

Report to the Nuttall Ornithological Club

Northern Saw-whet Owls in Arkansas: Where are they going? *October 2017 through March 2018*

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Introduction

The Northern Saw-whet Owl (NSWO) 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, NSWO 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 2 NSWO. Netting 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 NSWO. The second season continued through the first week of December, after which we were no longer capturing birds. In 2016 netting began in mid-October and resulted in the capture of 36 NSWO. Our 2016 field season continued through the first week of December, after which time no owls were captured. In 2017, netting began in mid-October and resulted in the capture of 21 NSWO. 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 NSWO (Confer et al. 2014, Pruitt and Smith 2016). After establishing that NSWO are moving into Arkansas during fall migration, we then hoped to determine where they were going after release.

Our primary hypothesis was that some 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 NSWO 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 27 NSWO in November 2016 (n=11) and October-November 2017 (n=16) 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 NSWO proper conservation for the future.

Project Objectives

1. Capture and band NSWO at the Ozark Natural Science Center (ONSC) in Madison County, AR.
2. Outfit NSWO with radio transmitters to track their stay in the region using telemetry surveys.
3. Identify roosting sites and assess habitat around roosting sites.

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 2017. The second season began on 20 October 2017. Banding continued through mid-December and telemetry surveys continued 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 male NSWO "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 NSWO was banded, weighed, measured, sexed, and aged. These methods followed standard protocol for the species (ProjectOwl.net.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 NSWO 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 1.5 to 2.0 miles on the ground. Weekly surveys are conducted November-April using a Yagi antenna attached to an SRX 400 VHF handheld receiver (Lotek Wireless, Ontario). 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 the 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 our 2016 and 2017 banding seasons, from 20 October to 2 December 2016 and 2017, respectively, we captured and banded 57 NSWO. Nets were open an average of 4.8 hours per night during a total of 67 nights afield. Efforts resulted in the capture of at least one NSWO 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. NSWO 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 Arkansas, where we saw an increase in captures from our 2015 banding season ($n=22$). In 2017, captures decreased to a non-irruption level, $n=21$. Sex ratios were as expected for our latitude: female $n=48$, male $n=8$, unknown sex $n=1$. As is typical during a flight year, the 2016 age ratio was skewed towards hatch year birds ($n=60.0\%$), whereas adults were more frequently encountered in 2017, a non-irruption year (Figure 1).

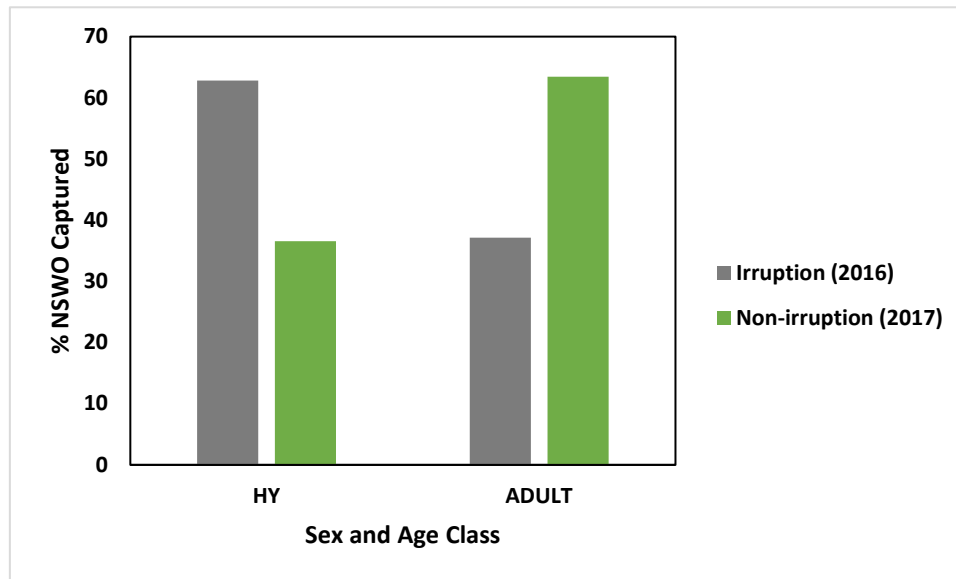


Figure 1. Age ratio of NSWO captured 2016-2017.

Radio Telemetry

Eleven radio transmitters were deployed in 2016 and 16 in 2017. Seventeen NSWO were detected after marking and 13 remained for up to 4 months within 8.5 kilometers of our field site, suggesting some NSWO winter in northwest Arkansas. We surveyed vegetation surrounding 19 roosting sites, 15 of which were in short-leaf pine (*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 in 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 m². A few roosting birds were identified visually, suggesting NSWOW may roost at a height of >21 meters in short-leaf pine. The Ozark Plateau of northern Arkansas, central and southern Missouri, and northeastern Oklahoma contain vast expanses of pine forest with sparse understory. It is conceivable this region is home to a considerable population of wintering NSWOW. 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 NSWOW non-breeding distribution.

Publications and Presentations

This award has funded two years of Pruitt's MS research and no publications have been produced yet. Since last fall, three presentations have been made: one at the World Owl Conference in September 2017, in Portugal, that acknowledge support from the Blake-Nuttall Fund. A manuscript has been submitted for the proceedings of that conference, though it does not directly pertain to our telemetry research. Presentations were also made at the Raptor Research Foundation meeting in November 2017, in Salt Lake City, UT and at the American Ornithological Society meeting in April 2018, in Tucson, AZ. All acknowledged support from the Blake-Nuttall Fund.

Statement of Funds Expended (Autumn 2017-Spring 2018)

We were graciously granted \$1800 from the Blake-Nuttall Fund to be used for the purchase of the following:

10 1.8g BD-2 radio transmitters @ \$180 each	1800
Funds Expended	
10 1.8g BD-2 radio transmitters @ \$180 each	1800
Total Funds Expended	\$1800

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