

Habitat Use and Movements of Breeding Male Boreal Owls (*Aegolius funereus*) in Northeast Minnesota as Determined by Radio Telemetry

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To determine habitat use and movements of male Boreal Owls (*Aegolius funereus*) in northeast Minnesota, we monitored 10 radio-equipped owls from 1990-1992. We used mist nets, bal-chartris, and the taped playback recording of the primary song of the male Boreal Owl to trap territorial male owls during the springtime breeding season. Owls were outfitted with 5.2 g backpack-type transmitters and monitored using a scanning receiver and a hand held, three-element Yagi antenna. Initial diurnal locations were estimated from directional azimuths obtained from landmark locations, followed by walk-ins to the roost site. At each roost site, a series of qualitative and quantitative habitat descriptions was recorded from within a 0.04 ha circular plot, centered on the roost tree. Roost site locations were recorded on aerial photographs and converted to Universal Transverse Mercator (UTM) coordinates. Nocturnal movement patterns were assessed, based on synchronous telemetry readings by at least two observers from predetermined locations. Observers recorded directional azimuths to the owl from a varying number of relocations with a minimum of 10 min separating successive relocation efforts.

A Minimum Convex Polygon (MCP) was generated to describe the boundary within which owl movements were recorded, and a 50 percent Harmonic Mean Transformation-Activity Area (HMT-AA) was used to depict areas of concentrated use. To evaluate the habitat used by nesting Boreal Owls, we drew MCP boundaries (based on roost site locations) atop USDA Forest Service compartment maps (1:15,480) and extracted stand data from within the perimeter of the MCP. Habitat available to owls was determined by pooling random habitat

samples from call-survey routes located adjacent to MCP locations. Both the habitat used and habitat available to owls were classified according to forest type, stand density, and areal extent.

RESULTS

Of the 10 radio-tagged owls, six presumably left the study area, one was killed by an avian predator, and three remained in the study area throughout the monitoring period (mid-June of each year). One owl, radio-tagged during its 1991 nesting season, was retrapped in 1992, less than 1 km from its 1991 nest site. Boreal Owls typically roosted in lowland areas characterized by thick, homogeneous coniferous growth. Black spruce (*Picea mariana*) was used as the roost tree at 94 (81.7 percent), balsam fir (*Abies balsamea*) at 10 (8.7 percent), and northern white-cedar (*Thuja occidentalis*) at 5 (4.3 percent) of 115 observed roost sites.

The average MCP home range estimate for nesting male Boreal Owls was 1,202 ha ($n = 4$; range = 742-1,444 ha). However, MCP size appeared to be influenced by owl movements following nesting attempts. Analysis of 50 percent HMT-AA estimates suggested that owls concentrated their activities within relatively small areas in comparison to MCP home range size.

Habitat composition within home range perimeters varied considerably from random habitat samples taken from adjacent call-survey routes. Rank tests for habitat usage and availability suggest that lowland conifers were the most preferred and upland mixed-type forests the least preferred habitat features used for roosting within the landscape.

Our results indicate that Boreal Owls use a diversity of habitat types for nesting and non-nesting activities in northeast Minnesota. Specifically, based on nest site locations and locations of singing male owls, Boreal Owls are associated with mature, upland, mixed-type

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forests for nesting activities. Lowland homogeneous conifer forests are preferred for roosting and foraging activities. Although Boreal Owls are prone to annual population fluctuations, due to prey availability and winter conditions, factors that negatively affect landscape scale features identified by our study as important to owls, will likely affect both long term population size and distribution of Boreal Owls in northeast Minnesota.