Sage-grouse Winter Habitat Use and Survival

Mitchell J. Willis, Robert G. Anthony, and Richard A. Schmitz

Introduction

Research on sage-grouse has focused largely on habitat relationships, productivity, and survival from the prebreeding period through fall. A recent grant from the Species at Risk program of the U.S. Fish and Wildlife Service has allowed us to begin investigation of sage-grouse winter habitat use and survival in southeast Oregon.

Experimental Protocol

Fieldwork was conducted from mid-September through onset of breeding behavior in late February, 1989–1990, through 1991–1992. Grouse populations in Lake County (Hart Mountain National Antelope Refuge [HMNAR]), Harney County (Jack Creek), and Malheur County (Jordan Valley) were examined. The three study sites were selected to represent a range of variability in core sage-grouse habitats in Oregon. The HMNAR study site was at the highest elevation (5,000–8,000 ft) and had the most productive and diverse plant communities. The Jack Creek study site was intermediate in elevation, and was typical of Wyoming big-sagebrush plant communities in southeast Oregon. The Jordan Valley study site was lowest in elevation (3,000–5,500 ft) and included crested wheatgrass seedings over approximately 25 percent of the area. Sage-grouse hens were captured using spotlighting, net guns, and rocket nets. Radio transmitters weighing approximately 1 ounce were mounted on a reinforced vinyl poncho and placed over the neck of each hen at capture. The number of birds monitored each year varied, but attempts were made to maintain a minimum of 20 birds for each study area by periodically capturing additional hens. Hens were visually located at least every other week.

Results and Discussion

This research will attempt to quantify habitat-specific survival and identify habitat structure that is associated with survival. We will also investigate how habitat, animal movement, and winter weather interact to influence survival of sage-grouse. Specific objectives are to 1) estimate survival rates of wintering sage-grouse, 2) determine the association of habitat structure and weather to winter survival, 3) determine whether there were differences in habitat selection and use among three study areas at both the microhabitat and landscape scale between the two types of rangeland, and 4) determine whether habitat use varied according to changes in temperature, windspeed, and snow depth.

We will characterize resource selection from the location data by calculating selection indices. We will estimate variances in selection ratios for different habitat types and test for differences among habitat types and among study areas. We will model changes in selection related to month during winter, proportions of sage habitats, and proportions of converted rangelands.

Survival rates will be estimated for the fall and winter seasons (October–March), using radiotelemetry data and known-fate models. A recently developed survival/analytical package (program MARK) will be used to estimate bi-weekly survival rates. The focus of these

Strutting sage-grouse.

analyses will be to test for differences in survival among study areas and years. We will select models that most accurately reflect differences in survival due to area, time, and age of grouse. We also will make use of weather and habitat variables as covariates in the analyses, in an attempt to identify factors that influence winter survival in sage-grouse. Initial analysis indicates that survival varied among the 2-week periods but did not diminish through the winter.

Management Implications

From this research, we hope to describe important wintering habitats for sage-grouse. Land managers should be better able then to assess what habitats, if any, are in short supply for wintering sage-grouse and what factors make these habitats important. We also hope to provide statistically valid survival estimates of sage-grouse through the winter and perhaps identify factors consistently contributing to mortality. This information currently is unavailable for the species. Understanding winter survival will contribute toward understanding the status of sage-grouse, which is especially important given the current petitions to list sage-grouse as a threatened species.