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History and Fall Migration of Northern Saw-whet Owls (*Aegolius acadicus*) in Arkansas

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Running title: Northern Saw-whet Owls in Arkansas

Abstract

The secretive Northern Saw-whet Owl (*Aegolius acadicus*) is believed to be much more widespread during fall and winter than previously thought in the southern United States. To see if they occur more frequently in Arkansas, we initiated a banding study in fall of 2014 in northwestern Arkansas. Prior to that, only 12 historic records existed for Arkansas between 1959 and 2010. Over the course of two field seasons, we captured and banded 24 Northern Saw-whet Owls in rural Madison County. All birds were mist-netted along a trail, in woodland composed of pine and cedar with fairly dense undergrowth. Two were captured during our 2014 season when we started in late November and 22 were captured between late October and early December in 2015. We also had at least 10 birds vocalizing at our site. It would appear that the peak of migration in Arkansas is late October through early November, with capture rates dropping off by early December. All but one of the captured birds were females, the most common sex this far south. There was a fairly even distribution of hatch-year, second-year, and after-second-year birds and hatch-year birds and adults arrived at about the same time in late October and early November in 2015. Exactly where the owls are migrating from is unknown, although three foreign recoveries in Missouri and four recoveries in Arkansas suggest they are coming from the western Great Lakes region. Once considered a vagrant, based on our research, the Northern Saw-whet Owl appears to be an uncommon fall migrant, at least in the northwestern part of Arkansas. Comparing our data with that for central Missouri, about the same number of birds were captured at the same rates for about the same length of time, suggesting that Northern Saw-whet Owls are probably more common in the Ozarks than previously thought.

Introduction

In eastern North America, Northern Saw-whet Owls (*Aegolius acadicus*; hereafter “saw-whet”) are primarily a denizen of the boreal forests of Canada and mountainous forest of Appalachia during the breeding season, but birds migrate south in fall into the United States (Confer et al. 2014), sometimes in large “invasions” (Brinker et al. 1997, Whalen and Watts 2002, Brittain et al. 2009). However, their distribution is poorly known in the southern United States. Recent attempts to capture birds during fall migration have been successful in Missouri (D. Ripper, *unpubl. data*), Alabama (R. Sargent, *unpubl. data*), and Georgia (Muisse 2009), as was an earlier attempt in South Carolina, primarily in 1999 (W. Hilton, *pers. comm.*).

The first mention of a saw-whet in Arkansas was made by Howell (1911) although he doubted the authenticity of the report based on time of year. Since he worked closely with the National Museum at the Smithsonian Institute in his capacity as a scientist for the Bureau of Biological Survey in Washington, D.C., he knew of the report of a specimen of a saw-whet attributed to the Whipple Expedition from Fort Smith in early July of 1853. This specimen is indeed listed in the catalog of the museum (number 3891), but the specimen has been lost (Howell 1911; B. Schmidt, *pers. comm.*). The Whipple Expedition was one of several expeditions to find the best route for the railroad to extend to the West Coast and traveled through what is today Oklahoma, Texas, New Mexico, Arizona, and California. The major collector for the trip from Fort Smith to Albuquerque was Heinrich Balduin Möllhausen, but the missing specimen is attributed to the leader, Lt. Amiel Weeks Whipple, according to the Smithsonian catalog. There is no date associated with that record, but the expedition spent about 2 weeks in Fort Smith before departing on 15 July (Wright and Shirk 1949).

There is little support for the saw-whet record associated with the Whipple Expedition, reported by Howell (1911). It was the middle of summer, the

Northern Saw-whet Owls in Arkansas

specimen has been lost, and there is no mention of this bird in the report of the birds collected on the Whipple Expedition (Kennerly 1859). [Kennerly (1859) did mention a Carolina Parakeet (*Conuropsis carolinensis*) and a Yellow-crowned Night-Heron (*Nyctanassa violacea*) collected by Möllhausen from Fort Smith and they are both in the collection of the National Museum (B. Schmidt, *pers. comm.*).] Baird summarized results of all birds collected on all railroad expeditions and did not mention a saw-whet from the Whipple Expedition (Baird 1858:58). He did mention a saw-whet from "Texas" collected on the Pope Expedition, which was the route south of the Whipple route. This specimen is also listed in the Smithsonian catalog (number 5039), but it too has been lost (B. Schmidt, *pers. comm.*).

Between 1959 and 2010, there were 12 reports of saw-whets in Arkansas that involved a sighting or a specimen, according to the records maintained by the Arkansas Audubon Society (AAS), most of which occurred in November and December (Fig. 1). These records are scattered, but mostly north of the Arkansas River, with an emphasis on the Ozarks, Crowley's Ridge, and around Little Rock (Fig. 2). The first specimen was a road-killed owl found by Trusten Holder, an Arkansas Game and Fish Commission employee, on 11 November 1959 in Reydell (Jefferson County). This unsexed specimen is in the University of Arkansas Museum (UAFMCZ 0085-0078-1802). A second specimen, also a road kill, was found by Keith Sutton, the noted outdoors writer, on 22 November 1976, 1.6 km north of Harrisburg (Poinsett County). At

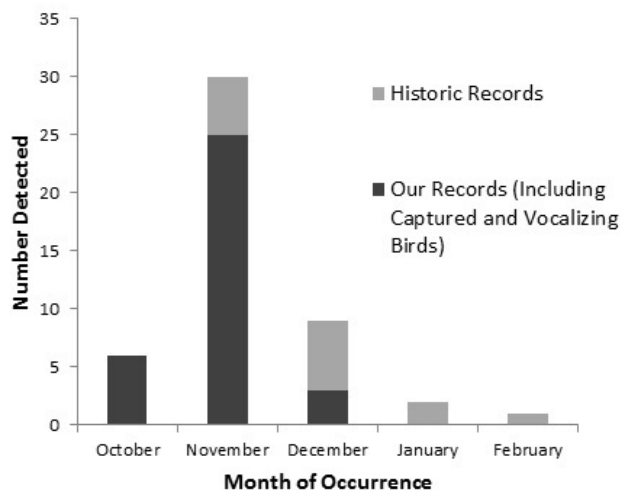


Figure 1. Arkansas saw-whet owl records from 1959 through 2015 by month. The historic records are from the Arkansas Audubon Society database and include the two game-camera records from Madison County in December 2014 and January 2015 mentioned in the text.



Figure 2. Distribution of the first 12 records from Arkansas with the month and year of each sighting. ONSC refers to the location of our study site. Note that most sightings are associated with heavily forested areas on the background map. Four records and our study site are in the Ozarks (upper left) and 3 records are on Crowley's Ridge (upper right).

the time, Sutton was an undergraduate at Arkansas State University and gave the specimen (AAS verification doc. #389) to Earl Hanebrink, the ornithologist there, who made a study skin of the bird. This specimen has apparently been lost as it is not in the Arkansas State University collection. While investigating the collection at the University of Arkansas Museum, another heretofore unreported specimen was discovered from Fayetteville (Washington County). The bird was found along Tilly Willy Creek south of town, on 4 December 1993, with a broken wing and was taken to a rehabilitation facility where it died on 21 January 1994. Then graduate student T. Scott Sillett prepared the study skin (UAFMCZ 0094-0009-0004) of the female owl.

Three other birds were found and taken to rehabilitation centers. On 25 November 1975, an injured bird was reported from North Little Rock (Pulaski County). It was taken to a veterinary clinic, where it died on 2 December. On 30 December 1999, a bird was captured by a dog patrol in West Memphis (Crittenden County) and taken to Knox Martin, a rehabilitator in Memphis, Tennessee. He fed the bird mice and released it on 3 January 2000. On 4 November 2005, Lynn Slater found a bird that had been hit by a car north of London on the Pope/Johnson County line. It was photographed in rehabilitation (AAS files), recovered, and was released in Wisconsin during spring of 2006 (L. Slater, *pers. comm.*).

Two of the reports were foreign recoveries of birds banded elsewhere. The first was a bird “caught by hand” by Roman J. Selig, Jr., on 12 December 1969, 6.4 km north of Rector (Clay County). The bird had been banded (U. S. Fish and Wildlife band 574-45418) the previous month, on 14 November 1969 at Cedar Grove (Sheboygan County), Wisconsin, by Daniel D. Berger. The distance between those 2 sites is 840 km, indicating the bird averaged at least 30 km/night. The second banded bird was brought by a dog to its owner on 23 February 1992, 9.6 km south of Paragould (Greene County) on Highway 49. It had internal injuries and a broken wing and eventually was given to Karen Rowe, a wildlife biologist with the Arkansas Game and Fish Commission. She gave it to Heath Garner, a rehabilitator in Jonesboro, but the bird subsequently died that night and the specimen was destroyed. The bird had been banded (0614-45855) as an adult female by W. N. Grigg on 9 October 1990 near Stonington (Delta County) on the Upper Peninsula of Michigan.

Of the remaining 4 records of saw-whets in Arkansas, 3 were sightings of single birds and one was a photograph. The first was a bird found by Douglas A. James, ornithologist at the University of Arkansas, and then student H. H. (Hank) Shugart, Jr., at Shores Lake (Franklin County) on 30 January 1967. Donna O’Daniel, a birdwatcher, reported one at her residence in the Crumpler Subdivision (Boone County) on the upper Bull Shoals reservoir near the Arkansas/Missouri border on 25 December 1997 (AAS verification doc. #900). A third sighting occurred predawn with a flashlight while Jack and Pam Stewart were owling during the Crooked Creek Christmas Bird Count at the Erbie (Newton County) campground within the Buffalo National River on 15 December 2010. Larry Obsitnik, a photographer for the Little Rock newspaper, *Arkansas Gazette*, took a picture of a saw-whet sitting on a “no parking” sign during the day in Little Rock, on 7 November 1969, and it appeared on the front page on 8 November. Douglas James obtained a copy of the photograph for the AAS files (Fig. 3).

The objective of our study was to attempt to document occurrence of saw-whets in Arkansas during fall migration and winter, using mist-nets and audio lures for the first time. Prior to our research, saw-whets were considered a rare bird within the state of Arkansas (James and Neal 1986). James and Neal (1986) concluded that due to their nocturnal habit and secretive nature, saw-whets might be more common in the state than records suggested. Nonetheless, our expectation was that we would capture no saw-whets.



Figure 3. Photograph of saw-whet taken by Larry Obsitnik that appeared on the front page of the *Arkansas Gazette* the following day, on 8 November 1969. He had no idea what the owl was and was making a joke about the owl not being able to read the sign. Douglas James identified the bird from the picture in the newspaper and obtained a copy of the picture for the AAS files. (Photo courtesy of Lyndal York)

Methods

Our research used standard methods developed by a group of researchers in the northeastern United States (Project Owl-net 2016). We used four 12m mist nets with 60mm mesh, an audio lure to draw birds into the net area, and tools for processing upon capture. A typical night consisted of being in the field from 1900 until 0000 hours or later.

Our field station was located at the Ozark Natural Science Center (ONSC) in rural Madison County, Arkansas, where the habitat is a mixture of pine and deciduous upland with a thick cedar understory, the apparently preferred habitat of saw-whets (Brittain 2008). ONSC is a residential nature center on property owned by the Arkansas Natural Heritage Commission, imbedded in the McIlroy Madison County Wildlife Management Area, administered by the Arkansas Game and Fish Commission.

Four mist nets were arranged in a line down a trail through cedars adjacent to the main parking lot of the center. The audio lure was placed at the center of this arrangement and played continuously during time afield. The use of an audio lure began in 1986 as a

Northern Saw-whet Owls in Arkansas

method to increase saw-whet captures (Erdman and Brinker 1997). Our lure was played on a predator caller (Cabela's Outfitter Series, FoxPro, Lewistown, PA) programmed with several call types of saw-whets from Stokes and Stokes (2010). Call types played included the breeding male's *toot, toot, toot* (18 sec) as well as an "excited" male call (3 sec) and a whine call (8 sec), which is often given during migration (Weidensaul 2015). Those 3 calls were played continuously with a 6 sec break between bouts. No netting was conducted on nights deemed to be too windy (> 24.2 kph) or too cold ($< -5^{\circ}\text{C}$).

In 2014, netting began on 19 November and continued sporadically through January into early February of 2015. In fall of 2015, netting began on 18 October and ended on 3 December. Nets were checked every 45 minutes.

Upon capture, a bird was taken inside a building for processing, which involved sexing, ageing, and banding the bird. Sexing of saw-whets was done by comparing a bird's closed wing chord and its mass using the chart published by Brinker (2000). All birds were weighed in a mesh banding bag using a Pesola spring scale.

Ageing saw-whets was done using ultraviolet (UV) light to fluoresce porphyrin pigment on the ventral surface of flight feathers (Primaries: P1-P10; Secondaries: S1-S12). In saw-whets, this pigment is pink when fluoresced by UV "black" light. Once

exposed to sunlight, porphyrins begin to fade making different ages of feathers fairly distinct. New feathers fluoresce bright pink, middle-aged feathers are light pink, and old feathers may not show any pink (Weidensaul et al. 2011). Three distinct age classes can be identified using this method (Fig. 4). Hatch-year (HY) birds have flight feathers of a single age. Second-year (SY) birds have two distinct ages of flight feathers. After second-year (ASY) birds have three or more distinct ages of feathers (Pyle 1997). After a saw-whet's second year, its age cannot be identified more specifically unless it was previously banded. Finally, captured birds were banded using a size 4 (short) federal band, and released into the night.

Capture rates were calculated for the fall 2015 banding season based on birds captured per 100 net-hours, the standard way of reporting banding effort for saw-whets. Typically, 4 nets were open for 4 hours each night, or 16 net-hours per night. The season capture rate was calculated from the night of the first capture (28 October) to the night of the last capture (21 November).

Results

Over the course of two field seasons, a total of 24 saw-whets were captured and banded at the Madison County field site. In 2014, netting efforts did not begin until 20 November due to issues in obtaining all

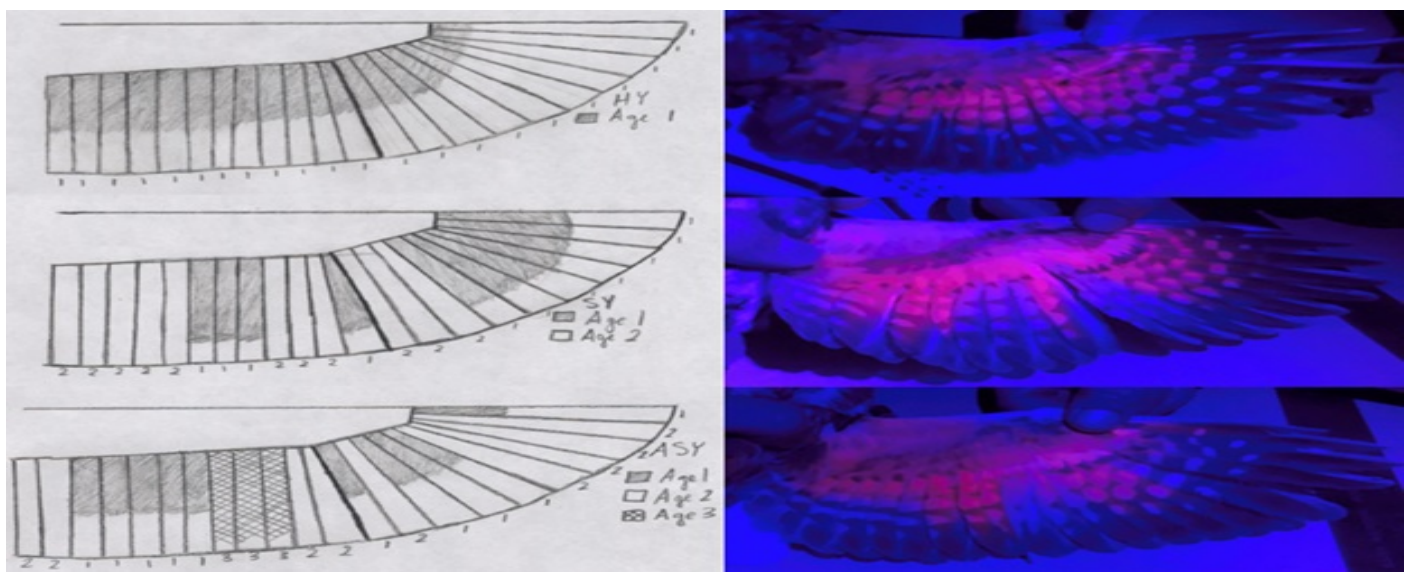


Figure 4. Age classes of the saw-whets based on fluorescence of porphyrin on the underwing. Top: hatch-year bird with uniform color indicating that all feathers are new. Middle: second-year bird with 2 different colors of feathers: new feathers are bright while second-year feathers are faded. Bottom: After second-year bird with 3 different colors of feathers: new feathers are bright, second year feathers are paler, and third year feathers barely fluoresce.

necessary permits from federal and state agencies. Even so, two individuals were captured. The first saw-whet was captured on 21 November and was in the company of another individual that was not captured. (Two birds were vocalizing simultaneously at the nets 30 min prior to the capture.) Another individual was captured on 7 December. Efforts continued through January 2015 and sporadically into February with no captures or vocal detections after the first week of December. Our second field season began earlier in fall of 2015 in October, and continued through 3 December. During this time, 22 saw-whets were captured and banded (Fig. 5). The 2015 field season consisted of 23 total nights afield, or 257.3 total net hours. Of these 23 nights, 10 nights had captures (43.5%) and five birds were captured on the night of 6 November after the passage of a cold front.

The sex ratio was heavily skewed towards females. Only one individual of the 24 captures was identified as a male. The single male was captured 21 November 2015 and was aged as a hatch-year bird. The male had a closed wing chord (CWC) of 136mm and weighed 80g. The average CWC of captured 23 females was 141.9mm (0.57 SE) with a range of 138-146mm. The average weight of captured females was 90.9g (1.16 SE) with a range of 80-105g. The age distribution was fairly even between the three identifiable classes: HY (33%), SY (29%), ASY (33%), and fourth year (4%). A saw-whet captured on 7 November 2015 at ONSC was banded as a SY bird at the Linwood Springs Research Station near Stevens Point (Portage County), Wisconsin on 17 October 2013, meaning it was in its fourth year when captured at our field site. Hatch-year

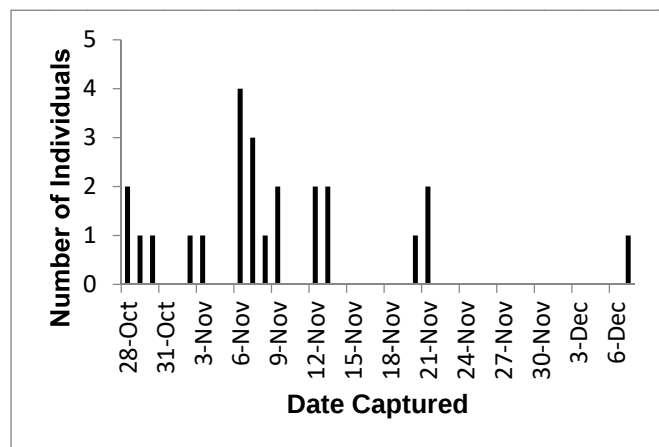


Figure 5. Saw-whet captures at Ozark Natural Science Center during November and December 2014 and October to December 2015.

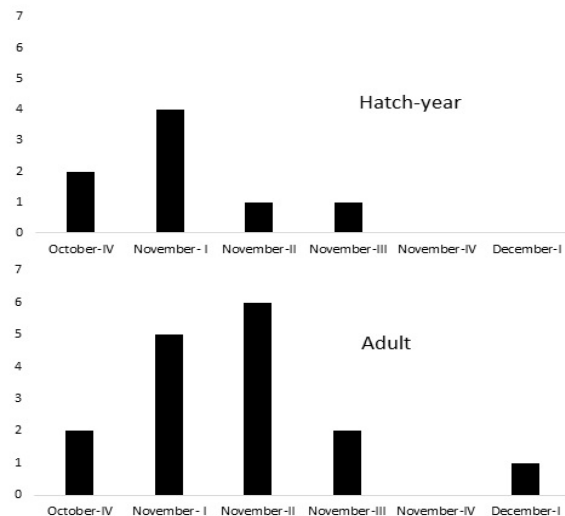


Figure 6. Number of arrivals of hatch-year and adult saw-whets by week from the 4th week of October through the first week of December combining 2014 and 2015.

birds arrived at about the same time as adults (Wilcoxon sign-rank test, $W = 72.5$, $P = 0.27$; Fig. 6).

The capture rate for 2015 was 8.6 birds per 100 net-hours. Records from this research were compared to Arkansas's historic records and show a peak in migration during the first two weeks in November (Figs. 1 and 5). Interestingly, most of the captures seemed to occur during the hours of 2100-2200 and again around midnight (Fig. 7).

During the 2015 season, two birds were foreign recaptures, meaning they were banded somewhere other than our ONSC field site. The first was the aforementioned 4-year-old bird banded (0914-53397)

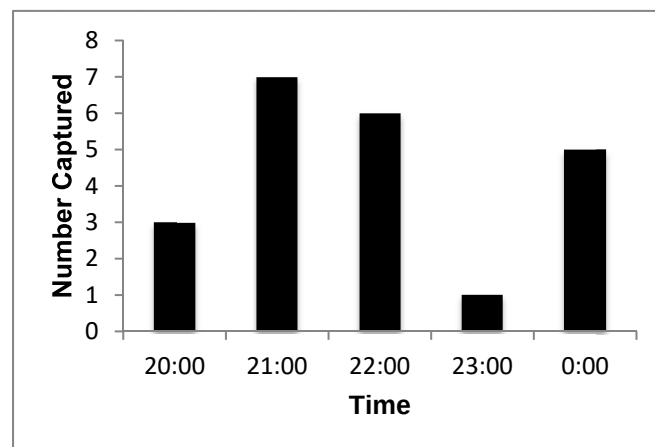


Figure 7. Saw-whets captured per hour at Ozark Natural Science Center during October and November 2015.

Northern Saw-whet Owls in Arkansas

as a female in October 2013 at Stevens Point, Wisconsin and captured at ONSC in November 2015 (Fig. 8). This owl was underweight (80g) with a CWC of 144mm. The second recapture occurred on 21 November 2015 and was banded (0914-99385) on 30 September 2015 at Hawk Ridge Bird Observatory near Duluth (Saint Lewis County), Minnesota (Figure 8). The distance between the two research sites is 1186 km indicating the bird averaged at least 23 km/night. This ASY female weighed 91g and had a CWC of 145mm. We also had a local recapture during our 2015 season. A HY female was banded on 7 November 2015. She weighed 86g, which is slightly underweight. The bird was recaptured the following night, 8 November, and weighed 91g. She had dried blood on her beak and talons, indicating she had eaten between captures.

Vocalizations were heard on several occasions. On the first night of netting in 2014, one bird was responding to the audio lure when another gave the 2-note alarm call when it was flushed from a cedar tree. Another bird responded immediately when the audio lure was turned on on 6 December, but no birds were captured that night. During fall of 2015, at least 10 birds were detected vocally, with at least one occasion when 2 or maybe 3 birds were calling simultaneously. In most cases, birds appeared to vocalize after the whine call was played, often calling repeatedly each time the whine call was played.

Discussion

From this research, we conclude that the Northern Saw-whet Owls are, in fact, more common in Arkansas than previously thought, at least during fall migration in the northwestern part of the state. With only 12 previously confirmed records in Arkansas, averaging about one record every 4 years, we did not expect to capture any saw-whets. However, with 24 total captures and additional vocal detections over 2 fall seasons, it is reasonable to believe the species previously went undetected, probably due to their secretive nature (Rasmussen et al. 2008). Continuation of this project for several more years should determine their exact status in Arkansas.

All but one of the birds we captured were females, which is consistent with more males being captured further north (Brittain et al. 2009, Beckett and Proudfoot 2012). Brinker et al. (1997) suggested this is because males do not stray as far from prime breeding habitat, allowing for quicker reoccupation in spring when they are vying for precious cavities for nesting. Alternatively, the larger and heavier females may have



Figure 8. Banding recoveries from Arkansas (white) and from the Missouri River Bird Observatory (black) (D. Ripper, *unpubl. data*). Most birds appear to be coming from the western Great Lakes region. Key (banded, recovered): A (9/2015, 11/2015), B (10/2013, 11/2015), C (10/1990, 2/1992), D (11/1969, 12/1969), E (10/2015, 11/2015), F (10/2015, 11/2015), G (?/2013, 10/2014).

dietary requirements that are met further south (Weir et al. 1980, Beckett and Proudfoot 2012). Such differential migration is not uncommon in birds and has been documented in the Boreal Owl (*Aegolius funereus*), a close relative of the saw-whet (Brinker et al. 1997).

Based on only one full field season, we cannot attribute much to the equal distribution of age classes that we found. Brittain et al. (2009) found that the number of HY birds fluctuated annually from about 30% to 50% in southern Indiana. At northern locations,

HY birds usually appear first in the fall, but our limited data suggest that they arrive at the same time as adults in northwestern Arkansas.

In our region, other banding efforts for saw-whets have been conducted only in Alabama and Missouri. Banding was conducted by R. Sargent from 2007-2013 in Clay (Jefferson County), Alabama with a total of 104 individuals captured (data from the USGS Bird Banding Laboratory, Patuxent, Maryland). Efforts at the Missouri River Bird Observatory in and around Marshall (Saline County), Missouri began in 2010 and continued through fall of 2015, with a total of 117 captures. Annual capture rates at that site ranged from 6.0-15.0 birds per 100 net-hours (D. Ripper, *unpubl. data*). Our capture rate for fall of 2015 is right in the middle of that range and catching 24 birds in fall is also about the average for the Missouri site. Thus, the fall migration in northwestern Arkansas is very comparable to that in central Missouri.

Captures in our 2015 season started in late October, peaked during the first few weeks of November, and decreased to no captures after the first week of December. This trend is also similar to that of Missouri (D. Ripper, *unpubl. data*) and slightly before that of northern Alabama, where captures continued into January (R. Sargent, *unpubl. data*). This difference in Alabama might be because those birds are following a different migratory pathway (see below). This peak in early November coincides exactly with the prediction from the model presented in Beckett and Proudfoot (2011) for a northern latitude of about 36 degrees. Our results agree with those authors that fall migration of saw-whet owls is a uniform front that moves southward as fall progresses.

Weather conditions also appear to play a role in successfully capturing saw-whets. The nights that we captured the most birds followed cold fronts from the north, suggesting that migrating birds were riding those fronts. Brittain et al. (2009) also caught more birds in southern Indiana following the passage of fronts and on nights with calm winds (see also Weir et al. 1980). Nights with full moons are typically unproductive (Speicher et al. 2011), because birds can see the mist nets or they may be wary of larger, predatory owls, such as Barred Owls (*Strix varia*), which were commonly heard calling at our field site. However, four captures were made in late October when the moon was an 85% full waning gibbous. This was probably due to leaves still being on the trees, and the forest near our nets being dark.

Based on the 4 foreign recoveries from Arkansas and 3 of 4 from Missouri, it would appear that the saw-

whets migrating to our region are coming from the western Great Lakes region (Fig. 8). Four recoveries from Arkansas were two birds banded in Wisconsin, one from Minnesota, and another banded in the Upper Peninsula of Michigan. Three recoveries from Missouri include two birds banded in Minnesota, and one from southeast Ontario (Figure 8). (Another bird captured in Missouri came from Prince Albert, Saskatchewan, far to the northwest.) These data appear to establish a here-to-fore unknown migration route for saw-whets, flying south or southwest from the western Great Lakes to the Ozarks (see Confer et al. 2014). Birds in Alabama most likely are not coming from the western Great Lakes, but down the Appalachian Mountains, which might explain the longer banding season there.

Two of the recaptures occurred in the same fall the birds were banded, allowing us to calculate a minimum daily rate of 30 km/night (assuming that they do not fly during the day) in 1969 and 23 km/night for the 2015 bird. These compare favorably with the average of about 29 km/night reported by Brittain et al. (2009) in southern Indiana based on 9 birds, and many long-distance migrants reported in Wisconsin by Erdman et al. (1997). This is also consistent with the estimate that the migration front moves about 30 km/night (Beckett and Proudfoot 2011).

During the 2014 and 2015 field seasons, we were able to document several different vocalizations. One of the vocalizations played by the audio lure was the male's territorial *toot, toot, toot* call. We heard no response to this call because it is rarely heard outside breeding season and saw-whets do not breed in Arkansas. Another vocalization we played as an audio lure was an eerie, drawn out whine call that is heard most frequently in fall and could be a contact call used during migration to locate other individuals (Rasmussen et al. 2008). Most often a response to the whine call was heard, but we documented several other vocalizations as well. Another common call heard during field research was a quick *ksew* or chirping note. This was often elicited by flushing birds while checking nets. Both the *ksew* and squeak seemed to be given by agitated individuals. *Ksew* notes were also heard while listening from a distance, meaning they are probably given off in agitation towards other individuals as well. On one occasion, a two note, squeaking alarm call was heard from a flushed bird. On another occasion, two individuals were heard high up in a pine giving a series of soft chirping notes, seemingly talking back and forth to each other. The saw-whet owl is still understudied outside of the breeding season, making it difficult to understand the

Northern Saw-whet Owls in Arkansas

social context behind most of their vocalizations.

Based on the scattered historic records, it would appear saw-whets could be found throughout the state. There are also other large tracts of suitable cedar habitat in northwestern Arkansas. Thanks to publicity of our project, we were contacted by Becky Christenson, who had 2 images of a saw-whet from a trail camera that she had set up on her property, approximately 16 km south of Kingston (Madison County) on County Road 3655. Presumably the same bird, the first image was taken at night on 23 December 2014 and the second image was taken on 12 January 2015. Her property is about 32 km due south of our study site at the Ozark Natural Science Center. This is likely just one of several unknown and unreported individuals.

After early December, our capture rates dropped to zero and saw-whets seemed to vanish. We continued our banding operation into January and early February of 2015, but caught or heard no birds. The banding station in Missouri also typically shuts down after the first week of December as they do not catch any birds after that time (D. Ripper, *pers. comm.*). However, sporadic records in Arkansas from December to February suggest that some individuals may spend the winter here.

There are several possibilities why no birds are heard or captured after early December. First, they could be going further south, but there are no records in southern Arkansas and almost none in Louisiana. Second, they could be spending winter in the Ozarks, but they no longer respond to audio lures after late November, perhaps becoming net adverse. Third, they could be returning north in December, but that seems to oppose the logic behind migration. Or they could be doing something completely different, like wandering throughout winter, as found in Snowy Owls (*Bubo scandiacus*) (Norman Smith, *pers. comm.*).

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provided information on historical records. Nancy Glover McCartney, Curator of Zoology at the University of Arkansas Museum collections, allowed access to the specimens in that collection. Brian Schmidt, Division of Birds, Smithsonian Institution, provided information on the specimens from the Whipple Expedition. The following people helped with permits: Cindy Osborne and Bill Holiman, Arkansas Natural Heritage Commission; Andrea Daniel, Arkansas Game and Fish Commission; Kimberly Rowe, Arkansas State Parks; and J. Keith Whelan, U. S. Forest Service. Christy Slay loaned us the net poles. Norman Smith first suggested we try to mist-net saw-whets in Arkansas. Ross Brittain made many helpful suggestions on an earlier version of this paper. This project was funded by the Arkansas Audubon Society Trust and the Northwest Arkansas Audubon Society. This research was conducted under the University of Arkansas IACAC protocol #15010. We dedicate this paper to the memory of Bob Sargent, who also encouraged us to start this project and whose success in Alabama was an inspiration to us.

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