

*One of Idaho's resident boreal owls  
roosts in a lodgepole pine.*

Patricia and Gregory Hayward





# Lone Ranger of the Rockies

*Why does the diminutive boreal owl lead a restless life of one-night stands?*

by Patricia H. Hayward and Gregory D. Hayward



By 6:00 P.M., the February light was fading. I restuffed my backpack after recording data about the subalpine fir, five feet away, where a small brown-and-white boreal owl dozed. The bird didn't even bother to open an eye while I tied a blue flag to the tree so I could relocate it in the summer. Before I finished packing up, a snow squall blew in. The wind's muffled roar and the creaking of trees woke the owl. He looked around anxiously, then shook himself, fluffed his feathers, and went back to sleep, ignoring the snow that fell on his shoulders, melted, and slid over his plumage.

I turned to start the six-mile ski trip back to the cabin to compare notes on the day's owl watching with my husband, Greg. A mile from home, I was skiing by the light of the moon. At the base of a slope covered with ponderosa pine and Douglas fir, I paused to enjoy the quiet and the moonlight, and to rest my aching muscles. In the distance, two coyotes howled a duet, then silence returned. Just as I was about to ski on, the air around me was punctuated by a staccato call that began quietly and crescendoed to a briefly sustained peak—the courtship call of a male boreal owl. I scanned a couple of frequencies on my radio receiver, wondering if the calling bird was one of the owls I had radio tagged. On the third try, beeps came booming in. The Moosejaw male, the same owl I had left an hour and a half earlier and six miles away, was singing on the hill above. I tried a few other frequencies, and more beeps sounded. The Flossie female, an owl that Greg had located earlier in the day three miles to the west, was also up on the hillside. The movement patterns of these two owls typified the behavior of the boreals we studied for more than four years in Chamberlain Basin in Idaho's Frank Church–River of No Return Wilderness. Long-distance commutes are a way of life for this small, forest-dwelling owl. Likewise, travel became a way of life for us as we and our assistants skied and hiked more than 16,000 miles trying to follow the owls as they moved about their home ranges, which averaged 3,700 acres.

The owls we studied inhabit spruce-fir

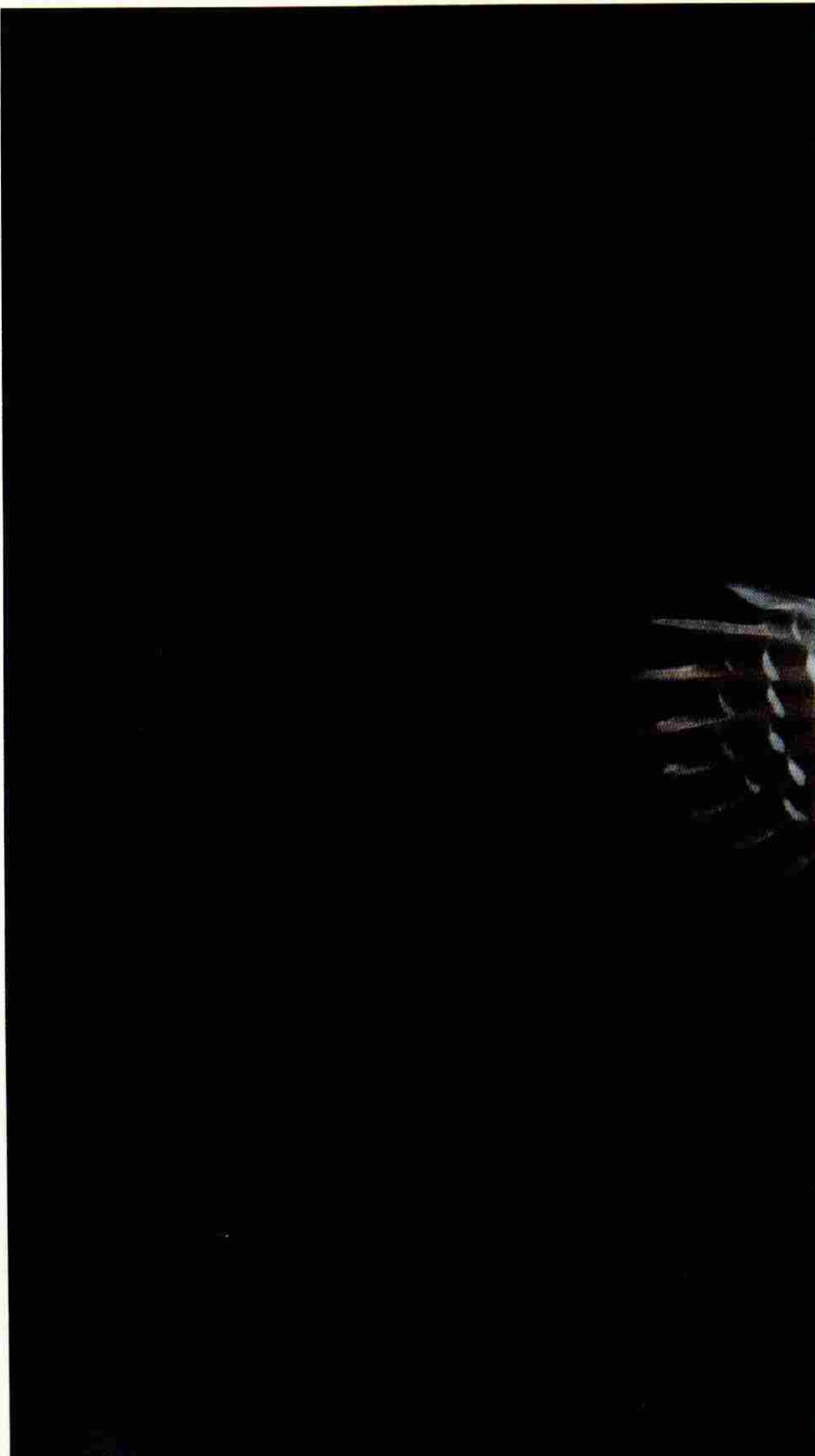




forests in the High Rockies, 400 miles south of the species' stronghold in central Canada. Boreal owls breed throughout the northern forests of Alaska, Canada, the Soviet Union, and Scandinavia, where they are the most common forest owl. Until recently, however, ornithologists considered the species a rare visitor to the contiguous United States. Almost by chance, in 1980 we discovered a breeding population of boreals in the wilderness of central Idaho, and by 1985 we knew that these small, secretive owls breed in the high mountains from northern Montana, Idaho, and Washington south to Colorado. Most recently, they have been seen in New Mexico. But even more surprising than the discovery that this species breeds in the United States were our findings of the distances traveled daily by these owls.

Wanderlust appeared to be an integral characteristic of the population we studied. Although a great horned, screech, long-eared, or other forest owl will frequently roost in the same stand of timber—often in the same tree—day after day, we found that a typical Chamberlain Basin boreal almost never roosts in the same tree and frequently sleeps in a tree miles from the one it occupied the previous night.

The owl we called the Boreal Hill male was a good example. His daytime roosts in the winter of 1986 were, on average, more than two miles apart. On March 15, Greg radio tracked this male and found him four miles east of our cabin, sleeping in a large spruce. The next morning I skied from our cabin eager to find several of our radio-tagged owls. (We had used mist nets and mesh cages holding live mice to capture these owls two months earlier while they were courting at their potential nest sites. Radio signals from the small transmitters we had attached, weighing less than two-tenths of an ounce each, do not travel far.) As usual, the radio signal from the male's transmitter was not audible until I reached a high ridge three-quarters of a mile north of home. Twirling the antenna to the west, I tuned in a faint beep. For the next four hours I broke fresh powder as the signal sharpened and I moved



*Common in spruce-fir forests, the red-backed vole, left, is the principal food of Idaho's boreal owls. A vole-bearing male owl, below, arrives at a nest cavity in an aspen. As sole provider for his mate and brood of unfledged young, a male may make as many as twelve hunting trips per night.*

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*Boreal nestmates about three and a half weeks old perch on the branches of a lodgepole pine. While boreal owls in the forests of Scandinavia regularly rear five to seven owlets each summer, those in Idaho seldom fledge more than two.*

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higher in the basin toward the bird. My hopes of locating several owls before nightfall faded. Finally, I reached the Boreal Hill male perched low in a subalpine fir, leaning against the trunk, with a dead red-backed vole draped across the branch at his side. This perch was almost seven miles, "as the crow flies," from the previous day's roost and nearly a thousand feet higher in elevation.

Why would these small birds need to travel such long distances and have such large home ranges? Boreal owls rank thirteenth in weight among the seventeen species of North American owls. Weighing from four to six ounces (males are considerably smaller than females), the owls are not much larger than pigeons. Chamberlain Basin boreals, however, occupy areas two to eight times larger than those reported for other small forest owls. The size of their ranges even approaches that of the spotted owl, a species four to five times larger than the boreal. Like other wild animals, boreal owls can't afford to expend energy needlessly. The cost of movements throughout the home range must be offset by greater benefits. Most animals move to locate mates, avoid competition from others of the same species, find shelter from the elements or predators, or find food. Which factors influence Chamberlain boreal owls?

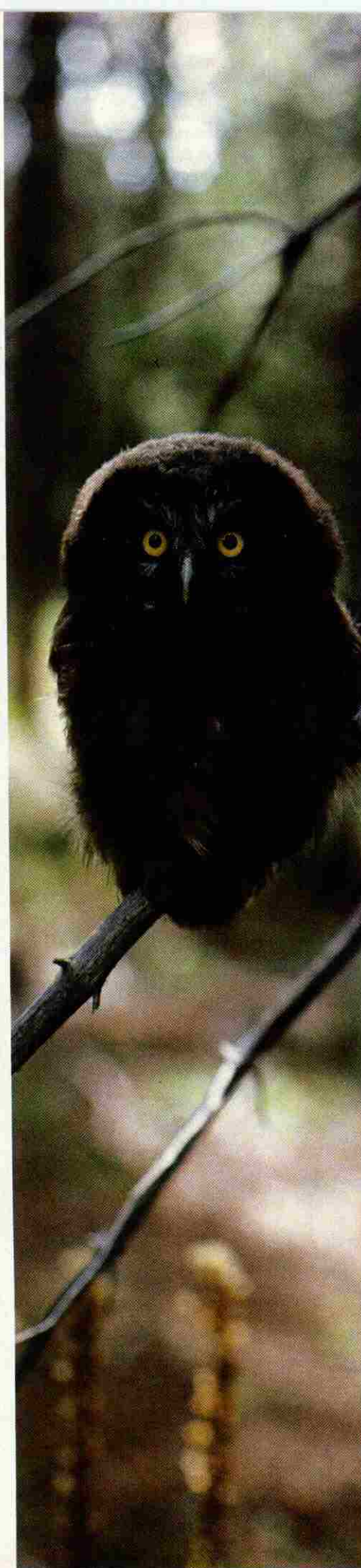
Solitary birds, boreal owls associate with one another only to mate. However, they do not defend territories or actively avoid one another. Their home ranges may overlap extensively; we found males roosting less than one hundred yards apart. To reproduce, a male locates a suitable nest cavity, where he sings his courtship call in the hope of attracting a female. The male confines his courtship calling to a small area around the potential nest cavity and limits any defensive action against intruding males to this same space. In the deep silence of a winter night, the boreal's song can travel miles, and the female must track it to its source. In most years, she doesn't have far to look because several males will most likely call within her home range. Courtship and territorial activities, then, account for little of the boreal owl's day-to-day movements.

If boreals aren't seeking companionship, patrolling territorial boundaries to exclude intruders, or wandering the countryside in search of love, can the search either for shelter or for food explain the large home ranges used by these owls? Shelter from the elements, at least in winter, apparently is not the reason for the distances traveled because boreal owls, which occupy coniferous forests throughout the far north, are superbly adapted for the cold. We often found owls roosting in the open, unprotected from wind or falling snow, even during storms. A perch next to the bole of a conifer appeared to provide sufficient protection. So a search for shelter cannot explain the owls' extraordinary movement patterns.

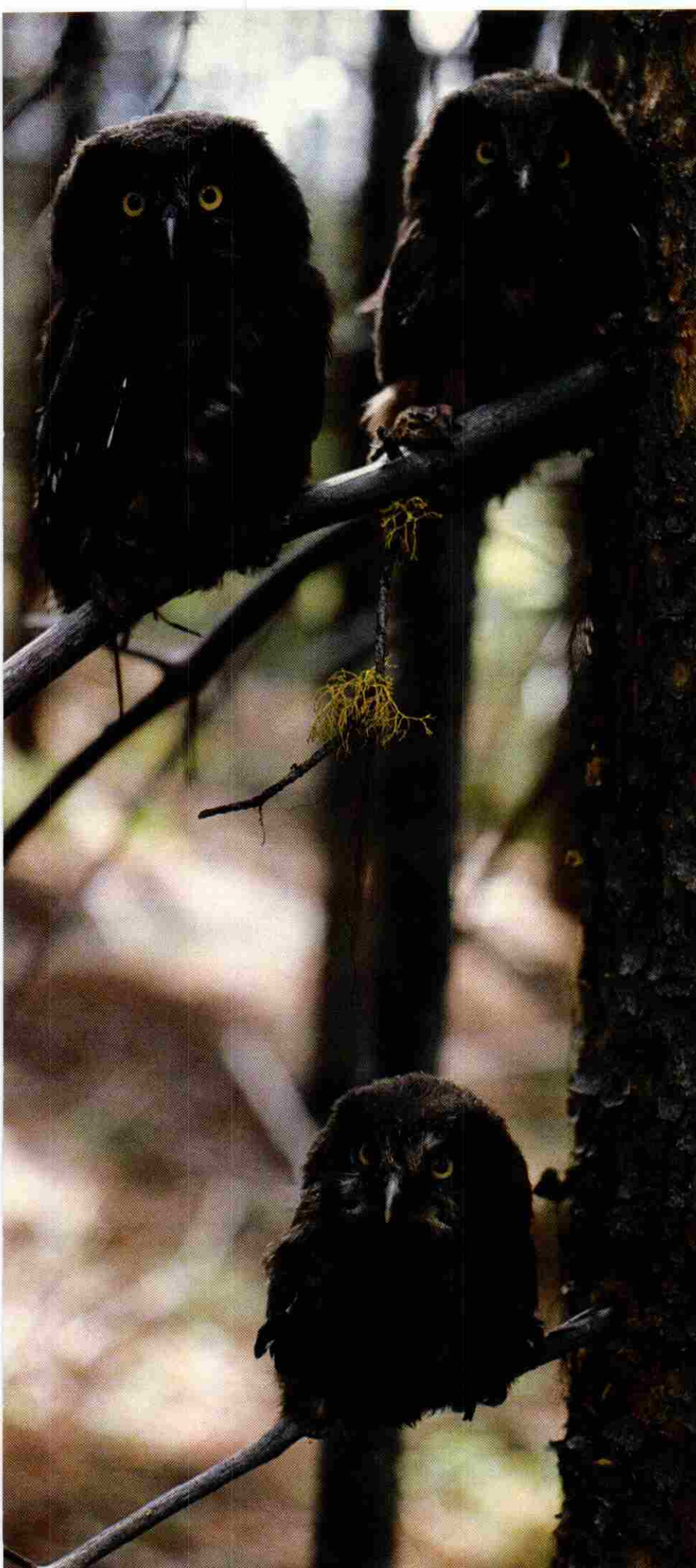
Although not definitive, several lines of evidence suggested to us that boreal owls at Chamberlain need such large home ranges to obtain sufficient food. The lives of many predators are controlled by the availability of their prey. During the four years of our study, we trapped small mammals, the major prey of boreal owls, to determine how numerous these animals were in various habitats and how much their numbers fluctuated from year to year.

If prey influences the owls' movements, we reasoned, the owls should stretch the boundaries of their home ranges in lean years. Results of our mammal trapping indicated large populations in 1984 and 1987, smaller populations in 1985, and extremely low numbers in 1986. We therefore expected to find relatively little movement and small home ranges in 1984 and 1987, and the opposite situation in 1985 and 1986. Summer movements and home range sizes did increase substantially in 1986. Winter home ranges and movements, on the other hand, were surprisingly constant. At first this seemed inexplicable, but after pondering our data, we began to piece together an explanation.

From the beginning of our study, the scarcity of small mammals, even in "good" years, surprised us. Prey populations at Chamberlain were smaller than those reported in other northern forests. Likewise, the number of young raised by Chamberlain boreal owls contrasted







sharply with clutch sizes reported at higher latitudes. In Scandinavia, boreal owls fail to breed during small-mammal population crashes, but in good years, pairs commonly fledge five to nine owlets. At Chamberlain, one-third to one-half of the nests failed completely, the largest clutch contained only four eggs, and only one nest in four years managed that many. Two or three eggs were the norm, and two young seemed about the maximum Chamberlain owls were capable of fledging.

Chamberlain boreals are relatively unproductive under any conditions and appear to be barely able to sustain their numbers. Sparsely distributed prey forces the owls to search long and hard for their meals. Even in good prey years, the owls must travel widely if they are to eventually put on weight and breed successfully.

In the wild, breeding occurs only if animals obtain the energy to survive. Studies of tawny owls in England have shown that the level of the female's fat reserves before breeding is the primary factor determining the number of healthy young a pair raise in a given year. In boreal owls, as in most owl species, the male does all the hunting for his mate and young from the onset of incubation to near fledging. Not every night, however, is perfect for hunting. During rain, mice and voles stay tucked away in burrows and nests. On such nights the male may be unable to provide enough food for his mate. If her body fat reserves are high, she can sit such nights out, keeping her eggs and young warm. If her fat stores are dwindling, however, she may be forced to leave the nest to hunt on her own, exposing the eggs and young to cold. (Exposure to predators, however, is not a major factor. The main nocturnal predator, the pine marten, may attack even when the female is present.) Thus, any extra fat that a female can acquire prior to nesting helps insure nestling survival. Because Chamberlain boreal owls must range far to find prey even in good years, the size of their home ranges remains relatively constant. Instead, nest success seems to vary directly with the availability of prey.

We did find, however, that the owls



*In summer, boreals choose cool roosting spots, such as the shady boughs of an Engelmann spruce. Boreals are solitary; the male and female of a pair may roost miles apart and rendezvous only at the nest site.*

Art Wolfe

traveled farther in winter than in summer. In the high mountain areas inhabited by boreal owls, three to six feet of snow blanket the forest for six to eight months of the year. Most prey remain burrowed beneath the snow, taking advantage of the thick insulation to conserve energy and to protect themselves from predators. Tiny tracks, however, attest to the comings and goings of some individuals on the surface. Deep plunge holes encircled by delicate wing tracings indicate where others succumbed to the owls' acute hearing and sharp talons when they burrowed too close to the snow's surface. During this harsh season, the owls have to work harder to find meals. The distance between roosts used on consecutive days, an index of an owl's daily movements, was on the average 66 percent longer in winter than in summer, and winter home ranges were 25 percent larger than summer home ranges. For males, the latter generally encompassed 2,100 acres or more.

In summer, male owls that are feeding families find easy pickings at high elevations in the old-growth spruce-fir forests. Here, red-backed voles, which are one-third to one-half of the boreal owl's diet, are two to ten times more numerous than at lower elevations. While the voles are protected by six feet of snow in winter, in summer they are vulnerable, despite their habit of hiding beneath rotting logs. Even male boreals that nest at lower elevations find long trips to these high-elevation spruce forests rewarding. In fact, males roosted and, we believe, foraged an average of one and a half miles from their nests—a sharp contrast to the behavior of most owl species.

Why don't the owls simply nest at high elevations, where the food is located? Given a chance, most owls probably would. But for nesting they need large tree cavities that are rare in spruce-fir forest, even in the virgin timber of the wilderness. In four and a half years we saw only two usable cavities in subalpine fir and Engelmann spruce. Ponderosa pines, on the other hand, are "hotel trees" that may contain up to ten good holes for nesting. Woodpecker-excavated holes in aspens are also used by boreals. At Chamberlain

Basin, both aspens and ponderosa pines tend to grow at low elevations. Thus, Chamberlain boreal owls commute to exploit the resources at both elevations, and their small clutches reflect the cost of this active life style.

The activity of unmated owls further testifies to the role played by prey and cavity distribution in the owls' movements. One unmated male, the Three-Blaze owl, named for the trail running through the middle of his summer home range, had the smallest home range observed. With an abundance of voles underfoot and no need to travel to a nest, he sometimes moved as little as twenty-five yards between roosts. Although he never used the same tree on consecutive days, we found up to twelve pellets of regurgitated hair and bones, some more than a year old, under certain trees. Because boreal owls regurgitate only one to two pellets a day, such a large number under these trees indicated that they were frequently used favorites. During an entire summer, he hunted over an area of only 390 acres. When prey is abundant, an unmated owl has little need or inclination to move long distances. Several mated male and female owls that moved to higher, prey-rich elevations after their nesting attempts for the year had failed also immediately confined their activities to small areas.

In May 1988, after tracking Chamberlain boreal owls for four and a half years, we piled our gear into a single-engine plane and said goodbye to the basin. The plane roared down the dirt strip, then silence settled over us as we lifted off the ground. All the streams, valleys, and ridges we had come to know so intimately fled away below, as did the owls that had taught us so much: the Moosejaw male, the Flossie female, the Three-Blaze and Boreal Hill males, and many others. Less than a decade ago, no one knew that boreal owls resided and bred in the contiguous United States. Since then we've answered many questions about their habits and habitat needs. Now we need to look for new teachers to help us answer our new questions about the future of the Rocky Mountain boreals. □





