# MASSACHUSETTS PIPING PLOVER HABITAT CONSERVATION PLAN
# CERTIFICATE OF INCLUSION REQUEST 2023
# SANDY NECK BEACH PARK
# BARNSTABLE MASSACHUSETTS

**Prepared for submission to:**

**Natural Heritage & Endangered Species Program**
**Massachusetts Division of Fish & Wildlife**
**1 Rabbit Hill Road**
**Westborough, MA 01581**

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**April 2016**
**Amended: January 2017**
**Renewal with amendments December 2019**
**Renewal December 2022**

# TABLE OF CONTENTS

## INTRODUCTION AND OVERVIEW

This request for a Certificate of Inclusion (COI) is prepared as part of an application from the Town of Barnstable in order to participate in the statewide Plover Habitat Conservation Plan (HCP). This document also serves as an application for a Conservation and Management Permit (CMP) pursuant to the Massachusetts Endangered Species Act (MESA; MGL c. 131A; 320 CMR 10.00). The Town is requesting the opportunity to implement "Recreation and Beach Operations Associated with Reduced Proactive Symbolic Fencing," a covered activity described in the HCP. No more than three nesting territories would be exposed to this activity (7.5% of the breeding pairs on site, based on 39.7 average breeding pairs since 2012). The activity and associated impact minimization procedures would be confined to a portion of the suitable habitat along 4,529 linear feet of beach call the "Recreation Zone" (RZ). This area supported a Piping Plover (Plover) nest in 2013, which caused a complete closure of the Off Road Vehicle (ORV) Beach. The intent is to reduce symbolic fencing in this area to allow recreational activities that would not otherwise occur, and to use coverboards, beach raking, flagging tape or the like to reduce the risk of interaction between beachgoers and Plovers attempting to breed in this section of beach. Within the RZ, the Town also proposes the ability to escort recreational vehicles past unfledged plover chicks, should early season efforts fail to deter pairs from nesting within this section of beach. In addition, the Town would like the opportunity to escort recreational vehicles past unfledged Least Tern (Tern) chicks in the ORV corridor. The Town is proposing that mitigation be in the form of funding to implement selective off-site predator management, educational outreach and increased law enforcement, overseen by the Natural Heritage & Endangered Species Program (NHESP), as set forth in the HCP.

## GEOGRAPHIC SCOPE

The geographic area encompassed by this request includes suitable Plover habitat from the east edge of the parking lot to approximately 0.5 miles east of Trail 1 (Figure 1). We are also requesting that two small blow-outs (known as "Shoo" and "Scram") be included (Figure 1, Photographs 1 & 2). This area of suitable habitat equals 3.38 acres (this calculation does not include the tern escorting area of 0.62 acres). We obtained this figure by using the Arc View measuring tool on a 2015 aerial map of the beach. Measurements were taken from the toe of the dune to the extreme high tide line. We would like to re-evaluate the geographical scope each year as winter storms may change the beach and dune profile which could shift the desirable Plover nesting habitat.

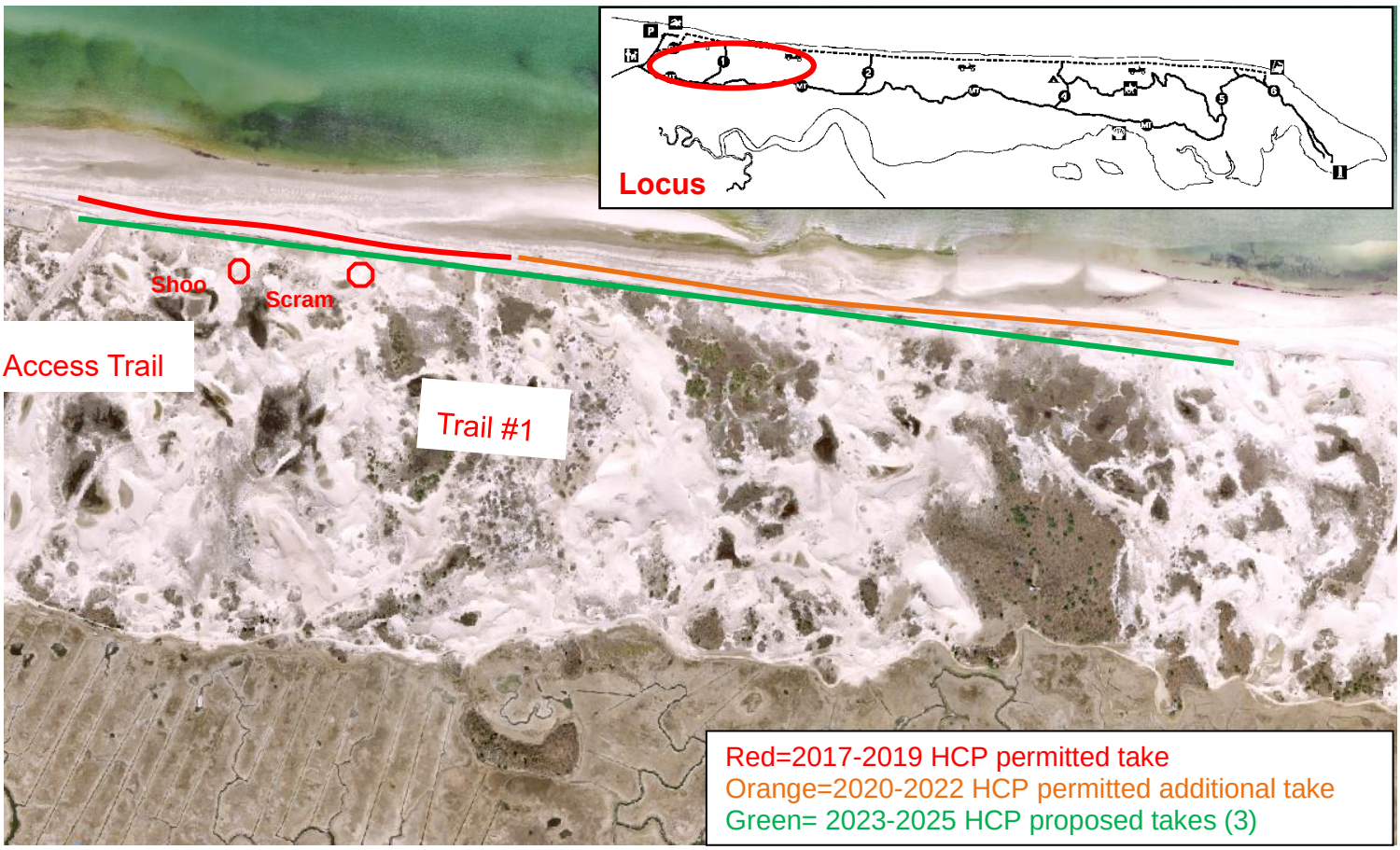



**Figure 1:** Proposed "Recreation Zone" at Sandy Neck Beach Park.
**~0.31mi (2017-2019)** **~0.86mi (2020-2022)** **~0.86mi (2023-2025)**

| **1 take (2 acres)** | | |
|---|---|---|
| Tern Escort | 0.62 acres | 27,000 ft^2 (600ft x 45ft) |
| Front Beach | 1.12 acres | 48,750 ft^2 (1,625ft x 30ft; **0.31mi**) |
| Shoo/Scram | 0.26 acres | 11,450 ft^2 |
| **Total** | **2 acres** | **87,300 ft^2** |

| **2 takes (4 acres)** | | |
|---|---|---|
| Tern Escort | 0.62 acres | 27,000 ft^2 (600ft x 45ft) |
| Front Beach | 3.12 acres | 135,870 ft^2 (4,529ft x 30ft; **0.86mi**) |
| Shoo/Scram | 0.26 acres | 11,450 ft^2 |
| **Total** | **4 acres** | **174,600 ft^2** |

| **3 takes (4 acres)** | | |
|---|---|---|
| Tern Escort | 0.62 acres | 27,000 ft^2 (600ft x 45ft) |
| Front Beach | 3.12 acres | 135,870 ft^2 (4,529ft x 30ft; **0.86mi**) |
| Shoo/Scram | 0.26 acres | 11,450ft^2 |
| **Total** | **4 acres** | **174,600 ft^2** |

**Figure 2:** Breakdown of distances for areas involving Sandy Neck HCP implementation.

**Photograph 1:** Blow out area known as “The Shoo.”

**Photograph 2:** Blow out area known as “Scram.”

## I. SITE DESCRIPTION

Sandy Neck Beach Park is a 1,390 acre barrier beach that is located on Cape Cod Bay. It is owned and operated by the Town of Barnstable (Figures 3 & 4). Most of the park has been preserved as conservation lands. The property is approximately 6.5 miles long by 0.5 miles wide and is located as a protective landform for The Great Marsh and Barnstable Harbor.

Sandy Neck Beach Park allows ORV access with a permit and this activity occurs on the front beach corridor, which is 4.5 miles long. However, the ORV corridor is reduced in length for much of the summer season due to nesting Plovers and Terns that require protection under state and federal law. Along the south side of the property is the Marsh Trail that runs east to west. There are six (6) trails that run north-south between the front beach and the Marsh Trail (Access Trail, Trail 1, Trail 2, Trail 4, Trail 5 and Trail 6). Trail 3 was abandoned. These trails are used by hikers and are also utilized for vehicular access to Sandy Neck cottages. There are 50 privately owned cottages. Some are on private lands and those that are located on town owned land require a yearly property lease. These cottages are situated along the Marsh Trail and within the Cottage Colony, which is also where the Sandy Neck Lighthouse is located.

On the front beach, east of Trail 6 is an area known as Little Neck, which is the most prolific section of the beach for shorebird nesting due to many acres of high quality habitat. East of Little Neck is Beach Point, which is a destination for boaters in the summer season, particularly during low tide. This section of beach is closed to vehicular access, year-round.

Access to the beach (unless traveling via boat) occurs in one location at the western end of the property. Vehicles travel down Sandy Neck Road and patrons are greeted by Sandy Neck Gatehouse personnel. Some patrons park at the Gatehouse and enjoy the hiking trails. Others travel to the 200+ spaces parking lot (north of the Gatehouse) and use the public bathing beach known as Bodfish Park. Within this section of the property is the bathhouse which includes a concession stand and lifeguard room where first aid is provided. ORV and camper traffic is checked in at the Gatehouse, and then they travel to the Access Trail and ultimately the front beach.

The summer season at Sandy Neck is bustling with the majority of patrons using Bodfish Park and the ORV beach. During the shoulder seasons; horseback riders, dog walkers, fisherman, hunters, birdwatchers, fat tire bike riders and hikers are more prevalent. Winter months often include nor'easters that hit the northern exposed shoreline head-on and change the landscape due to high rates of erosion and accretion.

*Most of the following information found on pages 9 -10 has been taken from the Sandy Neck Management Plan (2003). For a complete copy visit:*
**http://www.townofbarnstable.us/SandyNeckPark/fileuploads/managementplan.pdf**

Sandy Neck is a valuable and beautiful barrier beach that has been recognized as a significant natural resource at the private, municipal, state, regional, and federal levels. It is included in the state's designation as an Area of Critical Environmental Concern (ACEC), and has been identified by the Nature Conservancy as one of the best barrier beach systems remaining in the North Atlantic Coast Ecoregion. For this reason, the Nature Conservancy, the Town of Barnstable, and other leading organizations invest resources into conservation and research efforts at Sandy Neck. For all of the attributes of Sandy Neck, there are a variety of stakeholders and interests that, at times, conflict but share the undisputed importance of Sandy Neck as a valuable environmental resource. Sandy Neck includes one of the largest stretches of publicly accessible coastline in the Commonwealth, and has a pristine character. With its diverse and unique wildlife habitat; including migrating dunes, coastal beaches, tidal flats, wetlands, and maritime forests, Sandy Neck offers a coastal wilderness experience for the public only 15 minutes from the center of Hyannis or Sandwich.

Sandy Neck is a barrier beach system located on the north shore of Cape Cod, MA that extends approximately 6 miles east from its sole mainland connection. The barrier shelters on its leeward side extensive estuarine salt marsh and Barnstable Harbor. This narrow neck of sand varies in width from approximately 200 feet to a maximum of 0.5 miles. Shaped by glacial activity and longshore drift, Sandy Neck is geologically quite young, although relatively stable for this type of landform. The front beach is relatively stable with erosion rates on the order of one-quarter to one-half foot per year. The eastern tip of Sandy Neck at Beach Point has a substantial historical accretion rate of more than 1.5 feet per year. Pioneering work by Alfred Redfield in 1972 characterized the system, and dates the oldest sections of Sandy Neck at about 3500 years. Despite its historical evolution, the recent relative stability of the barrier spit has facilitated the establishment of a variety of soil types and natural communities; including migrating sand dunes, fresh and saltwater marshes, bogs and both deciduous and coniferous forests.

The topography of the surrounding embayment at Sandy Neck results in large fluctuations in local sea level due to tidal action. The mean tidal range at Sandy Neck exceeds 9 vertical feet and can reach 13 feet during full and new moon periods, with storm tides exceeding peak lunar values. During high tide periods, Sandy Neck is often inundated with water along its coastal and salt marsh boundaries, making human access along these ecotones nearly impossible. During winter storms and hurricanes, the storm surge often penetrates the primary dunes. These storms leave standing pools of salt water deep in the interdune area. Although rare, these storms provide crucial nutrients to the plant communities within the dunes and help shape the topographic features of the beach. They do, however, present challenges to the management of permanent transportation corridors along the barrier beach. Current vehicle travel corridors are situated in the most dynamic areas of the beach that are at highest risk to tidal and storm action.

Freshwater wetlands at Sandy Neck are made possible by the presence of a freshwater supply that sits atop and slightly displaces the salty ground water. This lens of freshwater is nourished solely by rainwater. The freshwater table varies considerably throughout the annual cycle with the peak being in early spring. During spring, temporary ponds and flooded natural bogs dominate the landscape at Sandy Neck. These ephemeral freshwater ponds, called interdunal swales, are crucial resources for many organisms that complete their life cycles on Sandy Neck. Many species of amphibians, insects, and plants exploit these seasonal resources.

Nearly all of Sandy Neck is considered a resource area with respect to the Massachusetts Wetlands Protection Act. These wetland resources include barrier beach, coastal beach, coastal dunes, salt marsh, land under the ocean, land containing shellfish, bordering vegetated wetlands, coastal banks, and estimated habitats of rare wildlife for coastal and inland wetlands. Additionally, all of Sandy Neck has been designated by the Secretary of Environmental Affairs as an Area of Critical Environmental Concern (ACEC) by the Massachusetts Office of Coastal Zone Management. The importance of Sandy Neck as an environmental resource is undisputed. As such, all proposals for management changes at Sandy Neck receive a higher level of scrutiny and review by various authorities.

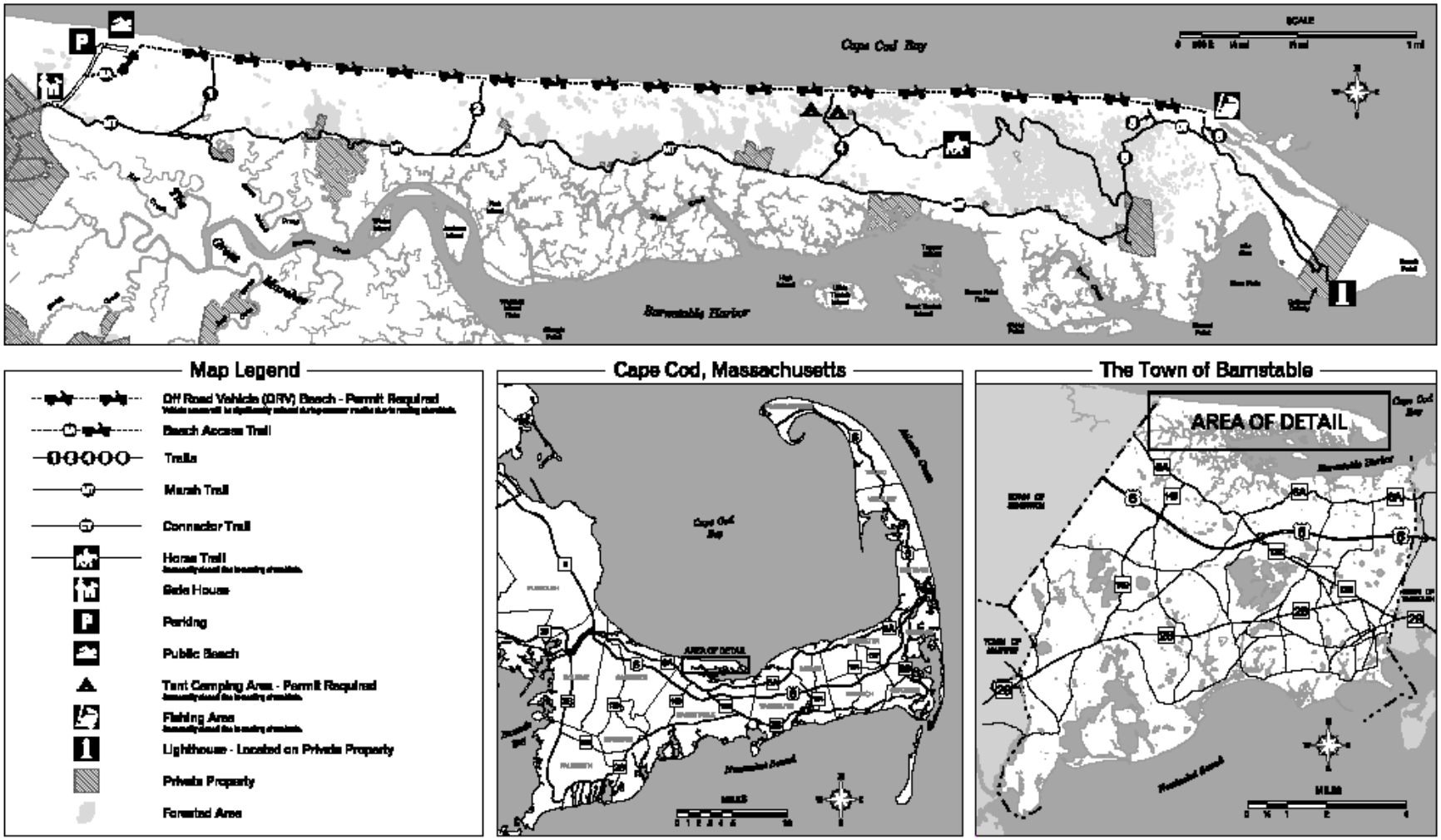



**Figure 3:** Sandy Neck Beach Park Map for Patrons


**Figure 4:** Sandy Neck Beach Park Landforms

## II. Ownership and Management Entity(ies)

Sandy Neck Beach Park is owned and managed by the Town of Barnstable, Marine and Environmental Affairs Department under the Sandy Neck Program. Sandy Neck staff work closely with the Barnstable Police Department and West Barnstable, Barnstable and Sandwich Fire Departments for emergency response and safety concerns. Cape Cod Mosquito Control accesses the site year round and Conservation is escorted by Sandy Neck staff for site visits.

## III. Responsible Staff

The Sandy Neck Program employs a full-time Park Manager, Nina Coleman; a full-time Assistant Park Manager, Hannah Lawrence and two full-time Natural Resource Officers, Josh Kelleher and Antonio Mancha.

Nina Coleman has a Bachelor degree in Environmental Science and a Master's degree in Natural Resources Conservation both from UMass Amherst. She has 25+ years of experience in barrier beach management, endangered species protection, plant identification and ecological restoration. As a Conservation Agent for the town of Bourne, Nina worked extensively under the Wetland's Protection Act. Now in her 20$^{th}$ year as Sandy Neck Park Manager, Nina has advanced experience with rare and endangered nesting shorebirds and terrapins.

Hannah Lawrence has a Bachelor of Science degree in Natural Resource Conservation from UMass Amherst with 5 years of experience in shorebird monitoring and enforcement relating to Endangered Species protection. She has been managing the HCP for the last 2 years, including overseeing seasonal and full time staff monitoring, communication with the Coastal Waterbird program, and increasing public outreach.

Josh Kelleher has a Bachelor of Science degree in Biology with 4 years of experience in Shorebird monitoring and enforcement relating to Endangered Species protection.

Antonio Mancha has an Associate's Degree in Criminal Justice and has 6 years of enforcement experience relating to Endangered Species protection.

Resumes can be made available upon request.

All Sandy Neck staff members work 40 hours/week with two weekdays off in order to maintain full coverage of the park, particularly on spring/summer and fall weekends when visitation numbers are up. Full-time staff spends hours in the field and they hire, train and oversee daily operation of the seasonal staff. Coleman, Lawrence, and Kelleher are scientists with extensive experience in endangered species monitoring and management. In addition, all seasonal field staff receives training from the Barnstable Police Department and the West Barnstable Fire Department, plus seasonal shorebird staff participates in the MA Audubon shorebird training that is held each year.

## IV. Sandy Neck Piping Plovers

The number of Sandy Neck Plover breeding pairs has been slowly increasing with an average of 29 pairs from 1996-2005 to an average of 35.3 pairs from 2006-2022 (Table 1). However, the data demonstrates large variability between years, so this small upward trend in number of nesting pairs needs further analysis to determine significance (Chart 1). Further, the number of chicks fledged has varied dramatically over this same time-period (Chart 2).

Threats to Plover and Tern breeding success are numerous and vary from year to year making management challenging. For instance, in 2012 and 2013 we experienced summer storms that caused nearly 100% loss of nests due to over-wash. Other years, fox, coyote, crow and seagulls are problem species that caused low productivity rates.

Sandy Neck has acres of potential Plover and Tern nesting habitat along the toe of the dune, the entire Little Neck area, as well as blow-outs in the secondary dunes. Presently the highest quality habitat is located from the Sandwich Town-line to Trail 1, in the Trail 2 area to Trail 4, and from approximately Trail 5 to Beach Point (Figure 5). The rest of the beach has patches of decent habitat, which supports scattered nests. The less utilized habitat is generally due to erosion creating very soft shifting substrate void of pebbles or beach grass, which does not appear to attract nesting pairs. Within the interior of the beach, pebbly blowouts are sometimes habitat and nests have been located in odd areas. Of course, Plover and Tern nesting trends change overtime as storms alter the beach and dune profiles.

Increases in the Sandy Neck Beach Park's population of Plovers that have occurred during the past two decades are likely the result of our intensive monitoring and management program. Sandy Neck staff includes a full-time Park Manager, a full-time Assistant Park Manager, two full-time Natural Resource Officers, three seasonal Natural Resource Officers, two seasonal Shorebird Monitors and a seasonal Turtle Monitor.

Management of Sandy Neck Plovers conforms to state and federal guidelines for management of recreational activities as well as our active Orders of Conditions SE3-5965 and SE3-5966 (Attachment C & D). Beginning in early April, off-road vehicles are restricted (by symbolic fencing) to discrete travel corridors along the outer edges of suitable Plover/Tern nesting habitat. Once nest areas are established, the protection zone is increased by symbolic fencing and warning signs. In addition, some nests are protected by wire mesh predator exclosures in order to increase the percentage of eggs that survive to hatching. These nests are selected by analyzing the predator tracks in the area and the number of nesting attempts by the pair.

Once the nests hatch, sections of beach where unfledged Plover/Tern chicks are present are completely closed to recreational vehicles until chicks reach 35 days of age or are observed in flight. Only staff escorted caravans of essential vehicles pass within areas of unfledged Plover and Tern chicks.

| Year | Number of Plover Pairs | Index Pair Count | Number of Chicks Fledged |
|---|---|---|---|
| 1995 | 25 | 20 | 49 |
| 1996 | 29 | 28 | 74 |
| 1997 | 33 | 33 | 29 |
| 1998 | 30 | 30 | 34 |
| 1999 | 32 | 32 | 32 |
| 2000 | 29 | 29 | 28 |
| 2001 | 26 | 23 | 43 |
| 2002 | 26 | 25 | 57 |
| 2003 | 31 | 27 | 74 |
| 2004 | 34 | 29 | 41 |
| 2005 | 28 | 26 | 29 |
| 2006 | 23 | 23 | 20 |
| 2007 | 35 | 34 | 53 |
| 2008 | 35 | 32 | 43 |
| 2009 | 28 | 28 | 28 |
| 2010 | 38 | 37 | 60 |
| 2011 | 44 | 41 | 57 |
| 2012 | 40 | 40 | 3 |
| 2013 | 27 | 24 | 14 |
| 2014 | 32 | 30 | 42 |
| 2015 | 40 | 37 | 55 |
| 2016 | 34 | 31 | 24 |
| 2017 | 28 | 28 | 15 |
| 2018 | 27 | 27 | 42 |
| 2019 | 36 | 36 | 24 |
| 2020 | 45 | 41 | 48 |
| 2021 | 38 | 38 | 73 |
| 2022 | 50 | 49 | 97 |

**Table 1.** Summary of abundance and reproductive success of Piping Plovers on Sandy Neck, 1995-2022.

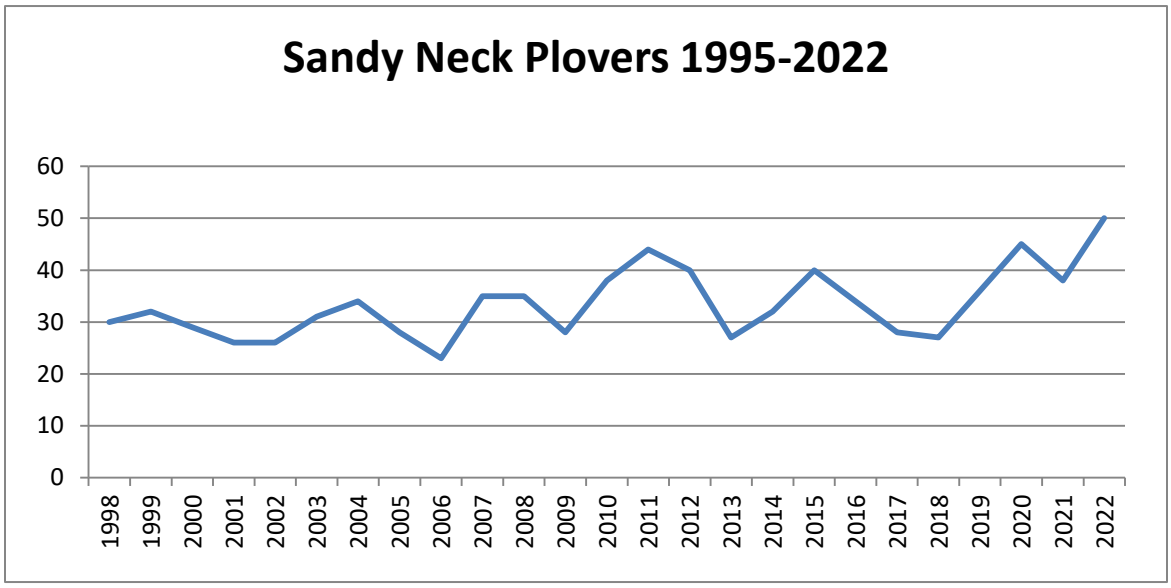



**Chart 1.** Number of Sandy Neck Piping Plover Pairs 1995-2022

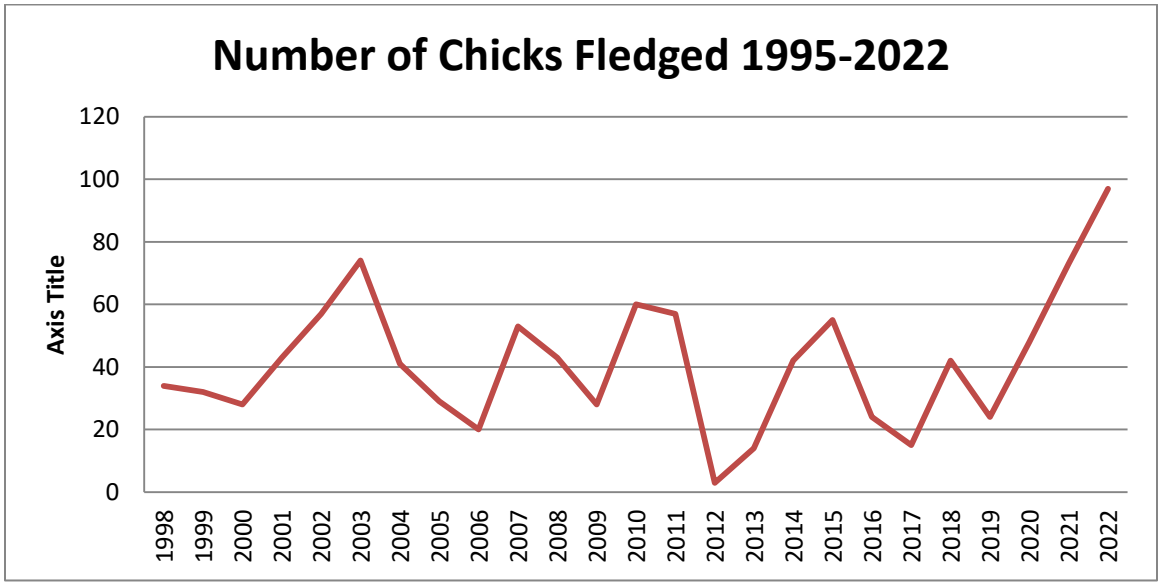



**Chart 2.** The Number of Sandy Neck Piping Plover Chicks Fledged 1995-2022


**Figure 5:** 2022 Plover and Tern Nesting Locations. Chosen beach location in 2022 represent recent nesting trends on Sandy Neck Beach Park.

## V. Least Terns and Other Rare Species

Sandy Neck supports a wide range of biological diversity that includes significant numbers of endangered species. Its large size, isolation and relatively pristine ecology provide some of the most important habitats for rare and endangered species anywhere in Massachusetts. The Massachusetts Division of Fisheries and Wildlife has recorded and certified the presence of at least eight endangered or threatened species on Sandy Neck (Table 2). They include two species of plants, one invertebrate species, one amphibian species, one reptile species, and three species of shore birds. Other species observed and documented at Sandy Neck (but not resident) include transient Roseate terns (*Sterna dougallii*), Yellow-crowned night herons (*Nycticorax violaceus*), and a variety of sea turtles and marine mammals.

| **Common name** | **Scientific name** | **Listing status**[a] |
|---|---|---|
| Coastal Heathland Cutworm | *Abagrotis crumbi benjamani* | SC |
| Diamondback Terrapin | *Malaclemys terrapin* | T |
| Plymouth Gentian | *Sebatia kennedyana* | SC |
| Eastern Spadefoot | *Scaphiopus holbrookii* | T |
| Bristly Foxtail | *Setaria geniculata* | SC |
| Least Tern | *Sterna antillarum* | SC |
| Common Tern | *Sterna hirundo* | SC |

[a] FE = federal endangered, FT = federal threatened, E = state endangered, T = state threatened, SC = state Species of Special Concern

**Table 2:** Summary of federal and state-listed species of plants and animals that occur within the Barnstable portion Sandy Neck Beach not including the Great Marsh.

The Sandy Neck Program is known for its excellent stewardship of the land and endangered species. The following is a synopsis of our projects and programs.

*Sandy Neck Beach Park Least Terns*

Over the last five years, the number of Least Tern pairs nesting at Sandy Neck Beach Park has fluctuated with an average of 80 pairs (2018 – 2022). Year after year, Tern fledgling productivity is consistently poor to fair with an occasional colony yielding good productivity (Table 3).

Similar to the Sandy Neck Plovers, threats to Tern breeding success are numerous and vary from year to year making management challenging. In the past, late summer storms have caused nearly 100% loss of nests due to over-wash. Other years, fox, coyote, crow and seagulls are problem species that caused low productivity rates.

Sandy Neck has acres of potential Tern nesting habitat along the toe of the dune, the entire Little Neck area, as well as blow-outs in the secondary dunes. Presently the highest quality habitat is located from the Sandwich Town-line to Trail 1, in the Trail 2 area to Trail 4, and from approximately Trail 5 to Beach Point (Figure 5). The rest of the beach has patches of marginal habitat, which supports scattered nests. The less utilized habitat is generally due to erosion creating very soft shifting substrate void of pebbles or beach grass, which does not appear to attract nesting pairs. Within the interior of the beach, pebbly blowouts are sometimes habitat and nests have been located in odd areas. Of course, Tern nesting trends change overtime as storms alter the beach and dune profiles.

Beginning in early April, off-road vehicles are restricted (by symbolic fencing) to discrete travel corridors along the outer edges of suitable Plover/Tern nesting habitat. Once nest areas are established, the protection zone is increased by symbolic fencing and warning signs.

Once the nests hatch, sections of beach where unfledged Plover/Tern chicks are present are completely closed to recreational vehicles until chicks reach 35 days of age or are observed in flight. Only staff escorted caravans of essential vehicles regularly pass within areas of unfledged Plover and Tern chicks.

Least and Common Terns are monitored during the nesting season and data is reported to NHESP as required. Management of state-listed Terns conforms to state and federal guidelines for management of recreational activities as well as our active Orders of Conditions SE3-5965 and SE3-5966 (Attachment C & D).

| | | A Count | B Count | | |
|---|---|---|---|---|---|
| | | **No. Pairs** | **No. Pairs** | **Productivity Estimate** | **Fledglings** |
| **2018** | Colony A | 8 | - | Poor | 3 |
| | Colony B | 18 | - | Fair | 6 |
| | Colony C | 48 | - | Good | 12 |
| | Colony D | 23 | - | Poor | 3 |
| **2019** | Colony 1 | 10.4 | 8 | Poor | 2 |
| | Colony 2 | 7.2 | 24 | None | 0 |
| | Colony 3 | 8 | 4 | None | 0 |
| | Colony 4 | 2.4 | 1.6 | None | 0 |
| | Colony 5 | 128.8 | 80 | Fair | UNK |
| **2020** | Colony A | 18.4 | 17 | Fair | UNK |
| | Colony B | 22.4 | 12.8 | Fair | UNK |
| | Colony C | 49.6 | 41.6 | Good | UNK |
| | Colony D | 8 | 6.4 | Poor | UNK |
| **2021** | Colony A | 4 | 5 | None | 0 |
| | Colony B | 2 | 2 | None | 0 |
| | Colony C | 4 | 4 | None | 0 |
| | Colony D | 101 | 32 | Poor | 1 |
| **2022** | Colony A | 3.2 | 16 | Good | 4 |
| | Colony B | 0 | 16 | Fair | 2 |
| | Colony C | 40 | 16 | Good | 5 |
| | Colony D | 12 | 40 | Fair | 2 |

**Table 3:** Least Tern census numbers, taken from TERNODES from 2018 – 2022.

*Sandy Neck Beach Park Stewardship and Other Rare Species*

Using GIS/GPS, over 300 interdunal swales have been mapped and attribute data collected. This project is a culmination of twenty (20) years of fieldwork.

In 2000, the Sandy Neck Program and the Nature Conservancy, began an ambitious wetland restoration project. To date, over 150 interdunal swales and over five (5) acres of Salt Marsh have been restored. Restoration refers to application of herbicides on Common Reed (*Phragmites australis)* and Rusty Willow (*Salix atrocinerea)* and mechanical removal of Purple Loosestrife (*Lythrum salicari)* and an introduced grass (*Panicum amarum ssp. amarulum*). In addition, we mechanically remove Spotted Knapweed (*Centaurea maculosa*) from all dunes and roadways within the park. These activities are permitted under ongoing Orders of Conditions (OOC) SE3-4129.

We are working with the Cape Cod Botany Club to create a complete inventory of vascular plants on Sandy Neck Beach Park. This work is funded by a Mehrhoff Botanical Research Award.

Every fall, the Sandy Neck staff participates in a massive sea turtle rescue effort that includes around the clock beach patrols to collect animals that wash up on our 6.5 miles of coastline. We work closely with MA Audubon (Wellfleet) to improve survivorship rates for these rare turtle species.

For the past ten (10) years we have been supporting the MA Audubon Spadefoot Toad research and headstart program at Sandy Neck Beach Park. This research and specimen collection is permitted by NHESP under Ian Ives, MA Audubon Long Pasture, Barnstable, MA.

Sandy Neck Beach Park lies at the northern-most range for the Diamondback Terrapin (*Malaclemys terrapin*). Every year, from early June until mid-July, adult females are observed leaving the waters of the Barnstable Great Marsh in order to nest among the expansive dune systems on the south side of this barrier beach. On hot, sunny days, these turtles will crawl across the Marsh Trail in search of a good nesting site. There has never been any documented evidence of adults coming up to the beach from Cape Cod Bay. While a nest was found on the front beach in 2013, the track led to and from the dunes, and into the marsh.

Throughout the nesting season, our Turtle Monitor patrols this trail via all-terrain vehicle (ATV) looking for signs of nesting Terrapins emerging from the marsh. Staff will follow these turtle tracks to the nest site, and determine if a clutch of eggs was deposited (Table 4). Female Terrapins in this location generally lay between 10-20 eggs per clutch, and may lay up to two clutches per season. If eggs are observed, the monitor will then dig a small trench around the nest cavity and will cap the site with a plastic milk crate. These act as deterrents to the many predators that frequent these locations such as coyote, fox, skunk and raccoon. Plastic crates are used in place of metal materials, as research suggests that wire cages can interfere with a hatchling's ability to properly navigate after emerging from the nest. These milk crates have

worked well at preventing predators from digging up nests, and the holes within the crate are large enough to allow hatchlings to successfully emerge from the sand after hatching. The ability for a milk crate to affect incubating nest temperatures has not yet been studied in-depth. However, there is a direct correlation between nest caps and predation rates of Terrapin nests at Sandy Neck (Table 4). Capping nests has shown tremendous success in protecting eggs through the hatching period. Milk crates are also buried deep enough in the sand to minimize shading effects on Terrapin nests, and to maximize their effectiveness against predator interaction. More recently, nests are also bucketed and then capped as smart predators have figured out how to dig under the cap.

The Marsh Trail runs parallel west-east on the south side of the beach where the marsh and sand dune habitats connect. This trail is composed almost entirely of sandy sediments, causing female Terrapins to sometimes nest directly in the trail. Because this trail is still used by vehicles to access private properties, these nests run the risk of being crushed or destroyed. Any nest that is deposited directly in the Marsh Trail is carefully dug up and relocated to a safe location for monitoring. When these selected nests hatch out in the fall, they are collected and sent to be used for our Headstart Program. Every year, schools and other organizations help us to raise these turtles over the course of the winter. Instead of these turtles digging into the mud and brumating, they will be raised in warm water and fed a proper diet so that they may continue to grow all winter long. By the time they are released into the marsh, these Terrapins are generally the size of a 3-year old Terrapin in the wild. At this point, they no longer run the risk of being eaten by many of the predators that go after smaller hatchling turtles. We believe that our nest capping and Headstart Program is improving the reproductive success rates of our Terrapin population.

During the Terrapin nesting season, there are times when essential vehicles are using the Marsh Trail as the front beach is closed due to nesting shorebirds. [2] During these times, essential vehicles travel the front beach to Trail 2 and then turn east on the Marsh Trail. As such, essential vehicles only travel through a small section of Marsh Trail where adult females may be crossing to reach nesting grounds. However, there is a small probability of a "take" and the Town is committed to continue our nest capping and headstarting programs for the next three years during the duration of this permit request. The benefits of this program will more than offset any small risk of harm associated with limited vehicular use of the Marsh Trail.

This headstarting project is permitted by NHESP under Nina Z Coleman, Sandy Neck Park Manager.

[2] Recreational ORVs *never* use the Marsh Trail, and implementation of the proposed covered activity is limited to one small section of the beachfront. Therefore, HCP implementation will in no way adversely affect Diamond-back Terrapins and their habitat, and actually stands to benefit this species by potentially reducing essential vehicle use on the Marsh Trail in years when Plovers nest in the covered activity area.

| Year | Total # Nests | # Nests Capped for Predator Deterrence | # Nests Collected for Headstarting | # Nests Predated | Total # Nests Hatched |
|---|---|---|---|---|---|
| 2001 | 85 | 0 | 5 | 40 | 45 |
| 2002 | 42 | 6 | 6 | 37 | 5 |
| 2003 | 48 | 22 | 3 | 21 | 27 |
| 2004 | 70 | 31 | 7 | 35 | 35 |
| 2005 | 32 | 29 | 1 | 2 | 30 |
| 2006 | 44 | 28 | 7 | 2 | 42 |
| 2007 | 36 | 19 | 0 | 0 | 36 |
| 2008 | 59 | 49 | 2 | 2 | 57 |
| 2009 | 119 | 111 | 7 | 0 | 119 |
| 2010 | 122 | 113 | 6 | 1 | 121 |
| 2011 | 116 | N/A | 6 | 4 | 112 |
| 2012 | 109 | N/A | 3 | 1 | 108 |
| 2013 | 87 | 79 | 4 | 4 | 83 |
| 2014 | 153 | 121 | 5 | 11 | 142 |
| 2015 | 147 | 124 | 5 | 14 | 133 |
| 2016 | 176 | 135 | 7 | 21 | 155 |
| 2017 | 202 | 139 | 13 | 124 | 78 |
| 2018 | 172 | 59 | 10 | 78 | 94 |
| 2019 | 261 | 43 | 10 | 170 | 91 |
| 2020 | 272 | 67 | 10 | 195 | 77 |
| 2021 | 406 | 65 | 10 | 256 | 150 |
| 2022 | 389 | 142 | 10 | 69 | 320 |

**Table 4:** Summary of Diamondback Terrapin Breeding Success and Management Activities, 2001-2022.

## VI. Beach Operations and Management

As noted earlier, multiple recreational activities occur at Sandy Neck Beach Park. The most popular areas are the ORV and Public Bathing Beaches. Sandy Neck also hosts primitive tent and lean-to camping that requires a 3.3 mile hike to the sites, horseback riding, boating (including paddle boarding and kayaking), fishing and shellfishing, hunting, hiking, bird watching, fat tire biking and numerous events such as campfire gatherings, weddings and other celebrations. We also provide access to essential vehicles to the privately owned cottages and we support many research projects on a variety of topics.

**a. Hours of Operation**

Sandy Neck Beach Park is open to the public year round, including the use of the Off-Road Vehicle (ORV) Beach to permitted individuals. In season, May 1 – October 31 the hours of operation for the ORV Beach is 8:00am – 10:00pm. During the off season, November 1 – April 30 the ORV Beach is open weather and tide permitting from 8:00am – 4:00pm.

**b. Recreational Activities**

Our lifeguarded public beach is a busy place during the summer season. It has been many years since a Plover nested within this area but, if this occurred, protocols would be followed as set forth by our OOCs and the guidelines. Plover and Tern nests are often located to the west of the lifeguarded area and this habitat is fenced by April 1st and adjusted when nests are established. Campfires and dogs are not permitted within this section of beach (from the east edge of the lifeguarded beach to the Sandwich Town-line). Public beach campfires are permitted from the east edge of the lifeguarded area to the ORV beach.

The ORV Beach and sections of the public beach allow evening campfires weather permitting. ORV permit holders are provided the campfire regulations when they purchase their permit. All other campfire patrons must purchase a fire permit at the Gatehouse at which time they are provided the regulations. In addition, our regulations booklet states that fireworks (including sky lanterns) are prohibited by state law. Natural Resource Officers (NROs) and Barnstable Police address firework problems by issuing citations when appropriate and by confiscating fireworks from beach patrons.

Horseback riding on Sandy Neck Beach requires a permit and patrons are provided the regulations that address beach use. Horses (and fat tire bikes) are treated like vehicles in so much as they may not travel within the sections of beach where unfledged Plover or Tern chicks are present. Information about beach closures is available on the website which has updates for each beach use (ORV, Cottage Owner, Fat Tire Bikes, Horseback Riding, Fishing/Shellfishing and Campfires).

Boating activities are monitored by the Marine & Environmental Affairs Department - Harbormaster Division that shares our two-way radio channel making communication efficient. Beach Point is patrolled by the Harbormaster Division by boat for vessel

operation infractions and by land via Sandy Neck staff for issues such as dogs off leash, alcohol infractions and walking in the dunes. Beach Point and Little Neck are symbolically fenced and signed to keep foot traffic out of the nesting areas. The adjacent boat ramps have signs reminding boaters in route to Sandy Neck to keep their dogs on leash and stay out of the fenced in areas due to endangered species protection.
Hunting and fishing are generally shoulder season activities and are overseen by our full time Natural Resource Officers who are also Deputy Shellfish Constables. We would work with state Environmental Police if there was an egregious fishing or hunting violation.

**c. Parking and Roads**

Sandy Neck Road passes by the Gatehouse and leads up to a paved parking lot with 200+ parking spaces. There is also a small gravel parking lot located at the Gatehouse for patrons utilizing the hiking trails.

**d. Beach Rules and Regulations**

Over many years, the Sandy Neck Program has developed and implemented Sandy Neck Beach Park Regulations and Policies that address public safety and natural resource protection (Attachments E & F). In season, dogs are allowed on the ORV beach as long as they are leashed. No dogs are allowed within the tent camping area because it is only patrolled a few times a day. Citations are issued for dogs off leash and patrons will be asked to leave the beach and/or lose their beach privileges if compliance is not achieved. We can also suspend beach privileges for a specific dog that owners cannot and/or will not keep under control.

**e. Fencing and Signage**

Symbolic fencing is erected over 8 miles throughout the property, and is historically installed between March 23 and April 1. Yellow "AREA CLOSED – Threatened Birds Nesting" signs are installed on every fifth stake (~fifty feet) along the symbolic fencing. Immediately following the discovery of a new nest, symbolic fencing is further bumped out to 50 meters to meet state and federal guidelines and "No Parking" areas are established in the vicinity of the Plover nests. These no parking areas are clearly marked with "No Parking" and "5mph - Shorebird Nesting" signs on either end of the bumped out fencing. Further, "Dogs Must Be Leashed year round" signs are installed throughout the park. "No Pets Beyond this Point" signs are installed at both the permanent Trail 6 ORV closure line and the variable ORV closure line. The variable ORV closure line is moved according to the location of unfledged Plover and Tern chicks.

**f. Compliance and Law Enforcement**

Uniformed Natural Resource Officers (NROs) and Barnstable Police Department Officers patrol the beach, trails and Beach Point to ensure compliance with the rules and regulations of the beach. Staff uses multiple enforcement tools to achieve compliance including verbal and written warnings, citations, permit revocations and no-trespass orders. Patrons that cannot achieve respectful and responsible pet ownership could have their pet's beach privileges revoked. All warnings are tracked digitally so that decisions can be made about increasing our response to repeat offenders.

All incoming vehicles must pass by the Gatehouse and staff is tasked with providing the rules and regulations to the different user groups along with trail maps and information about our Park. Our web site is at https://www.townofbarnstable.us/ and it includes a blog to provide updates and beach information including beach closures due to nesting shorebirds. Also, our web site includes an informational video on how to safely operate an ORV at Sandy Neck Beach Park https://www.youtube.com/watch?v=uiwbzjAifi. In addition, we have surveillance cameras in multiple locations to help with the enforcement of beach laws.

**g. Commercial/Vendor Activities**

The Sandy Neck Snack Shack is a popular stop for visitors to the park and is located at the Bathhouse adjacent to the Public Beach. The Snack Shack is open from Memorial Day weekend through Labor Day.

**h. Events**

Gatherings of over 20 people and all weddings require a Special Permit. This permit gives the patrons special conditions for their event that help with compliance of the regulations and ensure better safety protocols. Research projects also require a Special Permit and will not be issued until all other applicable state and federal permits have been secured.

**i. Maintenance**

Park maintenance is completed in house by Sandy Neck staff and includes general maintenance such as landscaping, fencing repairs and upkeep, servicing portable toilets on the ORV Beach, and seasonally relevant signage installation, etc.

**j. Seasonal Features**

Installation of lifeguard stands, Mobi Mat, and handrails on the Public Beach are completed in early May, prior to opening Memorial Day weekend. Portable toilets are also placed on the ORV Beach in early May for the start of the summer season. All of these activities are completed under the direct supervision of Sandy Neck professional staff.

**k. Beach Grooming**

Chain drag raking occurs in the RZ per this HCP. In addition, minor raking with hand tools is accomplished on the public beach to reduce seaweed after storm event.

**l. Trash Management**

The ORV Beach is patrolled for trash pick-up and fencing repaired daily by NROs and maintenance personnel. We pride ourselves on presenting a clean, well run beach. Further, we provide portable toilets on the ORV beach for customer's comfort and also for environmental protection. We ask beach patrons to recycle and we provide a recycling dumpster that is located on the Access Trail. Trash barrels are emptied daily and dumpsters are emptied three times a week (in season).

**m. Management of Wrack/Seaweed**

Limited removal of the seaweed line is achieved by hand tools only within the lifeguarded area of the front beach (approximately 600 feet).

**n. Sand Redistribution and Beach Grading**

Dune nourishment is accomplished under active OOCs SE3-5781 in front of the parking lots in order to protect Sandy Neck infrastructure with time of year restrictions.

**o. Recreational and Essential Vehicles**

All ORV and essential vehicle use is governed by our active OOCs (Attachment C & D) and each permit holder receives the Beach Park Regulations (Attachment E), which are designed to keep the Town in compliance with federal, state and local laws as well as to ensure public safety. Beach closures for nesting Terns and Plovers follow strict requirements set forth by our OOCs and the state guidelines. In addition, escort procedures, fencing and signage requirements are all discussed within our OOCs.

Essential vehicle access was a contentious topic for much of the 1980s and 1990s. To avoid a lawsuit, the town entered into a memorandum of understanding (MOU) with the cottage owners that in part promises "reasonable access." This is a balancing act but has been achieved by providing daily scheduled escorts on the front beach during the shorebird nesting season. In addition, the Town (via a Notice of Intent) opened the Marsh Trail for non-escorted essential vehicle access. Staff therefore is tasked with five scheduled escorts a day during the shorebird nesting season. We are also willing to escort outside of this schedule with reasonable notice. Staff also patrols the Marsh Trail for Diamondback Terrapins and closes the trail on days of high nesting activity. In an effort to reduce the number of essential vehicle escorts past unfledged chicks, the Sandy Neck Program has worked with the Barnstable Department of Public Works' (DPW) Highway Division to repair the Marsh Trail for improved vehicle access. This is achieved under ongoing conditions under OOCs SE3-4207.

Sandy Neck Beach Park utilizes the MooringInfo database system shared with the rest of the Marine and Environmental Affairs (MEA) Department. This system has a customer interface allowing patrons to apply for and purchase Off-Road Vehicle and Horse permits and make tenting and RV camping reservations. This system is also used to track any violations associated with vehicle permit holders and other incidents occurring at the Park and encountered by other members of the MEA Department throughout the town.

## VII. Bird Management and Monitoring

Over the last 4 years, Sandy Neck Beach Park has seen a steady increase in Piping Plover pairs and fledged chicks. Further we are seeing a decrease in the availability of seasonal staff largely due to the onset of the 2020 COVID-19 pandemic. The Town of Barnstable acknowledged these concerns and approved the hiring of additional full-time staff. This staffing change was made in order to ensure that all requirements for endangered species monitoring and management were being met. In conjunction with the hiring of additional full-time staff, Sandy Neck Beach Park intends to hire one additional seasonal Shorebird Monitor to further our monitoring capacity.

**a. Management History**

Piping Plover and Least Tern management has remained relatively unchanged over the years as all monitoring and management protocols conform to both State and Federal guidelines. One significant change to note is the use of predator exclosures, which was significantly reduced in the early 2000s. Historically all nests had been exclosed, but due to observations of predators cueing in to the exclosures and significant nest loss, this practice was reduced to only a few nests at most per season.

**b. Entity Conducting Management and Monitoring**

All Piping Plover and Least Tern management and monitoring is overseen by Town of Barnstable, Division of Natural Resource staff that are employed by the Sandy Neck program. The program is overseen by professional staff, which includes a full-time Park Manager, full-time Assistant Park Manager and two full-time Natural Resource Officers. These staff members, along with three seasonal Shorebird Monitors, are responsible for Plover/Tern management throughout the park.

**c. Management Techniques**

Sandy Neck Beach Park utilizes stake and twine symbolic fencing placed over 8 miles marking any potential Plover and Tern habitat. The fencing is marked with commonly used yellow triangle signs indicating the area is closed for threatened and endangered shorebird nesting. Predator exclosures are commonly placed around nests found on the public beach where there tends to be a higher concentration of human traffic or at times they are placed around re-nests when predation is suspected. No vegetation management or predator control is done on the property.

**d. Bird Monitors**

Staff responsible for shorebird monitoring includes Nina Coleman, Hannah Lawrence and Josh Kelleher who spend many hours in the field ensuring monitoring quality. Historically the Sandy Neck program has hired two (2) Shorebird Monitors each season, but due to the increase in pairs and fledglings over the last few years the program will be increasing its Shorebird Monitor count to three (3). Shorebird Monitors are hired on a seasonal basis and are typically college students pursuing a degree in various Biology fields, Natural Resources, and Environmental Sciences. Shorebird Monitors are responsible for data collection of nesting Plovers and Terns, addressing "dog off leash" issues, educating the public they encounter, and ensuring any issues that arise in the more remote locations of the park are relayed to the appropriate full time staff. Shorebird Monitors are also responsible for the general upkeep of symbolic fencing and assuring the cleanliness of the park by removing any garbage or debris. Further, the Turtle Monitor is cross-trained to help with shorebird monitoring as the bulk of the shorebird-nesting season precedes the turtle-nesting season. In addition, our full-time Natural Resource Officer, Antonio Mancha and three seasonal NROs are trained in escort procedures and basic shorebird ecology and identification.

**e. Seasonal Staff**

Seasonal Shorebird Monitors are on duty from April 1 through Labor Day weekend and work 40 hour weeks. Shorebird staff is on site daily, from 7:00 – 3:30 or 8:00 – 4:30 with two Shorebird Monitors covering the weekends as they are the busier days at the park.

**f. Training and Oversight of Monitors**

Monitors are overseen and trained by Nina Coleman, Hannah Lawrence, and Josh Kelleher who spend many hours in the field with seasonal staff to ensure proficiency in finding and identifying Plovers and Terns and their nests and familiarity with the NestStory and PIPLODES platforms.

**g. Data Collection and Recording Protocols**

Plover nests are checked daily within the ORV corridor and at a minimum every other day in the more remote locations. Further, nests within the ORV corridor with unknown hatch dates are monitored twice a day per our Orders of Conditions.

Our OOCs (Attachment C & D) reference the State Guidelines for Managing Recreational Use of Beaches for additional monitoring and escorting protocol, exclosures, fencing and signage, etc. This document is required reading for our seasonal shorebird monitors and the OOCs and Guidelines are available in the Gatehouse staff room for reference during the season. Over the years, Sandy Neck has developed our own Shorebird data collection sheets specific to monitoring in the Recreation Zone (Attachment G). During the 2022 season, Sandy Neck staff began using the NestStory (Attachment A) online platform which was very successful in streamlining our data collection procedures.

Sandy Neck field staff participates in weekly meetings to ensure good communication and daily changes in brood locations are written on a white board in the staff area of the Gatehouse. This insures that NROs are briefed on shorebird information each time they are tasked with an escort. In addition, all field staff is equipped with a two-way radio.

**h. Data Reporting**

Under our Orders of Conditions, we are required to present a yearly report to the Conservation Commission each November. This report consists of data on endangered species nesting success as well as the park financials, number of permits sold, number of vehicular trips on the beach, enforcement efforts, and number of escorts. Reports can be made available upon request.

**i. Public Education and Outreach**

The Sandy Neck Program provides a number of educational programming each season, including guided Walks and Talks in which staff partners with other local community organizations such as Mass Audubon and Barnstable Land Trust. These Walks and Talks programs cover a number of different topics such as early spring Piping Plover hikes, to Diamondback Terrapin hikes and even Flora and Fauna walks. Sandy Neck also hosts a Jr. Rangers program open to children ages 8-12 residing in the Town of Barnstable, where they gain the opportunity to learn about Piping Plovers, marine mammals, and more.

An increase in educational signage has also been utilized over the last few seasons, not only to share with the public the challenges that Piping Plovers face, but also to share

with beachgoers information about our HCP program.

During the 2022 season, Sandy Neck Staff partnered with one of our biggest user groups, Mass Beach Buggy Association (MBBA) to assist staff in the placement of coverboards early in the season under the direction of full-time staff. Each year MBBA hosts an annual spring cleanup of the beach, providing an opportunity for staff to further educate our users on our programs.

## VIII. Covered Activities

The Sandy Neck Beach Park Program is asking for the ability to ensure that at least a small portion of the beach is available for ORV use by allowing increased recreational use associated with reduced proactive symbolic fencing along 4,529 linear feet of beach hereon referred to as the Recreation Zone (Figure 1). Within the RZ, as an impact minimization procedure, we are requesting the deterrence of up to three breeding Piping Plover pairs from nesting thereby ensuring at least some ORV access throughout the year. Sandy Neck is requesting an additional third take, beginning in the 2023 season. Due to the increase in breeding Plover pairs and fledged chicks, we would like the opportunity to deter a third pair from nesting within the RZ, should it appear during the nesting season. Additionally, we are asking for Off Road Vehicle (ORV) use in the vicinity of unfledged Least Tern chicks.

### a. Proposed Covered Activities

Sandy Neck Beach Park is requesting a three year permit to continue our Plover deterrent program within the first 0.86 miles of ORV Beach called the Recreation Zone. This program has been very successful at increasing ORV beach access while still protecting nesting shorebirds. We are suggesting that discouraging nesting include reduced buffer zones, raking, and using wooden pallets or other objects such as dune fencing and flagging tape to create undesirable nesting locations. Further, we would like the opportunity to place a public safety shed (to be installed in the RZ for the summer season) on the beach to house a rescue vessel, first aid station, and an AED. The proposed location for this shed would be immediately west of the Access Trail in the area adjacent to the Public Beach. The associated activity from the shed would act as a deterrent in this area. We would like the potential opportunity to receive permission to use additional, presently unthought-of, deterrent activities. These activities would require consultation and approval from NHESP prior to implementation. The Town is also requesting the ability to escort ORVs past unfledged Plover and Tern chicks as outlined below.

*Reduced Symbolic Fencing:*

Within the RZ, we are requesting the ability to reduce the area of symbolically fenced nesting habitat. Beach habitat above the high tide line would not be fenced, but a narrow buffer extending from the toe of the dune would be fenced to help protect the dune. This activity is already permitted under our OOCs SE3-5965 (Conditions 2.1 and 14).

Therefore, our OOCs would not need to be amended. Proactive reduced fencing would occur prior to the April 1st deadline.

The proposed activity of reducing required symbolic fencing consists of 4.1% of Sandy Neck's potential nesting habitat, which falls below the site-specific limit specified in the HCP. This location is comprised of 4,529 ft x 30 ft = 135,870 square feet or ~3.12 acres. The actual acreage to be impacted is likely to be considerably lower because it will be confined to a portion of the RZ where Plover activity is detected. The low percentage means that the displaced pairs will not likely be under significant competition for other sites. In addition, Sandy Neck supports an average of 39 nesting pairs per year. Exposing three pairs to a reduced buffer and deterrents will not reach the stated maximum thresholds for numbers of pairs affected by the activity.

*Deterrents*

The primary impact minimization procedure will be to implement the use of a chain drag in the area of the RZ between the public parking lot and east to the 0.86 mile marker. This location is comprised of 4,529 ft x 30 ft = 135,870 square feet or ~3.12 acres. Historic Sandy Neck data over the last 5 years shows that an average of 2-3 plover pairs have nested in this location based on recent trends. This would be implemented in order to establish a groomed area for ORV use and to reduce the likelihood of interaction between breeding Plovers and recreational beach users. In addition, symbolic fencing will be drastically reduced in this area to allow efficient use of the chain drag in order to successfully deter up to three (3) breeding pairs from nesting in this location.

Coverboards (and other approved deterrent measures) may be placed within a portion of the nesting habitat to reduce the likelihood of interaction between breeding Plovers and recreational beach users. This location is comprised of 4,529 ft x 30 ft = 135,870 square feet or ~3.12 acres plus two small blowouts consisting of 0.26 acres. Therefore total area of coverboards and other deterrents is ~3.38 acres.

Coverboards, in the form of wooden shipping pallets are utilized due to the weight and shape of the board. The rectangular shape and perfectly square corners allows boards to be placed flush against each other covering the maximum amount nesting habitat possible. Due to the weight of the wood, the pallets securely rest on top of the sand reducing any additional disturbance to the habitat (Photograph 3). The same materials used for symbolic fencing would be utilized for flagging sections within the RZ, south of the symbolically fenced area. The specific materials used includes 1in x 1in x 4 ft wooden tomato stakes pounded about 12 inches into the sand with a 2 – 3 ft strip of hot colored surveyors tape tied (so as to not detach) onto the stakes at various heights. Stakes would be placed roughly 2 – 3 ft apart to avoid entanglement and tearing of tape from neighboring stakes.

Coverboards and/or beach raking would be deployed prior to the very first signs of

territorial behavior and courtship *before* the period of intensive scraping and mating. The purpose of this procedure is to reduce the likelihood that a pair attempting to breed would be disturbed later in the breeding cycle when recreational beach use increases by users such as pedestrians and ORV operators. The theory is to make this area of the beach an undesirable nesting location and encouraging these pair(s) to choose a better site further down the beach. If the procedure is not effective, and a Plover egg is observed in this area, the use of coverboards and/or beach raking would cease immediately. The NHESP would make the final decision about when to cease the use of coverboards and/or beach raking.

*Escort Past Unfledged Plovers*

Should the implementation of the above-listed activities fail to deter up to three Plover pairs from nesting within the RZ, the Town would implement a staff-guided escort program for ORVs past up to three broods of unfledged Plover chicks. This activity would only be implemented if conditions allow, and only if deterrents do not prevent Plovers from nesting within this area.

Sandy Neck has been providing cottage owner escorts past both Tern and Plover chicks for over 20 years under OOCs SE3-5966. Therefore, protocol, staff training and scheduling procedures are already in place. Historically, cottage owner escorts commence in late May or early June. Field staff (Shorebird Monitors, Turtle Monitors and Natural Resource Officers) are trained to escort on ATVs past multiple broods of Plover chicks as well as Tern colonies. Full-time professional staff is responsible for training the seasonal field staff. Seasonal staff escort assignments do not occur until both the trainer and the trainee feel comfortable with the procedures. Weekly field staff meetings are used to communicate brood locations and movement trends. Daily chick location updates are noted on the Escorting Information Board that is posted in the Gatehouse.

*Escort Past Unfledged Least Terns*

Should there be a colony of no more than 15 unfledged Tern chicks remaining after all Plover chicks have fledged, the town would implement a staff-guided escort program for ORVs to access the remainder of the ORV Beach if conditions allow (Figure 6).

Sandy Neck has been providing cottage owner escorts past both Tern and Plover chicks for over 20 years under OOCs SE3-5966. Therefore, protocol, staff training and scheduling procedures are already in place. Historically, cottage owner escorts commence in late May or early June. Field staff (Shorebird Monitors, Turtle Monitors and Natural Resource Officers) are trained to escort on ATVs past multiple broods of Plover chicks as well as Tern colonies. Full-time professional staff is responsible for training the seasonal field staff. Seasonal staff escort assignments do not occur until both the trainer and the trainee feel comfortable with the procedures. Weekly field staff meetings are used to communicate brood locations and movement trends. Daily chick location updates are noted on the Escorting Information Board that is posted in the Gatehouse.


**Photograph 3:** Coverboard placement and stakes/flagging tape to be used in the RZ as nesting deterrents.

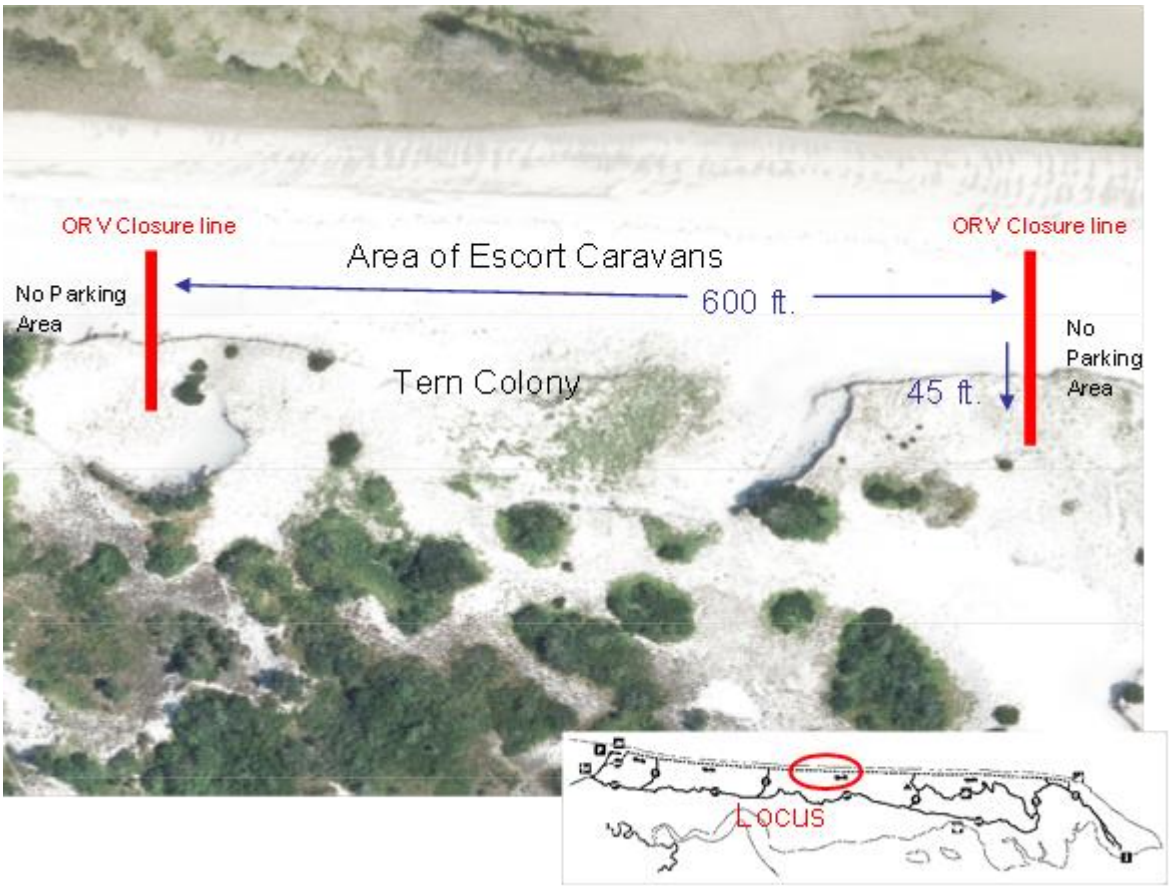



**Figure 6:** Example of the proposed Least Tern escorting zone. Least Tern area of impact has been estimated as 600-ft. X 45-ft. = ~0.62 acres

**b. Protocols for Implementation**

*Reduced Symbolic Fencing and Coverboards*

All symbolic fencing throughout the Park is installed prior to the April 1st deadline to ensure all suitable Plover and Tern habitat is protected. The proactive reduced symbolic fencing and placement of coverboards and flagging tape protocols are designed to minimize impacts to the Sandy Neck Plover population:

- Notification is sent to the Coastal Waterbirds program 24 hours in advance of implementation of covered activities.
- Symbolic fencing is proactively reduced to protect vegetation and to allow efficient use of the chain drag.
- Prior to the installation of coverboards, flagging tape, and the first aid shed, the area is intensively monitored for signs of Plover nesting activity. Once it is determined by full-time staff that there are no Plover eggs in the area, coverboards, flagging tape and the shed are placed.

- Coverboards, flagging tape, and the shed are deployed prior to the first signs of territorial behavior and courtship before the period of intensive scraping and mating. This should reduce the likelihood that a pair attempting to breed would be disturbed later in the breeding cycle.
- If the procedure is not effective and a Plover egg is observed in the area, the use of coverboards, flagging tape and the shed would cease immediately.

*Beach Raking*

Beach raking would be implemented with the use of a chain drag in the area of the RZ between the public parking lot and east up to the 0.86 mile marker.

- Twice daily monitoring of the RZ would occur during implementation of the chain drag.
- Prior to the use of the chain drag, the area would be intensely monitored to ensure that a Plover egg has not been laid in the area.
- Beach raking would be implemented by trained staff prior to the very first signs of territorial behavior and courtship before the period of intensive scraping and mating.

*Escorting Past Unfledged Piping Plover Chicks*

During escorts, Plover chicks are expected to be on either side of the ORV corridor: either foraging by the tide line, or brooding along the vegetation and primary dune. The escorting activity is designed to minimize impacts to the Sandy Neck Plover population:

- Escorts past 3 unfledged Plover broods or less. To confirm the number of unfledged Plover chicks present, two chick counts will be conducted by qualified shorebird monitors within 48 hours of commencing the activity. Chick counts and associated sketch maps of chick locations and brood ranges will be reported to NHESP prior to commencing the covered activity.
- Escorted caravans limited to daylight hours on Friday (am, noon and pm), Saturday (am, noon and pm), and Sunday (am, noon and pm).
- Caravans will be limited to one round trip during each daily travel window listed above (three travel windows per day Friday- Sunday). Each one-way escort is expected to take (conservatively) 30 minutes. Therefore, total Plover chick exposure time for this program would be 3 hours/day.
- Up to five trained Sandy Neck staff members will be on-site during each escort. They will each be equipped with a two-way radio in order to communicate with each other simultaneously.
- *Escort procedures for one brood:* one staff member will be in the vicinity of the Plover brood, monitoring chick locations and movements. One member will be at the head of the escort caravan and one member at the rear of the caravan.
- *Escort procedures for two broods:* one staff member will be in the vicinity of each Plover brood, monitoring chick locations and movements. One member will be at the head of the escort caravan and one member at the rear of the caravan.
- *Escort procedures for three broods:* one staff member will be in the vicinity of each Plover brood, monitoring chick locations and movements. One member will be at the

head of the escort caravan and one member at the rear of the caravan.

- Escorting will begin at least 100 yards from the closest unfledged chick, and will end at least 300 feet past the last unfledged chick. Chick monitors will arrive at the brood's range location at least one half hour before each caravan to assess approximate chick locations and adjust the caravan escort zone on an as-needed basis.
- In the event that a brood is observed on either side of the ORV corridor during the 30 minute monitoring window prior to the escort, the monitor will contact the Gatehouse via Ocean radio to alert full-time staff of the chick locations. An additional trained staff person will then be assigned to assist with the monitoring of chicks on both sides of the ORV corridor to ensure they do not cross between vehicles in the caravan.
- The speed limit will be less than 5 mph (mimicking walking speed), which will be dictated by the lead staff member.
- To the extent practical, Sandy Neck cottage owner escorts will be combined with this service thus reducing exposure times and combining staff efforts.
- No parking areas will be set up at either end of the escort corridor in order to minimize Plover chick disturbance and to provide an area to organize the caravans. All parking will be located >100 yards from unfledged Plover chicks.
- The caravan will halt in place if a chick moves towards, or within, the travel corridor. The monitors will allow traffic to resume once it has been determined that no chicks remain within the travel corridor. To minimize risk associated with halted vehicles adjacent to the brood, monitors may walk in the vicinity of the chick in an effort to displace it from the corridor.
- Vehicle ruts will be hand-raked and smoothed out after the last travel window of each day, whenever chicks estimated to be <15 days old are present using the U.S Army Corps Piping Plover Aging Guidelines (Attachment I).
- Once the escorting is underway, monitors will record the number of chicks observed during each escort travel window along with brood behavior and any changes to their range or location.

*Escorting Past Unfledged Least Tern Chicks*

During escorts, Tern chicks are expected to be located 30-50 feet from the vehicles (Figure 6). This figure was calculated using historic Tern colony location data and the existing beach profile. However, there may be some occasions, depending on tides and chick movement, when the escort caravan could be <15 feet from Tern chicks.

The escorting activity is designed to minimize impacts to the Sandy Neck Least Tern population:

- Escorts past 15 unfledged Tern chicks or less. To estimate the number of unfledged Tern chicks present, two chick counts will be conducted by qualified shorebird monitors in the 5 days prior to commencing the covered activity, with one count within 24 hours of commencing the activity. The number of chicks will be estimated by monitors observing the colony from a distance with binoculars and marking on a sketch map the approximate locations where chicks or chick feeding behavior is observed. If adults are

observed feeding chicks in dense vegetation it should be assumed that two chicks are present unless it is possible to confirm the presence of a single chick through continued observation. In general, it will not be necessary to enter the colony to obtain an estimated chick count. Chick counts and associated sketch maps of chick locations will be reported to NHESP prior to commencing the covered activity.

- Escorted caravans limited to daylight hours on Thursday (noon and pm), Friday (am, noon and pm), Saturday (am, noon and pm), Sunday (am, noon and pm), and Monday (am, noon and pm).
- Caravans will be limited to one round trip during each daily travel window listed above (two travel windows on Thursday and three per day, Friday- Monday). Each one-way escort is expected to take (conservatively) 30 minutes. Therefore, total tern chick exposure time for this program would be 3 hours/day.
- Four trained Sandy Neck staff members will be on-site during each escort. They will each be equipped with a two-way radio in order to communicate with each other simultaneously. Two staff members will be in the vicinity of the Tern colony but outside of the symbolic fencing monitoring chick locations. One member will be at the head of the escort caravan and the second will be at the rear of the caravan (Note: when escorts are past two or less chicks, only one staff member will be needed to monitor chicks within the Tern colony).
- Escorting will begin at least 200 feet from the closest unfledged chick, and will end at least 200 feet past the last unfledged chick. Chick monitors will arrive at the colony at least one half hour before each caravan to assess approximate chick locations and adjust the caravan escort zone on an as-needed basis.
- In the event that chicks are observed on either side of the ORV corridor during the 30 minute monitoring window prior to the escort, the monitor will contact the Gatehouse via Ocean radio to alert full-time staff of the chick locations. An additional trained staff person will then be assigned to assist with the monitoring of chicks on both sides of the ORV corridor to ensure they do not cross between vehicles in the caravan.
- Escorts will drive as low as the tide will permit in order to minimize disturbance.
- The speed limit will be less than 5 mph (mimicking walking speed), which will be dictated by the lead staff member.
- To the extent practical, Sandy Neck cottage owner escorts will be combined with this service thus reducing exposure times and combining staff efforts.
- No parking areas will be set up at either end of the escort corridor in order to minimize Tern disturbance and to provide an area to organize the caravans. All parking will be located >100 yards from unfledged Tern chicks.
- The caravan will halt in place if a chick moves within the travel corridor. The monitors will allow traffic to resume once it has been determined that no chicks remain within the travel corridor. To minimize risk associated with halted vehicles adjacent to the colony, monitors may walk in the vicinity of the chick in an effort to displace it from the corridor.
- Monitors will also halt traffic if chicks move <10 ft from the travel corridor, depending on chick behavior. Specifically, if the chicks appear to be moving towards the corridor to

access wrack or the intertidal zone.

- Vehicle ruts will be hand-raked and smoothed out after the last travel window of each day, whenever chicks estimated to be <11 days old are present using the U.S Army Corps Least Tern Aging Guidelines (Attachment I).
- Once the escorting is underway, monitors will record the number of chicks observed during each escort travel window. In addition, estimated chick counts for the colony as a whole will be obtained 1-2 times per week, using the procedures described above, and reported to NHESP.

The proposed activity of escorting past Terns consists of 1.38% of Sandy Neck's potential Tern nesting habitat (0.62 acres), which falls below the site-specific limit specified in the HCP (Figure 6).

Sandy Neck has been providing cottage owner escorts past both Tern and Plover chicks for over 20 years under OOCs SE3-4712 and now SE3-5666. Therefore, protocol, staff training and scheduling procedures are already in place. Historically, cottage owner escorts commence in late May or early June. Field staff (Shorebird Monitors, Turtle Monitors and Natural Resource Officers) are trained to escort on ATVs past multiple broods of plover chicks as well as tern colonies. Full-time professional staff is responsible for training the seasonal field staff. Seasonal staff escort assignments do not occur until both the trainer and the trainee feel comfortable with the procedures. Weekly field staff meetings are used to communicate brood locations and movement trends. Daily chick location updates are noted on the Escorting Information Board that is posted in the Gatehouse. By August, most plovers have fledged and field staff are well versed in escort procedures. This "infrastructure" will be used late in the season to provide escorts to recreational vehicles past Tern chicks.

## c. Monitoring and Compliance Requirements

*Compliance Monitoring*

*Reduced Symbolic Fencing and Coverboards*

All monitoring associated with the covered activities shall be undertaken by Sandy Neck professional scientific staff (Nina Coleman, Hannah Lawrence and Josh Kelleher). Assistant Park Manager Lawrence will be the point person for the HCP monitoring and covered activities. Coleman and Lawrence will continue to be involved in training and oversight of the seasonal shorebird monitors, but will allocate an additional estimated 3-5 hours per day to intensively monitor the RZ. Officer Kelleher is tasked with additional duties in monitoring and compliance of HCP implementation as part of his daily routine, which provides the park with many additional monitoring hours beyond the minimum requirements. This will help to insure effective and strategic implementation of covered activities throughout the season. Seasonal Shorebird Monitors will primarily be focused on

non-HCP Plover/Tern activities thought out the park.

Nina Coleman: 2 hours per day (plus administration hours)
Hannah Lawrence: 2 hours per day (plus administration hours)
Josh Kelleher: 3-5 hours per day (includes raking and placing coverboards)
Seasonal Staff: 3-5 hours per day (maintenance personal assisting with raking and coverboards)

Beginning in early April, prior to initiation of the covered activity, the RZ will be monitored intensively on a daily basis (estimated 3-5 hours/day) to ensure early detection of territorial Plovers. Monitors will keep a daily log describing in detail all territorial, scraping, and courtship behaviors in order to ensure that coverboards and/or beach-raking operations are deployed safely and effectively. Should beach raking or coverboards be deployed, staff will monitor this location twice daily and observe Plover activity in the area to efficiently search for any nesting locations and ensure that no eggs are present within the RZ prior to additional beach raking or coverboard implementation. During the raking process, if Plovers are observed in the area, a monitor will keep an eye on the birds to ensure there would be no adverse interactions between Plovers and the rake itself. Any additional beach raking within the RZ will trigger twice daily monitoring.

As long as any Plover activity is detected and the covered activity is implemented, supplemental daily monitoring will continue. After a period of ten days of no activity, increased monitoring can be suspended and the area of reduced symbolic fencing may remain in place. If new activity is detected, increased monitoring may be resumed to allow for additional modification of fencing (as long as the site-specific limit have not been exceeded) or redeployment of coverboards and/or raking (if activity is detected early in the breeding cycle).

*Escorting past Unfledged Piping Plover and Tern Chicks*

All escort activities shall be undertaken by Sandy Neck seasonal field staff (Shorebird Monitors, Turtle Monitor and Natural Resource Officers) under the direct supervision of Assistant Park Manager Hannah Lawrence, full time Natural Resource Officer Josh Kelleher and/or Park Manager Nina Coleman. The requested activity would occur late within the shorebird and Terrapin nesting season when the field biologists have more free time as Plover/Terrapin nesting attempts diminish with the season. In addition, field staff members will be well trained and well versed in escort procedures by late in the season as Sandy Neck provides escorts to cottage owners as early as May depending on Plover hatch dates.

The organization and management of the escorting programs will be tasked to full-time Division Assistant Donna Bragg who is under the direct supervision of the Park Manager. Ms. Bragg has been freed from the many daily duties at the Gatehouse by the hiring of additional seasonal staff. This allows Ms. Bragg to accomplish more operational

duties and have her physically "at large" in the park rather than limited to the Gatehouse. One of her duties will be community outreach and education so that the escorting opportunities and limitations are portrayed to the recreational beach users. Each year, Ms. Bragg will update the escort policies and procedures which will be an opportunity to learn, and adjust, from the previous year's experiences (Attachment B).

Tern nesting activities are monitored by counting nests at least twice during the Tern census window which is reported to NHESP along with estimates on productivity. This is achieved under the direction of Assistant Park Manager Hannah Lawrence and Natural Resource Officer Josh Kelleher using trained seasonal field staff. In addition, monitoring of the Tern colony will be increased to daily during the time period that escorts are allowed within this area. Data collected within this colony will include: number of Tern nests, number of chicks, location of chicks and estimated chick age.

During escorts, staff will document dates and times of each escort effort, number of vehicles, staff utilized for the escorts and number of chicks observed when the escort activity occurred, all observations of chicks within the travel corridor, evidence of chick injury or mortality, observations of chick and adult behavior during caravanning (e.g. flushing/mobbing). This information will be provided in interim reports to NHESP at least weekly when the escorting program is operating. Observations of chick injury or mortality will be reported immediately.

*Data Collection and Reporting*

A log shall be maintained in which staff will record Plover sightings, observations and activity within the RZ, as described above, as well as observations of Plover responses to recreational activities within the reduced buffer zones. This will include observations of disturbance (e.g. calling and broken wing displays), as well as accidental disturbance of scrapes incidental to the recreational activities. The log will include documentation of the dates and times of any fencing alterations, the extent of the habitat affected, and the dates, times, and extent of all coverboard placements and/or raking procedures. As required by the HCP, weekly reports will be submitted to NHESP.

On or before October 15 of each calendar year the COI is in effect, the Park Manager or Assistant Park Manager shall submit to NHESP a detailed report that describes and quantifies monitoring efforts, date range covered activity were implemented, extent and locations of fencing reduction and placement of coverboards, detailed description of Plover activity and behavior within the RZ, Tern monitoring efforts within the escort zone as well as a summation of the escort season. Management recommendations and lessons learned will be presented in the final report.

In addition to the detailed log of Plover activity within the RZ, Shorebird Monitors and full-time staff utilize the NestStory platform (Attachment A) to document Plover and Tern activity throughout Sandy Neck Beach Park.

*Effectiveness Monitoring*

*Data Collection Protocols*

During each field monitoring session and implementation of covered activities, staff members participating in monitoring duties are required to fill out the applicable HCP specific data sheets (Attachment G & H). These datasheets have been designed for staff to log any and all plover activity observed and any implemented covered activities. A year to year log (illustrated in Table 5) is also kept by full-time staff to monitor trends in beach openings and closures providing insight into the effectiveness of the HCP. Due to the implementation of the HCP, over the last several years, Sandy Neck staff has been able to maintain a portion of the beach open for recreational vehicles and cottage owner access to Trail 1 at a minimum. In conjunction with other factors (such as favorable tides) access to Trail 1 has contributed to a reduction in the need of staff guided escorts of essential vehicles along the front beach in the vicinity of unfledged Plover and Tern chicks. Consistent and proactive implementation of HCP covered activities has resulted in improved access for ORV use and has corresponded with high Plover productivity rates.

| Year | Plover Pairs | Distance Open | # Days Closed | % Open for ORV | Permitted Takes |
|---|---|---|---|---|---|
| **2013** | 27 | 0.0 miles | 7 | 0% | N/A |
| **2014** | 32 | 1.5 miles | 20 | 33% | N/A |
| **2015** | 40 | 1.5 miles | 26 | 33% | N/A |
| **2016** | 34 | 1.9 miles | 41 | 42% | N/A |
| **2017** | 28 | 0.7 miles | 7 | 15% | 1 |
| **2018** | 27 | 0.4 miles | 37 | 8% | 1 |
| **2019** | 36 | 0.3 miles | 11 | 6% | 1 |
| **2020** | 45 | 0.5 miles | 37 | 11% | 2 |
| **2021** | 38 | 0.5 miles | 43 | 11% | 2 |
| **2022** | 50 | 0.7 miles | 27 | 15% | 2 |

**Table 5:** Greatest closure (distance) per season from 2013 – 2022.

**d. HCP Staffing**

The HCP is managed by full-time staff that is permanently stationed at Sandy Neck Beach Park. In addition, a number of seasonal staff members (Shorebird Monitors, Turtle Monitor, Natural Resource Officers, and maintenance) are assigned certain HCP related tasks such as escorts, beach raking, and aiding with coverboard placement. Seasonal staff members are hired and are on-site mid to late March to assist with many of the early season preparations such as symbolic fencing and signage installation. Regardless of the HCP, these staff members are hired to ensure the operations of the park.

In 2022, we were funded to hire an additional full-time NRO, Antonio Mancha. Therefore, Coleman, Lawrence, and Kelleher were freed from many enforcement duties and were better able to focus on the HCP requirements. The majority of intense HCP monitoring occurs April through June while nests are establishing or reestablishing after predation. Table 6 demonstrates full-time staffing coverage of the HCP during this timeframe. As noted above, full time staff members Coleman, Lawrence and Kelleher are freed from many enforcement duties and can focus on HCP shorebird monitoring and supervising seasonal staff from April through June.

| | **Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday** | **Saturday** | **Sunday** |
|---|---|---|---|---|---|---|---|
| Coleman | off | Day HCP | Day HCP | Day HCP | Day HCP | Day HCP | off |
| Lawrence | Day HCP | Day HCP | off | off | night | Day HCP | Day HCP |
| Kelleher | off | off | Day HCP | Day HCP | Day HCP | night | Day HCP |
| Mancha | enforcement | off | off | enforcement | enforcement | enforcement | enforcement |

**Table 6:** Sandy Neck Beach Park full-time staff assignments April through June.

## IX. Budget

The Sandy Neck Program has developed into a multifaceted stewardship effort that includes providing recreational opportunities to the public, ensuring property owner access rights, ecological restoration, environmental education, endangered species protection and public outreach. Starting in 2006, the Sandy Neck Program became an Enterprise Account and is tasked with self-funding via user fees. The bulk of our revenue is collected from the ORV program. Other sources include cottage leases, public beach parking, concession stand revenue, merchandise sales and donations (Table 8). However, our business plan is tenuous because any summer we could have the ORV beach close due to one nesting pair of Plovers. In addition, complete beach closures are extremely controversial and create negative sentiment for endangered species protection and the Sandy Neck Beach Park Program.

Budgeting for this HCP program falls into three categories: full-time staffing, seasonal staffing and the HCP mitigation fee.

*HCP Staffing costs are as follows:

Nina Coleman: 2 hours per day X 12 weeks (plus 200 hours administration work)
Hannah Lawrence: 2 hours per day X 12 weeks (plus 200 administration hours work)
Josh Kelleher: X 12 weeks (3-5 hours per day includes raking and placing coverboards)
Seasonal Staff: (maintenance personnel assisting with raking and coverboards)

Nina Coleman: $21,961
Hannah Lawrence: $14,053
Josh Kelleher: $7,022
Seasonal Maintenance Staff: $5,000

| | |
|---|---|
| *Mitigation Fee | $17,400 |
| Full-time staffing costs | $43,036 |
| Seasonal staff | $5,000 |
| ***Total Cost of COI*** | ***$65,436*** |

**Table 7**: Estimated cost of the Sandy Neck Beach Park HCP program

*If the Plover/Tern escorting programs are initiated, we anticipate additional costs of $2,500-$5,000 for seasonal Shorebird Monitoring staffing. Escorting would be at the end of the Plover/Tern nesting season and use of seasonal staff for this program would not negatively affect our other park wide monitoring duties.

To supplement the increase in full-time staff's dedication to the HCP program, the Town of Barnstable has hired an additional full-time NRO, Antonio Mancha. In addition, in 2023 we are going to increase our seasonal Shorebird Monitor staffing by one new member. These staff members are focused on other duties thus insuring all aspects of the park's operations and

endangered species monitoring commitments continue along with the HCP program. The cost of this additional personnel is not included in the HCP budget.

The funding provided for mitigation will be secured through the budget process and will be paid for by the Sandy Neck Enterprise Account prior to the "take" activities.[3] Therefore, the total annual cost of HCP implementation is estimated to be ***$65,436*** per year for each year during the three year COI term when covered activities are implemented.

| | **FY18** | **FY19** | **FY20** | **FY21** | **FY22** |
|---|---|---|---|---|---|
| Beach Parking | $129,490 | $121,985 | $98,405 | $192,030 | $149,833 |
| ORV Permit* | $572,590 | $481,357 | $442,274 | $687,145 | $768,093 |
| Camp Fire Permit | $3,525 | $3,115 | $2,615 | $1,105 | $4,760 |
| Special Permit | $930 | $1,085 | $780 | $270 | $1,700 |
| Camping Fees | $78,670 | $70,370 | $75,140 | $46,047 | $59,930 |
| Horse Fees | $1,960 | $4,820 | $2,260 | $580 | $750 |
| Sandwich Revenue | $47,072 | $48,248 | $49,454 | $51,775 | $51,933 |
| Beach Concession | $5,100 | $5,200 | $5,200 | $1,670 | $2,500 |
| Cottage Lease Fees | $55,375 | $58,850 | $54,750 | $31,900 | $87,00 |
| Parking Stickers | $71,258 | $76,169 | $72,877 | $85,546 | $86,507 |
| Merchandise | $39,179 | $41,102 | $27,941 | $60,774 | $50,628 |
| Miscellaneous | $346 | $1,150 | 0 | $361 | $603 |
| Earnings on Investments | $11,664 | $16,484 | $16,295 | $7,616 | $9,459 |
| ***Total Revenue*** | ***$1,017,159*** | ***$929,935*** | ***$847,991*** | ***$1,291,620*** | ***$1,273,696*** |

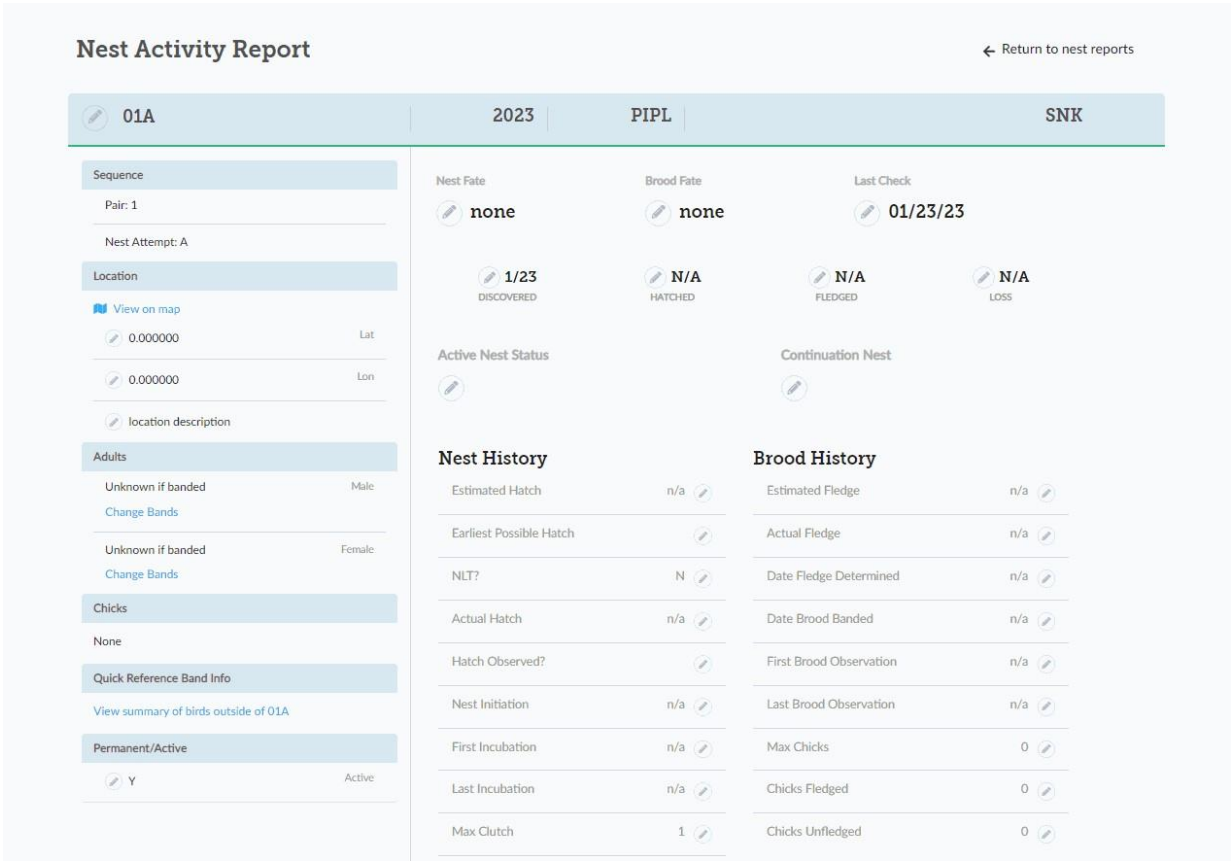
**Table 8:** Sandy Neck Enterprise Account revenue Fiscal Year 18 through Fiscal Year 22.

[3] This is the rate per take exposure set by DFW in the HCP

## X. MITIGATION PLAN

The Town of Barnstable is proposing to provide funding for three "takes" to NHESP to implement predator management, educational outreach and increased law enforcement off site, as described in the HCP. To fund the mitigation, in advance of carrying out covered activities, the Town has drafted an escrow agreement that was sent to NHESP on 12/15/22. Prior to the implementation of covered activities in any given year, the Town will deposit $17,400 into said escrow account in accordance with the schedule set forth in the Escrow Agreement.

## Attachment A



Nest Activity Report

← Return to nest reports

01A | 2023 | PIPL | SNK

Sequence
Pair: 1
Nest Attempt: A

Location
View on map
0.000000 Lat
0.000000 Lon
location description

Adults
Unknown if banded Male
Change Bands
Unknown if banded Female
Change Bands

Chicks
None

Quick Reference Band Info
View summary of birds outside of 01A

Permanent/Active
Y Active

Nest Fate: none
Brood Fate: none
Last Check: 01/23/23

1/23 DISCOVERED
N/A HATCHED
N/A FLEDGED
N/A LOSS

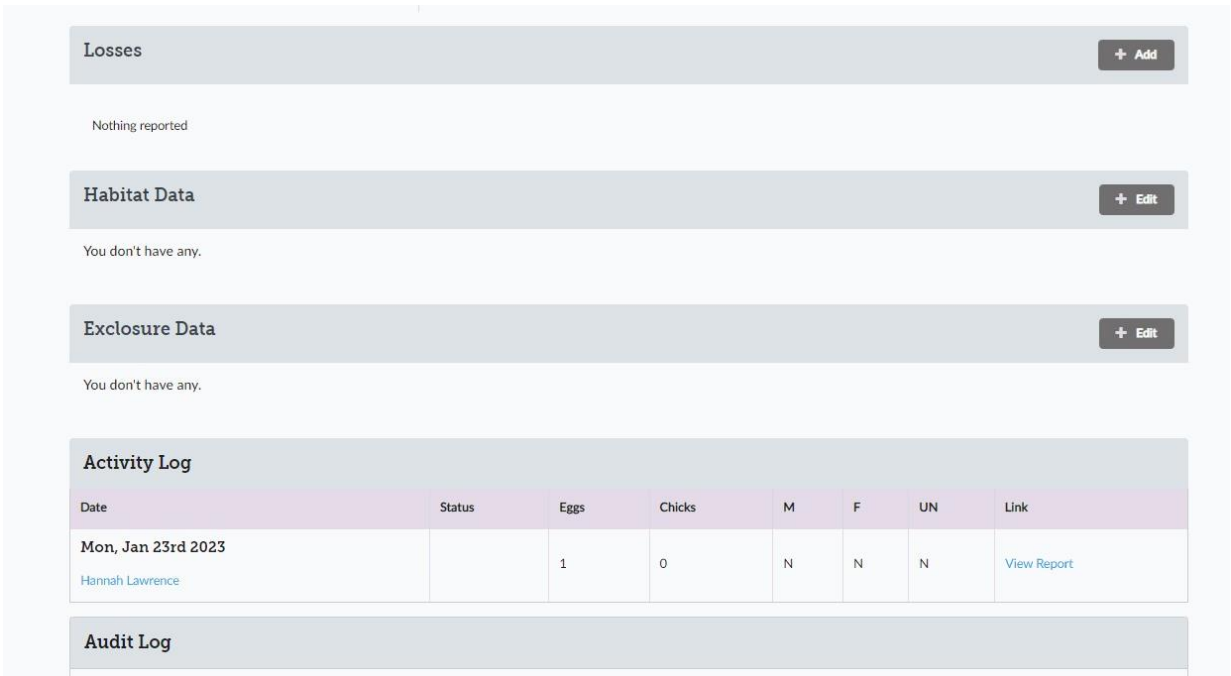
Active Nest Status
Continuation Nest

Nest History

| | |
|---|---|
| Estimated Hatch | n/a |
| Earliest Possible Hatch | |
| NLT? | N |
| Actual Hatch | n/a |
| Hatch Observed? | |
| Nest Initiation | n/a |
| First Incubation | n/a |
| Last Incubation | n/a |
| Max Clutch | 1 |

Brood History

| | |
|---|---|
| Estimated Fledge | n/a |
| Actual Fledge | n/a |
| Date Fledge Determined | n/a |
| Date Brood Banded | n/a |
| First Brood Observation | n/a |
| Last Brood Observation | n/a |
| Max Chicks | 0 |
| Chicks Fledged | 0 |
| Chicks Unfledged | 0 |



Losses + Add

Nothing reported

Habitat Data + Edit

You don't have any.

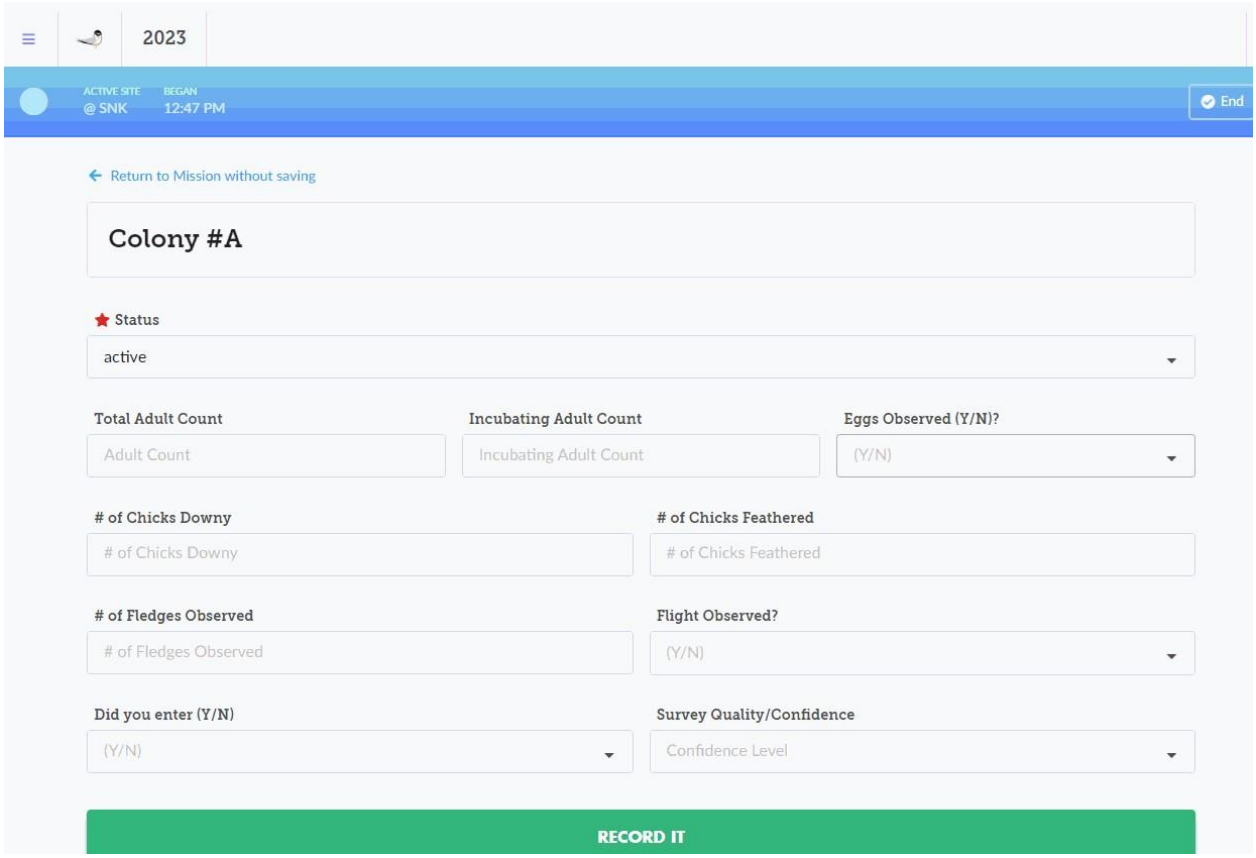
Exclosure Data + Edit

You don't have any.

Activity Log

| Date | Status | Eggs | Chicks | M | F | UN | Link |
|---|---|---|---|---|---|---|---|
| Mon, Jan 23rd 2023<br>Hannah Lawrence | | 1 | 0 | N | N | N | View Report |

Audit Log


2023
ACTIVE SITE
@ SNK
BEGAN
12:47 PM
End
Return to Mission without saving
Colony #A
Status
active
Total Adult Count
Adult Count
Incubating Adult Count
Incubating Adult Count
Eggs Observed (Y/N)?
(Y/N)
# of Chicks Downy
# of Chicks Downy
# of Chicks Feathered
# of Chicks Feathered
# of Fledges Observed
# of Fledges Observed
Flight Observed?
(Y/N)
Did you enter (Y/N)
(Y/N)
Survey Quality/Confidence
Confidence Level
RECORD IT

**Attachment B**

Tern Escort Program
Policies and Procedures-revised 12/14/22
Donna Bragg, Sandy Neck Division Assistant

This is a summary of the implementation for providing escorts past the Least Tern colony that is located between Trail 2 and Trail 4.

Sandy Neck staff has been escorting cottage owners past plovers and tern colonies and protocols have been in place to ensure safe, scheduled and orderly escorting past endangered shorebirds. The following is the prescribed method.

1. All requests for escorts are handled by supervisory Gatehouse staff.
2. All those requesting escorts will follow the written schedule.
3. All those requesting an escort must read and sign an agreement requiring adherence to all escort rules set forth by the Sandy Neck Management.
4. Non-compliance of escort rules will result in immediate permit revocation.
5. Escorts will be logged by management staff on a form that includes: date, name, cell phone number and time.

Staffing and mechanics of the escort:

Sandy Neck field staff are present on the ORV corridor at all times during summer operational hours. Staff members are assigned by management to perform the escorts either at the beginning of their shift or via two way radio contact. This method minimizes any disruption of other duties assigned to staff members.

Staff is instructed to meet all those being escorted at the escort closure line at the designated time and then safely escort vehicles past the endangered species. This system is the done in the same method for escorting patrons both on and off the beach.

Public Outreach:

1. Sandy Neck website
2. Sandy Neck email blasts
3. Informational handouts

**Attachment C**

Orders of Conditions SE3-5965

OOCs SE3-5965_.pdf

**Attachment D**

Orders of Conditions SE3-5966

OOCs SE3-5966.pdf

**Attachment E**

Sandy Neck Beach Park Regulations

Sandy Neck Regulations.pdf

**Attachment F**

Sandy Neck Beach Park Policies

SNK policies ORV.pdf

**Attachment G**

Plover Monitoring Data Sheet

Sandy Neck HCP Data Sheet.pdf

**Attachment H**

PIPL and LETE Escort Data Sheets

Sandy Neck HCP
Data Sheet_ Escorts.

**Attachment I**

Army Corps of Engineers PIPL and LETE Aging Guidelines

USACE Chick Aging
Guide.pdf

**Attachment J**

Approved Budget FY 2023

YTD Budget Report
FY23_0001.pdf