Impact Avoidance and Minimization Plan:

Cape Poge Wildlife Refuge, Leland Beach, Wasque Point, and Norton Point Beach

Edgartown, Martha's Vineyard

January 2020

The Trustees of Reservations

200 High Street

Boston, MA 02110

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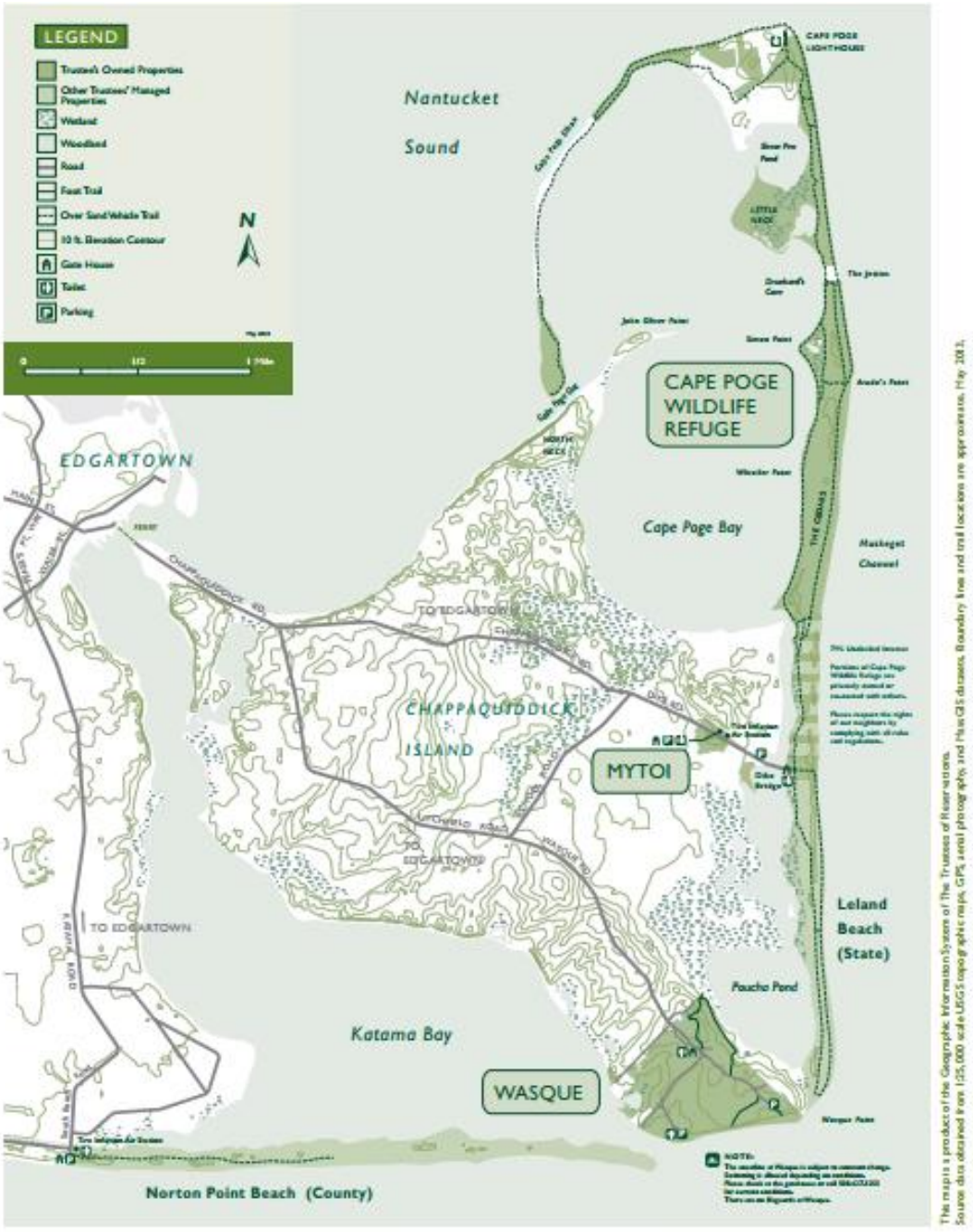
I. Site Description

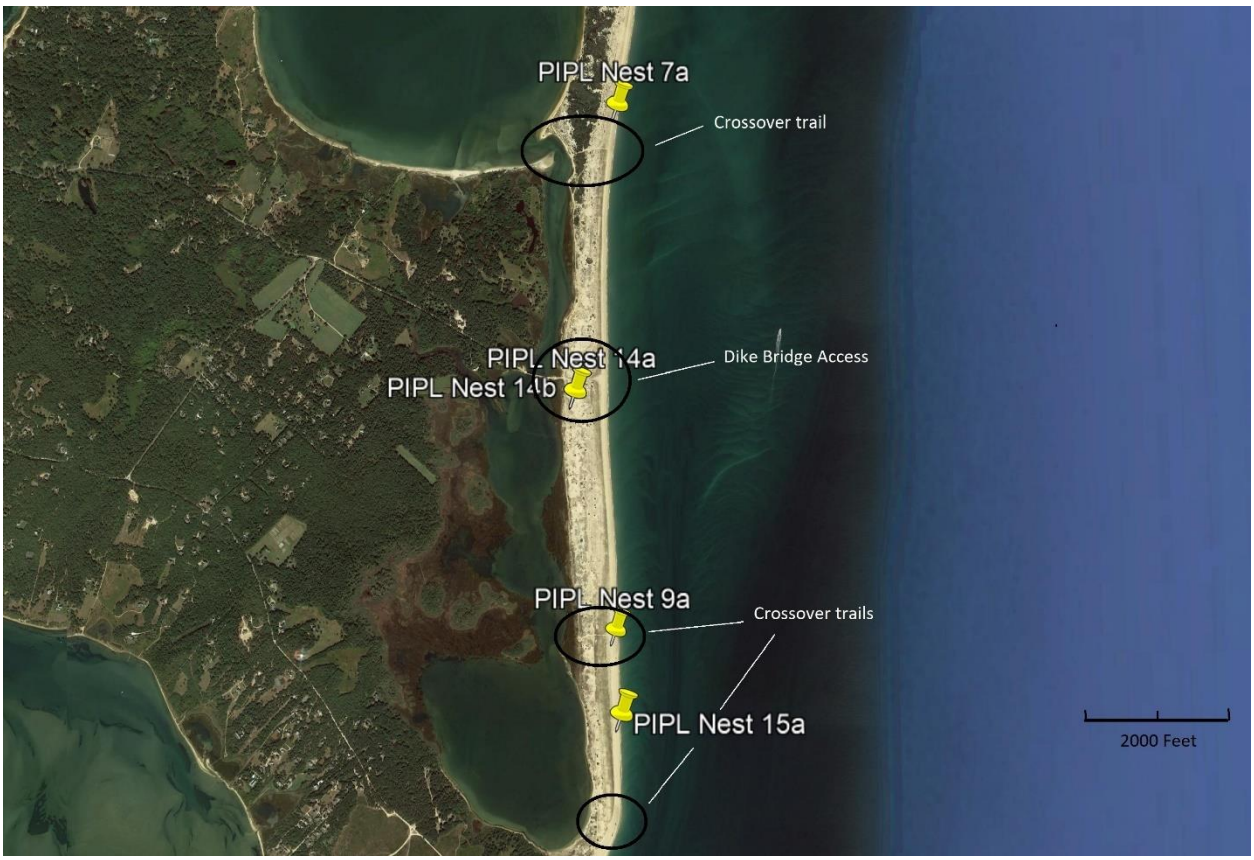
1.a. Maps

Figure 1: Katama to the Gut: Geography and Ownership of the Chappaquiddick Barrier Beach System



Note that this older map still shows a breach, now closed, at the eastern end of Norton Point Beach.

Figure 2: Piping Plover Nest Locations and Key Trail Junctions, East/Leland Beaches, 2019



Circles indicate most likely points where plover broods may cross the dune system (crossover trails) or interfere with access to the East/Leland beach system as a whole (Dike Bridge).

Figure 3: Piping Plover Nest Locations and Access Points, Wasque/Norton Point, 2019

1.b. Description of property

The Trustees of Reservations, one of the oldest land conservation organizations in the United States, was founded in 1891 by Charles Eliot, a landscape architect, who wanted to preserve open spaces from the dramatic urban development he was witnessing. Our mission is to preserve areas, for public enjoyment and use, of exceptional scenic, historic, and ecological value throughout Massachusetts. We frequently collaborate with other conservation groups and government agencies that share our mission.

Sprawling across about 1000 acres, Cape Poge Wildlife Refuge East Beach and Wasque Reservation include (along with limited upland habitat) an extensive barrier beach system wrapped along the eastern and northern shores of Chappaquiddick Island. The beach ranges in form from classic beach/dune barrier between the ocean and a salt pond, to a precariously narrow sand and cobble spit near “the Gut,” to beach backed by bluffs and sandplain upland at Wasque Point. While for reasons of flexibility we are including this entire system in this Impact Avoidance and Minimization Plan (IAMP), along with Norton Point Beach (see below), a main focus of our attention is East and Leland Beaches. East Beach, owned by The Trustees, is a 1.7-mile stretch of Cape Poge Wildlife Refuge (Figure 2). This is a classic, dynamic barrier made up of an oceanside beach, dunes, cedar forests, and a low-energy bayside beach along a tidal salt pond. East Beach connects, both geographically and ecologically, with Leland Beach, a roughly mile-long stretch of barrier beach also made up of an oceanside beach, dunes, and a bayside beach along a salt pond. Leland is owned by the Commonwealth of Massachusetts (Division of Marine Fisheries) but managed by The Trustees of Reservations under a 1993 Memorandum of

Understanding (MOU). This MOU specifies that "…public access for sportfishing shall be a priority use of Leland Beach" and that the "Trustees agree to permit the general public to have access to Leland Beach through the Wasque Reservation and the Cape Poge Wildlife Refuge." To the extent possible, our management of Leland Beach complies with these priorities. Several private landowners at Cape Poge have rights of passage over East Beach in order to reach their property.

Continuing to the south of Leland Beach is the shoreline of Wasque Reservation. Subject to dramatic cycles of erosion and deposition, and frequently experiencing overwash during storms or even just astronomically high tides, Wasque is famed both for its scenic value and for the sportfishing associated with a strong tidal rip just offshore. In terms of recreational access, Wasque represents a key linkage for OSV travel between Leland and East Beaches to the north and Norton Point Beach, extending about two miles to the "mainland" of Martha's Vineyard proper, to the west.

Currently, Norton Point, which is owned by the County of Dukes County and managed by The Trustees under a Memorandum of Agreement, is the only land link between Martha's Vineyard and smaller Chappaquiddick. Historically, this link has been broken periodically when storms breached the Norton Point barrier beach, connecting Katama Bay with the open Atlantic Ocean. During one such opening that lasted from 2007 to 2015, about 40 acres of upland was lost to erosion from Wasque Point (and from Wasque Reservation). Also lost was an OSV access point at the eastern end of Norton Point Beach, and while two pedestrian access points remain at Wasque Reservation, at present there is no vehicular entrance onto or egress from the barrier beach system between the Katama entrance to Norton Point and the Dike Bridge access gatehouse on East Beach.

In addition to nesting shorebirds, use by transient birds at this site deserves mention. Outer beaches are used during spring and, especially, fall migration by species including black-bellied and semipalmated plovers, sanderling, and ruddy turnstone. Inside beaches, especially along Norton Point, where large areas of mudflat are exposed at low tide, host those species in addition to least, white-rumped, and semipalmated sandpipers, greater yellowlegs, willet, and American oystercatcher (which also breeds here in significant numbers). While not rivalling sites like South Beach/Monomoy on Cape Cod or Newburyport Harbor in importance, Chappaquiddick makes a significant contribution to the survival of migrant shorebirds, and The Trustees incorporate these transients into the planning and management.

Taken together, these properties represent one grand, contiguous, roughly 11-mile stretch of habitat and will be combined under one Certificate of Inclusion. Effectively managing the sometimes competing uses of these properties, in light of the large areas and distances involved and the limited opportunities for vehicles or even pedestrians to enter or leave the beach, is a central preoccupation for The Trustees. Landowner permission (from Massachusetts Division of Marine Fisheries) to participate in the HCP on Leland Beach has been requested and will be obtained before implementation of any covered activities. Similar permission has been requested from the County of Dukes County for implementation of the plan on Norton Point. We will also be seeking a renewed Order of Conditions from the Town of Edgartown for oversand vehicle (OSV) use on the entire beach complex. Our Notice of Intent filing has been delayed by the internal process of developing a uniform statewide internal policy for beach management and OSV use; promulgation of this policy is necessary prior to filing a Notice of Intent, since the policy will

partly determine what activities and management will be included in the Notice of Intent. A valid Order of Conditions will be in hand prior to any exercise of our Certificate of Inclusion on East/Leland, Wasque, or Norton Point beaches.

1.c. Plover habitat and management

This large, complex, and dynamic beach system offers a variety of resources used by plovers. Historically, pairs have nested on the ocean-side beach, on the inside salt pond shore, and in blow-outs or washover areas in the dunes. Experienced shorebird managers will not be surprised that plovers occasionally nest (or at least attempt to nest) in settings that do not conform to the accepted definition of ideal plover nesting habitat. The breeding population size and productivity have generally trended upward in recent years, while exhibiting considerable annual variation. Management of these birds is constantly challenging not just due to the vagaries of the birds themselves and the dynamics of a barrier beach, but because this entire location is heavily used by a range of overlapping human constituencies: homeowners accessing their property across the beach, surf fisherman, swimmers, sight-seers, and birders, some of them accessing the beach on foot, many others accessing it by means of 4WD vehicles. OSV access points to the beach system are currently limited to The Trustees' Dike Bridge gatehouse, about in the middle of the overall East/Leland Beach complex, and a gatehouse at the western end of Norton Point beach. At both the Dike Bridge and Wasque, The Trustees maintains parking areas and pedestrian access points; pedestrian access is also possible from Katama onto North Point. On Chappaquiddick and at Katama, tire deflation/inflation stations are maintained for OSVs.

Over-sand vehicle travel is accommodated throughout the Norton Point to Cape Poge system on a network of jeep trails; across much of the barrier beach (including most of East/Leland and Norton Point), a system of parallel trails (inside along the salt pond, outside along the ocean beach, and often in the middle, through the interior of the dune system), linked by occasional crossover trails, makes this network fairly "robust" in spite of tidal flooding, erosion, or closures necessitated by bird nesting activity. Still, extensive sections of individual trails and usually entire sections of beach are closed to nonessential traffic each breeding season. The Trustees, given their multifaceted mission and obligations under various management agreements, seeks to maximize public access to the extent consistent with sound ecological management of wildlife and the physical beach environment itself.

A frequent complication in beach management arises when a pair of adult plovers makes use – often intermittent, unpredictable use – of a low or sparsely vegetated spots in the dunes to bring their brood of fledglings from one side of the barrier beach to the other, generally in order to access productive foraging habitat. In particular, crossover roads may furnish opportunities for this kind of expedition. Such mobility makes closure of entire sections of beach much more likely, since the birds could appear unexpectedly on any stretch of trail, inside, outside, or in the dunes. Our participation in the Piping Plover Habitat Conservation Plan is largely aimed at providing more flexibility in responding when this type of situation arises.

A "first" in 2019 was the decision to invoke our Certificate of Inclusion in the Piping Plover Habitat Conservation Plan administered by the state's Natural Heritage and Endangered Species Program.

Intended to allow beach managers greater flexibility while still ensuring continued growth of the state's plover population, the HCP allows carefully managed exposure of a small number of plovers to increased risk of "take," in exchange for measures implemented elsewhere to increase productivity. In this case, the presence of a quartet of highly mobile plover chicks on East Beach created a situation where passage of OSVs (including tour vehicles operated by The Trustees) appeared likely to pose a threat to the chicks.

From June 22 through June 28, Trustees staff exercised the use of our COI to escort tour trucks past the zone where the chicks were feeding on the outside beach. Tour trucks were escorted by a Trustees' shorebird-trained ranger who rode ahead of the lead tour truck on an ATV at a speed not exceeding 5 mph. Tour truck operators were also instructed to leave no more than two truck lengths between each tour truck. A second Trustees shorebird-trained ranger served as the Brood Monitor, and the Brood Monitor and the Escort were in constant touch via VHF radio communications. The Brood Monitor remained with the plover brood throughout the course of the day and radioed updates regularly to the Chief Ranger or property Stewardship Manager, who were both located on the property.

Trustees staff halted the COI tour truck escorting on June 28 when it became apparent that the three remaining chicks had traveled about a half-mile northward along the oceanside beach. In that area, far away from the crossover trail and on a stretch of beach backed by heavily vegetated dunes and a steep bluff at the toe of the dune, the chicks were clear of any OSV danger and could be managed for the remainder of their time under the Massachusetts' guidelines. At all times, the chicks were separated from vehicular traffic by about 100 yards of well-vegetated dune; as a result, this use of our Certificate of Inclusion did not result in any "take" and probably did not even produce additional stress on the chicks or their parents, which may have been unaware of the passage of vehicles. During the six days of COI implementation a total of 13 escorted round-trips were made through the shorebird zone, which allowed 20 individual escorted truck round trip passages. A total of 133 adults and 43 children were onboard those 20 tour truck trips to Cape Pogue. These tours represented an important part of our educational and public access mission for the season, as well as a source of revenue to support beach management, including management of breeding shorebirds.

During the 2019 breeding season, between 15 and 17 pairs of piping plover (*Charadrius melodus*) nested on property managed by The Trustees on Martha's Vineyard, Massachusetts. The uncertainty in the number of piping plover pairs stems from the possibility that some pairs were double-counted on the crowded eastern end of Norton Point when they re-nested following nest failure. The only pair on East Beach produced nest 7a around May 22, with four eggs hatching on June 22 and one chick finally fledging. Nest 9a was found on Leland Beach on May 24; four eggs hatched around June 18, and three young ultimately fledged. Also, on Leland Beach, pair 14 nested (14a) by June 8, lost the nest ten days later, re-nested by June 24, and lost that clutch almost immediately on June 25. The final Leland Beach pair produced nest 15a by June 15, and a full clutch of four eggs was lost to crow predation on June 22.

Wasque Point continues to recover from beach loss due to erosion during the 2007-2015 breach in North Point Beach. While the beach at Wasque remains highly dynamic, the trend appears to be one of accretion rather than loss. Where tidal flow once cut deep into the uplands, a broad beach now extends

seaward from the base of the bluffs, and the process has produced new nesting habitat for plovers and potentially other birds. In 2019, the highly skilled plover pair #4 had nested and produced a full clutch of four eggs by May 14. All four eggs hatched, and the chicks ultimately fledged successfully, probably helped by conservative management by The Trustees of OSV travel on this key stretch of beach. The success of this pair was a bright spot in a difficult season for Chappaquiddick/Norton Point shorebirds.

Somewhere around half of the plovers nesting on Trustees-managed beaches on Martha's Vineyard typically nest on Norton Point Beach. Exposed to the open Atlantic and subject to sometimes dramatic instances of erosion and overwash, Norton Point usually offers some of the most promising habitat piping plovers. Nesting occurs on the oceanside beach, in blowouts or overwash areas in the dunes, and sometimes on the "inside" Katama Bay shore, though a low gradient to the beach and exposure to occasional storm winds from the north can result in nests on that side being lost to overwash. 2019 featured discouragingly low productivity for plovers on Norton Point, which experiences heavy recreational usage (e.g., OSV travel, surf fishing, clamming, birding, and kiteboarding on Katama Bay). Between nine and 11 pairs of piping plovers nested on Norton Point. Combined, the pairs produced 12 nests, 46 eggs, 3 chicks, and 0 fledglings. Nest failure was a result of abandonment (25%; 3/12), washover (8.33%; 1/12), depredation by striped skunk (8.3%; 1/12), depredation by an unknown predator (8.33%; 1/12), and unknown causes (50%; 6/12). Many of the nests where the cause of failure was unknown were suspected to have been predated, but there was insufficient evidence assign a specific cause. In 2020, The Trustees plan an aggressive targeted predator control program, a program to monitor as many as ten nests with game cameras, efforts to better understand and manage disburbance effects related to kiteboarding, and participation in an Atlantic States Flyway study of disturbance effects, in addition to our usual annual monitoring and management program.

While nest locations and number of pairs across the whole Chappaquiddick barrier beach system shows year-to-year variation, as one would expect, the 2019 pair census was typical of recent seasons while per-pair productivity (Table 1) showed a discouraging reversal.

Table 1: 12-year Piping Plover pairs and productivity on Martha's Vineyard

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
# Pairs	14	12	9	12	15	16	16	17	18	17	19	15-17
Productivity	0.24	0.33	1.78	0.86	0.67	1.25	0.88	1.12	1.11	0.65	1.0	0.47-0.53

i.d. Other state-listed species

Least, common, and roseate terns all nest annually on the Chappaquiddick barrier beach system, though numbers and colony locations vary dramatically from year to year. Prior to the closure of the 2007-2015 breach in Norton Point Beach, the eastern end of Norton Point was a favored spot for a colony to establish; breeding results were often good here, perhaps because the location was well insulated from mammalian predators and (because the beach did not continue beyond the colony) no OSV traffic passed the colony site. Since the closure of the breach, varying combinations of terns have nested in

blowouts and washovers on Norton Point, East/Leland Beach, and near the outermost tip of Cape Poge near the Gut (where the terns nest in alarmingly close proximity to a colony of great black-backed gulls).

While the beach system often offers structurally suitable habitat and an abundance of appropriate prey species in nearby waters, nesting terns experience the same challenges here that piping plovers do: a wealth of predators both avian and mammalian, sometimes encouraged by unintentional human subsidies, and heavy recreational use by humans that cannot be completely managed to suit the interest of the birds. Accordingly, breeding success varies widely (and is discussed more fully in section III.vi.b, below). Ordinarily, terns require little special management on the Katama-to-Gut shoreline because the areas in which they nest are also managed for piping plovers; beach closures or access restrictions for plovers protect terns, as well, generally extending well beyond the dimensions that guidelines would specify for terns alone.

II. Responsible Staff

Russ Hopping, Lead Ecologist/Coastal Ecology:

Oversees statewide coastal ecology program including shorebird management. Oversees a team of two Coastal Ecologists and 5-6 seasonal Shorebird Technicians. Works with state and federal officials and partners in the implementation of the program. Began ecology career by managing piping plovers and least terns at Crane Beach, Ipswich, starting in 1991. Completed undergraduate research on migratory shorebirds at Crane Beach in 1991. B.S. in Human Ecology and M.S. in Environmental Studies.

Chris Kennedy, Chappaquiddick Island Stewardship Manager:

Oversees operations on Chappaquiddick and Norton Point Beach. Has been a beach manager since 1988, overseeing general management and protection of rare shorebirds. Implemented state and federal guidelines related to beach nesting bird species. Former Assistant Commissioner of Massachusetts Department of Fish and Wildlife. Also former Deputy Director of Massachusetts Environmental Police.

Matt Pelikan, Coastal Ecologist:

Versatile naturalist with extensive experience at bird observation and field studies. Began working for The Trustees of Reservations in 2019, overseeing and coordinating ecological management on both Nantucket and Martha's Vineyard, including the management of beach-nesting birds. Prior to joining The Trustees, worked for 14 years for The Nature Conservancy/Massachusetts as a program director, restoration ecologist, and coastal ecologist. Trains and supervises shorebird staff, interns, and volunteers.

Seasonal Shorebird Monitors (3):

Seasonal Shorebird Monitors are hired by May 1 for a 15-week term at 40 hours per week. They are responsible for maintaining fencing around nesting areas, monitoring nesting shorebirds, conducting predator management, providing escort to staff needing to get past shorebird closures for essential

maintenance or safety reasons, and recording and reporting shorebird data. They are trained by the Coastal Ecologist in conjunction with the staff of BiodiversityWorks, a conservation research, management, mentoring organization based on Martha's Vineyard.

Rangers:

Seasonal Rangers are hired to enforce rules and regulations and ensure the safety of visitors. Those who have received appropriate training can also serve as Brood or Compliance Monitors or Escorts when needed.

III. Beach operations

The Trustees manage beaches and OSV recreation using a management plan which adheres to the Massachusetts Division of Fisheries & Wildlife, Natural Heritage and Endangered Species Program and Guidelines for Managing Recreational Use of Beaches to Protect Piping Plovers and Terns and Their Habitat (1993).

i. Recreational activities

a. OSV use

Nesting habitat and nests are protected by symbolic fencing and signage by April 1st. This includes historic and suitable habitat. While pairs are sitting on nests, vehicles are allowed to drive past them outside of symbolic fencing 100 yards (300 feet) away or as wide as the beach allows per the state and federal guidelines. Two days before the expected hatch date for a particular nest, the beach is closed to vehicles up to and beyond 100 yards (300 feet) of the nest site. This necessitates the closure of the vehicle corridor in front of nests on our beaches as they are too narrow to allow vehicles past and maintain a safe distance. As the chicks move, the fencing is adjusted to maintain a minimum of 200 meters (600 feet) or more, and never less than 100 meters (300 feet) between them and OSVs. Broods are monitored every day, and sometimes more often, by qualified Shorebird Monitors.

b. Fishing: Symbolic fencing and signage is placed by April 1st. No pedestrians are allowed behind fencing.

c. Kiteboarding: Kiteboarding is not allowed within 200 yards (600 feet) of the shoreline where there is symbolic fencing and signage

d. Swimming: See Fishing

e. Boating: Boats are not allowed to land on the shore where there is symbolic fencing and signage.

f. Bird watching and photography: See Fishing

ii. Parking and roads

Parking is permitted along the shoreline or in designated pull-outs outside of symbolically fenced habitat as long as it is not within the travel corridor established 10 feet away from the toe of the dune. Vehicles are not permitted behind symbolic fencing or where beaches are closed to vehicle traffic due to the presence of unfledged chicks.

iii. Beach cleaning and refuse management

Beaches are NOT raked. Trash is picked up by Rangers during routine patrol and removed from the beach. Recreational beachgoers are expected to carry in-carry out. No trash barrels that can attract predators are available.

iv. Rules and Regulations

· Oversand vehicle access is subject to occasional closures (June/July) to protect rare nesting shorebirds, the presence of rare or endangered species, or for any other reason pertaining to the safety needs of visitors and/or wildlife.

· Dogs are prohibited from beaches with breeding birds for the duration of the breeding season (April 1-September 30) and must be kept on a leash at other times.

· Seasonal hunting (waterfowl only except for portions of Cape Poge) is permitted at this property subject to all state and town laws. In addition, a Trustees of Reservations permit is required.

· Camping is not allowed.

· Open fires are not allowed.

· Fireworks are prohibited.

· Collection of vegetation is prohibited.

· Driving on beach vegetation is prohibited.

· Entry into areas closed for shorebird management is prohibited.

· Littering is prohibited.

· Commercial activities are prohibited.

· Conduct disturbing the tranquility of the refuge and visitors is prohibited.

· Disturbing birds and other wildlife is prohibited.

v. Law Enforcement

Rangers on the property are responsible for enforcing all property rules and regulations. Rangers may periodically request assistance from the Edgartown Police Department and the Massachusetts Environmental Police. Rangers patrol assigned areas approximately once per hour during the shorebird breeding season. Areas which require more frequent patrol (e.g., due to high levels of visitation or a history of problematic human behavior) may have a stationary Ranger assigned.

vi. Other operation

vii. a. Plover monitoring and management

1. Fencing and signage: Symbolic fencing and signage is placed around suitable and historic habitat by April 1st in accordance with state guidelines. It is adjusted as needed throughout the season. Signs are placed every third post. Twine and flagging are used as well as galvanized t-posts. Three Shorebird Monitors are hired for a 15-week period by May 1 and work five days a week for 40 hours. Starting dates and work days are staggered to ensure coverage 7 days a week with at least two technicians on during peak shorebird season. The Coastal Ecologist is available to assist Shorebird Monitors or cover for days off. The Shorebird Monitors locate and

record the courtship, territorial, and nesting behavior of shorebirds. They will also locate and record reproductive data including nest locations, number of eggs laid, number of chicks hatched and number of chicks fledged. They will complete daily observation forms, census forms, nest attempt and nest failure forms as well as record violations potentially harmful to shorebirds (e.g., dogs on beach). They will also create maps using GPS locations of nests. In addition, they will perform some predator management. Monitoring will be conducted daily during daylight hours. Monitors are provided with binoculars, spotting scopes, field notebooks, map software, GPS unit, and computer in order to perform their duties. They will be directly supervised by the Coastal Ecologist.

2. Other management: Nest exclosures may be used in consultation with MNHESP. We are aware that while exclosures remain a useful tool in the plover management arsenal, exclosure use is a potentially disruptive intervention that can cause nest abandonment by adult plovers and may expose adults to elevated risk of predation. Shorebird technicians are trained to look for and identify listed plant species found on our beaches, e.g., seabeach knotweed (*Polygonum glaucum*) and bristly foxtail (*Setaria parviflora*), and notified of the location of known populations of these plants. If found, populations of listed plants are delineated by symbolic fencing to prevent trampling or other disturbance. Often, rare plants are found in areas already fenced for use by shorebirds for nesting and foraging.

3. Monitoring: Two Shorebird Technicians are on site every day and monitors every pair unless weather prevents it. Daily site visit forms are filled out as well as nest attempt/nest success forms for each nest. Census forms are filled out and turned into the state at the end of the season. Maps are updated in each gatehouse to keep all staff informed. Field books are kept by each Shorebird Technician to keep a detailed account of each day. Seasonal data for plovers and terns are uploaded to PIPLODES and TERNODES, respectively, and detailed records, including a master list of plover nesting chronology and results, maps showing locations of plover nests and tern colonies, and a detailed internal report covering all species, are prepared and retained.

Staffing levels and qualifications:

Chappaquiddick Island Stewardship Manager Experienced and trained in shorebird monitoring and management, high degree of familiarity with the properties.

Coastal Ecologist: Extensive experience in wildlife monitoring and project management; trained in shorebird monitoring and management.

Shorebird Technicians: have completed or are working toward a degree in biology, wildlife management, or a similar natural resources-related field. They are trained to identify shorebirds and interpret their behavior.

vii. b. Tern management

Three species of terns frequently nest on the Norton Point/Cape Poge barrier beach complex, typically in blowout areas within the dune system, upper beach areas and vegetated dunes in the case of Roseate terns. Black skimmers are occasionally present as well. Locations selected for colonies, numbers of birds, and productivity vary widely and unpredictably from year to year. In 2019, a colony of 58 pairs of least terns (*Sterna antillarum*) nested on the private property on the Elbow, with poor productivity (approximately three fledglings). 64 pairs of least terns made a short-lived nesting attempt (less than two weeks between arrival of the first individuals and disappearance of the last ones) on Leland Beach, with no productivity. On Norton Point, two different subcolonies of least terns were established, one with 330 pairs and one with 289 pairs. The larger subcolony had no productivity and the smaller subcolony had poor productivity. 180 pairs of common terns (*Sterna hirundo*) and 19 pairs of roseate terns (*Sterna dougallii*) nested together in a third colony on Norton Point, with no productivity.

Because of the layout of the beaches, overlapping habitat preferences, the extent of proactive symbolic fencing, and the extent of beach closures necessitated by nesting piping plovers, tern colonies are typically adequately protected by measures taken on behalf of piping plovers. When unfledged chicks are present in a tern colony, vehicles (if not already prohibited due to the presence of plover chicks) are excluded from the entire width of the barrier beach – low tide line on the ocean side to low tide line on the inside – for at least 100 yards on either side of lines drawn from the margins of the colony, perpendicular to the long access of the beach.

This management plan complies with state and federal guidelines which ensure that there is no adverse impact to or "take" of protected species. Depending on the property and the year, Trustees properties may support nesting piping plovers, American oystercatchers, black skimmers, and least, common, and roseate terns. Piping plovers are state and federally Threatened. Roseate terns are state and federally Endangered. Common and least terns are Species of Special Concern in Massachusetts. The Trustees report census information to the Massachusetts Division of Fisheries and Wildlife and maintains communication with this agency throughout the nesting season.

IV. Covered Activities

Covered activity will impact a maximum of two broods, or between 11.7% and 13.3% of breeding pairs based on 2019 breeding census. This exposure may be apportioned among two covered activities, but in any event a maximum of two broods will be affected. When the Ecology staff identifies the brood to be exposed, 24-hour advance notice will be provided to DFW before initiating the covered activity.

In view of the limited resources available for implementation of the plan, The Trustees may elect to further limit the vehicles that may participate in this covered activity. For example, our own beach tours are a high priority since they both advance our education mission and generate revenue to fund all aspects of beach management. During our implementation in 2019, for example, East Beach north of the Dike Bridge remained closed to general OSV use.

1. a: OSV use in vicinity of unfledged chicks

Our concern centers mainly on unusually mobile broods using crossover roads or other areas of low-lying or unvegetated dune habitat to move between oceanside and bayside beaches. In many cases, plovers nesting on the ocean beach remain there, and the jeep road system allows one road (usually either a bayside or an interior dune road) to remain open when the oceanside beach, separated from the active road(s) by a substantial expanse of vegetated dunes, is closed to protect breeding birds. But occasionally adult plovers show interest in bringing their brood across the dune system, and when behavior suggestive of this is observed, and it can be necessary to shut down the road system entirely, precluding both public access and educational tours offered by The Trustees. With an appropriate mix of close observation of the birds and management of the flow of OSV traffic, we believe procedures outlined in our IAMP allows continued access via an interior or bay side road with acceptably low risk to the unfledged chicks. In most foreseeable cases, as in 2019, we anticipate that any elevated risk at all can be avoided, with the birds kept separate from OSV traffic by a substantial barrier of habitat that is inhospitable to plovers. The nature and extent of access to the affected area will be adjusted by The Trustees according to the availability of management resources and the overall access picture on the beach (closures "downstream" of a plover pair, for example, may make it pointless to offer access to the general public). In general, educational tours offered by The Trustees, generally from the Dike Bridge access point on Chappquiddick, are a high priority since these tours both advance our mission and generate revenue for beach management.

The travel corridor will be an existing jeep road, no greater than five yards wide, selected to minimize the likelihood of vehicles coming into proximity of chicks given observed patterns of behavior and movement. There will be no parking or stopping along the corridor until the exposed brood has been passed by at least 200 meters (600 feet) as designated by signs placed by shorebird staff and readjusted as necessary. Travel will only occur between 1000 and 1600 hours. OSVs may be either self-guided with a passenger in front of every vehicle or in escorted single vehicles or groups of vehicles guided by a shorebird-trained Trustees employee either on foot or on ATV operated at no more than 5 miles per hour. The specific circumstances and location will determine which method of controlled access will be implemented.

For self-escort, each vehicle must have at least one passenger 16 years of age or older to walk approximately 10 feet in front of the vehicle in the self-escort corridor. The escort will look for chicks in the road and stop the vehicle if either a chick is observed or one of the monitors (shorebird or vehicle monitor) requires the vehicle to stop. All self-escorted vehicles must maintain a safe distance of at least 15 feet from the escort to the vehicle in front. Vehicles will be held by the Compliance Monitor (i.e., cue) in the travel corridor before the 200-meter (600-foot) self-escort zone until chicks have moved more than 50 feet away, as confirmed by the Brood Monitor. All OSV operators wishing to participate will receive an OSV self-escort training and will be required to pass a written test that has been approved by the Division of Fish and Wildlife. Operators will be required to carry signed proof that they have read and understand the rules and procedures. Tire ruts will be smoothed out after each period of travel until chicks

reach 14 days old. This will be done on foot with rakes or with an ATV and appropriate attachment.

There will be a Brood Monitor continuously keeping track of the pair during the entire travel period. At least one half-hour before 1000, the Monitor will be dispatched to locate the brood and account for all unfledged chicks. Once the Brood Monitor has established the locations of chicks, he/she will notify the Coastal Ecologist. At this time, the Compliance Monitor will be notified that the OSV trail is open for travel. In the event that all chicks are not located, opening the OSV trail will be delayed until such time that all chicks are accounted for or it has been determined by the Brood Monitor that there are no chicks in the OSV trail. The Brood Monitor will communicate his/her determination to the Coastal Ecologist for confirmation to open the trail. Monitors will be given lunch and breaks as required by law and will be relieved by trained Rangers or shorebird staff as needed.

During the entire self-escort period, the Brood Monitor shall maintain constant visual contact with any plover chicks, using binoculars from a distance of no less than 200 feet. Disturbance of the chicks shall be minimized. Once vehicles have passed through the delineated "chick zone," which shall extend at least 200 meters (600 feet) past the closest chick, vehicles may proceed to use the sections of beach previously determined to be free of piping plover chicks, in accordance with state and federal guidelines.

Simultaneously, a Compliance Monitor will be located along the self-escort corridor so that he or she can stop traffic if the pair begins to lead their chicks to the road. The Monitors will communicate through radio with cell phones as a backup.

If at any time during the escorting process the Brood Monitor loses visual contact with one or more chicks, travel through the self-escort corridor will be stopped until chicks can be located. Monitors will document in the daily report the approximate time that visual contact with the chick(s) was lost and efforts made to relocate it.

The Coastal Ecologist, Compliance Monitor, and each individual Brood or Shorebird Technician will have the independent authority to temporarily close the corridor at any time for any reason. For example, if at any time a Brood Monitor determines that chicks have approached within 50 feet of the self-escort corridor, the Monitor will immediately notify the gate attendant and Compliance Monitors by radio to temporarily halt traffic and allow the chicks to cross the corridor and/or move >50 feet from it. The OSV trail will not reopen until the Coastal Ecologist or Brood Monitor determines that it is safe to do so. Monitors will document in the daily report the approximate time that the OSV trail was closed and the duration of the closure. They will carry radios to call for backup when chicks approach the vehicle corridor in order to ensure that traffic is stopped from both directions.

The Compliance and Brood Monitors may be additional staff brought on specifically for HCP implementation, or they may be existing Rangers (see budget below). In either case, the same basic qualifications and training will apply: Compliance and Brood Monitors will have at least a

high school education, be able to safely operate UTV/ATVs, have clear communication skills, and the ability to learn shorebird identification and behavior. They will be trained for at least two weeks before beginning monitoring and compliance duties. Seasonal Shorebird Technicians may assist with implementation of the escort system, but only to the extent that these duties do not distract from fulfillment of the Technicians' primary function, daily monitoring and management of nesting birds, which will not be affected by HCP implementation.

Least terns: Given the locations historically used by nesting least terns on Chappaquiddick, it seems unlikely that we would exercise our Certificate of Inclusion to allow OSV use near chicks as a Covered Activity. Colonies generally occur in portions of the beach already closed to protect piping plovers, obviating the issue of road use near fledglings. In the event of a least tern colony impinging on use of an important road, though, implementation of the plan would follow essentially the same protocol for monitoring chicks and controlling traffic that we propose for piping plovers. Our 24-hour notification to DFW of a proposed implementation of the plan will include an assessment of the number and developmental stage of chicks present at the colony, the configuration of the colony with respect to shorelines and the road being affected, and our proposal for the location of the travel corridor and the size of the associated monitoring staff (which might include multiple Brood Monitors for a large or dispersed tern colony, or in the presence of multiple pre-fledging chicks) that will suffice to safely keep track of the location of the birds.

1.b: Reduced symbolic fencing around nests

At a few points in our beach road and access system, bottlenecks exist at which a closure would shut down access to most or all of the Chappaquiddick barrier beach system. The Dike Bridge gatehouse, roughly in the middle of East/Leland Beach, is one such location. The intersection of the inside and outside roads near the south end of Leland Beach, near the boundary with Wasque Beach, is another. And the access point at the western end of Norton Point beach is a third (piping plover pair number 5 – see figure 3, above – forced a closure of that access point during a short-lived but creative nesting attempt on a recently formed washover area near the gatehouse). Depending on specific seasonal circumstances, there may be other such bottlenecks. Ordinarily, the habitat around these points is not suitable for nesting plovers, making it unlikely that a pair of nesting birds would force a closure. But the occasional pair of plovers shows a regrettable unfamiliarity with proper behavior as defined in published species accounts, nesting in a location with habitat features that are unexpected for this species. It is also possible, given the dynamic nature of the barrier beach system, that beach conditions will change as they did on Norton Point in 2019, creating new patches of typical plover nesting habitat in close proximity to an access point.

In the unlikely event of birds nesting close enough to a key access point so that the normal radius of fencing around the nest would shut off access entirely, we propose to reduce the fenced radius on one side of the nest to the largest dimension that would allow use of the access road while the pair is courting or incubating. Following hatching, the situation would be

managed under the protocol outlined above for Covered Activity 1.A, OSV use in proximity to unfledged chicks. As many as two plover broods could be exposed under this covered activity, though a maximum of two broods in total will be exposed to increased risk as a result of all covered activities.

If territorial behavior, courtship, or nesting activity is observed by beach staff in a location meeting the criteria outlined for this covered activity, symbolic fencing and signage will be put in place immediately following our usual procedures for nesting plovers. Fencing will be erected a minimum of 50 yards from the presumed nest site (the nest itself or the center of courting and scraping activity), except as needed to keep open the affected access corridor. No further reductions in fencing radius will occur. The birds will be monitored at least daily by shorebird monitors, though as a practical matter any pair subject to this covered activity is likely to be in a location that allows for frequent observation by shorebird monitors or rangers throughout the daylight hours. OSV and pedestrian traffic along the access corridor will be discouraged, by signage and verbal instruction from gatehouse staff, from lingering near the fenced area, to reduce stress and disturbance of the birds. If eggs hatch, we will switch immediately to the protocol for covered activity 1.A, described above.

1.c. Reduced proactive symbolic fencing

Given the dynamic nature of barrier beaches and the vagaries of avian behavior, it is possible that we might want to implement this Covered Activity at any of a number of points on the Katama-to-the-Gut beach system during the lifetime of this IAMP. But at the time of preparation of this document, by far the point of greatest concern to us is the OSV and pedestrian access point on the western end of Norton Point, at Katama. Beginning with a series of storms during the winter of 2017-2018, the primary dune on this section was severely eroded by wave action, and a large overwash was created (Figure 4):

As of January 2020, the overwash area was approximately 5,000 m^2 in extent, or about 1.23 acres, and beach sand had covered marsh and marsh-edge vegetation back to within a few feet of the Herring Creek, an artificial stream that flows into the uppermost end of Mattakeset Bay (the western arm of Katama Bay). The high point of the berm where the dune formerly existed was only a meter or so above the average high tide line in elevation, suggesting that additional overwash events were likely to be frequent in coming months, occurring with every moderate wind event or perhaps even just astronomically high tides.

If such a pattern of overwash continues into the breeding season, of course the site will not be suitable for nesting terns or plovers; overwash will obliterate any attempted nests. Birds may still attempt to nest there, however, and if a little sand accretes to raise the berm line, the site could be very attractive as a nesting site. In effect, a patch of potential high-quality nesting habitat has been superimposed right on top of an access trail that has been in use for decades.

Figure 4: Overwash at Norton Point access in October 2018. Note the well-established OSV trail crossing the seaward portion of the overwash.

A pair of plovers nested here in 2019, but in spite of intensive efforts to protect the birds, they abandoned the nest shortly after a full clutch of eggs had been laid. In addition to the risk of overwash, birds attempting to use this site must also contend with human disturbance associated with a major pedestrian access to State Beach to the west, managed for intensive beach recreation through the summer, and with the pedestrian and OSV access point onto Norton Point. In addition to human activity, skunks and raccoons frequent the site, using it to access the beach just as people do and no doubt attracted by the expectation of resources left behind by recreational activity. The Trustees manage this area intensively, but given the volume of recreational uses of various types associated with this access point, we cannot realistically maintain it as nesting habitat that can be expected to work well for the birds.

Accordingly, we believe that reduced use here of proactive symbolic fencing will not just facilitate management – it is probably in the best interest of the birds, reducing the likelihood of nesting in a location where the context makes success improbable. Suitable nesting habitat on the remainder of the roughly 11 miles of beach included in this IAMP will be fenced as usual. In keeping with the two-acre limit on this Covered Activity at any one site, only this location (or, conceivably, only some other point on the beach but not this one) will be managed with reduced proactive fencing in any given season. No beach raking or placing of obstacles is contemplated. The site will be monitored daily by trained shorebird technicians throughout the season, and the site will also benefit from frequent (albeit incidental) monitoring by Rangers (some of whom will be shorebird-trained) and other stewardship staff using the access trail. In

the event of nesting, symbolic fencing will be erected around the nest consistent with the procedures we describe for the Covered Activity “reduced symbolic fencing,” described above.

2. Contingency Plan

Personnel: In the event that the Brood Monitor or Compliance Monitor is unavailable (e.g., calls in sick), the Coastal Ecologist, a Shorebird Monitor, or their designee shall assume this duty. Any such substitute will be fully trained to the standards of regular monitors; if no such staff is available, the OSV corridor will be shut down until the site can be fully staffed.

Inclement weather: The Chappaquiddick Island Stewardship Manager Coastal Ecologist, or their designee, will monitor weather forecasts on a daily basis. In the event that a storm warning is issued by the National Weather Service, or any other weather warning that could jeopardize public safety within a 24-hour period, the self-escort corridor shall be closed for the duration of the hazard or the start time may be moved later or earlier. The self-escort corridor may not reopen until the Martha’s Vineyard , or their designee has given the all clear. It shall be presented in writing prior to purchasing an OSV sticker that all users shall use the beach at their own risk. Exiting escorts will not take place in the event of unpredicted severe weather. Instead, OSV sticker holders shall be informed in writing that a “shelter in place” policy will go into effect until the inclement weather has passed, or scheduled exiting escorts have begun.

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

3. Violations

A zero-tolerance policy will be fully enforced. Monitors and Beach Rangers will be in constant contact to ensure enforcement. Beach Rangers will be authorized to revoke OSV stickers and eject the violators from the beach immediately. Violators of the escort protocols shall be subject to OSV sticker revocation and shall have their rights to operate an OSV on Cape Poge Wildlife Refuge suspended immediately for a period of one year from the date of the violation.

4. Self-Escorting Program Reporting

Chick numbers, chick locations, and travel corridor locations/dimensions shall be provided to the Coastal Ecologist by shorebird monitoring staff daily, prior to commencing self-escort procedures. A map showing the locations shall be posted at Mytoi maintenance shop and Mytoi and Dike Bridge gatehouses and shall be updated daily. As required by the HCP, a daily implementation log will be kept to document staffing, frequency of brood monitoring, and compliance with OSV escorting procedures, and will be made available to DFW upon request.

Any violations, incidents or accidents associated with the vehicle escort program, including take of a chick, shall be immediately reported to DFW and USFWS staff. In the event of an alleged incident related to the escort program, the Coastal Ecologist or their designee, in coordination with a Shorebird Monitor, shall cooperate with and assist Town, State and Federal officials with the investigation of the incident. Depending on the nature of the incident, The Trustees, DFW and USFWS may suspend all vehicle escorts for such time as they deem appropriate.

Every week during which the plan is in effect, a summary report will be submitted to DFW. The report will include: (1) daily vehicle trip count; (2) for each affected brood, daily observations of chick numbers and behavior including a daily sketch map of the observed range of the brood on the beach; (3) weekly tally and description of any rules violations and enforcement actions taken; (4) weekly tally and description of all observations of broods crossing or approaching <100 feet from the vehicle corridor, whether during the OSV travel windows observed during routine monitoring; (5) any other notes, observations, or recommendations relevant to operating the escorting program.

By October 15 of each calendar year, The Trustees will submit an escort monitoring report to DFW describing at minimum, estimated age of chicks in each brood when self-escorting was initiated, fledging success, escorting dates, number of broods, number of chicks present during self-escorting on each date, estimated daily chick survival based on daily brood counts, number of vehicle passages, and any documented “take” of chicks resulting from the vehicle self-escorting program shall be included in this report. The report will also contain recommendations for improving the efficiency and or effectiveness of the escorting program in the future.

Staff will meet weekly to assess effectiveness and go over issues. After any incident a meeting will be held to discuss what happened and how to prevent it. Pair data will be recorded into field notebooks, daily monitoring sheets, nest attempt and fate forms, and census forms.

V. Budget

Cost To Implement HCP First Year

Item	Cost
MESA and CMP application fees (one time fee/3 year COI)	$900
Compliance and Brood Monitors (3 seasonal, shorebird-trained rangers, at $15/hour, 40 hours/wk for 13 weeks)	$23,400
Fringe benefits (13%)	$3,042
Fuel ($2,500), O/H @ 10% ($3,089), Signs ($1,000), Uniforms ($500)	$7,089
Contingency (5%)	$2,266
TOTAL	$36,697

VI. Mitigation Plan

In order to mitigate for piping plover pairs that may be impacted under the HCP, The Trustees will implement a comprehensive predator management plan at Crane Beach, Ipswich, Massachusetts, through contracting with US Department of Agriculture-Wildlife Services (USDA-WS). The same body of work will be used to mitigate for take exposures on Nantucket (one brood). USDA-WS has identified four species of predators impacting the reproductive success of nesting shorebirds at Crane Beach: American crow, common raven, great-horned owl, and Eastern coyote. Each species has been responsible for shorebird predation at various times of the year and requires different management practices.

In 2020, we will use mock piping plover exclosures baited with hard-boiled chicken eggs to detect avian nest predators. Infrared cameras will confirm species uptaking bait eggs. If American crows or common ravens are observed, USDA-WS will replace plain chicken eggs with DRC-1339-laced chicken eggs to reduce or remove individuals that “key in” on piping plover exclosures. Trustees staff on Crane Beach will set up mock exclosures and place plain bait eggs two weeks before UDSA-WS site visits. Three (3) mock exclosures will be placed in similar locations as in 2019. When Trustees staff observes 100% pre-bait uptake, they will contact ASDA staff to conduct a DRC-1339 application. These methods have been quite successful in the past. In 2019, of 33 toxicant eggs deployed this season, 22 were taken by American crows, two by common ravens, and nine were unconsumed and removed by USDA-WS. Crow predation was greatly reduced, and nest success on sections of the beach formerly vulnerable to corvids was good for the remainder of the season.

Great Horned Owl control was conducted throughout 2019 using Forward Looking Infrared (FLIR) and call backs, and one great horned owl was removed. In 2019, probably reflecting the removal in previous seasons of individuals that had acquired plover predation habits, no nest predation was attributed to great horned owl. Owl tracks were seen on occasion, and one day during the season, owl tracks were discovered at nearly every nesting area on the beach front. Great Horned Owl control will be conducted adaptively during 2020-2022, with methods and intensity depending on numbers of individuals suspected to be present and the amount of evidence for predation (or attempted predation) by this species.

If called for by observed circumstances, USDA-WS will use a variety of trapping methods in order to manage and capture great-horned owls (GHOW) on Crane Beach. These traps include Goshawk traps, Bal-Chatri traps, and pole traps. These methods are all non-lethal so that non-target species can be released. WS will release any non-target species of owls or hawks not deemed potential predators of nesting shorebirds. Traps will be set overnight by USDA-WS and monitored every few hours by Trustees staff to ensure the safety of any animal captured. USDA-WS will remain in the area performing other control activities so that they can respond immediately when notified of a capture by Trustees staff. Any GHOWs trapped will either be taken to a licensed rehabilitator and released after the shorebird nesting season, or will be euthanized. Permits issued by the U.S. Fish and Wildlife Service (USFWS) and Massachusetts Department of Fisheries and Wildlife (MDFW) will specify the disposition of captured animals. Traps can be placed prior to the nesting season, March-April, or when there are signs of GHOW depredation.

During the 2019 season coyotes (or coyote sign) were consistently present through the breeding season. while conducting night surveys for GHOW. They responded to electronic distress calls being used during GHOW control. Coyotes were responsible for some depredation, so the WS will continue to use electronic calls to remove coyotes in the nesting areas. WS will use suppressed rifles and/or shotguns with non-toxic shot prior to, and throughout, the nesting season. Coyote removal has proven particularly difficult at Crane Beach due to topography, challenging accessibility to the dunes, and coyote behavior. We keep in mind the possibility that coyotes may be predating or deterring the presence of other potential predators, such as skunks, raccoons, or feral cats. This could mean that the presence of coyotes on the beach produces a net benefit for nesting shorebirds, potentially even if coyotes predate some nests, chicks, or adults. Decisions on how or whether to manage coyotes at Crane will be based on our best assessment of their overall ecological effects. In any event, management of these crafty canids is enormously challenging at this location. Coyotes are extremely light shy at Crane Beach, making it difficult to remove the animals with firearms. When lights are shone on the animals that respond to USDA callbacks, the animals flee quickly. USDA has described that this behavior is less common on other beaches closer to urban settings where coyotes are used to night time lighting.

Based on a scope of work developed by USDA - WS in consultation with Trustees staff, the cost for this comprehensive predator management on Crane Beach is anticipated to be approximately $8500. It will include six months of control which consists of up to twelve (12) control visits. In addition, it is expected Trustees shorebird staff will spend a minimum 60 hours on predator management, costing about $800 (total cost $9300). This plan is expected to benefit an estimated 39 pairs of piping plovers and 146 pairs of least terns based on the five-year (2015-2019) average for this site, resulting in an estimated cost of $228 per piping plover breeding pair to benefit from predator control ($9300/39). The proposed covered activities (OSV use near unfledged chicks and reduced symbolic fencing near nests) require mitigation for 2.5 pairs per exposed brood, resulting in an estimated mitigation cost of $1140 ($228 x 2.5 x 2 broods). The Trustees are committed to implementing the full 2020 Crane Beach predator management plan regardless of whether or not external funding (e.g. a grant) is available to partially fund the work. The Trustees may elect to self-fund more than the minimum required $1140 in order to avoid the need to “true up” mitigation funding the following year in the event that the 2020 Crane

Beach plover population declines below 30 pairs (see Statewide HCP for more information). The Trustees will fund additional predator management as necessary to meet the truing up requirements of the HCP and will continue to fund predator control during the term of the three year COI as necessary to offset exposure of up to six broods (two per year) to the covered activity at an estimated cost of up to $1140 per year (at least 2.5 piping plover breeding pairs to benefit annually per exposure).

Additionally, The Trustees conducts a similar predator program on Martha's Vineyard, and efforts will continue for 2020. These are not considered comprehensive and so do not contribute towards our HCP mitigation efforts, but they do contribute towards successful management of nesting shorebirds. On Martha's Vineyard, American crows and striped skunk are the main predators. The USDA-WS will conduct crow control using methods similar to those used on Crane Beach on Leland, East, and Norton Point Beach. Trustees staff will place box traps and monitor them daily for striped skunk. Captured animals will be euthanized using CO_2 in a chamber. USDA-WS will conduct box trapping when they are on site.

The Trustees will monitor and provide an annual report to MADFW. This report will contain the number of plover broods exposed to covered activities, number of breeding pairs of piping plovers and least terns benefitting from the comprehensive predator management, program reach and effectiveness (e.g. number of warnings, citations, any violations, changes in public attitude), documentation that the selective predator management was implemented (i.e. paid invoices and contractor final report), piping plover and least tern productivity for the site, causes of nest and/or chick loss, and any mitigation credits or deficits that will be carried over into the following season.

Itemization of Costs for Predator Management (Estimated):

Item	Cost
Contract Services (USDA-WS)/per year	$8500