

## SPOTTED OWL NEST SITE CHARACTERISTICS IN MIXED CONIFER FORESTS OF THE EASTERN CASCADE MOUNTAINS, WASHINGTON

This study describes habitat characteristics associated with Spotted Owl (*Strix occidentalis*) nest sites in mixed-conifer forests of the east slope of the Cascade Mountains, Washington. I gathered habitat data at 85 historic nest sites; at 62 of these sites I also collected data at random sites within the same stand to be used in a comparative analysis. Nest elevations ranged from 1250–4800 feet. Most nests were on the lower third of slopes, but nests were also found on other slope positions and on bottom land. The distribution of nest site aspects was random but differed significantly from the aspect of paired comparison sites. Various types of natural disturbances, such as fire, root rot, and mistletoe infection, influenced many nest sites. In addition, 46% of the stands had been partially harvested at least 40 years prior to this study.

Analyses of data from paired sites revealed a number of significant differences between nest trees and randomly selected comparison trees. Douglas-fir (*Pseudotsuga menziesii*) was used at a greater frequency (92%) than expected in comparison to other tree species in the vegetation plots. Most nest trees occupied either dominant or codominant crown positions in the canopy, and were typically alive and fully intact. However, more nest trees had broken tops than random trees. Nest trees ranged from 66 to 700 years of age, the median age was 137 years. Nest trees on south-facing slopes were significantly larger (dbh) and older than those on north-facing slopes. Cavity and broken-top nest trees were significantly larger (dbh) and older than trees that supported other nest types. The most common nest type (55.3%) used by Spotted Owls included those originally made by Northern Goshawks (*Accipiter gentilis*); other nests were located in mistletoe growth (24.7%), in cavities (10.6%), on broken-tops (5.9%), and on large horizontal branches (3.5%).

Certain features of vegetation structure varied significantly between nest and random sites. Habitat characteristics with greater values at nest sites included height of intermediate trees, canopy height of codominant and intermediate trees, basal area of class IV snags, abundance of small (4–13 inches dbh) snags, abundance of 14–23 inch (dbh) Douglas-firs, and basal area of all Douglas-firs and of all live trees combined. Habitat characteristics with greater values at random sites included basal area of class I and II snags and basal area of a group of several less common conifer species. Differences in habitat features between nest and random sites were noted in comparisons of sites with and without evidence of timber harvest, and between sites of the same or different aspect. Two features often associated with Spotted Owl habitat, volume of downed wood (decay classes I–IV) and percent canopy cover, generally did not differ significantly between nest and random sites.

A basic logistic regression model correctly classified 71 percent of nest and random sites. Four supplemental submodels developed to account for differences in aspect and logging history correctly classified between 65 and 93 percent of nest and random sites combined. The best predictor variables were canopy height of dominant trees, basal area of decay class I snags, basal area of decay class II snags, abundance of 4–13 inch (dbh) snags, and abundance of 24–33 inch (dbh) Ponderosa Pines. The five models classified sites significantly better than chance and goodness of fit analyses indicated that the models provided appropriate fit to the data. However, classification rates obtained in cross-validation indicate the models were not stable because of the high degree of variance associated with habitat features at nest sites. Inclusion of stand and/or landscape habitat characteristics will be required to improve all modelling efforts.

Spotted Owls nest in a wide variety of forest stand conditions on the east slope of the Cascade Mountains. Over 50% of the nest sites are in relatively young (median age = 130 years) even-aged patches or stands of trees. These results are in contrast to Spotted Owl habitat research in other regions of the Pacific Northwest. The variability of habitat features within and between regions indicates a substantial degree of flexibility in the habitat selection process.

The suppression of forest fires on the east slope of the Cascade Mountains since about the turn of the century has had a profound effect on forest stand dynamics. Recent consequences of fire suppression include increased fire intervals and changes in tree species composition and stand structure. Although these factors have produced certain stand conditions favorable to Spotted Owls, the legacy of fire suppression enhances the probability of widespread stand-replacement wildfires. An active program of forest management, using prescribed fire and various silvicultural techniques, should be developed now to reduce this risk. All such adaptive management experiments must be compatible with management guidelines that ensure the long-term survival of Spotted Owls. **Joseph B. Buchanan, 1991. M.S. thesis, College of Forest Resources, University of Washington, Seattle, WA 98195. Present address: Nongame Program, Washington Department of Wildlife, 600 Capitol Way N., Olympia, WA 98501-1091 and Cascadia Research Collective, Waterstreet Building, Suite 201, 218½ West Fourth Avenue, Olympia, WA 98501.**