Habitat Relationships of Northern Spotted Owls

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Abstract: Experiences with threatened species in the United States should help inform conservation planning for Canadian species at risk. In this abstract, I review habitat relationships of the threatened northern spotted owl (*Strix occidentalis caurina*), and suggest mechanisms for developing decision support tools for integrated forest habitat assessment and conservation planning. After the northern spotted owl was listed as threatened in 1990 under the *Endangered Species Act* of 1973, extensive research was conducted which significantly reduced scientific uncertainty about the species. Recent scientific findings indicate that suitable habitat for the northern spotted owl is broader and more complex than that given in the 1990 definition (i.e., late-successional and old growth forests). A basic habitat dichotomy exists in which important ecological differences between relatively dry mixed conifer forests and mesic Douglas-fir/western hemlock (*Pseudotsuga menziesii*/*Tsuga heterophylla*) forests affect owl population performance. For example, thinning in young Douglas-fir/western hemlock forests apparently improves habitat conditions for some prey species of the spotted owl. Similarly, definitions of suitable habitat for Douglas-fir/western hemlock forests should now include forests with trees ≥ 25 cm in diameter, at least in western Oregon and northern California. In mixed conifer forests, relatively young successional stages appear to be more important than later successional stages for providing important sources of prey; moreover, many owl sites in mixed conifer forests are at risk due to uncharacteristic wildfires. Judicious thinning and partial harvesting should improve mixed conifer forest habitat for spotted owls while reducing risk of catastrophic wildfires. Importantly, recent science shows that vegetation conditions and a suite of physical environmental factors (e.g., elevation, riparian zones, site productivity) can be integrated into models that predict owl locations, assess habitat supplies, and predict population sizes of northern spotted owls. Habitat carrying capacity for northern spotted owls can be estimated via GIS-based resource selection probability function models. These models can be used to map current habitat supplies and estimate overall population size. By linking these results with projections of forest conditions under alternative forest management strategies, the resource selection probability function models can be used as decision support tools that predict future habitat supplies and population sizes. These models provide an improved habitat-based mechanism for predicting future persistence of the northern spotted owl given explicit strategies for conservation and forest management are implemented.

Key Words: northern spotted owl, *Strix occidentalis caurina,* habitat, conservation, resource selection probability function models, decision support tools, United States