Piping Plover Habitat Conservation Plan (HCP)

Request for Certificate of Inclusion (COI) for Coskata-Coatue Wildlife Refuge, Nantucket

2020

The Trustees of Reservations

200 High Street

Boston, MA 02110

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Figure 1: Coskata-Coatue Wildlife Refuge Trail and Property Boundary Map

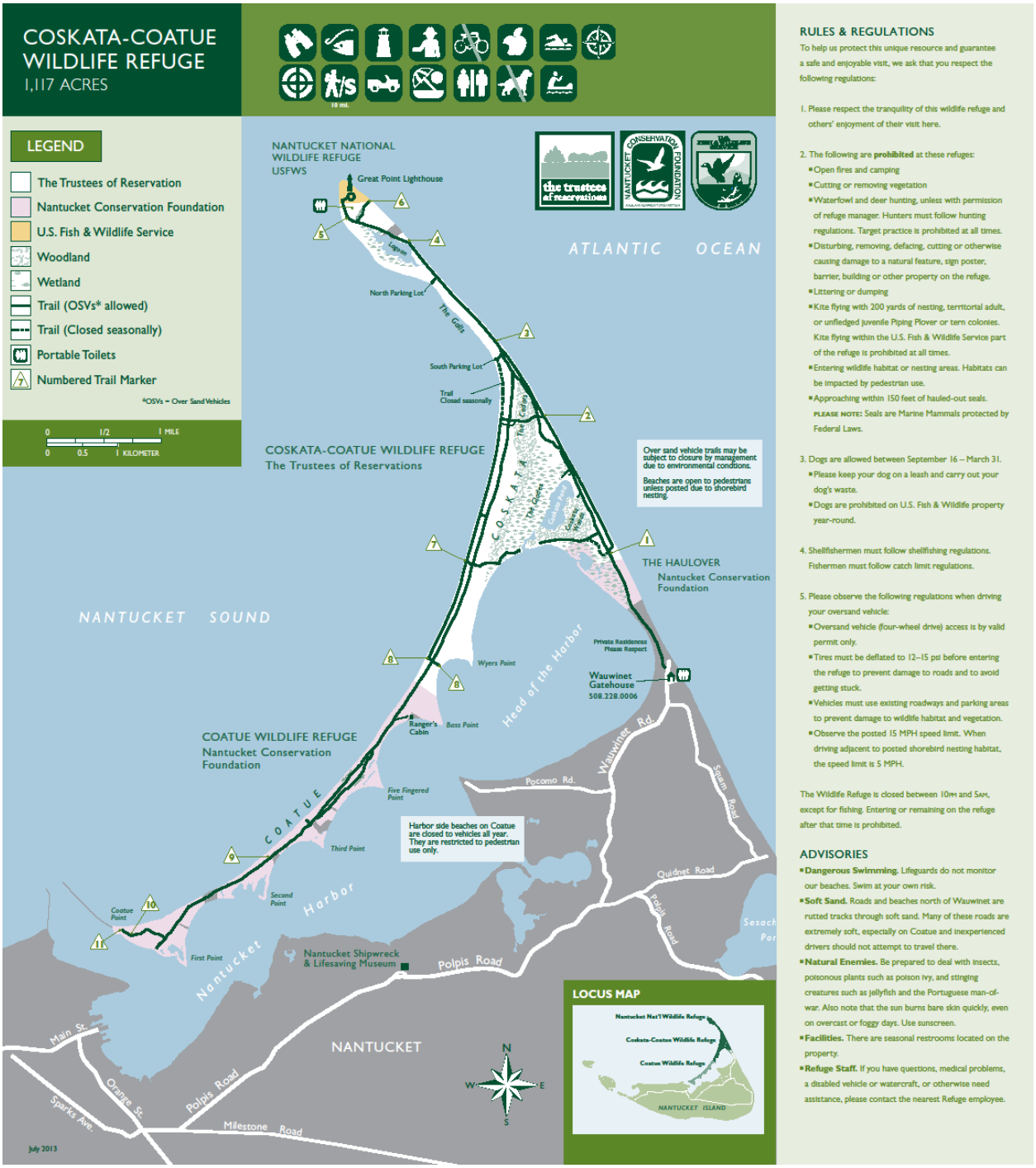

Figure 2: Piping Plover Nest locations in 2019

Figure 3: Detail of Great Point

b. Description of property, habitat, and management

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.

Coskata-Coatue Wildlife Refuge (CCWR) is owned by The Trustees of Reservations. It comprises 1117 acres, including woodlands, salt marshes, dunes, lagoons, and beaches. On the furthest end it borders a parcel owned by the USFWS that contains the Great Point lighthouse. Other parts of CCWR are bordered by Nantucket Conservation Foundation properties (Figure 1). The beach system at CCWR is highly dynamic one, with east-facing shoreline fronting on the open Atlantic Ocean. Even on the slightly more sheltered western side of the refuge, beaches are exposed to winds and waves with a long "fetch" behind them. Changes in the shoreline due to erosion or deposition of sediment are virtually constant, and washover areas or blowouts are a prominent and ever-changing feature of the landscape. The size, excellent condition, and varied habitats of CCWR make the refuge home to an impressive array of wildlife. A number of state-listed plants occur on the refuge, and several species of state-listed birds nest along the shorelines or higher up in the dunes.

The beaches of CCWR, in addition to the obvious ecological value as an expansive, high-quality beach/dune system, represent a heavily used recreational resource. The refuge offers some of the best surf fishing on the East Coast. Adjacent to the northernmost part of the refuge, Great Point Light, owned by the U.S. Fish and Wildlife Service, is a historic and scenic destination for many over-sand vehicle (OSV) visitors. To support this visitation, the Trustees maintain a network of over-sand jeep trails on the refuge. Balancing the needs of the refuge's wildlife with the interests of human visitors to CCWR is a constant management challenge; both values figure prominently in the mission statement of the Trustees.

c. Population and productivity

In 2019, piping plovers successfully nested in three locations on CCWR (Figures 2 and 3): a washover area located along the East Beach, a washover area in the northern end of the Galls, and in the upper beach along the southwestern edge of Great Point. Though the specific locations can be expected to change from year to year, the 2019 plover cohort, despite its small size, illustrated the typical habitats this species may use for nesting at CCWR. In particular, the outer reaches of CCWR, near Great Point, offers resources that appeal to plovers.

The first nest location (PIPL 01) was in a washover break in the dune grass, 54 meters from the mean high tide line. The wash over area extends from the east beach, through the dune, and into the saltmarsh to the west, offering excellent nesting and foraging habitat. While the immediate area around the nest was unvegetated, there was vegetation nearby, including American beach grass, dusty miller, and sea rocket. This vegetation was used frequently as cover for the chicksskirting through the edges of the grass in order to make their way down to the wrack line, rather than cutting straight through the

barren washover. A pair of plovers spent several weeks at this site courting and scraping in 2018, but it was not until 2019 that the habitat was successfully utilized for nesting and hatching chicks.

The section of beach used by the pair of birds at the Galls (PIPL 02) is referred to as the Blowhole: an area where the dune has completely washed away, creating an open, sandy expanse 190 yards long and 85 yards wide. It is exposed to Nantucket Sound to the west and the Atlantic Ocean to the east. This also happens to be where a large tern colony has historically nested, although the habitat was not heavily utilized by terns in 2019. Severe storms this the winter and early spring of 2019 eroded approximately 30 yards of dune on the southern end of the Blowhole while depositing almost 40 yards of sand on the western beach, effectively doubling its width. Despite the widening of the beach, this area remains prone to washover. Fortunately, plover and tern nests were on high enough ground to escape the several overwash events that occurred this season. The exposed nature of the site made for a challenging incubation and early chick-rearing period. Sparse vegetation provided very little cover for adults and young chicks. During the heat of the day or inclement weather, adults and chicks could be seen taking refuge against pieces of debris or piles of seaweed. Once the chicks grew more mobile, the adults moved the brood to the more heavily vegetated southern end of the Blowhole. The Blowhole was an extremely active site in 2019, also featuring a small tern colony, tern staging later in the season, and intensive hunting by northern harrier and a lingering snowy owl.

The third nest (PIPL 03) was located just north of an area locally referred to as the "North Parking Lot." This area consists of wide, unvegetated beach. Despite the lack of vegetation, the beach cover consisted of lots of cobble, which worked surprisingly well for keeping plovers conealed. The nest was located 35 meters from the mean high tide line. Throughout several spring tide events, water washed over significantly into the upper beach, but at its highest came no closer than approximately 15 meters from the nest. A large gull colony was established nearby, consisting mainly of herring gulls but also frequently utilized by great black-backed gulls. A tendency for seal carcasses to wash up along this western stretch of beach was also likely another draw for predators such as gulls and crows. Northern harriers nested high up into the dune almost adjacent to the nest and did most of their hunting in this area. The lack of vegetation and far distance from the nest to the wrack and water line likely made this pair's chicks extremely vulnerable to predation.

And in general, it appears to be chick predation rather than egg predation that limits plover productivity at CCWR. All three 2019 nests hatched a full set of four chicks, but of these 12 chicks, only two from the pair nesting at the Galls (PIPL 02) successfully fledged. Avian predators are though to pose the greatest risk; gulls are plentiful on the property, and the entire refuge is easily accessible to crows. In an interesting conflict of conservation priorities, northern harriers, listed as "Threatened" in Massachusetts, were believed to have eaten the two chicks from PIPL 02 that failed to survive.

Table 1: Historical plover numbers and productivity

Historical Plover Averages	# of Pairs	# of Fledglings	Productivity
5 Year Avg 2014-2018	4	1	.25
10 Year Avg 2009-2018	6	5	.83

15 Year Avg 2004-2018	**5**	**5**	**1.0**

Given that CCWR supports only a relatively small sample size of plovers, it is to be expected that annual results would show some dramatic swings, and we would caution against reading too much into any set of census data or productivity results. But comparing -5-year, 10-year, and 15-year productivity (Table 1) suggests a fairly constant population size with productivity dragged downward by some difficult recent years.

d. Terns

Numbers of breeding terns at CCWR but tend to be rather low (Table 2). The high density of avian predators on the refuge may deter terns, which may also be attracted to other, nearby locations that offer less human activity and sometimes better physical conditions (e.g., Tuckernuck or Muskeget Islands or associated, temporarily exposed sandbars). 2019 marked only the second year since 2013 that terns nested on CCWR. A small least tern colony was established at the Blowhole, a marked difference from the large colony that nested there in 2018. At the beginning of May 2019, a large colony was present and beginning to court and scrape. However, after several carcasses were found that appeared to have been predated by a peregrine falcon, the terns all but disappeared. They were not seen again in significant numbers until July 12th.

Table 2: Historical least tern population

Historical Tern Averages	# of Pairs
5 Year Avg 2014-2018	**28**
10 Year Avg 2009-2018	**25**
15 Year Avg 2004-2018	**56**

The first 2019 least tern chicks were spotted on July 18. A count revealed anywhere from 50-75 staging (nonbreeding or post-breeding) least terns, with at least seven nesting pairs. Overall productivity was extremely poor for this colony, with both egg and chick predation evidently taking a toll. The highest number of chicks counted at one time was four, with the chicks appearing anywhere from several days to one week old. However, none of the chicks made it to fledging age. No common terns nested within the least tern colony this year, unlike 2018. The massive failure of this year's terns can likely be attributed to poor timing. Courtship began unusually late this year in comparison to previous years, and as the weeks progressed from the appearance of chicks, more and more least terns left the colony to migrate or move to another staging area. Eventually the colony shrank down to one bird, apparently without a mate, with two chicks that hatched on August 12, and one incubating bird. Common and least terns were staging nearby but offered little help in driving away predators. The single tern with two chicks was observed leaving the nest up to several times an hour to drive away gulls that were passing through nearby. Without the protection of the colony, it is likely that the remaining two chicks perished due to predation. The final nest being incubated never hatched.

Figure 4: Tern colony location at the Blowhole, 2019

It is worth noting that older least tern chicks and fledglings tended to gravitate to the western Sound side beach as opposed to the eastern Atlantic facing beach. This tendency brought them away from the main OSV corridor. As is typically the case, suitable tern nesting habitat overlapped habitat that had been fenced off for piping plovers, so no additional measures were needed to accommodate the terns.

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 (Martha's Vineyard) but also serves as a resource for beach management on Nantucket. Has been a beach manager since 1988, overseeing 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.

Diane Lang, Stewardship Manager:

Responsible for administering the management plan for the wildlife refuge, including shorebird management. Responsible for enforcing refuge regulations and educating the public about these regulations. Worked in beach management from 2007 through 2019; 14 years of experience managing Trustees properties, 8 years of experience at OSV management, and 6 years of experience at shorebird management. Originally trained at shorebird management by Massachusetts Audubon in 2005.

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 Technician

A seasonal Shorebird Technician is hired by May 1 for a 17-week term at 40 hours per week. He or she is 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. The Shorebird Technician is trained by the Coastal Ecologist and Nantucket Superintendent.

Rangers

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

III. Beach Management

The Trustees manage beaches and over-sand vehicle (OSV) recreation using a management plan which adheres to the Massachusetts Division of Fisheries and 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).

A. Beach operations

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 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, 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. Birdwatching 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 Refuge Management

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

iv. Rules and Regulations

- Camping is not allowed
- Open fires are not allowed
- Fireworks are prohibited
- Use of firearms is prohibited except during hunting season
- Dogs are prohibited from April 1 to September 15
- 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 Nantucket Police Department and the Massachusetts Environmental Police. Rangers patrol assigned areas approximately once per hour. Areas which require more frequent patrol (areas with higher visitation) have a stationary Ranger assigned.

Keith Robinson 508-257-6932, Massachusetts Environmental Police

Brian Willard, USFWS Federal Wildlife Officer

Nantucket Police 508-228-1212

vi. Other operations (e.g. fireworks, public events)

At present, one semi-public event, Great Point Circle celebration, is held on the property at the end of August, after the most active part of the nesting season. No fireworks are allowed on the property. Tours of the refuge are given twice daily throughout the nesting season using a 4WD van before chicks hatch and in areas not subject to shorebird closures.

vii.a. Plover monitoring and management

1. 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. One Shorebird Technician is hired for a 17-week period by May 1 and works five days a week for 40 hours. A trained Ranger or the Nantucket Stewardship Manager fills in on the Shorebird Monitor's days off. The Shorebird Technician is in charge of locating and recording 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, and nest attempt and nest failure forms. 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. They will be 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 Nantucket Stewardship Manager. The Nantucket Stewardship Manager, in consultation with the Coastal Ecologist, will oversee the Shorebird Management Program.

2. Other management

We take several measures to protect rare plants at Coskata-Coatue. Often, protection consists of prohibition of access to the area around known populations. Experimental introduced populations of seabeach amaranth, for example, are kept off-limits to the general public by fencing, signage, and close monitoring. More generally, impacts to known or unknown populations of rare plants are reduced by careful maintenance of vehicle corridors. Well-established roads, constrained either by fencing or woody vegetation, keep vehicles or pedestrians from disturbing eastern prickly pear plants in the Cedars, for example. Shorebird technicians are trained in how to notice and identify listed plant species, and when populations are already known or newly discovered, they are roped off with symbolic fencing to prevent trampling. Often, rare plants occur in the same areas shorebirds use for nesting, so fencing often serves two purpose.

Nest exclosures for protection against predation will be used when suitable and in consultation with MNHESP.

3. Monitoring

One Shorebird Technician or comparably qualified staff member is 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

Nantucket Superintendent
Trained in shorebird monitoring and management.

Coastal Ecologist
Extensive experience with bird studies and program management. Trained at shorebird management.

Shorebird Technician has at least a high school degree and is working towards a degree in biology or natural resources-related field. Trained to identify shorebirds and their behaviors.

vii.b. Tern management

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. The Trustees properties include 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.

The Trustees will obtain a valid Order of Conditions from the Town of Nantucket for OSV use on CCWR prior to implementation of this plan. We are currently developing a uniform internal policy on beach management and OSV use, and this policy will significantly influence the specifics of the Notice of Intent we submit.

IV. Covered Activities

1.A. OSV use in vicinity of unfledged chicks

This will impact a maximum of one brood. Since the small population size at this location limits increased risk under the HCP to a maximum of only one pair, this Covered Activity will be implemented only if neither of the other Covered Activities included in this IAMP have not be used earlier in the season. When the Nantucket Stewardship Manager identifies the brood to be exposed, 24-hour advance notice will be provided to DFW before initiating the covered activity.

The travel corridor will be on the ocean side of the beach, no greater than 5 yards wide and delineated with highly visible markers. There will be no parking or stopping along the self escort 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 will be either self-guided, with a passenger in front of every vehicle, or in caravans guided by a shorebird-trained ranger either on foot or on an open ATV, depending on the specific situation. For self-escort, each vehicle must have at least one passenger 16 years of age or older able to walk approximately 15 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 if a Brood or Compliance 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., queue up) in the travel corridor before the 200 (600 foot) meter self-escort zone until chicks have moved at least 50 feet away as confirmed by the Brood Monitor.

There will be a qualified Brood Monitor continuously keeping track of the pair and the chicks during the entire travel period. At least one half-hour before 1000, the Brood 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 Nantucket Stewardship Manager. 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 Nantucket Superintendent for confirmation to open the trail. Monitors will be given lunch and breaks as required by law and will be relieved by other appropriately trained Rangers 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, if any, 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 (including but not limited to restrictions on parking within 200 meters [600 feet] of unfledged chicks; some exceptions apply, see Guidelines).

Simultaneously, a Compliance Monitor will be located along the self escort corridor so that they 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 Nantucket Stewardship Manager, Compliance Monitors, and Brood Monitors will have the independent authority to temporarily close the trail 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 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 Nantucket Stewardship Manager 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.

All OSV operators wishing to participate will receive an OSV self-escort training and demonstrate their understanding of procedures by passing a DFW-approved test. They will be required to carry with them in the vehicle signed proof that they have read and understand the rules and procedures. Tire ruts will be smoothed out after each period of travel until the chicks reach 14 days old. This will be done on foot with rakes or with ATV and appropriate attachment.

The Compliance and Brood Monitors may be either Rangers who have received special training or short-term staff trained in advance and brought on explicitly for implementation of this plan. In any event, they will be distinct from the Nantucket Shorebird Technician(s), with the latter continuing to conduct routine monitoring of plovers, terns, and oystercatchers. 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.

Least terns: In many cases, tern colonies would likely be established in portions of the beach already closed, either proactively or in response to nests, to protect piping plovers, obviating the issue of road use near fledglings. But the layout of jeep roads in the context of suitable tern nesting habitat makes it possible that at a location such as the Blowhole, where terns have nested in each of several recent years, a tern colony would impact road usage even in the absence of plovers. In the event of a least tern colony impinging on use of an important road, 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 age (to the

extent that age can be generalized) 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 the CCWR beach road and access system, bottlenecks exist at which an access restriction could shut down access to most or all of the barrier beach system. In most cases, the habitat at these particular points is not typical preferred nesting habitat for plovers, and hence it would not be proactively fenced. In the event of birds nesting in a spot not normally fenced as potential habitat and 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 nesting 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. One plover brood could be exposed under this covered activity in any given season. Since a maximum of one brood in total may be exposed to increased risk as a result of all covered activities on this property, the decision to implement Reduced Symbolic Fencing will preclude use of other Covered Activities during that season.

If territorial behavior, courtship, or nesting activity is observed by beach staff in a location meeting the criteria described above, additional 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

At present, we have no specific locations in mind at Coskata-Coatue where we contemplate implementing this covered activity. We include it in this IAMP simply for completeness and to allow for flexibility in the event of unforeseen changes in beach configuration during the lifespan of our anticipated Certificate of Inclusion. The number of piping plover pairs at Coskata-Coatue is generally low enough so that we would be reticent to take any measure that would discourage nesting. And the number of prime breeding sites used consistently over recent years

is small enough so that, again, we are unlikely want to take any action that would reduce the attractiveness or suitability of any of those sites. But given a dynamic system like this one, it is possible to imagine a situation emerging in which a small piece of appealing nesting habitat overlapped with a critical trail junction, threatening access to a large portion of the beach system. And if the context of such a site – e.g., high levels of human disturbance over which we had limited control – dramatically reduced the likelihood of successful nesting, it might serve the best interests of the birds and the beachgoing public alike if a limited area were not proactively protected as breeding habitat.

Only one site would be considered for Reduced Proactive Symbolic Fencing in a given season. Given the small size of areas that would be managed this way, only one pair of plovers could be considered to be displaced from its preferred nesting site by this Covered Activity. In seasons during which this Covered Activity is implemented, we will forgo implementation of other Covered Activities later in the same season, since those activities would increase the risk of "take" to more than allowed number of pairs.

By the definition of this Covered Activity, we would identify such a site early in the season, before birds would be present, delineate the area proposed for this management, and determine its area. An estimate of available nesting habitat on the property will be prepared, using the most recent available aerial photos combined with ground-truthing, to ensure that the are managed under this covered activity remains below the "10% of habitat/2 acres, whichever is less" specified in the HCP. (Given the unpredictable, energetic nature of erosion and overwash at Coskata-Coatue, and the uncertain time before any use of this Covered Activity might occur, we don't think there is any point to including an estimate of suitable habitat on the property with this application. The actual figure could be dramatically different at the time of implementation. And perhaps even more than at some other sites, plovers at Coskata-Coatue often have creative ideas about what is truly "suitable habitat.") To ensure that risks from this Covered Activity are appropriately limited, we will consult with NHESP before finalizing the decision to forego symbolic fencing, sharing our estimate of overall habitat area and our rationale for handling the particular site in this manner.

Implementation of this covered activity, once both The Trustees and NHESP are satisfied with the plan, is of course simple: when potential breeding habitat is fenced off in early spring, the selected site will be left unfenced. It will be monitored at least once a day throughout the season by a shorebird technician or shorebird-trained stewardship staffer (*ad hoc* observations of the site are likely to occur much more frequently). If an independent-minded pair of plovers elects to nest on the site despite the absence of fencing, the pair will be managed under the procedures for the Covered Activity "Reduced Symbolic Fencing" outlined above.

Contingency Plan

Personnel: In the event that the Brood Monitor or Compliance Monitor is unavailable (e.g., calls in sick), the Nantucket Stewardship Manager or her fully qualified designee shall assume this

duty. If a full roster of implementation staff is not available, use of the OSV corridor will be suspended until full staffing is once again possible.

Inclement weather: The Nantucket Stewardship Manager will monitor weather forecasts on a daily basis. In the event that a storm warning is predicted by the National Weather Service, or any other weather warning that could jeopardize public safety within a 24-hour period, the self-escort corridor shall be closed for the duration of the hazard, or the start and/or end time for passage on the corridor may be changed. The self-escort corridor may not reopen until the Nantucket Stewardship Manager has given the all clear. It shall be presented in writing prior to purchasing an OSV sticker that all users shall use the beach at their own risk. Exiting escorts will not take place due to unpredicted weather. OSV sticker holders shall be informed in writing that a "shelter in place" policy will go into effect until the inclement weather has passed, or scheduled exiting escorts have begun.

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

3. Violations: Any violations of the aforementioned protocol will not be tolerated. 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 Coskata-Coatue 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 Nantucket Superintendent by the shorebird monitor daily, prior to commencing self-escort procedures. A map showing the locations shall be posted at Coskata-Coatue Wildlife Refuge gatehouse 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(s) shall be immediately reported to DFW and USFWS staff. In the event of an alleged incident related to the escort program, the Nantucket Superintendent, Southeast Ecology Assistant, 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 reserve the right to suspend all vehicle escorts for such time as they deem appropriate.

Every week, 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; *both during the OSV travel windows and any other such observations* 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. Compliance and Brood Monitors will be in addition to current staff.

V. Budget

Cost To Implement HCP First Year

Item	Cost
MESA CMP application fees (one time fee/3 year COI)	$900
Compliance and Brood Monitors (3 Seasonal Ranger hires 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	$36,679

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). 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. The same body of work will be used to mitigate both take exposures on Nantucket (one pair) and on Martha's Vineyard (two pairs).

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.

7. Itemization of Costs for Predator Management

Cost of Crane Beach, Ipswich, MA Comprehensive Predator Management Plan

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