

**BOREAL OWL (AEGOLIUS FUNEREUS) SURVEYS NEAR THE
APPALACHIAN TRAIL, ACADIA NATIONAL PARK, AND BAXTER
STATE PARK IN MAINE**

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PREPARED BY

**WOODLOT ALTERNATIVES, INC.
122 MAIN STREET
TOPSHAM, MAINE 04086**

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1.0 INTRODUCTION

The boreal owl (*Aegolius funereus*) is a small, cavity-nesting owl that ranges from Alaska to the maritime provinces of Canada in North America. It was previously thought to occur in the United States (U.S.) as only an occasional winter visitor. Some ornithologists (Knight 1908, Palmer 1949), however, considered it likely to be a rare resident. In the 1980s, Hayward *et al.* (1993) conducted surveys in Idaho and Montana and confirmed breeding of the species in the U.S. for the first time. Subsequent surveys in Colorado and New Mexico have also recently confirmed disjunct breeding populations (Palmer and Ryder 1984, Stahlecker and Duncan 1996). These authors believe that boreal owls have always nested in the Rocky Mountains and were only overlooked due to the harsh climates and rugged terrain that are associated with nesting habitats. Dr. Hayward's opinion is that the species very likely breeds in other northern tier states, including Maine (Hayward and Hayward 1993 and pers. comm. from G. Hayward to M. Thompson). This opinion is also shared by local ornithologists (P. Vickery, pers. comm. to M. Thompson).

This report presents the results of a preliminary survey for breeding boreal owls and potential breeding habitats in Maine near the Appalachian Trail, Acadia National Park, and Baxter State Park. These areas were selected because they have the highest potential, based on historic records and anticipated habitat conditions, of supporting breeding boreal owls. The report contains a summary of existing information relevant to the search for boreal owls in Maine, the results of winter play-back call surveys for breeding boreal owls, and recommendations for future surveys.

Acknowledgments. We appreciate the assistance and encouragement of Greg and Pat Hayward who provided play-back call tapes and advice on survey techniques. We also wish to thank Peter Vickery for his encouragement. Peter has been keeping his keen eye out for these birds for many years and we are indebted to his blazing a trail that hopefully will lead to a nesting boreal owl. We also thank Jody Despres for compiling a list of boreal owl sightings in Maine from *Maine Bird Notes* records. Denver Holt of the Owl Research Institute offered help in developing survey protocols.

This study was supported in part with funds from the Appalachian Trail Conference through a grant to the Maine Natural Areas Program (MNAP). We very much appreciate the support of MNAP staff members. Logistical support and encouragement were also provided by Acadia National Park (ANP) and Baxter State Park (BSP). This effort has benefited greatly from the involvement of both agencies. The findings, conclusions, and recommendations in this report, however, do not necessarily represent the views of the MNAP, ANP, BSP, or their staff members.

2.0 NATURAL HISTORY OF THE BOREAL OWL

Detailed accounts of the natural history of the boreal owl, which is also known as Tengmalms' owl, can be found in Eckert (1987), Johnsgard (1988), Hayward and Hayward (1993), and Hayward *et al.* (1993). Following is a summary of that information with particular attention given to those aspects of boreal owl ecology that are relevant to determining its breeding status in Maine.

2.1 Range in North America

Seven subspecies of boreal owls are currently recognized, six in Eurasia and one in North America (*Aegolius funereus richardsoni*). Breeding populations are known to occupy boreal forests of Alaska and Canada down to the extreme northern U.S. in Minnesota, and they likely exist in Wisconsin, Michigan, and Maine. South of this region they are restricted to subalpine forests in the mountains of Washington, Idaho, Montana, Wyoming, Colorado, and northern New Mexico. They are also likely to nest in mountainous regions of Utah. Winter range is essentially the same as the breeding range, though wanderers are regularly noted in several other states as far south as Pennsylvania and New Jersey.

2.2 Physical Characteristics

The boreal owl is a small owl with a large head and long wings. Though the sexes are alike in appearance, adult females (25-28 cm total length; 132-215 g) are slightly larger than males (21-25 cm total length; 93-139 g). Upper parts are deep brown and the crown is thickly spotted with white dots or teardrops. There is a conspicuous grayish-white facial disk outlined by a dark border and highlighted by white raised eyebrows. Eyes are yellow and the bill is buff white. Under parts are creamy-white with broad, brown streaks, and the back is umber-brown with large white spots. The tail feathers have three rows of white spots that are visible even when folded tight. Dense plumage covers the legs and upper feet, and the talons are uniformly black.

There is evidence to suggest that boreal owls and saw-whet owls (*Aegolius acadicus*) recently evolved from a common ancestor (Pielou 1991). The adult saw-whet resembles the boreal owl in size, shape, and general appearance, but unlike the boreal, the saw-whet has a black beak, no dark border around the facial disk, and white streaks on its crown rather than spots. Neither of these owl species has prominent ear tufts. Depending on perching stance, the top of the boreal owl's head often has an unusual flat-topped appearance.

2.3 Vocalizations

The boreal owl has a wide range of calls, but it is mainly heard from late winter through early spring during courtship and mating. The *primary song*, uttered only by adult males, is a staccato-like series of trills lasting several seconds and repeated after a silence of one to several seconds. This song is a vaguely snipe-like winnow that is distinct from the saw-whet's steady "*toot...toot...toot*" that has been compared to the warning sound of a construction truck backing up. Singing bouts may last from 20 minutes to three hours. The primary song is frequently audible from as much as 1.5 km to 3.5 km, and is usually delivered by a male within 10 m to 100 m of a potential nest cavity. Playback trials suggest that males do not defend large territories and males appear to stop singing the primary song shortly after pair formation. In Idaho, singing began by January 20, reached the greatest intensity by late March, and was uncommon by late April. In Colorado, singing started mid-February, peaked by late-April, and continued to decline until June. Late singers tend to be younger birds or recent immigrants to the area.

From the beginning of courtship to initiation of incubation, male boreal owls switch to the *prolonged song*, which is similar to the primary song but is uttered more quietly. Males appear to use the prolonged song while flying repeatedly between the female and the nest cavity. Both the primary song and the prolonged song are uncommon outside the breeding season and are presumed to function in long-distance mate attraction. Other calls described in the literature include the *delivery call* (male), *screech* (either sex), *peeping call* (female), *weak call* (female), *chuck call* (female), *hiss* (female), and *moo-a* or *hooch-up* (probably male).

2.4 Habitats

Habitats of the boreal owl include forests ranging from pure deciduous to mixed to pure coniferous. The dominant tree species within boreal regions of the breeding range include black and white spruce, aspen, balsam poplar, white birch, and balsam fir. In subalpine biomes of the western states, tree species include subalpine fir, Engelmann spruce, and western hemlock, growing at various elevations as influenced by latitude. In most areas, boreal owls prefer forests with large, mature trees (including virgin forests), more so than the saw-whet owl. Nesting is generally in deciduous trees, either dead or alive. Studies suggest that the type of roosting tree varies, but there appear to be affinities to coniferous species that afford greater protection from overhead attack by avian predators. In Idaho and Colorado, mature spruce-fir habitats are preferred for foraging, especially in winter when un-crusted snow conditions allow better access to prey. Mature forest habitats also have more cavity trees and less herbaceous ground cover, providing better foraging opportunities for boreals in the summer.

2.5 Food Habits

The main foods of the boreal owl are small mammals, primarily voles but also including mice, shrews, squirrels, flying squirrels, and chipmunks. Small birds and insects (particularly crickets and grasshoppers) are also common food items. Seasonal and yearly variation in the boreal's diet has been noted, influenced by availability of prey. Years with low proportions of voles in Idaho are poor breeding years for boreals.

Boreal owls hunt primarily after dark, and are a sit-and-wait predator rather than a pursuer. Localization of sound appears to be the primary method of foraging, and except for its own food caches, selection is for fresh prey.

2.6 Breeding Ecology

Boreal owls are cavity nesters, typically utilizing existing woodpecker nests or natural cavities in live or dead trees. In Montana and Idaho, nests are almost always in mature and older stands. Deciduous, coniferous, and mixed stand types are all utilized for nesting, depending on location and availability. Males choose potential nest sites (sometimes several), and begin courting females from those sites by displaying and presenting courtship food. In Idaho, females first occupied nests from mid- to late-April, though egg-laying can be delayed up to three weeks after the female takes up permanent residency at the nest. In Colorado, laying dates were estimated to be from mid-April through the end of May, with half of the known nests initiated by May 10. In Idaho, initiation dates were from mid-April to the end of May. Though boreals in Europe are known to have a second brood, this phenomenon has not been reported in North America.

Boreal owls in North America are monogamous for the most part, the pair bond lasting a single season, occasionally two. The male feeds the female at the nest, but rarely remains near the nest while foraging or roosting. Brooding is done exclusively by the female. For the first three weeks, the male brings food to the nest and the female feeds the young, though females in Idaho often left the nest at least once per night, presumably for prey deliveries.

Clutch size in Idaho ranged from two to five eggs per nest (average 3.5), with successful nests producing 2.3 young on average. Young are fledged 28 to 36 days after hatching and owlets remain within 100 m of the nest for the first week or so and are fed by the adults. They become independent three to six weeks after leaving the nest cavity. Little is known, however, about the habits and movement of immature boreal owls.

2.7 Home Range and Population Status

Both male and female boreal owls frequently occupy year-round home ranges, although these may be abandoned in years of low prey availability. Males tend to be more site-tenacious than females. The size of the home range varies depending on prey availability, geographic conditions, and breeding status of the individual. In Colorado, home ranges of two males were about 1,400 ha to 1,600 ha in size, with significant overlap. In Idaho, winter ranges covered about 1,450 ha and summer ranges about 1,180 ha. The average distance between nests for five owls was 1,729 m. In subalpine regions, home ranges typically move down in elevation during winter.

Little is known about the population status of boreal owls in North America. During periods of poor prey conditions, nomadic movements by adults (particularly females) may occur, along with poor nest success. Most nomadic movements appear to occur within the boreal forest, but large scale movements into more southern regions have been noted, often in conjunction with similar movements of great gray owls (*Strix nebulosa*) and northern hawk owls (*Surnia ulula*).

2.8 Competition with Other Owl Species

Boreal owls are closely related to northern saw-whet owls and share overlapping range throughout North America. Saw-whets and boreals share the same habitats and prey species, though the saw-whets' primary prey (mice and shrews) differs from the boreals (voles). The two species nest in similar-sized cavities (though the smaller saw-whets can utilize slightly smaller cavities), suggesting possible competition for nest sites in limited habitats. It appears that saw-whets are antagonistic toward boreals (but not vice versa), suggesting that boreals may be able to displace saw-whets from contested nest sites, and they can limit boreals to higher-elevation forests in the west.

3.0 BOREAL OWLS IN MAINE

The status of boreal owls in Maine was recently reviewed by Thompson and Lortie (1996). A summary of their review is provided in the following sections.

3.1 Recorded Sightings

The boreal owl is considered a regular winter visitor to Maine in small numbers. Palmer (1949) noted that boreals were sometimes fairly common during incursion years and, along with Knight (1908), speculated that they were probably rare residents. Most of the recent Maine records (1978-1994) have been in winter, with a few as late as the end of March (*Maine Bird Notes*). Mendall (1944) reported that between 1920 and 1942, 20 specimens were taken within 25 miles of Lincoln in all months except June, July, and August. In reference to that citation, Palmer noted that lack of captures (i.e., birds shot) during the summer months was not evidence of this owl's absence, but rather a function of the thick coniferous growth it inhabits and the fact that few people carry guns into such places in those months. Table 1 lists other boreal owl records in Maine by month observed that are available from *Maine Bird Notes*.

Based on the evidence of consistent winter and late spring records of boreal owls in Maine, confirmed breeding in nearby Canadian habitats, and the occurrence of suitable habitats, Thompson and Lortie (1996) concurred with Knight (1908) and Palmer (1949) that the species should be considered a likely breeding bird in Maine.

TABLE 1
MAINE BOREAL OWL RECORDS THROUGH 1994

Month Sighted or Collected	Location (Year)
January	Rumford (1981) Little Deer Isle (1987) Kingfield (1988)
February	Isle au Haut (1880) Franklin (1980) Orono (1980) Boothbay Harbor (1980)
March	East Hebron (1904) Sherman Station (1978) Waldoboro (1992)
April	Dexter (1877) Grand Manan Island (1924, as late as 1940) (Nest & eggs found)
November	Augusta (1944)

3.2 Potential Breeding Habitats in Maine

Based on information about breeding boreal owls from other parts of North America, as well as the recent and historical records of this bird in Maine, resident breeding birds would most likely occur in the mountainous regions of Maine, in the northern spruce-fir zone, and on coastal islands in the downeast part of the state (roughly from Camden to the east). Older forests would provide the most likely habitat because of the potential for abundant cavities and suitable foraging and roosting conditions. Mixed stands where coniferous trees are overtopping mature deciduous trees potentially

offer suitable conditions due to the likelihood of decaying trunks with natural cavities. Mature stands of aspen (*Populus spp.*), which frequently include cavity trees, may also provide suitable breeding habitat as they do in Canada, Alaska, and the western mountain states.

The highest potential for nesting in Maine may likely be found in areas that have been protected from logging for the last 80 to 100 years or more, including portions of Baxter State Park, Mattawamkeag Wilderness Park, Great Wass and other coastal forested islands, and mountainous areas along the Appalachian Trail. Suitable habitat may also be found in forested areas that are more difficult to harvest, such as high elevations, steep slopes, ravines, and bogs.

4.0 1997 MAINE BOREAL OWL SURVEY

The MNAP, with a grant from the Appalachian Trail Conference, provided funds that partially supported a survey for breeding boreal owls near the Appalachian Trail. These surveys were supplemented by surveys conducted in likely habitats away from the Appalachian Trail, including Isle au Haut and Baxter State Park. Some of these latter surveys were supported in part by Acadia National Park and Baxter State Park through information provided by agency staff members and lodging for surveyors. The remainder of the effort was funded by Woodlot Alternatives. Work conducted as part of the MNAP grant focused on refining survey protocols, coordinating the efforts of volunteers, conducting winter play-back call surveys near the Appalachian Trail, and preparing this report.

4.1 Methods

Refine Survey Protocols. Recent literature from studies in the west were reviewed to refine the survey protocols to be used by Woodlot's surveyors and volunteer surveyors. These protocols (see Appendix A) were further refined through discussions with Dr. Hayward, at the University of Wyoming, and Denver Holt of the Owl Research Institute. In preparation for selecting survey sites,

a cursory landscape analysis was made to identify areas with the highest potential for having breeding boreal owls with particular attention given to areas near the Appalachian Trail. We used existing aerial photographs, records of old growth forests, and personal knowledge of sites to identify suitable areas to survey, then mapped and prioritized potential survey routes.

Volunteer Coordination. Approximately ten people volunteered to conduct playback call surveys for breeding boreal owls. Surveyors live in northern, downeast, central, and western mountain regions of Maine. Each surveyor was given a copy of the playback call tape and the survey protocols, which was followed by an interview to discuss the procedures and to review potential survey sites.

Playback Call Survey Methods. We used the playback method to survey for boreal owls. This technique was designed to elicit calls from territorial males responding to a taped call (Hayward and Hayward 1993). Persons conducting the playback survey were instructed on how to identify boreal owl calls and how to distinguish them from saw-whet calls. During playback call surveys, the surveyors looked for courtship and territorial calling as an indication of a likely nesting territory. If such activity were observed, the position of the calling boreal owl would be located by GPS (Global Positioning System) so it could be revisited during the nesting season.

The playback surveys were started approximately one hour before sunset and continued for three to five hours. At each survey point along the route, a series of calls were played over a three-minute period (the speaker was turned at least one time to increase the range of the calls). A three-minute listening period followed the calling period, at which time any responses by boreal owls would be recorded. This sequence was repeated three times, followed by one sequence of saw-whet calls. Along vehicle routes, playbacks were done every half mile as a general rule, but the spacing was often based on the terrain and habitat. For safety reasons, surveys were conducted by two-person teams. Most routes were located in easily-accessible areas (i.e., with driveable roads and snowmobile trails) and were conducted from vehicles to maximize the amount of potential habitat surveyed. Others involved more remote trails that were accessed on foot.

4.2 1997 Survey Results

From results of the landscape analysis, we chose survey routes within potential boreal owl breeding habitat primarily near or along the Maine Appalachian Trail (Table 2), including the Appalachian Trail within Baxter State Park. Additional surveys were conducted in other parts of Baxter State Park and on Acadia National Park land on Isle au Haut. The routes encompassed over 100 miles, and included roads, snowmobile trails, and foot trails.

We visited survey routes in April and June 1997 (Table 2). Several routes where surveys had been planned were either not accessible at that time, due to mud or snow that would not support a snowmobile, or were found to contain unsuitable boreal owl habitat (i.e., the areas were recently clearcut or contained young forest growth). No boreal owls were heard or seen during the playback surveys at routes that we did survey, but potential habitat that should be resurveyed was found at several sites. Saw-whet owls, barred owls, and great horned owls were heard or seen at several of the survey sites, including Isle au Haut. A great horned owl nest was also found on Isle au Haut. Due to trail conditions, sites within Baxter State Park were not surveyed until early June. Even at this date, however, many trails were still closed due to snow and wet conditions. Volunteers were only able to conduct cursory surveys in the vicinity of their homes, but most have committed to conducting additional surveys in 1998.

TABLE 2
1997 BOREAL OWL PLAYBACK CALL ROUTES

Survey Route	Location	Survey Date	Owls Heard or Seen
Isle au Haut	Acadia National Park	4/21/97	Saw-whet, Barred, Great Horned Owls
South Arm Road	TWP C near AT	4/22/97	None
Clearwater Brook Trail	TWP C near South Arm Road	4/22/97	None
Grafton Notch State Park	Near Route 26 and AT	4/22/97	Saw-whet Owl
Old Blue Mountain	TWP C near AT	4/22/97	None
Katahdin Iron Works Rd.	Katahdin Iron Works TWP	4/24/97	No access to AT at that time
Upper Jo-Mary Lake to Wadleigh Pond Road	TAR10 WELS & T1R11 WELS	4/24/97	Habitat along road not suitable for Boreal Owls
Cranberry Peak	Wyman TWP	4/30/97	Great Horned Owl
Mahoosuc Arm	Grafton near AT	4/30/97	None
Park Road to Nesowadnehunk Field Campground	Baxter State Park	6/7/97	Barred Owl
Togue Pond Bunkhouse	Baxter State Park	6/7/97	None
Hunt Trail (AT)	Baxter State Park	6/7/97	Few cavities, no responses
Owl Trail	Baxter State Park	6/7/97	Few cavities, no responses
South Turner Mountain Trail	Baxter State Park	6/8/97	Potential cavities in big-toothed aspen at lower elevations; no responses, but should be resurveyed
Russell Pond Trail to Whidden Ponds	Baxter State Park	6/8/97	Potential cavities in big-toothed aspen; no responses, but should be resurveyed
Roaring Brook Road	Baxter State Park	6/8/97	None

5.0 DISCUSSION AND RECOMMENDATIONS

The lack of responses to playback call tapes is not surprising and should not be interpreted as an absence of boreal owls in Maine. With similar surveys in the Rocky Mountain west, surveys over a period of years were necessary before owls were encountered. Following are recommendations for additional surveys along the Appalachian Trail, within Baxter State Park, and at Acadia National Park. Woodlot Alternatives' efforts with volunteers and self-funded surveys will continue in 1998. Our hope, however, is that the agencies associated with this year's surveys will consider supporting, either financially or through logistical support, additional surveys in 1998. Such surveys should ideally begin in late January and continue through mid-June.

5.1 Appalachian Trail

The Appalachian Trail still holds some of the most likely habitat for boreal owls in Maine. Particular emphasis should be placed on the Mahoosucs, the Bigelow Mountain region, and the trail within Baxter State Park. If any forest inventory data are available, information on forests with cavity trees should be retrieved and used to focus future survey efforts. Appalachian Mountain Club volunteers could also be used to search for cavity trees during their hikes or trail maintenance activities.

5.2 Baxter State Park

Baxter State Park probably has the highest potential of any area in Maine for harboring breeding boreal owls. This is due to the following facts: 1) a northern location, 2) older spruce-fir forests mixed with hardwood trees likely to contain cavities, 3) elimination of logging in most areas for an extended period of time, 4) several old growth stands, and 5) high elevations that might provide a refuge from competing saw-whet owls. Future surveys should include a snowmobile survey of the perimeter road and all other habitats accessible by normal snowmobile routes (i.e., off trail

snowmobiling is not suggested), the complete Russell Pond trail, lower elevations near South Turner Mountain, softwood stands on the south flank of Doubletop, mixed wood stands on the west slope of The Brothers; the Basin region, Traveler Mountain (including Howe Brook), and the South Branch Ponds. Although surveys are apparently discouraged in the region, the Klondike potentially has a very high probability for harboring boreal owls due to its being historically protected from logging. A survey in this area would consist of snowshoeing or skiing around the perimeter of the Klondike (calls should be audible even if they come from within the Klondike), which might require overnight camping away from designated campgrounds.

5.3 Acadia National Park

Almost any portion of Acadia National Park has the potential for harboring boreal owls. Particular emphasis, however, should be placed on offshore islands, including another survey at Isle au Haut.

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APPENDIX A

MAINE BOREAL OWL SURVEY PROTOCOLS

MAINE BOREAL OWL SURVEY PROTOCOLS

1.0 BACKGROUND

The boreal owl is a small, cavity-nesting owl that ranges from Alaska to the maritime provinces of Canada. It was previously thought to only occur in the U.S. as a winter visitor, although some, including Knight (1908 *Birds of Maine*) and Palmer (1949 *Birds of Maine*), considered it likely a rare resident. In the 1980s, Greg Hayward conducted boreal owl surveys in Idaho and Montana while a graduate student at the University of Idaho and confirmed breeding in the U.S. for the first time. Subsequent surveys in Colorado and New Mexico have also confirmed disjunct breeding populations. Dr. Hayward's opinion is that the species very likely breeds in Maine (see *Birds of North America* No. 63).

Boreal owls are closely related to saw-whet owls and it is thought that the two species only recently separated during the Wisconsin glaciation. It appears that saw-whets, which are antagonistic toward boreals, limit boreals to higher-elevation forests in the west.

2.0 SURVEY PROTOCOLS

Boreal owl surveys will be conducted using taped calls of male boreals. This survey method is called the playback survey method and is designed to elicit calls from territorial males responding to the tape. Before conducting a survey, please refer to a good field guide to learn how to identify a boreal owl. Pay particular attention to separating boreals from saw-whets.

Survey Location. Until proven otherwise, surveyors should assume that breeding boreal owls could occur anywhere in Maine. It is more likely, however, that they will be found in the western and central mountains, northern Maine, and downeast, including the downeast coastal islands. Surveys can be conducted from a car or truck, snowmobile, cross-country skis, snowshoes, or just walking. It is a good idea to plan your route ahead of time and bring along a good map and a compass. Based on work in other regions, the most likely habitats are mature softwood stands, or mixed softwood and hardwood stands, with numerous cavity trees and dense clumps of softwood trees in the understory. It is also possible that they will be limited to high-elevation areas to avoid saw-whets. Feel free to call if you would like guidance on where to survey.

Time of year. Surveys can be conducted any time from January through July. From January through April you are most likely to encounter males on a territory or courting males and females. From April through July you may encounter a nesting pair or fledged young. To avoid birds that are merely passing through as part of a winter migration, and to minimize disturbance of nesting pairs, the preferred survey dates are late March through the end of April.

Time of day. A good time to survey is in the evening, just as the stars become visible. Owls are active throughout the night and your surveys can last until you are too tired to continue. The best times, however, are an hour before to an hour after sunset. Occasionally owls will respond to playback calls during the day. In addition, some surveyors conduct surveys within 5 days of the full moon to get the best viewing conditions.

Clothing and logistics. It is best to wear clothing that does not make noise, such as wool, and to use colors that blend in well with the forest. It is also a good idea to walk slowly and quietly through the survey area.

The book *How to Spot an Owl* provides very useful information on how to conduct owl surveys.

Playback tape survey methods. Four series of calls will be played over a three-minute calling period. While the tape is playing, the speaker should be turned at least one time to increase the range of the calls. A three-minute listening period will follow the calling period, at which time any responses by boreal owls will be recorded. Responses may include a clearly-calling owl, a faint calling response (boreals will sometimes respond from within the cavity tree and the sound is muffled), or an owl actually flying over to you. Be alert for any sound. Often owls make noises that don't sound much like an owl. Look toward the sky for silhouettes of owls flying in and shine your flashlight around the trees to look for a perching owl (it usually won't alarm the owl). If you don't get a response, which is to be expected in many cases, move on to a new area. In a vehicle, it is common to stop every half mile. The spacing of your survey points, however, should be based on the terrain and habitat.

Reporting results. Please call as soon as possible (preferably within 24 hours) if you encounter a boreal owl. We will likely return to the area with you to see if the owl can be found again. All calls of responding owls should be recorded, regardless of species. The species and time of day should be recorded, as well as any observations on behavior and type of response, on the attached data forms. Send the results in to:

Michael Thompson
Woodlot Alternatives, Inc.
122 Main Street
Topsham, Maine 04086
207-729-1199
207-729-2715 (fax)
woodlot@ime.net (e-mail)

Ethics. In conducting these surveys, we ask that you adhere to some strict ethical protocols. Unless you are on public lands, you should obtain landowner permission before conducting surveys. Don't use playback calls where they are illegal (e.g., some National Parks). If you discover an owl, observe it quietly for a few moments then move on and leave it undisturbed. Don't use playback calls during the breeding season outside of this specific survey. It can disturb breeding owls. If you find a nest or roost site, please do not visit it repeatedly. In addition, please keep all boreal owl sightings confidential to avoid having too many birders disturb the site.

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Michael Thompson
Woodlot Alternatives, Inc.
122 Main Street
Topsham, Maine 04086

Name of Observer(s):
Date of Survey:
Location (Attach map or route using USGS topo map or DeLorme):
Weather Conditions:

[illegible]