Observations of Wintering Snowy Owls (Nyctea scandiaca) at Logan Airport, East Boston, Massachusetts from 1981-1997

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Abstract.—Snowy Owls (Nyctea scandiaca) wintering at Logan International Airport were studied over the 15-year period of 1981-1997. Two-hundred twenty-seven Snowy Owls were banded and color-marked to examine the length of time individual birds stayed at this location and to track the movements elsewhere. Fifty-six owls were re-observed outside of the airport vicinity, and 11 of these were observed more than 150 km away. Dietary preferences based on observations of hunting and feeding owls recorded a total of 192 individuals of 35 species or species types. Educational programs are an important part of the ongoing research effort underway at the airport.

Since 1981, countless days and nights, in every imaginable weather condition, have been spent observing, capturing, banding, and color-marking Snowy Owls (Nyctea scandiaca) at Logan International Airport (fig. 1). Snowy Owls usually arrive at the study site in early November and depart in late April. Observations of roosting, hunting, and intraspecific interactions were recorded. Owls were captured when possible to obtain data for the study.

Observing wild Snowy Owls documents their habitat needs, dietary consumption, and nomadic existence. To continue observations after sunset, an ITT 3rd generation night vision scope was used. Hunting techniques and chronology, diet, movements, and social interaction with other owls, were primary interests of this project.

Owls have always fascinated me and this was a unique opportunity to learn more about wintering Snowy Owls. I undertook this study to answer the following questions:

- When do the owls arrive at the airport each year?
- How long do they stay?

Figure 1.—Snowy Owl (Nyctea scandiaca) at Logan International Airport, Boston, MA.

- How many pass through each winter?
- What do they feed on?
- What are their roosting and hunting habits?
- Do the same birds return to the airport each year?

Trapping can also help determine the distance at which a Snowy Owl can see prey. From observation, we know that Snowy Owls can find rodents under snow without seeing them. We do not know how far away they can hear prey

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under snow with the noise at Logan Airport. Data collected through trapping these birds provides answers to these questions, and how individual birds adapt to a changing environment.

STUDY AREA

The study was conducted at Logan International Airport in East Boston, MA, latitude 42°22N and longitude 071°01W. The 13th busiest in the world, the airport encompasses approximately 1,053 ha including roadways, terminals, parking garages, runways, and a weather station. The airfield has 729 ha of short, mowed, rolling grassland habitat which supports a large rodent population. On three sides, the open water of Boston Harbor and salt marsh surround the airfield, attracting a number of waterfowl and shore birds. The fourth side is the approach from the city, with the skyscrapers of downtown Boston providing the landscape backdrop. Average precipitation and temperature from November through April are 670 mm and 3°C. A variety of communication and instrument structures provide excellent hunting perches, while rolling grasslands provide good roosting locations.

METHODS

Permission to gain access to the restricted airfield to conduct the study was obtained through the airport's governing body, the Massachusetts Port Authority. This included a background security check, the acquisition of a special driver's license, and a $1,000,000 liability insurance policy.

Equipped with a night vision scope, spotting scope, and binoculars, visual observations of owls were made from a vehicle used as a blind, beginning with the first arrival and continuing until the last bird had departed.

Owls were captured using a manually-triggered 1.5 m diameter spring-loaded bow net placed on the ground. Live bait birds or rodents were placed in a wire cage and the cage situated in the center of the bow net. The trap was triggered from the vehicle after an owl had landed on the bait cage. Each owl captured was banded with a U.S. Fish and Wildlife Service numbered band. The bird was weighed, wing and tail measurements taken, sex and age estimates recorded, and external parasites collected. Each bird was color-marked with a temporary dye on the back of its head, photographed, and released.

The birds were color-marked to allow easy identification of individuals. Color-marking was initially done applied to the birds' chests; however, this method proved unreliable when a bird under observation was facing away from the observer. Color-marking on the back of the head was more successful; when the bird faced the observer it eventually turned its head to survey its surroundings. The color-marking wore off in approximately 6 months leaving only the leg band to identify individuals.

Data gained from trapping and banding birds included the age, sex, and physical condition of Snowy Owls who sojourn at Logan International Airport.

RESULTS

In 15 years, the earliest arrival of a Snowy Owl was October 24 and the latest departure was July 7. These being the exception, the majority of Snowy Owls arrived in mid-November and stayed until late April.

The number of owls observed each winter varied, from lows of five during the winters of 1980-1981 and 1995-1996, to a high of 49 in 1986-1987. On the morning of 23 January 1987, there was a record high of 23 Snowy Owls on the airfield at one time. To date, 227 captured Snowy Owls have contributed data to this ongoing study. Ten owls were re-trapped at Logan from 1 to 10 years after their initial capture.

Color-marking has established proof that these migrant owls travel extensively, with many of the birds being observed in other New England locations throughout the season and identified by their color-mark. A total of 56 sightings of color-marked Snowy Owls have been reported from Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York and Delaware. Eleven of these 56 owls were re-observed more than 150 km from the airport (table 1). One particular bird was captured at Logan Airport on 9 November 1991, and color-marked green. It was photographed in Bath, Maine, on 19 December 1991, 197 km northeast. On 24 January 1992, the bird was back at Logan. It was then sighted on Martha's Vineyard, Massachusetts, on 25 February 1992, 115 km southeast of Logan and in

Table 1.—Reports of color-marked Snowy Owls (Nyctea scandiaca) 150 km or more from Logan Airport, Boston, Massachusetts.

Last date at Logan	Next date/location observed		Number of km/direction from Logan	
01/11/85	02/16/85	Montauk Point, New York	160	SW
12/09/86	01/30/87	New London, Connecticut	155	SW
12/27/86	02/01/87	Fire Island, New York	250	SW
12/28/86	03/07/87	Woodstock, Vermont	185	NW
02/22/87	03/19/87	Watertown, New York	430	NW
11/30/87	01/25/88	Lewes, Delaware	550	SW
02/13/88	03/14/88	Winooski, Vermont	195	NW
01/31/88	03/29/88	Rochester, New York	555	W
07/07/90	07/08/90	Squam Lake, New Hampshire	155	NW
11/09/91	12/19/91	Bath, Maine	197	NE
02/04/93	03/11/93	Sharon, Vermont	195	NW

Charlestown, Rhode Island, on 26 February 1992, 92 km east of Martha's Vineyard. The lighthouse keeper at Boston Light, Little Brewster Island, Massachusetts, photographed the bird on 16 March 1992, 125 km northeast of Charlestown, Rhode Island. The bird was again back at Logan Airport on 23 March 1992, 6 km west of Boston Light and was seen at this site on a regular basis until it departed Logan on 20 May 1992. Other birds; however, have stayed at the study site the entire season.

Seven immature banded Snowy Owls have been recaptured at the study site the following year, one was recaptured at the site 2 years later, and one 6 years later. Most recently, in February 1997, an adult male Snowy Owl was captured and identified as a bird that had been banded at the same site 10 years earlier as a SY[2] bird. In Canada, birds banded at Logan Airport have been recaptured in subsequent years in Ontario and Toronto, and recoveries of dead birds which had been shot have been made in Quebec and Nova Scotia.

Through observation, it has been noted that Snowy Owls prefer to roost on the ground during the day. As the sun sets, they become very active, stretching their legs and wings, and generally will regurgitate a pellet in preparation for their evening hunt. They then locate a perch from which to hunt under the cover of darkness. In addition to hunting from a perch, they will also use a hovering technique similar to a Rough-legged Hawk (Buteo lagopus). With the night vision scope, they can be watched throughout the night. Over the course of the study, Snowy Owls were observed capturing or feeding on 192 prey items of 35 species or species types (table 2). They prefer to take their prey on the wing much like a large falcon. Extremely agile, Snowy Owls have been observed outmaneuvering Snow Buntings (Plectrophenax nivalis) and overtaking American Black Ducks (Anas rubripes) in flight. The largest observed kill was that of a Great Blue Heron (Ardea herodias), and the heaviest a Canada Goose (Branta canadensis). Other raptors the Snowy Owl has captured are American Kestrel (Falco sparverius), Northern Harrier (Circus cyaneus), Short-eared Owl (Asio flammeus), Barn Owl (Tyto alba), and one has even been observed feeding on another Snowy Owl.

Snowy Owls have demonstrated their keen eyesight and hearing during this study. In one instance, a Snowy Owl was observed diving into 20.3 cm of snow and coming up with a vole, which was not visible from the surface. The owl must have heard the vole under the snow. The amazing aspect is that a 747 passenger jet was thundering down the adjacent runway at the same moment. Another Snowy Owl, barely visible to the human eye using 10 x 50 binoculars, somehow managed to spot a European Starling (Sturnus vulgaris) in the bow net after dusk had fallen and flew 1.6 km across the harbor for the bait.

[2] Term SY is used by the Bird Banding Lab to characterize a bird in the second year of its life.

Table 2.—Prey items which Snowy Owls (Nyctea scandiaca) have been observed feeding on or capturing at Logan International airport, 1981-1997.

Common name	Scientific name	Number of observations
American Black Duck	*Anas rubripes*	23
American Kestrel	*Falco sparverius*	2
American Oystercatcher	*Haematopus palliatus*	1
Barn Owl	*Tyto alba*	1
Black-bellied Plover	*Pluvialis squatarola*	2
Brant	*Branta bernicla*	2
Bufflehead	*Bucephala albeola*	1
Canada Goose	*Branta canadensis*	1
Clapper Rail	*Rallus longirostris*	1
Common Goldeneye	*Bucephala clangula*	1
Double-crested Comorant	*Phalacrocorax auritus*	1
Dunlin	*Calidris alpina*	8
Eastern Meadowlark	*Sturnella magna*	2
European Starling	*Sturnus vulgaris*	5
Great Blue Heron	*Ardea herodias*	1
Herring Gull	*Larus argentatus*	1
Horned Lark	*Eremophila alpestris*	2
Killdeer	*Charadrius vociferus*	6
Muskrat	*Ondatra zibethicus*	7
Northern Harrier	*Circus cyaneus*	2
Norway Rat	*Rattus norvegicus*	47
Red-breasted Merganser	*Mergus serrator*	5
Ring-billed Gull	*Larus delawarensis*	4
Ring-necked Pheasant	*Phasianus colchicus*	2
Rock Dove	*Columba livia*	13
Short-eared Owl	*Asio flammeus*	5
Snow Bunting	*Plectrophenax nivalis*	4
Snowy Owl	*Nyctea scandiaca*	1
Striped Skunk	*Mephitis mephitis*	3
Upland Sandpiper	*Bartramia longicauda*	1
Unidentified species of fish		2
Unidentified species of rabbit		1
Unidentified species of scaup		2
Unidentified species of vole, mice or shrew		31
Unidentified species of yellowleg		1

CONCLUSIONS

The number of wintering Snowy Owls at Logan Airport varied greatly from year to year. In years when many owls were observed and captured, most of them were immature birds and appeared to be in good physical health and body weight. This observation could indicate that there may have been an abundant food supply on the breeding grounds, which in turn resulted in a large number of young hatched and therefore an abundance of Snowy Owls here. The years when few owls were observed, a high percentage tended to be underweight adults, which perhaps means that food had been scarce on the breeding grounds and few young were produced, the result being fewer owls wintering here. Of the 227 owls captured 19 were adult males, 14 adult females, 102 immature males, 81 immature females, and 11 were of undetermined age and sex. More observations need to be done to see how the lack of, or abundance of food on the breeding grounds might affect the numbers of wintering birds. The number of owls observed and captured at Logan Airport has made this the largest known wintering population of Snowy Owls in New England. Even after 15 years spent on this study, it is still hard to imagine that an airport, with all its activity, mega

decibel sound levels, and constant jet fumes provides one of the best locations in New England for observation of and research on these magnificent raptors.

Color-marking and banding of Snowy Owls at this location has provided important data about this species. It has also presented more questions which require further exploration about this bird's erratic and nomadic habits, visual range, and hearing capacity. While it is now known that these birds travel extensively during the non-breeding season, and sometimes return to the same wintering site annually or even several years later, it is not known where they go during the more frequent intervals when they are not sighted or captured at Logan and elsewhere.

Examination of 5,039 pellets collected at the study site revealed the most common prey items; Norway rat (Rattus norvegicus), meadow vole (Microtus pennsylvanicus), and American Black Duck. An examination of these pellets has yet to be summarized. Other prey items include small birds, waterfowl, shorebirds, insects, fish, mice, muskrats, skunks, and even other owls. Observation of Snowy Owls capturing and consuming large prey items has revealed that they tend to eat out the breast cavity, taking in small amounts of roughage which leave minimal traces in pellets. Therefore, visual observation must be included to determine an accurate account of their diet.

EDUCATIONAL PROGRAMS

In addition to gathering data about wintering Snowy Owls, a second objective was to use the information and photographs of the research in a way that would stimulate and educate as many people as possible about the natural history and importance of owls. Yearly bus tours of the airfield in search of Snowy Owls are very popular, especially for the Boston residents who live in the city and have always thought of the airport only as a source of noise and pollution. The tours give them an opportunity to appreciate and understand the habitat and wildlife encompassing the airport. Presentations on this Snowy Owl project using slides, and live birds when available, are done as a regular program at the Blue Hills Trailside Museum[3] for groups of both children and adults. These programs increase the general public's awareness and appreciation for owls and their habitats.

I was fortunate to have two young assistants eager to help me with this study, my daughter, Danielle (fig. 2), now 16, and son, Joshua (fig. 3), now 13. Both are raptor enthusiasts who

Figure 2.—My assistants Danielle and Joshua holding Snowy Owls for banding.

share my admiration and respect for these creatures and who have been active in my research since they were small children. When small, one of their many tasks was collecting pellets from roost sites. As they grew older, they also assisted in the capture, banding, and color-marking aspects of the study. I now find myself in the role of assistant, as Danielle has started her own project on migrating owls and has captured and banded 96 owls of 7 species. They have both given me a new appreciation for how energetic and resourceful young minds can be. I realize now, more than ever, how important it is to provide education about our

[3] Blue Hills Trailside Museum is a natural history museum located in the2,756 ha (7,000 acre) Blue Hills Reservation, 3.2 km (2 miles) Southeast of Boston. It is owned by the State of Massachusetts and managed by the Massachusetts Audubon Society.

environment and all that inhabit it; especially to our children so that they can learn to appreciate, protect, and preserve it for us as well as for future generations.

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Figure 3.—My assistant Joshua with an immature (second year) Snowy Owl, left. Joshua with the same Snowy Owl 10 years later, right.