USGS science for a changing world

USGS Western Ecological Research Center

# Research Profile

## Greater Sage-Grouse and the Sagebrush Ecosystem


### Are there management solutions that can successfuly balance multiple land use objectives for the sagebrush ecosystem?

An obligate of the sagebrush-steppe ecosystem of the Great Basin, the **greater sage-grouse** (*Centrocercus urophasianus*) is a candidate species for federal listing — one squarely at the intersection of **public land-use planning, rangeland use, and mineral and energy development**.

The **USGS Western Ecological Research Center** has a suite of ongoing research projects to inform federal and state management options for sage-grouse and sage-brush habitat. WERC scientists have been tasked by the Nevada Sagebrush Ecosystem Program, Nevada Department of Wildlife, and Bureau of Land Management to create **a comprehensive map of greater sage-grouse habitat throughout the State of Nevada**.

This map will be the backbone of land-use and resource management decisions for federal and state lands in Nevada, a tool showing government managers and public users where sage-grouse critical habitat is distributed — and where proposed developments could fragment sage-grouse habitat and breeding grounds, or impact sage-grouse behavior through physical or audible disturbances.

**The map effort is a synthesis of the wide scope of sagebrush ecosystem research that WERC scientists conduct:** conifer encroachment and cheatgrass invasions; sage-grouse movement patterns and ranges based on satellite telemetry studies; sage-grouse life history and reproductive ecology, based on nesting success surveys, vegetation surveys, and nest camera surveys on predator activity; sage-grouse habitat preferences, based on telemetry studies and visual observations.

This is just one example of how WERC delivers research findings and applied tools to resource agencies and community forums in Nevada and California — we help provide science for the changing world of sagebrush ecosystems.

### RESEARCH CONTACTS

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**Main Research Page**
http://www.werc.usgs.gov/sagegrouse

**Nevada Statewide Habitat Map**
http://www.werc.usgs.gov/nvsagemap

# WERC Greater Sage-Grouse Research


Steven Schwarzbach

## NEVADA STATE-WIDE MAP OF SAGEBRUSH HABITAT

Tasked by BLM and the State of Nevada, WERC is creating a state-wide map of sagebrush habitat in Nevada as a decision tool for land use planning. To create the map, WERC is collecting a suite of field data: 1) sage-grouse movement patterns and ranges based on satellite telemetry tracking studies; 2) sage-grouse life history and reproductive ecology, based on nesting success surveys, vegetation surveys, and predation studies; 3) sage-grouse microhabitat preferences and diet selection, based on telemetry studies and visual observations.


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## RENEWABLE ENERGY PLANNING

In addition to the state-wide habitat map, many other WERC projects are contributing science support to understand how energy development will interact with sage-grouse habitat selection, population trends, and movement patterns. WERC has monitored lekking activity to determine optimal buffer zones for surface use (SU) designations, and performed initial assessments of sage-grouse breeding ecology for baseline studies. WERC is also exploring the potential acoustic effects of industrial activity on sage-grouse behavior, and other unanswered questions related to sage-grouse-human interactions.


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## ADDITIONAL RESEARCH AREAS

**Advanced Tools:** Testing the use of aerial-based infrared thermal imaging to improve estimates of sage-grouse abundance.

**Wildfires and Invasives:** Studying the effects of invasive cheatgrass on sage-grouse habitat loss and population vital rates in Nevada, and the impacts of wildfire on sage-grouse population demography and habitat availability.

**Climate and Drought:** Conducting a long-term evaluation of climatic variation effects on sage-grouse population vital rates, to assess implications for landscape management in future periods of drought.

**Conservation Planning:** Applying sage-grouse space-use data and models to help the State of Nevada Sagebrush Ecosystem Program develop conservation credits. Contributing additional analyses and genetic studies on Bi-State sage-grouse to inform federal listing considerations, and developing a spatially-explicit integrated population model as a planning tool.


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## CPT-CONIFER MANAGEMENT MAP

WERC research confirmed that sage-grouse with broods avoided areas with pinyon and juniper trees, and prefer areas with increased perennial forbs and meadow edge — areas where hens had higher brood survival probabilities. Assessing the distribution and encroachment of conifers is therefore critical to understanding the dynamic changes in the sagebrush biome. Partnering with universities and state agencies, WERC is mapping conifers to create a 1-meter resolution map as a tool for resource managers in California and Nevada, and as a critical GIS layer within habitat maps for state-wide projects.


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## EFFECTS OF HUMAN STRUCTURES AND SUBSIDIZED PREDATORS

Common ravens are a major predator of greater sage-grouse, and WERC research has demonstrated that ravens prefer to nest at habitat edges associated with direct human disturbance, and that structures like transmission lines increase the likelihood of raven nests. WERC research continues to assess the relationship between habitat disturbance versus trends in predators and grouse population vital rates, studying the stress response of grouse to man-made structures, and using nest camera videos and field surveys to study predator effects on sage-grouse population dynamics.

WERC partners in greater sage-grouse research include: public and private community members • Idaho Department of Fish and Game • State of Nevada Sagebrush Ecosystem Program • Nevada Department of Wildlife • Nevada Department of Conservation and Natural Resources • California Department of Fish and Wildlife • University of California, Davis • University of Nevada, Reno • University of Idaho • Idaho State University • Wildlife Conservation Society • BLM • U.S. Fish and Wildlife Service • U.S. Forest Service • USGS Forest and Rangeland Ecosystem Science Center • USGS Fort Collins Science Center

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