

Increasing Mist Net Captures of Migrant Northern Saw-whet Owls with an Audiolure

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Abstract--In 1986, an "Audiolure" was developed and tested at the Little Suamico Ornithological Station. The Audiolure consisted of broadcast amplified "solicitation" calls of Northern Saw-whet Owls normally associated with courtship activities. From 1971 through 1985, using passive mist netting at Little Suamico, the mean number of owls captured each autumn was 57. Using an audiolure, from 1987 through 1995 the mean annual catch was 636 owls. During 1989, an Audiolure was also tested at Finzel Swamp in western Maryland by comparing captures during adjacent 3-hour time blocks. Use of an Audiolure significantly increased capture rates over passive mist netting. Audiolures are now being used by all major Northern Saw-whet Owl banding stations in the western Great Lakes area to net 2,000-3,000 owls each autumn. Audiolures have also proven effective for netting saw-whet owls during both the breeding and wintering seasons. Descriptions of the audiolure and basic characteristics of captures at simple autumn migration netting operations are also presented.

Each year more Northern Saw-whet Owls (*Aegolius acadicus*) are banded in North America than any other owl species.

In the Great Lakes region 2,000-3,000 are banded during each autumn migration. It has been assumed that these small owls, like most diurnal raptors, are reluctant to cross large bodies of water and that they concentrate along certain shorelines. Most bird watchers, unfamiliar with the results at banding stations, still consider saw-whet owls rare and a "great find."

Taverner (1911) suggested that Northern Saw-whet Owls were migratory during the early 1900s. The first published attempt at capturing and studying numbers of migrant Northern Saw-whet Owls came from the Cedar Grove Ornithological Station located along the Wisconsin shoreline of Lake Michigan. Mueller and Berger (1965) reported that "numbers" of these then "rare" owls could be captured with mist nets left open at night. Using that technique they documented a pronounced autumn migration during October and November, confirming Taverner's (1911) suggestions.

Since the 1960s many other banding stations have tried mist netting migrant owls, but with varying degrees of success.

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single area, and by 1988 the effort consisted of 25 nets in an essentially continuous line along a single lane gravel road that crossed the swamp. The line of nets was established to investigate differential habitat use. An audiolure was first used at Finzel during 1989. The net line was reduced to 6 nets with an audiolure in 1990, and use of this site ceased after 1990. Studies began at Assateague in 1991 and at Casselman River in 1992. Audiolures were used at both Assateague and Casselman since establishment and these sites each operate 6-7 nets annually.

Design of our audiolures varied, but has stabilized around lures that produce sound pressure levels of 100-110 dB at 2 m. On calm nights, at this sound pressure level most people can hear the lures at distances of more than 1.5 km.

Audiolures replay the primary solicitation calls of Northern Saw-whet Owls recorded on 3-minute continuous loop tapes. Several tapes with differing call sequences have been used with equal success. All tapes have quiet periods on them, some as long as 30 seconds. Construction details and a schematic of the audiolure are included as an appendix.

As a final test of the audiolure's effectiveness, a rigorous sampling design was applied to its operation at Finzel during 1989. The audiolure was operated on alternate nights during one of two randomly selected 3-hour blocks, either dusk-21:00 or 21:00-midnight. There is a strong seasonality component to capture rate effect. Early in the season capture rate is low and by mid season it is high, capture rate then declines as the season progresses and comes to a close. Seasonality is not a linear effect, it is most similar to a quadratic relationship. The sampling design controlled for seasonality by treating each test night as a replicate. The design also controlled for major variation in weather effects that differed between test nights. Variation from weather effects occurring during the dusk-midnight period and time-of-night effects were relegated to random error. The difference between treatments, lure on or lure off, was tested with Analysis of Variance using SAS' general linear model (GLM). Although a Paired T-test could have been used to simply test for treatment effect, the GLM approach was used to facilitate providing an estimate of the total number of owls that would have been trapped during the 1989 season with and without the use of an audiolure. GLM was used to output daily predicted values for both treatments. To obtain the total for the season, daily predicted values were summed by treatment. When the GLM was run, date was a significant effect and date*date very closely approached significance.

RESULTS

Owl Captures

Using an audiolure significantly increased the capture of migrant Northern Saw-whet Owls over passive netting.

Captures at LSOS increased by an order of magnitude, while the number of nets was reduced by approximately 65%.

Increases in capture rates at Finzel Swamp, although smaller in magnitude, were also highly significant. Before work at Finzel Swamp, mist netting directed toward migrant Northern Saw-whet Owls had not been attempted in Maryland.

Without the use of an audiolure, banding of migrant saw-whet owls would not be practical in Maryland or further south.

Other researchers are now netting significant numbers of Northern Saw-whet Owls at sites where previous attempts had failed (E. Jacobs, pers. com.). Several of these are not near any hint of a classical leading line, such as a shoreline or mountain ridge.

The audiolure is presumed to increase captures by attracting owls to the vicinity of mist nets from considerable distances and by increasing the time owls spend near the nets. Increased residency time near the nets increases the probability of capture significantly. This results in a considerable increase in captures above the random ones typical of passive mist netting. Because of the strong attractive influence of the audiolure, capture rates at banding stations using audiolures are probably more indicative of larger scale regional and geographic influences than small scale local habitat effects.

The significant increase in captures with use of the audiolure indicated that a small proportion of the possible migrants was being netted with passive techniques. Undoubtedly this proportion has increased since use of audiolures became routine. However, the increase may not be as great as one might suspect. It is apparent from vocalizations that an unknown proportion of the migrants attracted to the vicinity of the mist nets are not being netted.

As with any improvement in a technique, new problems arise. One complication was housing large numbers of owls until they could be processed. A system of small boxes or mesh bags to individually hold owls is essential. For example, in Wisconsin it is not unusual to have one or more nights per season when over 50-75 saw-whet owls are netted in a night. In cases like this, additional personnel is absolutely necessary to tend nets properly and process birds. Another problem has been the increased threat from ground predators and larger owls. Mammals, such as Common

experiment on Assateague Island. We have also netted individual owls and family groups during the summer breeding season with the use of a mist net and audiolure.

Audiolure Construction

Construction and operation of an audiolure is relatively simple and inexpensive. The total cost of a recorder, storage battery, battery charger, amplifier, voltage converter and outdoor speakers is approximately \$200-\$300. Good deep-cycle rechargeable 12v DC wet cells (RV/Marine battery) will last 10 to 14 days without recharging. For an additional \$100 or so, a solar panel can be used to recharge the 12v battery in remote locations where 120v AC current is not readily available. An alternative power source is a sealed rechargeable lead-acid battery, commonly used for home security systems. These small batteries (nine x 11 x 7 cm) provide 4 amp-hours of current and are sufficient to run the audiolure for a 12 hour period. They can be recharged in approximately 4 hours. With a few extra accessories, it is also possible to run the audiolure from the cigarette lighter of a nearby vehicle. We recommend not wasting money trying to use standard C or D sized dry cells made for use in portable tape recorders. Even the most expensive seldom last more than one night, while a good quality 12v battery charger can recharge a wet cell in 12-24 hours. The tape used is a 3-minute continuous loop used in telephone answering machines, and costs about \$5.00. Shorter loops are available, but they wear out much faster because of the increased number of times that the loop is played per night compared to the 3-minute loop. Just about any speaker will suffice, provided it is of sufficient wattage that it will not be ruined by overpowering and that it is properly protected from the elements.

For permanent sites, we build a weatherproof wooden shelter to house the audiolure. This shelter contains the battery, amplifier, tape player and other electrical components. Standard coaxial speaker cable is run from the shelter to the speakers. For portable rigs, we use the small sealed lead acid batteries and along with the other components.

Everything can be easily carried in a small backpack.

The actual saw-whet vocalization was recorded from a commercial bird vocalization record. Interestingly, quality of the call does not seem to matter to the owls, as considerable success was achieved by an associate using a tape recorded

LITERATURE CITED

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Mueller, H. C. and D. D. Berger. 1965. Observations on migrating saw-whet owls. *Bird Banding* 28(2):120-125.

Taverner, P. A. and B. H. Swales. 1911. Notes on the migration of the saw-whet owl. *Auk* 28(3):329-334.

Audiolure

Schematic,

Parts List,

and

Construction Notes

PARTS LIST

<u>Major Components</u>	<u>Cat. No.</u>	<u>Price</u>	<u>Notes:</u>
Any good quality tape player (for ex. Radio Shack)	14-1156	\$49.99	mono
40 Watt Auto Stereo Amplifier	12-1869	\$19.99	
Powerhorn Outdoor Speakers			
8 Watts or	40-1236	\$43.98	cost is for 2
15 Watts	40-1239	\$67.98	cost is for 2
Universal DC Auto Adapter	270-1560	\$12.99	
 <u>Other Components</u>			
Flip Switch/Light Panel	275-704	4.49	On/Off switch for power supply or RS 274-331
Triple Accessory Outlet	270-1544	9.99	
Lighter Plug	274-021	3.49	
In line Fuse Holder & Fuse	270-1281	1.59	
Diode	276-1143	1.19	
1/8" Mono Plug - 2 RCA Phono Jacks	42-2154	2.49	Y Adapter
RCA Phono Plugs (pkg. of 4)	274-319A	1.99	4 males required
RCA Phono Jacks (pkg. of 4)	274-337	2.59	2 females required
Quick Disconnect Connectors	64-3049	1.49	misc. connections
Heat Shrink Tubing Assortment	278-1627	1.99	misc. short protection
18 Gauge R/B Wire	278-567	4.19	misc. wiring needs
Endless Loop Cassette Tape (3 min. preferable)	EC-3M	3.78	suggest TDK
Tape Player Cleaner	44-1116	3.99	
12v Deep Cycle Wet Cell Battery (for ex. Sears RV-Marine)	96493	\$75.00	

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Nominal Cost - all components purchased new, battery and tape player already available, substitute speakers also available	\$76.24
Minimum Cost - all components purchased new, battery and tape player available, two 8 watt speakers	\$120.22
Average Cost - all components purchased new, battery and tape player available two 15 watt speakers	\$144.22
Maximum Cost - all components purchased new, Radio Shack Tape Player	\$269.21

When connecting the amplifier to a mono tape player, plug the Y adapter into the earphone jack of the tape player. Then plug the two RCA phono plugs from the amplifier input into the two jacks of the Y adapter. This will direct audio output to both channels of the amplifier. For a stereo tape player purchase a 1/8" stereo plug - 2 RCA phono jack adapter (RS 274-369, \$3.59). Substitute this for the Y adapter.

The speakers come with bare wire ends. Connect a RCA phono plug (σ) to each of the speakers. The wire with the white stripe is the positive (+) wire that goes to the short tab. The wire without the stripe is the negative wire that goes to the long tab. To locate the speakers at a distance from the audiolure, use shielded speaker cables with plugs (σ) and jacks (φ) at opposite ends, for example RS42-2363, a 12 foot cable (\$3.49).

There are a variety of options for connecting the amplifier and tape player to a power source. For example, one of the simplest is to operate the audiolure from the cigarette lighter of a vehicle. Purchase a DC-Y adapter (RS 270-1535, \$5.99) and plug it into the vehicle's cigarette lighter outlet. Then plug the amplifier into one of the two outlets. Plug the universal DC auto voltage adapter into the other outlet. Set the voltage on the DC adapter to the correct setting for the tape player being used (often 6v). Set the polarity of the adapter output to match that required for the tape player. Connect the tape player to the amplifier, connect up the speakers, and the audiolure is set to operate. For use with a 12v wet cell in a weatherproof box, additional wiring is necessary.

Mount the on/off switch and the triple accessory outlet at some convenient location on the inside of the box. Use the 18 gauge supply wire to make the following connections. To obtain red and black wires, the 2-conductor supply wire can be split. Throughout the following, all bare connections should be protected with either heat shrink tubing or electrical tape to prevent shorts. Crimp a female quick connector to a red piece of the supply wire. Solder the opposite end to the negative (-) side of the diode. The purpose of the diode is to prevent equipment damage if the battery is connected with the polarity reversed. To the positive end (+) of the diode attach one end of the fuse holder (polarity is not important). The opposite end of the fuse holder is attached to the positive pole of the battery, either directly or via a second piece of supply wire. The completed audiolure draws a current of less than 0.5 A and a 2 or 3 amp quick blow fuse is sufficient protection. The female quick connector is connected to the supply (supp) tab of the on/off switch. Crimp female quick connector to a piece of black supply wire. To the opposite end, solder two more pieces of black supply wire. One end of the two black wires is connected to the negative (-) pole of the battery. The other black wire is soldered to the black (-) wire on the triple accessory outlet. The female quick connector is connected to the ground (grd) tab of the on/off switch. Lastly take a piece of red supply wire and crimp a female quick connector to one end. Solder the other end to the red (+) wire of the triple accessory outlet. Connect the female quick connector to the accessory (acc) tab of the on/off switch. Plug the DC adapter and amplifier power supply plugs into the triple accessory outlet and proceed as described for powering from a vehicle.

