Banding Northern Saw-whet Owls in the Blackstone River Valley

Kathy Clayton

The First Owl

October 16, 2003, began like most mornings last October. I woke up, got ready for work, checked the weather forecast, decided conditions were right for an owl-banding attempt that night, threw extra food and warm clothing into the car, and drove to work wishing very hard for my first close encounter with a Northern Saw-whet Owl (*Aegolius acadicus*). During the day as I sat at the computer, my mind drifted to owls, and I would check the weather forecast again or look at the Project Owlnet web site, a site describing banding techniques used at a network of collaborating saw-whet banding stations in eastern and central North America. Midafternoon, Strickland Wheelock, our master bander, called in great excitement about a perfect forecast of light westerly winds, cool temperatures, and a dark night with little moonlight. I quickly e-mailed volunteers with the news and made carpool arrangements with Jackie Pascucci, a volunteer who had anticipated this experience as long as I had. She was with us a year before on a trip to Dead Creek, Vermont, where Rodney Olsen, a high-school teacher and raptor bander, introduced us to mist-netting saw-whet owls. She was one of the few who waited as long as possible that night for a chance to see a saw-whet, and had enthusiastically joined us for three unsuccessful attempts earlier in the month.

After work, I met Jackie in Natick, and we hastily proceeded west to Northbridge. After the standard greetings, she asked the question I had been asking myself all day, "Do you think this will be the night? The conditions are good, and you said they caught some in Maine earlier in the week." I thought about the many places through which saw-whets might migrate, other than our small, rocky overlook on the Blackstone River, and the fact that no one had previously reported major movements of these owls in Worcester County, but merely said, "I hope so! What a great night for it!" After only a few minutes, our conversation was interrupted by my cell phone ringing. The screen flashed "Strickland W," which either meant Strickland was looking for a status report on our arrival with dinner, or he had news to report. I answered the phone to: "You're not going to believe this. We have an owl in the net!" My heart skipped a few beats, but I regained my composure enough to relay the news to Jackie and to let Strickland know we were not far away. Jackie hit the accelerator, and we sped toward our first owl in hand. Shortly thereafter, Strickland called again to say he had extracted a second owl, and both were in bags waiting for us.

We arrived at the park road, and I jumped out to let the car through the gate. I closed the gate and was back inside before the car came to a complete stop. Jackie wove a path through the roots and ruts of the dirt road as quickly as she dared. At last we arrived at "The Rock," a large rocky outcropping next to a gravel parking area

with trails leading into thick pine-oak woods. Stepping out of the car into the darkness, the first thing I became aware of was the loud, insistent, monotonous "toot, toot, toot" of our audio lure, which continuously broadcasts the male saw-whet's territorial advertisement call. It was a crisp fall night with a light, cool breeze that hinted at winter to come. The glow of a lantern caught my eye, and I saw Strickland and volunteers Paul and Beth Milke silhouetted next to a pickup truck. Banding supplies were spread on a worn black and white wool blanket in the bed of the truck. But where were the owls? Quickly grabbing our coats and headlamps, Jackie and I rushed to join them. Sensing our impatience, Strickland smiled, taking his time illuminating two white cotton bags hanging from a nearby tree branch. My heart began to beat at twice the normal rate, and I was no longer cold, tired, or hungry, for in a few minutes I would not only see my first saw-whet owl, but I would have the chance to hold the bird and study it in detail for banding!

During the prior year I had researched saw-whet banding techniques, making extensive use of banding references by Pyle (1997b), saw-whet banding protocols outlined on the Project Owlnet web site, and discussions on Sawwhetnet, an e-mail list for saw-whet banders. The federal Bird Banding Laboratory requires the same data for owls as for passerines: location, date, bander, species, age, and sex. To determine the age of saw-whets, the flight feathers of the wing are closely examined for molt patterns. While most passerines undergo at least one complete molt per year, saw-whet owls take three or more years to molt their wing feathers. They replace them in a standard pattern, at least for the first two years. This allows a bander to determine specific ages up to three years old (Pyle 1997a). There is ongoing debate about molt patterns in saw-whets and a call for further research, so banders are asked to record individual molt patterns. To determine sex, we measure both the bird's weight and its wing chord, the length from the bend in the wing to the tip of the longest primary. For passerines, we generally use only wing chord and plumage or breeding characteristics. Female owls are larger than males,which means they are heavier and have longer wings. David Brinker, Project Owlnet founder and ecologist with the Maryland Department of Natural Resources, developed a discriminant function table for determining sex, given weight and wing chord combinations (Brinker et al. 1997). In preparation for banding, I had created data collection sheets to make sure we recorded all the information necessary to make these determinations. It was now time to field test the system.


Male (right) and female (left) Saw-whets. Photograph by Paul Milke.

Strickland handed me one of the owl bags, and I looked at him quizzically. He responded with a laugh, "You don't expect me to stick my hand in there, do you! That's the

subpermittee's job." I have to admit that even though I have handled thousands of passerines, including cardinals and grosbeaks, I was a little nervous. Owls use their talons for snaring and disabling prey, and their bills for ripping it apart. Plus, I was not sure whether the standard bander's grip would work with the owl's comparatively large neck. Everyone was staring at me expectantly, so I took a deep breath and pushed my hand into the bag. I winced as talons dug into my palm. Everyone chuckled. Using my free hand outside the bag, I was able to remove the talons and position the owl into what seemed like a reasonably secure hold. I removed the bag, and there it was — a Northern Saw-whet Owl! The bird was even smaller and lighter than I expected, barely larger than my hand, and weighing about the same as a Blue Jay. The biggest surprise was its amazingly soft and silky plumage. Combined with its curious, large, yellow eyes, this cute little owl reminded me more of a plush stuffed animal than a carnivorous bird of prey. That is, until it began to rapidly kick out its legs, attempting to talon everything within reach. Not knowing what to do, I offered my free hand as a pincushion until Strickland was ready with a band.

The author (right) and Jackie Pascucci with Saw-whet Owl #1. Photograph by Paul Milke.

I expected the act of banding the owl to be the same simple process we use for passerines: remove the appropriate band from its string, insert it into banding pliers, place the band around the bird's tarsus and gently squeeze the pliers to close the band. I was wrong. It turned out to be more difficult for a number of reasons. First, an owl's tarsus, is thickly feathered, and the feathers tend to catch in the band. Second, the bands are larger and stiffer, making them harder to open and close. Most of all, the pliers currently available for the larger band sizes close poorly around the band causing it to stick in the pliers. Eventually, we developed an efficient system and made improvements to the pliers, but it took quite a few minutes for Strickland to place a band on the leg of our first owl.

After banding, I awkwardly measured the wing chord while the owl continued to kick its legs. With more experience I would learn to offer the owl my sweater or coat as a temporary "perch," which made the process easier for both of us. At this point, I realized that to determine the sex of the owl we needed to weigh it, which we neglected to do before removing it from the bag. This meant going through the somewhat painful removal process again. I decided to put that off as long as possible, so I spread the left wing, and Strickland, Jackie, and I began to look for molt limits. Newer feathers are darker and less worn. They also glow pink when observed under a black light. We did not see any difference in color or feather wear. I had read that sometimes wing molt is not symmetrical in owls, so we checked the right wing, but

came to the same conclusion. This bird had grown all flight feathers at the same time, so it must be a hatching year bird. It was now time to put the owl back in the bag for weighing. We hung the bag from a spring scale, waited for the reading to settle and recorded the weight. I removed the owl from the bag without incident, and we weighed the bag in order to derive the owl's weight. Looking up the weight and wing chord on the Brinker table, we determined our young owl was a female. I smiled, thinking about probability. Though there is variability by station and year, the overwhelming majority of owls captured by banders are females, and the majority are hatching-year birds (Brinker et al. 1997 and Johnsgard 1988). We were right on target.

At this point we could stand back and appreciate our first owl. The combination of silky brown and white plumage, large yellow eyes that seem to have an innocently curious expression, and small size make this little owl incredibly endearing. As we were excitedly pointing out different features of the owl's plumage or demeanor, we were joined by another volunteer, Jack Barthel. Photography is one of his many talents, and he had his camera ready to document the occasion on film. After we had taken a number of poses, Strickland reminded us of owl # 2 waiting for our attention. So I reluctantly placed the owl on my outstretched arm and let it fly silently into the night. We were all struck by how much larger it looked in the air. It perched on a bare branch on a nearby tree about twenty feet from the ground, where it appeared even more diminutive than it had in hand. It remained there motionless and seemed to watch us. It would have been easy to overlook, were we not aware of its presence.

I was becoming increasingly aware that lunch had been a long time ago, but I ignored the discomfort and retrieved the remaining owl bag. After remembering to weigh the owl, I placed it in Jackie's hands with a big grin, saying, "Your turn!" Jackie returned the grin, and her eyes shone with an excitement that not even the prospect of sharp talons could diminish. She gamely removed the owl from the bag, and we banded and measured #2. We were delighted to find that this individual demonstrated a clear molt limit. Two generations of wing feathers were easily visible. The outer primaries and inner secondaries were considerably darker, and less worn, than the feathers in the middle of the wing. This pattern revealed a second-year bird. We spent a few minutes admiring and photographing her before sending her off to join her predecessor, who had disappeared at some point during the processing. By the time we were finished, we were due for a net check. Dinner would have to wait.

The molt pattern of a second-year bird with two generations of wing feathers. The outer primaries and inner secondaries are darker than the middle feathers. Photograph by Paul Milke.

Strickland hefted his large, yellow spotlight, and Beth picked up the owl bags. We all turned on our headlamps and silently followed Strickland single-file along the dark, leaf-covered trail into the dense pines. We had erected seven nets in a cross formation with an audio lure at the junction. When

Strickland arrived at the first, he stopped and waited for us to catch up. Then he trained his powerful spotlight on the nets, illuminating the first two. I held my breath as Strickland moved the light back and forth, but there was nothing. We continued to the junction, the audio lure drowning out all other sounds. Strickland shone his light on each of the remaining nets in turn, and just when I thought we would return empty-handed I heard Jack's breath catch as he whispered, "Wow!" I followed the beam of the flashlight, and there was a small dark blob with wings suspended in fine netting. Wow indeed! Somehow this was even more gratifying than banding #1. We steadily approached the owl, and Strickland motioned for me to extract it from the net, encouraging me with, "You had better not let it go." I positioned myself at the point of entry and methodically untangled the feet, wings, and head. I found the extraction easier than with many passerines because the owl's shape and size kept it from becoming badly entangled. After removing the owl, I held it up for everyone to admire, and then gently placed it in a white cotton holding bag.

A Saw-whet Owl hanging in a mist net. Photograph by the author.

We returned to our base of operations at the parking area and processed #3, another hatching-year female. The rest of the night we conducted regular net checks every half an hour. Sometimes we found the nets empty, and we would pass the time snacking, trying to identify the nocturnal insects and listening to the Sox and Yankees World Series game. Twice more we found saw-whets, both females, one hatching year, and one after second year. By midnight, the thought of work in the morning was more pressing than the hope for more owls, so we decided to call it a night. Catching five owls gave Strickland, Jackie, and me ample opportunity to extract, measure, and band, refining our skills for the busy weeks to come. More than that, everyone present had an intimate, personal experience with a saw-whet owl. I had hoped and prayed for one owl. Dreaming of five would have been absurd. Ironically, the Sox scored five runs that night. Five was not a winning score for them, but it was for the West Hill Banding Site. This was just the beginning of a season that would greatly exceed all of our expectations.

The Rest of the Story

The primary goals of our banding project are to document the migration of Northern Saw-whet Owls through the Blackstone River Valley and to contribute to the general understanding of migration patterns by collaborating with Project Owlnet. Because saw-whets migrate quietly at night, their passage through an area is easily overlooked without a banding effort. We are also studying the correlation of migration patterns with weather conditions and lunar phase. Knowing what to expect on any given night assists us in scheduling volunteers and programs. Another one of our

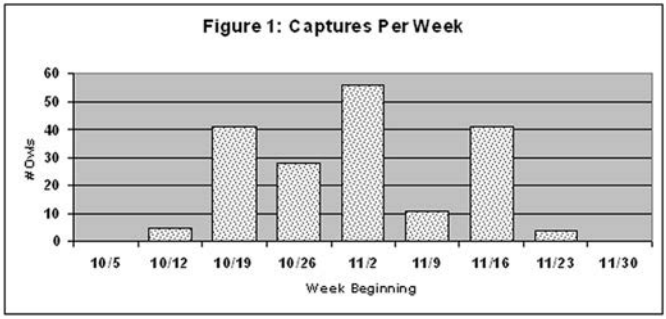
goals is to educate the public about the saw-whet owl, its habitat requirements for both breeding and migration, and the role banding studies can play in conservation.

The Northern Saw-whet Owl's breeding range extends from southern Alaska eastward across central and southern Canada to Nova Scotia, and southward along the Pacific coast, into the Great Lakes region and into the northeastern United States (Cannings 1993). Although the saw-whet is a winter resident throughout its breeding range, part of the population migrates south each fall to the east-central United States. The movement begins in early September at northern latitudes and continues until the end of November at southern latitudes (Johnsgard 1988). Analysis of the breeding and wintering ranges, and habitats utilized, suggests that Northern Saw-whets may migrate from northern coniferous forest to southern coniferous forest where there is greater understory cover in the winter (Brinker et al. 1997). Banding records indicate two main migratory corridors in eastern North America. One extends from central Ontario through the Ohio River Valley into Kentucky. The other follows the Atlantic coastal lowlands from Nova Scotia to North Carolina (Cannings 1993, and Johnsgard 1988). However, based on conversations on the Sawwhetnet e-mail list, banders often caught saw-whets in their suburban backyards on nights they did not operate their main sites, suggesting that saw-whets may migrate over a broader front. One of the goals of Project Owlnet is to learn more about Northern Saw-whet migration patterns through the collaboration of banding sites like ours throughout North America.

Our owl-banding site is located at Lookout Rock Park, a rocky overlook on the Blackstone River in Northbridge, Massachusetts. The Blackstone River and Canal Heritage Park manages the site and granted us permission to band there. The fall of 2003 was our first season banding saw-whets, and we discussed a number of sites before choosing Lookout Rock. Strickland picked the park for three primary reasons. First, the site is elevated, allowing our audio lure to be heard at greater migratory altitudes. Second, it consists of relatively dense woodland with a limited understory, providing cover for the owls while allowing sufficient flight area around the mist nets. Third, he theorized that owls follow the Blackstone River as a migratory corridor. Strickland often seems to possess a sixth sense for where birds will be, and this was no exception.

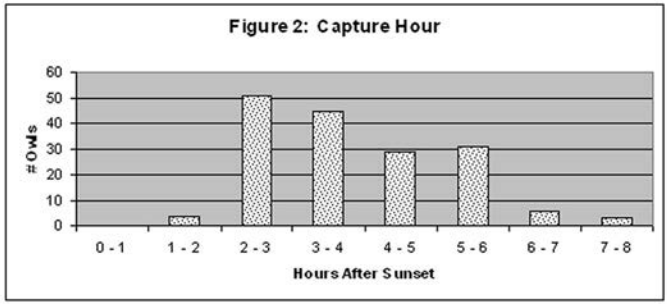
The habitat at the site is primarily a mixture of mature red pine and northern red oak. Our original nets, the "Upper Nets," consisted of seven nets in a cross formation with an audio lure at the junction. The trees in the immediate vicinity of the nets were mostly tall pines. After we started capturing owls on a regular basis, Strickland decided that we should purchase an additional audio lure and expand our net array to increase captures. At a nearby location we erected the "Dell Nets," a group of five nets in a T formation with an audio lure at the intersection. These nets were at a lower elevation with a mix of shorter and more densely packed pine and oak trees. They were less affected by wind and were less visible in bright moonlight; they therefore outperformed the Upper Nets under less than optimal capture conditions. For both locations we used the same size nets that we use for passerines: 12 meters long, 2.6 meters high, with 36 millimeter polyester mesh.

We operated the banding site thirty-one nights between October 2 and November 27. Since this was our first season, our mission was to be open every night, weather permitting, so that we could track the beginning, peak, and end of fall migration through the area (Figure 1). Our first capture was on October 16. The peak flight period spanned the last week of October to the middle of November. Our best night was October 24, with twenty-six captures. When we closed at 1:00 a.m., owls were still flying into the nets! Our last capture, on November 25, was also our only foreign capture (a bird originally banded at another site). This was a particularly feisty individual that had been banded a month earlier in Falmouth, Maine. In total, we caught 186 Northern Saw-whet Owls and one Eastern Screech-owl. One hundred sixty-eight of the saw-whets were new captures, sixteen were recaptures of individuals we caught earlier in the season, and one was the foreign capture mentioned above. None of our owls were recaptured by other banding stations.



When we embarked on this project, we never fathomed we would capture such a quantity of owls; our original string of one hundred bands seemed more than adequate. Before our banding study, large numbers of saw-whet owls had not been recorded migrating through the Blackstone River Valley or Worcester County. In fact, the general feeling among banders on Sawwhetnet was that migration this season was delayed, and total number of captures was low compared with that of other years. Because of this and our second net array, we hope for an even greater number of captures this coming fall.

Based on discussions on Sawwhetnet, the peak time to capture saw-whets varies considerably among banding sites. Many stations report their highest numbers during the first few hours after dark. Others have their best luck before dawn. Some do well during both periods, with a lull for a few hours around midnight. We opened our nets and turned on the audio lure when it was truly dark, about an hour after sunset. We remained open until we stopped catching owls, or became exhausted, usually closing around midnight. Most evenings we did not catch owls after 10:30 or 11:00 p.m. However, during peak migration, we had some nights where the flight lasted until after midnight. As shown in Figure 2, most of our captures occurred between two and six hours after sunset. Due to full-time jobs and limited resources, we did not try to band in the predawn hours. We are hoping to attempt this in the future, if only on a limited basis, to determine whether a full effort is justified.

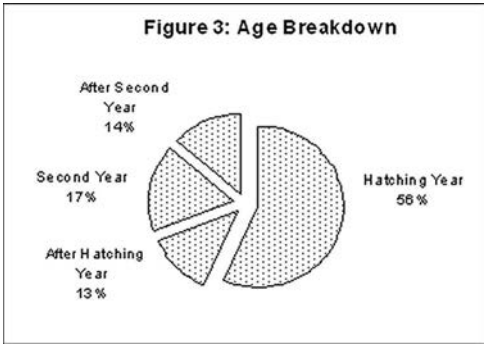


The overwhelming majority of saw-whets captured by banders using an audio lure are female (Brinker et al. 1997). This was certainly true for us. Eighty-three percent of our new captures were female, 2 percent male, and 15 percent unknown. This is expected since the audio lure broadcasts the male's advertisement call, attracting females while making males more wary. However, even without a lure, females make up a larger percentage of captures. At a banding station in Cape May, New Jersey, 65 percent of captures were female before an audio lure was used, and 80 percent were female when using the lure (Duffy and Matheny 1997). Discussions of banding results on Sawwhetnet indicate that male captures generally occur later in the season. Our few male captures did occur late in the season. We caught our first male on November 7, the same night that we caught our hundredth owl. In addition, the Project Owlnet web site proposes that since male owls are more cautious around a potential competitor, they are more likely to be captured in the nets that are farthest from the lure. We did not find this to be the case at our site, but we caught only four males so our sample size is too low to be significant. Overall 69 percent of our total captures and 75 percent of males were in the nets next to the audio lure.

According to Brinker et al. (1997), banding records from collaborating Project Owlnet stations suggest that male and female saw-whet owls may exhibit differential migration similar to the Tengmalm's Owl (*Aegolius funereus*) in Finland. [Note: This owl is known as the Boreal Owl in North America.] In 1995, the proportion of male captures at coastal banding sites from Virginia to New Jersey increased with latitude: 14 percent in Cape Charles, Virginia, 16 percent in Assateague, Maryland, and 18 percent in Cape May, New Jersey. At these sites the predominant age-sex class was immature females while the most infrequent was adult males. Similar to the Tengmalm's Owl, the Northern Saw-whet is small and may have difficulty surviving extended periods of low prey availability due to cold or snow cover. Immature owls, which are inexperienced hunters, and females, which are heavier and less agile hunters, benefit from migrating to an area with greater food resources. However, both species are unable to excavate their own nest cavities. In order to breed successfully, males must compete for existing cavities, making it advantageous to remain on or near breeding territory during the winter. Further study is needed to confirm this hypothesis (Brinker et al. 1997).

The age breakdown of captures is much more variable, with significant differences exhibited across banding stations and years. In large flight years, young

owls predominate (Brinker et al. 1997). It is possible that a higher percentage of hatching-year birds migrate, since they have not established breeding territories. Another theory is that they are more likely to be caught since they lack experience avoiding mist nets. This past fall, most banders on the Sawwhetnet e-mail list reported capturing a majority of hatching year birds. Fifty-seven percent of our new captures were hatching-year birds, and 43 percent were after-hatching-year birds (Figure 3). Of the after-hatching-year birds, we captured 29 second-year owls with two generations of primaries and secondaries, and 22 after-second-year birds with three generations of feathers. One surprising individual had four generations of wing feathers, the oldest extremely faded and broken.



Since this was our first season, we were very interested in tracking conditions conducive to catching the most owls. Other banders had found that the best flights were on dark, moonless nights with light northerly or westerly winds after the passage of a cold front (Brinker et al. 1997, Cannings 1993, and Johnsgard 1988). Our experience was that wind speed and moonlight both had a marked negative impact on captures, possibly because the nets were more visible or because fewer owls migrate in those conditions. Ninety-four percent of our captures were in winds of less than ten miles per hour. Wind direction played a role as well. Ninety-two percent of our captures were on nights with a north or west wind. A lunar eclipse on November 8 provided an exceptionally clear demonstration of how much moonlight affects captures — we caught twenty owls in five hours. Fifteen were caught during the eclipse, which lasted a little over an hour. However, these variables could not fully explain our results. Some "perfect" nights with light westerly winds and no moonlight failed to yield any captures. At first we were baffled, but we noticed that these nights generally preceded periods of bad weather. Because of this, we theorized that barometric pressure also played a role. 60 percent of our captures were on nights with a rising barometer, 34 percent with a steady barometer, and 6 percent with a falling barometer. We will look to see whether this pattern holds this coming fall.

Generally, eastern banders do not capture many saw-whet owls during the northward migration in the spring. Part of this probably reflects reduced banding efforts due to harsh weather in March and April. However, many eastern stations that are able to open regularly report drastically reduced captures at more sporadic intervals. The reasons for this are not currently known. It is possible that saw-whets follow a different migratory path in the spring or that they travel quickly to their final destination, making the lure much less effective. We attempted banding in April on a few nights without excessive wind, snow, or rain. We did not catch any owls. A number of observers in Massachusetts and New Hampshire reported Northern Saw-whets singing in March, so it is very possible that our attempt in April was too late. Next year, we plan to open our nets at the beginning of March, weather permitting.

One of the highlights of the season was conducting educational demos. We held six programs – two per week during the peak of fall migration. Each was filled to capacity. If you include friends, family, and volunteers, close to one hundred people visited our site. Participants learned about the saw-whet's natural history, the banding process, the data we collect, and how our station fits into the Project Owlnet network. Capturing a large number of owls provided participants with exciting, up-close views of a bird that is seldom encountered. The program donations were instrumental in defraying costs for first-season equipment and net replacement (needed due to extensive damage caused by bats and flying squirrels). We were extremely gratified to be able to share our excitement for this project, and we hope that our educational efforts conveyed the benefits of conserving habitats for the Northern Saw-whet Owl and other migratory birds.

Our first year banding saw-whet owls was a very rewarding experience. The fall season was more successful than we could have expected. It is hard to believe that we once feared that the site we had chosen would not yield a single owl. Capturing many owls on a regular basis allowed us to perform weather analysis and offer educational programs. The year was also a great learning experience. As the fall season progressed, we developed efficient banding procedures, made improvements to our equipment, and learned how to minimize net damage from bats. Our negative results in the spring were disappointing but informative. We expect this fall to be even more successful. We will have additional nets in place at the beginning of the season, and we plan to extend our banding effort into the predawn hours. It will be exciting to recapture owls we banded last fall and look at wing molt progression. We will continue to conduct educational programs during the peak of migration in late October and early November, and plan to create a lecture and slide show. We will commence spring banding at the beginning of March, and hope to net at least a few owls on their return trip north.

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Kathy Clayton *has been banding birds with Strickland Wheelock at the West Hill Banding Site for five seasons and is responsible for coordinating volunteers, data entry, and reporting. She received her banding sub-permit in 2003. She is an avid birder and volunteers for Mass Audubon co-leading trips, fundraising for birdathons, and performing breeding bird surveys. She is a resident of Sudbury, MA, and is employed as a systems programmer for a financial company.* *She would like to thank the resourceful and dedicated core group of volunteers who helped to make this project successful. Paul and Beth Milke opened nets and started the lure every night. Paul handled the electronics, created a web site with a photo gallery, and performed weather and net productivity analysis. Beth took responsibility for recording data. Jack Barthel, in addition to taking beautiful photos, coordinated all of the demo nights, a monumental task given their popularity. Jackie Pascucci functioned as an extremely competent assistant bander. Bob Lawson donated equipment, created the lure tapes, and helped with preseason testing.*

NORTHERN SAW-WHET OWL BY GEORGE C. WEST