

DRAFT

**ENVIRONMENTAL ASSESSMENT FOR THE
PROPOSED MASSACHUSETTS PIPING PLOVER
HABITAT CONSERVATION PLAN AND
INCIDENTAL TAKE PERMIT**



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Acronyms and Abbreviations

AADT	Average daily traffic
APHIS	Animal and Plant Health Inspection Service
B-120	Bouchard Barge 120
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO ₂	carbon dioxide
COIs	certificates of inclusion
Corps	U.S. Army Corps of Engineers
CZMA	Coastal Zone Management Act
DEIS	draft Environmental Impact Statement
EA	environmental assessment
EIS	environmental impact statement
ESA	Endangered Species Act
ESM	Environmental Statement Memorandum
FONSI	Finding of No Significant Impact
HCP	Habitat Conservation Plan
HRRC	Herring River Restoration Committee
IAMP	impact avoidance and minimization plan
ITP	incidental take permit
MADER	Massachusetts Division of Ecological Restoration
MADFW	Massachusetts Division of Fisheries and Wildlife
MassDOT	Massachusetts Department of Transportation
MBTA	Migratory Bird Treaty Act
MESA	Massachusetts Endangered Species Act
MGL	Massachusetts General Law
MWPA	Massachusetts Wetlands Protection Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OSV	over-sand-vehicle
Plan	Habitat Conservation Plan
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
U.S.	United States
U.S.C.	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

1.1 Introduction

This environmental assessment (EA) was prepared by the U.S. Fish and Wildlife Service (USFWS or Service) pursuant to the National Environmental Policy Act (42 United States Code [U.S.C.] §§ 4321–4370, et seq.) (NEPA), the Council on Environmental Quality (CEQ) NEPA-implementing regulations (40 Code of Federal Regulations [CFR] 1500–1508), and the Department of the Interior’s complementary NEPA-implementing regulations (43 CFR Part 46) (see section 1.3). The EA evaluates the effects of issuing an incidental take permit (ITP) under section 10(a)(1)(B) of the Federal Endangered Species Act (87 Stat. 884, as amended: 16 U.S.C. 1531, et seq.) (ESA) to the Massachusetts Division of Fisheries and Wildlife (MADFW) for implementation of activities covered by the “*Massachusetts Division of Fisheries and Wildlife Habitat Conservation Plan For Piping Plover*” (HCP or Plan). Under section 10(a)(2)(A) of the ESA, any application for an ITP must include a habitat conservation plan that details the impacts of the incidental take allowed by the ITP on covered species and how the impacts of incidental take will be minimized and mitigated.

The MADFW proposes to deviate from State and Federal guidelines (MADFW 1993, USFWS 1994) when managing some recreational activities on Massachusetts beaches during the piping plover (*Charadrius melodus*) nesting season. These deviations increase the potential for take of the federally threatened piping plover. Therefore, the MADFW has prepared a draft HCP that describes the avoidance, minimization, and mitigation measures they will implement to address impacts to piping plovers. The HCP serves as an umbrella plan whereby other Massachusetts beach managers can receive incidental take coverage by opting into the plan via certificates of inclusion. Covered activities in the HCP include:

1. use of roads and parking lots in the vicinity of unfledged (i.e., unable to fly) chicks;
2. recreation and beach operations
 - a. associated with reduced symbolic fencing¹ around nests,
 - b. associated with reduced proactive symbolic fencing of piping plover habitat, and
 - c. at piping plover nest sites with nest moving; and
3. over-sand-vehicle (OSV) use in the vicinity of unfledged piping plover chicks.

Chapter 2 describes the covered activities in more detail.

The ESA and its implementing regulations prohibit take of federally listed threatened or endangered species without prior approval pursuant to either section 7 or section 10 of the ESA. The ESA defines *take* as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The regulations at 50 CFR § 17.3 define the term *harass* in the take

¹ *Symbolic fencing* is fencing that consists of temporary stakes and rope or twine with signage that is erected around piping plover nests and habitat to delineate areas where pedestrians and OSVs should not enter.

definition as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The regulations define *harm* as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Issuance of a section 10 ITP constitutes a discretionary Federal action by the Service and is thus subject to NEPA, which requires that all Federal agencies assess the effects of their actions on the human environment. This EA is intended to satisfy the Service's obligations under NEPA to evaluate the effects on the human environment from issuance of an ITP and implementation of the MADFW's HCP.

1.2 Project Background

Piping plovers are small, sand-colored shorebirds that nest on sandy, coastal beaches along the eastern shore of North America from South Carolina to Newfoundland. In 1986, the U.S. Atlantic Coast piping plover population was listed as threatened by the Service. In the same year, Massachusetts also listed the piping plover as threatened pursuant to the Massachusetts Endangered Species Act (MESA; Massachusetts General Law [MGL] Chapter [c.] 131A). Since the listing, the MADFW developed a program to manage and regulate activities occurring within piping plover habitat.

In 1993, the MADFW published "Guidelines for Managing Recreational Use of Beaches to Protect Piping Plovers, Terns and Their Habitats in Massachusetts" (MADFW 1993; hereafter referred to as the State guidelines), which were closely followed by the publication of the Service's "Guidelines for Managing Recreational Activities in Piping Plover Breeding Habitat on the U.S. Atlantic Coast to Avoid Take Under Section 9 of the Endangered Species Act" (USFWS 1994; hereafter referred to as the Federal guidelines). The State and Federal guidelines describe management techniques to prevent disturbance of nesting piping plovers, trampling of nests, monitoring requirements and restrictions on the use of OSVs when unfledged chicks are present. Currently, the vast majority of plover nesting beaches in Massachusetts are managed in accordance with the State and Federal guidelines, including all sites with recreational OSV use.

In Massachusetts, the MADFW coordinates piping plover conservation efforts by (1) providing site-specific technical assistance and advice to beach managers making plover-related decisions, including recommendations to minimize effects on recreation while avoiding take; (2) working with partners to ensure adequate training for new beach managers and plover monitors; (3) coordinating annual piping plover censuses, and ensuring that index count, total count, and other data are collected and reported in accordance with protocols (MADFW 2012); (4) collecting, compiling, and reporting annual census and productivity results, and conducting data quality control; and (5) conducting regulatory reviews for MESA and Massachusetts Wetlands Protection Act (MWPA; MGL c. 131, section 40) compliance.

Since the piping plover's Federal listing in 1986, the Massachusetts plover population has increased from an estimated 139 to a preliminary estimate of 689 breeding pairs in 2015 (A. Hecht, USFWS, pers. comm. 2015). This almost five-fold increase over 25 years has led to management challenges in balancing recreational beach use with the need to avoid take of piping plover nests, eggs, or chicks.

There are increasing incidences of piping plover nests in or near public beach access points, beach parking lots, or access roads. In these cases, avoiding take has resulted in road or parking lot closures and restricted access of recreational beach use. As the piping plover population expanded, beach managers have increased fencing to protect breeding birds. Smaller beaches with high numbers of nesting piping plovers may have large areas symbolically fenced to protect piping plover nests and provide a refuge for chicks, precluding recreational use. Factors such as severe early summer weather or increased predation pressure has led plovers to renest, sometimes multiple times, resulting in a protracted breeding season. Late season nests and chicks further extend restrictions on OSV access or the maintenance of large symbolically fenced areas. For example, under the current State and Federal guidelines, the presence of one or two late-nesting piping plover pairs situated near an OSV access point can lead to its closure, once unfledged chicks are present, to avoid take. This can close miles of beach beyond the access point that may have no nesting plovers and that would otherwise be open for mid-to-late summer OSV use.

To increase flexibility for beach managers and enhance recreational opportunities, the MADFW is applying for an ITP for the statewide plover management program and extend take authorization to beach managers through certificates of inclusion (COIs) and implementation of the Plan.

The Plan's stated purpose is to advance piping plover conservation and recovery in Massachusetts while maintaining and improving recreational beach access and beach operations. To achieve plover conservation and provide flexibility for recreational beach management and operations, the Plan identified broad program goals including (1) a framework to maintain a "viable and robust" piping plover population in Massachusetts, (2) community support for piping plover conservation, and (3) streamlining the permitting process in compliance with State and Federal Endangered Species Act regulations for site-level management flexibility (HCP section 1.1.1).

1.3 Environmental Assessment Overview

The purpose of an EA is to determine if significant environmental impacts are associated with a proposed Federal action that would require the preparation of an environmental impact statement (EIS). EAs also evaluate the impacts associated with alternative means to achieve the agency's objectives. EAs should be concise documents that focus on aspects of the human environment that may be affected by the proposed action. EAs are intended to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an EIS;
- Aid an agency's compliance with NEPA when no EIS is necessary; and
- Facilitate preparation of an EIS when one is necessary (40 CFR § 1508.9).

The proposed action consists of issuance of an ITP for recreational activities and beach operations that are already occurring. No new activities are specifically allowed as result of this Plan. Rather, there would be minor deviations from how the activities are currently conducted during the piping plover nesting season. Examples of recreational activities that will occur under the Plan include swimming, sunbathing, picnicking, pedestrian activity, dog walking, fishing, nature study, beach sports, boating, water sports (such as surfing and wind surfing), camping, and OSV use on beaches that currently allow it. Beach operations activities may include but are not limited to beach raking or cleaning of debris and litter, erection of lifeguard stands or beach access structures, maintenance of beach surface, etc. The proposed action would include minor changes to how these activities are

implemented. For example, the State and Federal guidelines allow OSV use outside the piping plover breeding season and during the prenesting, egg-laying, incubation, and postfledging periods. The proposed action would permit limited, escorted OSV use to occur during the pre fledging period (i.e., after chicks have hatched but before they have fledged). Thus, the proposed action would not change whether the activities occur or not, but rather it would change details of how they would be managed when piping plovers are present. Therefore, because of the limited scope of the proposed action, the analysis in this EA focuses on a limited suite of environmental resources that have the potential to be affected. These include biological resources (including potential impacts on piping plovers, other shorebirds, and species affected by the Plan's conservation strategy (namely selective predator management and nesting habitat improvements), coastal resources, recreation, transportation and traffic, and socioeconomics.

The CEQ lists two factors that should be considered in determining the significance of environmental impacts of an action: context and intensity. *Context* means that the significance of an action must be analyzed in several settings, such as its impact on society as a whole, the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the impacts in the locale rather than in the world as a whole. Both short- and long-term effects are relevant (40 CFR § 1508.27[a]). *Intensity* refers to the severity of impact, and a number of subfactors are generally considered in evaluating intensity. These include–

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect would be beneficial;
- The degree to which the proposed action affects public health or safety;
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas;
- The degree to which the effects on the quality of the human environment are likely to be highly controversial;
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks;
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration;
- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts;
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources;
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA; and
- Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment (40 CFR § 1508.27[b]).

In addition to considering the above factors, an agency should consider its own procedures in determining whether the action requires an EIS. Additional criteria that the Service uses to determine whether to prepare an EIS include–

- Controversy over environmental effects (e.g., major scientific or technical disputes or inconsistencies over one or more environmental effects);
- Change in agency policy having a major positive or negative environmental effect;
- Precedent-setting actions with wide-reaching or long-term implications (e.g., special use permits for off-road vehicles, mineral extraction, or new road construction);
- Major alterations of natural environmental quality, which may exceed local, State, or Federal environmental standards;
- Exposing existing or future generations to increased safety or health hazards;
- Conflicts with substantially proposed or adopted local, regional, State, interstate, or Federal land use plans or policies that may result in adverse environmental effects;
- Adverse effects on designated or proposed natural or recreation areas, such as wilderness areas, parks, research natural areas, wild and scenic rivers, estuaries, sanctuaries, national recreation areas, habitat conservation plan areas, threatened and endangered species habitats, fish hatcheries, wildlife refuges, lands acquired or managed with Dingell-Johnson/Pittman-Robertson funds, unique or major wetland areas, and lands within a 100-year floodplain; and
- Removal from production of prime and unique agricultural lands, as designated by local, regional, State, or Federal authorities; in accordance with the Department of the Interior's Environmental Statement Memorandum No. (ESM) 94-7 (USFWS 1996b).

On January 14, 2011, the CEQ issued a "Memorandum for Heads of Federal Departments and Agencies" (Memorandum) (CEQ 2011). The Memorandum stresses the importance of mitigation under NEPA, and explicitly approves the use of a "mitigated Finding of No Significant Impact (FONSI)" when the NEPA process results in enforceable mitigation measures (CEQ 2011, p. 7, n.18). The Memorandum builds on previous guidance from the CEQ that states that when an agency develops and makes a commitment to implement mitigation measures to avoid, minimize, rectify, reduce, or compensate for significant environmental impacts (40 CFR § 1508.20), then NEPA compliance can be accomplished with an EA coupled with a FONSI. Using mitigation to reduce potentially significant impacts to support a FONSI may enable an agency to conclude the NEPA process, satisfy NEPA requirements, and proceed to implementation without preparing an EIS. In such cases, the basis for not preparing the EIS is the commitment to perform those mitigation measures identified as necessary to reduce the environmental impacts of the proposed action to a point or level where they are determined to no longer be significant as part of the approved action. That commitment should be presented in the FONSI and any other decision document. The CEQ recognizes the appropriateness, value, and efficacy of providing for mitigation to reduce the significance of environmental impacts; consequently, when that mitigation is available and the commitment to perform it is made, there is an adequate basis for a mitigated FONSI.

Ultimately, the decision whether a significant impact exists and an EIS is required is made after consideration of the issues in question and the matters documented in the EA. The determination must be reasonable in light of the circumstances involved in the particular project being evaluated, and in light of any past, present, or foreseeable future actions.

1.4 Summary of the Proposed Action Addressed in this EA

The proposed action considered in this EA is the Service's issuance of an ITP under section 10 of the ESA for incidental take of piping plovers resulting from activities covered in the Plan. The Plan describes the covered activities (described in chapter 3 of the Plan, and in sections 1.3 and 2.2 of the EA) and the conservation measures proposed to protect and conserve the piping plover in the course of carrying out the covered activities and implementing the Plan. The section 10(a)(1)(B) permit holder would be the MADFW. The MADFW intends to extend its take authorization by issuing COIs to MADFW-approved landowners and beach managers, including other State agencies (hereafter referred to as Plan participants) who (1) engage in the covered activities described in the Plan; (2) meet the COI eligibility and application requirements described in the Plan; and (3) agree to implement the Plan, required ITP conditions, and the MADFW conservation and management permit. Recreational activities on Federal beaches are not covered by the Plan, because they are required to undergo a separate consultation with the Service under section 7 of the ESA.

The MADFW is requesting a 25-year permit duration to provide a predictable framework to Massachusetts and Plan participants for permitting of covered activities and Plan implementation. The MADFW expects the 25-year permit duration to ensure enough time to fully implement the proposed conservation measures, the adaptive management and monitoring programs, and the mitigation measures described in the Plan. Additional details on the proposed action are provided in chapter 2.

Accordingly, this EA analyzes the direct, indirect, and cumulative impacts on the human environment of approving the Plan and issuing an ITP. These impacts include the impacts of the covered activities and conservation measures proposed to avoid, minimize, or mitigate potential effects on the piping plover.

1.5 Purpose and Need

The purpose of the proposed action is to authorize take of piping plovers incidental to otherwise lawful activities associated with beach operations and recreation while maintaining a Massachusetts piping plover population that continues to contribute to the recovery of the Atlantic Coast piping plover population. The need for action is for the Service to respond to the MADFW's ITP application. The MADFW is seeking a permit under ESA section 10(a)(1)(B) and its implementing regulations and policies because proposed covered activities are likely to result in incidental take of piping plovers. In addition, it is in the interest of both the Service and the MADFW to develop and implement a framework to maintain a piping plover population in Massachusetts that continues to contribute to the recovery of the Atlantic Coast piping plover population. This purpose and need establishes the basis for determining whether other viable alternatives to the proposed action may meet the intended purpose and reduce potential effects from the ITP.

1.6 Document Organization

This EA is intended to provide agency decisionmakers and the public clear and concise information on the proposed action and alternatives, existing environmental conditions, and potential environmental impacts. This EA is organized by the following chapters:

- “Chapter 1—Purpose and Need” introduces the project and states the underlying purpose of and need for Federal action.
- “Chapter 2—Proposed Action and Alternatives” discusses the proposed action and reasonable alternatives.
- “Chapter 3—Affected Environment” discusses the existing environmental conditions in the area that could be affected by the proposed action and alternatives.
- “Chapter 4—Environmental Consequences” discusses the potential direct and indirect impacts on the human environment from the proposed action and alternatives.
- “Chapter 5—Cumulative Impacts and Climate Change” discusses the potential cumulative impacts of the proposed action and the implications of climate change for the environmental effects of the proposed action.
- “Chapter 6—List of Preparers” lists the people who contributed to the preparation of the EA.
- “Chapter 7—References” is a bibliography of literature cited in the text.

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Chapter 2

Proposed Action and Alternatives

NEPA requires that Federal agencies consider a range of reasonable alternatives to the proposed action when evaluating the environmental effects of an action. This chapter describes the three alternatives considered in this EA as well as alternatives considered but eliminated from further study. The three alternatives considered are the no action alternative, proposed action, and shorter permit term alternative. CEQ regulations (44 CFR § 1502.14) require Federal agencies to consider a “no action” alternative in their NEPA analyses to compare the effects of not taking action with the effects of the action alternative(s). Thus, the no action alternative serves as a baseline to compare the impacts of the proposed action and the shorter permit term alternative. Evaluation of the three alternatives considered in this EA fulfills the Service’s NEPA responsibility to evaluate a reasonable range of alternatives to the proposed action that are technically and economically practical or feasible and meet the purpose of and need for the proposed action.

2.1 No Action Alternative

Under the no action alternative, the Service would not issue an ITP to the MADFW for implementation of the HCP. Implementation of existing piping plover conservation measures consistent with State and Federal guidelines for managing recreational use of beaches would continue unchanged. Beach operations would also continue to be conducted in a manner to avoid take of piping plovers. This alternative presents the status quo or existing conditions under which recreational beaches are currently managed. The MADFW and beach managers would comply with all components of the State and Federal guidelines and by doing so would avoid all take of plovers and other federally listed or State-listed species. Therefore, there would be no need to seek an ITP or to develop and implement an HCP. A conservation plan including increased flexibility in beach management and operations and mitigation measures to benefit the piping plover would not be implemented, and statewide-scale mitigation would not be implemented. If the MADFW or individual beach managers were to need to deviate from the existing beach management guidelines, in a manner that may result in take of a federally listed species, they would apply for individual ITPs as needed and appropriate. The no action alternative does not meet the purpose of and need for the project (see section 1.5).

2.2 Proposed Action

Under the proposed action, the Service would issue a 25-year ITP to the MADFW for incidental take of the piping plover during implementation of the HCP. Most beach activities would still follow State and Federal guidelines and most beach operations would continue to be implemented to avoid take. However, the HCP allows deviations (i.e., covered activities) that may result in take of piping plovers. The HCP would function as an umbrella plan whereby incidental take coverage would be extended by the MADFW via COIs to approved landowners and beach managers that meet specified eligibility criteria (see HCP sections 1.1.1 and 5.2.2.3). One of the principle eligibility criteria is development of a site-specific impact avoidance and minimization plan (IAMP) that details the site-

specific activities and corresponding minimization and mitigation measures the Plan participants will implement. COIs would be issued to landowners and beach managers for 3-year periods. The MADFW may grant COI renewals but would reserve the right to require submittal of new applications if requests for coverage exceed the available number of statewide take exposure allowances (see HCP section 3.3.2.1). Also, as part of the process of obtaining a COI under the HCP, Plan participants would be required to achieve compliance under MESA for State-listed species by avoiding take or obtaining a MESA conservation and management permit (see HCP section 1.1.1). Furthermore, because the ITP is only effective for an otherwise lawful activity, each Plan participant's COI would contain a provision stating that it is not actionable unless carried out in accordance with all applicable local, State, and Federal laws and regulations. For example, a COI holder for activities requiring a valid Order of Conditions pursuant to the MWPA (e.g., beach raking or OSV use; 310 CMR 10.00) would not be able to implement covered activities or act on the COI until a valid Order of Conditions is issued (see section 3.1.1 for a description of the MWPA). As the ITP holder, the MADFW would remain ultimately responsible for ensuring proper implementation of the HCP.

The covered activities are divided into three categories:

1. Use of roads and parking lots in the vicinity of unfledged chicks
2. Recreation and beach operations. Recreational activities include swimming, sunbathing, picnicking, pedestrian activity, dog walking, fishing, nature study, beach sports, boating, water sports (such as surfing and wind surfing), camping, and OSV use on beaches that currently allow it. Beach operations include beach raking or cleaning of debris and litter, erection of lifeguard stands or beach access structures, maintenance of beach surface, etc. As covered activities, recreation and beach operations are further sub-divided as follows:
 - a. Recreation and beach operations associated with reduced symbolic fencing around nests,
 - b. Recreation and beach operations associated with reduced proactive symbolic fencing of piping plover habitat, and
 - c. Recreation and beach operations at piping plover nest sites with nest moving.
3. OSV use in the vicinity of unfledged piping plover chicks

These proposed activities include measures to minimize the adverse effects of the activities on piping plovers and monitoring. Under Service policy, monitoring is required to assess the level of take resulting from the HCP (i.e., effects monitoring).² The proposed action also includes the Plan's conservation strategy (mitigation measures), as well as additional required monitoring (compliance and effectiveness monitoring—see section 2.2.4) and adaptive management.

2.2.1 Location

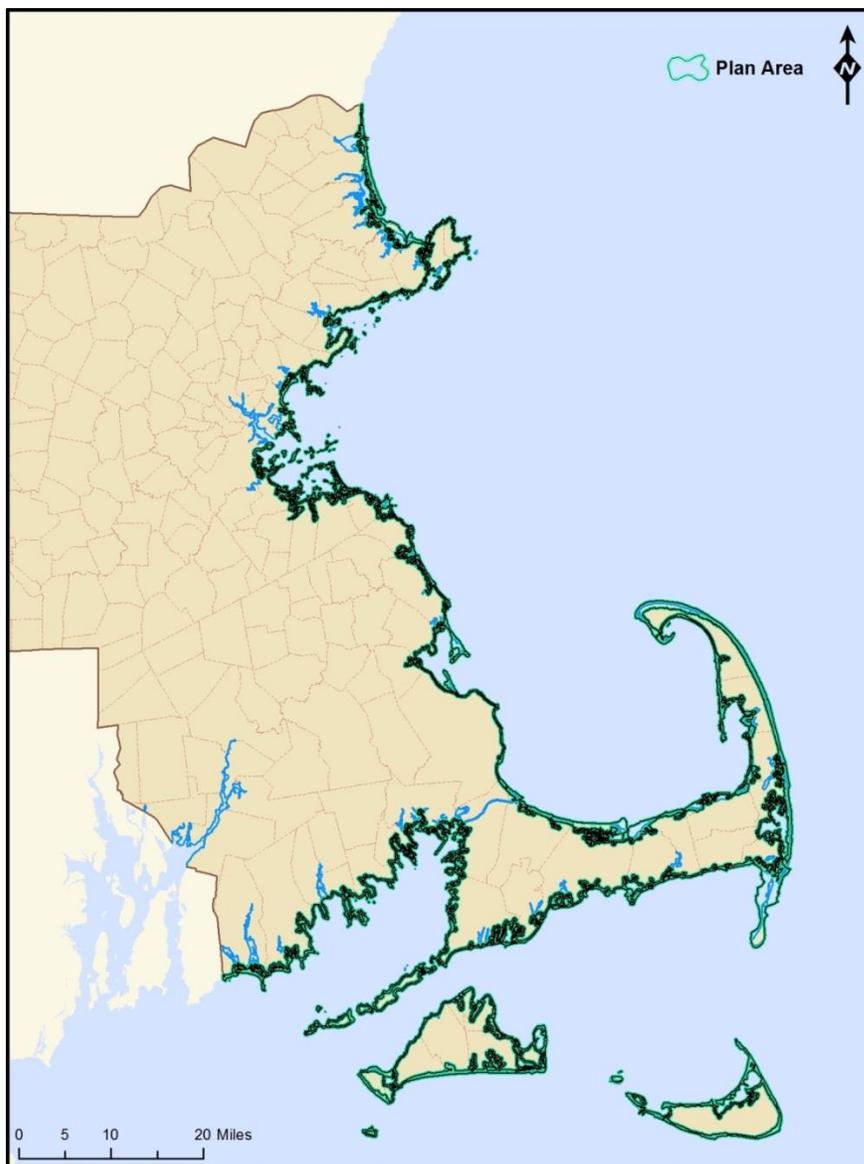
The study area for this EA is the same as the plan area defined in the HCP. It includes an approximately 300-yard-wide zone along almost the entire coastline of Massachusetts, with the exception of one small area in Mount Hope Bay in the vicinity of Fall River. The study area

² *Effects monitoring* is different from *effectiveness monitoring*, which is evaluating the effectiveness of the Plan's conservation strategy (see section 2.2.4).

incorporates approximately 1,774 linear miles of coastline (see figure 2-1). The study area includes all currently and recently occupied piping plover habitat delineated as priority habitat by the MADFW, as well as other beach and dune areas that could support breeding piping plovers in the future. This area is intended to capture all currently suitable Massachusetts piping plover breeding habitat, as well as the area within which additional plover breeding habitat could develop in the foreseeable future due to the dynamic nature of the coastline. It includes the coastal portions of the following counties: Essex, Suffolk, Norfolk, Plymouth, Barnstable, Bristol, Dukes, and Nantucket.

The study area covers approximately 150,000 acres of land, of which approximately 29,000 acres are currently classified as beach and coastal dune—the land cover types most associated with piping plover breeding. It contains approximately 43,531 acres of current or recently occupied piping plover habitat delineated by the MADFW.

Figure 2-1. Study Area



2.2.2 Covered Activities

The covered activities are generally associated with the operation of public or semi-public³ recreational beaches. Covered activities could also occur on beaches under private ownership or in association with aquaculture grants.

Plan participants requesting piping plover take coverage would be required to develop and implement an MADFW-approved, site-specific IAMP, drawing on the information and minimization measures outlined in the Plan. The minimization measures would be adapted for site-specific characteristics.

The covered activities are discussed below, including a description of the beach management action and the required minimization measures and monitoring activities. Refer to chapter 3 of the HCP for a complete, detailed discussion of the covered activities.

2.2.2.1 Use of Roads and Parking Lots in the Vicinity of Unfledged Piping Plover Chicks

Road and parking lot use occurs in association with summer recreational beach use in Massachusetts. The State and Federal guidelines state that sections of beaches where unfledged piping plover chicks are present should be temporarily closed to all vehicles not deemed essential.⁴ Under this covered activity, limited driving past unfledged chicks would be permitted. This would prevent parking lot and beach access road closures. Specifically, this covered activity would allow driving on improved roads⁵ and parking lots when adult plovers and unfledged chicks are present.

Minimization measures that would be required as part of this covered activity include (1) barriers to prevent adults and chicks from accessing road and parking lots, (2) signage, (3) staff training, and (4) managing traffic during periods when birds are crossing. Each of the minimization measures presented in the Plan is summarized below.

- **Barriers.** At some sites, the deployment of barriers, such as silt fencing, would likely be effective in preventing chicks from accessing roads or parking lots. For example, if unfledged chicks are passing through a parking lot located at a road terminus to move from the beachfront to bayside foraging areas, a barrier could be effective at preventing access to the high-risk parking lot while not unduly hindering important chick movements. In contrast, in other settings, such as a parking lot located in the middle of a longer road, deployment of a barrier might simply shift the crossing point from the parking lot to the road and not necessarily reduce the disturbance and/or mortality risk.
- **Signage.** Signage alerting motorists to watch for crossing birds and to obey speed limits would be installed. Signs requesting motorists and beach goers to alert staff if they observe piping plovers in or near a road or parking lot may be appropriate at some sites.

³ Semi-public beaches are those owned by a nongovernmental entity that allows public access.

⁴ Essential OSVs are defined as those used by shorebird monitors, law enforcement, beach homeowners, or others described specifically in the guidelines.

⁵ An improved road is a paved, gravel, or otherwise actively maintained traveled roadway. Improved roads have been graded, realigned, resurfaced, and/or altered through significant drainage improvements. Most sand tracks and OSV corridors used by OSVs would not be considered improved roads.

- **Staff training.** Plan participants implementing this covered activity would be required to employ shorebird monitors and parking attendants with adequate training prior to implementation. Training conducted by beach managers and/or other qualified staff would ensure that all relevant staff understand basic piping plover biology and behavior, their respective roles and responsibilities, communication procedures, and contingencies. The site-specific IAMP developed by Plan participants would identify those personnel to receive training and provide specific details regarding the training.
- **Managing traffic.** The site's IAMP would include a protocol to be followed when chicks and adults are detected in a parking lot or road. This might include temporarily rerouting traffic away from a section of a parking lot with chicks, having a monitor or parking attendant approach the chicks to herd them out of a parking lot or across a road, reduced speed limits, or temporary road closures to allow chicks to pass. Communication among staff would be important for traffic safety and to minimize risk to chicks, so communication procedures would be described clearly in the IAMP.

Regular monitoring of broods located in the vicinity of roads and parking lots would reduce the risk that chicks cross into traffic without adequate protective measures in place. Monitoring would be described in each IAMP.

2.2.2.2 Recreation and Beach Operations

This covered activity would occur as one of the three scenarios described below.

Recreation and Beach Operations Associated with Reduced Symbolic Fencing around Nests

According to the State and Federal guidelines, any piping plover nest must be symbolically fenced with a buffer of at least 50 yards around the nest, above the high-tide line, to minimize disturbance and avoid take. In some cases, maintaining a full 50-yard buffer may substantially reduce recreational use. For example, if piping plovers nest within 50 yards of a major beach access point, symbolic fencing could close that access point. Under this covered activity, nests would have smaller than 50-yard buffers to allow recreational access and beach operations. The IAMP for this covered activity would include the following elements:

- Fencing would be reduced only to the extent necessary to achieve specific recreational objectives (e.g., opening a specific beach access trail). Symbolically fenced buffers would not be reduced to less than 10 yards except under very limited circumstances, such as in lieu of moving a nest, and which must be approved by the MADFW.
- A fenced buffer larger than the target buffer would be established initially and maintained during egg laying and through at least the first 24 hours after clutch completion. A 50-yard buffer may not be practical in all cases, but every effort would be made to maximize fencing distance from the nest during this sensitive period.
- Fencing distance from the nest would be gradually reduced.

Monitoring during early nesting phases would confirm acceptance of the reduced buffer by the incubating adults. More intensive monitoring would be focused on early periods of intensive recreational use (e.g., the first weekend after the fencing is reduced).

Recreation and Beach Operations Associated with Reduced Proactive Symbolic Fencing of Piping Plover Habitat

Currently, the most suitable piping plover nesting habitat in Massachusetts is delineated with symbolic fencing prior to nesting or at the first signs of courtship or scraping behavior to minimize disturbance of breeding piping plovers. Under this covered activity, recreation and beach operations would be allowed in suitable piping plover nesting, feeding, and sheltering habitat that would otherwise be restricted by the placement of proactive symbolic fencing in accordance with the State and Federal guidelines—particularly in sections of beach near major access points that have high recreational use. Because this covered activity would be carried out in high-use recreational areas, the MADFW may allow beach raking or the temporary placement of material (such as boards) on the beach to deter nesting.

Measures to deter nesting must be outlined in the IAMP. These activities may reduce the risk that piping plovers would nest in unfenced areas with a higher potential for disturbance associated with recreational activities. The MADFW would reject a proposal for this covered activity if the symbolic fencing is not substantially impairing access or recreational activities.

Note under the MESA no take determination letters and Order of Conditions under the MWPA both require measures to avoid take from beach raking (such as limits on the frequency, duration, and areal extent of raking; intensive monitoring of adults and chicks by qualified shorebird monitors during raking operations; a monitor walking in front of the beach rake; maintenance of setbacks between raking equipment and unfledged chicks; and retention of beach wrack and vegetation). Therefore, beach raking is not in and of itself a covered activity.

Impact minimization measures for this covered activity include the following:

- Reduced proactive fencing would be limited to 10 percent or 2 acres (whichever is less) of the available nesting habitat at a given site. However, at up to five sites statewide, the MADFW may allow reduced proactive fencing of up to 20 percent or 4 acres (whichever is less) of the available nesting habitat. This measure would minimize the risk of displacing a breeding pair from a given site or substantially increasing competition from other pairs of piping plovers by limiting the amount of nesting habitat that could be lost relative to the amount of habitat available.
- The MADFW will limit the number of breeding pairs that may be exposed to all covered activities at a given site to 15 percent of the breeding pairs present at that site during the previous breeding season. For example, at sites with fewer than 14 breeding pairs, the covered activity would not be allowed to impact more than one breeding territory.
- Should piping plovers nest despite the lack of symbolic fencing, the Plan participant would immediately install symbolic fencing around the nest to limit disturbance and prevent destruction of eggs, consistent with the covered activity scenario of reducing fencing buffers around nests (described above).

Monitoring the area subject to reduced fencing would occur for plover activity in accordance with the IAMP developed by the Plan participant and approved by MADFW.

Recreation and Beach Operations at Piping Plover Nest Sites with Nest Moving

The State and Federal guidelines prohibit moving piping plover nests because moving a nest would be considered capture and capture is take. Symbolic fencing must be placed in active courtship areas and around nests, which can result in closures of parking lots, beach access roads and paths, and OSV corridors, and in other restrictions on beach recreation and operations. Under this covered activity, recreation and beach operations would be allowed in the immediate vicinity of piping plover nest sites, subject to the minimization measures contained in section 3.2.2.3 of the Plan. If the MADFW determines that nest moving is the best minimization measure at a site, the MADFW would authorize a qualified shorebird monitor, trained in nest moving procedures by the MADFW, to move nests using the nest-moving protocols described in section 3.2.2.3 of the Plan. Moving a nest would be permitted only in cases where the MADFW determines the nest location is having a major impact on beach access or recreational activities.

A Plan participant who is authorized by the MADFW to move a nest would develop an IAMP following the measures described in the Plan. The IAMP would include timing and weather restrictions, a relocation site in suitable habitat that minimizes the movement distance to the extent practicable, and gradual movement of the nest. The MADFW must review and approve the IAMP prior to the nest being moved.

Monitoring the nests that are moved would occur from a distance to confirm acceptance and incubation per the steps described in the Plan.

2.2.2.3 Over-Sand-Vehicle Use in the Vicinity of Unfledged Chicks

The State and Federal guidelines allow OSV use prior to egg hatching and after chick fledging. When unfledged chicks are present, the Federal guidelines require a vehicle-free area extending 3,280 feet (1,000 meters) on each side of a line drawn through the nest site and perpendicular to the long axis of the beach. However, vehicles may be allowed to pass through portions of the protected area that are considered inaccessible to plover chicks because of steep topography, dense vegetation, or other naturally occurring obstacles. Under this covered activity, limited, escorted driving of nonessential⁶ OSVs within the 100-yard or greater OSV setback from unfledged piping plover chicks required by the State and Federal guidelines would be permitted. The majority of the OSVs are expected to be recreational, although some could be used for other purposes (e.g., tending aquaculture beds). OSV use outside the piping plover breeding season and during the prenesting, egg-laying, incubation, and postfledging periods would be carried out in accordance with the State and Federal guidelines. Therefore, the need for incidental take coverage related to this covered activity is specific to the prefledging period (i.e., after chicks have hatched but before they have fledged).

The minimization procedures that would be incorporated into the IAMPs are discussed below (see HCP section 3.2.3 for details). These measures would be expected to be applied at most sites. However, at sites with very little beach traffic, some measures may not be required.

- **Narrow vehicle corridor, no parking.** Travel in the vicinity of unfledged chicks would be restricted to a single, clearly demarcated vehicle travel corridor less than 5 yards wide. Parking would not be allowed within 656 feet (200 meters per the Federal guidelines) of unfledged

⁶ Vehicles not used by shorebird monitors, law enforcement, beach homeowners, or others described specifically in the guidelines (e.g., not essential vehicles).

chicks during the first week after hatching, and in no event would parking be allowed within 328 feet (100 meters per the Federal guidelines) of unfledged chicks. Because chicks are mobile, Plan participants would be encouraged to establish a restricted parking zone considerably farther than 100 yards from unfledged chicks to reduce the need for constant monitoring of chicks and readjustment of vehicle parking during the course of the day.

- **Restricted travel hours.** To limit disturbance of chicks and impacts on foraging, vehicle travel in the vicinity of chicks would be restricted to no more than 6 hours per day in two to three travel periods during daylight hours. For example, vehicle travel would be restricted to several hours in the morning and late afternoon to access and exit the beach. The IAMP for each site would specify the restricted vehicle travel timeframes for that site.
- **Vehicle escorting.** Vehicle escorting would be performed in addition to the stationary monitoring of chicks described above, using one of two options:
 - Each vehicle would be escorted by a passenger who walks in front of the vehicle (self-escorting), scanning for chicks; or
 - A single escort would walk in front of a caravan of up to 50 vehicles, scanning for chicks.⁷

Vehicle escorting would begin at least 200 feet from the closest chick and terminate 200 feet past the last chick in a given brood.

- **Staff training, enforcement, and communication.** IAMPs developed by Plan participants would describe how restricted driving hours and escorting procedures would be enforced; the communication among monitors, beach access attendants, law enforcement, and other staff; and the protocols for escorting vehicles off the beach during emergencies.
- **Mandatory OSV operator education.** All OSV users participating in the escort program would undergo a mandatory orientation each beach season prior to implementation of the escort program.
- **Smoothing of tire ruts.** Tire ruts would be smoothed out at least once per day in the travel corridor—at the end of a travel period—to minimize the risk of plovers or other sensitive species sheltering in the tire ruts. Tire rut smoothing would be performed either by hand raking or dragging appropriate equipment behind a vehicle. This requirement may be waived if all chicks present near the travel corridor are more than 14 days old.

Continuous monitoring of chicks by qualified monitors would be conducted during the travel hours when vehicles are present. Each monitor would be responsible for monitoring no more than one brood. In addition, a compliance monitor would be stationed adjacent to the vehicle corridor and would have radio contact with the brood monitor. The monitors must have the ability to stop vehicle travel in the event that chicks approach or enter the travel corridor. Monitors would also be used to escort vehicle caravans.

⁷ In lieu of the single pedestrian caravan escort, the MADFW may approve a qualified shorebird monitor driving in an open top OSV at a speed of 5 miles per hour or less.

2.2.3 Conservation Strategy

This section summarizes the conservation strategy provided in the HCP under the proposed action. In addition to the impact minimization measures described in section 2.2.2, the MADFW will implement mitigation measures in partnership with the Plan participants. Specifically to address the ITP issuance criteria, the primary mitigation measure will be implementation of a selective predator management program on Massachusetts beaches. This program is expected to increase piping plover productivity at sites where it is implemented, and is specifically designed to offset any loss of piping plover productivity in Massachusetts associated with the covered activities. In addition to the selective predator management program, the conservation strategy allows the MADFW and Plan participants also to implement education, outreach, increased law enforcement, and nesting habitat improvements on a site-specific basis. These actions are intended to contribute to a net conservation benefit.

2.2.3.1 Selective Predator Management

Each fall, the MADFW would determine the amount of take to be authorized under the Plan for the following beach season based on the prior 3-year average (see table 3-1 in the HCP). This authorized level of take would then determine the level of predator management required for mitigation. Predator management would be designed to benefit 2.5 breeding pairs for every brood, nest, or territory exposed to take from covered activities. In the event that the covered activity being implemented is “Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks,” a selective predator management to benefit an additional 0.5 adult breeding pairs would be required. This benefit would be ensured by implementing selective predator management at sites that support more than adequate numbers of breeding pairs to achieve this mitigation ratio, based on the prior season’s count of breeding pairs. A recount of the number of breeding pairs would be conducted in the season during which predator management is implemented. If plover population declines result in a failure to achieve the required mitigation ratio, additional predator management would be implemented during the following season to make up for the deficit.

Site-specific implementation plans would be prepared to focus management on the most problematic predator species and/or individuals (USFWS et. al. 2012). The preferred management approach is to selectively remove individual predators, particularly those predators that have become focused on plover nests, chicks, or adults. Predator removal efforts would use approved lethal techniques for wildlife damage management (USDA 2003, 2004, 2011a). Massachusetts law (MGL c.131 section 80A: Regulations 321 CMR 2.08) requires that only cage- or box-type traps be used to trap mammalian predators (e.g., raccoons [*Procyon lotor*], Virginia opossums [*Didelphis virginiana*], and striped skunks [*Mephitis mephitis*]). All traps used to capture mammals would meet the existing “Best Management Practices for Trapping in the United States” (Association of Fish and Wildlife Agencies 2006). Massachusetts does not permit mammalian predator relocation; therefore, mammalian predators would be humanely euthanized with the exception of feral cats. If feral cats are among the identified predators, cat control would be coordinated with local animal shelters. All cats that are captured live as part of the proposed program would either be returned to the cat’s owner (if proper identification can be determined) or taken to an animal shelter for health evaluation and, if possible, adoption. The final disposition of a feral cat would be determined by the animal shelter in consultation with the MADFW.

In addition to trapping, shooting of nocturnal mammalian predators, such as coyote (*Canis latrans*) and fox (*Vulpes vulpes*), would be employed. The predators would be located at night using spotlights or thermal imaging equipment and then shot with suppressed rifles or shotguns (USDA 2011a). Avian predators would also be removed, using firearms employing a silencing device. Approved toxicants, such as DRC-1339 (3-chloro p-toluidine hydrochloride) may be applied to eggs and placed in plover exclosures to remove American crows (*Corvus brachyrhynchos*) known to target plover nests. Studies have demonstrated that when appropriately applied, DRC-1339 poses a minimal risk of primary or secondary poisoning of nontarget animals (Eisemann et. al. 2001). By applying the toxicant to eggs placed in exclosures, the risk of impacting nontarget mammalian or avian predators is reduced.

Predator removal efforts would be implemented in late winter or spring by U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service's (APHIS) Wildlife Services or other qualified personnel. Removal efforts would be undertaken before or as piping plovers return to nest locations. A second phase of predator removal may be implemented during the plover egg-laying period (late April into June), if the removal activity can be done without adversely affecting plovers. Monitoring for predator presence would be conducted following the predator removal efforts to identify any predators that may still be present and to assess the effects of the selective predator management.

Any predator removal efforts would be conducted only with landowner permission and appropriate local, State, and Federal permits. Predator removal activities are typically implemented at times of the year (late winter and early spring) and times of the day (evening) when human use of the beaches is greatly reduced or absent. As a result, beach closures would not be necessary during implementation (USFWS et al. 2012).

2.2.3.2 Education, Outreach, and Increased Law Enforcement

The proposed education and outreach mitigation strategy is to maintain and increase community support for the continued conservation of piping plovers on Massachusetts recreational beaches. Some sites may benefit from outreach directed specifically to pet owners, OSV operators, or other groups of beach users.

Increased law enforcement may include extra patrols and other enforcement operations during the piping plover breeding season. The purpose of increased law enforcement is to reduce the risk of disturbance, harassment, or mortality of piping plovers resulting from off-leash dogs or other illegal recreational activities. Despite regular plover monitoring and other beach management measures, complex patterns of land ownership and beach use result in enforcement gaps. Supplementing existing law enforcement efforts is expected to benefit piping plovers at some sites although the outcomes are not quantifiable.

Education, outreach, and increased law enforcement efforts would be conducted by Plan participants at sites they manage and also may be conducted at supplemental sites. All site-specific education, outreach, and increased law enforcement plans would be subject to advance review and approval by the MADFW.

2.2.3.3 Nesting Habitat Improvement

Vegetation management has the potential to provide benefits to piping plovers in some cases. For example, at some sites, plant growth and succession has rendered formerly suitable nesting habitat

unsuitable. The MADFW proposes to implement a pilot project by removing vegetation at 2 to 5 sites, although not more than 0.5 acre per site may be affected. The total acreage for all projects may not exceed 2.5 acres.

Because nesting habitat improvement through vegetation management actions has rarely been implemented on Massachusetts beaches, there is uncertainty as to its effectiveness and duration. This uncertainty would be addressed as part of the adaptive management process described in section 2.2.5.

2.2.4 Monitoring

Under Service policy (65 Federal Register 35242), HCPs are required to include monitoring to assess whether the permittee is carrying out the terms of the HCP and the ITP (i.e., compliance monitoring), assess the effects of the covered activities on covered species (i.e., effects monitoring), and evaluate the effectiveness of the conservation strategy in achieving the HCP's biological goals and objectives (i.e., effectiveness monitoring). Effects monitoring for each covered activity is discussed in section 2.2.2. This section focuses on the two other types of monitoring: compliance monitoring and effectiveness monitoring.

2.2.4.1 Compliance Monitoring

Compliance monitoring assesses whether the Plan participants are carrying out the terms of the Plan and ITP and whether the MADFW is ensuring compliance with the Plan and ITP. Plan participants would monitor their own compliance and report these monitoring results to the MADFW. The MADFW would conduct its own compliance monitoring and report the results of both Plan participant and MADFW compliance monitoring to the Service (HCP section 4.4.1.1). The Service would evaluate reports from Plan participants and the MADFW to determine whether the HCP is being properly implemented and whether the terms and conditions of the ITP are being met. The Service can check compliance and may request copies of monitoring logs at any time during the Plan's implementation.

Compliance monitoring by Plan participants and/or the MADFW would report the implementation of tasks associated with specific covered activities and mitigation measures as outlined in the Plan, site-specific IAMPs, and selective predator management mitigation plans (if on-site mitigation is conducted by the Plan participant). For example, compliance monitoring would report whether travel corridor locations and setback distances between OSVs and unfledged plover chicks were maintained, whether the appropriate number of monitors were present to implement the intensive monitoring required for nest relocation or OSV travel in the vicinity of unfledged chicks, and whether monitoring of the results of reduced symbolic fencing was conducted.

2.2.4.2 Effectiveness Monitoring

Effectiveness monitoring ultimately assesses whether implementation of the Plan is achieving the HCP's biological goals and objectives, and in turn, helps determine if any changes in management (HCP section 4.4.1.2) are necessary. Statewide monitoring data are essential for Plan implementation, as these data are needed to determine the level of allowable take. Virtually all piping plover breeding pairs in Massachusetts are monitored and included in statewide census and productivity estimates. The MADFW tracks the annual population status and documents the population trend by compiling individual beach monitoring reports.

Effectiveness monitoring would evaluate the reproductive success of breeding pairs of piping plovers exposed to covered activities and compare this result to the reproductive success of pairs not exposed. Effectiveness monitoring would also provide information on the benefits of selective predator management. In addition, effectiveness monitoring would qualitatively evaluate the education, outreach, and increased law enforcement mitigation measure. Finally, effectiveness monitoring would evaluate the extent to which nesting habitat improvement projects (i.e., vegetation management) influence patterns of habitat use and reproduction by piping plovers. The Plan outlines the effectiveness monitoring and reporting requirements of various Plan elements in table 4-8 (see HCP section 4.3.2.3).

2.2.5 Adaptive Management

Adaptive management is a process whereby Plan effectiveness is monitored and the conservation strategy is adjusted in response to monitoring results, new research, or other sources of new information. Adaptive management may lead to improvements to minimization protocols and implementation of the mitigation. For example, monitoring may provide information that leads to improvements in the design of barriers to prevent piping plovers from accessing roads or improvements to nest-moving techniques. Similarly, adaptive management could lead to improvements to trapping methods for mammalian predators. In addition, establishing the limits on take exposure would follow an adaptive management process, as the number of permits authorized per year would vary based on the statewide population size.

In general, under the Plan, adaptive management would be limited to refining the minimization and mitigation measures. Prior to implementing adaptive management actions, the actions would be presented as recommendations in the annual monitoring report the MADFW provides to the Service as part of Plan implementation. Adaptive management would be implemented as an iterative process whereby any changes would be followed by additional monitoring to determine the effectiveness of the change, thereby facilitating continued improvements over time.

2.3 Shorter Permit Term Alternative

The shorter permit term alternative includes the same study area, covered activities, conservation strategy, monitoring, and adaptive management program as described above for the proposed action. It is the same as the proposed action, except the duration of the ITP would be 10 years and the MADFW would issue COIs to landowners and beach managers for a 1-year period. This alternative is carried forward for detailed analysis because it is an option that the Service is considering at this time. We note that the analysis in the EA on this alternative is short because the annual effects are identical to the proposed action, with the exception that they will be limited to only a 10-year period.

There are benefits to this alternative. First, limiting the ITP to an initial 10-year period would allow the Service and Plan participants to re-assess how the Plan is being implemented relative to management flexibility and piping plover conservation over a shorter length of time. Under the Service's no surprises policy, once an ITP is issued, the agency cannot require additional changes to the Plan that impose financial or land obligations that are not already provided for in the Plan. Therefore, shorter permit duration would allow the Service to better address uncertainty (such as impact of climate change). The Plan could be renewed or revised after the initial permit duration.

Secondly, the issuance of annual COIs to Plan participants may simplify aspects of Plan implementation. For example, 1-year COIs may allow Plan participants to more easily demonstrate funding assurances and may allow the Service to more effectively assess whether the Plan is functioning successfully.

There are drawbacks to this alternative as well. First, limiting COIs to one year will place a greater administrative burden on the MADFW because of the need to evaluate and issue new COI's annually. Second, Plan participants also would have a greater administrative burden in having to prepare and submit COIs every year instead of every three years. Third, Plan participants would have less certainty regarding public recreation if the planning horizon is one year instead of three. Finally, this alternative would require greater Service staff time for oversight for annual reviews of COIs, IAMPs, and Plan participant mitigation plans.

2.4 Alternatives Considered but Eliminated from Further Consideration

The following alternatives to the proposed action were not carried forward for detailed analysis in this EA for the reasons described below.

2.4.1 Greater Deviations from the Guidelines

The Service considered additional covered activities that are not described in the proposed action that could provide greater access and flexibility to beach managers and recreational users. Specific actions considered included vehicle parking within 100 yards of unfledged chicks, vehicle travel within 100 yards of chicks for more than 6 hours per day, and no vehicle escorting. In addition, greater allowable take exposures were considered for some statewide population sizes.

The additional flexibility provided by inclusion of these additional covered activities may increase beach recreational and operation opportunities, but could increase incidental take of piping plovers. The Service believes that such measures would not have met the regulatory standard of section 10 of the ESA to minimize and mitigate the impacts of the taking of the covered species "to the maximum extent practicable." In addition, the avoidance and minimization measures described in the Plan and in the proposed action were developed in close coordination with beach managers and are practical to implement as these measures would allow the desired level of recreational opportunity expressed in the Plan's Objectives and Goals (HCP section 1.1.1). For these reasons, the Service decided not to further evaluate this alternative.

2.4.2 Additional Covered Species

This alternative considered covering additional species in the Plan. Three other federally listed species occur in the study area: roseate tern (*Sterna dougallii dougallii*), red knot (*Calidris canutus rufa*), and northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*). These species are not proposed for inclusion as covered species in the Plan because incidental take of these species from implementation of the covered activities is unlikely. There is little overlap between piping plover and roseate tern breeding habitat, and impacts from covered activities on roseate tern staging areas are expected to be minimal. There is some overlap between piping plover breeding habitat and red knot migratory/staging habitat; however, the peak staging season for red knots during fall migration

is in mid- to late August, following the piping plover nesting season. Thus, take of red knot from implementation of the covered activities is not expected. The northeastern beach tiger beetle has an extremely restricted distribution in Massachusetts, limited to Federal land and a few private properties where implementation of the covered activities is not anticipated.

Least terns (*Sterna antillarum*) could be included in this alternative, because they occur in the study area and their habitat overlaps extensively with piping plover habitat. Least terns are State-listed as a species of special concern but are not federally listed. Because the species is not federally listed, and the MADFW did not include the species in the HCP, the MADFW currently does not need take exemption under section 10(a)(1)(B) of the ESA.

There are two federally and State-listed fish species in coastal and fresh waters of Massachusetts: the shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinchus*). Because the covered activities would not occur in waters used by these species, they are not proposed for inclusion as covered species in the Plan.

The Service decided not to further evaluate this alternative because the desired covered activities are not anticipated to result in take of any federally listed species other than the piping plover. If the desired covered activities are later discovered to result in take of any federally listed species other than the piping plover a separate ITP would be required.

2.4.3 Smaller Plan Area

A smaller Plan area boundary was considered that excluded Federal lands such as the Cape Cod National Seashore, Monomoy National Wildlife Refuge, and Parker River National Wildlife Refuge. Together, these large Federal landholdings include 10 beaches that in 2012 supported 143 of the 676 pairs (21 percent) of piping plovers observed that year. Beach recreation and related uses on Federal land cannot be covered under section 10(a)(1)(B) of the ESA, because take authorization on such land is provided through Federal agency consultations under section 7. However, there may be opportunities to implement mitigation measures on Federal lands that can simultaneously improve the piping plover population and offset impacts of the covered activities. Including Federal lands in the Plan area therefore expands the opportunities to conduct the conservation measures and increases the flexibility of Plan implementation. Excluding Federal lands from the Plan area would unnecessarily limit conservation opportunities. A small Plan area that excludes Federal land would also not meet MADFW's purpose of developing a comprehensive conservation strategy for the piping plover for all of Massachusetts. Therefore, the Service decided not to further evaluate this alternative.

Chapter 3

Affected Environment

This chapter describes the affected environment, including the regulatory setting and existing conditions. As discussed in section 1.3, EAs are intended to be concise documents that focus on aspects of the human environment that may be affected by the proposed action. The proposed action includes recreational activities and beach operations that are already occurring and does not include new activities. Recreational activities include swimming, sunbathing, picnicking, pedestrian activity, dog walking, fishing, nature study, beach sports, boating, water sports (such as surfing and wind surfing), camping, and OSV use on beaches that currently allow it. Beach operations include beach raking or cleaning of debris and litter, erection of lifeguard stands or beach access structures, maintenance of beach surface, etc.

Under the proposed action, the Service would issue an ESA section 10(a)(1)(B) ITP, and the MADFW and Plan participants would implement an HCP that allows deviations from the State and Federal guidelines for managing recreational use of beaches. All other activities related to beach management and use would comply with the State and Federal guidelines. Therefore, the primary differences between what would be implemented under the no action alternative and the two action alternatives include: recreational activities that occur on areas of the beach that would otherwise be protected by symbolic fencing around nests or proactive symbolic fencing of suitable piping plover habitat; OSV use during the time when access is normally prohibited due to the presence of unfledged piping plover chicks; use of roads or parking lots that may otherwise be closed to protect nesting or adult plovers; required levels of selective predator management for mitigation; and implementation of pilot piping plover nesting habitat improvement projects as a component of the mitigation. Thus, the proposed action or shorter permit term alternative would not change whether recreational activities occur or not, but rather would change the details of how recreational activities would be managed when piping plovers are present. In addition, outside of the small scale (less than 0.5 acre per project for a total of 2.5 acres) pilot nesting habitat improvement projects and vehicle ruts associated with OSV use (which are required to be remediated via raking daily under the Plan—see section 2.2.2), no components of any of the alternatives will result in ground disturbing activities. Therefore, this EA primarily focuses on the following resource areas:

- Biological Resources (section 3.1),
- Coastal Resources (section 3.2),
- Recreation (section 3.3),
- Transportation and Traffic (section 3.4), and
- Socioeconomics (section 3.5).

This EA does not analyze potential environmental impacts on the following resource areas in detail, for the reasons explained below.

- **Air Quality and Climate.** The only components of the action alternatives that have the potential to affect this resource area are OSV use, and additional vehicle use associated with the implementation of predator management, increased law enforcement, and nesting habitat improvements (if motorized equipment is required) through vehicle exhaust emissions. In the event that late season nesting plovers and chicks are present on the beaches, the action

alternatives would allow limited OSV use during the pre fledging period, when such use would otherwise be prohibited. In general, OSV use is allowed most of the time, except during this short time period. Therefore, the action alternatives would allow minimal OSV use on beaches compared to what already occurs (the extent to which this increased allowance of OSV use on beaches would result in a decrease of OSV use on nonbeach areas is unknown). Similarly, predator management, increased law enforcement, and nesting habitat improvements would involve personnel temporarily operating vehicles or motorized equipment and thus temporarily generate exhaust emissions. However, like OSV use during the pre fledging period, air emissions associated with these activities would be minimal compared to the no action alternative. The action alternatives would not result in new stationary sources⁸ of emissions and would not result in exceedance of any air quality standards (e.g., National Ambient Air Quality Standards) because they would not substantially add to existing air emissions in study area.

CEQ's revised draft guidance for greenhouse gas emissions and climate change (CEQ 2014) states that Federal agencies should consider the following when addressing climate change in a NEPA document: (1) the potential effects of a proposed action on climate change as indicated by its greenhouse gas emissions; and (2) the implications of climate change for the environmental effects of a proposed action.

To provide perspective on whether vehicle emissions associated with OSV use, predator management, increased law enforcement, and nesting habitat improvements could affect global climate change, it is necessary to consider worldwide greenhouse gas emissions. Greenhouse gas emission rates are quantified in units of million metric tons of carbon dioxide (CO₂) equivalent (MMTCO₂E). In 2010, estimated worldwide greenhouse gas emissions from human activities totaled nearly 4,600 MMTCO₂E (EPA 2015). If the greenhouse gas emissions from predator management, increased law enforcement, and nesting habitat improvements were a conservatively high 10,000 gallons of diesel fuel in a year, those vehicles would emit 110 tons of CO₂, which would equate to only 0.0001 MMTCO₂E/year of greenhouse gases. This level of emissions would be a tiny fraction of the worldwide total, and would have a negligible influence on climate both in Massachusetts and globally.

Chapter 5 addresses the implications of climate change for the environmental effects of a proposed action.

- **Cultural Resources.** Based on the nature of the action alternatives (i.e., no construction activities and only very minor ground alteration or disturbance of a temporary nature) and location (beaches with active recreation and OSV use), the Service does not anticipate adverse effects to cultural resources, including historic properties or archaeological resources. The only components of the action alternatives that would potentially lead to ground alteration or disturbance are the pilot nesting habitat improvement projects and vehicle ruts associated with OSV use. Two to five pilot nesting habitat improvement projects (e.g., vegetation removal) may be incorporated as components of the MADFW and Plan participant site-specific mitigation plans. If implemented, these projects would result in vegetation removal to improve beach dune habitat conditions in small (less than 2.5 acres) sandy soil areas over the 25-year ITP term. The

⁸ A stationary source in air quality terminology is any fixed emitter of air pollutants, such as fossil fuel burning power plants, petroleum refineries, petrochemical plants, food processing plants, and other heavy industrial sources.

represents less than 0.002 percent of the study area that is being analyzed in this EA. Therefore, the ground disturbance would be minimal in size and the sandy dune environment would recover nearly immediately. There is also potential for some ground disturbance from vehicle ruts associated with OSV use. However, the Plan incorporates a commitment to remediate these ruts daily through raking and impacts are anticipated to be both minor and of short duration. For these reasons, the Service does not anticipate any components of the action alternatives would affect cultural resources. In accordance with section 106 of the National Historic Preservation Act, the Service sent a letter to the State Historic Preservation Officer (SHPO) requesting concurrence with the Service's finding of no adverse effect. The SHPO's response will be provided in the final EA.

- **Farmlands.** Activities associated with the action alternatives would occur on coastal beaches in Massachusetts. No aspect of the action alternatives has the potential to affect farmlands. Therefore, the action alternatives would not affect prime or unique farmlands or farmland of statewide or local importance as defined by the Farmland Protection Policy Act.
- **Geology and Soils.** Based on the nature of the action alternatives (i.e., no construction activities and only very minor ground alteration or disturbance of a temporary nature) and location (beaches with active recreation and OSV use), the Service does not anticipate adverse effects to geology or soils. The potential for minor ground alteration or disturbance is described above under the cultural resources section. Based on these impacts, the Service anticipates the effects on soils and geology would be minimal.
- **Hazardous Materials.** The action alternatives do not include any activities that would use hazardous materials or impact any resources related to hazardous materials, such as disturbance of a contaminated site. The use of toxicants in predator management is addressed under the impacts of predator management.
- **Land Use.** The action alternatives include minor changes to how existing recreational activities are managed and implemented. They do not include activities that would change the existing use of the land. Therefore, the action alternatives would have no effect on land use.
- **Noise.** The action alternatives would generate minimal and temporary additional noise compared to the no action alternative. The action alternatives' noise sources are not different from the no action alternative's noise sources. Additional noise would be generated from OSVs being driven in areas where they would otherwise not be allowed during the approximate 8-week piping plover nesting season. Noise would be generated also from vehicles and suppressed firearms used to remove predators from beaches. This noise would be temporary and would not substantially exceed (if at all) ambient noise levels. Noise associated with the action alternatives would not violate local noise ordinances.
- **Public Utilities.** The action alternatives would not affect public utilities because they do not involve any actions that would result in changes to public water supply, electricity, or natural gas.
- **Visual Resources.** The action alternatives would not result in significant visual impacts, because they involve only minor changes to existing activities. Additional fencing and barriers would be minimal (in some cases less) and would not deviate substantially from existing fencing and barriers. Although some beach users may believe that OSV use affects the aesthetic experience, OSV use is currently allowed the majority of the time. Therefore, allowing fencing,

barriers, and OSV use during the piping plover pre fledging period would not result in significant impacts to visual resources.

- **Water Resources (including floodplains, wetlands, surface water, and groundwater).** The action alternatives would have no impact on water resources because the activities implemented under these alternatives would not occur within floodplains or wetlands regulated by the Clean Water Act and would not affect surface water or groundwater. Wetland resources protected under the MWPA are addressed in sections 3.2 and 4.2.2.
- **Environmental Justice.** Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” requires all Federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The action alternatives would not result in any identifiable adverse human health or environmental effects on minority or low-income populations and communities.

As stated in section 2.2.1, the environmental setting or study area is the same as the Plan area defined in the HCP. It includes all areas where activities (i.e., covered activities and mitigation measures) would be conducted and thus where all direct, indirect, and cumulative effects of the action alternatives would occur. Generally, the study area includes almost the entire coastline of Massachusetts (see Plan figure 2-1). The study area encompasses all currently and recently occupied piping plover habitat delineated as priority habitat by the MADFW, as well as other beach and dune areas that could support breeding piping plovers in the future. It includes the coastal portions of the following counties: Essex, Suffolk, Norfolk, Plymouth, Barnstable, Bristol, Dukes, and Nantucket.

3.1 Biological Resources

This section discusses the regulatory setting and existing conditions for biological resources (i.e., plants, wildlife, fish and other aquatic species, and their associated habitat). Because the proposed action and alternatives would occur entirely on beaches and would not impact the aquatic environment, there is no further discussion of aquatic biological resources.

3.1.1 Regulatory Setting

3.1.1.1 Endangered Species Act

The ESA was enacted to provide a means by which threatened and endangered species and the ecosystems on which they depend may be conserved. The ESA and its implementing regulations (50 CFR 17.1 et seq.) include provisions for the protection and management of federally listed threatened or endangered plants and animals and their critical habitats.

Section 9 of the ESA prohibits the take of any endangered or threatened species of fish or wildlife listed under the ESA. *Take*, as defined by the ESA, means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” The ESA-implementing regulations define the term *harass* in the take definition as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding,

feeding, or sheltering. Similarly, the regulations define *harm* as an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

The ESA includes mechanisms that provide exceptions to the section 9 take prohibitions. These are addressed in section 7 for Federal actions and section 10 for non-Federal actions. Specifically, section 7 of the ESA requires Federal agencies to consult with the Service and/or National Marine Fisheries Service (NMFS) and obtain a biological opinion prior to carrying out any Federal program or agency action that may adversely affect threatened or endangered species. The section 7 consultation process includes an evaluation of whether a project is likely to jeopardize the continued existence of any endangered or threatened species or result in the “destruction or adverse modification” of critical habitat. Section 10 provides a mechanism for non-Federal entities to obtain take authorization through the ITP process provided in section 10(a)(1)(B). Incidental take is defined by the ESA as take that is “incidental to, and not the purpose of, the carrying out of otherwise lawful activities.” The issuance of an ITP by the Service or NMFS is a Federal action subject to the section 7 consultation process.

3.1.1.2 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. 703–712), prohibits the take of migratory birds. A list of birds protected under MBTA-implementing regulations is provided at 50 CFR § 10.13 and includes the piping plover. Unless permitted by these regulations, under the MBTA it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture, or kill; possess, offer to or sell, barter, purchase, deliver, or cause to be shipped, exported, imported, transported, carried, or received any migratory bird, part, nest, egg, or product. The MBTA provides no process for authorizing the incidental take of MBTA-protected birds; however, the Service has a policy of allowing an ITP to serve as a special purpose permit under 50 CFR § 21.27 for the take of listed, migratory birds that are addressed in an HCP (USFWS 1996c). The covered activities are not anticipated to take migratory birds other than piping plovers. Some components of the mitigation program under the Plan may result in selective intentional take of avian predators, such as American crows (*Corvus brachyrhynchos*). However, the Plan’s predator management program would comply with the conditions of the Service’s depredation order (50 CFR § 21.43), which applies to blackbirds, cowbirds, grackles, crows, and magpies. When other MBTA-protected species are targeted by the mitigation, an MBTA permit would be obtained by the entity conducting the mitigation.

3.1.1.3 Massachusetts Endangered Species Act

The MESA was enacted in December 1990. Implementing regulations were promulgated in 1992 and most recently revised and implemented as of October 15, 2010 (321 Code of Massachusetts Regulations [CMR] 10.00). The MESA protects rare species and their habitats by prohibiting the take of any plant or animal species listed as endangered, threatened, or of special concern by the MADFW. *Take*, in reference to animals, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct. In reference to plants, take means to collect, pick, kill, transplant, cut or process or attempt to engage or to assist in any such conduct. Disruption of nesting, breeding, feeding, or migratory activity may result from, but is not limited to, the modification, degradation, or destruction of habitat. As part of the process of obtaining a COI under

the HCP, Plan participants would be required to achieve compliance under the MESA for State-listed species by avoiding take or obtaining a MESA conservation and management permit (see HCP section 1.1.1).

3.1.1.4 Massachusetts Wetlands Protection Act

Activities in wetland resource areas, such as dunes, beaches, tidal flats, and coastal banks, are subject to performance standards outlined in the MWPA's regulations (310 CMR 10.00), including storm damage prevention and protection of wildlife habitat. The local agency responsible for enforcing this Act and its accompanying regulations is the Town's or City's conservation commission. The local conservation commission implements the regulations as overseen by the Massachusetts Department of Environmental Protection's Division of Wetlands and Waterways. For activities proposed in coastal wetland resource areas, the commission may decide that the proposed activity would not endanger the resource, as long as the activity proceeds subject to certain conditions. If this is the commission's determination, it issues an Order of Conditions, which is the permit for the proposed activity. Orders of Conditions regulate proposed activities to minimize or prohibit impacts on wetland resource areas. Some of the covered activities require an Order of Conditions (e.g., OSV use and beach raking) or are expected to require an Order of Conditions to implement them (e.g., nesting habitat improvement).

3.1.2 Existing Conditions

3.1.2.1 Plants

The proposed action and alternatives would occur on sandy beaches. Unvegetated expanses are common between the ocean and the foredune⁹. The dominant plant species is American beachgrass (*Ammophila breviligulata*), which is generally found on dunes but also occurs in sporadic sparse patches on the berm (a long narrow wedge of sand with its steep slope facing the ocean). Other commonly occurring species are seaside goldenrod (*Solidago sempervirens*), dusty miller (*Artemisia caudata*), beach pea (*Lathyrus japonicus*), and sea rocket (*Cakile edentula*). Wrack—organic material including seaweed, vegetation, seashells, driftwood, and other organic debris—is deposited on the beach by tidal action and storms. Wrack is an important seed source for vegetation.

There are no federally listed plants in the study area. The federally threatened seabeach amaranth (*Amaranthus pumilus*) historically occurred in coastal Massachusetts but is no longer present. Plant species protected under the MESA with habitat that potentially overlaps with piping plover habitat in the study area includes the oysterleaf (*Mertensia maritima*) (endangered). Oysterleaf is currently known to occur in Barnstable and Nantucket Counties, and was historically found in Bristol County (MADFW 2008). Hereinafter, the analysis relative to plants refers to native and nonnative vegetation that is found in piping plover habitat.

3.1.2.2 Wildlife

Wildlife in the study area includes species typically associated with coastal and intertidal marine habitats. Mammals found on Massachusetts beaches include striped skunk, gray fox (*Urocyon*

⁹ Named for their position as the first (fore) dunes inland from the beach, foredunes are low, active dunes that parallel the beach.

cinereoargenteus), red fox, eastern coyote, raccoon, and Virginia opossum. These mammals are known to prey on piping plover eggs and young. Some bird species are also piping plover predators, including the American crow, gulls, and common grackle (*Quiscalus quiscula*). There are no population estimates for furbearer species (other than coyotes) in Massachusetts, but all populations are considered to be healthy and stable. Coyotes are well established throughout most of Massachusetts (except Nantucket and Martha's Vineyard), and the State's population has likely been stable at about 10,000 animals since the mid-2000s (USFWS 2015a). The American Crow is a common and widespread year-round resident in Massachusetts (Mass Audubon 2015a). It is protected by the MBTA, but hunting is permitted on specific days in Massachusetts except from April 11 to June 30. The American crow population in Massachusetts was estimated at 110,000 crows statewide based on the North America Breeding Bird Survey information (Rich et al. 2004). From 1966 to 2007, trend data from the survey indicates the number of crows observed in Massachusetts during the survey has increased at an annual rate of 1.2 percent (Sauer et al. 2008). The number of crows observed in Massachusetts in areas surveyed during the National Audubon Society Christmas Bird Count has shown a general increasing trend since 1966 (NAS 2010).

The USDA completed an EA for predator management activities conducted on recreation areas in Massachusetts (USDA 2011a). The USDA EA included an effects analysis of management actions for all small mammal predators of ground-nesting birds, including Virginia opossum, red fox, gray fox, raccoon, and striped skunk. Because statewide population estimates are not available for these species, APHIS estimated conservative populations based on typical species densities and amount of available habitat: Virginia opossum (5,100–79,200), red fox (10,200), gray fox (12,200), raccoon (7,900), and striped skunk (32,500).

A great diversity and abundance of shorebirds and coastal waterbirds are found on Massachusetts beaches, although a limited number of species breed on the beaches including (but not limited to) roseate, least, common and arctic terns; laughing, herring, and Great black-backed gulls; black skimmers; and oystercatchers. Foraging habitat for these species may be found in the intertidal zone, in the wrack found along the beaches, and over coastal waters. Massachusetts beaches are also important migratory stopover areas for shorebirds and waterbirds, providing important staging, foraging, and roosting habitat.

Wildlife species protected under the ESA (in addition to the piping plover) with habitat that potentially overlaps with piping plover habitat in the study area include the endangered roseate tern, the threatened red knot, and the threatened northeastern beach tiger beetle. There are no federally listed mammals, amphibians, or reptiles in the study area. Also, there is no terrestrial designated critical habitat in the study area.

Species protected under the MESA with habitat that potentially overlaps with piping plover habitat in the study area include the least tern (*Sternula antillarum*) (special concern), common tern (*Sterna hirundo*) (special concern), arctic tern (*Sterna paradisaea*) (special concern), northern harrier (*Circus cyaneus*) (threatened), and eastern spadefoot (*Scaphiopus holbrookii*) (threatened) (MADFW 2015).

Measures for the protection of least, common, roseate, and arctic terns and their habitats are contained in the State guidelines (MADFW 1993). A description of the federally listed species and their distribution in the study area is provided below. More detail is provided for the piping plover because it is the species that would be most affected by the proposed action and for which the MADFW is seeking an ITP.

Piping Plover

The piping plover is federally listed across its global range, with the Service recognizing three separate breeding populations: Atlantic Coast (threatened), Great Lakes (endangered), and Northern Great Plains (threatened). No critical habitat has been proposed or designated for the breeding range of the Atlantic Coast population. All piping plovers are classified as threatened on their shared migration and wintering range.

Piping plovers are small, sand-colored shorebirds that nest along the Atlantic Coast on sandy beaches from North Carolina to Newfoundland. Following the breeding season, they migrate farther south to winter on beaches from North Carolina to Florida, the Gulf of Mexico, and the Caribbean. The Atlantic Coast population ranges from maritime Canada (Newfoundland) to North Carolina, with four recovery units: (1) Atlantic Canada, (2) New England, (3) New York–New Jersey, and (4) Southern (Delaware, Maryland, Virginia, and North Carolina) (USFWS 1996a).

Piping plovers begin returning to their Atlantic Coast nesting beaches in mid-March. Atlantic coast piping plover nesting habitat includes sandy beaches above the high-tide line, sand flats at the end of sand spits and barrier islands, gently sloping dunes, and unvegetated “blow-outs” and washover areas created by wind and wave action between or behind coastal dunes. They may also nest on areas where suitable sandy dredged material has been deposited. Nest sites are shallow scraped depressions in substrates ranging from fine-grained sand to mixtures of sand and pebbles, shells, or cobble. Nests are usually found in areas with little or no vegetation, although, on occasion, piping plovers will nest under American beachgrass or other vegetation. Piping plovers depend on natural processes of beach erosion and accretion through wind and wave action to maintain suitable nesting habitat.

Eggs may be present on the beach from mid-April through late July. Clutch size is generally four eggs. Eggs are incubated by the adult plovers for a period that usually lasts 27 to 28 days. Piping plovers generally fledge only a single brood per season, but they may renest several times if previous nests are lost. Chicks are able to move about and forage for themselves within several hours of hatching. They may move hundreds of yards from the nest site during their first week of life. Chicks remain together with one or both parents until they fledge (i.e., are able to fly) at 25 to 35 days of age. Depending on the date of hatching, flightless chicks may be present from mid-May until late August, although most fledge by the end of July.

Primary feeding habitats for both adults and chicks are the intertidal zones of both ocean-facing and bay-side beaches (especially wet sand areas) and wrack. Plovers eat invertebrates such as marine worms, fly larvae, beetles, crustaceans, and mollusks.

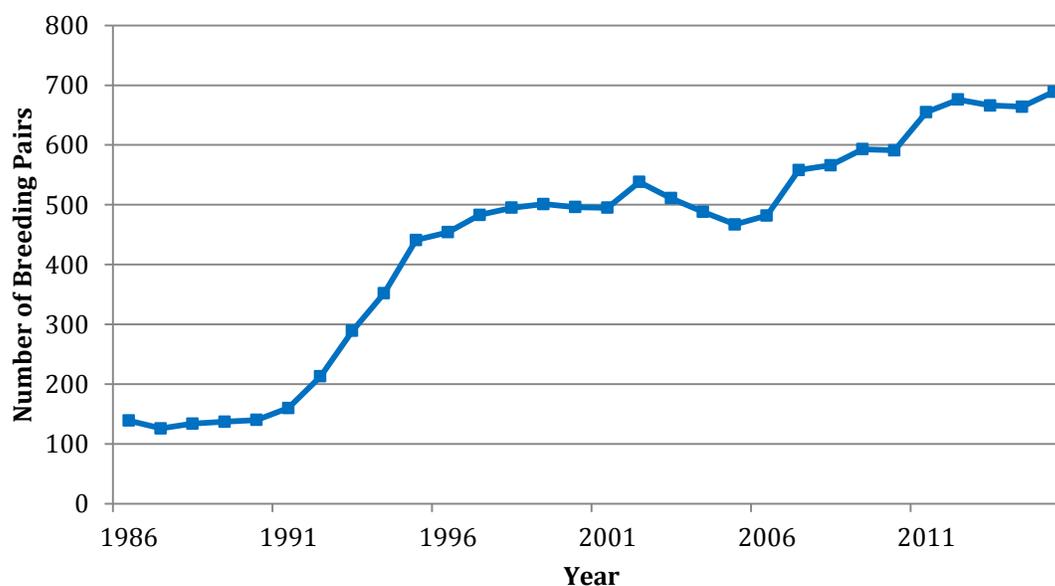
Threats to piping plovers in Massachusetts include disturbance by humans, pets, and vehicles (usually associated with recreational activity); predation; and habitat modification and loss. Additional threats include beach raking, oil spills, wind turbines, and climate change and storm surge.

New England is the only recovery unit to have consistently exceeded the regional recovery goal for minimum population size established in the Revised Recovery Plan (USFWS 1996a).¹⁰ The recovery goal of 625 breeding pairs was first exceeded in 1998 and has been exceeded in all but 3 years

¹⁰ The New York-New Jersey unit exceeded its goal for one year (2007).

during the period 1998 to 2013 (1999, 2000, and 2005). The Massachusetts population increased from an estimated 139 in 1998 to an adjusted total of 666 breeding pairs in 2013 (MADFW 2015) (figure 3-1). The 2014 preliminary estimated population size in the New England recovery unit is 862 breeding pairs, which incorporates a preliminary estimate of 664 breeding pairs for Massachusetts (A. Hecht, USFWS pers. comm. 2015). The preliminary 2015 population estimate for Massachusetts is currently at 689 breeding pairs (A. Hecht, pers. comm. 2015).

Figure 3-1. Number of Breeding Pairs of Piping Plover in Massachusetts, 1986–2015



Two regions harbored 59 percent of the total breeding pairs in Massachusetts in 2013: the Lower Cape (41 percent) and the Upper Cape (18 percent). Sixteen sites had 10 or more piping plover breeding pairs in 2013 (table 3-1) and accounted for 53 percent of the State's population (MADFW 2015).

There are three Federal properties supporting large numbers of breeding piping plovers (more than 20 breeding pairs) in the study area: Cape Cod National Seashore (99 pairs in 2014), Monomoy National Wildlife Refuge (i.e., South Monomoy Island; 50 pairs in 2013), and Parker River National Wildlife Refuge (32 pairs in 2013). Note that the Cape Cod National Seashore is divided into several sites for management purposes; sites depicted in table 3-1 located within the Seashore include Race Point South, North Beach Island, and Marconi Beach.

Four State-owned properties in the study area collectively supported 29 piping plover pairs in 2013: Revere Beach (9 pairs), Horseneck Beach State Reservation (9 pairs), Demarest Lloyd State Park (7 pairs), and South Cape Beach (4 pairs). Although piping plovers nest on many municipal properties throughout the State, as a rule the Towns of Chatham and Barnstable support the greatest numbers of piping plovers on municipal property, followed by the Towns Orleans and Plymouth. Crane Beach, Duxbury Beach, and Little Beach/Barney's Joy are the largest piping plover sites owned by nongovernmental organizations.

Table 3-1. Massachusetts Piping Plover Breeding Sites with Ten or More Pairs, 2013

Site Name	Town	Number Breeding Pairs (Adjusted Total Count)
South Beach (south end)	Chatham	62
South Monomoy Island	Chatham	47
Parker River National Wildlife Refuge	Newbury/Rowley	32
Crane Beach	Ipswich	23.5
Sandy Neck	Barnstable	27
North Beach Island	Chatham	21
Duxbury Beach	Duxbury/Plymouth	17
Sampson's Island/Dead Neck	Barnstable	16
Plymouth Long Beach	Plymouth	14.5
Norton Point/Leland/Cape Pogue Elbow	Chappaquiddick/Edgartown	14
North (Nauset) Beach	Orleans	14
Nauset Spit (Heights)	Orleans	14
Race Point South	Provincetown/Truro	14
Little Beach/Barney's Joy	Dartmouth	13.5
North (Nauset) Beach	Chatham	12.5
Marconi Beach	Wellfleet	10

Source: MADFW 2015

Roseate Tern

The endangered North Atlantic roseate tern (*Sterna dougalii dougalii*) population is one of only two temperate populations of *S. d. dougalii*, the other being the federally threatened Caribbean roseate tern population (USFWS 2010). It was listed as endangered in 1987. Roseate terns in the United States greatly declined in the late 19th century due to commercial hunting, primarily for the millinery (hatmaking) trade. In the 1930s, protected under the MBTA, the population reached a high of about 8,500, but since then, population numbers have declined and stayed in the low range of 2,500 to 3,300. Threats to roseate terns include loss of nesting habitat due to erosion, the spread of invasive plants, competition from expanding numbers of large gulls, and impacts on their prey base as a result of climate change (USFWS 2010).

Approximately 85 percent of the northeastern population is concentrated at three colonies: Great Gull Island (New York), Bird Island (Marion, MA; Plymouth County), and Ram Island (Mattapoisett, MA; Plymouth County). Other small nesting colonies in Massachusetts are found on Penikese Island (Gosnold, MA; Dukes County), Monomoy National Wildlife Refuge (Chatham, MA; Barnstable County), and Martha's Vineyard (Edgartown, MA; Dukes County).

Roseate terns begin arriving on breeding grounds at the end of April and begin laying eggs as early as the third or fourth week of May. The entire North Atlantic population of the roseate tern stages on Cape Cod prior to migration. Migration generally occurs in September, and all birds have left Cape Cod by mid- to late September.

In Massachusetts, roseate terns nest in common tern colonies located primarily on sandy, gravelly, or rocky islands and rarely in small numbers at the ends of long barrier beaches. Roseate terns

select nest sites with vegetation, such as seaside goldenrod (*Solidago sempervirens*) and beach pea (*Lathyrus japonicus*), which is also used for cover by chicks. They feed in highly specialized situations over shallow sandbars, shoals, inlets, or schools of predatory fish, which drive smaller prey to the surface (MADFW 2007a). In Massachusetts, most roseate terns nest on islands in vegetated areas, with the exception of two locations on Martha's Vineyard, whereas piping plovers select unvegetated areas to nest. Therefore, in general there is little overlap of piping plover and roseate tern breeding habitat in the study area although they may nest in the vicinity of each other on Martha's Vineyard. Potential overlap of staging habitat may exist where roseate terns are concentrated in Massachusetts (see above) prior to migration.

Red Knot

In December 2014, the Service announced Federal protection for the red knot, a robin-sized shorebird, designating it as threatened under the ESA. Since the 1980s, the red knot's population has fallen by about 75 percent in some key areas, largely due to declines in one of its primary food resources—horseshoe crab eggs—in Delaware Bay, an important migratory stopover site. Other threats, including sea level rise, changing climatic conditions, and coastal development, continue to shrink the red knot's wintering and migratory habitat.

The red knot is easily recognized during the breeding season by its distinctive rufous (red) plumage. It breeds in the central Canadian Arctic and winters along the Atlantic coasts of Argentina and Chile, north coast of Brazil, northwest Gulf of Mexico, and southeast United States from Florida to North Carolina. Each year, red knots make one of the longest distance migrations known in the animal kingdom, traveling up to 19,000 miles annually. Important fall stopover habitat includes the coast of Massachusetts. In Massachusetts, red knots use sandy beaches and tidal mudflats. No known regular counts are currently conducted in Massachusetts, but flocks of over 100 red knots are routinely reported from Monomoy National Wildlife Refuge (USFWS 2013). The Service has reviewed available survey data from areas regularly used by substantial numbers of red knots in the fall and has determined there is insufficient data for a trend analysis for fall stopover areas (USFWS 2013).

There is some overlap of piping plover breeding habitat and red knot stopover habitat in the study area, in particular, on Cape Cod beaches. During fall migration, red knots arrive in Massachusetts in July, and the peak staging season occurs in mid- to late August, overlapping only the tail of the piping plover nesting season.

Northeastern Beach Tiger Beetle

In 1990, the Service listed the northeastern beach tiger beetle as a threatened species under the ESA. In 2009, the Service completed a 5-year status review and recommended changing the tiger beetle's status to endangered, due to continuing habitat loss and population decline. At this time, the Service has not formally proposed the recommended status change. Northeastern beach tiger beetle population decline and habitat loss primarily resulted from shoreline development, beach stabilization, and high levels of recreational use. Shoreline erosion and inundation rates are steadily increasing due to accelerating sea level rise induced by climate change, possibly resulting in future beach stabilization projects that may impact tiger beetle habitat. Other known threats are pollution, pesticides, and oil slicks. Some natural limiting factors are beach erosion, flood tides, hurricanes, parasites, and predators (USFWS 2011).

Tiger beetles live their entire lives on the beach and prefer medium to medium-coarse sand (USFWS 2011). They require large, highly exposed beaches with fine sand particles and a low intensity of human disturbance. Adult beetles emerge from mid-June to mid-August, usually peaking in mid-July. The adult beetles forage in the intertidal zone, preying on small invertebrates and scavenging dead fish. They are primarily diurnal, but are occasionally active at night from mid-July to late August. Mating occurs from mid-July to early August, and the females lay their eggs in the intertidal zone. By September, most, if not all, of the adult beetles have died (MADFW 2007b).

The northeastern beach tiger beetle currently has a very restricted distribution in Massachusetts. It is known only from two areas (both are within the study area): Martha's Vineyard and Monomoy National Wildlife Refuge, the site of a translocated population (USFWS 2011).

3.2 Coastal Resources

This section discusses the regulatory setting and existing conditions associated with coastal resources.

3.2.1 Regulatory Setting

3.2.1.1 Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 (16 U.S.C. 1451 et seq.) established a national policy to “preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation’s coastal zone for this and succeeding generations.” The CZMA is also designed to “encourage and assist the states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone” (16 U.S.C. 1452, § 303 [1] and [2]). Administered by the National Oceanic and Atmospheric Administration, the CZMA promotes the “effective management, beneficial use, protection, and development” of the Nation’s coastal zone; those goals are met through State involvement in implementation of the CZMA. The CZMA gives States the authority to review Federal projects, federally financed projects, and projects receiving Federal licenses and permits to ensure that they abide by State-defined enforceable coastal policies. This process is referred to as Federal consistency review. The Massachusetts Office of Coastal Zone Management serves as the lead agency for implementing the State’s coastal program.

The Federal consistency regulations (50 CFR 930) explain consistency for Federal agency activities and consistency for activities requiring a Federal license or permit. The term “Federal agency activity” does not include the issuance of a Federal license or permit to an applicant or person (50 CFR § 930.31(a)). The term “Federal license or permit” means any authorization that an applicant is required by law to obtain to conduct activities affecting any land or water use or natural resource of the coastal zone and that any Federal agency is empowered to issue to an applicant (50 CFR § 930.51(a)). Thus, while the MADFW is required to submit a consistency certification (50 CFR § 930.57) to the Massachusetts Office of Coastal Zone Management, the Service is not required to submit a consistency determination.

3.2.1.2 Massachusetts Executive Order 190

Massachusetts Executive Order 190 (1980), “Regulation of Off-Road Vehicle Use on Public Lands Containing Coastal Wetland Resources,” directs State agencies to balance the competing uses of public lands and minimize the degradation of wetland resources due to off-road vehicle use through management and monitoring. The “Guidelines for Barrier Beach Management in Massachusetts” (Massachusetts Barrier Beach Task Force 1994) advance this executive order.

3.2.2 Existing Conditions

The official Massachusetts coastal zone includes the lands and waters within the seaward limit of the State’s territorial sea to generally 100 feet beyond (landward of) the first major land transportation route encountered (a road, highway, rail line, etc.). Included in the State’s coastal zone are all of Barnstable County, Dukes County, and Nantucket County (i.e., Cape Cod, Martha’s Vineyard, Nantucket, and Gosnold).

Massachusetts’ coastal zone has many types of ecosystems, including saltmarshes, eel grass beds, sand dunes, sand beaches, tidal flats, rocky shores, salt ponds, and barrier beaches. Massachusetts’ barrier beaches perform a variety of important functions, including protection of landward areas from storm damage and flooding. Barrier beaches deflect the force of onshore waves and absorb wave energy during coastal storms. Mainland areas landward of barrier beaches are partially sheltered from high tides and storm surges that accompany coastal storms. Barrier beaches also protect saltmarshes, which in turn serve as major sources of nutrients for shellfish and finfish and provide important spawning and feeding grounds for many commercial fisheries. Barrier beaches also facilitate recreational finfishing and shellfishing by protecting enclosed coastal waters and intertidal flats adjacent to river mouths, bays, and sounds (see *Recreation* below for additional recreational activities). Examples of barrier beaches in Massachusetts include Duxbury Beach, Crane Beach, Sandy Neck, North (Nauset) Beach, Monomoy Island, Coatue Beach, the south beach on Martha’s Vineyard, and Horse Neck Beach. Residences are located on some Massachusetts barrier beaches, such as North (Nauset) Beach. Some barrier beaches, such as Duxbury Beach, also provide the sole means of overland access to non-barrier beach homes.

3.3 Recreation

3.3.1 Regulatory Setting

The State and Federal guidelines provide management recommendations for recreational activities to avoid take of piping plovers and State-listed terns, and the “Guidelines for Barrier Beach Management in Massachusetts” (Massachusetts Barrier Beach Task Force 1994) provides management recommendations to protect the coastal ecosystem. The MWPA applies to activities, including recreation or beach operations that occur in wetland resource areas, such as dunes, beaches, tidal flats, and coastal banks (see section 3.1.1.4).

3.3.2 Existing Conditions

Recreational uses on Massachusetts beaches vary and may include swimming, sunbathing, picnicking, pedestrian activity, dog-walking, fishing, nature study, beach sports, boating, water

sports (such as surfing and wind-surfing), camping, and OSV use. Relatively new recreational activities at some beaches include fat-tire biking and kite boarding. The nature and intensity of recreational uses vary widely among beaches due to beach characteristics, beach use regulations, and accessibility. For example, many beaches have limited parking, parking fees, or resident-only policies that limit the number of beach visitors and the intensity of use. According to the Massachusetts “Statewide Comprehensive Outdoor Recreation Plan” (Commonwealth of Massachusetts 2006), coastal beaches and shorelines have a projected use of nearly 111 million person-trips annually.

Recreational OSVs are permitted at 10 sites that supported 5 or more breeding piping plover pairs in 2013 (refer to table 2-6 in the HCP), subject to the avoidance and minimization measures of the State and Federal guidelines that are designed to avoid take of piping plover (the State guidelines also address terns). OSV access on coastal beaches generally requires a municipal permit or permit issued by the landowner. According to the State and Federal guidelines and the “Guidelines for Barrier Beach Management in Massachusetts,” OSV use is limited to specific OSV corridors, with vehicular access to the open beach limited to specific “cuts” or dune openings. Under the MWPA, landowners allowing OSVs to drive on coastal beaches must have an Order of Conditions issued by the local Conservation Commission that is consistent with the State guidelines.

Town of Barnstable

OSV use at Sandy Neck requires an annual permit, available to both residents and nonresidents (Town of Barnstable 2014). OSV numbers are limited annually by space availability, which is driven by beach closures to protect plover nesting activity, tide, wind direction, and beach topography on any given year.

Town of Plymouth

A maximum of 225 OSVs at any one time are permitted on the northern section of Plymouth Long Beach. OSVs must display a sticker, available to Town of Plymouth residents only. A portion of the beach is closed to OSVs year round and another section is closed to OSVs from April 1 to September 30 (Town of Plymouth 2013).

Cape Cod National Seashore, Provincetown and Truro

Portions of the Cape Cod National Seashore, on the ocean shore of Provincetown and Truro from Hatches Harbor to Longnook Beach, may be open to limited OSV use (NPS 2013). Restrictions may apply, including a long section of beach from Route 6A, Exit 8 to High Head, which is closed to OSVs from April 1 to July 20, and an area from Coast Guard Beach to Longnook Beach, where OSV use is limited to night fishing. OSV permits are required and limited to 3,400 annually.

Town of Duxbury

OSV use at Duxbury Beach requires an annual permit. The Duxbury Beach Reservation leases the beach to the Town of Duxbury, which sells permits and manages OSV use on the beach. OSV numbers are limited annually by space availability, which is driven by beach closures to protect plover nesting activity, tide, wind direction, and beach topography on any given year (Town of Duxbury undated).

Towns of Orleans and Chatham

Recreational OSV use is limited to Nauset Beach, Orleans, extending south to the beach terminus located in Chatham (Town of Orleans 2013). Annual resident and nonresident registration stickers are required. Driving on the north end of Nauset Beach is limited to Orleans residents only. The maximum number of OSVs allowed on Nauset Beach at any one time is 575 vehicles (200 vehicles north of the parking lot and 375 vehicles south of the parking lot).

Town of Truro

The municipal OSV corridor is located on the bay side, with seasonal beach access points at Fisher Beach, Corn Hill Beach, and Beach Point Landing (Town of Truro 2013). OSV use is limited to Town residents with valid beach stickers.

Town of Dennis

Recreational OSV use is permitted at two sites: Crowes Pasture and Chapin Beach. Annual stickers are required and are available to residents and nonresidents. The number of OSVs is limited to a maximum of 125 at each site at any given time (Town of Dennis 2014).

Town of Nantucket

OSV use is permitted along several limited sections of municipal beach (Town of Nantucket 2014). Beaches where OSVs are permitted include portions of Nobadeer Beach, South Shore Beach, Madeket Beach, and 40th Pole. Town-issued beach stickers are required and are available to vehicles registered both on- and off-island.

Nantucket, Coskata-Coatue Wildlife Refuge

Seasonal or day use OSV permits may be purchased from the Trustees of Reservations (Trustees of Reservations 2015a).

Martha's Vineyard, Norton Point and Long Point Wildlife Refuge

Seasonal permits may be purchased from the Trustees of Reservations (Trustees of Reservations 2015b).

3.4 Traffic and Transportation

This section discusses the regulatory setting and existing conditions for transportation and traffic. A discussion of local transportation planning (e.g., specific local transportation plans) is not provided because the proposed action and shorter permit term alternative would not change or affect transportation plans.

3.4.1 Regulatory Setting

3.4.1.1 Massachusetts General Laws

Part I, Title XIV, Chapter 90H of Massachusetts General Laws establishes the Gateway Roads Program for the purpose of undertaking improvements of the gateway roads, including portions of Route 1, Route 2, Route 3, and Route 128, which are deemed to be essential routes for the

convenience of tourists entering the commonwealth and for the movement of commerce within the commonwealth.

3.4.1.2 Massachusetts Department of Transportation

The Massachusetts Department of Transportation (MassDOT) has authority over the State highway and bridge systems, including freeways, interchanges, and arterial State Roads. MassDOT is composed of several divisions, including the Massachusetts Division of Highway Safety, which was established under the Highway Safety Act to help reduce the number of fatalities, injuries, and economic losses from motor vehicle crashes on Massachusetts roadways.

3.4.2 Existing Conditions

3.4.2.1 Roadway System

The primary routes for tourists and recreational visitors to access the study area are listed below:

- Essex County—Routes 1, 1A, and 128
- Suffolk County—Routes 1 and 1A
- Norfolk County—Routes 1 and 3A
- Plymouth County—Routes 3 and 3A
- Barnstable County—Routes 6, 6A, and 28
- Bristol County—Route 6
- Dukes and Nantucket Counties—local island roads

The majority of roadways providing direct access to beaches are local two-lane roads. Routes 1 and 128 are part of the MassDOT Gateway Roads Program; these roads are designated for road improvements because they are used by tourists.

3.4.2.2 Traffic Conditions

Average daily traffic counts (AADT) in 2009 along the routes listed above were as follows (MassDOT 2010):

- Route 1 in Essex, Suffolk, and Norfolk Counties ranged from 8,769 to 186,197 vehicles
- Route 1A in Essex and Suffolk Counties ranged from 8,700 to 54,010 vehicles
- Route 128 in Essex County ranged from 38,500 to 160,200 vehicles
- Route 3 in Plymouth County ranged from 35,320 to 135,235 vehicles
- Route 3A in Norfolk and Plymouth Counties ranged from 11,000 to 22,800 vehicles
- Route 6 in Bristol County range from 9,700 to 50,041 vehicles

Local AADT for Dukes and Nantucket Counties ranged from 6,023 to 13,464 vehicles in 2010 (MassDOT 2010).

A large number of tourists visit Cape Cod (Barnstable County) for the cape's beaches. The Cape Cod Commission has been counting traffic since 1998, and traffic count data show an overall negative

traffic growth. Heaviest travel occurs on the Cape Cod Canal road, and canal bridges, and Route 6/Mid-Cape Highway (Cape Cod Commission 2013).

3.4.2.3 Alternative Transportation

The study area includes bike paths and pedestrian sidewalks for people who live near the beach. Access to Martha's Vineyard (Dukes County) and Nantucket Island (Nantucket County) from the mainland is by ferry, boat, or plane. Cape Code can also be accessed by boat; several seasonal ferry and cruise boats operate between Boston Harbor and Provincetown.

3.5 Socioeconomics

This section discusses the regulatory setting and existing conditions for socioeconomics. Because the action alternatives would not affect the study area's population, income, housing, or community services, this section focuses on the attribute of the human environment that could be impacted—employment. Additionally, this section provides information regarding the coastal economy, specifically the revenue generated from beach recreation.

3.5.1 Regulatory Setting

The CEQ's NEPA implementing regulations state that the human environment "shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment" (40 CFR § 1508.14). This means that economic or social effects are not intended by themselves to require preparation of an environmental analysis. When economic and social and natural or physical environment effects are interrelated, then the environmental analysis will discuss these effects on the human environment (40 CFR § 1508.14).

3.5.2 Existing Conditions

Unemployment rates for the United States, State of Massachusetts, and the counties within the study area for the last 2 years are shown in table 3-2. Unemployment rates from 2013 to 2014 have declined in the study area at a greater rate than in Massachusetts and the Nation. Half of the counties in the study area have a higher unemployment rate than the State and Nation.

Table 3-2. Unemployment Rates for the Study Area

Jurisdiction	Unemployment Rate 2013 ^a (%)	Unemployment Rate 2014 ^b (%)	Percent Change in Unemployment Rate
United States	6.7	5.6	-16.4
Massachusetts	6.2	5.3	-14.5
Barnstable County	8.3	6.3	-24.1
Bristol County	9.3	6.5	-30.1
Dukes County	9.2	7.3	-20.7
Essex County	7.0	5.1	-27.1
Nantucket County	7.7	6.2	-19.5
Norfolk County	5.6	3.9	-30.4
Plymouth County	6.7	4.9	-26.9
Suffolk County	6.4	4.6	-28.1

^a December 2013

^b December 2014

Source: BLS 2015

Massachusetts' marine economy comprises five major sectors, one of which is coastal tourism and recreation (Massachusetts Office of Coastal Zone Management 2006). Within this sector, approximately 11 percent of employment (approximately 13,625 jobs) is related to entertainment and recreation (including fishing and boating), with the remaining employment provided by food services and accommodations.

The University of Massachusetts modeled annual spending associated with day trips to the beach (Massachusetts Office of Coastal Zone Management 2006). The modeling concluded that direct spending associated with day trips to the beach is over \$22 million. The model suggested that over 82 percent (approximately \$18 million) of this total is spent within Massachusetts. The model also showed that day trips to the beach result in direct employment of approximately 325 people and that their wages are over \$7 million. The model also concluded that the direct employment generates an additional 110 indirect and induced jobs within the State, and those jobs account for more than an additional \$4 million in wages.

Chapter 4

Environmental Consequences

The purpose of this EA is to analyze the effects of the proposed action and alternatives on the human environment. The State and Federal guidelines are currently being implemented by beach owners and managers in Massachusetts and are considered the baseline relative to beach activities and impacts. Under the HCP, the MADFW and Plan participants (i.e., landowners and beach managers) would be allowed to implement beach recreational activities and beach operations that deviate from existing piping plover conservation measures identified in the State and Federal guidelines. All other activities related to beach management and use would comply with the State and Federal guidelines. Therefore, the potential for environmental consequences from the proposed action and alternatives is limited to those activities that may occur as result of the beach recreational activities and beach operations covered by the HCP and that deviate from the State and Federal guidelines. Within this context, this chapter discusses the direct and indirect impacts that could result from implementation of the proposed action and alternatives, focusing on the biological, coastal, recreation, transportation and traffic, and socioeconomics resource areas carried forward for detailed analysis as described in chapter 3. For a discussion of resource areas dismissed from detailed analysis, see chapter 3. Cumulative impacts are discussed in chapter 5.

4.1 No Action Alternative

Under the no action alternative (i.e., status quo), the MADFW and beach managers would implement beach recreational activities and beach operations that continue to comply with current State and Federal guidelines to protect the piping plover (including its habitat) and would continue to contribute to the recovery effort for the species. Similarly, breeding terns would continue to benefit from implementation of the State guidelines. As these guidelines are intended to avoid the potential for take of piping plovers, there would be no need for the MADFW or beach managers to seek incidental take authorization for such activities. Therefore, an HCP would not be developed and the Service would not issue an ITP.

Under the no action alternative, the MADFW and beach managers would prohibit road use and parking where unfledged piping plover and tern chicks are present (in accordance with the State guidelines), all suitable piping plover habitat would continue to be symbolically fenced to preclude entry into these areas, fifty-yard (150-foot) buffers around established plover and tern nests would continue to be implemented, and OSV travel would be prohibited where unfledged piping plover chicks are present. Predator management activities are currently implemented by some beach owners and managers and may continue to be implemented under the no action alternative. However, under the no action alternative, mitigation measures to benefit the piping plover would not be implemented, and a statewide approach to predator management would not be coordinated. In addition, more flexible beach management and operations would not be allowed. The environmental consequences of the no action alternative on each resource area being carried forward for detailed analysis are described below.

4.1.1 Biological Resources

As explained in chapter 3, the assessment of consequences of the no action alternative on biological resources will focus on plants, wildlife, and their habitats. The no action alternative would not impact aquatic resources (such as marine life), and therefore analysis of those resources is not necessary. Under the no action alternative, recreational activities and beach operations consistent with State and Federal guidelines would occur in the beach and foredune areas in accordance with the State and Federal guidelines and the “Guidelines for Barrier Beach Management in Massachusetts.” Section 3.1.2 provides an overview of the existing conditions for coastal plants and their habitat in these areas.

In general, recreational activities and beach operations (swimming, sunbathing, picnicking, pedestrian activity, dog walking, fishing, nature study, beach sports, boating, water sports [such as surfing and wind surfing], and camping), road use and parking associated with beach recreation, and predator management may impact plants if occurring in vegetated areas, preventing plants from establishing through concentrated foot traffic or removing a seed source during wrack removal (beach operations). Delineating areas with symbolic fencing could provide temporary benefits to plants (e.g., protected species) by precluding the entry of pedestrians and OSVs and preventing trampling or crushing of seedlings or mature plants during times of year when symbolic fencing is in place. Often, early successional plants will establish in the symbolically fenced plover areas; however, once the fences are removed and recreationists access these areas, the plants may be impacted depending on the vegetation density and type. Under the no action alternative, any seasonal benefits from symbolic fencing and impacts from recreation on plants would continue at the current level.

OSV use on beaches prior to egg hatching and after chick fledging would continue unchanged under the no action alternative. Frequent OSV use can damage or kill plants resulting in vehicle paths free of vegetation. However, since OSV use is restricted to designated travel corridors and parking areas following the MWPA and associated Orders of Conditions, vegetation growing on the dunes is generally protected. Implementation of existing regulations would continue under the no action alternative, and therefore baseline conditions would not be affected.

Section 3.1.2 provides an overview of the existing condition for wildlife and their habitat on Massachusetts’ beaches. Implementation of the no action alternative would not change the magnitude or extent of recreational activities or beach operations that currently occur in the beach and foredune areas. Recreational activities and beach operations, road use and parking associated with beach recreation, and OSV use on beaches may or may not impact wildlife populations, depending on the species and time of year. Individual birds, flocks of shorebirds, or other wildlife using the beach would be disturbed by pedestrians and OSV use in their vicinity. In particular, the energetic resources of migratory shorebirds may be affected through continued disturbance by recreationists during the early migration (August). Conversely, other wildlife species may adapt to recreational use on beaches and not be as impacted by disturbance. Under the no action alternative, impacts to wildlife would continue at the current level.

OSV use has the potential to result in alteration of piping plover and other shorebird feeding and sheltering habitat through destruction of beach wrack and vegetation, creation of deep sand ruts, and beach erosion. This could result in both direct and indirect effects because OSV use can alter beach characteristics over time. Godfrey and Godfrey (1980) found that 50 vehicle passes on Cape Cod were enough to prevent seaward development of dunes and result in a scarped, rather than

sloped, dune profile. The authors noted that vegetation was completely eliminated after 70 to 175 passes and that the number of vehicles using a path makes little difference once the vegetation was eliminated. Identifying a link between beach driving and beach erosion is complicated by the natural variability of the environment in space and time (Houser et al. 2013). Houser et al. (2013) conducted a study to determine if differences in beach and dune morphology between restricted and open access sections of beach are associated with beach driving. Despite changes in dune morphology between the restricted and open beaches, the authors' results showed no statistically significant difference in beach-dune volume on either side of the beach access road, which suggests that driving on the beach does not lead to a net loss of sediment from the beach-dune system. However, the authors concluded that driving on the beach makes the foredune more susceptible to scarping (erosion) and overwash during tropical storms and hurricanes. OSV use on Massachusetts beaches is required to comply with the MWPA, which prevents OSV use from significantly impairing wildlife habitat functions. OSV impacts to the coastal ecosystem and management recommendations to avoid those impacts are described in the "Guidelines for Barrier Beach Management in Massachusetts" (Massachusetts Barrier Beach Task Force 1994).

Under the no action alternative, existing predator management activities in the study area would continue. Currently, predator management is being implemented at a number of piping plover beaches to increase local piping plover productivity as part of restoration activities associated with the 2003 Bouchard Barge 120 (B-120) oil spill in Buzzards Bay and nearby waters in Massachusetts and Rhode Island. Table 4-1 shows the numbers of predators removed during the first 2 years (2013–2014) of the B-120 predator removal program. Skunks and crows were the most targeted predator. A total of 42 skunks and 130 crows were removed from these beaches in Massachusetts. Crows were primarily removed through the use of toxicants (baited eggs placed in dummy plover exclosures). All skunks removed were from sites in Martha's Vineyard. The B-120 predator removal program is likely to continue through 2017. After 2017, program funding is uncertain, and therefore the program could be discontinued.

The USDA's EA for predator management activities on recreation areas in Massachusetts (USDA 2011a) shows that most of the wildlife species considered for selective predator management are harvestable in Massachusetts within designated annual hunting and/or trapping seasons. The USDA concluded that removal of a limited number of targeted individuals would not reduce the local populations to the extent that hunting and/or trapping of these species in these areas would be affected. The USDA also concluded that the lethal removal of predators to benefit nesting threatened and endangered species would have a low magnitude of effect to current populations of these predators based on trend data, population estimates, and/or harvest data (USDA 2011b).

Under the no action alternative, there is little potential for impacts to northeastern beach tiger beetles or their habitat because of its restricted distribution in Massachusetts (Martha's Vineyard and Monomoy National Wildlife Refuge) and its Federal listing status. Activities that occur in the vicinity of the beetles must avoid take of the species. Beach operations are limited and occur only on privately owned, occupied northeastern beach tiger beetle beaches that receive limited recreational use. Nonessential OSV use does not occur in occupied northeastern beach tiger beetle habitat. The largest population occurs on Monomoy National Wildlife Refuge and receives little pedestrian recreational use and no nonessential OSV traffic.

Northeastern beach tiger beetle larvae are found in burrows up to 18 inches deep, and adult tiger beetles are generally found at the water's edge or on the beach berm. Light foot traffic, such as would occur during selective predator management, would not disturb foraging or mating adult

tiger beetles above and beyond activities already occurring on the beach (pedestrian activities). Light foot traffic also would not compact the sandy beach habitat to the point larvae need to expend additional energy to repeatedly reopen collapsed burrows. Predator management has been implemented at Monomoy National Wildlife Refuge in the vicinity of northeastern beach tiger beetles but as a rule does not occur in occupied northeastern beach tiger beetle habitat (USFWS. 2015a).

In conclusion, the no action alternative would result in continuation of existing recreational activities and beach operations consistent with the State and Federal guidelines. The type, magnitude, and extent of activities would not change, and the effects to biological resources would not be different from those that currently exist. Therefore, the no action alternative would not significantly impact biological resources.

Table 4-1. Predators Removed under B-120 Restoration Program, 2013–2014¹¹

Site Name	Predator									
	Skunk	Cat	Crow	Coyote	Opossum	Fox	Raccoon	Rat	Mice	
Dogfish Bar, MA	13	2	7	0	0	0	0	0	0	0
Edgartown Great Pond, MA	6	0	3	0	0	0	0	0	0	0
Cedar Tree Neck, MA	6	3	0	0	0	0	0	0	0	0
West Tashmoo, MA	1	1	0	0	0	0	0	0	0	0
Parker River NWR, Newbury, MA	0	0	17	2	0	0	0	0	0	0
Sandy Point State Park, Ipswich, MA	0	0	6	0	0	0	0	0	0	0
Leland Beach, MA	8	0	22	0	0	0	6	0	0	0
Norton Point, MA	8	0	20	0	0	0	0	3	0	0
Coskata-Coatue, Nantucket, MA	0	0	0	0	0	0	0	5	31	
Demarest Lloyd State Park, Dartmouth, MA	0	0	12	0	0	1	1	0	0	0
Horseneck Beach State Reservation, Westport, MA	0	0	9	0	1	0	0	0	0	0
South Cape Beach, Mashpee, MA	0	0	34	0	0	0	0	0	0	0
Briggs Beach, RI	0	0	0	0	1	0	1	0	0	0
Total	42	6	130	2	2	1	8	8	31	

MA = Massachusetts; NWR = national wildlife refuge; RI = Rhode Island

¹¹ Data in the table are a compilation of data provided in individual reports. All reports are on file at the New England Field Office, 70 Commercial Street, Suite 300, Concord, NH 03301.

4.1.2 Coastal Resources

The existing conditions for Massachusetts' coastal resources are described in section 3.2.2. Under the no action alternative, beach recreational activities and beach operations would continue to be managed according to the State and Federal guidelines. These activities are consistent with the State's coastal program and thus comply with the CZMA. OSV use on beaches that allow driving would continue to require an Order of Conditions pursuant to the MWPA, which would prevent or minimize impacts to coastal wetland resources, including preventing any short- or long-term adverse effects on the habitat of local species.

Under the no action alternative, the type, magnitude, and extent of recreational activities and beach operations would not change, and the effects to coastal resources would not be different from those that currently exist. Therefore, the no action alternative would not significantly impact coastal resources.

4.1.3 Recreation

The existing conditions for Massachusetts' beach recreation are described in section 3.3.2. Under the no action alternative, beach recreational activities would continue to be managed according to the State and Federal guidelines. Beach recreational activities, including OSV use, would continue to be prohibited during the piping plover nesting season in areas that are symbolically fenced to protect suitable piping plover nesting habitat, nests, and young. Similarly, road use and parking would continue to be managed according to the State and Federal guidelines when piping plovers (adults and chicks) are present, which may result in periodic closures of roads or parking lots. Recreational activities that potentially affect State-listed terns would also continue to be managed according to State guidelines unless a beach management entity sought a State conservation permit to deviate from the State guidelines. An ITP would not be needed for State-listed terns, and the no action alternative would not affect the State endangered species permitting process.

Under the no action alternative, the type, magnitude, and extent of beach recreational activities would not change, and the effects to recreation would not be different from those that currently exist. Therefore, the no action alternative would not significantly impact recreation at the current piping plover population size. However, if the species' population continues to grow, and beach managers continue to implement State and Federal guidelines, recreational opportunities may be limited in the future beyond the current restrictions.

4.1.4 Transportation and Traffic

The existing conditions for transportation resources on Massachusetts' beaches are described in section 3.4.2. Under the no action alternative, recreational activities and beach operations would continue to be managed according to the State and Federal guidelines. In general, Massachusetts' existing roadways, bike paths, and sidewalks would continue to provide beach access to locals and tourists. Ferries, boats, and planes would continue to provide access to Martha's Vineyard and Nantucket Island from the mainland. Consistent with current implementation of the State and Federal guidelines, if piping plovers nest in or near parking lots or beach access points, temporary, localized closures causing traffic congestion in these areas could occur. Beach goers would have to park at another parking lot, or access the beach from another location until the closed parking lot or access point is reopened.

The type, magnitude, and extent of recreational activities and beach operations would not change, and the effects to transportation and traffic would not be different from those that currently exist. Therefore, the no action alternative would not significantly impact transportation and traffic.

4.1.5 Socioeconomics

The existing conditions for socioeconomics in the study area are described in section 3.5.2. Under the no action alternative, recreational activities and beach operations would continue to be managed according to State and Federal guidelines. OSV use is currently one of the recreational activities that has been the most constrained by State and Federal guidelines. In accordance with the guidelines, OSVs are not permitted to drive on piping plover nesting beaches when unfledged chicks are present. The sale of OSV permits provides revenue to Towns throughout the study area. When OSV use is prohibited, Towns that sell OSV permits can experience reduced OSV permit-related revenue. For example, the Town of Orleans has stated that the predictable annual and increasing duration of OSV access closures at Nauset Beach was directly linked to a decline in revenue from its OSV management program (Town of Orleans HCP; Town of Orleans 2014). According to the Town of Orleans' HCP, the average revenue produced by the OSV program in the 4-year period prior to and including the first total OSV access closure (2003–2006) was over \$415,000 per year. In contrast, the average revenue over the 7-year period since total OSV access closures at Nauset Beach began (2007–2013) was \$243,000 per year. The Town of Orleans attributed this 41 percent decline in revenue in OSV permit sales to a reduction in OSV access to Nauset Beach as a result of late season unfledged piping plover chicks near the OSV trail.

The no action alternative would not affect employment of those who manage recreation and beach operations according to the State and Federal guidelines during the piping plover nesting season (e.g., those who erect symbolic fencing around plover habitat and nests, manage beach access points when plovers are nearby, etc.). Therefore, the no action alternative would not change the existing unemployment rates in the study area.

Under the no action alternative, the type, magnitude, and extent of recreational activities and beach operations would not change, and the effects to socioeconomic conditions would not be different from those that currently exist. Therefore, the no action alternative would not significantly impact socioeconomic conditions.

4.2 Proposed Action

Under the proposed action, the Service would issue an ESA section 10(a)(1)(B) ITP and the MADFW would implement an HCP that allows deviations from current State and Federal guidelines for recreational activities and beach operations. All other activities related to beach management and use would comply with the State and Federal guidelines. Under the proposed action, some activities would be conducted under certain circumstances that would not be conducted under the no action alternative. These include (1) recreational activities that occur in areas of the beach that would otherwise be protected by symbolic fencing around nests or proactive symbolic fencing of suitable piping plover habitat; (2) OSV use in areas that may normally be closed due to the presence of unfledged piping plover chicks; (3) use of roads or parking lots that may otherwise be closed to protect nesting or adult plovers; and (4) a mitigation strategy that includes predator management and in some circumstances, pilot piping plover nesting habitat improvement projects. The HCP

includes avoidance and minimization measures associated with the covered activities. The HCP would allow for some flexibility in beach management and operations and provide a statewide approach to predator management and piping plover conservation. The environmental consequences of the proposed action on each resource area being carried forward for detailed analysis are described below.

4.2.1 Biological Resources

Like with the no action alternative (section 4.1.1), the assessment of consequences of the proposed action on biological resources will focus on plants, wildlife, and their habitats. The proposed action would not affect aquatic resources, and therefore analysis of those resources is not necessary. Under the proposed action, some recreational activities and beach operations would differ from management under the State and Federal guidelines. The environmental consequences of each of the covered activities and the conservation strategy on biological resources are evaluated separately in this section. At the end of this section, a summary is provided that considers together the direct and indirect effects of all of the covered activities and mitigation on biological resources.

For all of the covered activities, the proposed action would have no effect on the federally threatened northeastern beach tiger beetle or its habitat. The northeastern beech tiger beetle has a very restricted distribution in Massachusetts. As described in the HCP, the MADFW would not issue COIs for activities that could result in take of the northeastern beach tiger beetle, and would not conduct or authorize mitigation activities that would affect northeastern beech tiger beetles or their habitat.

4.2.1.1 Use of Roads and Parking Lots in the Vicinity of Unfledged Piping Plover Chicks

Under the proposed action, driving would be allowed on improved roads and parking lots in the immediate vicinity of unfledged chicks. This covered activity would have no additional impacts to plants because vehicles access the parking lots and roads in the absence of piping plover nests or broods and most plants do not grow on these improved (paved, gravel, or otherwise actively maintained) roads or parking lots.

This covered activity would impact piping plovers by allowing driving in areas where chicks and tending adults may be present. Allowing driving on roads and parking lots in the vicinity of unfledged plover chicks could disturb or harass adults and chicks as they move between breeding, feeding, and sheltering habitat. Increased disturbance by passing vehicles may cause adult plovers to flush (fly away) from the unfledged chicks, thereby increasing chick exposure to predators. If an unfledged chick or chicks go undetected by drivers and beach staff (monitors), one or more chicks could be killed. Adult piping plovers could be injured or killed by vehicles as they are tending their broods. The likelihood of adult plover injury or mortality is less than that of an unfledged chick because adult birds have greater maneuverability and can fly.

The minimization measures (barriers, signage, staff training, and traffic management; see section 2.2.2.1) would limit the amount of take by minimizing the exposure of chicks and adults to vehicles on beach access roads and parking lots. Regular monitoring of broods located in the vicinity of roads and parking lots would reduce the risk that chicks cross into traffic without adequate protective measures in place. The HCP (HCP section 4.3.3) estimates that 1 adult plover could be taken for

every 20 instances in which this covered activity is implemented. Therefore, this activity would impact piping plovers few, if any, times annually and would have a minor impact on the species.

This covered activity would have insignificant impacts to roseate terns, because there are only one to two small areas in the Plan area where nesting roseate terns and piping plovers occasionally overlap, and roseate terns do not nest or forage on roads or parking lots (USFWS 2011).

This covered activity would have minor, if any, impacts on red knots. Although there is some overlap of piping plover breeding habitat and red knot stopover habitat in the study area, the likelihood of red knots foraging or roosting on roads or parking lots is discountable (USFWS 2013). Therefore, any impacts of this covered activity on the red knot would be insignificant.

4.2.1.2 Recreation and Beach Operations

Recreation and Beach Operations Associated with Reduced Symbolic Fencing Around Nests and Reduced Proactive Symbolic Fencing of Piping Plover Habitat

Under the proposed action, recreation and beach operations would be allowed to occur in areas less than 50 yards from a piping plover nest that otherwise would be symbolically fenced and restricted from use according to the State and Federal guidelines. Also, recreation and beach operations would be allowed to occur in suitable piping plover nesting, feeding, and sheltering habitat that otherwise would be restricted by the placement of proactive symbolic fencing according to the State and Federal guidelines, in particular, beach sections near major access points with high recreational use.

This covered activity could have impacts on plants if plants were present in the areas that would no longer be fenced. Pedestrian entry into these areas could result in the trampling or crushing of seedlings or mature plants. Impacts on plants are expected to be minor given that most of the piping plover nesting habitat will continue to be symbolically fenced, protecting vegetation that is growing within these areas as long as the fencing remains in place. Moreover, the coastal beaches will continue to be protectively managed per the Massachusetts Beach Barrier Guidelines and the MWPA.

Allowing recreation and beach operations closer to piping plover nests has the potential to result in disturbance or harassment of nesting adults and to result in egg mortality through increased risk of nest abandonment or lower hatch rates due to inconsistent incubation. Increased flushing of incubating adults from nests would expose eggs to predators (e.g., crows, gulls, cats) and could cause excessive cooling or heating of eggs. Repeated exposure of eggs on hot days may cause overheating, killing the embryos (Bergstrom 1991). Excessive cooling may kill embryos or delay their development, thus delaying hatching dates. This covered activity could also result in increased disturbance, harassment, or harm of unfledged chicks after hatching. These effects would be minimized by the required minimization measures and monitoring (see HCP section 3.2.2.1 for a discussion of minimization measures). For example, fencing would be reduced only to the extent necessary to achieve specific recreation or beach operation objectives, and monitoring, which would be focused on early nesting phases and early periods of recreational use of beaches (e.g., the first weekend after the fencing is reduced), would document whether adults continued to incubate the eggs with the reduced fencing buffer.

The combined number of piping plover nests, broods, and territories exposed to covered activities at a given site would not exceed 15 percent of the number of breeding pairs present at the site during

the prior year. At a site with fewer than seven pairs, no more than one nest, brood, or territory would be exposed to covered activities (see HCP sections 3.2 and 5.2.2.3).

Although monitoring of piping plovers is conducted so as not to disturb plovers, it could disturb other shorebirds in the area. However, under the no action alternative, other shorebirds are already exposed to disturbance from pedestrians recreating on beaches and staff monitoring piping plover adults, nests, and broods. Therefore, any additional impacts to other shorebirds or wildlife species from additional monitoring of piping plovers that may be required for a covered activity under the proposed action would be minor.

Similarly, allowing recreation and beach operations in suitable piping plover nesting habitat that otherwise would be restricted could result in disturbance or harassment of territorial and nesting piping plover adults by preventing them from attempting to nest (including courtship) or reneat at that site or by forcing them to seek alternative nesting habitat. If the piping plover population in a region approaches the available habitat's carrying capacity, some adults that are displaced may not breed at all. The reduction of symbolic fencing could also result in increased disturbance or harassment of unfledged chicks by affecting their ability to find shelter and to forage. However, the majority of symbolic fencing at a given breeding site would remain, because the Plan generally requires that this covered activity be limited to the lesser of 10 percent or 2 acres of available nesting habitat. Therefore, although disturbance to adults and chicks is likely to increase, given the relatively small area (the lesser of 10 percent or 2 acres at a breeding site) over which the disturbance would occur, the effects on the piping plover would be insignificant.

This covered activity could also reduce piping plover nesting and fledging success in the event that affected adults relocate to poorer quality habitat or face increased intraspecific competition. Potential effects would be minimized by the measures described in section 2.2.2.2 (see also HCP section 3.2.2.2), which include the requirement that reduced fencing be limited to the lesser of 10 percent or 2 acres of available nesting habitat at a given breeding site.

To the extent that fencing around piping plover nests and habitat is reduced, it allows recreational activities and beach operations to occur in areas in which they would otherwise (under the State and Federal guidelines) not occur. This may affect other species that are also protected from disturbance, such as the American oystercatcher [*Haematopus palliatus*] and State-listed least tern. However, the area of new exposure is relatively small compared to the area of beach already being exposed to recreational activities and beach operations, and reduced fencing under the Plan is not anticipated to significantly impact those resources. Furthermore, Plan participants would be required to achieve compliance under MESA for the least tern and other State-listed species by avoiding take or obtaining a conservation and management permit.

Pursuant to MESA and MWPA requirements, protective measures are required to avoid take of piping plovers by beach raking. In the absence of these requirements, beach raking in suitable plover habitat exposed as a result of reduced symbolic fencing could destroy plover scrapes and disturb or harass courting and scraping piping plover adults. It could also interrupt adult and chick feeding and reduce feeding habitat through the removal of beach wrack, an important food source for piping plovers and other shorebirds. These effects also could increase chick energy expenditures. However, the protective conditions required pursuant to the MESA and MWPA would avoid these effects. These conditions may include, but are not limited to, limits on the frequency, duration, and areal extent of raking, intensive monitoring of adults and chicks by qualified shorebird monitors during raking operations, a monitor walking in front of the beach rake, maintenance of setbacks

between raking equipment and unfledged chicks, and retention of beach wrack and vegetation. These conditions would continue to apply under the Plan with the exception of the areal extent to be symbolically fenced. Because any reduction in symbolic fencing would be limited to the lesser of 10 percent or 2 acres, reduced symbolic fencing in conjunction with beach raking would result in minor impacts to nests, adults, fledglings, unfledged chicks, and habitat (e.g., wrack). Accordingly, this covered activity would have insignificant impacts on the piping plover.

This covered activity would have insignificant effects on red knots. Red knots do not breed in Massachusetts, and when present in the study area during migration, red knots primarily forage offshore on mud and sand flats where most beach recreational activities do not occur. If they were present during the piping plover nesting season in areas where fencing was reduced, they could be disturbed by pedestrians. It is unknown how repeated disturbance from pedestrians affects the energetic resources of red knots. However, this disturbance is ongoing at almost all Massachusetts beaches during the red knot spring and fall migration, and the impact of the additional exposure to OSV use from this covered activity would be incremental and minor. The MADFW would not issue a COI to a Plan participant if a covered activity would cause take of red knots.

This covered activity would have insignificant impacts on roseate terns. There are only one to two small sites in the Plan area where nesting roseate terns and piping plovers occasionally overlap, and staging roseate terns generally do not occur within symbolically fenced habitat. Where they do occur in fenced habitat, they also occur between the symbolic fencing and the intertidal zone where they could be affected by pedestrians or vehicles regardless of the symbolic fencing. The slight reduction in fencing (lesser of 10 percent or 2 acres) would have little to no additional impact on staging roseate terns. In addition, activities that could cause take of roseate terns would require separate take authorization or amendment of the Plan to include the roseate tern as a covered species. The MADFW would not issue a COI under the current Plan for this covered activity if it would cause take of roseate terns (see HCP section 1.1).

Shorebirds and other wildlife would not be impacted at any greater level than is occurring under current levels of beach raking since reduction of symbolic fencing for plovers generally does not protect shorebirds feeding in the intertidal zone and the reduction of the symbolically fenced area would be limited to the lesser of 10 percent or 2 acres.

Recreation and Beach Operations at Piping Plover Nest Sites with Nest Moving

Under the proposed action, trained shorebird monitors would be allowed to move nests under certain limited circumstances and using the nest-moving protocols described in the HCP (HCP section 3.2.2.3). Moving a nest would disturb or harass nesting piping plover adults and could cause egg mortality through increased risk of nest abandonment. If the adults exhibit reduced nest attendance after the nest is moved, eggs would be exposed to predators (e.g., crows, gulls, cats), and if the adults do not immediately return to the nest to incubate the eggs, the eggs could be subject to excessive cooling or heating.

Nest moving can be an effective conservation measure of last resort. For example, biologists have moved piping plover nests to prevent nest inundation elsewhere in the species' range (Prellwitz et al. 1995; Gordon and Kruse 1999). Biologists working on the Great Plains report that piping plovers often return to the nest and continue to incubate eggs if the eggs are moved infrequently and over short distances (Prellwitz et al. 1995). Other observations and evidence indicate that adult piping plovers are capable of moving eggs on their own short distances during incubation and establishing

new nests (Wiltermuth et al. 2009). The risk of nest moving causing nest abandonment would be minimized by the required impact minimization measures included in the Plan (see HCP section 3.2.2.3), which include timing and weather restrictions, a relocation site in suitable habitat that minimizes the movement distance to the extent practicable, and gradual movement of the nest. Monitoring nests that are moved would occur from a distance to confirm acceptance of the new nest location by adults and a quick return to incubation per the steps described in the Plan.

The combined number of piping plover nests, broods, and territories exposed to covered activities at a given site would not exceed 15 percent of the number of breeding pairs present at the site during the prior year. At a site with fewer than seven pairs, no more than one nest, brood, or territory would be exposed to covered activities (see HCP sections 3.2 and 5.2.2.3).

This covered activity would not impact red knots or roseate terns, because red knots do not breed in Massachusetts, and there is very little overlap of roseate tern and piping plover nesting habitat in the Plan area. Moreover, the MADFW would not issue a COI if it is determined that take could occur to roseate terns through this covered activity. Therefore, these species would continue to be unaffected by piping plover nest moving in piping plover breeding areas.

The presence of monitors observing the nest acceptance could disturb other feeding or roosting shorebirds in the area. However, any additional disturbance from the presence of one monitor for a limited period of time would be minor in comparison to the general ongoing recreational activity on the beach. Therefore, impacts to other shorebirds are anticipated to be very minor.

Over-sand-Vehicle Use in the Vicinity of Unfledged Chicks

Under the proposed action, limited, escorted driving of nonessential OSVs (e.g., tourist vehicles) within the 100-yard or greater OSV setback from unfledged piping plover chicks would be permitted during an approximate 8-week period when such activities would generally be prohibited under the State and Federal guidelines. This covered activity could affect adult, recently fledged, and unfledged plovers.

OSV use in the vicinity of unfledged chicks could disturb adult piping plovers, thereby disrupting essential parental behaviors (e.g., sheltering under their wings chicks that cannot thermoregulate, alerting chicks to remain motionless in the presence of predators). OSV use may also disturb or harass unfledged chicks and recently fledged young of the year by causing them to flush, interrupting their foraging, resting, or movements through the area. Because adult piping plovers and recently fledged chicks can typically maneuver or fly away from an approaching vehicle, and because the Plan requires vehicles to be escorted, adults and fledged young of the year are unlikely to suffer direct injury or direct mortality. Direct unfledged chick mortality may occur if drivers or escorts fail to detect chicks in the vehicle pathway or if chicks attempt to move between vehicles in a caravan after the escort leading the caravan has passed. This potential effect would be minimized by the Plans' required minimization measures and monitoring (see HCP section 3.2.3). For example, to limit disturbance of chicks and impacts on their foraging, vehicle travel in the vicinity of chicks would be restricted to no more than 6 hours per day in 2 to 3 travel periods during daylight hours.

As discussed in section 4.1.1 for the no action alternative, unmanaged OSV use has the potential to result in alteration of feeding and sheltering habitat through destruction of beach wrack (and the invertebrates associated with the wrack) and vegetation, creation of deep sand ruts, and erosion of the beach. Also, because OSV use can lead to changes in beach characteristics later in time, some effects to plovers may lag the OSV use. However, the "Guidelines for Barrier Beach Management in

Massachusetts” and the State and Federal guidelines outline OSV travel corridor requirements that avoid or minimize destruction of the wrack line and dune vegetation. Plan participants proposing this covered activity would be required to comply with the relevant portions of the “Guidelines for Barrier Beach Management in Massachusetts” and the MWPA to ensure that this covered activity would not significantly impair habitat function. Also, under the Plan, OSV use in the vicinity of chicks would be limited to a narrow (less than 5 yards wide) corridor located to avoid and minimize impacts to wrack, and tire ruts in the travel corridor would be smoothed out at least daily at the end of one or more travel periods to minimize the potential for plovers or other shorebirds to shelter in the tire ruts and be less visible to caravan monitors or escorts. Therefore, this covered activity is not expected to result in any short- or long-term adverse effects to piping plover habitat.

Increased OSV use in the vicinity of unfledged chicks would not impact breeding roseate terns, because they do not nest on beaches with OSV traffic. However, this covered activity could disturb staging roseate terns. Roseate terns stage (congregate in flocks) on barrier beaches prior to migration. At these staging sites, young-of-the-year terns, although able to fly, are still fed by their parents. Both adults and young may rest in between foraging forays, reserving energy prior to their long migration south. OSV access to otherwise isolated staging areas may disturb flocks of resting roseate terns, causing them to flush and move to another location. However, the disturbance to staging roseate terns currently resulting from implementation of the State and Federal guidelines has not been demonstrated to rise to the level of take. And because this covered activity is expected to result in only minor additional disturbance to staging roseate terns, this additional disturbance is also not expected to rise to the level of take. The MADFW would not issue a COI to a Plan participant if a covered activity would cause take of roseate terns.

The combined number of piping plover nests, broods, and territories exposed to covered activities at a given site would not exceed 15 percent of the number of breeding pairs present at the site during the prior year. At a site with fewer than seven pairs, no more than one nest, brood, or territory would be exposed to covered activities (see HCP sections 3.2 and 5.2.2.3).

Similarly, increased OSV use in the vicinity of unfledged piping plover chicks would have insignificant effects on red knots when present during the piping plover breeding season. It is unknown how repeated disturbance from OSV use (or pedestrians) affects the energetic resources of red knots. They primarily forage offshore on mud and sand flats where OSV traffic does not occur. Roosting red knots might be disturbed by passing vehicle traffic or pedestrians exiting OSVs. However, this disturbance is ongoing at almost all Massachusetts beaches during the red knot spring and fall migration, and the impact of the additional exposure to OSV use from this covered activity would be incremental and minor. The MADFW would not issue a COI to a Plan participant if a covered activity would cause take of red knots.

The covered activity of OSV use that would otherwise (under the full implementation of State and Federal guidelines) not occur may impact other shorebirds nesting, foraging, or roosting in and above the intertidal zone. Migratory shorebirds foraging or resting in these areas are exposed to OSV traffic prior to piping plover egg hatching and after chick fledging. Some may be acclimated to OSV traffic, although they may not be acclimated to disturbance from pedestrians exiting the OSVs. The effect of disturbance on migratory shorebirds was studied by Koch and Paton (2013). The authors noted that the species and the age of the birds affected the flight initiation distance (response to disturbance); for example, juvenile shorebirds were more likely to fly at shorter distances than adults, allowing pedestrians to approach more closely prior to taking flight. The specific energetic demands of responding to disturbance are unknown; nevertheless, the authors

recommended buffers around staging migratory birds to reduce impacts. However, such disturbance is ongoing at almost all Massachusetts beaches during late summer and fall migration, and the impact of the additional exposure to OSVs from this covered activity would be insignificant. Additionally, the amount of beach habitat that would be affected by this covered activity is relatively small compared to the areas where OSV use is not allowed. Therefore, OSV use under the HCP is not anticipated to compound ongoing impacts to other shorebirds.

Regarding State-listed species, as part of the process of obtaining a COI under the HCP, Plan participants would be required to achieve compliance under MESA for the least tern and other State-listed species by avoiding take or obtaining a conservation and management permit.

4.2.1.3 Conservation Strategy

In addition to the impact avoidance and minimization measures, the conservation strategy provided in the HCP includes measures to mitigate potential impacts on the piping plover. These measures include selective predator management; education, outreach, and increased law enforcement; and nesting habitat improvements. The effects of each of these components of the conservation strategy on biological resources are discussed below.

Selective Predator Management

Predator management actions would be implemented in late winter or spring by USDA APHIS Wildlife Services or other qualified personnel. Predator management would include trapping smaller mammalian predators of piping plover, such as raccoons, opossums, and skunks, and euthanizing them. All traps used to capture mammals would meet the existing Best Management Practices for Trapping (Association of Fish and Wildlife Agencies 2006). In addition to trapping, shooting with suppressed rifles or shotguns would be employed to manage larger mammalian predators, such as coyote and fox, and avian predators. Toxicants (e.g., DRC-1339) applied to eggs may be used to remove crows known to predate plover nests and chicks emerging from exclosures. Baited eggs would be placed in “dummy exclosures” before or as plovers return in the spring to nest to target crows that have focused on exclosures as a source of food. Baiting eggs reduces the likelihood that nontarget avian predators are impacted. Killing predators that are not targeting piping plovers would be minimized as much as possible. All predator removal efforts would use approved lethal techniques for wildlife damage management (USDA 2003, 2004, 2011a).

The number of predators removed would depend on the amount of piping plover take exposure authorized. Each fall, the MADFW would determine the number of take exposures to be authorized under the Plan for the following beach season, based on a rolling 3-year average of the plover population size (see HCP section 3.3). The authorized level of take would determine the level of predator management required for mitigation. The predator management program would be designed to benefit 2.5 breeding piping plover pairs for every brood, nest, or territory exposed to take from the covered activities. In the event that the covered activity being implemented is “Use of Roads and Parking Lots in the Vicinity of Unfledged Chicks,” selective predator management to benefit an additional 0.5 adult breeding pairs would be required. Predator management would occur at sites that support adequate numbers of breeding pairs to achieve the mitigation ratio, based on the prior season’s count of breeding pairs. A recount of the number of breeding pairs would be conducted in the breeding season following predator management to ensure that a sufficient number of breeding pairs are present and benefiting from predator removal. If fewer plover pairs are found to occur on beaches selected for predator management during implementation, and the

required mitigation ratio is not met, additional predator management would be implemented during the following season to make up for the deficit.

Predator removal programs have been implemented at a number of sites in the Northeast, including New York (Cohen et al. 2009), Virginia, New Jersey (NPS 2007a), Maryland (NPS 2007b), Massachusetts (USFWS 2009), Rhode Island (Hartlaub et al. 2007; Hartlaub et al. 2008; Wiitala et al. 2009), and Maine (Vashon 2008), and have demonstrated that selective predator management can increase piping plover productivity. Generally, predator management is conducted on a predator species whose local population densities are high (hence the increase in predation impacts to nesting plovers) or is targeted on a small number of individual predators that have learned to focus on plover chicks and eggs.

As noted above in section 4.1.1, the USDA completed an EA for predator management activities conducted on recreation areas in Massachusetts (USDA 2011a). The USDA concluded that removal of a limited number of targeted individuals would not reduce the local populations to the extent that hunting and/or trapping of these species in these areas would be affected. The USDA also concluded that the lethal removal of predators to benefit nesting threatened and endangered species would have a low magnitude of impact to current populations of these predators based on trend data, population estimates, and/or harvest data (USDA 2011b).

The anticipated exposure to take and the corresponding level of selective predator management required to offset take for the 25-year permit term is discussed in the following analysis. Benefits (e.g., increased productivity) are expected for piping plovers and other ground-nesting shorebirds and would depend on the success of predator removal and the duration of the predator management program.

Predator management activities would have no effect on plant populations. Vehicular use of the beach is not anticipated to be necessary for the proposed predator management strategies. The increased foot traffic associated with predator management is anticipated to cause only minor impacts if occurring in vegetated areas (e.g., erecting a baited dummy enclosure in or near a vegetated dune).

The annual amount of take under the HCP over the 25-year permit duration could range from a low of no nests, broods, or territories exposed to take (if the State population drops below 500 breeding pairs as measured by a 3-year running average or no COIs are authorized) to a high of 7 percent of the State population's nests, broods, or territories exposed to take. The maximum take exposure of 7 percent of the statewide population would occur only if the State population exceeds 655 breeding pairs and if enough COIs are requested by participating beaches to allocate all of the take authorized under the ITP. Because the maximum take exposure is dependent on plover population size (i.e., as the population increases above 655, allowable take exposure is maintained at 7 percent), the actual amount of take exposure allocated would ultimately be limited by the carrying capacity¹² of the beaches in the study area.

For the purposes of the EA analysis, the Service is estimating the highest level of take and mitigation (selective predator management) anticipated to occur over the ITP 25-year term. This ensures that

¹² Carrying capacity is a theoretical limit of a species' population size based on ecological and physical limits of the environment related to the life history requirements of the species.

the maximum potential effects of predator removal are estimated. Actual take exposure of plovers and effects of predator removal would likely be less than the effects described in this analysis.¹³

The current (2015) preliminary piping plover population size in Massachusetts is estimated to be 689 breeding pairs (A. Hecht, USFWS pers. comm. 2015). This represents an average annual population increase of 2.3 percent since 1998. In 1996, the MADFW estimated the State's carrying capacity of piping plovers at approximately 1,100 breeding pairs (MADFW 1996). Based on this estimate, the Service anticipates that the plover population would not likely exceed a 3-year running average of 1,000 breeding pairs during the 25-year permit duration. In general, it is difficult for species to maintain population levels above their carrying capacity because environmental forces tend to reduce populations below that level. If the population reached this size, the HCP would allow a maximum take exposure of 70 broods, nests, or territories annually (7 percent of 1,000). The selective predator management mitigation measure would therefore have to benefit 175 breeding pairs (2.5 times 70).

To estimate the number of nesting sites that would be required to benefit 175 plover pairs, the Service used the predator removal data for the B-120 predator removal program discussed in section 4.1.1. The B-120 data are the best available data specific to Massachusetts to estimate the potential effects of mitigation under the proposed action. The B-120 predator removal program is a similar mitigation measure that would be implemented under the HCP and also the largest and most recent predator removal program conducted to date in Massachusetts. Data from the first 2 years of B-120 predator management shows that plover productivity at 10 mitigation sites has on average increased by 0.2 chick per breeding pair. Productivity has not consistently increased across sites because of other, uncontrolled factors, including weather and predation of plovers from predators that were not targeted. The number of breeding pairs per site ranged from 2 to 32 in 2013 and 2014, with an average of 8.5 breeding pairs per site where selective predator management was applied. Applying this average number of breeding pairs per site to the EA analysis, if mitigation under the Plan was required to benefit 175 plover pairs during the year when the maximum take exposure was issued to Plan participants, predator management would need to be conducted at 20 or 21 sites across the study area¹⁴, although it is anticipated that fewer sites would be needed if sites with more than 8.5 pairs of plovers are selected (see table 3-1).

Table 4-3 in the HCP outlines the process for selecting sites to implement predator management. Sites with relatively high plover densities (greater than five breeding pairs) with high predation rates resulting in low productivity (less than one fledgling/pair) would be preferred. Once those sites are identified, and predation is known to be the cause of reduced productivity, landowner permission would be obtained to implement the targeted predator management.

Because of the variation in predator populations across the beaches of the study area, and the variation in their effects on plovers, it is highly unlikely that a single predator species would be targeted at all mitigation sites. The Service recognizes that the determination of which predators to

¹³ This analysis is performed only for the purposes of the NEPA analysis; it does not represent an upper limit of authorized take or take exposure issued by the Service to the MADFW.

¹⁴ Note that the maximum number of sites at which predator removal would be applied could be greater if there is a lower average density of plover pairs. However, with the same population carrying capacity, the intensity of predator management would be reduced if applied at more sites and lower plover density per site. For the purposes of this analysis, the environmental effects of predator control actions are considered to be the same for both scenarios.

target would be site specific. For example, at Dogfish Bar (see table 4-1), the primary predator removed was the striped skunk. Removal of 13 skunks (along with 2 cats and 7 crows) resulted in an average increase of 1.26 chicks fledged per breeding pair. At Leland Beach, the American crow, striped skunk, and raccoon were the primary predators targeted for management. Removal of 22 crows, 8 skunks, and 6 raccoons resulted in an average increase of 0.3 chick fledged per breeding pair over the 2-year period of treatment.

Table 4-2 shows the predator management achieved in the B-120 predator management program across 13 sites and the USDA's estimate of the statewide population of each of these predators. Because the populations of these predators are widespread in Massachusetts and occur in a wide range of ecosystems, the effect of the B-120 predator management program on statewide populations is negligible (table 4-2). Also in table 4-2, the Service applied the rate of management for B-120 to up to the maximum estimate of 21 mitigation sites that could be managed under the HCP and estimated the number of predators that could be removed. Even when considered cumulatively with the B-120 predator management program, the HCP's predator management program would have an insignificant impact on the statewide populations of these predators.

Table 4-2. Estimate of Maximum Predator Removal for EA Analysis

	Crow	Skunk	Coyote	Opossum	Raccoon	Red Fox
Estimated Statewide Population Size ¹	110,000	32,500	10,000	5,100–79,200	7,900	10,200
# of individuals removed under B-120 predator removal program at 13 Sites (2013-2014) ²	130	42	2	2	8	1
Percent of population size	0.12	0.13	0.02	0.04–0.003	0.10	0.01
Potential # of individuals removed under the HCP in year with estimated maximum take exposure for plover ³	210	68	4	4	13	2
Percent of population size	0.19	0.21	0.04	0.08–0.006	0.16	0.02

¹ Source: USDA 2011a.

² See Table 4.1.1.

³ Assumes same rate of predators removed by B-120 (per site) applied to 21 sites under the HCP analytical maximum, rounded up. Additional assumptions described in text. Estimates of removal are not limits but for analytical purposes only. Actual predator removal, by species, may be higher in some years.

Given the level of predator removal that has occurred under the B-120 predator removal program and based on this conservative analysis of maximum possible levels of predator management, the Service concludes that selective predator removal under the HCP would have insignificant impacts on predator populations at the local, regional, and statewide levels. Removal of individual predators would result in short-term, localized reductions in numbers of these predators. Long-term impacts to the predator populations are not anticipated, given their generally large sizes, wide distributions, and high mobility and reproductive rates.

The Service is relying on the MADFW's predator management program to compensate (i.e., offset) the number of plovers that are authorized for take on an annual basis under the ITP. This will be the primary type of mitigation that will be considered in the context of the assessing the ITP issuance

criteria. Additional mitigation measures included in the MADFW HCP will help advance piping plover conservation and recovery in Massachusetts and are described below.

Education, Outreach, and Increased Law Enforcement

The MADFW and Plan participants can implement site-specific education, outreach, and increased law enforcement efforts under the HCP. The details of the education and outreach efforts would be included in the Plan participant's MADFW-approved, site-specific IAMP. Education, outreach, and law enforcement would have the potential to benefit the piping plover. The purpose of education and outreach would be to increase community support for and compliance with measures to protect and manage piping plovers. Some sites may benefit from outreach directed specifically to pet owners, OSV operators, or other groups of beach users. The purpose of increased law enforcement would be to reduce the risk of disturbance, harassment, or mortality of piping plovers resulting from offleash dogs or other illegal recreational activities (e.g., driving where not permitted and metal detecting). Where education, outreach, and increased law enforcement are applied, these actions are expected to benefit piping plovers by reducing the impacts of recreational use.

Nesting Habitat Improvement

The MADFW and Plan participants can implement pilot nesting habitat improvement projects under the HCP. Vegetation management has the potential to provide benefits to piping plovers in some cases. For example, at some sites, plant growth and succession has rendered formerly suitable nesting habitat unsuitable. As part of this mitigation measure, a pilot habitat management project would be conducted on at least two sites within the first 5 years of the permit term and up to five sites over the permit term in accordance with all applicable Federal, State, and local laws, including the standards outlined in the MWPA. These pilot projects would be limited in scope to no more than 0.5 acre per project and 2.5 acres total, and would mimic natural disturbance processes such as storm overwash.

The nesting habitat improvement program would result in the removal of individual plants, but the effects on plant populations would be localized and minor given the small size of the pilot projects.

Because nesting habitat improvement through vegetation management actions has not yet been implemented on Massachusetts beaches, there is uncertainty in its effectiveness in benefiting piping plovers. However, this activity is expected to increase the amount of suitable piping plover nesting habitat, which could result in increased productivity. Similarly, any other shorebirds using the same habitat could benefit as well.

4.2.1.4 Summary

The aspects of the proposed action that would affect plants or wrack (and the invertebrates associated with wrack) would be (1) conducting recreation and beach operations in areas that are no longer symbolically fenced, (2) OSV use when unfledged chicks are present, and (3) the nesting habitat improvement mitigation measure. If plants were present in the areas that would no longer be fenced, entry of pedestrians into these areas could crush or trample seedling and mature plants, or prevent plants from establishing in certain areas. OSV use has the potential to destroy beach wrack and vegetation, although as a rule beach wrack is protected from vehicle traffic per the MWPA and State and Federal guidelines. OSV use in the vicinity of unfledged chicks would be limited to a narrow (less than 5 yards wide) OSV corridor located to avoid and minimize impacts to wrack.

Overall, impacts to plant populations and wrack (and associated invertebrates) under the proposed action would be minor. The nesting habitat improvement program would result in the removal of plants in a small area (0.5 acre per project and no more than 2.5 acres), these effects would be localized and would not affect plants at the population level.

Unfledged piping plover chick and egg mortality would be the primary losses resulting from vehicle collision and nest abandonment due to disturbance of nesting adults throughout the ITP term. Although breeding adults would likely reneest after nest abandonment during the early part of the nesting season, later nesting attempts may have smaller clutch sizes and lower egg and chick survival rates. Nest abandonment would decrease the probability of successful nest hatching and chick fledging, thereby reducing average productivity. Similarly, reduction in proactive fencing of nesting habitat could decrease fledging success of affected breeding pairs if the pairs are forced to nest in lower quality habitat or face greater competition with other nesting plovers. Piping plover chicks could be killed as a result of vehicle collisions from expanded road use and parking and OSV use, but the number of chicks impacted by this covered activity would be expected to be small because the conservation measures include requirements to intensively monitor chicks during vehicle operation, to limit the width of the OSV corridor, and to escort vehicles.

Disturbance of foraging chicks from escorted OSVs and pedestrians could be disruptive enough to reduce survivorship of fledglings or postfledglings, primarily by decreasing growth rate and possibly increasing susceptibility to predation. The magnitude of these effects is expected to be small due to the limits on driving hours associated with OSV use and other minimization measures.

Assuming a maximum 3-year running average population size of 1,000 breeding pairs over the course of the permit term, up to 70 breeding pairs (7 percent of the estimated maximum population size) could be exposed to take. The Plan's conservation strategy, primarily selective predator management (the benefits of education, outreach, increased law enforcement, and nesting habitat improvement are not quantifiable), is expected to result in a net benefit to piping plovers by increasing productivity (number of fledglings per breeding pair). Predator management would result in mortality of individual mammals (e.g., raccoons, opossums, skunks, coyotes, and foxes) and avian predators (e.g., crows) but would not result in significant changes to local, regional, or statewide populations of these species.

The proposed action would be expected to result in insignificant impacts on other federally listed species (i.e., roseate terns and red knots) and no impacts to northeastern beach tiger beetles. Given the limited overlap of piping plover and roseate tern breeding habitat, most of the covered activities with the exception of extended OSV use would not impact roseate terns. OSV access to otherwise isolated staging areas on some beaches may disturb flocks of staging roseate terns, causing them to flush and move to another location. Similarly, although there is some overlap of piping plover breeding habitat and red knot stopover habitat in the study area, the proposed action would have insignificant effects on red knots if they were exposed to the covered activities. The northeastern beach tiger beetle has a very restricted distribution in Massachusetts and covered activities are not anticipated to occur in occupied northeastern beach tiger beetle habitat. As described in the HCP, the MADFW would not issue COIs for activities that could result in take of the northeastern beach tiger beetle, roseate tern, or red knot.

The proposed action would be expected to minimally impact other beach-nesting, foraging, or roosting birds. Expanded piping plover monitoring associated with the covered activities is not expected to impact wildlife such as shorebirds since the additional level of monitoring is

insignificant in comparison to ongoing productivity monitoring required under the State and Federal guidelines. To the extent that fencing around plover nests and habitat is reduced, other nesting shorebirds in these areas could be disturbed; however, most of these species are State listed (e.g., least tern) and take of these species would require a State conservation permit. Because foraging shorebirds or shorebirds roosting above the intertidal zone are regularly exposed to disturbance from pedestrians recreating on beaches, the incremental impacts from the covered activities would be minor. OSV use in areas that would otherwise (under normal implementation of the State and Federal guidelines) not occur may affect shorebirds. These areas are exposed to OSV use prior to egg hatching and after chick fledging. The increase in OSV traffic when unfledged plover chicks are present is not anticipated to significantly impact foraging or roosting shorebirds. With respect to mitigation actions, other ground-nesting shorebirds in the study area would be expected to benefit from selective predator management and nesting habitat improvements to the same extent that piping plovers are expected to benefit (increased productivity, less disturbance from predators). Removing a limited number of mammalian or avian predators is not anticipated to affect their local or regional populations.

In conclusion, the proposed action would not significantly impact biological resources.

4.2.2 Coastal Resources

Under the proposed action, recreation and beach operations during the piping plover nesting season would be expanded in certain areas in compliance with the HCP. These activities will generally occur on the beach where recreational activities and beach operations currently occur, and thus these activities are not anticipated to affect coastal resources. Amendment of existing Orders of Conditions or issuance of new Orders of Conditions might be necessary for implementing the conservation strategy for expanded OSV use, beach operations, or nesting habitat improvements. As with the no action alternative, the proposed action would not change or affect coastal resources. Therefore, the proposed action would not significantly impact coastal resources.

4.2.3 Recreation

Current recreational uses on Massachusetts beaches vary and may include swimming, sunbathing, picnicking, pedestrian activity, dog walking, fishing, nature study, beach sports, boating, water sports (such as surfing and wind surfing), camping, fat tire biking, kite boarding, and OSV use. Under the proposed action, the types of recreational activities on participating beaches would not change. However, the location, timing, and extent of these activities would change as a result of the proposed action. Under the proposed action, beach access points in participating jurisdictions that would normally be temporarily closed or relocated under the current State and Federal guidelines could be opened as a result of the covered activities (limited driving past unfledged chicks, moving nests away from parking lots and beach access points, reducing fencing buffers around nests, and reducing proactive symbolic fencing near beach access points). Thus, the proposed action is expected to result in an increase in the availability of public recreational access and use during the piping plover nesting season on beaches participating in the HCP.

Allowing OSV use near unfledged chicks would increase the amount of time each year that recreational OSVs are permitted to operate on beaches that allow OSVs (refer to section 3.3.2 for sites that supported five or more breeding piping plover pairs in 2013 and allow OSV use) and could increase the amount of overall OSV use in the study area during the time fledglings are present. The

increase in time allowed for OSV operation would vary by participating beach and by year but could be up to 8 weeks depending on when the covered activity is initiated, the number of broods exposed to the activity, and the age at which the broods fledge.

Targeted predator management implemented in the past by the USDA and now being implemented as part of the B-120 predator management program has not required beach closures to recreational use during predator removal efforts. Additionally, no risk to public safety has been documented (M. Sperduto, USFWS, pers. comm. 2014). Therefore, the Plan's selective predator management program is not expected to affect beach recreation.

In conclusion, the purpose of the HCP is to allow limited recreational access to occur on Massachusetts beaches during the piping plover breeding season. This recreational use would otherwise occur in the absence of plovers. The increase in the availability of public recreational access would provide a modest benefit to beach users. Therefore, the proposed action would not significantly impact recreation.

4.2.4 Transportation and Traffic

Impacts related to transportation and traffic might result from all of the covered activities. Under the proposed action, barriers such as silt fencing would be used to prevent chicks from entering improved roads and parking lots. This would reduce the amount of potential road or parking lot closures during the spring and summer beach season, thereby improving local traffic conditions in participating Towns during the plover fledging period. Plan participants would develop IAMPs, which would include a protocol that would be applied when chicks are detected in a parking lot or on a road. The protocol might include temporarily rerouting traffic away from a section of a parking lot with chicks or having a monitor or parking attendant approach the chicks in an effort to herd them out of a parking lot or off a busy road. This protocol, when applied, could help improve local traffic conditions during periods of heavy beach use during the piping plover breeding season (e.g., warm, sunny weekends).

Nest movement or a reduced fencing buffer may be implemented to prevent the closure of a beach access point, parking lot, or road due to the location of a piping plover nest. These activities could result in localized improvements in beach traffic and parking in areas that may have experienced temporary congestion as a result of closed roads or the closure of all or portions of parking lots. Overall, the proposed action might result in a slight beneficial effect on local traffic during the summer plover nesting season.

The expected increase in OSV use on participating beaches would not cause a significant increase in vehicle use along roads in the study area. Although the exact amount of increased beach use by OSVs as a result of the HCP is unknown, the increase is expected to be minimal relative to existing local traffic. The impacts would be localized (at the beach access points) and temporal (only during access and egress).

In conclusion, implementation of the HCP could result in localized improvements in traffic conditions during the plover nesting season and an increase in OSV use during the latter part of the nesting season. Therefore, the proposed action would not significantly impact transportation and traffic conditions in the study area.

4.2.5 Socioeconomics

As a result of increased recreational use (see section 4.2.3), the proposed action could result in an increase in the amount of economic activity in the study area, including spending at local businesses, avoiding temporary closure of fee parking areas, and OSV permit sales. The extent of increased spending, parking revenue, and purchase of OSV permits is not determinable because it is not possible to predict when or for how long parking areas may be closed or expanded OSV access might occur. The Plan generally would allow parking areas to remain open when plovers are present and expanded OSV use on beaches where OSV use is currently prohibited when unfledged chicks are present. Factors such as the number of plovers and broods present and fledging rate will affect the additional parking revenue and amount of time that OSVs may access the beaches on which this covered activity is implemented when compared to the no action alternative. Permit sales, and thus beach revenue, is expected to increase based on the anticipation of increased OSV access, but the increase is unpredictable at this time.

For example, as discussed in section 4.1.5, the Town of Orleans experienced a substantial decline in revenue after Nauset Beach OSV access closures began. According to the Town of Orleans' HCP, the average revenue produced by the OSV program in the 4-year period prior to and including the first total OSV access closure (2003–2006) was over \$415,000 per year. In contrast, the average revenue over the 7-year period since total OSV access closures began (2007–2013) was \$243,000 per year (a 41 percent decline). Thus, under the proposed action, a popular beach site that allows OSV use could experience an increase in revenue over the ITP term.

The proposed action could result in extended beach and law enforcement employee hours or the hiring of additional staff. The impact minimization measures include extensive monitoring to avoid or minimize potential take of piping plovers. Employees conducting the monitoring may work longer hours during the nesting season, earning additional pay, or additional staff may be hired. Similarly, as part of the Plan's conservation strategy, there would be an increase in law enforcement (e.g., natural resources officers) in the study area. Like beach staff, law enforcement personnel may work long hours during the nesting season, or additional staff may be hired. The Town of Orleans' HCP hired additional short-term monitors to implement the flexible OSV management covered in their ITP (Town of Orleans 2014). These jobs were of very short duration since only one brood was monitored at that time. No significant increase in the number of jobs is expected.

Removal of piping plover predators may be contrary to the values of some people. Increasing piping plover survival at the expense of predators such as crows, skunks, or coyotes would be unfavorable to some, while other people may hold the opposite opinion. Predator control would be carefully planned and implemented to target a limited number of individuals of known predatory species. Risks to public safety from removal activities would be avoided by carefully selecting removal times and by employing trained and experienced personnel.

In conclusion, the HCP seeks to strike a balance between environmental protection (i.e., piping plover conservation) and social values (i.e., beach recreation), thereby maintaining community support for piping plover conservation. Therefore, the proposed action would not significantly impact socioeconomics.

4.3 Shorter Permit Term Alternative

The environmental consequences of the shorter permit term alternative on each resource area being carried forward for detailed analysis are described below. In general, the impact mechanisms under this alternative are the same as those discussed above for the proposed action. That is, the types of impacts under this alternative would be the same as the proposed action's impacts on the human environment. The only difference between this alternative and the proposed action is the length of the ITP term (10 years versus 25 years) and the duration of COIs (1 year instead of 3 years). Thus, the amount of take provided to Plan participants would be issued annually rather than every 3 years. Like the proposed action, the MADFW may grant COI renewals but would reserve the right to require submittal of new applications if requests for coverage exceed the available number of statewide take exposure allowances. As explained below, the shorter permit term alternative would not significantly impact the human environment.

4.3.1 Biological Resources

Impacts on biological resources, including plants, piping plovers, other shorebirds, and plover predators, would be similar to those impacts described above for the proposed action (section 4.2.1), except these impacts would occur for a shorter period of time. Impacts include minor effects to individual plants and beach wrack (and associated invertebrates); disturbance of piping plover and other shorebird adults and chicks in areas of increased recreational activity (e.g., areas that would otherwise be temporarily closed to pedestrians or OSVs); potential loss of piping plover nests, eggs, and chicks; and removal of piping plover predators.

The shorter permit term alternative would result in the same amount of average annual take of the piping plover during the 10-year permit term as the proposed action would. Provided the ITP is not renewed, this alternative would result in approximately 40 percent of the take of piping plovers authorized under the proposed action, because after 10 years OSV use and other recreational uses would revert back to compliance with the State and Federal guidelines and no take of piping plovers would be allowed without another ITP. Similarly, provided the ITP is not renewed, the 10-year permit term would provide a conservation strategy and mitigation efforts for only 10 years.

Based on the preliminary adjusted total population estimate of 689 breeding piping plover pairs in Massachusetts for 2015 and assuming the ITP permit is issued in 2016, in 10 years (year 2025) it is anticipated that there would be over 900 breeding pairs using a constant population growth rate as described for the proposed action (approximately 2.1 percent). In 2023 and 2024, the population size would be 826 and 845 breeding pairs, respectively. Thus, the 3-year running average population size by the end of the permit term would be 845 breeding pairs. If the population reached this size by 2025, the HCP would allow a maximum take of 59 plover pairs annually (7 percent of number of pairs). The selective predator removal mitigation would therefore have to benefit 147 plover pairs (= 59x2.5 pairs). Using the same rationale described above for the proposed action, predator management could be implemented at up to 17 or 18 sites (based on a site supporting an average of 8.5 pairs). As described above for the proposed action, selective predator removal conducted on up to 17 sites would have insignificant effects on local, regional, or statewide predator populations.

In conclusion, the shorter permit term alternative would result in similar impacts to biological resources as the proposed action. However, because these impacts would occur for a shorter time

period, the overall effect on the piping plover, plants and other wildlife over the course of the ITP term would be less than the impacts that would occur under the proposed action. Therefore, the shorter permit term alternative would not significantly impact biological resources.

4.3.2 Coastal Resources

Impacts on coastal resources would be similar to those impacts described above for the proposed action (section 4.2.2), except these impacts would occur for a shorter period of time. The shorter permit term alternative would not change or affect coastal resources. Each municipality's Conservation Commission would continue to implement the MWPA regulations and issue Orders of Conditions as necessary for OSV use and beach raking. Orders of Conditions may also be necessary for implementing the conservation strategy for nesting habitat improvements. Orders of Conditions regulate proposed activities to prohibit or minimize impacts to wetland resource areas. Therefore, the shorter permit term alternative would not significantly impact coastal resources.

4.3.3 Recreation

Impacts on recreation would be similar to those impacts described above for the proposed action (section 4.2.3), except these impacts would occur for a shorter period of time. Like the proposed action, the shorter permit term alternative would increase public recreational access and benefit beach users, but for a shorter period of time. After the permit term, public recreational access would be similar to the no action alternative. Because the impacts to recreation under the shorter permit term alternative would occur for a shorter period of time, they would be less than the impacts that would occur under the proposed action. Therefore, the shorter permit term alternative would not significantly impact biological resources.

4.3.4 Transportation and Traffic

Impacts on transportation and traffic would be similar to those impacts described above for the proposed action (section 4.2.4), except these impacts would occur for a shorter period of time. Any benefits experienced as a result of improvements in local traffic congestion or increased economic activity associated with recreation (e.g., allowing parking lots and improved roads to remain open) would occur annually for 10 years compared to 25 years under the proposed action. Because the impacts to transportation and traffic under the shorter permit term alternative would occur for a shorter period of time, they would be less than the impacts that would occur under the proposed action. Therefore, the shorter permit term alternative would not significantly impact transportation and traffic.

4.3.5 Socioeconomics

Impacts on socioeconomics would be similar to those impacts described above for the proposed action (section 4.2.5), except these impacts would occur for a shorter period of time. During the course of the ITP term, there could be increases in parking revenue and OSV permit sales due to avoiding parking lot closures and anticipation of OSV access during the piping plover breeding season. An increase in administrative burden of annual preparation, review, submittal, and issuance of COIs on MADFW and Plan participants could translate to increased administrative costs, although we expect preparation and review of a participant's initial COI to require the vast majority of time and financial obligation. Risks to public safety inherent with predator removal activities would be

avoided by carefully selecting removal times and by employing trained and experienced personnel. The HCP's goal is to strike a balance between environmental protection (i.e., piping plover conservation) and social values (i.e., beach recreation), thereby maintaining community support for piping plover conservation. Because the impacts to socioeconomics under the shorter permit term alternative would occur for a shorter period of time, they would be less than the impacts that would occur under the proposed action. Therefore, the shorter permit term alternative would not significantly impact socioeconomics.

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Cumulative Impacts and Climate Change

This chapter discusses the potential cumulative impacts of the proposed action—namely issuance of an ITP and approval of the HCP—and the implications of climate change for the environmental effects of the proposed action. A cumulative impact as defined by the CEQ (40 CFR § 1508.7) is the impact on the environment that results from the incremental impact of the Federal action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. This chapter presents the spatial and temporal boundaries of the cumulative impacts analysis (section 5.1.1) and summarizes applicable past, present, and reasonably foreseeable actions (section 5.1.2) that are included in the analysis.

CEQ's revised draft guidance for greenhouse gas emissions and climate change (CEQ 2014) states that Federal agencies should consider the following when addressing climate change in a NEPA document: (1) the potential effects of a proposed action on climate change as indicated by its greenhouse gas emissions; and (2) the implications of climate change for the environmental effects of a proposed action. Chapter 3 addresses the potential effects of the proposed action on climate change and dismisses climate as a resource category evaluated in detail in this EA, because increased emissions associated with the proposed action or shorter permit term alternative would be a tiny fraction of the world's emissions and would have a negligible influence on climate either in Massachusetts or globally. Section 5.2 of this chapter addresses the implications of climate change for the environmental effects of the proposed action.

5.1 Cumulative Impacts Analysis

5.1.1 Study Area

The cumulative impacts study area is the same as the study area defined in chapter 3. The study area includes all currently and recently occupied piping plover habitat delineated as priority habitat by the MADFW, as well as other beach and dune areas that could support breeding piping plovers in the future. This area is intended to capture all currently suitable Massachusetts piping plover breeding habitat, as well as the area within which additional plover breeding habitat could develop in the foreseeable future due to the dynamic nature of the coastline. The time period for this cumulative impacts analysis is the same as the proposed ITP term (25 years).

5.1.2 Actions Analyzed

The Service considered past, present, and reasonably foreseeable projects and actions in the study area that could result in impacts that would coincide in time and space with impacts of the proposed action. This section summarizes projects or actions that are included in the analysis of cumulative impacts in this chapter. Given the large size of the study area and the 25-year duration of the proposed ITP, this section presents the general types of projects or actions that occur or are planned

to occur in the study area rather attempting to develop an exhaustive list. Specific projects are noted as examples.

5.1.2.1 Town of Orleans HCP

The Town of Orleans prepared an HCP (Town of Orleans 2014) to support its ITP application for incidental take of piping plovers exposed to late season OSV use beginning on or after July 15. Under the Town of Orleans HCP, OSV access to Nauset Beach South that is often unavailable due to unfledged piping plover chicks would be allowed. The Town of Orleans HCP outlines measures to protect chicks on a nearly 1-mile stretch of Nauset Beach. These measures require a pedestrian escort walking in front of each vehicle, limiting vehicle access to four hours per day, and continuous monitoring during OSV travel windows. In addition, the Town will implement a number of measures to benefit piping plovers in Massachusetts, including educational outreach, experimental management to deter plover nest predators, and funding for targeted predator management at plover sites outside of the Town of Orleans.

After receiving the HCP from the Town of Orleans, the Service prepared a “Low Effect HCP Determination Form and Environmental Action Statement” (USFWS 2015b) and ultimately determined the Town of Orleans HCP was a low-effect plan. Low-effect HCPs are eligible for a categorical exclusion under NEPA as provided by the Department of the Interior Manual (516 DM 2 Appendix 1 and 516 DM 8). The Town of Orleans HCP would not pose potential significant environmental effects or involve unique or unknown environmental threats. The Service issued a 3-year ITP in early 2015 that authorizes the potential effects of escorting OSVs past two plover broods (up to eight plover chicks) per year after July 15. The MADFW issued a parallel State endangered species permit in 2014.

5.1.2.2 Beach Stabilization and Nourishment

Property owners, beach managers, and the Federal government deploy a variety of measures in an attempt to prevent storm damage and beach erosion. Activities include beach nourishment, artificial dune building, and construction of hardened and semihardened structures such as seawalls or sand drift fencing.

Beach projects that involve a Federal action subject to NEPA must assess the potential impacts of the project on the human environment. For example, the U.S. Army Corps of Engineers (Corps) recently conducted a feasibility investigation under section 103 of the 1962 River & Harbor Act, as amended, to examine coastal storm damage reduction alternatives for the Massachusetts Department of Conservation and Recreation’s Reservation at Nantasket Beach in the Town of Hull (USACE 2014). The proposed project would provide shoreline protection along Nantasket Beach through the construction of a stone retaining wall. The Corps prepared an EA and issued a FONSI for this project (USACE 2014).

Another example project is the Corps’ study of the beneficial use of dredged material to be removed as part of maintaining the Cape Cod Canal and directly placing the material on Town Neck Beach in the Town of Sandwich, MA (USACE 2015). As part of the project, the Corps is evaluating the Federal interest in beneficially reusing the dredged material as beach-fill on a 2,500-foot long-eroded section of Town Neck Beach in Sandwich. The Corps prepared an EA and issued a FONSI for this project (USACE 2015).

5.1.2.3 Aquatic Habitat Restoration

To help reverse the adverse effects of past aquatic habitat damage, the Massachusetts Division of Ecological Restoration (MADER) works with many partners to implement a wide variety of habitat restoration projects across the State. MADER serves as a facilitator of restoration, working to identify new projects, organize project teams, provide technical assistance, secure project funding, and help manage and coordinate restoration activities. The locations and brief descriptions of MADER's priority projects can be found on MADER's Web site¹⁵. Two example projects are noted below.

Located on the shores of Little Pleasant Bay, Orleans, a 6-acre salt marsh (Palmisano Marsh) is being restored by removing earthen berms and tide control structures associated with a long-since-abandoned cranberry operation. Tidal influence within Palmisano Marsh is only a fraction of what it once was prior to conversion of the site to cranberry production. Restoring the tide's natural ebb and flow will convert this degraded site into a productive tidal salt marsh.

Farm Pond, a coastal pond and associated salt marsh located in Oak Bluffs, is isolated from Nantucket Sound by an undersized culvert that regularly fills with sand and gravel. This project involves replacing the culvert with a 16-foot wide box culvert to restore tidal flow to the 51-acre site, improving water quality and storm drainage. The primary goal of this tidal restoration is to reduce bacteria levels, thus creating the potential to reopen the productive shellfishery. Water quality improvements will also benefit the pond's extensive eel grass beds and create new recreational opportunities.

The interagency Herring River Restoration Committee (HRRC) is developing a large-scale restoration plan for an 1100-acre tidally restricted estuarine wetland system in Wellfleet and Truro, Massachusetts. A draft Environmental Impact Statement (DEIS) was prepared with the National Park Service as the lead Federal agency and the Service as one of a number of Federal cooperating agencies. The DEIS was released in October 2012 for public comment. The HRRC plans to release the final EIS in late 2015. The Herring River Restoration Project would restore daily and spring tides to approximately 890 acres and indirectly benefit hundreds of acres of additional habitat beyond the influence of normal tidal flow around the periphery of the estuarine floodplain, in upstream herring spawning ponds, and downstream in Wellfleet Harbor and Cape Cod Bay. The project will directly benefit those using the Herring River, Wellfleet Harbor, and Cape Cod Bay for shellfishing, finfishing, and other economic and recreational purposes.

5.1.3 Cumulative Impacts by Resource

Because the proposed action would not have any direct or indirect impacts on coastal resources (see section 4.2.2), there would be no potential for cumulative impacts. Therefore, coastal resources are not included in this cumulative impacts analysis.

¹⁵ <http://www.mass.gov/eea/agencies/dfg/der/der-priority-projects-map.html>.

5.1.3.1 Biological Resources

Summary of Proposed Action's Impacts

As discussed in chapter 4, the proposed action would not significantly impact biological resources. If plants were present in the areas that would no longer be fenced, entry of pedestrians into these areas could result in the trampling or crushing of seedlings or mature plants. Although OSV use has the potential to destroy beach wrack (and the invertebrates associated with the wrack) and vegetation, current beach management guidelines provide recommendations for travel corridor locations to avoid destroying fragile coastal vegetation. OSV use in the vicinity of chicks would be limited to a narrow (less than 5 yards wide) OSV corridor located to avoid and minimize impacts to wrack. Overall, impacts to plant populations and wrack (and associated invertebrates) under the proposed action would be minor. The limited amount of area impacted by reduced symbolical fencing (the lesser of 10 percent or 2 acres per site) is not anticipated to significantly impact plants growing on the beach since the majority of suitable plover nesting habitat would remain fenced. The potential mitigation action of nesting habitat improvement program would result in the removal of individual plants in a small area (0.5 acre per project and no more than 2.5 acres). Effects would be localized and would have only minor effects on plant populations.

Unfledged piping plover chick and egg mortality would be the primary impacts to plover productivity occurring mostly as the result of vehicle collision (chicks) and nest abandonment due to disturbance of nesting adults throughout the ITP term. Although breeding adults would likely reneest after nest abandonment during the early part of the nesting season, later nesting attempts may result in smaller clutch sizes and lower productivity. Nest abandonment resulting from the covered activities (e.g., nest movement) would decrease the probability of nesting successfully, thereby reducing average productivity. Similarly, reduction in proactive fencing of nesting habitat could decrease fledging success of affected breeding pairs if the pairs are forced to nest in lower quality habitat or face greater competition with other nesting plover. The number of chicks killed as a result of vehicle collisions from expanded road use and parking and OSV use would be expected to be small because of the requirements to intensively monitor chicks during vehicle operation and to have vehicle escorts.

Disturbance of foraging chicks from OSV use or pedestrian traffic could be disruptive enough to reduce survivorship of fledglings or postfledglings, primarily by decreasing growth rate and possibly increasing susceptibility to predation. The magnitude of these effects is expected to be small due to the limits on driving hours associated with OSV use and other minimization measures.

Assuming a maximum 3-year running average population size of 1,000 breeding pairs over the course of the permit term, up to 70 breeding pairs (7 percent of population size) could be exposed to take. The Plan's primary mitigation, selective predator management, is expected to result in a net benefit to piping plovers by increasing productivity (number of fledglings per breeding pair) although unquantifiable mitigation measures including education, outreach, increased law enforcement, and nesting habitat improvements would provide additional benefits. Predator management would result in mortality of individual mammals (e.g., raccoons, opossums, skunks, coyotes, and foxes) and avian predators (e.g., crows) but would not result in significant changes to local, regional, or statewide populations of these species. Additional human presence either as monitoring or law enforcement staff are not anticipated to cause significant impacts to biological resources.

The proposed action would be expected to result in insignificant impacts on other federally listed species (i.e., roseate terns, red knots), and no impacts to the northeastern beach tiger beetle. Given the limited overlap of piping plover and roseate tern breeding habitat, none of the covered activities would impact breeding roseate terns. OSV access to otherwise isolated staging areas at the distal end of beaches may disturb flocks of resting roseate terns, causing them to flush and move to another location. OSV use is allowed at any time that plovers are not precluding access to the beaches and after the plover breeding season irrespective of roseate tern presence (during the peak tern staging period). Such disturbance has not been determined to cause significant impacts to roseate terns. Similarly, although there is some overlap of piping plover breeding habitat and red knot stopover habitat in the study area, the proposed action would have minor impacts on red knots if they were exposed to the covered activities. The northeastern beach tiger beetle has a very restricted distribution in Massachusetts. As described in the HCP, the MADFW would not issue COIs for activities that could result in take of the northeastern beach tiger beetle, roseate tern, or red knot.

The proposed action would be expected to result in minor impacts to other ground-nesting shorebirds (e.g., American oystercatcher and least tern). Piping plover monitoring activities are not anticipated to impact nesting, foraging, or roosting shorebirds in the area since plover monitoring is ongoing irrespective of the proposed action. The additional monitoring would be of short duration (hourly and daily). To the extent that fencing around plover nests and habitat is reduced, shorebirds that might have sought refuge in these areas could be disturbed. Given that recreation is ongoing outside of the symbolically fenced areas, especially near the intertidal zone, shorebirds are exposed to pedestrian disturbance irrespective of the proposed action. OSV use in areas that would otherwise (under the State and Federal guidelines) not occur may affect shorebirds. These areas are exposed to OSV use prior to egg hatching and after chick fledging, and therefore, OSV use under the HCP is not anticipated to significantly impact shorebirds. Like piping plovers, other ground-nesting shorebirds in the study area would be expected to benefit from selective predator management and nesting habitat improvements.

Contribution of the Proposed Action to Cumulative Impacts

The Town of Orleans HCP will have insignificant cumulative impacts on biological resources. OSV travel on Nauset Beach is an ongoing activity that is regulated under the Massachusetts Environmental Protection Act and requires an approved Order of Conditions to occur. The Orleans Conservation Commission reviewed environmental impacts for the management of OSVs at Nauset Beach, including the installation of temporary symbolic fencing, delineator posts, signage, temporary closings, and management of the sand trail, including crossover, pullout, and parking areas. The Conservation Commission evaluated the effects of OSV operation that currently occurs on the designated sand trail at times when unfledged plover chicks are not present and determined that the existing OSV trail would not promote wind tunneling or erosion or wave washover, nor was any increase from storm or flood damage anticipated. Moreover, the Conservation Commission determined that the design and placement of the OSV trail would not cause a change in vegetation, nor would there be any interference with the landward movement of coastal dunes (USFWS 2015b).

The cumulative impact of the Town of Orleans HCP on piping plovers and its habitat will be minor (USFWS 2015b). The amount of incidental take relative to the State, regional, and rangewide population is of small magnitude and short duration. Breeding habitat is only temporarily impacted. Minimization measures are anticipated to substantially decrease the potential for even the small amount of incidental take expected in the Town of Orleans HCP. The replacement of fledglings

through offsite mitigation will further reduce the impact of the Town of Orleans HCP on piping plovers. The Town of Orleans' proposed onsite and offsite predator management for mitigation is also anticipated to result in only minor or negligible effects to predator populations in the study area.

To limit cumulative statewide impacts to piping plover, the limits on take exposure outlined in the Plan are intended to apply to all future or current individual ITPs for piping plovers pertaining to recreational beach activities or operations issued by the Service for such activities in Massachusetts (including, but not limited to, the ITP issued to the Town of Orleans). The MADFW will also apply the statewide take exposure limits in table 3-1 of the HCP to any take authorizations for recreational activities or beach operations made by the Service for Federal actions pursuant to section 7 of the ESA (e.g., at the Cape Cod National Seashore). For example, if the statewide take exposure limit in 2016 was set at 35 exposures based on the statewide population size in the previous 3-year period, the number of take exposure allowances available to Plan participants would be adjusted to 33 to account for the individual ITP issued to the Town of Orleans that would allow escorted vehicle use in the vicinity of 2 piping plover broods. Thus, the amount of take issued to Plan participants under the Plan would account for all take issued by the Service in the study area.

Beach stabilization and nourishment projects have the potential to destroy or degrade individual plants and wildlife habitat, including piping plover and other shorebird nesting, feeding, and sheltering habitat. However, a carefully designed beach nourishment project has the potential to be beneficial to shorebirds, if the project can be implemented outside major overwash areas, so as to preserve nesting habitat, while reducing the short-term risk of nest loss due to storm overwash. Moreover, if created or enhanced shorebird habitat is managed according to the State and Federal guidelines, beach nourishment projects could benefit plovers and other shorebirds by providing additional nesting and foraging habitat. The potential impacts of most of these projects on federally listed species are addressed through section 7 consultations with the Service and NMFS, because a Federal agency (e.g., the Corps) is taking action. The MADFW reviews large- and small-scale projects pursuant to the MESA, and has developed standard conditions for avoiding take when implementing beach nourishment projects (e.g., slope requirements and time-of-year restrictions). The Corps has adopted similar standards that are generally applied to such projects with Corps involvement. Non-Federal projects resulting in take of piping plover or another federally listed species—for example, significant dune building in prime nesting habitat—would require an HCP and ITP if take were determined to occur. Therefore, in the context of past, present, and reasonably foreseeable beach stabilization and nourishment projects, the additive effect of the proposed action (i.e., authorization of incidental take of plovers resulting from beach recreational activities and beach operations) is expected to be negligible to the biological resources in the study area.

Aquatic habitat restoration projects are designed to improve aquatic habitat conditions and benefit species. In the examples noted above, plant and wildlife species associated with salt marshes would benefit from the restoration projects. If any restoration project has the potential to result in take of a federally listed species, it would require compliance with the ESA (i.e., an HCP and ITP for non-Federal projects or a section 7 consultation for Federal projects). The Plan's proposed piping plover nesting habitat improvements could add to the habitat improvements in the study area, including those from aquatic habitat restoration projects. As indicated above, the proposed action's contribution to habitat improvements would be minor (0.5 acre per pilot project and no more than 2.5 acres total). Therefore, in the context of past, present, and reasonably foreseeable aquatic habitat restoration projects, the additive effect of the proposed action (i.e., authorization of incidental take

of plovers resulting from beach recreational activities and beach operations) is expected to be negligible to the biological resources in the study area.

In summary, when combined with other actions occurring at the same time and place in the study area, the proposed action could result in cumulative impacts on biological resources. Potential cumulative impacts on plants include injury or destruction. No significant cumulative impacts on plant populations are expected. Potential cumulative impacts to piping plovers and other shorebirds include disturbance, injury, or mortality. Cumulative impacts on piping plovers would be avoided, minimized, and mitigated by the completion of HCPs, section 7 consultations, and the Service's tracking of take. Similarly, potential cumulative impacts on State-listed species (e.g., least tern) would be minimized through compliance with the MESA and MWPA. Potential cumulative impacts on general wildlife species would be minimal and not result in significant changes to regional or local populations.

Implementation of the Plan's conservation strategy, along with aquatic habitat restoration projects managed by the MADER, could result in beneficial impacts to wildlife in the study area. In the context of past, present, and reasonably foreseeable future actions, the additive effect of the proposed action (i.e., authorization of incidental take of plovers resulting from beach recreational activities and beach operations) is expected to be negligible to the biological resources in the study area.

5.1.3.2 Recreation

Summary of Proposed Action's Impacts

As discussed in chapter 4, beach access points in participating jurisdictions that would be temporarily closed or relocated under the current State and Federal guidelines could be opened as a result of allowing limited driving past unfledged chicks, moving nests away from parking lots and beach access points, reducing fencing buffers around nests, and reducing proactive symbolic fencing near beach access points. Thus, the proposed action is expected to result in an increase in the availability of public recreational access and use during the piping plover nesting season. These impacts would occur only on beaches participating in the HCP.

Allowing OSV use near unfledged chicks could increase the amount of overall OSV use in the study area during the time fledglings are present. This covered activity would increase the amount of time each year that recreational OSVs are permitted to operate on those beaches that allow OSVs.

Targeted predator management implemented in the past by APHIS Wildlife Services and currently being implemented as part of the B-120 predator program has not required closures for recreational use during predator removal efforts or been documented to place public safety at risk. Therefore, the Plan's selective predator management program is not expected to affect beach recreation.

Contribution of the Proposed Action to Cumulative Impacts

Like the Plan, the Town of Orleans HCP allows OSVs in areas where OSVs were previously prohibited when unfledged plover chicks are present. Monitored OSV use is now allowed on up to 5 miles of beach south of the Pochet (a narrow section of Nauset Beach South) after July 15 when unfledged piping plover chicks are present. The proposed action would add to this increase in recreational use in the study area, thus resulting in cumulative impacts on recreation.

In general, aquatic habitat restoration projects have minimal to no impacts on beach recreation. Beach stabilization and nourishment projects can provide increased recreational opportunities by providing wider beaches (USACE 2015) or restoring heavily degraded beaches (e.g., placing sand over cobble beaches). Beach nourishment plans consider recreational benefits in addition to preventing storm damages. In the Corps study noted above (USACE 2015), the Corps determined that the beneficial use of dredge material would add substantial areas for beachgoers and fishermen to access the beach without trespassing on private lots. In the context of past, present, and reasonably foreseeable future actions, the proposed action (i.e., authorization of incidental take of plovers resulting from recreational activities and beach operations) would result in an increase in recreational benefits. This additive effect to potential beach nourishment projects is expected to be minor in the study area.

5.1.3.3 Transportation and Traffic

Summary of Proposed Action's Impacts

As discussed in chapter 4, implementation of the HCP could result in localized improvements in traffic conditions during the piping plover nesting season. Barriers such as silt fencing would be used to prevent chicks from entering improved roads and parking lots. This would reduce the amount of potential road or parking lot closures during the spring and summer beach season, thereby improving local traffic conditions in participating Towns during the plover fledging period. Additional protocols implemented by Plan participants could help improve local traffic conditions during periods of heavy beach use during the piping plover breeding season (e.g., warm, sunny weekends).

When a nest's location requires the closure of a beach access point (e.g., the nest is located within 50 yards of a parking lot), the nest could be moved or the symbolic fence buffer could be reduced. Similarly, if proactive fencing closed or limited access, the amount of proactive fencing could be reduced. These activities could result in localized improvements in beach traffic and parking in areas that may have experienced temporary congestion as a result of closed roads or parking lots of the beach.

Contribution of the Proposed Action to Cumulative Impacts

The Town of Orleans HCP could result in a slight increase in vehicle traffic near Nauset Beach South after July 15 as a result of allowing OSV use. No measurable impact on traffic or transportation is expected. Beach stabilization and nourishment projects and aquatic habitat restoration projects have minimal to no impacts on land-based traffic and transportation. In the context of past, present, and reasonably foreseeable future actions, the additive effect of the proposed action (i.e., authorization of incidental take of plovers resulting from recreational activities and beach operations) is expected to be negligible to transportation and traffic in the study area.

5.1.3.4 Socioeconomics

Summary of Proposed Action's Impacts

As discussed in chapter 4, the HCP seeks to strike a balance between environmental protection (i.e., piping plover conservation) and social values (i.e., beach recreation), thereby maintaining community support for piping plover conservation. As a result of increased recreational use, the

proposed action could result in an increase in the amount of economic activity in the study area, including spending at local businesses and OSV permit sales. The extent of increased spending and parking revenue and purchase of OSV permits is unknown. However, because the Plan generally would prevent parking lot closures and allow OSV use during the piping plover nesting season in areas where OSV use is currently prohibited when unfledged plover chicks are present, OSV permit sales and beach revenue, are expected to increase.

The proposed action could result in extended beach and law enforcement employee hours or the hiring of additional, short-term staff. The impact minimization measures include extensive monitoring to avoid or minimize potential take of piping plovers. The additional monitoring requirements could result in employees working long hours or the hiring of additional short-term staff during the nesting season. Similarly, as part of the Plan's conservation strategy, there would be an increase in law enforcement (e.g., natural resource officers) in the study area. Like beach staff, law enforcement personnel may work long hours during the nesting season or additional staff might be hired. No significant increase in the number of jobs is expected.

Removal of piping plover predators may be contrary to the values of some people. Increasing piping plover survival at the expense of predators such as crows, skunks, or coyotes would be unfavorable to some, while other people may hold the opposite opinion. Predator control would be carefully planned and implemented to target a limited number of individuals of known predatory species. Risks to public safety from removal activities would be avoided by carefully selecting removal times and by employing trained and experienced personnel.

Contribution of the Proposed Action to Cumulative Impacts

Under the Town of Orleans HCP, allowing OSV access in areas that were previously prohibited as a result of the presence of unfledged piping plover chicks is expected to result in additional OSV permit sales, which would increase the Town of Orleans revenue generated from OSV permits. This revenue will be used to further manage and protect the beach's natural resources. After the Town of Orleans' ITP expires, the Town could apply for a COI under the Plan. Thus, the proposed action would continue to allow OSV access to Nauset Beach South when unfledged piping plover chicks are present. This would continue to provide the Town revenue from additional OSV permit sales during the piping plover nesting season.

Aquatic habitat restoration projects could result in long-term socioeconomic benefits if the restored habitat is open and accessible to public recreational activities (e.g., bird watching). Potential socioeconomic impacts associated with Federal beach stabilization and nourishment projects would be reviewed in accordance with NEPA. In the Corps study noted above (USACE 2015), the Corps determined the overall effect of the Cape Cod Canal maintenance dredging project would be beneficial, as it would accommodate deep draft vessel traffic through the canal, which would alleviate any additional costs associated with tidal delays or the need to circumvent the canal. Placement of the dredged material on Town Neck Beach would provide needed sediment for the renourishment of the beach to protect nearby homes and businesses from storm damage. Thus, the proposed action could add to these types of positive effects on socioeconomic conditions in the study area. In the context of past, present, and reasonably foreseeable future actions, the additive effect of the proposed action (i.e., authorization of incidental take for plovers for beach recreation and management operations) on socioeconomics in the study area is expected to be minor.

5.2 Climate Change

Section 2.2.3 of the HCP discusses the topics of climate and climate change and is incorporated into this EA by reference. Global climate change is recognized as a potential major threat to wildlife populations and habitats, including the piping plover (Seavey et al. 2010). Climate-related disturbance plays a critical role in both creating and eliminating wildlife habitat, resulting in a shifting mosaic of habitats over time.

Sea level rise is one consequence of climate change, posing a threat to coastal ecosystems that may become inundated, resulting in habitat change or loss, and resulting in adverse impacts to species that depend on these habitats. Additionally, climate change may affect the frequency, severity, and timing of coastal storms. It is generally considered by climate scientists that coastal ecological resources are likely to be among the most sensitive to the changing climate, and climate change impacts on ecosystems over the next few decades could be most marked in coastal zones.

The National Oceanic and Atmospheric Administration's Center for Operational Oceanographic Products and Services maintains several tide gauge stations across coastal Massachusetts, including long-term stations at Boston, Woods Hole, and Nantucket. Mean sea level trends from these long-term stations are listed in Table 5-1.

Table 5-1. Mean Sea Level Trends for National Oceanic and Atmospheric Administration's Massachusetts Tide Gauge Stations

Station	Mean Sea Level Trend and 95% Confidence Interval		Period	Century Rate (feet/100 years)
	millimeter/year	inch/year		
Boston, MA	2.79 ± 0.17	0.11 ± 0.007	1921–2012	0.92
Woods Hole, MA	2.81 ± 0.19	0.11 ± 0.007	1932–2012	0.92
Nantucket, MA	3.52 ± 0.42	0.14 ± 0.017	1965–2012	1.15

Sea level rise and other climate changes pose a substantial, potential long-term threat to coastal wildlife and their habitat. Seavey et al. (2010) assessed the threat of sea level rise to the breeding habitat of piping plover on the barrier islands of Suffolk County, New York. They estimated the extent of habitat change over the next 100 years under several sea level rise assumptions, as well as the interactive effects of coastal development and storm surge. They found that if piping plover habitat cannot migrate, sea level rise is likely to reduce breeding areas. However, if habitat is able to migrate upslope and inland, breeding areas could actually increase with sea level rise. They also found that the spatial configuration of developed areas mattered more than the intensity of development in blocking the migration of potential habitat area.

These results suggest that, as climate change effects increase in intensity, there may be an increased likelihood of conflict between piping plover habitat protection and human recreation. Also, these results highlight increased risk from the combination of sea level rise and more intensive coastal storms as a result of climate change. A large hurricane could flood up to 95 percent of piping plover habitat in some areas. Seavey et al. (2010) concluded that to assure the future of piping plover habitat on the New York barrier islands, management needs to promote natural overwash and habitat migration while minimizing development adjacent to future breeding habitat.

The North Atlantic Landscape Conservation Cooperative is conducting a project to predict how piping plover breeding habitat will change as a result of sea level rise and altered storm patterns. The project will also analyze the effectiveness of conservation strategies, given projected sea level rise. It will provide biologists and managers along the Atlantic Coast with tools to predict the effects of accelerating sea level rise on the distribution of piping plover breeding habitat, test those predictions, and feed the results back into the modeling framework to improve predictive capabilities. Immediate model results will be used to inform a coast wide sea level rise risk assessment and related habitat conservation recommendations that can be implemented by land managers, and inform recommendations to regulators.

Neither the proposed action nor the shorter permit term alternative would contribute substantial greenhouse gases to the environment. Therefore, neither alternative would increase the rate of global climate change or further contribute to the resulting effect of rising sea levels or intensifying and more frequent storms. Also, both alternatives would result in minor impacts on shorebird habitat, mainly from recreation and OSV use in areas where these activities are currently prohibited during the piping plover nesting season. Compliance with the MWPA through Orders of Conditions would prevent any short- or long-term adverse effects on the habitat of local species. Thus, the proposed action and shorter permit term alternative would not significantly add to the potential long-term effects of climate change on coastal shorebird populations.

Nonetheless, under the proposed action and shorter permit term alternative, the Plan includes provisions for dealing with rising sea levels and flooding in the study area. Specifically, if shorelines change due to erosion and sea level rise, the location of piping plover breeding habitat will shift. As stated in the HCP, the study area (or plan area) automatically adjusts in response to erosion or accretion to include a 300-yard zone along the Massachusetts coast. The MADFW would provide the Service and the public with an updated map of the plan area at least once every 5 years, and more frequently in response to major coastal storms, if practical.

Piping plover habitat as a result of sea level rise or coastal erosion would be taken into account during the annual assessments of population size and population trends. For example, if habitat availability declines as a result of sea level rise or coastal erosion due to more frequent or intense storms and the plover population responds negatively to these events, annual limits of take exposure would be reduced corresponding to the reduced population. If population declines were extreme and fell below the HCP threshold¹⁶, take exposure allowances would be discontinued altogether. The requirement to adjust the level of take allotted annually based on the 3-year running average population is a mechanism to ensure that HCP impacts are alleviated in times when the population may decline for whatever reason.

The monitoring program described in chapter 4 of the HCP is based on the study area and population levels each year. If piping plover populations increase or decrease in response to shifting habitats associated with coastal erosion, sea level rise, and flooding, the monitoring program would adapt to tracking new population levels and locations.

¹⁶ Less than 500 breeding pairs in Massachusetts, as measured by a rolling 3-year average population count.

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6.1 U.S. Fish and Wildlife Service

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