

# Wyoming Big Sagebrush Cover Types in Eastern Oregon: Ecological Potentials and Sage-grouse Guideline Habitat Requirements

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## Introduction

Plant cover and composition are often the key attributes for describing wildlife habitat requirements. Developing vegetation guidelines for wildlife requires a detailed understanding of wildlife interactions with plant communities at many scales and over time. However, this knowledge is often lacking, thus, developing applicable habitat management guidelines for wildlife is often difficult and contentious.

Sage-grouse habitat guidelines based on plant cover have recently been developed for sagebrush communities of eastern Oregon. Many plant ecologists and land managers have questioned their appropriateness and applicability, for a number of reasons. First, sage-grouse-vegetation cover relationships tend to be based on a relatively small scale without adequate description of plant communities at the stand or landscape level. Habitat guidelines based on specific microsite cover requirements may not reflect the cover potential and variability of sagebrush communities at larger scales. Most rangeland vegetation surveys tend to focus on larger areas to describe plant communities. Preliminary evidence suggests that sagebrush cover is significantly overestimated when using smaller-scale measurements (Eastern Oregon Agricultural Research Center file data). Second, because of a lack of data for our region, guidelines have also been based on results from studies conducted outside of our area, which may not reflect cover potentials in sagebrush systems of eastern Oregon. Development of appropriate manage-

ment guidelines and strategies for sagebrush obligate and facultative wildlife species requires up-to-date information on ecological site potentials within the sagebrush alliance. Surprisingly, there is a lack of information regarding the range, variability, and biological potential of vegetation characteristics within the big sagebrush alliance, particularly the Wyoming big sagebrush cover type.

## Experimental Protocol

Our goal was to improve knowledge of the ecological potentials of the Wyoming big sagebrush type in the northern Great Basin. The Wyoming big sagebrush cover type was once the most extensive of the big sagebrush types but it has been severely impacted in many areas by past land use and the introduction of nonnative weeds. We chose to focus the study in the Wyoming big sagebrush cover type because it has received limited attention in large-scale vegetation cover surveys in the region and because among big sagebrush community types it has the greatest potential to be impacted by sage-grouse habitat guidelines. Our objectives were to 1) fully describe vegetation/soil characteristics at the stand level and develop an appropriate community classification system for the Wyoming big sagebrush alliance, and 2) compare stand-level cover characteristics with sage-grouse habitat requirements.

In 2001 and 2002, 107 high-ecological-condition sites were sampled, mostly in the High Desert and Owyhee ecological provinces. Several sites also were located in

the northern region of the Humboldt Ecological province and Oregon portion of the Snake River province. Thirty-two of these sites were resampled in 2003 to begin assessing climatic effects on plant cover, production, and composition. Sites were divided into five associations based on differences in the abundance of dominant perennial bunchgrass species. Associations within the Wyoming big sagebrush cover type were 1) bluebunch wheatgrass, 2) Thurber's needlegrass, 3) Idaho fescue, 4) needle-and-thread, and 5) bluebunch wheatgrass/Thurber's needlegrass codominance (codominance required the species with the lower cover to contribute at least 40 percent of its combined cover). The bluebunch wheatgrass association was the most extensively sampled with 63 sites, second was the Thurber's needlegrass association with 16 sites, third was the Idaho fescue association with 14 sites, and both the needle-and-thread and the bluebunch wheatgrass/Thurber's needlegrass associations had 7 sites.

## Results and Discussion

Analysis of functional group (perennial grass, Sandberg bluegrass, perennial forbs, annual forbs, annual grass) cover illustrated vegetation differences among associations (Table 1). Analysis of species composition within associations, after excluding dominant perennial grass species used for grouping, was more homogenous than expected by chance. Inclusion of the dominant perennial grass species in the analysis increased the similarity within associations. Sites within an association tended to have similar

plant species present. Thus, differences in functional group cover and species composition indicate that separating the Wyoming big sagebrush alliance by dominant grass species associations is appropriate.

Of the 107 sites, and with a strict interpretation of the plant cover guidelines, none of the high ecological condition sites would meet sage-grouse nesting and brood-rearing habitat requirements (Table 2.). The main reasons for this are 1) tall forb cover did not equal or exceed 10 percent on any sites, and 2) sagebrush cover exceeded 15 percent on less than a quarter of the sites. Rarely did tall forb cover exceed 5 percent in these communities. Sagebrush live cover exceeded the

15 percent cover requirement on 24 plots. However, if dead sagebrush cover was included, then an additional 37 sites would meet sagebrush cover requirements. Either not enough sites were sampled or the unique environmental characteristics necessary to support the required combination of cover values were not present in the Wyoming sagebrush alliance. However, the years when sampling occurred were drier than average, which may explain the low forb cover values measured. Our long-term monitoring study will continue over the next 9 years, and we may be able to develop a relationship between climate and forb cover. However, based on our stand-level surveys,

the management guidelines for sage-grouse nesting and optimum brood-rearing habitats appear to be largely unachievable within the majority of the Wyoming big sagebrush alliance across the ecological provinces studied.

### Management Implications

The limited potential of the Wyoming big sagebrush alliance to meet nesting and optimum sage-grouse cautions against adopting current guidelines to direct management decisions in our region. Recognizing the ecological potential of Wyoming big sagebrush across its range may result in the development of better management and more realistic management guidelines.

**Table 1. Vegetation functional groups mean percent cover by association.**

Functional group	<i>Bluebunch wheatgrass</i>	<i>Thurber's needlegrass</i>	<i>Needle-and-thread</i>	<i>Idaho fescue</i>	<i>Bluebunch/Thurber's mix</i>
<i>Poa</i> species	6.0 A <sup>1</sup>	4.8 AB	1.6 C	4.5 B	6.7 A
Perennial grass	11.9 B	8.8 C	11.0 BC	19.4 A	9.4 C
Annual grass	0.8 A	0.4 AB	0.8 A	0.02 B	0.7 A
Perennial forb	4.8 A	2.5 B	0.3 C	4.4 A	5.0 A
Annual forb	0.6 AB	0.8 AB	0.2 B	0.4 AB	0.4 A
ARTRwyo <sup>2</sup>	12.0 B	13.5 B	9.9 B	11.1 B	16.8 A

<sup>1</sup> If the same letter follows the means of a functional group in different associations, there is no statistically significant difference in that functional group between those associations ( $p > 0.05$ ). If the letter following the functional group mean in one association does not follow the functional group mean in another association, then there is a statistically significant difference between them ( $p < 0.05$ ).

<sup>2</sup> ARTRwyo = Wyoming big sagebrush

**Table 2. Sagebrush alliance canopy cover requirements for sage-grouse habitat.**

Habitat	Sagebrush cover	Perennial grass cover	>18-cm-tall forb cover
Nesting	15–25%	15% or greater	10% or greater
Optimum brood-rearing	10–25%	15% or greater	10% or greater

Source: Bureau of Land Management, United States Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, and Oregon Division of State Lands. 2000. Greater sage-grouse and sagebrush-steppe ecosystem: management guidelines. August 21, 2000. p. 27.