STATUS AND TRENDS IN HABITAT OF NORTHERN SPOTTED OWLS ON FEDERAL LANDS

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Monitoring the status and trend of spotted owl habitat under the Northwest Forest Plan (Plan) was initiated to determine whether habitat was being maintained and restored as prescribed under the Plan. In addition, information about the proportion of federal lands in habitat, the amount and distribution of habitat inside the large, reserved blocks, and the change agents that affected habitat were of interest (Davis and Lint, in press).

We first estimated the proportion of the owl’s range capable of growing forests and then what proportion of the forest-capable land was capable of developing into owl habitat. About 95 percent of the 24,444,100 federal acres administered by the FS, BLM and NPS in the range of the spotted owl can grow forests. About 74 percent of federal land has the capability to develop into habitat for territorial spotted owls. Combined, the West Cascades provinces in both Oregon and Washington and the Klamath provinces in Oregon and California contain two-thirds of the habitat-capable acres in the Plan area.

We then assessed the condition of habitat for all of the habitat-capable acres at the time of Plan implementation (1994) by using BioMapper v3.0 (Hirzel et al. 2004). BioMapper is a recently developed software package that contains GIS and statistical tools designed to build habitat suitability models and maps. One of the main reasons it was chosen was because it operates on species-presence-only data, which was the type of owl location data available. The model performs an ecological niche factor analysis that compares ecological conditions that correspond with species presence to conditions across the entire area being analyzed (Hirzel et al. 2002). The “suitability” statistic calculated by the BioMapper model is based on the similarity of the biotic and abiotic characteristics of a habitat-capable map unit to the characteristics of sites inhabited by territorial owls. Habitat suitability or “similarity” ranges from 0-100. A value close to zero signifies that an individual map unit (pixel) has little in common with the conditions found where territorial owls are present, and those with values close to 100 have much in common with sites having territorial owl presence.

Owl habitat suitability was mapped for all physiographic provinces using biotic and abiotic habitat variables such as quadratic mean diameter of trees, canopy cover of coniferous trees and elevation. The condition of owl habitat was reported at three broad geographical scales: 1) the physiographic province; 2) the state; and 3) the range of the owl. At the province-scale owl habitat condition was also assessed inside and outside of the large, reserved blocks designed to support clusters of reproducing spotted owls.

Habitat suitability (ranging from 0 to 100 ) of habitat-capable federal acres was displayed in histograms using five equal-interval categories (that is, 0-20, 21-40, and so on). These histograms provide a “habitat condition profile” for the habitat-capable acres. Habitat-capable acres that fall on the right side of the profile (habitat suitability from 41 to 100) have characteristics similar to the characteristics of areas where territorial owls have been found, while those on the left side of the histogram (habitat suitability from 0 to 40) are less similar to the characteristics of owl presence locations.

Range wide, about 57 percent of the habitat-capable acres had a habitat suitability of >41. About 35 percent had a score in the range of 0 to 40, and the remaining 7 percent was in the unknown class due to remotely-sensed data limitations. All provinces, except the East Cascades in Washington (44%) and the Cascades in California (41%), had 50 to 63 percent of the habitat-capable acres in the habitat suitability range of 41 to 100.

Habitat suitability was also analyzed for habitat-capable acres inside and outside of the large, reserved blocks. Across the range, about 62 percent of habitat-capable acres inside the reserved blocks had a habitat suitability of 41 to 100, with two-thirds of that in the 61 to 100 range. Of the 32 percent of the habitat-capable acres with < 41 habitat suitability, slightly less than half were in the 0-20 category. Habitat suitability conditions outside of the reserved blocks were different than inside. About 52 percent of the habitat-capable acres were in the 41 to 100 category, and 41 percent was in the < 40 category.
At the province scale, the proportion of area inside the reserved blocks with a habitat suitability $\geq 41$ was highest in the Olympic Peninsula of Washington (67%), the Eastern Cascades (71%) and Western Cascades (68%) provinces in Oregon and the Klamath Province (66%) in California.

We also monitored changes within the habitat suitability intervals caused by stand-replacing disturbances for the first decade of Plan implementation (1994-2003). Range wide, an estimated 1.5 percent of habitat within the 41 to 100 range of habitat suitability was lost. Stand-replacing timber harvest removed about 0.25 percent and stand-replacing wildfires, while less widespread than timber harvest, had larger local effects and accounted for the larger proportion of habitat loss of about 1.3 percent. In the Klamath Province of Oregon, about 6.6 percent of the habitat-capable acres in the 41 to 100 category were lost to wildfire, and nearly all (86 percent) of the loss was in the congressional and late-successional reserves. Loss of habitat-capable acres in the 41 to 100 habitat suitability range was less than 1.5 percent in all other provinces.

Range-wide, the loss of owl habitat inside the reserved blocks from stand-replacing timber harvest was 0.04 percent and outside the blocks it was only 0.53 percent. Again, losses of habitat-capable acres in the 41 to 100 range were greater from wildfire than from timber harvest, but as noted earlier were limited to specific provinces. About 2.0 percent of the 41 to 100 range habitat-capable acres were lost, range-wide, inside the reserve blocks. The Klamath provinces in Oregon and California had the highest percentage losses, 11.6 and 2.3 percent, respectively. None of the other provinces had higher than a 1.6 percent loss.

Maintaining 60 to 80 percent of the habitat-capable acres in the 41 to 100 range of habitat suitability in reserved blocks that occur in the drier southern and eastern provinces, or moderate to high density lightning-ignited wildfire areas may be a challenge without stand treatments that reduce the risk of habitat loss to wildfire. However, understanding the effects of stand treatments on owl habitat and owls before they are applied is an important first step to ensure that these treatments do not have a greater effect on the owls than the wildfires would.

Finally, increases in the percent of habitat-capable acres in the 41-100 range of habitat suitability will accrue in the short term from the transition of acres currently in the 21-40 range. The greatest increases in habitat suitability acres will likely be in the West Cascades provinces of Washington and Oregon, the Klamath provinces of Oregon and California and the Coast Range Province of Oregon. This will result in significant increases in habitat in the 41 to 100 habitat suitability range in the coming decades since these provinces contain over two-thirds of the habitat-capable acres in the Plan area.

The loss of owl habitat did not exceed the rate expected under the Plan. There were large wildfires that removed owl habitat in local areas in several of the provinces, but analysis of the magnitude of the loss at the province and range-wide scales showed the strength of the Plan’s repetitive, reserved-block design to absorb these losses. In the short term, these losses were also buffered by habitat conditions outside of the reserved blocks. The Plan has shown its strength in the short term for maintaining habitat and is expected to do equally well in restoring habitat over time. At the end of the first ten years, habitat conditions are no worse, and perhaps better than expected.


STATUS & TREND REPORTS CONCURRENT SESSIONS- Northern Spotted Owl

1 USDA Forest Service- 2900 NW Stewart Parkway, Roseburg, OR
2 USDI Bureau of Land Management- 777 Garden Valley Blvd. NW, Roseburg, OR