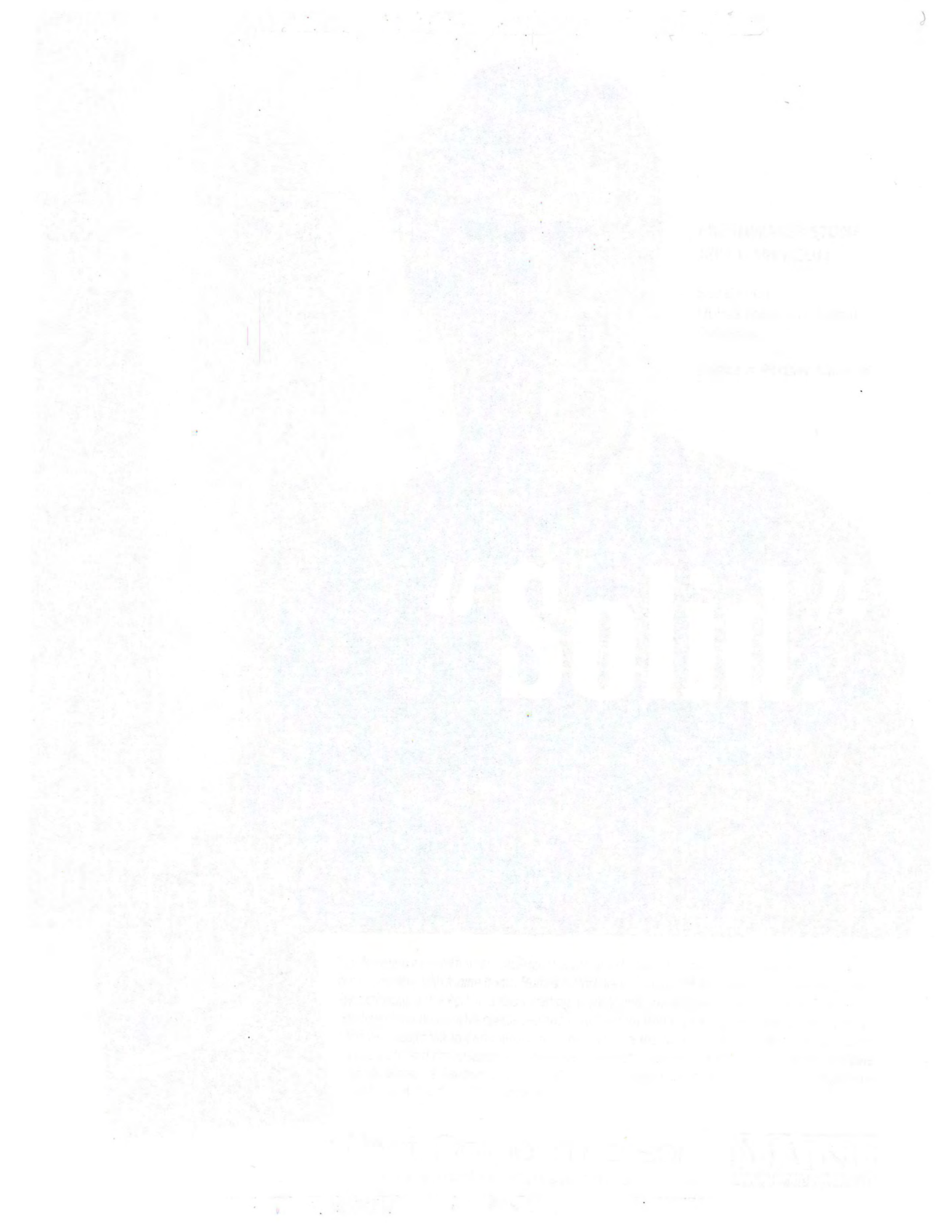

The Northern Saw-Whet OWL

Coastal Maine's Tiny Migrant

The study of this photogenic, nocturnal bird is part of ongoing efforts to understand the potential side effects of wind-power generation.

TEXT AND PHOTOGRAPHS BY TONY OPPERSDORFF

ONE DAY LAST SUMMER, Wing Goodale, deputy director of Maine's BioDiversity Research Institute, mentioned to me that the institute intended to conduct a study of the saw-whet owl. To appreciate that, first you have to understand the mission of the BioDiversity Research Institute; second, you have to know what a saw-whet owl is.

In the first instance, the mission is to assess emerging threats to wildlife and ecosystems through collaborative research, and to use scientific findings to advance environmental awareness and inform decision makers. In the second, a saw-whet owl is a tiny, nocturnal bird about which little is actually known.

Information about these owls is fragmented, Goodale said. We know they go south in the fall. We suspect they travel over water, perhaps hopping from island to island and resting during the day or during bad weather. But we need confirmation.

He said that wildlife biologist Kate Williams would be going into the field to gather data. Kate would set up banding stations along the coast. We'd learn about the owls and how many there are. This is important because saw-whets may be one of the raptor species affected by coastal wind farms. The project would allow BRI to provide accurate data that could be used by the decision makers.

The banding program being undertaken by Maine's BioDiversity Research Institute aims to learn more about the saw-whet owl, how many there are, and the potential impact on the population from coastal wind-farm development.

CAN I Tag ALONG?

My curiosity boiled down to one question: "Can I tag along?"

And that's how this story began.

I started by checking what earlier ornithologists had to say. A 1949 copy of *Maine Birds* by Ralph Palmer informed me that saw-whets were common wherever there was coniferous forest, referred to their presence along the coast in October, and even mentioned saw-whets descending on ships in the Gulf of Maine. A comment made in 1926 by Arthur Herbert Norton in *Notes of the Acadian Owl* also caught my eye: "Usually a denizen of deep woodland shade, in winter, at least, [the saw-whet] frequently comes to the borders of the woods to bask in the sun, or perhaps is drawn there in the quest of mice which seem to form the chief part of its diet."

I followed this by reading the 50-plus pages on saw-whets in *Birds of North America* by Richard J. Cannings and others, the ultimate current source of information on the owls.

A few weeks later, in the last days of September, I am on the northern end of Seven Hundred Acre Island in Penobscot Bay, lugging a long, red bag filled with clanking metal poles that would hold up mist nets, fine-meshed nets used to capture small birds. Under Wing's direction I drive a crowbar into mossy, stony soil, ram the poles into place, and then guy them with shroud line and tent stakes. When deployed, the three sections arc through the woods for 36 meters. The top stretches up for three meters; the bottom less than a meter from the ground. It looks like a long badminton net that was abandoned half a century ago. Drab flocks of late fall warblers flit about among the spruce, fir, and birch trees.

At 6:30 p.m. we extend the poles and raise the nets. We remove a couple of leaves, unhook the net from an overhanging spruce branch, give the delicate panels of fine, black mesh a final inspection, turn on the caller—an audio device for luring saw-whets—dial up the volume, and retreat to the cabin.

One of the 11 known saw-whet calls is a loud, monotonously repeated "advertising" whistle used mostly by males to attract females. Audubon generously described it as "the faint tones of a distant bell."

A.C. Bent is no less poetic: "In the ardor of midnight under a full moon, this suitor whoops it up at the rate of about three whoops in two seconds, and this pace he maintains with the unfailing regularity of a clock. But to prevent his lady love from going to sleep, he changes the key occasionally." Something seems to have been lost since that was written in 1923, because to my ear a saw-whet's advertising call offers no more appeal than the back-up alarm of an earth-mover stuck in reverse. I have never heard the eponymous "ksew" or "skiew" call, said to sound like the filing of a mill saw.

Our cabin is lit by candles, kerosene lanterns, a fire in the hearth, and battery-powered lamps. Our two study stations are ready with the tools of our trade: spring scales, digital calipers, a metric ruler, a string of shiny Federal saw-whet-sized bird bands, an ultra-violet flashlight, scissors, small brown envelopes, pencils, a BRI report sheet, a thermometer, our all-important headlamps, and a pile of 6"x8" white cotton bags with drawstrings. All we need to do is wait.

An hour later Wing and I approach the nets, our headlamps sweeping the blackness and revealing motes of unknown matter in the night air. The space between the poles is dark except for a withered leaf caught in one of the invisible

Fine-meshed nets are used to catch saw-whets in flight. The owls are examined, weighed, banded, and released.

panels a meter from the ground.

"We've got one," Wing whispers, and my light jerks back to the leaf.

The confident tone of Wing's instruction calms both of us: "The first thing to do is figure out which side of the net the bird came from. Work on that side and get the bird out the way it flew in."

"But before anything," he continues, "turn off the loudspeaker. We don't want to attract other owls while we're here."

"Right," I say, though I am nervous and uncertain about locating the switch. It would be like me to trip over a guy line, pull down the net, fall into the speaker, lose my light, and injure a bird that might attract a predator. My anxiety was justified.

On the previous night Wing was by himself, concentrating on a netted saw-whet, grasping the bird by the legs in the proper fashion to avoid injury, working the nylon loose, feather by feather, line by line. There was a blood-freezing scream behind him. He jumped. His headlamp fell off and went out. He was holding the saw-whet in the dark. Another scream. A thudding heart. It was a barred owl, a species that preys on saw-whets. Wing yelled. Marie, his wife, was in the cabin. She came running with a flashlight. The barred owl vanished, leaving Wing and the unharmed saw-whet shaken, but with stories to tell.

That was last night. Tonight it's me, and I'm staring, eyes to eyes, at a tiny raptor. He's smaller than two tennis balls. He's in my hand. Wing is a yard away, talking me through the procedure. But I know what to do because I cherish this little creature as if it were an infant, forgetful that it has its own genetic trajectory. There's magic to the softness of the feathers, the warmth, the grab from the tiny beak, the clutch of the tiny, sharp talons. And what seems nearly incredible: apparent trust. The little bird looks at me with huge golden eyes set in a round facial disk, his large head swivels to my movement. He lies calmly in my hand and snaps his beak from time to time. I think he's patiently reminding me to get a move on. He's small, so he's probably a male.

1. Captured in the dark of night, this tiny saw-whet owl is banded under flashlight illumination.
2. Measurements are taken with a specially designed ruler...
3. ...and a caliper.
4. Ultraviolet light exposes a patterned palette of feather colors that indicates the bird's age. Second-year birds show a distinctive pink/blue/pink arrangement.

A saw-whet's environment is a dynamic world of climate destabilization and anthropogenic influences. As the experts observed years ago, these owls are resident across the northern United States and southern Canada, from the St. Lawrence River to Vancouver Island and extending up the Alaskan panhandle and south into the mountainous spine of Mexico, but with annual variations. They are small, camouflaged, nocturnal, and secretive. And for good reason: being spotted by a larger owl, a Cooper's hawk, or a goshawk is dangerous for a saw-whet. They are also solitary. (There's no such thing as a parliament of saw-whets.)

Breeding success is dependant on tree cavities made by other creatures—pileated woodpeckers, for example—for which they compete with squirrels and, of course, loggers. (Fortunately for the owls, saw-whets take to nesting boxes.) Here, the female lays a clutch of five or six eggs that she incubates for 21 to 28 days, while the male brings her food and provides defense from predators. Fledging occurs in about four or five weeks. In captivity, saw-whets may live for 16 years, but their lifespan in the wild is shorter, 10 years being the banded record. They are specialized dawn and dusk feeders, with an unusually large, asymmetric head and ears that provide stereoscopic hearing, which allows them to locate their prey in the dark.

Saw-whet owls complement their preferred food—deer mice (*Peromyscus maniculatus*) and white-footed mice (*P. leucopus*)—with a smorgasbord of other creatures, including bats (we caught one in our net), flying squirrels, birds (kinglets to rock doves), moles, frogs, and probably anything else that crawls, flies, slides, or wiggles. When prey is abundant, saw-whets may kill with abandon, caching the surplus for winter consumption.

Weighing less than 2.6 ounces (75 grams), the male saw-whet is Maine's smallest owl. Even the female, which is 25% larger, can fit into a soup can. Their small size places them between the even tinier northern pygmy owl (*Glaucidium gnoma*), found only in the West, and the saw-whet's slightly larger, northern cousin, the boreal owl (*Aegolius funereus*). There's nothing else like them in Maine.

With a bird in the bag, we retreat to the cabin. Our procedure begins with weighing bag and bird, then, using the bag to restrain the bird, Wing measures the beak and tarsus length with a caliper, and deftly fits a Federal band around the latter, carefully closing the loop with pliers. The band's number will identify this specimen if it is ever re-captured or retrieved. Next, he removes the bird from the bag and gently extends one wing, which we measure for length with a specialized ruler. This helps to determine the gender.

Birds with a long wing chord that weigh more than 3.1 ounces (92 grams) are judged to be female. With the bird in one hand, he palpates the breast for muscle. This is complemented by another examination for the level of nutrition: gently blowing the neck and breast feathers apart to look for subcutaneous fat deposits. None found.

I record Wing's comments, subtract the weight of the empty bag, label an envelope, and snip half an inch from the tip of a secondary feather. This will be sent to a lab that will test for the specific ratios of stable isotopes of oxygen and hydrogen. The result will provide an

atomic signature indicating the approximate latitude from which this particular bird originated.

Then we dim the lamps and shine ultraviolet on the underside of the wing. The UV exposes a patterned palette of feather colors unseen by the naked eye that indicates the age based on molt. Birds born this year have uniformly pink underside feathers. Second-year birds show a distinctive pink/blue/pink arrangement. The color on older birds is less organized and more difficult to interpret accurately.

Studying a bird requires 10 to 12 minutes. When it's over one of us places the owl on a safe perch outside. Before that, if our captive is relaxed and there are no others in line, we will take a minute for photography, but without the flash or bright lights that would compromise a bird's night vision.

None of the 253 birds that BRI caught in 2010 was harmed, no doubt because every employee exercises a "do no harm" mindset: There is no banding in the rain or if the nets are wet from fog or condensation, because in those conditions an owl's downy insulation would be compromised. The nets are also rolled up whenever a large owl is seen or is heard calling. And, of course, untended nets are marked by survey tape.

Fossil remains for the species extends back 500,000 years, well before the Wisconsin glaciation. This tells us that saw-whets have been evolving for a long time and prompts curiosity about ice-age survival, for which there is an explanation. Genetic data suggest that there was a glacial refugium, a refuge, in southern Appalachia from which a post-glacial saw-whet diaspora occurred.

The energy and strategic opportunism of that large-scale dispersion is visible every year. Migration in these owls is not just the consistent north-to-south-and-back-again wave that most of us assume. This simplified truth masks a more complex story. For example, some scientists believe that older males tend to over-winter within their breeding range, leaving the females and younger birds to venture south. (Sixty percent of the birds captured in Maine in 2010 were female, while only thirteen percent were male; the rest were of undetermined sex.) According to this hypothesis, breeding success likely falls to these stay-behind males, as they are in the best territory when the first females arrive. Other birds merely migrate to lower altitudes. There are also unscheduled, non-migratory departures from the normal winter range. These irruptions generally occur every four years and are probably linked to insufficient prey. We say that owls are wise. It might be more accurate to call them mysterious.

Are the birds dispersed as they migrate, or are they concentrated into defined corridors, for example, between the Atlantic Ocean and the Appalachian Mountains, and along the coast of Maine? BRI posed this question in 2009 when a pilot inquiry indicated the presence of saw-whets on Isle au Haut.

The need for more data was immediately evident: wind turbines are fast-tracking their way onto our land and seascapes. There are already three wind turbines on Vinalhaven, and further marine test sites are planned—near Monhegan Island, for example. Few dispute wind turbines' desirability or inevitability, or dispute the economics of construction, maintenance, or transmitting wind-produced power to the mainland. But their location is critical to

wildlife. Several square miles of 400-foot-high spinning blades are a potentially lethal obstacle for birds searching for food, traveling to and from feeding grounds, or migrating either south or north.

At what altitude do saw-whets fly? Do the females fly lower? Under what conditions do they roost? Are they attracted to light? Especially in poor visibility? If so, to what colors and kind: fixed, flashing, occulting? There is hardly enough time to gather information, form conclusions, and offer recommendations. The progress of science is slow, but the need for answers is immediate. And wind-farms, once constructed, are permanent.

Wildlife biologist Kate Williams said it well: "As for the threat to saw-whets in particular, we really have no idea. We don't know at what height saw-whets fly during migration, or whether they could successfully detect and avoid turbine blades during their nocturnal migration. BRI has made an important first step, in starting to learn about their coastal migration route, but there is much more to learn before we can definitively say whether saw-whet owls are threatened by near-shore or offshore wind power development."

BRI has proven that saw-whets migrate along the coast, hopping from island to island. The number of birds captured at the eight banding stations (from Lubec, to Cape Elizabeth) demonstrate this conclusively.

There is also the astonishing number of re-captures—birds caught in Maine that were wearing bands from other locations: Quebec (2), Pennsylvania (2), Indiana (1), and New York (1). There was one individual that was banded on Isle au Haut in 2009, then caught twice more in 2010, first on Vinalhaven and later back on Isle au Haut. In addition, there were several more birds banded and recaptured in Maine either at the same or different sites. This suggests two populations—one resident (saw-whets have been seen year-round on Isle au Haut), the other migratory. More questions; more need to follow up.

BRI has mapped the location of sensitive bird populations, and has released some migratory data, but conservation biology requires further research. Williams said, "It is more difficult to study offshore migration than migration over land, for obvious reasons. There is a huge amount that we still do not know about bird migration in the Gulf of Maine. It was largely unknown prior to our study, for instance, that saw-whet owls even

migrate offshore. This is one of the key information gaps for understanding potential environmental impacts of marine wind power development: what birds are flying through these areas, when, and at what height? Can they avoid the turbine blades, even in poor weather conditions? Studies conducted prior to development are essential to inform marine spatial planning efforts to site wind farms in areas that will cause the least amount of harm."

The tools for this are available—satellite transmitters (but saw-whets are too small for these), ultra-sensitive microphones for recording nighttime migration, radar, thermal imaging devices, even drones—but they are expensive and may need years of research.

A month after our October 2010 fieldwork on Seven Hundred Acre Island, I attended a lecture by the founding director of Boston University's world-renowned Center for Ecology and Conservation Biology, Dr. Thomas H. Kunz. He spoke about an emerging discipline that focuses on the thin layer of air that covers and circles our planet. This science is called aeroecology, and its focus is the aerosphere, a field of study with which few of us are familiar, although that may change.

Dr. Kunz focused on bats, which are known to die from the sudden decrease in atmospheric pressure caused by the airfoil blades of a turbine. As he spoke, my inner light bulb began to glow. His comments had wide application. Aeroecology is about the fluid world that moves around our planet and about global connectedness. He talked about the many forces within the aerosphere: wind, air density, oxygen concentration, precipitation, air temperature, sunlight, polarized light, moonlight, geomagnetism, gravity. To these he added the ever-increasing number of human, or anthropogenic factors, including skyscrapers, air pollution, aircraft, radio, TV and communication towers, lighted towns and cities—and wind turbines. He also mentioned forest fragmentation, intensive agriculture, urbanization, and assorted industrial activities. All these, and others, are irreversibly transforming the habitat "that airborne organisms rely upon for navigational cues, sources of food, water, nesting and roosting habitats…."

I realized that Dr. Kunz was talking as much about owls as bats, and I found comfort in this. Aeroecology can help inform us about the larger significance of what may seem to be a small, isolated change to the environment. That's good to know. So is the news that Kate Williams has secured funding for BRI to continue the saw-whet project in 2011.

Tony Oppersdorff is, with Kyrill Schabert, co-author of Best Nature Sites of Midcoast Maine, *published by Waterline Books, Jefferson. He lives in Lincolnville.*

FOR MORE INFORMATION:
The BioDiversity Research Institute's website is www.briloon.org.

A direct link to maps and other information relevant to northern saw-whet owls (*Understanding Migration in the Gulf of Maine: Owls*), can be found at: http://www.briloon.org/about/documents/BRI_NSWO_factsheet_122010.pdf

A broader consideration of wind farms (*Birds, Bats, and Offshore Windfarms*), can be read at: http://www.briloon.org/windpower/Goodale_BirdsBatsWindFarms.pdf