

Scientific Information for Greater Sage-Grouse and Sagebrush Habitats

Overview

The U.S. Fish and Wildlife Service (USFWS) is conducting a status review and listing determination for the Greater Sage-Grouse. The U.S. Geological Survey (USGS), in collaboration with a consortium of scientists, is producing new scientific information about sage-grouse and sagebrush habitats. This information is being provided in a comprehensive scientific monograph that includes 25 chapters about greater sage-grouse, its population levels, habitat, and land-use effects.

Reasons for a New Listing Determination

In 2005, the USFWS determined that listing the Greater Sage-Grouse was not warranted under the Endangered Species Act. A 2004 conservation assessment for Greater Sage-Grouse and sagebrush habitats (produced by the Western Association of Fish and Wildlife Agencies) provided the scientific foundation for understanding range-wide conditions, trends, and threats for sage-grouse populations and habitats. The USFWS listing decision was challenged in Federal District Court, and the Court directed the USFWS to reconsider their listing determination. The USFWS expects to release a new determination in February 2010.

New, Comprehensive Scientific Monograph

Thirty-eight federal, state, university, and nongovernmental experts have collaborated to provide a comprehensive scientific understanding of Greater Sage-Grouse populations, sagebrush habitats, and relationships between sage-grouse, sagebrush habitats, and land use. The information will be published by the University of California Press in a peer-reviewed, scientific monograph. The monograph is a contribution to the series *Studies in Avian Biology*, managed by the Cooper Ornithological Society. USGS and Idaho Department of Fish and Game scientists are lead editors for the volume under the direction of the society.

Although the 2004 conservation assessment provided a foundation for this new effort, the monograph includes additional topics, incorporates updated data, uses new analytical techniques, and provides new results and information. Each chapter in the series has followed a

rigorous, scientific peer-review process prior to its acceptance by the Cooper Ornithological Society.

Although work on the monograph was initiated prior to the Court's decision, the monograph is recognized by the USFWS and the Court as the primary source of science for the new review and listing determination. Based on negotiated agreements, the USGS has provided copies of monograph chapters to the USFWS as chapters are accepted for publication. Twenty-three of 25 chapters have been provided, with the understanding that doing so does not waive proprietary rights to the information. All chapters will be posted on a USGS website once the entire set is accepted for publication.

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Monograph Findings

The Greater Sage-Grouse is a widely-distributed species presently occurring in 11 states and 2 provinces. Over 70% of the sagebrush habitats used by sage-grouse are public lands managed by federal or state agencies, often for multiple uses. Sage-grouse have undergone long-term population declines and now are absent from almost half of their estimated range prior to Euro-American settlement. The underlying cause for population declines is loss of suitable sagebrush habitat to meet seasonal requirements for food, cover, and nesting.

Greater Sage-Grouse Populations

Greater Sage-Grouse have large annual ranges that can exceed 1,000 square miles. Birds often make lengthy migrations (12-50 miles) between seasonal ranges. Large landscapes with sufficient sagebrush are necessary for sage-grouse conservation.

- A minimum of 88,816 male sage-grouse were counted on 5,042 leks (community breeding grounds) in 2007 in western North America. Using a population reconstruction, the Greater Sage-Grouse was estimated to be 320,000 males in the period 1965-1970. An example of a population reconstruction is presented in Figure 1.
- Model forecasts suggest that at least 4% of populations may decline below effective population sizes of 50 breeding adults within the next 30 years, whereas 78% of the populations may decline below effective population sizes of 500 breeding adults within 100 years if current conditions and trends persist.

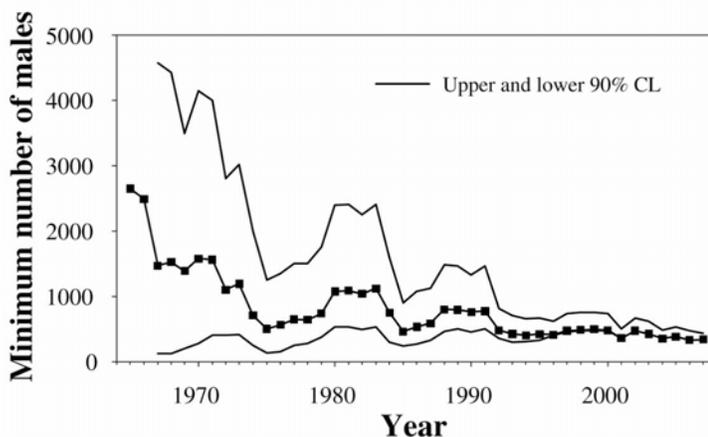


Fig.1. Population reconstruction for the Columbia Basin Management Zone from 1965 through 2007. This population has become isolated from any neighboring populations.

- Greater Sage-Grouse in the Columbia Basin (Washington) and the Mono Lake Basin (California and Nevada) show genetic evidence of isolation from populations in the core areas of the range. The largest populations and most important regions are primarily in the central portion of the sage-grouse range (see dark areas on Fig. 2)
- Declines in sage-grouse are primarily associated with loss of sagebrush due to fire, agriculture, or human development. The probability that a lek was abandoned between 1965 and 2007 increased by 12% for each square mile burned. Lek abandonment also increased with increases in a cumulative measure of human influence on the landscape, called the “human footprint.” The combination of multiple land uses may influence sage-grouse more than any single use (Fig. 3).
- Predation, disease, and hunter harvests cause sage-grouse mortality; however, there is little evidence they cause broad population effects.
- West Nile virus emerged as an important, new source of mortality in low- and mid-elevation Greater Sage-Grouse populations from 2003-2007. Small, isolated populations may be at greatest risk of significant reductions or extirpation if West Nile virus outbreaks occur.

Sagebrush

Sagebrush is the dominant land cover on more than 190,000 square miles within the sage-grouse range. Three subspecies of big sagebrush, two species of low sagebrush, and silver sagebrush are most important for Greater Sage-grouse. Altered fire regimes, exotic plant invasions, human development, and climate change are the primary stressors to sagebrush.

- Carrying capacity, the number of birds the habitat can support, declined at a rate of 2% to 12% per year in 44% of the populations modeled.
- Up to 65% of the sagebrush in some portions of the sage-grouse range could be converted to cheatgrass. Cheatgrass is a highly invasive exotic that increases the potential for fire by changing the dynamics of the plant community. As a result, fire has converted large landscapes to these exotic grasslands in low-elevation sagebrush communities. Number of fires and total area burned has increased in most parts of the sage-grouse range.
- At high elevations, decreased fire has permitted expansion of woodlands into sagebrush communities.

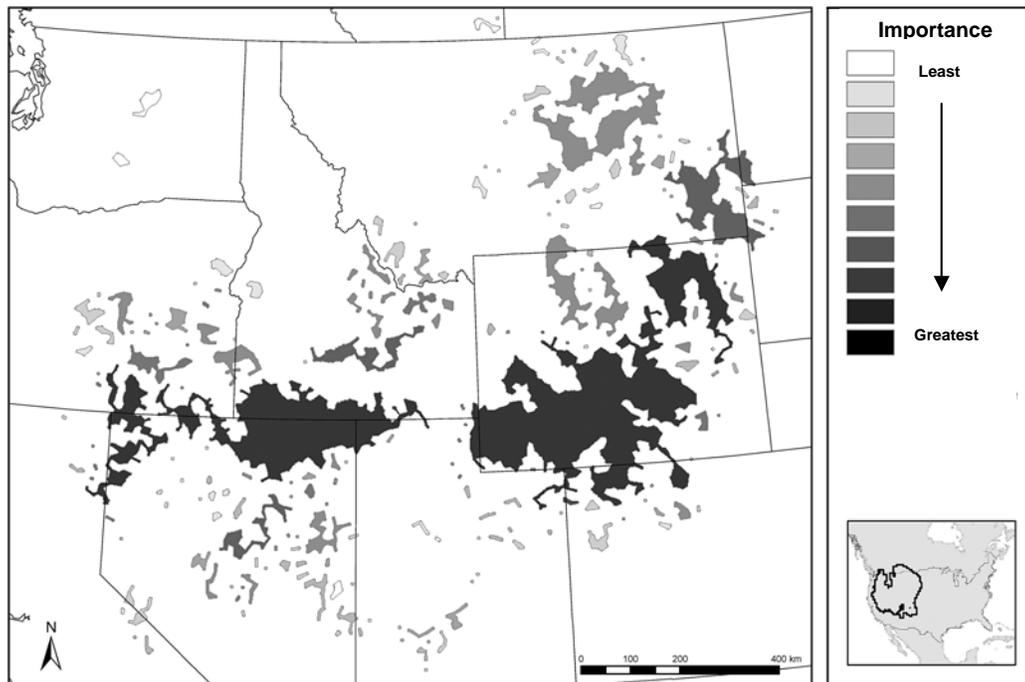


Fig. 2. Connectivity among sage-grouse leks within regions has declined and resulted in peripheral populations becoming increasingly isolated from core regions. The importance of a population for maintaining connectivity is a function of the number of male sage-grouse in the population and juxtaposition to other population centers.

- Agriculture covers 89,000 square miles of the sage-grouse range and primarily influences sage-grouse by removing or fragmenting habitat in the most productive areas.
- Oil and gas development influences 8% of sagebrush habitats, primarily in the eastern portion of the sage-grouse range.
- Human populations have increased up to 666% from 1920 to 2000 in some parts of the sage-grouse range. Over 8,400,000 people live within 3 miles of sagebrush. As infrastructure expands to support population growth, sagebrush is fragmented into small, isolated patches, ultimately making the landscape unsuitable for sage-grouse.
- Ninety-five percent of the sagebrush within the sage-grouse range is within 1.5 miles of a road. Roads can influence predator movements, introduce invasive species, increase wildfire potential from human activities, and exacerbate other factors that may adversely affect sage-grouse.
- With climate change, average temperatures could increase more than 6°C for much of the sage-grouse range. Only 20% of the current sagebrush would remain under the most extreme increase.

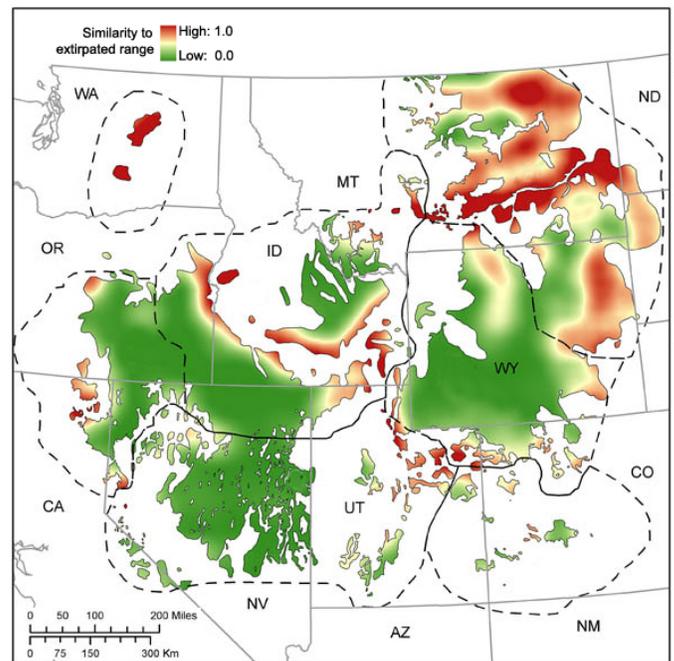


Fig. 3. Regions in which sage-grouse had been extirpated from their former range had lower amounts of sagebrush in the landscape, a higher proportion of agriculture, and more human development compared to regions still occupied by sage-grouse.

Ecology and Conservation of Greater Sage-Grouse: A Landscape Species and Its Habitats

Monograph chapters for publication in *Studies in Avian Biology* (Cooper Ornithological Society).

INTRODUCTION

- 1 Greater Sage-Grouse and sagebrush habitats: an introduction to the landscape. *Steven T. Knick and John W. Connelly*

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- 13 Ecological influence and pathways and land use in sagebrush. *Steven T. Knick, Steven E. Hanser, Richard F. Miller, David A. Pyke, Michael J. Wisdom, Sean P. Finn, E. Thomas Rinkes, and Charles. J. Henny*
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