

Provincetown Municipal Airport

2013 Wildlife Hazard Assessment



Prepared for
Provincetown Airport Commission

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Cover Photo by Bill Richardson

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EXECUTIVE SUMMARY

Provincetown Municipal Airport (PVC) is located in Provincetown, Massachusetts on the northern tip of Outer Cape Cod. The Airport is within the Cape Cod National Seashore (CCNS), sited on an airport lease area of approximately 322 acres of federally owned land administered by the National Park Service (NPS).

PVC completed a Wildlife Hazard Assessment because it is a commercial service federally-obligated airport accepting funds from the Federal Aviation Administration (FAA) Airport Improvement Program (AIP). Between 1997 and 2010, six strikes were reported at PVC. There have been anecdotal reports of other strikes with birds and deer.

Surveys for the Wildlife Hazard Assessment (WHA) were conducted from January 2013 to December 2013 at 5 survey stations. The WHA includes the required components summarizing methodologies, results and recommendations. The objectives of the 2013 PVC Wildlife Hazard Assessment were:

- Identify hazardous wildlife species at PVC;
- Identify wildlife attractants on or near the Airport within 5 miles;
- Recommend actions to reduce airport wildlife hazards and address wildlife population management.

Deer, turkey, gulls, and geese are the most serious wildlife hazard at Provincetown Municipal Airport. Management measures to control these species will also improve control of other wildlife species at the Airport.

Recommendations for mitigating the hazardous wildlife are discussed in Section 7. The following types of Wildlife Hazard Management are discussed:

- Habitat Modification-Turf Management
- Habitat Modification-Vegetation Management
- Open Water Management and Monitoring
- Elimination of Artificial Attractant(s)
- Active Dispersal/Harassment Measures
- Exclusion Measures-Perimeter Fence and Netting in Hangar
- Operational Measures

List of Acronyms

AC	Advisory Circular
AIP	Airport Improvement Program
ARFF/SRE	Aircraft Rescue and Fire Fighting/Snow Removal Equipment Garage
AOA	Air Operations Area
AWOS	Automated Weather Observation System
CCNS	Cape Cod National Seashore
FAA	Federal Aviation Administration
GA	General Aviation
ILS	Instrument Landing System
LES	Localizer Equipment Shelter
LOC	Localizer
MassDOT	MA Department of Transportation Aeronautics Division
MALSF	Medium Intensity Approach Light System with Flashers
NHESP	Natural Heritage Endangered Species Program
NOTAM	Notice to Airmen
NPS	National Park Service
OFA	Object Free Area
PAPI	Precision Approach Path Indicator
PVC	Provincetown Municipal Airport
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RW	Runway
TSA	Transportation Security Administration
TW	Taxiway
VASI	Visual Approach Slope Indicator
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan

1.0 INTRODUCTION

1.1 Airport Location

Provincetown Municipal Airport (PVC) is located in Provincetown, Massachusetts on the northern tip of Outer Cape Cod (Locus Figure 1). The Airport is sited within the Cape Cod National Seashore (CCNS), on approximately 322 acres of federally owned land administered by the National Park Service (NPS). The Airport pre-dates the formation of the CCNS. A Special Use Permit, between the NPS and the Provincetown Airport Commission, establishes terms under which airport operations and improvements are carried out.

The Airport is operated and maintained by the 5-member Provincetown Airport Commission. The Airport is a Non-hub Primary Service airport as defined by the FAA National Plan of Integrated Airport Systems (NPIAS). It is a public use, commercial service airport with scheduled passenger service to and from Logan International Airport (BOS), and Westchester County Airport (HPN) in White Plains, New York, enplaning 10,000-15,000 passengers annually. The Airport is one of eleven airports in Massachusetts that have a runway with full Instrument Landing System (ILS) approach capabilities.

1.2 Wildlife Strike History at PVC

The Federal Aviation Administration (FAA) maintains a Strike Database on its website (<http://wildlife.faa.gov>). The FAA Wildlife Strike Database contains records of reported wildlife strikes since 1990. Strike reporting is voluntary. Nation-wide, birds make up the majority of reported strikes. Although mammal strikes are only a small percent of the total recorded strikes, strikes with large ungulates such as deer are extremely dangerous.

As adapted from the FAA Advisory Circular (AC 150/5200-32B, 5/31/2013), a reportable wildlife strike has occurred when:

- a. A strike between wildlife and aircraft has been witnessed or reported by a pilot;
- b. Evidence or damage from a strike has been identified on an aircraft;
- c. Bird or other wildlife remains are found within 250 feet of a runway centerline, within 1,000 feet of a runway end, on a taxiway or anywhere else on or off the airport that there is reason to believe was the result of a strike with an aircraft.
- d. The presence of birds or other wildlife on or off the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, or the aircraft left pavement area to avoid collision with wildlife).

Between 1997 and 2010, six strikes were reported at PVC (Table 1). Five of the strikes involved birds (Unidentified Gulls, Canada Geese, small unknown birds) and one strike involved a white-tailed deer. Three strikes were on the approach, two were on take-off, and one was on the ground during a landing roll. The deer was hit on lift-off and an

emergency was declared when the right engine shut down. The aircraft landed safely at BOS.

There have been anecdotal reports of other strikes with birds and deer. Remains of birds have been found on or near the runway.

Table 1 FAA Strike Database: Reported Wildlife Strikes at PVC

Date (most recent on top)	Aircraft	Species/Number Struck	Time	Runway	Height ¹	Speed (knots)	Phase Of Flight
7/25/2011	C-402	Gulls/1	13:45	7	500	100	Approach
6/21/2010	C-402	Canada goose/1	22:50	7	UNK	60	Landing Roll
7/19/2009	C-402	UNK small bird/1	Day	25	1000	140	Climb
6/22/2009	C-402	Gulls/2-10	18:20	7	UNK	UNK	Approach
11/5/2000	C-402	Gulls/2-10 (Flock of 100)	12:45	7	100	95	Approach
6/25/1997	C-402	White-tailed deer/1	Day	UNK	UNK	95	Climb

Source: FAA Wildlife Strike Database, <http://wildlife.faa.gov>. Checked on May 28, 2014.
 1. Feet above ground level.

1.3 Requirement for Wildlife Hazard Assessment

In accordance with FAA Advisory Circular (AC) 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports*, airports that have received federal assistance and/or that have authority to impose and/or use a Passenger Facility Charge must use the standards and practices contained in the AC during the conduct and preparation of Site Visits, Assessments and Plans.

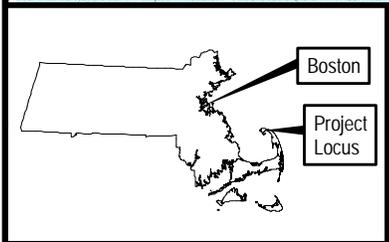
PVC completed a Wildlife Hazard Assessment because it is a commercial service airport accepting funds from the Federal Aviation Administration (FAA) Airport Improvement Program (AIP) and there have been reported wildlife strikes at the Airport.

1.4 Objectives of the 2013 PVC Wildlife Hazard Assessment

- Identify hazardous wildlife species at PVC;
- Identify wildlife attractants on or near the Airport within 5 miles;
- Recommend actions to reduce airport wildlife hazards and address wildlife population management.



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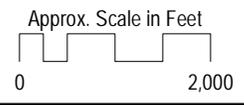


Prepared By:



Data compiled from the following source: MassGIS, Commonwealth of Mass., Info. Technology Division

- USGS Topo Quad Images: Dec. 1995 Provincetown Quad



USGS Project Locus
 Wildlife Hazard Assessment
 Provincetown Municipal Airport
 Provincetown, MA

Figure 1

2.0 AIRPORT DESCRIPTION

2.1 Facilities

The Airport Operations Area (AOA) and managed safety areas encompass approximately 100 acres of the 322 acre lease area within the CCNS. Facilities include:

- Runway 7-25 (3,500 feet long and 100 feet wide with a full ILS),
- Parallel taxiway with 3 connecting taxiways,
- Medium Intensity Approach Light System with Flashers (MALSF),
- navigational aids,
- managed safety areas,
- Automated Weather Observation System (AWOS),
- Aircraft parking aprons (paved and turf),
- Terminal building (passenger facilities, TSA screening areas, weather briefing room),
- Aircraft hangar,
- Aircraft Rescue and Fire Fighting/Snow Removal Equipment (ARFF/SRE) garage,
- ground support facilities such as fuel farm, fuel pump station, emergency generator, baggage carts, deicing cart, and other support facilities,
- Sightseeing Shack which houses FAA equipment and sightseeing operations,
- TSA trailer, and
- Auto parking areas.

The Airport currently has some limited perimeter fencing at the end of Runway 25 which is adjacent to the CCNS bike path, and around the terminal apron and the fueling station.

2.2 Operations

Cape Air provides commercial air service between PVC, HPN, and BOS and provides Fixed Based Operator (FBO) services to general aviation travelers. Cape Air staff manage daily airport operations at PVC. The Airport does not have a control tower and operates by communicating through a UNICOM station (122.80 MHz). UNICOM is a communication service that provides open communications between pilots. Pilots talk with each other to discuss intentions, as well as to communicate any hazards that they have encountered while operating in the area, such as weather conditions, animal hazards, construction, etc. Airport personnel may be asked to move wildlife such as turkeys or deer off the airport operating surfaces.

The number of commercial scheduled flights varies from four daily during the off-season to eight daily flights during the peak season between the hours of 7:00 AM and 9:00 PM. During the peak season, sections (additional planes) are added to each flight time

depending on demand. As the seasonal demand increases, the number of aircraft per scheduled flight may increase to up to 20 aircraft operating under the scheduled eight flights.

3.0 AIRPORT HABITAT INVENTORY

Hundreds of acres of wetlands and coastal dunes surround the Airport. Similar natural resources are within the AOA. This mosaic of natural communities provides habitat for wildlife that can be hazardous to airport operations.

3.1 Coastal Dunes

Coastal Dunes habitats include Pitch Pine and Maritime Shrubland. An expansive cranberry-pine swale habitat type is on the southern side of the runway. These swales provide abundant wildlife cover and fruit-bearing plants. Windfalls and standing dead wood provide foraging and nesting habitat for cavity nesting bird species. Fallen dead wood provides escape cove for small mammals and amphibians.

3.2 Grasslands

Grasslands habitats result from the mowing of the operational safety areas and include Sandplain Grassland with grasses and occasional small shrubs, and Sandplain Heathland with shrubs and low-growing trees such as scrub oak. The grass areas provide food, cover and nesting habitat.

3.3 Wetlands and Open Water

Freshwater Wetlands

Isolated freshwater wetland habitats dominated by grass, herbaceous species and low shrubs are located on the airfield between the Runway and taxiways separated from paved surfaces by managed grassland communities of varying width. Other isolated wetlands, ranging in size from a few hundred square feet to several acres in size are associated with coastal interdunal swales and are often separated from each other by dune ridges running parallel to the runway. These interdunal swales have a high habitat value to birds and mammals for food, cover, and nesting sites.

Areas of standing water are highly attractive to hazardous wildlife such as gulls, geese and ducks. Turkeys need daily water and stay close to sources of fresh water. The isolated wetlands are typically dry in mid to late summer and in early fall. However during seasonal high water, there is standing water in some of the wetlands within the AOA. One wetland area south of the runway within the coastal dunes has persistent surface water providing highly valuable fresh water during the dry periods of the year.

Salt Marsh

The Hatches Harbor salt marsh system lies west of Runway 7 and can be seen in the cover photo. Tidal flows reach the approach lights off Runway 7. This area of salt marsh and open water provides habitat for many shorebirds, ducks, and gulls.

3.4 Listed Species

Before habitat management or other control measures for hazardous wildlife are implemented, the presence of federal or state listed endangered and threatened species that might be affected needs to be considered. If listed species are known to occur, control activities would need to be reviewed by environmental resource agencies.

At this time, no federally listed or proposed endangered/threatened federal species have been identified at the Airport.

The following Massachusetts State-listed species have been recorded within the Airport lease area:

- Eastern Box Turtle (Species of Special Concern)
- Eastern Spadefoot Toad (Threatened)
- Vesper Sparrow (Threatened)
- Northern Harrier (Threatened)
- Broom Crowberry (formerly state-listed)

The entire Airport is within Priority Habitat of Rare Species and Estimated Habitat of Rare Wildlife and Certified Vernal Pools as designated by the Massachusetts Division of Fisheries and Wildlife, NHESP.

4.0 ASSESSMENT METHODS

4.1 Survey Station Locations

Five survey station locations were established on the airfield that allowed observation of the AOA. One off-site seasonal survey station was established at the CCNS Race Point Beach parking lot. The off-site station was selected to capture any seasonal attractant to gulls during the summer tourist season. The locations of the survey stations are shown on Figure 2. Photos of field conditions are provided in Appendix 1. The station locations were selected based on knowledge of the Airport, field work over several years, and previous habitat studies listed in the reference section.

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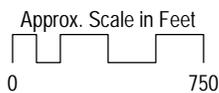


Prepared By:



Data compiled from the following source: MassGIS, Commonwealth of Mass., Info. Technology Division

- USGS Color Ortho Imagery (2008/2009)



Survey Station Locations

Wildlife Hazard Assessment
Provincetown Municipal Airport
Provincetown, MA

Figure 2

4.2 Survey Protocol

The wildlife surveys were conducted from January 2013 to December 2013. The surveys were designed to identify species, numbers, locations, and seasonal occurrence of wildlife hazardous to aviation. The surveys were not meant to be a complete inventory of all wildlife species that are present at the Airport.

Point-count surveys were conducted monthly. Each surveyed station was surveyed for approximately three minutes. At each station species were surveyed in a 360-degree sweep without the aid of binoculars, unless needed for identification or closer observation. The surveys were done at various times of the day. On some site visits, nighttime spotlight and dawn surveys were also conducted. No wildlife were observed during the spotlight surveys.

Given the size and layout of the airfield visual contact could be maintained among many of the stations at one time. This minimized counting an individual bird more than once during the survey.

Weather data was recorded prior to the start of the survey. Information on temperature, wind speed, wind direction, visibility, cloud cover, and humidity was obtained from the weather station inside the terminal. General ground conditions were also recorded.

4.3 Interviews and Observations

Interviews were conducted with Airport staff, Airport Commission members, pilots, and the NPS North District Ranger. These interviews gave valuable insight into current conditions and historical wildlife trends. The information obtained confirmed the information obtained from the surveys.

During the period of the Assessment, general observations of wildlife and potential hazardous wildlife attractants were made around the Airport, outside of the standard point-count surveys. These observations provided additional information about activities that might contribute to wildlife attractants at the Airport.

5.0 RESULTS OF 2013 PVC ASSESSMENT

Approximately 25 species of birds and mammals were observed on or near the airfield during the assessment period. These species are identified on a list of all species recorded at the Airport provided in Appendix 2. Species groups observed during the assessment are discussed below.

Not all wildlife species present a hazard to aircraft. FAA ranks species based on damage incurred, effect on flight and other factors (1 is most hazardous). Hazardous wildlife species either directly or indirectly present an aircraft strike hazard. These species can either be involved in an aircraft strike or act as attractants (food source) to other

hazardous wildlife. The FAA Hazard Ranking of the most hazardous species is provided in Table 2 below, with the species observed during the assessment noted.

Species group	Composite ranking ¹	Relative hazard score ¹	Observed during Assessment
Deer	1	100	yes
Vultures	2	64	
Geese	3	55	
Cormorants	4	54	yes
Cranes	5	47	
Eagles	6	41	
Ducks	7	39	yes
Osprey	8	39	
Turkey/pheasants	9	33	yes
Hérons	10	27	yes
Hawks (buteos)	11	25	yes
Gulls	12	24	yes
Rock pigeon	13	23	
Owls	14	23	
H. lark/s. bunting	15	17	
Crows/ravens	16	16	yes
Coyote	17	14	yes
Mourning dove	18	14	yes
Shorebirds	19	10	yes
Blackbirds/starling	20	10	yes
American kestrel	21	9	yes
Meadowlarks	22	7	
Swallows	23	4	yes
Sparrows	24	4	yes
Nighthawks	25	1	

Source: AC 150/5200-33B. Ranking of 25 species groups as to relative hazard to aircraft (1=most hazardous) based on three criteria (damage, major damage, and effect-on-flight), a composite ranking based on all three rankings, and a relative hazard score. Data were derived from the FAA National Wildlife Strike Database, January 1990–April 2003. Shading indicates species observed during Assessment in 2013.

5.1 Birds

The bird species of most concern at PVC are turkey, gulls, and geese. Although flocks of gulls and geese were not observed during the assessment period, these hazardous species are known to occur at the Airport depending on weather and water level conditions. Flocks of red-wing blackbirds and swallows are present during the summer months. Management measures recommended in Section 7 to control these species will also improve control of other wildlife species at the Airport.

Figure 3 shows the monthly total of bird counts during the standardized counts at the survey stations. The relatively low counts are due in some part to the fact that large flocks of gulls, geese, or starlings were not observed. During some surveys no birds were counted but this does not mean that birds were not observed at all during that time, just not within the standardized survey.

A Wildlife Hazard Assessment is not strictly a scientific experiment, even with the standardized surveys. Weather conditions, wind speed, time of day and activity at the Airport effect each survey. The survey data has been used along with other general observations and historical information to determine the specific wildlife issues at the Airport.

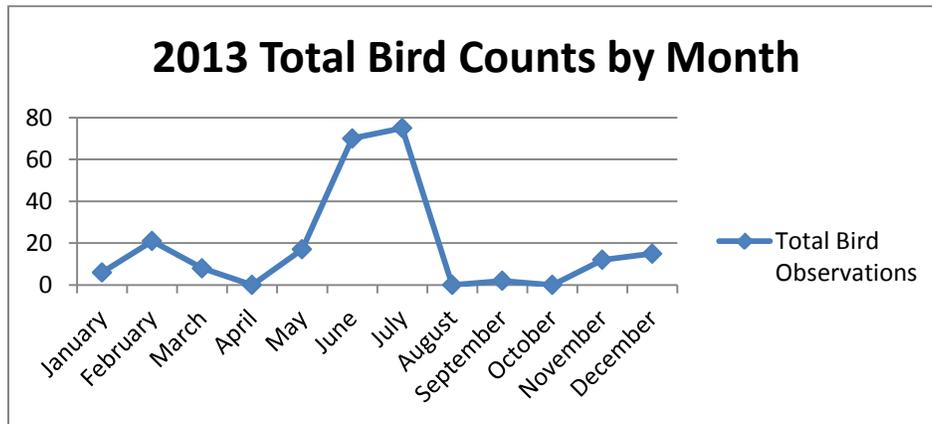


Figure 3 Total Survey Bird Counts by Assessment Month

Waterfowl

Ducks can be seen year round at the Airport. These are either Mallard or American Black Duck. The ducks were observed flying singly or in small flocks across the runway or over the salt marsh off Runway 7. Flocks larger than 5-10 were not observed.

Although not observed during the assessment, Canada Geese have been seen at the Airport and were involved in a reported strike in June 2010.

Ducks have a relative ranking of 7 and Geese are ranked 3 out of the top 25 hazardous wildlife. The most effective control measure is removal or exclusion of standing water.

When standing water cannot be removed or covered, harassment with pyrotechnics can be effective.

Shorebirds

Cormorants and Great Blue Heron were occasionally observed flying over the salt marsh west of Runway 7.

Cormorants have a relative ranking of 4 and Great Blue Herons are ranked 10 out of the top 25 hazardous wildlife. The most effective control measure is removal or exclusion of standing water. When standing water cannot be removed or covered, harassment with pyrotechnics can be effective.

Gulls

Gulls can be seen year round at the Airport. The gulls were observed flying singly or in small flocks. Large flocks of gulls were not observed on any paved areas during the assessment period. However, it is reported that large flocks of gulls can be seen at the Airport during severe winter weather. Gulls were involved in reported strikes in November 2000 and June 2009.

Gulls have a relative ranking of 12 out of the top 25 hazardous wildlife. Habitat modification and the removal or exclusion of standing water are the most effective control measures. When standing water cannot be removed or covered, harassment with pyrotechnics is effective.

Raptors

Red-tail Hawk and Northern Harrier can be seen year round at the Airport. A Northern Harrier was frequently seen hunting or foraging along the grassland and shrub areas north of the taxiway.

Hawks have a relative ranking of 11 out of the top 25 hazardous wildlife. Turf modification (grass height) is the most effective and feasible control measure at the Airport. There may have been a strike involving a Red-tail Hawk sometime in October because a Red-tail Hawk carcass was observed in the runway safety area south of the runway between Stations 1 and 2 during the October survey.

Passerines/Small birds/Upland birds

Several species of small birds were observed near areas of brush and other vegetative cover. Many of these species are only present during the warmer months of the year. Robins were observed but not in large numbers. A Northern Bobwhite was flushed from the grassland during a survey in June. These birds generally stay on the ground unless disturbed. Chickadees and House Sparrows were seen year round, in front of the Terminal at the bird feeder and areas of brush and trees.

Sparrows have a relative ranking of 24 out of the top 25 hazardous wildlife. Habitat modification is the most effective control measure, especially removal of the feeder and clearing of brush.

Doves

Mourning Doves were observed on occasion with a flock of about 10 observed on the taxiway near the GA Apron in July (Figure 4).

Mourning Doves have a relative ranking of 18 out of the top 25 hazardous wildlife. Habitat modification (turf management) is the most effective control measure along with removal of the feeder and clearing of brush. The hangar should be monitored for any nesting activity.

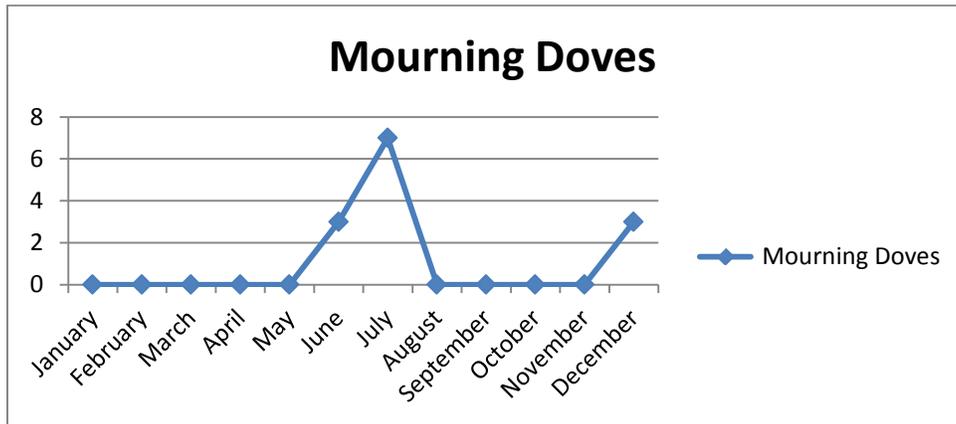


Figure 4 Total 2013 Mourning Dove Survey Counts

Swallows

Tree Swallows were observed on several occasions with a flock of about 20 observed on Runway 7 in July (Figure 5). Although not observed directly, swallows are known to flock in large numbers at the Airport. There are anecdotal reports of Cessna 402s striking flocks of swallows. Barn Swallows have been observed nesting in the hangar.

Swallows have a relative ranking of 23 out of the top 25 hazardous wildlife. Habitat modification is the most effective control measure. Northern Bayberry produces berries, which are a food source for tree swallows. Management of this shrub within the airfield may be effective.

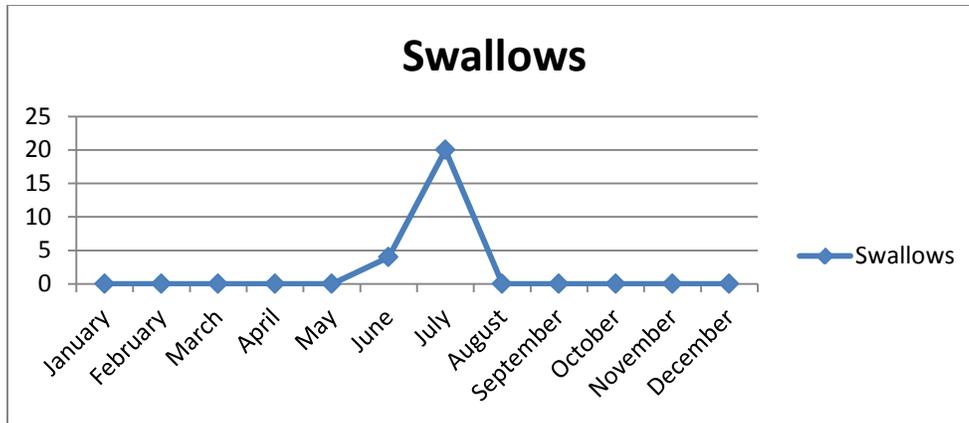


Figure 5 Total 2013 Swallow Survey Counts

Blackbirds

Red-winged blackbirds are present at the Airport during the summer months (Figure 6). Some flocks consisted of about 20 birds. They tend to stay in the wetlands but can be seen flying over the runway and roosting in the brush between the runway and taxiway.

Blackbirds have a relative ranking of 20 out of the top 25 hazardous wildlife. Habitat modification is the most effective control measure, especially grass height and removal of roosting trees.

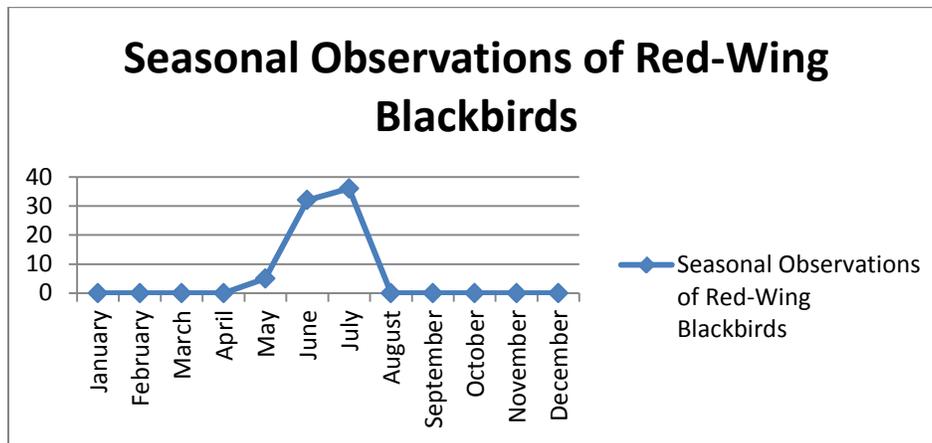


Figure 6 Total 2013 Red-Wing Blackbird Survey Counts

Crows

Crows are seen in small flocks throughout the year at the Airport (Figure 7). They generally are seen flying over the approach to Runway 25 or north of the parallel taxiway. They were not observed roosting in trees during the survey period.

Crows have a relative ranking of 16 out of the top 25 hazardous wildlife. Habitat modification is the most effective control measure, especially grass height and removal of trees.

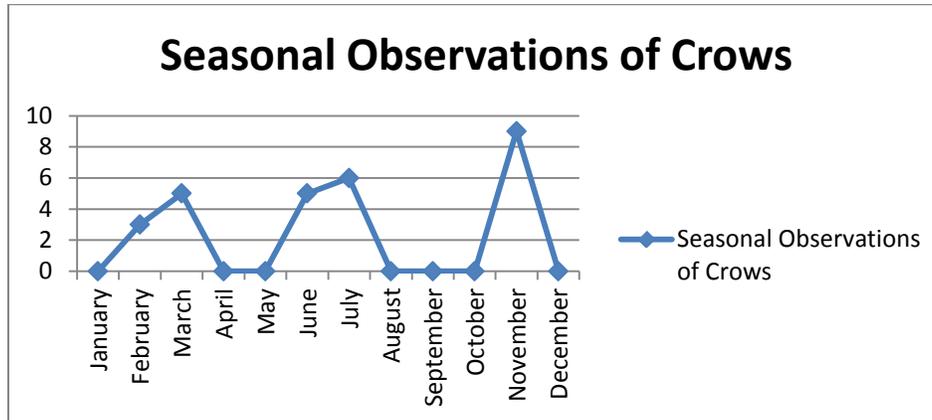


Figure 7 Total 2013 Crows Survey Counts

Turkeys

Turkeys are present year round at the Airport. They are seen south of the runway in the grass and shrubs near Stations 1 (Runway 25) and 3 (Glide Slope Critical Area). Hunting for turkey is allowed on the airport lease area on the south side of the runway up to the edge of the glide slope area, and on the CCNS land abutting the airfield.

Turkeys have a relative ranking of 9 out of the top 25 hazardous wildlife. Habitat modification is the most effective control measure, especially grass height and removal of trees.

5.2 Mammals

The most hazardous mammal species, and also the most hazardous wildlife species found at PVC is the White-tailed Deer.

Deer

Deer occur year round at the Airport and have access to the airfield because the Airport does not have a complete perimeter fence. The deer graze in the grass of Glide Slope Critical Area and browse in the shrub areas south of the runway. Deer trails are seen leading to areas south of the runway. The North District NPS Park Ranger was interviewed by telephone regarding the deer population. According to the Ranger, over the past several years the small herd seems to be stable and not increasing. Specific numbers within the CCNS are not available.

During hunting season, the deer move to islands within the marsh north of the Airport. There is also a population south of the runway. Hunting for deer is allowed on the Airport lease area on the south side of the runway up to the edge of the glide slope area, and on the CCNS land abutting the airfield.

During the Assessment period, two deer were observed during the day feeding next to the runway. It was very foggy and the deer blended in with the VASI lights (see photo in Attachment). As a Cape Air flight prepared for take-off, the deer withdrew south to the shrub area. A deer strike that resulted in significant damage to the aircraft was reported in June 1997. There have been anecdotal reports of other deer strikes since 1997.

Deer have a relative ranking of 1 out of the top 25 hazardous wildlife. Exclusion with a perimeter fence is the most effective control measure for deer. Turf modification and harassment are the most effective and feasible control measures at the Airport until a fence can be installed.

Coyote

Coyote are present at the Airport year round and a single coyote was observed during the assessment period in the glide slope critical area.

Coyote have a relative ranking of 17 out of the top 25 hazardous wildlife. Turf modification is the most effective and feasible control measure at the Airport. Immediate removal of any carcasses (tree swallows) would eliminate a food source and short-term attractant.

Fox

Fox are present at the Airport year round. Although not directly observed during the assessment, reports of fox sightings were obtained during interviews with staff and Airport Commission members.

Fox are not considered hazardous species at airports and may help manage small mammal populations and discourage ducks from nesting near the Airport.

6.0 HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR PVC

Wildlife is attracted to areas that provide food, water, or cover. Wildlife attractants identified at the Airport are discussed below and include:

-Natural Habitat

- Infield areas and seasonal standing water,
- Coastal Dunes and Isolated Wetlands surrounding the AOA, especially south of the runway.

-Managed Habitat

- Mowed grass
- Vegetation along existing fence
- Shrub areas within RSA

-Structures and other Features of the Airport Environment

6.1 Habitat Attractants

Habitat types at the Airport that are attractive to hazardous wildlife include:

- Wetlands with seasonal standing water,
- Managed Grasslands, and
- Trees and Brush.

Although there is little that can be done to reduce the habitat value of the Cape Cod National Seashore completely surrounding the Airport, the fact that the Airport land is within the National Park System reduces the amount of land development and human activities that can occur adjacent to the Airport. The presence of hundreds of acres of habitat around the Airport reduces the pressure on the Airport land and maintains stable wildlife populations.

Wetlands

The isolated freshwater wetlands within the infield do not contain permanent surface water but periods of seasonally high water levels can result in standing water especially in the wetland near the Terminal apron. Although not observed during the WHA period, reports of gulls and ducks using this area during high water levels is a potential concern. According to FAA studies, 10 of the 15 most hazardous birds are associated with water.

Managed Grass

The managed grasslands within the runway and taxiway safety areas are attractive to many hazardous species. The areas provide foraging, grazing, nesting, and hunting areas (for raptors and coyote). Height of grass, composition of seed producing plants and density of the vegetative cover are all factors that attract different species.

Trees/Shrubs

The trees and shrubs bordering the runway and taxiway provide cover, food, and roosting areas.

6.2 Airport Attractants

Airport facilities and practices that can become wildlife attractants include structures, both in use and abandoned, housekeeping practices and other activities that could provide food and/or shelter.

The Airport maintains excellent housekeeping procedures. All trash at the Airport is kept in closed dumpsters stored inside the hangar.

The only structure on the Airport that provides habitat (i.e. nesting areas) is the hangar. Sparrows and swallows nest in the hangar. Other structures have been inspected and there is no indication that wildlife species have access to the structures. There are no abandoned or unoccupied buildings at the Airport.

There is bird feeder and water dish near the terminal entrance. Sparrows and other small birds are seen flying between the feeder and the shrubs behind the TSA trailer. There have been reports of turkeys observed at the feeder. The small birds could attract raptors such as hawks, and the seed could attract small rodents which are a food source for coyote.

6.3 Off-Site Attractants

The presence of natural and man-made wildlife attractants (ponds, landfills, water treatment lagoons, etc.) within 5 miles of the airfield was investigated. Off-site attractants within 5 miles of the Airport include large ponds, a municipal transfer/recycling center, and public beach/visitors areas within the CCNS. The Race Point Beach parking area (0.5 miles north) was observed on several site visits and no attractants such as open trash cans were observed. Provincetown Center is approximately 2 miles to the southeast. The site of the closed town landfill is now used as the transfer/recycling station. The transfer station is approximately 1.5 miles southeast of the Airport. The closest golf course is in North Truro, approximately 9 miles from the Airport.

The attractants of most concern would be the large freshwater ponds 1 mile to the south and open tidal waters of Hatches Harbor immediately to the west of Runway 7. Depending on the location relative to an airport, birds might fly across the runway to move from one open water area to another. At PVC, the freshwater ponds are all to the south of the Airport which minimizes the chance of an avian flight path crossing the airspace.

Hatches Harbor includes open tidal water, salt marsh, and coastal dunes. It is located in a highly critical and sensitive airspace off Runway 7, the predominant low visibility runway used for both approach and take-off operations. Ducks, gulls, Great Blue Herons, Red-Wing Blackbirds and other birds were consistently seen flying, heard in the *Phragmites* adjacent to the ILS, or on the water at high tide.



Figure 8 Attractants within 5 miles of PVC

7.0 RECOMMENDATIONS

Based on wildlife hazards identified during the assessment and guidance documents sponsored by FAA, the following recommendations are made to mitigate and minimize hazardous wildlife at Provincetown Municipal Airport. These recommendations are discussed below and summarized in Table 3.

7.1 Habitat Modification

Habitat Modification is the first management tool to consider for a wildlife hazard management program. It is the most effective approach to reduce the potential for wildlife strikes. The management objective of habitat modification is to create an environment around an airport that is unattractive as possible to hazardous wildlife.

Turf Management

According to several studies, turf management is one of the most effective wildlife deterrents. FAA guidelines recommend a grass height of 6-12 inches. The seed mix for any areas that are reseeded should not have millet and should consider fescue that contains an endophytic fungus, which is less palatable to geese. The Airport uses a seed

mix approved by resource agencies consisting of the following for all reconstruction projects:

- Canada Wild Rye (20-30%)
- Creeping Red Fescue (12-23%)
- Indian Grass (11-21%)
- Bib Blue Stem (09-19%)
- Switch Grass (03-12%)
- Little Blue Stem (03-12%)
- Sand Dropseed (02-07%)

The grass height and mowing schedule should be reviewed and modified if needed and as allowed by budget restraints. The current management schedule allows the grass to grow tall in the early spring and summer which seems to discourage gulls and geese.

Vegetation Management

Airport management has an ongoing program to maintain the infield areas free of trees and tall shrubs. This clearing has reduced cover for deer between the runway and taxiway. *Phragmites* is becoming more widespread in the infield wetlands. To the extent feasible and allowed by environmental permits, trees and shrubs should also be removed from the safety areas south of the runway.

The trees and shrubs adjacent to the fencing near the TSA trailer should be cut back including around the drainage outlet. Many sparrows were seen in these trees.

Open Water Management and Monitoring

Open water is highly attractive to gulls and geese. During seasonal high water, there is standing water in the airfield wetlands especially near the Terminal Apron. These areas should be closely monitored. Any gulls, ducks or geese seen in these areas should be harassed and driven off the airfield as discussed below in Section 7.2. Once these birds get established at a location it is difficult to get rid of them.

The current maintenance program for *Phragmites* in the ILS area off Runway 7 should be continued and extended to include a wider area to eliminate perching areas under the flight path.

At high tide, there are areas of open water near the boardwalk that attract ducks. The height of the cut of the *Phragmites* should be evaluated to see if leaving the *Phragmites* a little higher might mask or fill in the open water areas.

7.2 Harassment and Active Dispersal

The Airport currently uses a vehicle to disperse deer, gulls and other hazardous wildlife from the runway when they interfere with flight operations. This measure should be continued and pilots should be encouraged to request that operations carry out this harassment technique.

The Airport should purchase a small supply of pyrotechnics to use on any birds that gather in standing water.

If noise harassment is not enough to make the open water unattractive, a hose with a spray head set on a support and aimed at the standing water near the apron might drive off the birds.

At this time, lethal removal of deer (depredation) is not recommended. If a deer is injured or killed at the Airport, the NPS Rangers are notified and remove the animal. Any animal struck and killed on the runway (bird or mammal) should be removed so that predators and scavengers are not attracted.

The Airport should continue the contract with the exterminator for rodent control.

7.3 Exclusion

Perimeter Fence

The #1 wildlife hazard at PVC is deer and the most effective measure for keeping deer off the airfield is adequate fencing. FAA recommends a 10-12 foot chain link fence with 3-strand barbed wire outriggers. The Airport has very limited perimeter fencing. Environmental permitting for a perimeter fence project is in progress.

The proposed perimeter fence should be a high priority capital improvement project and completed as soon as possible.

Hangar

Sparrows are nesting in the Hangar. Small birds and nestlings are a food source and attractant for raptors and coyote. These nests should be removed as soon as possible but when the nests are inactive and unoccupied. A USFWS Migratory Bird Depredation Permit would be required to remove active nests. A deterrent such as netting for the sills and other areas should be investigated to prevent nesting.

Sparrows and other small birds are also gathering at the entrance to the terminal, attracted to the bird feeder. Bird feeders in general have many benefits including the enjoyment of watching the birds and educational opportunities. Visitors to the Airport enjoy watching the birds, and the airport maintains the feeder for this purpose. Although small birds in and of themselves rank low as a hazard to aircraft operations they can attract raptors. The

seed can attract mice and other small rodents that in turn attract coyote. The Airport should monitor the bird feeder and limit the amount of seed on the ground.

Although it would be preferable to keep the hangar door closed, opening and closing the large bay door is impractical. Strip doors of vinyl plastic might be an effective deterrent. Strip doors consist of 6- to 16 inch wide strips of vinyl hung like a curtain. Strips overlap about 2 inches. Strip doors do not require opening and closing like conventional doors and are not damaged by passage of equipment.

7.4 Operational Measures

Communications

- The Airport should continue to list operational notes in the FAA Airport/Facility Directory about deer, turkey and coyote under Airport Remarks;
- Educate pilots and operations staff about what is considered a wildlife strike and encourage reporting of strikes;
- Add wildlife hazard topic to any regularly scheduled meetings with Cape Air Pilots and/or NPS Park Rangers;
- Educate the public about not feeding wildlife at the Airport;
- Display FAA Wildlife Hazard posters in the pilot briefing room.

Data Collection and Analysis

Maintain records of wildlife observations/strikes and wildlife management measures taken at the Airport, such as dispersal by vehicle.

These records will help evaluate overall risk level of wildlife strikes and efficacy of the Airport's wildlife hazard mitigation program

Permits Required

Most of the recommendations do not require permits. Natural areas at the Airport are protected and regulated under several different environmental laws. These include the Federal Clean Water Act (33 U.S.C. 1251, et seq.), the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131 § 40), the Town of Provincetown Wetlands Protection Bylaw (Chapter 12 of the Provincetown General Bylaws), and the Cape Cod Commission Act (Chapter 716 of the Acts of 1989).

A Migratory Bird Depredation permit would be required to remove active nests.

Table 3 Wildlife Hazard Management Recommendations		
		Permit Required
Habitat Management		
Maintain grass in the safety areas between 6-12 inches high.		No
Continue to manage the infield areas between the taxiways and runway to keep the shrubs low and prune out trees.		No
Monitor the bird feeder and remove if it becomes a significant attractant of undesirable wildlife.		No
Maintain and expand the clear area along the section of fence near the fuel farm.		TBD
Monitor closely any standing water.		No
Maintain and expand the clear area of <i>Phragmites</i> adjacent to the ILS.		TBD
Harassment and Active Dispersal		
Continue to harass wildlife with vehicles as needed to remove from runway and taxiway.		No
Purchase a small supply of pyrotechnics.		No
Investigate sprayer to have on hand to disperse birds on standing water.		
Exclusion		
Proceed with the capital improvement project to construct the perimeter fence alternative identified in the Final EA.		Yes
Remove the bird nests from the hangar and check annually. Investigate netting deterrents and strip door for hangar to discourage nesting.		No-If inactive/unoccupied nests are removed Yes-If active nests are removed
Operational Measures/Communication		
Continue to alert pilots.		No
Display informational posters in the ready room to encourage pilots to report wildlife strikes.		No
Continue the good housekeeping procedures that are in place at the Airport (all dumpsters keep inside the hangar).		No
Talk with the NPS Park Rangers annually to learn of deer population trends that may affect deer activity on the airfield.		No
Continue to allow, but monitor hunting on the Airport lease area. Coordinate with NPS CCNS to educate hunters about not entering the AOA until perimeter fence is constructed.		No
Data Collection and Analysis		
Maintain records of wildlife observations and wildlife control measures taken at the Airport, such as dispersal by vehicle.		TBD

8.0 CONCLUSION

Provincetown Municipal Airport is small municipal airport with all the security and operational requirements of a larger airport. It is a commercial service airport with scheduled passenger service to and from BOS and HPN, enplaning between 10-15 thousand or more passengers annually. Yet it has the financial constraints of a small municipal airport. Additionally, it is located within the CCNS, a National Park with sensitive natural and cultural resources. The Airport management is to be commended on the management balance it has found for the inherent conflict between wildlife and airport operations.

A Wildlife Hazard Management Plan (WHMP) should be adopted that builds on the recommendations and prioritizes the management measures. The measures will be formalized and reviewed annually to evaluate the effectiveness as part of the WHMP.

The Airport should continue with the good housekeeping practices that keep all trash and other storage inside building or closed containers. The Airport should monitor what animals are coming to the bird feeder, limit the amount of seed on the ground, and remove the feeder if it becomes a significant attractant of undesirable wildlife.

The schedule for mowing the grass areas should be reviewed to see if it is possible to cut the grass before it flowers and goes to seed. The general recommendation for turf at airports is to maintain mowed areas between 6 and 12 inches. The height of the cut at PVC should be evaluated before any change. Changing the height to discourage one hazard may result in better habitat for another hazard. At this time it is recommended that a schedule for the mowing be determined and records kept of the height at the time of the cut and the cutting height. More information over time is needed before any modification is made to avoid unintended consequences.

Brush and shrub vegetation should be cut back away from the existing sections of fence. Cutting of the other shrubs in the infield between the runway and taxiway should be continued; the expanding areas of *Phragmites* in this location should be cut, but not to ground level. The idea is to remove areas of cover for deer and perching for birds (tall plants) but not to have too much open ground or open water for flocks of birds to land (short plants).

Record keeping of dispersal of deer, coyote, and birds for flight operations should be improved. This information is important to determine the effectiveness of wildlife hazard management measures.

Educational materials about wildlife hazards for pilots, especially transient pilots that may not be familiar with the Airport, should be available on the website and in the pilot ready room.

All of the above recommendations cannot substitute for the most effective control for deer and that is a perimeter fence. Without a fence, it is impossible to keep deer off the

airfield. In foggy conditions, the deer are almost invisible as witnessed during the site assessment and illustrated in Photo 6 in Attachment 1.

9.0 REFERENCES

The following is a selected list of sources of information used during the preparation of this Wildlife Hazard Assessment.

Airport Cooperative Research Program (ACRP) Synthesis 23: Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports, Jerrold L. Belant and James A. Martin, 2011.

ACRP Report 32: Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports, Edward C. Cleary and Archie Dickey, 2010.

ACRP Synthesis 39: Airport Wildlife Population Management, Russell P. DeFusco and Edward T. Unangst, 2013.

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Summary of Wetland Resource Areas, Horsley Witten Group, April 2007.

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Wildlife Hazard Management at Airports, Edward C. Cleary and Richard A. Dolbeer, Second Edition, July 2005.

10.0 PREPARERS

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Appendix 1

Airport Field Photos

Photos # 1-8

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Photo 1 Cape Air provides commercial air service.



Photo 2 Summer Turf Conditions.



Photo 3 Turkey Near Glide Slope Area.



Photo 4 Mourning Doves on the Taxiway and GA Parking Apron.



Photo 5 Winter Turf Conditions.



Photo 6 Deer Blend in with the VASI lights during Fog Conditions.



Photo 7 Standing Water at High Tide Attracts Ducks off RW 7



Photo 8 Sparrows and Swallows nest in the hangar.

Appendix 2

Airport Species List

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**Appendix 2 Provincetown Municipal Airport Species List
Recorded and Observed Wildlife Species (1991-2005)¹**

SCIENTIFIC NAME	COMMON NAME	STATUS ²	Observed during Assessment	Total Number of Observations during assessment	Largest Flock Size Observed
Avian Species					
<i>Gavia immer</i>	Common Loon	SC			
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	-	X	1	1
<i>Ardea herodias</i>	Great Blue Heron	-	X	1	1
<i>Butorides virescens</i>	Green Heron	-			
<i>Cathartes aura</i>	Turkey Vulture	-			
<i>Anas rubripes</i>	American Black Duck	-		12	6
<i>Anas platyrhynchos</i>	Mallard	-			
<i>Pandion haliaetus</i>	Osprey	-			
<i>Meleagris gallopavo</i>	Wild Turkey		X	10	5
<i>Circus cyaneus</i>	Northern Harrier	T	X	6	1
<i>Accipiter cooperii</i>	Cooper's Hawk	-			
<i>Buteo jamaicensis</i>	Red-tailed Hawk	-	X	1	1
<i>Falco sparverius</i>	American Kestrel	-	X	1	1
<i>Phasianus colchicus</i>	Ring-necked Pheasant	-			
<i>Bonasa umbellus</i>	Ruffed Grouse	-			
<i>Colinus virginianus</i>	Northern Bobwhite	-	X	1	1
<i>Charadrius vociferus</i>	Killdeer	-			
<i>Haematopus palliatus</i>	American Oystercatcher	-			
<i>Larus argentatus</i>	Herring Gull	-	X	2	2
<i>Larus marinus</i>	Great Black-backed Gull	-			
<i>Sterna hirundo</i>	Common Tern	SC			
<i>Sterna antillarum</i>	Least Tern	SC			
<i>Zenaida macroura</i>	Mourning Dove	-	X	13	5
<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	-			

SCIENTIFIC NAME	COMMON NAME	STATUS ²	Observed during Assessment	Total Number of Observations	Largest Flock Size Observed
Avian Species					
<i>Colaptes auratus</i>	Northern Flicker	-			
<i>Tyrannus tyrannus</i>	Eastern Kingbird	-			
<i>Cyanocitta cristata</i>	Blue Jay	-	X	1	1
<i>Corvus brachyrhynchos</i>	American Crow	-	X	31	6
<i>Eremophila alpestris</i>	Horned Lark	-			
<i>Tachycineta bicolor</i>	Tree Swallow	-	X	24	20
<i>Hirundo rustica</i>	Barn Swallow	-			
<i>Poecile atricapillus</i>	Black-capped Chickadee	-	X	5	4
<i>Sitta carolinensis</i>	White-breasted Nuthatch	-			
<i>Thryothorus ludovicianus</i>	Carolina Wren	-			
<i>Turdus migratorius</i>	American Robin	-	X	6	2
<i>Dumetella carolinensis</i>	Gray Catbird	-	X	2	1
<i>Mimus polyglottos</i>	Northern Mockingbird	-	X	2	1
<i>Sturnus vulgaris</i>	European Starling	-			
<i>Dendroica petechia</i>	Yellow Warbler	-			
<i>Dendroica magnolia</i>	Magnolia Warbler	-			
<i>Dendroica coronata</i>	Yellow-rumped Warbler	--	X	1	1
<i>Dendroica virens</i>	Black-throated Green	--			
<i>Dendroica pinus</i>	Pine Warbler	--			
<i>Mniotilta varia</i>	Black-and-white Warbler	--			
<i>Geothlypis trichas</i>	Common Yellowthroat	--	X	5	1
<i>Pipilo erythrophthalmus</i>	Eastern Towhee	--			
<i>Spizella passerina</i>	Chipping Sparrow	--			
<i>Poocetes gramineus</i>	Vesper Sparrow	T			
<i>Passerculus sandwichensis</i>	Savannah Sparrow	--			
<i>Melospiza melodia</i>	Song Sparrow	--	X	5	
<i>Melospiza georgiana</i>	Swamp Sparrow	--			
<i>Cardinalis cardinalis</i>	Northern Cardinal	--	X	1	1
<i>Dolichonyx oryzivorus</i>	Bobolink	--			
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	--	X	73	20
<i>Quiscalus quiscula</i>	Common Grackle	--			
<i>Icterus spurius</i>	Orchard Oriole	--			

SCIENTIFIC NAME	COMMON NAME	STATUS ²	Observed during Assessment	Total Number of Observations during assessment	Largest Group Size Observed
Avian Species					
<i>Icterus galbula</i>	Baltimore Oriole	--			
<i>Carpodacus purpureus</i>	Purple Finch	--			
<i>Carpodacus mexicanus</i>	House Finch	--			
<i>Carduelis tristis</i>	American Goldfinch	--	X	3	1
<i>Passer domesticus</i>	House Sparrow	--	X	15	
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	--	X	1	1
<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	--	X	4	2
Reptile and Amphibian Species					
<i>Plethodon cinereus</i>	Eastern Red-backed	--			
<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	--			

Species were observed during field studies by others for various environmental reviews.

2. Species status designated by the Massachusetts Natural Heritage and Endangered Species Program.

E: Massachusetts Endangered Species; T: Massachusetts Threatened Species, SC: Massachusetts Species of Special Concern.