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Summary of Natural Resources and Rare Species Habitat Assessments

Provincetown Municipal Airport
Provincetown, Massachusetts

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1. INTRODUCTION

The Provincetown Airport Commission recently filed an Environmental Notification Form (ENF; EOEA No. 13789) under the *Massachusetts Environmental Policy Act* (M.G.L. c. 30 §§ 61 through 62H, inclusive, or MEPA). The ENF was based on the Provincetown Municipal Airport (Airport) 2005 Master Plan, the preparation of which is the initial step toward developing a Capital Improvement Project (CIP) program for the Airport facilities.

An integral component of this planning process involves identifying the existing conditions and facility needs, while also identifying various alternatives for meeting those needs. The various improvement projects, as well as alternative project footprints, were outlined in the ENF. Data provided on existing conditions in support of the ENF were based upon initial field surveys performed in 2004 and 2005 in the areas immediately surrounding the Airport facilities, and supplemented with available Massachusetts Department of Environmental Protection (DEP) wetlands data from MassGIS. The initial field surveys were reported in two documents prepared by the Horsley Witten Group, Inc. (HW) in support of the Master Plan: *Wetland Resource Area Report* (October 2005) and *Wildlife Habitat and Rare Species Report* (December 2005). The Certificate of the Secretary of the Executive Office of Environmental Affairs (EOEA) on the ENF (May 26, 2006) specifically requested that the Airport definitively quantify the potential impacts on wetlands, wildlife habitat, and rare species habitat for each of the proposed projects and the alternative footprints, thus necessitating additional field surveys. As a result, additional habitat surveys and wetland delineations were completed in 2006 to support the pending (DEIR).

Wetland resource areas, including isolated and bordering vegetated wetlands that are protected and regulated under the *Massachusetts Wetlands Protection Act* (M.G.L. Ch. 131 § 40), its implementing Regulations (310 CMR 10.00), the Federal *Clean Water Act* (33 U.S.C. 1251, *et seq.*), the Town of Provincetown *Wetlands Protection Bylaw* (Chapter 12 of the Provincetown General Bylaws), and/or the Cape Cod Commission (CCC) Regional Policy Plan (RPP), were reviewed and approved by the Provincetown Conservation Commission under an Order of Resource Area Delineation (“Order”) issued January 25, 2007. Figure 1 depicts the approved wetland areas. A summary of the wetland resource areas is provided as a separate document entitled *Summary of Wetland Resource Areas* (HW, April 2007).

According to the 2006 *Massachusetts Natural Heritage Atlas* (12th Edition), the entire Airport lease area is located within both *Priority Habitat of Rare Species* (PH 1232) and *Estimated Habitat of Rare Wildlife and Certified Vernal Pools* (EH 821) as designated by the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP). As shown in Figure 2, these designated habitats extend well beyond the Airport lease area, including most of Provincetown, and extending throughout Cape Cod and southeastern Massachusetts. Correspondence from NHESP, included in the Appendix, indicates that the Airport property is mapped for four State-listed rare species: Eastern Box Turtle, Eastern Spadefoot, Vesper Sparrow, and Broom Crowberry. NHESP had recommended that rare wildlife and plant surveys be conducted to assess the existing habitats for these species for use in future site planning and to address the Massachusetts *Endangered Species Act* (M.G.L. Ch. 131A) or MESA. Species-specific surveys were conducted in 2005 in accordance with the

protocols established through NHESP (The protocols are provided in the Appendices to this report).

Additional regulatory review relating to the implementation of future projects identified in the ENF will likely include review by NHESP under a MESA Project Review, review by the CCC under its Development of Regional Impact (DRI) review process, and permitting through the Town of Provincetown under local bylaws. These regulatory agencies have specific requirements for evaluating wildlife habitat and/or rare species habitat. HW has prepared this Summary of Natural Resources and Rare Species Habitat Assessments report to supplement and expand upon the earlier *Wildlife Habitat and Rare Species Report* (December 2005) which was prepared to support the 2005 Master Plan and the ENF.

This report provides a description of the natural resources habitats with specific emphasis on the areas where alternatives for Airport facility improvements are being considered. Included within this report are a general description of the Airport property, its general habitat characteristics, a discussion of field methodologies and the results of the wildlife habitat assessments conducted between 2004 and 2006, and further discussion on habitats for rare species. Information within this report is intended to provide a thorough overview of the natural resources and wildlife habitats at the Airport in addition to addressing comments submitted by various agencies in response to the ENF.

2. GENERAL HABITAT CHARACTERISTICS

The Airport lease area occupies approximately 322 acres of land situated within the bounds of the Cape Cod National Seashore (CCNS) at the northern tip of Cape Cod. The Airport lease area consists of developed areas maintained for Airport facilities and operations, as well as undeveloped areas. The undeveloped areas contain diverse wetland and upland habitats, including salt marsh, freshwater wetlands, forested areas, a system of coastal dunes, and open grasslands; portions of the grasslands are managed as part of the airfield. These diverse areas provide a variety of habitats for the local wildlife.

To support the preparation of the ENF and future EIR documents, the habitat assessments focused on the areas where the CIP projects described in the ENF and their identified alternatives would occur. Areas along the taxiway, runway, and approach areas include vegetative communities that are mowed to maintain aviation safety zones and navigational surfaces. Beyond these areas, the vegetative communities are largely undisturbed and uninterrupted, but for a portion of the CCNS bike path that traverses the southeastern corner of the Airport lease area.

Vegetative communities and habitats at the Airport are described in this report based upon the classification system described in the *Classification of the Natural Communities of Massachusetts* (Swain and Kearsley, 2001; hereinafter referred to as “the *Classification*”). The dominant types of vegetative communities encountered at the Airport include Cultural Grassland, Maritime Dune Community, Coastal Interdunal Marsh/Swale with developing areas of Sandplain Grassland and/or Sandplain Heathland, and Estuarine Intertidal Salt Marsh. Descriptions of

these habitat communities and our general observations within each community type are provided below. Additional information regarding the soils classification and geologic characteristics may be found in the *Summary of Wetland Resource Areas* (HW, April 2007), included as a separate document within the DEIR Appendices.

2.1 Cultural Grassland

According to the *Classification*, the Cultural Grassland community is “*a human-created and maintained open community dominated by grasses, normally maintained by mowing.*” This community often occurs at airfields and is “*a grassland community that generally occurs on sand or other droughty, low-nutrient soils.*” In general, the unpaved areas at the Airport that are maintained by mowing or selective cutting for aviation operations are Cultural Grasslands, which may also contain areas of developing Sandplain Grassland and/or Sandplain Heathland (descriptions provided below), and or developing dunes. These areas are immediately adjacent to the Airport runway, the partial parallel TW, and along both sides of the west end entrance taxiway and mid-entrance taxiway that are maintained to provide Airport safety. Cultural Grassland areas at the Airport vary in width from approximately 20-25 feet along either side of the mid-entrance taxiway, to nearly 400 feet wide in the southwestern corner of the airfield between the Runway 7 end and the Glideslope Antenna, as well as southeast of the Runway 25 end. The vegetative community observed in areas of Cultural Grassland is dominated by grass species and various herbaceous species that are mowed an average of three to four times annually.

2.1.1 Sandplain Grassland

Sandplain Grasslands are open communities dominated by grasses with some herbaceous species and small shrubs. According to the *Classification*, this community occurs on “*flat outwash plains with droughty, low nutrient soils. Most occurrences are near the ocean and within the influence of winds and salt spray of storms.*” This habitat type is maintained by fire, salt spray, and mowing. Associated plant species include grasses with patches of shrubs. This vegetative community has great overlap with species found in Sandplain Heathlands (below), but with a greater diversity of vascular plant species. Approximately 29 hectares (72 acres) of the land in proximity of the Airport [not necessarily corresponding to the Airport lease area] are considered grasslands and/or heathlands (Kearney and Cook, 2001).

2.1.2 Sandplain Heathland

The Sandplain Heathland community is described as an “*open, shrub dominated primarily coastal community, sharing many species with Sandplain Grasslands. Heathlands often have sparse clumps of plants with bare soil or lichen cover between the vascular plants.*” This plant community type occurs in poor nutrient, acidic soils, dominated by low-growing woody vegetation. This vegetation includes scrub oak (*Quercus ilicifolia*), black huckleberry (*Gaylussacia baccata*), bearberry (*Arctostaphylos uva-ursi*), and lowbush blueberry (*Vaccinium angustifolium*), with much overlap in species diversity as within Sandplain Grasslands.

2.2 Maritime Dune Community

According to the *Classification*, a Maritime Dune community is “*the classic community of sand dunes, with patches of herbaceous plants interspersed with areas of bare sand and shrubs.*” This community type “*occurs on windswept dunes, within the salt spray zone, often landward of the Beach Strand Community and grading into shrubland or woodlands on the more sheltered back dunes.*” The vegetative composition and structure of the vegetation depends on the dune stability. The Maritime Dune Community observed along the Airport lease line to the north and northwest of the Airport facilities occurs within the boundaries of the Race Point barrier beach system, consisting of both primary and secondary dune habitats, although there are no primary dunes located within the Airport lease area. These dunes are generally vegetated with American beachgrass (*Ammophila breviligulata*) and common hairgrass (*Deschampsia flexuosa*) in open exposed areas. Plant diversity increases on the leeward side of these dunes, where HW field biologists observed open clumps and patches of golden heather (*Hudsonia ericoides*), poison ivy (*Toxicodendron radicans*), beach plum (*Prunus maritima*), and bayberry (*Myrica pensylvanica*). HW observed that frequently, seaward-facing slopes were completely devoid of vegetation. Topography among these dunes varies widely from nearly flat to steeply sloping (e.g., 1:1 slopes or steeper).

The coastal dune habitats located to the southeast of the Airport are secondary coastal dune habitats that are not within the barrier beach system. While the topography among these secondary dunes is equally varied, the more stable substrate of these areas supports a greater diversity of vegetative species, particularly trees and shrubs. It is in these areas that communities of Maritime Pitch Pine on Dunes and Maritime Shrubland occur to varying degrees. These communities share similar characteristics in terms of the vegetative species composition of other communities, including Pitch Pine (Scrub Oak, Pitch Pine), Oak Forest/Woodland, and Coastal Forest/Woodland communities as described in the *Classification*.

2.3 Coastal Interdunal Marsh/Swale

Among the interdunal swales, sheltered from shifting sands, HW observed various types of freshwater wetland communities. The Coastal Interdunal Marsh/Swale community type appears to be one of the predominant, if not the predominant, type of wetland habitat existing at the site. According to the *Classification*, this community type is a “*graminoid-[grasses or grass-like species such as sedges or rushes] or shrub-dominant coastal community occurring in shallow basins (swales) between sand dunes.*” With respect to environmental setting, “*Interdunal swales are low, shallow depressions that form between sand dunes along the coast. They occur as part of a dune system, and the best examples are complexes of numerous swales. Soils generally have a thin, about one centimeter [0.4 inch], organic layer over coarse sand. The water regime ranges from seasonally flooded to permanently inundated.*” The interdunal swales observed at the Airport range from sparsely vegetated seasonally flooded pools to graminoid or shrub dominated communities to forested communities.

Within this Coastal Interdunal Marsh/Swale community type, HW generally encountered three basic variations: a graminoid-dominated palustrine emergent marsh (PEM), a shrub-dominated

palustrine shrub swamp (PSS), and a palustrine forested swamp (PFO). Emergent marshes and shrub swamps were generally encountered north of the Airport facilities and in low-lying areas to the immediate south and west of the runway, where the wetlands are either connected to the Hatches Harbor wetland system, or else are part of the Airport-managed areas. Dominant vegetation within the emergent marshes includes woolgrass (*Scirpus cyperinus*), twig rush (*Cladium mariscoides*), black grass (*Juncus gerardii*), and soft rush (*Juncus effusus*).

Vegetation encountered within shrub swamp communities included bayberry, willow (*Salix* spp.), winterberry (*Ilex verticillata*), arrowwood (*Viburnum dentatum*), shadbush (*Amelanchier canadensis*), Virginia rose (*Rosa virginiana*), and poison ivy, with a diversity of herbaceous species including Joe-Pye weed (*Eupatorium* spp.), various goldenrods (*Solidago* spp.), various asters (*Aster* spp.), and various ferns. In more inland areas, there are large patches of American cranberry (*Vaccinium macrocarpon*), interspersed with clumps of woolgrass, ferns, and sphagnum moss (*Sphagnum* spp.) among dense clumps and patches of highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), and dwarf huckleberry (*Gaylussacia dumosa*).

Forested wetlands (PFO) are located primarily to the south of the Airport runway beyond the managed areas. HW considered all areas conforming to a pitch pine (*Pinus rigida*), cranberry, and highbush blueberry-dominant, forested wetland habitat type (also referred to here as “cranberry-pine swales”) to be a local variant of the shrub-dominant Coastal Interdunal Marsh/Swale. Pitch pine appears to have become well adapted to seasonally wet conditions, and was considered to be a local wetland-indicator species.

The freshwater wetland communities within the Airport lease area are generally either Bordering Vegetated Wetland (BVW), isolated freshwater wetlands (PFO/PSS), or Coastal Interdunal Marsh/Swales.

2.4 Estuarine Intertidal Salt Marsh

The extreme western end of the Airport lease area extends into the Hatches Harbor salt marsh system, classified as an Estuarine Intertidal Salt Marsh community by Swain and Kearsley (2001). Generally dominated by graminoid species, such as smooth cordgrass (*Spartina alterniflora*) and saltmarsh cordgrass (*Spartina patens*) with occasional shrub species observed along its upper reaches, salt marshes are well known as a productive ecosystem that “provide[s] habitat for various species of wildlife – including migrating and overwintering waterfowl and shorebirds and the young of many species of marine organisms.”

The Hatches Harbor salt marsh system represents an area of former salt marsh that had developed brackish to freshwater characteristics over time due to the construction of the Hatches Harbor dike in 1930. The dike was constructed in an attempt to eradicate the problem of a flourishing mosquito population. However, the resultant near monoculture of common reed, and the severe reduction of wildlife habitat values prompted the Hatches Harbor Salt Marsh Restoration Project, initiated by National Park Service (NPS) in 1998. Subsequent improvements to the tidal flushing in this area have begun to restore brackish and freshwater

wetlands to salt marsh that is contiguous with undisturbed salt marsh areas located seaward of the dike. The resultant community along the upper reaches of this salt marsh is somewhat brackish, and has yet to take on the full distinctions of a salt marsh community.

The *Summary of Wetland Resource Areas* report (HW, April 2007) discusses in detail each of the wetland resource areas delineated and approved under the Order. A copy of the Order and *Wetland Resource Area Map* (December 2006), are provided in the DEIR Appendix.

3. METHODOLOGY AND APPROACH

3.1 Initial Site Assessments

During the initial assessment period, HW field biologists observed site conditions at the Airport between August 2004, and September 2005, to describe site characteristics related to previously documented and potential use of the various habitats by local wildlife. Fieldwork included the assessment of habitats of locally common plant and animal species, as well as habitats of certain State-listed rare species. A combination of meander surveys and linear walking surveys were performed during the assessment period for the purposes of:

- describing the areas in the vicinity of the Airport;
- documenting wildlife species utilization and the habitats in which these species, both resident and migratory, were observed; and
- identifying structural landscape or other features observed within the wetland resources and adjacent upland resources that are or are likely important to individual species or groups of species.

Initial field investigations focused upon the areas immediately surrounding the airport facilities where any future projects identified under the Airport Master Plan planning process would likely occur. Field biologists visited the site on 14 different dates during the initial assessment period. Fieldwork performed in 2004 was completed in conjunction with initial wetland resource area delineations immediately around the Airport facilities, while the majority of the wildlife surveys (both species-specific and general wildlife inventories) were performed in 2005. Most site visits involved two field biologists observing site conditions over a six- to ten-hour period. Several surveys began at dawn while other surveys began later in the day and extended past dusk. Meander surveys were performed within and along the margins of the various vegetative communities for the purpose of observing and documenting habitat features in accordance with accepted natural resource inventory guidelines. HW recorded all field observations and took numerous photographs documenting the occurrence of various site features and habitat types.

3.2 Rare Species Habitat Survey Methodologies

Previous wildlife studies conducted by others identified the presence of three State-listed species within the airport property: Eastern Spadefoot (*Scaphiopus h. holbrookii*), Northern Harrier (*Circus cyaneus*), and Broom Crowberry (*Corema conradii*) (Fugro/ENSR, 1993). In previous reports describing the habitat characteristics at the Airport, it had been noted that the Piping

Plover (*Charadrius melodus*), a State- and Federally-listed Threatened shorebird, nests and breeds in the “immediate vicinity” of the Airport. Based upon an understanding of the habitat requirements of this species, this would likely occur primarily within the dunes north of the Airport along the CCNS shoreline, and outside of the Airport lease area.

HW contacted NHESP in May 2004 to determine whether their database of State-listed species for this area had been updated since the early 1990s. The most current NHESP database identifies four “*protected rare species that have been found in the vicinity of the [Airport] site*”:

- Eastern Box Turtle (*Terrapene c. carolina*);
- Eastern Spadefoot (*Scaphiopus h. holbrookii*);
- Vesper Sparrow (*Pooecetes gramineus*); and
- Broom Crowberry (*Corema conradii*).

In their correspondence, NHESP recommended that rare wildlife and plant surveys be conducted in accordance with scientifically accepted survey methodologies for each of the four species. Survey protocol methods were developed by HW and approved by NHESP prior to commencement of the habitat surveys. Rare species habitat surveys were conducted in accordance with the approved survey protocols for each of the four State-listed species identified. Copies of the written correspondence with NHESP and the approved protocols are included within the Appendix. Below is a brief description of each species, its general habitat requirements, and the survey methods.

3.2.1 Eastern Box Turtle

The Eastern Box Turtle is a Massachusetts Species of Special Concern. This small terrestrial turtle uses a relatively wide range of terrestrial habitat types, including woodlands, field edges, and thickets (DeGraaf and Rudis, 1983), and has also been found in various wetland habitat types including wet meadows and lowland swamps (Klemens, 1993). NHESP identifies two natural communities with which this species is associated, including Coastal Forest/Woodland and Pitch Pine-Oak Forest (Swain and Kearsley, 2001), although other similar vegetative communities may also provide suitable habitat for this species. Optimal habitats on Cape Cod include pine barrens and oak thickets, where box turtles are associated with cranberry dominated swales. Communities with similar vegetative characteristics to these identified habitats are found within the Airport.

Survey methods included a presence-absence survey for this species, as well as a general characterization of the potential habitat for the Eastern Box Turtle at the Airport. HW performed meander surveys within each habitat type at the site. Field surveys specifically performed to observe this species were done in the early morning and/or during the day immediately following storm events when this species is reported to be most active (Klemens, 1993). Surveys for the Eastern Box Turtle occurred primarily in the spring and fall.

3.2.2 Eastern Spadefoot

The Eastern Spadefoot is a medium-sized toad, protected as a Threatened Species in Massachusetts. Reported habitat for this species includes dry sandy or loose soils in areas of sparse shrub growth of open forest areas (DeGraaf and Rudis, 1983). In addition, this species breeds only in shallow, temporary pools formed after very heavy, warm rains (Martof, 1980). Natural communities with which this species is associated that exist at the Airport include Coastal Interdunal Marsh/Swale, Wet Meadow, and Shrub Swamp.

Surveys for the Eastern Spadefoot included identification of isolated depressions that may temporarily hold water after significant rainfalls, and observation surveys following significant rainfall events from April through September. Target areas included the Coastal Interdunal Marsh/Swales in and immediately surrounding the Airport facilities.

This species emergence from underground burrows and migration to these temporary pools is triggered by heavy rainfall. There were very few evenings during the 2005 field survey period between May 15 and September 1 (the period when this species is most active) when significant precipitation events occurred. HW conducted evening field surveys within several of the inundated isolated wetland areas on two occasions (March 28 and August 31, 2005), during warm evening storm events.

3.2.3 Vesper Sparrow

The Vesper Sparrow is a small sparrow reported to inhabit open areas (cultivated fields, grasslands, fallow fields, and pastures) as well as Sandplain Heathlands. NHESP reports that this species is associated with Cultural Grasslands, which are often maintained open communities dominated by grasses. The Vesper Sparrow is designated as a Threatened Species in Massachusetts.

HW conducted morning and evening absence-presence surveys in 2005 between May 1 and July 31, when this species is most active. Surveys for the Vesper Sparrow and its habitat were concentrated within the managed areas (Cultural Grasslands) adjacent to the airport runway, taxiway, and runway approach. Field surveys included both listening and visual surveys, performed along walking transects. HW established 15 transects spaced approximately 150 meters apart within Cultural Grassland habitat located adjacent to shrub-dominant thickets (Figure 3). At each transect HW recorded all avian species seen or heard during a five-minute interval. A recording of Vesper Sparrow calls was then repeatedly broadcast along the length of each transect.

3.2.4 Broom Crowberry

Broom Crowberry is a low-growing, densely branching evergreen shrub, which inhabits open areas (low shrub communities or sandy flats, as well as dry pitch pine/scrub oak barrens and relic sand dunes). The NHESP-described natural communities with which this species is associated

include Sandplain Heathland and Pitch Pine – Scrub Oak Communities. Broom Crowberry is a Massachusetts Species of Special Concern.

Broom Crowberry was previously reported at the Airport in the managed grassland habitat southwest of the glide slope antennae. HW conducted meander surveys for Broom Crowberry, targeting the area where this species was previously identified and areas of Cultural Grassland habitat and/or Sandplain Grasslands/Sandplain Heathlands, as well as pitch-pine forested areas with associated plant communities.

3.3 Capital Improvement Program Projects and Supplemental Field Assessments

Since the ENF, the CIP projects have been refined slightly, as listed below. The CIP projects include the following:

1. Relocate the West Entrance Taxiway (TW)
2. Realign the Westerly End of the Partial Parallel TW
3. Improve the Access Road to the Approach Lights
4. Install TW Edge lights and Construct an Electric Vault
5. Rehabilitate or Replace the Sightseeing Shack
6. Realign the Mid Entrance TW
7. Relocate the East Entrance TW
8. Reconstruct the Terminal Apron within the Existing Footprint
9. Reconstruct the Easterly End of the Partial Parallel TW within the Existing Footprint
10. Construct Additional Turf Apron
11. Construct Service Access Roads to the Localizer Equipment Shelter and to the Weather Station
12. Install a Perimeter Safety/Security Fence
13. Expand Auto Parking
14. Expand the Terminal Building

Please note that the DEIR combines the relocation of the West Entrance TW, realignment of the Westerly End of the Partial Parallel TW, and realignment of the Mid Entrance TW, and that these three CIP projects are discussed as a whole.

HW field biologists performed continued site observations and assessments at the Airport from August through December 2006 in order to further describe the site characteristics related to the various projects identified in the ENF. As with HW's initial field efforts in 2004 and 2005, a combination of meander surveys and linear walking surveys were performed for the purposes of identifying structural landscape, or other features detected within the wetland resource areas, along with adjacent uplands that are, or are likely important, to an individual species or groups of species. In addition, 2006 field surveys focused upon:

- Identifying and delineating all wetland resource areas in the general vicinity of the identified CIP project alternatives (i.e., within 100 feet of these areas); and
- Describing the general habitat characteristics and documenting wildlife species observations.

Specific to one of the CIP projects, Installation of a Perimeter Safety/Security Fence, the Airport Lease Line, as well as the two interior alternative layouts identified in the ENF that were under consideration were survey-located, and marked at 50- or 100-foot intervals with labeled wooden stakes to facilitate our field efforts. Additional projects located immediately adjacent to existing Airport facilities did not necessitate field staking.

HW concentrated field assessments around the footprints of the CIP projects identified in the ENF, including the provided alternatives, to accurately describe the existing habitat and vegetative communities in these locations. During a verbal conversation with NHESP regarding their ENF comment letter, the NHESP review biologist indicated that additional species-specific surveys were unnecessary to address the NHESP Comments, and that all future field assessments for the four State-listed species should focus upon the site characteristics with respect to their potential to provide habitat for each specific species. As a result, all habitats encountered within the Airport lease area were evaluated for their ability to provide suitable habitat for rare species.

During this phase of the field assessments, field biologists visited the site on 17 separate dates. Most often, habitat assessments were completed in conjunction with wetland resource area delineation fieldwork, as both wetland and upland habitats are likely to be affected by the various CIP projects. As with previous field surveys performed by HW, site assessments generally involved two to three field biologists observing site conditions over a six- to nine-hour period. Most of the 2006 surveys began in the early morning and extended throughout the day, and occasionally extended into dusk. As our focus was on assessing the habitat characteristics, nighttime surveys were not deemed necessary for this phase of the wildlife studies.

4. RESULTS OF GENERAL HABITAT ASSESSMENTS

This discussion of the wildlife habitats survey is organized according to the different natural community types observed at the site. A list of all bird, mammal, amphibian, and reptile species observed at the Airport during these and previous field surveys is provided in this section. Additional details regarding wetland habitats are provided in the *Summary of Wetland Resource Areas* report (HW, April 2007).

4.1 Coastal Interdunal Marsh/Swale Habitat

The Coastal Interdunal Marsh/Swale community is one of the predominant types of wetland habitats existing at the Airport. With respect to habitat functions and values, the *Classification* indicates that “*interdunal swales can function as vernal pool habitat if water remains standing for two to three months and they lack fish; these swales provide important amphibian breeding habitat, particularly for toads, including American, Fowler’s, and spadefoot toads.*” The *Classification* identifies the Eastern Spadefoot as a rare animal species associated with this community type, while HW also notes that this may be an important habitat component for the Eastern Box Turtle.

As noted in the *Classification*, “*Interdunal swales have a high habitat value to birds and mammals for food, cover, and nesting sites.*” In addition to numerous resident and migratory bird species that were observed in or near these wetland habitats during each field visit, Northern black racer (*Coluber c. constrictor*), Fowler’s toad (*Bufo w. fowleri*), and small mammals were frequently encountered. Following the 2006 *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands*, published by DEP, HW assessed the project areas overall in the context of whether any important habitat features occur at the Airport. HW noted the overall presence or absence of wetland-specific and upland wildlife habitat features and characteristics (Table 1).

Table 1. Presence-absence of habitat features within the Airport assessment areas.

Habitat Feature	Present (Y/N)
Habitat(s) for State-listed animal species	Y
Sphagnum hummocks and pools suitable as for nesting habitat for four-toed salamanders	N
Trees with large cavities (≥18” tree diameter at cavity entrance)	N
Existing beaver mink or otter beds	N
Areas within 100 feet of existing beaver, mink or otter dens	N
Existing nest trees for birds that traditionally reuse nests	Y
Land containing freshwater mussel beds	N
Wetlands and waterbodies known to contain open water in winter	Y
Potential turtle nesting areas	Y
Vertical sandy banks	N
Depressions that hold standing water with potential to provide vernal pool habitat	Y
Areas surrounding vernal pools	Y
Isolated wetlands greater than 5,000 square feet in surface area	Y

The cranberry-pine swale habitat type is expansive on the southern side of the runway and most often supports cranberry and pitch pine as the predominant species with lesser amounts of highbush blueberry, bayberry, and woolgrass. Sphagnum moss is often abundant in these swales, which remained inundated to varying degrees in the winter, spring, and early summer; and generally dried up in late summer into the fall. These swales are geographically isolated and range in size from only a few square meters to several hundred square meters in area. These swales are seasonally inundated for relatively long periods during the year due to the seasonal rise in the groundwater table.

With respect to valuable structural features and hydrologic regimes comprising this habitat, these cranberry-pine swales are characterized by abundant wildlife habitat cover and fruit-bearing plants. Windfalls and standing dead wood are present in relative abundance, providing suitable foraging and nesting habitat for cavity nesting bird species. Small-diameter, fallen dead wood is plentiful, providing escape cover for amphibians, certain reptiles, and small mammals. Pine needle-litter is relatively thick, and mature pitch pines are generally less than 10 inches at breast-height diameter (DBH). Common resident and migratory avifauna were frequently observed,

along with Eastern ribbon snakes (*Thamnophis s. sauritus*). Coyotes were frequently heard and often observed in the vicinity of these habitats, with one coyote den noted to the east of Wetland L at the margin of the pine-forested area. Evidence of white-tail deer breeding activity (territorial markings such as scrapes and rubs along woody vegetation) was frequently observed throughout wetland areas south of the runway.

4.1.1 Potential Vernal Pool Habitat

In the period between August 2004 and September 2005, and again throughout most of the fall season in 2006, HW observed that all of the isolated wetland areas conforming to the Coastal Interdunal Marsh/Swale community type held some amount of standing water for a period of time during the growing season. This was evident by water stained vegetation along the surface. Observations of standing water in many of the larger wetland areas in late spring of 2005 and again in early January 2007.

HW observed juvenile amphibians (tadpoles) within several of the cranberry-pine swales southeast of the Airport runway when shallow inundation was present in May 2005. Within Wetland B, HW noted the presence of Fowler's Toads through recognition of their distinctive breeding chorus. Although not observed in all of the isolated freshwater wetland areas, evidence of amphibian breeding activity indicates that many of these seasonally inundated wetland areas provide suitable amphibian breeding habitat at least during some years. These pools, as well as the surrounding upland areas (primarily coastal dune habitats) that are considered part of the vernal habitat under the local wetlands bylaw, are important wildlife habitat features found within the Airport lease area.

The current source data available in MassGIS (updated as of January 2007) indicates that there are no certified vernal pools (CVPs) or potential vernal pools (PVPs) within the Airport lease area (see Figure 2). The nearest certified vernal pool is located to the east of the Airport, adjacent to Race Point Road just to the north of this road's intersection with Province Land Road. Two NHESP-designated Potential Vernal Pools are identified by the *Atlas*, northeast and southwest of the Airport lease area.

4.1.2 Persistent Water Regime

All of the geographically isolated freshwater wetland areas, with the exception of a small area within Wetland K, appear to experience dry conditions for some period during mid to late summer and early fall when regional groundwater elevations are at their lowest levels. Due to persisting surface water in the northern corner of Wetland K (PEM/PSS habitat), this wetland resource is highly valuable for wildlife species as a source of fresh water during drier portions of the year.

4.2 Maritime Dune Habitat

The Maritime Dune Habitat community is the predominant unmanaged upland habitat type within the Airport lease area. Stable Maritime Dune communities (i.e., Maritime Pitch Pine on Dunes and Maritime Shrubland), supporting shrubs and trees interspersed with Coastal Interdunal Marsh/Swales, are found at the lowest land elevations. These comprise nearly the entire habitat community south of the Airport runway, outside of, and beyond areas identified as Cultural Grassland and the wetland areas. HW found these Maritime Dune communities to be relatively consistent in vegetative makeup, dominated by pitch pine, with a canopy cover of 40-50%, and understory species limited to various lichens (*Cladonia* spp.) and common hairgrass. In addition, HW observed that these areas were interspersed with open areas of golden heather and lichens with less frequent occurrences of pinweed (*Lechea maritima*), occasional scrub oak, bayberry, and smaller areas of open bare sand. Prostrate branches of the pitch pine provide cover for small mammals and reptiles, and HW frequently observed small cavities or dens among these branches. Occasionally, HW encountered small stands of Virginia pine (*Pinus virginiana*), an introduced species. HW frequently observed small wildlife paths and corridors traversing the dune habitat south of the Airport runway.

A less sheltered Maritime Dune community exists between the Airport facilities and the CCNS shoreline to the north. The dunes in these areas are undulating, varying in topography and vegetative composition, yet are largely uniform in species diversity outside of the wetland areas. Open areas of bare sand, and occasional pebbles, are interspersed with sparsely to moderately vegetated dunes, dominated by American beachgrass, hairgrass, and areas containing clumps and patches of golden heather. Sparsely scattered areas of dense upland vegetation observed primarily along leeward slopes and consisting largely of bayberry, beach plum, and/or poison ivy, are interspersed among the more open dune areas and provide shelter and valuable food source for small mammals and birds.

Coyote activity (in the form of tracks and scat) was observed frequently among the outermost dunes. Broken shells (quahog) among pebbly areas indicate that this area provides some feeding habitat for shorebirds. HW observed flocks of tree swallows (*Tachycineta bicolor*) congregating in the dense vegetation in these outer dune areas. These birds were presumed to be migrating due to the timing of the observations (late fall 2006). For the most part, the outer dune community does not support pitch pine, with the exception of the dunes in the northeastern corner of the Airport lease area (near the Airport parking lot). Interspersed among the outer dunes are several isolated vegetated wetland areas, which provide additional habitat diversity. Descriptions of the plant communities within individual wetland areas are provided in the *Summary of Wetland Resource Areas* report (HW, April 2007). On one occasion in October 2006, HW observed a Northern Harrier in a small stand of pitch pines just south of Wetland AL; observations of this species were previously reported by HW foraging along the airport runway, and by others during past surveys (see HW, December 2005).

With respect to habitat values, the *Classification* indicates that “a variety of seabirds, shorebirds, and song birds nest at the base and sides of dunes and in the interdunal area. The particular species depend upon topography, hydrologic regime, and the amount and type of plant cover.

Vernal pools occur in some dune systems, serving as important feeding and breeding areas for a variety of reptiles and amphibians, invertebrates, and birds and mammals.” A complete list of species observed by HW and/or documented by other field biologists at the Airport is provided in Table 2.

Table 2 includes species observed by HW during field surveys between 2004 and 2005, and continued surveys in 2006. This list is updated from species observed by others between 1991 and 1994 as presented in the October 1999 Final Environmental Impact Statement (FEIS)/ Final Environmental Impact Report (FEIR), Department of Transportation Section 4(f) Statement for the Airport.

Table 2. Recorded and Observed Wildlife Species.

SCIENTIFIC NAME	COMMON NAME	STATUS*
Avian Species		
<i>Gavia immer</i>	Common Loon	MASC
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	--
<i>Ardea herodias</i>	Great Blue Heron	--
<i>Butorides virescens</i>	Green Heron	--
<i>Cathartes aura</i>	Turkey Vulture	--
<i>Anas rubripes</i>	American Black Duck	--
<i>Anas platyrhynchos</i>	Mallard	--
<i>Pandion haliaetus</i>	Osprey	--
<i>Circus cyaneus</i>	Northern Harrier	MAT
<i>Accipiter cooperii</i>	Cooper's Hawk	--
<i>Buteo jamaicensis</i>	Red-tailed Hawk	--
<i>Falco sparverius</i>	American Kestrel	--
<i>Phasianus colchicus</i>	Ring-necked Pheasant	--
<i>Bonasa umbellus</i>	Ruffed Grouse	--
<i>Colinus virginianus</i>	Northern Bobwhite	--
<i>Charadrius vociferus</i>	Killdeer	--
<i>Haematopus palliatus</i>	American Oystercatcher	--
<i>Larus argentatus</i>	Herring Gull	--
<i>Larus marinus</i>	Great Black-backed Gull	--
<i>Sterna hirundo</i>	Common Tern	MASC
<i>Sterna antillarum</i>	Least Tern	MASC
<i>Zenaida macroura</i>	Mourning Dove	--
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	--
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	--
<i>Bubo virginianus</i>	Great Horned Owl	--
<i>Picoides pubescens</i>	Downy Woodpecker	--
<i>Picoides villosus</i>	Hairy Woodpecker	--
<i>Colaptes auratus</i>	Northern Flicker	--
<i>Tyrannus tyrannus</i>	Eastern Kingbird	--
<i>Cyanocitta cristata</i>	Blue Jay	--
<i>Corvus brachyrhynchos</i>	American Crow	--
<i>Eremophila alpestris</i>	Horned Lark	--
<i>Tachycineta bicolor</i>	Tree Swallow	--
<i>Hirundo rustica</i>	Barn Swallow	--
<i>Poecile atricapillus</i>	Black-capped Chickadee	--
<i>Sitta carolinensis</i>	White-breasted Nuthatch	--
<i>Thryothorus ludovicianus</i>	Carolina Wren	--
<i>Turdus migratorius</i>	American Robin	--
<i>Dumetella carolinensis</i>	Gray Catbird	--
<i>Mimus polyglottos</i>	Northern Mockingbird	--
<i>Sturnus vulgaris</i>	European Starling	--
<i>Dendroica petechia</i>	Yellow Warbler	--
<i>Dendroica magnolia</i>	Magnolia Warbler	--

SCIENTIFIC NAME	COMMON NAME	STATUS*
<i>Dendroica coronata</i>	Yellow-rumped Warbler	--
<i>Dendroica virens</i>	Black-throated Green Warbler	--
<i>Dendroica pinus</i>	Pine Warbler	--
<i>Mniotilta varia</i>	Black-and-white Warbler	--
<i>Geothlypis trichas</i>	Common Yellowthroat	--
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	--
<i>Spizella passerina</i>	Chipping Sparrow	--
<i>Pooecetes gramineus</i>	Vesper Sparrow (obs. by others)	MAT
<i>Passerculus sandwichensis</i>	Savannah Sparrow	
<i>Melospiza melodia</i>	Song Sparrow	
<i>Melospiza georgiana</i>	Swamp Sparrow	
<i>Cardinalis cardinalis</i>	Northern Cardinal	--
<i>Dolichonyx oryzivorus</i>	Bobolink	--
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	--
<i>Quiscalus quiscula</i>	Common Grackle	--
<i>Icterus spurius</i>	Orchard Oriole	--
<i>Icterus galbula</i>	Baltimore Oriole	--
<i>Carpodacus purpureus</i>	Purple Finch	
<i>Carpodacus mexicanus</i>	House Finch	
<i>Carduelis tristis</i>	American Goldfinch	--
<i>Passer domesticus</i>	House Sparrow	--
Mammalian Species		
<i>Blarina brevicauda</i>	Northern Short-tailed Shrew	--
<i>Sylvilagus floridanus</i>	Eastern Cottontail	--
<i>Tamiasciurus hudsonicus</i>	Red Squirrel	--
<i>Microtus pennsylvanicus</i>	Meadow Vole	--
<i>Canis latrans</i>	Coyote	--
<i>Vulpes vulpes</i>	Red Fox	--
<i>Procyon lotor</i>	Common Raccoon	--
<i>Mephitis mephitis</i>	Striped Skunk	--
<i>Odocoileus virginianus</i>	White-tailed Deer	--
Reptile and Amphibian Species		
<i>Plethodon cinereus</i>	Eastern Red-backed Salamander	--
<i>Bufo fowleri</i>	Fowler's Toad	--
<i>Pseudacris crucifer</i>	Spring Peeper	--
<i>Coluber constrictor</i>	Eastern Racer	--
<i>Thamnophis sauritus</i>	Eastern Ribbon Snake	--
<i>Thamnophis sirtalis</i>	Common Garter Snake	--

Key

- MAE = Massachusetts Endangered species
MAT = Massachusetts Threatened species
MASC = Massachusetts Species of Special Concern

*Status of Massachusetts' species as designated by the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program, set forth in 321 CMR 10.00 *et seq.*

5. RARE SPECIES HABITAT ASSESSMENTS

Four State-listed rare species, identified by the NHESP, have been previously documented to occur in the vicinity of the Airport by HW and/or by others. Surveys for these species were performed in accordance with NHESP-approved protocols. Following the verbal directive from NHESP (as noted above in Section 3.3), HW conducted additional field assessments for each of these species, focusing on the habitat potential for each species, rather than presence/absence surveys. The results of the 2005 species-specific surveys as well as the general characteristics of each species are provided in this section, followed by the identification of the communities and areas likely to be significant for providing habitat for each species. Figure 4 depicts the approximate areas of potential habitat within the Airport lease area for each of the four rare species based upon our field observations. Portions of the Airport lease area that were not assessed were supplemented with available source data from MassGIS.

5.1 Broom Crowberry

HW observed a population of Broom Crowberry located within Cultural Grassland to the southwest and west of the glide slope antenna within approximately 200 to 300 feet of this antenna, verifying previously documented observations of this species within the Airport lease area. The location of approximately 52 clusters of this species were survey-located and are shown on Figure 4. The observed clusters of Broom Crowberry, all of which are located within a few meters of each other, range in size from approximately 0.25 to 1.25 meters in diameter. The NHESP Rare Plant Observation Form is provided in the Appendices to this report.

HW continued to conduct meander surveys for Broom Crowberry in 2006 within areas of potential habitat for this species, including the area near the Glideslope antennae, in additional areas of Cultural Grassland habitat, in developing Sandplain Grasslands/Sandplain Heathlands, and within pitch-pine forested areas along the dunes. HW did not identify any additional occurrences of this species within the project areas.

5.2 Eastern Box Turtle Habitat

HW did not observe Eastern Box Turtles during any of the field assessments between 2004 and 2006. However, suitable habitat for this species is present, particularly in the southern portion of the Airport lease area, classified as Maritime Dune and Coastal Interdunal Marsh/Swale communities, where foraging habitat and abundant food sources are found within close proximity to open areas of sand suitable for nesting habitat. The rare species information provided by NHESP for Eastern Box Turtles states that “*in optimal habitats in Cape Cod pine barrens and oak thickets, the species is generally associated with cranberry dominated swales interspersed with bearberry groundcover, low bush blueberries, and thickets of bracken fern.*” The Eastern Box Turtle would be considered a generalist in the context of habitat preference, and many of these habitat characteristics are found within the Airport lease area, observed primarily in the expansive areas to the south of the Airport runway. All pitch-pine dominated habitats, including the cranberry-pine swales and the lower slopes of the pitch pine and oak dominant dune habitats together are suitable habitat for the Eastern Box Turtle. These areas contain

abundant fruit-bearing shrubs and ericaceous plants, as well as abundant mushrooms, which are considered high-value food sources for the Eastern Box Turtle as well as for many other birds and mammals.

5.3 Eastern Spadefoot Habitat

Eastern Spadefoots were not observed by HW during any site visits. The distinctive breeding call of this animal was also not detected during evening surveys performed in 2005. However, Eastern Spadefoots have been observed by others during nocturnal road surveys conducted along nearby Race Point Road (Patten, et al., 2003). These researchers also positively identified a single Eastern Spadefoot breeding area, consisting of two small temporary ponds on Hatches Harbor Dike Road, located considerably south of the Airport lease area.

The Eastern Spadefoot uses temporary pools of standing water as breeding habitat, and prefers a soil in which it can burrow, consisting of loose, sandy material, with temporarily inundated isolated wetlands nearby (breeding habitat). The emergence of this species from underground burrows and migration to these temporary pools is triggered by heavy rainfall. The evening field visit conducted in August 2005 occurred immediately following a significant storm event, during which approximately four inches of rain fell within a 24-hour period¹. It was anticipated that after such a significant rainfall that most isolated wetlands located in the eastern corner of the Airport, as well as other isolated wetland areas would contain standing water. However, due to the rainfall deficit observed on Cape Cod during the 2005 summer months², and the relatively high porosity of the coarse sandy soils, significant precipitation events occurring over a short period of time during the summer months did not result in temporary pools at the Airport this year. Temporary inundation likely occurs earlier in the season when groundwater elevations are higher. The presence and fluctuation in depth of standing water in the wetlands at this site are likely related primarily to the gradual changes in groundwater elevation on a seasonal basis and not to precipitation events.

Habitat suitability surveys for the Eastern Spadefoot included identification of open, sandy depressions, which may temporarily hold water after significant rainfalls. Target areas included the Coastal Interdunal Marsh/Swales in and immediately surrounding the proposed footprints of the CIP projects, along with the alternative locations where vegetation was sparse, but with plentiful vegetative cover in surrounding areas. Portions of the Airport lease area, particularly in the southeastern corner, provide both of these features and may provide suitable habitat for the Eastern Spadefoot. These suitable habitat features are abundant within the Airport lease area, particularly south of the Airport runway.

5.4 Vesper Sparrow Habitat

HW did not document the presence of any Vesper Sparrows during our 2004-2005 field surveys. Following the survey protocol approved by NHESP and incorporating techniques used successfully by researchers in 1993 (Jones and Vickery, 1995), HW performed field surveys for

¹ Source: Massachusetts Climatological Reports, National Weather Service, 24-hour precipitation amounts.

² Source: Massachusetts Department of Conservation and Recreation <http://www.mass.gov/dcr/waterSupply/rainfall/>

the presence of Vesper Sparrows between mid-May and the end of July in 2005. Three early morning surveys (May 18, June 16, and July 29) and two early evening surveys (June 3 and July 11) were conducted during favorable weather conditions (i.e., no precipitation and light or no wind).

Kearney and Cook (2001) reported that approximately 29 hectares of land at the Provincetown Airport that are considered grasslands and/or heathlands, some or all of which may be classified as Cultural Grassland, with which the State-Threatened Vesper Sparrow is associated (Swain and Kearsley, 2001). The most recently documented observation of the Vesper Sparrow at the Airport that HW is aware of occurred in 2000, when NPS ecologists documented two Vesper Sparrows within the grassland habitat located northeast of the runway. Prior to this, in July of 1996, NPS observers reported “*small flocks of adult males (less than or equal to five individuals)*” observed along the Airport runway shoulders³. Earlier documented observations of this species at the Airport occurred in 1993, during a State-wide grassland bird survey, when seven (7) vocalizing male vesper sparrows were recorded at the airport (Jones and Vickery, 1995).

Kearney and Cook (2001) report that the distribution and abundance of Vesper Sparrows within the CCNS declined from 1995 to 2000. Earlier observations indicate that this species has been decreasing in numbers since the 1930s (Hill, 1965, as reported in Kearney and Cook, 2001). However, based upon the reported Vesper Sparrow observations by others during past surveys at the Airport, available resources including information from the NHESP pertaining specifically to known habitat requirement of this species, observations of associated wildlife (Northern Harrier; see below), and an understanding of existing community types, HW believes that the Cultural Grassland community and adjacent maintained shrub thickets that along the Airport runway, taxiway, and approach areas may provide suitable habitat for Vesper Sparrow, although perhaps not during every breeding season. Regular mowing of these areas as part of routine Airport maintenance, in part, maintains suitable habitat for this species.

5.5 Other State-Listed Species Observed

During their review of protocols for this study, NHESP requested that any observations of the Northern Harrier and the Grasshopper Sparrow (*Ammadramus savannarum*) be recorded. These species, both State-listed Threatened species, are associated with similar, overlapping habitat types as the Vesper Sparrow. While Grasshopper Sparrows were not observed (this species is thought to be extirpated from this part of Cape Cod; Kearney and Cook, 2001), HW observed individual male and female Northern Harriers during 12 of the 14 site visits made between August 2004 and September 2005, and routinely observed individual male and female Northern Harriers during site assessments and land surveys in 2006. Generally, these individuals were observed hunting or foraging along the Cultural Grasslands adjacent to the Airport runway. On one occasion, HW observed a female harrier in the dune area adjacent to Wetland AL.

³ Source: Rare Species Observation Form, submitted to NHESP July 25, 1996; observer K. Jones.

6. CAPITAL IMPROVEMENT PROJECTS AND HABITAT ASSESSMENTS

Based on the habitat assessments presented here, several projects included in the CIP for the Airport have the potential to impact wetlands, wildlife habitat, and/or rare species habitat. The type and amount of impact depends on the alternative ultimately selected for each project element. The DEIR for the CIP will include an alternatives analysis. Table 3 presents a baseline overview of potential impacts, with respect to each project.

Table 3. Estimated potential for environmental impacts to wetland resource areas and rare species habitat for all build alternatives of CIP projects identified in the ENF.

Projects	Potential for Impact to Natural Resource Areas and Rare Species Habitat							
	Cultural Grassland	Maritime Dune Habitat	Coastal Interdunal Marsh/Swale	Freshwater Wetland Habitat	Broom Crowberry	Eastern Box Turtle	Eastern Spadefoot	Vesper Sparrow
West End TW (Alt. 1)	Impact	No Impact	Impact	Impact	No Impact	Potential	Potential	Potential
West Taxiway (Pref. Alt. 2)	Impact	No Impact	Impact	Impact	No Impact	Potential	Potential	Potential
Mid Entrance TW	Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Potential
East End TW	Impact	No Impact	No Impact	Impact	No Impact	Potential	Potential	Potential
Partial Parallel TW	Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	Potential
Electrical Vault	No Impact	No Impact	Impact	Impact	No Impact	No Impact	No Impact	No Impact
Sightseeing Shack	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Turf Apron Expansion	Impact	No Impact	Impact	Impact	No Impact	No Impact	No Impact	Potential
AWOS Access Rd (Alt. A)	Impact	Impact	Impact	Impact	No Impact	Potential	Potential	Potential
AWOS Access Rd (Alt. B)	Impact	Impact	Impact	Impact	No Impact	Potential	Potential	Potential
AWOS Access Rd (Pref. Alt. C)	No Impact	Impact	Impact	Impact	No Impact	Potential	Potential	No Impact
AWOS Access Rd (Alt. D)	No Impact	Impact	Impact	Impact	No Impact	Potential	Potential	No Impact
Equip Shelter Road (Alt. A)	Impact	Impact	No Impact	No Impact	No Impact	Potential	Potential	Potential
Equip Shelter Road (Pref. Alt. B)	No Impact	Impact	No Impact	No Impact	No Impact	Potential	Potential	No Impact
Equip Shelter Road (Alt. C)	No Impact	Impact	Impact	Impact	No Impact	Potential	Potential	No Impact
Equip Shelter Road (Alt. D)	No Impact	Impact	No Impact	No Impact	No Impact	Potential	Potential	No Impact
Equip Shelter Road (Alt. E)	Impact	Impact	No Impact	No Impact	No Impact	Potential	Potential	Potential
Perimeter Fence (Pref. Alt.)	No Impact	Impact	Impact	Impact	No Impact	Impact	Impact	No Impact
Perimeter Fence (Alt. 2 – 500 ft.)	Impact	Impact	Impact	Impact	Impact	Impact	Impact	Potential
Perimeter Fence (Alt. 3 – 1,000 ft.)	No Impact	Impact	Impact	Impact	No Impact	Impact	Impact	No Impact
Terminal Building-Vertical	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Terminal Building-Horizontal	No Impact	No Impact	No Impact	Impact	No Impact	No Impact	No Impact	No Impact
Parking Area	No Impact	Impact	Potential	Potential	No Impact	Potential	Potential	No Impact

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7. SUMMARY

This report constitutes a draft Natural Resources Inventory (NRI) for submission to the CCC, and an initial summary for submittal with a MESA Project Review with NHESP. Data and information submitted with this report are used to support the DEIR.

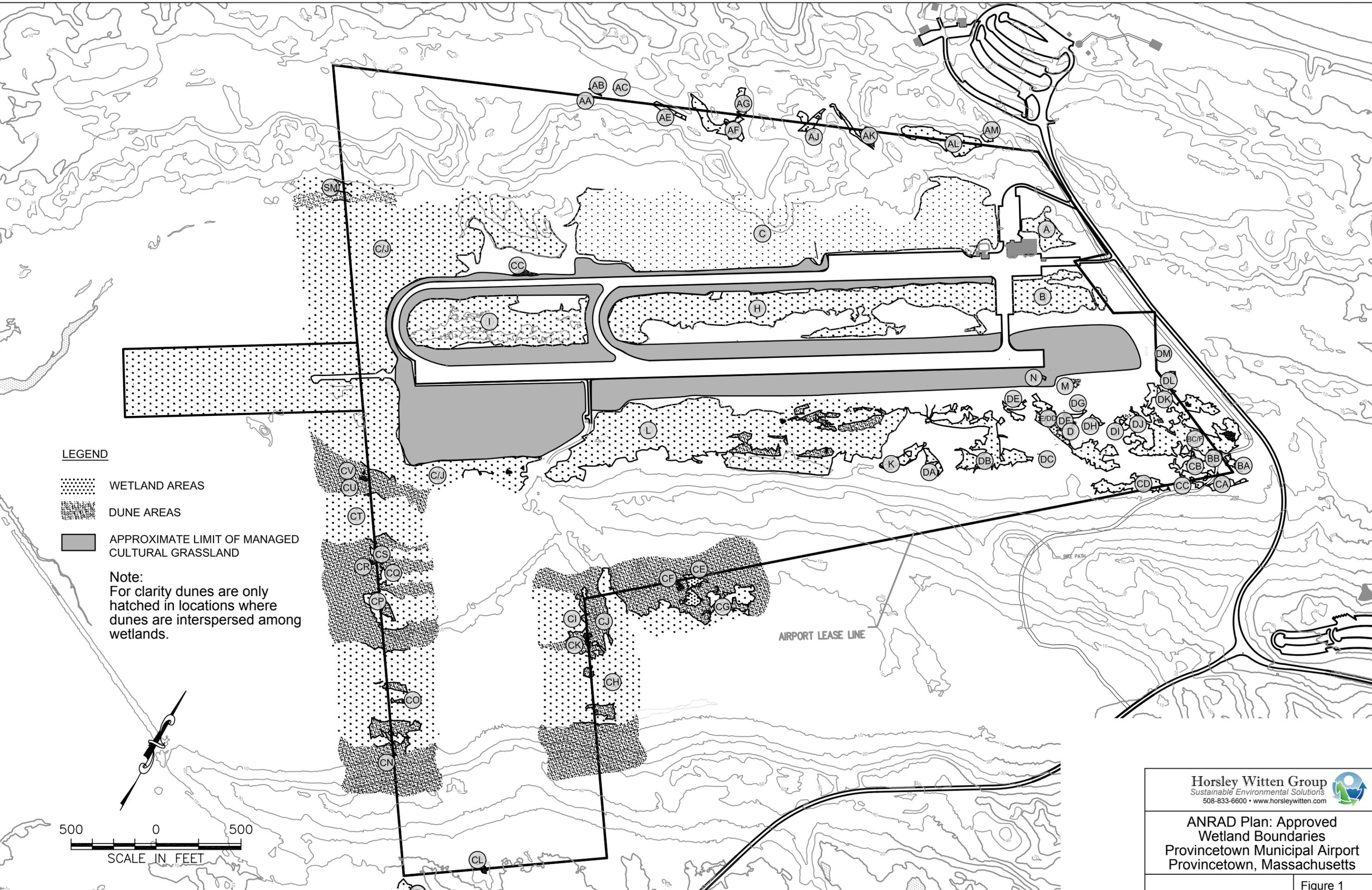
Within the Airport lease area, HW conducted numerous habitat inventories, concentrated within areas likely to be affected by various alternatives to proposed projects for the CIP which were presented in the ENF. Site assessments were completed between the summer of 2004 and the fall of 2005, and again in the summer-fall seasons in 2006 to evaluate wildlife habitat characteristics and quantify the site's natural resources. As most of the CIP projects will be analyzed with respect to meeting performance standards under applicable local, State, Federal, and/or regional regulations (pertaining to wetland resource areas, wildlife habitat, and habitat of rare plant and animal species), this information is intended to serve as the baseline for evaluation of the CIP projects and development of the alternatives analyses in the EIR. Data here will also serve as the basis for developing appropriate mitigation where it is deemed necessary.

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last modified: 03/07/07 printed: 03/07/07 by ew J:\4027 E&K-PTown Airport\Drawings-4027.dwg\4027 WETLANDS 2006.dwg



LEGEND

-  WETLAND AREAS
-  DUNE AREAS
-  APPROXIMATE LIMIT OF MANAGED CULTURAL GRASSLAND

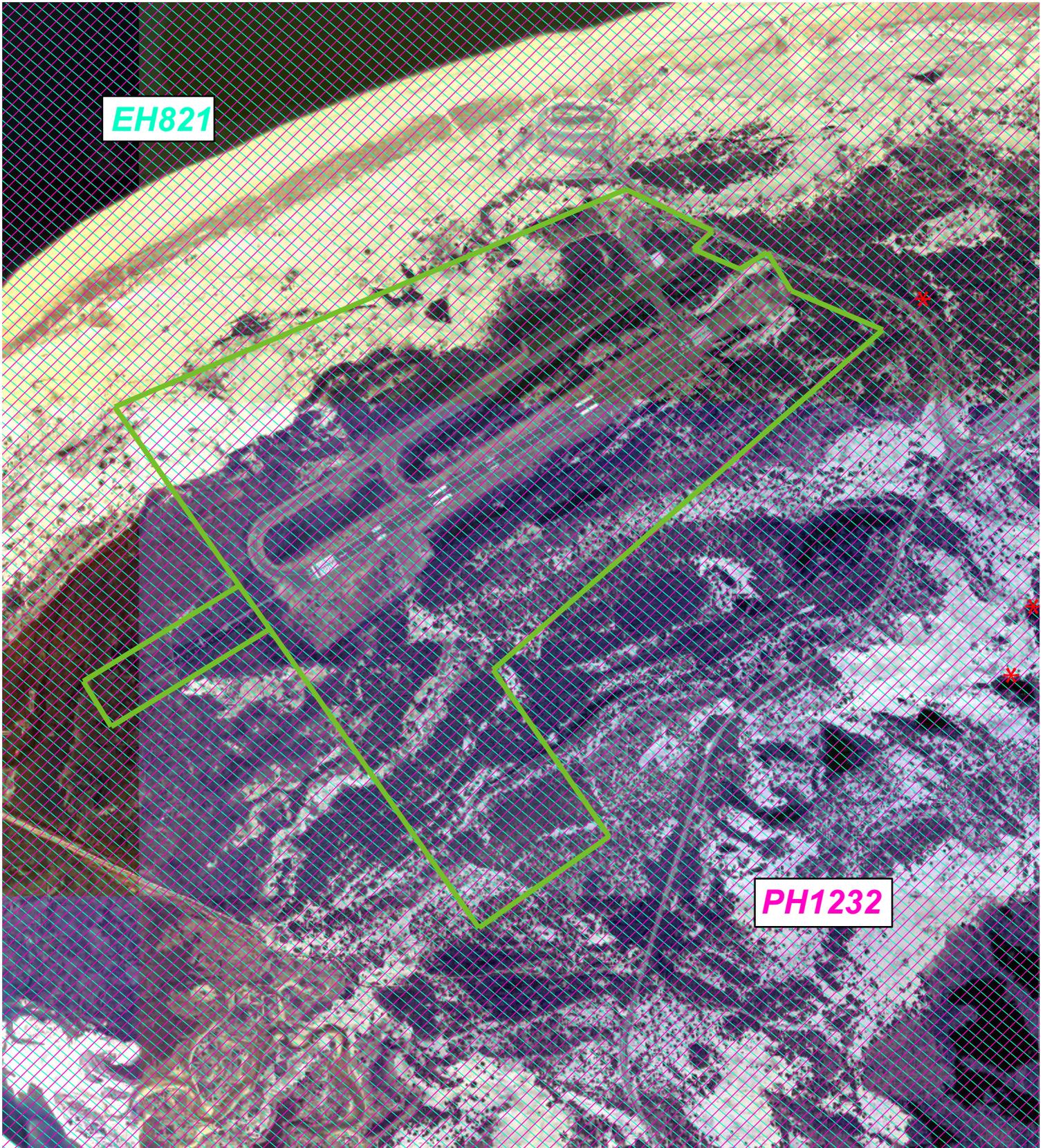
Note:
For clarity dunes are only hatched in locations where dunes are interspersed among wetlands.



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**ANRAD Plan: Approved
Wetland Boundaries
Provincetown Municipal Airport
Provincetown, Massachusetts**

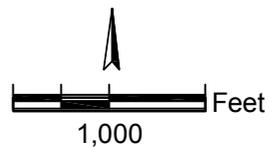
Figure 1



Legend

-  Lease Line
-  NHESP Priority Habitats of Rare Species
-  NHESP Certified Vernal Pools
-  NHESP Estimated Habitats of Rare Wildlife

**Source: Certified Vernal Pools - MassGIS, January 2007
 Estimated & Priority Habitats - MassGIS, December 2006*



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Natural Heritage & Endangered
 Species Program (NHESP)
 Provincetown Municipal Airport
 Provincetown, MA

Figure 2

Legend:

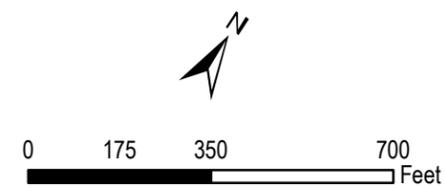
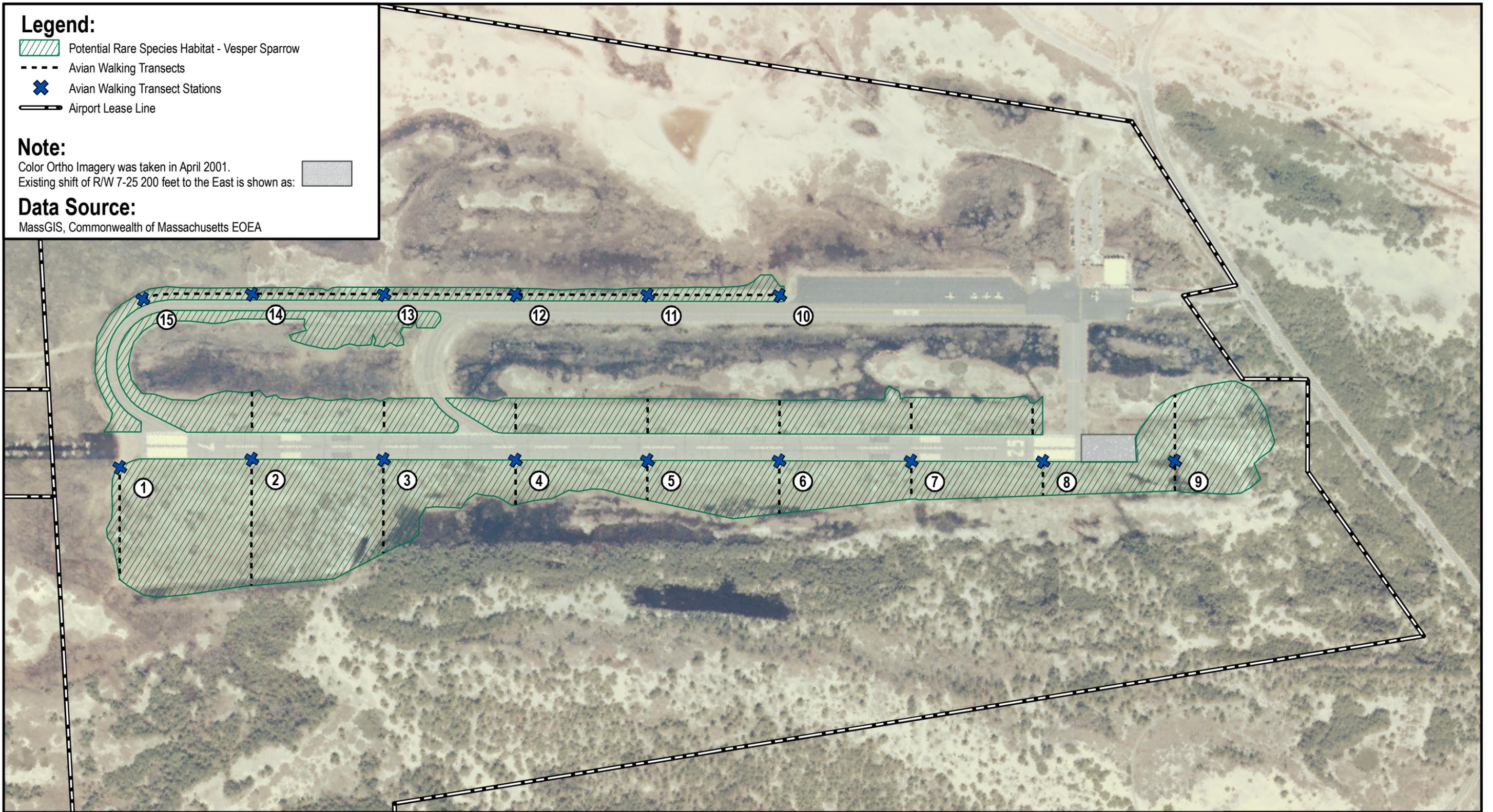
-  Potential Rare Species Habitat - Vesper Sparrow
-  Avian Walking Transects
-  Avian Walking Transect Stations
-  Airport Lease Line

Note:

Color Ortho Imagery was taken in April 2001.
Existing shift of R/W 7-25 200 feet to the East is shown as: 

Data Source:

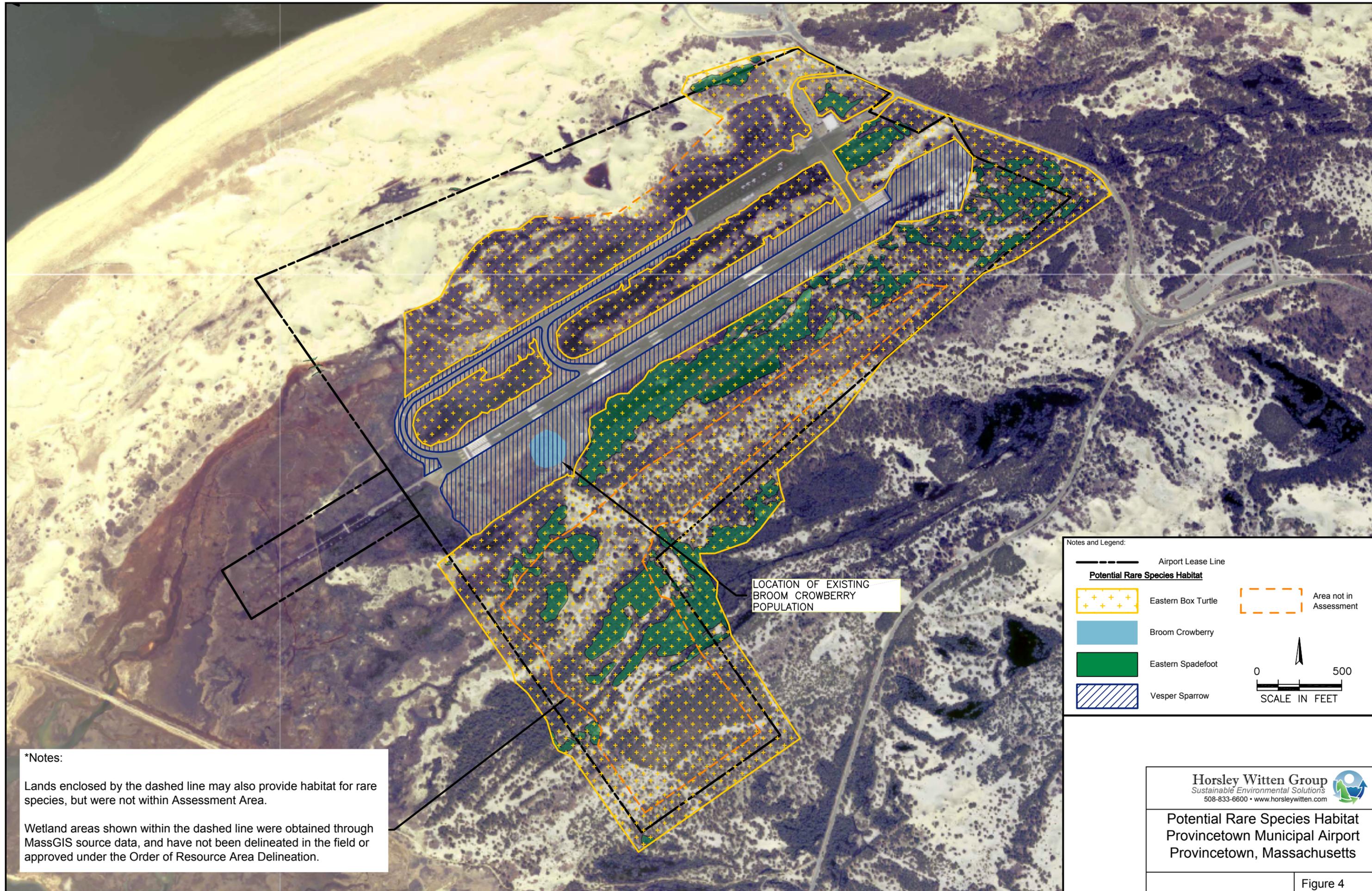
MassGIS, Commonwealth of Massachusetts EOE



Edwards AND Kelcey 343 Congress Street
Boston, MA 02210
Tel: 617-242-9222

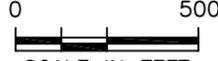
**Walking Transects
for Vesper Sparrow Surveys
Provincetown Municipal Airport**

Prepared For:
Horseley Witten Group



Notes and Legend:

	Airport Lease Line		Area not in Assessment
Potential Rare Species Habitat			
	Eastern Box Turtle		
	Broom Crowberry		
	Eastern Spadefoot		
	Vesper Sparrow		



 SCALE IN FEET

***Notes:**

Lands enclosed by the dashed line may also provide habitat for rare species, but were not within Assessment Area.

Wetland areas shown within the dashed line were obtained through MassGIS source data, and have not been delineated in the field or approved under the Order of Resource Area Delineation.

Horsley Witten Group
Sustainable Environmental Solutions
 508-833-6600 • www.horsleywitten.com

Potential Rare Species Habitat
Provincetown Municipal Airport
Provincetown, Massachusetts

Figure 4

APPENDICES

Correspondence with NHESP
NHESP-Approved Rare Species Habitat Survey Protocols
Rare Plant Observation Form (*Corema conradii*)



MassWildlife

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

JUN 01 2004

HORSLEY & WITTEN, INC.

Wayne F. MacCallum, Director

May 26, 2004

Amy Ball
Horsley Witten Group
90 Route 6A
Sandwich, MA 02563

Re: Provincetown Municipal Airport
Provincetown, MA
NHESP File: 04-15716

Dear Ms. Ball

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-protected rare species in the vicinity of the above referenced site. We have reviewed the site and would like to offer the following comments.

This project site is located entirely within Priority Habitat 1150 and near Estimated Habitat 17 as indicated in the 11th Edition of the Massachusetts Natural Heritage Atlas. Our database indicates that the following protected rare species have been found in the vicinity of the site:

<u>Scientific name</u>	<u>Common Name</u>	<u>Taxonomic Group</u>	<u>State Status</u>
<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	Amphibian	Threatened
<i>Terrapene carolina</i>	Eastern Box Turtle	Reptile	Special Concern
<i>Pooecetes gramineus</i>	Vesper Sparrow	Bird	Threatened
<i>Corema conradii</i>	Broom Crowberry	Plant	Special Concern

These species are protected under the Massachusetts Endangered Species Act (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.37 and 10.59). Fact sheets for these species can be found on our website <http://www.state.ma.us/dfwele/dfw/nhesp/nhfact.htm>.

This evaluation is based on the most recent information available in the Natural Heritage database, which is constantly being expanded and updated through ongoing research and inventory. Should your site plans change, or new rare species information become available, this evaluation may be reconsidered.

MA Endangered Species Act (G.L. c. 131A)

Using the list of rare species provided above, we recommend that rare wildlife and plant surveys and assessments be conducted by qualified individuals within suitable habitats on and near the site according to

www.masswildlife.org

Division of Fisheries and Wildlife

Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 792-7270 Fax (508) 792-7275

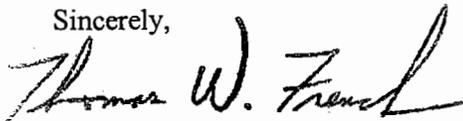
An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

scientifically accepted survey methodologies. Survey methodologies should be approved by NHESP prior to initializing rare species surveys. A Rare Animal/Plant Observation Form, available at our website www.nhesp.org, should be submitted for each species encountered. If during this site evaluation rare species are found on or near the site, then site plans and a project description should be sent to NHESP Environmental Review to determine whether a probable "take" under the MA Endangered Species Act would occur (321 CMR 10.04).

If NHESP determines that the proposed project would "take" a rare species, and the site is greater than two acres, and within a Priority Habitat site, an Environmental Notification Form should be submitted pursuant to the MA Environmental Policy Act regulations (301 CMR 11.03(2)(b)(2)). A Conservation & Management Permit (321 CMR 10.04 (3)(b)) may be required for work in rare species habitat.

If you have any questions regarding this review please call Ellen Shultzabarger, Environmental Review Assistant, at ext. 154.

Sincerely,

A handwritten signature in cursive script that reads "Thomas W. French".

Thomas W. French, Ph.D.
Assistant Director

cc:

Provincetown Conservation Commission

Horsley Witten Group

Sustainable Environmental Solutions



June 29, 2004

90 Route 6A • Sandwich, MA • 02563
Phone - 508-833-6600 • Fax - 508-833-3150 • www.horsleywitten.com

Mr. Jon Regosin, Endangered Species Project Analyst
MA Natural Heritage and Endangered Species Program
Route 135, North Drive
Westborough, MA 01581

**Re: Rare Species Habitat Survey Methodologies
Provincetown Municipal Airport Master Plan Update**

Dear Mr. Regosin:

The Horsley Witten Group (HW) will be performing fieldwork to update all wetland resource area boundary delineations and conduct appropriate wildlife habitat evaluations in conjunction with the Provincetown Municipal Airport Master Plan Update (AMPU). Proposed projects associated with the AMPU will likely occur within Priority Habitat of Rare Species (PH 1150).

We recently requested and obtained information from the Massachusetts Natural Heritage and Endangered Species Program (NHESP) regarding the potential state-listed species at the airport facility. These include:

- Eastern Box Turtle (*Terrapene c. carolina*),
- Vesper Sparrow (*Pooecetes gramineus*),
- Broom Crowberry (*Corema conradii*), and
- Eastern Spadefoot (*Scaphiopus h. holbrookii*)

We are anxious to begin field surveys for these species and their habitats as soon as possible this growing season. Our intention is to coordinate closely with NHESP prior to conducting any wildlife habitat evaluations. At Patricia Huckery's suggestion, I am forwarding to you draft descriptions of our proposed field survey methodologies for review and comment.

As the AMPU will involve long-term projects, we anticipate extensive future coordination with the NHESP, as well as the Cape Cod Commission and the Provincetown Conservation Commission, prior to the design phase of any future project. Thank you in advance for your assistance with this matter. Should you have any questions, please do not hesitate to contact me at (508) 833-6600 ext. 123, or Mike Ball at ext. 105. You may reach either of us by email at aball@horsleywitten.com and mball@horsleywitten.com. We look forward to hearing from you.

Sincerely,

HORSLEY WITTEN GROUP


Amy M. Ball
Project Manager – Wetland Scientist

Enclosures (4)

cc: William Richardson, Edwards and Kelcey

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Sandwich Boston Providence





DRAFT

Broom Crowberry (*Corema conradii*)

(Massachusetts Species of Special Concern)

Description

Broom Crowberry is a low-growing, densely branching evergreen shrub with tiny leaves. This species blooms between March and May with inconspicuous reddish purple flowers. Summer growth is characterized by a bright yellow-green coloration, distinguishing this species from similar heather-like plants.

Reported Habitat

This species inhabits open areas (low shrub or moor communities or sandy flats, as well as dry pitch pine/scrub oak barrens and relic sand dunes. Associated species include scrub oak (*Quercus ilicifolia*), pitch pine (*Pinus rigida*), golden heather (*Hudsonia ericoides*), and bearberry (*Arctostaphylos uva-ursi*). The NHESP- described natural communities with which this species is associated include Scrub Oak Shrubland and the Pitch Pine – Scrub Oak Community.

Broom Crowberry was previously recorded at the Provincetown Municipal Airport in the managed grassland habitat southwest of the glide slope antennae. The airport's current environmental consultant has documented additional records of this species within a developing sandplain grassland habitat. All documented occurrences of this species will be incorporated within any future project development.

Methodology for Identification and Mapping of Habitat

Horsley Witten Group will conduct meander surveys for Broom Crowberry, targeting areas of open grassland habitat and/or sandplain grasslands/heathlands with associated plant communities (described above) to search for occurrences of Broom Crowberry located in and immediately adjacent to the airport facility.

The location of any Broom Crowberry communities encountered within the site will be recorded by field measurements (when practical) and by using a GPS unit for potential future mapping. Documentation will include photographs and a description of the habitat occupied, including the associated plant community. A Rare Plant Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program.

References

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Broom Crowberry (1985).



DRAFT

Vesper Sparrow (*Pooecetes gramineus*)

(Massachusetts Threatened Species)

Description

The Vesper Sparrow is a small, short-tailed grayish-brown sparrow with a streaked breast. Unique characteristics include a notched, black tail with white outer tail feathers that are conspicuous during flight.

Reported Habitat

This species is reported to inhabit open areas (cultivated fields, grasslands, fallow fields, and pastures) as well as sandplain heathlands with clump-forming grasses, bare patches, and scattered shrubs or saplings growing in typically dry and well drained soils. This type of habitat serves as nesting habitat, cover, foraging sites, and singing perches for the Vesper Sparrow. The NHESP- described natural community with which this species is associated is Cultural Grassland (formerly described as Sandplain Grassland – Cultural Community), which is often a maintained, open community dominated by grasses, normally maintained by mowing.

Methodology for Identification of Habitat

Meander surveys for the Vesper Sparrow and its habitat will concentrate on managed grassland areas adjacent to airport runways and taxiways, as well as target areas of open grassland habitat within and immediately adjacent to the airport facility.

As this species is known to frequently sing during the early evening hours, habitat assessments will be timed appropriately. Field investigators may solicit territorial singing by playing recorded vocalizations of this species and may attempt to record species response to these recordings.

Any individual Vesper Sparrow encountered will be documented as to location within the site, its activity (nesting, foraging, singing, etc.), and a description of the habitat occupied. Photographs will be taken as obtainable. A Rare Animal Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program. Incidental bird species observed within these areas will also be recorded.

References

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Connecticut Department of Environmental Protection, Wildlife In Connecticut Endangered And Threatened Species Series, Vesper Sparrow (*Pooecetes gramineus*) website.
<http://dep.state.ct.us/burnatr/wildlife/factshts/vesp.htm>

New Jersey Department of Environmental Protection, Endangered Species Program website
www.nj.gov/dep/fgw/ensp/pdf/end-thrtened/vespersparrow.pdf

NatureServ Explorer Fact Sheet on Vesper Sparrow

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook: a field guide to the natural history of North American birds. New York: A Fireside Book published by Simon & Schuster, Inc., 785 pp.



DRAFT

Eastern Spadefoot (*Scaphiopus h. holbrookii*)

(Massachusetts Threatened Species)

Description

The Eastern Spadefoot is a medium-sized, smooth-skinned toad with small, scattered warts. Distinguishing characteristics are a bright golden eye with a vertical pupil and a dorsal pattern of two golden stripes (Klemens, 1993). A spade-like, black horny projection is located on the inner border of the foot. The call is a short, explosive, low-pitched “wank” repeated every two seconds (Martof, 1980).

Reported Habitat

Available literature describing this species reports that spadefoots require dry sandy or loose soils in areas of sparse shrub growth of open forest areas (DeGraaf and Rudis, 1983). In addition, this species breeds only in shallow, temporary pools formed after very heavy, warm rains and may be found in large numbers when rainfall is extensive (Martof, 1980). The NHESP-described natural communities with which this species is associated and that may exist at the subject site include Coastal Interdunal Marsh/Swale, Wet Meadow, and Shrub Swamp.

Methodology for Identification and Mapping of Habitat

Fieldwork to identify suitable habitats for the Eastern Spadefoot will involve location of all isolated depressions within the defined limits of the survey area that may temporarily hold water after significant rainfalls. Once these isolated areas are identified, these areas will be observed during and within five days of following a significant rainfall event in order to observe breeding activity (i.e. mating pairs or vocalizations) or evidence of this activity (i.e., egg masses). At least one evening observation period will be performed in the period between the mid-July and mid-September, when the breeding season is reported to end. We intend to acquire a recording of this species vocalization and use this recording during the evening observation period. The locations of all potential and known breeding habitats will be mapped and any individuals observed will be photographed and the location(s) in which they were observed will be located by GPS. In addition, a Rare Animal Observation Form will be completed for submission to the NHESP.

References

Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Eastern Spadefoot

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England, Amherst, Massachusetts: The University of Massachusetts, 1983.

Klemens, Michael W., Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 12, Connecticut DEP, 1993.

Martof, Bernard S., W. M. Palmer, J. R. Bailey, J. R. Harrison. Amphibians and Reptiles of the Carolinas and Virginia. The University of North Carolina Press, Chapel Hill, 1980.



DRAFT

Eastern Box Turtle (*Terrapene c. carolina*)

(Massachusetts Species of Special Concern)

Description

The Eastern box turtle is a small to medium-sized (4.5 to 8-inch) terrestrial turtle, recognized by its domed, globular carapace with a pattern of orange or yellow markings on a dark brown or black background. Adults have varying amounts of yellow, orange, and pink pigment on the head, neck, throat, and forelimbs (Klemens, 1993).

Reported Habitat

Available literature describing this species reports that this species uses a relatively wide range of terrestrial habitat types, including woodlands, field edges and thickets (DeGraaf and Rudis, 1983). These habitats are generally characterized by sandy, well-drained soils and, despite this species association with terrestrial habitats, they have been found in various wetland habitat types including wet meadows and lowland swamps (Klemens, 1993). The Massachusetts NHESP-described natural communities with which this species is associated include Coastal Forest/Woodland and Pitch Pine-Oak Forest.

Methodology for Identification and Mapping of Habitat

The Horsley Witten Group (HW) will perform meander surveys for the Eastern Box Turtle within each habitat type at the site. The primary habitat types at this site within which searches will predominantly be done will be any coastal forest/woodland or pitch pine-oak forest habitat, and the margins (i.e., "edge areas") between these wooded habitats and any open field or wet meadow habitats encountered. As this species is strictly diurnal, field surveys specifically performed to observe this species will be done in the early morning and/or during the day immediately following thunderstorms when the species is reported to be active (Klemens, 1993). HW will document any box turtle encountered by recording its observed location with a GPS unit (for habitat mapping purposes), its apparent activity (nesting, aestivation, direction of travel, etc.), a description of the habitat in which the individual animal was observed, and any characteristic markings, including evidence of injury to the animal. Photographs of each individual will be collected. A Rare Animal Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program. Any box turtle remains will be documented as well.

References

Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Eastern Box Turtle

DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England, Amherst, Massachusetts: The University of Massachusetts, 1983.

Klemens, Michael W., Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 12, Connecticut DEP, 1993.

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Horsley Witten Group
Sustainable Environmental Solutions

90 Route 6A • Sandwich, MA • 02563
Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com



Memorandum

TO: Mr. William Richardson, Edwards and Kelcey
FROM: Amy M. Ball
DATE: July 30, 2004
RE: Provincetown Rare Species Habitat Evaluations

Horsley Witten Group has received verbal feedback from Dr. Jon Regosin at the Massachusetts Natural Heritage and Endangered Species Program (NHESP) regarding our proposed field protocols for assessing the potential habitat for the four state-listed species identified at the Provincetown Airport site. Several individuals at NHESP reviewed our proposed protocols and provided us with input. I have incorporated these comments into our revised field protocols (see attached) with a brief summary for each species provided below.

NHESP has requested that we modify our protocols to include the following specifications:

Vesper Sparrow

- Surveys should be conducted between the hours of 5:30-10:00 a.m. and 6:00 to 8:00 p.m. during three (3) evenly spaced surveys between May 1st and July 31st;
- Field conditions should not be windy or rainy;
- Walking transects should be established approximately 150 meters apart within all grassland areas and at the edges of paved areas;
- Surveys should include both listening and visual surveys (broadcasting during surveys, as we had proposed, is not essential, but may be useful);
- Locations of all species observed should be plotted;
- All adults observed carrying food should be indicated; and
- Observers should also note any observations of two other bird species which utilize the same habitat types: the Grasshopper Sparrow (*Ammodramus savannarum*) and the Northern Harrier (*Circus cyaneus*).

Broom Crowberry

- Survey areas should be expanded to include Pitch Pine forested areas as well as sandplain grassland areas;
- Survey protocols should refer to the *NHESP Plant Survey Protocols*, noting precisely when and how the surveys were conducted;
- Reporting should include an overall description of the plant community in which a rare species was observed; and
- Reporting should include a complete list of vascular plants observed during the rare plant survey, including any other rare species encountered.

Spadefoot Toad

- Initial surveys should include a general assessment of isolated wet areas;
- Surveys for actual individuals should be conducted from April through September, when this species is most active; and
- Surveys should be conducted after a storm event; approximately once every three (3) weeks with a focus on the tadpole stage (this species has a three week aquatic larval stage).

Eastern Box Turtle

- Walking transects should be set up, focusing efforts on prime habitat areas:
 - (a) Edges of ecotones
 - (b) Mesic areas
 - (c) Wetland edges;
- Surveys should be conducted after a storm event with an ideal focus on spring and late fall; and
- Shells of all (live) individuals encountered should be carefully notched to assist in general population study efforts.

Essentially, the NHESP has granted us permission to begin this fieldwork, as long as we incorporate their comments and specifications into our protocols. I will be seeking written confirmation from the NHESP to that effect. Note that the NHESP comments regarding the surveys for the Vesper Sparrow, and to a lesser degree for the Eastern Box Turtle and the Spadefoot Toad, will necessitate our continuing rare species survey work into next spring. At this time I am not certain how this would affect the project timeline that was presented to the FAA and MAC. At the very least, we can still document the potential habitat for these species, as our intent is to identify the habitat for the rare animal species, rather than documenting actual individuals, for project planning purposes.

In the interim, we are planning to begin the rare species fieldwork the first to second week in August. We will coordinate with the Airport Manager, Butch Lisenby, regarding security identification for all field personnel involved.

Mr. William Richardson
July 30, 2004
Page 3 of 3

We should discuss our approach to contacting the Cape Cod Commission (CCC) to give them some notice on our fieldwork related to wildlife habitat. I would recommend keeping contact with the CCC informal at this point, particularly since there is no definitive proposal for the upcoming projects. Given the proposed timing for some of our rare species habitat surveys, we would also be able to collect information toward our Natural Resources Inventory (NRI) that is required by the CCC (i.e., early morning and early evening field surveys). However, we would anticipate that the bulk of the NRI fieldwork would occur between September and November, as per their Technical Bulletin guidelines..

cc: Joseph Longo
D. Michael Ball

NHESP-Approved Rare Species Habitat Assessment Protocols

Vesper Sparrow (*Pooecetes gramineus*)

(Massachusetts Threatened Species)

Description

The Vesper Sparrow is a small, short-tailed grayish-brown sparrow with a streaked breast. Unique characteristics include a notched, black tail with white outer tail feathers that are conspicuous during flight.

Reported Habitat

This species is reported to inhabit open areas (cultivated fields, grasslands, fallow fields, and pastures) as well as sandplain heathlands with clump-forming grasses, bare patches, and scattered shrubs or saplings growing in typically dry and well drained soils. This type of habitat serves as nesting habitat, cover, foraging sites, and singing perches for the Vesper Sparrow. The NHESP- described natural community with which this species is associated is Cultural Grassland (formerly described as Sandplain Grassland – Cultural Community), which is often a maintained, open community dominated by grasses, normally maintained by mowing.

Methodology for Identification of Habitat

Three (3) evenly spaced surveys will be conducted between May 1st and July 31st, between the hours of 5:30-10:00 a.m. and 6:00 to 8:00 p.m., during non-windy, non-rainy conditions. Surveys for the Vesper Sparrow and its habitat will concentrate on managed grassland areas adjacent to airport runways and taxiways, as well as target areas of open grassland habitat and at the edges of paved areas within and immediately adjacent to the airport facility. Walking transects will be established approximately 150 meters apart.

Field surveys will include both listening and visual surveys. As this species is known to frequently sing during the early evening hours, habitat assessments will be timed appropriately. Field investigators may solicit territorial singing by playing recorded vocalizations of this species, and may attempt to record species response to these recordings.

Any individual Vesper Sparrow encountered will be documented and its location plotted, its activity (nesting, foraging, singing, etc.), including observations of adult individuals carrying food, and a description of the habitat occupied. Photographs will be taken as obtainable. A Rare Animal Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program. Observers will also document any observations of two other bird species, which utilize the same habitat types: the Grasshopper Sparrow (*Ammodramus savannarum*) and the Northern Harrier (*Circus cyaneus*). Incidental bird species observed within these areas will also be recorded.

References

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Connecticut Department of Environmental Protection, Wildlife In Connecticut Endangered And Threatened Species Series, Vesper Sparrow (*Pooecetes gramineus*) website.
<http://dep.state.ct.us/burnatr/wildlife/factshts/vesp.htm>

New Jersey Department of Environmental Protection, Endangered Species Program website
www.nj.gov/dep/fgw/ensp/pdf/end-thrtened/vespersparrow.pdf

NatureServ Explorer Fact Sheet on Vesper Sparrow

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1988. The birder's handbook: a field guide to the natural history of North American birds. New York: A Fireside Book published by Simon & Schuster, Inc., 785 pp.

Eastern Box Turtle (*Terrapene c. carolina*)

(Massachusetts Species of Special Concern)

Description

The Eastern box turtle is a small to medium-sized (4.5 to 8-inch) terrestrial turtle, recognized by its domed, globular carapace with a pattern of orange or yellow markings on a dark brown or black background. Adults have varying amounts of yellow, orange, and pink pigment on the head, neck, throat, and forelimbs (Klemens, 1993).

Reported Habitat

Available literature describing this species reports that this species uses a relatively wide range of terrestrial habitat types, including woodlands, field edges and thickets (DeGraaf and Rudis, 1983). These habitats are generally characterized by sandy, well-drained soils and, despite this species association with terrestrial habitats, they have been found in various wetland habitat types including wet meadows and lowland swamps (Klemens, 1993). The Massachusetts NHESP-described natural communities with which this species is associated include Coastal Forest/Woodland and Pitch Pine-Oak Forest.

Methodology for Identification and Mapping of Habitat

The Horsley Witten Group (HW) will perform meander surveys along walking transects for the Eastern Box Turtle within each habitat type at the site. The primary habitat types at this site within which searches will predominantly be done will be any coastal forest/woodland or pitch pine-oak forest habitat, along edges of ecotones (i.e., "edge areas") between these wooded habitats and any open field or wet meadow habitats, and into the wetland edges.

As this species is strictly diurnal, field surveys specifically performed to observe this species will be done in the early morning and/or during the day immediately following storm events when the species is reported to be most active (Klemens, 1993). Surveys will occur primarily in the spring and fall.

HW will document any box turtle encountered by recording its observed location with a GPS unit (for habitat mapping purposes), its apparent activity (nesting, aestivation, direction of travel, etc.), a description of the habitat in which the individual animal was observed, and any characteristic markings, including evidence of injury to the animal. Photographs of each individual will be collected and shells will be carefully notched (for general population study efforts). A Rare Animal Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program. Any box turtle remains will be documented as well.

References

- Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Eastern Box Turtle
- DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England, Amherst, Massachusetts: The University of Massachusetts, 1983.
- Klemens, Michael W., Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 12, Connecticut DEP, 1993.
- Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Broom Crowberry (*Corema conradii*)

(Massachusetts Species of Special Concern)

Description

Broom Crowberry is a low-growing, densely branching evergreen shrub with tiny leaves. This species blooms between March and May with inconspicuous reddish purple flowers. Summer growth is characterized by a bright yellow-green coloration, distinguishing this species from similar heather-like plants.

Reported Habitat

This species inhabits open areas (low shrub or moor communities or sandy flats, as well as dry pitch pine/scrub oak barrens and relic sand dunes. Associated species include scrub oak (*Quercus ilicifolia*), pitch pine (*Pinus rigida*), golden heather (*Hudsonia ericoides*), and bearberry (*Arctostaphylos uva-ursi*). The NHESP- described natural communities with which this species is associated include Scrub Oak Shrubland and the Pitch Pine – Scrub Oak Community.

Broom Crowberry was previously recorded at the Provincetown Municipal Airport in the managed grassland habitat southwest of the glide slope antennae. The airport's current environmental consultant has documented additional records of this species within a developing sandplain grassland habitat. All documented occurrences of this species will be incorporated within any future project development.

Methodology for Identification and Mapping of Habitat

Horsley Witten Group (HW) will conduct meander surveys for Broom Crowberry, targeting areas of open grassland habitat and/or sandplain grasslands/heathlands, as well as pitch-pine forested areas with associated plant communities (described above) to search for occurrences of Broom Crowberry located in and immediately adjacent to the airport facility.

Survey protocols will follow the guidelines outlined in the *NHESP Plant Survey Protocols*, noting precisely when and how the surveys were conducted, and following reporting guidelines for all occurrences of this species.

The location of any Broom Crowberry communities encountered within the site will be recorded by field measurements (when practical) and by using a GPS unit for potential future mapping. Documentation will include photographs and a description of the habitat occupied, including the associated plant community. A Rare Plant Observation Form will be completed for submission to the Massachusetts Natural Heritage and Endangered Species Program.

References

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Broom Crowberry (1985).

Eastern Spadefoot (*Scaphiopus h. holbrookii*)

(Massachusetts Threatened Species)

Description

The Eastern Spadefoot is a medium-sized, smooth-skinned toad with small, scattered warts. Distinguishing characteristics are a bright golden eye with a vertical pupil and a dorsal pattern of two golden stripes (Klemens, 1993). A spade-like, black horny projection is located on the inner border of the foot. The call is a short, explosive, low-pitched “wank” repeated every two seconds (Martof, 1980).

Reported Habitat

Available literature describing this species reports that spadefoots require dry sandy or loose soils in areas of sparse shrub growth of open forest areas (DeGraaf and Rudis, 1983). In addition, this species breeds only in shallow, temporary pools formed after very heavy, warm rains and may be found in large numbers when rainfall is extensive (Martof, 1980). The NHESP-described natural communities with which this species is associated and that may exist at the subject site include Coastal Interdunal Marsh/Swale, Wet Meadow, and Shrub Swamp.

Methodology for Identification and Mapping of Habitat

Fieldwork to identify suitable habitats for the Eastern Spadefoot will involve location of all isolated depressions within the defined limits of the survey area that may temporarily hold water after significant rainfalls. Once these isolated areas are identified, these areas will be observed approximately once every three (3) weeks following significant rainfall events from April through September in order to observe evidence of breeding activity (i.e. mating pairs or vocalizations) with an emphasis on the tadpole larval stage. At least one evening observation period will be performed in the period between the mid-July and mid-September, when the breeding season is reported to end. We intend to acquire a recording of this species vocalization and use this recording during the evening observation period. The locations of all potential and known breeding habitats will be mapped and any individuals observed will be photographed and the location(s) in which they were observed will be located by GPS. In addition, a Rare Animal Observation Form will be completed for submission to the NHESP.

References

Massachusetts Natural Heritage and Endangered Species Program Fact Sheet – Eastern Spadefoot

Swain, Patricia, C., and J.B. Kearsley. Classification of the Natural Communities of Massachusetts. Natural Heritage and Endangered Species Program - Massachusetts Division of Fish and Wildlife, Westborough, Massachusetts, DRAFT July 2000.

DeGraaf, Richard M. and Rudis, Deborah D. Amphibians and Reptiles of New England, Amherst, Massachusetts: The University of Massachusetts, 1983.

Klemens, Michael W., Amphibians and Reptiles of Connecticut and Adjacent Regions. State Geological and Natural History Survey of Connecticut, Bulletin 12, Connecticut DEP, 1993.

Martof, Bernard S., W. M. Palmer, J. R. Bailey, J. R. Harrison. Amphibians and Reptiles of the Carolinas and Virginia. The University of North Carolina Press, Chapel Hill, 1980.



Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife

Please submit field forms, a copy of a USGS map, and all supporting documentation to the State Botanist at:

1 Natural Heritage and Endangered Species Program
2 Massachusetts Division of Fisheries and Wildlife
Route 135, Westborough MA 01581
(508) 792-7270 Ext. 200

RARE PLANT OBSERVATION FORM

SPECIES SCIENTIFIC NAME: *Corema conradii*

Element Occurrence No., if known:

Observation Date: 8-24-04 (initial)

Today's Date: 01-17-06

Population Found? Yes No

Observed By: Michael Ball of the Horsley Witten Group, Inc.

Other Observers: Jennifer McKay, Amy Ball

Observer's Address: 90 Route 6A Sandwich, Massachusetts 02563

Observer's Email Address: mball@horsleywitten.com

Telephone: 508-833-6600 ext. 105

Photograph Taken? Yes No (if yes, please attach, and label back with your name, date taken, and the location)

Specimen Collected? Yes No Collection #

Repository:

Site Name (informal): Provincetown Airport

USGS Topo Name: Provincetown

County: Barnstable

Town: Provincetown

Directions to the rare plant population (if found), or search area (if not found). **Mark the location on a copy of the USGS topo map.**

Proceed to the glide slope antenna structure near the southwest end of the airport runway. At building face west. The slightly elevated, open grassland community in front of you supports the population of this rare plant. (On date of observation each mound of crowberry observed was marked with a numbered pink pin flag. However, we expect that only the metal pins remains and not the flagging material.)

GPS Coordinates: System used (check one): UTM Lat-Long Mass. State Plane Datum:

At, or near, the center of the population:

or:

Least-rectangle (i.e., the coordinates delimiting the north, east, south, and west corners of the population):

North East South West

Has the full extent of the population been determined? (check one) yes; no; uncertain whether full extent is known

Identification Problems? Yes No **Explain:**

Diagnostic Characters used: much branched bushy shrub to 5dm tall, 2m wide; lvs linear, 3-6 mm **Reference used:** Gleason & Cronquist

Do other members of the genus or look-alike plants occur at this site? Yes No

Explain: *Hudsonia* also present; however, the two species are fairly distinctive

Population Data

Approximate Area Occupied by the Population (check appropriate unit): apx. 1,850 sq. m ha sq. ft sq. yds acres

Population Size:

Total number of "genets" (i.e., genetically distinct, or clearly separate individuals): 52 (Precise count or estimate?)

and/or

Total number of "ramets" (e.g., stems or shoots arising from clones): (Precise count or estimate?)

Population Structure (check all that apply):

Age Classes Present

- Seedlings
 Immature plants
 Mature plants
 Plants of unknown age

Reproductive Condition of the Population on this Date

- Vegetative (in leaf) Mature fruit
 In bud Seed dispersing
 In flower Senescent
 Immature fruit Dormant

How would you characterize the vigor of this population? Excellent Good Fair Poor

Evidence of Disease, Predation, or Injury? No

Pollinators: unknown

Environmental Setting

Describe the plant community and list the associated species:

Population is located adjacent to an airport runway in a Cultural Grassland community that is maintained by regular mowing.

Other observed plant species comprising this habitat included Hudsonia tomentosa, Schizachyrium scoparius, Danthonia spicata, Holcus lanatus.

List any exotic plant species present and discuss their possible impacts:

Exotics including Holcus lanatus, Festuca ovina, and Poa pratensis were observed as part of the plant community, but not in significant amounts.

Describe evidence of natural or human-caused disturbance (including changes in ecological processes) and effects on population:

Maintenance by infrequent mowing may benefit the species by maintaining conditions favorable for its growth.

Surrounding Land Use: *municipal airport*

Elevation: <10 ft. or m?

Soil Type(s): *Hooksan - Beaches - Dune Land*

Surficial Geology: *Dune / Interdunal Swale*

Bedrock Geology: *unknown*

Check Appropriate Habitat Descriptors:

<u>Landform/Topography</u>	<u>Aspect</u> °	<u>Slope</u> %	<u>Light</u>	<u>Soil Moisture Regime</u>	<u>Important Ecological Processes</u>
<input type="checkbox"/> summit/crest	<input type="checkbox"/> N <input type="checkbox"/> NE	<input checked="" type="checkbox"/> flat	<input checked="" type="checkbox"/> open	<input type="checkbox"/> xeric	<input type="checkbox"/> seasonal or regular flooding
<input type="checkbox"/> upper slope	<input type="checkbox"/> E <input type="checkbox"/> SE	<input type="checkbox"/> gentle	<input type="checkbox"/> filtered	<input checked="" type="checkbox"/> dry	<input type="checkbox"/> groundwater seepage
<input type="checkbox"/> mid slope	<input type="checkbox"/> S <input type="checkbox"/> SW	<input type="checkbox"/> average	<input type="checkbox"/> shade	<input type="checkbox"/> mesic	<input type="checkbox"/> colluvial processes
<input type="checkbox"/> lower slope	<input type="checkbox"/> W <input type="checkbox"/> NW	<input type="checkbox"/> rather steep		<input type="checkbox"/> wet	<input type="checkbox"/> alluvial processes
<input type="checkbox"/> rolling terrain/plain	<input checked="" type="checkbox"/> flat/variable	<input type="checkbox"/> steep		<input type="checkbox"/> inundated	<input checked="" type="checkbox"/> wind/salt spray
<input checked="" type="checkbox"/> flood plain/terrace		<input type="checkbox"/> very steep			<input type="checkbox"/> erosion
<input type="checkbox"/> wetland		<input type="checkbox"/> abrupt			<input type="checkbox"/> fire
<input type="checkbox"/> shore/pond/lake/stream					<input type="checkbox"/> none apparent

Describe Microhabitat Conditions:

Conservation Information

Land Owned/Managed by:

Name(s)

Address

Telephone

CC National Seashore / NPS

Marconi Site Road, South Wellfleet

(508)-349-3785

P-Town Municipal Airport

Race Point Road, Provincetown

(508)-487-0241

Managed Area Name: *Provincetown Municipal Airport*

Contact Person: *Arthur "Butch" Lisenby (Mgr.)*

Owner Comments:

Are any *past* or *existing* negative impacts on the Element Occurrence evident? What additional factors might *potentially* threaten the population?

None

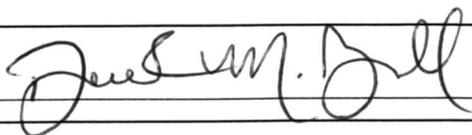
What are your recommendations for future inventory, monitoring, research, and/or management?

Annual count of individual genets. Continue existing maintenance practice of mowing area.

What are your protection recommendations? *Continue existing maintenance of area to maintain plant community structure.*

Additional Comments:

Signature: _____



Date: _____

1/17/06

For office use only: Relative Size: _____ Relative Condition: _____ Relative Landscape Context: _____ MA EO Rank: _____

MA EO Rank Comments: _____

Global EO Rank: _____ Global EO Rank Comments: _____

Sketch:

Use this space to draw or diagram useful information about the rare plant occurrence, such as its location relative to landmarks and habitat features. Consider depicting, for instance, a vertical cross section of a population's position on a ledge or slope, or how a population is distributed in clumped patches in the habitat relative to boulders, stone walls, brooks, trees, etc.

SEE ATTACHED FIGURES.

Please:

**Don't forget to attach a copy of a USGS topo map indicating the location of the rare plants or the search area!
Mark the location of the rare plants as precisely as possible, and label with the map source, date and species name.**

