Northern Saw-whet Owl banding in eastern Nebraska – fall 2021

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Introduction

The Northern Saw-whet Owl (*Aegolius acadius;* NSWO) is one the smallest owls in North America. Once considered a rare sighting in the lower 48 United States, recent banding studies have increased the overall knowledge about the species' distribution and occurrence. NSWOs breed in forested regions across the northern United States and southern Canada as well as throughout the Rocky Mountains (Rasmussen et al. 2020). NSWOs migrate south from breeding areas during the late autumn months (Beckett and Proudfoot 2011). Relatively high densities occur around the Great Lakes annually as a result of these movements (Rasmussen et al. 2020). This species also demonstrates cyclical population fluctuations which can result in irruptive flight years during some fall migrations, typically occurring at 3-5 year intervals (Beckett and Proudfoot 2011).

Before 2019, records in Nebraska during fall were limited. Eastern Nebraska had less than five accepted reports since the 1950s (Silcock and Jorgensen, 2018), but successful targeted banding efforts in 2019 (Brenner and Jorgensen 2019) suggested NSWOs may migrate annually through the region. The Hitchcock Nature Center banding station along the Missouri River loess bluffs in nearby western Iowa captures, bands, and releases 20-50 birds every year during autumn migration (J. Toll, personal communication). Despite the relative lack of continuous forested habitat in the eastern and central part of the state and extensive areas of agricultural land cover, there is a possibility that many NSWOs in eastern Nebraska go undetected during fall. Increased banding efforts in eastern Nebraska during an irruptive flight year in 2020 (Brenner and Jorgensen 2020) resulted in the capture of 20 NSWOs and confirmed relatively large numbers of this species can migrate through eastern Nebraska given favorable conditions and proper seasonal timing. However, what remains unclear is whether this species is only relatively numerous during so-called irruption years or whether moderate numbers migrate through our area in non-irruption years.

We continued our annual NSWO fall trapping and banding in eastern Nebraska during the autumn of 2021. The purpose of this year's study was to continue to document the presence (or absence) of NSWOs at our study sites in fall, thereby determining whether this secretive species regularly migrates through eastern Nebraska across years when both extrinsic (e.g., weather conditions) and intrinsic (e.g., population cycles) are different. If NSWOs were captured in 2021, a secondary question is whether the sex and age structure of our sample of birds is similar or different between 2020 (irruption year) and 2021 (non-irruption year). Results from 2021 will provide a more complete picture of NSWO movements in eastern Nebraska given multiple years of data from before, during and after an irruption year.

Methods

We used similar methods to our banding efforts in 2019 and 2020 (Brenner and Jorgensen 2019, 2020). We attempted to catch NSWOs at one site in the fall of 2021; Branched Oak State Recreation Area (SRA) (N 40.973, W- 97.874). We erected nets in two different areas on opposite sides of the lake separated by 2.8 km (1.75 mi). We used an array of two 12-meter mist nets (60 x 60 mm) centered on a nearby speaker playing NSWO calls on a continuous loop. Playback began ~30 minutes after sunset each night of operation and lasted for 2-3 hours each night. Net checks occurred at 30-45 minutes intervals.

Results

We operated trapping efforts for 49 net hours over 7 nights from 21 October – 22 November 2021. We captured and banded 10 NSWOs during the fall of 2021 (Table 1). Four were Hatch Year (HY) birds, 5 were

second year (SY), and 1 was after second year (ASY). The majority of the owls banded were female (n = 6), the remainder were male (n = 1) or unknown sex (n = 3). We also captured and banded one adult Eastern screech-owl (EASO, *Megascops asio*) on 15 November. Our most productive capture day was 2 November (Fig. 1) when we banded 5 NSWOs. When considering data from all three years of our study collectively, NSWO migration in our area peaks during the first two weeks of November (Fig. 1).

Table 1. Species, age, sex and date of owls captured and banded during fall 2021 at Branched Oak SRA.

Species	Age	Sex	Location	Date
NSWO	SY	F	Branched Oak SRA	11/01/2021
NSWO	SY	F	Branched Oak SRA	11/02/2021
NSWO	SY	F	Branched Oak SRA	11/02/2021
NSWO	HY	F	Branched Oak SRA	11/02/2021
NSWO	HY	U	Branched Oak SRA	11/02/2021
NSWO	ASY	F	Branched Oak SRA	11/02/2021
NSWO	HY	M	Branched Oak SRA	11/15/2021
NSWO	SY	U	Branched Oak SRA	11/15/2021
NSWO	HY	F	Branched Oak SRA	11/15/2021
NSWO	SY	U	Branched Oak SRA	11/22/2021
EASO	AHY	U	Branched Oak SRA	11/15/2021

Discussion

After three consecutive seasons documenting NWSO migration in eastern Nebraska through targeted trapping and banding efforts, we have improved the understanding of this species occurrence during fall in eastern Nebraska. Our first NWSO banding efforts in the fall of 2019 established that this species does in fact migrate through our region, at least occasionally and in low numbers. We confirmed in 2020 that local numbers increase in kind with region-wide irruptions and large-scale migration events. The 2021 season showed that NSWO may also be relatively numerous during a (presumed) 'non-irruption' year. The combined three years advances a more definitive understanding about this species occurrence in the eastern half of the state and specifically demonstrates this species is a regular and not rare migrant away from major river corridors such as the Missouri River. Our work also helps contextualize the only previous fall banding study in the state which occurred in Hall County for only one year in 2004 (Kim 2005). Likewise, this earlier study provides additional context for our study.

The totals from all seasons provide additional evidence that there is a brief migration window in central-eastern Nebraska for NSWOs from mid-October to mid-November, with a definitive peak in movements in the first week of November (Fig. 1). We captured six owls (60%) in 2021 during this timeframe and during the irruption year of 2020 we captured the majority (n = 16, 80%) of owls within this timeframe as well. This peak could extend into the second week of November during some years, and this would encompass nearly all our NSWO captures (n = 25 of 32, 79%) over the past three years. Additionally, only 45% of our total trapping effort (68.25 net hours) was within the first two weeks of November, yet we caught nearly 80% of NSWOs during this time. Kim (2005) also banded the majority (n = 11, 79%) of owls in that study during the first two weeks of November. Trapping nights in which the most NSWOs were captured were during the first week of November across all seasons, with eleven out of 32 (34%) birds captured on 2 November at Branched Oak Lake SRA in 2020 (6 NSWOs) and 2021 (5 NSWOs).

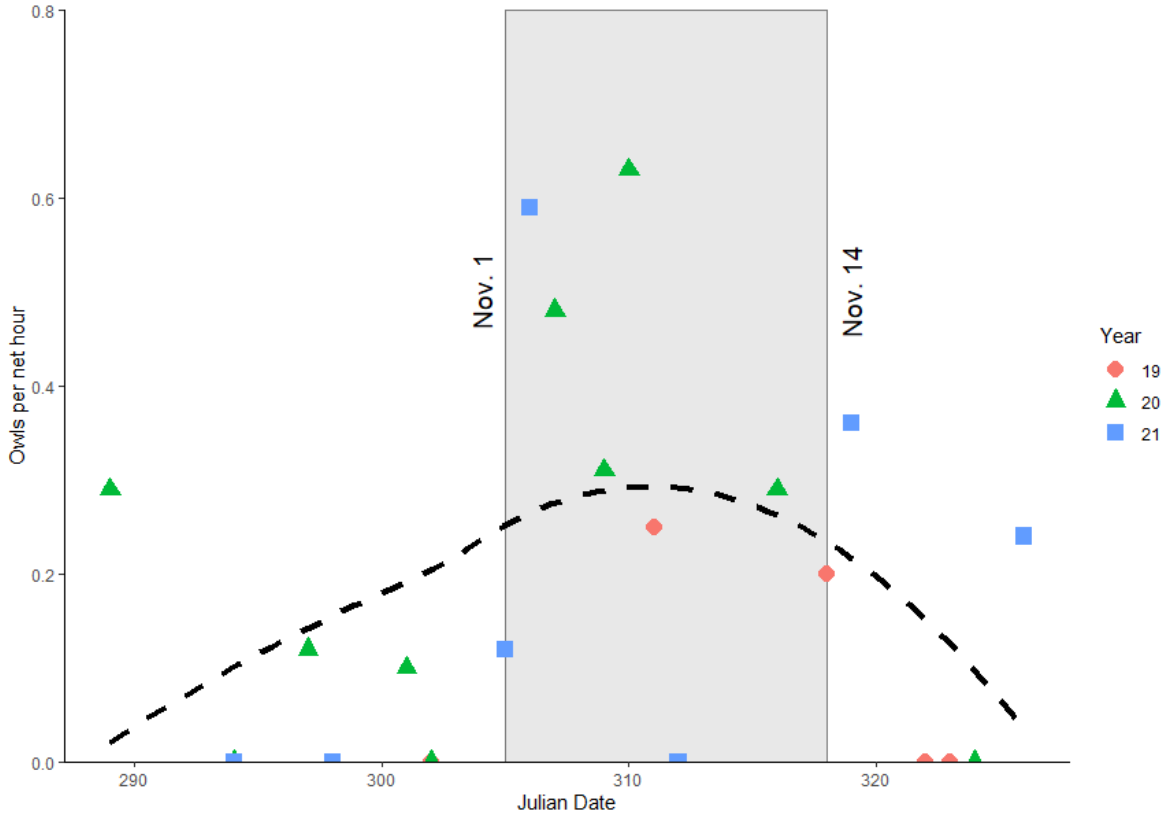

Figure 1. Northern Saw-whet Owls banded per net hour by date from 2019 (red circle), 2020 (green triangle), and 2021 (blue square) in eastern Nebraska. Trend line created using locally weighted scatterplot (LOESS) smoothing. The shaded gray box delineates the first two weeks of November, the apparent peak for NSWO movements in eastern Nebraska.

Our overall effort of 49 net hours in 2021 was lower than 2020 (82.5) but higher than 2019 (21.5). The NSWOs banded per net hour over all three seasons was 0.21 per net hour, with 0.09 birds per net hour banded in 2019, 0.24 per net hour in 2020, and 0.20 in 2021. Thus, our capture rates between an irruption (2020) and the following (2021) year were somewhat similar. However, the age ratios between these two years were different. During the 2020 season, the overwhelming majority of NSWOs were HYs, with the ratio of AHY NSWOs to HY NSWOs at 1:5.6 (3:17, Brenner and Jorgensen 2020). In 2021, the ratio of AHY to HY birds was 1.5:1 (6:4). The Kim (2005) study in 2004 also occurred during a non-irruption year (Brittain et al. 2009, Duncan et al. 2009), and the age ratio was also near even (~2:1) and not skewed towards HYs.

The higher catch rate of AHY birds to HY birds in 2021 provides additional evidence that 2020 was indeed an irruption year for NSWOs. Eastern Nebraska is within the larger overall region where juveniles produced at points farther north during irruption years will likely migrate to and through. What is interesting about this fact is that in north-central and western Nebraska, NSWOs are an uncommon breeder and would likely not experience the same timing of boom-bust cycles, which are a consequence of prey availability, as more northerly breeders (Duncan et al. 2009). This suggests that owl movements and numbers in the western part of the state may be separate from the movements and numbers in the

eastern portion of Nebraska. However, more work needs to be done on western Nebraska NSWOs' movements to confirm whether this is accurate. The winter or overwintering status of NSWO in eastern Nebraska away from the Missouri River valley also remains undefined and a priority for future research, as our trapping efforts did not extend into December and January.

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Literature Cited

Beckett, S.R. and G.A. Proudfoot. 2011. Large-scale movement and migration of Northern Saw-whet Owls in eastern North America. The Wilson Journal of Ornithology 123(3): 521-535.

Brenner, S.J. and J.G. Jorgensen. 2019. Northern Saw-whet Owl (*Aegolius acadius*) banding during fall migration in eastern Nebraska (2019 pilot season). Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, Nebraska, USA.

Brenner, S.J. and J.G. Jorgensen. 2020. Northern Saw-whet Owl (*Aegolius acadius*) banding during fall 2020 – a major flight year. Nongame Bird Program of the Nebraska Game and Parks Commission, Lincoln, Nebraska, USA.

Brittain, R.A., V.J. Meretsky, J.A. Gwinn, J.G. Hammond and J.K. Riegel. 2009. Northern Saw-whet Owl (*Aegolius acadius*) autumn migration magnitude and demographics in south-central Indiana. Journal of Raptor Research 43(3): 199-209.

Duncan, J.R., S.R. Swengel and A.B. Swengel. 2009. Correlations of Northern Saw-whet Owls *Aegolius acadicus* calling indices from surveys in southern Wisconsin, USA, with owls and small mammal surveys in Manitoba, Canada, 1986-2006. Ardea 97(4): 489-496.

Kim, D.H. 2005. Northern Saw-whet Owls: rare or overlooked? An example from the central Platte Valley. Nebraska Bird Review 73: 67-70.

Rasmussen, J.L., S.G. Sealy, and R.J. Cannings. 2020. Northern Saw-whet Owl (*Aegolius acadicus*), version 1.0. In The Birds of the World (A. F. Poole, Editor). Cornell Lab of Ornithology, Ithaca, New York, USA. https://doi.org/10.2173/bow.nswowl.01

Silcock, W.R., and J.G. Jorgensen. 2021. Northern Saw-whet Owl (*Aegolius acadicus*). In Birds of Nebraska — Online. www.BirdsofNebraska.org

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