Town of Orleans Over-Sand Vehicle Access Habitat Conservation Plan

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Table of Contents

I. Introduction 1

II. Purpose and Need 2

III. Regulatory Context 3

IV. Current OSV Management 9

V. Covered Lands – ITP Permit Area 10

VI. Covered Activities 11

VII. Covered Species 12

VIII. Biological Goals and Objectives 12

IX. Proposed OSV Program 13

X. Analysis of Impacts 20

XI. Mitigation Measures 23

XII. Monitoring and Reporting 27

XIII. Changed Circumstances 28

XIV. Unforeseen Circumstances 29

XV. Funding Assurances 30

XVI. Alternatives to Taking 31

XVII. Permit Amendment 31

XVIII. Permit Renewal 34

XIX. Literature Cited 35

Appendices

Appendix

1. Nauset Beach South ORV Map
2. MADFW Conservation & Management Permit (July 15, 2014)
3. Nauset Beach South ORV Management Plan: Order of Conditions (SE 542246) (July 23, 2014)
4. Beach Related Revenue Summary 2003 - 2013
5. 2013 Massachusetts Piping Plover Census Forms
6. Orleans Historical Commission re: Environmental Review (April 3, 2014)
7. MEPA Certificate
8. Orleans Conservation Commission's Order of Conditions (SE 54723) of January 14, 1991
9. Nauset Barrier System (Arial photographic map)
10. Variable Escort Route Map
11. 1998 Summary of Piping Plover and Other Shorebird Breeding Success
12. 1999 Summary of Piping Plover and Other Shorebird Breeding Success
13. 2000 Summary of Piping Plover and Other Shorebird Breeding Success
14. 2001 Summary of Piping Plover and Other Shorebird Breeding Success
15. 2002 Summary of Piping Plover and Other Shorebird Breeding Success
16. Summary of the 2003 Piping Plover and Waterbird Nesting season for Nauset Beach
17. Summary of the 2004 Piping Plover and Waterbird Nesting season for Nauset Beach
18. 2005 Summary of Piping Plover and Other Shorebird Breeding Success
19. Summary of the 2006 Piping Plover and Waterbird Nesting season for Nauset Beach
20. 2007 Massachusetts Piping Plover Census Forms
21. 2008 Summary of Piping Plover and Other Shorebird Breeding Success
22. 2009 Massachusetts Piping Plover Census Forms
23. 2010 Massachusetts Piping Plover Census Forms
24. 2011 Massachusetts Piping Plover Census Forms
25. 2012 Massachusetts Piping Plover Census Forms
26. Orleans/MADFW Offsite Mitigation Memo
27. Escrow Agreement
28. USFWS Piping Plover Atlantic Coast Population Recovery Plan (1996)

I. Introduction

Orleans is one of a number of Atlantic Ocean beachfront towns in the Commonwealth of Massachusetts whose beaches provide breeding habitat for state and federally protected shorebirds as well as recreational opportunities for residents and visitors. As such, the Town of Orleans is responsible for managing and permitting certain activities on these beaches in accordance with state and federal regulations and in the context of recreational use and natural resource protection. The Town of Orleans Over-Sand Vehicle Access Habitat Conservation Plan (HCP) will address management flexibility on "Nauset Beach South", a section of beach approximately 3.5 miles starting at the Nauset Beach Parking Lot in Orleans and extending south to the Chatham town line (Appendix 1). Although for many years, annual piping plover census reports (Appendices 5 & 11-25) submitted to the Massachusetts Division of Fisheries and Wildlife (MADFW) have referred to this beach as "North Beach", in order to be consistent with other formal documents and unless otherwise noted, the HCP will use the name "Nauset Beach South" to identify this beach.

In 1986, the Atlantic Coast Piping Plover (*Charadrius melodus*) was listed as a threatened species under the Endangered Species Act of 1973, as amended (ESA). The listing was due to interrelated threats such as loss of habitat, predators, and human disturbance. The Town of Orleans has a long history of managing Nauset Beach South with guidance from the Massachusetts Natural Heritage & Endangered Species Program (NHESP). The Town manages all beaches in compliance with the United States Fish and Wildlife Service (USFWS) for managing recreational activities in piping plover breeding habitat (USFWS 1994) (federal Guidelines), the Massachusetts guidelines for managing recreational use of beaches to protect piping plovers, terns, and their habitats (MADFW 1994) (state Guidelines) and the Massachusetts barrier beach management guidelines (Massachusetts Barrier Beach Task Force 1994).

Nauset Beach is managed by the Town of Orleans Department of Parks and Beaches according to federal and state recreational beach management Guidelines to protect piping plovers and state-listed least terns. Seasonal Parks and Beaches staff hired to manage recreation and natural resources consists of at least two full-time qualified shorebird monitors who work under the supervision of the Natural Resources Manager and the seasonally hired Beach Director. Parks and Beaches staff implement shorebird conservation and management actions such as installing symbolic fencing (i.e., pole and string fencing) to protect piping plover and least tern nesting habitat, monitoring nesting shorebirds, documenting reproductive success, installing predator exclosures as recommended by MADFW and USFWS, and a variety of other measures designed to increase piping plover and least tern productivity and to protect fragile coastal resources. Seasonally hired enforcement staff enforces access restrictions on the recreational use of plover and tern breeding habitat by pedestrians, domestic animals and over-sand vehicles (OSV) in accordance with state and federal Guidelines.

Implementation of protective measures outlined in the state and federal Guidelines by the Town of Orleans and throughout Massachusetts, has contributed to a significant increase in breeding pairs and progress towards statewide and regional recovery goals (USFWS 1996, 2009). The management being implemented by the Town of Orleans comprehensively

addresses the beach management issues that potentially affect piping plovers and cover a range of issues such as habitat protection, pedestrian traffic, dog exercising, surf activities and OSV use.

While the state and federal Guidelines generally work well for both the Town of Orleans recreational beach management objectives and the overall protection and conservation of piping plovers, recently there have been issues with aspects of the OSV program that require some flexibility from strict adherence to the Guidelines. This flexibility will introduce increased risk of impacts to a small number of piping plovers, primarily unfledged plover chicks, thus the Town's need for pursuing incidental take coverage under both the Massachusetts Endangered Species Act (MESA) and the Federal Endangered Species Act of 1973, as amended (ESA). Because the Town of Orleans is fully implementing the state and federal Guidelines for all other aspects of their beach management responsibilities, it is only the OSV use program that needs to be addressed by this habitat conservation plan.

This HCP is being submitted in support of a three-year incidental take permit (ITP) application for the piping plover, authorized under section 10(a)(1)(B) of the ESA, and to minimize and mitigate impacts to the piping plover and its habitat. The HCP provides a framework for effectively managing breeding piping plovers and their habitats at Nauset Beach South, and for providing mitigation to advance the conservation of the piping plover both on-site and elsewhere in Massachusetts. At the same time, this HCP will preserve recreational opportunities and historic uses of Nauset Beach South and reduce impacts of piping plover protection on beach revenue.

A previous draft of this HCP served as an application for the Conservation and Management Permit pursuant to the MESA (MGL c. 131A; 321 CMR 10.23) (CMP). Since the CMP was issued (July 15, 2014), the proposed escorting protocols have been revised and minor changes to the estimated take, biological objectives and mitigation have been made to the document. These changes address comments provided by the USFWS, MADFW, and the public. The MADFW will amend the CMP, or otherwise approve minor changes, to incorporate the final HCP and revised protocols.

II. Purpose and Need

Over the next three years (the permit term proposed in the HCP), the Town of Orleans will engage in management and regulatory activities along Nauset Beach that will provide conservation of the overall plover population and will minimize the potential for incidental take from OSV use of the beach. The Town of Orleans is pursuing this HCP for the years 2015, 2016, and 2017. Since piping plovers nest, roost, forage, and raise chicks on the sandy landscape of Nauset Beach, the Town of Orleans has an obligation to ensure its management activities are compatible with protecting plovers and their habitat.

In order to comply with the Massachusetts Wetlands Protection Act, MESA and avoid take of piping plovers, the Town of Orleans currently restricts, when necessary, OSV use on portions of Nauset Beach South during the breeding season (April 1 to August 31) to avoid potential adverse effects on nesting populations of piping plover. The only reasonable means

of access to the majority of available area of Nauset Beach South is via OSV access. Nesting and related piping plover activity in a 0.8 mile long area known as the "Pochet Wash-Over" (Pochet) is the primary reason for what has evolved into a predictable annual complete OSV access closure on Nauset Beach South. The Pochet area is located approximately three-quarters of a mile south of the Nauset Beach (Orleans) main parking lot and has no crossover access trails to direct traffic to the outer, seaward beach in order to avoid nesting plovers. Multiple cross-overs exist south of the Pochet area for OSV access to the outer beach (Appendix 1). Total closures related to breeding piping plover activity prevent OSV access to approximately five miles of beach located between the Pochet and the southern end of Nauset Beach South in the Town of Chatham. Currently, when piping plover protection mandates complete closure of the Pochet area to OSV access, OSV use on the remaining portion of the five-mile area south of the Pochet area complies with both state and federal Guidelines for avoiding take of the piping plover and the Orleans Conservation Commission's Order of Conditions (OOC) (SE 54-2246) (Appendix 3).

These seasonal use restrictions have been implemented annually since 1991. In 2006, Nauset Beach South experienced its first complete OSV access closure due to protection of nesting piping plovers and their chicks. A complete OSV access closure has been required during each consecutive season beginning in 2006. In general, closures have been increasing in length (number of days). The 2013 closure was the longest on record lasting 83 consecutive days (Table 1).

Table 1. South trail OSV closure at Pochet wash-over, 2006 -2014.

Year	Date of Closure	Date Re-opened	Number days Closed
2006	22-Jun	25-Jul	33
2007	22-Jun	1-Aug	40
2008	16-Jun	24-Jul	38
2009	30-May	4-Aug	66
2010	27-May	9-Aug	74
2011	3-Jun	5-Aug	63
2012	6-Jun	14-Aug	69
2013	3-Jun	23-Aug	81
2014	11-Jun	15-Aug	65

As previously stated, Nauset Beach South is managed according to state and federal beach management Guidelines, however; under the HCP, the Town will deviate from these beach management Guidelines by allowing late season OSV use, beginning on or after July 15th, in the presence of no more than two broods (chicks that hatched from a pair of plovers) of piping plover chicks occurring within the proposed permit area as defined in Section IV of this document. While this activity could result in incidental take[1] of the chicks, the Town

[1] Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by FWS as actions that create the likelihood of injury to listed

will implement measures including late-season OSV self-escorting to minimize the potential for impacts to the chicks. Self-escorting will be implemented for a total of two broods, irrespective of whether they overlap temporally or not. Therefore if a third brood occurs in the Pochet area within the authorized time frame (after July 15) the OSV program will not implemented.

The primary management issue this HCP is seeking to address is the repeated closure of OSV access to the majority of Nauset Beach South from mid-July through August. The length of beach that is unavailable to OSV use is considerable and results in very limited numbers of pedestrians that are able to access Nauset Beach South. The only reliable means of access to the majority of Nauset Beach South is via OSV access that has been affected by the annual 0.8 mile "pinch point" closure that occurs when late nesting plovers and their young are present in the Pochet area. Without OSV access, the majority of the public is unable to reach the 5 miles of available beach. Recreational users who are unable to visit much of Nauset Beach South include anglers, birders, family beach goers, children, the elderly and persons with disabilities for whom walk-on access is simply an unrealistic option.

A second and separate problem the Town of Orleans seeks to address within this HCP is that the predictable annual and increasing duration of OSV access closures are directly linked to a significant decline in revenue from the OSV management program as documented in the attached report entitled Beach Related Revenue (Appendix 4). The average revenue produced by the OSV program in the four year period prior to and including the first total OSV access closure (2003-2006) was over $415,000. The average revenue over the seven year period since total OSV access closures began (2007-2013) was $243,000. It is obvious to the town of Orleans that the significant decline in OSV revenue is due to the reduction of available access. OSV revenue contributes to the budget that funds management of the entire Nauset Beach. The Town of Orleans is concerned that this decline in revenue has the potential to affect the town's ability to fund management of Nauset Beach, including management actions recommended by state and federal Guidelines.

A third reason for developing this HCP is that piping plover production, as measured by fledge rate, is not sufficient to maintain a stable population at Nauset Beach despite management of Nauset Beach South that is in compliance with all regulations and guidelines set forth by both OOC (SE-54-2246), the USFWS and the MADFW. This lack of production is especially concerning when measured against the time, investment and sacrifice made by the entire Town of Orleans, all aimed at increasing piping plover production. The Nauset Beach 2013 piping plover census report with notes (Appendix 5) clearly demonstrates that predation is the main threat preventing continued piping plover recovery on Nauset Beach South (referred to as "North Beach" in the report).

Consequently, the Town of Orleans, in collaboration with USFWS and MADFW, has prepared this HCP with a proposed three year term, to address potential effects on piping plover resulting from the Town of Orleans' authorization and management of OSV activities

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species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3]

on the covered lands (Section V. Covered Lands) and to work toward the conservation and recovery of the coastal population of the species.

III. Regulatory Context

A number of Federal and State laws regulate the types of activities that can occur on beaches of Massachusetts. These laws address protection of threatened or endangered species (Federal and State law), and regulation of recreational activities (State law) and development. A summary of laws that may affect the Town of Orleans management activities is provided below. All measures that are incorporated into this HCP are compliant with local, state and federal laws and regulations.

Federal

Federal Endangered Species Act

Section 9 of the ESA prohibits the "take" of any endangered or threatened species of fish or wildlife listed under the ESA. Under the ESA, the term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect species listed as endangered or threatened or to attempt to engage in any such conduct. Under section 10 of the ESA, the USFWS may authorize, under certain terms and conditions, any taking otherwise prohibited by Section 9(a)(1)(B) if such taking is incidental to, and not the purpose of, an otherwise lawful activity. This section 10 take authorization is known as an ITP.

Harass in the definition of "take" in the ESA means an intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns that include, but are not limited to, breeding, feeding, or sheltering. Harm in the definition of take in the ESA means an act that actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

To qualify for an ITP, a non-federal landowner or land manager must develop, fund, and implement a USFWS-approved HCP. The HCP must specify the following information described in ESA Section 10(a)(2)(A) and 50 Code of Federal Regulations (C.F.R.) 17.22(b)(1) and 50 C.F.R. 17.32(b)(1):

- The impact that will likely result from such taking;
- The measures the applicant will undertake to monitor, minimize, and mitigate such impacts, the funding that will be available to implement such measures, and the procedures to be used to deal with unforeseen circumstances;
- The alternative actions the applicant considered that would not result in take and the reasons why such alternatives are not proposed to be utilized; and
- Such other measures that the Director of the USFWS may require as necessary or appropriate for purposes of the HCP.

The USFWS will issue an ITP if it finds that the following criteria of ESA Section 10(a)(1)(B) and 50 CFR 17.22(b)(2) and 50 CFR 17.32(b)(2) are met:

- The taking will be incidental to otherwise lawful activities;
- The applicant will, to the maximum extent practicable, minimize and mitigate the impacts of such takings;
- The applicant will ensure that adequate funding for the HCP and procedures to deal with unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild;
- The applicant has met the measures, if any, required by the Director of the USFWS as being necessary or appropriate for the purposes of the plan; and
- The Director of the USFWS has received such other assurances, as he or she may require, that the plan will be implemented.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703-712), prohibits the take of migratory birds. A list of birds protected under MBTA implementing regulations is provided at 50 CFR 10.13. Unless permitted by regulations, under the MBTA it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product. The MBTA provides no process for authorizing incidental take of MBTA protected birds. The piping plover covered by this HCP is protected under the MBTA. The USFWS has a policy of allowing an ITP to serve as a Special Purpose Permit under 50 CFR 21.27 for the take of listed, migratory birds that are addressed in an HCP (U.S. Fish and Wildlife Service 1996). The USFWS has determined that any take authorized by the ITP will not be in violation of the MBTA.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) is one of the primary laws governing the environmental protection process. It is a decision-making requirement that applies to proposals for Federal actions. The Council on Environmental Quality (CEQ) regulations defines, major Federal action as those actions with, "effects that may be major and which are potentially subject to Federal control and responsibility," including, "projects and programs entirely or partly financed, assisted, conducted, regulated, or approved by Federal agencies." NEPA states that any Federal agency undertaking a major Federal action likely to significantly affect the human environment must prepare an Environmental Impact Statement (EIS). If, however, a project qualifies as a low-effect habitat conservation plan and generally meets the following criteria, it may be eligible for a categorical exclusion under the National Environmental Policy Act as provided by the Department of the Interior Manual (516 DM 2 Appendix 1 and 516 DM 8):

- The effects of the ITP on federally listed, proposed, or candidate species and their habitat covered under the HCP are minor or negligible prior to implementation of the mitigation plan.
- The effects of the ITP on other environmental values or resources (e.g., air quality, geology and soils, water quality, socio-economic, cultural resources, recreation, visual resources) are minor or negligible prior to implementation of the mitigation plan.

- The impacts of the ITP, considered together with the impacts of other past, present, and reasonably foreseeable similarly situated projects will not result, over time, in cumulative effects to environmental values or resources that would be considered significant.

Issuance of an ITP under ESA Section 10(a)(1)(B) is a Federal action subject to NEPA compliance. Although ESA and NEPA requirements overlap considerably, the scope of NEPA goes beyond that of the ESA by considering the impacts of a Federal action not only on fish and wildlife resources, but also on other resources such as water quality, air quality, and cultural resources. The purpose of these procedures is to ensure the agency has before it the best possible information to make an "intelligent, optimally beneficial decision" and to ensure the public is fully apprised of any environmental risks that may be associated with the preferred action.

National Historic Preservation Act of 1966

USFWS's issuance of an ITP under ESA Section 10(a)(1)(B) is considered an "undertaking" as defined by regulation and must comply with Section 106 of the National Historic Preservation Act (NHPA) (36 CFR 800). Section 106 requires USFWS to assess and determine the potential effects on historic properties that would result from the proposed undertaking. When an adverse effect to a historic property cannot be avoided, the USFWS must consult with State Historic Preservation Office (SHPO), the Tribal Historic Preservation Office, and other interested parties to identify ways to mitigate the effects of the undertaking. This process usually results in the development of a Memorandum of Agreement (MOA), which identifies the steps the agency will take to reduce, avoid, or mitigate the adverse effect. The MOA will be submitted to the Advisory Council on Historic Preservation (ACHP) for review and comment. The USFWS must document NHPA compliance and include such documentation in the administrative record for the HCP. Details on the consultation process for resolution of adverse effects are found at 36 CFR 800.6.

Based on a review of the HCP proposed action and permit area, the Orleans Historical Commission determined that there are no known historic or archeological sites that will be affected by the HCP activities (Appendix 6).

State

Massachusetts Endangered Species Act

The Massachusetts Endangered Species Act (MESA) was enacted in December 1990 (M.G.L c.131A). Implementing regulations were promulgated in 1992 and most recently revised and implemented as of October 15, 2010 (321 CMR 10.00).

The MESA protects rare species and their habitats by prohibiting the "Take " of any plant or animal species listed as Endangered, Threatened, or Special Concern by the MADFW. "Take" is defined as, "in reference to animals to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct, and in reference to plants, means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct. Disruption of nesting, breeding, feeding or migratory activity may result from, but is not limited to, the modification, degradation or destruction of Habitat." Permits

for “taking” rare species for scientific, educational, conservation, or management purposes can be granted by the MADFW.

The MESA and its implementing regulations establish procedures for the listing and protection of rare plants and animals and outline project review filing requirements for projects or activities that are located within a Priority Habitat of Rare Species (“Priority Habitat”). The MESA regulations also provide clear review timelines and establish an appeal process for agency actions. If during the MESA project review it is determined that a project will result in a "take" of a state-listed species, the project may be eligible for a Conservation and Management Permit (321 CMR 10.23; CMP).

To be eligible for a CMP, the applicant must first (1) assess alternatives to both temporary and permanent impacts to state-listed species. Thus, certain projects that can be redesigned to avoid a "Take" may not be eligible for a CMP. The permit applicant must also (2) demonstrate that a proposed project will impact an insignificant portion of the local population of an affected state- listed species. Finally, the applicant must (3) design and implement a conservation and management plan that provides a long-term net benefit to the conservation of the affected state- listed species.

The Town of Orleans submitted a MESA filing checklist and supporting materials to MADFW concurrent with submission of this HCP, and the HCP is also serving as an application for a CMP. On July 15, 2014, MADFW issued a take determination and CMP for this Vehicle Access Plan prior to implementation to ensure MESA compliance (Appendix 2).

Massachusetts Environmental Protection Act

The Massachusetts Environmental Policy Act (MEPA; MGL c.30 s.61; 301 CMR 11.00) requires that state agencies study the environmental consequences of their actions, including permitting and financial assistance. It also requires them to take all feasible measures to avoid, minimize, and mitigate damage to the environment. MEPA further requires that state agencies "use all practicable means and measures to minimize damage to the environment," by studying alternatives to the proposed project, and developing enforceable mitigation commitments, which will become conditions for the project if and when they are permitted.

MEPA applies to projects that exceed certain review thresholds and that require a state agency action, specifically that they are either proposed by a state agency or are proposed by municipal, nonprofit or private parties and require a permit, financial assistance, or land transfer from state agencies. MEPA review is not a permitting process. MEPA requires public study, disclosure, and development of feasible mitigation for a proposed project. It does not pass judgment on whether a project is environmentally beneficial, or whether a project can or should receive a particular permit. Those decisions are left to the permitting agencies. MEPA review occurs before permitting agencies act, to ensure that they are fully cognizant of environmental consequences of their actions. MEPA review provides the mechanism through which this information collection and mitigation mandate is executed. MEPA empowers the Secretary of Energy & Environmental Affairs to oversee the review

process. The process is public and encourages comments from citizens and from state, regional and local agencies.

Pursuant to MEPA, on May 23, 2014 the Town of Orleans filed an Environmental Notification Form describing this HCP (Appendix 7), and was issued a MADFW Conservation & Management Permit on July 15, 2014 (Appendix 2).

Massachusetts Wetlands Protection Act

Activities in wetland resource areas, such as dunes, beaches, tidal flats and coastal banks, are subject to performance standards outlined in the regulations that protect the interests of the Massachusetts Wetlands Protection Act, including storm damage prevention and protection of wildlife habitat. The local conservation commission implements the regulations as overseen by the Department of Environmental Protection's Division of Wetlands and Waterways. Orders of Conditions regulate proposed activities to minimize or prohibit impacts to wetland resource areas.

The Orleans Conservation Commission's Order of Conditions (OOC) SE 54-2246 was filed and accepted by the MA Department of Environmental Protection on July 23, 2014 (Appendix 3).

Executive Order Number 190 Regulation of Off-Road Vehicle Use on Public Lands Containing Coastal Wetlands Resources (1980)

This Executive Order directs state agencies to balance competing uses of public lands and minimizes the degradation of the wetlands resources due to off-road vehicle use through management and monitoring. The Guidelines for Barrier Beach Management in Massachusetts (MADFW 1994) advance the Executive Order. The Town of Orleans adheres to the state Guidelines and is in compliance with the Executive Order.

IV. Current OSV Management

The Town of Orleans manages recreational use of Nauset Beach by implementing beach maintenance activities on the public pedestrian portion of Nauset Beach as well as the areas accessed by permitted OSVs. Beach management activities include raking, providing lifeguards and trash removal of the public beach, managing OSV and self-contained vehicle access, maintaining the OSV trails to ensure safe passage and patrolling the entire beach to ensure public safety. Implementation of these beach management activities takes into consideration the conservation of natural resources including protecting the dunes by prohibiting pedestrian and OSV access in fragile coastal habitat, managing breeding coastal shorebird populations including piping plovers, least terns and oystercatchers, and maintaining water quality.

The OSV program is administered under the joint supervision of the Towns of Orleans and Chatham. Program participants are required to complete an educational video, carry specific equipment and follow rules and regulations of the OSV program. In addition, access, driving and parking on the beach is limited to specific areas. Residents as well as non-residents may obtain OSV permits. Regulations address motor vehicle rules and equipment, registration,

prohibitions, restricted access, and other activities associated with OSV access (http://www.town.orleans.ma.us/pages/orleansma_parks/orv). In general, vehicles (other than those used by Parks and Beaches staff or emergency vehicles) are prohibited on Town of Orleans beaches except and unless they have authorization.

There is a long history of OSV use on Nauset Beach (Nauset Spit and Nauset Beach South) that dates back many decades. Since 1991, the OSV access at Nauset Beach has been managed according to the January 14, 1991 OOC (SE 54-723), specifically Sections E and F that constitute the Beach Management Plan as it pertains to rare and endangered species (Appendix 8). It is important to note Nauset Spit and Nauset Beach South have been managed as separate properties, both in compliance with the OOC (SE 54-723).

On July 23, 2014, the Massachusetts Department of Environmental Protection accepted a separate Order of Conditions (SE 54-2246) (Appendix 3) instituting a specific Management Plan for Nauset Beach South. Under the authority of each OOC (as described in Section I. Introduction), up to 375 permitted vehicles are authorized access at any one time. The maximum limit of vehicles on the beach at any one time shall be determined by the Natural Resource Manager based on general beach and shorebird nesting conditions, and at times may be less than the maximum allowable number of vehicles. The OOC specifically requires the use of existing access and egress corridors through the dunes and that the Ocean side north/south corridor be a minimum of 15 feet seaward of the coastal dune (in the absence of nesting piping plovers or terns). Driving on the shoreline of the bay (west) side of Nauset Beach South is prohibited with the exception of driving on the existing sand trails and spurs. Driving anywhere outside of the designated OSV corridor is prohibited.

V. Covered Lands

The entire plan area is the geographic area known as Nauset Beach (Orleans) which includes Nauset Spit and Nauset Beach South and is described in the two separate Orleans Conservation Commission's Orders of Conditions: (OOC SE 54-723 of 1991)(Appendix 8) and (OOC SE 54-2246 of 2014)(Appendix 3). The plan area for this HCP includes all vegetation communities, wetlands and water resources, wildlife and their habitats, threatened and endangered species and their habitats, land uses, and any other relevant natural resources or existing conditions as described in the OOC. An aerial photographic map entitled "Nauset Barrier System" which includes an overlay (in yellow) of Orleans boundaries and identification of the various sections of the entire Nauset Barrier System both within and abutting the plan area is provided in Appendix 9. On suitable piping plover habitat within the permit area the Town of Orleans will continue to implement the state and Federal Guidelines with the exception during implementation of the HCP.

The proposed self-escort travel corridor is completely contained within the approximately 0.8-mile Pochet area as measured north to south. For the purposes of this HCP, both the northern and southern boundaries of the area in which the covered activity (OSV travel) is limited are defined as the general location where the sandy eroded and sparsely vegetated wash-over area transitions into dense vegetation on both sides of the existing OSV corridor. It is assumed that because of the dynamic nature of Pochet that the actual northern and

southern endpoints are likely to change; however, the description of what defines the implementation area will be the control as to the actual location of the northern and southern endpoints. The eastern/seaward and western/estuarine boundaries of the permit area are defined in the 2014 Order of Conditions for Nauset Beach South (Appendix 3). The OSV travel corridor is a designated trail that may only be temporarily relocated with the approval by the Orleans Conservation Commission and after consultation with the Conservation Agent, Natural Resources manager and the Massachusetts Natural Heritage and Endangered Species Program. The temporary relocation of a section of the OSV corridor must still comply with conditions outlined in the OOC including avoiding nesting piping plovers and terns and avoiding driving in vegetated areas. The implementation area is further detailed in the Nauset Beach South ORV Trails Map (Appendix 1) which is accompanied in the filing for the Nauset Beach South OOC (SE 54-2246).

VI. Covered Activities

Through this HCP, the Town of Orleans will flexibly manage OSV access on Nauset Beach South in the presence of unfledged piping plover chicks beginning on or after July 15th, a deviation from the current management that follows state and federal Guidelines for managing piping plovers. Therefore, the covered activity for which the Town of Orleans is seeking incidental take is the authorization and implementation of the OSV program described under the OOC and consistent with conservation measures contained in the HCP. Vehicles that would be covered include day use vehicles and those permitted for self-contained overnight use.

In implementing the HCP, the Town will continue to implement the state and federal Guidelines to protectively manage piping plovers with respect to OSV use, until July 15th. Prior to July 15th, the Town of Orleans Natural Resource Manager, Beach Director and staff will have delineated all suitable piping plover nesting habitat with posts and warning signs or symbolic fencing on or before April 1. All vehicular access into or through posted nesting habitat will be prohibited. Vehicles may pass by such areas along designated vehicle corridors established along the outside edge of plover nesting habitat prior to hatching. Vehicles may also park outside delineated nesting habitat, if beach width and configuration and tidal conditions allow. Vehicle corridors or parking areas will be moved, constricted, or temporarily closed if territorial, courting, or nesting plovers are disturbed by passing or parked vehicles or if disturbance is anticipated because of unusual tides or expected increases in vehicle use during weekends, holidays, or special events. Because the OSV management program will follow state and federal Guidelines, no take is anticipated prior to July 15th. It should be noted that the HCP only addresses self-escorting of vehicles on the designated travel corridor and that no parking will be allowed, foraging habitat including wrack will not be affected and buffers around nests, should they be present, will be adhered to according to the state and federal Guidelines.

Beginning on or after July 15th, the Town will allow up to 180 self-escorted OSVs (360 vehicle passes) per day on Nauset Beach South past no more than two broods of piping plover chicks. The proposed limit of up to 180 vehicles per day includes all OSV's seeking to access Orleans and Chatham town property and further includes those permitted for self-

contained overnight use. While late season OSV use could result in incidental take of the chicks, the Town will implement OSV self-escorting and other measures to minimize the potential for impacts to the chicks.

VII. Covered Species

The only species to be covered is the Atlantic Coast piping plover (*Charadrius melodus*), which was listed as a threatened species under the ESA in 1986. There are no other federally listed species that breed in the HCP planning area or that will be affected by the HCP covered activities.

There is one state listed species known to nest within the HCP planning area, the least tern (*Sternula antillarum*) currently listed by the Commonwealth of Massachusetts as a species of special concern. The Town of Orleans will comply with state Guidelines for the management of OSV use when least terns are present and it is not considered to be a covered species.

Federally listed threatened red knots (*Calidris canutus rufa*) may be present during spring and fall migration foraging on the mud and sand flats of both Nauset Beach South and Nauset Spit, or roosting above the high tide line. Red knots, however, are not included as a covered species in the HCP since they have not been documented in the travel corridor at the Pochet. The travel corridor does not provide foraging habitat, and although red knots might roost in the Pochet area, there have not been any documented observations of red knots specifically in or near the OSV sand trail.

VIII. Biological Goals and Objectives

Biological Goals:

a. Reduce potential for take of piping plover chicks while exercising flexibility for OSV access during a limited time period in late July and/or August on Nauset Beach South.
b. Increase awareness of effects of predation on piping plover recovery on Orleans beaches.
c. Focus primary mitigation efforts at off-site locations, with the objective of increasing piping plover productivity at those locations.

Biological Objectives:

a. Reduce exposure risk of piping plover chicks to vehicle mortality by constraining time of year to late season broods, time of day, number of hours, number of vehicle passes, length of beach, and temporary closures to protect chicks in the vicinity of the active self-escort corridor.
b. Provide educational material to Orleans residents and vehicle permit holders on effects of predation on plover productivity and the tools needed to address the threats.

c. Contribute to increasing productivity by a minimum of 20% over existing productivity at one or more piping plover breeding sites in Massachusetts, through funding for off-site mitigation conservation measures.

IX. Proposed OSV Program

In implementing the HCP, the Town of Orleans will continue to implement the state and federal Guidelines (including the Town of Orleans Order of Conditions) with respect to OSV use, with the exception of the proposed OSV program to be implemented beginning on or after July 15th.

Over 20 years of experience implementing beach management in accordance with state and federal Guidelines in Massachusetts suggests that measures such as symbolic fencing, restricted access to suitable plover habitat by pedestrians, dogs, and OSV's, and active monitoring can significantly boost productivity and population size and provide state and federal wildlife agencies with essential information to make informed management decisions. Use of other measures such as exclosures can further benefit plover populations. The Town of Orleans has a longstanding history of implementing such measures in full compliance with the Guidelines, and will continue to do so during the permit period.

The proposed OSV program to be implemented beginning on or after July 15th includes a number of measures to avoid and minimize take of piping plover chicks. The number of vehicles that will be able to access Nauset Beach South has been reduced from 375 vehicles allowed under the OOC to 180 vehicles. This reduces the maximum number of vehicle passes in the vicinity of no more than two broods of piping plover chicks from 750 passes per day to 360 passes per day.

The number of vehicles allowed to pass plover chicks was set at not more than 180 in order to reduce the likelihood of take by ensuring a manageable number of vehicles that may be self-escorted during the time allotted for beach access. To further reduce the likelihood of take through harm, harassment or mortality of recently hatched chicks, escorting will be initiated past a brood no sooner than one day after all chicks have hatched if occurring on or after July 15.

Once all chicks in the Pochet area have fledged or been documented lost to natural causes by the shorebird monitors, then the OSV program at Nauset Beach South, including the total number of vehicles, will be implemented in compliance with the OOC.

Vehicle Escort Program Elements:

1. *Program Administration*
   Town of Orleans Natural Resources Manager
   Town of Orleans Beach Director

2. *Escort Protocol*
   Start date: Beginning on or after July 15th annually

Frequency: Twice daily[2]
Morning Session: 08:00 – 10:00
Afternoon Session: 16:00 – 18:00
Number of vehicles: 180 self-escorted vehicles for a maximum of 360 vehicle passes per day.

3. *Self-escort OSV Corridor Dimensions and Locations*
The self-escort corridor referred to in the proposed OSV program occurs within the ITP permit area (described in section V). The specific location of the self-escort OSV corridor is intended to be adaptive and variable to reflect the location of the brood(s). The self-escort OSV corridor may shift north or south along the identified route depending on piping plover locations and/or movements as shown in the Variable Escort Route Map (Appendix 10). The self-escort OSV corridor is not to exceed 2,100 feet in length and 30 feet in width (for vehicle traffic), for a total impact area of approximately 63,000 square feet or 1.45 acres. Additionally, 100 feet on either side of the OSV sand trail will be included in the corridor as the "safety zone" for plover chicks (vehicle traffic will be halted should plover chicks enter this zone).

The escort corridor will not be moved laterally for purposes of the HCP. The OSV corridor will be clearly marked at the beginning and termination points and will have the 30-foot travel width periodically delineated with wooden stakes. Updated corridor boundaries shall be reported daily to the Natural Resources Manager, Beach Director, or their designee, by shorebird monitor(s) prior to commencement of vehicle access and remarked as necessary.

4. *Personnel (monitors) and Required Qualifications:*
Up to two shorebird monitors will be required to monitor chick locations and movement, and up to two vehicle monitors will be required to ensure vehicle drivers comply with the self-escort protocols. One shorebird monitor per brood will be deployed to monitor the locations of chicks prior to and during the self-escort window; therefore, the number of plover broods will determine whether one or two bird monitors are required. The vehicle monitor (e.g., beach patrol ranger) will have the authority to revoke or suspend current over-sand beach stickers if the self-escorted vehicle is not following the protocols. The distance between the two broods within the permit area will determine by whether one or two vehicle monitors are required. All current and future monitors will meet the qualifications established by USFWS or MADFW definitions.

Seasonal Lead Shorebird Monitor
Reports to: Natural Resource Manager
Position Summary: Supervises shorebird monitors. Ensures that monitors locate, identify and symbolically fence piping plover, least tern and other shorebird nesting and locate shorebird feeding areas, adequately conduct surveys and counts

[2] Times may be flexible within one hour on each side due to inclement weather or temporary delay if monitors determine it is not safe to proceed because of chick locations.

of birds, re-route or escort vehicles (if necessary), compile and map bird nesting and productivity data, and prepare documentation required by State and Federal authorities.

Essential Functions:

- Working in assigned habitat areas, must be able to: identify piping plover, least and common terns, American oystercatcher, and other shorebird species as required; identify and locate shorebird nesting and feeding areas; and map the identified areas.
- Set up and maintain signage, symbolic fencing, and protective exclosures such that essential nesting and foraging habitat areas are protected from human disturbance.
- Interact with and educate the public to increase awareness of the birds and nesting/feeding areas.
- Re-route vehicles around protected areas and escort vehicles through protected areas as necessary.
- Conduct field surveys and establish counts of birds.
- Document and summarize results in formats provided by the state and federal authorities.
- Prepare annual End-of–Season reports as required by State and Federal authorities.
- Compile comprehensive maps that document the nesting sites of protected wildlife using GPS coordinates and GIS mapping tools.
- Performs other duties as assigned and in conjunction with other Town departments and employees.

Minimum Qualifications:

- A high school diploma or equivalent.
- Working knowledge of State and Federal Guidelines for the protection of Piping Plovers, Least and Common Terns, and American Oystercatchers on multi-use recreational beaches.
- Good observational skills.
- Ability to perform physical labor associated with the placing of posts, signage, symbolic fencing, and protective exclosures in habitat areas.
- Ability to walk up to 1-3 miles per day within habitat area for survey and protection activities.
- Knowledge and experience with four-wheel drive vehicles, small boat handling, and two-way radio communications.
- Ability to obtain Red Cross certification in basic first aid and CPR.
- Ability to work independently with little direct supervisory oversight.
- Strong people skills, team oriented, and ability to work in a collaborative, problem-solving approach.
- Experience with word processing and spreadsheet software.
- A valid Massachusetts driver’s license.

Seasonal Shorebird Monitor:
Reports to: Natural Resource Manager and Lead Shorebird Monitor
Position Summary: Locating and identifying endangered shorebird nesting and feeding areas, setting up exclosures, signage, and symbolic fencing, conducting surveys and counts of birds, re-routing or escorting motor vehicles under the direction of the Lead Shorebird Monitor.

Essential Functions:

- Working in assigned habitat areas, must be able to: identify piping plover, least and common terns, American oystercatcher, and other shorebird species as required; identify and locate shorebird nesting and feeding areas; and map the identified areas.
- Data collection and note taking to document nest establishment, egg laying, hatching, predation of nests, chick rearing, and fledgling activities.
- Set up and maintain signage, symbolic fencing, and protective exclosures such that critical habitat areas are protected from human disturbance.
- Interact with and educate the public to increase awareness of the birds and nesting/feeding areas.
- Re-route vehicles around protected areas and escort vehicles through protected area as necessary.
- Assist the Lead Shorebird Monitor in field surveys and bird counts.
- Provide clear concise data summaries of nesting activities to the Lead Shorebird Monitor for inclusion in annual reports.
- Performs other duties as assigned and in conjunction with other Town departments and employees.

Minimum Qualifications:

- A high school diploma or equivalent.
- Ability to gain a working knowledge of State and Federal Guidelines for the protection of Piping Plovers, Least and Common Terns, and American Oystercatchers on multi-use recreational beaches.
- Good observational skills.
- Ability to perform physical labor associated with the placing of posts, signage, symbolic fencing, and protective exclosures in habitat areas.
- Ability to walk up to 1-3 miles per day within habitat area for survey and protection activities.
- Knowledge and experience, or willingness to obtain, with four wheel drive vehicles, small boat handling, and two-way radio communications.
- Ability to obtain Red Cross certification in basic first aid and CPR.
- Ability to work independently with little direct supervisory oversight.
- Strong people skills, team oriented, and ability to work in a collaborative, problem-solving approach.
- A valid Massachusetts driver’s license.

Self-Escorting Procedures:

1. Basic Procedures for Escorting Past One Brood
   a) A pre-determined area of the Nauset Beach (Orleans) parking lot, or another pre-determined area free of protected species, will be identified for staging of OSVs.
   b) At least 1 hour prior to commencement of vehicle escorts, the shorebird monitor(s) will proceed along the designated vehicle route and surrounding area to determine locations of plover chicks. Each shorebird monitor will be responsible for monitoring the location of one brood. Once the shorebird monitor(s) have established the locations of chicks, they will notify the Natural Resource Manager, Beach Director or their designee of the brood locations and the self-escort corridor will be delineated with highly visible markers. At this time, personnel at the entrance booth, as well as the vehicle monitor will be notified that the OSV trail is open for travel. In the event that all chicks are not located, opening the OSV trail will be delayed until such time that all chicks are accounted for or it has been determined by the shorebird monitor(s) that there are no chicks in the OSV trail. The shorebird monitor(s) will communicate their determination(s) to the Natural Resource Manager for confirmation to open the trail. The self-escort duration of two hours will be implemented per the HCP protocols although the time of closing may be adjusted accordingly to respond to a later opening.
   c) Prior to opening the OSV trail, the vehicle monitor will contact the shorebird monitor(s) to confirm that the locations of all chicks are still being monitored, that all chicks are accounted for, and/or it is safe for the trail to open. During the two-hour self-escort period, monitor(s) shall maintain constant visual on any plover chicks using binoculars from a distance of no less than 200 feet. Disturbance, if any, of the chicks shall be minimized. Once vehicles have passed through the delineated "chick zone", vehicles may proceed to use the sections of beach previously determined to be free of piping plover and least tern chicks, in accordance with state and federal Guidelines.
   d) Each vehicle must have at least one passenger 16 years of age or older to walk approximately 10 feet in front of the vehicle in the self-escort corridor. The escort will look for chicks in the road and stop the vehicle if either a chick is observed or one of the monitors (shorebird or vehicle monitor) requires the vehicle to stop. All self- escorted vehicles must maintain a safe distance of at least 15 feet from the vehicle in front.
   e) In order to avoid adverse effects to the habitat and allow unimpeded chick passage across the OSV corridor when vehicles are not present, the vehicle "ruts" will be raked at the end of the afternoon self-escort period. Mechanized raking will be utilized only with a trained observer walking in front of the vehicle to search for chicks.
   f) If at any time during the escorting process, the shorebird monitor(s) lose visual contact with one or more chicks, the vehicles will be allowed to continue on their way and the period between the self-escort time frame (or after the afternoon session) will be used to determine the presence of the chick(s) in the area or absence of chicks in the corridor. Shorebird monitors

will document in the daily report the approximate time that visual contact with the chick(s) was lost and efforts made to relocate it.

g) The Natural Resource Manager or Beach Director will have the independent authority to close the trail at any time for any reason. For example, if at any time a shorebird monitor determines that chicks have approached within 100 feet of the self-escort corridor, the OSV trail will be closed to allow time for the chicks to move out of the area. The OSV trail will not reopen until the Natural Resource Manager or Beach Director determines that it is safe to do so. Monitors will document in the daily report the approximate time that the OSV trail was closed and the duration of the closure.

2. Basic Procedures for Escorting Past Two Broods

   The following procedures are in addition to applicable actions outlined under Basic Procedures for Escorting Past One Brood (see above):

   a) Two broods in close proximity (<1,200 feet apart): Only one segment of the OSV trail will require self-escorting due to the close proximity of the two broods and a single vehicle monitor will ensure compliance. Two shorebird monitors will be deployed to monitor the chicks in each brood. The corridor in front of the broods will have beginning and end points clearly marked for self-escorting and both monitors will follow each brood. The shorebird monitors and vehicle monitor will be in close communication to ensure that chicks are not moving towards the OSV trail.

   b) Two broods are more than 1,200 feet apart: Two segments of the OSV trail will require self-escorting. In this case, a second vehicle monitor will be assigned to monitor escorting compliance. Both sections will have beginning and end points clearly marked to delineate the separate self-escort corridors. Beginning and end points of the self-escort corridor may be moved in response to linear chick movements (information provided by the shorebird monitors). Two shorebird monitors will be deployed to monitor the chicks in each brood.

Contingency Plan

1. Personnel availability

   Two shorebird monitors *(i.e.*, one monitor per brood) will locate and observe chicks prior to and during the self-escort periods. A minimum of one vehicle monitor will oversee the self-escort corridor to ensure compliance by the self-escorted vehicles. Should two self-escort corridors be required (see above) then a second vehicle monitor will be required. In the event that one of these employees is unavailable, the Natural Resource Manager, Beach Director or their designee shall assume this duty.

2. Inclement weather

   The Natural Resource Manager, Beach Director or their designee, will monitor weather forecasts on a daily basis. In the event that a storm warning is predicted by the National Weather Service, or any other weather warning that could jeopardize public safety within a 24-hour period, the OSV trail shall be closed for

the duration of the hazard or the start time may be moved one hour later or earlier. The OSV trail may not reopen until the Natural Resource Manager, Beach Director or their designee has given the all clear. It shall be presented in writing prior to purchasing an OSV sticker that all users shall use the beach at their own risk. Exiting escorts will not take place due to unpredicted weather. OSV sticker holders shall be informed in writing that a "shelter in place" policy will go into effect until the inclement weather has passed, or scheduled exiting escorts have begun.

3. Medical or family emergencies
   OSV sticker holders shall be advised verbally and in writing at the time of OSV sticker application, via affidavit, that egress from the beach outside of the self-escort windows shall be strictly prohibited (see permit Rules and Regulations for information to report an emergency). In the event of a life-threatening medical emergency, the staff of the Nauset Beach Administration Building and/or emergency responders should be notified. Essential vehicles will assist in escorting the vehicle off of the beach.

Violations

Any violations of the aforementioned protocol will not be tolerated. Violators of the escort protocols shall be subject to OSV sticker revocation and shall have their rights to operate an OSV on Nauset Beach suspended immediately for a period of one year from the date of the violation.

Self-Escorting Program Reporting

Chick numbers, chick locations and travel corridor locations/dimensions shall be provided to the Natural Resource Manager or Beach Director by the lead shorebird monitor daily, prior to commencing OSV escorts. A map showing the locations shall be posted at the Nauset Beach administration building and shall be updated daily. Any violations, incidents or accidents associated with the vehicle escort program, including take of a chick(s) shall be immediately reported to MADFW and USFWS staff. In the event of an alleged incident related to the escort program, the Natural Resource Manager, Beach Director or their designee in coordination with a shorebird monitor shall cooperate with and assist Town, State and Federal officials with the investigation of the incident. Depending on the nature of the incident, the Town of Orleans, MADFW and USFWS reserve the right to suspend all vehicle escorts for such time as they deem appropriate.

Every week or sooner if necessary, a brief summary report will be submitted to the USFWS and MADFW. The Natural Resource Manager and Beach Director will work with USFWS and MADFW to develop a template summary report.

By December 31 of each calendar year, the Town of Orleans will submit an escort monitoring report to MADFW and USFWS describing at minimum, estimated age of chicks in each brood when self-escorting was initiated. Fledging success, escorting dates, number of broods, number of chicks present during self-escorting on each date, number of vehicle passages, and any documented "take" of chicks resulting from the vehicle

escorting program shall be included in this report. The report will also contain recommendations for improving the efficiency and or effectiveness of the escorting program in the future.

X. Analysis of the Impacts

Species Effects and Impacts Analysis

Because the Town of Orleans will be following the state and federal Guidelines for recreational beach management, the only anticipated impacts to piping plovers will occur during implementation of the late season self-escort OSV program. There are no anticipated impacts to state-listed nesting least terns during the Town's beach management activities because they will continue to be managed according to state least tern management guidelines to avoid adverse effects.

Late season OSV use (beginning on or after July 15th) could result in adverse effects leading to take of unfledged piping plover chicks that may be in the vicinity of the self-escorted vehicles. Adverse effects could occur to up to two broods of four chicks each (generally the maximum number of chicks per brood) from harm, harassment or mortality. Thus theoretically, adverse effects in the absence of minimization measures could occur to up to eight chicks per year.

Under state and federal beach management guidelines, vehicles in designated travel corridors are allowed to pass in the vicinity of adult piping plovers foraging or roosting outside of symbolic fenced nesting habitat. Adherence to state and federal Guidelines for managing piping plovers in the vicinity of OSV traffic is anticipated to avoid take of adults, including mortality. The HCP implements all state and federal guideline recommendations with the exception of the proposed vehicle traffic in the presence of up to two broods of plover chicks. Therefore, take of adults is not anticipated.

Piping plover habitat may be temporarily impacted during the late season OSV access as tire ruts are created by vehicle passage in the permit area. Nevertheless, adverse effects to piping plover habitat rising to the level of harm are not anticipated due to the avoidance and minimization measures incorporated into the escort procedures (Section IX. Proposed OSV Program). Daily raking of tire ruts at the end of every afternoon self-escort period will allow unimpeded piping plover movement between foraging and roosting habitats for the majority of the day and night. OSV travel will not occur in foraging habitat and should not affect the prey base for piping plover adults and chicks. Outside of the designated self-escorting travel corridor, no other piping plover habitat is anticipated to be adversely affected by OSVs accessing the beach within the plan area since the remainder of the beach will continue to be managed according to the Town of Orleans Conservation Commission Order of Conditions and state and federal guidelines for managing piping plovers.

Disturbance will be restricted to the four hours of self-escorting. Vehicles passing through areas near chicks could restrict chick movement and prevent them from foraging in preferred feeding habitat, seeking cover from predators or unfavorable environmental conditions, being brooded or otherwise protected by adults, or finding suitable roosting habitat. This could

affect the chicks' ability to thrive and delay fledging or expose them to an increased risk of predation. However, minimization measures are intended to reduce the effects of the disturbance so that take is not reached. Initiating the self-escort program after July 15 is likely to ensure that chicks are older, larger and more easily observed by vehicle escorts. In the past 5 years, approximately 63% of the broods have been 2 days or older and 36% of the broods have been 11 days or older. Older chicks may be less vulnerable to disturbance, more likely to survive on their own for short periods of time if separated from adults and better able to find foraging habitat away from the sand trail (which does not provide foraging habitat although it is a temporary barrier to moving between foraging habitats).

Take is anticipated to occur in the event an unfledged piping plover chick or chicks enter the self-escorted travel corridor during the four hours of OSV travel and are run over by a vehicle. This could occur if a chick is not detected by the chick monitors or the walker preceding each vehicle. Minimization measures to reduce mortality include: monitors locating chicks prior to and during the self-escorting of vehicles; allowing vehicle traffic to occur only when chicks are outside of the travel corridor; reduction in vehicle speed from 15 mph (under the OOC) to less than 5 mph; escorts watching for chicks in the corridor; and stopping vehicle traffic if monitors and/or the Natural Resource Manager determine that chicks are in the travel corridor and vulnerable to being run over.

In the absence of minimization measures, it is anticipated that annually a maximum of 8 chicks could be killed by being run over by OSVs (4 chicks per brood), or 24 chicks over the life of the permit (4 chicks per brood x 2 broods x 3 years = 24 chicks) at any time during the self-escorting program. However, the minimization measures should decrease the likelihood of take since the amount of time chicks may be exposed to take has been reduced to four hours per day: two hours in the morning and two hours in the afternoon. Take is not anticipated to occur during the period before, during or after the self-escorting periods. The additional measures incorporated to further reduce take include intensive chick monitoring and adjusting travel periods to preclude OSV travel when chicks might be vulnerable to take. Based on discussions with the MADFW and the USFWS, the Town conservatively anticipates that minimization measures will reduce the actual loss of chicks by 50 percent.

The average productivity from 1998 to 2014 (excluding 1999, 2005 and 2009 missing data) for piping plover pairs present on Nauset Beach South after July 15 is 1.7 chicks fledged per pair <u>in the absence of the HCP</u>. Productivity is influenced by a variety of factors including but not limited to weather, predation and intra-specific competition. Based on the long-term productivity average, the two pairs should produce approximately 3.4 chicks per year (2 pairs x 1.7 chicks/pair) for a total of 10.2 chicks fledged over three years (the life of the permit). The minimization measures should reduce the likelihood that all chicks will be run over by 50 percent; therefore, the impact of the HCP is on 5.1 chicks that otherwise would have fledged.

As a result, the overall impact of the take of 12 unfledged chicks will be equal to the loss of 5.1 chicks that would otherwise have fledged. The HCP should permit the take of 12 chicks over the lifetime of the permit. The mitigation required to offset the effect of the take should replace 5.1 chicks lost to the population (or 6 chicks rounded up to ensure the offset).

Piping plovers breeding on Nauset Beach are a small part of the local population centered on Cape Cod, and Massachusetts as a whole. This conclusion is supported by observations suggesting that few first time breeders return to natal sites to breed, but that they do tend to seek breeding sites in the general vicinity of natal beaches. Considering 2011 data on population size and fledging success (1.18 statewide; this is the most recent year for which regional and statewide data has been published), this would constitute an estimated impact of 1.0% (n=256), 0.8% (n=403), and 0.5% (n=655) of the Lower Cape, Cape Cod, and Massachusetts populations of piping plover (MADFW 2012). Although 2012 and 2013 data are not available in a format to allow for detailed analysis, preliminary 2012 and 2013 statewide data show a slight increase in number of breeding pairs coupled with declining productivity, indicating that these numbers could be underestimates (MADFW, unpublished preliminary data). However, even a doubling of the impact estimates provides a reliably conservative indication of the order of magnitude of the effect on the population. Furthermore, these impact estimates do not take into account the increased productivity expected to derive from the proposed on- and off-site mitigation program.

Cumulative Impacts

According to the MADFW, the state and federal governments do not anticipate receiving any additional piping plover permit applications for the 2015 beach season. It is extremely difficult to project how many additional HCP's might be permitted during the three-year period for which this proposed permit will be effective. In the 1996 Final Conservation Plan for Piping Plovers in Massachusetts, MADFW estimated that 3-7 sites per year might propose to escort caravans of non-essential vehicles under the then-proposed statewide HCP (MADFW 1996). During recent consultations with MADFW the agency has indicated that this estimate remains reasonable for the current permitting scenario, and that it is extremely unlikely that a full seven sites would implement caravan escorting (or other activities leading to equivalent incidental take) by even the second year of the Orleans permit (MADFW pers. comm). Again, all such permits would be required to meet the "net-benefit" mitigation standard to qualify for a state permit (321 CMR 10.23).

The Town of Chatham currently conducts a shorebird monitoring and management program including sending yearly reports to MADFW. Historically, regardless of OSV access in Orleans, the Town of Chatham implements proper signage and closures as recommended by state and federal Guidelines, therefore no adverse effects are anticipated to occur to piping plovers and least terns nesting on Town of Chatham property.

Societal Impacts

For many years, as restrictions and closures to traditional beach access have been increasing because of needed shorebird protection, there has been an increasing negative public sentiment toward shorebird protection and management. This is easily demonstrated by a petition submitted to the Town of Orleans during the summer of 2013 and by the proliferation of anti- shorebird merchandise sold in beach side communities across the region. Conversely, the same community of beach users are known to be good stewards of general beach conservation as evidenced by the multiple community organized beach clean-up programs and public support of other programs focused on natural resource protection

related to the beach environment. The implementation of the escort program proposed within this HCP is likely to be viewed as a "compromise" between shorebird protection and the historic use of the Nauset Beach South. Long-term natural resource protection requires public buy-in and the best way to reverse the current cultural attitude is through collaboration within the community not through prohibition. It is for this reason that implementation of the HCP is more than likely to have a significant positive impact on the long term sustainability of piping plover and other shorebird protection programs by increasing public support for the continued protective measures.

The enhanced outreach and education program describe below will focus on the effects of predation on piping plover breeding success and its relationship to public access closures. The objectives of the education program are to decrease beach user activities that may attract predators to the beach, with particular emphasis on non-resident tourists. Activities such as leaving trash on the beach and feeding wildlife that may attract predators will be a focus of the education program. In addition, highlighting the threats to piping plovers by predation and the relationship of predator management to the recovery of the plover is expected to contribute toward building public understanding and support of a predator management program for plover beaches.

XI. Mitigation

One of the greatest threats to nesting piping plovers at Nauset Beach (including Nauset Spit and Nauset Beach South) is from mammalian and avian predation of eggs, chicks and adults. A review of data from 1998 through 2013 (Appendices 5, and 11 through 25) clearly indicates that eggs, chicks, and occasionally adult piping plovers, are taken by a variety of predators living on Nauset Beach. Consistent predation by crows, foxes and coyotes is documented in data field sheets and yearly summaries of piping plover activity at Nauset Beach. Less consistent predators include raccoons and skunks.

To mitigate for the potential mortality of 5.1 fledged chicks from implementation of this HCP, the Town of Orleans has developed a mitigation strategy that is aimed at reducing the impacts of egg and chick predation in the plan area and at off-site locations. The mitigation is anticipated to increase piping plover productivity to a level that fully offsets (i.e., produces more fledged chicks than may be lost) the impacts of the take.

The Town of Orleans proposes to mitigate adverse effects to piping plovers using a combination of on-site (i.e. applied at Nauset Beach) and off-site (i.e., applied at a different plover beach in Massachusetts) mitigation measures through a combination of non-lethal and lethal selective predator management strategies. Non-lethal predator management has had mixed success in increasing piping plover productivity and may be considered to be of short duration. The Town proposes to investigate non-lethal techniques in an effort to increase on-site productivity over the short time span of the ITP. The Town recognizes that a minimum of two years may be necessary to develop and implement successful non-lethal predator management tools and has considered this time frame in the mitigation strategy presented below.

The on-site mitigation strategy for this HCP is designed to take incremental steps over time to improve piping plover productivity. This mitigation approach is sensitive to concerns among some in the community (and potential misunderstandings) about certain forms of predator control. Although the benefits of the proposed education program and on-site measures may be difficult to quantify, it is anticipated that these measures will pave the way for significant benefits to the piping plover over and above the benefits that will accrue through the off-site mitigation program.

The on-site mitigation strategy is phased over the 3-year permit period beginning with a community education and outreach program (Section XII below). In subsequent years, the outreach and education program will be continued and feasibility studies for on-site non-lethal targeted predator management will be initiated. If productivity objectives are not met within the life of the HCP, transitioning into on-site targeted predator management may be a requirement for a future, long-term HCP. On-site mitigation measures will be coordinated with the MADFW and USFWS in response to previous years' productivity, identification of threats to the plovers within the plan area and other available information.

Since on-site non-lethal predator management will take time to achieve and the more effective selective lethal predator management is not an immediately viable option for the Town of Orleans, the HCP also incorporates an off-site mitigation strategy. The off-site mitigation strategy will ensure that the impact of the take authorized by the ITP will be fully offset. For off-site mitigation, the Town of Orleans will put $10,000 per year into an escrow account. The money in this account will be used by MADFW to implement selective lethal predator management at other plover nesting sites in Massachusetts. In essence, MADFW (or their designated contractors) will be implementing the off-site mitigation that will generate the increased plover productivity required to offset the take that will occur from implementation of the HCP. The details of this agreement and how funds will be used by MADFW to implement selective predator management are provided in a memorandum from MADFW (appendix 26).

The Town anticipates that the MADFW will select the beach on which predator management will be implemented based on documented poor productivity that was caused by predators targeting plover nests and/or chicks. The Town anticipates that the beach at which predator management will be implemented will have a proven history of predation, will have target predator species identified and a plan developed to ensure that predators selected for removal are those responsible for the poor productivity (e.g. "smart" predators). The selective predator removal plan will be approved by the USFWS prior to implementation in order to ascertain that the off-site mitigation will be adequate to provide compensation for the take of piping plover chicks. An escrow agreement (Appendix 27) will ensure that the $10,000 provided by the Town will be directed entirely for off-site predator management.

Off-site mitigation is anticipated to result in about a 20 percent increase in piping plover productivity on beaches where targeted predator management is implemented. This calculation is based on a review of the effects of predator management on piping plover productivity (number of chicks successfully fledged per pair of plovers) for the 2003 Bouchard 120 oil spill Natural Resources Damage Assessment (Final Restoration Plan and

Environmental Assessment for Piping plover (*Charadrius melodus*) Impacted by the Bouchard Barge 120 Oil Spill Buzzards Bay Massachusetts and Rhode Island (http://www.fws.gov/newengland/pdfs/FinalBouchardRPEApipingplover_%20122012.pdf). Therefore, to offset the incidental take of 5.1 chicks, it is anticipated that the off-site mitigation will require selective predator management to benefit 8 breeding pairs per year. Assuming the 20% increase in productivity, based on the statewide average productivity, this will produce an increase of 0.25 fledglings/pair – for 2 additional fledglings per year or 6 over the permit term. Based on the costs associated with the above-mentioned projects, the mitigation costs for the HCP could range from $4,000 to $12,000 per year. However, we believe that both ends of that spectrum are unrealistic and that the actual costs will be somewhat lower than the higher end. Therefore, we anticipate that the $10,000 per year that the Town of Orleans will commit will be sufficient to produce the required amount of mitigation. The off-site mitigation will be focused on beaches where implementing predator management will increase the number of chicks.

The Town of Orleans will prepare and submit a detailed annual mitigation work plan to the USFWS and the MADFW. For year 1, at a minimum the plan will address the outreach and education program to be completed prior to July 1, 2015. For years 2 and 3, the mitigation plan will be based on data collected the previous year and progress toward increasing productivity on-site and offsetting the anticipated take by increasing productivity at an off-site plover beach (Section VIII). The mitigation work plan will: 1) report on the information collected in the previous year; 2) describe the outreach and education program; 3) design on-site non-lethal predator management strategies to assess likelihood of success; 4) commit to funding off-site targeted predator management; 5) describe reporting requirements and 6) describe other management measures that may be identified during the course of the ITP. For years 2 and 3, the mitigation work plan will need to be submitted to the MADFW and USFWS by February 1 and will require the written approval of MADFW and the USFWS. In order to ensure predictability for the Town of Orleans, MADFW and USFWS will commit to approving the plan within 30 work days of receipt as long as it is consistent with the HCP criteria. The February 1 date will allow for time prior to the recreational season in case a discussion or negotiation regarding the context of the plan is needed.

During year 3, on-site mitigation will be implemented in order to directly benefit the population that will potentially be exposed to risk; however, if other factors reduce the efficacy of on-site mitigation, off-site mitigation will be needed to supplement the required on-site mitigation and achieve the desired conservation outcome. If on-site productivity is $\geq$ 1 (average of years 1 & 2) <u>then the agencies may waive the requirement for off-site mitigation if they determine that the increase in on-site productivity is high enough to complete the mitigation requirement without the off-site mitigation. The agencies have determined that if on-site productivity is $>$</u> 1.5 (average of years 1 & 2) then the agencies will automatically waive the requirement for off-site mitigation because the on-site mitigation will have been effective enough to complete the mitigation requirement without the supplemental off-site mitigation.

Summary of On-site and Off-site Mitigation:

1. *Year 1* – Implement a community education and outreach program (described below)
2. Fund and ensure implementation of the off-site mitigation program as part of the annual mitigation work plan established by the HCP.

Year 2 – Prepare mitigation plan by February 1 for agency approval:

1. Identify and assess feasibility of potential targeted non-lethal predator control; implement if practicable and approved by the agencies.
2. Fund and ensure implementation of the off-site mitigation program as in year 1.
3. Continue to implement community education and outreach program developed in Year 1.

Year 3 – Prepare mitigation plan by February 1 for agency approval.

1. On-site productivity (average of years 1 & 2) < 1.
    a. Implement the community education and outreach program.
    b. Implement targeted on-site non-lethal predator control at Nauset Beach South if approved by the agencies.
    c. Fund and ensure implementation of off-site mitigation.
2. On-site productivity (average of years 1 & 2) $\geq$ 1
    a. Continue outreach and education program.
    b. If the agencies determine that the on-site non-lethal targeted predator management is reasonably likely to be effective, then the agencies may waive the requirement to provide off-site mitigation under this scenario in year 3. If the on-site productivity (average of years 1&2) $\geq$ 1.5, then the agencies will waive the requirement to provide off-site mitigation under this scenario in year 3.

Education and Outreach Program

The education and outreach program is intended to raise awareness among beachgoers and the general public of the many threats faced by the piping plover and the importance of maintaining adequate productivity through management actions. For example, data collected by the Town of Orleans clearly shows that predators are the major factor driving down plover productivity at Nauset Beach; it is possible that this link between predators and productivity is not well understood by the general public, stakeholders, and decision-makers. The limited, targeted nature of predator control is also not widely understood. The education and outreach efforts, to be undertaken in partnership with the MADFW, USFWS and other interested organizations will seek to provide an in-depth explanation of the issues impacting piping plover recovery and will explain potential solutions. The specific measures that will be implemented in the education and outreach program for all three years of the ITP will include (but may not be limited to):

- An expanded mandatory education program to educate OSV permit holders about the HCP escort program, piping plover productivity, the impact of predators on piping plover productivity and suggested techniques to minimize predators.

- The addition of the self-escort program and mitigation information to the existing mandatory instructional video for OSV permit holders.
- The design and erection of explanatory signage about the OSV program for locations targeting OSV permit holders.
- The addition of printed materials to locations targeting OSV permits holders.
- Implement of a public awareness campaign about the conservation status of the piping plover, threats and the link between predators, productivity & population status (in cooperation with MADFW and USFWS).
- Up to two annual public education seminars on the described subject matter hosted by the Town of Orleans beginning after 1/1/15. As host, the Town of Orleans will provide venue, presentation equipment, advertising and other types of promotion or may post a prerecorded public education seminar recording on the Orleans 18 TV station. Whereas the Town of Orleans does not have the expert knowledge on the subject matter, it will work with USFWS, MADFW, non-governmental organizations and/or academic institutions to develop the content and arrange for participation by qualified experts.

XII. Monitoring & Reporting

There are several types of monitoring and reporting that will occur for this HCP. First, annual monitoring data will be collected on piping plover productivity at Nauset Beach South, as it is at many other plover beaches in Massachusetts. Nauset Beach South is currently managed in compliance with the OOC and with guidance from the MADFW. Moreover, management is also in compliance with the USFWS "Piping Plover Atlantic Coast Population Recovery Plan" (Appendix 28). As such, piping plover monitoring is required and data related to the productivity are annually provided to the MADFW. Collection of productivity data necessitates a comprehensive monitoring and reporting program. The productivity data for Nauset Beach South will be included in an annual HCP implementation report provided by the Town of Orleans.

Second, the proposed OSV management program for the HCP establishes additional monitoring and reporting responsibilities. The additional data to be collected on the implementation of the self-escort program and effects to piping plover broods within the permit area will be the responsibility of the shorebird monitors specifically hired to implement the program. These and other responsibilities are described in Section IX and are further referenced and defined in other sections as well. As explained in Section IX, every week or sooner if necessary, a brief summary report will be submitted to the USFWS and MADFW. The Natural Resource Manager and Beach Director will work with USFWS and MADFW to develop a template summary report. In addition, by December 31 of each calendar year, the Town of Orleans will submit an annual HCP implementation report to USFWS and MADFW that includes an assessment of the escort program. The assessment will at a minimum describe: the estimated age of chicks in each brood when self-escorting was initiated, fledging success, escorting dates, number of broods, number of chicks present during self-escorting on each date, number of vehicle passages, and any documented "take" of chicks resulting from the vehicle escorting program shall be included in this report. The

report will also contain recommendations for improving the efficiency and or effectiveness of the escorting program in the future.

Finally, the Town of Orleans will provide a summary of the on-site and off-site mitigation programs in the annual HCP implementation report. For the on-site mitigation, the Town report will include the following information: 1) identification of target predators; 2) non-lethal management implemented (location, dates, days implemented); 3) evaluation of success (number nest(s) hatched, number chicks fledged in area where non-lethal predator management was implemented); and 4) recommendations for improving methodology (if necessary), addressing different predators or new methodology. For the off-site mitigation, the Town will incorporate the annual report provided by MADFW regarding implementation of selective predator management, per the signed memorandum (Appendix 26).

XIII. Changed Circumstances

Under HCP guidance, changed circumstances are those circumstances affecting a species or geographic area covered by a HCP that can reasonably be anticipated and that can be planned for. The HCP should discuss measures developed by the applicant to address foreseeable changed circumstances over time, possibly by incorporating adaptive management procedures for covered species within the HCP. To the extent practicable, HCP planners should identify potential changed circumstances in advance and develop specific strategies for dealing with them within the HCP. The intent of addressing changed circumstances early in the process is to provide a means for adjustments to the conservation plan as necessary without an amendment of the HCP/ITP.

Listing of a New Species

If a currently unlisted species is federally listed as endangered or threatened pursuant to the Endangered Species Act (ESA) after the ITP has been issued, the Town of Orleans will request that USFWS make a determination if there is a potential for incidental take of the newly listed species to occur while conducting activities covered by the HCP. If so, the Town of Orleans can choose to modify their management actions in coordination with USFWS to ensure incidental take of the species will be avoided, and/or amend the HCP to incorporate the newly listed species and request a formal amendment of the ITP in compliance with the provisions of section 10 of the ESA. The USFWS generally considers additions of covered species as a major amendment triggering re-initiation of the ESA section 7 consultations and additional NEPA compliance.

Extreme Weather Event

Morphological changes to the beach could result in precluding the implementation of the HCP should the designated travel corridor be impacted to the point vehicles may not proceed through the Pochet area (e.g. a breach at the Pochet wash over). Irrespective of whether the HCP may be implemented within the geographically designated area (Pochet), all other portions of Nauset Beach will continue to be managed according to the state and federal Guidelines. If the permitted activity is not able to be implemented due to extreme changes in

beach morphology, the Town will demonstrate that the mitigation has compensated for the take of plovers during previous years or continue to provide mitigation until the take has been offset.

XIV. Unforeseen Circumstances

Unforeseen circumstances are defined as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the negotiation and development of the plan and that result in a substantial and adverse change in the status of the covered species. (50 CFR § 17.3).

The USFWS bears the burden of demonstrating that unforeseen circumstances exist using the best available scientific and commercial data available while considering certain factors. (50 CFR §§ 17.22(b)(5)(iii)(C)). In deciding whether unforeseen circumstances exist, the USFWS shall consider, but not be limited to, the following factors (50 CFR §§ 17.22(b)(5)(iii)(C)):

1. The size of the current range of the affected species;
2. The percentage of the range adversely affected by the covered activities;
3. The percentage of the range that has been conserved by the HCP;
4. The ecological significance of that portion of the range affected by the HCP;
5. The level of knowledge about the affected species and the degree of specificity of the conservation program for that species under the HCP; and
6. Whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the species in the wild.

In negotiating unforeseen circumstances, the USFWS will not require the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water or other natural resources beyond the level otherwise agreed upon for the species covered by the HCP without the consent of the permittee. (50 CFR §§ 17.22(b)(5)(iii)(A)). If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the USFWS may require additional measures of the permittee where the HCP is being properly implemented only if such measures are limited to modifications within conserved habitat areas, if any, or to the HCP's operating conservation program for the affected species, and maintain the original terms of the plan to the maximum extent possible. (50 CFR §§ 17.22(b)(5)(iii)(B)). Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or additional restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan without the consent of the permittee.

Notwithstanding these assurances, nothing in the "No Surprises" Rule "will be construed to limit or constrain the USFWS, any Federal agency, or a private entity, from taking additional actions, at its own expense, to protect or conserve a species included in a conservation plan." (50 CFR §§ 17.22(b)(6)).

XV. Funding Assurances

The following financial analysis/projections detail costs related to implementing the HCP including the mitigation project, additional staff and adding to the existing education program. These costs are exclusive of the costs associated with the monitoring and management required under the state and federal Guidelines.

Table 2: Estimate Costs for Implementing the HCP:

Budget Item	Year 1	Year 2	Year 3	Permit Total
(4) Beach Patrol Officers	$12,096	$12,096	$12,096	$36,288 (2)
Plover & (2) Vehicle Monitors	$15,552	$15,552	$15,552	$46,656
Binoculars (4 pair)	$400	$0	$0	$400
Public Education Program**	$2,500	$2,500	$2,500	$7,500
Uniforms	$975	$975	$975	$2,925
3 Motorola Radios	$1,050	$0	$0	$1,050
Off-site Mitigation	$10,000	$10,000	$0	$20,000
On-site Predator Control	$0	$0	$10,000	$10,000
One Club Car	$18,000	$0	$0	$18,000
Totals	$60,573	$41,123	$41,123	$142,819

During the 2014 Orleans Town Meeting, the Town approved $10,000 for off-site mitigation for implementation in 2015 upon finalization and signature of the Escrow Agreement between MADFW and the Town, and receipt of the ITP. Off-site mitigation may not be required in year 3 based on the productivity or implementation of on-site predator control. Therefore, if agreed to by the USFWS and MADFW, the above table projects that the on-site Predator Control will replace the off-site mitigation.

Funding for implementation of the HCP will be included in the Town of Orleans annual operating budget. Prior to the Orleans Town Meeting, the Town will provide a copy of the proposed budget "warrant" to the USFWS. The Town of Orleans will annually provide a letter or memorandum to the USFWS verifying that the HCP operating budget was approved at the Orleans Town Meeting no later than June 1. If adequate funding is not secured then the self-escorting OSV program will not be implemented and the standard state and federal Guidelines for recreational beach management will be continue to be implemented throughout Nauset Beach. In this case, the Town would not be in compliance with the terms of the HCP and therefore incidental take coverage for piping plovers would not apply for that year.

XVI. Alternatives to the Taking

Since 1991, the Town of Orleans has managed Nauset Beach South in full compliance with the OOC. This management has included total closures to OSV access during the nesting

season beginning in 2006 and continuing each and every year through 2014. It is the intent of the proposed program to have no impact on any other natural resources or species of wildlife beyond what might occur under normal circumstances, e.g. plovers absent.

The objective of the HCP is to allow access to OSVs beginning on or after July 15th in thpresence of no more than two broods of piping plovers. Historic data indicates that generally one to two broods may be present in the Pochet area after July 15th, effectively precluding OSV access until late August. One alternative to the taking considered for the HCP was for only pedestrian access to Nauset Beach South when plover chicks are present. However, under current management, pedestrians are not restricted from the approximately five miles of beach that are restricted to OSVs when plovers are present in the Pochet but not on the beach south of the Pochet. Therefore, an alternative that considers pedestrian access only on or after July 15th is already in place. Moreover, this alternative does not meet the objective of providing OSV access and increased recreational access to open areas of the beach on or after July 15th, although it does prevent take.

Boat access to the five miles of beach that may be closed to OSVs on or after July 15th if plovers are present in the Pochet area would avoid take of piping plovers since the boat landings would not occur near the plover broods. However, the high-energy beach precludes safe boat landings and this alternative is not feasible.

Other alternatives that would meet the objective of providing recreational access to Nauset Beach South when two broods of piping plover chicks are present in the Pochet area on or after July 15th might not avoid or minimize to the level of the preferred alternative (for example, an alternative allowing 375 OSVs on the beach, the maximum allowable under the OOC) or sufficiently mitigate for lost plover fledglings. After years of consultation with both USFWS and MADFW; the Town of Orleans believes the only alternative to address the multiple issues described above in Section II (Purpose & Need) is to take the actions proposed within this HCP.

XVII. Permit Amendment

The HCP and/or ITP may be modified in accordance with the ESA, the USFWS's implementing regulations, and this chapter. HCP and permit modifications are not anticipated on a regular basis; however, modifications to the HCP and/or ITP may be requested by either the Town of Orleans or the USFWS. The USFWS also may amend the ITP at any time for just cause, and upon a written finding of necessity, during the permit term in accordance with 50 CFR § 13.23(b). The categories of modifications are administrative changes, minor amendments, and major amendments.

a) Administrative Changes
   Administrative changes are internal changes or corrections to the HCP that may be made by the Town of Orleans, at its own initiative, or approved by the Town of Orleans in response to a written request submitted by the USFWS. Requests from

the USFWS shall include an explanation of the reason for the change as well as any supporting documentation.

Administrative changes on the Town of Orleans' initiative do not require preauthorization or concurrence from the USFWS. Administrative changes are those that will not (a) result in effects on a HCP species that are new or different than those analyzed in the HCP, the USFWS's environmental action statement (EAS), or the USFWS's biological opinion (BO), (b) result in take beyond that authorized by the ITP, (c) negatively alter the effectiveness of the HCP, or (d) have consequences to aspects of the human environment that have not been evaluated. The Town of Orleans will document each administrative change in writing and provide the USFWS with a summary of all changes, as part of its annual report, along with any replacement pages, maps, and other relevant documents for insertion in the revised document.

Administrative changes include, but are not limited to, the following:

- Corrections of typographical, grammatical, and similar editing errors that do not change intended meanings;
- Corrections of any maps or exhibits to correct minor errors in mapping; and
- Corrections of any maps, tables, or appendices in the HCP to reflect approved amendments, as provided below, to the HCP or ITP.

b) Minor Amendments

Minor amendments are changes to the HCP the effects of which on HCP species, the conservation strategy, and the Town of Orleans's ability to achieve the biological goals and objectives of the HCP are either beneficial or not significantly different than those described in this HCP. Such amendments also will not increase impacts to species, their habitats, and the environment beyond those analyzed in the HCP, EAS, and the BO or increase the levels of take beyond that authorized by the ITP. Minor amendments may require an amendment to the ITP. A proposed minor amendment must be approved in writing by the USFWS and the Town of Orleans before it may be implemented. A proposed minor amendment will become effective on the date of the joint written approval.

The Town of Orleans or the USFWS may propose minor amendments by providing written notice to the other party. The party responding to the proposed minor amendment shall respond within thirty (30) days of receiving notice of such a proposed modification. Such notice shall satisfy the provisions of 50 CFR § 13.23 as well as include a description of the proposed minor amendment; the reasons for the proposed amendment; an analysis of the environmental effects, if any, from the proposed amendment, including the effects on HCP species and an assessment of the amount of take of the species; an explanation of the reason(s) the effects of the proposed amendment conform to and are not different from those described in this HCP; and any other information required by law. When the Town of Orleans proposes a minor amendment to the HCP, the USFWS may

approve or disapprove such amendment, or recommend that the amendment be processed as a major amendment as provided below. The USFWS will provide the Town of Orleans with a written explanation for its decision. When the USFWS proposes a minor amendment to the HCP, the Town of Orleans may agree to adopt such amendment or choose not to adopt the amendment. The Town of Orleans will provide the USFWS with a written explanation for its decision. The USFWS retains its authority to amend the ITP, however, consistent with 50 CFR § 13.23.

Provided a proposed amendment is consistent in all respects with the criteria in the first paragraph of this section, minor amendments include, but are not limited to, the following:

- Correction of the site map to address errors in the covered area boundary location.
- Modifying existing or developing new take avoidance measures.
- Modifying the reporting schedule or notification process.
- Minor changes to the monitoring method.
- Any other modifications to the HCP that are consistent with the biological goals and objectives of the HCP that the FWS has analyzed and agreed to, and that will not result in changes to the operations under the HCP that are significantly different from those analyzed in connection with the HCP as approved.

c) Major Amendments

A major amendment is any proposed change or modification that does not satisfy the criteria for an administrative change or minor amendment. Major amendments to the HCP and ITP are required if the Town of Orleans desires, among other things, to modify the projects and activities described in the HCP such that they may affect the impact analysis or conservation strategy of the HCP, affect other environmental resources or other aspects of the human environment in a manner not already analyzed, or result in a change for which public review is required. Major amendments must comply with applicable permitting requirements, including the need to comply with NEPA, the NHPA, and Section 7 of the ESA.

In addition to the provisions of 50 CFR § 13.23(b), which authorize the USFWS to amend an ITP at any time for just cause and upon a finding of necessity during the permit term, the HCP and ITP may be modified by a major amendment upon the Town of Orleans' submission of a formal permit amendment application and the required application fee to the USFWS, which shall be processed in the same manner as the original permit application. Such application generally will require submittal of a revised HCP and preparation of an environmental review document in accordance with NEPA. The specific document requirements for the application may vary, however, based on the substance of the amendment. For instance, if the amendment involves an action that was not addressed in the original HCP or NEPA analysis, the documents may need to be revised or new

versions prepared addressing the proposed amendment. If circumstances necessitating the amendment were adequately addressed in the original documents, an amendment of the ITP might be all that would be required.

Upon submission of a complete application package, the USFWS will publish a notice of the receipt of the application in the Federal Register, initiating the NEPA and HCP public comment process. After the close of the public comment period, the USFWS may approve or deny the proposed amendment application. The Town of Orleans may, in its sole discretion, reject any major amendment proposed by the USFWS.

Changes that would require a major amendment to the HCP and/or ITP include, but are not limited to:

- The listing under the ESA of a new species or critical habitat that may be affected by the covered activities of the proposed Project.
- Significant changes to the HCP which were not addressed in the HCP, such as changes to the covered activities or changes in the permit duration.

XVIII. Permit Renewal

It is requested that the ITP associated with this HCP is renewable pursuant to 50 CFR 13.22. In the event that the Town of Orleans plans to continue to implement the HCP after the permit term, the Town of Orleans will file in writing a renewal request at least 30 days prior to the permit expiration.

XIX. Literature Cited

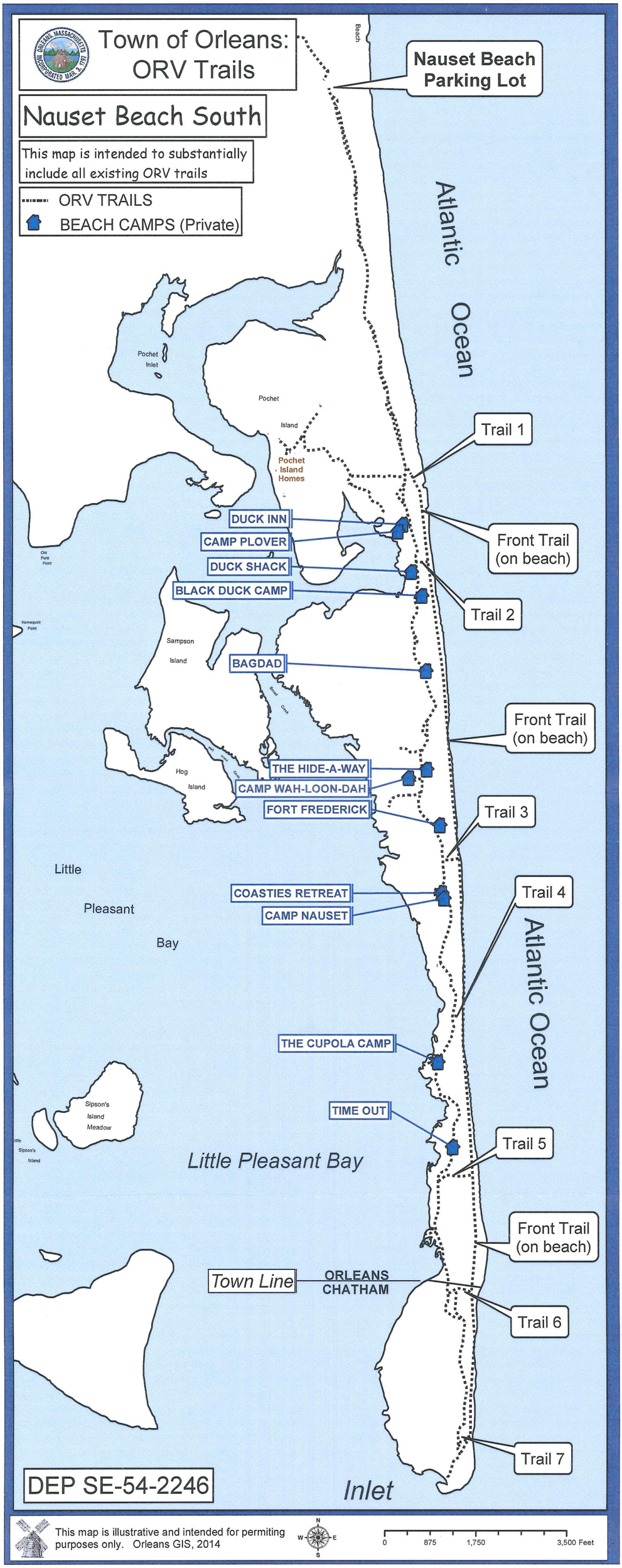
Massachusetts Division of Fisheries and Wildlife. 1993. Guidelines for managing recreational use of beaches to protect piping plovers, terns, and their habitats in Massachusetts. Natural Heritage and Endangered Species Program, Field Headquarters, Westborough, Massachusetts. 14 pp.

Massachusetts Barrier Beach Task Force. 1994. Guidelines for barrier beach management in Massachusetts. Massachusetts coastal Zone Management Program, Boston, Massachusetts. 265 pp.

U.S. Fish and Wildlife Service. 1994. Guidelines for managing recreational activities in piping plover breeding habitat on the U. S. Atlantic Coast to avoid take under section 9 of the Endangered Species Act. Hadley, Massachusetts. 15 pp.

U.S. Fish and Wildlife Service. 2009. Piping plover (Charadrius melodus) 5-year review: summary and evaluation. Northeast Region, Hadley, Massachusetts and the Midwest Region's East Lansing Field Office, Michigan. 95 pp.

U.S. Fish and Wildlife Service and National Marine Fisheries Service. 1996. Habitat Conservation Planning Handbook.



PLANS APPROVED by ORLEANS CONSERVATION COMMISSION

FILE # SE54-2246

BY _____ DATE _____

ENGINEER _____

MA ENDANGERED SPECIES ACT (G.L. c.131A)
CONSERVATION AND MANAGEMENT PERMIT

DATE		July 15, 2014
CONSERVATION PERMIT NO.:		014-244.DFW
NHESP FILE NO.		14-33037
PERMIT HOLDER		Town of Orleans
PROJECT		Off Road Vehicle Escorting Past Piping Plover Chicks

Pursuant to the authority granted in the Massachusetts Endangered Species Act ("MESA") (G.L. c. 131A) and its implementing regulations (321 CMR 10.23), the Director of the Massachusetts Division of Fisheries & Wildlife (the "Division") hereby issues a Conservation and Management Permit to the Town of Orleans (the "Permit Holder"). This permit authorizes the "taking" of the State-listed Piping Plover (*Charadrius melodus*) which is listed as "threatened" pursuant to the MESA, arising out of the late season (after July 15) off-road vehicle escorting program beach at Nauset Beach South, Orleans, Massachusetts (the "Property").

The Division has determined that the Project would result in a "take" of the Piping Plover through disturbance and heightened risk of mortality for up to two broods of unfledged Piping Plover chicks exposed to up to 180 vehicles or up to 360 vehicle trips/day.

Under the authority granted by and in accordance with MGL c131A§3 and 321 CMR 10.23, the Director may permit the taking of a State-listed Species for conservation and management purposes provided that there is a long-term Net Benefit to the conservation of the impacted species. If the Director determines that the applicant for a permit has avoided, minimized and mitigated impacts to the State-listed Species consistent with the following Performance Standards, then the Director may issue a conservation and management permit, provided:

(a) the applicant has adequately assessed alternatives to both temporary and permanent impacts to State-listed Species;

(b) an insignificant portion of the local population would be impacted by the Project or Activity, and;

(c) the applicant agrees to carry out a conservation and management plan that provides a long-term Net Benefit to the conservation of the State-listed Species that has been approved by the Director, as provided in 321 CMR 10.23(5), and shall be carried out by the applicant.

The Director has determined that the applicant for this permit has met the above noted Performance Standards and that the conservation and management plan described herein provides a long-term Net Benefit to the conservation of the Piping Plover.

Pursuant to this permit, intensive monitoring of Piping Plover chicks in the vicinity of the proposed escorted vehicles will be implemented in order to minimize the risk of direct mortality; an education and outreach program will be implemented to raise awareness about the escort program, piping plover conservation status, and the impacts of predators and other threats on piping plover productivity; and funding will be provided for off-site conservation projects to benefit plovers breeding in Massachusetts. In addition, depending on observed Piping Plover productivity levels on Nauset Beach, additional on-site mitigation measures such as non-lethal predator control may be implemented during the second and third years of the three-year escorting program. Finally, all other aspects of Piping Plover and Least Tern management will be conducted in accordance with Guidelines for Managing Recreational use of Beaches to Protect Piping Plovers and their Habitats in Massachusetts (dated 21 April 1993; the "Guidelines"), and predator exclosures will be deployed around Piping Plover nests if requested by the Division.

Therefore, the Project can be permitted pursuant to the MESA. This Conservation and Management Permit (the "Permit") is issued to condition the Project and to provide a long-term Net Benefit to the Piping Plover.

In accordance with the documents submitted to the Division entitled:

- "Town of Orleans Over Sand Vehicle Access Habitat Conservation Plan" (dated July 3, 2014; the "HCP");
- "Vehicle Escort Plan" (dated March 2014; Attachment 1)
- "Escrow Agreement" (Attachment 2)

and any other plans and documents referenced herein, this Conservation and Management Permit is issued with the following conditions:

Conditions:

1. This Permit authorizes limited escorting of recreational vehicles past up to two broods of unfledged Piping Plover Chicks in the Poche Overwash (the "Permit Area") of Nauset Beach (the "Plan Area"), as further described in the HCP, after July 15 of each year, during any three (3) calendar years of the five (5) beach season permit period, subject to conditions specified by this permit. (the "Covered Activity").

2. This Permit shall not preclude the review of projects or activities in the Plan Area that are subject to the Wetlands Protection Act regulations (310 CMR 10.37, 10.58(4)(b), 10.59), as applicable, by the Natural Heritage & Endangered Species Program ("NHESP") of the Division.

3. Division representatives shall have the right to enter and inspect the Plan Area subject to this Permit at reasonable hours to evaluate permit compliance and require the submittal of any reasonable information not otherwise required by this Permit but deemed necessary by the Division to complete its evaluation.

4. Any change to the proposed Covered Activity or any plan or procedure identified in this Permit shall require the Permit Holder to inquire of the Division, in writing, whether the change is significant enough to require the filing of a new Conservation and Management Permit Application, and or require additional long-term Net Benefit for affected State-listed species. The Division retains the right to require the submittal of additional, reasonable information to evaluate the plan change.

5. This Conservation and Management Permit shall apply to, and inure to the benefit of, the Permit Holder and any successor-in-interest of the Permit Holder, or to a subsequent successor-in-control of the Plan Area or portion thereof subject to this Conservation and Management Permit should Permit Holder convey its record ownership of the Plan Area to said successor-in-control, as well as to any contractor or other person performing work conditioned by this Conservation and Management Permit. Within three days of the transfer of an interest in the property or a portion thereof, any successor-in-interest or subsequent successor-in-control [ie, subsequent owners or operators] of the Plan Area or a portion thereof shall provide the Division with a letter indicating (1) that the successor is the successor-in-interest of the Permit Holder or the successor-in-control [ie, current owner or operator] of the Plan Area or a portion thereof, and (2) that said successor will perform the obligations of the Permit Holder as set forth in this Conservation and Management Permit.

6. Prior to the start of the Covered Activity, the Permit Holder shall notify the Division in writing of the name, address, business and home telephone numbers of the manager responsible for compliance with this Conservation and Management Permit. The Permit Holder shall provide updated information in writing to the Division should new or additional manager be hired after the Project has commenced.

7. The Permit Holder shall comply with all Conditions of this Permit and carry out the Covered Activity consistent with the HCP and all Division-approved plans and supporting documents except as otherwise approved by the Division in writing.

8. In managing the Plan Area, the Permit Holder shall comply with all pertinent aspects of the Guidelines as they pertain to both state-listed Piping Plovers and terns in order to ensure compliance with MESA, with the exception of the activities and procedures expressly authorized by this permit.

9. Escorted ORV use shall begin no earlier than July 15th of any given calendar year, and shall be conducted in accordance with the Vehicle Escort Plan (Attachment 1). The Town of Orleans is in discussion with the US Fish & Wildlife Service (FWS) regarding possible changes to the Escort Plan associated with obtaining a FWS Incidental Take Permit. Prior to the implementation of any changes, the Permit Holder shall submit a revised Escort Plan to the Division for review, in accordance with Paragraph 4 of this Permit. In any year when the Permit Holder intends to carry out the Covered Activity, the Permit Holder shall notify the Division at least 48 hours in advance of the anticipated start date.

10. The Permit Holder shall fully implement the Mitigation Measures as described in Section X of the HCP. Prior to the start of the Covered Activity, the Permit Holder shall execute an Escrow Agreement in substantially the same form as Attachment 2. In any year when off-site mitigation funds are required, prior to the start of the Covered Activity for said year the Permit Holder shall provide the Division with proof of deposit of $10,000 into the escrow account.

11. Section X of the HCP envisions an adaptive mitigation plan with mitigation in years two and three tied to observed on-site Piping Plover productivity (#fledglings/pair) in the prior year, and revised annual mitigation Work Plans to be submitted by the Permit Holder to the Division. To determine productivity the Permit Holder shall submit data on Plover Census Forms to the Division by October 1 of each year this Permit is in effect, and the Division shall make the final productivity determination. Draft Mitigation Work Plans shall be provided to the Division for review by December 31 and the Division shall provide comment or approval of each Work Plan within 30 days of receipt of said plan. No vehicle escorting shall be allowed until such time as the Division approves the applicable Work Plan.

12. Summary and annual reporting shall be conducted in accordance with the procedures and time frames specified in the HCP. The annual report to be provided to the Division by December 31 of each year shall contain a detailed description and assessment of both the vehicle escorting plan and any on-site mitigation and educational efforts carried out during the prior year.

13. This permit shall not be construed to authorize non-compliance with any applicable, federal, state, or municipal law, statute, or regulation, including but not limited to the Endangered Species Act. The Permit Holder shall not carry out the Covered Activity until such time as the United States Fish & Wildlife Service issues an Incidental Take Permit, or other written approval, authorizing the Covered Activity.

14. A violation of any condition of this Conservation and Management Permit will result in an unauthorized Take pursuant to M.G.L. c. 131A and may be subject to civil and or criminal penalties pursuant to M.G.L. c. 131A. In the event of non-compliance, the Division reserves the right to suspend or revoke this Permit.

15. Notice of Appeal Rights: This Determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.23. Any person aggrieved by this decision shall have the right to an adjudicatory hearing at the Division pursuant to M.G.L. c. 30A, s.11 in accordance with the procedures for informal hearings set forth in 801 CMR 1.02 and 1.03.

    Any notice of claim for an adjudicatory hearing shall be made in writing and be accompanied by a filing fee in the amount of $500.00. The notice of claim shall be sent to the Division by certified mail, hand delivered or postmarked within 21 days of the date of the Division's Determination to:

    Wayne MacCallum
    Director
    Division of Fisheries and Wildlife
    Field Headquarters
    One Rabbit Hill Road
    Westborough, MA 01581

Any notice of claim for an adjudicatory hearing shall include the following information:

1. The file number for the project;
2. The complete name, address and telephone number of the person filing the request, and the name, address and telephone number of any authorized representative;
3. The specific facts that demonstrate that a party filing a notice of claim satisfies the requirements of an "aggrieved person," including but not limited to (a) how they have a definite interest in the matters in contention within the scope of interests or area of concern of M.G.L. c. 131A or the regulations at 321 CMR 10.00 and (b) have suffered an actual injury which is special and different from that of the public and which has resulted from violation of a duty owed to them by the Division;
4. A clear statement that an adjudicatory hearing is being requested;
5. A clear and concise statement of facts which are grounds for the proceeding, the specific objections to the actions of the Division and the basis for those objections; and the relief sought through the adjudicatory hearing; and a statement that a copy of the request has been sent by certified mail or hand delivered to the applicant and the Record Owner, if different from the applicant.

Jack Buckley, Deputy Director
Massachusetts Division of Fisheries & Wildlife

On this 16th day of July, 2014, before me, the undersigned notary public, personally appeared Jack Buckley, Deputy Director, proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her knowledge and belief.

Lauren C. Glorioso, Notary Public
My Commission expires: February 6, 2020

Conservation Permit 014-244.DFW

Issued this 16th day of July, 2014

Activities and Reporting must be completed by: December 31, 2018

LAUREN C. GLORIOSO
NOTARY PUBLIC
Commonwealth of Massachusetts
My Commission Expires
February 6, 2020

ACKNOWLEDGEMENT AND ACCEPTANCE OF ALL TERMS OF THIS CONSERVATION PERMIT

The undersigned below agrees that commencement of any work authorized by and described in this Conservation and Management Permit constitutes acknowledgement and acceptance of all terms of this permit.

Signatory 1 Organization

COMMONWEALTH OF MASSACHUSETTS

On this _____day of _____, 20____, before me, the undersigned notary public, personally appeared _____, proved to me through satisfactory evidence of identification which was _____ to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her knowledge and belief.

Notary Public

_____

SEAL

My commission expires: _____

Distribution List

Orleans Board of Selectmen
Orleans Town Manager
Orleans Natural Resources Manager
Orleans Conservation Commission
DEP Southeast Regional Office, Wetlands Program

ATTACHMENT 1
Vehicle Escort Plan
March 2014

1. **Vehicle Escort Program – Elements**:
   a. *Program Administrator(s)*: Natural Resources Manager
   Beach Director

   b. *Escort Protocol*:

   Start date: On or after July 15th annually
   Frequency: Twice daily
   On-beach access: 07:00 – 10:00
   Off-beach egress: 15:00 – 18:00
   Number of vehicles: 180 (3 groups of up to 60 vehicles / group, single file, spaced approximately one vehicle length apart)
   Intervals: 30 minutes per group with 30 minutes rest period between groups. Monitoring of chicks, as described below, to continue during rest periods.

   c. *Escort (Vehicle) Corridor dimensions and locations:* The escort corridor referred to in the escort program occurs within the ITP permit area (described in section IV). The specific location of the escort corridor is intended to be adaptive and variable so that for each escort session, the escort corridor may shift along the identified route depending on piping plover and least tern locations and/or movements as shown in the Variable Escort Route Map (see attachment #5). Updated corridor boundaries shall be reported daily to the Program Administrator or their designee by monitor(s) prior to commencement of escorts. The escort corridor is not to exceed 2,100 feet in length. This length is calculated by adding a 200-yard escort buffer in front of 1,500 feet of the actual escort convoy (60 vehicles x 25 feet per vehicle which includes space between vehicles). The escort corridor is not to exceed 30 feet in width (10' on each side of the 10' vehicle track), for a total impact area of approximately 63,000 square feet or 1.45 acres.

   d. *Personnel (monitors) and Required Qualifications:* One beach patrol officer and up to three monitors will be required to escort the vehicle caravan past a brood of chicks. One monitor will be deployed to walk directly in front of the vehicle caravan and scout the area for chicks. The other monitor(s) will be deployed to monitor the locations of chicks such that no one monitor is ever responsible for monitoring more than two chicks (the "chick monitors"). Monitors must be qualified according to established USFWS or MADFW definitions. The Program Administrator or their designee, prior to escorts beginning each day, may appoint a "lead chick monitor". The lead chick monitor will work directly with the beach patrol officer and other monitor(s) in a supervisory role. The beach patrol officer will have the authority to revoke/suspend current over-sand beach stickers. Depending on factors including the number of chicks in each brood, the

separation distance between broods, escorting past two broods may require additional personnel (see below).

2. **<u>Escorting Procedures</u>:**
   a. *Basic Procedures for escorting past one brood:*
      i. A pre-determined area of the Nauset Beach (Orleans) parking lot, or another pre-determined area free of protected species, will be identified for (staging) of non-essential vehicles.
      ii. At least 1/2 hour prior to commencement of vehicle escorts, the chick monitor(s) will proceed along the designated vehicle route and surrounding area to determine locations of plover chicks. Each chick monitor will be responsible for monitoring the location of no more than two chicks. Once the chick monitor(s) have established the locations of chicks, they will notify the Program Administrator or their designee, and no escorts shall proceed unless authorized. At this time, personnel at the staging area, as well as the beach patrol officer will be notified that it is acceptable for the caravan to proceed onto the beach. In the event that all chicks are not located, vehicle escorts will be delayed until such time that all chicks are accounted for or it has been determined by the chick monitor(s) that there are no chicks in the over-sand vehicle corridor.
      iii. The caravan will be met by the beach patrol officer and a monitor (the one assigned to walk in front of the caravan), at a location on the beach at least 200 yards either side (North/South) of the brood(s). At this point, the caravan will assemble into a tightly packed single file led by the monitor on-foot.
      iv. Before allowing the caravan to proceed, the beach patrol officer will contact the lead chick monitor who will confirm that the locations of all chicks are still being monitored, that all chicks are accounted for, and/or it is safe for the caravan to proceed. During vehicle escort, monitor(s) shall maintain constant visual on any plover chicks using binoculars from a distance of no less than 200 feet. Disturbance, if any, of the chicks shall be minimized. Once the lead chick monitor determines that the last vehicle in the caravan has passed at least 200 yards from the nearest chick, escorting will end and the vehicles may proceed to use the sections of beach previously determined to be free of piping plover and least tern chicks, in accordance with state and federal guidelines.
      v. In order to avoid adverse effects to the habitat and allow unimpeded chick passage across the OSV corridor when vehicles are not present, the vehicle "ruts" will be raked across and through the established vehicle tracks at the end of each AM and PM escort session. This will create a 10-foot wide "passage" over/through the existing OSV trail. This process shall be repeated every 200 yards along the entire Pochet OSV corridor (Possible Permit Area).
      vi. If at any time during the escorting process, the chick monitor(s) lose visual contact with one or more chicks, the vehicles will be allowed to continue on their way and the ½ hour between escorts will be used to determine the presence of the chick(s) in the area or absence of chicks in the corridor. Monitors will document in the daily report the approximate time that visual contact with the chick(s) was lost and efforts made to relocate it.

vii. If at any time a chick monitor determines that chicks have approached within 100 feet of the caravan, in or near the direction of travel, the caravan will be halted to allow time for the chicks to move out of the area. The Program Administrator, chick monitor(s), or their designee, will have the independent authority to halt the caravan at any time for any reason. The caravan will not resume until the lead chick monitor determines that it is safe to do so. Monitors will document in the daily report the approximate time that the caravan was halted and the duration of the stopped caravan.

viii. As state and federal guidelines require non-essential vehicles to stay at least 200 yards away from plover chicks (or greater distances without intensive monitoring), the Program Administrator or their designee will deploy monitor(s) on an as-needed basis throughout the day to ensure that vehicles do not approach the foraging area including a 200 yard moving buffer zone around it. For this reason, to minimize staffing requirements, the Town of Orleans may elect to temporarily close an area of beach within several hundred yards of the chick foraging area to vehicle activity.

ix. The same procedures described above will be used to escort the caravan of vehicles back off the beach, from 15:00-18:00.

b. *Basic Procedures for escorting past two broods:*

i. Two broods in close proximity (<400 yards apart) – extra chick monitor(s) will be deployed to monitor all the chicks in both broods simultaneously (≤2chicks/monitor). The caravan will proceed past both broods without stopping (except if chicks are present ≤100 feet from vehicles, see No. 6, above), led by the monitor on foot, as described above. This is necessary because the caravan cannot safely stop in a zone free of chicks, and allow the monitors to redeploy to locate the next brood of chicks, without risking the possibility of inadvertently impacting the first brood. The Town of Orleans may elect to follow this procedure for broods >400 yards apart (with the monitor who walks in front of the caravan redeploying at least 100 yards before encountering the second monitored brood), or proceed with fewer staff, as described below.

ii. >400 yards apart – Prior to escorting past the first brood, a monitor will confirm the current location of the second brood, as follows. After proceeding at least 200 yards past the first brood as described above, the monitor(s) will scan the area in front of the caravan for chicks, and the caravan will stop temporarily at least 200 yards past the first brood and at least 100 yards shy of the second brood. The chick monitor(s) will then move ahead of the caravan, locate all chicks, and the caravan will proceed past the second brood as described in the "Basic Procedures" section above.

3. **<u>Contingency Plan:</u>**

a. *Personnel availability*: At least two, and up to three monitors (i.e., one monitor per 2 plover chicks) will be required to escort the caravan past a brood, depending on the number of chicks. The monitor(s) assigned to escort vehicles and to monitor the affected broods, will be in addition to the current monitors employed

by the Town of Orleans. In the event that one of these employees is unavailable to perform an escort, one of the Program Administrators or their designee shall assume this duty.

b. *Inclement weather***:** Weather forecasts will be monitored on a daily basis by the Program Administrator or their designee. In the event that a storm warning is predicted by the National Weather Service, or any other weather warning that could jeopardize public safety within a 24 hour period, all vehicle escorts shall, by the Program Administrator or their designee, be cancelled immediately and for the duration of said hazardous conditions. Vehicle escorts may not resume until the Program Administrator or their designee has given the all-clear. It shall be presented in writing prior to purchasing an OSV sticker that when taking part in the escort program, all users shall use the beach at their own risk. Exiting escorts will not take place do to unpredicted weather. OSV sticker holders shall be informed in writing that a "shelter in place" policy will go into effect until the inclement weather has passed, or scheduled exiting escorts have begun.

c. *Medical or family emergencies*: OSV sticker holders shall be advised verbally and in writing at the time of OSV sticker application, via affidavit, that egress from the beach outside of the escort time windows shall be strictly prohibited. In the event of a medical or family emergency, anyone requesting an exemption from this prohibition shall be required to immediately notify one of the Program Administrators at the Nauset Beach Administration Building. If the exemption is granted, one beach patrol officer and one monitor shall escort the vehicle off of the beach and the vehicle shall not be allowed to return for the remainder of that day.

ATTACHMENT 2

ESCROW AGREEMENT

ESCROW AGREEMENT
DRAFT 7/14/14

This ESCROW AGREEMENT (this "Agreement") is entered into as of this ____ day of _____, _____ by and between the Massachusetts Division of Fisheries and Wildlife, by and through the Natural Heritage and Endangered Species Program, having a principal place of business at 1 Rabbit Hill Road, Westborough, MA, 01581 ("NHESP"); the Town of Orleans (proponent) having a principal place of business at 19 School Road, Orleans, MA 02653; and Michael D. Ford, having a principal place of business at 72 Massachusetts 28, West Harwich, MA 02671 ("Escrow Agent"). NHESP, Town of Orleans and Escrow Agent are referred to herein collectively as the "Parties".

1. Recitals

a. The Conservation and Management Permit No. 014-244.DFW ("Permit") issued by NHESP to the Town of Orleans contains financial assurance provisions in paragraph 10 of the Conditions section requiring that the Town of Orleans ensure that funds are available in the sum of up to three annual payments of $10,000, the final amount of funding to be determined as set forth in the Permit, (the "Funds") for the restoration, management, and or monitoring of Piping Plovers, their predators, or their habitats in Massachusetts and/or conservation research, for the benefit of Piping Plover populations in Massachusetts.

b. The Parties agree the Funds shall be paid by the Town of Orleans to the Escrow Agent and held in an interest bearing escrow account ("Escrow Account") (further defined in paragraph 2 below) and expended pursuant to the terms and conditions described below to mitigate for the take of the Piping Plover in connection with off-road vehicle use and escorting in the vicinity of unfledged Piping Plover Chicks (the "Activity"), at Nauset Beach in Orleans, Massachusetts.

The Parties enter into this Agreement for the purpose of defining the terms and conditions under which the Funds shall be held and disbursed.

NOW THEREFORE, after consideration of the above recitals, Town of Orleans, NHESP and the Escrow Agent hereby covenant and agree as follows:

2. Escrow Account

a. Town of Orleans shall deliver the Funds to the Escrow Agent in the amounts, schedule and manner set forth in paragraphs 10 and 11 of Permit and as further described in the Habitat Conservation Plan referenced therein.

b. All funds delivered by Town of Orleans to the Escrow Agent shall be deposited by the Escrow Agent in an interest bearing account or held in obligations by the US Government at one or more banks ("Depository Bank"), said accounts to be at all times insured by the Federal Deposit Insurance Corporation and which shall pay interest on the Funds at a reasonable rate. The Depository Bank shall be entitled to charge the Escrow Account for services related to maintenance of the Escrow Account at a rate not exceeding the Bank's standard charges to other customers for similar services.

c. The Escrow Account shall be opened by the Escrow Agent and funds may be

withdrawn only by the Escrow Agent and no other person. Disbursements shall be made from the Escrow Account only in accordance with the terms of this Agreement.

d. The Escrow Agent shall maintain a record of all deposits, income, disbursements, and other transactions of the Escrow Account. Upon request, the Escrow Agent shall provide to any of the Parties a written accounting of all transactions. The Parties shall have the right to inspect all books and records of the Escrow Agent relating to the Escrow Account at reasonable times upon request. Escrow Agent's computation of the Funds is correct in the absence of manifest error.

e. The Escrow Agent shall keep possession of the book(s) and bank statements of the Escrow Account until such time as it is terminated in accordance with the terms of this Agreement, or until a successor Escrow Agent is appointed as provided herein.

3. Disbursements

From time to time, NHESP may, on or before the date which is eight (8) years from the date of this Agreement, request in writing the Escrow Agent to deliver all or portions of the Funds, plus any interest thereon, for the purposes described in paragraph 1.a of this Agreement. Upon receipt of such written request, the Escrow Agent shall deliver the requested portion of the Funds to NHESP or any party designated in writing by NHESP. Delivery of the Funds in accordance with the terms of this Agreement shall be made by cashier's check, or by federal funds wire transfer, at the option of the payee.

a. The Escrow Agent may make disbursements to the Depository Bank for services rendered in maintaining said account.

b. If, at the end of eight years from the date of this Agreement, any portion of the Funds is still held in escrow under this Agreement, then NHESP shall, within six (6) months after such date, develop a plan for the use of any remaining Funds by NHESP or any party designated in writing by NHESP for further management for the benefit of the Piping Plover in Massachusetts.

c. The Escrow Agent shall release any remaining Funds to NHESP or any party designated in writing by NHESP in accordance with such plan.

4. Termination of Agreement

This Escrow Agreement shall terminate, and the Escrow Agent shall be relieved of all liability, after all funds in the Escrow Account have been properly disbursed in accordance with the terms and conditions of this Agreement. When the Escrow Account is terminated, the Escrow Agent shall provide a final accounting of all transactions hereunder to the Parties.

5. Duties and Liabilities of Escrow Agent

a. The sole duty of the Escrow Agent under this Agreement is to receive funds from the Town of Orleans and to hold the funds for disbursement according to Section 3 above. The Escrow Agent shall be under no duty to pass upon the adequacy of any documents, to determine whether any of the Parties are complying with the terms and provisions of this

Escrow Agreement, or to determine the identity or authority of any person purporting to be a signatory authorized by Town of Orleans or NHESP.

b. The Escrow Agent may conclusively rely upon, and shall be protected in acting on, a statement, certificate, notice, requisition, order, approval, or other document believed by the Escrow Agent to be genuine and to have been given, signed and presented by a duly authorized agent of Town of Orleans or NHESP. The Escrow Agent shall have no duty or liability to verify any statement, certificate, notice, request, requisition, consent, order, approval or other document, and its sole responsibility shall be to act only as expressly set forth in this Agreement. The Escrow Agent shall not incur liability for following the instructions contemplated by this Agreement or expressly provided for in this Agreement or other written instructions given to the Escrow Agent by the Parties. The Escrow Agent shall be under no obligation to institute or defend any action, suit or proceeding in connection with this Escrow Agreement, unless first indemnified to its satisfaction. The Escrow Agent may consult with counsel of its choice including shareholders, directors, and employees of the Escrow Agent, with respect to any question arising under or in connection with this Agreement, and shall not be liable for any action taken, suffered or omitted in good faith. The Escrow Agent shall be liable solely for its own willful misconduct.

c. The Escrow Agent may refrain from taking any action, other than keeping all property held by it in escrow if the Escrow Agent: (i) is uncertain about its duties or rights under this Escrow Agreement; (ii) receives instructions that, in its opinion, are in conflict with any of the terms and provisions of this Agreement, until it has resolved the conflict to its satisfaction, received a final judgment by a court of competent jurisdiction (if it deems such action necessary or advisable), or it has received instructions executed by both Town of Orleans and NHESP.

d. Escrow Agent is acting, and may continue to act, as counsel to Town of Orleans in connection with the subject transaction, whether or not the Funds are being held by Escrow Agent or have been delivered to a substitute impartial party or a court of competent jurisdiction. Escrow Agent is not acting as counsel to Town of Orleans in Escrow Agent's capacity as escrow agent.

e. Each of the Parties admits, acknowledges and represents to each of the other Parties that it has had the opportunity to consult with and be represented by independent counsel of such party's choice in connection with the negotiation and execution of this Agreement. Each of the Parties further admits, acknowledges and represents to the other Parties that it has not relied on any representation or statement made by the other Parties or by any of their attorneys or representatives with regard to the subject matter, basis or effect of this Agreement.

6. Escrow Agent's Fee

a. The Escrow Agent shall be entitled to compensation from _____ for its basic services under this Escrow Agreement. The Escrow Agent may bill the _____ directly for such services in accordance with the fee schedule attached to this Escrow Agreement as Exhibit B. Payments for services provided by Escrow Agent shall not be made from Escrow Funds. {optional, as per permittee's arrangement with the Escrow Agent}

7. Investment Risk

a. In no event shall the Escrow Agent have any liability as a result of any loss occasioned by the financial difficulty or failure of any institution, including Depository Bank, or which holds United States Treasury Bills, or other securities, or for failure of any banking institution, including Depository Bank, to follow the instructions of the Escrow Agent. Without limiting the generality of the foregoing, in no event shall the Escrow Agent incur any liability as the result of any claim or allegation that the Escrow Agent should have invested the escrow funds in United States Treasury Bills rather than hold same on deposit at the Depository Bank, or vice versa.

8. Notices

a. All notices permitted or required by this Agreement shall be in writing and shall be deemed duly provided when deposited in the United States mail, postage prepaid, certified or registered mail, return receipt requested, to the other Parties at the addresses set forth in the first paragraph of this Agreement. The Party providing notice may choose alternate methods, including hand delivery, Federal Express, or other recognized overnight courier. Notices provided by hand delivery; Federal Express or other recognized overnight courier shall be deemed duly provided when received at the addresses set forth in the first paragraph of this Agreement.

b. All notices, certification, authorizations, requests or other communications required, or permitted to be made under this Escrow Agreement shall be delivered as follows:

To the NHESP:

Assistant Director
Natural Heritage and Endangered Species Program
ATTN: Regulatory Review, CMP ___(insert Permit Number Here)
Division of Fisheries and Wildlife
1 Rabbit Hill Road, North Drive
Westborough, MA 01581

To the Town of Orleans:

Town Manager
Town Hall
19 School Road
Orleans, MA 02653

To the Escrow Agent:

Attorney Michael D. Ford
72 Massachusetts 28
West Harwich, MA 02671

or to such other place or to the attention of such other individual as a Party from time to time

may designate by written notice to all other Parties.

9. Resignation, Removal, or Successor Escrow Agent

a. If, for any reason, the Escrow Agent is unable or unwilling to continue to act as Escrow Agent, he/she shall give written notice to the other Parties of his/her inability or unwillingness to continue as Escrow Agent. The parties shall agree upon a successor agent, formally appoint the successor agent, and provide written notification to the Escrow Agent of the subsequent appointment within ten (10) business days. The Escrow Agent shall then, within three (3) business days after receiving notice of subsequent appointment, deliver to the successor escrow agent all cash and other property held by the Escrow Agent under this Escrow Agreement. Upon such delivery, all obligations of the Escrow Agent under this Escrow Agreement shall automatically cease and terminate. If no successor escrow agent is designated within the prescribed ten (10) day period, or if notice of subsequent appointment is not received within such period, then the Escrow Agent may, at its option at any time thereafter, deposit the funds and any documents then being held by it in escrow into any court having appropriate jurisdiction, and upon making such deposit, shall thereupon be relieved of and discharged and released from any and all liability hereunder, including without limitation any liability arising from the Funds, or any portion thereof so deposited.

b. The Escrow Agent may be removed at any time by a written instrument or concurrent instruments signed by the NHESP and Town of Orleans and delivered to the Escrow Agent.

c. If at any time hereafter, the Escrow Agent shall resign, be removed, be dissolved, or otherwise become incapable of acting, or the position of the Escrow Agent shall become vacant for any of the foregoing reasons or for any other reason, the Parties hereto shall promptly appoint a successor Escrow Agent. Upon appointment, such successor Escrow Agent shall execute and deliver to his/her predecessor and to the Parties hereto an instrument in writing accepting such appointment hereunder. Thereupon, without further act, such successor Escrow Agent shall be fully vested with all the rights, immunities, and powers, and shall be subject to all the duties and obligations of his/her predecessor, and the predecessor Escrow Agent shall promptly deliver all books, records, and, other property and monies held by him/her hereunder to such successor Escrow Agent.

10. Interest

a. All interest income accrued on funds in the Escrow Account shall become part of the Escrow Account and shall remain in the Escrow Account. The Escrow Agent may disburse funds to Town of Orleans to pay federal and state taxes on accrued interest. Said disbursement may be made by the Escrow Agent only after receiving a written confirmation from Town of Orleans, with a copy sent to the NHESP, of all itemized federal and state tax liabilities incurred by interest accrued on the Escrow Account.

11. Miscellaneous

a. This Escrow Agreement shall be binding upon, and shall inure to the benefit of the respective Parties hereto and their successors and assigns.

b. This Agreement shall be governed by and be construed in accordance with the laws of the Commonwealth of Massachusetts.

c. This Agreement shall be interpreted as an instrument under seal.

d. This Agreement may be executed in any number of counterparts, each of which shall constitute an original, and all counterparts shall constitute one Agreement.

e. This Escrow Agreement may not be amended, altered, or modified except by written instrument duly executed by all of the Parties hereto.

f. If the term, condition or provision of this Agreement, or the application thereof to any circumstances or party hereto, ever shall be held to be invalid or unenforceable, then in each such event the remainder of this Agreement or the application of such term, condition, or provision to any other circumstance or party hereto (other than those as to which it shall be invalid or unenforceable) shall not be thereby affected, and each term, condition and provision hereof shall remain valid and enforceable to the fullest extent permitted by law.

g. Each individual and entity executing this Agreement hereby represents and warrants that he, she or it has the capacity set forth on the signature pages hereof with full power and authority to bind the party on whose behalf he, she or it is executing this Agreement to the terms hereof.

12. Effective Date

a. This Agreement shall take effect on the latest date of execution by the NHESP, Town of Orleans, or Escrow Agent.

[SIGNATURE PAGES FOLLOW]

IN WITNESS WHEREOF, the parties have caused this Escrow Agreement to be duly executed as of the day and year first written above.

FOR THE MASSACHUSETTS DIVISION
OF FISHERIES AND WILDLIFE:

_____
Name:
Title:

COMMONWEALTH OF MASSACHUSETTS

_____, ss _____ __, 2009

On this __ day of ___, 2009, before me, the undersigned notary public, personally appeared _____, and proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

_____
Notary Public
My commission expires:

FOR _____ (proponent):

Company Name

By: _____.

By: _____
Name: _____
Its: _____

STATE OF _____

_____, ss _____ __, 2009

On this __ day of ___, 2009, before me, the undersigned notary public, personally appeared _____, and proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

_____
Notary Public
My commission expires:

FOR THE ESCROW AGENT:

Company Name

By: _____
Name:
Title:

COMMONWEALTH OF MASSACHUSETTS

_____ ss. _____ __, 2009

On this __ day of ___, 2009, before me, the undersigned notary public, personally appeared _____, and proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

_____
Notary Public
My commission expires:

Bk 28280 Pg185 #32622
07-23-2014 @ 01:57p

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.

1. From: Orleans
Conservation Commission

2. This issuance is for (check one): a. ☒ Order of Conditions b. ☐ Amended Order of Conditions

3. To: Applicant:

a. First Name | b. Last Name

Town of Orleans-Board of Selectmen (Acting as Park Commissioners)
c. Organization

19 School Road
d. Mailing Address

Orleans | MA | 02653
e. City/Town | f. State | g. Zip Code

4. Property Owner (if different from applicant):

a. First Name | b. Last Name

c. Organization

d. Mailing Address

e. City/Town | f. State | g. Zip Code

5. Project Location:

0 Smith Neck Road-Nauset Beach South | Orleans
a. Street Address | b. City/Town

38 | 14
c. Assessors Map/Plat Number | d. Parcel/Lot Number

Latitude and Longitude, if known: d m s | d m s
d. Latitude | e. Longitude

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

A. General Information (cont.)

6. Property recorded at the Registry of Deeds for (attach additional information if more than one parcel):

Barnstable
a. County

Doc: 60173
b. Certificate Number (if registered land)

Book 1041 Page 392
Book 994 Page 172
c. Book

d. Page

7. Dates: 4/14/14 (a. Date Notice of Intent Filed) 6/24/14 (b. Date Public Hearing Closed) 6/25/14 (c. Date of Issuance)

8. Final Approved Plans and Other Documents (attach additional plan or document references as needed): Off Road Vehicle (ORV) and Beach Management Plan for Nauset Beach South

N/A
b. Prepared By

N/A
c. Signed and Stamped by

N/A
d. Final Revision Date

N/A
e. Scale

Town of Orleans: ORV Trails Nauset Beach South
f. Additional Plan or Document Title

Date Stamped 6/24/14
g. Date

B. Findings

1. Findings pursuant to the Massachusetts Wetlands Protection Act:

Following the review of the above-referenced Notice of Intent and based on the information provided in this application and presented at the public hearing, this Commission finds that the areas in which work is proposed is significant to the following interests of the Wetlands Protection Act (the Act). Check all that apply:

a. ☐ Public Water Supply
b. ☒ Land Containing Shellfish
c. ☒ Prevention of Pollution
d. ☐ Private Water Supply
e. ☒ Fisheries
f. ☒ Protection of Wildlife Habitat
g. ☐ Groundwater Supply
h. ☒ Storm Damage Prevention
i. ☒ Flood Control

2. This Commission hereby finds the project, as proposed, is: (check one of the following boxes)

Approved subject to:

a. ☒ the following conditions which are necessary in accordance with the performance standards set forth in the wetlands regulations. This Commission orders that all work shall be performed in accordance with the Notice of Intent referenced above, the following General Conditions, and any other special conditions attached to this Order. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, these conditions shall control.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

B. Findings (cont.)

Denied because:

b. ☐ the proposed work cannot be conditioned to meet the performance standards set forth in the wetland regulations. Therefore, work on this project may not go forward unless and until a new Notice of Intent is submitted which provides measures which are adequate to protect the interests of the Act, and a final Order of Conditions is issued. **A description of the performance standards which the proposed work cannot meet is attached to this Order.**

c. ☐ the information submitted by the applicant is not sufficient to describe the site, the work, or the effect of the work on the interests identified in the Wetlands Protection Act. Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides sufficient information and includes measures which are adequate to protect the Act's interests, and a final Order of Conditions is issued. **A description of the specific information which is lacking and why it is necessary is attached to this Order as per 310 CMR 10.05(6)(c).**

Inland Resource Area Impacts: Check all that apply below. (For Approvals Only)

3. ☐ Buffer Zone Impacts: Shortest distance between limit of project disturbance and Bank or Bordering Vegetated Wetland boundary (if available) — a. linear feet

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
4. ☐ Bank	a. linear feet	b. linear feet	c. linear feet	d. linear feet
5. ☐ Bordering Vegetated Wetland	a. square feet	b. square feet	c. square feet	d. square feet
6. ☐ Land Under Waterbodies and Waterways	a. square feet	b. square feet	c. square feet	d. square feet
	e. c/y dredged	f. c/y dredged		
7. ☐ Bordering Land Subject to Flooding	a. square feet	b. square feet	c. square feet	d. square feet
Cubic Feet Flood Storage	e. cubic feet	f. cubic feet	g. cubic feet	h. cubic feet
8. ☐ Isolated Land Subject to Flooding	a. square feet	b. square feet		
Cubic Feet Flood Storage	c. cubic feet	d. cubic feet	e. cubic feet	f. cubic feet

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

B. Findings (cont.)

Resource Area	Proposed Alteration	Permitted Alteration	Proposed Replacement	Permitted Replacement
9. ☐ Riverfront Area	a. total sq. feet	b. total sq. feet		
Sq ft within 100 ft	c. square feet	d. square feet	e. square feet	f. square feet
Sq ft between 100-200 ft	g. square feet	h. square feet	i. square feet	j. square feet

Coastal Resource Area Impacts: Check all that apply below. (For Approvals Only)

10. ☐ Designated Port Areas	Indicate size under Land Under the Ocean, below			
11. ☐ Land Under the Ocean	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
12. ☒ Barrier Beaches	Indicate size under Coastal Beaches and/or Coastal Dunes below			
13. ☒ Coastal Beaches	No Alteration a. square feet	No Alteration b. square feet	cu yd c. nourishment	cu yd d. nourishment
14. ☒ Coastal Dunes	No Alteration a. square feet	No Alteration b. square feet	cu yd c. nourishment	cu yd d. nourishment
15. ☒ Coastal Banks	No Alteration a. linear feet	No Alteration b. linear feet		
16. ☐ Rocky Intertidal Shores	a. square feet	b. square feet		
17. ☒ Salt Marshes	No Alteration a. square feet	No Alteration b. square feet	c. square feet	d. square feet
18. ☐ Land Under Salt Ponds	a. square feet	b. square feet		
	c. c/y dredged	d. c/y dredged		
19. ☐ Land Containing Shellfish	a. square feet	b. square feet	c. square feet	d. square feet
20. ☐ Fish Runs	Indicate size under Coastal Banks, Inland Bank, Land Under the Ocean, and/or inland Land Under Waterbodies and Waterways, above			
	a. c/y dredged	b. c/y dredged		
21. ☒ Land Subject to Coastal Storm Flowage	No Alteration a. square feet	No Alteration b. square feet		

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

B. Findings (cont.)

* #22. If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.5.c (BVW) or B.17.c (Salt Marsh) above, please enter the additional amount here.

22. ☐ Restoration/Enhancement *:

a. square feet of BVW | b. square feet of salt marsh

23. ☐ Stream Crossing(s):

a. number of new stream crossings | b. number of replacement stream crossings

C. General Conditions Under Massachusetts Wetlands Protection Act

The following conditions are only applicable to Approved projects.

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. The Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   a. the work is a maintenance dredging project as provided for in the Act; or
   b. the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance. If this Order is intended to be valid for more than three years, the extension date and the special circumstances warranting the extended time period are set forth as a special condition in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. If this Order constitutes an Amended Order of Conditions, this Amended Order of Conditions does not extend the issuance date of the original Final Order of Conditions and the Order will expire on 6/25/2017 unless extended (See Page 9).
7. Any fill used in connection with this project shall be clean fill. Any fill shall contain no trash, refuse, rubbish, or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles, or parts of any of the foregoing.
8. This Order is not final until all administrative appeal periods from this Order have elapsed, or if such an appeal has been taken, until all proceedings before the Department have been completed.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

9. No work shall be undertaken until the Order has become final and then has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of the registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order, which form must be stamped by the Registry of Deeds, prior to the commencement of work.

10. A sign shall be displayed at the site not less then two square feet or more than three square feet in size bearing the words,

    "Massachusetts Department of Environmental Protection" [or, "MassDEP"]

    "File Number SE 54-2246 "

11. Where the Department of Environmental Protection is requested to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before MassDEP.

12. Upon completion of the work described herein, the applicant shall submit a Request for Certificate of Compliance (WPA Form 8A) to the Conservation Commission.

13. The work shall conform to the plans and special conditions referenced in this order.

14. Any change to the plans identified in Condition #13 above shall require the applicant to inquire of the Conservation Commission in writing whether the change is significant enough to require the filing of a new Notice of Intent.

15. The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

16. This Order of Conditions shall apply to any successor in interest or successor in control of the property subject to this Order and to any contractor or other person performing work conditioned by this Order.

17. Prior to the start of work, and if the project involves work adjacent to a Bordering Vegetated Wetland, the boundary of the wetland in the vicinity of the proposed work area shall be marked by wooden stakes or flagging. Once in place, the wetland boundary markers shall be maintained until a Certificate of Compliance has been issued by the Conservation Commission.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

18. All sedimentation barriers shall be maintained in good repair until all disturbed areas have been fully stabilized with vegetation or other means. At no time shall sediments be deposited in a wetland or water body. During construction, the applicant or his/her designee shall inspect the erosion controls on a daily basis and shall remove accumulated sediments as needed. The applicant shall immediately control any erosion problems that occur at the site and shall also immediately notify the Conservation Commission, which reserves the right to require additional erosion and/or damage prevention controls it may deem necessary. Sedimentation barriers shall serve as the limit of work unless another limit of work line has been approved by this Order.

NOTICE OF STORMWATER CONTROL AND MAINTENANCE REQUIREMENTS

19. **The work associated with this Order (the "Project") is** (1) ☐ **is not** (2) ☒ **subject to the Massachusetts Stormwater Standards. If the work is subject to the Stormwater Standards, then the project is subject to the following conditions:**

a) All work, including site preparation, land disturbance, construction and redevelopment, shall be implemented in accordance with the construction period pollution prevention and erosion and sedimentation control plan and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Construction General Permit as required by Stormwater Condition 8. Construction period erosion, sedimentation and pollution control measures and best management practices (BMPs) shall remain in place until the site is fully stabilized.

b) No stormwater runoff may be discharged to the post-construction stormwater BMPs unless and until a Registered Professional Engineer provides a Certification that:
i. all construction period BMPs have been removed or will be removed by a date certain specified in the Certification. For any construction period BMPs intended to be converted to post construction operation for stormwater attenuation, recharge, and/or treatment, the conversion is allowed by the MassDEP Stormwater Handbook BMP specifications and that the BMP has been properly cleaned or prepared for post construction operation, including removal of all construction period sediment trapped in inlet and outlet control structures;
ii. as-built final construction BMP plans are included, signed and stamped by a Registered Professional Engineer, certifying the site is fully stabilized;
iii. any illicit discharges to the stormwater management system have been removed, as per the requirements of Stormwater Standard 10;
iv. all post-construction stormwater BMPs are installed in accordance with the plans (including all planting plans) approved by the issuing authority, and have been inspected to ensure that they are not damaged and that they are in proper working condition;
v. any vegetation associated with post-construction BMPs is suitably established to withstand erosion.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

c) The landowner is responsible for BMP maintenance until the issuing authority is notified that another party has legally assumed responsibility for BMP maintenance. Prior to requesting a Certificate of Compliance, or Partial Certificate of Compliance, the responsible party (defined in General Condition 18(e)) shall execute and submit to the issuing authority an Operation and Maintenance Compliance Statement ("O&M Statement) for the Stormwater BMPs identifying the party responsible for implementing the stormwater BMP Operation and Maintenance Plan ("O&M Plan") and certifying the following: *i.*) the O&M Plan is complete and will be implemented upon receipt of the Certificate of Compliance, and *ii.*) the future responsible parties shall be notified in writing of their ongoing legal responsibility to operate and maintain the stormwater management BMPs and implement the Stormwater Pollution Prevention Plan.

d) Post-construction pollution prevention and source control shall be implemented in accordance with the long-term pollution prevention plan section of the approved Stormwater Report and, if applicable, the Stormwater Pollution Prevention Plan required by the National Pollution Discharge Elimination System Multi-Sector General Permit.

e) Unless and until another party accepts responsibility, the landowner, or owner of any drainage easement, assumes responsibility for maintaining each BMP. To overcome this presumption, the landowner of the property must submit to the issuing authority a legally binding agreement of record, acceptable to the issuing authority, evidencing that another entity has accepted responsibility for maintaining the BMP, and that the proposed responsible party shall be treated as a permittee for purposes of implementing the requirements of Conditions 18(f) through 18(k) with respect to that BMP. Any failure of the proposed responsible party to implement the requirements of Conditions 18(f) through 18(k) with respect to that BMP shall be a violation of the Order of Conditions or Certificate of Compliance. In the case of stormwater BMPs that are serving more than one lot, the legally binding agreement shall also identify the lots that will be serviced by the stormwater BMPs. A plan and easement deed that grants the responsible party access to perform the required operation and maintenance must be submitted along with the legally binding agreement.

f) The responsible party shall operate and maintain all stormwater BMPs in accordance with the design plans, the O&M Plan, and the requirements of the Massachusetts Stormwater Handbook.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

C. General Conditions Under Massachusetts Wetlands Protection Act (cont.)

g) The responsible party shall:
1. Maintain an operation and maintenance log for the last three (3) consecutive calendar years of inspections, repairs, maintenance and/or replacement of the stormwater management system or any part thereof, and disposal (for disposal the log shall indicate the type of material and the disposal location);
2. Make the maintenance log available to MassDEP and the Conservation Commission ("Commission") upon request; and
3. Allow members and agents of the MassDEP and the Commission to enter and inspect the site to evaluate and ensure that the responsible party is in compliance with the requirements for each BMP established in the O&M Plan approved by the issuing authority.

h) All sediment or other contaminants removed from stormwater BMPs shall be disposed of in accordance with all applicable federal, state, and local laws and regulations.

i) Illicit discharges to the stormwater management system as defined in 310 CMR 10.04 are prohibited.

j) The stormwater management system approved in the Order of Conditions shall not be changed without the prior written approval of the issuing authority.

k) Areas designated as qualifying pervious areas for the purpose of the Low Impact Site Design Credit (as defined in the MassDEP Stormwater Handbook, Volume 3, Chapter 1, Low Impact Development Site Design Credits) shall not be altered without the prior written approval of the issuing authority.

l) Access for maintenance, repair, and/or replacement of BMPs shall not be withheld. Any fencing constructed around stormwater BMPs shall include access gates and shall be at least six inches above grade to allow for wildlife passage.

Special Conditions (if you need more space for additional conditions, please attach a text document):

Standard Conditions on Orders dated 6/24/14 & Off Road Vehicle (ORV) and Beach Management Plan for Nauset Beach South dated 6/18/14, that shall continue over time subject to the annual review & approval as set forth in Section F of this document.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

D. Findings Under Municipal Wetlands Bylaw or Ordinance

1. Is a municipal wetlands bylaw or ordinance applicable? ☒ Yes ☐ No

2. The Orleans Conservation Commission hereby finds (check one that applies):

   a. ☐ that the proposed work cannot be conditioned to meet the standards set forth in a municipal ordinance or bylaw, specifically:

   1. Municipal Ordinance or Bylaw — 2. Citation

   Therefore, work on this project may not go forward unless and until a revised Notice of Intent is submitted which provides measures which are adequate to meet these standards, and a final Order of Conditions is issued.

   b. ☒ that the following additional conditions are necessary to comply with a municipal ordinance or bylaw:
   Orleans Wetlands Regulations
   1. Municipal Ordinance or Bylaw — 2. Citation

3. The Commission orders that all work shall be performed in accordance with the following conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications, or other proposals submitted with the Notice of Intent, the conditions shall control.
   The special conditions relating to municipal ordinance or bylaw are as follows (if you need more space for additional conditions, attach a text document):
   Standard Conditions on Orders dated 6/24/14 & Off Road Vehicle (ORV) and Beach Management Plan for Nauset Beach South dated 6/18/14, that shall continue over time subject to the annual review & approval as set forth in Section F of this document. See attached Off Road Vehicle (ORV) and Beach Management Plan for Nauset Beach South dated 6/18/14.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 5 – Order of Conditions

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

E. Signatures

This Order is valid for three years, unless otherwise specified as a special condition pursuant to General Conditions #4, from the date of issuance.

6/25/14
1. Date of Issuance

Please indicate the number of members who will sign this form.
This Order must be signed by a majority of the Conservation Commission.

6
2. Number of Signers

The Order must be mailed by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate Department of Environmental Protection Regional Office, if not filing electronically, and the property owner, if different from applicant.

Signatures:

☐ by hand delivery on

Date

☒ by certified mail, return receipt requested, on

June 25, 2014
Date

F. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate MassDEP Regional Office to issue a Superseding Order of Conditions. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request of Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order, or providing written information to the Department prior to issuance of a Superseding Order.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act (M.G.L. c. 131, § 40), and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal ordinance or bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 5 – Order of Conditions
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:
SE 54-2246
MassDEP File #

eDEP Transaction #

Orleans
City/Town

G. Recording Information

This Order of Conditions must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on this page shall be submitted to the Conservation Commission listed below.

Orleans
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Orleans
Conservation Commission

Please be advised that the Order of Conditions for the Project at:

0 Smith Neck Road-Nauset Beach South — Project Location
SE 54-2246 — MassDEP File Number

Has been recorded at the Registry of Deeds of:

County _____ Book _____ Page _____

for: Property Owner _____

and has been noted in the chain of title of the affected property in:

Book _____ Page _____

In accordance with the Order of Conditions issued on:

Date _____

If recorded land, the instrument number identifying this transaction is:

Instrument Number _____

If registered land, the document number identifying this transaction is:

Document Number _____

Signature of Applicant _____

PLANS APPROVED by ORLEANS CONSERVATION COMMISSION

FILE # SE54-2246

BY DATE 6/24/14

ENGINEER

Off Road Vehicle (ORV) and Beach Management Plan for Nauset Beach South

FINDINGS

A. THE ACTIVITY

The Town of Orleans seeks a permit under the provisions of the State Wetland Protection Act MGL ch 131 Section 40 and the Town of Orleans Wetlands Protection Bylaw consisting of the operation of Off Road Vehicles (ORV's) on Nauset Beach South, 310 CMR 10.29. Although the permit requested is narrowly defined to ORV use, where ORV use/management issues overlap pedestrian and boating uses, it is herein recognized by the Conservation Commission and the Park Commissioners that these uses will be controlled in a manner consistent with permitting requirements for the ORV use, such as signage, fencing, plantings, temporary closures, etc.

The area of Nauset Beach South is shown on Assessors' Maps as the following: Map 38, Parcels 13 and 14; Map 45, Parcel 11 and 50; Map 52, Parcel 10; Map 59, Parcel 1; Maps 73, Parcel 1. The combined parcels contain 700+/- Acres. This area starts at the end of the existing public beach parking lot, and continues in a southerly direction to Chatham town line, where the barrier beach extends into Chatham to its terminus.

The Orleans Conservation Commission so finds that the area in which the proposed activity will take place is a Barrier Beach (310 CMR 10.29), a resource area which itself contains the following wetland resource areas: Land Subject to Coastal Storm Flowage (310 CMR 10.02 (1)(d)), Land Under the Ocean (310 CMR 10.25), Coastal Beaches (310 CMR 10.27), Coastal Dunes (310 CMR 10.28), Salt Marshes (310 CMR 10.32), and Rare Species Habitat (310 CMR 10.37).

For the above cited regulations, provided that where the proposed activity involves alteration of a resource area, the issuing authority shall presume the resource area to be significant to the interests noted in the regulations governing that specific area unless that presumption is overcome by a clear showing otherwise. The Commission therefore adopts the presumptions of significance for the resource areas cited in the previous paragraph.

B. PROJECT COMPLIANCE WITH MGL 131 ch. S.40 PERFORMANCE STANDARDS

Project compliance with MGL ch, 131 s.40 performance standards as cited in the attached regulations: Coastal Beaches, 310 CMR 10.27; Coastal Dunes, 310 CMR 10.28 ; Barrier Beaches, 310 CM R 10.19; and Rare Species Habitat, 310 CMR 10.37.

The proposed project calls for the following activities, designed to prevent any impact of ORV usage upon the resource areas of the Nauset Beach South cited above:

1. Placement of signage and wooden barrier posts, to be located as necessary to confine ORV traffic to defined access ways, maintained by hand, and spaced an average of 100 feet apart; signage to be attached to posts and/or fencing where possible; such posts to be placed in such a manner as not to disturb vegetative cover;
2. Placement of symbolic fencing and/or predator exclosures, as necessary, around potential nesting habitat, actual nesting, and foraging sites;
3. Placement of fencing barriers for access closures and/or openings, as deemed necessary for tern and plover habitat, nesting, and foraging protection. The Commission finds that the above activities, as controlled by the conditions herein, meet the performance standards set forth in 10.27 (3),(6), and (7);10.28 (3),(5), and (6); 10.29 (3) and (4). See "Rare Species" for compliance with 10:27.
4. With regard to the primary activity proposed, ORV usage itself, the Commission finds the following:
    a. Coastal Dunes: 310 CMR 10.28
        i. An evaluation of ORV access and egress trail location, field inspection of the ORV trails, show them to be sensitive to environmental concerns with respect to sinuosity and topography. The existing layout is not believed to promote wind tunneling, erosion, or wave overwash. Therefore, the Commission finds that based on the history and references of record, maintenance of the existing ORV trail routes is appropriate, and meets the performance standards set forth in 310 CMR 10.28 as follows:

        10.28 (3)(b) Use of existing access and egress corridors through the dunes will be restricted to corridors already without vegetation due to previous ORV use. No further de-vegetation and consequent destabilization should occur given appropriate posting as required in the Special Conditions.

        10.28 (3)(c) It is recognized that the ongoing use of an ORV corridor may cause limited modification to small dune areas. However, the Commission finds that due to the orientation, location, restriction in size, and proposed

maintenance activities, no significant increase from storm or flood damage is anticipated.

10.28 (3)(d) No interference with the landward movement of Coastal Dunes will occur as a result of the Special Conditions that provide for managing ORV traffic on the existing ORV trails of Coastal Dunes, with the possible exception of temporary alternate routes, provided in response to plover and tern protection needs, will be permitted.

10.28 (3)(f) See section on Rare Species

ii. Ocean Side North/South Corridor

Given the Special Conditions requiring that this corridor be a minimum of 15 feet seaward of the toe of the Coastal Dune, no change in vegetation should occur, and the performance standards set forth in 10.28 (3)(b) and (c) should be met. (10.28 (3) See section on Rare Species). Furthermore, the general location of the ocean side ORV corridor is typically westerly of the normally occurring wrack line.

b. Coastal Beaches: 310 CMR 10.27 (3)(7)

The continued use of the existing ORV corridors may cause temporary limited impact to the profile (form) of the beach area. The Commission recognizes that given the climatic and geologic characteristics of Nauset Beach South, these changes will not result in increasing the potential for wind and wave erosion.

The Commission recognizes that sediment disturbed by the passage of ORVs is not lost from the Beach resource area, and that significant sediment movement is not attributable to ORV use. Therefore, it finds ORV use as proposed will not result in a significant decrease to beach volume, and that such significant changes in beach volume are more likely to be influenced by climatic and/or meteorological factors (also see Rare Species 10.27 (7)).

SPECIAL CONDITIONS

A. PREAMBLE

The Orleans Conservation Commission, in setting forth the following Special Conditions, intends that these conditions be flexible enough to reflect the needs of the changing environment they are designed to protect. The Nauset Barrier Beach system has been

shown to be extremely dynamic over time. Significant changes in geomorphic form and wildlife habitat have occurred both prior to and during recreational uses of this resource area. The challenge for this Conservation Commission is to manage the competing uses of this Barrier Beach system under the provisions of both the Massachusetts Wetlands Protection Act, MGL 131 Section 40 and the Town of Orleans Wetland Protection Bylaw. Chapter 160 of the Code of the Town of Orleans.

These Conditions are designed to:

- Protect Coastal Resource areas and identify wetland interests for the Nauset Beach South Barrier Beach system as it currently exists;
- Allow for the ongoing recreational use of the Barrier Beach system;
- Allow for the continued historic uses and access of the twelve fowling & fishing camps located on the Town of Orleans Nauset Beach South;
- Allow for access to private property on Pochet Island;Require management of ORV use to be sensitive to any potential environmental impacts to the Nauset Beach South Barrier Beach system;
- Require greater restrictions on ORV users with respect to environmental education, scheduled and unscheduled temporary closures of access routes, etc;
- Require future management of the Barrier Beach system resource area to include hiring of specially qualified personnel to conduct detailed monitoring of and reporting on wildlife and wildlife habitat areas, which will serve as basis for modifying permitted management procedures/policies;
- Require interdisciplinary and agency cooperation which will result in sensitive, flexible, and responsive management of the Barrier Beach system.

B. RULES AND REGULATIONS

The Board of Selectmen, acting, and hereafter referred to, as the Park Commission, is responsible for implementing and enforcing the Rules and Regulations for ORV use on Nauset Beach South. These regulations shall be reviewed annually by the Conservation Commission and at a minimum require the following:

a) The maximum limit of ORV's permitted on the beach at any one time shall be determined by the Natural Resource Manager after taking into consideration the general beach and nesting conditions. Based on management since the 2007 breach, the limit of ORV's permitted on the beach at any one time shall be 375 ORV's. This number shall include those vehicles passing through Orleans to the Town of Chatham portion of the beach but shall not include the ORV's used to access the 12 camps and the private homes/cottages on Pochet Island, as they have their own dedicated parking areas.

b) Posting of temporary closures due to tide conditions or nesting considerations.

c) Driving on the Bay (west) side, along the shoreline, is prohibited, with the exception of driving upon the existing ORV trails and spurs off of the main trail or the private drives to camps.

d) Driving on the low beach may be permitted during the winter season between the first Friday in November to the Friday before Memorial Day, and at any additional specially designated times and places to avoid disturbance of nesting birds.

e) Parking is permitted seaward of a 37' corridor consisting of 15' from the toe of the dune, plus 12' for the vehicle track, plus a 10' margin between the vehicle track and parking area.

f) Closure of the beach between the hours of 11 PM and 6 AM except for active fishing and fowling and self contained vehicles. Driving anywhere outside of the designated ORV corridors is prohibited.

g) In posted areas near bird nesting, a speed limit of 5 mph shall be enforced.

h) No jet ski launching or landing.

i) No kite flying from March 15 to September 15.

j) Pets shall only be allowed as designated by the Nauset Beach Rules and Regulations for ORV's. Rules and Regulations on pets shall be developed to maximize protection of nesting shorebirds and shorebird habitat.

k) All ORV permittees must view an educational film /slide presentation prior to issuance and renewal of an ORV permit.

l) Minimum permittable equipment standards including but not limited to tire size and pressure as listed in regulations issued by Park Commissioners.

m) Any other conditions responsive to significant environmental changes and/or any conditions necessary to protect the Nauset Beach South Barrier Beach system, public health, safety, and welfare of the users and/or property owners.

n) Fines and penalties may be invoked, as necessary, by the Park Commissioners.

o) Walking between the bayside and the ocean side shall be prohibited in all but designated areas. No walking is to be allowed upon vegetated dunes, slopes or bare dune faces. No activity, i.e. sand sliding, dune jumping, or similar, is permitted at any time.

C. CLOSURE OF THE BAY (WEST) SIDE TO ORV TRAFFIC

Salt Marsh, tidal flats, and shellfish beds which adjoin the Pleasant Bay side of the beach are extremely sensitive to ORV use. Therefore, ORV use should not be permitted in these resource areas other than via existing ORV access corridors. Where the existing access corridors terminate, so shall the ORV use. Resources being accessed from the end of these ORV corridors for fishing, fowling, or passive recreation shall be via foot travel only. Furthermore, the Department of Natural Resources shall install signage, as necessary, at these locations indicating no ORV use.

Barrier Beaches migrate landward due to windblown sediment and overwash events of the Barrier Beach system, 310 CMR 10.29 (1). Therefore, the operation of ORVs on the landward side of the Barrier Beach, other than in existing ORV trails (corridors), could serve to inhibit dune formation through the creation of additional ruts and the crushing of ammophila rhizomes. This could potentially inhibit the landward migration of the inside beach, while the ocean side is continually dynamically eroded, and at times accreted, by wave action and long shore sediment transport. The net effect of these processes could be an ever narrower Barrier Beach, increasingly susceptible to overwash and inlet formation. This result would violate the performance standards for Coastal Dunes, which prohibit any modification of Dune form that would increase the potential for storm or flood damage, or any interference with the landward or lateral movement of the Dune, 310 CMR 10.28(3) and 10.29(3). Therefore, with the possible exception of temporary alternate routes discussed with the Commission, as described below, the westerly side of the Barrier Beach shall remain closed to ORVs, as previously described, except for emergency use by town officials and essential vehicles.

D. TEMPORARY ALTERNATIVE ROUTES:

The Town of Orleans has proposed that should the ORV corridor or ORV trail network be closed to protect shorebirds, alternate routes may be approved on a temporary basis. When considering a location of a temporary route, the route will be designed to provide greater protection for nesting shorebirds.

In answer to the concern that such temporary alternate routes could inhibit the landward migration of the Barrier Beach in violation of the performance standards and CMR 10.28 and 10.29, the Conservation Commission recognizes that there is evidence relating to the seasonal climatic/meteorologic energy levels and historical storm or wind patterns documented during the summer months and evidence relating to the textural components (coarse sand and gravel) of the back shore area which would indicate it was unlikely that the limited seasonal use of proposed alternative routes, would result in

increasing potential for storm and flood damage in violation of 310 CMR 10.28 (3)(c) or interfere with the landward movement of the Dunes of the Barrier Beach in violation of 10.28 (3)(d) and 10.29 (3).

When the need to protect specific habitat, nesting, and/or foraging sites by closure of the access routes is necessary, the Town may propose temporary access routes. When specific temporary routes are proposed, they will be done so after consultation with the Conservation Agent, Natural Resources Manager, and staff from the NHESP. If the Commission finds that such routes meet the performance standards cited in the relevant regulations, the Commission may approve temporary alternate ORV access route or routes.

E. RARE SPECIES

In addition to Piping Plovers and Least Terns that receive special protection measures under the Federal and or State Endangered Species Acts, and have specific management requirements detailed herein, the Commission recognizes that Nauset Beach South is habitat for other migratory waterbirds and shorebirds. Use of this habitat may be for nesting, resting, or feeding, either in the nesting season or during bird migration. The performance standards and management guidelines documented here for use in protecting Rare Species may be applied, as needed, to benefit other nesting shorebirds at the recommendation of the Natural Resource Manager.

1. Project Compliance with Performance Standards

The Conservation Commission finds that a potential to alter the resource area within part of the mapped habitat for State-listed rare species does exist. However, the Commission finds that the project as proposed and conditioned herein, inclusive of the hiring of a qualified habitat specialist and incorporation of temporary beach closure measures, should provide the protection necessary so that no effect will result within these specified habitat sites.

The presumption that the maintenance activities requested in order to continue ORV use of Nauset Beach South will impact specified habitat sites, in the opinion of this Conservation Commission, has been overcome and rebutted by the proposed species management plan. This management plan will require, among other measures, observation and tracking of the Plover and Tern species to determine exact habitat sites, including foraging routes; it will require temporary closures of the identified sites and routes to ORV and pedestrian use; and it will provide placement of fencing and predator barriers to afford habitat protection. The Commission, as the issuing authority, therefore finds that the project as proposed, and herein conditioned, should not result in an impact to

specified habitat sites identified for Plover and Tern populations on Nauset Beach South. If however, these conditions prove inadequate to protect the wetland interests defined in MGL 131, Section 40, or to ensure that there is no impact on rare species habitat as required by CMR 10.37, the Commission reserves the right to impose the necessary additional conditions and restrictions upon the use of ORVs on the Nauset Beach South.

2. Plover Monitor

The Park Commission, in cooperation with the Conservation Commission, shall be responsible for the hiring of a suitably qualified person to serve as a Piping Plover and Tern Habitat Analysis Specialist, hereafter referred to as "Monitor," responsible to the Director of Natural Resources. The Monitor will be employed annually from April 1 through August 31 to provide technical information relative to the habitat and characteristics of the Piping Plover and Tern populations on Nauset Beach, and will be responsible for alerting the Director of Natural Resources and the Conservation Commission, or their designated agents, as to the need to temporarily close access to ORV traffic during plover nesting and fledgling activity periods. The Monitor will also be responsible for providing the Parks Commission and the Conservation Commission regular updates on plover and tern activity, as well as a season-end report.

3. Limitation of access to prime nesting habitat areas

a. Vehicular Access

Parking in or vehicular access through identified Plover and Least Tern habitat as determined annually by the Plover Monitor and Natural Resources Manager, shall be prohibited. This restriction will not necessarily prohibit vehicular access past (i.e. northward/southward) such areas if consistent with specific management guidelines.

b. Boater and Pedestrian Access

It has been the custom for visitors to the Nauset Beach South to arrive by boat. Generally, this takes place in the area of the barrier beach terminus currently located outside the Town of Orleans. Disturbance of the birds by these pedestrians may be minimized by installing posts, signs, and fencing to indicate closed areas. Pedestrians will be encouraged to use the designated walkways thereby helping to protect dune form, vegetation, and birds.

Pedestrians shall be excluded from existing wash over areas in a manner which does not interfere with, or cause any effect to, the ability of such wash over areas to serve as nesting habitat for Shorebirds.

4. Piping Plovers

The beach management strategy for the Plovers includes devoting the highest priority to encouragement of the earliest arriving birds to nest as quickly and successfully as possible: i.e. minimizing human disturbance. The result, in addition to a high reproductive success rates, may be to minimize the period during which the beach is closed to ORV use.

Spring Arrival (March 16 - April 30)

Piping Plovers return from their southern winter quarters to establish nesting territories along Cape Cod beaches in early spring.

Management

Prior to the arrival of Piping Plovers, potential nesting areas shall be visited by a person familiar with their habitat requirements to evaluate the natural changes that have occurred through the winter, and to identify areas of suitable nesting habitat. The suitable nesting habitat shall be posted, with endangered species nesting area signs, and delineated with symbolic fencing, prior to the arrival of plovers (no later than April 1) to reduce the potential disturbance of this potential habitat by beachgoers for Plovers establishing their nesting territories. Vehicular access into or through posted areas shall be prohibited, though vehicles may pass by such areas at this time.

Laving and Incubation of Eggs (April 20 – August10)

Normally the nest, a shallow scrape in the sand, is placed at the toe of the dune, in a wash-over, or along the spring tide wrack line. The first of the sand-colored eggs is laid in late April and may contain a full clutch of 4 eggs a week after the first egg is laid. Then both adults incubate the eggs, alternating every few hours, for the next 28 days.

Management

When a monitor determines a nest is to be enclosed, a welded wire fence shall be placed around the nest, using a design recommended by the Massachusetts Division of Fisheries and Wildlife. Endangered species signs shall be placed

outside the symbolically fenced area to add additional protection. Vehicular access within the symbolically fenced area shall be prohibited.

Before the eggs hatch, it is necessary to close the beach and to level the ORV ruts to prevent an adverse effect on the young hatchlings. This must be accomplished within a 28 day period after incubation commences. If ruts are to be leveled by natural process, one week should be allowed, and the beach should be closed 21 days after the last egg is laid or the start of incubation. If ruts are to be leveled by hand, the beach could remain open a few additional days. When plover nests are found after the last egg has been laid, making it impossible to predict hatch date, restrictions on vehicles should begin on a date determined by 1 of 3 scenarios:

1) If a plover nest found with a complete clutch is monitored twice per day, at dawn and dusk (before 0600 hrs and after 1900 hrs), vehicle use may continue until hatching begins. Nests should be monitored at dawn and dusk to minimize the time that hatching may go undetected if it occurs after dark. Whenever possible, nests should be monitored from a distance with spotting scope or binoculars to minimize disturbance to incubating plovers.

2) If a plover nest is found with a complete clutch before May 22 (the earliest recorded hatch date for piping plovers in Massachusetts), and is not monitored twice per day, at dawn and dusk, then restrictions on vehicles should begin May 22.

3) If a plover nest is found with a complete clutch on or after May 22, and is not monitored twice per day, at dawn and dusk, then restrictions on vehicles should begin immediately.

Hatching Eggs and Movement of Young (May 20 - August 20)

Piping Plovers have precocial young, capable of walking and feeding themselves within 24 hours after hatching. The most vulnerable stage in their breeding cycle is the period when hatchlings are less than 10 days old, when they accompany the adults in their feeding forages. Normally, all eggs in a clutch hatch within a 24 hour period between the hatching of the first and last eggs. The hatchlings then accompany the adults to feed on small invertebrates along the wrack line, toe of the dunes, and inter-dunal blowouts. During their first week, the young usually do not wander more than 100 yards from their original nest site. They do not use the nest after the first couple of days from their hatch

date, but depend on their cryptic coloration to blend in with their surroundings. If an adult Plover sounds an alarm note, the young either run for cover beneath one of the adults, or seek cover in vegetation, among stones, along the wrack line, or in a vehicle rut. Plover chicks over a week old may accompany the adults for greater distances, up to 1/4 mile, and spend increasingly more of their time foraging along the wrack line and out into the intertidal zone.

Management

Plover chicks on Nauset Beach South may be seen foraging with adults in areas anywhere between the Bay and the ocean intertidal zones in areas where there is little vegetation to obstruct their movements. Because they may go from the ocean side to the bay side within minutes, using existing blowouts and over wash areas, they are vulnerable to vehicular travel through these areas at all times. Additionally, the ruts left by vehicles are known to trap young chicks that subsequently may be run over by another vehicle using the same ruts, or they remain trapped in the rut, may die from exhaustion, or are found in the rut by a predator.

Therefore, when unfledged plover chicks are present, vehicles should be prohibited from all dune, beach, and intertidal habitat within 100 yards of either side of a line drawn through the nest site and perpendicular to the long axis of the beach. The resulting 200 yard-wide area of protected habitat for plover chicks should extend from the ocean-side low water line to the bay-side low water line or to the farthest extent of dune habitat if no bay-side intertidal habitat exists. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally-occurring obstacles. If unfledged plover chicks move outside the original 200 yard-wide area of protected habitat, then the boundaries of the protected area should be adjusted to provide at least a 100 yard buffer between chicks and vehicles.

Fledging of the Young (June 28 - August 20)

Young plovers are capable of flying short distances within 30 days of their hatch date. Typically, these novice fliers remain with the adults, foraging in the same general area anywhere from a few days, to the rest of the summer. Adults may lead fledged young to more remote portions of neighboring beaches if they are disturbed by recreation or predation.

Management

Once the Monitor has determined that the young have fledged or left the beach, the area may be re-opened to vehicular traffic.

5. Least Terns

Nauset Beach South has been home to Least Tern nesting colonies.

Spring Arrival (May 7 - July 10)

Least Terns return from their winter quarters in South America to establish nesting colonies ranging in size from a dozen pairs to over 1000 pairs. Least Terns have used Nauset Beach South, and data over past years shows that colony size has varied annually.

Management

Prior to the arrival of Least Terns, potential nesting areas shall be visited by a person familiar with their habitat requirements to evaluate the natural changes that have occurred through the winter, and to identify areas of suitable nesting habitat. The suitable nesting habitat shall be posted, with endangered species nesting area signs, and delineated with symbolic fencing, prior to the arrival of the Terns to reduce the potential disturbance of this potential habitat by beachgoers. Vehicular access into or through posted areas shall be prohibited, though vehicles may pass by such areas at this time. On Nauset Beach South, it is likely that the protected area will have to be adjusted to encompass additional portions of the colony.

Laying and Incubation of Eggs (May 20 - August 5)

Most clutches of 2-3 eggs are laid in early June. The nests are simple scrapes in the sand or on bare stone between the wrack line and the toe of the dune, or in an open blow-out.

The adults incubate the eggs for 21 days after the last egg is laid. It is not uncommon for Least Terns to lose nests to storms or high tides. Least Terns will attempt to discourage mammalian, avian, or human intruders who come near their nests by attacking in unison, calling loudly, and dropping their "white wash."

Management

Incubation is the most vulnerable stage for breeding Least Terns. The presence of people, dogs, kites, and predators too close to a colony causes the entire flock of nesters to leave their nests during the disturbance. If the disturbance lasts more than 15 minutes, the eggs may be destroyed by exposure to the sun, rain, or wind-blown sand. Therefore, it is critical that the Monitor for the colony adjust the perimeter of the fence and signs to include a buffer zone wide enough to prevent disturbance to incubating adults.

Hatching of Eggs and Movement of Young (June 9- August 25)

The 2 to 3 semi-precocial young are active within 24 hours of hatching. Least Tern young are fed by the adults. Although the young are capable of running within a week of hatching, they typically do not wander more than 15 feet from their nest depression during the first 10 days. However, at ages between 10 and 28 days, they will run long distances to flee an intruder, find better locations for hiding, or await the return of adults with food. These older juveniles, over 14 days old, are often difficult to see. Their plumage is camouflaged, and they hide in vegetation and cover on the wrack line.

Management

When unfledged least tern chicks are present, vehicles should be prohibited from all dune, beach and intertidal habitat within 100 yards of either side of lines drawn through the outermost nests in the colony and perpendicular to the long axis of the beach. The resulting area of protected habitat for least tern chicks should extend from the ocean-side low water line to the bay-side low water line or the farthest extent of dune habitat if no bay-side intertidal zone exists. If unfledged chicks move outside the original protected area, then the boundaries of the protected area should be adjusted to provide at least a 100-yard wide buffer between unfledged chicks and vehicles. However, vehicles may pass through any portions of the protected area considered inaccessible to least tern chicks because of distance, steep topography, dense vegetation, or other naturally-occurring obstacles. Because least tern chicks disperse from nests shorter distances and at older ages than plover chicks, under some circumstances it may be possible to allow passage of vehicles through portions of least tern chick habitat if, in the opinion of the Division of Fisheries and Wildlife, this can occur without substantially increasing threats to least tern chicks or their habitats.

Fledging of Young (July 9 - September 10)

Least Terns young are capable of weak flight about 28 days after hatching. Most young in a colony fledge in mid-to late July in Massachusetts, unless the colony has been abandoned because of by tides, storms, or predators, and the survivors re-nest. Once the young are capable fliers, they are led by the adults further from the busy colony to quieter portions of beaches and sandbars. The young will even fly out to the fishing grounds where they rest on the water and wait to be fed.

Management

The Monitor of the colony will determine when the Terns have left the nesting area. As long as Least Terns are landing in the fenced area, it is likely that they are still nesting or rearing young. Most Least Terns will have left Massachusetts by late August or early September.

6. Diamond Back Terrapins

Diamond Back Terrapins have been observed nesting during both day and night on certain portions of the Nauset Barrier Beach system. Diamond Back Terrapin nesting sites, or habitat, needs to be protected and managed. Females venture onto land to nest typically once from mid-June to mid-July.

Efforts shall be made by the Monitor to identify and take protective measures to ensure successful nesting and nest protection. Efforts shall include alerting the appropriate state agency when Terrapin tracks are located on the beach. When tracks lead to nests, nests should be reported to the appropriate state agency so that a licensed specialist can provide onsite monitoring, nest relocation and or management for nesting success.

F. MANAGEMENT AND ANNUAL REVIEW

Management of the resource areas in terms of ongoing use, use restrictions , etc. will be the primary responsibility of the Park Commission and Natural Resources Department, with provisions for annual review of management guidelines and personnel hirings to be made cooperatively with Conservation Commission input prior to April 1st.

Changes in management, in relation to Rare Species, such as waivers of ORV closure requirements, by the State and Federal Agencies, may be allowed, upon notice to the Conservation Commission (e.g. Conservation & Management Permit).

As part of the overall ORV management plan, the Park Commission will instruct the Natural Resources Department personnel to maintain the approved ORV corridors and to install posts, fencing, and signage as subsequently approved by the Conservation

Commission. Additionally, the Conservation Commission will instruct the Department of Natural Resources personnel to continue ongoing re-vegetation and nourishment efforts, if needed, as described and approved by the Conservation Commission. These actions and the overall ORV management plan will be reviewed and approved annually by the Conservation Commission, based upon the reports and recommendations resulting from the implementation of this ORV Management Plan.

G. ENFORCEMENT

The Park Commission shall require additional enforcement patrol of the Nauset Beach South ORV corridor to include expanded patrol coverage during off-peak usage, specifically weekday and pre-season periods. Should expanded patrol prove inadequate to protect the natural and wild life resources which are the subject of this ORV Management Plan, the Conservation Commission may require additional enforcement.

Overall, the enforcement and management responsibility of Nauset Beach South as described by this ORV Management Plan, is designated by state and local statutory requirements to Town of Orleans officials. In this instance, primary enforcement responsibility will be shared by the Conservation Commission, Park Commission, and their respective agents.

BEACH RELATED REVENUE
FISCAL YEARS 2003 - 2013
IN THOUSANDS

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	AVG
NAUSET	483	446	412	573	560	603	495	538	574	648	626	542
SKAKET	184	85	91	119	129	140	132	139	141	144	144	132
ORV	336	468	429	421	270	214	257	231	225	279	226	305
OTHER							117	112	106	120	136	118

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2013

Observer(s): Paul Wightman, Pat Johnson, Nathan Lake

Site Name: Nauset Spit (Heights) includes all of the area north of the public parking lot and public beach and designated as Areas 1, 2, 3, 4, 5, 6, 7, 8, 9, to the tip of Nauset (Spit). Also includes Skaket Public Beach (separate public beach off site) with 1 single nest. Also includes New Island, which is under National Park Service jurisdiction, was monitored by Town until 6/24/13, thereafter by National Park Service monitor. Also includes nests on public beach to Aspinet Road.
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.*** **GIS NEST SITE MAPS ATTACHED on 8 ½ X 11 sheets.**

Agency: Dawson L. Farber IV
Natural Resources Manager
Harbormaster/Shellfish Constable
Town of Orleans, MA
19 School Rd.
Orleans, MA 02653
P: (508)240-3755
F: (508)240-3388

Telephone: 508-240-3755 **Email:** Dawson Farber IV, Natural Resources Manager. dfarber@town.orleans.ma.us
Shorebird Monitor: Paul Wightman **Email** lawwight2003@yahoo.com

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	16	16
Unpaired Adults	1	1

Census remarks (includes notes on pairs that did not nest [dates present, behavior]): Monitoring was undertaken primarily at dawn and dusk during census period. Monitoring was increased to dawn and dusk during mating, nesting, egg laying and incubation periods. Monitoring at dawn and dusk periods was also applied with unfledged chicks, attending adults and their primary habitat. Nest A1 & A2 located on public beach -- NO ORV traffic and was included with Nauset Heights index count for short and long form.
Nest Names Designations: "NS" stands for Nauset Heights and includes all area including the public beach and north of the main parking area, including all nests designated as "**A**" which stands for Aspinet Road at the public beach area where no ORV traffic is allowed. "**No evidence of re-nest.** List pairs not present during Index Count period:
Pair **P11** located at the (Pochet Washout) was a re-nest late season, counted during Index count period. Pair **SB2** was present during census count, but lost nest due to predation by Gull just prior to enclosure and is believed to have re-nested just south of the town line between Chatham and Orleans. The **NS2** nest may be re-nest from New Island which was predated with 1 egg before the North Beach but no solid evidence. Although New Island is under NPS jurisdiction it was counted during census period. All other pairs that were counted during index remained to establish nests due to use of enclosures and no late spring or early summer storms resulting in stable conditions for nesting.

List pairs not present during Index Count period: All present during count (excepting New Island). This area NPS jurisdiction.

***Send to*:** Scott Melvin, Mass Wildlife, One Rabbit Hill Rd., Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.)

April 2013 [c] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

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

Report specifications of predator enclosures used:

Enclosure Design	A	B	C
Shape	circular	Not utilized	Not utilized
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 -6 inc		
Cover material	bird netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:

Monitoring of nests occurred primarily at dawn during index count with periodic dusk counting and observations at dusk. Once nests were established and eggs were laid, monitoring occurred each day at dawn and dusk, including all periods when unfledged chicks hatched. Potential nesting habitat was fenced using symbolic fencing, erected prior to nesting period and adjusted based on nest sites. Standard Type "A" enclosures were utilized on the majority of nests after 3 eggs had been laid by adults. Enclosures placed where adult attachment to the nest site was observed and rated as a "high confidence" that nest would not be abandoned if enclosed. Although some nest abandonment did take place, it was primarily observed as being due to mammal harassment of adults. Monitoring was always conducted from a distance with field glasses and enclosures were inspected daily. No predator control methods have been implemented on habitat for many years, therefore predators, primarily American Black Crow, Red Fox and Coyotes were the main predators of eggs and chicks. Nests were enclosed immediately if found with 4 eggs. When enclosures were used, incubation resumed and was observed by adults within 5-10 minutes of enclosing nest with type "A" predator control device. The use of enclosures is believed to have created protection from predation of eggs as well as resulting in a stable period for incubation to occur by adults. While there were several nests abandoned due to predator harassment of adults, without the use of enclosures, egg predation and/or adult predation or abandonment of nests by adults, may have been higher due to the exceedingly high number of predators observed. Chick predation was high due to the number of predators frequenting the nest sites daily and nightly and hunting in nest area habitats and foraging habitats.

Vehicle Restrictions for Unfledged Chicks and nest sites at Nauset Heights: The Director closed ORV traffic from Area 3to Area 9 at the (Spit) on May 26, 2013 due to a 4 egg nest found just north of Area 3. A barricade was immediately erected well in excess of the 200 yard guideline to protect NS4 a 4 egg nest found 100 yards south of Pole number 4. This prevented ORV traffic north of the barricade. All of Nauset Heights was closed to ORV traffic on June 21, 2013 and remained closed due to the proximity of one nest "A2" based on projected hatch date. The ORV trail and traffic remained closed until the chicks fledged on July 23, 2013. Nauset Heights was gradually opened moving north to the Spit as chicks fledged. It was not fully opened to ORV traffic until August. 15, 2013.
No spring storms occurred so there was minimal loss due to storm surge

[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:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

Page 3 of 6

Pair No.	Nest No.	No. eggs laid	No. eggs hatched	No. chicks fledged	Date clutch found	No. eggs when clutch found	Date clutch completed (if known)	Date nest hatched (H) or failed	Enclosure Report		
									Y/N	Design (A)	Date installed
1	A-1 Public Beach	4	3	2-3	05/18/13	4	Unknown	6/15/13 H	Y	A	5/18/13
2	A-2 Public Beach	4	4	3	5/30/13	4	Unknown	6/23/13 H	Y	A	5/30/13
3	NS 1 Area 8	4	0	0	5/18/13	1	5/20/13	06/07/13 Abandoned	Y	A	5/18/13
4	NS 2 Area 8	2	0	0	5/17/13	1	06/20	5/19/13 Predated	N	N/A	N/A
5	NS 3 Area 7	2	0	0	05/25/13	3	5/27/13	6/1/13 Abandoned	Y	A	5/25/13
6	NS 4 Area 3	4	4	0	05/26/13	4	05/26 based on hatch date	6/23/13 H	Y	A	5/26/13
7	NS 5 Area 8	1	0	0	5/28/13	1	N/A	N/A	N	N/A	N/A
8	NS 6 Area 6	4	2	2	5/30/13	2	6/3/13	6/30/13	Y	A	6/1/13
9	NS 7 Area 8	1	0	0	6/1/13	1	N/A	6/2/13 Failed	N	N/A	N/A
10	NS 8 Area 4	4	0	0	6/3/13	1	6/8/13	06/12	N	A	6/6/13

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

[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:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

Nest No.	Cause of egg mortality/supporting evidence [d]	Nest No.	Cause of chick mortality/supporting evidence [d]
NS 1	Unknown. Nest Abandoned after predator harassment. Fox tracks positively identified at base of enclosure circling enclosure. Monitored 6/6/13 still incubating. On morning of 6/7/13 monitoring revealed nest abandoned. Red fox tracks and prints outside enclosure and at base. Digging in several spots at base of enclosure. Mammal harassment probable cause of abandonment.	NS 1	No Chicks
NS 2	American Black Crow. Crow predation of nest two egg nest found on 5/15/ 2 eggs, predated by American Black Crow on 5/19/13. Fresh Crow tracks at nest site and on top of nest. NS2 re-nested new nest named NS3.	NS 2	No Chicks
NS 3	Nest found on 5/25/13 with 3 eggs. Compete on 5/27/13. Nest enclosed on 5/25/13. Nest abandoned on 6/1/13 reason unknown. Red fox tracks in vicinity of enclosure. No evidence of adult predation found.	NS 3	No Chicks
NS 4	Four eggs hatched on 6/2313. Chicks disappeared on 6/25/13. Reason not known but f ox tracks observed at enclosure base and foraging habitat. American Black Crows also present at nest site daily.	NS 4	Red fox tracks observed at nest within 3'-5' site nightly.
NS 5	1 egg nest found on 5/28/13 predated on 6/1/13 by American Black Crow tracks positively identified at nest site on to of nest.	NS 5	American Black Crow tracks on top of and running over nest site.
NS 6	1 egg did not hatch.		
NS 7	1 egg nest found on 6/1/13 predated on 6/2/1 predator not indented.	NS 6	1 Chick unknown
NS 8	Nest found 6/3/13 abandoned 7/14/13 Coyote and Red Fox tracks at base of enclosure and digging Nest were abandoned and adults not observed again.	NS 7	No Chicks
		NS 8	Coyote tracks at nest site.
			TRACKS OBSEVED WITHIN 2-5' of nests and covered the ground over the entire foraging habitat daily. Can not speculate as to chick mortality.

[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.*

[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 $\geq$ 2 weeks and exhibited courtship or territorial behavior during that period, if not actual nesting.*

Site Name: Nauset Spit (Heights) **Year:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

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	Enclosure Report			
Nest No.								**Y/N**	**Design (A, B…)**	**Date installed**
NS9 Area 8	2	0	0	06/14/13	1	N/A	6/6/13	N	N/A	N/A
NS10 Area 7	4	3	0	6/16/13	2	6/20/13	7/13/13 Hatched	Y	A	6/18/13
NS11 Area 9	4	3	0	6/20/13	1	N/A	06/19/13	N	N/A	N/A
NS12 Area 8	1	0	0	6/21/13	1	N/A	6/30/13 Predated	N	N/A	N/A
SK1 Skaket Beach		0	0	06/10	1	N/A	06/19 High tide	Y	N/A	5/16/13
NI- 1 New Island NPS Jurisdiction	4	0	0	6/6/13	3	6/10/13	Between 6/25/13/ and 7/7/13 Note: Not monitored daily between these dates Re: NPS jurisdiction.	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.*

[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.*

[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:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

Page 6 of 6

Nest No.	Cause of egg mortality/supporting evidence [d]	Nest No.	Cause of chick mortality/supporting evidence [d]
NS 9 NS12 SK 1 NI-1	2 eggs lost reason unknown. 4 eggs lost reason unknown. 4 eggs lost to high tide. Reason for egg loss unknown. NOT COUNTED IN CENSUS NPS Jurisdiction.	NS10 NS11	3 chicks lost within 19 days, Red Fox tracks at nest site nightly. 3 chicks lost within 16 days. Red Fox tracks at nest site nightly as follows: **RED FOX TRACKS OBSERVED WITHIN 2-3' of nests and covered the entire foraging habitat nightly and observed by Monitors daily. CROW TRACKS walked over the nest where eggs missing and when chicks missing the crow tracks were observed within several feet of the nest and over much of the foraging habitat and intermingled with plover tracks of chicks and adults. Can not speculate as to cause of egg or chick mortality.**

[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.*

***Send to*:** Scott Melvin, Mass Wildlife, One Rabbit Hill Rd., Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.)
Site Name: Nauset Spit (Heights) **Year:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year 2013
Site Name: North Beach: Includes all of the area South of the main public parking lot and public beach and designated as areas between Cut 1, 2, 3, 4, 5, to Chatham Town Line. Cut 6 is Chatham.

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.*** **GIS NEST SITE MAPS ATTACHED on 8 ½ X 11 sheets.**

Observer(s): Paul Wightman, Pat Johnson, Nathan Lake
Agency: Dawson L. Farber IV,
Natural Resources Manager
Harbormaster/Shellfish Constable, Town of Orleans, MA
19 School Rd, Orleans, MA 02653
P: (508)240-3755 F: (508)240-3388
Telephone: (508) 240-3775 Email: dfarber@town.orleans.mau.us.

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	16	16
Unpaired Adults	1	1

Census remarks (include notes on pairs that did not nest [dates present, behavior]): 17 pairs were identified and observed during the census period. All pairs present and listed during the index count period nested due to good weather conditions and no spring storms. 1 pair SB2 lost their 3 egg nest due to predation by a Black Back Gull. The pair subsequently re-nested on the Chatham side of the town line approximately 50' north of the area designated as Cut 6. **Nest Name Designations: "P"** stands for **Pochet Washout Area.** This area includes a large storm wash over area running from the frontal beach to the west side of breach and wash over area and includes the mud flats west of the frontal beach adjacent to a tributary of Broad Creek and Pochet Island. The area also includes the *new wash over* area recently created in 2013 by a winter storms with a large breach of the dune system and wash over on the west side of the ORV trail adjacent to Cut 1. "**SB**" stands for **South Beach** and includes all of the area north of Chatham Town line. All ORV trails and Cuts were closed in accordance with the regulations.

List pairs not present during Index Count period: All pairs were present during the census period. The **SB2** pair established a nest 100'+ from the Chatham town line. The pair lost their nest due to predation by a Black Back Gull only a few hours before monitors were about to place a type "A" enclosure over the 3 egg nest. 1 adult present at SB2 disappeared when SB2 nested.

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 -30
June 16-30:	15- 30
July 1-15:	15 -30
July 16-31:	16 -30

Report specifications of predator enclosures used:

Enclosure 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 to 8 in		
Cover material	bird netting		
Cover spacing/Mesh size	¾ in		

Management actions taken or needed/Remarks:

Sites were monitored on daily basis throughout nesting season. Potential nesting habitat was fenced off with symbolic fencing well before the nesting periods and arrival of Piping Plovers. The new large wash over area created by the severe 2012/2013 winter storms located adjacent to Cut 1, on the west side of the ORV trail was fenced off with symbolic fencing shortly after the breach and wash over was created, and prior to the pair establishing a nest and using the wash over area as foraging habitat. Vehicles were prohibited from beach access when active piping plover broods were present. Dogs prohibited on beach from May 15th through August 24, 2013 at which point the last of the unfledged chicks at nest P9 chicks fledged. Monitoring of nests took place at both dawn and dusk throughout nesting season once chicks hatched and during the census period. As monitoring progressed, symbolic fencing was adjusted with increased buffer areas where it was determined that additional protection was necessary to protect a nest site(s). The Standard Type "A" enclosures were utilized on the majority of nest after 3 eggs had been laid by adults, and the Monitors were confident that the adults had established a strong attachment to their nest sites with all Monitors required to be in agreement that a high rate of attachment to the nest had occurred, thus decreasing adult abandonment of the nest. Monitoring was always conducted from a distance, in the early morning or late afternoon and not during excessively hot days. Three people were always used when possible to enclose a nest within 20 minutes time. Field glasses were used to monitor nests and enclosures from a distance of 100 feet, to insure the exclosures were intact, and the adults could move freely in and out on all sides and that they had accepted the enclosure with minimum stress being observed. Due to the fact that no predator control methods have been implemented on entire habitat for many years enclosures provided protection from the high number of predators observed, Crows, Red Fox, and Coyotes. Nests were enclosed if found with 4 eggs immediately. Adults resumed incubation within 5-10 minutes of completion of enclosures. The use of exclosures is believed to have created protection from predation of eggs as well as creating a stable period and environment for incubation to occur by adults. While there were some nests abandoned due to predator harassment of adults, there was justification for the use of enclosures with high historical rates of predation of eggs. Large flocks of crows were observed daily monitoring. Red Fox tracks observed nightly within several feet of nest sites. Tracks of Red Fox and Coyotes were Observed covering chick foraging habitat areas. Without speculating, the high rate of chick disappearance could not be documented with solid evidence. However, these were the primary predators in 2013.

Vehicle Restrictions for Unfledged Chicks at nest sites at North Beach. North Beach (all of the habitat south of the parking lot to Chatham Town Line was closed to ORV traffic on June 3, 2013 and did not re-open until August 23, 2013 when the 2 chicks hatched at the P9 nest were reported as fledged by Monitors. All Federal & State Guidelines were strictly adhered to. Dogs were prohibited on main beach from April 15th through September 15th. The main predators observed and were, American Black Crows by day, Red Fox, Coyotes, by night. During dawn monitoring each day, weather permitting, Red Fox and Coyote tracks were observed at nest sites and in foraging habitats. No spring storms occurred so there was minimal loss of nests due to storm surge. The P 9 nest was located in the primary dune at the frontal beach at Cut 1.This was a 4 egg nest which hatched out 2 chicks. Two eggs did not hatch for unknown reasons. The entire ORV trail from the access gate to the Chatham town line was closed once the chicks hatched and opened when they fledged. Their habitat was primarily the "new habitat from 2102/2013 storm wash over on the west side of the ORV trail in the new wash over area feeding primarily in the mud flats at low tide adjacent to the access road to Pochet Island.

[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 $\geq$ 2 weeks and exhibited courtship or territorial behavior during that period, if not actual nesting.*

Site Name: North Beach Orleans **Year:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

Page 3 of 4

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	Enclosure Report		
									Y/N	Design (A, B…)	Date installed
11	P1	4	3	1	5/5/13	2	5/10/13	6/5/13	Y	A	5/8/13
12	P2	4	2	2	5/5/13	1	5/12/13	6/8/13	Y	A	5/10/13
13	P3	4	2	0	5/7/13	1	5/14/13	6/15/13	Y	A	5/13/13
14	P4	4	4	4	5/19/13	1	5/15/13	6/12/13	Y	A	5/13/13
15	P5	4	0	0	5/16/13	1	5/17/13	5/30/13	Y	A	5/16/13
16	P6	2	0	0	6/4/13	2	N/A	6/15/13	Y	A	6/7/13
17	P7	4	0	0	6/10/13	1	7/15/13	7/5/13	Y	A	6/15/13
18	P8	2	0	0	6/13/13	2	N/A	6/14/13	N	A	N/A
19	P9	4	2	2	6/17/13	2	6/24/13	7/21/13	Y	A	6/24/13
20	P10	1	0	0	6/22/13	1	N/A	6/24/13	N	N/A	N/A
21	P11	3 1egg lost to tide re-nest	2	0	6/24/13	1	2	7/22/13	N	N/A	N/A
22	SB1	4	4	2	5/6/13	1	5/12/13	6/8/13	Y	A	5/10/13

Site Name: North Beach **Year:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

Page 4 of 4

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
23	SB2	3	0	0	5/11/13	1	Predated	5/14/13	N	N/A	N/A
24	SB3	4	3	0	5/17/13	4	Unknown	6/8/13	Y	A	5/17/13
25	SB4	4	0	0	5/13/13	1	6/6/13	6/9/13	Y	A	6/4/13
26	SB5	1	0	0	6/16/13	1	Unknown	6/26/13	Y	A	6/19/13
27	SB6	4	4	1	6/17/13	4	Unknown	7/11/13	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]
P1	Unknown 2eggs did not hatch.	P1	1 chick missing 3 days after hatch.
P2	Unknown 2 eggs did not hatch.	P3	2 chicks missing 2 days after hatch reason unknown.
P3	Unknown 2 eggs did not hatch.	P11	2 chicks missing 9 days after hatch reason unknown.
P5	Nest abandoned predation of 1 adult by unknown predator. Remains collected stored in freezer. Predation of adult nest abandoned. 2 eggs.	SB1	4 eggs hatched 2 chicks missing 8 days after hatch reason unknown.
P6	Abandoned. Reason unknown. No evidence re-nests.	SB6	3 chicks missing after 13 days after hatch reason unknown.
P8	Lost to high tide.		**Note: Only evidence of possible chick loss is Coyote tracks and Red Fox tracks at nest sites within 3' of nest and covering entire foraging habitat**
P9	2 eggs did not hatch reason unknown.		
P10	Nest lost to high tide 1 egg.		
P11	Re-nest of P10 no egg loss 2 eggs laid		
SB2	1 egg did not hatch reason unknown.		
SB3	4 eggs lost to high tide.		
SB4	3 eggs abandoned an in nest. Red Fox Tracks nearby within 3 feet.		
SB5	Abandoned 3 eggs remained in enclosure. Red Fox tracks digging at base of enclosure.		

[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.*

Send to: Scott Melvin, Mass Wildlife, One Rabbit Hill Rd., Westborough, MA 01581 scott.melvin@state.ma.us 508-389-6345 (off.)

Site Name: Nauset Spit (Heights) **Year:** 2013 **Observer(s):** Paul Wightman, Pat Johnson, Nathan Lake

NOTE: Of the 27 pairs of Plovers which nested only 21 chicks fledged.

NOTE: Nests were not assigned “a” or “b” for re-nests originating on new Island or re-nesting on Nauset Spit. One possible pair was involved, however, due to infrequent monitoring of New Island which was under NPS jurisdiction. It was impossible to determine if the pair on New Island re-nested on Nauset Spit. Nauset staff was informed at the outset of the season and census collecting period that this area was within the jurisdiction of NPS and would be monitored by their staff. Nauset Staff only monitored infrequently thereafter. No new nests observed on N1-1. Failed due to high tide.

The only positively identified re-nest was P11. This pair’s first nest P10 was lost to a high tide and laid 2 more eggs in the P11 nest which hatched. The chicks were missing after several days from hatch. No evidence for the loss of 2 chicks could be determined.

Additional Notes for Nauset Beach 2013 PIPL Census

Nauset Spit:

- This area encompasses everything north of the Nauset Beach parking lot to Nauset inlet.
- Two pairs nested early in the season, but lost their nests nearly a month prior to the census (May 8th). Following the loss of these nests, the pairs were not sighted again in these areas. We cannot reasonably say these pairs remained in the area and have reported them as having left prior to the census period and moved to Chatham as their nest was lost to gulls with 3 eggs hours before we made about to enclose.
- Evidence of harassment by predators and possible adult mortality led to removal of all enclosures on 6/12. The Crow population is growing and is very prevalent on the north and south sides, keying in on chicks, enclosures and monitoring activity. Crows were the main predator. It should be noted that the OoC, now 23 years old, has never been re-visited by the Orleans Conservation Commission. The enclosures mandated under said OoC may be contributing to these high loss numbers.

Pochet Washover Area and Nauset Beach:

- This area encompasses everything south of the Nauset Beach parking lot to the Chatham town line. At least 3 nests were believed to have lost chicks to crows, fox and/or coyotes which have high populations on the North beach side.
- Overall, the number of red fox, crows and coyotes appear to be on the rise throughout the area. Several dens have been identified by monitors. There were also frequent reports from locals of fox sightings, with animals seen walking the wrack line each night.
- The Town is considering applying for a Conservation Land Management Permit to eliminate and reduce the number of predators in order to create a balance between predator species and plovers. As of the date of this report, no final decision had been made by the town's administration.

Tern Colonies (Nauset Spit and Pochet Washover area):

- Tern populations are ranging from 55-60, for all colonies (both north and south). The north colony (Nauset Spit) did not produce any chicks due to nightly predation of eggs. Broken egg shells were discovered daily by monitors. Black Back Gulls and crows and believed to be the primary predators.

ORLEANS HISTORICAL COMMISSION

TOWN HALL, 19 SCHOOL STREET, ORLEANS, MA 02643

April 3, 2014

RE: Environmental Review for Habit Conservation Plan

Dear Mr. Kelly;

The Orleans Historical Commission reviewed the Habitat Conservation Plan at the last meeting March 28, 2014. It was moved and seconded "That to the best of our current knowledge, there are no known historic or archaeological sites that will be affected by the proposed activities in the Habitat Conservation Plan.

Sincerely,

Ann Sinclair, Chair

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Deval L. Patrick
GOVERNOR

Richard K. Sullivan Jr.
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
http://www.mass.gov/envir

May 23, 2014

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Habitat Conservation Plan for the Town of Orleans – Adaptive Management for Non-Essential Vehicle Access
PROJECT MUNICIPALITY	: Orleans
PROJECT WATERSHED	: Cape Cod
EEA NUMBER	: 15192
PROJECT PROPONENT	: Town of Orleans
DATE NOTICED IN MONITOR	: April 23, 2014

Pursuant to the Massachusetts Environmental Policy Act (MEPA) (M.G. L. c. 30, ss. 61-62I) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project **does not require** the preparation of an Environmental Impact Report (EIR).

Project Description

As described in the Environmental Notification Form (ENF), the project consists of a proposed Habitat Conservation Plan "Adaptive Management for Non-Essential Vehicle Access" (HCP) developed by the Town of Orleans (Town) to manage breeding piping plovers and their habitats at Nauset Beach in Orleans. The CMP will guide management and regulatory activities along Nauset Beach for the next three years to protect the piping plover from an incidental take that might otherwise result from recreational use of the beach. Town beach management will include: hiring dedicated staff to install symbolic fencing to protect nesting habitat; enforcing restrictions on the use of certain areas at certain times by pedestrians and over-sand vehicles (OSVs) in accordance with state and federal guidelines; hiring specifically trained bird monitors to document plover reproductive success; installation of predator exclosures around nest areas, and a variety of other measures designed to protect and increase plover reproductive activity. Due to the extended beach closures to OSV use over the past decade, the Town is also proposing to implement limited, late-season escorting of OSV caravans through known nesting habitat in

order to avoid complete closure of the beach past two broods of piping plover chicks during the late phase of plover reproductive activity.

The HCP does not propose any changes to the management of least tern and diamond-backed terrapin species and does not require any additional state or federal permits for these species nor is it anticipated to result in a "take" of these species.

The HCP will address several of the Town's concerns regarding continued piping plover protection including:

- access past the 0.8-mile long area known as the Pochet Wash-Over where there is nesting and related piping plover activity – which is presented as the primary means of access to the majority of Nauset Beach;
- significant decline in revenue from the OSV management program due to increasing and predictable annual OSV access closures; and
- despite a significant investment of resources and funding, including restricted OSV access, the piping plover fledge success rate has not improved at Nauset Beach notwithstanding Town management in compliance with the Order of Conditions and guidelines set forth by U.S. Fish and Wildlife Services (USFWS) and Natural Heritage and Endangered Species Program (NHESP).

The Town, in collaboration with USFWS and NHESP, has prepared the HCP with a proposed three-year term, to address potential effects on piping plover resulting from Town management activities on Nauset Beach and to work toward the conservation and increasing recovery of the coastal population of the species. The Town has engaged in public outreach efforts including a panel discussion on the HCP sponsored by the Orleans Citizens Forum which was attended by NHESP, Mass Audubon and others. Specifically, the HCP proposes to allow three caravans of vehicles, with up to sixty vehicles per caravan, to be escorted through the nesting habitat area (on or after July 15) by trained monitors in the morning (three-hour period) and then again late in the afternoon (three-hour period) in order to guide these vehicles through this narrow stretch and assist them off the beach.

Project Background

The Town has been managing Nauset Beach in Orleans in accordance with state and federal guidelines for managing recreational beaches to protect piping plovers and their habitats. Although piping plovers remain vulnerable, the number of breeding pairs in Massachusetts has increased significantly in the past 25 years due in large part to effective management of both plovers and recreational activities by landowners and beach managers.

The Town received an Order of Conditions from the Orleans Conservation Commission in 1991 that includes a Beach Management Plan requiring protection of rare and endangered species in compliance with state and federal guidelines. In order to comply with the Wetlands Protection Act (WPA) and avoid a "take" of piping plovers, the Town currently restricts, when necessary, use of OSVs on portions of Nauset Beach during the breeding season (April 1 to August 31) to minimize potential adverse effects on nesting populations. These seasonal use

restrictions have been implemented annually since 1991. In 2006, the southern portion of Nauset Beach experienced its first complete OSV access closure due to protection of nesting and related piping plover activity. A complete OSV closure has been required during each consecutive season since 2006. Closures have generally been increasing in length; the 2013 closure was the longest on record (83 consecutive days). The entire extent of the beach (approximately six miles) is passable on foot; restrictions limit the area accessible by OSV to approximately one mile.

Project Site

Nauset Beach is an undeveloped barrier beach located between the Atlantic Ocean and Pleasant Bay. The beach has been actively used by OSVs for decades, and accommodates thousands of recreational visitors to the beach annually. The beach includes numerous coastal resource areas, and is located within the Pleasant Bay Area of Critical Environmental Concern (ACEC). The beach includes areas of Priority Habitat for piping plovers and least terns.

The ENF describes the Possible Permit Area (PPA) in order to set a boundary within which an adaptive and variable Actual Permit Area (Escort Corridor) may be determined. The PPA is approximately 0.8 miles in length (north to south). The Town acknowledges that due to the dynamic nature of the Pochet Wash-Over, the boundaries of the PPA are approximate. For the purposes of the HCP, both the northern and southern boundaries of the PPA are defined as the general location where the sandy eroded and sparsely vegetated wash-over area transitions into dense vegetation on both sides of the existing OSV corridor.

The Escort Corridor will be located in a further defined subset of the PPA. The specific location of the Escort Corridor is intended to be adaptive and variable so that for each escort session, the Escort Corridor may shift along the identified route depending on piping plover and least tern locations and/or movements as depicted in a Variable Escort Route Map included in the ENF. Updated corridor boundaries shall be reported daily to the Program Administrator by monitors prior to commencement of escorts. The Escort Corridor will not exceed 2,100 feet in length consisting of a 600-foot escort buffer in front of 1,500 feet of the actual escort (60 vehicles x 25 feet per vehicle which includes space between vehicles). The Escort Corridor will not exceed 30 feet in width (10 feet on each side of the 10-foot vehicle track). The total project area will be approximately 1.45 acres.

Permitting and Jurisdiction

The project is undergoing MEPA review and requires preparation of an ENF pursuant to 301 CMR 11.03(11)(b) because it requires a State Agency Action and is proposed within a designated ACEC. The project will require a Conservation and Management Permit (CMP) from NHESP. The project will also require an Incidental Take Permit (ITP) from USFWS and a new Order of Conditions from the Orleans Conservation Commission (and, on appeal only, a Superseding Order of Conditions from the Massachusetts Department of Environmental Protection (MassDEP). The project may be subject to federal consistency review by the Massachusetts Office of Coastal Zone Management (CZM).

Because the Town is not seeking Financial Assistance from the Commonwealth for the project, MEPA jurisdiction extends to those aspects of the project that are within the subject matter of required or potentially required State Agency Actions and that may cause Damage to the Environment as defined in the MEPA regulations. In this case, MEPA jurisdiction extends to rare species and wetlands.

Review of the ENF

The HCP includes a description of project activities, an analysis of impacts to state-listed species, a limited analysis of alternatives, and outlines the elements of the conservation program, which includes minimization and mitigation measures for impacts to piping plovers. It includes a detailed description of the escorting procedures, contingency provisions, and violations and reporting requirements. The ENF indicates that the actions proposed within the HCP are the only alternative to address the multiple issues previously mentioned in this Certificate.

The HCP, if approved, will remain in effect for three years, at which time the Town and reviewing agencies will have an opportunity to evaluate the effectiveness of the program, and submit modifications for a revised HCP for review and approval. I note CZM's support of the project and efforts made by the Towns of Orleans and Chatham to balance the protection of the barrier beach habitat with the historic and cultural use of this beach for public use and recreation. Similarly, I note the comments from NHESP indicating that, notwithstanding the potential for conflict over curtailment of human activities and loss of beach revenue due to increased plover populations and their associated restrictions, successful management such as that exhibited by the Town creates opportunities for flexible permitting approaches that can meet MESA permitting standards. Comments from the Cape Cod Commission indicate that the provisions in the HCP for adaptive management, managing changed and unforeseen circumstances, and the limited time-frame of three years, appear to be reasonable terms under which to gauge the merits of the HCP. I encourage the Town to continue to work closely with NHESP and USFWS as they begin to implement adaptive management measures aimed at maintaining this balance of resource protection and public access.

Comments from Mass Audubon and the Cape Cod and Islands Group of the Sierra Club (Sierra Club) request additional analysis of the preferred alternative including: selecting a date later in the breeding season such as in August; reducing the number of caravans; reducing the number of OSVs per caravan; reducing the number of proposed caravans per week; eliminating caravans when chicks are less than a certain age; and reducing the monitor to chick ratio to 1:1. As recommended by CZM, Mass Audubon, and the Sierra Club, I encourage the Town to identify its rationale for identifying the number of vehicles allowed in a caravan.

The Town will file the HCP with NHESP as an application for a CMP. I expect NHESP will review and consider the comments provided on this ENF from Mass Audubon, Sierra Club and others. In addition, I am requiring the Town to distribute the draft permit to all organizations and/or individuals that commented on the ENF so that they may review the draft permit and associated requirements.

Rare Species and Wetlands

Wetlands resource areas on Nauset Beach include Barrier Beach, Coastal Beach, Coastal Dune, Coastal Bank, and Land Subject to Coastal Storm Flowage. Due to the nature of proposed activities, the project will have temporary impacts to existing wetland resource areas. The project will be reviewed for its consistency with the WPA by the Orleans Conservation Commission and by MassDEP. The Town has submitted a new Notice of Intent filing for the project to the Orleans Conservation Commission. The project will result in a "take" of the piping plover (threatened), a protected species under MESA (321 CMR 10.00) and the federal Endangered Species Act (ESA), and will require a CMP from NHESP.

The HCP proposes that all piping plover management will be carried out in accordance with the NHESP's Guidelines for Managing Recreational Use of Beaches to Protect Piping Plovers, Terns, and Their Habitats in Massachusetts, with the exception of the late season escorted ORV caravans. As described in the HCP, intensive monitoring of chicks is proposed when the ORV caravans, led by a plover monitor on foot, pass in the vicinity of unfledged chicks to ensure the vehicle corridor is clear for the caravan. One beach patrol officer and up to three monitors will be required to escort the caravan past a brood of chicks. The beach patrol monitor will halt the caravan at any time if visual contact with the chicks is lost by the assigned chick monitors. Intensive monitoring will minimize the risk of direct harm to chicks, although some disruption of chick behavior and increased risk is unavoidable. In addition, the HCP proposes several on and off-site mitigation measures designed to benefit piping plovers including: education and outreach; providing $10,000 for funding of off-site management and/or monitoring to benefit piping plovers as determined by NHESP; and implementation of an adaptive management plan for non-lethal predator control. The HCP indicates that if adequate funding is not secured through the Town operating budget for implementation and mitigation, then the escorting program and related actions will not be implemented.

The HCP identifies reporting requirements. Chick numbers, chick locations, and travel corridor locations/dimensions will be provided to the Program Administrator by the senior bird monitor daily, prior to commencing OSV escorts. Any violations or incidents/accidents associated with the escort program, including take of a chick(s) will be immediately reported to NHESP and USFWS. In the event of an alleged incident related to the escort program, the Program Administrator in coordination with a shorebird monitor will cooperate with and assist Town, State, and Federal officials with the incident investigation. The Town will submit a brief biweekly summary report to NHESP and USFWS and will also submit to them an escort monitoring report, by December 31 of each calendar year, describing at a minimum, the estimated age of chicks in each brood when escorting was initiated. As recommended by CZM, the escort monitoring report could also include additional information including fledging success, escorting dates, number of broods, number of chicks escorted past on each date, number of caravan passings, number of vehicles in each caravan, duration of each escort, and any documented "take" of chicks resulting from the vehicle escorting program. This annual report should also be submitted to CZM for its review.

The Town will comply with state guidelines for the management of OSV when least terns, a state-listed species located in the project area, are present; therefore no take will occur

and no MESA permit for least terns will be required. The Town is required to ensure that all state-listed species and their habitats located within the project area including the diamond-backed terrapin are protected in accordance with state and federal guidelines. The HCP should identify how state-listed terns and terrapins will be protected and managed if they enter the PPA.

In order to qualify for a CMP, the Town must demonstrate that it will avoid, minimize and mitigate impacts to state-listed species consistent with the following performance standards: (a) assessment of alternatives to both temporary and permanent impacts to state-listed species; (b) an insignificant portion of the local population would be impacted by the project; and (c) a long-term Net Benefit to the conservation of the state-listed species impacted will be provided. NHESP indicates that it appears that the proposed HCP will qualify for a CMP. Because the piping plover is also federally listed, the state CMP will not become effective until such time as the USFWS issues a compatible ITP pursuant to Section 10 of the ESA.

I note the comments from Mass Audubon regarding the Town's provision of mitigation as a net benefit to the piping plover. Mass Audubon asserts that the Town cannot claim existing mitigation measures such as hiring dedicated staff, providing symbolic fencing, and restrictions on OSV use as mitigation or net benefit for new uses that would result in a "take" of the species. I refer the Town to the comments provided by Mass Audubon and the Sierra Club on the protection of plovers from OSV impacts including establishing a cap on the cumulative number of broods present in the OSV corridor, and providing more information on the details of the escort plan to support the rationale for selection of escort timing, escort area limits, the number of monitors, and the protection of plovers within ruts and when out of visual range. I expect that, the Town and NHESP will consider these comments as it refines the HCP and address how the net benefit standard will be met.

Conclusion

The ENF has sufficiently defined the nature and general elements of the project for the purposes of MEPA review and demonstrated that the project's environmental impacts will be avoided, minimized and/or mitigated to the extent practicable. Based on the information in the ENF, review of comments, and after consultation with State Agencies, I find that no further MEPA review is required at this time. NHESP has sufficient permitting authority to require additional analysis of project alternatives, impacts and mitigation, as warranted. The Town of Orleans will provide a copy of the draft CMP to each individual and/or organization that commented on the ENF.

May 23, 2014
Date

Richard K. Sullivan Jr.

Comments received:

05/05/2014	Massachusetts Division of Marine Fisheries (DMF)
05/07/2014	Massachusetts Office of Coastal Zone Management (CZM)
05/07/2014	Massachusetts Natural Heritage and Endangered Species Program (NHESP)
05/12/2014	Town of Orleans Planning Board
05/12/2014	Kenneth M. Johnson
05/13/2014	Massachusetts Department of Environmental Protection – Southeast Regional Office (MassDEP/SERO)
05/13/2014	Cape Cod Commission
05/13/2014	Cape Cod and Islands Group – Sierra Club
05/13/2014	Mass Audubon (1)
05/15/2014	Town of Orleans Conservation Commission
05/16/2014	Mass Audubon (2)

RKS/PPP/ppp

310 CMR 10.99

Form 5

Commonwealth of Massachusetts

DEP File No. SE 54-723
(To be provided by DEP)

City/Town Orleans, MA

Applicant Town of Orleans

FILE COPY

Order of Conditions
Massachusetts Wetlands Protection Act
G.L. c. 131, §40

THE ORLEANS WETLAND PROTECTION BYLAW

From Orleans Conservation Commission

To Town of Orleans, Board of Selectmen (Acting as Park Commissioners)

(Name of Applicant)
Address 19 School Street, Orleans, MA 02653

(Name of property owner) Town of Orleans
Address 19 School Street, Orleans, MA 02653

This Order is issued and delivered as follows:

☐ by hand delivery to applicant or representative on _____ (date)

☒ by certified mail, return receipt requested on P 529 416 026 (2/13/91) (date)

This project is located at Nauset Spit, Callanan's Pass

Orleans Tax Assessor's Map Sheet No. 30 Parcel No. N/A

The property is recorded at the Registry of Barnstable

Book _____ Page _____

Certificate (if registered) _____

The Notice of Intent for this project was filed on December 21, 1990 January 14, 1991 (Amended) (date)

The public hearing was closed on January 23, 1991 (date)

Findings

The Orleans Conservation Commission has reviewed the above-referenced Notice of Intent and plans and has held a public hearing on the project. Based on the information available to the Commission at this time, the Commission has determined that the area on which the proposed work is to be done is significant to the following interests in accordance with the Presumptions of Significance set forth in the regulations for each Area Subject to Protection Under the Act and with the Orleans Wetland Protection Bylaw: (check as appropriate):

- ☐ Public water supply
- ☐ Private water supply
- ☐ Ground water supply
- ☒ Land containing shellfish
- ☒ Fisheries
- ☒ Protection of wildlife habitat
- ☒ Erosion & Sedimentation Control
- ☒ Recreation
- ☒ Aesthetics
- ☐ Agriculture
- ☐ Aquaculture
- ☒ Flood control
- ☒ Storm damage prevention
- ☒ Prevention of pollution

Total Filing Fee Submitted N/A State Share _____ (½ fee in excess of $25)

City/Town Share _____

Total Refund Due $ _____ City/Town Portion $ _____ (½ total) State Portion $ _____ (½ total)

FEB 13 1991

Therefore, the Orleans Conservation Commission hereby finds that the following conditions are necessary, in accordance with the Performance Standards set forth in the regulations, to protect those interests checked above. The Conservation Commission orders that all work shall be performed in accordance with said conditions and with the Notice of Intent referenced above. To the extent that the following conditions modify or differ from the plans, specifications or other proposals submitted with the Notice of Intent, the conditions shall control.

General Conditions

1. Failure to comply with all conditions stated herein, and with all related statutes and other regulatory measures, shall be deemed cause to revoke or modify this Order.
2. This Order does not grant any property rights or any exclusive privileges; it does not authorize any injury to private property or invasion of private rights.
3. This Order does not relieve the permittee or any other person of the necessity of complying with all other applicable federal, state or local statutes, ordinances, by-laws or regulations.
4. The work authorized hereunder shall be completed within three years from the date of this Order unless either of the following apply:
   (a) the work is a maintenance dredging project as provided for in the Act; or
   (b) the time for completion has been extended to a specified date more than three years, but less than five years, from the date of issuance and both that date and the special circumstances warranting the extended time period are set forth in this Order.
5. This Order may be extended by the issuing authority for one or more periods of up to three years each upon application to the issuing authority at least 30 days prior to the expiration date of the Order.
6. Any fill used in connection with this project shall be clean fill, containing no trash, refuse, rubbish or debris, including but not limited to lumber, bricks, plaster, wire, lath, paper, cardboard, pipe, tires, ashes, refrigerators, motor vehicles or parts of any of the foregoing.
7. No work shall be undertaken until all administrative appeal periods from this Order have elapsed or, if such an appeal has been filed, until all proceedings before the Department have been completed.
8. No work shall be undertaken until the Final Order has been recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land upon which the proposed work is to be done. In the case of registered land, the Final Order shall also be noted on the Land Court Certificate of Title of the owner of the land upon which the proposed work is to be done. The recording information shall be submitted to the Conservation Commission on the form at the end of this Order prior to commencement of the work.
9. A sign shall be displayed at the site not less than two square feet or more than three square feet in size bearing the words, "Massachusetts Department of Environmental Protection, File Number SE 54-723 clearly visible from the street and shall remain so displayed until construction is completed and a Certificate of Compliance has been granted.
10. Where the Department of Environmental Protection is requested to make a determination and to issue a Superseding Order, the Conservation Commission shall be a party to all agency proceedings and hearings before the Department.
11. Upon completion of the work described herein, the applicant shall forthwith request in writing that a Certificate of Compliance be issued stating that the work has been satisfactorily completed.
12. The work shall conform to the following plans and special conditions:

*

Plan of
ORV Routes &
Parking Area
on Nauset
Spit

Plans:

Title	Dated	Signed and Stamped by:	On File with:
Scale: 1" = 100'	January 7, 1991	Orleans Park Commissioners	ConsCom

This project is approved subject to the following and attached conditions:

Special Conditions (Use additional paper if necessary)

With the exception of the proposed temporary alternative crossovers to, and driving on, the Town Cove (West) side of Nauset Spit -
The above plan is approved subject to Conditions listed below for Town of Orleans Nauset Spit, Callanan's Pass, DEP Number SE 54-723.

13. In issuing this Order of Conditions, the Commission has relied on the information and data which the applicant has provided in connection with his application. If, subsequent to the issuance of this Order, such information and data prove to be false, incomplete, or inaccurate, this Order may be reviewed, modified or withdrawn in whole or in part, and/or the Commission may, in addition, institute appropriate legal proceedings.

14. Members of the Conservation Commission or its agents shall have the right to enter upon and inspect the premises to evaluate compliance with this Order of Conditions. The Conservation Commission reserves the right to require, following field inspection, additional information or resource protection measures.

15. Any substantial change made or intended to be made in the plans shall require the applicant to file a new Notice of Intent or to inquire of the Conservation Commission, in writing, and by certified mail, whether the change is so substantial as to require a new filing.

16. This Order and the general and special conditions are ongoing and do not expire with the issuance of a Certificate of Compliance.

(Leave Space Blank)

Issued By Orleans Conservation Commission

Signature(s)

This Order must be signed by a majority of the Conservation Commission.

On this Thirteenth day of February 19 91 before me personally appeared RICHARD Houghton to me known to be the person described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

Notary Public

My commission expires May 11, 1995

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the Department of Environmental Protection to issue a Superseding Order, providing the request is made by certified mail or hand delivery to the Department, with the appropriate filing fee and Fee Transmittal Form as provided in 310 CMR 10.03(7), within ten days from the date of issuance of this Determination. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and the applicant.

Detach on dotted line and submit to the Orleans Conservation Commission prior to commencement of work.

To Orleans Conservation Commission Issuing Authority

Please be advised that the Order of Conditions for the project at Nauset Spit, Callanan's Pass

File Number SE 54-723 has been recorded at the Registry of Barnstable and

has been noted in the chain of title of the affected property in accordance with General Condition 8 on _____ 19____

If recorded land, the instrument number which identifies this transaction is _____

If registered land, the document number which identifies this transaction is _____

Signature _____ Applicant

DEP SE 54-723

SPECIAL ORDER OF CONDITIONS RELATING TO ORV USE ON NAUSET SPIT

I. FINDINGS

A. THE ACTIVITY

The Orleans Conservation Commission finds, in accordance with the December 4, 1990 Superseding Determination of Applicability issued by the Massachusetts Department of Environmental Protection, that the activity for which the Town of Orleans seeks a permit under the provisions of State Wetland Protection Act MGL ch 131 Section 40 and the Town of Orleans Wetlands Protection Bylaw consists of the operation of ORV's on the Nauset Spit Barrier Beach system, 310 CMR 10.29. Although the permit request is narrowly defined to ORV use, where ORV use/management issues overlap pedestrian and boating uses, it is herein recognized by the Conservation Commission and the Park Commissioners that these uses will be controlled in a manner consistent with permitting requirements for the ORV use, i.e., signage, fencing, plantings, temporary closures, etc.

The Department of Environmental Protection further determined, and the Orleans Conservation Commission so finds, that the area in which the proposed activity will take place is a barrier beach, 310 CMR 10.29, a resource area which itself contains the following wetland resource areas: Land Subject to Coastal Storm Flowage (310 CMR 10.02(1)(d), Land Under the Ocean (310 CMR 10.25), Coastal Beaches(310 CMR 10.27), Coastal Dunes (310 CMR 10.28) Salt Marshes (310 CMR 10.32) and Rare Species Habitat (310 CMR 10.37).

The above cited regulations, provide that where the proposed activity involves alteration of a resource area, the issuing authority shall presume the resource area to be significant to the interests noted in the regulations governing that specific area unless that presumption is overcome by a clear showing otherwise. No such showing has been made. The Commission therefore adopts the presumptions of significance for the resource areas cited in the previous paragraph.

DEP # SE 54-723

B. PROJECT COMPLIANCE WITH MGL 131 ch. S.40 PERFORMANCE STANDARDS

Project compliance with MGL ch, 131 s.40 performance standards as cited in the attached regulations: Coastal Beaches, 310 CMR 10.27; Coastal Dunes, 310 CMR 10.28; Barrier Beaches, 310 CMR 10.19; and Rare Species Habitat, 310 CMR 10.37

The proposed project calls for the following activities designed to prevent adverse impact of ORV usage upon the resource areas of the Nauset Spit Barrier Beach cited above:

1. Placement of signage and wooden barrier posts, to be located as necessary to confine ORV traffic to defined access ways, to be maintained by hand, and spaced an average of 100 feet apart; signage to be attached to posts and/or fencing where possible, such posts to be placed in such a manner as not to disturb vegetative cover;

2. Placement of symbolic fencing and/or predator exclosures, as necessary, around potential nesting habitat and actual nesting and foraging sites;

3. Placement of fencing barriers for access closures and/or openings, as deemed necessary for tern and plover habitat, nesting, and foraging protection.

   The Commission finds that the above activities as controlled by the conditions herein meet the performance standards set forth in 10.27 (3),(6), and (7);10.28 (3),(5), and (6); 10.29 (3) and (4). See "Rare Species" for compliance with 10:27.

4. With regard to the primary activity proposed, ORV usage itself, the Commission finds the following:

   a. <u>Coastal Dunes</u> (310 CMR 10.28)

      i. <u>Evaluation of ORV Access and Egress Trail Location</u>

      The suggestion was made that the more southerly access trail be closed and that the more northerly egress trail be expanded to accommodate two way traffic using pullover/bypass areas. Field inspection of

the southerly access trail showed it to be sensitive to environmental concerns with respect to sinuosity and topography. Its layout was not believed to promote wind tunnelling and erosion or wave overwash. According to historical data, this showed the greatest stability in terms of shoreline migration over a 100 year period. Therefore, although the more northerly egress trail had initially been proposed to be expanded in width to accommodate two way traffic based on the closure of the more southerly trail, the record suggested that the existing layout and orientation characteristics of the more northerly trail should not be changed and that maintenance of the existing two trail system was preferable. The Commission, therefore finds, based on the testimony and references of record, that maintenance of the existing two ORV trail routes is appropriate, and meets the performance standards set forth in 310 CMR 10.28 as follows:

10.28 (3)(b) Use of existing access and egress corridors through the dunes will be restricted to corridors already without vegetation due to previous ORV use, and no further devegetation and consequent destabilization should occur given appropriate posting as required in the Special Orders.

10.28 (3)(c) It is recognized that the ongoing use of an ORV corridor may cause limited modification to small dune areas. However, the Commission credits testimony that due to the orientation, location , restriction in size, and proposed maintenance activities, no significant increase from storm or flood damage is anticipated.

10.28 (3)(d) No interference with landward movement of coastal dunes will occur since the Special Orders provide that no ORV traffic, with the possible exception of temporary alternate routes provided in response to plover and tern protection needs, will be permitted on the Cove (west) side of

the spit, toward which the landward movement is directed.

10.28 (3)(f) See section on Rare Species

ii. North/South Corridor

Given the Special Orders requiring that this corridor be a minimum of 15 feet seaward of the toe of the Coastal Dune, no change in vegetation should occur and the performance standards set forth in 10.28 (3)(b) and (c) should be met. (10.28(3) see section on Rare Species)

iii. Dune Enhancement

Concern was expressed that inappropriately located dune enhancement projects could adversely impact potential plover and tern habitat areas. Based on the testimony received, the Conservation Commission finds that specific delineation of dune enhancement areas on the present project plans should not be shown at this time. Rather, delineation of specific areas will be made by the Park Commissioners and their agents in consultation with the Conservation Commission and/or its agent based on wildlife habitat observations and reports presented to both agencies as required by the Order of Conditions.

b. Coastal Beaches (310 CMR 10.27 (3)(7)

The continued use of the existing ORV corridors may cause temporary limited impact to the profile (form) of the beach area. The Commission credits testimony that given the climatic and geologic characteristics of the Nauset Spit, these changes will not result in significantly increasing the potential for wind and wave erosion.

The Commission credits testimony that sediment disturbed by the passage of ORVs is not lost from the beach resource area and that significant sediment movement is not attributable to ORV use. Therefore it finds ORV use as proposed will not result in a significant decrease to beach volume and that such significant changes in beach volume

are more likely to be influenced by climatic and/or meteorologic factors (also see Rare Species 10.27(7).

II. SPECIAL CONDITIONS

A. PREAMBLE

The Orleans Conservation Commission, in setting the following Conditions, intends that they be flexible enough to reflect the needs of the changing environment they are designed to protect. The Nauset Barrier Beach system has been shown to be extremely dynamic over time. Significant changes in geomorphic form and wildlife habitat have occurred both prior to, and now during, recreational uses of this resource area. The challenge for this Commission is to manage the competing uses of this barrier beach system under the provisions of both the Massachusetts Wetlands Protection Act, MGL 131 Section 40 and the Town of Orleans Wetland Protection Bylaw, Chapter 160 of the Code of the Town of Orleans.

The following Conditions are designed to:

- protect coastal resource areas and identified wetland interests for the Nauset Barrier Beach system as it currently exists;

- allow for the ongoing recreational use of the barrier beach system, but at a lesser impact level than previously existed;

- require management of ORV use to be sensitive to any adverse environmental impact to the Nauset Barrier Beach system;

- require greater restrictions on ORV users with respect to environmental education, scheduled and unscheduled temporary closures of access routes, etc;

- require future management of the barrier beach system resource area to include hiring of specially qualified personnel to conduct detailed monitoring of and reporting on wildlife and wildlife habitat areas which will serve as basis

for modifying permitted management procedures/policies;

- require interdisciplinary and agency cooperation which will result in sensitive, flexible and responsive management of the barrier beach system.

B. RULES AND REGULATIONS

The Board of Selectmen, acting, and hereafter referred to, as the Park Commission, is responsible for implementing and enforcing Rules and Regulations for ORV use on Nauset Spit. These regulations shall be reviewed annually by the Conservation Commission and at a minimum require the following:

a) That the figure set for a maximum number of ORV's allowed on the beach at any one time be reduced from the 300 maximum permitted in 1990 to an initial figure of 200 for 1991 which may be subject to a downward revision dependent upon general beach or nesting considerations.

b) Posting of temporary closures due to tide conditions or nesting considerations.

c) Driving on the Town Cove (west) side to be prohibited (see Page 8).

d) Driving on the low beach to be permitted only during the winter season between the first Friday in November and the Friday before Memorial Day and at such other specially designated times and places to avoid disturbance of nesting birds.

e) Parking to be permitted seaward of a 37' corridor consisting of 15' from the toe of the dune, plus 12' for the vehicle track, plus a 10' margin between the vehicle track and parking area.

f) Closure of the beach between the hours of 11:00 PM and 6 AM except for active fishing. Driving in all but designated ORV corridors prohibited.

g) In posted areas near bird nesting or roosting areas, a speed limit of 5 mph.

h) No jet ski launching or landing.

i) No kite flying: March 15 - September 15.

j) No pets: March 15 - September 15.

k) All permittees to view educational film/slide presentation prior to issuance of and renewal of ORV permit.

l) Minimum permittable equipment standards including tire size and pressure as listed in regulations issued by Park Commissioners

m) Any other condition responsive to significant environmental changes and/or any conditions necessary to protect the Nauset Spit barrier beach system, the public health , safety and welfare of the users and/or property owners.

n) Such fines and penalties as the Park Commission may invoke.

o) Walking between the cove side and the ocean side to be prohibited in all but designated areas.

C. CLOSURE OF THE TOWN COVE (WEST) SIDE TO ORV TRAFFIC

In 1990, the Orleans Park Commission, on the recommendation of Dr. David Aubrey, coastal geologist with the Coastal Research Center of Woods Hole Oceanographic Institution and with the full concurrence of the Conservation Commission, closed the Town Cove side of the Nauset Spit to ORV traffic. Tidal flats and shellfish beds which adjoin the Town Cove side of the beach are extremely sensitive to ORV use, and ORV use should not be allowed in these resource areas under any circumstances. Barrier beaches migrate landward due to overwash events and consequent sand deposition of the barrier beach, 310 CMR 10.29(1). The operation of ORVs on the landward side of the beach could serve to inhibit dune formation through the formation of ruts and the crushing of ammophila rhizomes, stopping the landward migration of the inside, while the ocean side is continually eroded

by wave action. The net effect of these processes could be an ever narrower barrier spit, increasingly susceptible to overwash and inlet formation. This result would violate the performance standards for coastal dunes, which prohibit any modification of dune form that would increase the potential for storm or flood damage, or any interference with the landward or lateral movement of the dune, 310 CMR 10.28(3) and 10:29(3). Therefore, with the possible exception of temporary alternate routes as described below, the westerly (Town Cove) side of the barrier beach shall remain closed to ORVs except for emergency use by town officials.

D. TEMPORARY ALTERNATIVE ROUTES:

The applicant (Town of Orleans) has proposed that should the ORV corridor along the oceanside be closed to protect plovers foraging for food on that side, an alternate route along the Town Cove (west) side be approved on a temporary basis.

In answer to the concern that such temporary alternate routes could inhibit the landward migration of the barrier beach in violation of the performance standards and in CMR 10:28 and 10:29, the applicant has suggested that there is evidence relating to the seasonal climatic/meteorologic energy levels and historical storm or wind patterns documented during the summer months and evidence relating to the textural components (coarse sand and gravel) of the back shore area which would indicate it was unlikely that the limited seasonal use of proposed alternative routes, i.e., June, July and perhaps August, would result in increasing potential for storm and flood damage in violation of 310 CMR 10.28 (3)c or interfere with the landward movement of the dunes of the barrier spit in violation of 10.28 (3) (d) and 10.29 (3). Contradicting evidence was also offered.

However, the applicant has also suggested, and the Commission agrees, that the site specific delineation of temporary alternate routes is presently inappropriate. Therefore, the Commission makes no finding nor will it issue any orders as to the temporary alternate routes at this time.

When the need to protect specific habitat, nesting, and/or foraging sites by closure of the access routes

approved herein and shown on the plan of record is determined, the Town may file amended plans after consultation with its agents and the Conservation Commission or its agent and shall provide the Commission with information on such proposed temporary access routes including, but not limited to, delineation of the such proposed route or routes on the plan of record,an estimate of the duration of use, an estimate of the reduction or proposed reduction of daily vehicle traffic, a description of signage and fencing for such alternate ORV corridor, a description of proposed mitigating measures, etc. If the Commission finds that such plan meets the performance standards cited in the relevant regulations, the Commission may approve such temporary alternate ORV access route or routes.

E. RARE SPECIES

1. Project Compliance with Performance Standards

Based on the testimony provided by Massachusetts Natural Heritage Endangered Species Program, the Massachusetts Audubon Society and others, the Conservation Commission finds that a potential to alter the resource area which is part of the mapped habitat of State-listed species does exist. However, the Commission finds that the project as proposed and conditioned herein, inclusive of the hiring of a qualified habitat specialist and incorporation of temporary beach closure measures should provide the protection necessary so that no adverse effect on specified habitat sites will result.

The presumption that the maintenance activities requested in order to continue ORV use of Nauset Spit will adversely impact specified habitat sites, in the opinion of this Commission, has been overcome/rebutted/by the proposed species management plan as required by this Order of Conditions. This management plan will require, among other measures, observation and tracking of the plover and tern species to determine exact habitat sites, including foraging routes; will require temporary closures of the identified sites and routes to ORV and pedestrian use; and will provide emplacement of physical fencing and

predator barriers to afford habitat protection. The Commission, as issuing authority, therefore finds that the project as proposed and herein conditioned should not result in an adverse impact to specified habitat sites identified for plover and tern populations on Nauset Spit. If, however, these conditions prove inadequate to protect the wetland interests defined in MGL 131, Section 40 or to ensure that there is no adverse impact on rare species habitat as required by CMR 10:37, the Commission reserves the right to impose the necessary additional conditions and restrictions upon the use of ORVs on the Nauset Spit.

The Conservation Commission wishes here to note that the applicant, the Town of Orleans by its Selectmen serving as Park Commissioners, has, in fact, conducted a tern preservation project in cooperation with the Massachusetts Audubon Society which has contributed to the establishment of the largest least tern colony in New England. The Town has supported this preservation effort through the efforts of the Town's Parks Department under the direction of Paul Fulcher, Parks Superintendent with the financial support of the town. It now proposes to continue and broaden these efforts through the hiring of a plover habitat specialist to monitor the breeding, hatching, and fledging of the plovers, and by recognizing that temporary closures of the spit during critical plover breeding and fledging periods may be necessary.

2. <u>Plover Monitor</u>

The Park Commission, in cooperation with the Conservation Commission, shall be responsible for the hiring of a suitably qualified person to serve as a Piping Plover (and Tern) Habitat Analysis Specialist, hereafter referred to as "Monitor", responsible to the Park Superintendent. This person shall be selected by the Park Commissioners based on review of applicant qualifications and recommendations from the Conservation Commission, and will be required to participate in the site specific field training program developed and conducted cooperatively with the Massachusetts Division of Fisheries and Wildlife Natural

Heritage Program and the Cape Cod National Seashore Park experts on coastal bird habitats. Further, the Monitor shall cooperate and coordinate his/her activities with the Massachusetts Audubon Society Staff.

The Monitor will be employed annually from April 1 through August 31 to provide technical information relative to the habitat and characteristics of the Piping Plover and tern populations on Nauset Beach, and will be responsible for alerting the Park Superintendent and the Conservation Commission, or their designated agents, as to the need to temporarily close access to ORV traffic during plover nesting and fledgling activity periods. The Monitor will also be responsible for providing the Parks Commission and the Conservation Commission daily data on plover broods and tern nesting, and a season-end report relative to the Piping Plover population.

3. Limitation of access to prime nesting habitat areas

a. Vehicular Access

Parking in or vehicular access through identified plover and Least Tern habitat areas as shown on the attached map entitled "Approximate Rare Species Habitat", and as determined annually by the plover Monitor, shall be prohibited. This restriction will not necessarily prohibit vehicular access past (i.e. northward/southward) such areas if consistent with specific management guidelines.

b. Boater and Pedestrian Access

It has been the custom for many visitors to Nauset Spit to arrive by boat on the west or Town Cove side. Some remain on this west beach while others walk across the spit to the ocean side. This traffic is expected to increase as a result of increased ORV restrictions. Most boats land near the tip, beyond the dunes, the vegetation, and the

Least Tern colony, and they present a minimum threat to either birds or other resources. The other boaters, however, tend to come ashore in three areas where they must cross the dunes, either over the crest or through a washover area to reach the Atlantic side. Disturbance of the birds by these pedestrians may be minimized by: 1) Posts, signs and fencing to indicate closed areas and 2) installation of well-marked wooden walkways over the dunes in areas far from plover habitat. Since it is much easier to walk on these boardwalks than in the soft sand, pedestrians will be encouraged to use the designated walkways and thus they will help to protect dune form and vegetation as well as birds.

Pedestrians shall be excluded from existing washover areas in a manner which does not interfere with, or cause any adverse effect to, the ability of such washover areas to serve as nesting habitat for Piping Plover.

4. Piping Plovers

The beach management strategy for the plovers includes devoting highest priority to encouragement of the earliest arriving birds to nest as quickly and successfully as possible. This means minimizing human disturbance. The result in addition to a high reproductive success rate, may be to minimize the period during which the beach is closed to ORV use.

Spring Arrival (March 16 - April 30)

Piping Plovers return from their southern winter quarters to establish nesting territories along Cape Cod beaches in early spring.

Management - Prior to the arrival of Piping Plovers, potential nesting areas shall be visited by a person familiar with their habitat requirements to evaluate the natural changes that have occurred through the winter and to identify areas of suitable nesting habitat. The nesting habitat shall be posted, with endangered species

nesting area signs, prior to the arrival of plovers - no later than April 1 - to reduce the potential disturbance by beachgoers upon plovers establishing their nesting territories. Vehicular access into or through posted areas shall be prohibited, though vehicles may pass by such areas at this time.

Laying and Incubation of Eggs (April 20 - August 10)

Normally the nest, a shallow scrape in the sand, is placed at the toe of the dune, in a washover, or along the spring tide wrack line. The first of the sand-colored eggs is laid in late April and may contain a full clutch of 4 eggs a week after the first egg is laid. Then both adults incubate the eggs, alternating every few hours, for the next 28 days.

Management - when a nest is located with one to four eggs, a welded wire fence shall be placed around the nest, using a design recommended by the Massachusetts Division of Fisheries and Wildlife. Endangered species signs shall be placed outside the fenced area and strung off with twine to add additional protection from curious passersby. Vehicular access within the area strung off with twine shall be prohibited.

Before eggs hatch, it is necessary to close the beach and to level the ORV ruts to prevent an adverse effect on the young hatchlings. This must be accomplished within a 28 day period after incubation commences. If ruts are to be leveled by natural process, one week should be allowed, and the beach should be closed 21 days after the last egg is laid or the start of incubation. If ruts are to be leveled by hand, the beach could remain open a few additional days. If the monitor does not know when the last egg was laid or when incubation commenced, the beach should be shut down and ruts leveled immediately.

Due to the narrowness of the Nauset barrier beach,in some portions of plover habitat, the closure shall extend from the ocean side through the dunes to the cove side in a line 100 yards south of the location of the first nest

DEP # SE 54-723

encountered for outbound travel (i.e., the southerly most nest on the spit). The point of closure would be designated with posts, rope, and signs.

Hatching Eggs and Movement of Young (May 20-August 20)

Piping Plovers have precocial young, capable of walking and feeding themselves within 24 hours after hatching. The most vulnerable stage in their breeding cycle is the period when hatchlings are less than 10 days old when they accompany the adults in their feeding forages. Normally, all eggs in a clutch hatch within a 24-hour period between the hatching of the first and last eggs. The hatchlings then accompany the adults to feed on small invertebrates along the wrack line, toe of the dunes, and interdunal blowouts. During their first week the young usually do not wander more than 100 yards from their original nest site. They do not use the nest after the first couple of days from their hatch date, but depend on their cryptic coloration to blend in with their surroundings. If an adult plover sounds an alarm note, the young either run for cover beneath one of the adults or seek cover in vegetation, among stones, along the wrack line, or in a vehicle rut. Plover chicks over a week old may accompany the adults for greater distances, up to 1/4 mile, and spend increasingly more of their time foraging along the wrack line and out into the intertidal zone.

Management - Plover chicks on Nauset Spit may be seen foraging with adults in areas anywhere between the Cove and the ocean intertidal zones in areas where there is little vegetation to obstruct their movements. Because they may go from the ocean side to the cove side of the spit within minutes, using existing blowouts and overwash areas, they are vulnerable to vehicular travel at all times. Also, the ruts left by vehicles are known to trap young chicks that subsequently may be run over by another vehicle using the same ruts, or they remain trapped in the rut and die from exhaustion or found in the rut by a predator.

Therefore, temporary closures to vehicular traffic shall be required in habitat areas used by young foraging plovers. The size of this closure will vary depending on the data collected by the Monitor. The closure point of 100 yards south of hatched eggs shall be used until the Monitor can establish the perimeter of the total feeding range.

Fledging of the Young (June 28 - August 20)

Young plovers are capable of flying short distances within 30 days of their hatch date. Typically, these novice fliers remain with the adults foraging in the same general area for anywhere from a few days to the rest of the summer. Adults may lead fledged young to more remote portions of neighboring beaches if they are disturbed by recreation or predation.

Management - Once the Monitor has determined that the young have fledged or left the beach, the area may be reopened to vehicular traffic.

5. Least Terns

Nauset Spit has been home to the largest Least Tern nesting colony in New England for the past two years. This is largely due to the extensive nesting area available on the sand spit which has increased in its length annually since the storm in 1978. Another factor that has contributed significantly to the size of this colony is the placement of welded wire fence by the Massachusetts Audubon Society in cooperation with the Town of Orleans Parks Department, which has reduced disturbance to the birds by beachgoers and predators.

Spring Arrival (May 7 - July 10)

Least Terns return from their winter quarters in South America to establish nesting colonies ranging in size from a dozen pairs to over 1,000 pairs. Least Terns have historically used Nauset Spit, and data over the past 20 years shows that colony size has varied between 100 to 600 pairs nesting annually.

DEP # SE 54-723

Management - Prior to the arrival of the terns, welded wire fence, three or four feet in height, with 4" x 2" mesh shall be used to encircle the Least Tern nesting area based upon the prior year's data. On Nauset Beach the Least Tern Colony increased in size annually, and it is likely that the fence will have to be adjusted to encompass additional portions of the colony.

The side of fence running parallel to the ocean-side wrack line shall be as close to the mean high tide line as possible. This will ensure that nests near the wrack line are included and that chicks that wander or fly outside the colony are less likely to become trapped in ruts and be run over by subsequent traffic. Endangered species signs should be placed five feet inside the fence, one every 50 feet along the entire perimeter.

Laying and Incubation of Eggs (May 20 - August 5)

Most clutches of 2-3 eggs are laid in early June. The nests are simple scrapes in the sand or on bare stone between the wrack line and the toe of the dune, or in an open blow-out. Typically, Least Terns nest in colonies of 10 to 1,000 pairs.

The adults incubate the eggs for 21 days after the last egg is laid. It is not uncommon for Least Terns to lose nests to storms or high tides. Least Terns will attempt to discourage mammalian, avian, or human intruders who come near their nests by attacking in unison, calling loudly, and dropping their "white wash".

Management - Incubation is the most vulnerable stage for breeding Least Terns. The presence of people, dogs, kites, and predators too close to a colony causes the entire flock of nesters to leave their nests during the disturbance. If the disturbance lasts more than 15 minutes, the eggs may be destroyed by exposure to the sun, rain, or wind-blown sand. Therefore, it is critical that the Monitor for the colony adjust the perimeter of the fence and signs to include a buffer zone wide enough to prevent disturbance to incubating adults. Research has shown a minimum distance of 80 to 150 feet is needed between the outermost

nests in the colony and the protective barrier.

Hatching of Eggs and Movement of Young (June 9-August 25)

The 2 to 3 semiprecocial young are active within 24 hours of hatching. Least Tern young are fed by the adults. Although the young are capable of running within a week of hatching, they typically do not wander more than 15 feet from their nest depression during the first 10 days. However, at ages between 10 and 28 days they will run longer distances to flee an intruder or to find better locations for hiding or awaiting the return of adults with food. These older juveniles, over 14 days old, are often difficult to see. Their plumage is camouflaged, and they hide in vegetation and cover on the wrack line.

Managment - Dogs and feral cats shall be excluded from colonies using welded wire fence. The young terns, however, pass through the fence outside the colony. Typically, the young try to migrate toward the tidal zone to be fed by the adults. The young often become trapped in vehicle ruts and are run over by subsequent traffic. To reduce this problem, vehicles shall be directed to drive below the high tide line when possible. Fewer chicks go far from the colony and flattened sand in the tidal zone makes the chicks more visible. Also, a finer mesh plastic or wire fence can be used to discourage the young terns from migrating into areas where there are vehicles. This, however, must not be used if a pair of Piping Plovers has a nest or young in the area of the Least Tern colony, because plover young could get separated from adults or be excluded from their foraging areas. Also, a finer mesh plastic or wire fencing will not keep the young terns from migrating outside the colony once they are capable of flight.

Fledging of Young (July 9 - September 10)

Least Terns young are capable of weak flight about 28 days after hatching. Most young in a colony fledge in mid-to late July in Massachusetts, unless the colony has been abandoned because of by tides, storms, or predators and the survivors

renest. Once the young are capable fliers, after a week of practice, they are led by the adults further from the busy colony to quieter portions of beaches and sandbars. The young will even fly out to the fishing grounds where they rest on the water and wait to be fed. Most Least Terns have left their breeding grounds by September 10 for the long journey to South America.

Management- If vehicles are permitted near the Least Tern nesting area they pose a threat to the fledging terns during the day and night. The Monitor shall use signs, and twine if possible, to post the boundaries of the roosting area to restrict and slow traffic.

The Monitor of the colony will determine when the terns have left the nesting area. As long as Least Terns are landing in the fenced area, it is likely that they are still nesting or rearing young. Most Least Terns will have left Massachusetts by early September.

F. MANAGEMENT AND ANNUAL REVIEW

Management of the resource areas in terms of ongoing use, use restrictions, etc. will be the primary responsibility of the Park Commission and Park Department with provisions for annual review of management guidelines and personnel hirings to be made cooperatively with Conservation Commission input prior to April 1st.

As part of the overall ORV management plan, the Park Commission will instruct the Park department personnel to maintain the approved ORV corridors and to install posts fencings, and signage as indicated on the plan of record dated January 7, 1991 or as revised and subsequently approved by the Conservation Commission and will instruct the Park Department personnel to continue ongoing revegetaiton and nourishment efforts as described and approved by the Conservation Commission. These actions and the overall ORV management plan will be reviewed and approved annually by the Conservation Commission based upon the reports and recommendations resulting from the implementation of this Order of Conditions.

DEP # SE 54-723

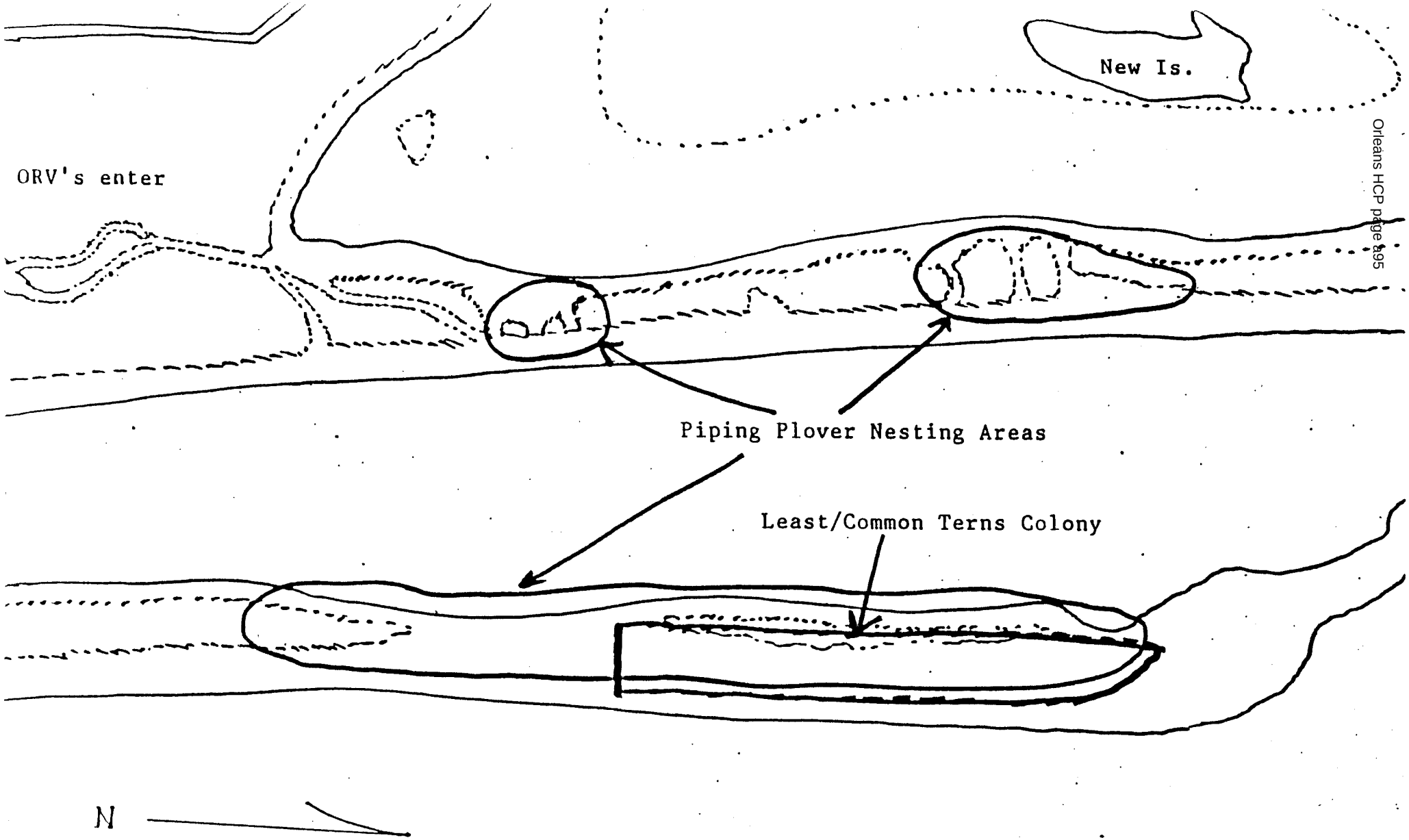
G. ENFORCEMENT

The Park Commission shall require additional enforcement patrol of the Nauset Spit ORV corridor to include expanded patrol coverage during off-peak usage, specifically weekday and pre-season periods. Should expanded patrol prove inadequate to protect the natural and wildlife resources which are the subject of this Order, the Conservation Commission may require additional enforcement.

Overall enforcement responsibility for management of the Nauset Barrier Beach system as described by the attached Order of Conditions is designated by state and local statutory requirements to Town of Orleans officials. In this instance, primary enforcement responsibility will be shared by the Conservation Commission, Park Commission, and their respective agents.

Piping Plover and Least Tern
Management Calendar - Approximate dates

ECOLOGY	MANAGEMENT
March	
16 First plovers return	15-31 Post known plover habitat
April	
28 First plover eggs laid	20 Fence and post known Least Tern areas 28 Fence and post each plover nest
May	
7 First Least Terns arrive 20 First Least Tern eggs laid 28 First plover eggs hatch	1-31 Continue to fence and post new plover nests 20 Discontinue ORV travel post early plover nests 25 Adjust Least Tern fence to include new changes
June	
1-6 Peak period of plover hatchings 9 First Least Tern eggs laid	1-30 Monitor feeding territory boundaries of plovers 1-30 Remove plover fences if not used by roosting plovers
July	
1-31 Peak of Least Tern hatching 1-6 Peak of plover fledging 9 First Least Terns fledge 21-31 Peak of Least Tern fledging	1-31 Direct traffic to pass Least Tern area in low tide zone when possible and enforce 5 mph speed limit 1-31 Re-open traffic when plovers have fledged 1-31 Continue to monitor foraging plovers
August	
1-31 Least Terns continue to fledge 1-20 Piping Plovers continue to fledge 15-31 Least Terns and plovers begin to migrate south	1-31 Continue to remove plover fence 1-31 Continue to monitor foraging plovers 1-31 Continue to maintain tern fence 1-31 Continue to direct traffic and enforce speed limits
September	
1-10 Least Terns continue to fledge and depart 1-10 Last plovers depart	10-15 Remove Least Tern fence 10-15 Remove all signs and symbollic fence 15-30 Prepare reports for conservation commission, parks, [illegible]



Approximate Rare Species Habitat
Based on 1990 Conditions

Nauset Spit Barrier Beach

(from Callanan's Pass to tip 2.1 mi.)
One inch = 515 feet

Hecker 1/91

10.27: Coastal Beaches

(1) Preamble. Coastal beaches, which are defined to include tidal flats, are significant to storm damage prevention, flood control and the protection of wildlife habitat. In addition, tidal flats are likely to be significant to the protection of marine fisheries and where there are shellfish, to land containing shellfish.*

Coastal beaches dissipate wave energy by their gentle slope, their permeability and their granular nature, which permit changes in beach form in response to changes in wave conditions.

Coastal beaches serve as a sediment source for dunes and subtidal areas. Steep storm waves cause beach sediment to move offshore, resulting in a gentler beach slope and greater energy dissipation. Less steep waves cause an onshore return of beach sediment, where it will be available to provide protection against future storm waves.

A coastal beach at any point serves as a sediment source for coastal areas downdrift from that point. The oblique approach of waves moves beach sediment alongshore in the general direction of wave action. Thus, the coastal beach is a body of sediment which is moving along the shore.

Coastal beaches serve the purposes of storm damage prevention and flood control by dissipating wave energy, by reducing the height of storm waves, and by providing sediment to supply other coastal features, including coastal dunes, land under the ocean and other coastal beaches. Interruptions of these natural processes by man-made structures reduce the ability of the coastal beach to perform these functions.

A number of birds also nest in the coastal berm, between the toe of a dune and the high tide line. In addition, isolated coastal beaches on small islands are important as haul out areas for harbor seals.

Tidal flats are likely to be significant to the protection of marine fisheries and wildlife habitat because they provide habitats for marine organisms such as polychaete worms and mollusks, which in turn are food sources for fisheries and migratory and wintering birds. Coastal beaches are extremely important in recycling of nutrients derived from storm drift and tidal action. Vegetative debris along the drift line is vital for resident and migratory shorebirds, which feed largely on invertebrates which eat the vegetation. Below the drift line in the lower intertidal zone are infauna (invertebrates such as mollusks and crustacea) which are also eaten by shore birds.

Tidal flats are also sites where organic and inorganic materials may become entrapped and then returned to the photosynthetic zone of the water column to support algae and other primary producers of the marine food web.

When a proposed project involves the dredging, filling, removing, or altering of a coastal beach, the issuing authority shall presume that the coastal beach is significant to the interests specified above. This presumption may be overcome only upon a clear showing that a coastal beach does not play a role in storm damage prevention, flood control, or protection of wildlife habitat, or that tidal flats do not play a role in the protection of marine fisheries or land containing shellfish, and if the issuing authority makes a written determination to such effect.

*For regulations concerning land containing shellfish see 310 CMR 10.34.

10.27: continued

When coastal beaches are determined to be significant to storm damage prevention or flood control, the following characteristics are critical to the protection of those interests:

(a) volume (quantity of sediments) and form, and

(b) the ability to respond to wave action.

When coastal beaches are significant to the protection of marine fisheries or wildlife habitat, the following characteristics are critical to the protection of those interests:

(a) distribution of sediment grain size,

(b) water circulation

(c) water quality, and

(d) relief and elevation.

When tidal flats are in a designated port area, 310 CMR 10.26(1) through 10.26(4) shall apply. When tidal flats are significant to land containing shellfish, 310 CMR 10.34(1) through 10.34(8) shall apply.

(2) Definitions.

(a) Coastal Beach means unconsolidated sediment subject to wave, tidal and coastal storm action which forms the gently sloping shore of a body of salt water and includes tidal flats. Coastal beaches extend from the mean low water line landward to the dune line, coastal bankline or the seaward edge of existing man-made structures, when these structures replace one of the above lines, whichever is closest to the ocean.

(b) "Tidal Flat" means any nearly level part of a coastal beach which usually extends from the mean low water line landward to the more steeply sloping face of the coastal beach or which may be separated from the beach by land under the ocean.

WHEN A COASTAL BEACH IS DETERMINED TO BE SIGNIFICANT TO STORM DAMAGE PREVENTION, FLOOD CONTROL, OR PROTECTION OF WILDLIFE HABITAT, THE FOLLOWING REGULATIONS SHALL APPLY:

(3) Any project on a coastal beach, except any project permitted under 310 CMR 10.30(3)(a), shall not have an adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach.

(4) Any groin, jetty, solid pier, or other such solid fill structure which will interfere with littoral drift, in addition to complying with 310 CMR 10.27(3), shall be constructed as follows:

(a) It shall be the minimum length and height demonstrated to be necessary to maintain beach form and volume. In evaluating necessity, coastal engineering, physical oceanographic and/or coastal geologic information shall be considered.

(b) Immediately after construction any groin shall be filled to entrapment capacity in height and length with sediment of grain size compatible with that of the adjacent beach.

(c) Jetties trapping littoral drift material shall contain a sand by-pass system to transfer sediments to the downdrift side of the inlet or shall be periodically redredged to provide beach nourishment to ensure that downdrift or adjacent beaches are not starved of sediments.

(5) Notwithstanding 310 CMR 10.27(3), beach nourishment with clean sediment of a grain size compatible with that on the existing beach may be permitted.

WHEN A TIDAL FLAT IS DETERMINED TO BE SIGNIFICANT TO MARINE FISHERIES OR THE PROTECTION OF WILDLIFE HABITAT, THE FOLLOWING REGULATION SHALL APPLY:

(6) In addition to complying with the requirements of 310 CMR 10.27 (3) and 10.27(4), a project on a tidal flat shall if water-dependent be designed and constructed, using best available measures, so as to minimize adverse effects, and if non-water-dependent, have no adverse effects, on marine fisheries and wildlife habitat caused by:

10.27: continued

(a) alterations in water circulation,
(b) alterations in the distribution of sediment grain size, and
(c) changes in water quality, including, but not limited to, other than natural fluctuations in the levels of dissolved oxygen, temperature or turbidity, or the addition of pollutants.

(7) Notwithstanding the provisions of 310 CMR 10.27(3) through 10.27(6), no project may be permitted which will have any adverse effect on specified habitat sites or rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

10.28: Coastal Dunes

(1) Preamble. All coastal dunes are likely to be significant to storm damage prevention and flood control, and all coastal dunes on barrier beaches and the coastal dune closest to the coastal beach in any area are per se significant to storm damage prevention and flood control. Coastal dunes are also often significant to the protection of wildlife habitat.

Coastal dunes aid in storm damage prevention and flood control by supplying sand to coastal beaches. Coastal dunes protect inland coastal areas from storm damage and flooding by storm waves and storm elevated sea levels because such dunes are higher than the coastal beaches which they border. In order to protect this function, coastal dune volume must be maintained while allowing the coastal dune shape to conform to natural wind and water flow patterns.

Vegetation cover contributes to the growth and stability of coastal dunes by providing conditions favorable to sand deposition.

On retreating shorelines, the ability of the coastal dunes bordering the coastal beach to move landward at the rate of shoreline retreat allows these dunes to maintain their form and volume, which in turn promotes their function of protecting against storm damage or flooding.

A number of birds, most commonly terns and gulls, nest at the base or sides of dunes. In some dune systems other birds also nest in the interdunal area, the species being determined by the plant community structure, topography, and hydrologic regime of the area. In a few dune systems, wet meadows or vernal pool habitats occur, which serve as important feeding areas for a wide variety of bird species.

When a proposed project involves the dredging, filling, removal or alteration of a coastal dune, the issuing authority shall presume that the area is significant to the interests of storm damage prevention, flood control and the protection of wildlife habitat. This presumption may be overcome only upon a clear showing that a coastal dune does not play a role in storm damage prevention, flood control or the protection of wildlife habitat, and if the issuing authority makes a written determination to that effect.

When a coastal dune is significant to storm damage prevention, flood control or the protection of wildlife habitat, the following characteristics are critical to the protection of those interest(s):

(a) the ability of the dune to erode in response to coastal beach conditions;
(b) dune volume;
(c) dune form, which must be allowed to be changed by wind and natural water flow;
(d) vegetative cover;
(e) the ability of the dune to move landward or laterally; or
(f) the ability of the dune to continue serving as bird nesting habitat.

(2) Definition. Coastal Dune means any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.

WHEN A COASTAL DUNE IS DETERMINED TO BE SIGNIFICANT TO STORM DAMAGE PREVENTION, FLOOD CONTROL OR THE PROTECTION OF WILDLIFE HABITAT, THE FOLLOWING REGULATIONS SHALL APPLY:

10.28: continued

(3) Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by:

(a) affecting the ability of waves to remove sand from the dune;
(b) disturbing the vegetative cover so as to destabilize the dune;
(c) causing any modification of the dune form that would increase the potential for storm or flood damage;
(d) interfering with the landward or lateral movement of the dune;
(e) causing removal of sand from the dune artificially; or
(f) interfering with mapped or otherwise identified bird nesting habitat.

(4) Notwithstanding the provisions of 310 CMR 10.28(3), when a building already exists upon a coastal dune, a project accessory to the existing building may be permitted, provided that such work, using the best commercially available measures, minimizes the adverse effect on the coastal dune caused by the impacts listed in 310 CMR 10.28 (3)(b) through 10.28(3)(e). Such an accessory project may include, but is not limited to, a small shed or a small parking area for residences. It shall not include coastal engineering structures.

(5) The following projects may be permitted, provided that they adhere to the provisions of 310 CMR 10.28(3):

(a) pedestrian walkways, designed to minimize the disturbance to the vegetative cover and traditional bird nesting habitat;
(b) fencing and other devices designed to increase dune development; and
(c) plantings compatible with the natural vegetative cover.

(6) Notwithstanding the provisions of 310 CMR 10.28(3) through (5), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

10.29: Barrier Beaches

(1) Preamble. Barrier beaches are significant to storm damage prevention and flood control and are likely to be significant to the protection of marine fisheries and wildlife habitat and, where there are shellfish, the protection of land containing shellfish.*

Barrier beaches protect landward areas because they provide a buffer to storm waves and to sea levels elevated by storms. Barrier beaches protect from wave action such highly productive wetlands as salt marshes, estuaries, lagoons, salt ponds and fresh water marshes and ponds, which are in turn important to marine fisheries and protection of wildlife habitat. Barrier beaches and the dunes thereon are also important to the protection of wildlife habitat in the ways described in 310 CMR 10.27(1) (coastal beaches) and 10.28(1) (coastal dunes).

Barrier beaches are maintained by the alongshore movement of beach sediment caused by wave action. The coastal dunes and tidal flats on a barrier beach consist of sediment supplied by wind action, storm wave overwash and tidal inlet deposition. Barrier beaches in Massachusetts undergo a landward migration caused by the landward movement of sediment by wind, storm wave overwash and tidal current processes. The continuation of these processes maintains the volume of the landform which is necessary to carry out the storm and flood buffer function.

When a proposed project involves removal, filling, dredging or altering of a barrier beach, the issuing authority shall presume that the barrier beach, including all of its coastal dunes, is significant to the interest(s) specified above. This presumption may be overcome only upon a clear showing that a barrier beach, including all of its coastal dunes, does not play a role in storm damage prevention, flood control, or the protection of marine fisheries, wildlife habitat, or land containing shellfish, and if the issuing authority makes a written determination to such effect.

*For regulations concerning land containing shellfish see 310 CMR 10.34.

10.29: continued

When a barrier beach is significant to storm damage prevention and flood control, the characteristics of coastal beaches, tidal flats and coastal dunes listed in 310 CMR 10.27(1) and 10.28(1) and their ability to respond to wave action, including storm overwash sediment transport, are critical to the protection of the interests specified above.

(2) Definition. Barrier Beach means a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends.

(3) When a Barrier Beach is Determined to be Significant to Storm Damage Prevention, Flood Control, Marine Fisheries or Protection of Wildlife Habitat. 310 CMR 10.27(3) through 10.27(6) (coastal beaches) and 10.28(3) through 10.28(5) (coastal dunes) shall apply to the coastal beaches and to all coastal dunes which make up a barrier beach.

(4) Notwithstanding the provisions of 310 CMR 10.29(3), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.37.

10.37: Rare Species

Ninety (90) days or less prior to the filing of a Notice of Intent, the applicant shall notify the Massachusetts Natural Heritage and Endangered Species Program (hereinafter referred to as the Program) certified mail or hand delivery (so that the Program will have received such notification prior to the filing of the

10.37: continued

Notice of Intent), of any proposed work which would alter a resource area identified on the most recent Estimated Habitat Map (if any) of state-listed vertebrate and invertebrate animal species occurrences in resource areas, provided to the conservation commission by the Program. Such map shall be based on the estimated geographical extent of the habitats of all such species for which a reported occurrence within the last 25 years has been accepted by the Program and incorporated into its official data base. Notification by the applicant to the Program shall include: a completed copy of Appendix A of a Notice of Intent (Form 3) or Abbreviated Notice of Intent (Form 4), as well as a copy of an 8 1/2" x 11" section of the USGS quadrangle map of the area, containing sufficient information for the Program to locate the precise boundaries of the portion(s) of the wetland resource area(s) to be altered.

Within 45 days of receipt by the Program of a fully completed Appendix A, or within 30 days of the filing of a Notice of Intent for which a fully completed Appendix A has been received by the Program in a timely manner (whichever comes first), the Program shall determine whether any state-listed species identified on the aforementioned map are likely to continue to be located on or near the site of the original occurrence and, if so, whether the area to be altered by the proposed project is in fact part of such species' habitat. Such determination shall be presumed by the issuing authority to be correct. Any proposed project which would alter a resource area that is not located on the most recent Estimated Habitat Map (if any) provided to the conservation commission, shall be presumed not to be within a rare species' habitat. Both of these presumptions are rebuttable and may be overcome upon a clear showing to the contrary. If the conservation commission fails to receive a response from the Program within 30 days of the filing of a Notice of Intent for which an Appendix A is or should have been filed in a timely manner, it shall issue its Order of Conditions based on available information; however, the fact that a proposed project would alter a resource area that is located on an Estimated Habitat Map shall not be considered sufficient evidence in itself that such project is in fact within the habitat of a rare species.

If the Program determines that a resource area which would be altered by a proposed project is in fact within the habitat of a state-listed species, it shall provide in writing to the applicant and (after a Notice of Intent has been filed by the applicant) to the Conservation Commission and the Department, the identification of the species whose habitat would be altered by the proposed project, and all other relevant information which the Program has regarding the species' location and habitat requirements, insofar as such information may assist the applicant and the issuing authority to determine whether the project is or can be designed so as to meet the performance standard set in this Section, below.

Notwithstanding 310 CMR 10.24(7) and 10.25 and 310 CMR 10.27 through 10.35, if a proposed project is found by the issuing authority to alter a resource area which is part of the habitat of a state-listed species, such project shall not be permitted to have any short or long term adverse effects on the habitat of the local population of that species. A determination of whether or not a proposed project will have such an adverse effect shall be made by the issuing authority. However, a written opinion of the Program on whether or not a proposed project will have such an adverse effect shall be presumed by the issuing authority to be correct. This presumption is rebuttable and may be overcome upon a clear showing to the contrary.

The conservation commission shall not issue an Order of Conditions under 310 CMR 10.05(6) regarding any project for which an Appendix A is required for at least 30 days after the filing of the Notice of Intent or Abbreviated Notice of Intent, unless the Program before such time period has elapsed has either determined that the resource area(s) which would be altered by the project is not in fact within the habitat of a state-listed species or, if it has determined that such resource area(s) is in fact within rare species habitat, rendered a written opinion as to whether the project will have an adverse effect on that habitat.

Notwithstanding any other provision of this Section, should an Environmental Impact Report be required for a proposed project under the Massachusetts Environmental Policy Act, as determined by 301 CMR 11.00 the performance standard established under this Section shall only apply to proposed projects which would alter the habitat of a rare species for which an occurrence has been entered into the official data base of the Massachusetts Natural Heritage and Endangered Species Program prior to the time that the Secretary of the Executive Office of Environmental Affairs has determined, in accordance with the provisions of 301 CMR 11.09(4), that a final Environmental Impact Report for that project adequately and properly complies with the Massachusetts Environmental Protection Act (unless, subsequent to that determination, the Secretary requires supplemental information concerning state-listed species, in

Town of Orleans: Nauset Barrier Beach System

This map is illustrative and intended for planning purposes only. Orleans Planning, 2013

photo base map: April, 2011

N W E S

0 1,400 2,800 5,600 Feet

Summary of Piping Plover (*Charadrius melodus*) Breeding Success on Nauset Spit and North Beach, Orleans And Chatham, Massachusetts 1998

SEP - 9 1998

Submitted to:

Paul O. Fulcher
Park Superintendent
Orleans Park Department
Orleans, MA 02653

And

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

And

Dr. Scott M. Melvin
Natural Heritage and Endangered Species Program
Mass. Dept. of Fisheries and Wildlife
Westboro, MA 01581

Submitted by:

Kerry Collier and Meggan Eldredge
Orleans Park Department
Orleans, MA 02653

Introduction

This is a summary of the 1998 breeding success of the Piping Plover (*Charadrius melodus)* on Nauset Spit and North Beach in the towns of Orleans and Chatham, Massachusetts. This report contains tables illustrating the productivity rates of the birds, as well as summaries of Plover activity. It also contains maps displaying nest locations and charts comparing the productivity of previous years.

In 1997, exclosures had only been used for a few nests because there was reason to believe that predators were beginning to recognize and associate the white wire exclosures with a food source. For 1998, attempts were made to exclose all completed nests. Three of the nests were not exclosed: ONB-7 was not found until after the eggs hatched, NS-17 would not accept an exclosure and CNB-3 hatched before an exclosure could be erected. All of these unexclosed nests hatched. Unlike previous years, none of the exclosed nests were lost to depredation. In one instance, an adult from an exclosed nest was depredated, and the wing of the bird was found five feet from the exclosure. The eggs from that nest were abandoned.

Least Terns were observed attempting to nest on Nauset Spit in early May. Approximately six nests were found in early June, yet when the census was conducted only one of the nests had not been depredated. We believe gull activity and depredation disturbed the small Tern colony. One Least Tern chick was seen on June 23, but was not seen after that date.

Least Terns were also observed scraping and roosting late in the season in Chatham, on the South tip of North Beach. One nest was found on August 6. As of this writing, the eggs were still being incubated.

Abundance and Productivity of Piping Plovers on Nauset Spit, Orleans, MA, and North Beach, Orleans and Chatham, MA, 1998.

	Nauset Spit	North Beach Orleans	North Beach Chatham	TOTAL
Nests				
Pairs*	18	7	9	31 (34)
Total	20	8	9	37
Total Successful (%)**	13 (65)	5 (62.5)	7 (77.77)	25 (67.56)
Eggs				
Laid	70	23	31	124
Hatched (%)	45 (64.28)	19 (82.6)	24 (77.41)	88 (70.69)
Chicks				
Fledged (%)	7 (15.55)	9 (47.36)	13 (54.17)	29 (32.95)
Mean Fledge/Pair***	0.43	1.28	1.625	0.935

*Includes territorial pair who may have scraped, shown site fidelity, etc...but did not lay eggs.
** A successful nest is one that hatched 1 or more eggs.
*** Total no. of chicks fledged divided by the total no. of territorial pairs that were monitored closely enough to get fledging data for, even if fledging or breeding success for those pairs was zero.

Nesting Attempts on Nauset Spit
1998

Nest	Location	Found (#eggs)	Complete	Exclosed	Expected Hatch	Hatch Date	Fledge Date (#)	Notes
NS-1	1	5/1 (4)	<=5/1	5/27	<=5/29	X	X	Abandoned <=5/11
NS-1b	3 post S of 1	5/24 (3)	5/25	5/27	6/22	6/20	X	
NS-2	1 stake N of 1	5/2 (3)	5/11	X	X	X	X	washed out 5/14
NS-2b	1 post N of 1	5/24 (2)	5/27	5/27	6/24	6/21	X	
NS-3	1 post S of 2	5/9 (2)	5/11	5/17	6/9	6/8 (3)	X	lost 1 egg 5/14
NS-4	N of 2	5/9 (2)	X	X	X	X	X	washed out 5/14
NS-5	1 post S of 3	5/8 (3)	X	X	X	X	X	washed out 5/14
NS-5b	1 post S of 3	5/28 (4)	<=5/28	6/3	<=6/25	6/20	7/15 (3)	
NS-6	2 posts S of 4	5/2 (2)	5/9	5/11	6/7	6/6 (3)	X	lost 1 egg 5/14
NS-7	1 post N of 4	5/2 (4)	<=5/2	5/11	<=5/30	5/29 (3)	6/23 (1)	1 egg failed
NS-8	2 posts S of 3	5/14 (1)	X	X	X	X	X	abandoned 5/16
NS-9	N of 6	5/18 (4)	<=5/18	5/23	<=6/15	6/12 (2)	X	2 eggs failed
NS-10	S of 5	5/24 (4)	<=5/24	5/27	<=6/21	X	X	abandoned 6/12
NS-10b	S of 5	6/23 (1)	6/27	7/2	7/25	7/22 (3)	X	1 egg failed
NS-11	3	5/24 (3)	5/25	5/27	6/22	6/21	X	
NS-13	N of Calanans	5/24 (1)	5/30	6/3	6/27	6/25	X	
NS-14	S of pond	5/25 (3)	5/26	5/27	6/23	6/21	7/16 (3)	
NS-15	1 post S of 6	6/3 (4)	<=6/3	6/3	<=7/1	6/27	X	
NS-16	1 post N of 6	6/6 (1)	X	X	X	X	X	depredated 6/7
NS-17	3 N of 6	6/9 (1)	6/13 (3)	no	7/11	7/10 (3)	X	would not accept exclosure

Nesting Attempts on North Beach, Orleans
1998

Nest	Location	Found (#eggs)	Complete	Exclosed	Expected Hatch	Hatch Date	Fledge Date	Notes
ONB-1	N of 1	5/7 (1)	5/11	5/17	6/9	6/6	7/1 (2)	
ONB-2	5 posts S of 2	5/15 (1)	5/21	5/23	6/18	6/18	7/13 (3)	
ONB-3	12 posts N of 6	5/15 (1)	X	X	X	X	X	abandoned 5/17
ONB-4	5 posts N of 6	5/19 (1)	5/23	5/23	6/18	6/16	X	
ONB-4b	5 posts N of 6	6/25 (1)	X	X	X	X	X	depredated 6/29
ONB-5	S of Pochet	5/23 (3)	<=5/23 (3)	5/25	<=6/20	6/20 (3)	7/15 (2)	
ONB-6	1 post S of 3	5/25 (4)	<=5/25	5/26	<=6/22	X	X	adult depredated 6/9
ONB-7	S of Pochet	nest not found	5/20?	no	6/15	6/15	7/2 (2)	

Nestint Attempts on North Beach, Chatham
1998

Nest	Location	Found (#eggs)	Complete	Exclosed	Expected Hatch	Hatch Date	Fledge Date	Notes
CNB-1	N of 9	5/2 (3)	5/5	5/9	6/2	5/31	7/25 (2)	
CNB-2	3 posts S of 6	5/15 (4)	<=5/15	5/17	<=6/12	6/9	7/4 (3)	
CNB-3	S spit	5/19 (3)	<=5/19 (3)	no	<=6/16	6/7 (3)	7/2 (2)	
CNB-4	S of 10	5/26 (1)	X	X	X	X	X	abandoned <5/26
CNB-4b	S of 10	5/26 (4)	<=5/26	6/7	<=6/23	6/17 (3)	7/12 (2)	1 egg failed
CNB-5	S spit	5/29 (4)	<=5/29	6/7	<=6/26	6/15	7/10 (2)	
CNB-6	S spit	6/3 (1)	6/10 (3)	6/11	7/8	7/5 (3)	7/30 (2)	
CNB-7	3 post S of 10	6/7 (4)	<=6/7	6/9	<=7/5	X	X	abandoned 6/15
CNB-8	S spit	6/9 (4)	<=6/9	6/10	<=7/7	7/3 (3)	X	1 egg failed

Year: 1998

Site Name: Nauset Spit

Town: Orleans

Ownership:

Observer/Agency: Kerry Collier + Meggan Eldredge

Address: Orleans Park Department
Nauset Beach, Orleans

Telephone: (508) 240-3780

Census Results:	Index Count	Total Count
No. of Pairs	18	18
Unpaired Adults	1	1

Census Remarks:

Month	Average # of visits to site per week
April	2
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular with wings	Circular, no wings	
Diameter/Length of Side	10 Foot diameter	same	
Size of Wire Mesh	5" x 2"	same	
Height Above Ground	4'	same	
Depth Buried	5"	same	
Cover Material	black Fruit netting	same	
Cover Spacing/Mesh Size	1/2" x 1/2"	same	

Other Management Undertaken or Needed/Remarks:

Symbolic Fencing around entire nesting area. No dogs allowed. No pedestrians with in 50 Feet of nests. Area closed to ORV traffic 2 days before expected hatch date.

Site Name: Nauset Spit Year: 1998 Observer: Kerry Collier + Meggan Eldredge

Page 1 of 3

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-1	1	4	—	—	5/1 (4)	≤ 5/1	F 5/11	Y	B	5/5
NS-1b	2	4	4	—	5/24 (3)	5/25	H 6/20	Y	A	5/27
NS-2	1	4	—	—	5/2 (3)	5/3	F 5/14	N	—	—
NS-2b	2	4	4	—	5/24 (2)	5/27	H 6/21	Y	A	5/27
NS-3	1	4	3	—	5/9 (2)	5/11	H 6/8	Y	A	5/17
NS-4	1	2	—	—	5/9 (2)	—	F 5/14	—	—	—
NS-5	1	4	—	—	5/8 (3)	5/9	F 5/14	N	—	—
NS-5b	2	4	4	3	5/28 (4)	5/23	H 6/20	Y	A	6/3
NS-6	1	4	3	—	5/2 (2)	5/9	H 6/6	Y	B	5/9
NS-7	1	4	3	1	5/2 (4)	≤ 5/2	H 5/29	Y	B	5/9

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
NS-1	4 eggs were abandoned 5/11	
NS-2	washed out 5/14. Visible wrack line above nest.	
NS-3	Lost 1 egg to tide 5/14	
NS-4	washed out 5/14. Visible wrack line	
NS-5	washed out 5/14. Visible wrack line	
NS-6	1 egg Failed to hatch	
NS-7	1 egg Failed to hatch	

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te Name: Nauset Spit Year: 1998 Observer: Kerry Collier + Meggan Eldredge

Page 2 of 3

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-8	1	1	—	—	5/14 (1)	—	F 5/16	N	—	—
NS-9	1	4	2	—	5/18 (4)	≤ 5/18	H 6/12	Y	A	5/23
NS-10	1	4	—	—	5/24 (4)	≤ 5/24	F 6/10	Y	B	5/27
NS-10b	2	4	3	—	6/23 (1)	6/27	H 7/22	Y	A	7/2
NS-11	1	4	4	—	5/24 (3)	5/25	H 6/21	Y	B	5/27
NS-13	1	4	4	—	5/24 (1)	5/30	H 6/25	Y	B	6/3
NS-14	1	4	4	3	5/25 (3)	5/26	H 6/21	Y	A	5/27
NS-15	1	4	4	—	6/3 (4)	≤ 6/3	H 6/27	Y	A	6/3
NS-16	1	1	—	—	6/6 (1)	—	F 6/9	N	—	—
NS-17	1	3	3	—	6/9 (1)	6/13	H 7/10	N	—	—

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
NS-8	1 egg abandoned 5/16.	
NS-9	2 eggs Failed to hatch.	
NS-10	abandoned 4 eggs on 6/10.	
NS-12	determined to be NS-2b.	
NS-16	Depredated. Gull tracks within 1 Foot of nest.	
NS-17	Would not accept exclosure on 6/18.	

Please attach a copy of

ite Name: Nauset Spit Year: 1998 Observer: Kerry Collier + Meggan Eldredge

Page 3 of 3

		Number of Eggs/Chicks			Date clutch was:			Exclosure		
Pair No.	Nest No.	Laid	Hatched	Fledged	Found (#eggs?)	Completed	Hatched or Failed	Y/N	Design(A,B,...)	Date Installed
NS-18	—	—	—	—	—	—	—	—	—	—
NS-19	—	—	—	—	—	—	—	—	—	—

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
NS-18	pair did not lay eggs	
NS-19	pair did not lay eggs.	

**Please attach a copy of a map of this site [illegible]

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 1998

Site Name: North Beach

Town: Orleans

Ownership:

Observer/Agency: Kerry Collier & Megan Eldredge

Address: Orleans Park Dept.
Nauset Beach

Telephone: 240-3780

Census Results:	Index Count	Total Count
No. of Pairs	4	7
Unpaired Adults	0	0

Census Remarks:

Month	Average # of visits to site per week
April	2
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular w/wings	Circular, no wings	
Diameter/Length of Side	10' diameter	same	
Size of Wire Mesh	2" x 5"	same	
Height Above Ground	4'	same	
Depth Buried	5"	same	
Cover Material	Fruit netting	same	
Cover Spacing/Mesh Size	1/2"	same	

Other Management Undertaken or Needed/Remarks:

Symbolic fencing around each nest. Redirected ORV traffic around nests. No pedestrians within 50 feet of nest and 15 feet from the toe of the dune. Dogs must be on a leash 30 feet or less. Areas closest to vehicles and dogs 2 days before expected hatch date

Orleans CP page a116

Site Name: Orleans North Beach Year: 1998 Observer: Kerry Collier & Meggan Eldredge

Page 1 of 1

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
ONB-1	1	4	4	3	5/7 (1)	5/11	H 6/6	Y	A	5/17
ONB-2	1	4	4	3	5/15 (1)	5/21	H 6/18	Y	A	5/23
ONB-3	1	1	—	—	5/15 (1)	—	F 5/17	—	—	—
ONB-4	1	4	4	—	5/19 (1)	5/23	H 6/16	Y	A	5/23
ONB-4b	2	2	—	—	6/25 (1)	—	F 6/29	—	—	—
ONB-5	1	3	3	2	5/23 (3)	E 5/23	H 7/15	Y	A	5/25
ONB-6	1 **	4	—	—	5/25 (4)	E 5/25	F 6/9	Y	B	5/26
ONB-7	1	?	3	2	No	5/20?	H 6/15	N	—	—

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
ONB-3	egg was abandoned 5/17.	
ONB-4b	eggs were depredated 6/26, no tracks, unknown predator.	
ONB-6	eggs were abandoned, plover wing was found 5 feet from nest 6/9, unknown predator.	

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

Year: 1998

Site Name: North Beach

Town: Chatham

Ownership:

Observer/Agency: Kerry Collier & Meggan Eldredge

Address: Orleans Park Dept.
Nauset Beach

Telephone: (508) 240-3780

Census Results:	Index Count	Total Count
No. of Pairs	8	9
Unpaired Adults	1	0

Census Remarks:

Month	Average # of visits to site per week
April	2
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular, with wings	Circular, no wings	
Diameter/Length of Side	10' diameter	Same	
Size of Wire Mesh	2" x 5"	Same	
Height Above Ground	4'	Same	
Depth Buried	5"	Same	
Cover Material	Fruit netting	Same	
Cover Spacing/Mesh Size	1/2"	Same	

Other Management Undertaken or Needed/Remarks:

Symbolic fencing around each nest. Redirected ORV traffic around nests. No pedestrians within 50 feet of nest and 15 feet from toe of the dune. Dogs must be on leashes of 30 feet or less. Area closed to vehicles and dogs 2 days before expected hatch date.

Cape Cod HCP page 4-118

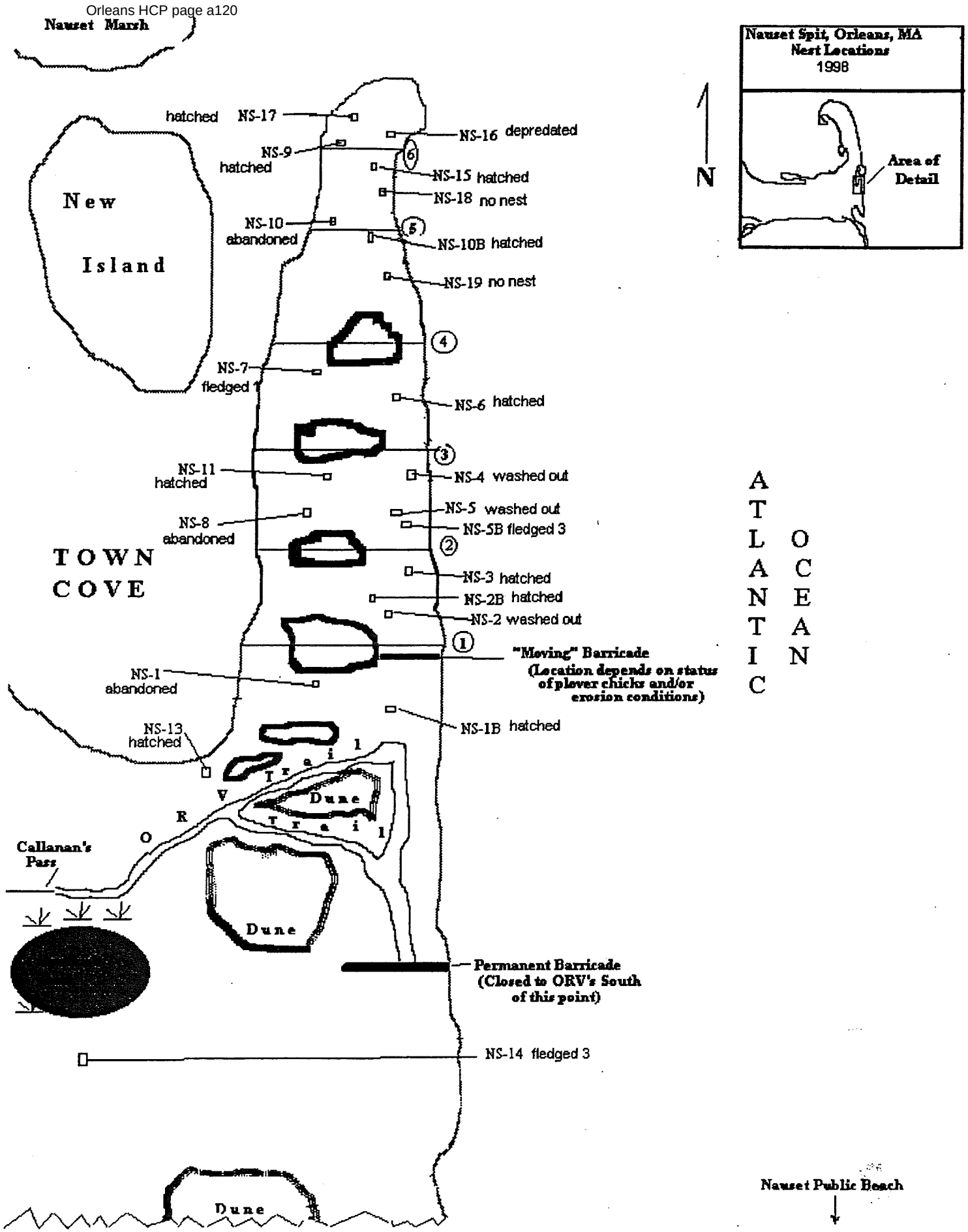
ite Name: North Beach, Chatham Year: 1998 Observer: Kerry Collier & Meggan Eldredge

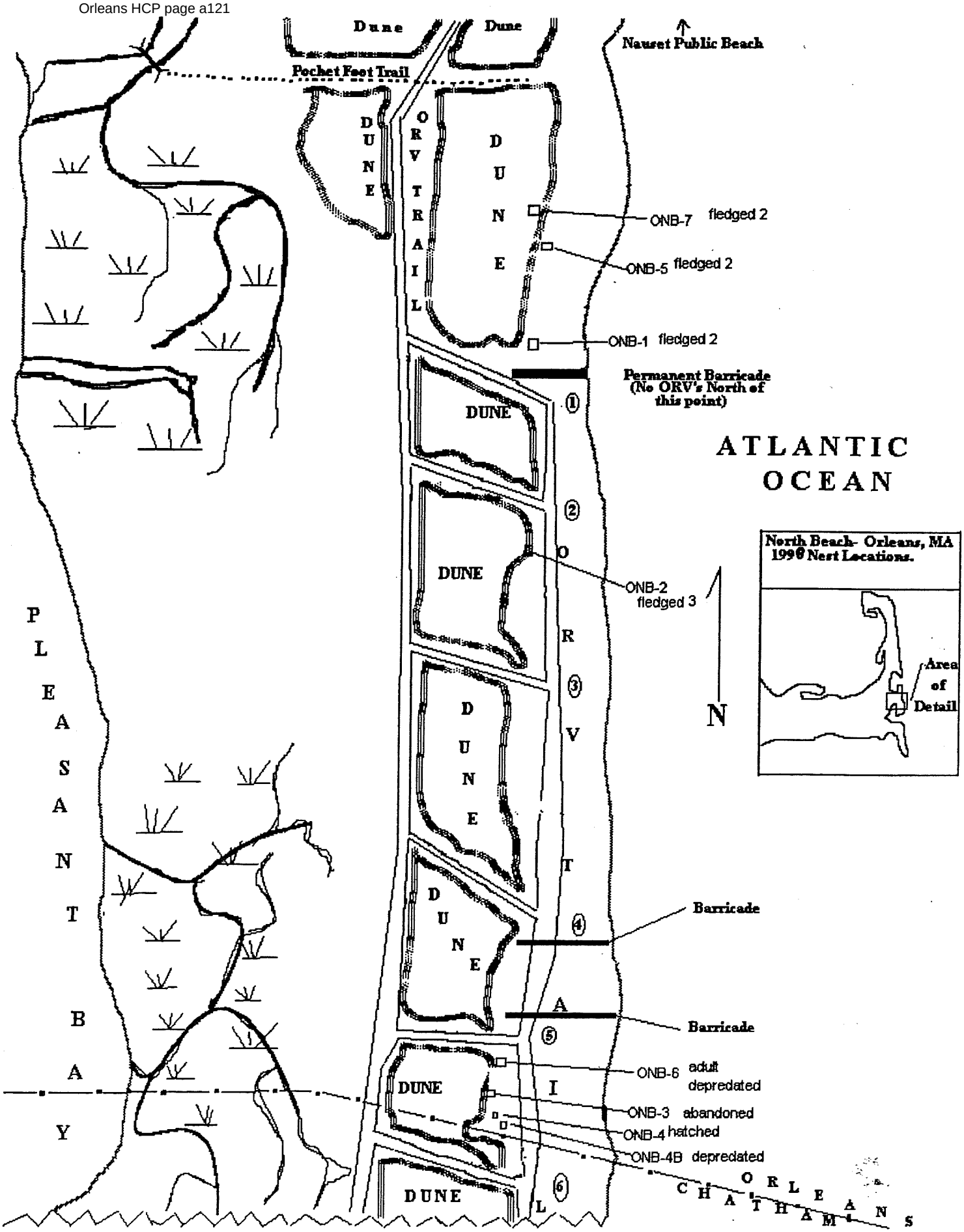
Page 1 of 8

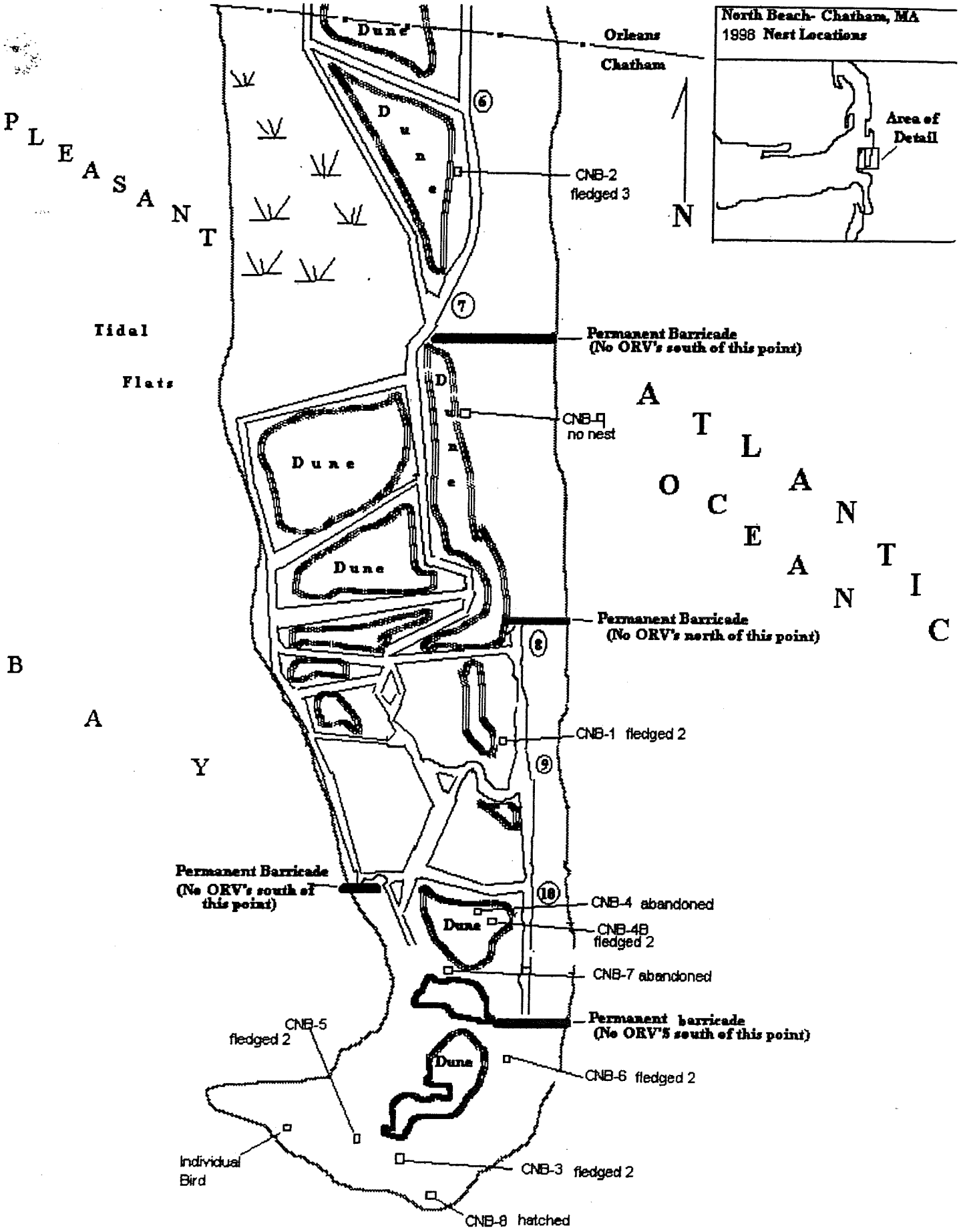
Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
CNB-1	1	4	4	2	5/2 (3)	5/5	H 5/31	Y	B	5/8
CNB-2	1	4	4	3	5/2 (4)	≤ 5/2	H 6/9	Y	A	5/17
CNB-3	1	3	3	2	5/19 (3)	≤ 5/19	H 6/7	N	—	—
CNB-4	1	1	—	—	5/25 (1)	—	—	—	—	—
CNB-4b	2	4	3	2	5/25 (4)	≤ 5/25	H 6/17	Y	A	6/7
CNB-5	1	4	4	2	5/29 (4)	≤ 5/29	H 6/15	Y	A	6/7
CNB-6	1	3	3	2	6/3 (1)	6/10	H 7/5	Y	A	6/11
CNB-7	1	4	—	—	6/7 (4)	≤ 6/7	F 6/14	Y	A	6/9
CNB-8	1	4	3	—	6/9 (4)	≤ 6/9	H 7/3	Y	A	6/10
CNB-9	1	0	—	—	—	—	—	—	—	—

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
CNB-4	1 egg was abandoned before 5/25.	
CNB-7	eggs abandoned 6/14.	

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

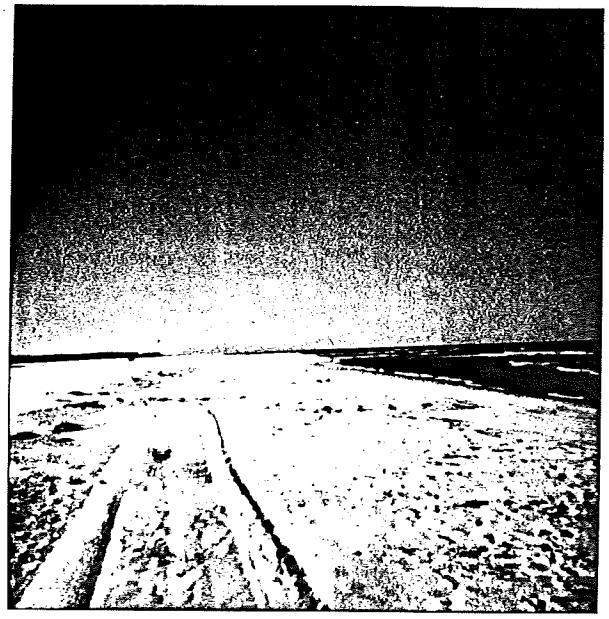

Nauset Marsh
Nauset Spit, Orleans, MA
Nest Locations
1998
Area of Detail
N
New Island
TOWN COVE
ATLANTIC OCEAN
hatched NS-17
NS-16 depredated
NS-9 hatched
NS-15 hatched
NS-18 no nest
NS-10 abandoned
NS-10B hatched
NS-19 no nest
NS-7 fledged 1
NS-6 hatched
NS-11 hatched
NS-4 washed out
NS-5 washed out
NS-5B fledged 3
NS-8 abandoned
NS-3 hatched
NS-2B hatched
NS-2 washed out
"Moving" Barricade
(Location depends on status of plover chicks and/or erosion conditions)
NS-1 abandoned
NS-1B hatched
NS-13 hatched
Trail
Dune
Trail
Dune
Callanan's Pass
Permanent Barricade
(Closed to ORV's South of this point)
NS-14 fledged 3
Dune
Nauset Public Beach


Dune
Dune
Nauset Public Beach
Pochet Feet Trail
DUNE
ORV TRAIL
DUNE
ONB-7 fledged 2
ONB-5 fledged 2
ONB-1 fledged 2
Permanent Barricade (No ORV's North of this point)
DUNE
1
ATLANTIC OCEAN
2
DUNE
ONB-2 fledged 3
ORV TRAIL
3
DUNE
PLEASANT BAY
DUNE
4
Barricade
Barricade
5
ONB-6 adult depredated
DUNE
ONB-3 abandoned
ONB-4 hatched
ONB-4B depredated
DUNE
6
CHATHAM
ORLEANS
N
North Beach- Orleans, MA 1990 Nest Locations.
Area of Detail


North Beach- Chatham, MA
1998 Nest Locations
Area of Detail
Orleans
Chatham
N
PLEASANT
BAY
Tidal
Flats
ATLANTIC OCEAN
Dune
Dune
Dune
Dune
Dune
Dune
Dune
Dune
6
7
8
9
10
CNB-2
fledged 3
Permanent Barricade
(No ORV's south of this point)
CNB-
no nest
Permanent Barricade
(No ORV's north of this point)
CNB-1 fledged 2
Permanent Barricade
(No ORV's south of this point)
CNB-4 abandoned
CNB-4B
fledged 2
CNB-7 abandoned
Permanent barricade
(No ORV'S south of this point)
CNB-5
fledged 2
CNB-6 fledged 2
Individual
Bird
CNB-3 fledged 2
CNB-8 hatched

July, 1998

Wrack line on the Atlantic Ocean side of Nauset Spit



Wrack line on the Town Cove side of Nauset Spit

PAIR SUMMARIES

1998

NS-1
5/1 found nest with 4 eggs
5/11 exclosed nest was abandoned after a few days of strong winds
5/18 and 6/13 crow tracks observed circling abandoned exclosure

NS-1b
5/24 nest found with three eggs
6/20 4 eggs hatched; chicks fed on the cove near a large patch of grass
7/5 last sighting of three chicks
7/10 saw 1 chick, alone, 20 days old. Chicks were not seen again, none are believed to have fledged

NS-2
4/26 pair scraping
5/2 nest found with 3 eggs
5/14 nest was washed out by high tide

NS-2b
5/24 nest found with 2 eggs
6/21 4 eggs hatched, chicks fed on the cove in a large patch of grass
6/25 last sighting of 3 chicks
6/27 saw 2 birds, but no chicks. Coyote tracks observed going through the area

NS-3
5/9 nest found with 2 eggs
5/14 lost 1 egg to high tide
5/25-6/6 gull seen roosting next to the exclosure
6/8 3 eggs hatched
6/23 saw 3 chicks
6/24 could not find chicks
6/27 pair scraping

NS-4
4/25 pair scraping
5/9 found nest with 2 eggs
5/14 nest washed out by high tide

NS-5
5/2 pair scraping
5/8 nest found with 3 eggs
5/14 nest washed out by high tides

NS-5b
5/28 nest found with 4 eggs
6/20 4 eggs hatched, chicks fed near a seal carcass on the ocean side, near a patch of grass
6/21 saw 4 chicks
7/15 3 chicks fledged

NS-6
5/2 nest found with 2 eggs
5/14 lost 1 egg to high tide
6/6 3 eggs hatched, chicks fed on the cove in a sandy area without grass
6/10 chicks could not be found

NS-7
5/2 nest found with 2 eggs
5/29 3 eggs hatched, 1 failed; chicks fed near a seal carcass on the ocean side, near a large patch of grass
6/6 saw 3 chicks
6/12 saw 2 chicks
6/23 1 chick fledged

NS-8
5/14 found nest with 1 egg
5/16 1 egg abandoned
6/3 pair scraping

NS-9
5/18 nest found with 4 eggs
6/12 2 eggs hatched, 2 eggs failed; chicks fed on the cove near a sandy area without grass
6/14 saw 2 chicks
6/16 saw 1 chick
6/18 could not find chicks

NS-10
5/4 pair scraping
5/24 nest found with 4 eggs
6/12 exclosed nest was abandoned

NS-10b
6/21 pair scraping
6/24 nest found with 2 eggs
7/22 3 eggs hatched, 1 egg failed, chicks fed on the cove near the same patch of grass as NS-7, but did not utilize the seal carcass
7/23 saw 3 chicks
7/26 saw 2 chicks; decapitated Common Tern found in the area
8/1 could not find chicks

NS-11
5/24 nest found with 3 eggs
6/21 4 eggs hatched; chicks fed in the same grass as NS-5b
6/22 saw 3 chicks
6/24 could not find chicks
6/27 and 7/7 pair scraping

NS-12
see NS-2b

NS-13
5/24 nest found with 1 egg
6/25 4 eggs hatched; severe thunderstorm in the evening
6/27 could not find chicks

NS-14
4/25 pair in area
5/25 nest found with 3 eggs
6/21 4 eggs hatched; chicks fed on the ocean in the a.m. and on a brackish pond during the day
7/16 3 chicks fledged

NS-15
6/3 nest found with 4 eggs
6/27 4 eggs hatched; chicks fed on the cove near a sandy area with no grass
6/29 could not find chicks

NS-16
6/6 nest found with 1 egg
6/7 1 egg lost to unknown predator

NS-17
6/9 nest found with 1 egg
6/18 would not accept exclosure
7/10 3 eggs hatched; chicks fed near a large patch of grass until NS10b hatched, then on the cove near a sandy area where the nest was located
7/15 saw 3 chicks
7/23 saw 2 chicks; decapitated Common Tern found in the area
7/25 saw 1 chick. 15 days old; chicks were not seen again

NS-18
5/24 saw territorial bird
5/30 bird was seen again
6/3 bird was seen again

NS-19
6/3 saw territorial pair at barricade

ONB-1
5/7 nest found with 1 egg
6/6 3 eggs hatched
6/20 saw 3 chicks
6/24 saw 2 chicks
7/2 2 chicks fledged

ONB-2
5/15 nest found with 1 egg
6/18 4 eggs hatched
6/24 and 6/25 chicks were seen outside of closed area, barricade was moved farther north
7/13 3 chicks fledged

ONB-3
5/15 nest found with 1 egg
5/17 nest abandoned, skunk tracks seen throughout the area, coming was close as one foot to the nest
6/6 birds scraping

ONB-4
5/19 nest found with 1 egg
6/16 4 eggs hatched
6/17 saw bird fly over to bay side, two birds seen on bay, no chicks

ONB-4b
6/25 nest found with 1 egg
6/24 lost 3 eggs to an unknown predator

ONB-5
5/23 nest found with 3 eggs
6/20 3 eggs hatched; chicks fed south of the grass in a rocky area
7/15 2 chicks fledged

ONB-6
5/25 nest found with 4 eggs
6/9 found adult plover wing 5 feet from nest, eggs were abandoned

ONB-7
nest was not found
6/15 3 chicks were found; fed north of the grass in rocky area
7/2 2 chicks fledged

CNB-1
5/2 nest found with 3 eggs
5/15 hawk was seen circling the exclosure
5/31 4 eggs hatched
6/5 hawk was seen circling the area
6/18 saw 3 chicks
7/25 2 chicks fledged

CNB-2
5/15 nest found with 4 eggs
6/9 4 eggs hatched; chicks stayed in thick grass
7/4 3 chicks fledged

CNB-3
5/19 nest was found with 3 eggs
6/7 3 eggs hatched; chicks fed on bay
7/2 2 chicks fledged

CNB-4
5/26 found 1 abandoned egg

CNB-4b
5/26 nest found with 4 eggs
6/17 3 eggs hatched, 1 egg failed
6/20 birds were heard in grass on the bay
7/6 saw 1 chick on the ocean near south barricade
7/11 saw 2 chicks
7/12 2 chicks fledged

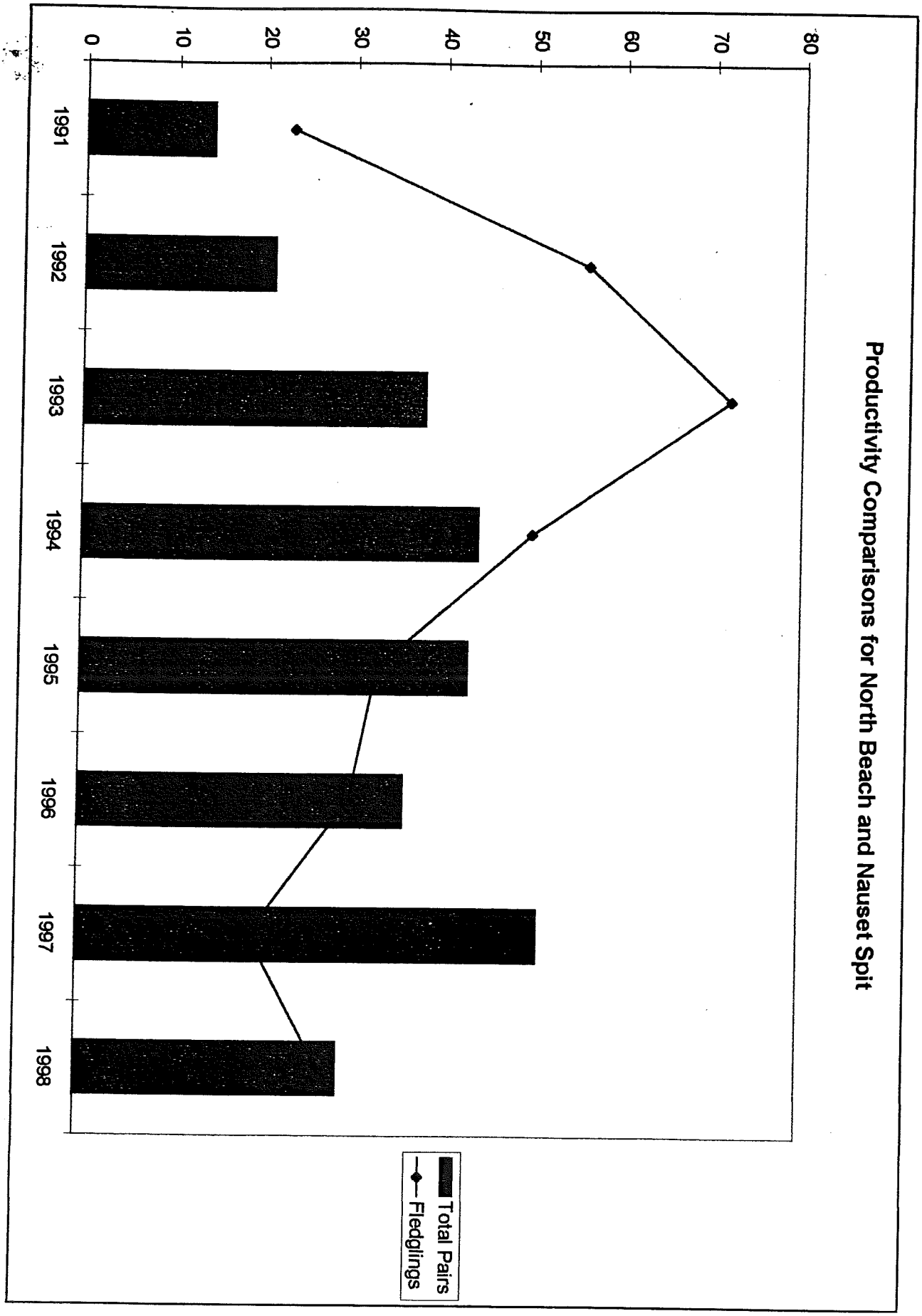
CNB-5
5/29 nest found with 4 eggs
6/15 4 eggs hatched
6/17 saw 2 chicks on the cove in the grass
7/6 saw 2 chicks, 21 days old. Chicks were not seen again, but assumed to have fledged 2 on 7/10

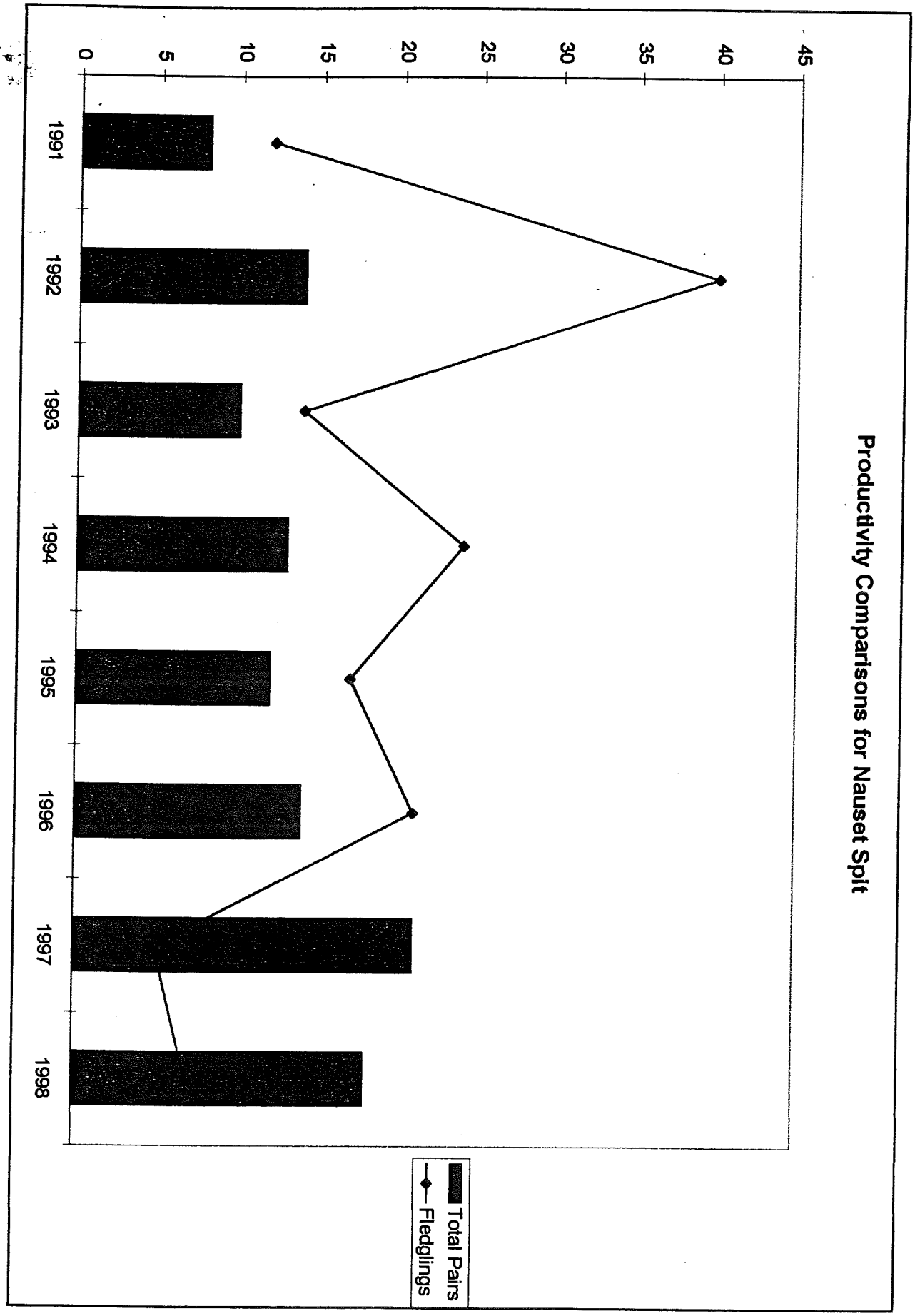
CNB-6
6/3 nest found with 1 egg
7/5 3 eggs hatched; chicks fed on ocean
7/30 2 chicks fledged

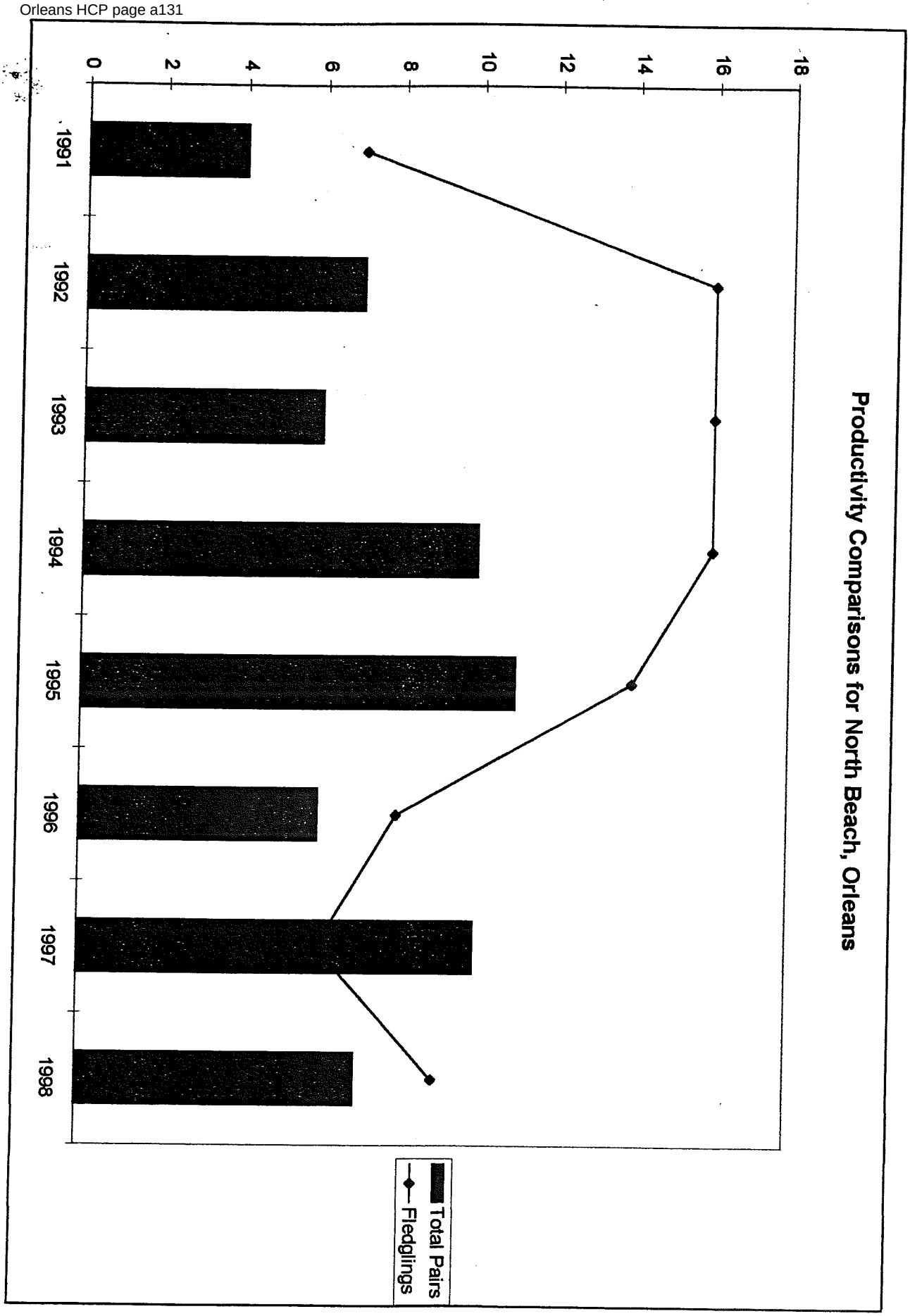
CNB-7
6/7 nest found with 4 eggs
6/15 exclosed nest abandoned

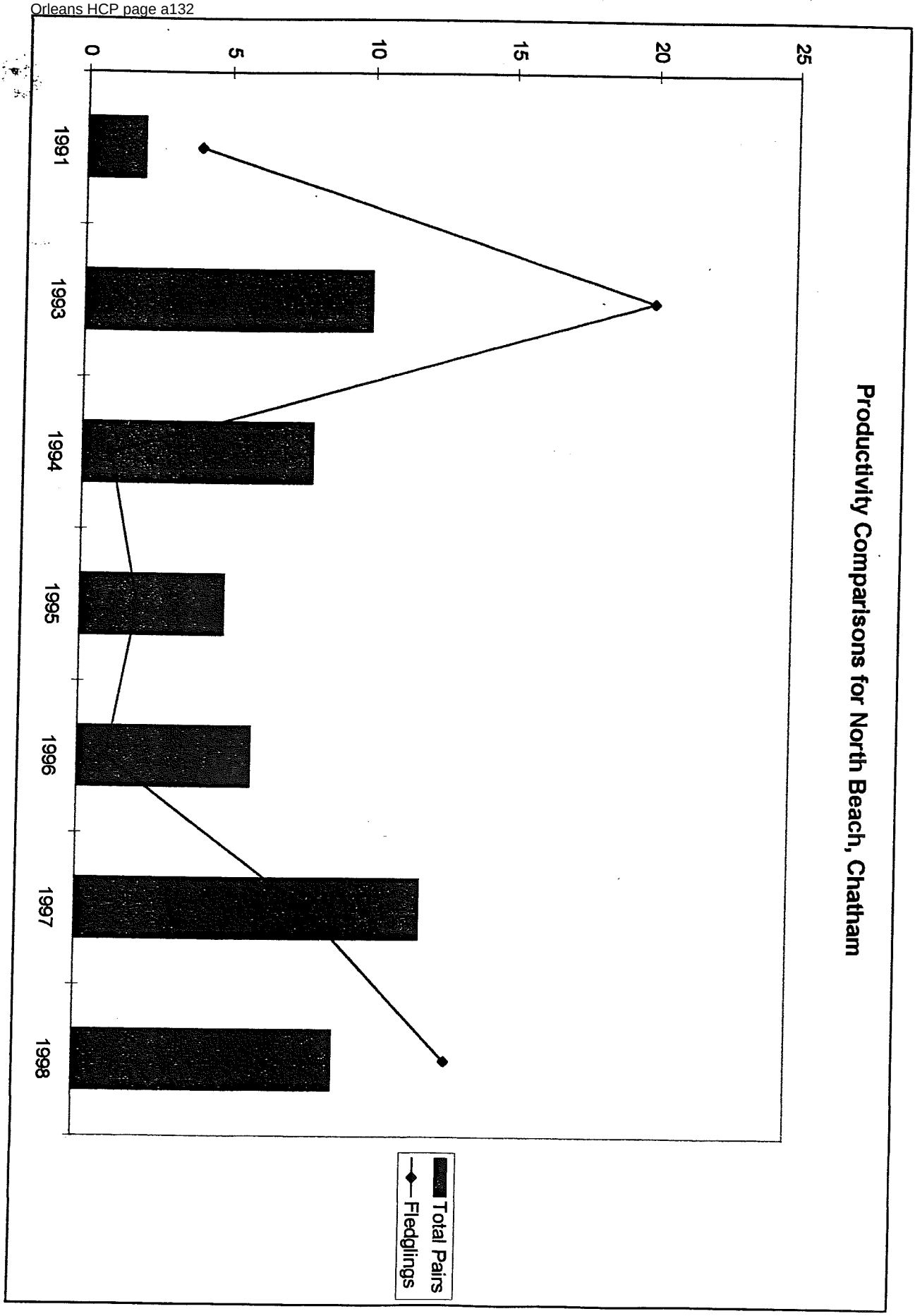
CNB-8
6/9 nest found with 4 eggs, 30-50 gulls were regularly seen roosting in the area throughout the summer
7/3 3 eggs hatched, 1 egg failed. Chicks were not seen after 7/3

CNB-9
5/30 1 bird was seen
7/3 pair found scraping


Productivity Comparisons for North Beach and Nauset Spit
80
70
60
50
40
30
20
10
0
1991
1992
1993
1994
1995
1996
1997
1998
Total Pairs
Fledglings


Productivity Comparisons for Nauset Spit
45
40
35
30
25
20
15
10
5
0
1991
1992
1993
1994
1995
1996
1997
1998
Total Pairs
Fledglings


Productivity Comparisons for North Beach, Orleans
18
16
14
12
10
8
6
4
2
0
1991
1992
1993
1994
1995
1996
1997
1998
Total Pairs
Fledglings


Productivity Comparisons for North Beach, Chatham
25
20
15
10
5
0
1991
1993
1994
1995
1996
1997
1998
Total Pairs
Fledglings

Summary of Piping Plover (Charadrius melodus) Breeding Success on Nauset Spit and North Beach, Orleans Massachusetts 1999

MAR 10 2000

Submitted to:

Paul Fulcher
Park Superintendent
Orleans Park Department
Orleans, MA 02653

And

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

And

Dr. Scott Melvin
Natural Heritage and Endangered Species Program
Mass. Dept. of Fisheries and Wildlife
Westboro, MA 01581

Submitted by:

Anna Resnick and Kerry Collier
Orleans Park Department
Orleans, MA 02653

Introduction

The following is a summary of the 1999 breeding success of the Piping Plover (*Charadrius melodus*) on Nauset Spit and North Beach in the town of Orleans, Massachusetts. This report contains maps showing the locations of the nests, summaries of plover activity and tables illustrating the productivity of the birds. Plovers nesting on Nauset Spit beach were much more successful this season than in 1998.

Tern Nesting

Least Terns (*Sterna antillarum)* and Common Terns (*Sterna hirundo*) returned to Nauset Spit beach in large numbers in the 1999 nesting season. Four hundred and ninety-five Common Tern pairs were counted on Nauset Spit in early June. Also, at least 62 Least Tern pairs nested on the rocky berm at the north end of Nauset Spit. These numbers were recorded from the official A count conducted on June 15th. The Least Tern colony did not change significantly in size during the course of the nesting season, for this reason, a B count was not performed.

Abundance and Productivity of Piping Plovers on Nauset Spit, Orleans, MA, and North Beach, Orleans MA, 1999.

	Nauset Spit	North Beach Orleans	TOTAL
Nests			
Pairs	13	7	20
Total	15	7	20
Total Successful (%)*	15 (100)	5 (71)	20 (90)
Eggs			
Laid	56	27	83
Hatched (%)	56 (100)	17 (62)	73 (88)
Chicks			
Fledged (%)	27 (48)	10 (58)	37
Mean Fledge/Pair**	2.07	1.42	1.74

* A successful nest is one that hatched 1 or more eggs.
** Total no. of chicks fledged divided by the total no. of territorial pairs that were monitored closely enough to get fledging data for, even if fledging or breeding success for those pairs was zero.

1999 NEST LIST

m

Nest	Location	Found (#)	Complete	Exclosed	Exp. Hatch	Hatch Date	Fledge (#)	Notes	
NS-1	1 N of 5	4/25 (1)	2-May	4-May	30-May	30-May	6/24 (2)		
NS-2	S of 1	4/28 (1)	5-May	4-May	2-Jun	31-May	6/25 (3)		
NS-3	post 5	4/30 (3)	2-May	4-May	30-May	28-May	—	predated May 29	
NS-4	post 4	5/2 (4)	<= 4/30	4-May	<=5/28	30-May	—	predated May 30	
NS-5	1 N of 3	5/2 (1)	5/8 (3)	11-May	<= 6/5	30-May	6/25 (3)		
NS-6	1 N of 4	5/6 (1)	9-May	10-May	6-Jun	6-Jun	7/1 (2)		
NS-7	1 N of 2	5/8 (3)	7-May	10-May	4-Jun	5-Jun	6/30 (2)		
NS-8	1st washover	5/17 (4)	<=5/17	18-May	<=6/14	12-Jun	7/6 (3)		
NS-9	2 posts N of 6	5/24 (1)	30-May	28-May	27-Jun	23-Jun	7/24 (2)		
NS-10	2 posts N of 7	5/24 (3)	25-May	25-May	22-Jun	20-Jun	7/16 (2)		
NS-11	1 post N of 6	5/26 (1)	31-May	1-Jun	28-Jun	26-Jun	7/26 (2)		
NS-12	2 posts N of 3	6/8 (3)	<=6/8 (3)	15-Jun	<=7/5	17-Jun	7/14 (2)		
NS-3B	1 1/2 posts N of 5	6/23 (4)	<=6/23	27-Jun	<=7/21	16-Jul	—		
NS-4B	1/2 post N of 4	6/30 (3)	<=6/30	4-Jul	<=7/26	16-Jul	8/15 (2)		
NS-13	1/2 post S of 4	7/3 (3)	<=7/3	4-Jul	<=7/29	27-Jul	8/22 (2)		
ONB-1	S of Pochet (south)	5/10 (3)	11-May	11-May	<=6/5	6-Jun	7/1 (2)		
ONB-2	S of Pochet (north)	5/11 (1)	5/ 18 (3)	18-May	15-Jun	--	—	washed over 5/18	
ONB-3	N of 1	5/11 (2)	15-May	17-May	12-Jun	6/10 (3)	7/12 (3)		
ONB-4	10 posts S of 2	5/11 (1)	16-May	17-May	13-Jun	6/12 (3)	7/10 (3)		
ONB-5	S of Pochet (mid)	5/20 (4)	<= 5/20	20-May	<= 6/17	6/13 (3)	7/11 (2)		
ONB-6	S of Pochet (+north)	5/26 (1)	31-May	1-Jun	28-Jun	--	—		
ONB-7	S of 4	6/7 (1)	15-Jun	15-Jun	13-Jul	10-Jul	—	chicks not seen after 2 days	

Pair Summaries for 1999

ONB-1
Found 5/10
Hatched 6/6
4 chicks 6/10
3 chicks 6/12
3 chicks 6/23
2 chicks 6/29
2 fledglings 7/2
1 fledgling 7/3
2 fledglings 7/11

ONB-2
Found 5/11
Washed over 5/18- abandoned

ONB-3
Found 5/11
Hatched 6/10- 1 egg failed
3 chicks 6/10
3 chicks 6/11
3 chicks 6/12
3 chicks 6/13
3 chicks 6/19
3 chicks 6/24
3 chicks 7/3
2 chicks 7/9
3 chicks 7/11
3 fledglings 7/12

ONB-4
Found 5/11
Hatched 6/12- 1 egg failed
3 chicks 6/13
2 chicks 6/19
2 chicks 6/24
3 chicks 6/25
3 chicks 6/27
3 fledged 7/10
3 fledged 7/11

ONB-5
Found 5/20
Hatched 6/13- 1 egg failed
2 chicks, 2 eggs 6/13
2 chicks 6/16
2 chicks 6/20
3 chicks 6/23
2 chicks 6/25
2 chicks 7/1
2 chicks 7/3
2 chicks 7/9
2 chicks 7/10
2 fledged 7/11
2 fledged 7/29

ONB-6
Found 5/26
Washed over 6/9- abandoned

ONB-7
Found 6/7
Hatched 7/10
4 chicks 7/10
3 chicks 7/11
Disappeared

NS-1
Found 4/25
Hatched 5/30
3 chicks 5/31
4 chicks 6/1
1 chick 6/4
2 chicks 6/15
2 chicks 6/20
1 fledged 6/24
2 fledged 6/26

NS-2
Found 4/28
Hatched 5/31
3 chicks 6/1
2 chicks 6/2
3 chicks 6/3
3 chicks 6/8
2 chicks 6/16
2 chicks 6/17
3 chicks 6/23
3 chicks 6/24
3 fledged 7/8

NS-3
Found 4/30
Hatched 5/28
3 chicks 6/1- 4 days old

NS-4
Found 5/2
Hatched 5/31
4 chicks 5/31
1 chick 6/1
1 chick 6/4- 5 days old

NS-5
Found 5/2
Hatched 5/30
3 chicks 5/31
1 chick 6/1
3 chicks 6/2
2 chicks 6/11
4 chicks 6/13
3 chicks 6/16
2 chicks 6/20
3 chicks 6/23
3 fledged 6/25
3 fledged 7/29

NS-6
Found 5/6
Hatched 6/6
2 chicks 6/8
2 chicks 6/11
3 chicks 6/20
2 chicks 6/29
2 fledged 7/11
2 fledged 7/29

NS-7
Found 5/8
Hatched 6/5
3 chicks 6/8
2 chicks 6/13
2 chicks 6/18
2 chicks 6/20
2 chicks 6/27
2 fledged 7/2
2 fledged 7/29

NS-8
Found 5/17
Hatched 6/12
4 chicks 6/12 (on pond side until 6/24)
4 chicks 6/13
4 chicks 6/14
4 chicks 6/20
4 chicks 6/23
3 chicks 6/24 (on ocean side)
3 chicks 7/1
3 fledged 7/7
3 fledged 7/11
1 fledged 7/31

NS-9
Found 5/24
Hatched 6/23
4 chicks 6/23
4 chicks 6/26
4 chicks 6/27
2 chicks 7/6
2 chicks 7/8
2 chicks 7/16
2 fledged 7/24

NS-10
Found 5/24
Hatched 6/20
4 chicks 6/20
4 chicks 6/23
2 chicks 6/26
2 chicks 7/2
2 chicks 7/16
1 fledged 7/31

NS-11
Found 5/26
Hatched 6/26
4 chicks 6/26
3 chicks 7/2
3 chicks 7/6

(NS-11 cont'd)
2 chicks 7/10
2 chicks 7/16
2 chicks 7/23
2 chicks 7/25
2 fledged 7/30

NS-12
Found 6/8
Hatched 6/17 –(3 eggs only)
3 chicks 6/19
3 chicks 6/20
3 chicks 6/25
3 chicks 6/28
2 chicks 7/3
2 chicks 7/12
2 fledged 7/15
2 fledged 7/29
2 fledged 7/31

NS-3B
Found 6/23
Hatched 7/16
4 chicks 7/17
3 chicks 7/18
2 chicks 7/23
1 chicks 7/25—9 days old

NS-4B
Found 6/30
Hatched 7/16 (3 eggs only)
3 chicks 7/16
3 chicks 7/17
3 chicks 7/23
3 chicks 7/24
3 chicks 7/30
2 chicks 8/1
2 chicks 8/12
2 fledged 8/15

NS-13
Found 7/3
Hatched 7/27 (3 eggs only)
3 chicks 7/28
3 chicks 7/30
3 chicks 7/31
2 chicks 8/1
3 chicks 8/12
2 fledged 8/22

Year: 1999

Site Name: Nauset Spit

Town: Orleans

Ownership: Town

Observer/Agency: Kerry Collier and Anne Resnick

Address: Orleans Park Dept.
Bay Ridge lane
Orleans

Telephone: (508) 240-3775

Census Results:	Index Count	Total Count
No. of Pairs	12	13
Unpaired Adults	–	–

Census Remarks:

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

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

Exclosure Design	A	B	C
Shape	Circular w/wings	Circular w/no wings	
Diameter/Length of Side	10'	same	
Size of Wire Mesh	2" x 4"	same	
Height Above Ground	3'	same	
Depth Buried	4"	same	
Cover Material	netting	same	
Cover Spacing/Mesh Size	½" x ½"	same	

Other Management Undertaken or Needed/Remarks: No dogs allowed on beach. No pedestrians or vehicles within 50 feet of nest or 15 Feet of toe of dune. Area closed to ORV's 2 days before expected hatch date. Symbolic Fencing around entire nesting area.

OrleansCCP page a140

Site Name: Nauset Spit Year: 1999 Observer: Anna Resnick & Kerry Collier

Page 1 of 2

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-1	1	4	4	2	4/25 (1)	5/2	H 5/30	Y	A	5/4
NS-2	1	4	4	3	4/28 (1)	5/5	H 5/31	Y	A	5/4
NS-3	1	4	4	Ø	4/30 (3)	5/2	H 5/28	Y	A	5/4
NS-4	1	4	4	Ø	5/2 (4)	≤4/30	H 5/30	Y	A	5/4
NS-5	1	3	3	3	5/2 (1)	5/30	H 5/30	Y	A	5/11
NS-6	1	4	4	2	5/6 (1)	5/9	H 6/6	Y	A	5/10
NS-7	1	4	4	2	5/8 (3)	5/7	H 6/5	Y	A	5/10
NS-8	1	4	4	3	5/17 (4)	≤5/17	H 6/12	Y	B	5/18
NS-9	1	4	4	2	5/24 (1)	5/30	H 6/23	Y	A	5/28
NS-10	1	4	4	2	5/21 (3)	5/25	H 6/20	Y	B	5/25

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
		NS.3 - unknown predation 5/29 NS.4. unknown predation 5/30

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

Year: 1999

Site Name: Nauset Spit

Town: Orleans

Ownership:

Observer/Agency:

Address:

Telephone:

Census Results:	Index Count	Total Count
No. of Pairs		
Unpaired Adults		

Census Remarks:

Month	Average # of visits to site per week
April	
May	
June	
July	

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

Exclosure Design	A	B	C
Shape			
Diameter/Length of Side			
Size of Wire Mesh			
Height Above Ground			
Depth Buried			
Cover Material			
Cover Spacing/Mesh Size			

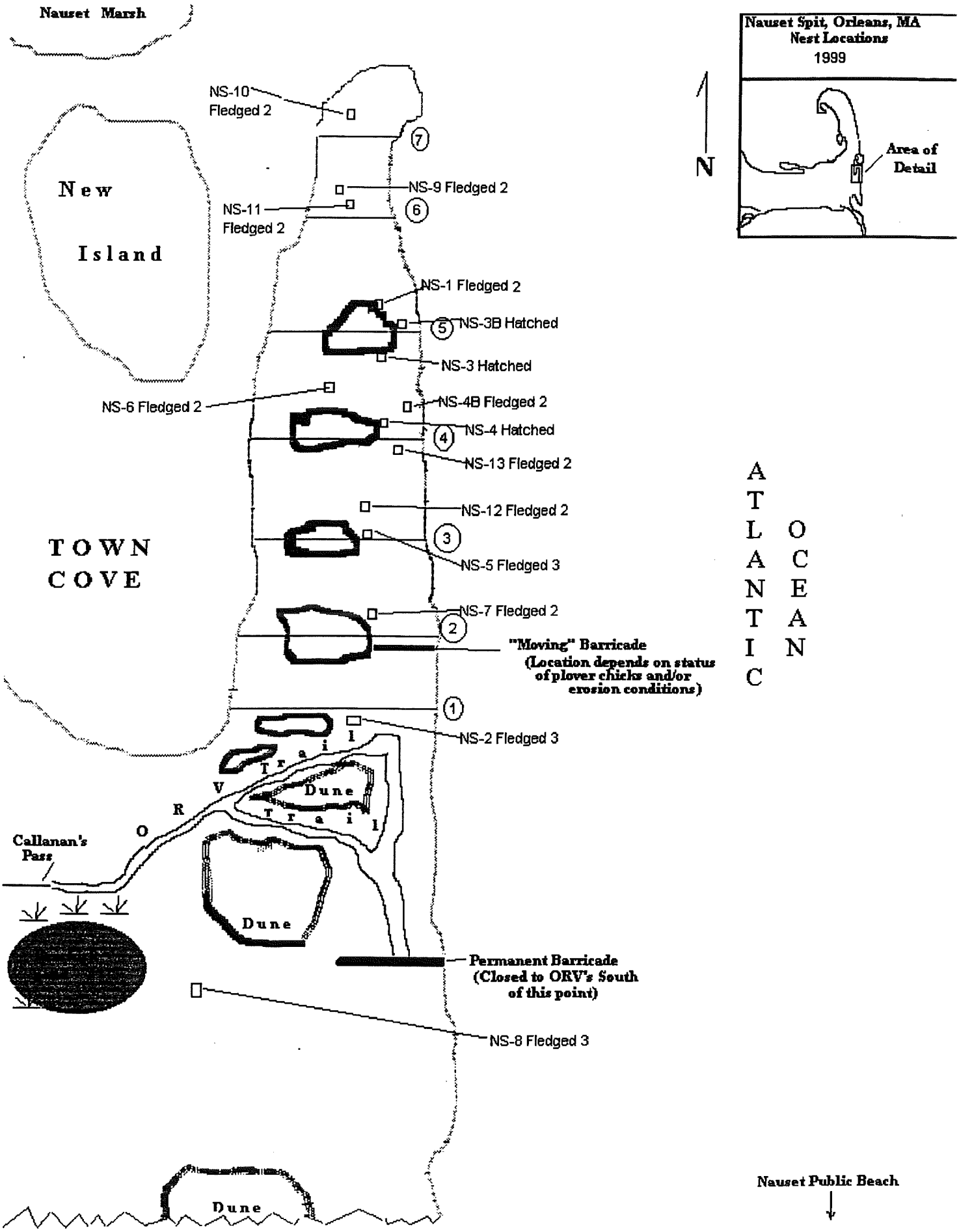
Other Management Undertaken or Needed/Remarks:

Year: [illegible] Observer: [illegible] / Terry Collier

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-11	1	4	4	2	5/26 (1)	5/31	H 6/26	Y	B	6/1
NS-12	1	3	3	2	6/8 (3)	≤ 6/8	H 7/17	Y	B	6/15
NS.3B	2	4	4	0	6/23 (4)	≤ 6/23	H 7/16	Y	B	6/27
NS.4B	2	3	3	2	6/30 (3)	≤ 6/30	H 7/16	Y	B	7/4
NS.13	1	3	3	2	7/3 (3)	≤ 7/3	H 7/27	Y	B	7/4

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
		NS.3B. 3 chicks predated 7/16, 1 chick predated 7/19. Cause unknown

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


Nauset Marsh
Nauset Spit, Orleans, MA
Nest Locations
1999
Area of Detail
N
New Island
TOWN COVE
NS-10 Fledged 2
NS-9 Fledged 2
NS-11 Fledged 2
NS-1 Fledged 2
NS-3B Hatched
NS-3 Hatched
NS-6 Fledged 2
NS-4B Fledged 2
NS-4 Hatched
NS-13 Fledged 2
NS-12 Fledged 2
NS-5 Fledged 3
NS-7 Fledged 2
"Moving" Barricade
(Location depends on status of plover chicks and/or erosion conditions)
NS-2 Fledged 3
ATLANTIC OCEAN
Trail
Dune
Trail
VROO
Callanan's Pass
Dune
Permanent Barricade
(Closed to ORV's South of this point)
NS-8 Fledged 3
Dune
Nauset Public Beach

12

Year: 1999

Site Name: Orleans North Beach

Town: Orleans

Ownership: Town

Observer/Agency: Anna Resnick + Kerry Collier

Address: Orleans Park Dept.
Bay Ridge Lane

Telephone: (508) 240-3775

Census Results:	Index Count	Total Count
No. of Pairs	7	7
Unpaired Adults	—	—

Census Remarks:

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

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

Exclosure Design	A	B	C
Shape	circular w/ wings	circular w/o wings	
Diameter/Length of Side	10'	10'	
Size of Wire Mesh	2" x 4"	2" x 4"	
Height Above Ground	3'	3'	
Depth Buried	4"	4"	
Cover Material	netting	netting	
Cover Spacing/Mesh Size	½" x ½"	½" x ½"	

Other Management Undertaken or Needed/Remarks: Dogs allowed on leashes. Symbolic Fencing around each nest. No pedestrians or vehicles within 50 feet of nest or 15 feet from toe of dune.

Orleans HCP Page 146

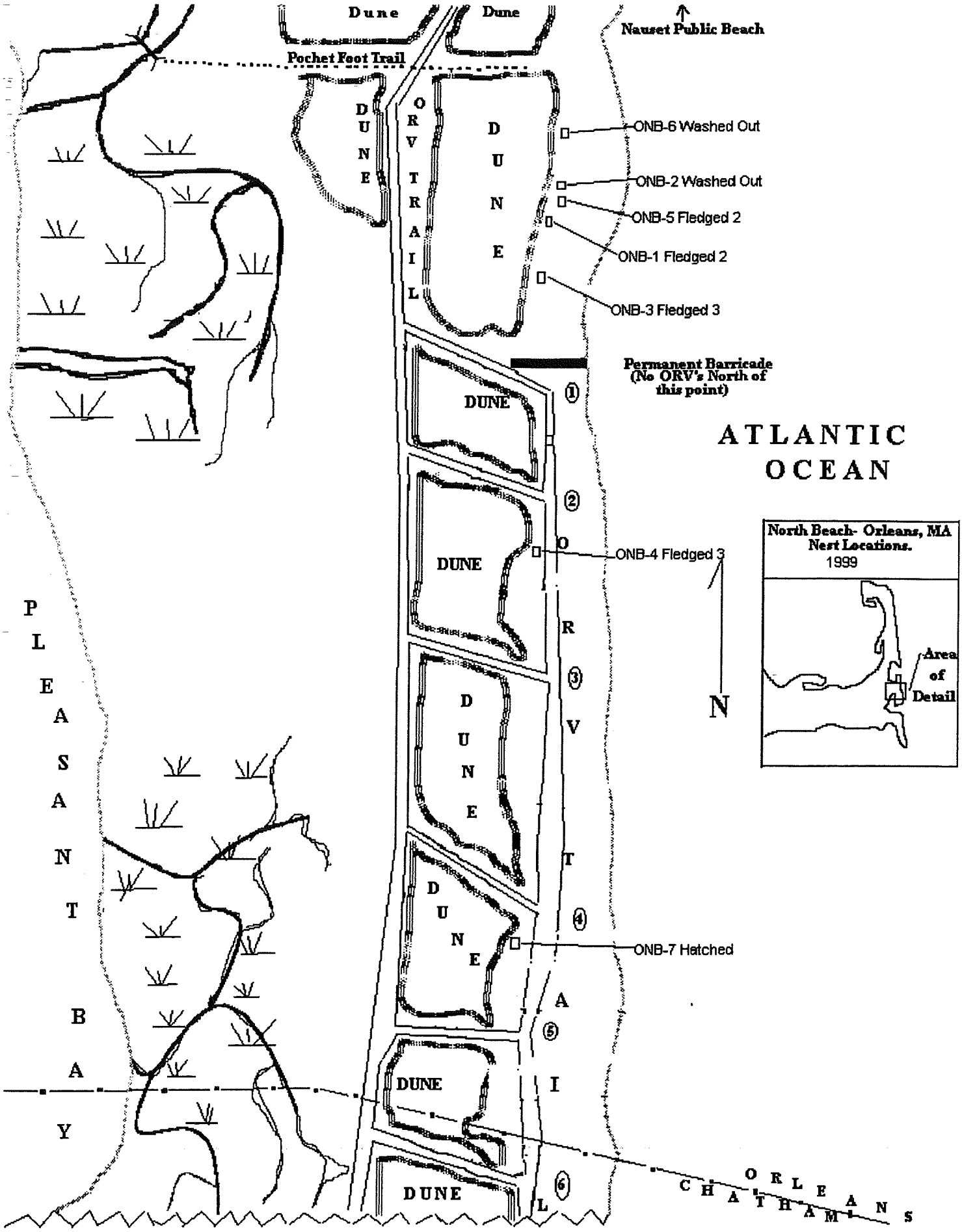
[illegible] Year: [illegible] Observer: [illegible]

Page____of_____

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
ONB-1	1	4	4	2	5/10(3)	5/11	H 6/6	Y	A	5/11
ONB-2	1	3	Ø	Ø	5/11 (1)	5/18	F 5/18	Y	B	5/18
ONB-3	1	4	3	3	5/11 (2)	5/15	H 6/10	Y	A	5/17
ONB-4	1	4	3	3	5/11 (1)	5/16	H 6/12	Y	B	5/17
ONB-5	1	4	3	2	5/20 (4)	≤5/20	H 6/13	Y	B	5/20
ONB-6	1	4	Ø	Ø	5/26 (1)	5/31	F 6/9	Y	B	6/1
ONB-7	1	4	4	Ø	6/7 (1)	6/14(3)	H 7/10	Y	B	6/15

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
ONB-2	washed over 5/18/high tide line 2" above nest	ONB-7 - chicks not seen after 7/11.
ONB-6	washed over 6/9/high tide line 2' above nest	

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


Dune
Dune
Nauset Public Beach
Pochet Foot Trail
DUNE
ORV TRAIL
DUNE
ONB-6 Washed Out
ONB-2 Washed Out
ONB-5 Fledged 2
ONB-1 Fledged 2
ONB-3 Fledged 3
Permanent Barricade (No ORV's North of this point)
DUNE
1
ATLANTIC OCEAN
2
DUNE
ONB-4 Fledged 3
ORV TRAIL
3
DUNE
N
4
DUNE
ONB-7 Hatched
5
DUNE
6
DUNE
PLEASANT BAY
CHATHAM
ORLEANS
North Beach- Orleans, MA Nest Locations. 1999
Area of Detail

HUK · MELVIN YOUNG

Massachusetts Tern Census Form

1999

15

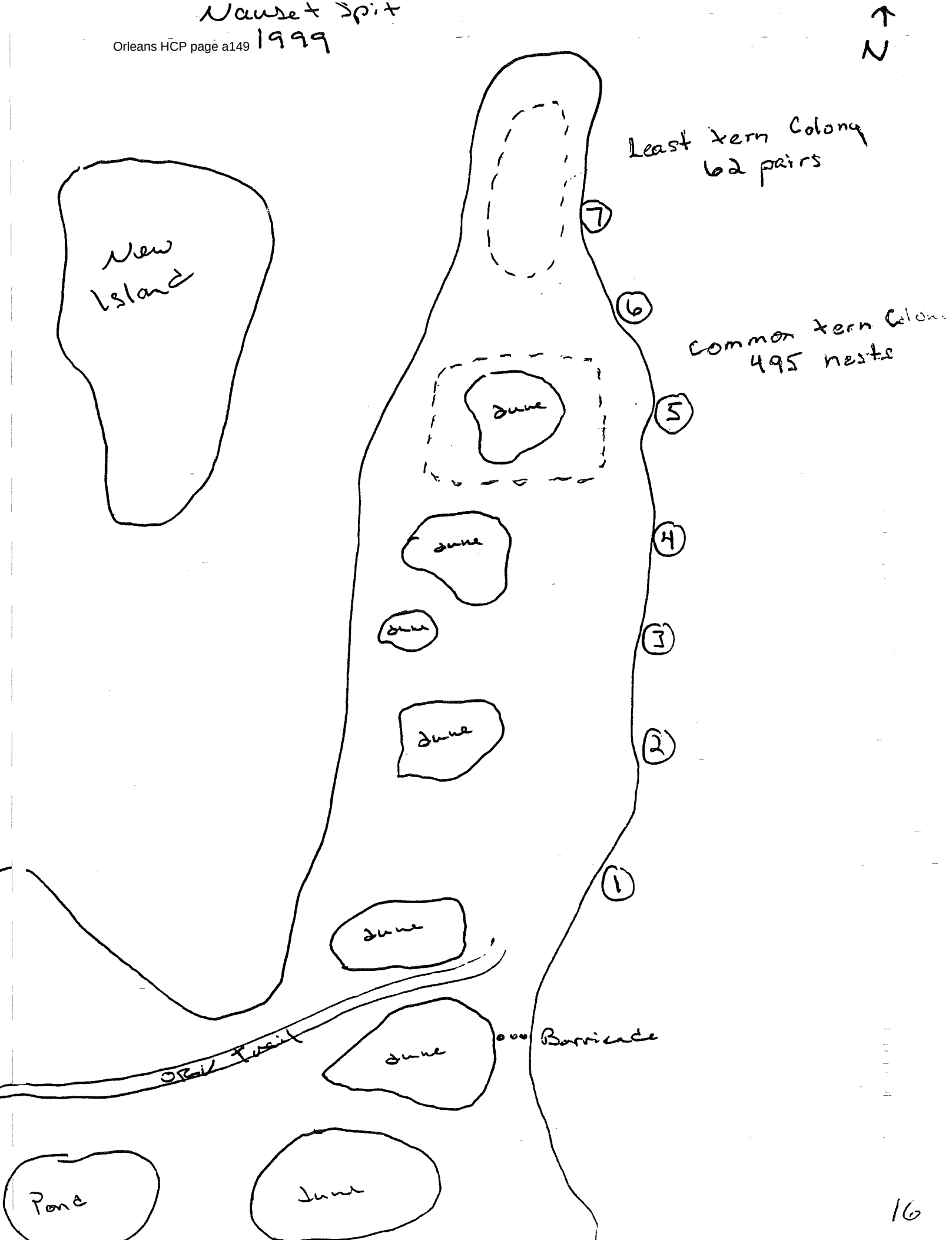
Colony Name: Nauset Spit	**Observer/Agency:** Anna Resnick / Kerry Collier, Park Dept.
Colony Number: 352009	**Street:**
Town: Orleans	**Town:**
Ownership: Town	**Zip:** **Telephone:** (508) 240-3775

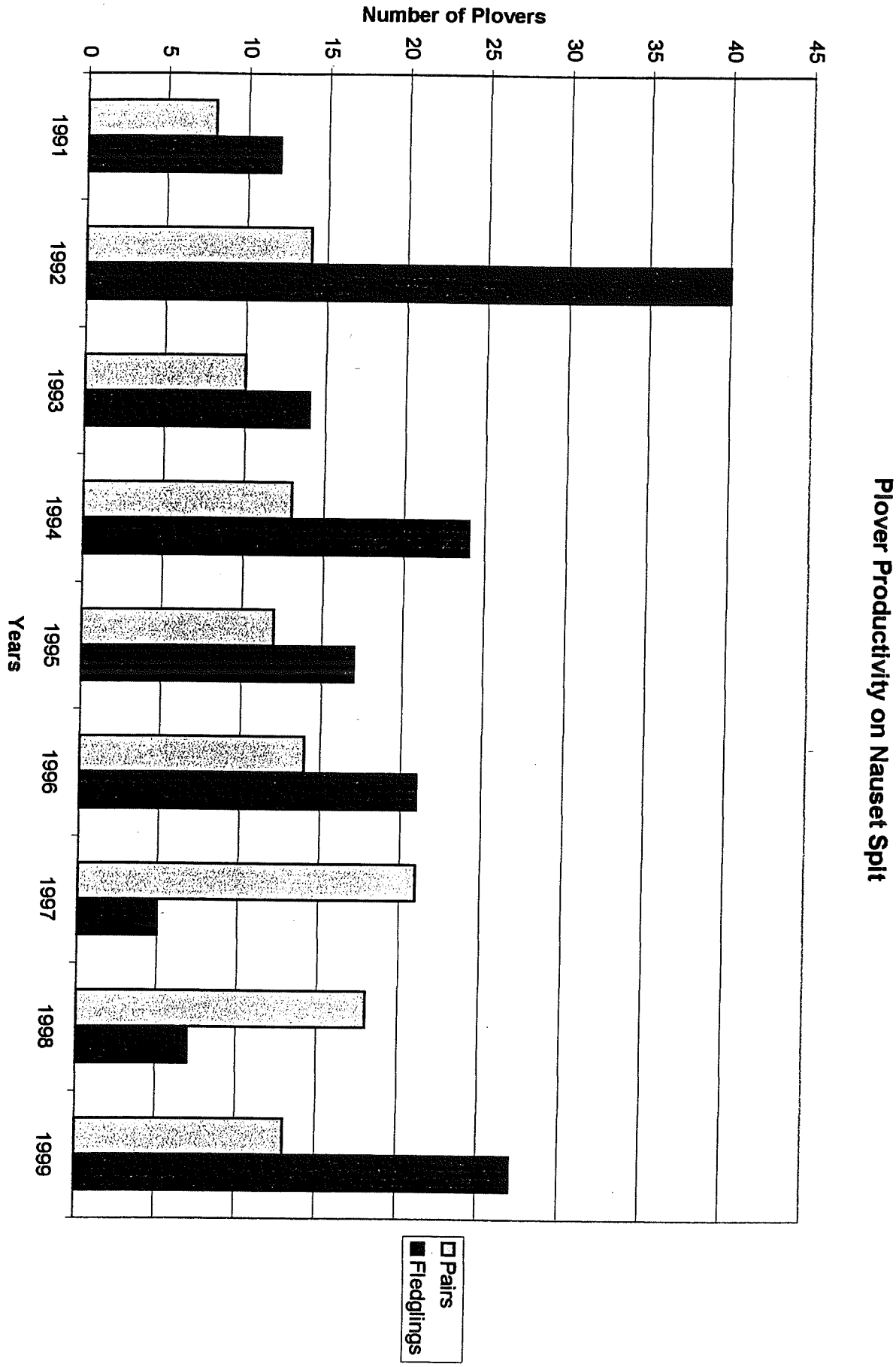
***PLEASE read the instructions on the reverse of this form before filling out.

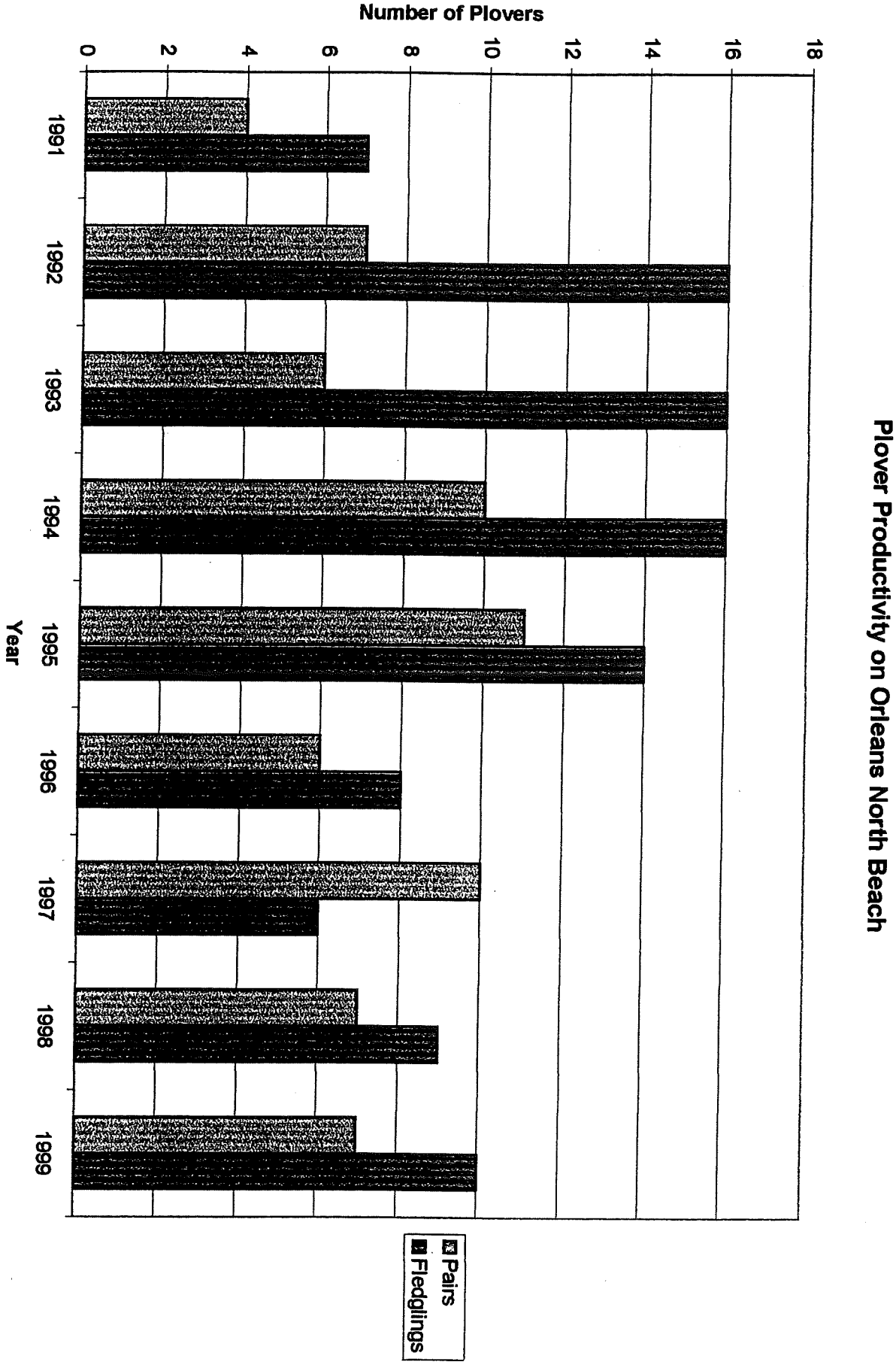
Species Code	A-Count				B-Count				P	Remarks: (e.g., evidence of predation, tide or storm washout, human disturbance, etc.) *INDICATE (if known) DATE OF FIRST EGGS LAID AND FIRST EGGS HATCHED.
	Date	No. Pairs	M	Q	Date	No. Pairs	M	Q		
ROST										
COTE	6/15	495	NC	HC						
ARTE										
LETE	6/15	62	AC	HC						
LAGU										
BLSK										
OTHER										

Please forward completed form(s) no later than July 31 to Bradford G. Blodget, State Ornithologist, Massachusetts Division of Fisheries and Wildlife, Field Headquarters Rt. 135, Westborough, MA 01581-3337. Telephone: (508)792-7270 x152 / Fax: (508)792-7275 / Internet address for electronic filing: bblodget@state.ma.us

Nauset Spit 1999




Plover Productivity on Nauset Spit
Number of Plovers
0
5
10
15
20
25
30
35
40
45
1991
1992
1993
1994
1995
1996
1997
1998
1999
Years
Pairs
Fledglings


Plover Productivity on Orleans North Beach
Number of Plovers
0
2
4
6
8
10
12
14
16
18
1991
1992
1993
1994
1995
1996
1997
1998
1999
Year
Pairs
Fledglings

Summary of Piping Plover (*Charadrius melodus*) Breeding Success and Tern Nesting Status on Nauset Spit and North Beach, Orleans Massachusetts 2000

By Jason Luscier

Submitted to:
Paul Fulcher
Park Superintendent
Orleans Park Department
Orleans, MA 02653

&

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

&

Dr. Scott Melvin
Natural Heritage and Endangered Species Program
Massachusetts Department of Fisheries and Wildlife
Westboro, MA 01581

Submitted by:
Jason Luscier and Kerry Collier
Orleans Park Department
Orleans, MA 02653

Table of Contents

Introduction page 1

The Exclosures page 1

The June 6th - 7th Noreastern page 2

Tern Nesting page 3

Appendix A - Summary of Field Observations page 5

Appendix B - Tables page 12

Table #1 - 2000 Piping Plover Nest List for Nauset Spit and Orleans North Beach page 13

Table #2 - Aubundance and Productivity of Piping Plovers on Nauset Spit and Orleans North Beach page 14

Appendix C - Maps page15

Figure #1 - 2000 Piping Plover Nest Locations for Nauset Spit page 16

Figure #2 - 2000 Piping Plover Nest Locations for Orleans North Beach page 17

Appendix D - Charts page 18

Chart #1 - Piping Plover Productivity on Nauset Spit page 19

Chart #2 - Piping Plover Productivity on Orleans North Beach page 20

Appendix E - Census Forms page 21

Form #1 - Massachusetts Piping Plover Census Form page 22

Form #2 - 2000 Massachusetts Tern Census Form page 27

Appendix F - Bird List page 29

Introduction:

This report documents the nesting success of the piping plover (*Charadrius melodus*) in the town of Orleans, MA. These birds nest on the ocean side of the town in two locations – Nauset Spit and Orleans North Beach (see maps on pages 15 and 16 in Appendix C for the area of detail). Nests were located and monitored. When the breeding adults laid 4 eggs, predator exclosures were erected around the nests. Not all nests were exlcosed due to predation before being able to exclose them. Once the eggs hatched, the chicks were monitored to keep track of how many survive and become fledglings. Piping plovers typically fledge between 25 and 30 days after they've hatched. The following is a report describing the exclosures used, the devastating noreastern of June 6th and 7th, and the status of terns nesting in Orleans. The appendices that follow contain summaries of field observations, the number of breeding pairs present, the number of eggs laid and hatched, the number of chicks that fledged, two maps of the nesting areas, copies of the piping plover and tern census forms sent to the Massachusetts Division of Fisheries and Wildlife, and a list of all the birds observed in the Nauset Beach area.

The Exclosures:

The exclosures consist of many integral parts in order to be sure they are sturdy enough and that they appropriately keep out predators. The main part of the exclosure is a large cage-like metal fencing 4 feet high and 35 feet long. It is pulled together into a circular shape and buried 4 inches into the ground, making the exclosure 44 inches high

off the ground. Five wooden stakes are used to support the exclosure. Zip ties are used to attach the stakes to the exclosure to assure strength. A fruit netting is used as a cover for the top. The netting is tied down to the exclosure in several places with twist ties.

It was discovered part way through the season that it was not appropriate for all nests being exclosed to have a fruit net covering. Nests that were laid in the dunes and/or in vegetation – American beach grass (*Ammophila breviligulata*) and/or beach pea (*Lathyrus japonicus*) – were exclosed with no fruit net covering. It was found that the breeding adults defending these nests would escape the nest by flying up and out rather than walking away. It would seem that these birds could not see an approaching predator as well through the vegetation, so flying up and out of the nesting area would be necessary to successfully escape.

It was decided to remove covers from nests in this position when a bird was directly affected. The female from nest ONB-2 (Orleans North Beach) got her wing caught in the fruit net covering on May 25. The covering was then removed and fortunately the bird recovered.

There was one mortality caused by an exclosure. It should be noted that this nest was not in any sort of vegetation. After the heavy June 6th Noreastern that destroyed many nests, the female from nest NS-11 (Nauset Spit) got her feet caught in the netting and unfortunately was not found soon enough. She died June 8.

The June 6th – 7th Noreastern:

On June 6th and 7th, the combination of over a twelve-foot high tide and the attack of strong northeastern winds from a noreastern devastated the nesting attempts of the piping plovers. There were 13 nests on Nauset Spit, 3 of which had already hatched. The storm's strong tide completely washed over the spit. There were a total of 6 chicks on the spit before the noreastern, and surprisingly enough, 5 of those chicks survived the storm. All of the 10 nests remaining were washed over by the tide and buried in the sand. June 8th, NS-5 hatched. The eggs were buried in sand, yet 3 of the 4 eggs in the nest hatched. The pair at NS-10 recovered 3 of their eggs and successfully hatched them 21 days later. Only three of the 8 nests destroyed by this storm did not renest (NS-4, NS-7, & NS-11), the other 5 did.

South on Orleans North Beach did not look any better. There were 6 nests prior to the storm, 4 of which were washed over by the tide. Three of those four nests failed. ONB-1b recovered their eggs and successfully hatched all four eggs 19 days later. Two of the three nests destroyed by this storm renested and successfully hatched eggs. The pair from ONB-6 disappeared.

Tern Nesting:

Each year a tern census is conducted for Nauset Spit and Orleans North Beach combined. Data are reported to the Massachusetts Division of Fisheries and Wildlife on the *2000 Massachusetts Tern Census Form* found on page 27 in Appendix E. One count

is conducted within a census window of June 5-20 and is called the A-Count. Roseate terns (*Sterna dougallii*), common terns (*Sterna hirundo*), arctic terns (*Sterna paradisaea*), least terns (*Sterna antillarum*), laughing gulls (*Larus atricilla*), and black skimmers (*Rynchops niger*) are censused. The A-Count was conducted June 21 (a day late of the census window) and only 1 nesting pair of least terns was found on Nauset Spit. No nesting activity of the aforementioned species was apparent in the Orleans North Beach area. A few days prior to the count, many nesting pairs of laughing gulls, common terns, least terns, and 1 nesting pair of black skimmers were present on Nauset Spit. This large tern colony very suddenly evacuated the area. There was mass predation apparent in the area with many decapitated birds present. This would indicate the possible presence of a great-horned owl (*Bubo virginianus*).

As part of the tern census, a second count, the B-Count, was conducted for certain species outside the census window (after June 20). The B-Count was conducted on July 16. There was no new nesting activity of roseate terns, arctic terns, or black skimmers; however, 33 least terns were counted on Nauset Spit. Using the adult count method of survey, it was determined that an estimated 26.4 nesting pairs were present (33 adults * .8 = 26.4 pairs).

Appendix A

Summary of Field Observations

Summary of Field Observations:

The following lists are summaries of field observations made for each nest. Failed is defined ultimately as not having fledged chicks, which in some cases may more proximately mean not having hatched eggs. Fledged is defined as being 25 days or older and the chicks were determined fledged when witnessed in flight.

Nauset Spit

NS-1

4/29	found & completed with 3 eggs
5/1	exclosed
5/29	all 3 eggs hatched
5/29-6/3	3 chicks present
6/4-6/27	2 chicks present
6/28	2 chicks fledged

NS-2

4/29	found completed with 4 eggs
5/1	exclosed
5/26	all 4 eggs hatched
5/26-5/27	no observations were made
5/28-6/5	1 chick present
6/6	noreastern; 1 chick disappeared - declared failed

NS-2b

6/25	found completed with 4 eggs
6/26	exclosed
7/16	all 4 eggs hatched
7/16-7/20	3 chicks present
7/21-7/22	2 chicks present
7/23-7/24	1 chick present
7/25-8/6	no chicks observed - declared failed

NS-3

5/6	found completed with 3 eggs
5/13	exclosed
5/31	all 3 eggs hatched
5/31-6/10	3 chicks present (survived the 6/6 noreastern)
6/11-6/27	2 chicks present
6/28	2 chicks fledged

NS-4

5/7	found with 1 egg
5/15	completed with 4 eggs
5/17	exclosed
6/6	washed out by noreastern - declared failed

NS-5

5/7	found with 2 eggs
5/12	completed with 4 eggs
5/13	exclosed
6/6	washed over by noreastern
6/8	3 of the 4 eggs hatched
6/9-6/10	no observations were made
6/11-6/16	no chicks were seen
6/17-7/3	1 chick present
7/4	1 chick fledged

NS-6

5/7	found with 2 eggs
5/12	completed with 4 eggs
5/13	exclosed
6/6	washed out by noreastern - declared failed

NS-6b

6/16	found with 1 egg
6/19	completed with 3 eggs
6/19	exclosed
7/16	all 3 eggs hatched
7/16-7/18	3 chicks present
7/19-7/23	2 chicks present
7/24	1 chick present
7/25-7/28	no observations were made
7/29-8/9	1 chick present
8/10	1 chick fledged

NS-7

5/14	found with 3 eggs
5/15	completed with 4 eggs
5/17	exclosed
6/6	washed out by noreastern - declared failed

NS-8

5/14	found completed with 4 eggs & exclosed
6/6	washed out by noreastern - declared failed

NS-8b

6/17	found with 1 egg
6/21	completed with 3 eggs & exclosed
7/15	all 3 eggs hatched
7/15-7/20	3 chicks present
7/21-7/24	2 chicks present
7/25-7/28	no observations were made
7/29	no chicks present
7/30-8/4	no observations were made
8/5-8/6	no chicks present - declared failed

NS-9

5/15	found completed with 4 eggs
5/17	exclosed
6/6	washed out by noreastern - declared failed

NS-9b

6/19	found with 2 eggs
6/21	completed with 4 eggs & exclosed
7/16	3 of the 4 eggs hatched
7/16-7/18	3 chicks present
7/19-7/24	2 chicks present
7/25-7/28	no observations were made
7/29	2 chicks present
7/30-8/4	no observations were made
8/5-8/9	no chicks present - declared failed

NS-10

5/31	found with 3 eggs & exclosed
6/3	completed with 4 eggs
6/29	3 of the 4 eggs hatched
630-7/1	no observations were made
7/2-7/12	2 chicks present
7/13-7/25	1 chick present
7/26	1 chick fledged

NS-11

5/31	found with 3 eggs & exclosed
6/2	completed with 4 eggs
6/6	washed over by noreastern - declared failed
6/8	female caught in cover - mortality

NS-12

5/31	found with 2 eggs
6/1	exclosed
6/4	completed with 4 eggs
6/6	washed out by noreastern - declared failed

NS-12b

6/25	found completed with 4 eggs
6/26	exclosed
7/14	3 of the 4 eggs hatched
7/14-7/21	3 chicks present
7/22-7/24	no chicks present
7/25-7/28	no observations were made
7/29	no chicks present
7/30-8/4	no observations were made
8/5-8/6	no chicks present - declared failed

NS-13

5/31 found completed with 4 eggs & exclosed
6/6 washed out by noreastern - declared failed

NS-13b

6/15 found with 1 egg
6/20 predated by crow; no eggshell fragments observed - declared failed

Orleans North Beach

ONB-1

5/18 found with 3 eggs
5/19 completed with 4 eggs
5/20 predated by gull; no eggshell fragment observed - declared failed

ONB-1b

5/28 found with 2 eggs
5/30 exclosed
6/1 completed with 4 eggs
6/27 all 4 eggs hatched
6/27-7/3 3 chicks present
7/4-7/21 2 chicks present
7/22 2 chicks fledged

ONB-2

5/22 found completed with 4 eggs & exclosed
5/25 female caught in cover; removed cover; female recovered
6/14 abandoned - declared failed

ONB-3

5/28 found with 4 eggs & exclosed
5/29 completed with 5 eggs
6/19 abandoned - declared failed

ONB-4

5/30 found with 1 egg
6/1 predated suspected gull - declared failed

ONB-5

5/30	found with 2 eggs
6/1	exclosed
6/3	nest moved by tide; enlarged exclosure
6/6	washed out by noreastern - declared failed

ONB-5b

6/16	found with 2 eggs & exclosed
6/18	completed with 4 eggs
7/15	all 4 eggs hatched
7/15-7/24	2 chicks present
7/25-7/27	no observations were made
7/28-7/29	1 chick present
7/30-8/4	no observations were made
8/5-8/8	1 chick present
8/9	1 chick fledged

ONB-6

6/1	found completed with 4 eggs & exclosed
6/6	washed out by noreastern - declared failed

ONB-7

6/3	found with 3 eggs
6/4	completed with 4 eggs & exclosed
6/6	washed out by noreastern - declared failed

ONB-7b

6/18	found with 3 eggs
6/19	completed with 4 eggs & exclosed
7/18	3 of the 4 eggs hatched
7/18-7/21	3 chicks present
7/22	2 chicks present
7/23-7/24	no chicks seen
7/25-7/27	no observations were made
7/28	found 1 dead chick; no other chicks seen
7/29	no chicks seen
7/30-8/4	no observations were made
8/5-8/9	no chicks seen - declared failed

Appendix B

Tables:

Table #1: 2000 Piping Plover Nest List
for Nauset Spit and Orleans North Beach .....page 13

Table #2: Abundance and Productivity of Piping Plovers
on Nauset Spit and Orleans North Beach .....page 14

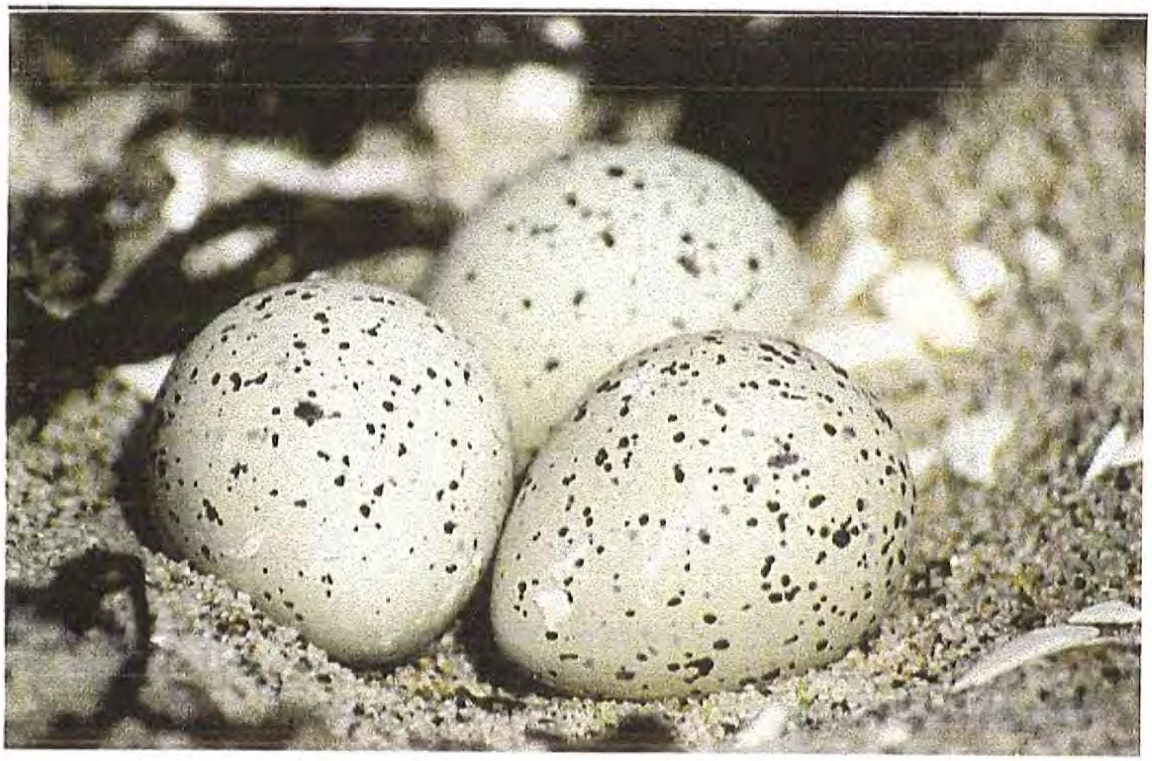


Table #1: 2000 Piping Plover Nest List for Nauset Spit and Orleans North Beach

NS = Nauset Spit
ONB = Orleans North Beach

Nest	Location	Found (#)	Complete	Exclosed	Exp. Hatch	Hatch Date	Fledge (#)	Notes
NS-1	1 S of 5	4/29 (3)	<=4/29 (3)	5/1	<=5/24	5/29	6/28 (2)	
NS-2	post 6	4/29 (4)	<=4/29	5/1	<=5/24	5/26	******	noreastern 6/6
NS-2b	post 6	6/25 (4)	<=6/25	6/26	<=7/23	7/16	******	disapperance of chicks unknown
NS-3	2 N of 2	5/6 (3)	<=5/6 (3)	5/13	<=6/3	5/31	6/28 (2)	
NS-4	S of 4	5/7 (1)	5/15	5/17	6/12	******	******	washed out - noreastern 6/6
NS-5	1 N of 5	5/7 (2)	5/12	5/13	<=6/10	6/8	7/4 (1)	washed over - noreastern 6/6; 1 egg failed
NS-6	N of 7	5/7 (2)	5/12	5/13	<=6/10	******	******	washed out - noreastern 6/6
NS-6b	post 7	6/15 (1)	6/19 (3)	6/19	7/17	7/16	8/10 (1)	
NS-7	1 N of 1	5/14 (3)	5/15	5/17	<=6/12	******	******	washed out - noreastern 6/6
NS-8	end	5/14 (4)	<=5/14	5/14	<=6/11	******	******	washed out - noreastern 6/6
NS-8b	2 S of end	6/17 (1)	6/21 (3)	6/21	7/19	7/15	******	disapperance of chicks unknown
NS-9	1.5 S of 8	5/15 (4)	<=5/15	5/17	<=6/12	******	******	washed out - noreastern 6/6
NS-9b	2 S of 8	6/19 (2)	6/21	6/21	7/19	7/16	******	1 egg failed; disappearance of chicks unknown
NS-10	1 S of 6	5/31 (3)	6/3	5/31	7/1	6/29	7/26 (1)	washed over - noreastern 6/6; 1 egg failed; disappearance of chicks unknown
NS-11	1 S of 9	5/31 (3)	6/2	5/31	6/30	******	******	washed out - noreastern 6/6; female caught in cover = mortality 6/8
NS-12	2 N of 4	5/31 (2)	6/4	6/1	7/2	******	******	washed out - noreastern 6/6
NS-12b	2 N of 4	6/25 (4)	<=6/25	6/26	<=7/23	7/14	******	1 egg failed; disappearance of chicks unknown
NS-13	S of 1	5/31 (4)	<=5/31	5/31	<=6/27	******	******	washed out - noreastern 6/6
NS-13b	washover	6/15 (1)	******	******	******	******	******	predated - confirmed crow 6/20; prints detected w/in 1" of nest; no eggshell fragments observed
ONB-1	S of 2	5/18 (3)	5/19	******	6/15	******	******	predated - confirmed gull 5/20; prints detected w/in 5" of nest; no eggshell fagments observed
ONB-1b	S of 2	5/28 (2)	6/1	5/30	6/29	6/27	7/22 (2)	washed over - noreastern 6/6; removed cover 6/5
ONB-2	S of pochet	5/22 (4)	<=5/22	5/22	<=6/19	******	******	female got caught in cover; removed cover 5/25; abandoned ~6/14 suspected presence of predator
ONB-3	S of ONB-2	5/28 (4)	5/29 (5)	5/28	6/26	******	******	no cover; abandoned ~6/19 suspected presence of predator
ONB-4	N of ONB-5	5/30 (1)	******	******	******	******	******	predated - 6/1; suspected gull; tracks washed out from rain night before
ONB-5	N of 1	5/30 (2)	******	6/1	******	******	******	nest moved by tide; enlarged exclosure 6/3; washed out - noreastern 6/6
ONB-5b	N of 1	6/16 (2)	6/18	6/16	7/16	7/15	8/10 (1)	no cover
ONB-6	S of 5	6/1 (4)	<=6/1	6/1	<=6/29	******	******	washed out - noreastern 6/6
ONB-7	4 S of 3	6/3 (3)	6/4	6/4	7/2	******	******	washed out - noreastern 6/6
ONB-7b	5 S of ONB-1b	6/18 (3)	6/19	6/19	7/17	7/18	******	no cover; 1 egg failed; found 1 dead chick - cause unknown

= completed

Table #2: Aubundance and Productivity of Piping Plovers on Nauset Spit and Orleans North Beach

	Nauset Spit (NS)	*Orleans North Beach (ONB)*	*Total*
Nests			
Total # of Pairs	13	7	20
Total # of Nesting Attempts	19	10	29
Total Successful (%)*	10 (52.7%)	3 (30%)	13 (44.9%)
Eggs			
Total # of Eggs Laid	69	36	105
Total # of Eggs Hatched (%)	32 (46.4%)	11 (30.6%)	43 (41.0%)
Chicks			
Total # of Chicks Fledged (%)	7 (21.9%)	3 (27.3%)	10 (23.3%)
Fledge Rate / Pair**	.54 chicks per pair	.43 chicks per pair	.50 chicks per pair

*Successful is defined as a nest having 1 or more eggs hatch.
**The Fledge Rate per Pair is the total number of chicks fledged, divided by the total number of pairs with fledging data, even if those fledging data were zero.

Appendix C

Maps:

Figure #1 – 2000 Piping Plover Nest Locations
for Nauset Spit.....page 16

Figure #2 – 2000 Piping Plover Nest Locations
for Orleans Norrh Beach.....page 17

Figure #1: 2000 Piping Plover Nest Locations for Nauset Spit Orleans, MA

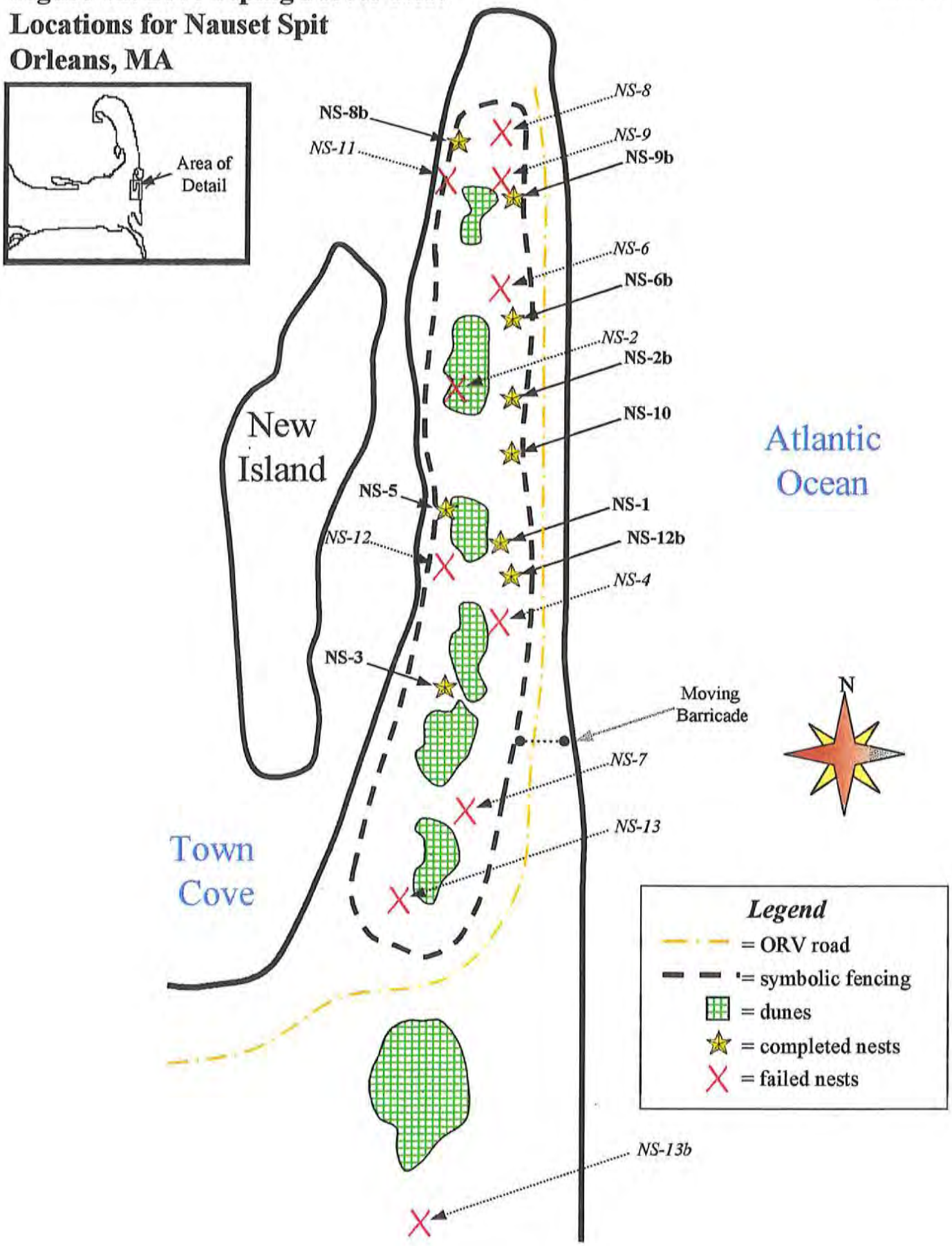
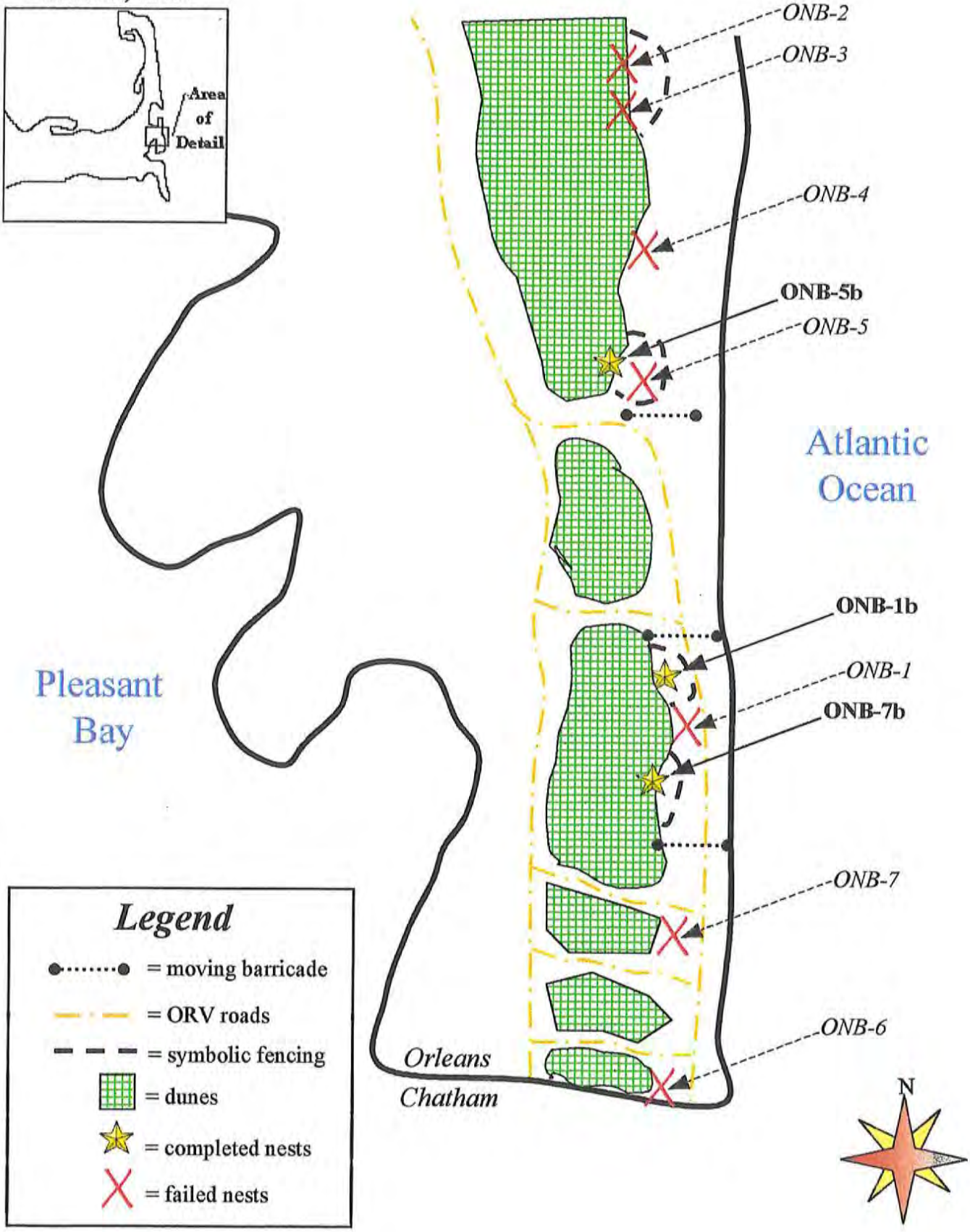


Figure #2: 2000 Piping Plover Nest Locations for Orleans North Beach Orleans, MA

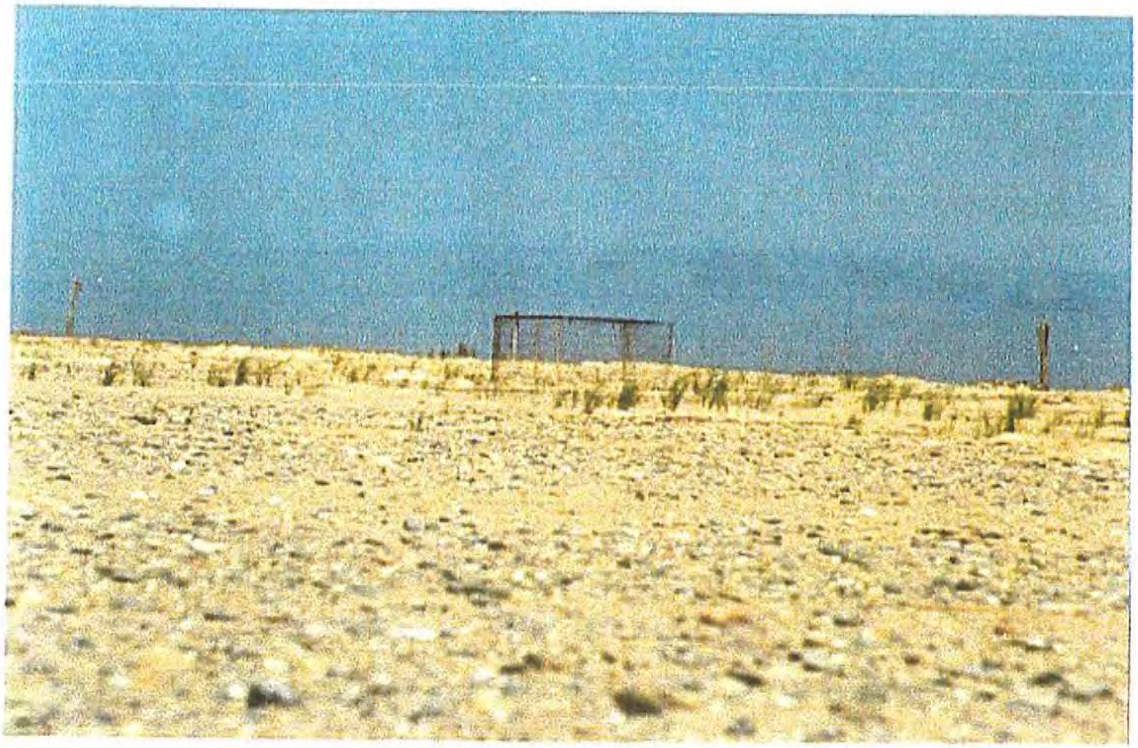


Appendix D

Charts

Chart #1: Piping Plover Productivity on Nauset Spit.....page 19

Chart #2: Piping Plover Productivity on Orleans North Beach.....page 20



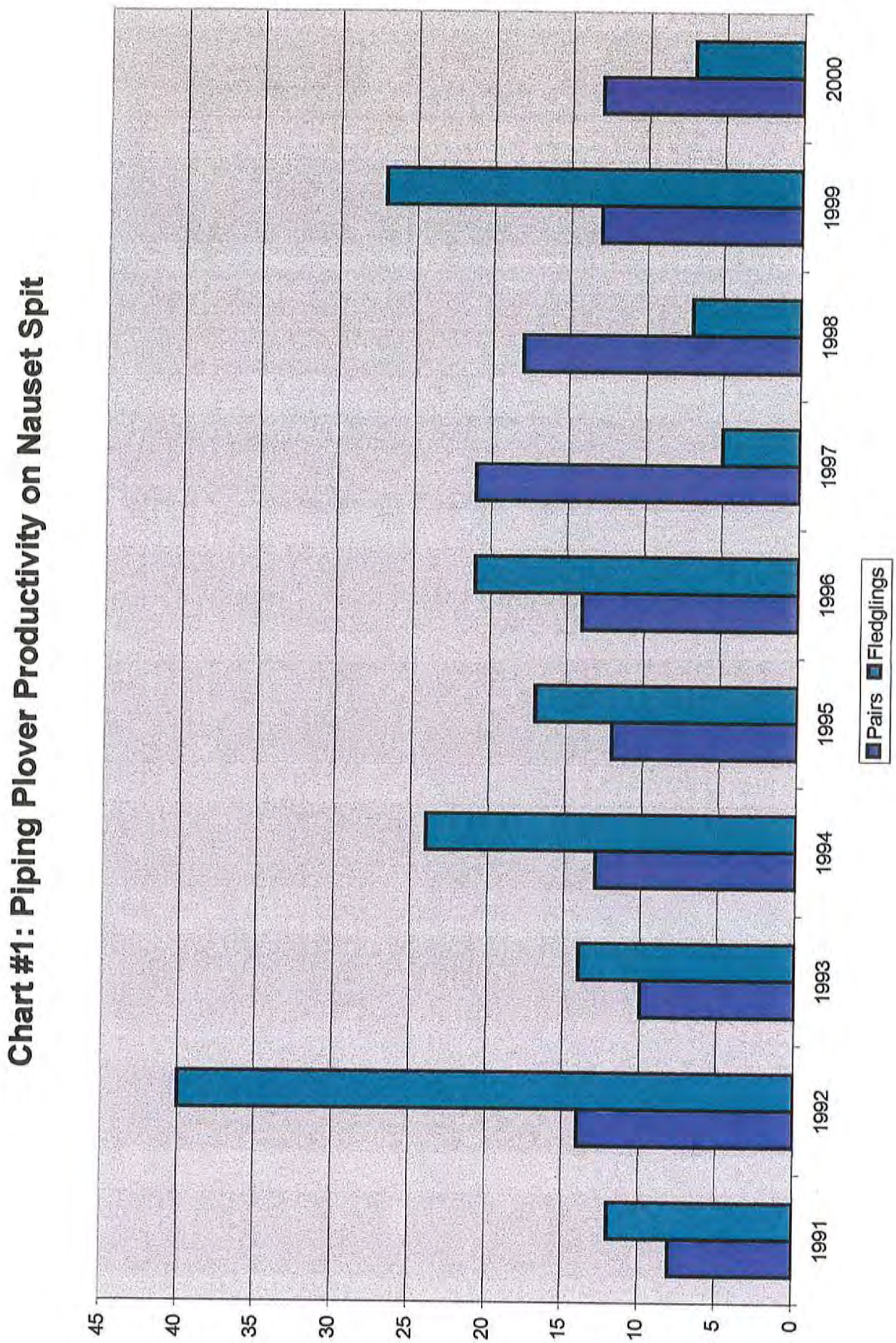


Chart #1: Piping Plover Productivity on Nauset Spit
45
40
35
30
25
20
15
10
5
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Pairs
Fledglings

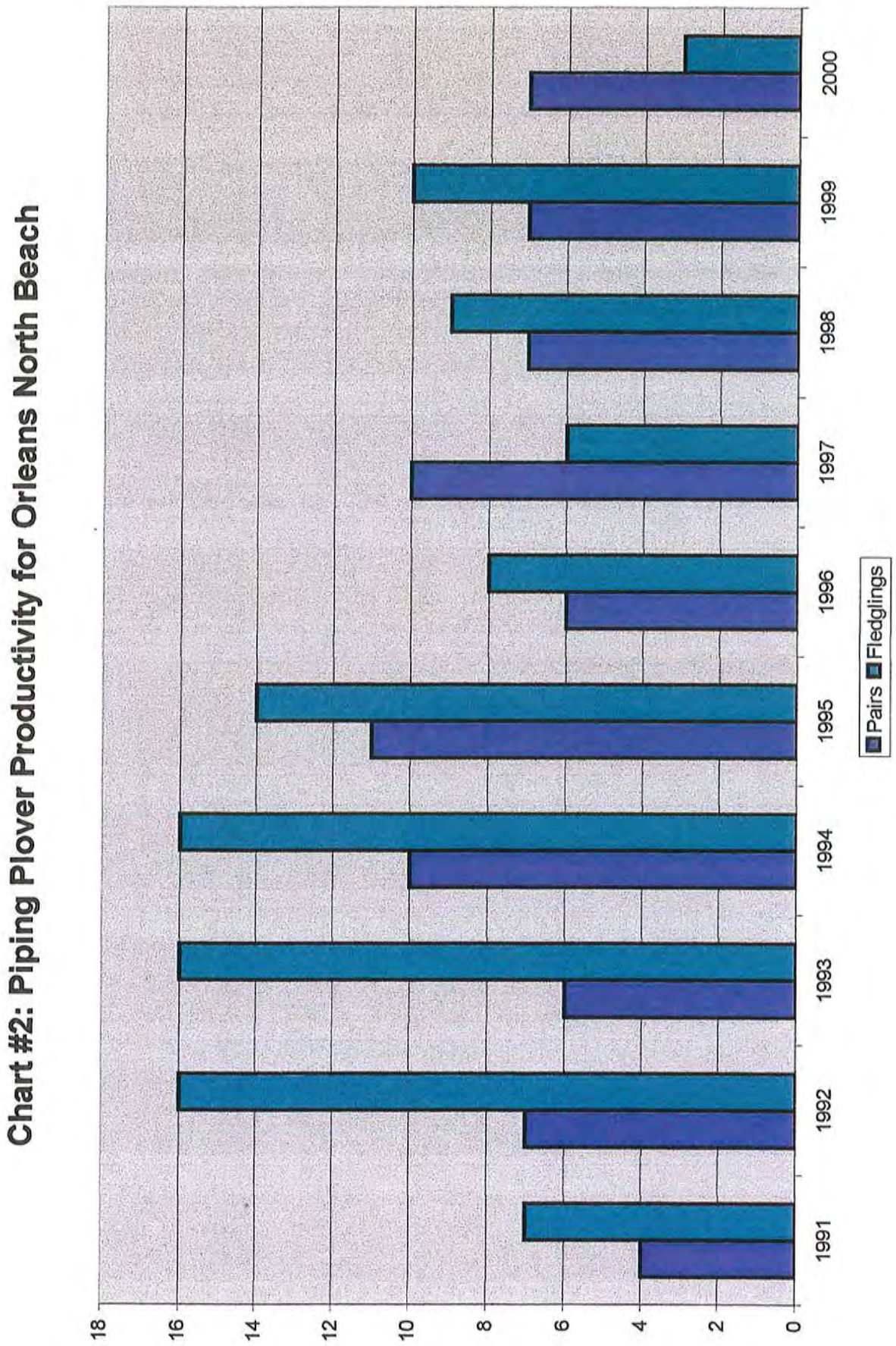


Chart #2: Piping Plover Productivity for Orleans North Beach
18
16
14
12
10
8
6
4
2
0
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
Pairs
Fledglings

Appendix E

Census Forms:

Form #1 – Massachusetts Piping Plover Census Form.....pages 22-26

Form #2 – 2000 Massachusetts Tern Census From.....pages 27-28

Year: 2000

Site Name: Nauset Spit

Town: Orleans

Ownership: Town

Observer/Agency: Jason Luscier and Kerry Collier

Address: Orleans Park Dept.
18 Bay Ridge Lane - P.O. Box 122
Orleans 02653 Telephone: (508) 240-3775

Census Results:	Index Count	Total Count
No. of Pairs	13	13
Unpaired Adults	—	—

Census Remarks:

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

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

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of Side	10'		
Size of Wire Mesh	2" X 4"		
Height Above Ground	44"		
Depth Buried	4"		
Cover Material	netting		
Cover Spacing/Mesh Size	1/2" X 1/2"		

Other Management Undertaken or Needed/Remarks: no dogs allowed in nesting areas; symbolic fencing used around entire nesting area; no pedestrians or vehicles allowed w/in 50 feet of nests; areas closed to ORV's 2 days prior to hatching til chicks fledged

Site Name: [illegible] Year [illegible] Observer [illegible]

Page 1 of 2

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-1	NS-1	3	3	2	4/29 (3)	≤ 4/29	Hatched 5/29	Y	A	5/1
NS-2	NS-2	4	4	Ø	4/29 (4)	≤ 4/29	Hatched 5/26	Y	A No cover	5/1
NS-2	NS-2b	4	4	Ø	6/25 (4)	≤ 6/25	Hatched 7/16	Y	A	6/26
NS-3	NS-3	3	3	2	5/6 (3)	≤ 5/6	Hatched 5/31	Y	A	5/13
NS-4	NS-4	4	Ø	Ø	5/7 (1)	5/15	Failed 6/6	Y	A	5/17
NS-5	NS-5	4	3	1	5/7 (2)	5/12	Hatched 6/8	Y	A	5/13
NS-6	NS-6	4	Ø	Ø	5/7 (2)	5/12	Failed 6/6	Y	A	5/13
NS-6	NS-6b	3	3	1	6/16 (1)	6/19	Hatched 7/16	Y	A	6/19
NS-7	NS-7	4	Ø	Ø	5/14 (3)	5/15	Failed 6/6	Y	A	5/17
NS-8	NS-8	4	Ø	Ø	5/14 (4)	≤ 5/14	Failed 6/6	Y	A	5/14

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
NS-2	NA	dissappeared after noreastern 6/6
NS-2b	NA	unknown
NS-4	washed out by noreastern 6/6	NA
NS-6	washed out by noreastern 6/6	NA
NS-7	washed out by noreastern 6/6	NA
NS-8	washed out by noreastern 6/6	NA

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

Offered HCP page a176

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
NS-8	NS-8b	3	3	Ø	6/17 (1)	6/21	Hatched 7/15	Y	A	6/21
NS-9	NS-9	4	Ø	Ø	5/15 (4)	≤ 5/15	Failed 6/6	Y	A	5/17
NS-9	NS-9b	4	3	Ø	6/19 (2)	6/21	Hatched 7/16	Y	A	6/21
NS-10	NS-10	4	3	1	5/31 (3)	6/3	Hatched 6/29	Y	A	5/31
NS-11	NS-11	4	Ø	Ø	5/31 (3)	6/2	Failed 6/6	Y	A	5/31
NS-12	NS-12	4	Ø	Ø	5/31 (2)	6/4	Failed 6/6	Y	A	6/1
NS-12	NS-12b	4	3	Ø	6/25 (4)	≤ 6/25	Hatched 7/14	Y	A	6/26
NS-13	NS-13	4	Ø	Ø	5/31 (4)	≤ 5/31	Failed 6/6	Y	A	5/31
NS-13	NS-13b	3	Ø	Ø	6/15 (1)	—	Failed 6/20	N	—	—

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
NS-8b	NA	unknown
NS-9	washed out by noreastern 6/6	NA
NS-9b	1 egg failed	unknown
NS-11	washed out by noreastern 6/6	NA
NS-12	washed out by noreastern 6/6	NA
NS-12b	1 egg failed	unknown
NS-13	washed out by noreastern 6/6	NA
NS-13b	predated by crow 6/20; prints w/in 1" of nest	NA

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

Orleans HCP page a177

Year: 2000

Site Name: Orleans North Beach

Town: Orleans

Ownership: Town

Observer/Agency: Jason Luscier and Kerry Collier

Address: Orleans Park Dept.
18 Bay Ridge Lane - P.O. Box 122
Orleans 02653 Telephone: (508) 240-3775

Census Results:	Index Count	Total Count
No. of Pairs	7	7
Unpaired Adults	—	—

Census Remarks:

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

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

Exclosure Design	A	B	C
Shape	Circular	same	
Diameter/Length of Side	10'	same	
Size of Wire Mesh	2" x 4"	same	
Height Above Ground	44"	same	
Depth Buried	4"	same	
Cover Material	netting	no cover	
Cover Spacing/Mesh Size	1/2" x 1/2"	no cover	

Other Management Undertaken or Needed/Remarks: No dogs allowed in nesting areas; symbolic fencing used around entire nesting area; no pedestrians or vehicles allowed w/in 50 feet of nests; areas closed to ORV's 2 days prior to hatching til chicks fledged

Page 1 of 1

Pair No.	Nest No.	Number of Eggs/Chicks: Laid	Hatched	Fledged	Date clutch was: Found (#eggs?)	Completed	Hatched or Failed	Exclosure: Y/N	Design(A,B,...)	Date Installed
ONB-1	ONB-1	4	Ø	Ø	5/18 (3)	5/19	Failed 5/20	N	—	—
ONB-1	ONB-1b	4	4	2	5/28 (2)	6/1	Hatched 6/27	Y	B	5/30
ONB-2	ONB-2	4	Ø	Ø	5/22 (4)	≤ 5/22	Failed 6/14	Y	B	5/22
ONB-3	ONB-3	5	Ø	Ø	5/28 (4)	5/29	Failed 6/19	Y	B	5/28
ONB-4	ONB-4	1	Ø	Ø	5/30 (1)	—	Failed 6/1	N	—	—
ONB-5	ONB-5	3	Ø	Ø	5/30 (2)	—	Failed 6/6	Y	A added w/ugs	6/1
ONB-5	ONB-5b	4	4	1	6/16 (2)	6/18	Hatched 7/15	Y	B	6/16
ONB-6	ONB-6	4	Ø	Ø	6/1 (4)	≤ 6/1	Failed 6/6	Y	A	6/1
ONB-7	ONB-7	4	Ø	Ø	6/3 (3)	6/4	Failed 6/6	Y	A	6/4
ONB-7	ONB-7b	4	3	Ø	6/18 (3)	6/19	Hatched 7/18	Y	B	6/19

Nest No.	Cause of Egg Mortality/Evidence	Cause of Chick Mortality/Evidence
ONB-1	predated by gull 5/20; prints detected w/in 5" of nest	NA
ONB-2	nest abandoned ~ 6/14	NA
ONB-3	nest abandoned ~ 6/19	NA
ONB-4	predated 6/1; suspected gull - tracks washed by rain	NA
ONB-5	washed out by noreastern 6/6	NA
ONB-6	washed out by noreastern 6/6	NA
ONB-7	washed out by noreastern 6/6	NA
ONB-7b	1 egg failed	unknown; 1 dead chick found - cause not apparent

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

2[illegible]0 [illegible]ass[illegible]nu[illegible]ts [illegible]ern [illegible]er[illegible]s [illegible]rn

Colony Name: Nauset-Orleans (Chatham line north to Nauset Harbor Inlet

Colony Number: 352009

Town: Orleans

Ownership: Town of Orleans

Observer/Agency: Jason Luscier / Orleans Park Dept.

Street: 18 Bay Ridge Ln · P.O. Box 122

Town: Orleans

Zip: 02653 Telephone: (508) 240-3775

***PLEASE 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	6/21	0	NC	HC	7/16	0	AC	HC	0	
COTE	6/21	0	NC	HC					1	many birds were ~~aw~~ present 4 days prior to A-count - mass predation apparent (suspected great-horned owl) - whole colony evacuated ≈ 6/19
ARTE	6/21	0	NC	HC	7/16	0	AC	HC	0	
LETE	6/21	1	NC	HC	7/16	33 X .8 = 26.4	AC	LC	2	many birds were present 4 days prior to A-count - mass predation apparent - whole colony evacuated ≈ 6/19
LAGU	6/21	0	NC	HC					1	were a few pairs prior to colony evacuating
BLSK	6/21	0	NC	HC	7/16	0	AC	HC	1	1 pair w/a nest present prior to whole tern colony evacuating
OTHER										

lease forward completed form(s) no later than July 31 to Bradford G. Blodget, State Ornithologist, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rt. 135, Westborough, MA 01581-3337. Telephone: (508)792-7270 x152 / Fax: (508)792-7275 / E-mail address for electronic filing: brad. blodget@state.ma.us

Instructions for completing the Massachusetts Tern Census Form

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

Colony Name and **Colony Number** are provided according to *Erwin and Korschgen(1979)*. Complete a seperate form for each colony visited, even if no birds are found. If a previously unreported colony location is discovered, attach a photocopy of a labeled U.S.G.S. topographical map pinpointing the exact location of colony.

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 = 1 pair)
EC = Partial nest count(extrapolated)
AC = Adult Count (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 = None
1 = Poor
2 = Fair to Good
3 = Excellent

*Nests (or scrapes) should contain at least one egg in order to be counted. Also, 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 represent pairs and all results should be expressed as "numbers of pairs".

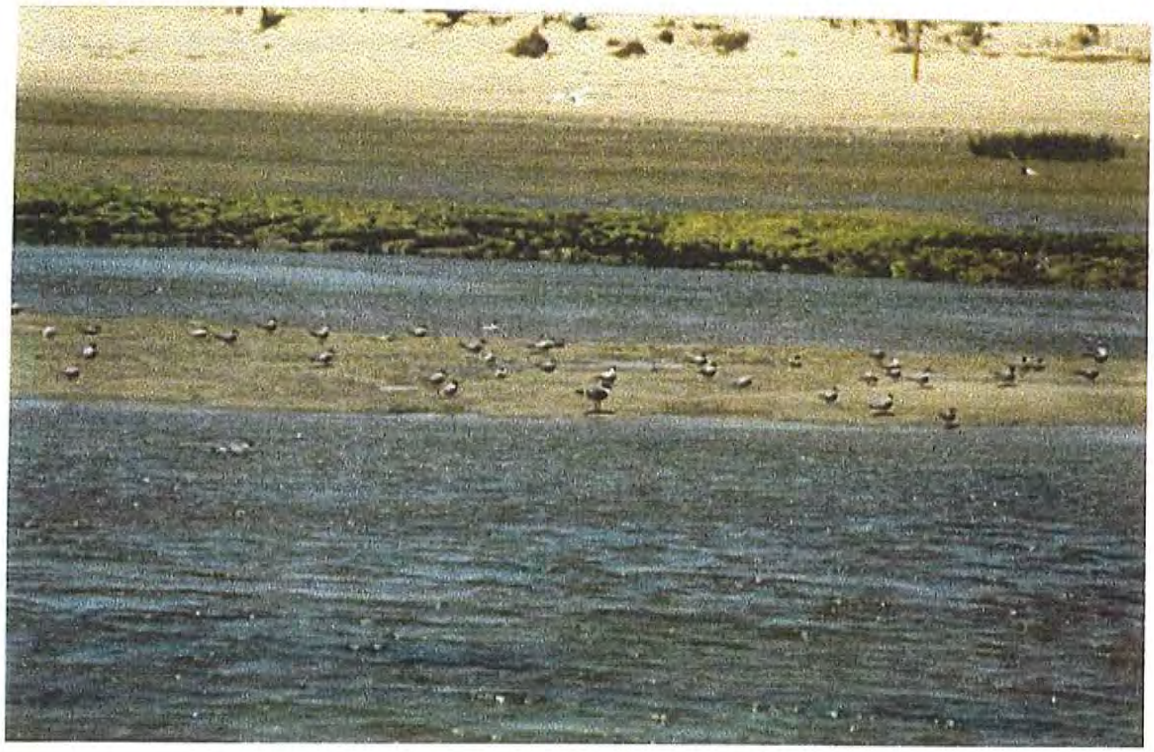
REMINDER: REPORT ALL NEGATIVE RESULTS

(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 common tern or least tern.	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.

Appendix F

Bird List



AOU Common Names	***Comments***
Common Loon	seen occasionally
Northern Gannet	6/20/00 - 1 imature washed up somewhat injured
Double-crested Cormorant	seen daily
Snowy Egret	seen often feeding in wetlands south of Nauset Spit
Great Blue Heron	seen rarely
Glossy Ibis	7/2/00 - 11 observed on Nauset Spit flying north
Canada Goose	seen rarely
Mallard	nesting activity in marsh near Pochet area
Common Eider	seen occasionally
White-winged Scoter	3 seen resting on Nauset Spit often
Surf Scoter	seen rarely
Osprey	1 nest at nesting platform near Pochet area
Northern Harrier	seen often foraging in marsh at Pleasant Bay
Black-bellied Plover	present at end of spring & late July into August
Piping Plover	seen daily
Semipalmated Plover	present late July into August
American Oystercatcher	nesting activity in Chatham; seen often
Willet	seen daily
Greater Yellowlegs	present late July into August
Ruddy Turnstone	present late July into August
Red Knot	present late July into August
Sanderling	seen daily
Short-billed Dowitcher	present late July into August
Laughing Gull	seen daily
Bonaparte's Gull	seen rarely
Ring-billed Gull	seen daily
Herring Gull	seen daily
Great Black-backed Gull	seen daily
Roseate Tern	nesting activity on New Island
Common Tern	seen daily
Arctic Tern	nesting activity on New Island
Least Tern	seen daily
Black Skimmer	seen daily
Mourning Dove	seen daily
Ruby-throated Hummingbird	seen rarely
Northern Flicker	seen rarely
Eastern Kingbird	seen daily
Blue Jay	seen occasionally
American Crow	seen daily

Horned Lark	seen daily
Tree Swallow	seen daily
Barn Swallow	seen daily
Black-capped Chickadee	seen rarely
American Robin	seen often
Gray Catbird	seen daily
Northern Mockingbird	seen daily
Cedar Waxwing	7/29/00 - 2 birds seen in tree at edge of marsh south of Nauset Spit
Common Yellowthroat	seen rarely
Song Sparrow	seen often
Northern Cardinal	seen daily
Red-winged Blackbird	nesting activity late spring/early summer in marsh at Pleasant Bay
Common Grackle	seen often
House Finch	seen occasionally
American Goldfinch	seen daily
House Sparrow	seen daily

Summary of Piping Plover (*Charadrius melodus*) Breeding Success and Tern Nesting Status on Nauset Spit and North Beach, Orleans Massachusetts 2001

Submitted to:
Paul Fulcher
Park Superintendent
Orleans Park Department
Orleans, MA 02653

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

Dr. Scott Melvin
Natural Heritage and Endangered Species Program
Massachusetts Department of Fisheries and Wildlife
Westboro, MA 01851

Submitted by:
Cathy Davis
Orleans Park Department
Orleans, MA 02653

Introduction:

This document contains the summary of the 2001 breeding season for the Piping Plover (*Charadrius melodus*) on Nauset Beach, which consists of Nauset Spit and North Beach in the town of Orleans, Massachusetts. Enclosed are maps with locations of the nests, summaries of field notes, breeding pair and fledged chick updates, and tables which illustrate the productivity of the birds. Also included is a list of all the birds and other animals that were observed in the Nauset Beach area during the season.

Piping plovers return to traditional nesting areas beginning late March through early May. They nest on the ocean side of town on Nauset Spit and North Beach. They prefer the sandy substrate that a barrier beach has to offer, as they, as well as their eggs and chicks are cryptically colored to blend in to their surroundings. Nests are located and monitored. When 4 eggs were laid in a nest, an exclosure was constructed around the nest area. The exclosure consists of welded-wire caging that is 4 feet high and 35 feet long. This is pulled into a circular shape around the nest and then buried 4 inches in the sand. Fruit netting is tied down and used as a cover and wooden stakes give the exclosure standing power. Piping plovers generally walk into their nests, not fly, so this type of predation device seems to work well. The birds can fit through the individual openings in the caging. Once the exclosure is in place, we always check to make sure the bird returns to the nest. Occasionally a bird will reject the exclosure, and abandon the nest. Last year a mortality occurred when a female adult was trapped in the fruit netting, attempting to fly up and out. Luckily this did not happen in the 2001 season.

Tern Nesting:

Every year a tern census is conducted for the entire Nauset Beach area. The official forms required by MassWildlife are included in this report. Two counts are conducted. The first one is done during the census window of June 5-20 called the A-Count. A-Count was conducted on June 21st, one day late of the official count period and 45 *Least Tern* nests were counted. No other shorebird

nests were found at that time. B-Count is conducted after June 20th. B-Count was conducted on July 17th and 73 *Common Tern* nests were counted, along with 6 *Least Tern* nests. All of these tern nests were found on Nauset Spit. The Common Terns had been nesting on New Island, an island located close to Nauset Spit in Town Cove that the National Park Service monitors. Subsequently, the least tern colony was displaced by the recent movement of the common terns. Several groups of least terns then nested further south on the Spit, in much smaller colonies. Two least tern nests were found outside of the B-Count on North Beach, north of the barrier for vehicle traffic. Both of these nests were washed over by the tide.

July 4th Fireworks Incident

A large fireworks display was observed on the cove side of the Nauset Spit section of Nauset Beach. The display originated from a pedestrian walkway that purposely cuts through the symbolic fencing used to protect the shorebird habitat area. The closest piping plover nest [NS15] to this location was measured at roughly 900 feet. That nest had hatched June 28th, a week prior to the incident. Two chicks from that nest were observed July 3rd and were again seen on July 5th, the day after the fireworks display.

The least tern colony at the end of the spit, roughly one mile from where the fireworks originated seemed not to suffer in their overall numbers. Curiously enough, about one week later, a colony of common terns, numbering roughly 150+ were seen in the area where the least terns had once occupied. As mentioned earlier, these birds had moved over from New Island. The entire common tern colony that had relocated to the end of the spit was predated sometime over the weekend of July 28th and 29th. All of the eggs were gone and a few eggshell fragments were found. Mammal tracks were seen throughout the entire colony area. They were surmised to be that of a fox, or small coyote. Large gull prints were also observed. The common terns themselves were not seen on the spit, but were observed nearby on a large sandbar.

Summary of Field Observations:

The following are summaries of the field observations made for each nest during the season. Fledged is defined as being 25 days old or witnessed in flight of at least 50 feet. Failed is defined as not having fledged chicks, which also includes a nest that did not hatch or abandoned nests.

Snapshot of Nauset Spit:

23 chicks fledged out of 12 successful nests
5 nests failed - 2 were predated, 1 washed over, 1 buried in sand, 1 abandoned.

Nauset Spit

NS-1

- 5-2 found with 3 eggs
- 5-4 completed with 4 eggs & exclosed
- 5-30 4 chicks hatched-only 3 are mobile, 1 laying still, barely alive, located outside of exclosure-feathers are not completely covering back-not fully formed or possibly attacked?
- 5-31 3 chicks seen brooding under adult
- 6-3 2 chicks seen
- 6-6/8 3 chicks seen
- 6-14 1 chick seen
- 6-16/26 2 chicks seen
- 6-26 2 chicks fledged
- One chick continued to be seen into early August in this area.

NS-2

- 5-5 found with 3 eggs
- 5-8 completed with 4 eggs
- 5-9 exclosed
- 6-3 hole in one egg observed
- 6-4/5 no observations made
- 6-6 2 chicks seen
- 6-7/10 2 chicks seen

- 6-17/27 1 chick seen
- 6-28 2 chicks seen
- 6-29 2 chicks fledged
- 7-14 2 chicks seen-one had moth hanging out of its bill!

NS-3

- 5-5 found with 2 eggs
- 5-7 complete with 4 eggs
- 5-9 exclosed
- 5-30 eggs sanded in due to high winds--I dug them out.
- 6-1 buried again, but some tracks seen
- 6-2 nest abandoned-declared failed

NS-4

- 5-6 found with 1 egg
- 5-9 two eggs present
- 5-10 nest washed over-declared failed

NS-5

- 5-6 found with 1 egg
- 5-12 complete with 4 eggs
- 5-13 exclosed
- 6-7 3 new chicks and one egg in nest
- 6-8 2 chicks seen
- 6-10 2 chicks seen
- 6-14 3 chicks seen
- 6-21 2 chicks seen
- 6-25/26 1 chick seen
- 6-28/30 2 chicks seen
- 7-6 2 chicks seen/fledged
- Both chicks continued to be seen into early August in this area.

NS-6

- 5-8 found with 1 egg
- 5-10 2 eggs present
- 5-12 3 eggs present

- 5-13 nest predated-no eggshell fragments-RAIN-faint crow tracks in area.
- 5-13 declared failed

NS-7

- 5-9 found with 3 eggs
- 5-10 complete with 4 eggs
- 5-11 exclosed
- 5-11 crows seen in area & perched on exclosure
- 5-23 no birds or tracks present--very windy and heavy rain the previous day
- 5-23 saw birds and tracks later that day, but never seen on nest again
- 5-24 abandoned--declared failed

NS-8

- 5-11 found with 3 eggs
- 5-13 complete with 4 eggs and exclosed
- 6-7 1 chick in nest with adult, 2 chicks & adult feeding cove side
- 6-8 4 chicks seen
- 6-10 4 chicks seen
- 6-14 2 chicks seen
- 6-16 3 chicks seen
- 6-21 2 chicks seen
- 6-25 3 chicks seen
- 6-26 2 chicks seen
- 6-27/28 3 chicks seen
- 7-4 1 chick seen
- 7-5 2 chicks seen/fledged
- One chick continued to be seen through early August in this area.

NS-9

- 5-13 found with 1 egg
- 5-21 complete with 4 eggs
- 5-23 exclosed
- 6-16 3 new chicks and 1 egg in nest
- 6-17 2 chicks seen
- 6-20 2 chicks seen
- 6-21 4 chicks seen
- 6-27/30 2 chicks seen
- 7-3 3 chicks seen

- 7-10 4 chicks seen
- 7-13 4 chicks seen/fledged-seen flying

NS-10

- 5-20 found with 1 egg
- 5-26 complete with 4 eggs & exclosed
- 6-22 2 eggs/2 new chicks in nest-2pm
- 6-26 2 chicks seen
- 6-27/30 1 chick seen
- 7-3 2 chicks seen
- 7-7 1 chick seen
- 7-14 1 chick seen
- 7-19 1 chick seen/fledged

NS-11 (believed to be a renesting attempt of predated nest NS-6)

- 5-23 found with 1 egg
- 5-24 2 eggs present
- 5-26 predated-no eggshell fragments-gull tracks prevalent
- 5-26 declared failed

NS-12

- 5-23 found with 4 eggs
- 5-24 exclosed
- 6-1 crow tracks seen circling exclosure
- 6-17 1 egg & new chick in nest, 2 chicks feeding with adult north of nest
- 6-20 1 chick seen
- 6-21 2 chicks seen
- 6-26/28 2 chicks seen
- 7-3 2 chicks seen
- 7-6 2 chicks seen
- 7-11 2 chicks seen
- 7-14 2 chicks seen/fledged

NS-13

- 5-26 found with 1 egg
- 6-1 completed with 4 eggs & exclosed
- 6-26 3 new chicks & 1 egg in nest
- 6-27/28 2 chicks seen

- 7-4 2 chicks seen
- 7-6 2 chicks seen
- 7-10 3 chicks seen
- 7-12/13 1 chick seen
- 7-17 3 chicks seen
- 7-18/19 1 chick seen
- 7-20/21 2 chicks seen/fledged

NS-14

- 5-27 found with 3 eggs
- 5-29 completed with 4 eggs
- 6-1 exclosed
- 6-25 new chick near nest & one near exclosure-no sign of other two
- 7-4 1 chick seen
- 7-13 1 chick seen
- 7-18 1 chick seen
- 7-20 1 chick seen/fledged-seen briefly flying

NS-15

- 5-30 found with 1 egg
- 6-3 complete with 4 eggs & exclosed
- 6-29 3 chicks seen-1 stumbling a bit more than the others
- 6-30 3 chicks seen
- 7-3 2 chicks seen
- 7-5 2 chicks seen
- 7-6 1 chick seen
- 7-7 2 chicks seen
- 7-12 3 chicks seen
- 7-13 2 chicks seen
- 7-14 3 chicks seen
- 7-17/19 2 chicks seen
- 7-23 2 chicks seen/fledged

NS-16

- 6-3 found with 1 egg
- 6-9 complete with 4 eggs
- 6-10 exclosed
- 7-3 3 eggs hatched-one still in nest-it never hatches

- 7-4 2 chicks seen
- 7-6 1 chick seen
- 7-7 3 chicks seen
- 7-10 2 chicks seen
- 7-12/14 2 chicks seen
- 7-17/20 1 chick seen
- 7-23 1 chick seen
- 7-25 1 chick seen
- 7-28 1 chick seen/fledged

NS-17

- 6-3 found with 2 eggs
- 6-7 completed with 4 eggs
- 6-8 exclosed
- 7-3 3 eggs hatched-1 egg still in nest-it never hatches
- 7-4 2 chicks seen
- 7-6/7 3 chicks seen
- 7-10 3 chicks seen
- 7-12 3 chicks seen
- 7-18/19 1 chick seen
- 7-20 1 chick seen
- 7-23 1 chick seen
- 7-28 2 chicks seen/fledged

Snapshot of Orleans North Beach:

Nine chicks fledged out of 4 successful nests.
Three nests failed; 1 washed over, 1 abandoned, 1 unknown reason for failure.

Orleans North Beach

ONB-1

- 5-6 found with 1 egg
- 5-10 completed with 4 eggs
- 5-11 exclosed
- 6-6 early am-1 bird hatched & hole in another egg

- 6-7 3 chicks seen
- 6-8 moved ORV barricade south as chicks were traveling beyond barricade
- 6-10 3 chicks seen
- 6-11 4 chicks seen
- 6-14/15 3 chicks seen
- 6-16/17 2 chicks seen
- 6-20 4 chicks seen--moved barricade south again-chicks on the move.
- 6-21/22 3 chicks seen
- 6-25 2 chicks seen
- 6-27 2 chicks seen
- 6-30 3 chicks seen
- 7-3/7 3 chicks seen & fledged (7-1)
- Three chicks continued to be seen through mid-July in this area.

ONB-2

- 5-9 found with 2 eggs
- 5-9 staked off nesting area as it was very close to tire tracks.
- 5-10 nest washed over-declared failed.

ONB-2A (most likely renesters from above failed nest)

- 6-14 witnessed 2 chicks--nest was never discovered
- 6-15/16 2 chicks seen
- 6-20/21 2 chicks seen
- 6-26/27 2 chicks seen
- 6-28 1 chick seen
- 7-3/4 2 chicks seen
- 7-5 1 chick seen
- 7-6/7-7 2 chicks seen
- 7-10/12 2 chicks seen & fledged (7-9)
- One chick witnessed through the end of July in this area.

ONB-3

- 5-11 found with 1 egg
- 5-18 completed with 4 eggs & exclosed
- 6-16 3 chicks seen & 1 egg still in nest
- 6-17 4 chicks seen
- 6-20 4 chicks seen
- 6-21 3 chicks seen

- 6-22 2 chicks seen
- 6-25 3 chicks seen
- 6-27 4 chicks seen
- 6-28 3 chicks seen
- 6-30 3 chicks seen
- 7-3 3 chicks seen
- 7-4 4 chicks seen
- 7-7 3 chicks seen
- 7-10/11 3 chicks seen & fledged

ONB-4

- 5-11 found with 2 eggs
- 5-15 complete with 4 eggs
- 5-16 exclosed
- 6-10 late afternoon 2 mobile chicks/2 new ones in nest
- 6-11 3 chicks seen
- 6-14 2 chicks seen
- 6-15 4 chicks seen
- 6-16 3 chicks seen
- 6-20 3 chicks seen
- 6-21/22 4 chicks seen
- 6-25 2 chicks seen
- 6-26 1 chick seen
- 6-27 4 chicks seen
- 6-28/30 1 chick seen
- 7-4 1 chick seen
- 7-6/7 1 chick seen & fledged (7-5)
- One chick seen through end of July in this area.

ONB-5

- 6-3 found with 3 eggs
- 6-10 exclosed with 3 eggs--nest never had 4 eggs
- 6-16 abandoned--no tracks or adults seen for several days

ONB-6

- 6-15 found with 1 egg
- 7-17 3 chicks seen and 1 egg still in nest
- 7-19 3 chicks seen

- 7-20 3 chicks seen--very scattered, moving all over the place
- 7-23 3 chicks seen
- 7-24 3 chicks seen-one week old
- 7-24 last day that any trace of this family was seen-declared failed

Piping Plover Nests for 2001 Season

Nest	Location	Found (#)	Complete	Exclosed	Exp. Hatch	Hatch Date	Anticipated Fledge dt.	Fledge (#)	Notes.....
	NAUSET SPIT								
NS1	2 posts S of 4		4-May	4-May	29-May	30-May	22-Jun	2	3 chicks 5/30, 1 barely alive close to nest
NS2	1 post N of 5	5/5 (3)	8-May	9-May	2-Jun	4-Jun	29-Jun	2	6-3 hole in one egg--ready to hatch!!
NS3	1 stake S of 6	5/5 (2)	7-May	9-May					eggs sanded in 5-30, I dug'em out,6-1 buried again
NS4	2 posts S of 8	5-6 (1)							2 eggs 5-9, washed over 5-10
NS5	1 stake N of 9	5-6 (1)	12-May	13-May	6-Jun	7-Jun	2-Jul	2	
NS6	3.5 posts N of 2	5-8 (1)							nest predated 5-13-no eggshell fragments
NS7	2.5 posts N of 4	5-9 (3)	10-May	11-May					abandoned 5-23 or 5-24
NS8	50 ft in at #8	5-11(3)	13-May	13-May	7-Jun	7-Jun	2-Jul	2	
NS9	Bayside #7	5-13 (1)	21-May	23-May	15-Jun	16-Jun	11-Jul	4	
NS10	N of 5, 2 stakes in	5-20 (1)	26-May	26-May	20-Jun	22-Jun	17-Jul	1	
NS11	S of 3, post & stake	5-23 (1)	renest						2 eggs 5-24, predated 5-26-no eggshell fragments
NS12	6 posts S of CP	5-23 (4)	23-May	24-May	17-Jun	17-Jun	12-Jul	2	
NS13	S of 10,post & stake	5-26 (1)	1-Jun	1-Jun	26-Jun	26-Jun	21-Jul	2	on edge of least tern colony
NS14	S of 6,post & stake	5-27 (3)	29-May	1-Jun	22-Jun	25-Jun	20-Jul	1	
NS15	S 3, post & 3stakes	5-30 (1)	3-Jun	3-Jun	28-Jun	28-Jun	23-Jul	2	
NS16	1 post N of 6	6-3 (1)	9-Jun	10-Jun	4-Jul	3-Jul	28-Jul	1	least terns, nest close to fencing-only 3 eggs hatched
NS17	post & stake S of 5	6-3 (2)	7-Jun	8-Jun	2-Jul	3-Jul	28-Jul	2	25 feet from fencing-only 3 eggs hatched
	ORLEANS N. BEACH								
ONB1	S of 2, pole #13	5-6 (1)	10-May	11-May	4-Jun	6-Jun	1-Jul	3	
ONB2	N of 1	5-9 (2)							3 eggs 5-9, washed over 5-10
ONB2A	S of Pochet,N of 1	6-14(2 ch)	none			b4 6-14	9-Jul	2	not sure hatch date-saw 2 chicks 6-14
ONB3	S of 1, 6.5 posts	5-11 (1)	18-May	18-May	12-Jun	16-Jun	11-Jul	3	
ONB4	S of 2, post 9	5-11 (2)	15-May	16-May	9-Jun	10-Jun	5-Jul	1	
ONB5	S of 3, post 12dunes	6-9 (3)		10-Jun	4-Jul				found w/3eggs-lost one-never had 4
ONB6	S of Pochet,N of 1	6-15 (1)	21-Jun	22-Jun	16-Jul	16-Jul	11-Aug	0	S of Big Stick and N of DUNE sign, mid beach

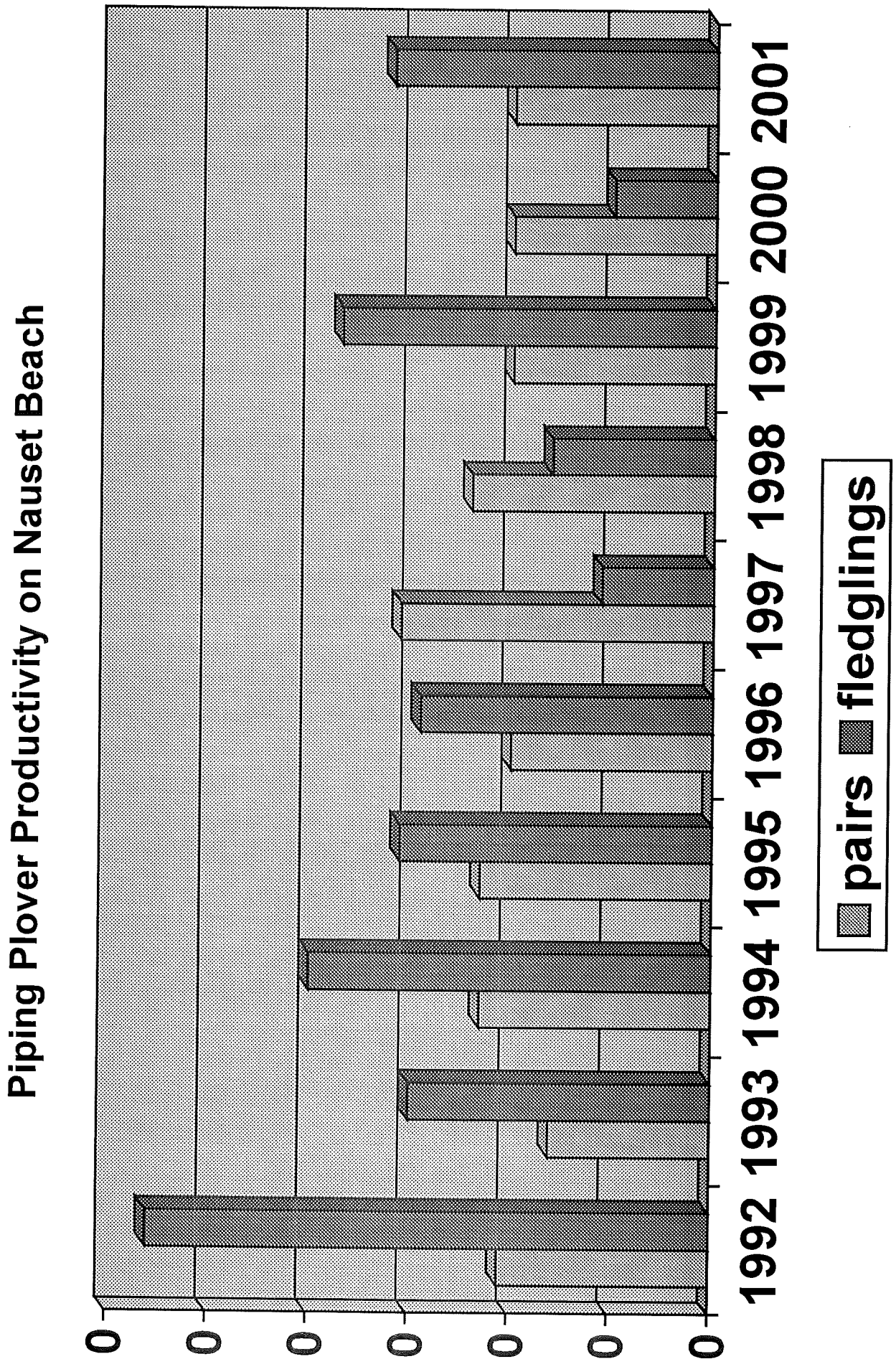
**Grey shaded rows signal a failed nest

Abundance and Productivity of Piping Plovers on Nauset Beach

	Nauset Spit	Orleans North Beach	Total
total # of pairs	14	6	20
total # of nesting attempts	17	7	24
total successful nests (%)*	12 (71 %)	6 (86 %)	18 (75 %)
total # of eggs laid	65	21	86
total # of eggs hatched (%)	46 (71 %)	18 (86 %)	64 (74 %)
total # of chicks fledged (%)	23 (50 %)	9 (50 %)	32 (50 %)
fledge rate per pair**	1.64 chicks	1.5 chicks	1.6 chicks

*Successful in this instance means a nest that had one or more eggs hatch.

** Fledge rate per pair is the total number of chicks fledged divided by the total number of pairs.


Piping Plover Productivity on Nauset Beach
0
0
0
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0
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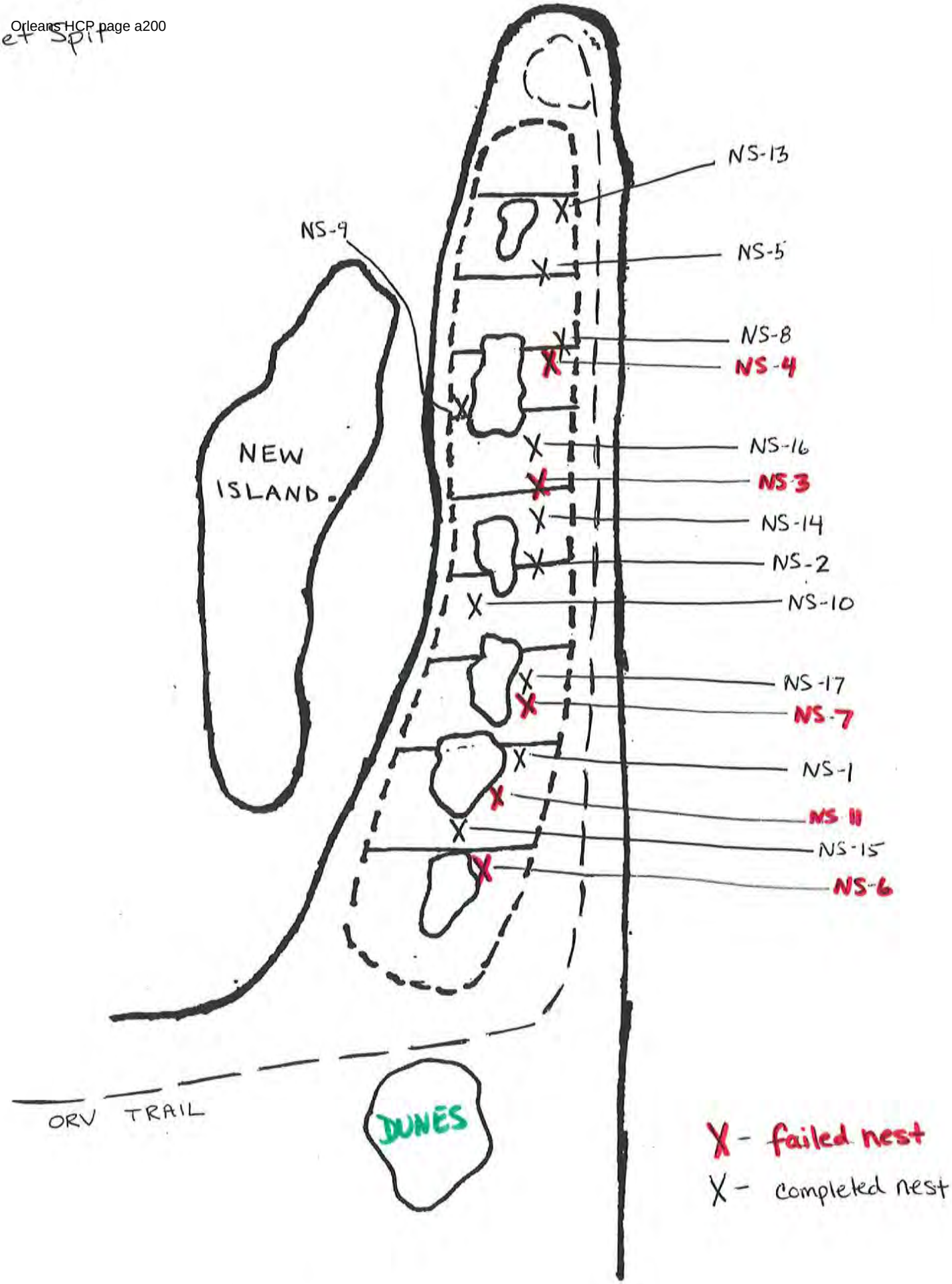
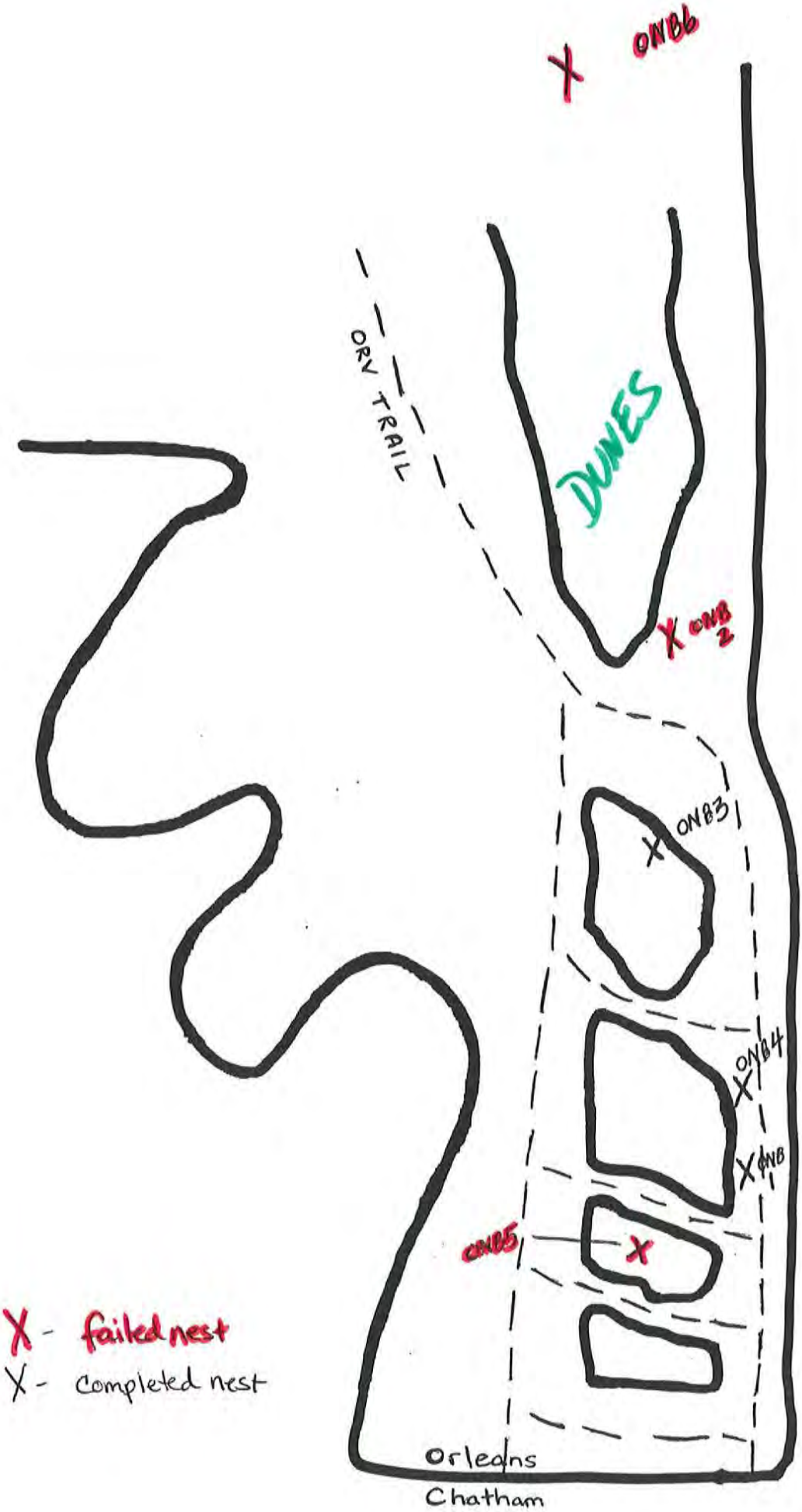
0
1992 1993 1994 1995 1996 1997 1998 1999 2000 2001
pairs
fledglings

Nauset Spit



X — NS-12

Orleans North Beach



X - failed nest

X - Completed nest

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2021

Site Name: Nauset Spit

Town: Orleans

Ownership: Town

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

Observer(s): Cathy Davis

Agency: Orleans Park Department

Address: 18 Bay Ridge Lane P.O. Box 122
Orleans MA 02653

Telephone: 508-240-3775 E-mail:

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	14	14
Unpaired Adults	—	—

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

List pairs not present during Index Count:

Month	Average # of visits to site per week
April	3
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10'		
Size of wire mesh	2" x 4"		
Total Height	48"		
Height above ground:	44"		
Depth buried:	4"		
Cover material	netting		
Cover spacing/Mesh size	1/2" x 1/2"		

Other management undertaken or needed/Remarks: No dogs allowed in nesting areas; symbolic fencing used around entire nesting area; no vehicles or pedestrians allowed within 50 ft of nests; area closed to ORV's one day prior to hatching til chicks are fledged.

[a]*The Index Count includes those pairs seen during the Index Count period (last Saturday in May – first Sunday in 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 Year: 2001 Observer(s): Cathy Davis

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	Exclosure Design (A, B…)	Exclosure Date installed
NS-1	NS-1	4	4	2			5-4	5-30	Y	A	5-4
NS-2	NS-2	4	4	2	5-3	3	5-8	6-4	Y	A	5-9
NS-3	NS-3	4	~~0~~	~~0~~	5-5	2	5-7	5-30	Y	A	5-9
NS-4	NS-4	2	~~0~~	~~0~~	5-6	1	~~0~~	5-10	N		
NS-5	NS-5	4	4	2	5-6	1	5-12	6-7	Y	A	5-13
NS-6	NS-6	1	~~0~~	~~0~~	5-8	1	~~0~~	5-13	N		
NS-7	NS-7	4	~~0~~	~~0~~	5-9	3	5-10	5-23	Y	A	5-11
NS-8	NS-8	4	4	2	5-11	3	5-13	6-17	Y	A	5-13
NS-9	NS-9	4	4	4	5-13	1	5-21	6-16	Y	A	5-23
NS-10	NS-10	4	4	1	5-20	1	5-26	6-22	Y	A	5-26

[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
NS-3	Sanded in due to high wind
NS-4	washed over
NS-7	abandoned

Nest No.	Cause of chick mortality/Evidence
NS-1	one dead chick observed close to nest 6/1 – appeared to have been attacked by avian predator OR not fully formed yet. Unable to determine

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 Year: 2001 Observer(s): Cathy Davis

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	Exclosure Design (A, B...)	Exclosure Date installed
NS-11	NS-11	2	~~0~~	~~0~~	5-23	1	~~0~~	5-26	N		
NS-12	NS-12	4	4	2	5-23	4	>5-23	6-17	Y	A	5-24
NS-13	NS-13	4	4	2	5-26	1	6-1	6-26	Y	A	6-1
NS-14	NS-14	4	4	1	5-27	3	5-29	6-25	Y	A	6-1
NS-15	NS-15	4	4	2	5-30	1	6-3	6-28	Y	A	6-3
NS-16	NS-16	4	4	1	6-3	1	6-9	7-3	Y	A	6-10
NS-17	NS-17	4	4	2	6-3	2	6-7	7-3	Y	A	6-8

[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
NS-11	predated		

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

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2011

Site Name: Orleans North Beach

Town: Orleans

Ownership: Town

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

Observer(s): Cathy Davis

Agency: Orleans Park Department

Address: 18 Bayridge Lane PO Box 122
Orleans MA 02653

Telephone: 508-240-3775 E-mail:

Census Results:	**Index Count[a]**	**Total Count[b]**
No. of Pairs	5	5
Unpaired Adults	1	1

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

List pairs not present during Index Count:
ONB6 - one egg found 6/15

Month	**Average # of visits to site per week**
April	3
May	5
June	5
July	5

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

Exclosure Design	**A**	**B**	**C**
Shape	Circular		
Diameter/Length of side	10'		
Size of wire mesh	2" x 4"		
Total Height	48"		
Height above ground:	44"		
Depth buried:	4"		
Cover material	netting		
Cover spacing/Mesh size	1/2" x 1/2"		

Other management undertaken or needed/Remarks:
No dogs allowed in nesting areas; symbolic fencing used around entire nesting area; no vehicles or pedestrians allowed within fifty feet of nests; area closed to ORV's one day prior to hatching until chicks are fledged.

[a]*The Index Count includes those pairs seen during the Index Count period (last Saturday in May – first Sunday in 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: Orleans North Beach Year: 2001 Observer(s): Cathy Davis

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	Exclosure Design (A, B...)	Exclosure Date installed
ONB-1	ONB-1	4	4	3	5-6	1	5-10	6-6	Y	A	5-11
ONB-2	ONB-2	3	~~0~~	~~0~~	5-9	2	~~0~~	5-10	N		
ONB2A	ONB2A	?	?	2	2 chicks seen 6-14	N/A	N/A	6-14	N		
ONB-3	ONB-3	4	4	3	5-11	1	5-18	6-16	Y	A	5-11
ONB-4	ONB-4	4	4	1	5-11	2	5-15	6-10	Y	A	5-16
ONB-5	ONB-5	3	~~0~~	~~0~~	6-9	3	—	6-16	Y	A	6-10
ONB-6	ONB-6	4	4	~~0~~	6-15	1	6-21	7-16	Y	A	6-22

[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
ONB-2	washed over	ONB-6	no evidence seen - chicks never seen again after 7/24 - approximately one week old.
ONB-5	abandoned		
ONB-2A	nest never discovered - 2 chicks seen 6-14		

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

Instructions for completing the Massachusetts Tern Census Form

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

Colony Name and **Colony Number** are provided according to *Erwin and Korschgen (1979)*. Complete a separate form for each colony visited, even if no birds are found. If a previously unreported colony location is discovered, attach a photocopy of a labeled U.S.G.S. topographical map pinpointing the exact location of the colony.

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 = 1 pair)
EC = Partial Nest Count (extrapolated)
AC = Adult** Count (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 = None
1 = Poor
2 = Fair to Good
3 = Excellent

Nests (or scrapes) should contain at least one egg in order to be counted. Also, 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 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.

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.

2001 Massachusetts Tern Census Form

Colony Name: Nauset - Orleans

Colony Number: 352009

Town: Orleans

Ownership: Town

Observer/Agency: Cathy Davis / Orleans Park Dept.

Street: 18 Bay Ridge Lane P.O. Box 122

Town & State: Orleans MA Zip: 02653

E-mail: Telephone: 508-240-3775

Orleans HCP page a208

⇨⇨ **PLEASE** 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	6/21	Ø	NC	HC	7/17	Ø	NC	HC		
COTE	6/21	Ø	NC	HC	7/17	73	HC	HC		large group moved from New Island (NPS) to end of Nauset Spit + displaced the least tern colony.
ARTE	6/21	Ø	NC	HC	7/17	Ø	NC	HC		
LETE	6/21	45	NC	HC	7/17	6	NC	HC		
LAGU	6/21	Ø	NC	HC						
BLSK	6/21	Ø	NC	HC	7/17	Ø	NC	HC		
OTHER										

Please forward completed form(s) no later than July 31 to Bradford G. Blodget, State Ornithologist, Massachusetts Division of Fisheries and Wildlife, Field Headquarters, Rte. 135, Westborough, MA 01581-3337. Telephone: (508)792-7270 x152 / Fax: (508)792-7275 / E-mail address for electronic filing: brad.blodget@state.ma.us

Animals and birds seen in the Nauset Beach Area during the season

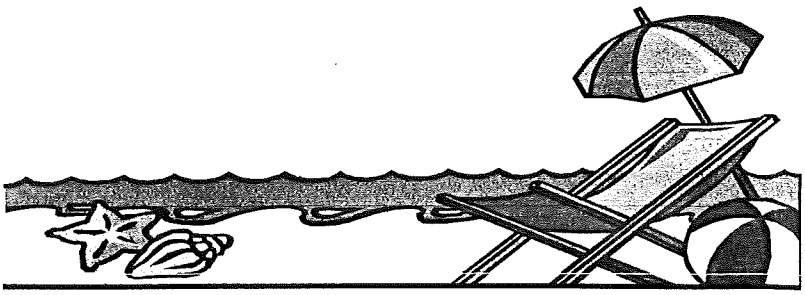
Animals:

eastern coyote (1)
eastern cottontail rabbit (many)
eastern striped skunk
grey seals (many)
harbor seal
hooded seal
humpback whales (several)
juvenile red fox (1)
white-tailed deer (1)

Birds:

american crow
american goldfinch
american kestrel
american oystercatcher (pair nested on Nauset Spit, but nest was predated)
american robin
barn swallow
black skimmer
black-bellied plover
common eider
common grackle
common loon
common merganser
common tern
common bobwhite (heard often)
double-crested cormorant
dunlin
eastern kingbird
gray catbird
great blue heron
great egret

greater black-backed gull
greater yellowlegs
herring gull
horned lark
house sparrow
killdeer
laughing gull
least tern
least sandpiper
mute swan
northern cardinal
northern harrier
northern flicker
northern mockingbird
osprey
piping plover
redknot
red-winged blackbird
ring-billed gull
roseate tern
ruddy turnstone
sanderling
semipalmated plover
short-billed curlew
song sparrow
snowy egret
tree swallow
whimbrel
willet



Summary of Piping Plover Breeding Success and Tern Nesting Status
2002 Nesting Season
Nauset Beach, Orleans, Massachusetts

AUG 2 1 2002

Submitted to:

Paul Fulcher
Park Superintendent
Orleans Park Department
Orleans, MA 02653

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

Dr. Scott Melvin
Natural Heritage and Endangered Species Program
Massachusetts Department of Fisheries and Wildlife
Westboro, MA 01851

Submitted by:

Cathy Davis
Shorebird Monitor
Orleans Parks Department
Orleans, MA 02653

Introduction

This document includes the summary of the 2002 breeding season for the Piping Plover population that resides on Nauset Beach. Nauset Beach consists of Nauset Spit to the north and Orleans North Beach to the south. Enclosed are maps with locations of the nests, summaries of field notes, tables illustrating productivity and breeding pair and fledged chick updates. Included is a list of all birds and mammals that were observed in the Nauset Beach area during the season.

Piping Plovers return to traditional nesting areas beginning late March through early May. In Orleans, they nest on the ocean side of town, Nauset Beach. They prefer the sandy substrate that a barrier beach has to offer, since the adults, as well as their eggs and chicks, are cryptically colored to perfectly blend in with their surroundings. Nests are located and monitored. When 4 eggs are laid in a nest, an exclosure is constructed around the nest area to protect the nest from predators. The exclosure consists of welded-wire caging that is 4 feet high and 35 feet long. This is pulled into a circular shape around the nest and then buried 4 inches in the sand. Light-weight fruit netting is tied down and used a cover from avian predators. Wooden stakes then give the exclosure standing power against the winds. The caging is wide enough for the diminutive plover to walk into and out of its nest, but not allowing access for other would-be predators. Piping Plovers generally walk, not fly, into their nests, so admittance is generally not inhibited for the birds.

Discovery of Adult Plover Mortality

On Wednesday May 29, 2002, an adult male Piping Plover was discovered dead *inside* an exclosure. This nest was located on Nauset Spit, NS5. I had checked on this nest the previous day, but with binoculars from a distance. At that time I could clearly see an incubating adult, but did not notice anything out of the ordinary.

Upon finding the deceased bird, I first looked for predator tracks or other clues as to what may have happened. There were no tracks nearby, and it had recently rained that morning. There was no sign of struggle with the netting and no blood on the bird or nearby area. The female was still incubating the eggs, but actively displayed while I was in the area. Other plover monitors have reported mortalities in exclosures this season. After conversing with the plover monitor in Chatham, who had seen Northern harriers actively harassing piping plovers within exclosures, I decided not to exclose any more nests. The last exclosures were erected June 3rd.

Tern Nesting

Each year a Tern census is conducted for the entire Nauset Beach area. The official forms required by MassWildlife are included in this report. Two counts are conducted. The first one is done during the census window of June 5-20 and is called A Count. In 2002 the A Count was conducted on June 20th and 2 Common Tern *nests* and nearly 63 Least Tern *pairs* were counted. B Count is conducted after June 20th. For the 2002 season, B Count was conducted July 14th, with only 6 Least Tern *nests* counted. All of these Tern nests were found on Nauset Spit. The nests of the Terns, as well as the Piping Plovers and one pair of American Oystercatchers were repeatedly predated by mammalian predators, namely fox, coyote and skunk. These birds repeatedly renested, but these too were predated.

American Oystercatcher Nesting

This year, the Coastal Waterbird Cooperators were asked to conduct a census of American Oystercatchers, which are now ranked as a *Species of High Concern* in the United States Shorebird Conservation Plan. The count period was the same as for the Piping Plover, June 1st though June 9th. One breeding pair was observed on Nauset Spit before and during this time. This pair attempted to nest twice, but unfortunately both times the nest was predated. Interestingly enough this pair nested in the midst of two Piping Plover nests, which themselves were quite close together. I was witness to an interesting scenario; an adult Piping Plover was seen chasing one of the American Oystercatchers nesting in the area. It was quite a sight seeing a small bird aggressively defending its territory to a bird much bigger in size.

In Conclusion

Overall, the 2002 shorebird nesting season was fair. We had a few less Piping Plover pairs return than the previous year, and the birds that did return displayed behavior that was not as typical as the season before. Many of the birds would run from their nests without a sound, as opposed to calling and displaying to distract the would-be predator. Nest predation was extremely high, especially by mammalian predators. I attribute this in part to a mild winter with many of the mammals surviving and reproducing. The Terns, both Common and Least were not successful in nesting on Nauset Spit, even though many attempts were made. I did witness immature birds of both species later in the season on the front beach and also in the flats on the bayside of Nauset Spit and over by New Island.

Summary of Field Observations

The following are summaries of the field observations for each piping plover nest during this season. Fledged is defined as being 25 days old or witnessed in flight of at least 50 feet. Failed is defined as not having fledged chicks, which also includes nests that did not hatch or were abandoned.

Snapshot of Nauset Spit

12 chicks fledged out of 6 successful nests. There were 22 nesting attempts. This number does include birds that renested.
16 nests failed - 12 were predated, 3 abandoned and 1 unknown cause.

	Nauset Spit
NS-1	
5-7	found with one egg
5-12	complete with 3 eggs (never laid 4th egg)
5-13	exclosed
6-11	not hatched yet & adult not seen incubating
6-12	one egg left in nest, 2 eggs gone – assume that they have hatched. 3rd egg never hatches – no sign anywhere of this brood.
6-13	searched all over for chicks – never find a trace of them or adults. Nest declared failed.
NS-2	
5-10	found with one egg
5-16	complete with 4 eggs
5-19/20	no observations made
5-21	nest found predated – evidence of fresh plover & crow tracks seen in area. Nest declared failed.
NS-3	
5-10	found with 2 eggs
5-14	complete with 4 eggs
5-15	exclosed
6-10	3 eggs hatch – 4th egg never hatches
6-12	3 chicks seen on the bayside
6-13	3 chicks seen
6-18	3 chicks seen
6-19	3 chicks seen

6-26	2 chicks seen
6-29	3 chicks seen
7-2	3 chicks seen
7-3	3 chicks seen
7-5	2 chicks seen – one witnessed in flight. Fledged.
7-9	2 chicks seen
7-10	2 chicks seen
7-11	2 chicks seen
7-14	1 chick seen
7-22	1 chick seen
7-26	1 chick seen

NS-4

5-11	1 egg found
5-18	complete with 4 eggs
5-21	exclosed
6-16	3 eggs hatch, 4th egg never hatches
6-18	2 chicks seen
6-23	2 chicks seen
6-26	1 chick seen
6-29	1 chick seen
7-5	2 chicks seen
7-10	2 chicks seen
7-12	2 chicks seen
7-17	2 chicks seen
7-26	2 chicks seen
8-7	2 chicks seen

NS-5

5-12	found with one egg
5-17	complete with 4 eggs
5-17	exclosed
5-29	Adult male mortality. Male found dead inside exclosure. No apparent sings of struggle with netting, no tell-tale tracks due to heavy rain. Most likely an avian predator.
6-3	nest abandoned and declared failed.

NS-6

5-14	found with 3 eggs
5-16	complete with 3 eggs, never a 4th egg
5-17	exclosed
6-10	all 3 eggs hatch

6-10	2 chicks seen ambulatory with adults, one chick still in exclosure
6-11	1 chick seen
6-19	1 chick seen
6-23	1 chick seen
6-29	1 chick seen
7-5	1 chick seen; 25 days old. Fledged.
7-11	1 chick seen
7-26	1 chick seen
8-1	1 chick seen

NS-7

5-15	found with 2 eggs
5-16	3 eggs present
5-19/20	no observations made
5-21	nest found predated. No tracks seen due to heavy rains. Nest declared failed.

NS-8

5-17	found with 3 eggs
5-18	complete with 4 eggs.
5-19	exclosed
6-12	all 4 eggs hatch
6-13	4 chicks seen
6-18	1 chick seen
6-26	3 chicks seen
7-1	2 chicks seen
7-2	4 chicks seen
7-9	2 chicks seen. Fledged.
7-12	2 chicks seen resting together with adult.
7-17	2 chicks seen. One in flight.
7-22	1 chick seen
8-1	2 chicks seen
8-7	2 chicks seen

NS-9

5-16	found with 2 eggs
5-18	3 eggs present
5-19/20	no observations made
5-21	nest found predated. Small mammal tracks in area, most likely fox. Coyote tracks skirting area as well. Nest declared failed.

NS-10

5-20	found with one egg by Lee Miller, Beach Director.
5-21	nest found predated. Very shaly-type sand. Cannot see any tracks nor signs of disturbance. Very high winds and rain the past few days. Nest declared failed.

NS-11

5-22	found with one egg
5-29	complete with 3 eggs
6-3	exclosed
6-14	high tide clearly went through exclosure and nest – eggs & adults all accounted for. Impressive!
6-26	nest hatched – 2 chicks seen – one egg still in nest
6-27	all 3 eggs have hatched
6-28	2 chicks seen
6-29	3 chicks seen
7-2	1 chick seen
7-6	1 chick seen
7-10	1 chick seen
7-12	1 chick seen
7-19	1 chick seen
7-22	1 chick seen. Fledged and in flight!
8-1	1 chick seen. Flew over to flats at New Island.
8-7	1 chick seen

NS-12

5-27	found with one egg
6-1	complete with 4 eggs
6-12	nest predated. Crow tracks lead into nest and all around area. Nest declared failed.

NS-13

5-27	found with one egg
5-30	complete with 4 eggs
6-8	nest found predated. Heavy rain previously. No sign of adults or tracks of any kind. Nest declared failed.

NS-14

5-27	found with 3 eggs
5-28	exclosed with 3 eggs as birds were visibly disturbed by folks using walkway 20 feet from nest. Adults nowhere around. Relocated walkway as well.

**Nest abandoned sometime over 5-27/29. Most likely due to disturbance on walkway which had been relatively quiet when birds first laid eggs, but became much more heavily trafficked due to Memorial Day weekend.

Nest declared failed.

NS-15

5-29	4 eggs found hidden in dune grass. Unsure when complete, but no more than a day or two.
6-8	Nest found predated. Few eggshell fragments in nest. No visible tracks. High winds and rain recently.

Nest declared failed.

NS-16

5-30	found with 2 eggs
6-3	complete with 4 eggs
6-3	exclosed
6-16/17	no observations made. Storm surge tides very high 6-15.
6-18	eggs are starting to be sanded in. No sign of adults or any tracks. Tide came up to symbolic fencing, but still 50 feet from nest.
6-19	eggs definitely sanded in. No adults or tracks. Abandoned.

Nest declared failed.

NS-17

6-1	found with 3 eggs
6-3	complete with 4 eggs
6-3	exclosed
6-15	high tide clearly went through exclosure and nest, but all eggs and adults accounted for. wow.
6-30	all 4 eggs hatched
7-2	4 chicks seen
7-9	2 chicks seen
7-11	3 chicks seen
7-12	3 chicks seen
7-18	3 chicks seen
7-22	3 chicks seen
7-25	3 chicks seen. 25 days old today. Fledged.
8-7	3 chicks seen with adult

NS-18

6-11	found with 2 eggs
6-12	complete with 3 eggs- never a 4th egg. No exclosure as nest is in dune grass area and birds have flown up.
7-2	nest found predated. Not sure of tracks – maybe crow?? Nest declared failed.

NS-19

6-13	found with one egg, no adults present **no other egg ever appears, nor do adults or tracks. Nest declared failed.

NS-20

6-17	found with 3 eggs
6-20	complete with 4 eggs
7-10	found nest predated. Most likely skunk. Depression was dug out where nest was. Nest declared failed.

NS-21

6-18	found with 2 eggs
6-20	3 eggs present
6-23	complete with 4 eggs. Not exclosed as nest in dune area.
6-27	found nest predated. Fox tracks in area. Nest declared failed.

NS-22

6-21	found with 3 eggs
6-30	found nest predated. Shaly area, difficult to see tracks. Lone adult calling in area. Nest declared failed.

Snapshot of Orleans North Beach

3 chicks fledged out of 2 successful nests. 6 nests failed. 1 was abandoned, 3 were predated, 1 sanded in and 1 washed over.

Orleans North Beach

ONB-1

5-10	found with 2 eggs
5-14	found nest predated. Not sure of cause due to heavy rains and wind. Nest declared failed.

ONB-2

5-15	found with 2 eggs
5-17	no signs of adults or tracks
5-18	still no signs – pair seen a few posts north- no calling.
5-19/20	no observations made
5-21	eggs sanded in – nest abandoned and declared failed.

ONB-3

5-23	found with one egg under tuft of beach grass up in dunes
5-24	found nest predated- fox tracks in area. Nest declared failed.

ONB-4

5-25	found with one egg
5-28	complete with 4 eggs
5-29	exclosed
6-16/17	no observations made
6-18	no sign of adults & no tracks at all. High tide came to about 20 feet from nest.
6-20	abandoned- no adults or tracks. Nest declared failed.

ONB-5

5-22	found with one egg
5-28	exclosed with 3 eggs
5-29	complete with 4 eggs
6-26	3 hatchlings and one egg in nest in the am. All eggs hatch.
6-27	3 chicks seen
6-28	3 chicks seen
7-2	3 chicks seen
7-3	2 chicks seen
7-5	2 chicks seen
7-6	3 chicks seen
7-9	3 chicks seen
7-12	3 chicks seen
7-17	1 chick seen
7-18	1 chick seen
7-19	1 chick seen
7-21	1 chick seen. Fledged.
7-22	1 chick seen
7-25	1 chick seen
7-26	1 chick seen

ONB-6

5-30	found with one egg
6-3	complete with 4 eggs
6-3	exclosed
6-30	all four eggs hatch
7-2	3 chicks seen
7-3	2 chicks seen
7-5	1 chick seen
7-6	2 chicks seen
7-9	2 chicks seen
7-12	1 chick seen
7-17	3 chicks seen
7-18	2 chicks seen
7-21	2 chicks seen
7-25	2 chick seen
7-26	2 chicks seen

ONB-7

6-14	found with 2 eggs
6-16/17	no observations made
6-18	found nest washed over due to high tides. Nest declared failed.

ONB-8

6-22	found with 2 eggs
6-24	complete with 3 eggs
6-28	found nest predated. Fox tracks near nest site. Nest declared failed.

NESTS FOR 2002

NEST	LOCATION	Found (#)	Complete	Exclosed	Exp.Hatch	Hatch Date	Anticipated Fledge Date	Fledge #	Notes
	ORLEANS NORTH BEACH								
ONB1	8 posts So of 3	5/10(2)							predated/after heavy rain
ONB2	13 posts So of 2	5/16 (2)							sanded in over 5-19/20
ONB3	7 posts So of 2	5-21 (1)							predated 5-21/22 fox/skunk?
ONB4	9 posts So of 2	5-23(1)	5-28(4)	28-May	22-Jun				abandoned after high tides 6-16
ONB5	4.5 posts So of 1	5-23(1)	5-30(4)	5-28(3)	24-Jun	26-Jun	21-Jul	one	
ONB6	4.5 posts So of 3	5-29(1)	6-3 (4)	3-Jun	28-Jun	30-Jun	25-Jul	two	
ONB7	N of 1, S of Pochet	6-13(2)							washed over/high tides 6-16
ONB8	Sof 2, near big post	6-23 (2)	6-25(3)						predated
	NAUSET SPIT								
NS1	2 Posts/1.5 stks N of 5	5/7 (1)	5/12 (3)	14-May	6-Jun	12-Jun	7-Jul		eggs hatch but never se
NS2	Post 7	5/10 (1)	5/16 (4)						predated over 5-19/20
NS3	1 stake S of 9	5/10 (2)	5/14 (4)	14-May	8-Jun	10-Jun	5-Jul	two	4 eggs laid/only 3 hatch
NS4	2.5 stakes N of 2	5/11 (1)	5-18 (4)	21-May	12-Jun	16-Jun	11-Jul	two	1 egg never hatched
NS5	1 post N of 4 (back)	5/11(1)	5/17 (4)	17-May	11-Jun				dead adult 5/29/abandnd
NS6	1 post S of 8 (middle)	5/14 (3)	5-17 (3)	17-May	11-Jun	10-Jun	5-Jul	one	
NS7	1 stake N of 5 (middle)	5/14 (2)							predated over 5-19/20
NS8	4 & 1 stake south	5/14 (3)	5/16 (4)	17-May	10-Jun	12-Jun	7-Jul	three	
NS9	S of CP 3 posts & 2 stks	5/15 (2)							predated over 5-19/20
NS10	2 stakes N of 10	5-19 (1)							predated over 5-19/20
NS11	6 Bayside	5-21 (1)	5-29 (3)	6-3 (3)	23-Jun	26-Jun	21-Jul	one	3 eggs since 5-29
NS12	S of CP 2nd washout	5-27(1)	6-1 (4)						crow predation
NS13	S of CP 1st washout/back	5-27(1)	5-31(4)						predated over 6-6/6-8
NS14	N of walkway @1	5-27 (3)		5-28 (3)					abandoned 5-27/29
NS15	1 stake S of 10 bayside	5-30(4)	????????						predated over 6/6-6/8
NS16	2.5 stakes S of 5	5-30 (2)	6-3 (4)	3-Jun	28-Jun				abandoned 6-16
NS17	1 posts N of 6	6-1(3)	6-3(4)	3-Jun	28-Jun	30-Jun	25-Jul	three	renesters from 7?
NS18	2 stakes S of 10	6-11 (2)	6-13 (3)						dune grass area-no exclosure
NS19	2 stks/1.5 posts N of 5	6-13 (1)							no tracks/birds or anything
NS20	S of Cp, 1st washout	6-18 (3)	6-20 (4)		15-Jul				predated by skunk 7-10
NS21	N of 10, 2 stks S from end	6-19 (2)	6-23 (4)						predated
NS22	1 stake S of 5	6-20 (3)							renester

Expected hatch date is 25 days with 4th egg being laid

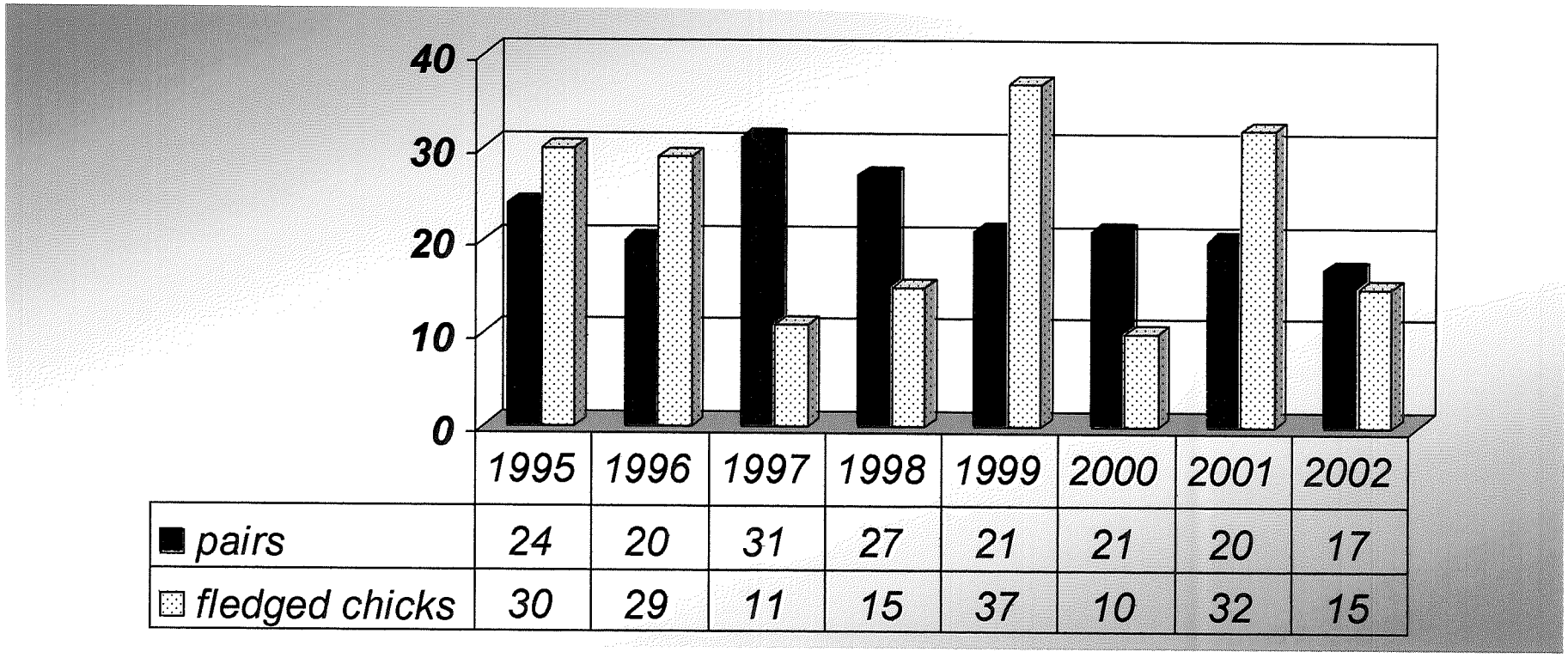
****grey shading means a nest was predated/abandoned****

Abundance & Productivity of Piping Plovers on Nauset Beach

	Nauset Spit	Orleans North Beach	Total
Total # of pairs	13	4	17
Total # of nesting attempts	22	8	30
Total successful nests (%)*	6 (28%)	2 (25%)	8 (27%)
Total # of eggs laid	73	22	95
Total # of eggs hatched (%)	22 (31%)	8 (37%)	30 (32%)
Total # of chicks fledged	9 (41%)	3 (38%)	12 (40%)
Fledge rate per pair**	.70 chicks	.75 chicks	.71 chicks

*Successful in this instance indicates a nest that had one or more eggs hatch.

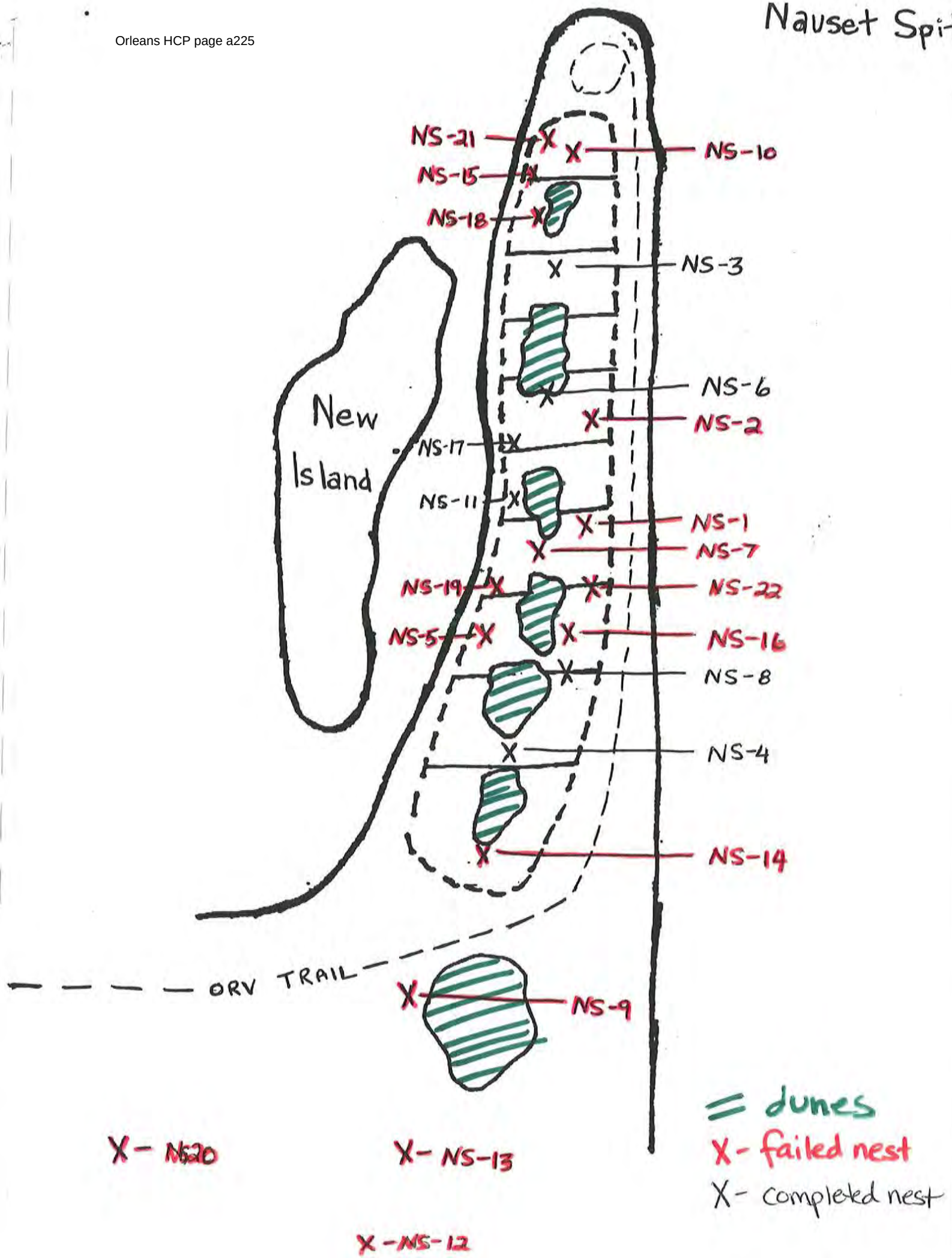
**Fledge rate per pair is the total number of chicks fledged divided by the total number of pairs.



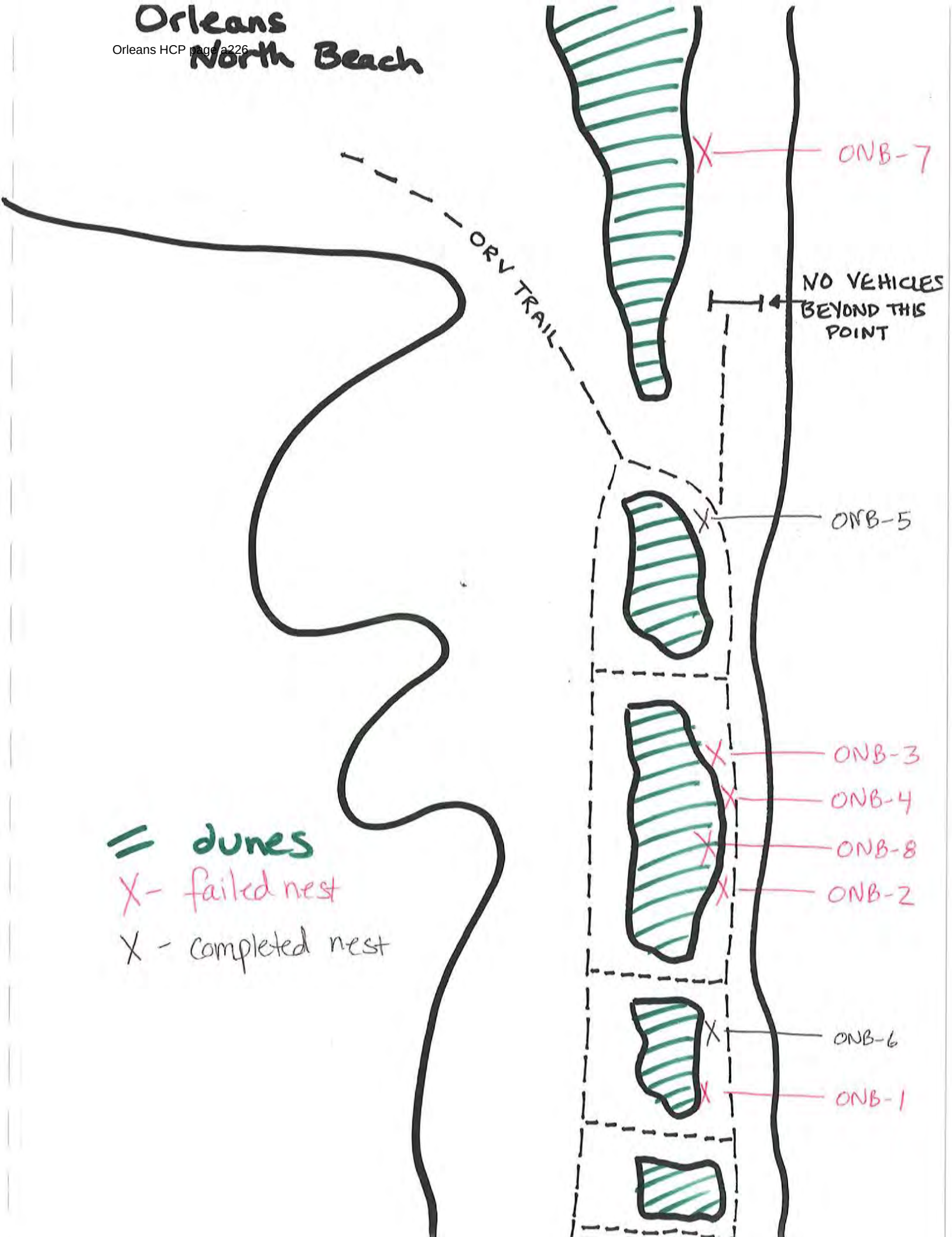
	1995	1996	1997	1998	1999	2000	2001	2002
pairs	24	20	31	27	21	21	20	17
fledged chicks	30	29	11	15	37	10	32	15

Chart 1: Productivity on Nauset Beach

Nauset Spit


NS-21
NS-10
NS-15
NS-18
NS-3
NS-6
NS-2
New Island
NS-17
NS-11
NS-1
NS-7
NS-19
NS-22
NS-5
NS-16
NS-8
NS-4
NS-14
ORV TRAIL
NS-9
= dunes
X- failed nest
X- completed nest
X- NS20
X- NS-13
X-NS-12

Orleans North Beach



MASSACHUSETTS NESTING PLOVER CENSUS FORM

Year: 2002

Site Name: Nauset Spit

Town: Orleans

Ownership: Town

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

Observer(s): Cathy Davis

Agency: Orleans Park Department

Address: 18 Bayridge Lane PO Box 122
Orleans MA 02653

Telephone: 508-240-3775 E-mail: seedy32@hotmail.com

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	12	13
Unpaired Adults	1	

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

* unpaired adult due to male mortality inside exclosure 5/29
She was still present during index count period *

List pairs not present during Index Count:

Month	Average # of visits to site per week
April	3-4
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10'		
Size of wire mesh	2" x 4"		
Total Height	48"		
Height above ground:	44"		
Depth buried:	4"		
Cover material	netting		
Cover spacing/Mesh size	1/2" x 1/2"		

Other management undertaken or needed/Remarks:

No dogs allowed in nesting areas, symbolic fencing used around entire nesting area, no vehicles or pedestrians allowed within fifty feet of nests, area closed to ORV's one day prior to hatching until chicks are fledged.

[a]*The Index Count includes those pairs seen during the Index Count period* [redacted] *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: [illegible] Year: [illegible] Observer(s): [illegible]

Page ____ of ____

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	Exclosure Design (A, B…)	Exclosure Date installed
NS-1	NS-1	3	2	Ø	5-7	1	5-12	6-6	Y	A	5-14
NS-2	NS-2	4	Ø	Ø	5-10	1	5-16	5-19	N		
NS-3	NS-3	4	3	2	5-10	2	5-14	6-10	Y	A	5-14
NS-4	NS-4	4	3	2	5-11	1	5-18	6-16	Y	A	5-21
NS-5	NS-5	4	Ø	Ø	5-11	1	5-17	5-29	Y	A	5-17
NS-6	NS-6	3	3	1	5-14	3	5-17	6-10	Y	A	5-17
NS-7	NS-7	2	Ø	Ø	5-14	2	Ø	5-19	N		
NS-8	NS-8	4	4	3	5-14	3	5-16	6-12	Y	A	5-17
NS-9	NS-9	2	Ø	Ø	5-15	2	Ø	5-19	N		
NS-10	NS-10	1	Ø	Ø	5-19	1	Ø	5-19	N		

[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
NS-2	predated - crow tracks seen in area
NS-5	adult male found dead in exclosure - nest abandoned several days after
NS-7	predated - Scrape intact - no tracks seen as heavy rains the day before.
NS-9	predated - small mammal tracks nearby probably fox.
NS-10	predated - shaly-type sand so tracks cannot readily be seen - Also high winds & rain.

Nest No.	Cause of chick mortality/Evidence
NS-1	nest hatched 6/12, but no sign of chicks or adults after that date. declared failed.

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

Site Name: [illegible] Pit Year: 2002 Observer(s): Cathy Davis

Page ____ of ____

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	Exclosure Design (A, B…)	Exclosure Date installed
NS-11	NS-11	3	3	1	5-21	1	5-29	6-26	Y	A	6-3
NS-12	NS-12	4	∅	∅	5-27	1	6-1	6-13	N		
NS-13	NS-13	4	∅	∅	5-27	1	5-31	6-8	N		
NS-14	NS-14	3	∅	∅	5-27	3	—	5-29	Y	A	5-28
NS-15	NS-15	4	∅	∅	5-30	4	?	6-8	N		
NS-16	NS-16	4	∅	∅	5-30	2	6-3	6-16	Y	A	6-3
NS-17	NS-17	4	4	3	6-1	3	6-3	6-30	Y	A	6-3
NS-18	NS-18	3	∅	∅	6-11	2	6-13	7-2	N		
NS-19	NS-19	1	∅	∅	6-13	1	∅	∅	N		
NS-20	NS-20	4	∅	∅	6-18	3	6-20	7-10	N		

[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
NS-12	predated - crow tracks lead into nest & all around area.
NS-13	predated - cannot tell by whom due to heavy rain previously.
NS-14	abandoned - birds nested within 20 ft of walkway which became busy over Memorial Day. Relocated walkway but birds abandoned
NS-15	predated - few eggshell fragments in nest no visible tracks - high winds & rain

Nest No.	Cause of chick mortality/Evidence
NS-16	abandoned - high tides were within 50 ft of nest, but not through it.
NS19	found with one egg - no other eggs ever appeared. no signs of adults or tracks either. ?
NS-18	nest predated - possibly by crow?
NS-20	nest predated - likely by skunk. Nest area dug completely out - no eggshell fragments

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

Site Name: Vo et Pi Year: 2000 Observer(s): [illegible]

Page ____ of ____

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	Exclosure Design (A, B…)	Exclosure Date installed
NS-21	NS-21	4	Ø	Ø	6-19	2	6-23	6-27	N		
NS-22	NS-22	3	Ø	Ø	6-20	3	?	6-29	N		

[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
NS-21	nest predated – fox tracks in area		
NS-22	nest predated – shaly sand area – very difficult to see tracks		

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

May 2001

Site Name: Orleans Nickerson Beach Year: 2002 Observer(s): Cathy Davis

Page ____ of ____

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	Exclosure Design (A, B...)	Exclosure Date installed
ONB-1	ONB-1	2	~~0~~	~~0~~	5-10	2	~~0~~	5-14	N		
ONB-2	ONB-2	2	~~0~~	~~0~~	5-16	2	~~0~~	5-19	N		
ONB-3	ONB-3	1	~~0~~	~~0~~	5-21	1	~~0~~	5-22	N		
ONB-4	ONB-4	4	~~0~~	~~0~~	5-23	1	5-28	6-16	Y	A	5-28
ONB-5	ONB-5	4	4	1	5-23	1	5-30	6-26	Y	A	5-28
ONB-6	ONB-6	4	4	2	5-29	1	6-3	6-30	Y	A	6-3
ONB-7	ONB-7	2	~~0~~	~~0~~	6-13	2	~~0~~	6-16	N		
ONB-8	ONB-8	3	~~0~~	~~0~~	6-23	2	6-24	6-28	N		

[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
ONB-1	predated - cannot tell the means due to heavy rains & wind	ONB-7	nest washed over due to high tides
ONB-2	abandoned - eggs sanded in. Unsure of reason for abandonment	ONB-8	nest predated. fox tracks near nest site.
ONB-3	predated by small mammal (fox or skunk)		
ONB-4	abandoned after high tides came up about 20 feet from nest		

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

MASSACHUSETTS AMERICAN OYSTERCATCHER CENSUS FORM

Year: 2002

Site Name: Nauset - Orleans

Town: Orleans

Ownership: Town

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

Observer(s): Cathy Davis - Orleans

Affiliation: Orleans Park Department

Address: 18 Bayridge Lane / PO Box 122
Orleans MA 02653

Telephone: 508-240-3775 E-mail: seedy32@hotmail.com

Total breeding pairs: one

Total chicks fledged (30 days of age or able to fly): Ø

Max number(s) of post-breeding birds (adults and fledged young) / date observed:

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.

Ø

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

- Both nesting attempts by this pair of Oystercatchers were well within the symbolic fencing. Nest was inbetween two piping plover nests. Mammalian predation is the most likely cause.

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

Site Name: Nauset-Orleans Year: 2002 Observer(s): Cathy Davis

Page ____ of ____

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
OC-1	OC-1	2	~~0~~	~~0~~						
					5/30	1	?	6/6	—	—

[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
OC-1	predated 6/6 - no tracks visible as area has shaly-type sand. * 2nd nesting attempt for this pair in close location to 1st attempt *	

Instructions for completing the Massachusetts Tern Census Form

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

Colony Name and **Colony Number** are provided according to *Erwin and Korschgen (1979)*. Complete a separate form for each colony visited, even if birds are found. If a previously unreported colony location is discovered, attach a photocopy of a labeled U.S.G.S. topographical map pinpointing the exa location of the colony.

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 = 1 pair)
EC = Partial Nest Count (extrapolated)
AC = Adult** Count (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 = None
1 = Poor
2 = Fair to Good
3 = Excellent

*Nests (or scrapes) should contain at least one egg in order to be counted. Also, a nest should be counted if it is apparent that eggs have hatched and/or the chicks are away from the ne Do not count empty scrapes or nests that are obviously abandoned. Remember, nests 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.

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.

2002 Massachusetts Tern Census Form

my cell phone 508-317-2172

Colony Name: Nauset - Orleans (Chatham line N to Nauset Harbor inlet)

Colony Number: 352009

Town: Orleans

Ownership: Town

Observer/Agency: Cathy Davis / Orleans Park Dept.

Street: 18 Bay Ridge Lane P.O. Box 122

Town & State: Orleans MA **Zip:** 02653

E-mail: Seedy32@hotmail.com **Telephone:** 508-240-3725

⇨⇨ **PLEASE** read the instructions on the reverse of this form **before** filling out. ⇦⇦

Species Code	A-Count Date	A-Count No. Pairs	A-Count M	A-Count Q	B-Count Date	B-Count No. Pairs	B-Count M	B-Count Q	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.
ROST	6/20	~~0~~	NC	HC	7/14	~~0~~	NC	HC	0	
COTE	6/20	2	NC	HC					0	
ARTE	6/20	~~0~~	NC	HC	7/14	~~0~~	NC	HC	0	
LETE	6/20	(70 x 0.8) 62.4	AC	RC	7/14	6	NC	HC		* nests are repeatedly predated by mammals (skunk, fox + coyote) * 7-26 * 1 least tern nest w/ 1 egg remains *
LAGU	6/20	~~0~~	NC	HC					0	
BLSK	6/20	~~0~~	NC	HC	7/14	~~0~~	NC	HC	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)792-7270 x312 / Fax: (508)792-7821 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Animals and birds seen in the Nauset Beach area during the season

Animals:

Basking shark
Eastern cottontail rabbit
Eastern coyote
Eastern red fox
Eastern striped skunk
Grey seal
Harbor seal
Humpback whale
White-tailed deer

Birds:

American crow
American goldfinch
American kestrel
American oystercatcher
American robin
Barn swallow
Black skimmer
Black-bellied plover
Bohemian waxwing
Common bobwhite
Common eider
Common grackle
Common loon
Common merganser
Common tern
Double-crested cormorant
Dunlin
Eastern kingbird
Gray catbird
Great blue heron
Great egret
Greater black-backed gull
Greater yellowlegs
Herring gull
Horned lark
House sparrow
Killdeer
Laughing gull
Least sandpiper
Least tern
Mute swan
Northern cardnial
Northern harrier
Northern flicker
Northern mockingbird
Mute swan
Osprey
Piping plover
Redknot
Red-winged blackbird
Ring-billed gull
Snowy egret
Ruddy turnstone
Sanderling
Semipalmated plover
Short-billed curlew
Song sparrow
Tree swallow
Whimbrel
Wilson's storm petrel
Willet

ABSTRACT

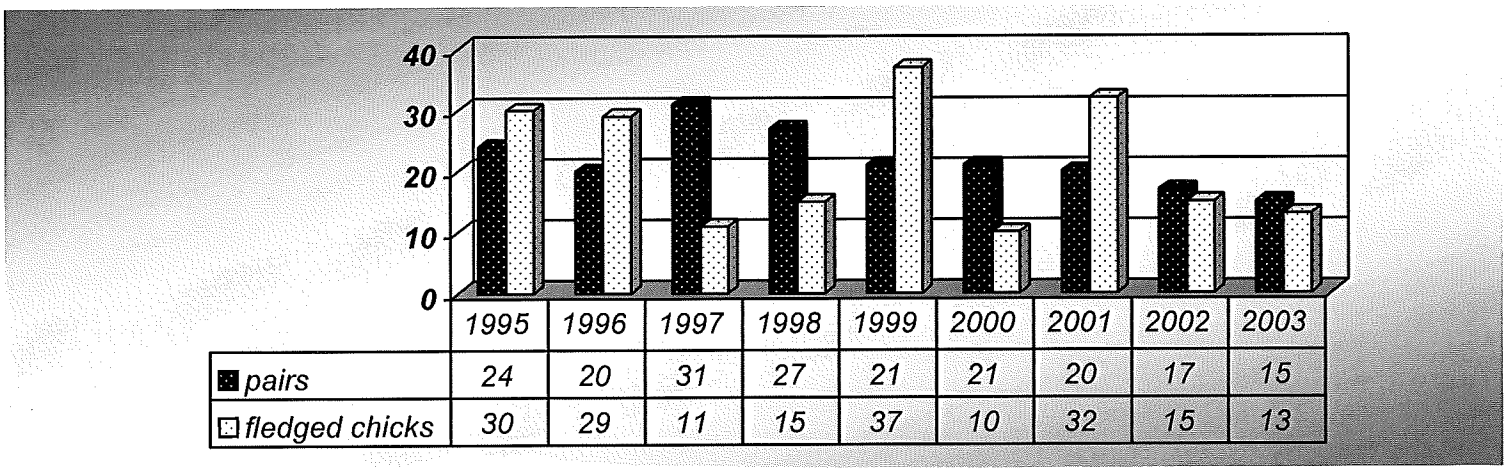
This is a summary of the 2003 Piping Plover and Waterbird nesting season for Nauset Beach. Piping Plovers (Charadrius melodus) were monitored at two separate beaches, Nauset Spit to the north and Orleans North Beach to the south. Observations began mid April. A total of 15 pairs were monitored at these two ocean sites. Egg laying began in the first week of May for Nauset Spit and the second week of May for Orleans North Beach. Overall hatching success was .31. Fledging success was .54. A total of 13 chicks fledged. Productivity was .87. (Refer to charts 1 and 2). Of 23 nesting attempts 16 failed. Thirteen nests were exclosed. Of these exclosed nests 7 (54%) were successful and 6 (46%) failed. Of these failures 2 were abandoned due to coyote harassment, 1 to a coyote digging under the exclosure and 3 were storm related. Unexclosed nests were lost to coyote (3), unknown (3), skunk (2), crow (1), and fox (1).

CHART 1
PIPING PLOVER BREEDING SUCCESS

SITE	PAIRS	1. NESTS	EGGS LAID	EGGS HATCHED	CHICKS FLEDGED	2. HATCHING SUCCESS	3. FLEDGING SUCCESS	4. PRODUCTIVITY
SPIT	11	16	52	9	9	0.17	1.00	.82
ONB	4	7	26	15	4	.57	.26	1.00
TOTAL	15	23	78	24	13	0.31	0.54	.87

1. INCLUDES RENESTS
2. TOTAL EGGS HATCHED/ TOTAL EGGS LAID = 0.31
3. TOTAL CHICKS FLEDGED/ TOTAL EGGS HATCHED = 0.54
4. TOTAL CHICKS FLEDGED/TOTAL PAIRS = 0.87

CHART 2
PRODUCTIVITY ON NAUSET BEACH



INTRODUCTION

Nauset Beach is owned and managed by the town of Orleans and located on the Atlantic Ocean. Within Nauset Beach is Nauset Spit and Orleans North Beach. There is also a section of Orleans North Beach called Pochet, which is located just south of the public beach; this section is a mile long. Being prime feeding and nesting grounds, these beaches are host to Piping Plovers, Least Terns, Roseate Terns, Common Terns, Arctic Terns, American Oystercatchers and Black Skimmers. Piping Plovers traditionally return to nesting sites late March through early May. Plovers prefer the sandy substrate that a barrier beach has to offer. Adults as well as chicks are cryptically colored to blend with their surroundings. In 1986, when the plover was federally listed as threatened species, the town of Orleans initiated active management and protective measures to protect these breeding birds. Included in Appendix I are the Massachusetts Census Forms for Piping Plovers, American Oystercatchers, and Terns.

NESTING AREAS

Since 1989 piping plovers have historically nested on two beaches within Nauset Beach. A total of 15 breeding pairs nested on Nauset Beach in 2003. Of these pairs, 11 nested on Nauset Spit and 4 nested on Orleans North Beach. This is a slight decline from 2002. ORV'S are allowed on both these beaches. (Graph 1 &2)

Nauset Spit

Nauset Spit is approximately 2 miles long and is frequented by Orleans residents only. No dogs are allowed on this beach. Symbolic fencing that consists of posts with clearly marked signage surrounds nesting areas; the entire fence is then closed off with a line of string attached to each post. Several walkways are in place for access to and from Nauset Cove. This activity was implemented in late April. To prevent chick mortality, areas with chicks due to hatch within 24 hours are closed off to vehicles by the placement of barriers. Several 6' posts are placed from symbolic fencing to the tide line. This barrier is kept in place for 25 days or until the chicks fledge.

Orleans North Beach

Orleans North Beach is located south of Nauset Spit and is approximately 3 ½ miles long. This beach is open to Orleans residents and the general public. Access to Orleans North Beach requires purchasing a sticker and viewing an informational video on rules and regulations. Nesting sites on Orleans North Beach are defined with 6' posts outlining the area. No string is used in the beginning of the season. This was completed in late April. Every other post is marked with signs. Dogs are permitted off leash and under voice control outside the nesting areas on this beach. Once a nest is found, symbolic fencing is put in place directing traffic away from the nest. One day before chicks are due to hatch a barrier consisting of several 6' posts with signage are put in place and remain until chicks are 25 days old or fledge. Dogs are not allowed in this barricaded area.

Pochet

Pochet is located just north of Orleans North Beach. This area has always been included with Orleans North Beach data. The Pochet area provides about a mile of excellent foraging and nesting habitat. This beach is frequented by residents of Pochet, an area in Orleans. Dogs are allowed on this beach under voice control. No vehicles are allowed. This year 1 pair pf piping plovers nested on this beach, this nest was located high on the dune, as there is little habitat available early in the season for nesting. This nest was frequently monitored and only the male was observed. A brood of 4 chicks from Orleans North Beach traveled over a mile to this area in early July and ultimately fledged 2 chicks.

Tern Nesting

Each year a Tern census is conducted for the entire Nauset Beach area. The official forms required by Mass Wildlife are included in this report. Two counts were conducted. A-count was conducted during the census window of June 5-20. In 2003 the count was conducted on June 11th. Four Common Tern pairs and 56 Least Terns pairs were counted. B-count was conducted on July 15 and showed a decrease in Least Terns to 15 pairs. All nesting pairs were located on Nauset Spit. With repeated predation by a coyote, terns were forced to relocate to different sections of Nauset Spit. Several attempts at renesting were basically unsuccessful. A total of 10 nests remained on Nauset Spit on July 26th. Of these 10 nests, two chicks hatched on July 28th, one
chick hatched on August 2, and two additional chicks hatched on August 4th. All of these chicks were last seen on August 11th. Fresh coyote tracks were found in the area as well as several Black-Backed Gulls.

American Oystercatchers

As in years past Coastal Waterbird Cooperators were asked to conduct a census of American Oystercatchers which are now ranked as a Species of High Concern in the United States Shorebird Conservation Plan. The count period for 2003 was conducted May 24th – June 1st, one week earlier than in past years. This census was done in the absence of the shore bird monitor and results are unreliable. Upon the monitors return, June 1st no Oystercatchers were observed nesting on Nauset Spit.

Nesting Results For Nauset Spit

The first returning pair of Plovers was observed on Nauset Spit March 23. An increase of pairs and courtship activity soon followed. Egg laying began in the first week of May and continued to the end of June. All nests were laid in sand. All 4 egg nests were exclosed. Eleven pairs ultimately nested on Nauset Spit with a total of 16 nests. Of these nests, 1 pair made 3 unsuccessful attempts, 2 pair renested successfully fledging a total of 7 chicks, 1 nest successfully fledged 2 chicks on it's first nesting attempt. One renest failed, as did 6 other nests whose pairs showed no attempt at renesting. The leading cause of predation on Nauset Spit was the presence of a coyote. This coyote was observed on several occasions systematically trotting through the colony of Terns and Plovers. On 23 July, it was observed at 11:30 A.M. swimming at mid-tide from New Island to Nauset Spit. Washover caused the demise of 2 nests, 1 succumbed to a skunk and 3 were lost of unknown causes. Figure 1 displays nesting data.

(Fig.1)

NESTING DATA FOR NAUSET SPIT

NEST NAME	# OF EGGS LAID	# OF EGGS HATCHED	# FLEDGED	CAUSE OF FAILURE
1	2	0	0	Skunk
1-A	4	0	0	Eggs sanded over
1-B	4	0	0	Wash over
2	3	0	0	Unknown
2-A	4	3	3	Evidence of coyote digging around exclosure on day of hatching
3	2	0	0	Unknown
4	3	0	0	Unknown
4A	4	4	4	
5	4	2	2	2 eggs disappeared 6 days before hatching
6	4	0	0	Abandoned, coyote digging around exclosure. Crow observed sitting on netting
6-a	3	0	0	Did not exclose due to "smart predator"
7	4	0	0	Removed exclosure "smart predator" in area
9	4	0	0	Coyote dug into exclosure
10	2	0	0	Coyote
11	1	0	0	Crow
12	4	0	0	Coyote
TOTAL 11	**52**	**9**	**9**	

Calculations

1. Hatching success = total number eggs hatched/total number eggs laid = .17
2. Fledging success = total number of chicks fledged/total number of eggs hatched = 1.0
3. Productivity = total number of chicks fledged/total number of pairs = .82

Nesting results for Orleans North Beach

Egg laying began May 9th and continued until June 24th for Orleans North Beach. Four pair nested successfully after 7 attempts. Three of these attempts were unsuccessful, skunk, fox and a Nor'easter being the cause. Two pair renested successfully. Of these nests, one was found with four eggs high on a dune in a sparsely vegetated area. Throughout incubation and brooding only the male was observed. If the nest was unoccupied when monitored the male quickly came on the scene. Figure 2 displays nesting data.

(Fig.2)

NESTING DATA FOR ORLEANS NORTH BEACH

NEST NAME	# OF EGGS LAID	# OF EGGS HATCHED	# FLEDGED	CAUSE OF FAILURE
1	3	0	0	Skunk
1-A	4	4	0	Unknown
2	4	0	0	Nor'easter
2-A	3	0	0	Fox
2-B	4	4	0	Unknown
4	4	4	2	Chick mortality unknown
6	4	3	2	Chick mortality unknown
TOTAL 4	**26**	**15**	**4**	

Calculations

1. Hatching success = total number eggs hatched/total number of eggs laid = .57
2. Fledging success = total number of chicks fledged/total number of eggs hatched = .26
3. Productivity = total number of chicks fledged/total number of pairs = 1.0

Roseate Mortality

On 6 July at approximately 11:30 am while patrolling Nauset Spit, a law enforcement officer recovered a dead Roseate Tern. The Roseate was found 8-10' from the northern barrier in section 8 of Nauset Spit. It was not in any recognizable vehicle track. Both legs on the Roseate were banded. Left leg band reads: 34/E9. Right leg band reads 1172-41934. Scott Melvin, state zoologist for Mass Fish and Wildlife was notified and the bird was placed in a freezer for pending necropsy. Refer to Incident Report in Appendix II.

Dogs Off Leash

A new ruling for Orleans North Beach in 2003 allowed dogs to be off leash and "under voice control". Tracks consistent to a dog, rather than a coyote were frequently observed within the symbolic fencing. On several occasions unleashed dogs were observed inside nesting areas and up and down the dunes. This action prompts owners to also enter restricted areas to retrieve their dogs who were not responding to voice command. Once chicks hatched, barricades were put in place. Dogs and their owners were observed inside this barricaded area. Barricades consist of up to 25 6' posts with clearly marked signage from the dune to the wrack line. This year several plovers were killed; there is documentation of domestic dogs killing piping plover chicks and harassing both plover adults, chicks and other wildlife. Data on the impact to both public safety and the environment needs to be documented and evaluated. More enforcement and public education is needed.

Unauthorized Vehicle Use

Each day 300 +/- vehicles are allowed access to Orleans North Beach. Access to the beach is limited when there are flightless chicks on the beach. In 2003 there were two incidences of vehicles inside the closed/restricted area of Orleans North Beach. On 2 July a vehicle drove around the barricade and through the restricted area where it proceeded to park. The park superintendent removed the sticker and then informed the owner that they would receive a letter in the mail explaining the length of the revocation and the appeal process. After initiating the appeal process the revocation was upheld.

The second infraction occurred 7 July at approximately 7:50am. While monitoring piping plovers the shorebird monitor observed a vehicle driving erratically inside the restricted area. The occupant proceeded to the barrier, removed a stake and exited the restricted area. The oversand permit was suspended for a year and a citation was issued for $200.00. A thorough search was done for any chick mortality resulting from this infraction, none were found.

APPENDIX I

Massachusetts Census Forms

APPENDIX II

Incident Report

ABSTRACT

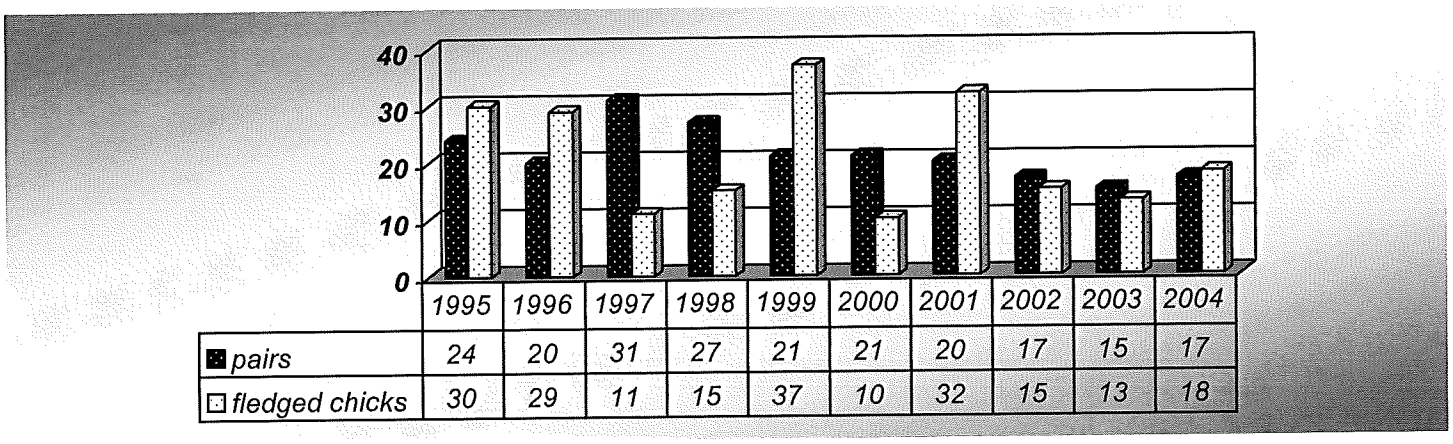
This is a summary of the 2004 Piping Plover and Waterbird nesting season for Nauset Beach. Piping Plovers (Charadrius melodus) were monitored at two separate beaches, Nauset Spit to the north and Orleans North Beach to the south. First returning plovers were observed April 3rd.. A total of 17 pairs were monitored at these two ocean sites, an increase of 2 pairs from 2003. Egg laying began in the first week of May for both Nauset Spit and Orleans North Beach. Overall hatching success was .62. Fledging success was .36. A total of 18 chicks fledged. Productivity was 1.06 (Refer to charts 1 and 2). A total of 23 nests were established during the 2004-breeding season. Ten of these nests were successful on the first attempt. Four were lost to washover, two lost to coyote, two were abandoned, four were renests and one nest was vandalized.

CHART 1
PIPING PLOVER BREEDING SUCCESS

SITE	PAIRS	1. NESTS	EGGS LAID	EGGS HATCHED	CHICKS FLEDGED	2. HATCHING SUCCESS	3. FLEDGING SUCCESS	4. PRODUCTIVITY
SPIT	12	14	49	41	16	0.84	.39	1.33
ONB	5	9	32	9	2	.28	.22	.40
TOTAL	17	23	81	50	18	0.62	0.36	1.06

1. INCLUDES RENESTS
2. TOTAL EGGS HATCHED/ TOTAL EGGS LAID = 0.62
3. TOTAL CHICKS FLEDGED/ TOTAL EGGS HATCHED = 0.36
4. TOTAL CHICKS FLEDGED/TOTAL PAIRS = 1.06

CHART 2
PRODUCTIVITY ON NAUSET BEACH



INTRODUCTION

Nauset Beach is owned and managed by the town of Orleans and located on the Atlantic Ocean. Within Nauset Beach is Nauset Spit and Orleans North Beach. There is also a section of Orleans North Beach called Pochet, which is located just south of the public beach; this section is a mile long. Being prime feeding and nesting grounds, these beaches are host to Piping Plovers, Least Terns, Roseate Terns, Common Terns, Arctic Terns, American Oystercatchers and Black Skimmers. Piping Plovers traditionally return to nesting sites late March through early May. Plovers prefer the sandy substrate that a barrier beach has to offer. Adults as well as chicks are cryptically colored to blend with their surroundings. In 1986, when the plover was federally listed as threatened species, the town of Orleans initiated active management and protective measures to protect these breeding birds. Included in Appendix I are the Massachusetts Census Forms for Piping Plovers, American Oystercatchers, and Terns.

NESTING AREAS

Since 1989 piping plovers have historically nested on two beaches within Nauset Beach. A total of 17 breeding pairs nested on Nauset Beach in 2004. Of these pairs, 12 nested on Nauset Spit and 5 nested on Orleans North Beach. This is an increase of two pairs from 2003. ORV'S are allowed on both these beaches. (Graph 1 &2)

Nauset Spit

Nauset Spit is approximately 2 miles long and is frequented by Orleans residents only. No dogs are allowed on this beach. Symbolic fencing that consists of posts with clearly marked signage surrounds nesting areas; the entire fence is then closed off with a line of string attached to each post. Several walkways are in place for access to and from Nauset Cove. This activity was implemented in late April. To prevent chick mortality, areas with chicks due to hatch within 24 hours are closed off to vehicles by the placement of barriers. Several 6' posts are placed from symbolic fencing to the tide line. This barrier is kept in place for 25 days or until the chicks fledge.

Orleans North Beach

Orleans North Beach is located south of Nauset Spit and is approximately 3 ½ miles long. This beach is open to Orleans residents and the general public. Access to Orleans North Beach requires purchasing a sticker and viewing an informational video on rules and regulations. Nesting sites on Orleans North Beach are defined with 6' posts outlining the area. No string is used in the beginning of the season. This was completed in late April. Every fourth post is marked with signs. Dogs are permitted off leash and under voice control outside the nesting areas on this beach. Once a nest is found, symbolic fencing is put in place directing traffic away from the nest. One day before chicks are due to hatch a barrier consisting of several 6' posts with signage are put in place and remain until chicks are 25 days old or fledge. Dogs are not allowed in this barricaded area.

Pochet

Pochet is located just north of Orleans North Beach. This area has always been included with Orleans North Beach data. The Pochet area provides about a mile of excellent foraging and nesting habitat. This beach is frequented by residents of Pochet, an area in Orleans. Dogs are allowed on this beach under voice control. No vehicles are allowed. This year 2 pair of piping plovers nested on this beach. One pair lost 2 nests to wash over; the other pair lost 1 nest to wash over, renested and successfully fledged 2 chicks.

Tern Nesting

Each year a Tern census is conducted for the entire Nauset Beach area. The official forms required by Mass Wildlife are included in this report. Two counts were conducted. A-count was conducted during the census window of June 5-20. In 2004 the count was conducted on June 11th. 76 pair of Least tern was counted. B-count was conducted on July 6th and showed an increase in Least Terns to 170 pairs. All nesting pairs were located on Nauset Spit. No other tern species were observed during the A count or B count. High predation was likely due to the frequent presence of a coyote, as well as a large population of Black Backed Gulls. Skunk tracks were frequently observed during both counts. On August 12th for the first time in four years Nauset Spit fledged 4 least tern chicks.

American Oystercatchers

As in years past Coastal Waterbird Cooperators were asked to conduct a census of American Oystercatchers which are now ranked as a Species of High Concern in the United States Shorebird Conservation Plan. The count period for 2004 was conducted May 22 – 31. There were no Oystercatchers observed nesting on Nauset Spit, however on May 25th 29 Oystercatchers were observed feeding at low tide in Nauset cove. On June 4th 34 Oystercatchers were observed feeding in the cove.

Nesting Results For Nauset Spit

The first returning pair of Plovers was observed on Nauset Spit March. An increase of pairs and courtship activity soon followed. Egg laying began in the first week of May and continued to the end of June. Twelve nests were laid in sand, 1 in gravel and 1 in grass. Due to the presence of a coyote permission was given to exclose all nests when found with all exclosures being accepted. Twelve pairs ultimately nested on Nauset Spit with a total of 14 nests. Of these nests, 10 nested successfully on the first attempt. One pair abandoned 2 days prior to hatching date due to a skunk digging into the exclosure. A renest was not found. 2 pair renested with 1 pair fledging 1 chick.

(Fig.1)

NESTING DATA FOR NAUSET SPIT

NEST NAME	# OF EGGS LAID	# OF EGGS HATCHED	# FLEDGED	CAUSE OF FAILURE
1-A	4	4	3	
2-A	4	4	1	
3-A	1	0	0	Abandoned/coyote
3-B	3	3	0	Unknown
4-A	4	4	4	
5-A	4	0	0	Abandoned/skunk
6-A	4	4	4	
7-A	1	0	0	Coyote tracks up to nest
7-B	4	4	1	
8-A	4	4	0	Chicks and adults were constantly harassed by lone female plover
9-A	4	4	0	Gulls observed sitting on netting prior to hatching
10-A	4	3	3	
11-A	4	3	0	Gulls in area
12-A	4	4	0	Large population of gulls in area
TOTAL	**49**	**41**	**16**	

Calculations

1. Hatching success = total number eggs hatched/total number eggs laid = .84
2. Fledging success = total number of chicks fledged/total number of eggs hatched = .39
3. Productivity = total number of chicks fledged/total number of pairs = 1.33

Nesting results for Orleans North Beach

Egg laying began May 6h and continued until the end of June on Orleans North Beach. 7 nests were laid in sand and 2 were laid in grass. Five pair nested on Orleans North Beach, two of which nested in the Pochet area. A sixth pair were observed copulating and scraping during the index count but failed to establish probably due to skunk, coyote and human disturbance. Of the five pair only 1 nested successfully on the first attempt. Two pair renested once, one pair renested twice and one nest was vandalized. This pair failed to renest. Two chicks were fledged from the Pochet area of Orleans North Beach.

(Fig.2)

NESTING DATA FOR ORLEANS NORTH BEACH

NEST NAME	# OF EGGS LAID	# OF EGGS HATCHED	# FLEDGED	CAUSE OF FAILURE
1-A	4	4	0	Unknown
2-A	4	0	0	Washover
2-B	3	0	0	Coyote tracks at nest
2-C	3	3	0	Avian predator observed in area
3-A	4	0	0	Washover
3-B	4	0	0	Washover
4-A	4	0	0	Washover
4-B	3	2	2	
5-A	3	0	0	Nest was vandalized
TOTAL	**32**	**9**	**2**	

Calculations

1. Hatching success = total number eggs hatched/total number of eggs laid = .28
2. Fledging success = total number of chicks fledged/total number of eggs hatched = .22
3. Productivity = total number of chicks fledged/total number of pairs = 0.40

Dogs Off Leash

A new ruling for Orleans North Beach in 2003 allowed dogs to be off leash and "under voice control". Tracks consistent to a dog, rather than a coyote were frequently observed within the symbolic fencing. On several occasions unleashed dogs were observed inside nesting areas and up and down the dunes. This action prompts owners to also enter restricted areas to retrieve their dogs who were not responding to voice command. Dogs were also observed chasing birds feeding at low tide at Nauset Cove. Once chicks hatched barricades were put in place. Dogs and their owners were Observed inside this barricaded area. Barricades consist of up to 25 6' posts with clearly marked signage from the dune to the wrack line. Data on the impact to both public safety and the environment needs to be documented and evaluated. More enforcement and public education is needed.

Adult Mortality

On June 13th ONB nest # 1-A hatched 4 chicks after 32 days of incubation. On June 14th at 6:30 A.M. wings and part of an adult carcass were found at the northern edge of the exclosure. One dead chick was found 12' east of the exclosure. Three chicks and a male adult were observed approximately 150'south of the exclosure. Stakes had been removed from the northern end of symbolic fencing and vehicle tracks were evident. Skunk tracks were visible on the western end of the exclosure. Evidence of human and dog disturbance was visible. In addition to all these disturbances a peregrine falcon had previously been spotting in the Chatham area.

Unauthorized Vehicle Use

Each day 300 + vehicles are allowed access to Orleans North Beach. Access to the beach is limited when there are flightless chicks on the beach. In 2004 there were 6 documented instances of vehicles inside the closed/restricted area of Orleans North Beach, of these 5 were suspended for 1 year.

On Sunday June 21st a vehicle caught fire on Orleans North Beach causing vehicles to drive through a barricade knocking down 8 stakes and establishing a trail, which several vehicles followed. ONB #1-A with 1 adult and 3 six day old chicks were inside this barrier and last observed on Friday July 18th. On Monday July 22nd the barricade was reestablished and a thorough search was made for chicks and one remaining adult. None were found.
All barricades that were installed were breached at least once.

Vandalized Nest

ONB nest # 5 was found and exclosed on June 8 with 2 eggs. On June 9th the nest was checked at 6:30 am. The plover was on the nest incubating 3 eggs. Nest was checked from afar also at 1:30pm the same day; the bird was again incubating. On June 10th at 7:40 am ONB nest # 5 was found vandalized. Netting was torn open, turf and a triangular piece of plywood with paint on it appeared to have been used to smash the eggs. 1 adult was near the exclosure defending the nest. The area was walked in search of a possible adult mortality. None was found. Paul Fulchure was immediately called. Heavy rain had fallen the previous evening.

Management Suggestions

In addition to posting ONB, stakes and string should also be installed in April to better establish a restricted area. Signage on every other post instead of every fourth post better explains the restricted area.

Due to the increase of human disturbance in restricted areas, law enforcement would benefit on review of the definition of "taking" and it's resulting penalties.

Signage at town landings prohibiting dogs on Nauset Spit.

Increased awareness and attentiveness of available law enforcement on Orleans North Beach

Cause of Nest/Chick Failure for ONB

ONB #1-A	See **Adult Mortality** and **Unauthorized Vehicle Use**
OBN #2-A	4 egg nest lost to wash over from nor'easter
ONB #2-B	Coyote tracks leading up to 3 egg nest
ONB #2-C	Peregrine Falcon observed at nesting site
OBN # 3-A	4 egg nest lost to wash over from nor'easter
ONB # 3-B	2 egg nest found at tide line, complete with 4 eggs and lost to tide
ONB # 4-A	4 egg nest lost to wash over from nor'easter
ONB # 5-A	See **Vandalized Nest**

Cause of Nest/Chick Mortality for Nauset Spit

NS # 3-A Coyote tracks in area of 1 egg nest probably led to abandonment. Pair renested.

NS # 3-B Cause of chick mortality unknown.

NS # 5-A Nest was abandoned 2 days prior to hatching due to skunks digging into exclosure. Pair failed to renest

NS # 7-A Coyote tracks observed leading up to1 egg nest. Pair renested successfully

NS # 8-A Nest hatched 6-30 (33) days of incubation. A lone female was observed harassing incubating pair, harassment continued after hatching 4 chicks. After 4 days, 1 chick remained with 1 female adult, chick was last seen 7-16.

NS # 9-A Cause of chick mortality likely due to large population of black backed gulls in area. 12 gulls were observed perched on top of exclosure prior to hatching.

NS # 11-A Large population of black backed gulls observed in area.

NS # 12-A Large population of black backed gulls observed in area.

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ORLEANS CONSERVATION COMM.

Summary of Piping Plover Breeding Success and Tern Nesting Status 2005 Nesting Season Nauset Beach, Orleans, Massachusetts

Submitted to:

Paul Fulcher
Parks & Beaches Superintendent
Orleans Parks & Beaches Department
Orleans, MA 02653

Orleans Conservation Commission
Town Hall
Orleans, MA 02653

Dr. Scott Melvin
Natural Heritage and Endangered Species Program
Massachusetts Department of Fisheries and Wildlife
Westboro, MA 01851

Submitted by:

Barbara Walsh
Shorebird Monitor
Orleans Parks & Beaches Department
Orleans, MA 02653

ABSTRACT

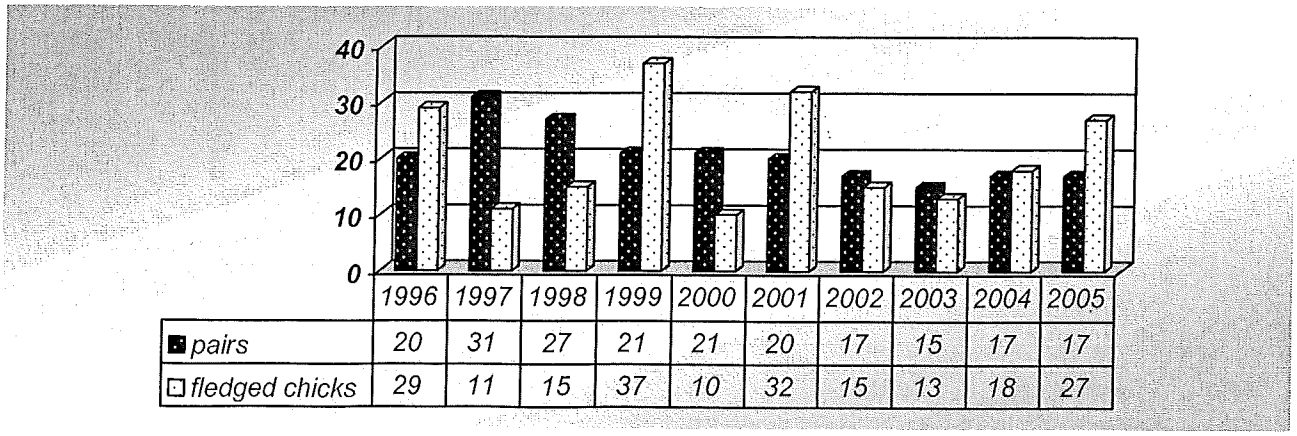
This is a summary of the 2005 Piping Plover and Waterbird nesting season for Nauset Beach. Piping Plovers (Charadrius melodus) were monitored at two separate beaches, Nauset Spit to the north and Orleans North Beach to the south. First returning plovers were observed in late March. A total of 17 pairs were monitored at these two ocean sites. Egg laying began in the first week of May for Nauset Spit. Two pair exhibited breeding behavior on Orleans North Beach; both pairs were unsuccessful in establishing a nest. Overall hatching success was .96 Fledging success was .34. A total of 27 chicks fledged. Productivity was 1.59 (Refer to charts 1 and 2). A total of 26 nests were established during the 2005-breeding season. Five nests were lost to a Nor'easter on May 7th and five were lost to a Nor'easter on May 24th. Six nests were successful on their first attempt. Four were successful on their second attempt and three were successful on their third attempt. Two nests were abandoned.

CHART 1
PIPING PLOVER BREEDING SUCCESS

SITE	PAIRS	1. NESTS	EGGS LAID	EGGS HATCHED	CHICKS FLEDGED	2. HATCHING SUCCESS	3. FLEDGING SUCCESS	4. PRODUCTIVITY
SPIT	15	26	83	80	27	0.96	.34	1.80
ONB	2	0	0	0	0	.00	.00	.00
TOTAL	17	26	83	80	27	0.96	0.34	1.59

1. INCLUDES RENESTS
2. TOTAL EGGS HATCHED/ TOTAL EGGS LAID = 0.96
3. TOTAL CHICKS FLEDGED/ TOTAL EGGS HATCHED = 0.34
4. TOTAL CHICKS FLEDGED/TOTAL PAIRS = 1.59

CHART 2
PRODUCTIVITY ON NAUSET BEACH



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
pairs	20	31	27	21	21	20	17	15	17	17
fledged chicks	29	11	15	37	10	32	15	13	18	27

INTRODUCTION

Nauset Beach is owned and managed by the Town of Orleans and is located on the Atlantic Ocean. Within Nauset Beach is Nauset Spit and Orleans North Beach. There is also a section of Orleans North Beach called Pochet, which is located just south of the public beach; this section is a mile long. Being prime feeding and nesting grounds, these beaches are host to Piping Plovers, Least Terns, Roseate Terns, Common Terns, Arctic Terns, American Oystercatchers and Black Skimmers. Piping Plovers traditionally return to nesting sites late March through early May. Plovers prefer the sandy substrate that a barrier beach has to offer. Adults as well as chicks are cryptically colored to blend with their surroundings. In 1986, when the plover was federally listed as 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, and Terns.

NESTING AREAS

Since 1989 piping plovers have historically nested on two beaches within Nauset Beach. A total of 15 breeding pairs nested on Nauset Beach in 2005. Of these pairs, 14 pairs nested on Nauset Spit, and 1 pair nested on New Island, which is owned by the National Park Service. Because of the proximity of New Island to Nauset Spit, this pair has been entered into the Nauset Beach count. Two pair exhibited breeding activity on Orleans North Beach but failed to establish a nest. ORV'S are allowed on both Nauset Spit and Orleans North Beach.

NAUSET SPIT

Nauset Spit is approximately 2 miles long. ORV traffic is allowed and limited to Orleans residents only. Dogs are not allowed on this beach from March 15th to September 15th. Symbolic fencing that consists of posts with clearly marked signage surrounds nesting areas. The entire fence is then closed off with a line of string attached to each post. Several walkways are in place for access to and from Nauset Cove. This activity was implemented in late April. To prevent chick mortality, areas with chicks due to hatch within 24 hours are closed off to vehicles by the placement of barriers. Several 6' posts are placed from symbolic fencing to the tide line. This barrier is kept in place for 25 days or until the chicks fledge.

ORLEANS NORTH BEACH

Orleans North Beach is located south of Nauset Spit and is approximately 5 miles long. This beach is open to Orleans residents and the general public. Access to Orleans North Beach requires purchasing a sticker and viewing an informational video on rules and regulations. Nesting sites on Orleans North Beach are defined with 6' posts and 5' stakes outlining the area. This symbolic fencing is then strung to better outline the area. This was completed in late April. Every post is marked with signage. One day before chicks are due to hatch a barrier consisting of several 6' posts with signage are put in place and remain until chicks are 25 days old or fledge. Dogs are not allowed in this barricaded area.

POCHET

Pochet is located just north of Orleans North Beach. This area has always been included with Orleans North Beach data. The Pochet area provides about a mile of excellent foraging and nesting habitat. This beach is frequented by residents of Pochet, an area in Orleans. Dogs are allowed on this beach under voice control. No vehicles are allowed. This past winter a blizzard caused a wash over of approximately 720' creating excellent habitat for piping plovers. One pair of Piping Plovers were exhibiting breeding activity in this area, they were not successful.

PIPING PLOVER NESTING RESULTS

NESTING RESULTS FOR NAUSET SPIT

enclose

The first returning pair of Plovers was observed on Nauset Spit in late March. An increase of pairs and courtship activity soon followed. Egg laying began in the first week of May and continued to the end of June. Due to the presence of a coyote, permission was given to exclose all nests when found. All exclosures were accepted. Fourteen pairs ultimately nested on Nauset Spit with a total of 25 nests. One nest was found on New Island, which is owned by Cape Cod National Seashore. Because of the proximity of New Island this nest is being included with Nauset Spit data. Of these nests, 7 were successful on their first attempt, 5 on their second attempt, and 3 on their third attempt.

CAUSE OF NEST/CHICK MORTALITY FOR NAUSET SPIT

NS# 1-A	3 egg nest lost to a May 7th Nor'easter
NS# 1-B	loss of 1 chick unknown
NS# 2-A	1 egg nest lost to a May 7th Nor'easter
NS# 2-B	3 egg nest lost to a May 24th Nor'easter
NS# 3-A	1 egg nest lost to a May 7th Nor'easter
NS# 3-B	4 egg nest lost to a May 24th Nor'easter
NS# 3-C	loss of 1 chick unknown
NS# 4-A	3 egg nest lost to a May 24th Nor'easter
NS# 4-B	loss of 2 chicks unknown
NS# 5-A	1 egg nest lost to a May 7th Nor'easter
NS# 5-B	4 egg nest lost to a May 24th Nor'easter
NS# 6-A	4 egg nest lost to a May 4th Nor'easter
NS# 6-B	loss of 1 chick unknown
NS# 7-A	loss of 2 chicks unknown
NS# 8-A	1 egg nest lost to a May 24th Nor'easter
NS# 8-B	loss of 1 chick unknown
NS# 9-A	nest was abandoned after 3 chicks hatched possibly due to a large Flag flying close to exclosure. Loss of 3 chicks unknown.

N

CONTINUATION CAUSE OF NEST/CHICK MORTALITY FOR NAUSET SPIT

NS# 10-A	loss of 2 chicks unknown
NS# 11-A	4 egg nest lost to abandonment due to crow harassment
NS# 11-B	3 egg nest lost to abandonment due to possible crow harassment Adult mortality found 20' from exclosure, Harrier observed two weeks later in area.
NS# 12-A	nest abandoned after two chicks hatched. A kite was observed flying over exclosure by a beach patron during hatching. A kite was later found near the exclosure.
NS# 13-A	4 egg nest was abandoned due to gull harassment
NS# 14-A	loss of 1 chick unknown
NS# 15-A	1 chick found dead possibly from a Black Backed Gull

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2005

Site Name: Nauset Spit

Town: Orleans

Ownership: Town

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

Observer(s): Barbara Walsh

Agency: Orleans Parks and Beaches Department

Address: 18 Bayridge Lane P.O. Box 122
Orleans, MA 02653

Telephone:

E-mail:

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	15	15
Unpaired Adults		

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

List pairs not present during Index Count:

Month	Average # of visits to site per week
April	5
May	5
June	5
July	5

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

Exclosure Design	A	B	C
Shape	Circular		
Diameter/Length of side	10'		
Size of wire mesh	2" x 4"		
Total Height	48"		
Height above ground:	44"		
Depth buried:	4"		
Cover material	netting		
Cover spacing/Mesh size	1/2" x 1/2"		

Other management undertaken or needed/Remarks:

[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 Year: 2005 Observer(s): Barbara Walsh

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	Exclosure Design (A, B…)	Exclosure Date installed
NS#1	1-A	3	0	0	5-2	1	—	5-7	Y	A	5-3
	1-B	4	4	3	6-6	1	6-11	7-6	Y	A	6-6
NS#2	2-A	1	0	0	5-3	1	—	5-7	Y	A	5-4
	2-B	3	0	0	5-18	1	—	5-27	Y	A	5-18
	2-C	3	3	3	6-3	2	6-9	7-6	Y	A	6-4
NS#3	3-A	1	0	0	5-4	1	—	5-7	Y	A	5-4
	3-B	4	0	0	5-18	3	5-20	5-24	Y	A	5-18
	3-C	4	4	3	6-14	4		7-5	Y	A	6-14
NS#4	4-A	3	0	0	5-4	1	—	5-24	Y	A	5-4
	4-B	3	3	1	6-14	3		7-10	Y	A	6-14

[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
1-A 2-A 2-B 3-A 3-B 4-A	Nor'Easter's	1-B 3-C 4-B	unknown Large population of Black-Backed Gull

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 Year: 2005 Observer(s): Barbara Walsh

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	Exclosure Design (A, B…)	Exclosure Date installed
NS#5	5-A	1	0	0	5-4	1	—	5-7	Y	A	5-5
	5-B	4	0	0	5-23	4		5-24	N		
	5-C	4	4	4	6-2	1	6-7	7-2	Y	A	6-2
NS#6	6-A	4	0	0	5-4	4		5-7	Y	A	5-5
	6-B	4	4	3	6-16	4		7-1	Y	A	6-16
NS#7	7-A	4	4	2	5-18	3	5-20	6-17	Y	A	5-18
NS#8	8-A	1	0	0	5-23	1		5-24	N		
	8-B	4	4	3	6-1	1	6-7	7-2	Y	A	6-2
NS#9	9-A	4	3	0	6-2	1	6-8	7-3	Y	A	6-2
NS#10	10-A	4	4	2	6-3	1	6-10	7-5	Y	A	6-3

[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
5-A, 5-B, 6-A, 8-A	Nor'Easter
9-A	25' Flag was found Flying close to exclosure on July 4th 1 egg hatched 7-3 1 egg hatched 7-4 1 egg hatched 7-5 2 chicks were Last observed 7-19

Nest No.	Cause of chick mortality/Evidence
6-B, 7-A, 8-B, 10-A	unknown
9-A	unknown

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 Year: 2005 Observer(s): Barbara Walsh

Page 3 of 3

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	Exclosure Design (A, B…)	Exclosure Date installed
NS#11	11-A	4	0	0	6-3	1	6-7	6-22	Y	A	6-3
	11-B	3	0	0	6-27	2	6-28	7-15	Y	A	6-27
NS#12	12-A	4	2	0	6-5	1	6-11	7-6	Y	A	6-5
NS#13	13-A	4	0	0	6-3	2	6-7	6-24	Y	A	6-3
* NS#14	14-A	2	2	1	6-9	2		7-2	Y	A	6-9
NS#15	15-A	3	3	2	6-23	3		7-10	Y	A	6-23

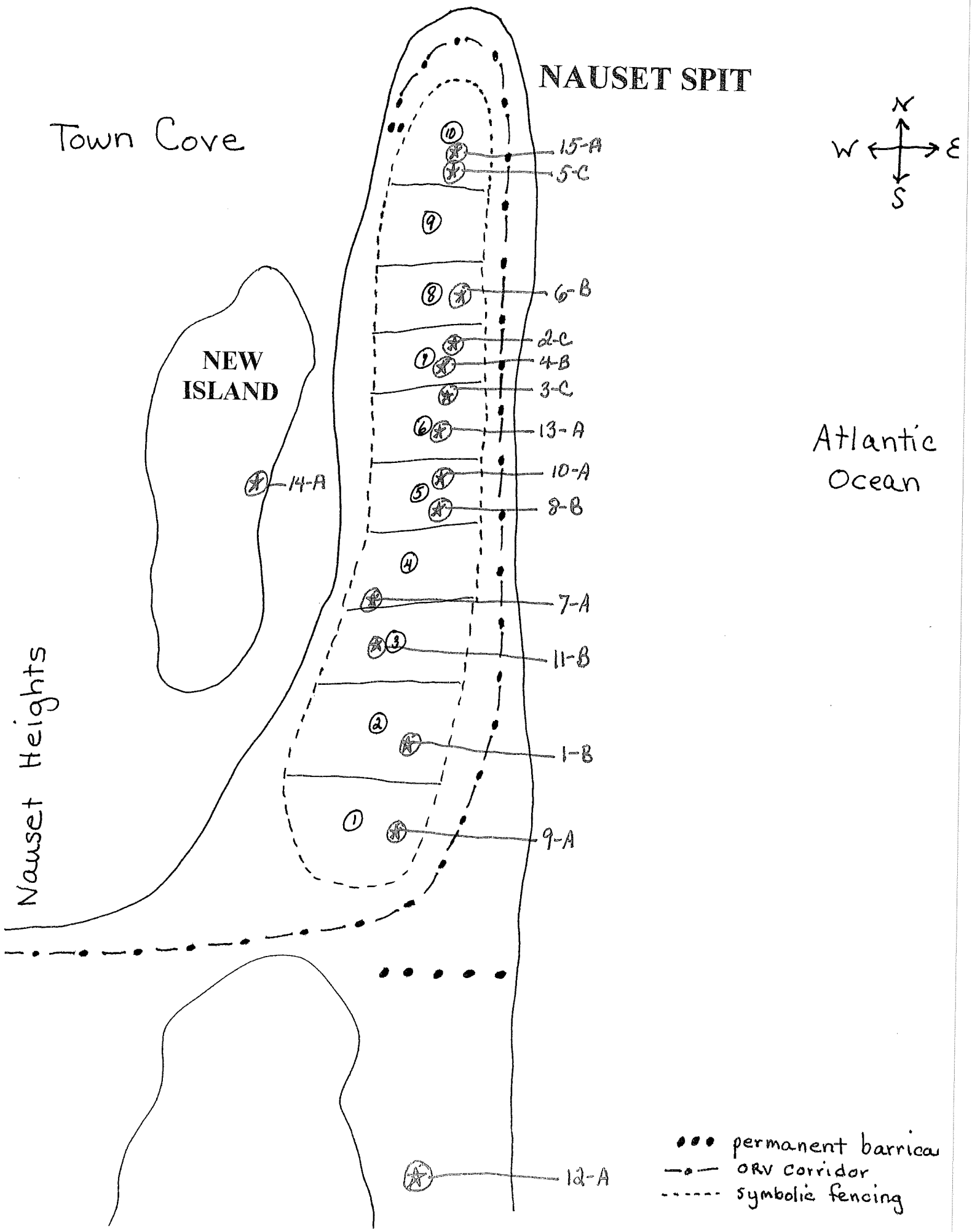
[c] *Indicate below the reasons for nest failure and egg/chick mortality (if known) and the evidence, or indicate "unknown." Attach additional sheets if necessary.*
[d] *Chicks are considered "fledged" if they are ≥ 25 days old or are observed in flight for ≥ 50 ft., whichever occurs first.*

Nest No.	Cause of egg mortality/Evidence
#11-A	Abandoned Crow harassment
11-B	Abandoned crow harassment. 1 adult mortality possibly Harrier.
12-A	Kite was observed flying over exclosure on day of hatching
13-A	Gull harassment abandoned
* 14-A	Nest was on New ISLAND Property of CCNS

Nest No.	Cause of chick mortality/Evidence
12-A	unknown
14-A	unknown
15-A	5 day old chick found in open sandy area. Large population of Black Backed Gulls in area.

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

June 2002


NAUSET SPIT
Town Cove
NEW ISLAND
Nauset Heights
Atlantic Ocean
N
W
E
S
15-A
5-C
6-B
2-C
4-B
3-C
13-A
10-A
8-B
14-A
7-A
11-B
1-B
9-A
12-A
permanent barricade
ORV corridor
symbolic fencing

NESTING RESULTS FOR ORLEANS NORTH BEACH

Two pair of piping plovers was observed for a two-week period exhibiting breeding behavior on Orleans North Beach. One pair on beach 2 of Orleans North Beach failed to establish a nest. Orleans North Beach also includes the area of Pochet, in this area another pair exhibiting breeding behavior failed to establish a nest.

CAUSE OF NEST/CHICK FAILURE FOR ONB

For reasons unknown, two pair of piping plovers failed to establish a nest on Orleans North Beach.

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year:	2005
Site Name:	Orleans North Beach
Town:	Orleans
Ownership:	Orleans

Observers:	Barbara Walsh
Agency:	
Address:	
Telephone:	
Email:	

☐ *Please mail a hard copy of a map of this site that shows locations of all nests and pairs that did not nest.*

Census remarks/notes on any pairs that did not nest (dates present, behavior):

Pairs were observed exhibiting breeding behavior but did not nest.

List pairs, if any, not present during Index Count:

Census results:

No. of pairs	
Index Count[a]	Total Count[b]
1	2

Monitoring effort:

Month	Avg. no. of visits to site per week
April	5
May	5
June	5
July	4

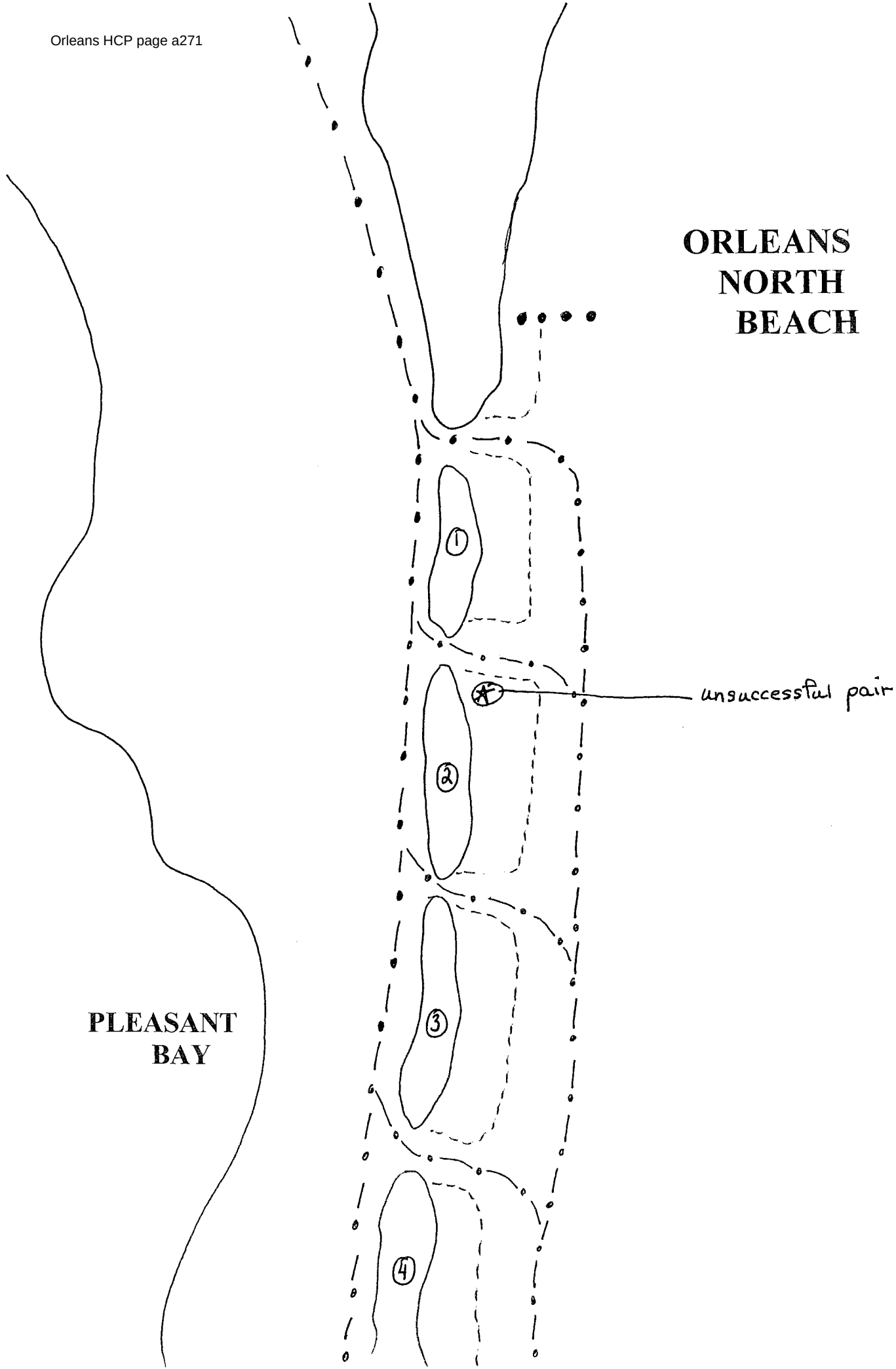
Exclosure Design	A	B	C
Shape			
Diameter/Length of side			
Size of wire mesh			
Total Height			
Height above ground:			
Depth buried:			
Cover material			
Cover spacing/Mesh size			

Other management undertaken or needed/Remarks:

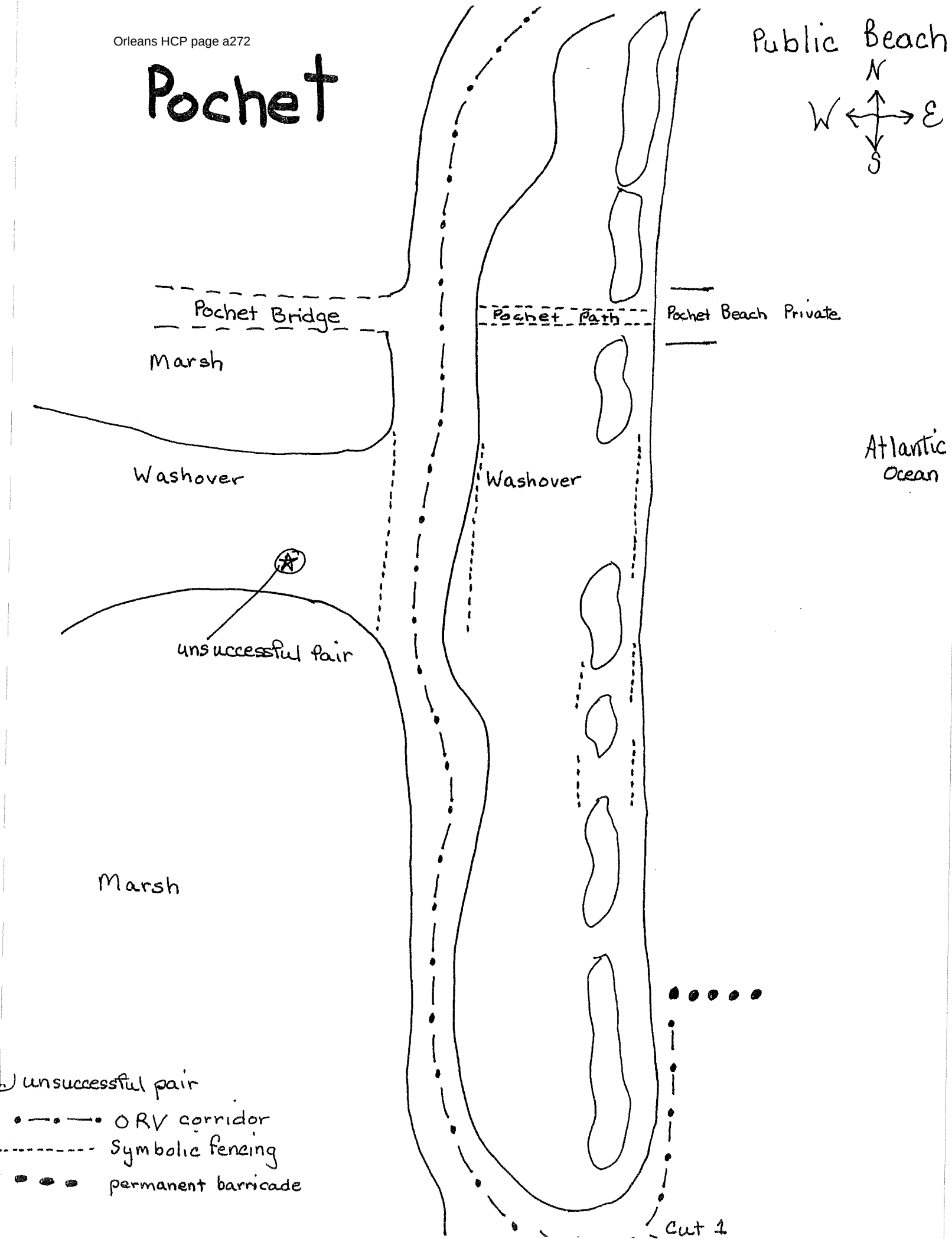
[a]*The Index Count includes pairs seen during the Index Count period (1-9 June), as well as pairs not detected then, but that must have been present based on subsequent laying or hatching dates.*

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

Email or send forms to: Scott Melvin, ***MassWildlife***, Rte. 135, Westborough, MA 01581. scott.melvin@state.ma.us. Tel.: (508) 792-7270 x. 150 / Fax: (508) 792-7821


ORLEANS
NORTH
BEACH
1
2
3
4
unsuccessful pair
PLEASANT
BAY

Pochet


Public Beach
N
W
E
S
Pochet Bridge
Pochet Path
Pochet Beach Private
Marsh
Washover
Washover
Atlantic Ocean
unsuccessful pair
Marsh
unsuccessful pair
ORV corridor
Symbolic fencing
permanent barricade
Cut 1

TERN & OYSTERCATCHER NESTING RESULTS

TERN NESTING

Each year a Tern census is conducted for the entire Nauset Beach area. The official forms required by Mass Wildlife are included in this report. An A-count was conducted during the census window of June 5-20. In 2005 the count was conducted on June 15th. Ten pair of Least Terns was counted, this is a marked decrease from 2004. With no significant change in numbers, a B-count was not done. All nesting pairs were located on Nauset Spit. No other tern species were observed during the A-count. Predation was likely due to the frequent presence of a coyote, as well as a large population of Black Backed Gulls. On September 4th one least tern chick fledged from Nauset Spit.

AMERICAN OYSTERCATCHERS

As in years past Coastal Waterbird Cooperators were asked to conduct a census of American Oystercatchers which are now ranked as a Species of High Concern in the United States Shorebird Conservation Plan. The count period for 2005 was conducted May 22 – 31. One pair established a 1-egg nest on Nauset Spit. This nest was washed over on May 24th due to a Nor'easter. The pair did not re-nest.

Massachusetts Tern Census Form, *Year* 2005

Colony Name: Nauset - Orleans

Colony Number: 352009

Town: Orleans

Ownership: Town of Orleans

Observer/Agency: Barb Walsh

Street:

Town & State: Zip:

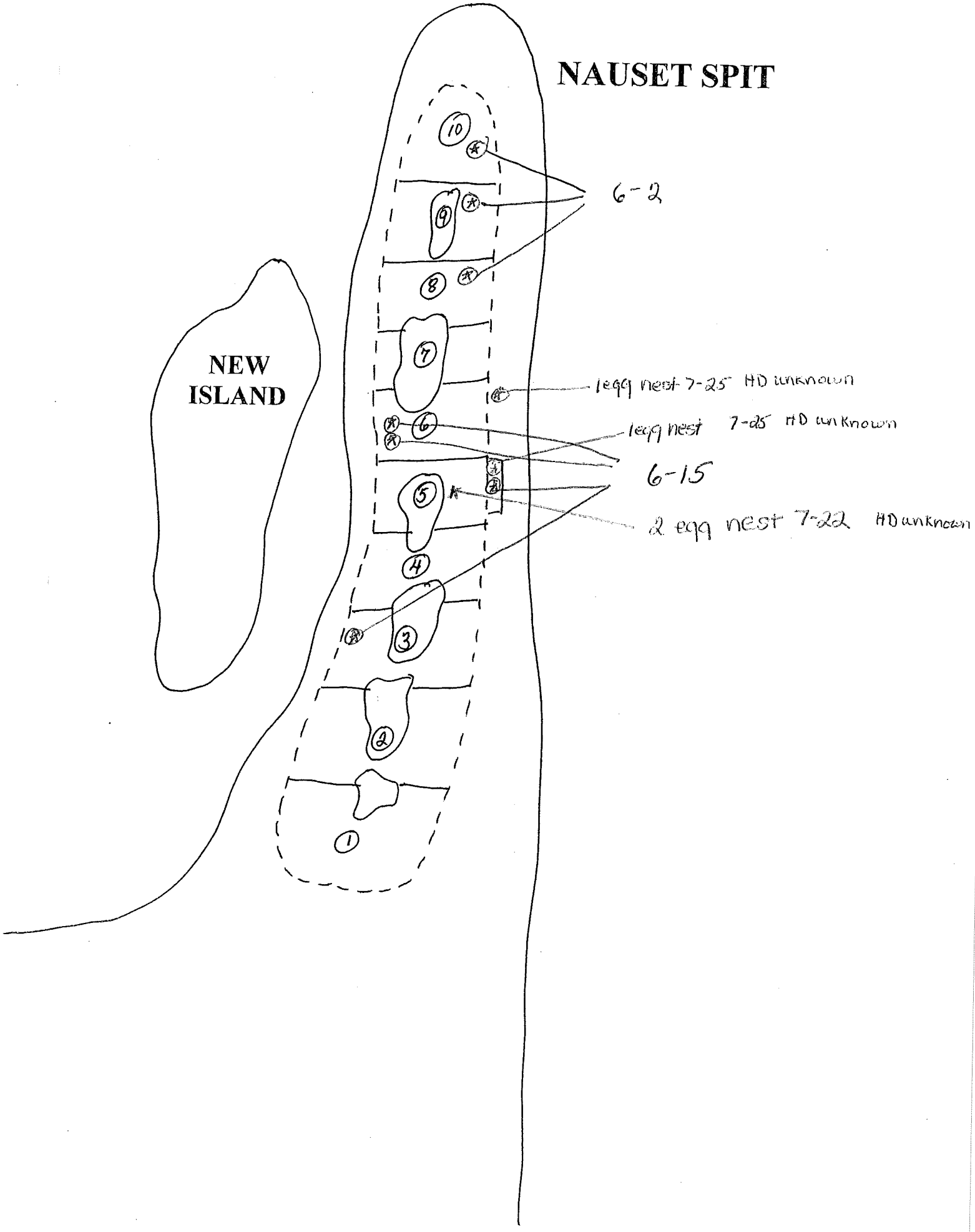
E-mail: JTWALSH@CAPECOD.NET Telephone: 508240-0037

⇨⇨ **PLEASE** 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	6-15	0	AC	RC	7-10	0	AC	RC		
COTE	6-15	0	AC	RC						
ARTE	6-15	0	AC	RC	7-10	0	AC	RC		
LETE	6-15	10	AC	RC						Coyote tracks throughout nesting area large population of Blackbacked Gulls
LAGU	6-15	0	AC	RC						
BLSK	6 15	0	AC	RC	7-10	0	AC	RC		
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)792-7270 x312 / Fax: (508)792-7821 / E-mail address for electronic filing (**please make sure all necessary information is included**): carolyn.mostello@state.ma.us

Least Terns


NAUSET SPIT
NEW ISLAND
10
9
8
7
6
5
4
3
2
1
6-2
1 egg nest 7-25 HD unknown
1 egg nest 7-25 HD unknown
6-15
2 egg nest 7-22 HD unknown

MASSACHUSETTS AMERICAN OYSTERCATCHER CENSUS FORM

Year: 2005

Site Name: Nauset Spit

Town: Orleans

Ownership: Town of Orleans

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

Observer(s): Barbara Walsh

Affiliation:

Address:

Telephone: 508-240-0037 E-mail: JTWALSH@CAPECOD.NET

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 7-19-05

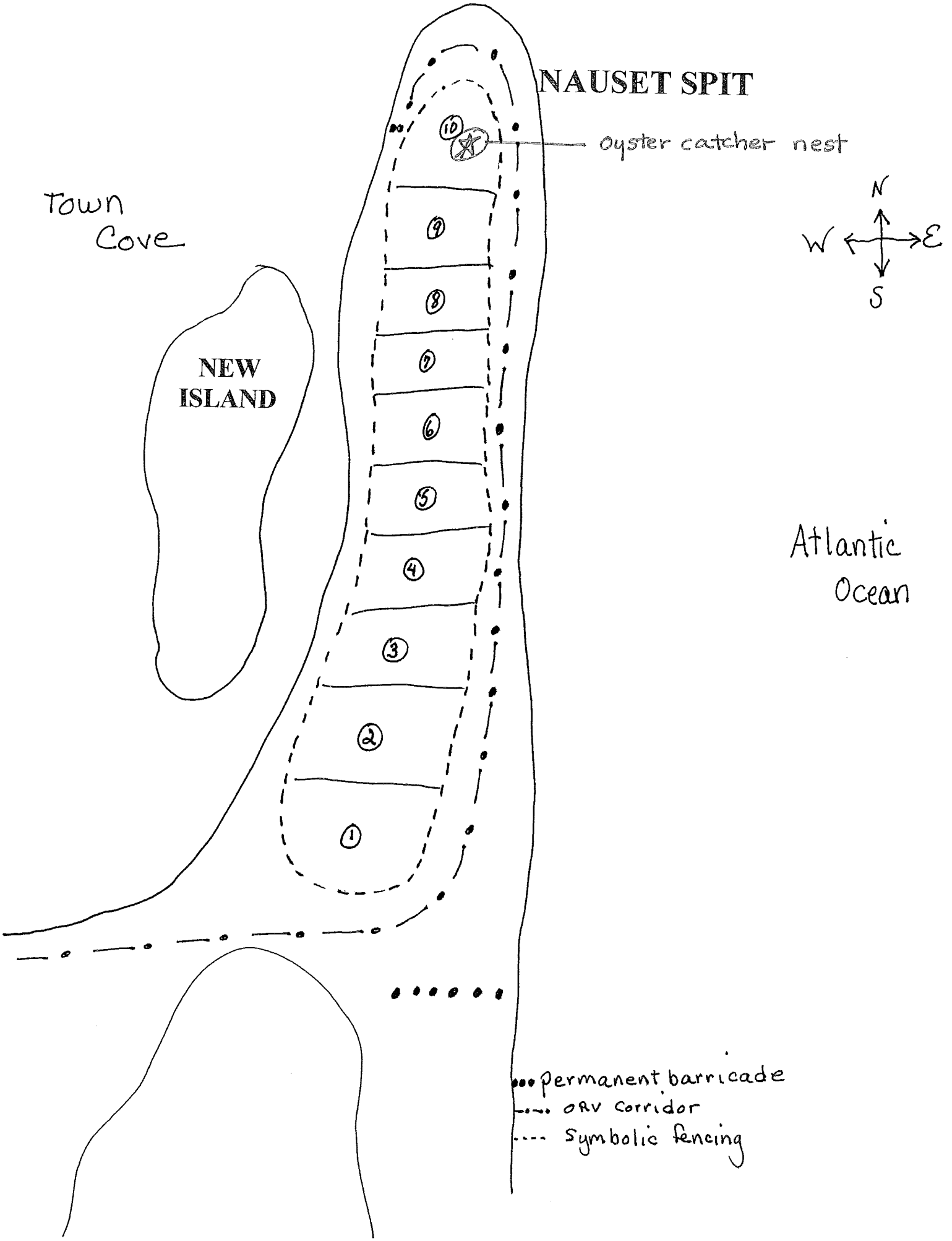
Please indicate which, if any, Oystercatcher nests, broods, or important habitat areas were not adequately protected from human disturbance or off-road vehicles by existing management for Piping Plovers and terns.

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

1 egg nest lost to May 24th Nor'Easter

pair failed to renest

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


NAUSET SPIT
oyster catcher nest
Town Cove
NEW ISLAND
N
W
E
S
Atlantic Ocean
10
9
8
7
6
5
4
3
2
1
permanent barricade
ORV corridor
Symbolic fencing

ADULT MORTALITY

On July 15th NS# 11-B with 3 eggs was found to be abandoned. Crow tracking was observed around the exclosure and in the area. On July 19th a dead adult plover was found 20' from the exclosure. The chest cavity was badly decomposed. The carcass of a dead willet was found 4' from the plover. Coyote and crow tracking were observed around the birds. On two occasions in early August a Harrier was observed in the area.

CHICK MORTALITY

On July 10th NS# 15-A hatched 3 chicks. On July 15th a dead chick was found in an open sandy area in section 10 of Nauset Spit. Tracking from a single plover led to and from the chick. A large population of Black Backed Gulls frequents this area of Nauset Spit. The Chick was recovered and given to Scott Melvin.

DOGS ON ORLEANS NORTH BEACH

In the past dogs were allowed on ONB under voice control. In November of 2004 the Board of Parks Commissioners of Orleans and Chatham, revisited the rules and regulations pertaining to dogs on the beach. A new ruling was designated as follows: " ...All dogs must be on a leash of not more than 30' at all times, unless below the high tide mark, from May 15 through Labor Day. (This will be a zero tolerance enforcement issue.) Dogs are prohibited from areas closed to vehicle or human traffic for Piping Plover protection. In addition to any other penalties set forth in these regulations, any violations of this Section constituting a first offense is the automatic revocation of the offenders beach permit rights for a period of one (1) year..." Several beach permits were revoked because of dogs off leash.

DOGS ON NAUSET SPIT

Dogs are prohibited on Nauset Spit from March 15th to September15th. Despite this rule, the shorebird monitor on Nauset Spit observed **49** dogs. The majority of these dogs with their owners access Nauset Spit by way of a public stairway at Nauset Heights. Several of these people are well aware of the rules and regulations pertaining to dogs. Dogs are also brought to the spit by way of boats. Once barricades are put in place for hatched chicks there is no patrol allowed by law enforcement on Nauset Spit. There is more than adequate signage alerting the public about dogs on the beach and why. This has become a constant chronic problem that needs to be addressed.

HUMAN DISTURBANCE

During the 2005 nesting season on Nauset Spit there were several instances of foot traffic through the nesting areas. Terns are particularly sensitive to this type of disturbance and will abandon a nesting site only to re-establish at another point on the beach delaying egg laying and incubation. This type of event happened several times. Several acts of vandalism were also observed on Nauset Spit in the Nauset Heights area, posts were removed and burned, signage was ripped off posts, stakes were snapped off, and string was cut on a daily basis. An undercover police officer was positioned on the beach, nothing was observed.

UNAUTHORIZED VEHICLE USE

Each day 300 + vehicles are allowed access to Nauset Beach. Access to the beach is limited when there are flightless chicks on the beach. In 2005 there was 1 documented instance of a vehicle inside the closed/restricted area of Nauset Spit. This vehicle has been suspended for 1 year. A thorough search was made for any chick mortalities, none were found.

MANAGEMENT SUGGESTIONS

Dogs should be banned from Orleans North Beach during the nesting season.

Signage should be installed at all town landings prohibiting dogs on Nauset Spit.

Law enforcement needs to be more active in giving citations to people who bring dogs on Nauset Spit.

An interpretive sign should be installed at Callanan's Pass in April to inform the public about nesting birds on Nauset Spit.

All beach staff should be educated on the rules and regulations pertaining to nesting plovers and terns.

Some type of law enforcement needs to be established for Nauset Spit when chicks have hatched and barricades are put in place.

ABSTRACT

This is a summary of the 2006 Piping Plover and Waterbird nesting season for Nauset Beach. Piping Plovers (Charadrius melodus) were monitored at three separate areas, Nauset Spit to the north, Pochet wash over to the south and further south, Orleans North Beach. First returning plovers were observed in late March. A total of 18 pairs were monitored at these three ocean sites. This is an increase of one pair from 2005. Egg laying began in the first week of May for Nauset Spit. Pochet wash over nests were established the second week in May. No activity was observed at Orleans North Beach. Overall hatching success was .46. Fledging success was .61. A total of 22 chicks fledged. Productivity was 1.22 (Refer to charts 1 and 2). A total of 24 nests were established during the 2006-breeding season. Four nests were lost to early May storms. Seven nests were successful on their first attempt. One was successful on the second attempt. Two nests lost all their chicks. Four nests were lost to a smart predator. Three nests were predated after exclosures were removed due to a smart predator. Three nests were lost to crow predation.

CHART 1

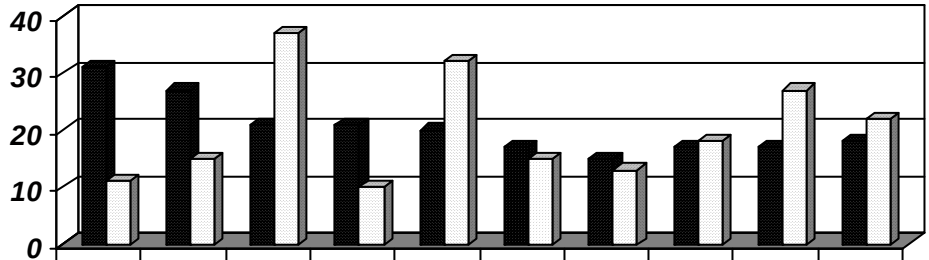
PIPING PLOVER BREEDING SUCCESS

SITE	PAIRS	1. NESTS	EGGS LAID	EGGS HATCHED	CHICKS FLEDGED	2. HATCHING SUCCESS	3. FLEDGING SUCCESS	4. PRODUCT-IVITY
SPIT	16	22	71	29	17	.41	.59	1.06
POCHET	2	2	8	7	5	.88	1.00	2.50
TOTAL	18	24	79	36	22	.46	.61	1.22

1. INCLUDES RENESTS
2. TOTAL EGGS HATCHED/ TOTAL EGGS LAID = 0.46
3. TOTAL CHICKS FLEDGED/ TOTAL EGGS HATCHED = 0.61
4. TOTAL CHICKS FLEDGED/TOTAL PAIRS = 1.22

CHART 2

PRODUCTIVITY ON NAUSET BEACH



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
■ pairs	31	27	21	21	20	17	15	17	17	18
□ fledged chicks	11	15	37	10	32	15	13	18	27	22

INTRODUCTION

Nauset Beach is owned and managed by the Town of Orleans and is located on the Atlantic Ocean. Within Nauset Beach is Nauset Spit and Orleans North Beach. There is also a section of Orleans North Beach called Pochet, which is located just south of the public beach; this section is a mile long. Being prime feeding and nesting grounds, these beaches are host to Piping Plovers, Least Terns, Roseate Terns, Common Terns, Arctic Terns, American Oystercatchers and Black Skimmers. Piping Plovers traditionally return to nesting sites late March through early May. Plovers prefer the sandy substrate that a barrier beach has to offer. Adults as well as chicks are cryptically colored to blend with their surroundings. In 1986, when the plover was federally listed as 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, and Terns.

NESTING AREAS

Since 1989 piping plovers have historically nested at three different areas within Nauset Beach. A total of 18 breeding pairs nested on Nauset Beach in 2006. Of these pairs, 16 pairs nested on Nauset Spit, and 2 pair successfully nested at the Pochet wash over. No nests were established at Orleans North Beach.

Nauset Spit

Nauset Spit is approximately 2 ½ miles long. ORV traffic is allowed and limited to Orleans residents only. Dogs are not allowed on this beach from March 15th to September 15th. Symbolic fencing that consists of posts with clearly marked signage surrounds nesting areas. The entire fence is then closed off with a line of string attached to each post. Several walkways are in place for access to and from Nauset Cove. This activity was implemented in late April. To prevent chick mortality, areas with chicks due to hatch within 24 hours are closed off to vehicles by the placement of barriers. Several 6' posts are placed from symbolic fencing to the tide line. This barrier is kept in place for 25 days or until the chicks fledge.

Orleans North Beach

Orleans North Beach is located south of Nauset Spit and is approximately 3 ½ miles long. This beach is open to Orleans residents and the general public. Access to Orleans North Beach requires purchasing a sticker and viewing an informational video on rules and regulations. Nesting sites on Orleans North Beach are defined with 6' posts and 5' stakes outlining the area. This symbolic fencing is then strung to better outline the area. This was completed in late April. Every post is marked with signage. One day before chicks are due to hatch a barrier consisting of several 6' posts with signage are put in place and remain until chicks are 25 days old or fledge. Dogs are not allowed in this barricaded area.

Pochet

Pochet is located approximately 1 1/2 miles south of Nauset Spit and ¼ of a mile from the gated entrance for all Off Road Vehicles. The Pochet area provides about a mile of excellent foraging and nesting habitat. A winter blizzard in 2005 created a wash over of approximately 855'north to south and 789' east to west. This created a pristine habitat for piping plovers and least terns. Two pair of piping plovers successfully nested in this area and fifty least tern nests were monitored. For the first time in history the Orleans Park Commissioners at their June 14th meeting voted to close the entire south end of Nauset Beach to all Off Road Vehicles including camp owners. This was done in compliance with the Federal and State Endangered Species Act Laws. The area was closed to Off Road Vehicles at 12:01 a.m. June 22nd and re-opened July 25th.

Tern Nesting

Least Terns returned to Nauset Spit May 15th. Symbolic fencing was extended due to accretion at the tip of Nauset spit. Both least terns and piping plovers attempted to nest in this area. Egg laying began during the last week in May. Almost all of these nesting attempts were predated causing most pairs to re-nest with some shifting of nesting locations. Egg predation continued. Two chicks were observed July 17th for 4 days only. Predation was likely due to a large population of black backed gulls. Coyote tracks were also observed.

Each year a Tern census is conducted for the entire Nauset Beach area. The official forms required by Mass Wildlife are included in the report. An A-count for Nauset Spit was conducted during the census window of June 5-20. In 2006 the count was conducted on June 12th. 14 pair of Least tern was counted, this is a slight increase from 2005. No other tern species were observed during the A-count. With no significant change in numbers a “B” count was not done.

The Pochet area fared much better. Pochet wash over provides excellent habitat for Least Terns. An “A” count was completed for the Pochet area on June 20th with 8 pair observed. Due to a marked increase a “B” count was conducted on July 13 with 50 nests being counted. Terns continued to lay eggs until early August. Plastic construction fencing was put in place and the ORV corridor was re-routed around the tern colony. Of these nests approximately 20 chicks were fledged. No other species of Tern were observed. There were no terns observed at Orleans North Beach.

American Oystercatchers

As in years past Coastal Waterbird Cooperators were asked to conduct a census of American Oystercatchers which are now ranked as a Species of High Concern in the United States Shorebird Conservation Plan. The count period for 2006 was conducted May 22nd-May 31st. One pair established a nest in early June; this nest was complete with 3 eggs on May 4th. The nest was abandoned after a storm on May 22. A re-nest produced one chick that was found dead above the tide line July 21st. This chick appeared to be about 4 weeks old. The cause of this mortality is unknown.

Nesting Results For Nauset Spit

The first returning pair of plovers was observed on Nauset Spit in late March. An increase of pairs and courtship activity soon followed. Egg laying began in the first week of May and continued to the end of June. All nests were exclosed and all exclosures were accepted. Sixteen pairs ultimately nested on Nauset Spit with a total of 22 nests. Of these nests, 5 were successful on their first attempt and 1 on their second attempt. One pair was unsuccessful and did not re-nest.

On June 25th it was observed that a 'smart predator' had penetrated 4 exclosed nests. Tracking at the outer edge of the exclosure was consistent with skunk although no tracking was visible inside the exclosure. Evidence of a predator inside the exclosure was most likely eradicated due to a wind storm the previous day. Skunk tracking observed on the 25th could have been the predator returning to a known food source. No adult mortalities were found. The decision was made to take down the remaining 5 exclosures. Of these 5 nests, 3 were predated and 2 each hatched 3 chicks, none of these chicks survived. Some attempts at re-nesting were observed they were all unsuccessful.

Cause of Nest/Chick Mortality for Nauset Spit

NS# 1-A	4 egg nest abandoned after May 22nd storm
NS# 1-B	4 egg nest lost to crow after exclosure was removed due to a smart predator
NS# 2-A	4 egg nest abandoned after May 14th storm
NS# 2-B	loss of 2 chicks unknown
NS# 3-A	4 egg abandoned after June 7th storm
NS# 3-B	3 egg nest lost June 25th to a smart predator
NS# 5-A	1 egg nest abandoned after a May 12th storm
NS# 5-B	4 egg nest lost June 25th to a smart predator
NS# 6-A	loss of 3 chicks unknown
NS# 8-A	2 egg nest lost May 25th to a crow
NS# 8-B	3 egg nest lost after exclosure was removed due to a smart predator
NS# 10-A	1 egg nest lost to black backed gull
NS#13-A	4 egg nest abandoned after June 8th storm
NS#13-B	4 egg nest lost to a smart predator
NS#14-A	3 egg nest lost June 26th to coyote after exclosure was removed due to a smart predator
NS#15-A	loss of 3 chicks unknown
NS#16-A	2 egg nest lost to a smart predator

Nesting results for Orleans North Beach

On May 24th scrapes were observed at beaches 2 and 3 of Orleans North Beach. No plovers were observed during the entire nesting season.

Nesting Results for Pochet

An 855' X 789' wash over at Pochet was established after a winter blizzard in 2005. This same blizzard also created several smaller wash overs just south of the larger one. One pair of piping plovers (P#2-A) established a 4 egg nest in the main wash over area. Two chicks were fledged from this nest. Approximately 100 yards south in a smaller wash over area a second pair of plovers (P#1-A) established a 4 egg nest. Three chicks hatched and fledged from this nest. Two days after hatching, P#1-A moved their 3 chicks to the large wash over area where they remained until fledging. Both pairs with their chicks utilized the entire wash over area feeding at the ocean and inlet tide line, new wrack line and old wrack line. Both sides of the inlet provided excellent concealment for chicks in the grasses.

Cause of Chick Mortality For Pochet

P#2-A	loss of 2 chicks unknown

Dogs On Orleans North Beach

In the past dogs were allowed on ONB under voice control. In November of 2004 the Board of Parks Commissioners revisited the rules and regulations pertaining to dogs on the beach. A new ruling was designated as follows: " All dogs must be on a leash of not more than 30' at all times, unless below the high tide mark, from May 15 through Labor Day. (This will be a zero tolerance enforcement issue.) Dogs are prohibited from areas closed to vehicle or human traffic for Piping Plover protection. In addition to any other penalties set forth in these regulations, any violations of this Section constituting a first offense is the automatic revocation of the offenders beach permit rights for a period of one (1) year."

Dogs on Nauset Spit

Dogs are prohibited on Nauset Spit from March 15th to September15th. Despite this rule, the shorebird monitor on Nauset Spit observed numerous dogs. Several of these dogs with their owners access Nauset Spit by way of a public stairway at Nauset Heights. The majority of these people are well aware of the rules and regulations pertaining to dogs. Dogs are also brought to the spit by way of boats. Once barricades are put in place for hatched chicks there is no patrol allowed by law enforcement on Nauset Spit. There is more than adequate signage alerting the public about dogs on the beach and why. This has become a constant chronic problem that has not been addressed. Despite calls from the shorebird monitor to law enforcement about dogs on the cove side of Nauset Heights not one dog owner was given a citation. Without a clear message of zero tolerance this problem continues.

Human Disturbance

During the 2006 nesting season on Nauset Spit there were several instances of foot traffic through the nesting areas. Terns are particularly sensitive to this type of disturbance and will abandon a nesting site only to re-establish at another point on the beach delaying egg laying and incubation. This type of event happened several times. Nesting areas on Nauset Spit are clearly marked with symbolic fencing encompassed with string and signage at every post.

Several acts of vandalism were also observed on Nauset Spit in the Nauset Heights area. As early as April 24th, posts were removed and burned, signage was ripped off posts, stakes were snapped off, established pathways destroyed, and string was cut on a daily basis. This has been a problem observed for the last 4 years by the current shorebird monitor. This vandalism has increased to a daily occurrence and needs to be addressed.

Unauthorized Vehicle Use

Each day 300 + vehicles are allowed access to Nauset Beach. Access to the beach is limited when there are flightless chicks on the beach. In 2006 there were several instances of vehicles inside the closed/restricted area of Nauset Spit. A thorough search was made each time for any chick/adult mortalities, none were found.

Management Suggestions

Dogs should be banned from Orleans North Beach during the nesting season.

Signage should be installed at all town landings prohibiting dogs on Nauset Spit.

Law enforcement needs to be active in giving citations to people who bring dogs on Nauset Spit from Nauset Heights.

Daily patrolling of Nauset Heights area is essential.

Patrolling of trained law enforcement needs to be established beyond the barricades for Nauset Spit.

All beach staff should be educated on the rules and regulations pertaining to nesting plovers and terns.

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2007

Site Name: Nauset Beach

Town: Orleans

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): Nathaniel Dodson, Paul Fulcher Pat Johnsey Elizabeth Hoxa

Agency: Orleans Parks and Beaches

Address: 18 Bay Ridge Lane PO Box 122
Orleans Ma, 02653-0182

Telephone: 508-240-3775

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

Census Results:	Index Count[a]	Total Count[b]
No. of Pairs	21	23
Unpaired Adults	0	1

Notes on pairs that did not nest (include dates present, activities)/Census remarks:
As of 6/1 Two pairs one scraping SB-6 No Nest Result
one ~~[illegible]~~ N/S ~~Not scraping~~ Moved on didnt show up elsewhere
Unpaired

List pairs not present during Index Count:
All Pairs were present at some point

Month	Average # of visits to site per week
April	5/wk
May	5/wk
June	5/wk
July	5/wk

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:	.5 ft		
Cover material	Mesh Netting		
Cover spacing/Mesh size	3/4 sq		

Other management undertaken or needed/Remarks:
Symbolic fencing was used in all areas and was moved/Altered as nest discovered to provide extra protection
Off Road access was denied June 25 Aug 3 on South Beach, all but 3/4 mile of N/spit Closed June 6 - Aug 11
Dogs Denied Starting ~~May~~ April 1 - Nauset spit May 1 South Beach
Pedestrians Kept out of Symbolic fenced Areas
exclosures discontinued after early problem with Crows Crows Were abundant This year

[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 Year: 2007 Observer(s): Nat Bodson, Pat Johnson, Elizabeth Horan, Paul Fidler

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	Exclosure Design (A, B…)	Exclosure Date installed
1	N/S-1	4	0	0	5/6	2	5/11	F 5/19	Y	A	5/13
	N/S-1A	4	3	3	5/28	1	6/2	H-6/28	N		
2	N/S-2	4	0	0	5/7	2	5/13	F 5/20	Y	A	5/13
	N/S-2A	4	0	0	5/28	1	6/2	F-6/21	N		
3	N/S 3	4	0	0	5/11	3	5/13	F 5/20	Y	A	5/14
	N/S 3A	4	0	0	6/1	1	6/6	F 6/21	N		
4	N/S 4	4	0	0	5/11	3	5/13	F 5/18	Y	A	5/17
	N/S 4A	1	0	0	6/1	1	—	F 6/2	N		
5	N/S 5	3	0	0	5/11	1	5/15 30/44	F 5/19	Y	A	5/17
6	N/S 6	4	0	0	5/14	3	5/16	F 5/19	Y	A	5/13

[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~~ egg mortality/Evidence
N/S 1	Crow seen on Top of exclosure (Nest Abandoned)		
N/S 2	Storm overwash Northeaster		
N/S 2A	Fox Track seen around Nest Depression	N/S 5	Storm overwash from Northeaster Did not Renest (Could have moved to New Island
N/S 3	Storm overwash Northeaster		
N/S 3A	Fox Track seen around Nest Depression	N/S 6	Crows seen on exclosure (abandoned Did not Renest (Could have moved to New Island
N/S 4	Crows seen in Area (No other Footprints		
N/S 4A	Unknown		

Orleans HCP page a292

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

June 2002

Site Name: Nauset Beach Orleans Nauset Spit Year: 2007 Observer(s): Nate Robson, Pat Johnson, Elizabeth Hagey, Paul Fulcher

Page 2 of 3

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	Exclosure Design (A, B…)	Exclosure Date installed
7	N/S 7	3	3	3	5/07	2	5/12	H-6/9	Y	A	5/13
8	N/S 8	4	4	1	5/23	4	Unknown	H-6/13	N		
9	N/S 9	4	0	0	5/24	2	5/28	F 6/21	N		
10	N/S 10	4	4	2	5/25	4	Unknown	H 6/17	N		
11	N/S 11	4	0	0	5/28	1	6/2	F-6/21	N		
12	N/S 12	4	4	0	5/28	2	5/31	F 6/14	N		
13	N/S 13	4	0	0	5/28	2	5/31	F 6/5	N		
	N/S 13	4	3	3	6/23	3	6/25	H 6/27	N		
14	N/S 14	2	0	0	5/28	1	—	F 6/1	N		
	N S 14A	3	0	0	6/07	1	6/13	F 6/21	N		

[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
9	Fox Tracks around Nest Depression	12	Chicks disappeared overnight (No Sign)
11	Fox Tracks around Nest Depression	13	unknown
13	unknown		
14A	Coyote Tracks Seen in Area		

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

Site Name: Nauset Beach Orleans Nauset Spit Year: 2007 Observer(s): Nate Dobson, Pat Johnson, Elizabeth Hagen Paul Fletcher

Page 3 of 8

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	Exclosure Design (A, B…)	Exclosure Date installed
15	N/S 15	3	4	4	6/9	2	6/12	H 7/7	N		
16	N/S 16	3	2	2	6/9	2	6/12	H 7/7	N		
17	N/S 17	3	3	2	6/4	2	6/7	H 7/10	N		

[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 Beach Orleans South Beach Year: 2007 Observer(s): Nate Dodson Pat Johnson Elizabeth Hogey Paul Fickley

Page 1 of 1

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	Exclosure Design (A, B…)	Exclosure Date installed
1	S/B 1	3	0	–	5/17	3	5/19	F 6/14	N		
	S/B 1A	3	0	–	6/20	2	6/25	F 7/8	N		
2	S/B 2	4	3	3	5/21	1	5/29	H 6/23	N	7-18	–
3	S/B 3	4	0	0	6/2	1	6/07	F 6/11	N		
	S/B 3A	4	3	3	6/23	4	unknown	H 7/6	N	8-3	–
4	S/B 4	4	0	–	6/2	2	6/05	F 6/14	N		
5	S/B-5	4	0	0	6/30	4	unknown	F 7/3	N		
6											

[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
1	S/B-1 washout Northeaster		
	S/B-1A Predation (Raccoon tracks)		
3	S/B-3 washout Northeaster		
4	S/B-4 Unknown		
5	Did not Renest (Peregrine Falcon in Area in June		
6	Did not Nest (Peregrine Falcon in Area) (in June)		

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

June 2002

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

RECEIVED
OCT 7 2008
ORLEANS CONSERVATION COMM.

Submitted to:

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TABLE OF CONTENTS

LIST OF TABLES 3
LIST OF FIGURES 3
LIST OF MAPS 3
ACKNOWLEDGEMENTS 4
ABSTRACT 4
INTRODUCTION 5
STUDY AREAS AND MANAGEMENT 6
Nauset Spit (Heights) 6
Nauset Beach Orleans 7
Pochet 7
Skaket Beach 7
METHODS 8
Pre-season Activities 8
Nesting Season Management and Monitoring 8
RESULTS AND DISCUSSION 9
Seasonal Chronology 9
Nesting Pairs 10
Nest Loss 10
Hatching Success 10
Fledging Success 11
Productivity 11
Predators 11
Predator Exclosures 12
Abandonment of Exclosed Nests 12
Chick Mortality 12
Adult Mortality 13
Feeding Activity 13
Off-road Vehicle Closures 13
Dog Activity 14
OTHER SHOREBIRDS 15
Least Terns 15
Common Terns 15
American Oystercatchers 15
Other Colonial Shorebirds 15
HISTORY OF MANAGEMENT RESULTS 16
CONCLUSIONS 16
MANAGEMENT RECOMMENDATIONS 17
TABLES 19
FIGURES 24
MAPS 25

TABLES

Table 1 Design of Standard Predator Exclosure 19
Table 2 Measures of Piping Plover Nesting Success 19
Table 3 Nest Loss for all Nests by Cause 20
Table 4 Nest Loss for Exclosed vs. Unexclosed nests by Cause 21
Table 5 Egg Loss by Cause 22
Table 6 Nest Summary for all pairs in Orleans, MA 23
Table 7 Nauset Spit (Heights) Vehicle Closures 24
Table 8 Nauset Beach Orleans Closures and Vehicle Escorts 24

FIGURES

Figure 1 Total number of nesting pairs of Piping Plovers in Orleans, MA. over the past decade 25
Figure 2 Productivity of Piping Plovers in Orleans, MA. Over the past decade 25

MAPS

Map 1 Northern half of Nauset Spit (Heights) Orleans 26
Map 2 Southern half of Nauset Spit (Heights) Orleans 27
Map 3 Public Beach (section of Nauset Spit) 28
Map 4 Pochet (section of Nauset Beach Orleans) 29
Map 5 Nauset Beach Orleans 30
Map 6 Skaket Beach (Cape Cod Bay side of town of Orleans) 31

ACKNOWLEDGEMENTS

Thanks and appreciation to all who worked diligently and cooperated willingly to help protect the breeding success of the Orleans Piping Plover and Least Tern populations: special recognition to Paul Fulcher, Superintendent of Orleans Parks and Beaches for his excellent preparation, unflagging support and expertise, to Monitors Stephen Struble, Elizabeth Hogan and Pat Johnson for their dedication and teamwork, to Lee Miller and all patrol staff for their willing assistance throughout the season, to home-owners who allowed us to protect birds on their property and to other agencies, in particular Mary Hake and her assistants at the Cape Cod National Seashore South District and Bob Prescott and his sharp-eyed volunteers at Wellfleet Bay Wildlife Sanctuary.

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 6, 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	2	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	?	06/20/08	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.
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	2 chicks disappeared on 07/06/08. 1 chick 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	2	1 egg did not hatch. 1 chick disappeared on 07/09/08.
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 Aspinet 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 Aspinet 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.

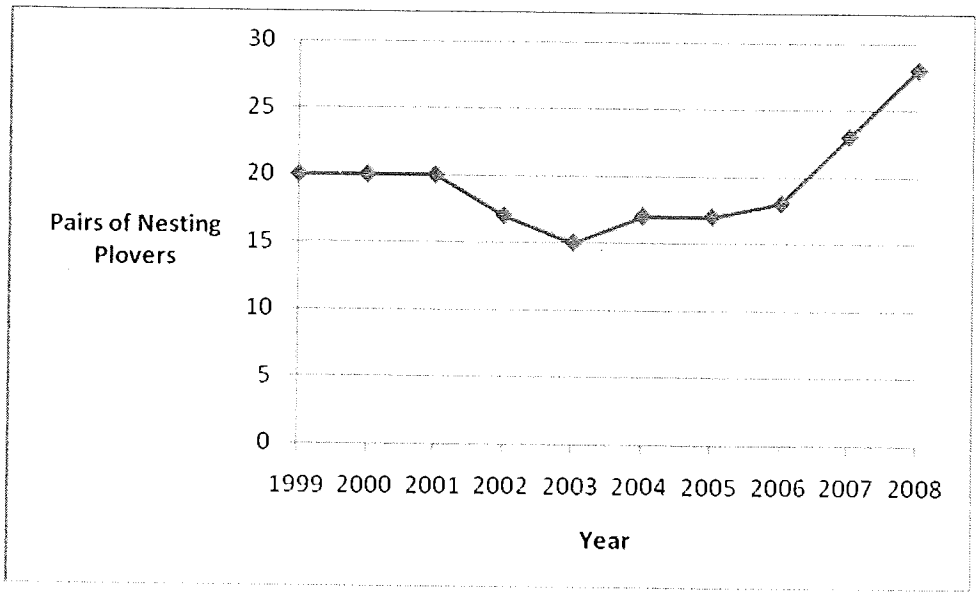
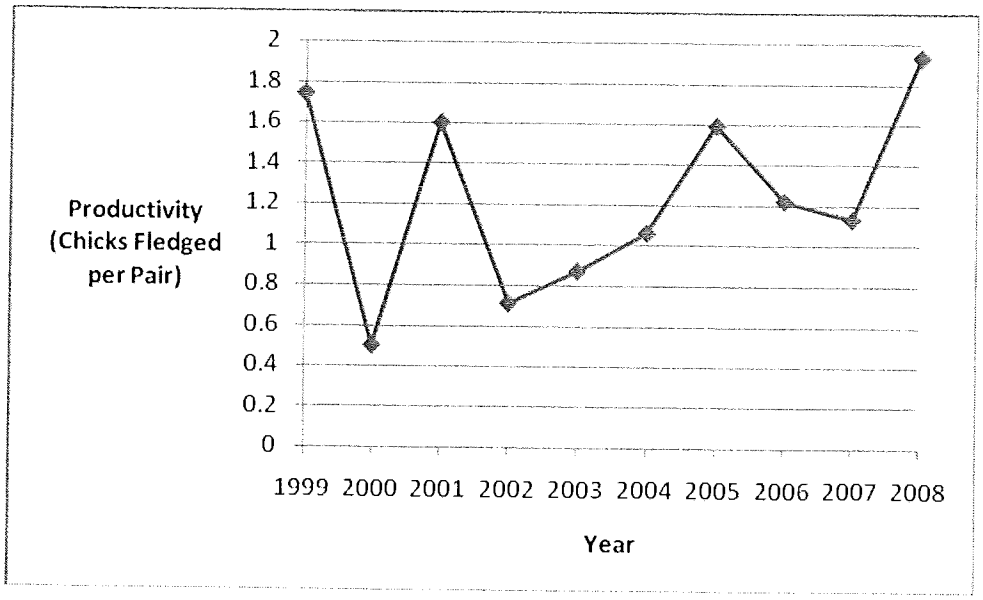


Figure 2. Productivity of Piping Plovers over the past decade in Orleans, MA.

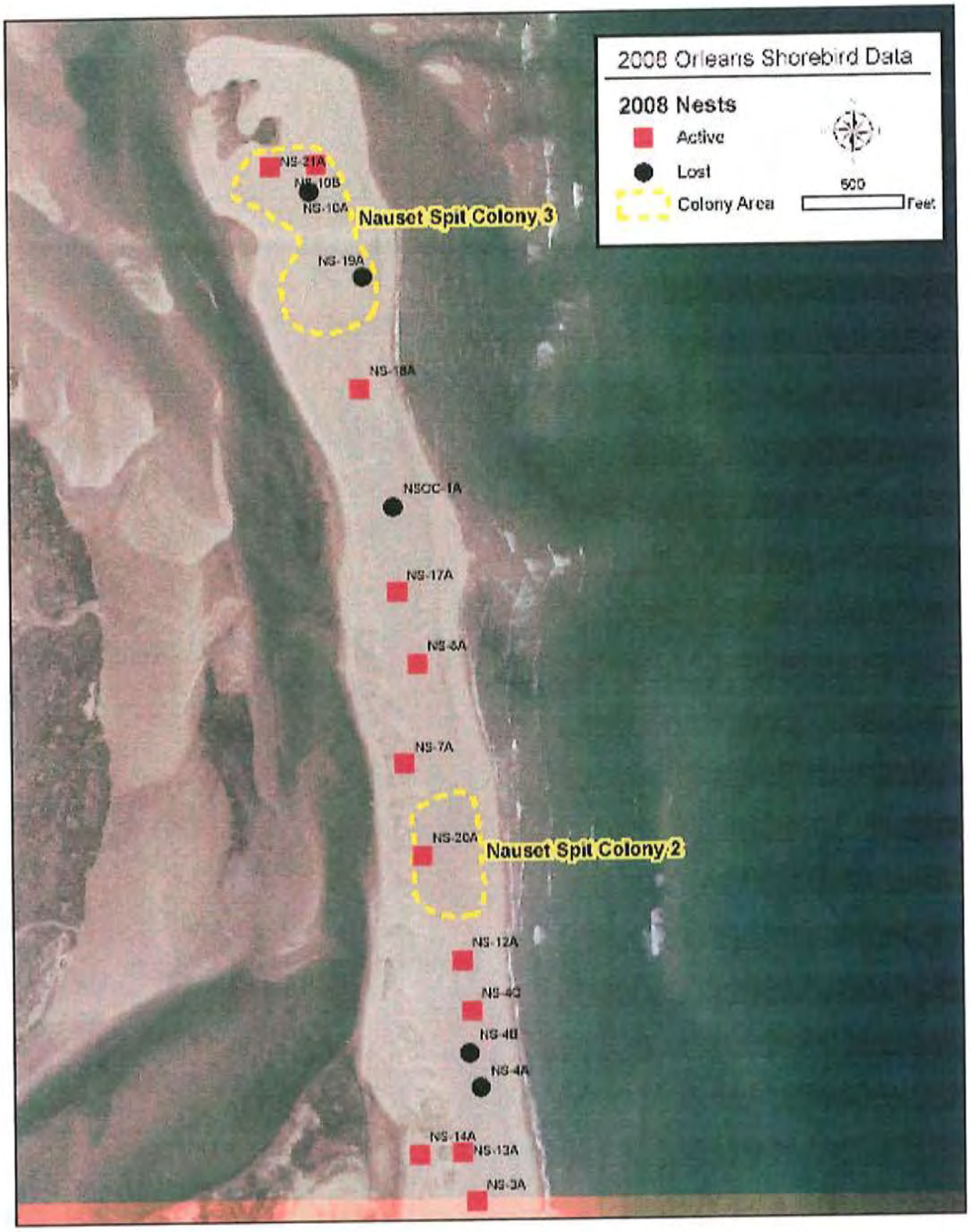


MAPS

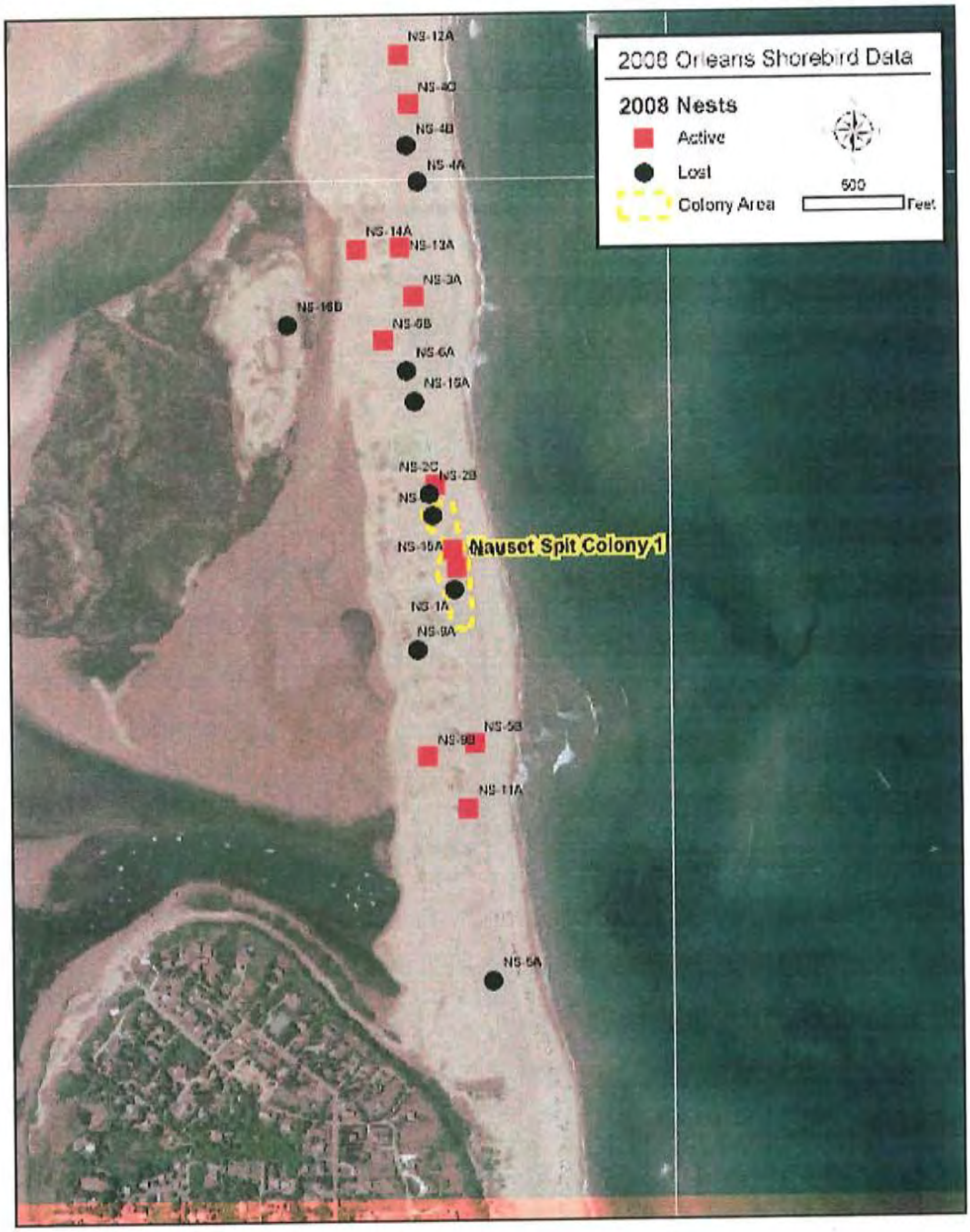
GPS point readings were taken for all Piping Plover nests and the American Oystercatcher nest. GPS-mapped polygons were created for all tern colonies. For point readings, all nests are Piping Plover nests with the exception of **NSOC-1A** in Map 1, which corresponds to the American Oystercatcher nest 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)

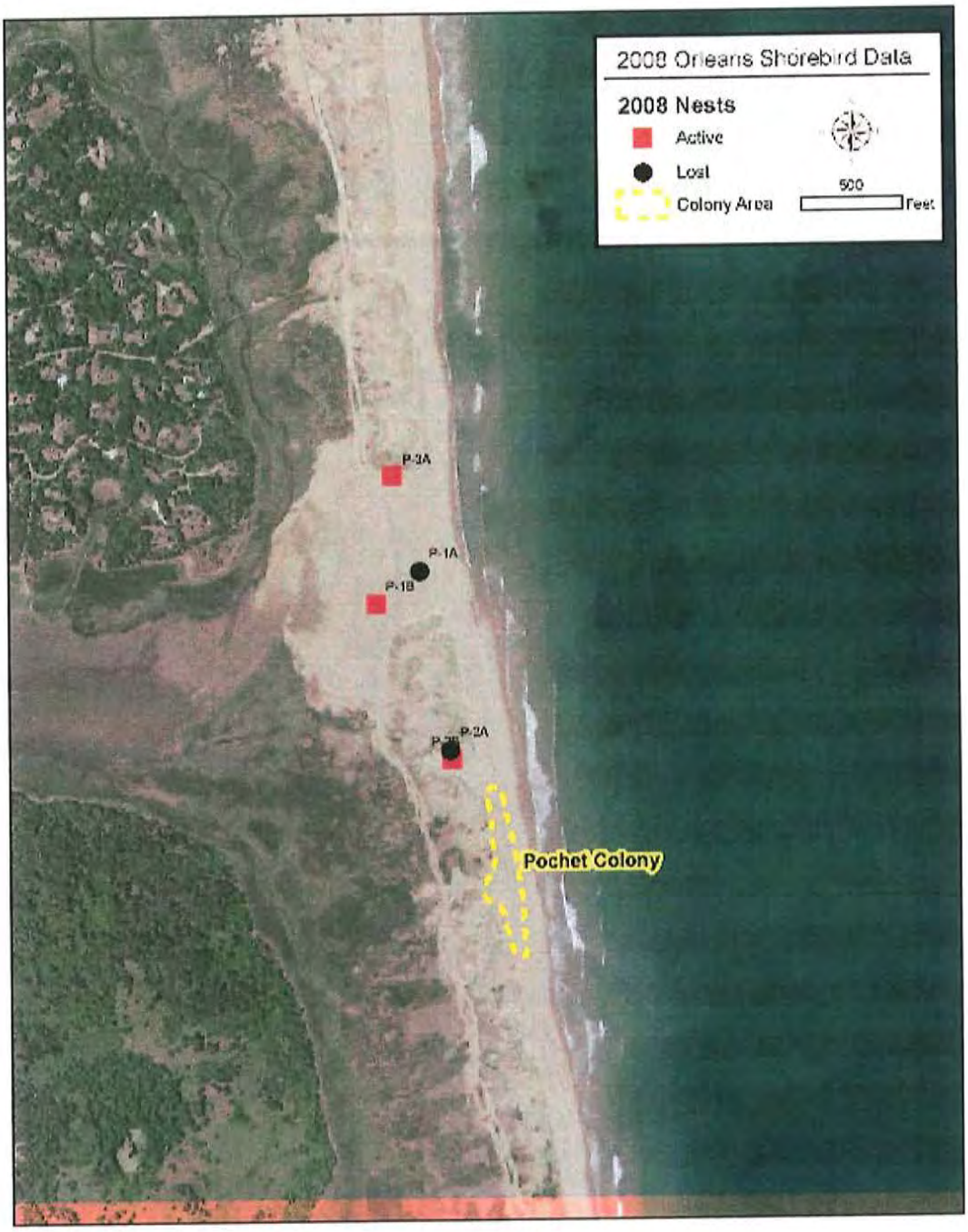


Map 2. Southern half of Nauset Spit (Heights)



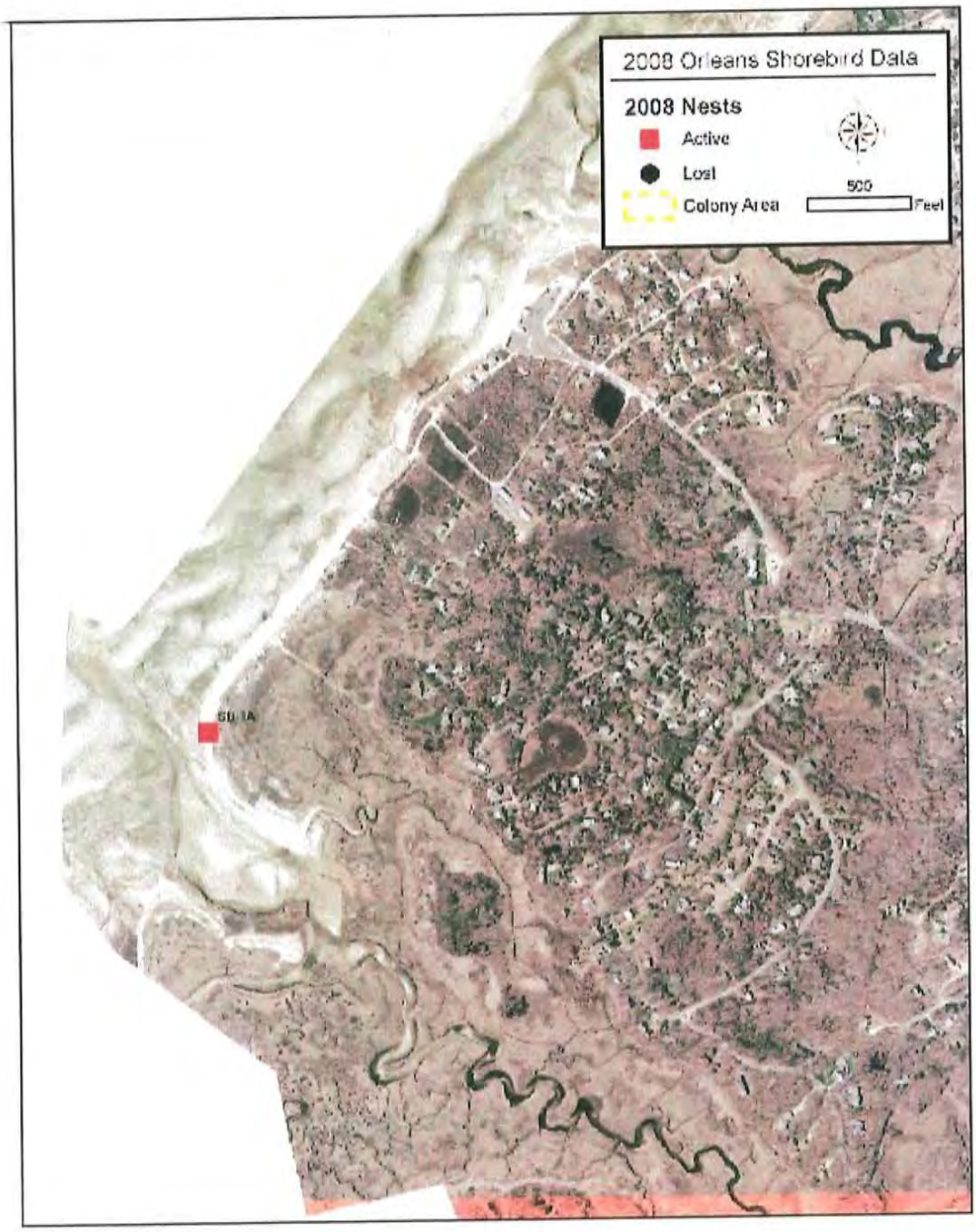
Map 3. Public Beach: a section of Nauset Spit (Heights)

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 not 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, 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	Exclosure Design (A, B…)	Exclosure 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

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

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: 2008 Observer(s): F. Fulcher, S. Struble, E. Hogan, F. 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): F. Fulcher, S. Struble, E. Hogan, F. 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

Orleans HCP page a332

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.

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.

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.

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

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

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

Site Name: Nauset Spit (Heights), Public Beach

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	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): F. Fulcher, S. Struble, E. Hogan, F. 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

Orleans HCP page 237

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

Site Name: Nauset Beach (Orleans), Pochet Washover

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	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): F. Fulcher, S. Struble, E. Hogan, F. 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	Exclosure Design (A, B…)	Exclosure 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	Nest No.	Cause of chick mortality/Evidence
1A	On 05/05/08, the nest had disappeared. Loss attributed to depredation by an unknown predator.	1A	Did not make it to hatching.
1B	Two eggs did not hatch.	1B	No chick mortality.
2A	On 05/15/08, gull tracks were observed leading directly up to the scrape, all eggs were missing.	2A	Did not make it to hatching.
2B	No egg mortality.	2B	No chick mortality.
3A	No egg 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 339

MASSACHUSETTS PIPING PLOVER CENSUS FORM

Year: 2008

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

Site Name: Nauset Beach (Orleans), North Beach

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	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. Fulcher, S. Struble, E. Hogan, F. 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	Exclosure Design (A, B…)	Exclosure 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

Orleans HCP page 341

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

Orleans HCP page a342

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. Fulcher, 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	Exclosure Design (A, B…)	Exclosure 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 2343

Massachusetts Tern Census Form, Year 2008

Colony Site Name: Nauset Spit (Heights)	Observer/Agency: Orleans Parks & Beaches
Subcolony ID: Colony 1	Street: 18 Bay Ridge Lane, PO Box 122
Town: Orleans, MA	Town, State, & Zip: Orleans, MA 02653
Ownership: Town of Orleans	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

Massachusetts Tern Census Form, Year 2008

Colony Site Name: Nauset Spit (Heights)	Observer/Agency: Orleans Parks & Beaches
Subcolony ID: Colony 2	Street: 18 Bay Ridge Lane, PO Box 122
Town: Orleans, MA	Town, State, & Zip: Orleans, MA 02653
Ownership: Town of Orleans	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

Massachusetts Tern Census Form, *Year* 2008

Colony Site Name: Nauset Spit (Heights)	Observer/Agency: Orleans Parks & Beaches
Subcolony ID: Colony 3	Street: 18 Bay Ridge Lane, PO Box 122
Town: Orleans, MA	Town, State, & Zip: Orleans, MA 02653
Ownership: Town of Orleans	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	06/29/08	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	Observer/Agency: Orleans Parks & Beaches
Subcolony ID: N/A	Street: 18 Bay Ridge Lane, PO Box 122
Town: Orleans, MA	Town, State, & Zip: Orleans, MA 02653
Ownership: Town of Orleans	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

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.

[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	Exclosure Design (A, B…)	Exclosure 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.

Orleans HCP page a357

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.

Orleans HCP page a358

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

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.

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
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.

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.

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
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 not 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	Nest No.	Cause of chick mortality/Evidence
1A	One egg did not hatch.	1A	One chick disappeared on 6/4. One chick disappeared on 6/19, at 23 days of age.
2A	Crow tracks leading to scrape.	2A	Eggs lost.
2B	All eggs disappeared, but only two chicks were ever seen. Grackles seen inside exclosure, may have taken unhatched eggs.	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	Sanded over following storm.	3A	Eggs lost.
3B	One egg did not hatch.	3B	One chick disappeared on 7/6.
4A	All eggs hatched.	4A	One chick disappeared on 6/16.
5A	Abandoned following storm.	5A	Eggs lost.
5B	Unknown.	5B	Eggs lost.
5C	All eggs hatched.	5C	Three chicks disappeared on 7/15.
6A	One egg began to hatch and was incubated for three days after others had hatched, but it never fully hatched.	6A	All three chicks disappeared on 7/4.

Orleans HCP page a365

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 not 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.

[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.

Orleans HCP page a368

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.

Orleans HCP page a371

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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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.

Original page a373

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
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.

Send forms to: Scott Melvin, MassWildlife, Rte. 135, Westborough, MA 01581 scott.melvin@state.ma.us 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 - 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 not 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.

[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.*

Orleans Footpaths 87

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.

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: 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.

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

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.*

To: Thomas R. Chapman, Supervisor, New England Field Office, USFWS

From: Thomas W. French, Ph.D., Assistant Director, MA Division of Fisheries & Wildlife

Re: Off-site mitigation to benefit the Piping Plover, Nauset Beach Habitat Conservation Plan, Orleans, MA

Date: February 24, 2015

Upon issuance of a Federal Endangered Species Act incidental take permit (ITP) by the US Fish and Wildlife Service (USFWS), the Town of Orleans will be implementing a habitat conservation plan (HCP) that addresses incidental take of piping plovers resulting from late season (after July 15th) over-sand vehicle use at Nauset Beach South. Late season over-sand vehicle use may result in take of piping plover chicks and therefore requires both an ITP and a Conservation & Management Permit (CMP) from MA Division of Fisheries & Wildlife (DFW) pursuant to the Massachusetts Endangered Species Act (MGL c. 131A; 321 CMR 10.00; MESA).

As described in the HCP, in addition to implementing avoidance and minimization measures, the Town will offset the impact of the authorized amount of incidental take by:

1. Implementing an education and public information program to raise awareness about ongoing threats to the piping plover, and management strategies to address those threats.
2. Considering the use of non-lethal on-site predator control at Nauset Beach, after investigations to determine feasibility of methodology.
3. Providing $10,000 per year in funding for implementing off-site piping plover mitigation.

To advance piping plover population recovery objectives, and meet MESA permitting requirements, the off-site mitigation funds (i.e., $10,000 per year) will be used exclusively for selective predator control at Massachusetts beaches that are experiencing low piping plover productivity as a result of high predation rates. The 1996 Piping Plover Recovery Plan recommends taking an "integrated approach to predator management" and more recently, the USFWS 2009 piping plover 5-year review recommended selective predator removal. That review documented beaches where productivity significantly increased during the time selective predator management was implemented, in some cases up to 50%. Selective predator management typically involves using traps, firearms, and/or toxicants to reduce predation pressure from species such as crows, fox, and coyotes that are known to cause reduced plover nesting productivity in Massachusetts. Similar predator management activities will be conducted under this plan, though other tools may be implemented in the future if they prove as or more effective.

The CMP issued by DFW will require the Town, an Escrow Agent identified by the Town, and DFW to execute an Escrow Agreement. The Town will be required to deposit $10,000 into the escrow account prior to July 15 (the date when late season over-sand vehicle use may begin per the HCP), in each of the three years of permit implementation (unless the Town is able to effectively implement on-site predator control at Nauset Beach, as outlined in the HCP). The Escrow Agreement will require the Escrow Agent to pay invoices and disburse funds to one or more contractors carrying out predator control, upon written request by DFW.

Selective predator management will be implemented at locations that will provide increased productivity at levels necessary to offset the take of plover chicks as required under the ITP, and along with other mitigation commitments specified in the CMP, to meet the MESA "net-benefit" mitigation requirement. The level of anticipated take in the HCP is no more than 6 fledged piping plover chicks over the 3-year permit period and therefore the off-site mitigation will need to increase nest productivity such that an additional six plover chicks are fledged.

Based on a review of available information, the USFWS recently determined that a similar selective predator management program associated with Piping Plover restoration for the Bouchard Barge 120 Oil Spill could be expected to increase Piping Plover productivity by at least 20% (USFWS et al. 2012). Based on an informal review of recent selective predator management efforts in Massachusetts (DFW unpublished data), DFW believes that productivity could increase by up to 57% (especially at sites that have particularly low productivity prior to predator control).

Information provided to DFW by the Buzzards Bay Oil Spill Trustees estimates the cost of selective predator management at approximately $1,440 per plover breeding pair, based on data from three sites during 2007-2009. However, these budgets include significant costs associated with increased plover monitoring, education, and outreach. Therefore, the actual cost of predator management was significantly lower. A review of work plans and budgets from multiple sites in Massachusetts and Rhode Island where selective predator management is being implemented as part of the Bouchard restoration suggest that costs of selective predator management, while highly variable, are generally within the $500-1,500 /pair range (see 2013 and 2014-2015 attachments to USDA/USFWS Interagency Agreements).

It is anticipated that the off-site mitigation for this Town of Orleans HCP will entail selective predator management to benefit 8 breeding pairs per year. Assuming a 20% increase in productivity, based on the statewide average productivity, this will produce an increase of 0.25 fledglings/pair – for 2 additional fledglings per year or 6 over the permit term. Based on the costs associated with the previously discussed projects, the mitigation costs for the HCP could range from $4,000 to $12,000 per year. However, we believe that both ends of that spectrum are unrealistic and that the actual costs will be somewhat lower than the higher end. Therefore, we anticipate that the $10,000 per year that the Town of Orleans will commit will be sufficient to produce the required amount of mitigation.

Off-site mitigation sites will be selected based on having: (1) a sufficient number of piping plover pairs utilizing the site for nesting (generally 8 or more pairs total); (2) low plover productivity rates (generally less than 1.0 fledglings per pair); (3) known presence of typical plover nest predator species (e.g., crows, fox, coyotes, etc.); and (4) baseline information on pre-predator control productivity levels. DFW and the USFWS will annually consult and select off-site mitigation locations.

Under this agreement, DFW will: (1) identify landowners willing to carry out targeted predator control; (2) procure the services of predator control contractors to carry out the predator control; (3) ensure collection and compilation of nest productivity data pre- and post-project; and (4) report on implementation and expenditures to the USFWS. 100% of the escrow funds will be used to fund the off-

site mitigation (e.g. there will be no administrative overhead). Once one or more appropriate mitigation sites are selected by DFW and USFWS each year, the DFW and the contractor will develop a targeted predator management work plan. The USFWS will have 10 business days to review and approve the work plan, prior to implementation of predator control, to ensure it meets the intent of the HCP's off-site mitigation requirement. The DFW will provide an annual report of the implementation of the selective predator management to the Town of Orleans by December 15th, including (but not limited to): location; number and species of predators removed; number of piping plovers affected; pre-predator management productivity; and post-predator management productivity. We note that the sample size for this effort is small and that comparison of pre- and post- productivity levels will not be the sole basis for evaluating the efficacy of the selective predator management program. Rather the data will be combined with a qualitative assessment on whether the mitigation objectives have been met.

ESCROW AGREEMENT
DRAFT TEMPLATE

This ESCROW AGREEMENT (this "Agreement") is entered into as of this ____ day of _____, _____ by and between the Massachusetts Division of Fisheries and Wildlife, by and through the Natural Heritage and Endangered Species Program, having a principal place of business at 1 Rabbit Hill Road, Westborough, MA, 01581 ("NHESP"); the Town of Orleans, MA ("Town") (proponent) having a principal place of business at _____; and _____, having a principal place of business at _____ ("Escrow Agent"). NHESP, _____ and Escrow Agent are referred to herein collectively as the "Parties".

1. Recitals

a. The Conservation and Management Permit No. 014-244. DFW ("Permit") issued by NHESP to the Town contains financial assurance provisions in paragraph #10 of the Conditions section requiring that the Town ensure that funds are available in the sum of up to three annual payments of $10,000, the final amount of funding to be determined as set forth in the Permit, (the "Funds") for the restoration, management, and or monitoring of Piping Plovers, their predators, or their habitats in Massachusetts and/or conservation research, for the benefit of Piping Plover populations in Massachusetts.

b. The Parties agree the Funds shall be paid by the Town to the Escrow Agent and held in an interest bearing escrow account ("Escrow Account") (further defined in 2 below) and expended pursuant to the terms and conditions described below to mitigate for the take of Piping Plovers in connection with off-road vehicle use and escorting in the vicinity of unfledged Piping Plover chicks (the "Activity"), at Nauset Beach in Orleans, Massachusetts.

The Parties enter into this Agreement for the purpose of defining the terms and conditions under which the Funds shall be held and disbursed.

NOW THEREFORE, after consideration of the above recitals, the Town, NHESP and the Escrow Agent hereby covenant and agree as follows:

2. Escrow Account

a. The Town shall deliver the Funds to the Escrow Agent in the schedule and manner set forth in paragraphs 10 and 11 of the Permit and as further described in the Habitat Conservation Plan referenced therein.

b. All funds delivered by the Town of Orleans to the Escrow Agent shall be deposited by the Escrow Agent in an interest bearing account or held in obligations by the US Government at one or more banks ("Depository Bank"), said accounts to be at all times insured by the Federal Deposit Insurance Corporation and which shall pay interest on the Funds at a reasonable rate. The Depository Bank shall be entitled to charge the Escrow Account for services related to the maintenance of the Escrow Account at a rate not exceeding the Bank's standard charges to other customers for similar services.

c. The Escrow Account shall be opened by the Escrow Agent and funds may be withdrawn only by the Escrow Agent and no other person. Disbursements shall be made

from the Escrow Account only in accordance with the terms of this Agreement.

d. The Escrow Agent shall maintain a record of all deposits, income, disbursements, and other transactions of the Escrow Account. Upon request, the Escrow Agent shall provide to any of the Parties a written accounting of all transactions. The Parties shall have the right to inspect all books and records of the Escrow Agent relating to the Escrow Account at reasonable times upon request. Escrow Agent's computation of the Funds shall be deemed to be correct in the absence of manifest error.

e. The Escrow Agent shall keep possession of the book(s) and bank statements of the Escrow Account until such time as it is terminated in accordance with the terms of this Agreement, or until a successor Escrow Agent is appointed as provided herein.

3. Disbursements

From time to time, NHESP may, on or before the date which is eight (8) years from the date of this Agreement, request in writing the Escrow Agent to deliver all or portions of the Funds, plus any interest thereon, for the pruposes described in paragraph 1 of this Agreement. Upon receipt of such written request, the Escrow Agent shall deliver the requested portion of the Funds to NHESP or any party designated in writing by NHESP. Delivery of the Funds in accordance with the terms of this Agreement shall be made by cashier's check, or by federal funds wire transfer, at the option of the payee.

a. The Escrow Agent may make disbursements to the Depository Bank for services rendered in maintaining said account.

b. If, at the end of eight (8) years from the date of this Agreement, any portion of the Funds is still held in escrow under this Agreement, then NHESP shall, within six (6) months after such date, develop a plan for the use of any remaining Funds by NHESP or any party designated in writing by NHESP for further management for the benefit of the Piping Plover in Massachusetts.

c. The Escrow Agent shall release any remaining Funds to NHESP or any party designated in writing by NHESP in accordance with such plan.

4. Termination of Agreement

This Escrow Agreement shall terminate, and the Escrow Agent shall be relieved of all liability, after all funds in the Escrow Account have been properly disbursed in accordance with the terms and conditions of this Agreement. When the Escrow Account is terminated, the Escrow Agent shall provide a final accounting of all transactions hereunder to the Parties.

5. Duties and Liabilities of Escrow Agent

a. The sole duty of the Escrow Agent under this Agreement is to receive funds from the Town and to hold the funds for disbursement according to Section 3 above. The Escrow Agent shall be under no duty to pass upon the adequacy of any documents, to determine whether any of the Parties are complying with the terms and provisions of this Escrow Agreement, or to determine the identity or authority of any person purporting to be a

signatory authorized by the Town or NHESP.

b. The Escrow Agent may conclusively rely upon, and shall be protected in acting on, a statement, certificate, notice, requisition, order, approval, or other document believed by the Escrow Agent to be genuine and to have been given, signed and presented by a duly authorized agent of the Town or NHESP. The Escrow Agent shall have no duty or liability to verify any statement, certificate, notice, request, requisition, consent, order, approval or other document, and its sole responsibility shall be to act only as expressly set forth in this Agreement. The Escrow Agent shall not incur liability for following the instructions contemplated by this Agreement or expressly provided for in this Agreement or other written instructions given to the Escrow Agent by the Parties. The Escrow Agent shall be under no obligation to institute or defend any action, suit or proceeding in connection with this Escrow Agreement, unless first indemnified to its satisfaction. The Escrow Agent may consult with counsel of its choice including shareholders, directors, and employees of the Escrow Agent, with respect to any question arising under or in connection with this Agreement, and shall not be liable for any action taken, suffered or omitted in good faith. The Escrow Agent shall be liable solely for its own willful misconduct.

c. The Escrow Agent may refrain from taking any action, other than keeping all property held by it in escrow if the Escrow Agent: (i) is uncertain about its duties or rights under this Escrow Agreement; (ii) receives instructions that, in its opinion, are in conflict with any of the terms and provisions of this Agreement, until it has resolved the conflict to its satisfaction, received a final judgment by a court of competent jurisdiction (if it deems such action necessary or advisable), or it has received instructions executed by both the Town and NHESP.

d. Escrow Agent is acting, and may continue to act, as counsel to the Town in connection with the subject transaction, whether or not the Funds are being held by Escrow Agent or have been delivered to a substitute impartial party or a court of competent jurisdiction

e. Each of the Parties admits, acknowledges and represents to each of the other Parties that it has had the opportunity to consult with and be represented by independent counsel of such party's choice in connection with the negotiation and execution of this Agreement. Each of the Parties further admits, acknowledges and represents to the other Parties that it has not relied on any representation or statement made by the other Parties or by any of their attorneys or representatives with regard to the subject matter, basis or effect of this Agreement.

6. Escrow Agent's Fee

a. The Escrow Agent shall be entitled to compensation from _____for its basic services under this Escrow Agreement. The Escrow Agent may bill the _____ directly for such services in accordance with the fee schedule attached to this Escrow Agreement as Exhibit B. Payments for services provided by Escrow Agent shall not be made from Escrow Funds.

7. Investment Risk

a. In no event shall the Escrow Agent have any liability as a result of any loss occasioned by the financial difficulty or failure of any institution, including Depository Bank, or which holds United States Treasury Bills, or other securities, or for failure of any banking institution, including Depository Bank, to follow the instructions of the Escrow Agent. Without limiting the generality of the foregoing, in no event shall the Escrow Agent incur any liability as the result of any claim or allegation that the Escrow Agent should have invested the escrow funds in United States Treasury Bills rather than hold same on deposit at the Depository Bank, or vice versa.

8. Notices

a. All notices permitted or required by this Agreement shall be in writing and shall be deemed duly provided when deposited in the United States mail, postage prepaid, certified or registered mail, return receipt requested, to the other Parties at the addresses set forth in the first paragraph of this Agreement. The Party providing notice may choose alternate methods, including hand delivery, Federal Express, or other recognized overnight courier. Notices provided by hand delivery; Federal Express or other recognized overnight courier shall be deemed duly provided when received at the addresses set forth in the first paragraph of this Agreement.

b. All notices, certification, authorizations, requests or other communications required, or permitted to be made under this Escrow Agreement shall be delivered as follows:

To the NHESP:

Assistant Director
Natural Heritage and Endangered Species Program
ATTN: Regulatory Review, CMP ___(insert Permit Number Here)
Division of Fisheries and Wildlife
1 Rabbit Hill Road, North Drive
Westborough, MA 01581

To the Town of Orleans

Town Manager
Town Hall
19 School Road
Orleans, MA 02653

To the Escrow Agent:

Attorney Michael D. Ford
72 Massachusetts 28
West Harwich, MA 02671

or to such other place or to the attention of such other individual as a Party from time to time may designate by written notice to all other Parties.

9. Resignation, Removal, or Successor Escrow Agent

a. If, for any reason, the Escrow Agent is unable or unwilling to continue to act as Escrow Agent, he/she shall give written notice to the other Parties of his/her inability or unwillingness to continue as Escrow Agent. The parties shall agree upon a successor agent, formally appoint the successor agent, and provide written notification to the Escrow Agent of the subsequent appointment within ten (10) business days. The Escrow Agent shall then, within three (3) business days after receiving notice of subsequent appointment, deliver to the successor escrow agent all cash and other property held by the Escrow Agent under this Escrow Agreement. Upon such delivery, all obligations of the Escrow Agent under this Escrow Agreement shall automatically cease and terminate. If no successor escrow agent is designated within the prescribed ten (10) day period, or if notice of subsequent appointment is not received within such period, then the Escrow Agent may, at its option at any time thereafter, deposit the funds and any documents then being held by it in escrow into any court having appropriate jurisdiction, and upon making such deposit, shall thereupon be relieved of and discharged and released from any and all liability hereunder, including without limitation any liability arising from the Funds, or any portion thereof so deposited.

b. The Escrow Agent may be removed at any time by a written instrument or concurrent instruments signed by the NHESP and the Town and delivered to the Escrow Agent.

c. If at any time hereafter, the Escrow Agent shall resign, be removed, be dissolved, or otherwise become incapable of acting, or the position of the Escrow Agent shall become vacant for any of the foregoing reasons or for any other reason, the Parties hereto shall promptly appoint a successor Escrow Agent. Upon appointment, such successor Escrow Agent shall execute and deliver to his/her predecessor and to the Parties hereto an instrument in writing accepting such appointment hereunder. Thereupon, without further act, such successor Escrow Agent shall be fully vested with all the rights, immunities, and powers, and shall be subject to all the duties and obligations of his/her predecessor, and the predecessor Escrow Agent shall promptly deliver all books, records, and, other property and monies held by him/her hereunder to such successor Escrow Agent.

10. Interest

a. All interest income accrued on funds in the Escrow Account shall become part of the Escrow Account and shall remain in the Escrow Account. The Escrow Agent may disburse funds to the Town to pay federal and state taxes on accrued interest. Said disbursement may be made by the Escrow Agent only after receiving a written confirmation from the Town, with a copy sent to the NHESP, of all itemized federal and state tax liabilities incurred by interest accrued on the Escrow Account.

11. Miscellaneous

a. This Escrow Agreement shall be binding upon, and shall inure to the benefit of the respective Parties hereto and their successors and assigns.

b. This Agreement shall be governed by and be construed in accordance with the laws of the Commonwealth of Massachusetts.

c. This Agreement shall be interpreted as an instrument under seal.

d. This Agreement may be executed in any number of counterparts, each of which shall constitute an original, and all counterparts shall constitute one Agreement.

e. This Escrow Agreement may not be amended, altered, or modified except by written instrument duly executed by all of the Parties hereto.

f. If the term, condition or provision of this Agreement, or the application thereof to any circumstances or party hereto, ever shall be held to be invalid or unenforceable, then in each such event the remainder of this Agreement or the application of such term, condition, or provision to any other circumstance or party hereto (other than those as to which it shall be invalid or unenforceable) shall not be thereby affected, and each term, condition and provision hereof shall remain valid and enforceable to the fullest extent permitted by law.

g. Each individual and entity executing this Agreement hereby represents and warrants that he, she or it has the capacity set forth on the signature pages hereof with full power and authority to bind the party on whose behalf he, she or it is executing this Agreement to the terms hereof.

12. Effective Date

a. This Agreement shall take effect on the latest date of execution by the NHESP, the Town, or Escrow Agent.

[SIGNATURE PAGES FOLLOW]

IN WITNESS WHEREOF, the parties have caused this Escrow Agreement to be duly executed as of the day and year first written above.

FOR THE MASSACHUSETTS DIVISION
OF FISHERIES AND WILDLIFE:

_____

Name:
Title:

COMMONWEALTH OF MASSACHUSETTS

_____, ss _____ __, 2009

On this __ day of ___, 2009, before me, the undersigned notary public, personally appeared _____, and proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

_____

Notary Public
My commission expires:

FOR Orleans (proponenet):

Company Name

By: John F. Kelly

By: John F Kelly
Name: John F Kelly
Its: Town Administrator

STATE OF Massachusetts

Barnstable, ss April 13, ~~2009~~ 2015

On this 13th day of April, ~~2009~~ 2015, before me, the undersigned notary public, personally appeared John F. Kelly, and proved to me through satisfactory evidence of identification, which were MA License, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

Kelly L. Darling
Notary Public, Commonwealth of Massachusetts
My Commission Expires Feb. 20, 2020

Kelly L Darling
Notary Public
My commission expires: Feb 20, 2020

FOR THE ESCROW AGENT:

Company Name

By: _____
Name:
Title:

COMMONWEALTH OF MASSACHUSETTS

_____ ss. _____ __, 2009

On this __ day of ___, 2009, before me, the undersigned notary public, personally appeared _____, and proved to me through satisfactory evidence of identification, which were _____, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

_____
Notary Public
My commission expires: