

Sage Grouse Ecology and Management in Northern Utah Sagebrush-Steppe.

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We observed sage grouse movements, habitat-use and chick production and population abundance 1985-2001 in Rich County, Utah. Results are compiled and available in a report entitled "*Sage Grouse Ecology and Management in Northern Utah Sagebrush-Steppe*", jointly published by and available from Deseret Land and Livestock (DLL) and the Utah Foundation for Quality Resource Management (QRM) (cost - \$15.00).

Winter ecology: Grouse generally wintered in flocks of 10-70 birds on relatively level, low elevation sagebrush dominated areas. Grouse movements from winter to spring breeding range varied from 0.1-40 miles. Colin Homer (1993) used GIS techniques to classify winter grouse habitat, and found Rich county sage grouse generally selected shrubs of medium height (15-25 in.) and medium cover (20-30%). However, winter habitat use varied with winter snow depth. Grouse used low sagebrush (<10 in.) when snow depth was <12 inches deep, and tall (>25 in.) sagebrush when snow depths exceeded 12 inches. Grouse seemed to be selecting brush cover protruding 10 inches above snow.

When snow depths exceeded 15 inches on winter range, sage grouse, mule deer and whitetail jackrabbits became concentrated on <5% of the winter range, in scattered patches of Wyoming and Basin big sagebrush still above the snow. These brush patches are considered critically important for wildlife survival in deep snow winters. Grouse populations declined (as did mule deer, pronghorn and whitetail jackrabbits) following two deep snow winters. It appeared grouse were more visible, more frequently flushed by predators (particularly eagles) and suffered greater mortality rates when deep snow covered the Wyoming sagebrush. 65% of grouse carcasses examined in the field were predated by raptors November–May (primarily golden eagles) and 18% died following collisions with fences. Estimated annual survival rate of radio-tagged grouse was 47%.

As coyote abundance increased during the study period, sightings of red fox, whitetail jackrabbits, and Uinta ground squirrels declined. Both red fox and ground squirrels can be significant nest predators. Golden eagle nesting success also declined as jackrabbit and ground squirrels declined. Since eagle-nesting success seems to depend on jackrabbit and squirrel abundance, coyotes may increase grouse production and survival by reducing grouse nest predators and eagle production.

Summer ecology: The number of known leks (grouse strutting grounds) on DLL ranch increased from 2-14 during the period of study. Leks sometimes became inactive during population lows, then reappeared as the population increased.

Hens generally nested within 2.5 miles of leks. Since the average distance between leks was 2 miles, nearly all sagebrush-dominated land on the ranch is potential grouse-nesting habitat. Radio-tagged hens generally remained within 3 miles of nest-sites throughout the

summer. Males moved 1.5-8 miles from leks to summer use areas. Male flocks used sparse lowland and mountain sagebrush in summer. Hens without broods used dense lowland sagebrush. Broods used meadows, spring burns and plantings containing broad-leaved forbs. Grouse were often observed along edges of forb-rich meadows, burns, plantings and roadsides. Use of lowland sagebrush was greatest April-June; use of meadows and mountain sagebrush increased July-August. Grouse use of meadows varied between years, depending on growing-season rainfall. In dry summers, grouse concentrated in meadows, on north slopes and at higher elevations. In contrast, grouse were widely dispersed among habitat types and throughout the study area in wet summers. Lek counts increased following wetter summers, but failed to increase following dry summers. 83% hens nested in Wyoming sagebrush stands, in patches >300 feet in diameter. Hunnicutt (1992) used GIS techniques to classify summer grouse habitat use. Hens selected dense brush cover (>17%) with sparse (< 8%) grass/forb (herbaceous) cover for nesting. Hens with young broods (June) preferred dense brush with <10% herbaceous cover; older broods (July-September) preferred sparse brush with >10% herbaceous cover.

Chick: hen ratios were 3 times greater in habitats with high plant species diversity than in species-poor sage-crested wheatgrass (**S-CW**) habitats. Mean brood sizes increased as forb availability increased due to burning and planting. Artificial nests (brown chicken eggs) were used to compare nesting success with vegetative characteristics. Nest predation was greatest in areas having both tall, dense brush and dense herbaceous cover (such as draws and mountain sagebrush). Insect abundance was highest in habitats having greatest herbaceous cover. Lowest insect abundance occurred in dense, Wyoming sagebrush with sparse herbaceous cover. Billaux (1996) measured foraging rates of hand-reared sage grouse chicks in various habitats. Foraging rates were highest in habitats with greatest forb abundance. Chicks selected both native and introduced forbs (particularly alfalfa) when available, avoided grasses, and always ate some shrubs. Percent forb cover was consistently lower in **S-CW** than in any other habitat, and appears to explain the low chick: hen ratios observed in **S-CW** habitats. Wilson (2000) studied grouse use of various vegetation treatments on DLL. Grouse, and broods in particular, readily used portions of burns and plantings having broad-leaved forbs and within 150 feet of brush patches.

Habitat management: Time-controlled grazing practices at DLL since 1979 have increased herbaceous cover on rangelands, and slowed the rate of sagebrush increase. Grazing exclosure data suggest: a) grass production depends on prior-year precipitation and b) excluding livestock increases shrub production, reduces forbs and fails to increase plant species diversity. Wyoming sagebrush vigor declined in areas receiving winter browsing by elk and pronghorn, but improved in areas where grasses were purposely overgrazed by cattle. Hot, August wildfire burns in Wyoming sage wintering areas appeared detrimental, while cool-season controlled burns in summering areas appeared beneficial to grouse. Mechanical brush thinning and planting desirable forbs may be effective ways to improve summer nutrition for grouse and pronghorn, without severely reducing winter and nesting habitat. Grouse and pronghorn abundance and production increased significantly as we increased forb abundance on 5 % of the DLL sagebrush country. Results of this study suggest livestock

grazing and brush management techniques can be used to enhance sagebrush habitats for sage grouse, pronghorn and other sagebrush-dependent species if used wisely.