

Roost habitat selection by three small forest owls.—In 1981 we examined winter and spring roost sites of Boreal (*Aegolius funereus*) and Saw-whet (*A. acadicus*) owls and late winter, spring, and summer roosts of Screech Owls (*Otus asio*) in the River of No Return Wilderness, Idaho. Characteristics of the vegetation around the roost site, as well as the position of the owl in the tree, were used to compare the roosting habits of these three small forest owls.

Study area and methods.—The study was conducted at two sites in the River of No Return Wilderness, Idaho (45°22'N, 115°07'W). Screech and Saw-whet owls were located near Taylor Ranch along Big Creek at 1175 m elevation. Douglas fir (*Pseudotsuga menziesii*) forest dominates northern aspects whereas bunchgrass, mountain shrub, and open Douglas fir habitats are interspersed on the dryer aspects. The riparian zones vary from stands of large Douglas fir with little understory to dense deciduous cover of birch (*Betula occidentalis*), alder (*Alnus tenuifolia*), hawthorn (*Crataegus* sp.), and scattered black cottonwood (*Populus trichocarpa*).

Boreal and Saw-whet owls inhabited the second study site near Chamberlain Basin Ranger Station at 1720 m elevation. Lodgepole pine (*Pinus contorta*) predominates; however, uneven-aged stands of mixed ponderosa pine (*P. ponderosa*), Douglas fir, and lodgepole pine occupy some slopes. Climate, vegetation, and topography of the region are discussed in more detail by Hornocker (Wildl. Monogr. No. 21, 1970) and Hayward (M.S. thesis, Univ. Idaho, Moscow, Idaho).

Boreal, Saw-whet, and Screech owls captured in bal-chatri traps or mist nets and radio tagged, were located on their diurnal roosts. The position of the owl in the roost tree was recorded by height above ground (estimated with a clinometer), distance from bole, and distance to nearest branch above and below the roost. The amount of cover afforded the owl by vegetation above, to the sides, and below the roost was rated on a scale from 1-5 for each direction. Both the density of vegetation and distance to the protective cover were used in assigning the cover rating.

The roost tree was later characterized by height, dbh, and minimum canopy height. Timber density within concentric 5.2-m and 11.4-m radius circles around the roost tree was recorded for trees in four size classes: 2.5-7.6, 7.6-23, 23-53, and >53 cm dbh. A modified line intercept sample totaling 360 m was used to characterize the structure of surrounding vegetation (Mueller-Dombois and Ellenberg, Aims and Methods of Vegetation Ecology, John Wiley & Sons, New York, New York, 1974). We measured the portion of eight lines, radial to the roost, intercepted by five vegetation cover categories. Lines in the four cardinal directions were each 60 m long; the remaining four lines were each 30 m. Data were tested for normality. Those variables deviating significantly from a normal distribution were transformed and retested. Statistical tests were performed on the transformed data.

Results.—We located the roosts of one Boreal Owl (N = 13) between 26 January and 8 April, two Screech Owls (N = 13) between 11 February and 5 August, and three Saw-whet Owls (N = 15) between 12 March and 22 June. Only a single Boreal Owl roost occurred in a cavity; on all other occasions owls roosted in conifers or shrubs. Only Screech Owls showed repeated use of roosting perches. One Screech Owl used the same roost on three of four occasions. Seven pellets found under one Boreal Owl roost, however, indicated repeated use by this bird. Roosts of Boreal and Saw-whet owls were dispersed, separated by as much as 2 km and 1.8 km, respectively, on consecutive days.

All roost trees of the Boreal Owl were coniferous, and its home range had less than 2% deciduous cover. Home ranges of all three Saw-whet Owls were bisected by stream courses

TABLE 1
MEAN (\pm SE) CHARACTERISTICS OF ROOSTS OF SMALL FOREST OWLS

Characteristic	Owl species		
	Boreal	Saw-whet	Screech
Roost height (m)	6.9 (\pm 0.60)	4.2 (\pm 0.64)	4.60 (\pm 1.46)
Min. roost height (m)	2.7	0.9	0.60
Max. roost height (m)	10.7	7.3	12.20
Roost tree height (m)	19.4 (\pm 1.62)	22.6 (\pm 3.04)	21.20 (\pm 4.64)
Bole height (m)	5.2 (\pm 0.90)	1.8 (\pm 0.27)	2.31 (\pm 0.99)
DBH of roost tree (cm)	36.0 (\pm 5.84)	46.0 (\pm 8.20)	54.00 (\pm 14.35)

and associated deciduous riparian habitat. A single Saw-whet Owl roost was found in a deciduous thicket; all others occurred in coniferous trees. Both Screech Owls concentrated their activity along Big Creek where conifer and deciduous habitats are mixed. Prior to leafout in spring, only conifers were used; however, after leafout, 45% of the Screech Owl roosts were in deciduous trees.

Over 80% of the Boreal and Screech owls perched immediately next to the bole of the roost tree. In contrast, 54% of the Saw-whet Owl roosts were >1 m from the bole. Saw-whet Owls often perched within foliated portions of the tree on the outer half of the branch.

The protection offered the roosting owl by surrounding foliage appeared to differ between species. The Boreal Owl was much easier to find on its roost than the Saw-whet or Screech owls. After locating the roost tree using the radio signal, we could usually find the Boreal Owl within 10 min; finding Saw-whet and Screech owls took up to 45 min. Nonparametric ANOVA (Kruskal-Wallis test) of the cover rating above, below, and to the side of the roost indicated a difference between species in protection above the roost ($P = 0.054$). Boreal Owl roosts had the least protection from above, and Saw-whet Owl roosts the most protection. There was no significant difference among species in distances to the nearest branch above or below the roost (ANOVA; $P = 0.16$ above, and $P = 0.21$ below). Saw-whet Owls roosted significantly lower in the tree than Boreal Owls ($P < 0.05$, Table 1).

Within a 5.2-m radius circular plot around the roost, tree density was higher for Boreal Owls (152 ± 22.8 trees/0.1 ha [$\bar{x} \pm$ SE]) than Screech Owls (106.2 ± 58.4 trees/0.1 ha) or Saw-whet Owls (78.2 ± 36.5 trees/0.1 ha). This same pattern was seen in concentric circular plots extending from 5.2–11.4 m from the roost where tree density was highest around Boreal Owl roosts (90.7 ± 13.7 trees/0.1 ha), less around Screech Owl roosts (40.2 ± 30.5 trees/0.1 ha), and least around Saw-whet Owl roosts (30 ± 11.7 trees/0.1 ha). Multivariate ANOVA, by study site, however, demonstrated that the apparent greater timber density around Boreal Owl roosts may result from differences in habitat at Chamberlain Basin and Taylor Ranch rather than differences in roost selection by the owl species. Boreal Owls chose roosts with denser timber within 5.2 m of the roost than in the next 6 m (paired- t test, $P = 0.001$). For the Saw-whet and Screech owls, the higher timber density near the roost was not significant (paired- t test, $P = 0.09$ for both species). Analysis of the vegetation cover (proportions of major categories) within a 60-m radius of the roost showed no significant overall differences among owl species (MANOVA $P = 0.11$ at Taylor Ranch, $P = 0.14$ at Chamberlain).