

Demography of Spotted Owls on the east slope of the Cascade Range, Washington, 1989-2001

Researchers

Dr. E.D. Forsman (PI). Lead Biologist: S. Sovern, Oregon State University, Corvallis, Oregon. Biologists: M. Taylor, Oregon State University, Corvallis, Oregon.

Cooperators

Plum Creek Timber Company, Boise Cascade Corporation, U.S. Timberlands, Washington State Department of Natural Resources.

Status

This study began in 1989. The Regional Monitoring Plan adopted by the Forest Service in 1998 stipulates the Cle Elum Study will continue at least until 2004.

Objectives

To determine demographic characteristics of spotted owls in forests on the east slope of the Cascade Range in Washington.

Benefits

This study was designed to collect long-term information on survival and reproductive rates of spotted owls on the east slope of the Cascade Mountains, Washington. This information is needed to assess population trends of spotted owls in this province.

Accomplishments

In the General Study Area (GSA), we returned to sites where owls were banded in previous years and attempted to determine site occupancy and reproduction. We also conducted a complete survey of the Swauk Creek Density Study Area (DSA), a 204 km² area within the GSA where we attempted to locate all resident owls each year from 1991-2001. We confirmed bands of 48 banded owls that were relocated, and banded 27 new owls with colored plastic bands on one leg and USFWS aluminum bands on the other. We banded 654 owls in 1989-2001.

A multiple regression model for the number of non-juvenile owls detected in the DSA in each year of survey produced the equation

$$\begin{array}{ccccccc} \text{number of} & 0 & 18.45 & - & 0.44*\text{year} & 0 & 0.14*\text{year}^2 \\ \text{owls} & & & & & & \\ (\text{SE}) & & (0.48) & & (0.15) & & (0.054) \end{array}$$

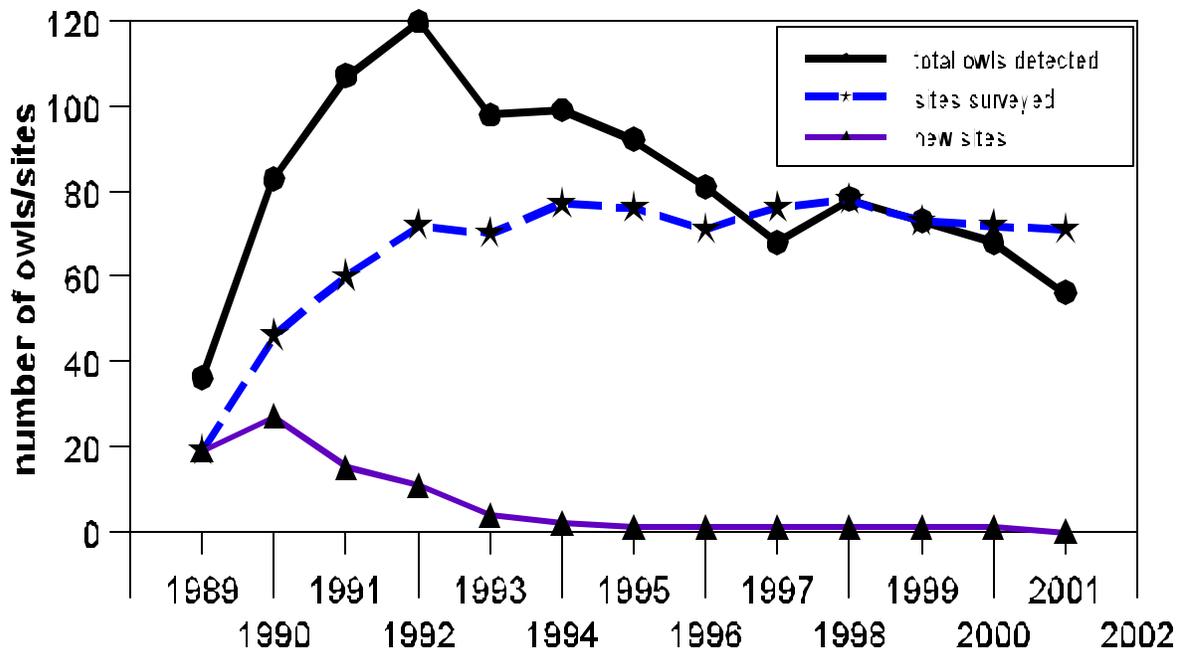
($R^2 = 0.66$, $P = 0.013$). The quadratic term (year^2) in the model may indicate that the decline in the number of owls in the DSA has slowed in recent years. To determine the rate of change in number of owls detected on the GSA since 1992, we modeled the number of owls detected in a given year as a function of year in a Poisson log-linear regression model. To account for slight variation in survey effort among years, we included the number of sites surveyed as an offset variable. The number of owls detected in the GSA declined by about 7% per year in 1992-2001 (95% CI = 5-9%).

A thorough discussion of Spotted Owl demography in the Pacific Northwest, including

more detailed analyses of data from the Cle Elum Study Area can be found in:
Forsman, E. D., DeStefano, S., Raphael, M. G., and Gutiérrez, R. J., Eds. 1996.

Demographics of the northern spotted owl. Studies in Avian Biology 17. 122 pp.,
and
Franklin, A. B., Burnham, K. P., White, G. C., Anthony, R. G., Forsman, E. D., Schwartz, C.,
Nichols, J. D., and Hines, J. 1999. *Range-wide status and trends in northern
spotted owl populations*. Unpublished report, Department of Fishery and Wildlife
Biology, Colorado State University. 71 pp.

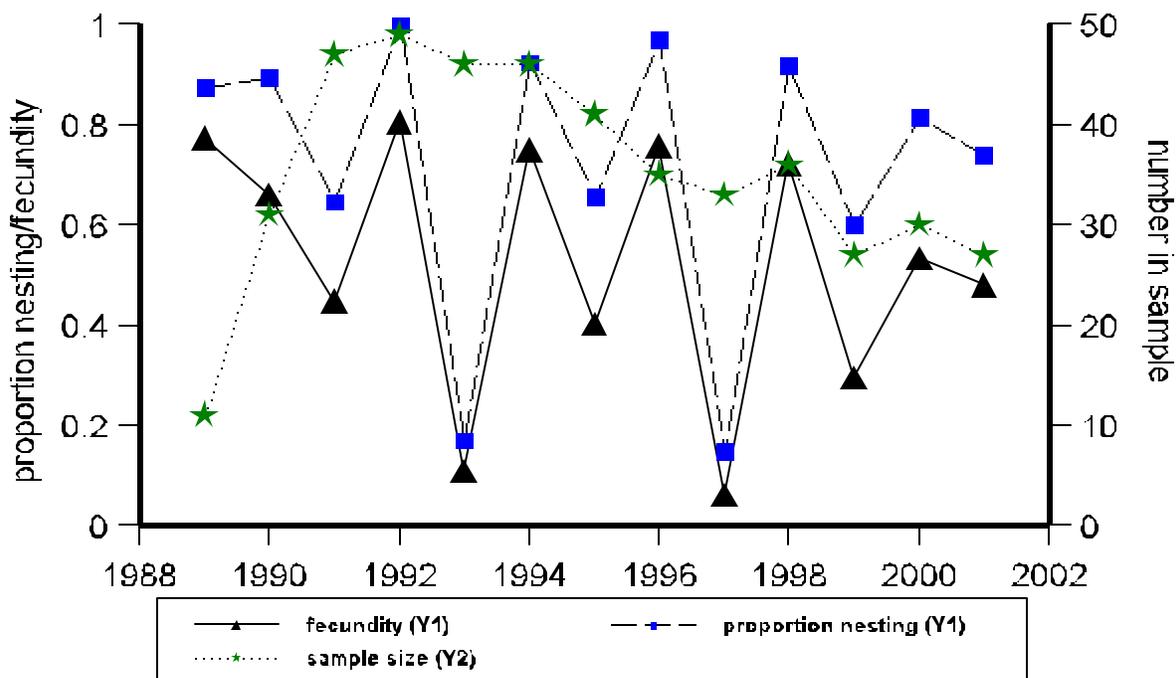
Figure 1. The number of owls detected, number of sites surveyed, and number of new sites added per year on the Cle Elum Study Area, Wenatchee National Forest, Washington, 1989-2001.



Reproduction

Reproductive indices for 2001 were higher than usual for odd-numbered years (figure 2). We documented nesting at 17 of 23 sites where we found a female, and young were fledged from 14 of the 17 nests.

Figure 2. Reproductive indices of Northern Spotted Owls on the Cle Elum Study Area, Wenatchee National Forest, Washington, 1989-2001. Indices shown are the proportion of females nesting and fecundity. Fecundity is the number of females produced per female owl, assuming a 50:50 sex ratio.. Sample size for fecundity analysis for each year is shown plotted on axis Y2.



Problems

The weather was unusually unsettled for this study area during spring and summer. There were numerous nights where high winds and/or precipitation prevented calling surveys.

Publications and Presentations

Forsman, E. D., I. A. Otto, S. G. Sovern, M. Taylor, D. W. Hays, H. Allen, S. L. Roberts, and D. E. Seaman. 2001. Spatial and temporal variation in diets of spotted owls in Washington. *Journal of Raptor Research* 35: 141-150.

Haig, S. M., R. S. Wagner, E. D. Forsman, and T. D. Mullins. 2001. Geographic variation and genetic structure in spotted owls. *Conservation Genetics* 2:25-40.