

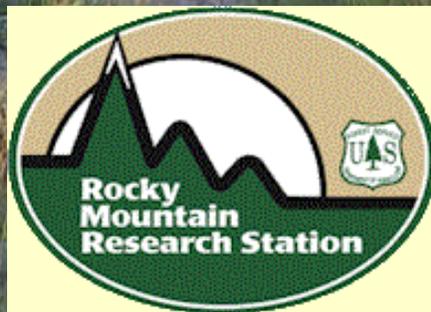


# Sage-grouse and Sagebrush Threats

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USDA Forest Service

Rocky Mountain Research Station





## Sage-grouse Depend on Sagebrush

Healthy sagebrush provides shelter and forage for a host of species, many of which are dependent on it

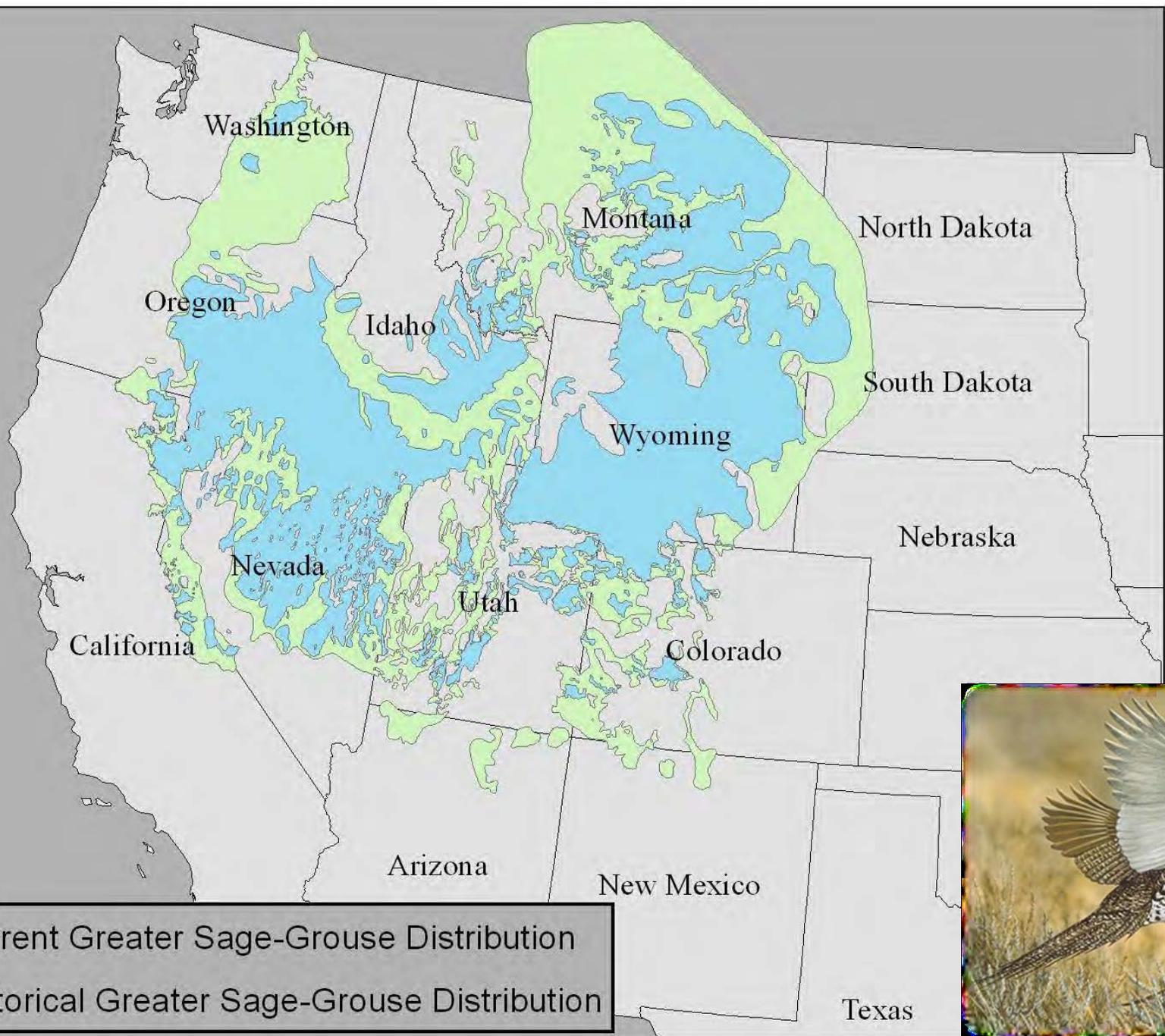
# What is the Scope?

## Threats to Sagebrush Ecosystems

- ▶ Threats identified for sage-grouse are the same for all sagebrush obligate species and ecosystems
- ▶ Species population and direct habitat threats
  - Persistent ecosystem threats
  - Anthropogenic threats
- ▶ Climate change

(USFWS 2013 Conservation Objectives Team Report – Table 2)

| Threats                        |
|--------------------------------|
| Isolated/Small Population Size |
| Sagebrush Elimination          |
| Wildfire                       |
| Conifer Expansion              |
| Weeds/Invasive Grasses         |
| Agricultural Conversion        |
| Energy Development             |
| Mining                         |
| Infrastructure                 |
| Improper Livestock Grazing     |
| Free-Roaming Equids            |
| Recreation                     |
| Urbanization                   |
| Climate Change                 |



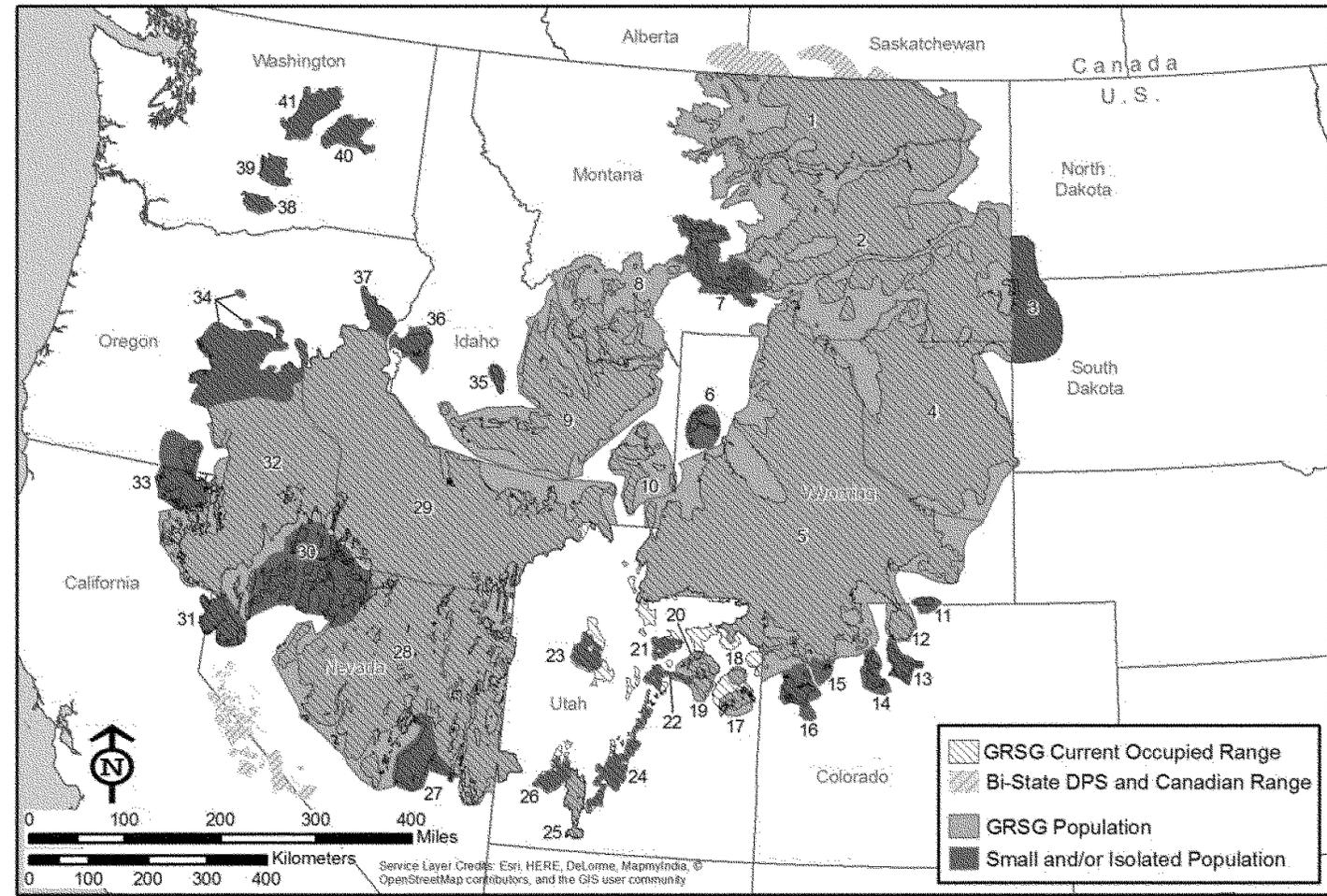
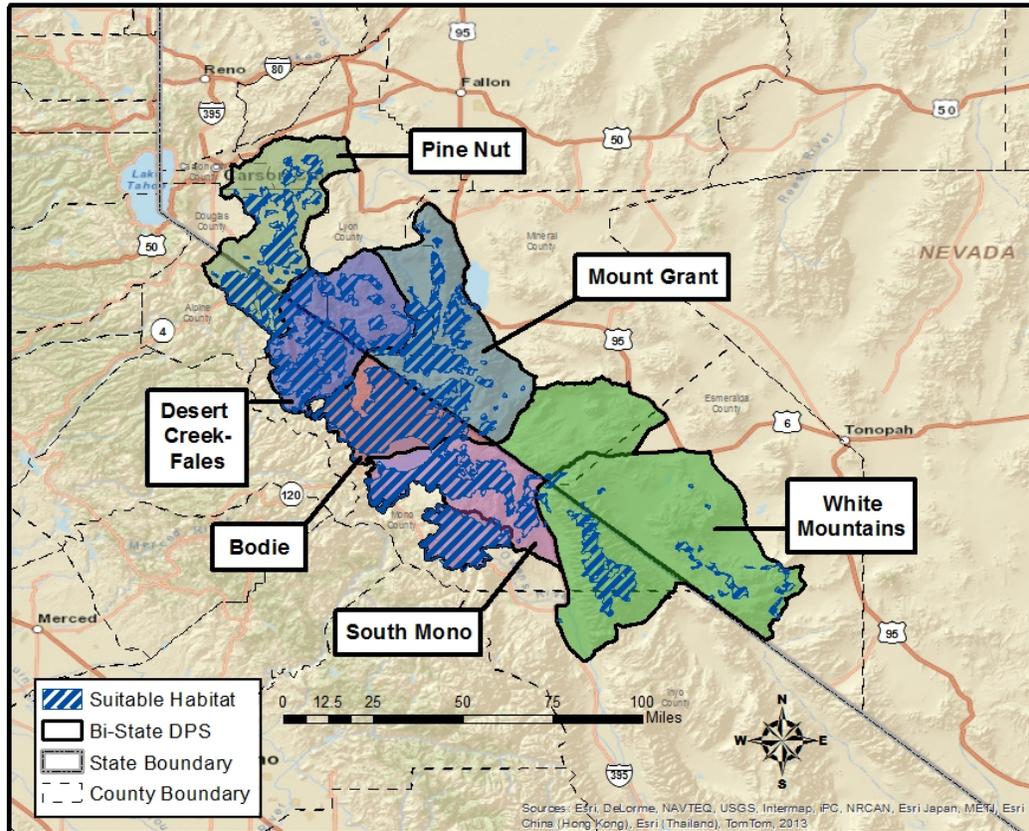


Figure 9. Sage-grouse populations identified as ‘small’ and/or ‘isolated’ in the Conservation Objection Team Final Report (USFWS 2013, pp. 16–29). For the purposes of the status review, Ibapah (UT) and Hamlin Valley (UT) were joined with the rest of the southern Great Basin population.

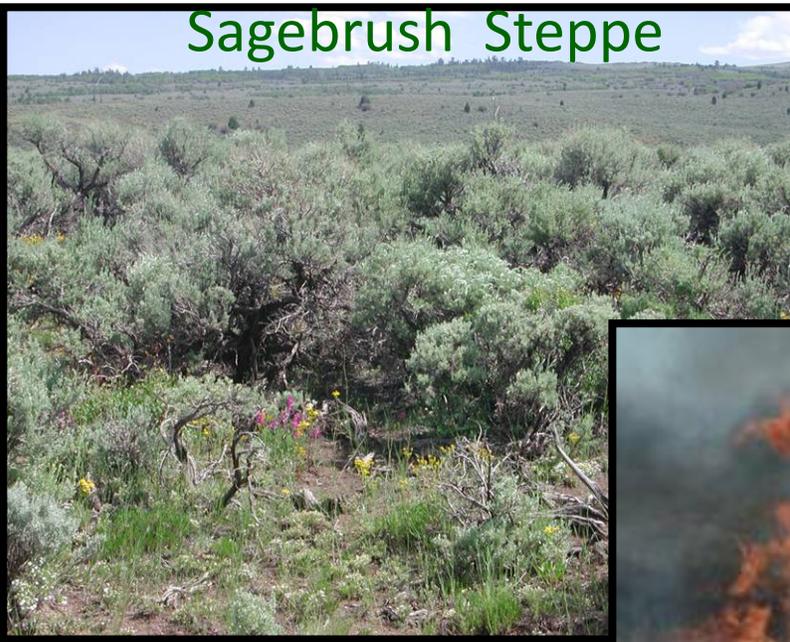


Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

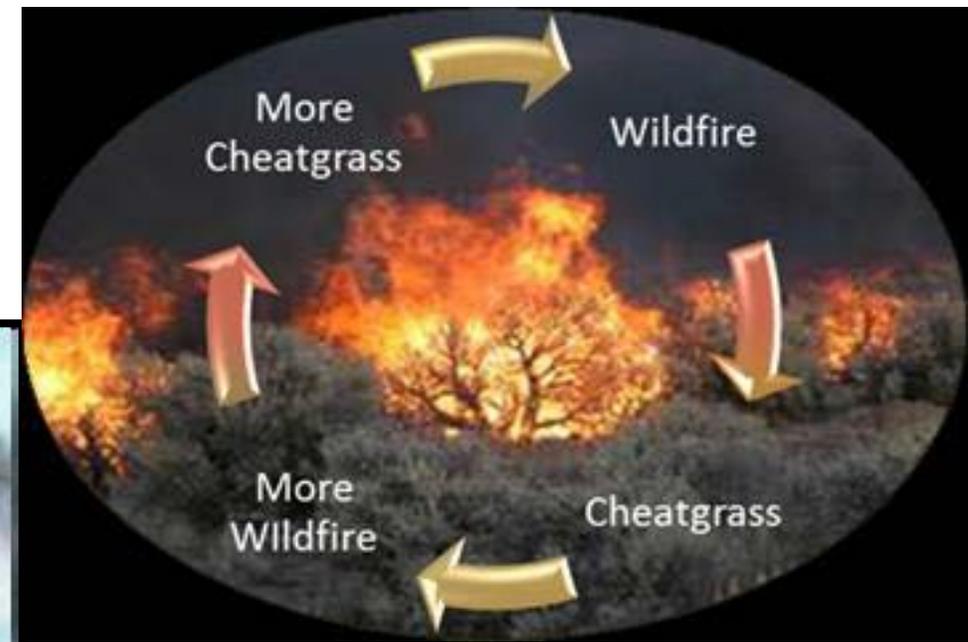
# Invasive Species

Invasive grasses like cheatgrass and medusahead can alter native plant communities, replace native plants and interfere in natural succession. They also make sagebrush ecosystems prone to more fires and more intense fires.

Sagebrush Steppe



# The Problem



Cheatgrass Monoculture



Fire is one of the primary factors linked to loss of sagebrush habitat. The increase in large and frequent fires in the sagebrush ecosystems has largely been caused by encroachment of nonnative annual grasses, such as cheatgrass and medusahead.

# Controlling Annual Bromes

- Biocontrol – Most cost-effective
  - Less damaging than herbicides
- Mechanical – Mowing, Cultivation / Disking
- Burning – Timed to reduce seed production
- Chemical - Variety of herbicides can work, can damage natives
- Cultural control
  - Grazing timed to reduce seed production
  - Competitive native plant species



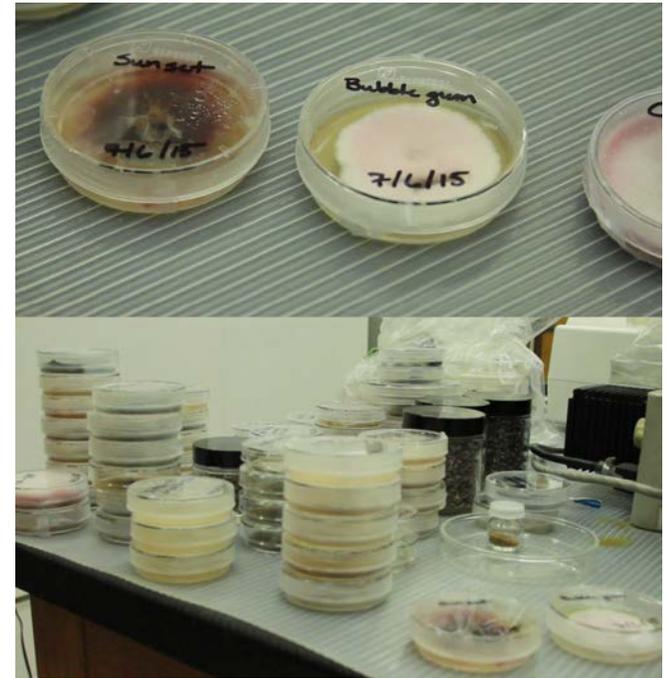
Bluebunch Wheatgrass,  
Native species

# In Search of a Biocontrol Agent

- Fungal pathogens
  - “Black Fingers of Death” – patent request
  - Head Smut *Ustilago bullata* Berk
  - Chestnut bunt pathogen *Tilletia bromi*
  - Fusarium seed rot pathogen (*Fusarium* Link sp.)
  - Rutstroemiaceae pathogen
- ACK55 bacteria (*Pseudomonas fluorescens*)
  - MB 906 Soil amendment – BioWest
- Evaluation of cheatgrass die-off mechanism



**Black Fingers of Death**  
(*Pyrenophora semeniperda*)



Fire can move quickly through the sagebrush ecosystem, especially when it has already burned

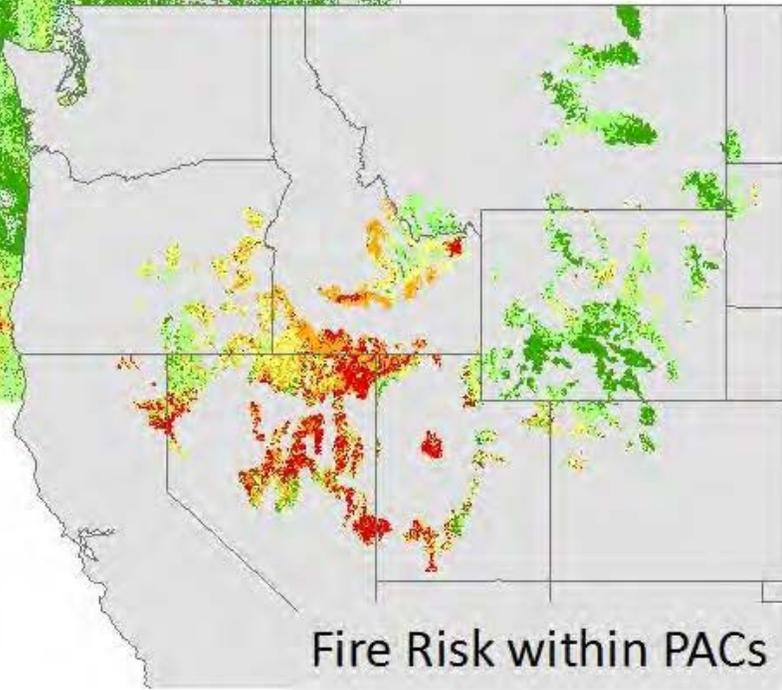
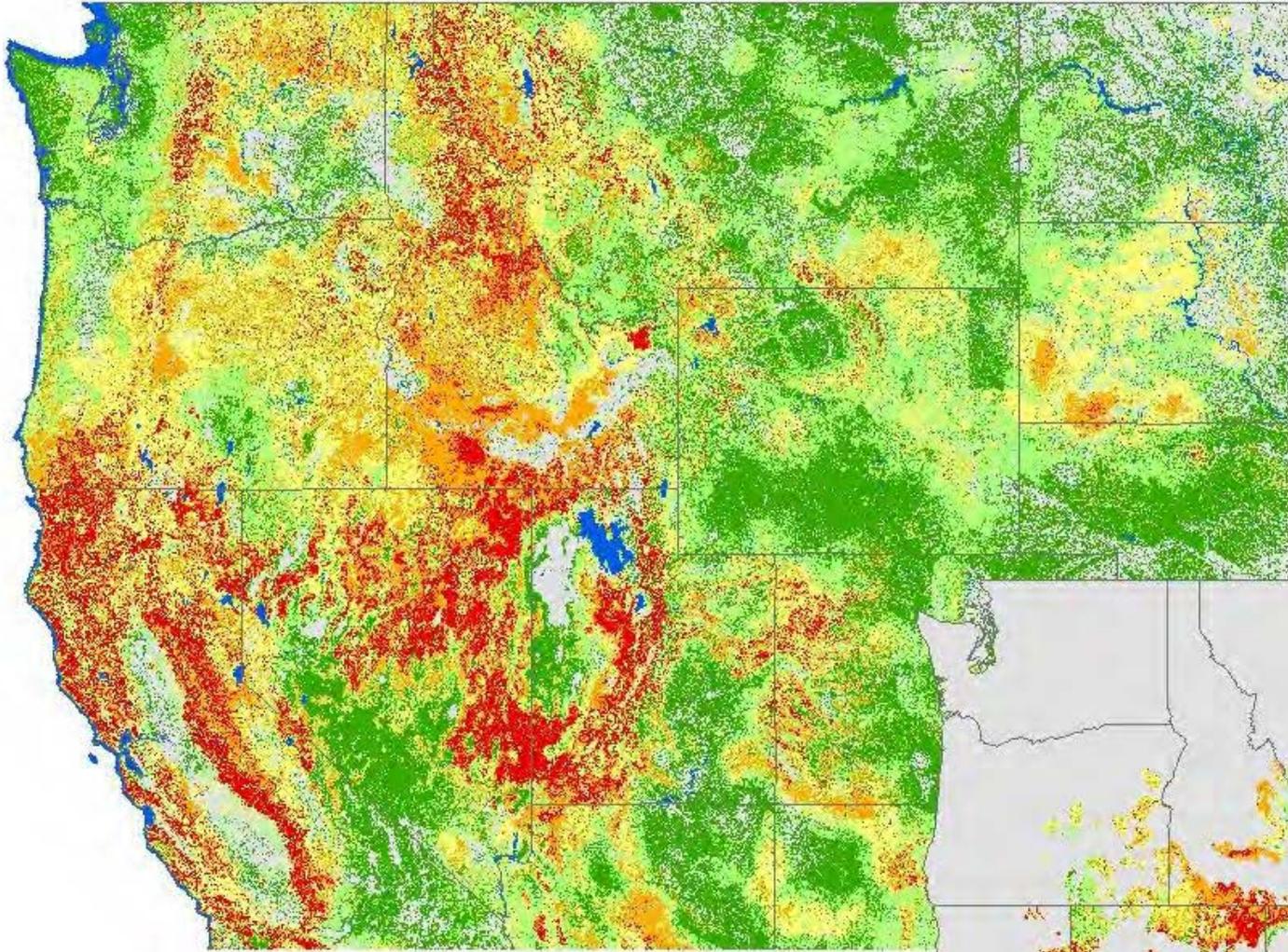


# Soda Fire

In 2015, the Soda Fire burned over 280,000 acres—over 40 square miles—in sage grouse habitat on BLM, Private, and State lands. It showed how quickly a blaze can burn in the sagebrush ecosystem. Structures were threatened and homes were evacuated. Over 200 wildland firefighters worked on the fire in Idaho and Oregon.



Photo credit: Hugo Sindelar



# Fire Risk

Fire Risk within PACs

Fire breaks are one way to slow fire down.



# Burn Management Plans



Rehabilitate/Restore



Be careful with  
seed mixes



# Rangeland Fire



THE SECRETARY OF THE INTERIOR  
WASHINGTON

ORDER NO. 3336

Subject: Rangeland Fire Prevention, Management and Restoration

**Sec. 1 Purpose.** This Order sets forth enhanced policies and strategies for preventing and suppressing rangeland fire and for restoring sagebrush landscapes impacted by fire across the West. These actions are essential for conserving habitat for the greater sage-grouse as well as other wildlife species and economic activity, such as ranching and recreation, associated with the sagebrush-steppe ecosystem in the Great Basin region. This effort will build upon the experience and success of addressing rangeland fire, and broader wildland fire prevention, suppression and restoration efforts to date, including the National Cohesive Wildland Fire Management Strategy, and ensure improved coordination with local, state, tribal, and regional efforts to address the threat of rangeland fire at a landscape-level.

**Sec. 2 Background.** The Department of the Interior is entrusted with overseeing the management of Federal lands for the benefit of current and future generations as well as the protection and recovery of imperiled species of flora and fauna and the ecosystems upon which they depend. Rangeland fires in the Great Basin of the Western United States have increased in size and intensity in recent years. The accelerated invasion of non-native annual grasses, in particular cheatgrass and medusahead rye, and the spread of pinyon-juniper across the sagebrush-steppe ecosystem, along with drought and the effects of climate change, have created conditions that have led to the increased threat of rangeland fires to the sagebrush landscape and the more than 350 species of plants and animals, such as mule deer and pronghorn antelope, that rely on this critically important ecosystem. As a result, the increasing frequency and intensity of rangeland fire also poses a significant threat to ranchers, livestock managers, sportsmen, and outdoor recreation enthusiasts



## AN INTEGRATED RANGELAND FIRE MANAGEMENT STRATEGY



*Final Report to the Secretary of the Interior*

*May 2015*

# Juniper and Pinyon Expansion



Human fire suppression has helped juniper take over sagebrush ecosystem areas.

Photo credit: Oregon State University



United States  
Department of  
Agriculture  
Forest Service  
Rocky Mountain  
Research Station  
General Technical  
Report RMRS-GTR-322  
June 2014

## A Field Guide for Selecting the Most Appropriate Treatment in Sagebrush and Piñon-Juniper Ecosystems in the Great Basin

Evaluating Resilience to Disturbance and Resistance to Invasive Annual Grasses, and Predicting Vegetation Response

Richard F. Miller, Jeanne C. Chambers, and Mike Pellant

Warm and dry  
Wyoming big  
sagebrush—  
Invaded State

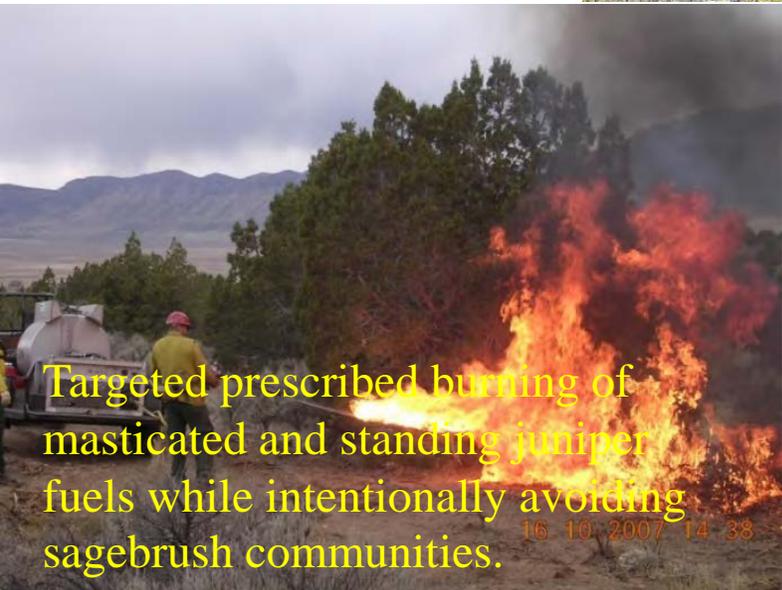


Cool and dry  
mountain big  
sagebrush—  
Reference State





Conifer expansion in the Big Horn Basin of the Cold Desert (MZ II). Photo by T. Christiansen.



Targeted prescribed burning of masticated and standing juniper fuels while intentionally avoiding sagebrush communities.

16 10 2007 14 38



Conifer mastication using a bobcat



Hand removal of conifers using a chainsaw

In the northeast part of sage grouse range, 70% of the best habitat is privately owned. A major threat in this region is cultivation of native sagebrush rangelands.



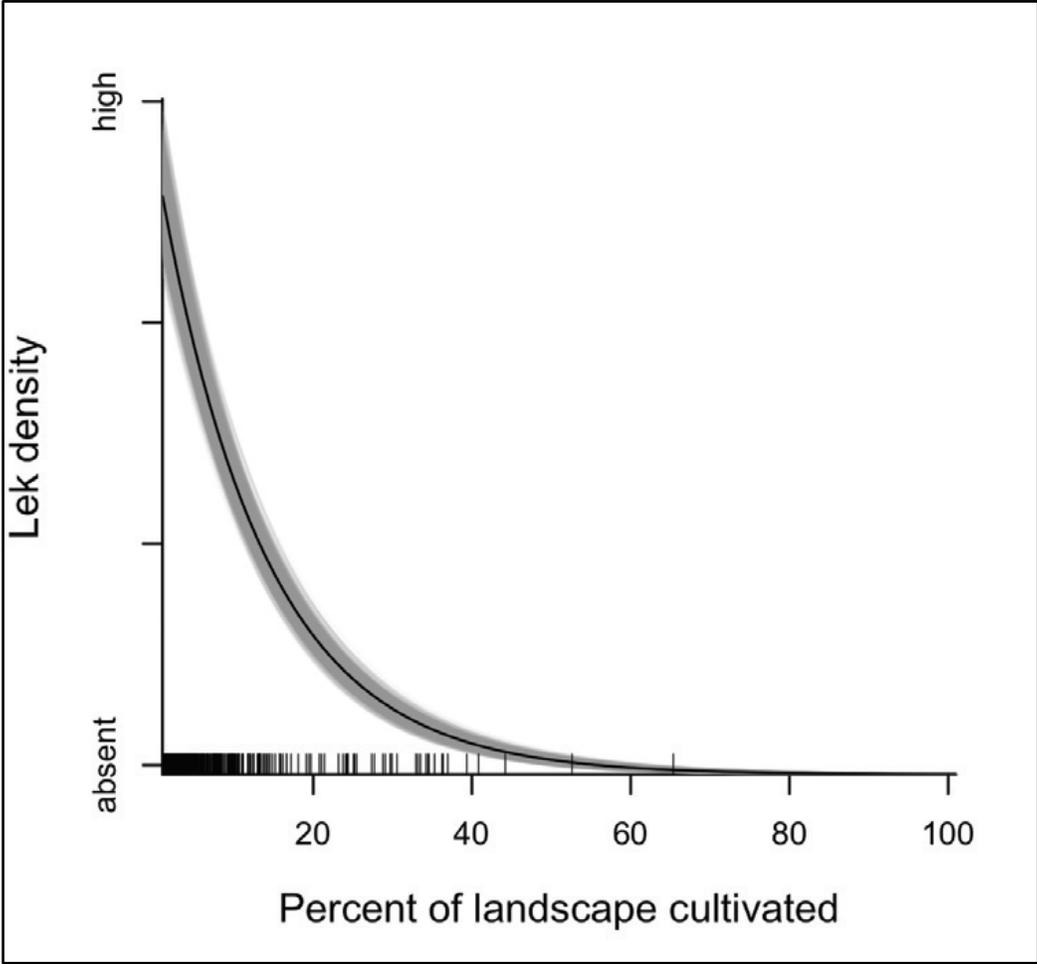
*Sustainable grazing can help to conserve sagebrush, sage grouse and western ways of life. Photo: Linda Poole.*



*Cultivation for wheat production (foreground) impacts ranching and sage grouse. Photo: Conservation Media*

Univ. MT/TNC scientists assessed lands in eastern MT, the western Dakotas, and northeast WY to evaluate potential impacts to sage grouse if more land is converted from sagebrush to crops.

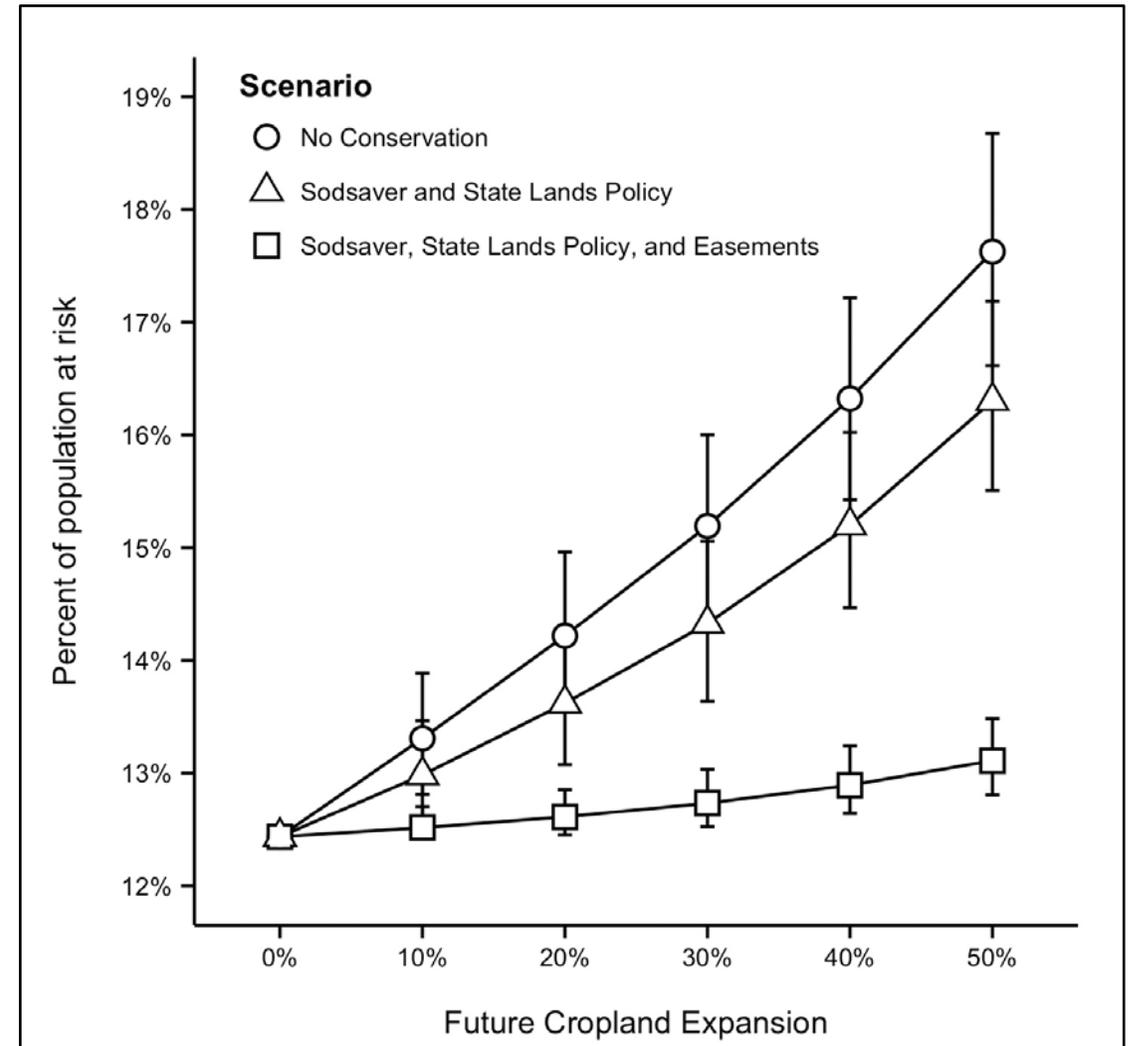
For each ten percentage point increase in cropland, scientists estimate an associated 54% decrease in lek density.



*Rapid decline in active sage grouse leks is predicted with increasing amount of landscape in cultivation.*

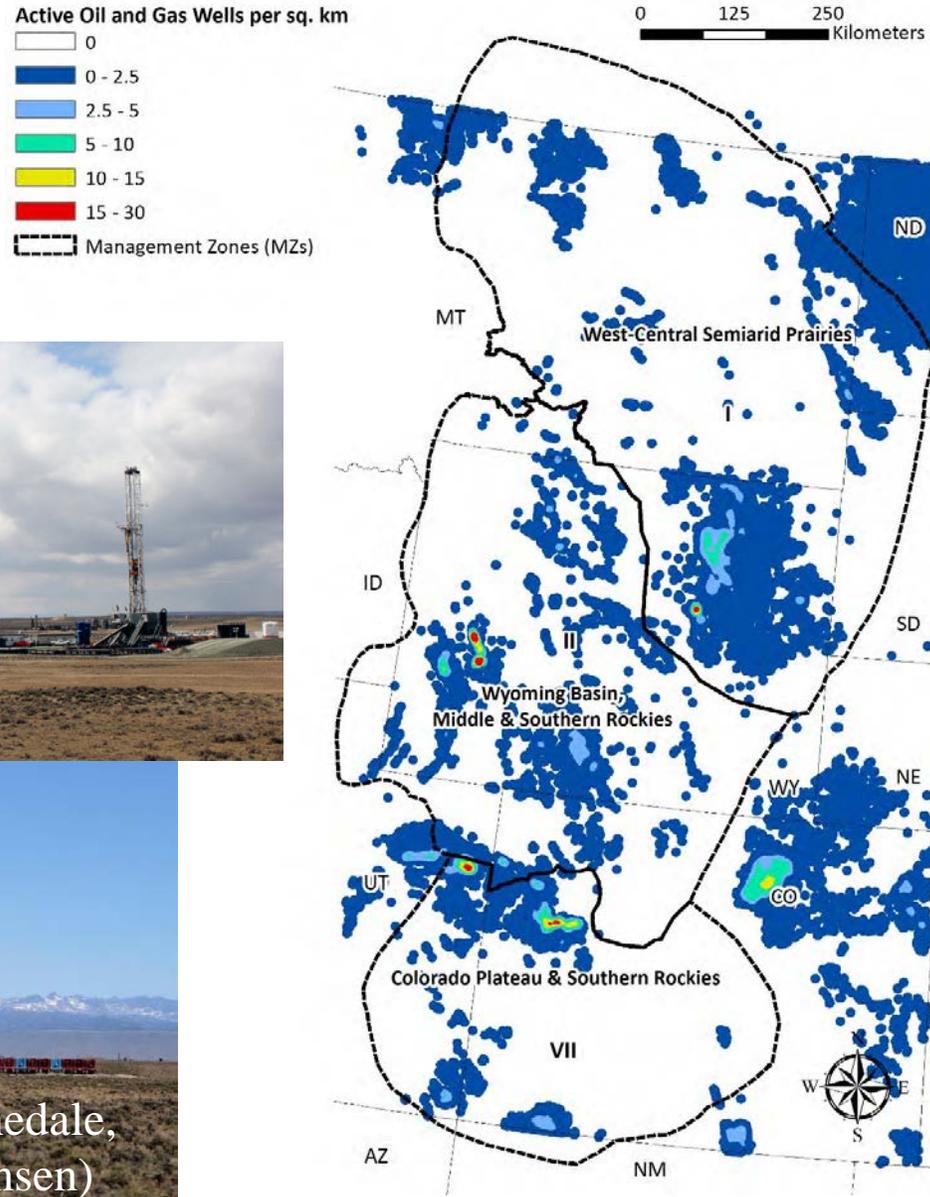
Scientists then found solutions by evaluating the roles of state and federal policies as well as conservation easements to mitigate risk to sage grouse.

Together, the Sodsaver policy in the 2014 Farm Bill, proposed policies on state lands, and a \$146 million easement investment can reduce by 87% the bird losses that would have occurred without these conservation measures in place.



Sage Grouse Initiative. 2015. Reducing cultivation of grazing lands conserves sage grouse. Science to Solutions Series Number 8. Sage Grouse Initiative. 4pp. <http://www.sagegrouseinitiative.com/>.

The number of active oil and gas wells per square kilometer (IHS; BLM (AFMSS)) within Management Zones I, II and VII (USFWS).



Well pad (photo by K. Henke).



Deep gas drill rig outside of Pinedale, Wyoming (photo by T. Christiansen)



# Livestock Grazing

Fencing

Timing of Pasture Use

Watering facilities

Treatments to increase livestock forage

Targeted grazing to reduce fine fuels





# Free-roaming Equids

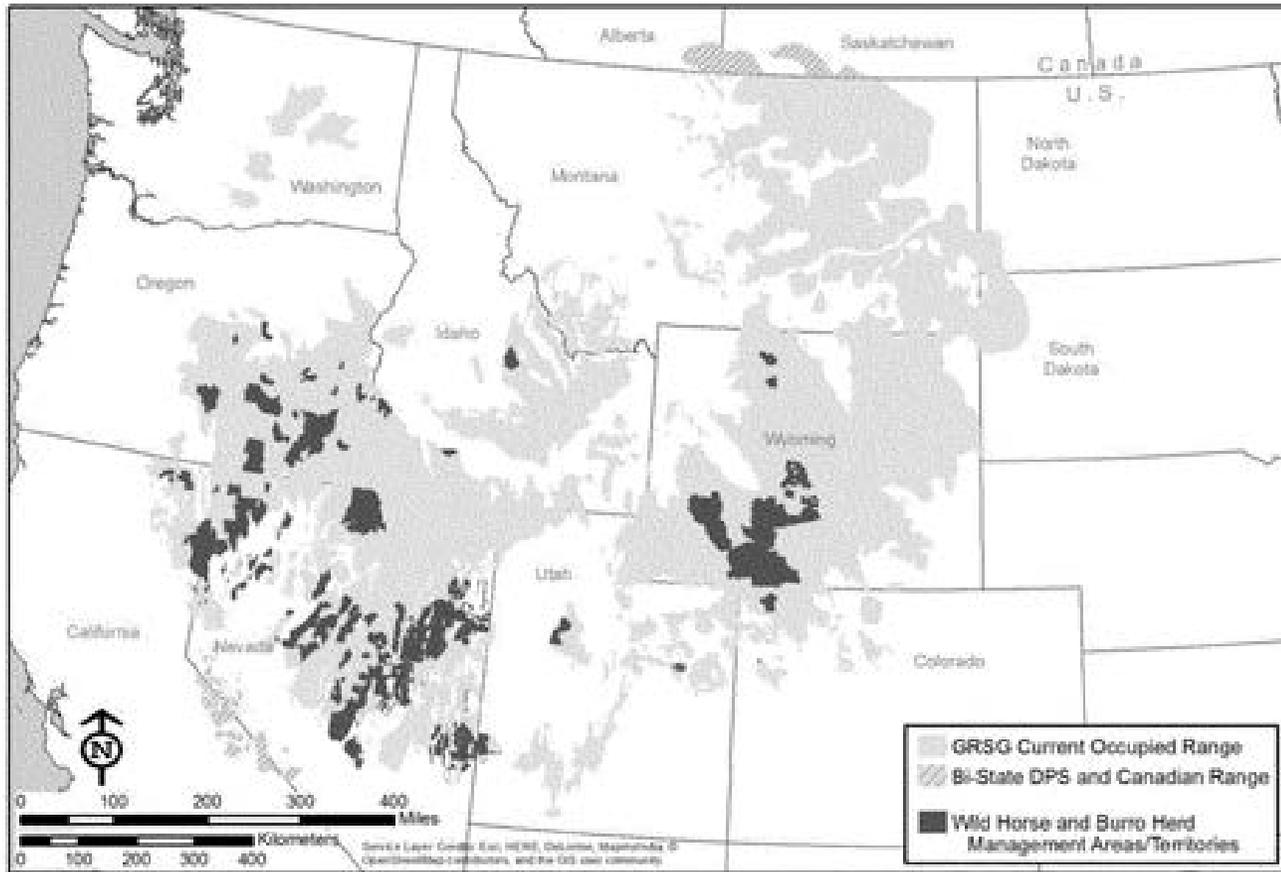


Figure 8. Free-roaming Equid Management Areas within the sage-grouse occupied range.





Kilometers of Roads per sq. km



0 125 250 Kilometers

# Infrastructure

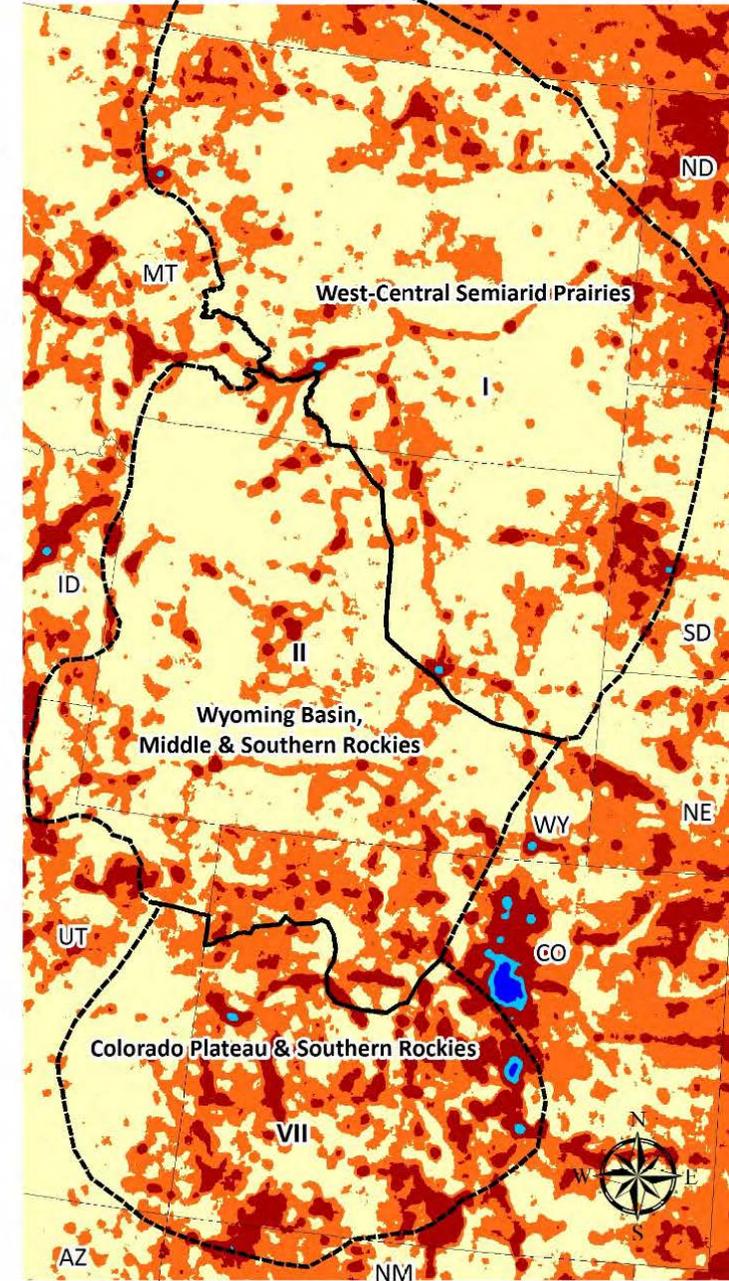
The density of all roads (surface roads, major roads, and interstate highways; ESRI Street Map Premium) in kilometers per square kilometer within Management Zones I, II and VII (USFWS).



KRISTY HOWE



Photo: Jesse Roberts, www.conservationsmedia.com

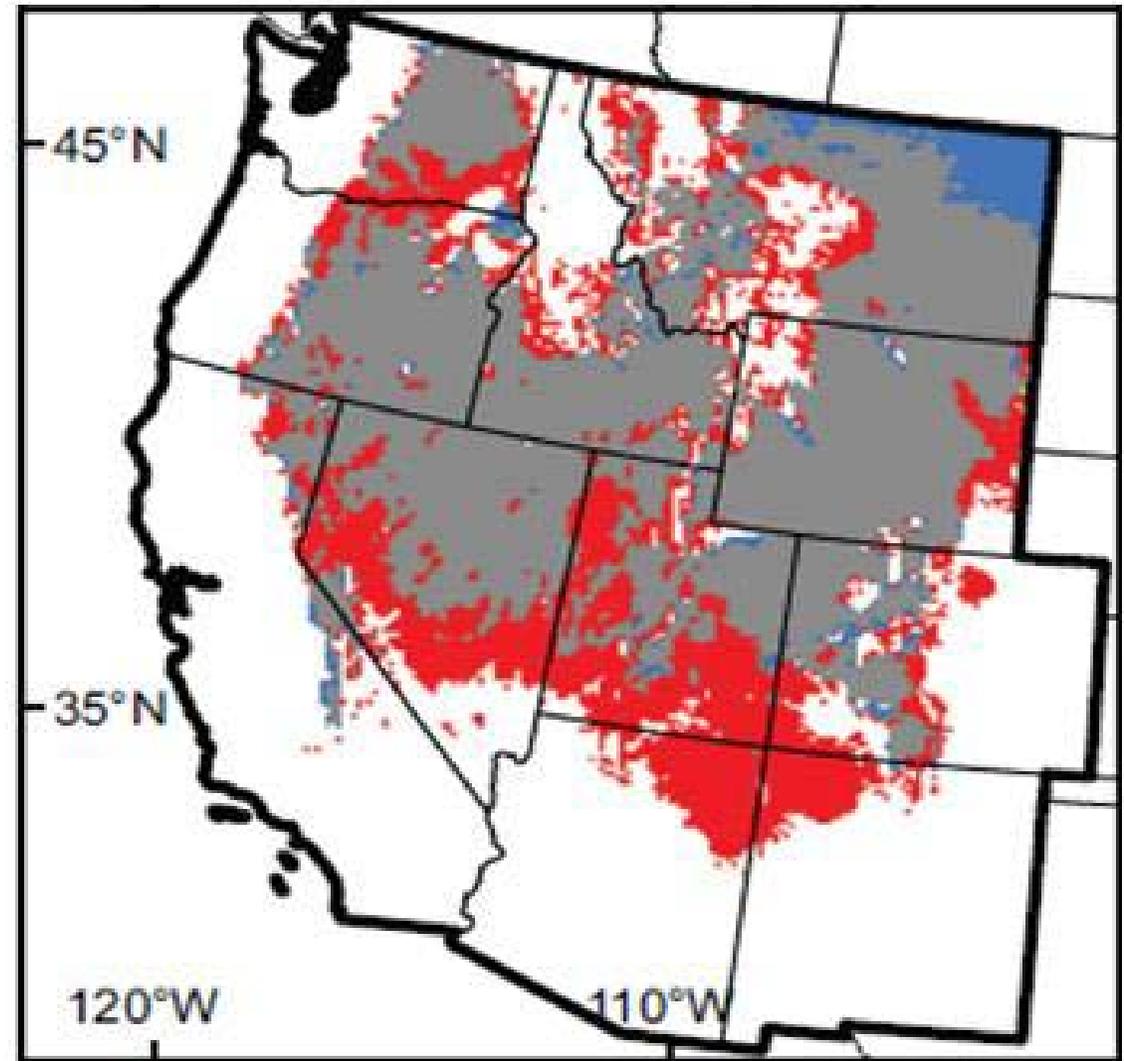


# Urbanization



## Management Implications of Climate Change

- Seed germination is unlikely to change at either the leading or trailing edge.
- Seedling survival is expected to decrease at the trailing edge while increasing at the leading edge.
- Actions to enhance seedling survival would be beneficial at both the leading and trailing edges.



The future sagebrush distribution leading edge is represented in blue and the future trailing edge is represented in red. *Image from: Schlaepfer et al 2012.*

# BLM and USFS Conservation Plans

**Unprecedented Coordination** – The planning involves coordination between the BLM and the USFS, which manage nearly 2/3's of remaining sage grouse habitat; state agencies which make decisions affecting state and private lands; the NRCS which provides technical assistance for conservation on private lands; and FWS which supports habitat protection and conservation of the species.

These plans influenced the FWS 2015 decision not to list Greater Sage-Grouse.

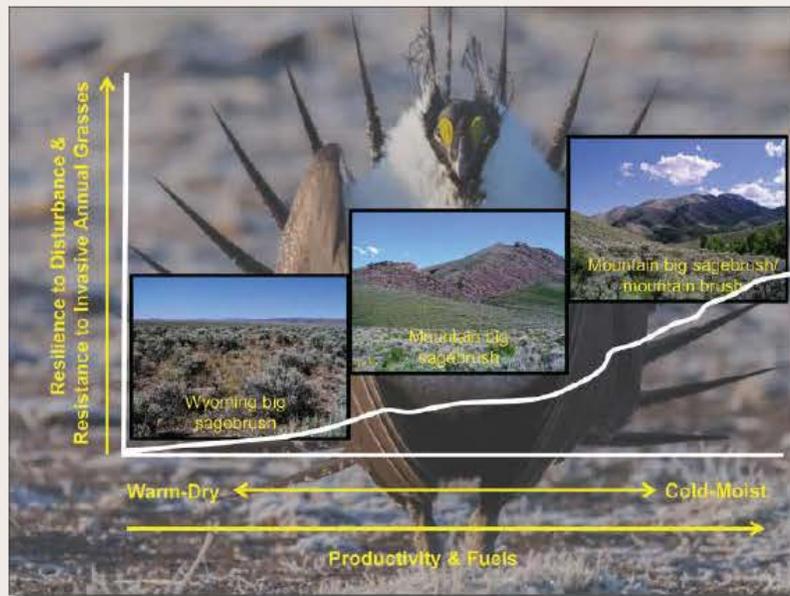


# The Science Basis - Resilience and Resistance



## Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach

Jeanne C. Chambers, David A. Pyke, Jeremy D. Maestas, Mike Pellant, Chad S. Boyd, Steven B. Campbell, Shawn Espinosa, Douglas W. Havlina, Kenneth E. Mayer, and Amarina Wuenschel



## WAFWA Fire and Invasives Working Group –

- ▶ Developed scientific basis to
  - Prioritize areas for management in western portion of range
  - Determine best management strategies at local scales
- ▶ Incorporated approach into
  - Subregional EISs
  - BLM IM 2014-134 (FIAT)
  - DOI SO 3336 (Rangeland Fire Prevention, Management & Restoration -1/2015)
- ▶ Developing similar approach for eastern portion of range (SMRRT)

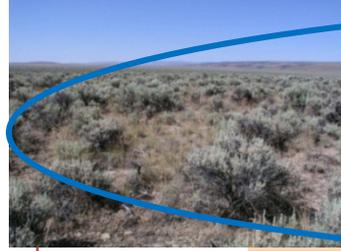
## Three Key Concepts

1. Resilience to disturbance and resistance to invasive annual grasses (R&R) differ along environmental gradients and among sagebrush types
2. Landscape sagebrush cover is closely related to Sage-Grouse population persistence
3. Areas that support viable populations of Sage-Grouse are focal areas for management
  - Population densities and habitat use



# SAGE-GROUSE HABITAT MATRIX

## Proportion of Landscape Dominated by Sagebrush

|   |  | Low = < 25%  | Medium = 25-65%  | High = > 65%                      |
|---|--|--|--|-----------------------------------|
| Resilience & Resistance of Sagebrush Community                                      |   | <p><b>RESTORATION/RECOVERY POTENTIAL HIGH</b><br/> <i>Native grasses and forbs sufficient for recovery</i><br/> <i>Annual invasive risk low</i></p>  |  |                                   |
|   | <b>High</b>  | Requires longer timeframe, enhance connectivity.   | Little intervention needed, enhance connectivity.                      | Little-to-no intervention needed. |
|   |   | <p><b>RESTORATION/RECOVERY POTENTIAL INTERMEDIATE</b><br/> <i>Native grasses and forbs usually adequate for recovery</i><br/> <i>Annual invasive risk moderate</i><br/> <i>Treatment success depends on site characteristics</i></p> |  |                                   |
| <b>Moderate</b>   | Requires longer timeframe and intervention.  | Enhance connectivity, minimize risk of invasives.  | Little intervention needed, minimize risk of invasives.                |                                   |
|  | <p><b>RESTORATION/RECOVERY POTENTIAL LOW</b><br/> <i>Native grasses and forbs inadequate for recovery</i><br/> <i>Annual invasive risk is high</i><br/> <i>May require multiple management interventions</i></p> |  |  |                                   |
| <b>Low</b>  | Recovery unlikely.   | Long timeframe for recovery, high amount of intervention.  | Moderate timeframe for recovery, moderate-high amount of intervention. |                                   |