

Population Demography of Northern Spotted Owls

By E. Forsman and 26 co-authors. *Studies in Avian Biology* No. 40, Cooper Ornithological Society, University of California Press, 1445 Lower Ferry Road, Ewing, New Jersey 08618 USA. 105 pages. 35 USD. Cloth.

This well-researched and informative monograph used data from 11 long-term studies, ranging from 17 to 24 years in duration. Three study areas were in Washington, five in Oregon and three in California. Owls were trapped most often with a noose pole or snare pole. The number of captures/resightings per study area varied from 583 to 3777, involving 24,408 recaptures and resightings of 5,224 marked Spotted Owls, nearly five per adult. This giant data set for a rare species demonstrates a biennial cycle, with unexplained higher fecundity in even-numbered years.

The study areas were large and covered 19,813 km², ~9% of the range of the Northern Spotted Owl. There was strong support for declining adult owl survival on 10 of the 11 study areas, with these declines most evident in Washington and Oregon. Reproduction and recruitment were insufficient to balance losses due to mortality and emigration; the average rate of Northern Spotted Owl population decline in all study areas combined was a worrying 2.9% per year.

There was also evidence of climatic effects (Pacific Decadal Oscillation and Southern Oscillation/El Niño Index) and of weather effects (early nesting season precipitation and early nesting season temperature).

Since about 1970, government agencies in the Pacific Northwest have attempted to maintain viable popu-

lations of Northern Spotted Owls, Marbled Murrelets and red tree voles, resulting in controversial reductions in the harvest of valuable old forests on federal lands. The Northern Spotted Owl, "the poster child" for conservation of old-growth and mature forests on federal lands, was listed as a threatened subspecies in 1990.

The more recent invasion of Barred Owls into the range of the Spotted Owl has elevated the concern. Apparent survival of Spotted Owls was negatively correlated with the presence of Barred Owls on the study area on six of the study areas.

Three possible data biases were identified: 1) permanent emigration of adults is rare because adult site fidelity is high; 2) variation in recapture rates is low because survey effort is relatively constant; 3) band loss bias is absent because band loss is close to zero; from more than 6,000 owls banded with standard aluminum bands or with colored bands, only two colored bands and no aluminum bands were lost.

The statistical analysis of these combined studies is exemplary. The monograph demonstrates the basic importance of bird banding as a tool for monitoring bird populations, identifying the reasons for their fluctuations. The results consistently identified loss of habitat and competition from Barred Owls as important stressors, the need to preserve as much high quality

old growth forest as possible and the need for continued monitoring of Northern Spotted Owls throughout their range. Experimental removal of Barred Owls in at least one study area is recommended.

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