# Massachusetts Habitat Conservation Plan for Piping Plover

## 2022 Annual Report

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Bill Byrne/MassWildlife

MASSWILDLIFE

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## I. Executive Summary

On July 8, 2016, the United States Fish and Wildlife Service (USFWS) issued a 25-year Incidental Take Permit (ITP) to the Massachusetts Division of Fisheries and Wildlife (MassWildlife) in accordance with Section 10(a) (1) (B) of the Endangered Species Act of 1973 (ESA), as amended, 16 U.S.C. 1539 (a) (1) (B). Pursuant to the ITP, MassWildlife is responsible for administering the Massachusetts Statewide Habitat Conservation Plan (HCP). The HCP identifies covered activities that are authorized by the ITP that could expose Piping Plovers (*Charadrius melodus)* to "take." Incidental Take coverage can be extended by MassWildlife to approved landowners and beach managers through Certificates of Inclusion (COIs).

During the 2022 beach season, eight beach operators held valid COIs encompassing 10 permit-sites. Covered activities were carried out at six beaches: Duxbury Beach Reservation, Duxbury; Norton Point, Edgartown; Plymouth Long Beach, Plymouth; Nauset Beach, Orleans; Sandy Neck Beach Park, Barnstable; and West Dennis Beach, Dennis. Statewide, 16 pairs of Piping Plovers were exposed to covered activities: nine broods to the operation of a road or parking lot, four broods to recreational oversand vehicle (OSV) use, two pairs to reduced proactive symbolic fencing, and one pair to reduced fencing around the nest. No pairs were exposed to multiple activities. Intensive impact avoidance and minimization measures were implemented by COI-holders. Required HCP compliance and effectiveness monitoring were carried out by both MassWildlife and COI-holders.

The 15 pairs for which we had complete information that were exposed to covered activities fledged 26 chicks (1.73 chicks per pair). (We did not receive complete information for West Dennis Beach.)

- Of the 8 broods for which we had complete information that were exposed to use of roads and parking lots, seven fledged at least one chick for a total of 13 fledglings.
- Of the four broods exposed to OSV use, nine chicks fledged.
- The two pairs subject to reduced proactive symbolic fencing each fledged two chicks (four total).
- The pair subject to reduced fencing around the nest did not fledge any chicks.

Participation in the HCP expanded recreational opportunities at all six beaches where covered activities were implemented.

- **Plymouth Long Beach, Plymouth**. The Town of Plymouth allowed recreational vehicle access to a road and parking areas for 74 days when it might otherwise have been limited by the presence

of unfledged plover chicks (60 days) or tern chicks (40 days, 7 of which overlapped with plover implementation).

- **Duxbury Beach, Duxbury**. The Duxbury Beach Reservation operated roads and parking lots contributing to 53 days of recreational activity on Duxbury Beach.
- **Norton Point Beach, Edgartown**. The Trustees of Reservations conducted vehicle-based tours on the beach on 19 days when access would have otherwise been restricted.
- **Nauset Beach, Orleans**. From 27 July to 12 August, up to 180 OSVs per day to passed through the self-escort zone during three daily access windows, allowing access 16 days earlier than would otherwise be allowable.
- **Sandy Neck Beach Park, Barnstable**. The OSV beach remained open for 27 days when there likely would have been a full beach closure absent implementation.
- **West Dennis Beach, Dennis**. Parking lots and roads were kept open over a period of several weeks when they would otherwise have been closed to recreational traffic.

On-site mitigation consisted of selective predator management designed to increase productivity and more than offset any harm resulting from exposure to the covered activities. Two off-site mitigation projects occurred in 2022. In all, 130 breeding pairs of Piping Plovers benefited from selective predator management under the HCP, substantially more than the minimum benefit of 44.5 pairs required pursuant to the HCP. This report documents compliance with the HCP and provides information about other state-listed species, Least Terns and Diamond-backed Terrapins, which may be exposed to take by covered activities.

## II. Annual Report Requirements

This annual report summarizes HCP implementation activities during 2022 and has been prepared by MassWildlife in accordance with the requirements of the HCP.

The goals of the annual report are as follows:

- To provide the information and data necessary for MassWildlife to demonstrate to the USFWS and the public that the HCP is being implemented properly.
- To disclose any problems with HCP implementation and the corrective measures planned or implemented to address the problems.
- To identify administrative or minor changes to HCP components required to increase the success of conservation actions.
- To identify the results and/or need for adaptive management and changed circumstances, and whether any HCP or ITP changes may be subsequently proposed as a result pursuant to Chapter 3.3.3. of the HCP.

A bulleted list of the required contents of the annual report is provided on pages 5-9 of the HCP. To facilitate review by the USFWS and the public, the remainder of this report systematically addresses each item on the list. Supporting documentation and data are included in the Appendices, which are available upon request.

### II.1 Description of all covered activities implemented during the reporting period by activity type and location.

Sixteen pairs of Piping Plovers were exposed to three activities covered under the HCP. **Tables 1a, 1b, and 1c** provide details of permits and implementation at each site, including duration of covered activities and productivity of exposed pairs.

1. *Use of Roads and Parking Lots in Vicinity of Unfledged Chicks***.** Nine broods were exposed.

- **Duxbury Beach, Duxbury**. One brood was exposed to recreational traffic on Gurnet Rd. when crossing between the beachfront and bayside; this brood was herded. (Additional broods crossed but were exposed to essential vehicle traffic only.) Another brood was exposed to barriers. Eight chicks were exposed to recreational traffic; six of those fledged.
- **Plymouth Long Beach, Plymouth**. Five broods crossed or were in the vicinity of Ryder Way and parking lots. One of these broods was exposed to barriers. Six of 16 exposed chicks fledged.
- **West Dennis Beach, Dennis**. Two of twelve pairs (16.7%) were impacted when parking lots and roads near unfledged broods were kept open.

2. *Oversand Vehicle Use in Vicinity of Unfledged Chicks*. Four broods were exposed.

- **Norton Point, Edgartown**. Two broods (six chicks) were exposed to OSVs operated by the public and escorted by The Trustees of Reservations; four chicks fledged. Cause of loss for two chicks was undetermined.

- **Nauset Beach, Orleans.** The public self-escorted their OSVs past two broods (five chicks); all five chicks fledged.

3. *Recreation and Beach Operations*. Two pairs/broods were exposed.

- *Reduced Proactive Fencing of Habitat*. Two pairs/broods were exposed.
    - *i.* **Sandy Neck Beach Park, Barnstable**. In all, 1.618 ac of nesting habitat were impacted. Fencing was initially moved toward the base of dune over 0.86 miles in the Recreation Zone (RZ), but in early April, a portion of it (0.1 miles) was expanded back to the dimensions recommended in the Guidelines to allow two displaced pairs to settle in an area that did not impede use of Trail 1 in the RZ. Beach raking (41 times) over 1.55 acres and 996 linear ft (2,988 $ft^2$) of coverboards were used to deter the pairs from a portion of the RZ. These pairs nested elsewhere. The nest of one pair was lost to crow predation, and the pair did not renest. The first nest of the other pair was also lost to crow predation, but the pair renested and fledged one chick.
- *Reduced Fencing Around the Nest*.
    - **i. Duxbury Beach, Duxbury**. One pair was exposed to reduced fencing around the nest to facilitate use of a beach crossover for vehicles. The nest failed due to coyote predation.
- *Nest Moving.* Not implemented.

**Table 1a**. Covered activities permitted (X) and implemented (gray shading) in 2022.

| | Covered Activities | | | Specfic Permissions | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Location** | **Roads & Parking Lots** | **Rec. & Bch. Ops.** | **Oversand Vehicle Use** | **Reduced proactive symbolic fencing** | **Reduced symbolic fencing around nests** | **Nest moving** | **Barriers** | **Chick herding** | **Deterrents (incl. raking)** |
| Cape Poge Wildlife Refuge, Leland Beach, Wasque Point, & Norton Point, Edgartown (TTOR) | | X | X | X | X | | | | |
| Coskata-Coatue, Nantucket (TTOR) | | X | X | X | X | | | | |
| Duxbury Beach, Duxbury (Duxbury Beach Reservation) | X | X | | X | X | X | X | X | X |
| Horseneck Beach State Reservation, Westport (DCR) | X | X | | X | X | | X | | X |
| Nauset Beach, Orleans | | X | X | | X | X | | | |
| North (Nauset) Beach, Chatham | | X | X | X | X | | | | |
| Plymouth Long Beach, Plymouth | X | | X | | | | X | | |
| Revere Beach State Reservation, Revere; Winthrop Shore Reservation, Winthrop; Nahant Beach State Reservation, Nahant (DCR) | X | X | | X | X | X | X | | X |
| Sandy Neck Beach Park, Barnstable | | X | X | X | | | | | X |
| West Dennis Beach, Dennis | X | | | | | | | | |

**Table 1b**. Take exposures permitted and implemented, productivity, and habitat affected in 2022.

| Location | Description of covered activity implementation | No. permitted take exposures | No. take exposures used | % of total pairs exposed | Productivity, exposed pairs (fledglings/ pair) | Productivity, unexposed pairs (fledglings/ pair) | Overall site productivity (fledglings/ pair) | Nesting habitat affected (acres) |
|---|---|---|---|---|---|---|---|---|
| Cape Poge Wildlife Refuge, Leland Beach, Wasque Point, & Norton Point, Edgartown (TTOR) | A trained escort on a utility vehicle led a queue of OSVs through the 1,712'-long travel corridor. 2 pairs exposed. | 2 | 2 | 7 | 2 | 0.22 | 0.55 | 1.45 |
| Coskata-Coatue, Nantucket (TTOR) | None. | 1 | 0 | 0 | n/a | n/a | 1.16 | 0 |
| Duxbury Beach, Duxbury (Duxbury Beach Reservation) | Traffic along roadway temporarily stopped to facilitate crossing events for PIPL broods. Occasional use of herding and barriers. Fencing was reduced from 50 m to 36 m to allow the reopening of vehice crossover 1. 3 pairs exposed. | 12 | 3 | 7.5 | 2 | 1.81 | 1.82 | 0.65 |
| Horseneck Beach State Reservation, Westport (DCR) | None (Least Tern only). | 4 | 0 | 0 | n/a | n/a | 2.2 | 0 |
| Nauset Beach, Orleans | Up to 180 vehicles self-escorted past broods twice per day through 15' wide corridor over distance of ~450.' 2 pairs exposed. | 2 | 2 | 4.76 | 2.5 | 1.15 | 1.21 | 3.09 |
| North (Nauset) Beach, Chatham | None. | 2 | 0 | 0 | n/a | n/a | 1.9 | 0 |
| Plymouth Long Beach, Plymouth | Ryder Way and parking areas were open to non-essential vehicle travel during daylight hours. Monitors were able to temporarily stop traffic if chicks approached within 50' of the road. A barrier was used along part of the roadway. 5 pairs exposed. | 7 | 5 | 10.5 | 1.2 | 1.27 | 1.26 | 0.23 |
| Revere Beach State Reservation, Revere; Winthrop Shore Reservation, Winthrop; Nahant Beach State Reservation, Nahant (DCR) | None. | 13 | 0 | 0 | n/a | n/a | Overall 0.52 (Revere 0.47, Winthrop 0.50, Nahant 0.75) | 0 |
| Sandy Neck Beach Park, Barnstable | Symbolic fencing was reduced and moved toward the dune ~4-5' beginning April 1. To further deter nesting, beach raking was conducted over 1.55 acres and coverboards were installed over 0.068 acres. 2 pairs exposed. | 2 | 2 | 4 | 0.5 | 2 | 1.9 | 1.618 |
| West Dennis Beach, Dennis* | Parking lots and roads were kept open over a period of several weeks when they would otherwise have been closed to recreational traffic. | 2 | 2 | 16.7 | no data | no data | 2.17 | no data |

*At West Dennis Beach, 2 pairs were exposed, but reporting was incomplete. 1 exposed pair fledged 1 chick, but the other pair was unknown.

**Table 1c**. Details of take exposures in 2022.

| Location | Description of Covered Activity Implementation | Pair identifier | No. chicks exposed | No. fledged from exposed pairs | Start of implementation | End of implementation | No. days pair/ brood exposed to covered activity | Age of chicks when first exposed (days) |
|---|---|---|---|---|---|---|---|---|
| Cape Poge Wildlife Refuge, Leland Beach, Wasque Point, & Norton Point, Edgartown (TTOR) | "OSV use" | 19 | 2 | 2 | 7/4/2022 | 8/8/2022 | 19 | 0 |
| Cape Poge Wildlife Refuge, Leland Beach, Wasque Point, & Norton Point, Edgartown (TTOR) | "OSV use" | 24 | 4 | 2 | 7/4/2022 | 8/8/2022 | 18 | 0 |
| Duxbury Beach, Duxbury (Duxbury Beach Reservation) | "Roads & parking lots" with herding | 6A | 4 | 3 | 6/4/2022 | 7/3/2022 | 29 | 4 |
| Duxbury Beach, Duxbury (Duxbury Beach Reservation) | "Roads & parking lots" with barrier | 23A | 4 | 3 | 6/13/2022 | 7/24/2022 | 41 | 0 |
| Duxbury Beach, Duxbury (Duxbury Beach Reservation) | "Recreation & beach ops" - Reduced fencing around the nest | 10A | 0 | 0 | 5/14/2022 | 5/17/2022 | 3 | n/a |
| Nauset Beach, Orleans | "OSV use" | RW1b | 3 | 3 | 7/27/2022 | 7/31/2022 | 5 | 24 |
| Nauset Beach, Orleans | "OSV use" | RW2b | 2 | 2 | 7/27/2022 | 8/12/2022 | 16 | 12 |
| Plymouth Long Beach, Plymouth | "Roads & parking lots" with barrier | 5A | 4 | 0 | 5/29/2022 | 6/24/2022 | 27 | 0 |
| Plymouth Long Beach, Plymouth | "Roads & parking lots" | 20A | 3 | 2 | 6/2/2022 | 7/2/2022 | 30 | 0 |
| Plymouth Long Beach, Plymouth | "Roads & parking lots" | 23A | 4 | 2 | 6/6/2022 | 7/6/2022 | 30 | 0 |
| Plymouth Long Beach, Plymouth | "Roads & parking lots" | 38A | 4 | 1 | 6/14/2022 | 7/12/2022 | 29 | 0 |
| Plymouth Long Beach, Plymouth | "Roads & parking lots" | 41A | 1 | 1 | 7/6/2022 | 8/3/2022 | 29 | 0 |
| Sandy Neck Beach Park, Barnstable | "Recreation & beach ops" - reduced proactive symbolic fencing, beach raking, coverboards | 9 | 0 | 2 | 4/1/2022 | 6/9/2022 | 33 | n/a |
| Sandy Neck Beach Park, Barnstable | "Recreation & beach ops" - reduced proactive symbolic fencing, beach raking, coverboards | 34 | 0 | 2 | 4/1/2022 | 6/9/2022 | 37 | n/a |
| West Dennis Beach, Dennis | "Roads & parking lots" | 11A | 4 | 1 | no data | no data | no data | no data |
| West Dennis Beach, Dennis | "Roads & parking lots" | no data | no data | no data | no data | no data | no data | no data |

## II.2 Summary of annual take exposure.

The total allowable take exposure for a given year is based on a three-year rolling average of the statewide Piping Plover breeding population (**HCP Table 3-1**). The average breeding population size for 2019 – 2021 was 834.8 breeding pairs, based on Adjusted Total Count, resulting in an allowable exposure to covered activities of 7%, or a maximum of 58 territories, pairs, nests, and/or broods that could be exposed to covered activities statewide (**Table 2**). During 2022, 16 territories/pairs/nests/broods were exposed to covered activities, and exposure at all but one site was <15% of the breeding population size at that site (**Tables 1, 4**).

Under a formal Section 7 consultation in 2010 with the Cape Cod National Seashore (CACO), the USFWS issued an incidental take statement for the exposure to take of up to three pairs of Piping Plovers to

flexible management. The USFWS completed a second formal consultation with the CACO in 2021 for additional flexible management actions and locations at which the management could be implemented. Annually, up to five Piping Plover pairs may be exposed to take beginning in 2022. Flexible management was implemented for one pair in 2022, resulting in an additional Massachusetts take exposures (M. Harrington, personal communication, 2023). Although take exposure for recreational activities on federal properties is not associated with the Massachusetts Piping Plover HCP, MassWildlife is required to subtract these authorizations from the total allowable statewide take exposure available to HCP participants in a given year.

**Table 2**. Abundance of breeding Piping Plovers in Massachusetts, 2019-2021, and allowable and actual take exposure for 2022 under the Massachusetts Piping Plover HCP and the National Park Service's flexible management program at Cape Cod National Seashore.

| | **YEAR** | | |
|---|---|---|---|
| | **2019** | **2020** | **2021** |
| **MA breeding pairs (*adjusted total count*)** | 743 | 794.5 | 967 |
| **MA *adjusted total count*, 3-year average (2019 – 2021):** | 834.8 | | |
| **Maximum allowable exposure in MA, 2022 (7%):** | 58 territories/pairs/nests/broods | | |
| **Statewide HCP (2022)** | | | |
| **Maximum allowable exposure** | 53 territories/pairs/nests/broods | | |
| **Actual exposure** | 16 territories/pairs/nests/broods | | |
| **Flexible management, NPS-Cape Cod National Seashore (2022)** | | | |
| **Maximum allowable exposure** | 5 territories/pairs/nests/broods | | |
| **Actual exposure** | 1 territory/pair/nest/brood | | |

### II.3 Summary of the annual mitigation implemented, and any mitigation credits or deficits outstanding from previous years.

**Offsite mitigation**. MassWildlife partially funded two organizations to conduct three offsite mitigation projects during the 2022 season. The Massachusetts Audubon Society, contracting with USDA-Wildlife Services, conducted selective predator management at Allens Pond Wildlife Sanctuary, Dartmouth; this benefitted 24 pairs of plovers and 298 pairs of Least Terns. BiodiversityWorks conducted selective predator management at Dogfish Bar, Little Beach, and Squibnocket/Long Beach on Martha's Vineyard; this benefitted 16 pairs of plovers and 416 pairs of Least Terns. BiodiversityWorks also conducted an odor misinformation study at Edgartown Great Pond; this did not provide immediate benefits to beach-nesting birds but contributed to University of Rhode Island graduate student research on the topic.

**Onsite/internal mitigation**. Three COI-holders used their own resources to offset take exposures at four sites. In all cases, USDA APHIS Wildlife Services carried out selective predator management in accordance with plans approved by the New England Field Office of the USFWS for the purpose of HCP mitigation. This work was not cost-shared with MassWildlife.

1. **Department of Conservation and Recreation**. Work onsite at Horseneck Beach and Demarest Lloyd State Park, Dartmouth benefitted 19 pairs of plovers.
2. **Duxbury Beach Reservation**. Work onsite at Duxbury Beach benefitted 40 pairs of plovers.
3. **Town of Plymouth**. Work onsite at Plymouth Long Beach benefitted 47.5 pairs of plovers.

The COI-holders implemented more than enough selective predator management to meet 2022 mitigation requirements. Therefore, there is a mitigation credit that carries forward (**Table 3**). At the mitigation ratios of 2.5:1 (OSV Use and Reduced Fencing) and 3:1 (Roads and Parking Lots), selective predator management was required to benefit 44.5 pairs in order to mitigate for exposures that occurred during 2022. In fact, selective predator management benefitted 130.69 pairs: COI-holders implementing on-site/internal mitigation benefitted 106.5 pairs while the portion of offsite mitigation funded through escrow benefitted 24.19 pairs. Including unexpired credits carried forward from previous years (2019 – 2021), at the end of 2022 there were 100.64 credits statewide and an additional 208.5 credits allocated to individual sites (*i.e.*, because the COI-holder directly funded mitigation activities). However, statewide credits from 2019 expired after 2022, reducing the number of statewide credits that will carry into 2023 to 28.38. No individual site credits expired at the end of 2022.

**Tables 3 a-c** provide additional detail on mitigation requirements, deficits, and credits.

**Table 3a**. Predator management mitigation requirements and credits for COI-holders under the Massachusetts Piping Plover HCP in 2022.

| 2022 COI Site | No. authorized exposures | No. actual exposures, 2022 | Selective predator management mitigation, required credits | Site credits gained, 2022[a] | Annual site credit balance, 2022[ab] | Total site credit balance, end of 2022[ac] | Non-expired credits carrying into 2023[a] | Year credits will expire[d] |
|---|---|---|---|---|---|---|---|---|
| Barnstable | 2 | 2 | 5 | 5 | 0 | 0 | 0 | 2023 |
| Chatham | 2 | 0 | 0 | 0 | 0 | 5 | 5 | 2023 |
| Dennis | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2023 |
| Duxbury | 12 | 3 | 8.5 | 40 | 31.5 | 34.5 | 34.5 | 2024 |
| Edgartown | 2 | 2 | 5 | 0 | -5 | 5 | 5 | 2023 |
| Nantucket | 1 | 0 | 0 | Same as Edgartown | Same as Edgartown | Same as Edgartown | Same as Edgartown | 2023 |
| Horseneck | 4 | 0 | 0 | 19 | 19 | 77.5 | 77.5 | 2024 |
| Revere/ Winthrop/ Nahant | 13 | 0 | 0 | Same as Horseneck | Same as Horseneck | Same as Horseneck | Same as Horseneck | 2023 |
| Orleans | 2 | 2 | 5 | 0 | -5 | 0 | 0 | 2022 |
| Plymouth | 7 | 5 | 15 | 47.5 | 32.5 | 86.5 | 86.5 | 2023 |
| **TOTAL** | **47** | **16** | **38.5** | **111.5** | **73** | **208.5** | **208.5** | |

**Table 3b**. Predator management mitigation programs and credits under the Massachusetts Piping Plover HCP in 2022.

| 2021 Mitigation site | Total cost | HCP cost (COI-holder or grant awardee) | HCP cost (State) | HCP cost-share (COI-holder or grant awardee) | Actual pairs benfitting | Site credits gained (selective pred. mgmt. only) | Site credits gained (escrow) | State credits gained (selective pred. mgmt. only) | Site credits used | Location(s) of credit use |
|---|---|---|---|---|---|---|---|---|---|---|
| Plymouth | $13,020.00 | $13,020.00 | $0.00 | 100% | 47.5 | 47.5 | n/a | 0 | 15 | Plymouth |
| Duxbury | $11,870.91 | $11,870.91 | $0.00 | 100% | 40 | 40 | n/a | 0 | 8.5 | Duxbury |
| Horseneck, Demarest Lloyd | $20,285.87 | $20,285.87 | $0.00 | 100% | 19 | 19 | n/a | 0 | 0 | Revere, Winthrop, Nahant, Horseneck |
| Dogfish Bar, Little, Squibnocket/ Long | $14,491.60 | $8,897.00 | $5,594.60 | 61% | 16 | n/a | n/a | 6.18 | n/a | n/a (offsite mitigation) |
| Allens Pond | $19,647.00 | $4,897.00 | $14,750.00 | 25% | 24 | n/a | n/a | 18.02 | n/a | n/a (offsite mitigation) |
| *Subtotal, mitigation sites* | *$79,315.38* | *$58,970.78* | *n/a* | | *146.5* | *106.5* | *0* | *24.20* | *23.5* | - |
| *Subtotal, State & escrow sites* | *n/a* | *n/a* | *$20,344.60* | | *0* | *0* | *5* | *-5* | *5* | 5 escrow credits from Barnstable are subtracted from 'State credits gained' so that they are not double-counted when the State funds mitigation |
| **TOTAL** | **$79,315.38** | **$58,970.78** | **$20,344.60** | | **146.5** | **106.5** | **5** | **19.20** | **28.5** | |

**Table 3c.** Statewide predator management net mitigation credits under the Massachusetts Piping Plover HCP in 2022.

| 2022 Credit Type | Credits, end of 2021 | Credits gained, 2022 | Credits used, 2022 | Net credits, end of 2022 | Credits expiring, 2022 | Credits carrying into 2023 |
|---|---|---|---|---|---|---|
| Credits Allocated to Individual Sites (includes escrow credits) | 141.5[a] | 111.5 | 44.5 | 208.5 | 0 | 208.5 |
| Credits Available Statewide | 81.454 | 19.19 | 0 | 100.644 | 72.265 | 28.379 |
| **TOTAL NET CREDITS** | **222.954** | **130.69** | **44.5** | **309.144** | **72.265** | **236.879** |

[a] updates error in 2020 report

## II.4 Summary of exceptions to the restrictions on the number or territories/nests/broods affected (15% vs. 75%) and habitat impacts (2 acres/10% vs. 4 acres/20%) employed for the covered activities (as provided for in the Plan).

- *Restriction on the number of territories/pairs/nests/broods affected (15% vs. 75%)* – The limit on number of pairs that can be affected is calculated based on the number of pairs present during the previous breeding season (HCP Section 3.2.2.2., p. 3-9). Up to eight sites annually may exceed 15%. In addition, sites with six or fewer pairs may impact one pair.

- ***Number of exceptions***. Based on number of authorized take exposures and 2021 population size, five sites had potential to exceed 15% of pairs affected, although only one did so in 2022 (**Table 4**).
- ***Site***: West Dennis Beach
  - ***Covered activity***. *Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks*
  - ***Description***. Two of twelve pairs (16.7%) were impacted when parking lots and roads near unfledged broods were kept open.

- *Restriction on habitat impacts (2 ac/10% vs. 4 ac/20%)* – This restriction refers specifically to the covered activity *Recreation and Beach Operations-Reduced Proactive Symbolic Fencing* (HCP Section 3.2.2.2, pp. 3-8 – 3-9). Up to five sites annually may exceed 2 ac or 10% of habitat impacted, whichever is less, up to a maximum of 4 ac or 20%, whichever is less. In 2022, no sites exceeded 2 ac/10% of habitat due to this covered activity (**Table 4**).

**Table 4**. Percent of pairs and nesting habitat impacted by covered activities, 2022. Shaded cells indicate authorized and actual exceptions to restrictions.

| Permit-site | No. PIPL take exposures permitted | No. PIPL pairs in previous year (2021) | Max. % of PIPL pop. to be affected (authorized) at site, 2022 | No. take exposures, 2022 | No. PIPL pairs, 2022 | % PIPL pairs affected (actual), 2022 | Acreage subject to *Reduced Proactive Fencing* , 2022 | % of suitable nesting habitat impacted by *Reduced Proactive Fencing* , 2022 |
|---|---|---|---|---|---|---|---|---|
| Coskata-Coatue, Nantucket | 1 | 5 | 20.0 | 0 | 5 | 0.0 | 0 | 0 |
| Duxbury Beach | 12 | 31 | 38.7 | 3 | 40 | 7.5 | 0 | 0 |
| East/Leland/Wasque/Norton, Edgartown | 2 | 25 | 8.0 | 2 | 29 | 6.9 | 0 | 0 |
| Horseneck Beach State Res., Westport | 4 | 14 | 28.6 | 0 | 15 | 0.0 | 0 | 0 |
| Nauset, Orleans | 2 | 43 | 4.7 | 2 | 42 | 4.8 | 0 | 0 |
| North (Nauset) Beach, Chatham | 2 | 23 | 8.7 | 0 | 21 | 0.0 | 0 | 0 |
| Plymouth Long Beach | 7 | 38 | 18.4 | 5 | 48 | 10.5 | 0 | 0 |
| Revere, Winthrop, Nahant | 13 | 30 | 43.3 | 0 | 27 | 0.0 | 0 | 0 |
| Sandy Neck Beach Park | 2 | 38 | 5.3 | 2 | 50 | 4.0 | 1.618 | 2.0 |
| West Dennis Beach | 2 | 8 | 25.0 | 2 | 12 | 16.7 | 0 | 0 |

**II.5 Year-to-date cumulative summary (*i.e.*, from the start of the permit term) of temporary impacts to Piping Plover habitat resulting from covered activities (Table 5).**

**Table 5.** Annual and cumulative temporary impacts to Piping Plover habitat under the activity *Recreation and Beach Operations - Reduced Proactive Symbolic Fencing*

| Year | Temporary habitat impacts[a] (ac) | Cumulative temporary habitat impacts[a] (ac) | Description |
|---|---|---|---|
| 2016 | 0 | 0 | Covered activities were confined to existing roads, parking lots, and OSV corridors, and, therefore, did not result in any additional impacts to habitat. |
| 2017 | 1.8 | 1.8 | Reduced proactive fencing and beach raking to deter plovers at 2 sites: Winthrop Shore (0.6 ac) and Sandy Neck Beach Park (1.2 ac). |
| 2018 | 11.66 | 13.46 | Reduced proactive fencing and beach raking to deter plovers at 3 sites: Sandy Neck Beach Park (1.2 acres), Revere Beach (0.96 acres), and Horseneck Beach (9.5 acres). To deter Least Terns only: Winthrop Shore (0.44 acres). |
| 2019 | 2.1 | 15.56 | Reduced proactive fencing, beach raking, and/or coverboards to deter plovers at 3 sites, Sandy Neck Beach Park (1.2 acres), Revere Beach (0.6 acres), and Horseneck Beach (0.3 acres). To deter Least Terns only: Horseneck Beach (5.7 acres). |
| 2020 | 4.92 | 20.48 | Reduced proactive fencing, beach raking, and/or physical deterrents (coverboards, tarps, flagging) at 3 sites: Horseneck Beach (0.3 ac), Sandy Neck Beach Park (3.12 ac), and Duxbury Beach (1.5 ac in a gravel parking lot). |
| 2021 | 1.55 | 22.03 | Reduced proactive fencing, beach raking, and coverboards to deter plovers at Sandy Neck Beach Park (1.55 ac). |
| 2022 | 1.618 | 23.648 | Reduced proactive fencing, beach raking, and coverboards to deter plovers at Sandy Neck Beach Park (1.618 ac). |

[a]For Piping Plovers only, under the activity *Reduced Proactive Symbolic Fencing*

**II.6 Year-to-date and cumulative (*i.e.*, from the start of the permit term) quantification of exposure to incidental take of Piping Plover individuals for the purpose of demonstrating compliance with the authorized level of take on the ITP (Table 6).**

**Table 6.** Annual and cumulative quantification of Piping Plover take exposure under the Massachusetts Piping Plover HCP, 2016 – 2022.

| Year | No. Pairs/ Territories/ Nests/ Broods Exposed | Total Statewide Allowable Take Exposures | % of Statewide Allowable Exposure | Cumulative No. Pairs/ Territories/ Nests/ Broods Exposed |
|---|---|---|---|---|
| 2016 | 3 | 47 | 6.4 | 3 |
| 2017 | 5 | 46 | 10.9 | 8 |
| 2018 | 19 | 46 | 41.3 | 27 |
| 2019 | 19 | 46 | 41.3 | 46 |
| 2020 | 22 | 48 | 45.8 | 68 |
| 2021 | 14 | 51 | 27.5 | 82 |
| 2022 | 16 | 58 | 27.6 | 98 |

**II.7 Description of all experimental vegetation management actions implemented during the reporting period including a year-to-date and cumulative summary of the extent and location of land cover types enhanced through vegetation management.**

To date, two experimental habitat management projects have been implemented, both in 2017.

1. **Duxbury Beach**. Vegetation in five experimental plots was scraped or buried, creating and maintaining five areas of potential nesting habitat totaling approximately 0.77 acres. Two pairs nested in the replicated habitats in both 2017 and 2018. Duxbury Beach maintained these sites by burying vegetation in February 2019, and three pairs subsequently nested within the experimental plots. In 2020, two pairs nested and each fledged three chicks. In 2021, one pair nested and fledged one chick. In 2022, three pairs nested and fledged nine chicks.
2. **Winthrop Shore Reservation**. Cobble was removed from the southern portion of the shorebird nesting area, where two pairs of Piping Plovers and 20-25 pairs of Least Terns nested in 2017. Plovers and terns continued to nest in this area in 2018, 2019, 2020, 2021, and 2022.

**II.8 Assessment of the efficacy of vegetation management actions in achieving performance objectives and recommended changes to improve the efficacy of the methods.**

Piping Plovers continued to nest in the experimental habitat areas at both Duxbury Beach and Winthrop Shore in 2022.

**II.9 List of all plan participants and activities authorized for take coverage.**

See **Table 1**.

**II.10 Accounting of all mitigation funds collected from plan participants during the previous year, and any unspent funds from previous years (Table 7).**

**Table 7**. Accounting of Offsite Mitigation Funds

| **Statewide Mitigation Funds Balance (end of 2022)** | |
|---|---|
| *Balance from Previous Years* | |
| $67,731.89 | Unspent, end of 2021 |
| *Returned escrow interest* | |
| $1,904.89 | Returned interest earned from escrow accounts |
| *Income* | |
| $11,600.00 | Barnstable Escrow |
| *Expenses* | |
| $14,750.00 | Massachusetts Audubon Society, Selective Predator Management at Allens Pond Wildlife Sanctuary, 2022 |
| $9,988.00 | BiodiversityWorks, Selective Predator Management at Piping Plover and Least Tern Nesting Beaches on Martha's Vineyard, 2022 |
| *Unspent Funds, end of 2022* | |
| $52,689.00 | |

**II.11 If appropriate, any updates to the mitigation fee as described under the adjustment process in Section 5.2.2.1 and an updated annual budget for MassWildlife's plan implementation.**

No adjustments to the mitigation fee or MassWildlife implementation budget are required at this time.

**II.12 If available at the time of the annual report, evidence that MassWildlife's needed funding has been assured for the coming year by the State legislature, and the funds have been earmarked or segregated for their intended purpose within MassWildlife's accounting system.**

Funding for Massachusetts Fiscal Year 2022 (ending June 30, 2023) has been secured and funding for Fiscal Year 2024 (beginning July 1, 2024) has been requested (**Appendix A**).

**II.13 Accounting of the cost of all mitigation measures implemented in the previous fiscal year and the expected cost of mitigation measures in the upcoming fiscal year.**

An accounting for the costs of all mitigation measures implemented in 2022 ($79,315.38) is provided in **Table 3b**. Additional information on off-site mitigation is provided in **Table 5**. The cost of onsite/internal mitigation is expected to be similar in 2023. MassWildlife has already established contracts totaling approximately $45,000 for offsite mitigation activities in 2023, including selective predator management, increased enforcement, and education and outreach.

**II.14 Record of any grants and Plan implementation contracts awarded to plan participants, other landowners, or implementation partners.**

None. See "*II.3 Offsite mitigation*."

**II.15 Description of the adaptive management process used during the reporting period, if applicable.**

No adaptive management took place during the 2022 reporting period.

**II.16 Summary for the reporting period of the monitoring program objectives, techniques, and protocols, including monitoring locations, variables measured, sampling frequency, timing and duration, and analysis methods.**

The monitoring program documented implementation of covered activities, compliance with the Guidelines, and mitigation programs. COI-holders kept required logs of initiation dates of covered activities; number of broods and chicks exposed; locations of exposed broods and any impacts to the broods associated with the covered activity; and monitoring frequency. MassWildlife was notified at least 24 hours in advance of implementing the covered activities and subsequently conducted COI compliance site visits at each site implementing a COI. Compliance with the impact avoidance and minimization protocols was documented in logs and summarized in the COI-holder final reports. Final reports and invoices also document implementation of required mitigation, which was also reported by USDA APHIS.

The monitoring program also aimed to assess the impacts of covered activities and effectiveness of impact minimization measures and mitigation programs. Effectiveness monitoring consisted of documenting pair behavior, chick behavior, crossing frequency, and nesting and fledging success at the covered activity implementation sites. Measures of reproductive success were also collected at the selective predator management implementation sites. Monitoring information was provided to

MassWildlife in HCP annual site reports and through the PIPLODES online database. MassWildlife coordinated the synthesis of 2022 Piping Plover data by cooperators, performed quality control, and finalized the 2022 index count, adjusted total count, and productivity of breeding Piping Plovers.

**II.17 Assessment of the efficacy of the monitoring and research program and recommended changes to the program based on interpretation of monitoring results and research findings, if applicable.**

***Compliance monitoring***.
Compliance monitoring occurred at all sites that implemented covered activities in 2022; however, West Dennis Beach appeared to be unable to adequately conduct compliance monitoring, implement the Guidelines, or properly implement its approved avoidance and minimization measures. Contributing factors included a significant increase in number of nesting pairs and difficulty in securing seasonal staff. Subsequently, the Massachusetts Audubon Society assisted with monitoring activities at the site in an effort to achieve compliance with the Guidelines and COI. (See also, II.20, below.)

***Effectiveness monitoring***. Making inferences about the effectiveness of mitigation measures and impacts of covered activities on productivity is methodologically challenging and will require larger sample sizes and possibly other methods, such as establishment of predator management control sites. There are no recommended changes to the monitoring program at this time.

**II.18 Description of all Plan-directed studies undertaken during the reporting period; a summary of study results; and a description of integration with monitoring, assessment, and compliance elements.**

No Plan-directed studies were undertaken in 2022.

**II.19 Description of any actions taken or expected regarding adaptive management and/or changed circumstances, including remedial actions resulting from any Plan or permit amendments granted in the prior years, if applicable.**

No actions were taken or expected regarding adaptive management and/or changed circumstances in 2022.

**II.20 Description of any unforeseen circumstances that arose and responses taken, if applicable.**

In July 2022, the Town of Plymouth was granted an emergency amendment to increase its take exposures from five to seven pairs at Plymouth Long Beach due to an unexpected increase in the population size and number of plovers nesting in proximity to the road.

MassWildlife worked closely with the Town of Dennis at West Dennis Beach to help it secure an appropriate level of monitoring and provided regular guidance to assist it with compliance (see II.17, above). Following the nesting season, MassWildlife continued to reach out to the Town to discuss bringing it back into compliance in future years. The Town did not submit a 2022 annual site report and indicated that it would not seek a COI for 2023 (2022 was the final year of its COI). To be considered eligible for future participation in the HCP program, the Town must consult with MassWildlife to address the concerns and challenges raised in the 2022 nesting season.

**II.21 Summary of any administrative changes, minor modifications, or major amendments proposed or approved during the reporting year (see Section 5.3.3, *Modifications to the Plan*). Any information about mitigation measures other than selective predator management, the associated funding, and monitoring is being provided for informational purposes only, as the USFWS has indicated that these activities do not count as mitigation to offset take associated with the ITP.**

On May 11, 2022, the USFWS approved an administrative clarification allowing COI-holders, through enhanced intensive monitoring that would exceed the monitoring requirements in the previous version of the HCP, to demonstrate a lack of exposure to take for broods near travel corridors (**Appendix B**). This clarification affects two covered activities, "Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks" and "OSV Use in the Vicinity of Unfledged Chicks." The clarification specifies the monitoring requirements that must be implemented to document the lack of Take exposure and outlines the changed language in the HCP:

Sec. 3.2.1., Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks (p. 3-6)

Add bullet 6.

"*6. Participants may elect to conduct enhanced intensive monitoring, documentation, and reporting for specific broods. Take exposures will not accrue to the participant if such monitoring demonstrates no chick use of roads or parking lots either directly observed or inferred and no injury, mortality, or negative effects from disturbance are detected, provided that sufficient documentation and reporting are submitted to MassWildlife. MassWildlife must approve monitoring, documentation, and reporting necessary to qualify for enhanced intensive monitoring. At minimum, (1) twice-daily monitoring and documentation will be required starting on the day of hatch and must continue throughout the duration of covered activity implementation regardless of the distance of the affected brood from the travel corridor or parking lot; and (2) raw data and maps showing all location data points for broods must be provided to MassWildlife. Take exposures will automatically accrue for broods subjected to herding or barriers. Enhanced intensive monitoring should not take the place of barriers.*"
Sec. 3.2.3. OSV Use in the Vicinity of Unfledged Chicks (p. 3-14)

"Monitoring: The IAMP must describe the monitoring plan associated with this covered activity. … Qualified monitors charged with monitoring broods associated with OSV use must be pre-approved in writing by DFW, have undergone training, and had prior work experience carrying out beach related shorebird monitoring.

*Participants may elect to conduct enhanced intensive monitoring, documentation, and reporting for specific broods. Take exposures will not accrue to the participant if such monitoring demonstrates no chick use of OSV corridors either directly observed or inferred and no injury, mortality, or negative effects from disturbance are detected, provided that sufficient documentation and reporting are submitted to MassWildlife. MassWildlife must approve monitoring, documentation, and reporting necessary to qualify for enhanced intensive monitoring. At minimum, (1) twice-daily monitoring and documentation will be required starting on the day of hatch and must continue throughout the duration of covered activity implementation regardless of the distance of the affected brood from the travel corridor; and (2) raw data and maps showing all location data points for broods must be provided to MassWildlife. Take*

*exposures will automatically accrue for broods subjected to herding or barriers. Enhanced intensive monitoring should not take the place of barriers.*"

COI-holders will not accrue Take exposures if they: conform to enhanced intensive monitoring, documentation, and reporting requirements; do not detect plover chicks in travel corridors or parking lots; and do not encounter evidence of Take related to operation of recreational vehicles within broods' ranges. Take exposures will automatically accrue if a travel corridor bisects a brood's range (for instance, if a corridor is located seaward of a dune that forms the landward edge of a brood's range), chicks' entry into travel corridors or parking lots can be inferred, or Take occurs.

**II.22 Other state or federally listed species affected by HCP implementation**

**Least Tern (*Sternula antillarum*)**

COI-holders at covered sites developed impact minimization and mitigation plans for Least Terns and obtained Conservation and Management Permits to ensure Massachusetts Endangered Species Act (MESA) compliance. Status of implementation at sites with coverage for take of Least Terns during 2022 is shown in **Table 8.**

**Table 8**. 2022 implementation status for covered activities affecting Least Terns at sites with Least Tern coverage.

| Site with Least Tern coverage | Take exposure in 2022? |
|---|---|
| Nauset Beach, Orleans | No |
| Plymouth Long Beach, Plymouth | **Yes** |
| Sandy Neck Beach Park, Barnstable | No |
| Nauset Beach (North Beach), Chatham | No |
| Winthrop Shore, Winthrop | No |
| Horseneck Beach, Westport | **Yes** |
| Duxbury Beach, Duxbury | No |
| Cape Poge/Leland/Wasque/Norton Pt. Beaches, Edgartown | No |
| Coskata-Coatue Wildlife Refuge, Nantucket | No |

- **Sites with take exposure**. At the two sites where take exposure occurred, the COI-holders conducted on-site mitigation.
    - **Horseneck Beach**. *Recreation and beach operations – Reduced fencing around the nest*. Fencing around two Least Tern nests was reduced to 10 yd-x-18 yd and 8 yd-x-15yd to preserve space for recreational activities. This impacted 1.24 ac of habitat over a period of 46 days. Each pair fledged two chicks. On-site mitigation in the form of selective predator management benefitted 96 pairs, which fledged about 29 chicks. DCR entered 2022 with a credit balance of 66, six of which were used for implementation in 2022, leaving a balance of 156 credits that will carry forward into 2023.
    - **Plymouth Long Beach**. *Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks*. A silt fence barrier was installed at the edge of the road along the length of a Least Tern

colony during May 25 – August 12 to prevent chicks from accessing the road. Fifteen unfledged chicks from eight pairs were exposed to vehicle traffic during July 2 – July 3 and July 15 – August 10. No evidence of road-related mortality or injury was detected in the exposed subcolony, but predation and extreme heat limited chick survival; only four chicks fledged. On-site predator management benefitted 47 pairs of Least Terns. Going into 2022, Plymouth had a credit balance of 8; with the addition of 31 credits (47 credits – 16 debits), a balance of 39 credits will carry into 2023.

**Diamondback Terrapin (*Malaclemys terrapin*)**

- **Sites with coverage for take of Diamondback Terrapins**. COI-holders for these sites developed impact minimization and mitigation plans, including nest protection, for Diamondback Terrapin and obtained CMPs to ensure MESA compliance: Sandy Neck Beach Park, Barnstable; Nauset Beach, Orleans. The Nauset Beach CMP covered limited exposure of terrapins, which sometimes cross the OSV corridor to nest. The Sandy Neck CMP also covered limited exposure of terrapins, which are sometimes found crossing or nesting within the Marsh Trail used by essential vehicles and campers.
- **Sites with no take exposure**. Sandy Neck Beach Park and Nauset Beach, Orleans.
- **Sites with take exposure**. None.