Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

August 8, 2014

Arthur Lisenby
Provincetown Airport Commission
176 Race Point Road
Provincetown, MA 02657

George Price
Cape Cod National Seashore
99 Marconi Site Road
Wellfleet, MA 02667

RE: Project Location: Provincetown Municipal Airport
Project Description: Capital Improvements Program
NHESP File No.: 04-15716

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist other required materials for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

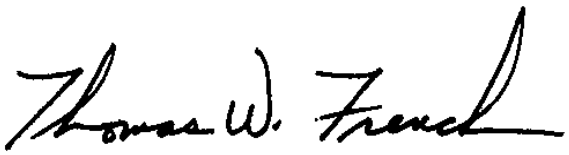
The Division is concerned that the proposed projects will either directly harm and/or disrupt the breeding and foraging behavior of state-listed species during construction, including the Eastern Box Turtle (*Terrapene carolina*), Eastern Spadefoot (*Scaphiopus holbrookii*), and the Vesper Sparrow (*Pooecetes gramineus*). Based on the information provided and the information contained in our database, the NHESP finds that this project, as currently proposed, **must be conditioned in order to avoid a prohibited "take"** of state-listed species (321 CMR 10.18(2)(a)). We note that you have been regularly consulting with the Division on the design and implementation of the various proposed project elements. As stated in the most recently submitted information, a final "Construction Management Plan for Environmental Compliance" will be developed to include information on construction timing, phasing, methods, and rare species protective measures. Said plan shall be submitted to the Division for review and written approval and shall be implemented during construction.

Provided the above-noted condition is fully implemented and there are no changes to the project plans, this project will not result in a "take" of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

Division of Fisheries and Wildlife
Temporary Correspondence: 100 Hartwell Street, Suite 230, West Boylston, MA 01583
Permanent: Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890
An Agency of the Department of Fish and Game

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Eve Schlüter, Ph.D., Senior Endangered Species Review Biologist, with any questions about this letter at (508) 389-6346 or eve.schluter@state.ma.us.

Sincerely,



Thomas W. French, Ph.D.
Assistant Director

cc: Michael Garrity, Jacobs Engineering

Rare Species Protection Plans (DRAFT)

Provincetown Municipal Airport

NHESP Tracking No. 04-15716

Introduction

The following draft Rare Species Protection Plans are intended to address the short and long-term protection of the three rare species identified at the Provincetown Municipal Airport (PVC), including Eastern Box Turtle (*Terrapene carolina*), Vesper Sparrow (*Pooecetes gramineus*), and Eastern Spadefoot (*Scaphiopus holbrookii*). These measures are broken down by species, although given the overlapping habitat requirements, some of these measures will be applicable to more than one species. Project-specific rare species protection plans will be developed and finalized in conjunction with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) in accordance with the MESA decision issued August 2014, and in consultation with National Park Service (NPS) scientists.

Construction activities will generally occur during the "off-season" (i.e., after Labor Day (on or about the first week in September) and before Memorial Day (the last week in May) annually, as permitted projects are funded. A schedule of the projected construction sequence will be developed during permitting. This will allow construction activities to occur outside of the most active periods for the Eastern Box Turtle, Vesper Sparrow, and Eastern Spadefoot. However, it is recognized that there will be some overlap of these species' active periods, and as such, measures will be set in place to avoid potentially harmful encounters with each of these species.

Generally, these measures include provisions for pre-construction precautionary measures, implementation of an on-site/on-call Environmental Monitor during construction activities, and long-term monitoring and maintenance measures, including implementation of a Vegetation Management Plan.

Environmental Monitor

A qualified and NHESP-approved biologist or ecologist will be retained to serve as the Environmental Monitor (EM) overseeing all aspects of construction to further the avoidance of adverse impacts to the rare species during and immediately following construction activities as well as to promote their protection.

The EM will obtain a Scientific Collection Permit prior to conducting pre-construction surveys for rare species at the Airport, and will renew this Collection Permit on an annual basis, as necessary, for the duration of the construction activities.

The EM will be the only designated individual permitted to handle any rare species encountered during construction activities. This individual is responsible for reporting any encounters with these species to NHESP and will prepare Rare Animal Observation Reports, which will include the submission of a Rare Animal Observation Form to NHESP within 10-days of a rare-species encounter along with preparation of an annual wildlife monitoring report during construction.

The EM will provide materials (i.e., fact sheets and photographs) and training to promote and ensure construction contractors and supervisors and other Airport personnel are aware of all four rare species at the Airport and are capable of readily identifying them. Prior to construction activities, the EM will provide education on proper species identification and proper protocol if a rare animal is encountered during construction activities. The EM will provide his or her contact information to all contractors and Airport personnel. As wireless networks are generally unavailable at the Airport, the EM will be equipped with a walkie-talkie device to facilitate communications while on-site.

Eastern Box Turtle (*Terrapene carolina*) Protection Plan

The following measures have been developed to avoid impacts to and protect the Eastern Box Turtle population at the Airport through a combination of efforts to be conducted prior to, during and following construction and implementation of the improvement projects.

Pre-Construction (Proactive) Protection Measures

- Temporary barriers (e.g., silt fence) will be installed to exclude turtles from entering the construction zone. The barrier may be constructed to fully discourage turtles from breaching the limit of work (e.g., angling fence ends outward to divert turtles away from the work zone). The barrier will be toed-in to an acceptable depth (4 to 6 inches) and installation will minimize vegetation disturbance.
- Pre-construction surveys will be conducted to ensure that turtles or potential nest sites are not present within the construction zone. Surveys will be conducted on non-consecutive days with weather conditions characteristic of higher levels of box turtle activity. Particular attention will be paid to areas with large, woody or piled debris. Any turtles found will be relocated outside the temporary barrier in appropriate adjacent (on-site) forested upland or dense shrub community habitat conditions, near to, but outside of the proposed construction zone. Turtles will be placed at least 20 feet within a forested treeline. All turtles encountered will be documented with a NHESP Rare Animal Observation Form and accompanying photographic evidence and data sheet within 10 days of the observation.

- Construction will be timed so as to avoid periods characteristic of peak activity (approximately mid-April through October, depending upon seasonal variability) for the Eastern Box Turtle.

Active Protection Measures During Construction

- Construction activities will not occur during times of peak activity of the Eastern Box Turtle.
- Personnel will follow proper survey protocol as defined in the pre-construction protection measures. Thorough searches will be conducted for any turtle individuals that may have breached the temporary barrier during construction on a routine basis.
- The temporary barrier (silt fence) will be checked daily by persons familiar with siltation barrier maintenance to ensure that the barrier is maintained in good condition (to discourage breaches) throughout the entire construction period. The silt fence barrier will be repaired, as necessary. Materials will be available on-site to repair the barrier at all times.
- If an Eastern Box Turtle is encountered within the construction zone, authorized personnel (EM) must conduct a full survey evaluation within the limit of work to check for additional turtles that may have entered the area within 48 hours of the initial observation. The EM will also check for potential nest sites within the construction zone.
- The temporary barrier will be removed in a timely fashion after all work is completed and will be disposed of properly.
- Work equipment and materials will be staged close to project sites and away from areas that may impact the species. Documented checks of the staging areas for construction vehicles would be conducted to ensure that turtles are not in the area and in danger of being run over. Any turtle found within the staging area will be relocated in adjoining habitat outside the work zone.

Post-Construction (Long-Term) Protection Measures/Habitat Enhancement

- Vegetation maintenance will be timed and conducted so as to avoid peak turtle activity and avoid potential impacts to the species. Brush cutting will occur outside of the active season for this species (i.e., after November 1st and before March 15th, again depending upon seasonal variability). In addition, mowing will be conducted using equipment with specialized mowing blades and blade heights that are documented to be less harmful to box turtles.
- The proposed perimeter fence will incorporate wildlife gaps along the bottom of the structure so as to not discourage the natural movements of Eastern Box Turtles

throughout the Airport. The wildlife gaps will occur every 100 feet along the fence line and shall be approximately eight inches tall. These small passageways will be monitored on a routine basis to ensure that the gaps are not blocked by debris or moved sand.

Vesper Sparrow (*Pooecetes gramineus*) Protection Plan

Measures have been developed to protect and avoid detrimental impacts to the Vesper Sparrow population at the Airport through a combination of efforts that will be conducted prior to, during, and following construction and implementation of the improvement projects.

Pre-Construction (Proactive Protection) Measures

- A NHESP-approved wildlife biologist will provide materials (i.e., fact sheets and photographs) and training to promote and ensure worker awareness of the species. Personnel will be educated on proper identification and associated protection protocols if a Vesper Sparrow is encountered during work activities. Personnel will also be trained as to standard Vesper Sparrow search methodologies and will be familiarized with Rare Animal Observation Reports in order to document all observed Vesper Sparrows.
- A protocol for any injured sparrows that are encountered and proper emergency care and wildlife rehabilitation center contacts will be established.
- Pre-construction surveys will be conducted to ensure that Vesper Sparrows and nesting areas are not present within the construction zone. Surveys will be conducted on days with weather conditions characteristic of high levels of sparrow activity. All Vesper Sparrows encountered will be documented with a NHESP Rare Animal Observation Form, accompanying photographic evidence, and a data sheet within 10 (ten) days of the observation.
- A contingency plan will be developed in the instance that a viable Vesper Sparrow nest is encountered within the construction zone prior to or during all construction related activities.
- Construction will be timed so as to avoid times characteristic of peak Vesper Sparrow activity and nesting.
- NHESP-approved personnel will obtain a Scientific Collection Permit prior to conducting surveys for Vesper Sparrows.

Active Protection Measures During Construction

- Authorized personnel will follow proper survey protocol as defined in the pre-construction protection measures and will conduct thorough searches for any Vesper Sparrows that may have entered the work area during construction on a routine basis.

- Construction will not occur during periods that are characteristic of peak Vesper Sparrow activity and nesting.
- If a Vesper Sparrow or a Vesper Sparrow nest is encountered within the construction zone, personnel must conduct a full survey evaluation within the limit of work to check for additional birds and nests that may be present in the area within 48 hours of the initial observation.
- A contingency plan will be in place in the instance that a viable Vesper Sparrow nest is encountered within the construction zone during all construction related activities or if an injured Vesper Sparrow is discovered.
- Work equipment and materials will be staged close to project sites and away from areas that may impact the species.

Post-Construction (Long-Term) Protection Measures/Habitat Enhancement

- The Airport will experience a net gain in Cultural Grassland habitat, which will directly increase the amount of available Vesper Sparrow nesting habitat. This may be viewed as long-term protection and habitat enhancement through a gain in habitat area.
- Perching posts (of an Airport-approved height) may be installed on the outskirts of the airfield to increase available perching locations and to enhance the quality of Vesper Sparrow habitat at the Airport.
- Vegetation Maintenance will be timed and conducted so as to avoid peak Vesper Sparrow activity and to avoid potential impacts to the species and their nests. A wildlife biologist may conduct pre-mowing and brush-cutting surveys to confirm that the species will not be impacted by these activities prior to each vegetation maintenance event. In addition, the wildlife biologist may work in tandem with the mower and traverse areas in front of the machinery to further ensure Vesper Sparrows are not within the maintenance zone during mowing activities.

Eastern Spadefoot (*Scaphiopus holbrookii*) Protection Plan

Measures have been developed to avoid impacts to and protect the Eastern Spadefoot population at the Airport through a combination of efforts to be conducted prior to, during, and following construction and implementation of the improvement projects.

Pre-Construction (Proactive Protection) Measures

- A NHESP-approved wildlife biologist will provide materials (i.e., fact sheets and photographs) and training to ensure worker awareness of the species. Construction and Airport personnel will be educated on proper identification and subsequent protection protocol if an Eastern Spadefoot is encountered during work activities. However,

observations of the Eastern Spadefoot are perceived to be highly unlikely due to their nocturnal nature.

- Temporary barriers (i.e., silt fence) will be installed so as to exclude Eastern Spadefoot individuals from accessing the construction zone. The barrier may be constructed to fully discourage a spadefoot from breaching the limit of work (e.g., angling fence ends outward to divert the species away from the work zone). The barrier will be toed-in to an acceptable depth (4 to 6 inches) and installation will minimize vegetation disturbance.
- NHESP-approved personnel will obtain a Scientific Collection Permit prior to conducting surveys for the Eastern Spadefoot.
- Pre-construction surveys will be conducted to ensure that this species is not present within the construction zone. Surveys will be conducted on non-consecutive days with appropriate weather conditions. Any Eastern Spadefoot found will be relocated outside the temporary barrier in appropriate adjacent (on-site) upland habitat conditions, near to, but outside of the proposed construction zone. Discovered individuals will be placed at least 20 feet within appropriate upland. Encounters with this species will be documented with a NHESP Rare Animal Observation Form and accompanying photographic evidence and data sheet within 10 days of the observation.
- Construction will be timed so as to avoid periods that are characteristic of peak activity for the Eastern Spadefoot.
- Contingency protocol will be developed in the instance that an Eastern Spadefoot is excavated during any digging activities or if an injured spadefoot is encountered. Contact information and emergency protocol will be available so that personnel may have access to the appropriate wildlife rehabilitation center/specialist.
- Buffer zones to wetlands documented to be prime breeding habitat for the spadefoot will be established and incorporated into project design.

Active Protection Measures During Construction

- Construction activities will not occur during peak activity of the Eastern Spadefoot, especially during night hours.
- Personnel will follow proper survey protocol as defined in the pre-construction protection measures and will conduct thorough searches for any Eastern Spadefoot individuals that may have breached the temporary barrier during construction on a routine basis.
- The temporary barrier (silt fence) will be checked daily by persons familiar with siltation barrier maintenance to ensure that the barrier is maintained in good condition (to

discourage breaches) throughout the entire construction period and is repaired, as necessary. Materials should be available on-site to repair the barrier at all times.

- If an Eastern Spadefoot is encountered within the construction zone, authorized personnel must conduct a full survey evaluation within the limit of work to check for additional Eastern Spadefoot individuals that may have entered the area within 48 hours of the initial observation.
- The temporary barrier will be removed in a timely fashion after all work is completed and will be disposed of properly.
- Care will be taken to avoid digging activities in areas that may serve as optimal burrowing habitat for the Eastern Spadefoot to the fullest extent practicable.
- Contingency protocol will be in place in the instance that an Eastern Spadefoot is excavated during any digging activities or if an injured spadefoot is encountered. Contact information and emergency protocol will be available so that personnel may have access to the appropriate wildlife rehabilitation center/specialist.
- Construction equipment will not be allowed to work at night during peak season of the Eastern Spadefoot to avoid potential Eastern Spadefoot foraging or breeding activities, particularly if construction activities are occurring during a period where Spadefoot activity has been observed.
- Work equipment and materials will be staged close to project sites and away from areas that may impact the species.

Post-Construction (Long-Term) Protection Measures/Habitat Enhancement

- Vegetation maintenance will be timed and conducted so as to avoid peak Eastern Spadefoot activity and avoid potential impacts to the species.
- The proposed perimeter fence will incorporate wildlife gaps along the bottom of the structure so as to not discourage the natural movements of the species throughout the Airport. These small passageways will be monitored on a routine basis to ensure that the gaps are not blocked by debris or moved sand.
- Wetland restoration area plantings will be designed to yield more suitable breeding habitat in wetland restoration zones to enhance overall breeding habitat available at the Airport.

Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife
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Eastern Box Turtle

Terrapene carolina

State Status: **Species of Special Concern**
Federal Status: None

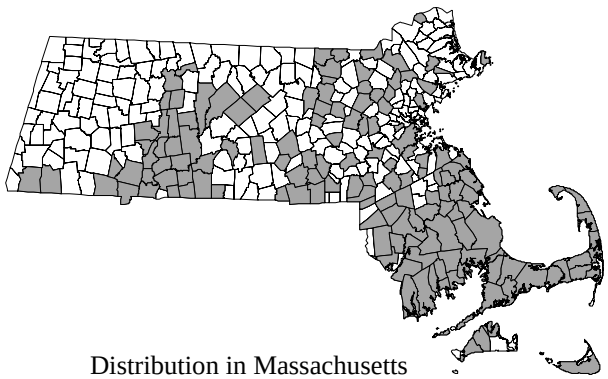
Photo by Liz Willey

DESCRIPTION: The Eastern Box Turtle is a small, terrestrial turtle ranging from 11.4–16.5 cm (4.5–6.6 in.) in length. It is so named because a hinge on the lower shell (plastron) allows it to enclose head, legs, and tail completely within the upper (carapace) and lower shells. The adult box turtle has an oval, high-domed shell with variable coloration and markings. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish blotches. The plastron typically has a light and dark variable pattern, but some may be completely tan, brown, or black. The head, neck, and legs also vary in color and markings, but are generally dark with orange or yellow mottling. The Eastern Box Turtle has a short tail and an upper jaw ending in a down-turned beak. The male box turtle almost always has red eyes, and females have yellowish-brown or some times dark red eyes. Males have a moderately concave plastron (female's are flat), the claws on the hind legs are longer and the tail is both longer and thicker than the females. Hatchlings have brownish-gray carapace with a yellow spot on each scute (scale or plate), and a distinct light colored mid-dorsal keel (ridge). The plastron is yellow with a black central blotch, and the hinge is poorly developed.

SIMILAR SPECIES: The Blanding's Turtle (*Emydoidea blandingii*) may be confused with the Eastern Box Turtle. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull into its shell but with less closure than in the Eastern Box Turtle. Both may have yellow markings on the carapace; however, the marking on a Blanding's Turtle are spots or flecks rather than blotches. An adult Blanding's Turtle is larger than the box turtle (15-23 cm; 6-9 in. in shell length). While both will be found nesting in similar habitat, the Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial. Eastern Box Turtle hatchlings could be confused with Spotted Turtle hatchlings, because both have spots on each scute. However, the Spotted Turtle lacks a mid-dorsal keel.

RANGE: The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although Eastern Box Turtles occur in many towns in Massachusetts, they are more heavily concentrated in the southeastern section of the state.

HABITAT IN MASSACHUSETTS: The Eastern Box Turtle is a terrestrial turtle, inhabiting many types of habitats. It is found in both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland.



Distribution in Massachusetts
1980 - 2006
Based on records in Natural Heritage Database

LIFE CYCLE & BEHAVIOR: The Eastern Box Turtle hibernates in the northern parts of its range from late October or November until mid-March or April depending on the weather. Box Turtles overwinter in upland forest, a few inches under the soil surface, typically covered by leaf litter or woody debris. As soil temperatures drop, the turtles burrow into soft ground. Overwintering is usually not communal, although several may overwinter within close proximity of one another. Some individuals may emerge prematurely during warm spells in winter and early spring. When this occurs they may perish from exposure if there's a sudden cold snap. During the spring, Box Turtles start to forage and mate in the forest and fields.

In summer, adult Box Turtles are most active in the morning and evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. They often scoop out a "form" (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms may be used on more than one occasion over a period of weeks. Though known as "land turtles", in hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, Box Turtles forage at any daylight hour.

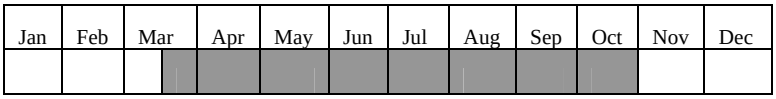
The Eastern Box Turtle is omnivorous, feeding on animal matter such as: slugs, insects, earthworms, snails, and even carrion. Box Turtles also have a fondness for mushrooms, berries, fruits, leafy vegetables, roots, leaves, and seeds.

Females reach sexual maturity at approximately 13 years of age. Mating is opportunistic and may take place anytime between April and October. Courtship begins with the male circling, biting, and shoving the female. After which the premounting and copulatory phases take place. Females can store sperm and lay fertile eggs up to four years after mating.

Females nest in June or early July and can travel great distances to find appropriate nesting habitat. They may travel up to approximately 1600 m (1 mile), many crossing roads during their journey. Nesting areas may be in early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits. Females sometimes exhibit nest site fidelity, laying eggs in close proximity to the previous years' nest. Females typically start nesting in the late afternoon-early evening and continue for up to five hours. Typically four or five white, elliptical eggs are deposited at intervals of one to six minutes, with the incubation period depending on soil temperature. Hatchlings emerge approximately 87–89 days after laying, usually in September. Juvenile Box Turtles are rarely seen, which is true of other turtle species as well.

During the first four or five years of life, box turtles may grow at a rate of half an inch to about three-quarters of an inch a year. The average life expectancy of a Box Turtle is 40 to 50 years, but it may live to be about 100.

ACTIVE PERIOD



THREATS: There are several reasons the Eastern Box Turtle is threatened in Massachusetts: habitat destruction resulting from residential and industrial development; road mortality; collection by individuals for pets; mowing of fields and early successional habitat during the active season; unnaturally inflated rates of predation in suburban and urban areas; disturbance of nest sites by ATVs; and genetic degradation due to the release of non-native (pet store) turtles. The release of non-native species could also transmit disease, which may become an issue in Massachusetts, but is not currently a problem.

MANAGEMENT RECOMMENDATIONS:
Using NHESP records, Eastern Box Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Box Turtles. Other considerations should include the size and lack of fragmentation of habitat and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs).

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private land-owners on the best management practices for Box Turtle habitat.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrade and road-widening projects within Box Turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for turtle conservation.

Educational materials need to be developed and distributed to the public in reference to the detrimental effects of keeping our native Box Turtles as pets (an illegal activity that slows reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases numbers of natural predators to turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Box Turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Motorized vehicle access to timber harvesting sites in Box Turtle habitat is restricted to the times when the Box Turtle is inactive during the winter, preferably when the ground is frozen. Motorized vehicles should not be used for soil scarification.

Finally, a statewide monitoring program is needed to track long-term population trends in Eastern Box Turtles.

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Updated: 2007

Natural Heritage & Endangered Species Program
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www.nhesp.org

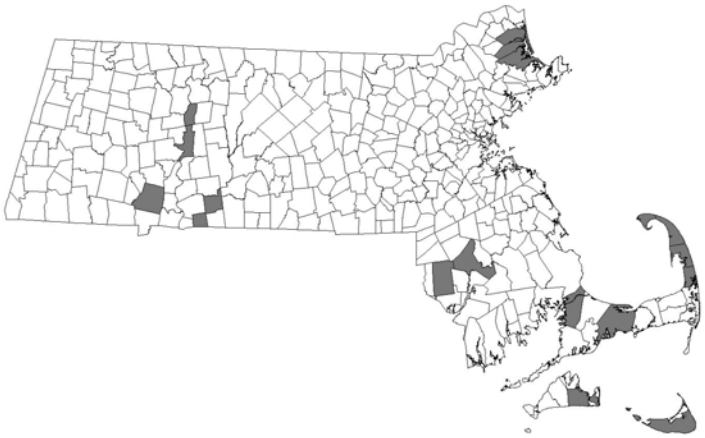
Eastern Spadefoot

Scaphiopus holbrookii

State Status: **Threatened**
Federal Status: **None**

Description: The Eastern Spadefoot, only 1.75-2.25" (4.4-5.7 cm) long, is a short-legged, squat, big-headed toad with unmistakable cat-like, vertically elliptical pupils. The grayish or blackish-brown with olive skin is fairly smooth and scattered with small warts. Two yellowish lines originate from each eye and run down the back to form a lyre-shaped pattern. Another light line runs along each side of the body. The toad's name comes from the horny, sharp-edged, sickle-shaped spade on the inner surface of the hind foot. It belongs to a primitive amphibian family that is neither a true frog nor a true toad.

Similar Species: The Eastern Spadefoot is the only toad in its family occurring east of the Mississippi River. It is distinguished from the true toads by its smoother skin, vertically elliptical pupils, and single sharp-edged spade on each hind foot.



Distribution in Massachusetts
1983-current
Based on records in Natural Heritage Database

Habitat: This burrowing species requires dry, sand or sandy loam soils characteristic of Pitch Pine barrens, coastal oak woodlands or sparse shrub growth, interspersed with temporary ponds. It prefers areas with leaf litter, and may be found in farmland areas. Colonies may occur within the floodplains of major rivers.

Life History: The Eastern Spadefoot is the most fossorial species of frog or toad in Massachusetts. It burrows up to eight feet below the ground's surface to hibernate during the cold months and to avoid desiccation during the rest of the year. It backs down into its burrow, digging with the hind feet and covering itself over with the fore feet. Spadefoots are secretive and nocturnal; activity peaks just after sundown and before sunrise. In the summer months, individuals remain in their burrows an average of 5-9 days between feedings.

In the warmer months, from April to September, the Spadefoot comes up to breed after prolonged warm and heavy rains. They emerge uttering explosive, low-pitched grunts, short in duration and repeated at brief intervals. Home range movements are estimated to be an average of 108 sq. ft./10 sq. m., 90% of which falls within an area of 67 sq. ft./6.2 sq. m. Spadefoots have been recaptured in the same ranges after 5 years. Individuals may live for several decades. Adults apparently produce noxious or distasteful skin secretions, because native predators usually ignore them.

Colonial breeding is initiated by heavy rainfall in April or May and lasts until August or September. This one or two night phenomenon has been likened to an orgy of raucous squawks and frantic courtship. Spadefoots breed in vernal

pools. The adhesive eggs, laid in masses or strings of 1000-2500, are draped over submerged twigs or grass, where they hatch in 5 to 15 days. Metamorphosis of larvae to adults is said to coincide with pond conditions; longer pond life results in longer larval life. In Essex County, a natural population metamorphosed in less than 4 weeks. Sexual maturity is reached during the second year after metamorphosis, males at 15 months and females at 19 months. Larvae feed on plankton for the first few days, later becoming vigorously carnivorous and sometimes cannibalistic. Adults eat flies, spiders, crickets, caterpillars, true bugs, other ground-dwelling arthropods, earthworms, snails, moths, and small vertebrates, such as salamanders.

Range: The Eastern Spadefoot Toad is found from Massachusetts to New York, south to eastern Florida and some of the Keys, west through Pennsylvania, through the southern Great Lakes region, to Arkansas and south to Louisiana. The species is absent from the higher elevations of the Appalachians and the Everglades.

Status: Only 32 current populations have been verified since 1982. Museum specimens and literature attest to the former widespread, if not abundant, status of the species. Several factors contribute to the rarity of the species. Plum Island is the northern limit of species' range. Destruction of suitable habitat continues to limit its numbers; Spadefoot populations have been extirpated by development from Middlesex County, inland Essex County and parts of Martha's Vineyard. The species is vulnerable to pesticides, and many individuals are killed crossing roads, especially during the breeding season.

Adapted from: Lazelle, J. D., Jr. 1987. Eastern Spadefoot. In T. W. French and J. E. Cardoza (eds). Endangered, Threatened, and Special Concern Vertebrates of Massachusetts. Massachusetts Division of Fisheries and Wildlife.

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Vesper Sparrow

Pooecetes gramineus

State Status: Threatened
Federal Status: None

Vesper Sparrow, showing rufous-colored shoulders and white outer tail feathers. Photo by, and courtesy of, Jim Stasz, from the USGS Patuxent Migratory Bird Research Center, at http://www.mbr-pwrc.usgs.gov/id/framlst/i5400id.html

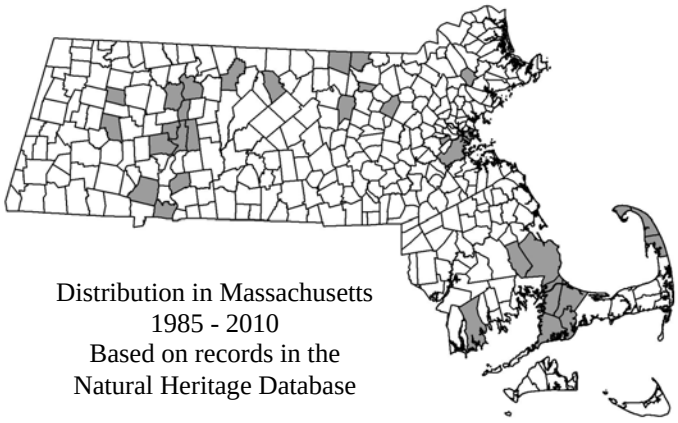
Description: To the beginning birder, most sparrows appear indistinguishable at first glance, and close attention to details is essential for identification. The overall plumage pattern of the Vesper Sparrow is typical of many sparrow species with the head, back, tail, and wings covered by streaks of black, white, and a variety of browns. The upper chest has a series of evenly-spaced, brown streaks that in some individuals may appear to form a v-shaped spot in the center of the chest. The under-tail and belly are usually cream-colored with no streaking. The Vesper Sparrow looks somewhat like a grayish Song Sparrow (*Melospiza melodia*), but with a thin, white eye-ring. The most distinguishing feature of the Vesper Sparrow is its white outer tail feathers (somewhat like those of the Dark-eyed Junco), which are particularly noticeable in flight and unique among grassland sparrows of Massachusetts. Another distinguishing feature is rufous- or chestnut-colored lesser wing coverts (shoulders), but they are seldom visible except, perhaps, in individuals with worn plumage. Vesper Sparrows are larger than other New England grassland sparrows, with a length of 6.25 inches (15.9 cm) and a wing span of 10 inches (25.4 cm). The song of the Vesper Sparrow is quite beautiful, similar in pattern to that of the Song Sparrow, but sweeter and more plaintive. The song typically begins with paired whistles followed by clear, musical trills that accelerate and descend in tone, described as *too too tee tee chidididididid swiswi-swiswitteew*. Generally, the first two introductory whistles are lower than the second two. In some cases, only a single higher whistle follows the first pair.

Similar Species in Massachusetts: No other sparrow that is a regular breeder in Massachusetts has white outer tail feathers. However, there are several species that may co-occur with Vesper Sparrow and otherwise resemble it in appearance.

The Savannah Sparrow (*Passerculus sandwichensis*) has a similar plumage pattern but is smaller (5.5 inches (13.3 cm) in length, 6.75-inch (16.5 cm) wing span), has a shorter tail, has yellow-tinged lores (patches of feathers between the beak and the eye), and lacks a white eye-ring and rufous coverts. Song Sparrows are generally more streaked on the chest (often forming a central breast-spot), and streaks extend down to the sides of the belly. The juvenile Grasshopper Sparrow (*Ammodramus savannarum*) also has a streaked upper chest, but is much smaller (length 5 inches

(19.7 cm)), has a much shorter tail, and lacks rufous coverts. Henslow's Sparrow (*Ammodramus henslowii*) does have evenly spaced streaks on the breast, a white eye-ring, and rufous on coverts and tertials (short feathers of the upper wing), but the rufous patch covers more of the shoulder, the head is generally olive-green in color, and total length is smaller (5 inches (12.7 cm)).

Range: The Vesper Sparrow is a Nearctic (North American) breeder; the northern extent of its range is Nova Scotia west to interior British Columbia, and the southern extent of the range is western Virginia to southern Illinois, northern New Mexico, and southern California. However, most breeding populations occur in the western half of the range. Vesper Sparrows overwinter throughout the lower U.S. and northern Mexico. In Massachusetts, Vesper Sparrows have been observed in Barnstable, Bristol, Essex, Franklin, Hampden, Hampshire, Middlesex, Plymouth, Suffolk and Worcester Counties. Most observations are from the Connecticut River Valley region and Barnstable County.



Distribution in Massachusetts
1985 - 2010
Based on records in the
Natural Heritage Database

Habitat in Massachusetts: The Vesper Sparrow is considered more of a habitat generalist than some of our other grassland sparrows because their territories often include taller woody vegetation interspersed within the grassland, rather than being completely open. Habitats of Vesper Sparrows are typically dry, well-drained sites with a mixture of short grass, bare ground, and shrubs, trees, or other high structures from which males can sing, including telephone lines and poles. However, Vesper Sparrows are not considered forest species as they are not typically affiliated with dense shrublands or post-logging forest regeneration. Habitats in Massachusetts consist of airfields, heavily disturbed heathlands and barrens (e.g., as at military grounds), active and abandoned hayfields and cropfields, abandoned gravel pits, sandplain grasslands, coastal moors, and even a capped landfill, There is some evidence to suggest that Vesper Sparrows prefer habitat patches covering at least 50 acres.

Life Cycle/Behavior: There are few published specific arrival and nesting dates in Massachusetts, but most Vesper Sparrows likely arrive in April and breed during May–August. The nest is constructed on the ground by the female, often in a slight depression and at the base of vegetation (e.g., grass, forbs, shrubs). The nest is usually well-concealed but may occasionally be in the open. Outer materials consist of coarse and fine grasses, forbs, moss, rootlets, and bark; the inner cup is lined with finer grasses, hair, down feathers, or even pine needles. Vesper Sparrows are capable of producing up to 3 broods/year in some parts of the species' range, but 1–2 broods are probably typical in Massachusetts. Clutch size is usually 3-5 eggs, with second clutches likely to have fewer eggs than first clutches. Nests are sometimes parasitized by Brown-headed Cowbirds (*Molothrus ater*). The eggs are variable in color and pattern, with a base color of white to greenish- or brownish-white, and speckles, spots, or blotches of brown, lavender, or purplish-gray. The eggs are incubated for 11–14 days, mainly by the female. The young leave the nest at 9–13 days of age but are not then capable of sustained flight. They remain dependent on their parents for another 3 weeks and are fed a diet primarily of insects (e.g., grasshoppers, caterpillars). Adults consume both insects and seeds.

Population Status: Vesper Sparrow is state-listed as Threatened in Massachusetts. Data from the North American Breeding Bird Survey (BBS) during the period 1966–2006 suggest that populations have been declining at an annual rate of 0.9% rangewide and 3.1% in the East, with greater rates of decline during the first 15 years of the survey period. There are no reliable trend estimates for populations in Massachusetts specifically, but abundance is likely returning to pre-settlement levels. Widespread use of fire, combined with agricultural development and abandonment, once temporarily increased the amount of available habitat for Vesper Sparrows in New England. However, declining farm abandonment leaving fewer unmanaged open fields, continuing fire suppression, and increasing forest succession, have led to loss of suitable breeding habitat in this region. Few natural processes in Massachusetts create and maintain habitat for the Vesper Sparrows which now rely almost exclusively on anthropogenic disturbances for breeding habitat in Massachusetts, except perhaps at the coastal moors of the Cape.

Management Recommendations: Although habitat availability for Vesper Sparrow was likely inflated following human settlement, and a decline in habitat availability in this region to more ecologically "normal" levels during the past 50 years may be contributing to population declines of the species in Massachusetts, populations of Vesper Sparrow none-the-less face anthropogenic threats that warrant special protections and/or management actions. However, since most populations seem to rely on anthropogenic sources of habitat, development of cost-effective management strategies is challenging. One of the biggest threats to breeding populations of Vesper Sparrow is mowing during the breeding season, which can result in destruction of nests and young. Since the breeding season may continue through August, delaying the mowing of fields until September or later is an ideal practice, especially in habitats such as airfields where mowing is not critical to production of a commodity. When delaying the mowing of fields until September is not a realistic option, waiting until at least July is recommended to allow enough time for successful production of at least one brood of young.

Another possible strategy to reduce impacts to nesting Vesper Sparrows is to implement a rotational mowing regime, where only a portion of the fields under management are mowed in any given year. In management of row crops, Vesper Sparrows are likely to benefit from (a) no-tillage practices, (b) minimal use of pesticides, and (c) retention of post-harvest crop residue in the fields. At abandoned sites (e.g., old fields, gravel pits), management should focus on maintaining habitat with either short or slow-growing grasses, patches of bare ground, and sparsely scattered shrubs and trees. Periodic burning, perhaps combined with mechanical treatments, should be a preferred management technique. Habitat patches exceeding 50 acres in size should be considered the highest priority for management.

For more information see:

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