lost.

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Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 508-389-6345 (off.) 508-389-7891(fax)

Site Name: Nauset Spit (Heights) **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
11	B (NS24)	4	4	0	05/23	1	05/28	06/26	Y	A	05/26
12	A (NS14)	4	4	4	05/13	2	05/16	06/14	Y	A	05/14
13	A (NS15)	1	0	0	05/15	1	N/A	05/21	N	N/A	N/A
14	A (NS16)	4	3	0	05/15	1	05/23	06/20	Y	A	05/22
15	A (NS17)	4	2	0	05/16	1	05/22	06/17	Y	A	05/21
16	A (NS18)	2	0	0	05/16	2	N/A	05/18	N	N/A	N/A
16	B (NS29)	4	4	3	05/28	3	05/30	06/24	Y	A	05/28
17	A (NS19)	1	0	0	05/16	1	N/A	05/19	N	N/A	N/A
17	B (NS30)	4	4	4	06/04	4	?	06/28	Y	A	06/04
18	A (NS20)	1	0	0	05/17	1	N/A	05/19	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence
11B	All eggs hatched.
12A	All eggs hatched.
13A	Crow tracks leading to scrape.
14A	Unknown. All eggs appear to have hatched, but 4 chicks were never seen. Grackle tracks inside exclosure.
15A	Two eggs did not hatch.
16A	Unknown.
16B	All eggs hatched.
17A	Eggs sanded over following storm.
17B	All eggs hatched.
18A	Unknown.

Nest No.	Cause of chick mortality/Evidence
11B	One chick disappeared on 7/9.
12A	All chicks fledged.
13A	Eggs lost.
14A	All chicks disappeared within two days of hatching.
15A	One chick disappeared on 6/25. The remaining chick disappeared on 6/28.
16A	Eggs lost.
16B	One chick disappeared on 7/9.
17A	Eggs lost.
17B	All chicks fledged.
18A	Eggs lost.

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Site Name: Nauset Spit (Heights) **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
18	B (NS22)	4	2	1	05/21	1	05/27	06/21	Y	A	05/25
19	A (NS26)	3	0	0	05/28	2	05/30	06/22	Y	A	05/30
20	A (NS32)	3	3	0	06/18	1	06/21	07/16	Y	A	06/22
21	A (PB1)	4	4	3	05/02	3	05/03	05/29	Y	A	05/03

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
18B	Two eggs did not hatch.	18B	One chick disappeared on 7/10.
19A	A coyote or fox jumped over wire and through netting.	19A	Eggs lost.
20A	All eggs hatched.	20A	One chick disappeared on 7/23. On 7/24, two chicks were found, one of which was extremely weak and unable to move (but still alive). Both chick disappeared several hours later. On 7/26, a dead adult was found in the same location the weak chick had been observed. Adult was intact with no signs of predation.
21A	All eggs hatched.	21A	One chick disappeared on 6/22.

Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 508-389-6345 (off.) 508-389-7891(fax)

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2010

Observer(s): Elizabeth Hogan, Pat Johnson, Stephen Struble

Site Name: North Beach Orleans (areas south of Orleans ORV access)
Town: Orleans

Agency: Town of Orleans Parks & Beaches

Address: 18 Bay Ridge Lane
Orleans, MA 02653

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and any pairs that did not nest.***

Telephone: 508-240-3775

E-mail: pfulcher@town.orleans.ma.us

Census Results:	**Index Count**[a]	**Total Count**[b]
No. of Pairs	11	11
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:

All known pairs nested.

List pairs <u>not</u> present during Index Count:
All pairs were present during index count.

Month	**Approx. # of visits to site per period**
Apr. 1- 15:	15
Apr. 16-30:	15
May 1-15:	15
May 16-31:	16
June 1-15:	15
June 16-30:	15
July 1-15:	15
July 16-31:	16

***Indicate type(s) of exclosure design(s) used*:**

Exclosure Design	**A**	**B**	**C**
Shape	circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2 in x 4 in		
Total Height	4 ft		
Height above ground:	3 ft 8 in		
Depth buried:	4 in		
Cover material	bird netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:
Sites visited on daily basis throughout nesting season. Potential nesting habitat fenced using symbolic fencing prior to nesting period. Nests were exclosed at 3 eggs once active incubation was observed. Vehicles prohibited within 0.1 mi of unfledged broods, beginning on June 1st and ending on August 8th. Dogs prohibited on beach from May 15th through Labor Day. Dogs permitted on a leash below high tide mark south of Trail #1 while ORVs allowed.

[a] *The Index Count should include not only pairs observed during the Index Count period (June 1-9), but also pairs later determined to have been present during that period based on laying or hatching dates.*
[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: North Beach Orleans **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
1	A (P1)	4	3	1	04/25	1	04/30	05/28	Y	A	05/03
2	A (P2)	1	0	0	04/30	1	N/A	05/07	N	N/A	N/A
2	B (P6)	4	2	0	05/22	1	05/27	06/28	Y	A	05/26
3	A (P3)	4	0	0	05/10	1	05/15	05/19	Y	A	05/14
3	B (P8)	4	3	2	05/28	2	06/01	06/27	Y	A	05/30
4	A (P4)	4	4	3	05/10	2	05/14	06/11	Y	A	05/13
5	A (P5)	1	0	0	05/16	1	N/A	05/19	N	N/A	N/A
5	B (P9)	1	0	0	06/04	1	N/A	06/06	N	N/A	N/A
5	C (P11)	4	4	1	06/09	2	06/13	07/07	Y	A	06/12
6	A (P7)	4	3	0	05/27	1	06/02	06/26	Y	A	05/30

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence
1A	One egg did not hatch.
2A	Crow tracks leading to scrape.
2B	All eggs disappeared, but only two chicks were ever seen. Grackles seen inside exclosure, may have taken unhatched eggs.
3A	Sanded over following storm.
3B	One egg did not hatch.
4A	All eggs hatched.
5A	Abandoned following storm.
5B	Unknown.
5C	All eggs hatched.
6A	One egg began to hatch and was incubated for three days after others had hatched, but it never fully hatched.

Nest No.	Cause of chick mortality/Evidence
1A	One chick disappeared on 6/4. One chick disappeared on 6/19, at 23 days of age.
2A	Eggs lost.
2B	On 6/29, two chicks were observed separated by a large distance and acting stressed. Following intense heat on 6/29, both chicks disappeared.
3A	Eggs lost.
3B	One chick disappeared on 7/6.
4A	One chick disappeared on 6/16.
5A	Eggs lost.
5B	Eggs lost.
5C	Three chicks disappeared on 7/15.
6A	All three chicks disappeared on 7/4.

Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 508-389-6345 (off.) 508-389-7891(fax)

Site Name: North Beach Orleans **Year:** 2010 **Observer(s):** E. Hogan, P. Johnson, S. Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
7	A (P10)	4	3	3	06/08	2	06/13	07/07	Y	A	06/11
8	A (PPN1)	4	4	2	05/06	1	05/12	06/07	Y	A	05/11
9	A (PPN2)	1	0	0	05/15	1	N/A	05/18	N	N/A	N/A
9	B (PPN3)	4	3	0	05/24	2	05/27	06/19	Y	A	05/26
10	A (NB1)	4	3	0	05/24	3	05/26	06/22	Y	A	05/24
11	A (NB2)	3	3	0	06/07	3	?	07/02	Y	A	06/07

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
7A	One egg did not hatch.	7A	All hatched chicks fledged.
8A	All eggs hatched.	8A	One chick disappeared on 6/14. A second chick disappeared on 6/15.
9A	Skunk tracks in area.	9A	Eggs lost.
9B	One egg did not hatch.	9B	One chick disappeared on 6/25. The remaining 2 chicks disappeared on 6/29.
10A	One egg did not hatch.	10A	One chick disappeared on 6/23. One chick disappeared on 7/4. The last chick disappeared on 7/8. One adult disappeared a week before hatching, and eggs were often untended. Only one adult was ever present with chicks.
11A	All eggs hatched.	11A	One chick disappeared on 7/3. One chick disappeared on 7/8. The remaining chick disappeared on 7/10.

Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 508-389-6345 (off.) 508-389-7891(fax)

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2011

Observer(s): S. Struble, E, Hogan, P. Johnson, P. Fulcher

Site Name: Nauset Beach - Nauset Spit (Heights)

Agency: Town of Orleans Parks & Beaches Department

Town: Orleans, MA

Address:

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and any pairs that did not nest.***

Telephone:

E-mail:

Census Results:	**Index Count**[a]	**Total Count**[b]
No. of Pairs	22	24
Unpaired Adults	0	0

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
All observed pairs nested.
Note that although pair 23 (PB2) lost their nest prior to the census window and never renested, they were observed in the area during the census window and are thus included in the index count.

List pairs <u>not</u> present during Index Count:
Pair 3(NS3) and pair 7 (NS7) both left prior to the census window.

Month	**Approx. # of visits to site per period**
Apr. 1- 15:	15
Apr. 16-30:	15
May 1-15:	15
May 16-31:	16
June 1-15:	15
June 16-30:	15
July 1-15:	15
July 16-31:	16

***Indicate type(s) of exclosure design(s) used*:**

Exclosure Design	**A**	**B**	**C**
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:
Symbolic fencing used to provide adequate protection. Nests initially exclosed at 3-4 eggs or when complete, but all exclosures were removed on 06/06/11 following suspected adult mortality related to exclosure use. Six nests were abandoned in the days prior to exclosure removal. Evidence related to possible adult mortality is reported under the nest failure section for associated nests.
Dogs prohibited from 03/15/11 through 09/15/11.
Offroad vehicle traffic prohibited from areas with active broods from May 31st until August 15th, with the length of the closed area changing as broods hatched or fledged.

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[a] *The Index Count should include not only pairs observed during the Index Count period (June 1-9), but also pairs later determined to have been present during that period based on laying or hatching dates.*

[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
1	A (NS1)	4	0	0	04/30/11	1	05/06/11	06/01/11	Y	A	05/07/11
1 / 12	B (NS32)	3	0	0	06/19/11	3	?	06/26/11	N	N/A	N/A
2	A (NS2)	4	0	0	04/30/11	1	05/07/11	05/22/11	Y	A	05/07/11
2	B (NS21)	3	0	0	05/31/11	2	06/03/11	06/17/11	Y	A	06/03/11
3	A (NS3)	2	0	0	05/02/11	1	N/A	05/05/11	N	N/A	N/A
4	A (NS4)	4	0	0	05/02/11	1	05/10/11	06/06/11	Y	A	05/07/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	Abandoned on 06/01/11. Incubation was sporadic on days prior to abandonment, and a single adult was seen scraping immediately following abandonment. Suspect possible loss of one adult.	1A	Did not hatch.
1B / 12B	Crow - tracks leading directly to empty scrape. This pair is a suspected re-pairing of two adults (from pairs 1 and 12) who both experienced mate loss.	1B	Did not hatch.
2A	Abandoned for unknown reasons - pair began scraping again almost immediately.	2A	Did not hatch.
2B	Crow - tracks leading directly to empty scrape.	2B	Did not hatch.
3A	Unknown - empty scrape, no obvious predator tracks.	3A	Did not hatch.
4A	Crow - tracks leading directly to empty scrape.	4A	Did not hatch.

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Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.) 508-389-7891(fax)

Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
4	B (NS30)	3	0	0	06/15/11	1	N/A	06/25/11	N	N/A	N/A
5	A (NS5)	3	0	0	05/04/11	1	N/A	05/11/11	N	N/A	N/A
5	B (NS13)	4	1?	0	05/22/11	1	05/27/11	06/21/11	Y	A	05/25/11
6	A (NS6)	3	0	0	05/04/11	1	N/A	05/11/11	N	N/A	N/A
6	B (NS12)	4	0	0	05/20/11	1	05/25/11	06/05/11	Y	A	05/25/11
7	A (NS7)	2	0	0	05/04/11	1	N/A	05/08/11	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*

[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
4B	Coyote - tracks leading directly to empty scrape.	4B	Did not hatch.
5A	Eggs sanded over during storm winds.	5A	Did not hatch.
5B	Coyote tracks leading directly to scrape on 06/21/11, assume 3 eggs taken by coyote (occurred as eggs were hatching, hard to say whether or not they hatched).	5B	On 06/22/11, observed one PIPL chick and one LETE chick being tended by PIPL adults. PIPL chick disappeared on 06/24/11. Adult PIPLs defending LETE chick until 06/25/11.
6A	Eggs sanded over during storm winds.	6A	Did not hatch.
6B	Abandoned. Because of a series of abandonments in this area from 06/01/11 through 06/06/11, we suspect there may have been harassment of the adults by a predator, though we do not have good evidence of actual adult mortality for this nesting pair.	6B	Did not hatch.
7A	Crow - tracks leading directly to empty scrape.	7A	Did not hatch.

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Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
8	A (NS8)	1	0	0	05/08/11	1	N/A	05/11/11	N	N/A	N/A
8	B (NS20)	4	0	0	05/28/11	1	06/03/11	06/06/11	Y	A	06/01/11
8	C (NS35)	4	0	0	06/25/11	4	?	06/07/11	N	N/A	N/A
9	A (NS9)	3	0	0	05/13/11	1	05/21/11	06/05/11	Y	A	05/21/11
9	B (NS28)	4	0	0	06/14/11	2	06/17/11	06/21/11	N	N/A	N/A
10	A (NS10)	4	0	0	05/13/11	1	06/20/11	06/02/11	Y	A	05/19/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
8A	Storm tides washed through area the night of 05/10/11.	8A	Did not hatch.
8B	Crow - tracks leading directly to empty scrape.	8B	Did not hatch.
8C	Crow - tracks leading directly to empty scrape.	8C	Did not hatch.
9A	Abandoned. Heavy crow tracks around exclosure, possible blood in sand. Suspect adult loss.	9A	Did not hatch.
9B	Unknown - eggs gone, no evidence of predators. Despite possible adult loss of the 9A pair, we suspect a remaining adult paired up with another bird.	9B	Did not hatch.
10A	Abandoned. Because of a series of abandonments in this area from 06/01/11 through 06/06/11, we suspect there may have been harassment of the adults by a predator, though we do not have good evidence of actual adult mortality for this nesting pair.	10A	Did not hatch.

Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.) 508-389-7891(fax)

Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
11	A (NS11)	4	0	0	05/13/11	1	05/21/11	06/02/11	Y	A	05/21/11
12	A (NS14)	4	0	0	05/22/11	4	?	06/04/11	Y	A	05/22/11
13	A (NS15)	3	0	0	05/22/11	2	N/A	05/25/11	N	N/A	N/A
13	B (NS27)	4	0	0	06/10/11	1	06/15/11	06/21/11	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
11A	Abandoned. Because of a series of abandonments in this area from 06/01/11 through 06/06/11, we suspect there may have been harassment of the adults by a predator, though we do not have good evidence of actual adult mortality for this nesting pair.	11A	Did not hatch.
12A	Abandoned. Heavy crow tracks around exclosure, possible blood in sand. Suspect adult loss. Note that we suspect the remaining adult re-paired with the remaining adult from pair 1 (See sheet 1).	12A	Did not hatch.
13A	Unknown - shell fragments found near scrape, no predator tracks.	13A	Did not hatch.
13B	Crow - tracks leading directly to empty scrape.	13B	Did not hatch.

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Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.) 508-389-7891(fax)

Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
14	A (NS16)	2	0	0	05/23/11	1	N/A	05/27/11	N	N/A	N/A
14	B (NS26)	4	0	0	06/10/11	1	06/15/11	06/27/11	N	N/A	N/A
15	A (NS17)	4	0	0	05/25/11	1	05/31/11	06/06/11	Y	A	05/30/11
15	B (NS29)	4	0	0	06/15/11	2	06/19/11	06/29/11	N	N/A	N/A
16	A (NS18)	4	0	0	05/26/11	1	06/02/11	06/10/11	Y	A	06/01/11
16	B (NS33)	4	0	0	06/20/11	3	06/22/11	06/23/11	N	N/A	N/A
17	A (NS19)	4	0	0	05/26/11	1	06/01/11	06/13/11	Y	A	06/01/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
14A	Crow - tracks leading directly to empty scrape, shell fragments nearby.	14A	Did not hatch.
14B	Crow-like tracks leading to empty scrape, but too small to be crow. Cannot be certain of culprit.	14B	Did not hatch.
15A	Crow - tracks leading directly to scrape.	15A	Did not hatch.
15B	Gull - tracks leading directly to scrape.	15B	Did not hatch
16A	Unknown - scrape empty, coyote tracks within 2 feet of scrape, but tracks seem to go right past nest.	16A	Did not hatch.
16B	Unknown - eggs missing, no visible predator tracks. Scrape gone, but it does not appear that tides washed over the area.	16B	Did not hatch.
17A	Unknown - possibly crow, but tracks unclear.	17A	Did not hatch.

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Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.) 508-389-7891(fax)

Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
17	B (NS31)	3	0	0	06/19/11	1	06/24/11	06/28/11	N	N/A	N/A
18	A (NS22)	4	0	0	06/02/11	1	06/09/11	06/11/11	N	N/A	N/A
19	A (NS23)	3	0	0	06/02/11	2	06/03/11	06/15/11	Y	A	06/04/11
19	B (NS34	4	4	0	06/22/11	1	06/27/11	07/21/11	N	N/A	N/A
20	A (NS24)	3	0	0	06/07/11	3	N/A	06/08/11	N	N/A	N/A
21	A (NS25)	3	0	0	06/08/11	1	N/A	06/14/11	N	N/A	N/A
22	A (PB1)	4	3	2	04/26/11	1	05/02/11	05/30/11	Y	A	04/30/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
17B	Gull - tracks leading directly to scrape.	17B	Did not hatch.
18A	Crow - fresh tracks leading up to scrape and 3 broken egg shells on 06/10/11. 4th egg recovered by adults, but gone by 06/11/11.	18A	Did not hatch.
19A	Coyote - tracks leading directly to scrape.	19A	Did not hatch.
19B	All eggs hatched.	19B	One chick disappeared on 07/26/11. One chick disappeared on 07/28/11. One chick disappeared on 08/05/11. The final chick disappeared on 08/13/11 at 24 days of age, and we do not feel confident that the chick fledged.
20A	Crow - tracks leading directly to empty scrape.	20A	Did not hatch.
21A	Unknown - eggs missing, no visible tracks.	21A	Did not hatch.
22A	One egg did not hatch.	22A	One chick disappeared on 06/17/11.

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Site Name: Nauset Spit (Heights) **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
23	A (PB2)	4	0	0	05/04/11	1	05/12/11	05/13/11	N	N/A	N/A
24	B (PB3)	4	0	0	05/22/11	1	05/28/11	06/11/11	Y	A	05/26/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
23A	Crow - tracks leading directly to empty scrape.	23A	Did not hatch.
24A	Unknown - scrape empty, no visible tracks.	24A	Did not hatch.

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MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2011

Observer(s): S. Struble, E, Hogan, P. Johnson, P. Fulcher

Site Name: Nauset Beach - Pochet and south

Agency: Town of Orleans Parks & Beaches Department

Town: Orleans, MA

Address:

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and any pairs that did not nest.***

Telephone:

E-mail:

Census Results:	**Index Count**[a]	**Total Count**[b]
No. of Pairs	6	8
Unpaired Adults	1	1

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
An unpaired adult was observed scraping and defending a territory just south of Pair 5 (P5) on and off for over a month, including several sightings at the beginning of the census window. No mate was ever observed and no nest was ever found. The bird left the area during the census window.

List pairs <u>not</u> present during Index Count:
Pair 3 (P3) left prior to census window. Pair 8 (NB4) arrived after the census window.

Month	**Approx. # of visits to site per period**
Apr. 1- 15:	15
Apr. 16-30:	15
May 1-15:	15
May 16-31:	16
June 1-15:	15
June 16-30:	15
July 1-15:	15
July 16-31:	16

***Indicate type(s) of exclosure design(s) used*:**

Exclosure Design	**A**	**B**	**C**
Shape	Circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2x4 in		
Total Height	4 ft		
Height above ground:	3.5 ft		
Depth buried:	0.5 ft		
Cover material	Mesh netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:
Symbolic fencing used to provide adequate protection. Nests initially exclosed at 3-4 eggs or when complete, but all exclosures were removed on 06/06/11 following suspected adult mortality at nearby Nauset Spit related to exclosure use.
Offroad vehicle traffic prohibited from areas with active broods from May 31st until August 15th, with the length of the closed area changing as broods hatched or fledged.
Dogs are prohibited from the beach from May 15th through Labor Day.

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[a] *The Index Count should include not only pairs observed during the Index Count period (June 1-9), but also pairs later determined to have been present during that period based on laying or hatching dates.*

[b] *To be included in the Total Count, a pair must have been present at the site for ≥ 2 weeks and exhibiting courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Pochet **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
1	A (P1)	3	3	2	05/03/11	2	05/06/11	06/08/11	Y	A	05/06/11
2	A (P2)	4	0	0	05/09/11	1	05/17/11	05/22/11	Y	A	05/15/11
2	B (P6)	4	0	0	06/05/11	2	06/08/11	06/13/11	N	N/A	N/A
2	C (P7)	4	4	0	06/21/11	2	06/25/11	07/19/11	N	N/A	N/A
3	A (P3)	2	0	0	05/09/11	1	N/A	05/11/11	N	N/A	N/A
4	A (P4)	4	0	0	05/13/11	1	05/22/11	06/09/11	Y	A	05/22/11
5	A (P5)	4	4	4	05/26/11	1	05/31/11	06/25/11	Y	A	05/29/11

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
1A	All eggs hatched.	1A	One chick disappeared on 06/23/11.
2A	Abandoned for unknown reasons - pair began scraping again almost immediately.	2A	Did not hatch.
2B	Coyote - tracks leading directly to empty scrape.	2B	Did not hatch.
2C	All eggs hatched.	2C	One chick disappeared on 07/25/11. Two chicks disappeared on 07/27/11. The final chick disappeared on 07/28/11.
3A	Eggs sanded over during storm winds.	3A	Did not hatch.
4A	2 eggs missing on 6/6 with crow tracks leading to scrape. 1 more egg missing on 6/7 with more crow tracks. Final egg gone on 6/9 with more crow tracks leading to scrape.	4A	Did not hatch.
5A	All eggs hatched.	5A	All chicks fledged.

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Site Name: Pochet **Year:** 2011 **Observer(s):** S. Struble, E. Hogan, P. Johnson, P. Fulcher

Pair No.	Nest No.	No. eggs laid	No. eggs hatched[c]	No. chicks fledged[d]	Date clutch found	No. eggs when clutch found	Date clutch completed	Date nest hatched or failed[c]	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
6	A (NB1)	4	0	0	05/12/11	4	?	06/07/11	Y	A	05/13/11
6	B (NB5)	2	2	0	06/25/11	2	?	07/21/11	N	N/A	N/A
7	A (NB2)	4	0	0	05/24/11	1	05/29/11	06/08/11	Y	A	05/28/11
7	B (NB3)	4	0	0	06/15/11	2	06/20/11	07/07/11	N	N/A	N/A
8	A (NB4)	3	0	0	06/18/11	2	06/20/11	06/27/11	N	N/A	N/A

[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence (please give details), or "unknown." Use additional pages if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence	Nest No.	Cause of chick mortality/Evidence
6A	Crow - tracks leading directly to scrape.	6A	Did not hatch.
6B	All eggs hatched.	6B	One chick disappeared on 08/08/11. The second chick disappeared on 08/11/11.
7A	Crow - tracks leading directly to scrape, shell fragments found nearby.	7A	Did not hatch.
7B	Unknown - empty scrape, no clear tracks of any predators.	7B	Did not hatch.
8A	Crow - tracks leading directly to empty scrape.	8A	Did not hatch.

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MASSACHUSETTS PIPING PLOVER CENSUS - SHORT FORM

Date: 7/21/11 Name: Town of Orleans Parks & Beaches Telephone: 508-240-3700 ext 465

Site Name	No. pairs		No. chicks		
	Index count	Total count	Fledged	Still unfledged	No. pairs with productivity data[a]
1. Nauset Spit (north of parking lot)	22	24	2	0	24
2. Pochet and Nauset Beach (south of parking lot)	6	8	6	0	8
3. Skaket Beach	0	0	0	0	0
4.					
5.					
6.					
7.					
8.					
9.					
10.					

[a] Includes all pairs for which you were able to determine number of chicks fledged, including pairs that were present for at least 2 weeks but did not nest, and pairs that failed to hatch any eggs or fledge any chicks.

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2012

Observer(s): Elizabeth Hogan, Pat Johnson, Stephen Struble

Site Name: Nauset Spit (Heights)

Agency: Town of Orleans Parks & Beaches

Town: Orleans

Address: 139 Main Street
Orleans, MA 02653

Ownership: Town of Orleans

⇒ ***Please attach a map of this site that shows locations of all nests and any pairs that did not nest.***

Telephone: 508-240-3775 **E-mail:** pfulcher@town.orleans.ma.us

Census Results:	**Index Count[a]**	**Total Count[b]**
No. of Pairs	10	11
Unpaired Adults	0	0

Census remarks (include notes on pairs that did not nest [dates present, behavior]:
All known pairs nested during the census period. Pair 10 did not have a known nest during the census period; however, monitors reported courtship behavior and scraping from 5/12-5/31 and likely missed a nesting attempt. A later nest in this area was attributed to this pair. Thus, this pair was included in the Index Count.
Pair 3 first nested on Nauset Spit and later renested on nearby New Island. This pair is included in the Nauset Spit Index Count.

List pairs not present during Index Count period:
Pair 11 is believed to have left prior to the Index Count period. All other pairs that disappeared before or during the Index Count period were connected to later nests as much as possible for a conservative estimate of numbers.

Month	**Approx. # of visits to site per period**
Apr. 1- 15:	15
Apr. 16-30:	15
May 1-15:	15
May 16-31:	16
June 1-15:	15
June 16-30:	15
July 1-15:	15
July 16-31:	16

Report specifications of predator exclosures used:

Exclosure Design	**A**	**B**	**C**
Shape	circular		
Diameter/Length of side	10 ft		
Size of wire mesh	2 in x 4 in		
Total Height	4 ft		
Height above ground:	3 ft 8 in		
Depth buried:	4 in		
Cover material	bird netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:
Sites visited on daily basis throughout nesting season. Potential nesting habitat fenced using symbolic fencing prior to nesting period. Exclosures were largely not utilized given issues in the previous season, though three nests at the end of the season were exclosed. Nests were exclosed at 3 eggs once active incubation was observed. Vehicles prohibited within 0.1 mi of unfledged broods. Dogs prohibited on beach from April 15th through September 15th.

[a] *The **Index Count** includes pairs observed during the **June 1-9** count period, and pairs determined to have been present during that period based on laying or hatching dates.*

[b] *Pairs included in the **Total Count** must have been present at the site for ≥ 2 weeks and exhibited courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) **Year:** 2012 **Observer(s):** Elizabeth Hogan, Pat Johnson, Stephen Struble

Pair No.	Nest No.	No. eggs laid	No. eggs hatched	No. chicks fledged[c]	Date clutch found	No. eggs when clutch found	Date clutch completed (if known)	Date nest hatched or failed	Exclosure Report		
									Y/N	Design (A, B…)	Date installed
1	A (NS1)	1	0	0	04/30	1	N/A	05/03	N	N/A	N/A
1	B (NS2)	3	0	0	05/08	1	N/A	05/23	N	N/A	N/A
1	C (NS14)	2	0	0	06/09	2	?	06/15	N	N/A	N/A
1	D (NS23)	3	2	2	06/17	1	06/20	07/16	Y	A	06/27
2	A (NS3)	2	0	0	05/11	1	N/A	05/13	N	N/A	N/A
2	B (NS9)	4	0	0	05/26	2	05/30	06/03	N	N/A	N/A
3	A (NS4)	4	0	0	05/12	1	05/19	05/24	N	N/A	N/A
3	B (NI1)	3	0	0	06/21	3	?	07/11	N	N/A	N/A
4	A (NS5)	4	0	0	05/12	1	05/19	06/05	N	N/A	N/A
4	B (NS17)	1	0	0	06/12	1	N/A	06/12	N	N/A	N/A

[c] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/supporting evidence [d]	Nest No.	Cause of chick mortality/supporting evidence [d]
1A	Unknown. Eggs missing on 05/03. No predator tracks near scrape.	1A	Did not hatch.
1B	Unknown. Eggs missing on 05/23. Coyote tracks 10' away, but not leading to scrape.	1B	Did not hatch.
1C	Unknown. Eggs missing on 06/15. Coyote tracks 10' away, but not definitively leading to scrape.	1C	Did not hatch.
1D	One egg did not hatch.	1D	Both chicks survived to 25 days of age.
2A	Unknown. Both crow and mammalian tracks around scrape.	2A	Did not hatch.
2B	Unknown. Eggs missing on 06/03. No predator tracks near scrape.	2B	Did not hatch.
3A	Crow tracks leading directly to empty scrape on 05/24.	3A	Did not hatch.
3B	Unknown. Eggs missing on 07/11.	3B	Did not hatch.
4A	Nest lost to storm tides on 06/04 or 06/05.	4A	Did not hatch.
4B	Egg shell found already depredated on 06/12. Crow tracks in area.	4B	Did not hatch.

[d] *Give cause of egg or chick loss for each nest or brood, if known or strongly suspected; please provide details of supporting evidence. Use additional pages if necessary.*