Report to the Nuttall Ornithological Club

Northern Saw-whet Owls in Arkansas: Where are they going?
October 2016 through March 2017

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Introduction

The Northern Saw-whet Owl (hereafter saw-whet) has an extensive range through most of Canada and the northern U.S., as well as south into the Appalachian and Rocky Mountains (König et al. 1999). Little is known about this secretive species despite its widespread distribution. Its migration through the south-central U.S. has been recently discovered, occurring during late autumn and early winter (Pruitt and Smith 2016). Prior to 2014, saw-whets were considered a rare bird in Arkansas with only 13 previous sightings within the state (James and Neal 1986, Pruitt and Smith 2016, Arkansas Audubon Society Bird Records Database).

In late November 2014, a mist netting project was initiated and resulted in the capture of two saw-whets, both females. Trapping attempts continued through early February with no further success from the first week of December. In 2015 netting began in mid-October and resulted in the capture of 22 saw-whets. The second season continued through the first week of December, after which we were no longer capturing birds. Of second-season saw-whet captures, 21 were females and one was a male. In 2016 netting began in mid-October and resulted in the capture of 36 saw-whets. Our 2016 field season continued through the first week of December, after which time no owls were captured. Season of capture is similar to that of three other stations in our region: north-central and eastern Missouri and northeastern Oklahoma.

In autumn 2015, we had two foreign recaptures to compare with two historic recoveries from Arkansas (James and Neal 1986). Comparing our 4 recoveries to 3 from Missouri, birds appear to pass through the western Great Lakes region en route to our site, a heretofore-unknown autumn migratory pathway for saw-whets (Confer et al. 2014, Pruitt and Smith 2016). After establishing that saw-whets are moving into Arkansas during fall migration, we then hoped to determine where they were going after release.

Our primary hypothesis was that some birds spent winter in the Ozarks Mountains of northwestern Arkansas. There are sporadic records from late December through February that led us to this hypothesis, but birds no longer responded to audio lures after early December.

To begin to answer this question we acquired funding, largely from the Nuttall Ornithological Club, for radio transmitters and radio tracking equipment and began a new phase of this research in 2016. Our primary objective was to determine how long saw-whets remained near our field site in an effort to determine the extent of the species' existence in northwest Arkansas in late autumn and winter. We attached radio transmitters to 11 saw-whets in November of 2016 to determine how long they remained in the region. Continuing to learn more

about their movements will be an essential and important step to afford the saw-whet owl proper conservation for the future.

Project Objectives

1. Capture and band saw-whet owls at the Ozark Natural Science Center (ONSC) in Madison County, Arkansas.
2. Outfit saw-whet owls with radio transmitters to track their stay in the region, using a stationary monitoring site and handheld telemetry antennas on road surveys.

Methods

This study is designed to be conducted over a two-season period, as part of Pruitt's Master of Science degree at the University of Arkansas. The first field season began on 20 October 2016. Banding continued through mid-December, when capture rates begin decreasing dramatically. Telemetry surveys continued through late-March. The second season will begin on 20 October 2017 and continue through late-March 2018. Our field site is located at the Ozark Nature Science Center, a 160-ha property owned by the Arkansas Natural Heritage Commission, surrounded by the 5900-hectare McIlroy Madison County Wildlife Management Area in rural Madison County, Arkansas.

At the study site, four 12 m mist nets were set up along a trail through woodland that is mostly mixed pine/deciduous with a dense cedar understory. Speakers were placed at the center of this arrangement which broadcast a recording of the male saw-whet's "toot, toot" call, as well as the species' "whine" call, to attract owls to the net area. Nets were checked every 45 to 60 minutes, depending on temperature. Upon capture, a saw-whet was banded, weighed, measured, sexed, and aged. These methods followed standard protocol for the species (ProjectOwlnet.org). Some birds were also fitted with a radio transmitter.

For this study, we are using 1.8 g BD-2 radio transmitters (Holohil Sys., Ontario) to determine how long the saw-whets linger near our study site after being banded. Thirty radio transmitters will be used during this study. Transmitters are placed on all individuals within the proper range of weight and size measurements. Transmitters are attached using a leg harness made of elastic sewing thread (Streby et al. 2015). Both transmitter and thread have an average life of approximately 14 weeks. They can be detected at 2 to 4 km on the ground. We detected radio-tagged birds using two different methods to increase the number of detections over the course of the study period. First, we established an automated search tower using an SRX 400 VHF Radio Receiver attached to 4 Yagi antennas (Lotek Wireless, Ontario). Each antenna is directed towards one of the four cardinal directions to maximize detection range. This method will provide us 24/7 surveying. Additionally, the automated method was supplemented by weekly ground surveys conducted using an additional Yagi antenna attached to a handheld receiver. Ground surveys are conducted by driving roads through the wildlife management area.

Roost trees for individuals found during telemetry surveys are located by triangulation using mapping software and a compass. Coordinates are recorded for each roosting site. When the owl is no longer using a site, vegetation surveys using the James-Shugart method are conducted (James and Shugart 1970). The roost tree is used as a central point for a four-quadrant transect. Parameters measured include average canopy height, average canopy cover, stem density, and species composition of each transect.

Results and Discussion

Banding

During the 2016 banding season, from 20 October to 2 December, we captured and banded 36 saw-whet owls at our ONSC field site. Net hours for the season totaled 570 (accounting for 4 mist nets), with an average of 4.8 hours per night over the course of 30 nights afield. Netting efforts resulted in the capture of at least one saw-whet owl on 60.0% of nights afield. On successful capture nights, ≥2 individuals were captured 44.4% of the time, suggesting there is some optimal condition conducive to nights with heavier owl migration. All nights where >1 individual was captured were nights with low wind speed and low percent cloud cover. In general, successful capture nights occurred immediately following the arrival of a cold front. Saw-whet owls undergo a fall migration yearly, but experience irruptions on roughly 4-year cycles. During these irruptions, capture rates can more than double from non-irruption years (Confer et al. 2014). Autumn 2016 was predicted to be an irruption year. This proved accurate at banding stations across eastern North America, including in Arkansas, where we saw an increase in captures from our 2015 banding season (n=22). Sex ratios were as expected for our latitude: female n=27, male n=7, unknown sex n=1. As is typical during a flight year, the age ratio was skewed towards hatch year birds (n=50.0%) (Figure 1).

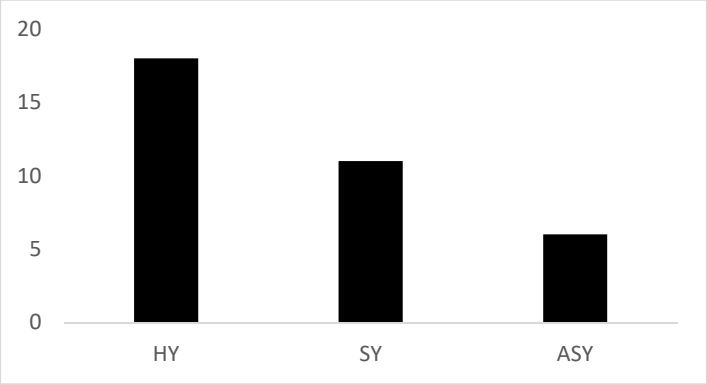

Figure 1. Ages of Northern Saw-whet Owls captured 20 October- 2 December 2016.

Radio Telemetry

From 11 November to 2 December, 11 saw-whets were fitted with radio transmitters at our ONSC field site. Six individuals stayed for up to 4 months within 8.5 kilometers of our field site, suggesting that some birds winter in northwest Arkansas. We surveyed vegetation surrounding six roost trees we were able to pinpoint specifically, all of which were short-leaf pines *(Pinus echinata)*. Roost trees were located in areas that were much more open and sparsely vegetated than expected based on known wintering habitat for the species elsewhere within North America. Average height of roost trees was 25.8 meters, average canopy height including roost tree was 20.3 meters, average canopy cover including roost tree was 32.1%, and average stem density was 0.42 stems/ 100 m^2. Remarkably, saw-whets are roosting during the day at the top of the tallest pines, some 25 m off the ground. To our knowledge, saw-whets have never been reported to roost this far above ground. The Ozark Mountains of northern Arkansas, southern Missouri, and northeastern Oklahoma contain vast expanses of pine forest with little understory. It is conceivable that this region is home to a considerable population of wintering saw-whet

owls. The extent of the species' autumn and winter range is not well known due to their secretive nature outside of the breeding season and lack of research. With this study, we hope to continue to increase the knowledge of the saw-whet's non-breeding distribution.

Publications and Presentations

As this award funded the first year of Pruitt's MS research, no publications have been produced yet. We will be making 2 presentations at the World Owl Conference in September, in Portugal, that acknowledge support from the Blake-Nuttall Fund. One manuscript will be submitted for the proceedings of that conference. We will also be making a presentation at the Raptor Research Foundation meeting in November, in Salt Lake City, Utah, that will acknowledge support from the Blake-Nuttall Fund.

Statement of Funds Expended (Autumn 2016-Spring 2017)

We were graciously granted $3000 from the Blake-Nuttall Fund to be used for the purchase of the following:

10 1.8g BD-2 radio transmitters @ $180 each	1800
2 Optima marine batteries (for monitoring station)	500
10 foot tripod support (for monitoring station)	150
Survey routes (90 miles @ 0.42/mile x 15 surveys)	567

Funds Expended

10 1.8g BD-2 radio transmitters @ $180 each	1800
2 Optima marine batteries (for monitoring station) @ 233.47 each	466.94
Survey routes (90 miles @ 0.42/mile x 15 surveys)	567
1 CT21 12m mist net with 60mm mesh (net replacement)	100
Total Funds Expended	$2933.94

Literature Cited

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