Nestling saw-whet owl with the author's leg gauge.

The author with nestling saw-whet owl.

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Northern Saw-whet Owl Migration Across Lake Ontario

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ABSTRACT

*The Great Lakes are major geophysical features that lie in the flight path of migrating birds. An autumn banding effort of Northern Saw-whet Owls (*Aegolius acadicus*) was carried out on the southern shore of Lake Ontario to ascertain if owls were flying across the lake. Our location, the timing of the captures, and the direction of their travel support the hypothesis that these owls are migrating over the open waters of Lake Ontario.*

INTRODUCTION

There is a long history of banding Northern Saw-whet Owls (*Aegolius acadicus*) in the Braddock Bay area northwest of Rochester, NY, during their spring migration (Nicoletti and Stanko 1994); to our knowledge no one has ever attempted to do so in the fall. These owls are readily seen roosting during the day throughout their spring migration, but are rarely seen during their fall migration, which suggests that Northern Saw-whet Owls follow the 'around the lake' migratory path of diurnal raptors (Haugh and Cade 1966) even though there is evidence in the literature that suggests Northern Saw-whet Owls fly across the Great Lakes (Saunders 1907, Taverner and Swales 1911, Catling 1971, Taylor et al. 2011). We investigated whether Northern Saw-whet Owls are flying directly across Lake Ontario and believe that we have a strong case to support the hypothesis that at least some Northern Saw-whet Owls do migrate directly across the lake during their fall migration.

METHODS

The Braddock Bay Bird Observatory (43°19'23"N, 77°43'05"W) is located 25 km northwest of Rochester and is situated approximately 100 m from the southern shoreline of Lake Ontario, 170 km from the western edge, and 125 km from the eastern edge of the lake. There is a single row of homes

between the observatory and the lakeshore, with 700 ac of protected land immediately to the south and to the west (Nicoletti and Stanko 1994). Immediately to the east of the observatory, the Lake Ontario shoreline drops sharply to the southeast. Nets are located in early second-growth habitats dominated by fruiting woody plants (*Cornus* spp, *Lonicera* spp, *Vitis* spp, *Viburnum* spp.), ash (*Fraxinus* spp.) and alder (*Alnus* spp.). The observatory runs a constant-effort passerine banding program for both the spring (15 Apr – 31 May) and fall (1 Sep – 30 Oct) seasons.

The nets were opened on 23 evenings between 1 Oct 2012 and 13 Nov 2012, for a total of 537 net-hours (one 12-m net for one hour equals one net-hour). Nets were opened 0.5 hours after sunset and checked every half-hour. Whenever possible, the nets stayed open until at least four hours after sunset. A FoxPro® Wildfire II digital caller played the Project Owlnet Saw-whet Owl advertising call continuously (see http://www.projectowlnet.org). To avoid interfering with the passerine operation, the lure was never run after 0200. All captured birds were taken in hand or in cloth bags to the station, fitted with USGS aluminum leg bands (unless previously banded), processed and released.

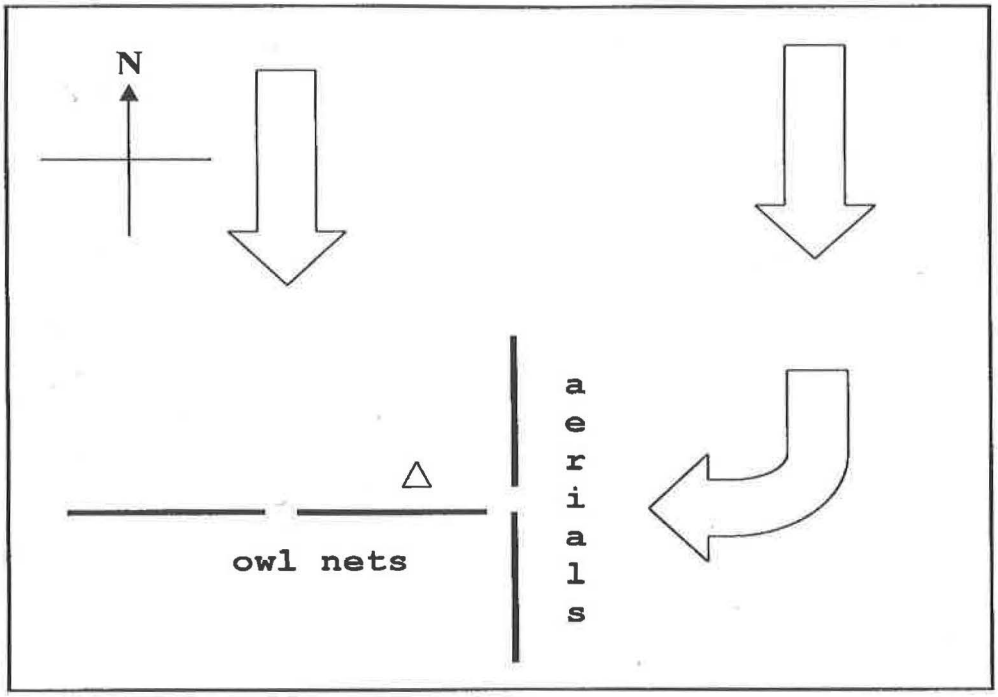


Fig 1. Layout of nets with suspected flight path of birds. The location of the caller is marked by the triangle.

In the fall of 2012, we used two existing passerine aerial nets (double-high setups with 30 mm mesh, see Bonter et al. 2008) and added two 60 mm mesh "owl-only" nets—specified as such because they were never used for passerines— for a total of six 12 m nets. The owl-only nets were placed perpendicular to the aerials, running east-west and parallel to the shoreline of Lake Ontario, which was about 160 m to the north. An audiolure was placed about 4 m from the east end of the owl-only net nearest the aerials (see Fig. 1).

Data recorded included net of capture, side of the net the bird entered, time captured (in hours after sunset), mass, wing chord (unflattened), age and sex.

Sex determinations were made using the wing-mass discriminant function developed by David Brinker in 1997, which also is available from the Project Owlnet website. Aging was based on remigial molt patterns (Pyle 1997) and was assisted by the use of a UV light (Weidensaul et al. 2011). Minitab 15® was used to create Graph 1 and also to

calculate the P-values used. Two hypotheses were tested, both that p = 0.5 where p represents the proportion of owls caught on one side of a net. We used two-sided P-values for both tests (Minitab calculates an exact P-value using the binomial distribution).

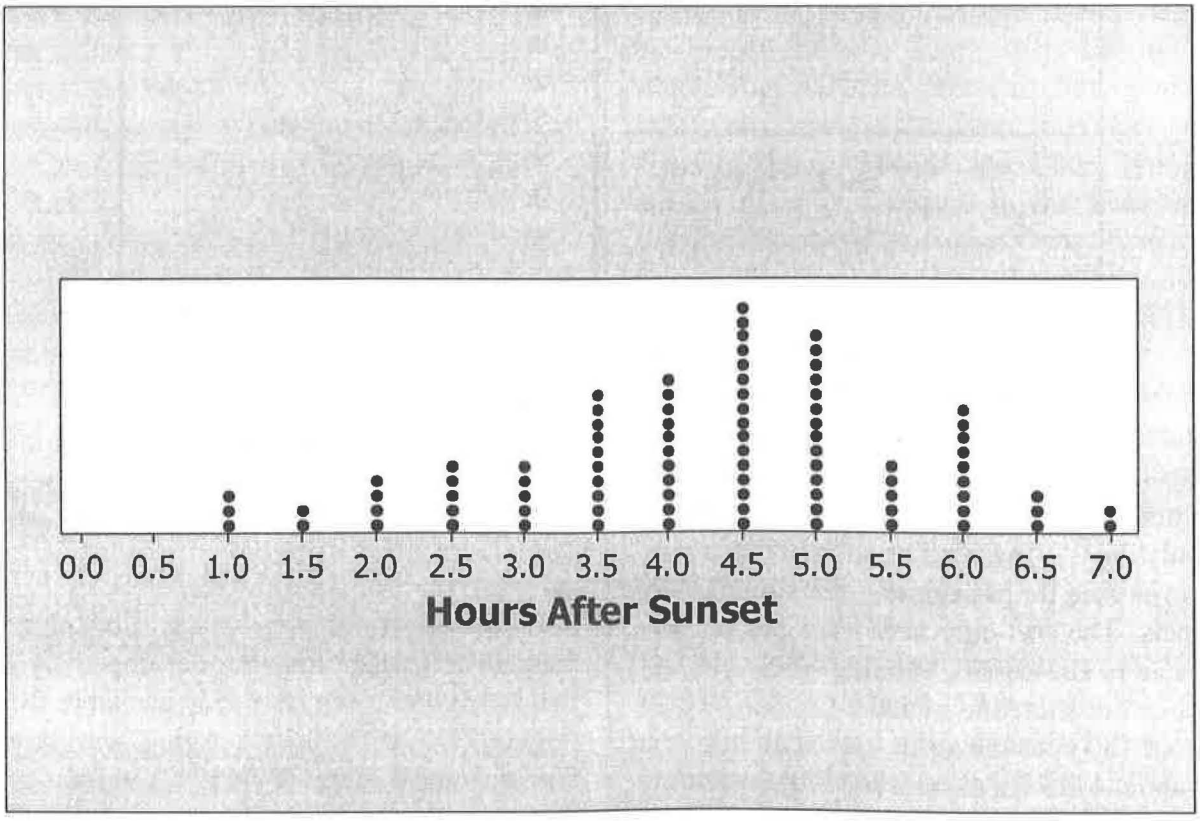
RESULTS

We opened our nets on 23 nights and caught owls on 18 of those nights, netting a total of 89 Northern Saw-whet Owls. The number of captures per day was not uniform, however, with three nights 12 Oct, 21 Oct, 4 Nov) accounting for 53 (60%) of our 89 Northern Saw-Whet Owls. Five of these 89 owls were foreign recoveries previously banded at other locations. This count (89) does not include any recaptures of owls previously banded by us earlier in the season because we were interested in new arrivals. The distribution of the capture times of our 89 Northern Saw-whet Owls is shown in Graph 1 below. (Each dot in the graph represents one owl, in position according to the time of capture.)

Fifty Northern Saw-whet Owls were caught in the two owl-only nets that ran parallel to the lakeshore. One of these owls did not have the side of entry recorded. Of the remaining 49, 36 were captured on the north side of the net. A hypothesis test for the two sides being equally likely yielded a two-sided exact P-value of 0.001, providing strong evidence that the north side was more likely to capture owls than the south side of the nets. Thirty-eight owls were caught in the aerial nets and 34 out of those 38 were caught on the east side, yielding a two-sided exact P-value = 0.000. We, therefore, conclude there is strong evidence that birds were more likely to be caught in the east side of those nets. One bird was not caught in a mist net, but was simply plucked out of a tree – that individual's capture is not factored into the above analysis.

DISCUSSION

The results of Holroyd and Woods (1975) and Brinker et al. (1997) support that Northern Saw-whet Owls do follow a migratory pattern of movement in the fall, but there is still uncertainty



Graph 1. Dotplot for Time of Capture

about to what extent they will cross large bodies of water. We cannot, however, attribute our capturing of 89 owls to erratic random wanderings in the face of Beckett and Proudfoot (2011) who demonstrate that "Fall movements in non-southbound directions should be considered exceptions to the general southward migration trend." Our argument that owls are flying directly across the lake is bolstered by two other points: (1) the timing of captures, both within an evening and across the season, and (2) the sides of the nets from which the birds entered.

Timing of Captures - The distribution of capture times in Fig. 1 clearly shows that most of the owls caught at Braddock Bay were caught 3.5 to 5 hours after sunset. This, along with the fact that 60% of the owls were caught on three nights, strongly suggests that birds are crossing the lake under the right conditions.

Lake Ontario is about 70 km wide at the point where Braddock Bay Bird Observatory is located. Brinker et al. (1997) report an owl which, based on initial banding and subsequent same-day recovery, traveled for a minimum of 30 km/h of darkness. We, therefore, estimate that it would take at least two hours for a Northern Saw-whet Owl to cross the lake. Fig. 1 shows an increase in captures starting at two hours after sunset, with a jump in captures 3.5 hours after sunset. Many nocturnal migrants begin their flight within an hour after sunset (Diehl et al. 2003, Podulka et al. 2004) and our data suggest that the same is true for Northern Saw-whet Owls. We would expect Northern Saw-whet Owls already in the vicinity of our caller to be caught early in the evening, within the first hour or two. Birds that are migrating across the lake would arrive at least 2-3 hours after sunset, with birds caught later in the evening having either departed later or from a slightly more northerly latitude.

Furthermore, we note that on our three busiest nights there was a distinct trend which is obscured by the aggregated data in Fig.1. On each of those three nights, a single owl was captured either 1 or 1.5 hours after sunset, after which no owls were captured until 3.5 to 4 hours after sunset. This is consistent with our hypothesis that while some owls may drift around the lake or stopover at Braddock Bay for several days, most of the owls we caught had flown across the lake.

Direction of Travel - There is a significant bias in the side of the nets from which the birds entered, and this bias is exactly counter to what one would expect from owls that were already in the vicinity.

Eighty percent of the owls entered from the north or east side of the nets. If the owls that we captured had been foraging locally, then we expect they would have been coming from the south and west, where the predominance of habitat exists. Given the paucity of habitat to the north (a strip of homes and then 70 km of water) and to the east (200 m of unmowed goldenrod and ash saplings, a strip of homes, and then 75 km of water heading straight east before striking land, due to the Rochester embayment), it is likely that the birds were migrating over the lake when they were lured to the nets.

If we assume that the owls that we captured were migrating across Lake Ontario, across a broad front, then we would expect about half to make landfall to the west of us and half to the east. Since these Northern Saw-whet Owls target the audio lure, we might expect that the owls to the east of the caller would turn or angle west and get caught on the east side of the aerials. We would also expect that the owls to the west of the caller would angle directly towards the caller and then be caught in the north side of the owl-only nets. Our results are consistent with these expectations; 36 of 49 birds were captured on the north side of the owl-only nets, and 34 of 38 birds were captured on the east side of the aerials. (Omitting the two birds without net sides assigned to them.)

Additionally, we note that during the course of this study we recaptured four owls that we had already banded on a previous night. Three of those four were caught in the south or west side of our owl nets, which is what we expect from locally foraging birds.

Brinker et al. (1997) note in their large-scale study of Northern Saw-whet Owls that migration over and around the Great Lakes is not well understood. Our data make a compelling case that at least some of these owls do fly across Lake Ontario. We do not know what the threshold conditions are for such a flight; that is an area for further research. More data, from other banding stations, will be needed to assess the fall migratory patterns of Northern Saw-whet Owls in the vicinity of the other (larger) Great Lakes.

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