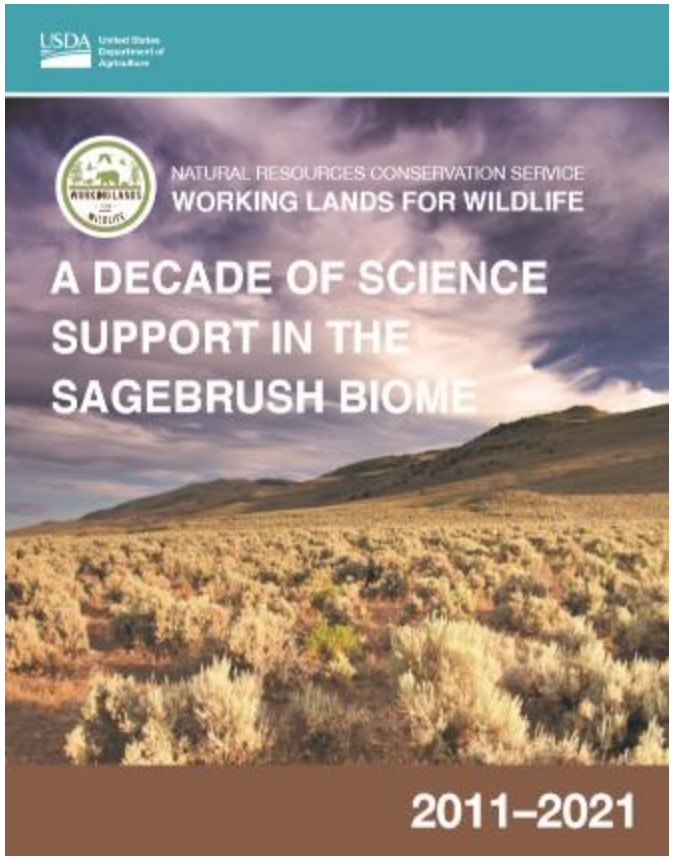
USDA United States Department of Agriculture



Huge thanks….

NRCS Leadership

WLFW Group

Outcomes Team (CEAP)

Communications folks

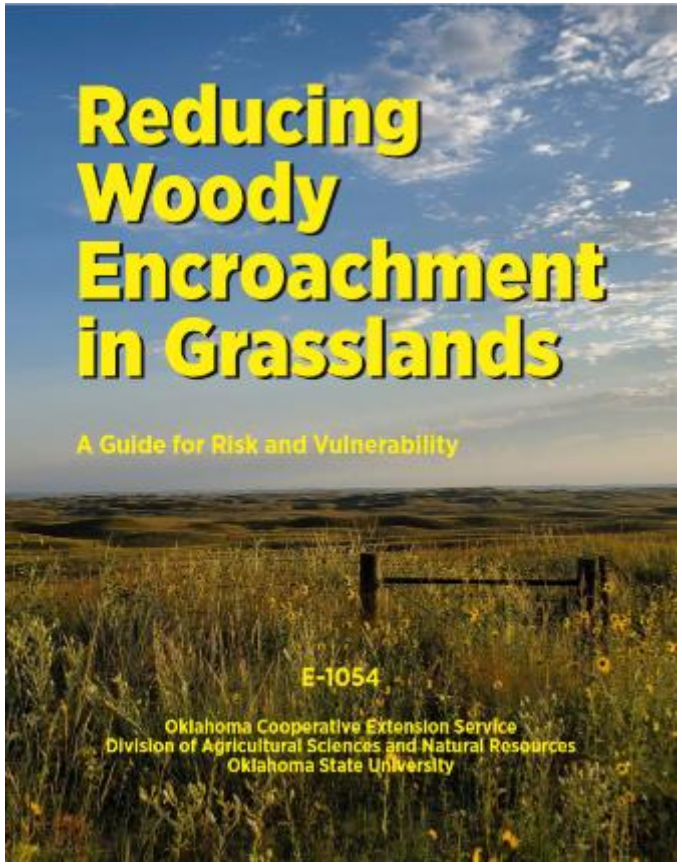
& more

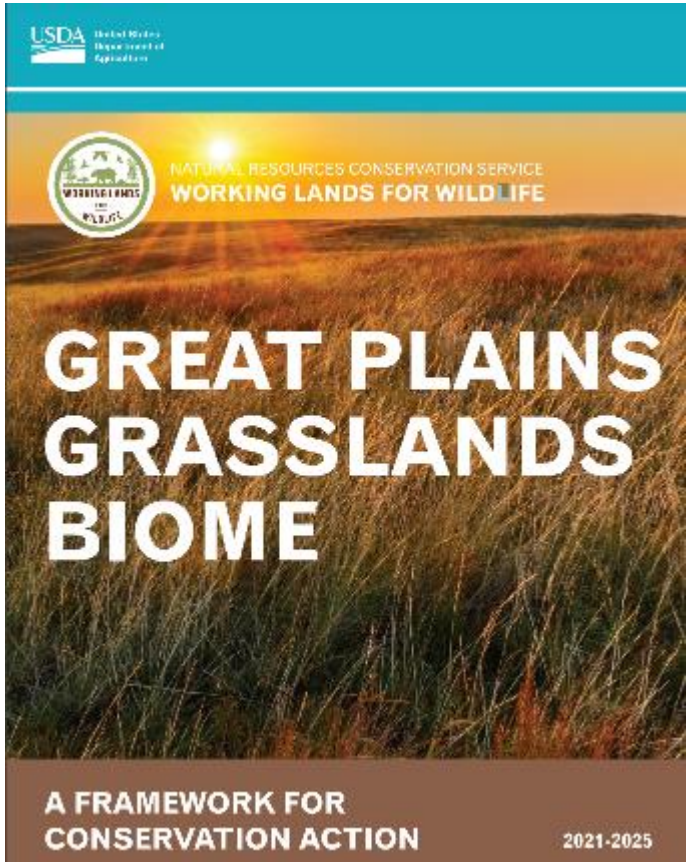
A Decade of Science Support in the Sagebrush Biome

Dave Naugle, Professor, University of Montana, and NRCS Science Advisor, Working Lands for Wildlife

Natural Resources Conservation Service

nrcs.usda.gov





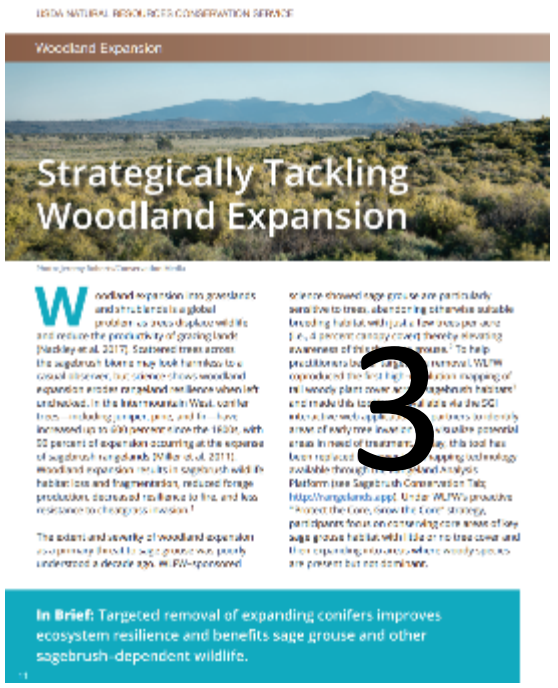
Similar Science Support for Great Plains Framework

How to Use this Synthesis

1. Audience is NRCS in inform project development & regulatory partners to credit voluntary conservation
2. Access @ https://doi.org/10.32747/2021.7488985

USDA National Agricultural Library Digital Collections
U.S. DEPARTMENT OF AGRICULTURE

3. Narrative for science that underpins your work
    * One-stop shopping
    * Use to improve projects and proposals
    * Cut/paste into regulatory documents
4. Citations to read for yourself
5. Related readings to learn more

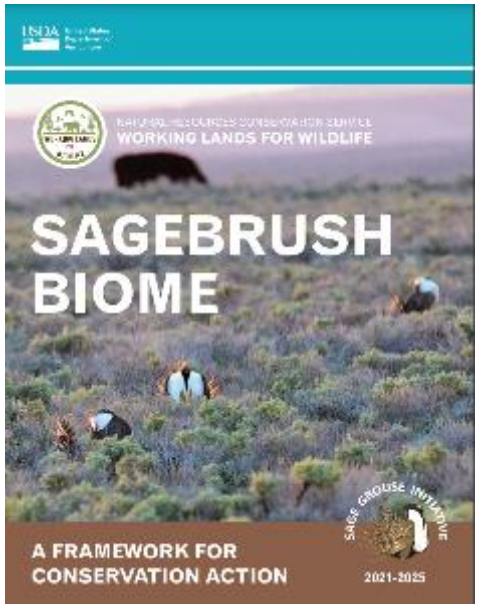


Unwavering Shared Vision

Wildlife Conservation Through Sustainable Ranching

2010

2015



Today

Durability is rare in Conservation

SGI Contract Numbers 2010-20

2,366 Ranchers enrolled

8,579,050 Acres conserved

The secret ingredient to achieving durability is….

A joint and singular focus on a common goal

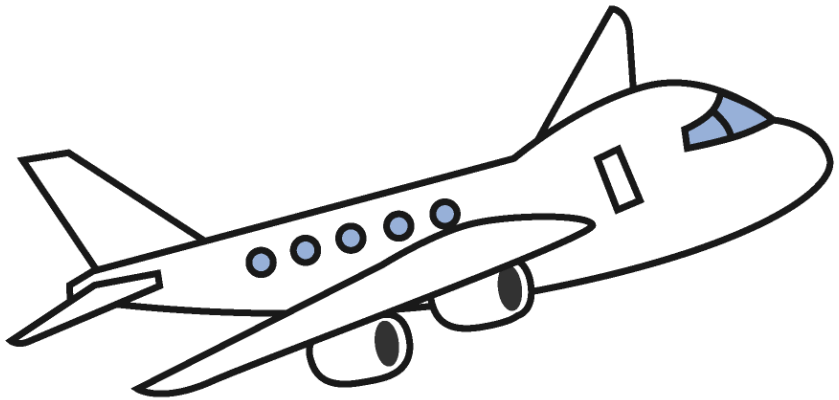
Rangeland sustainability

Today's presentation

1. 21st Century Technologies
2. Land-use Conversion
3. Woodland Expansion
4. Riparian / Wet Meadows
5. Annual Grasses
6. Domestic Livestock Grazing

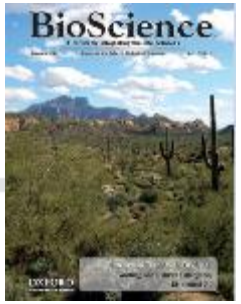
By the numbers…

- 61 peer-reviewed publications
- Works cited >1,200 times + 43 times in Federal Register



Coproduction & Outcomes

- ✓ Scientists embedded with NRCS staff
- ✓ Findings apply directly to Farm Bill implementation



Professional Biologist

Coproducing Science to Inform Working Lands: The Next Frontier in Nature Conservation

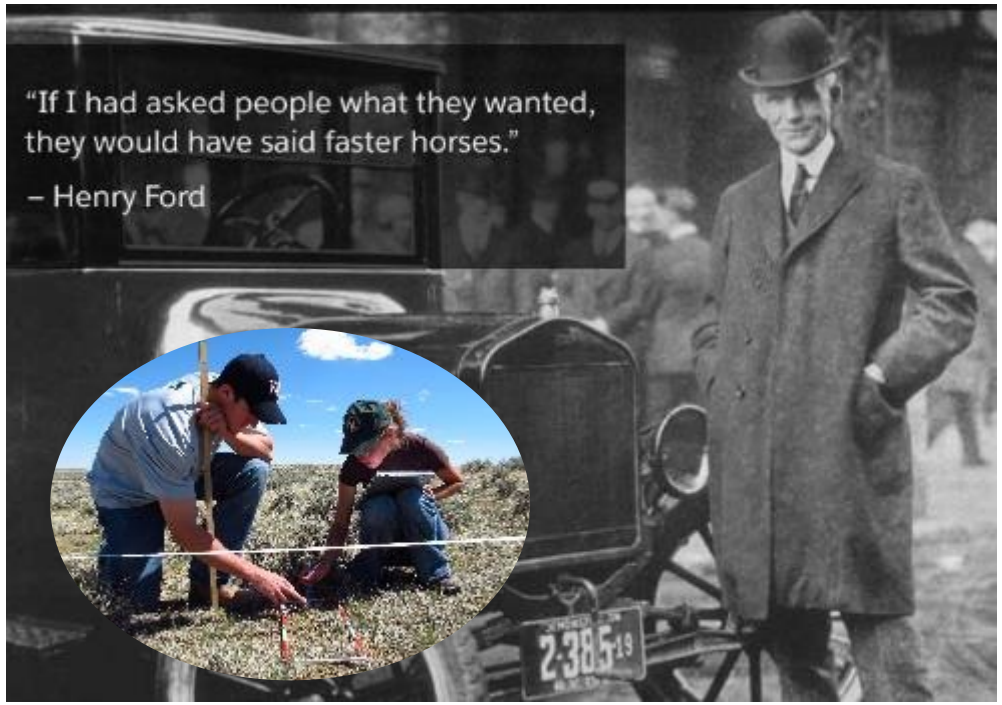
DAVID E. NAUGLE, BRADY W. ALLRED, MATTHEW O. JONES, DIRAC TWIDWELL, AND JEREMY D. MAESTAS

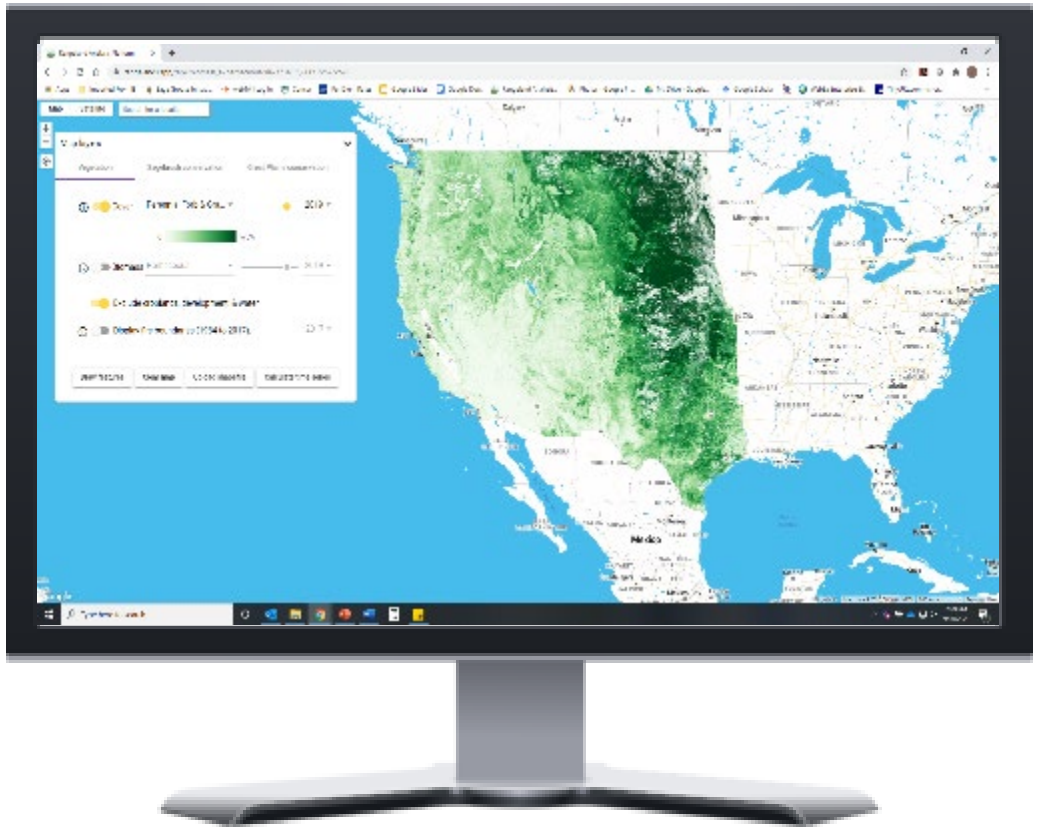
Merriam.—Outcome (n.) the way a story turns out; a consequence.
Syn. Upshot, the 'why', conclusion

"Outcomes provide the backbone for effective communications with producers." —Julia Debes, WLFW Director of Agricultural Communications

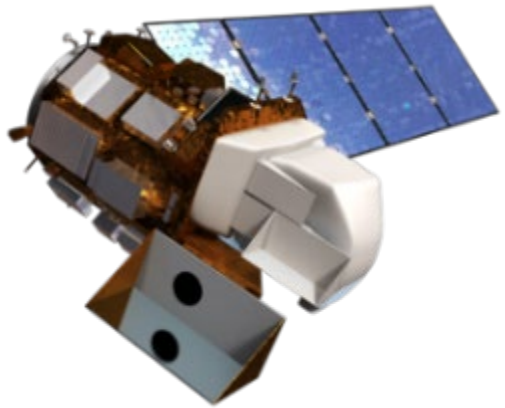
Rangeland Analysis Platform

21st Century Technology for Rangeland Conservation



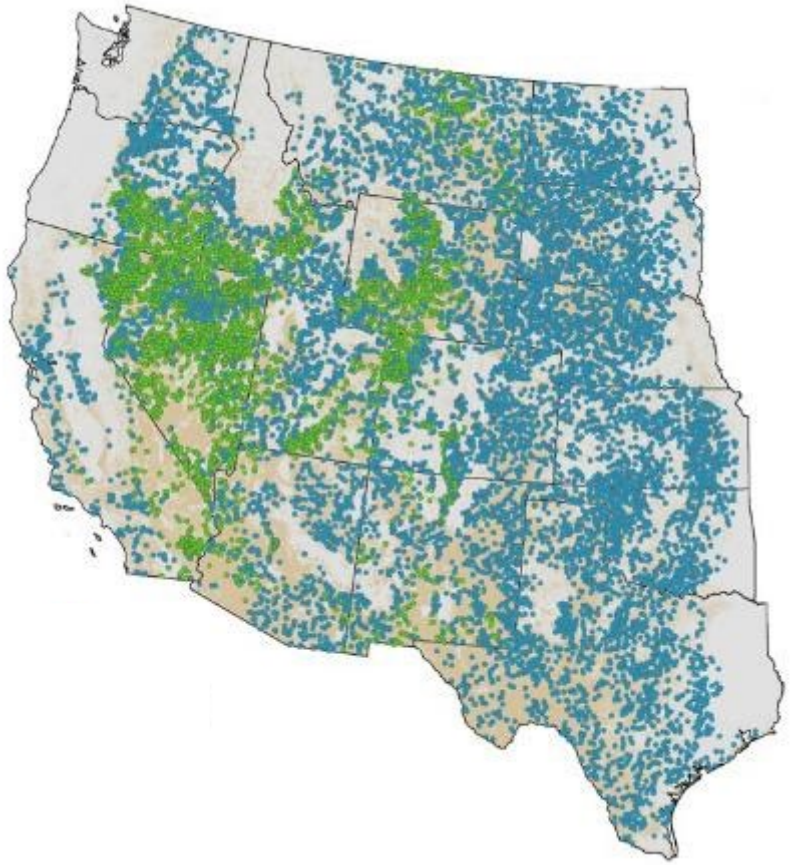


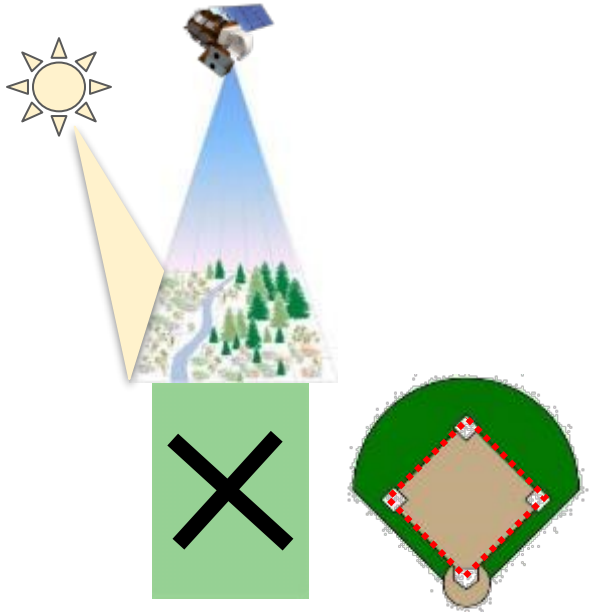
+

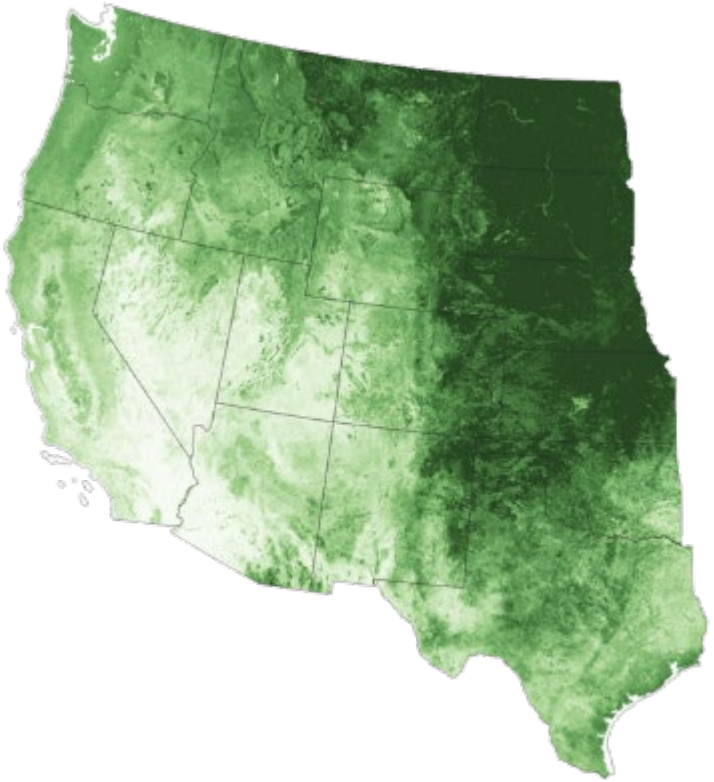


+

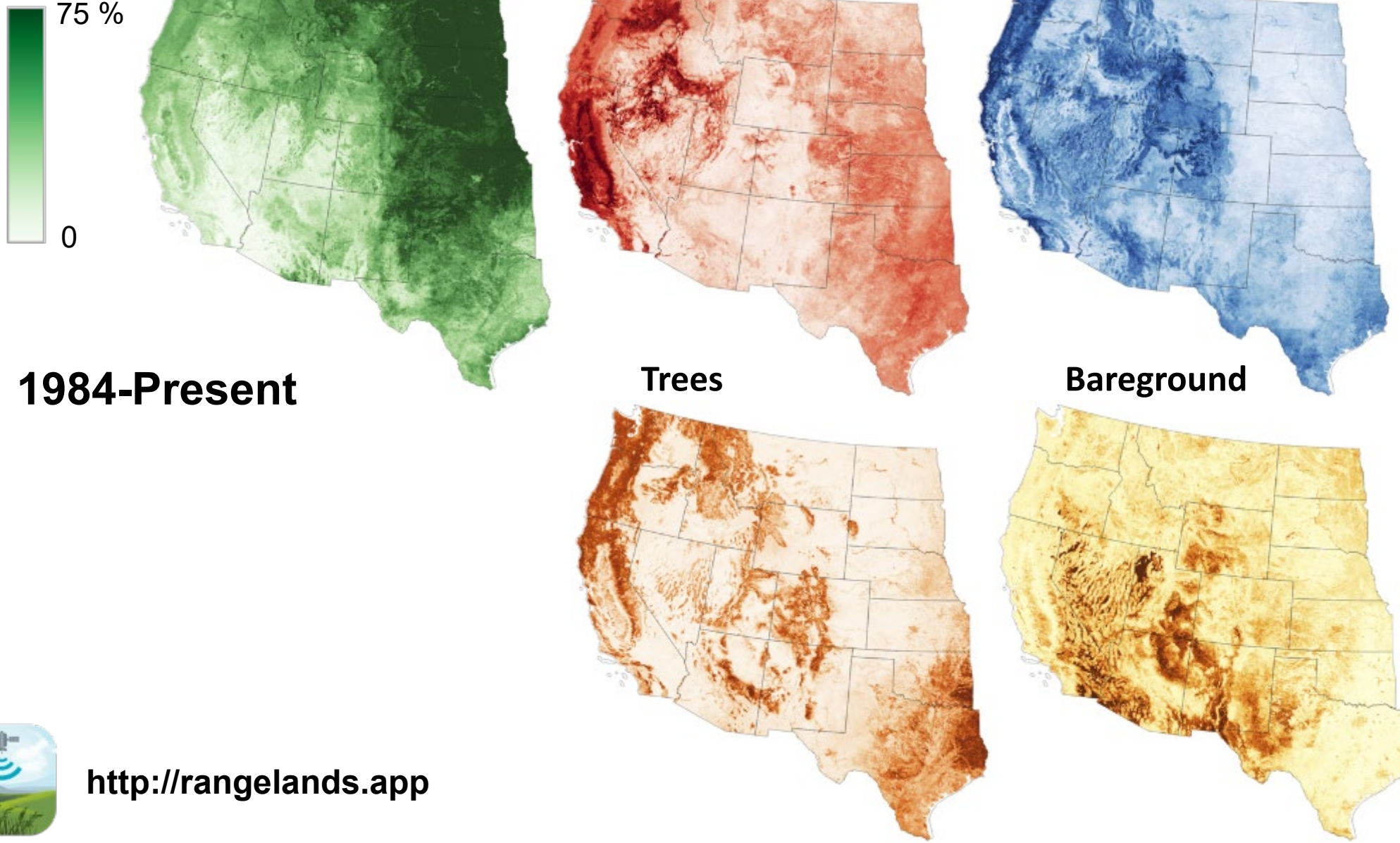
58,000 plots







Vegetation Cover (%)



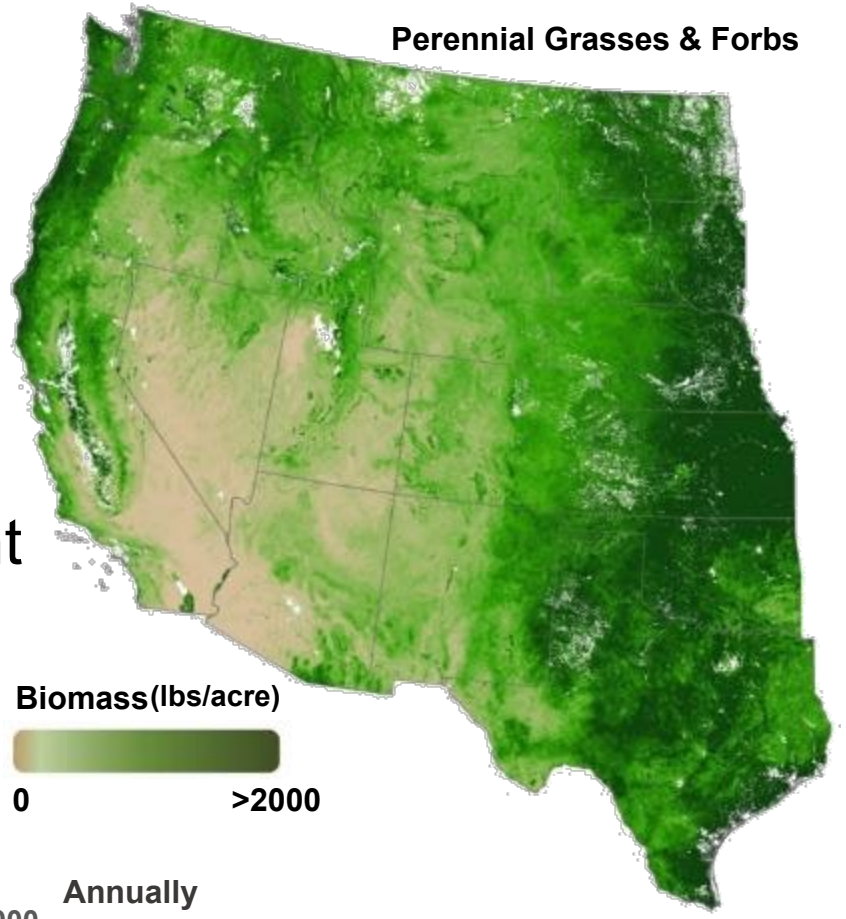
1984-Present

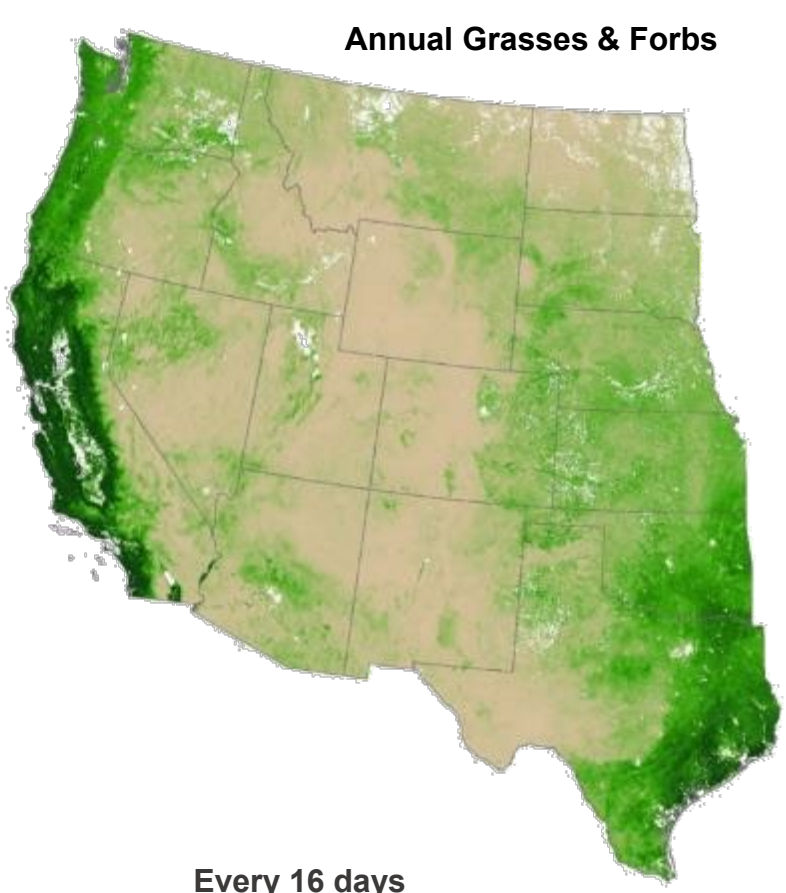
http://rangelands.app

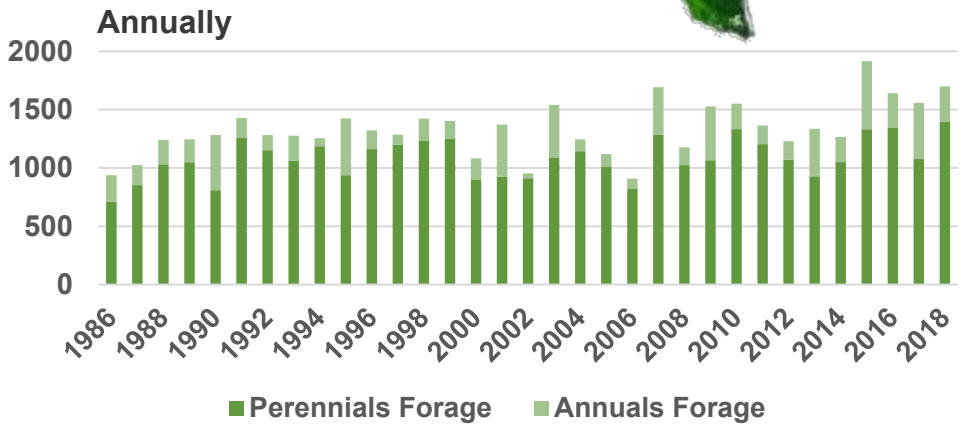
Allred et al. 2020

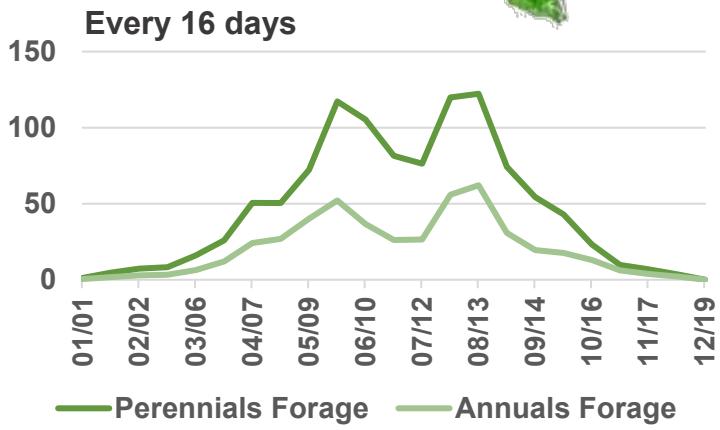
Herbaceous Biomass (lbs/ac)

1986-Present



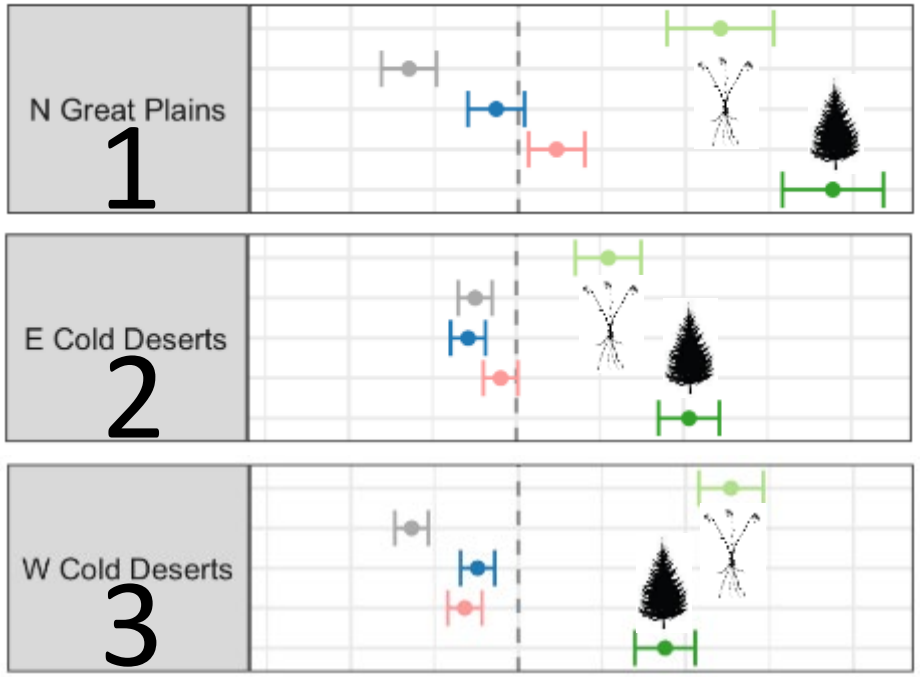




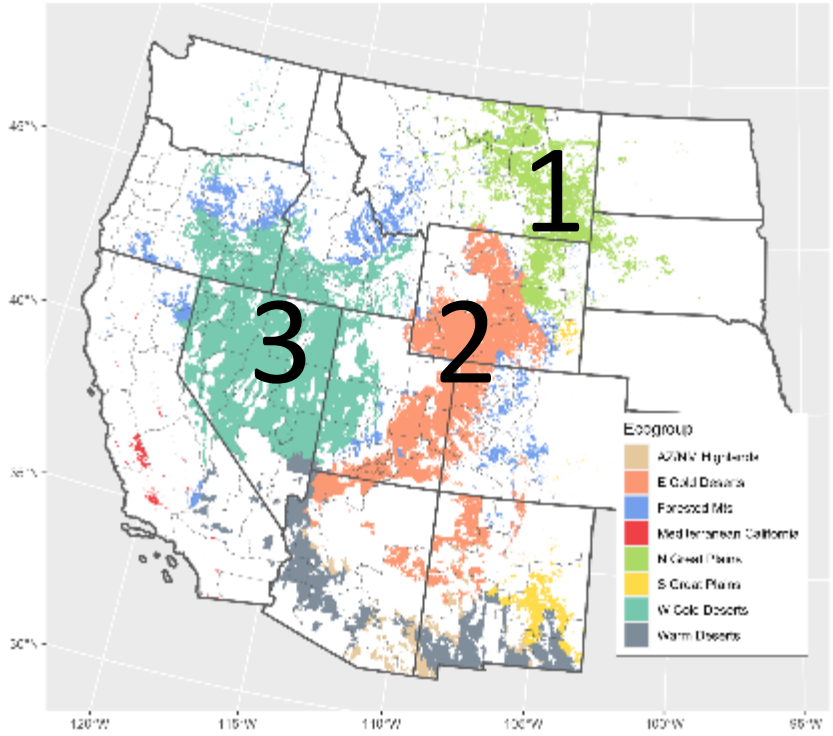


Vegetation Trends on BLM Allotments in the Western U.S.

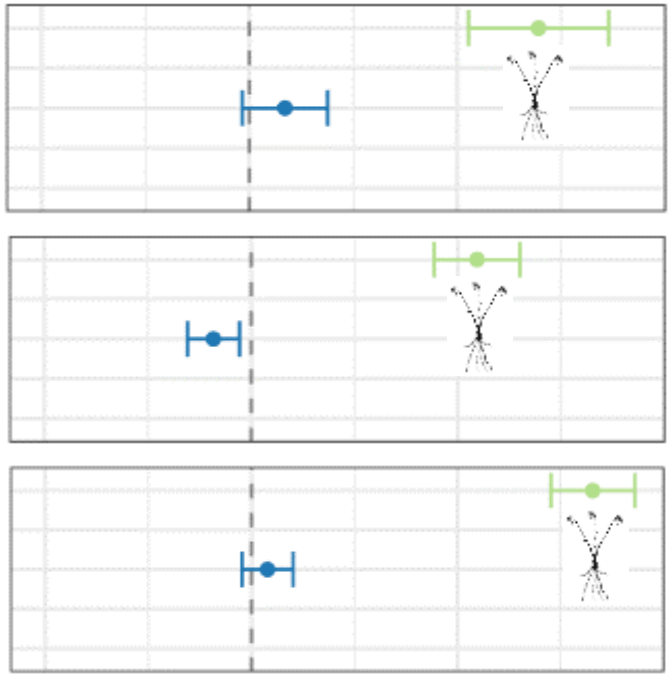
RAP Cover



30-yr Trend



RAP Biomass



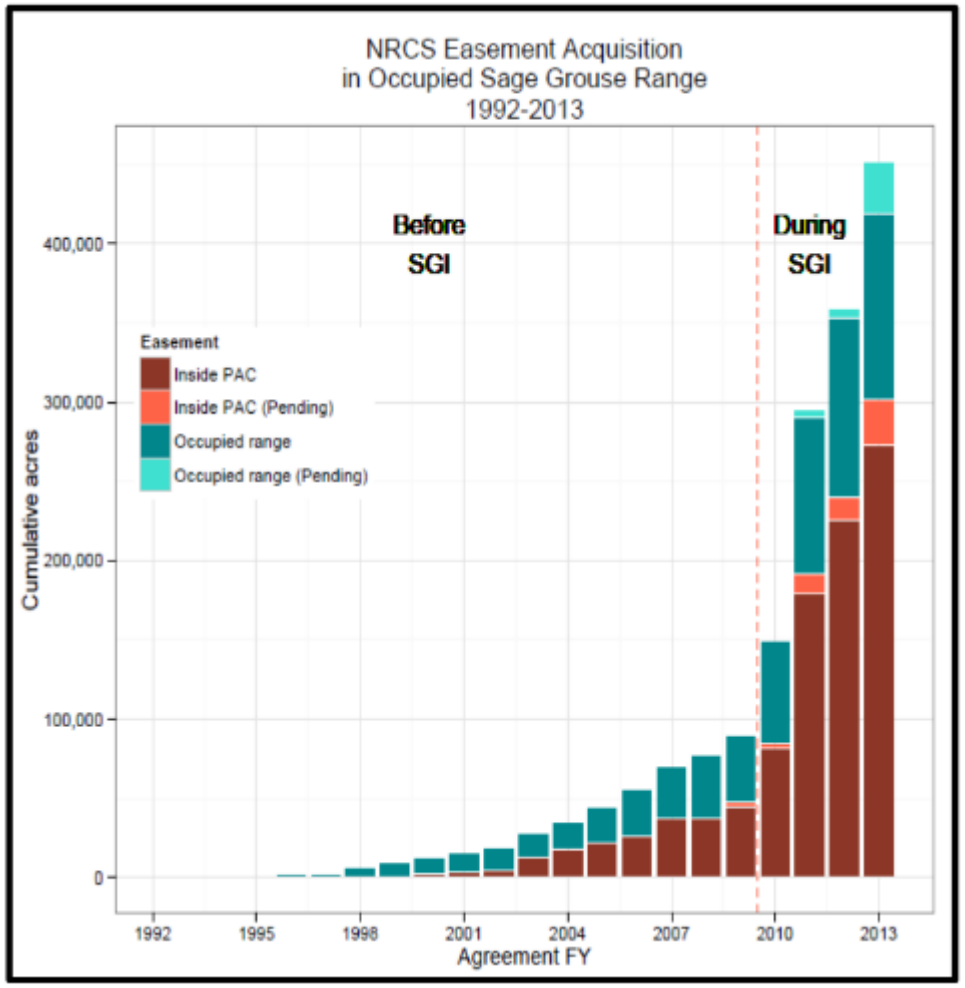
30-yr Trend

Functional Type

Annual
Bare
Perennial
Shrub
Tree

Land-use Conversion & Decision Support

Then….



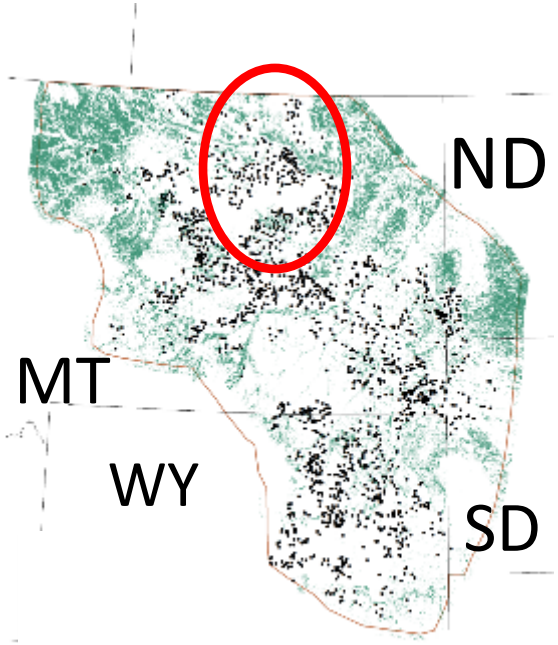
And now….

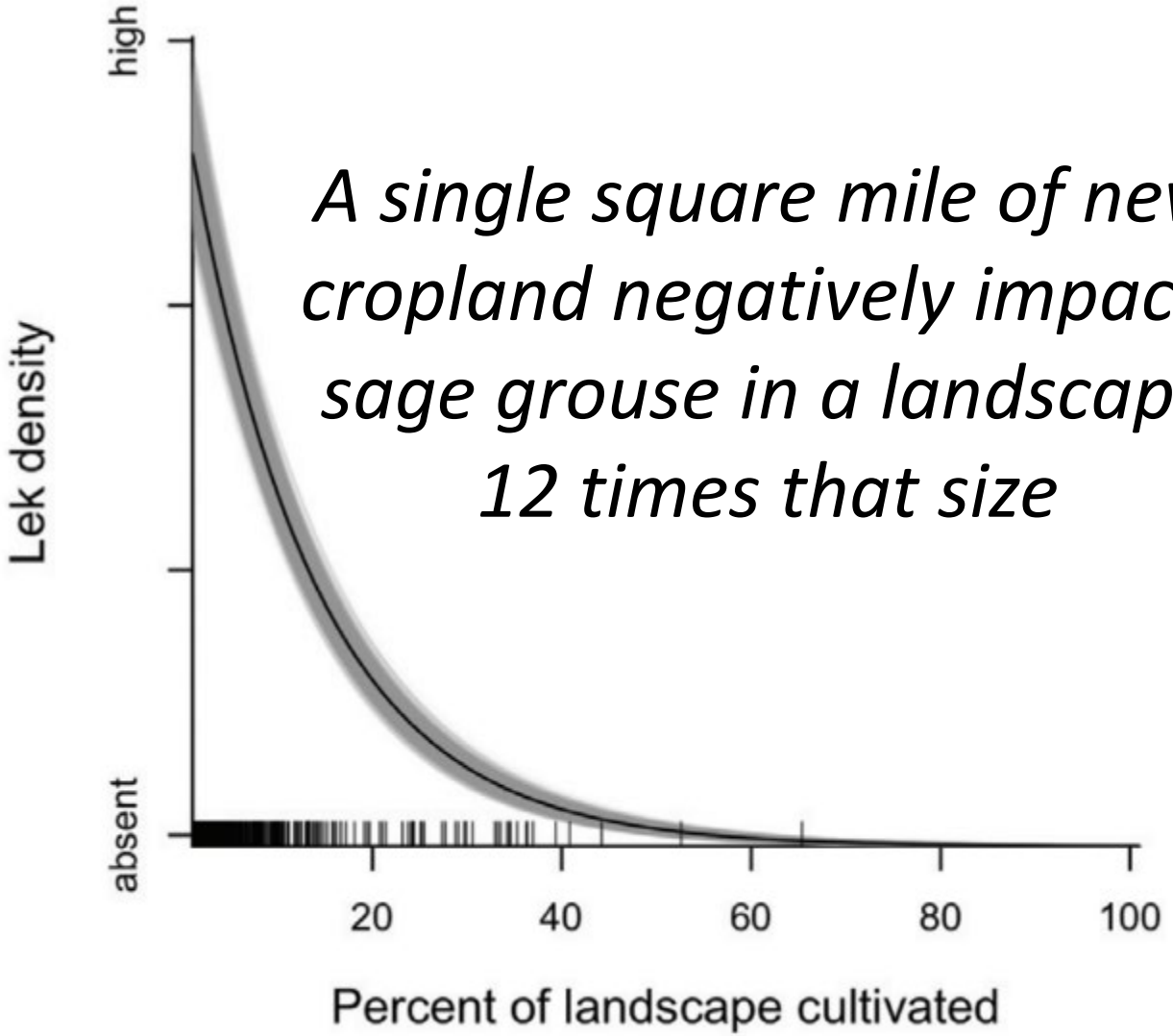
717,060 acres

$427.3M Invested

265 Ranches

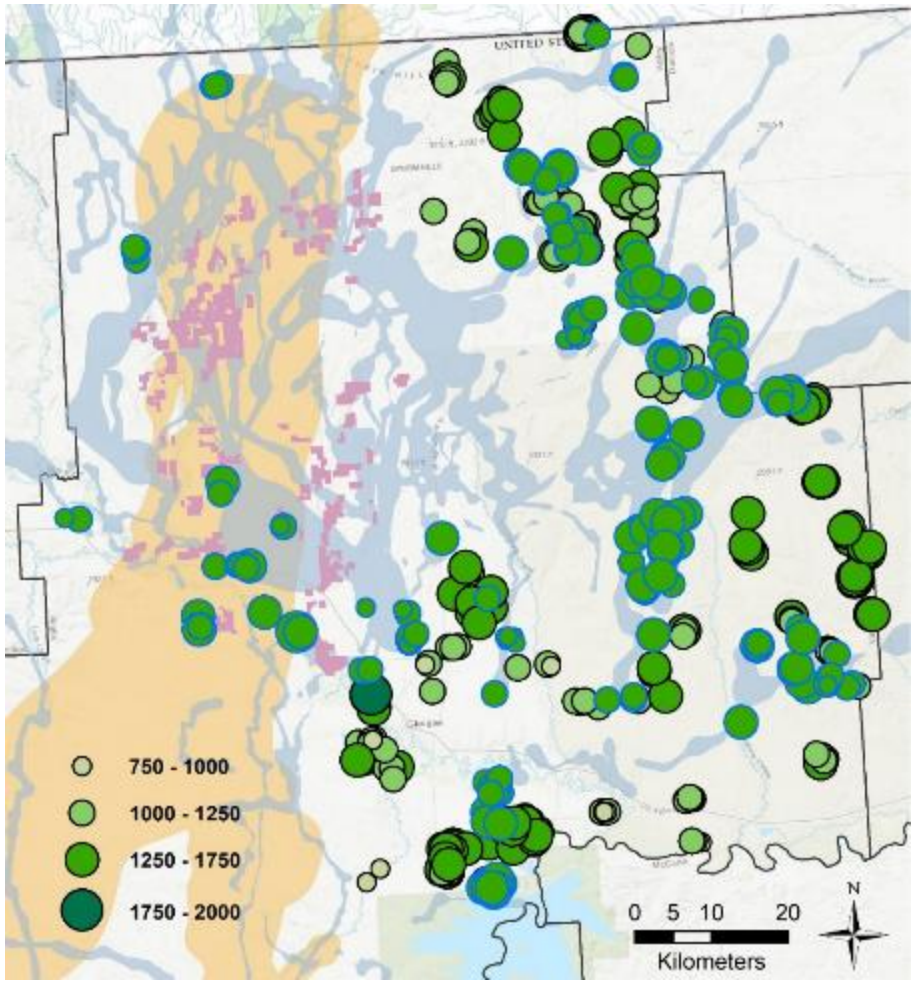
Early Decision Support





A single square mile of new cropland negatively impacts sage grouse in a landscape 12 times that size

Outcomes



Sage Grouse migratory pathways

Pronghorn migratory pathways

Conservation Easements

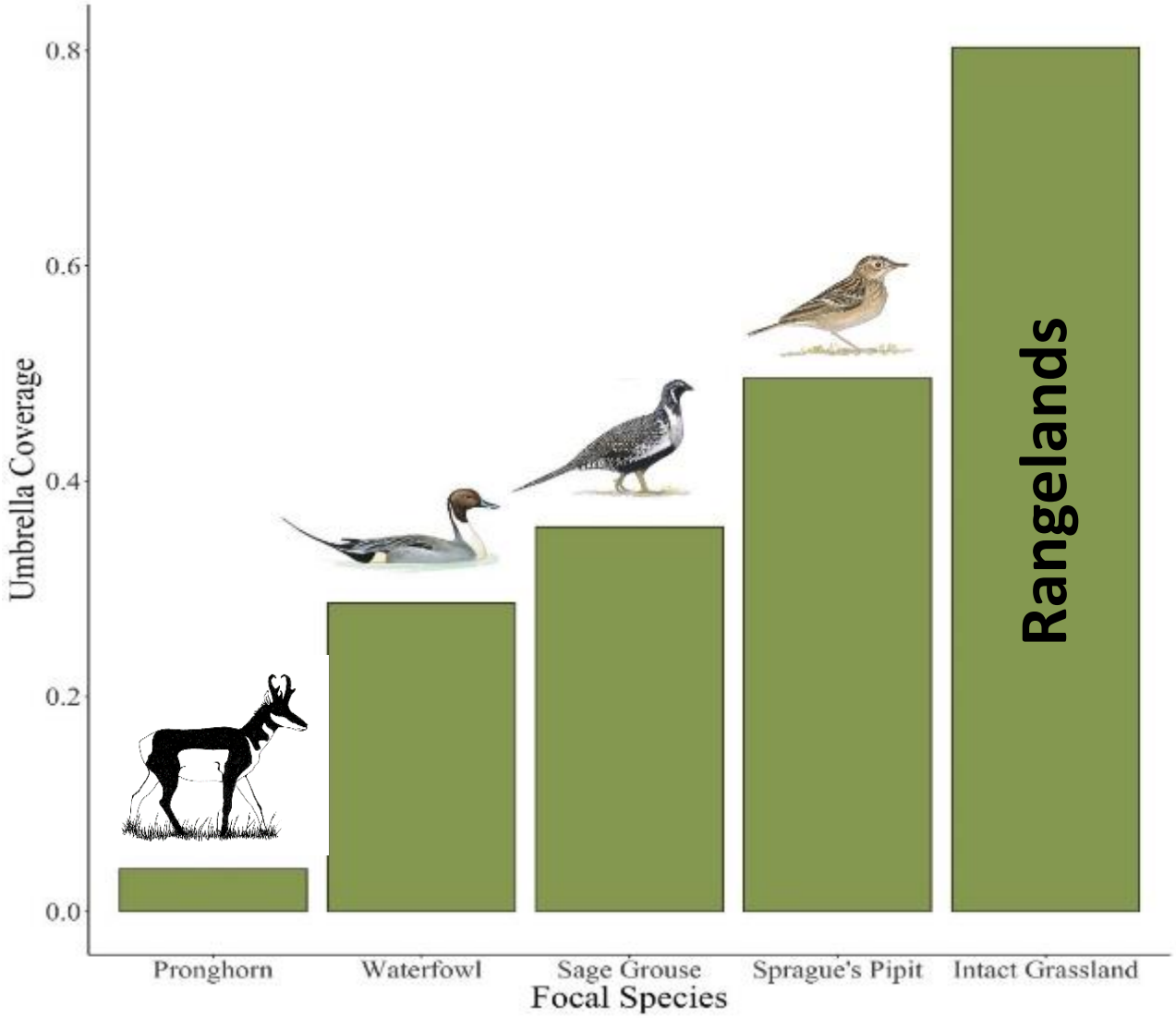
#1 Transitioning CRP to maintain $500,000 annually in grazing income

#2 Making space for young new ranching families

#3 Maintains habitat quality across a half million acres

#4 Supporting largest sage grouse and pronghorn migrations on the planet

Intact grasslands are the best umbrella for multi-species conservation



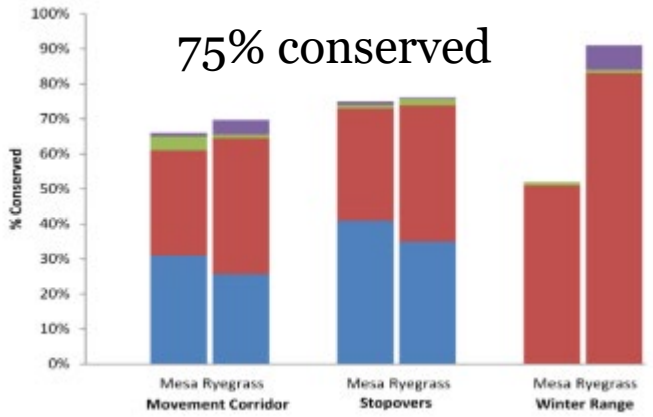
Reducing Subdivision Risk

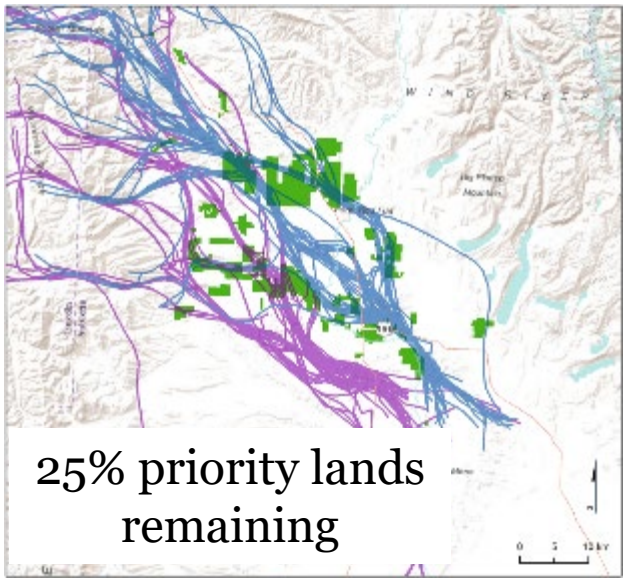
2014

ECOSPHERE

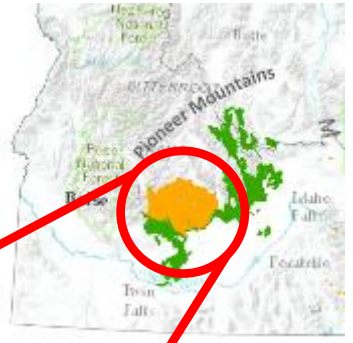
Conserving migratory mule deer through the umbrella of sage-grouse

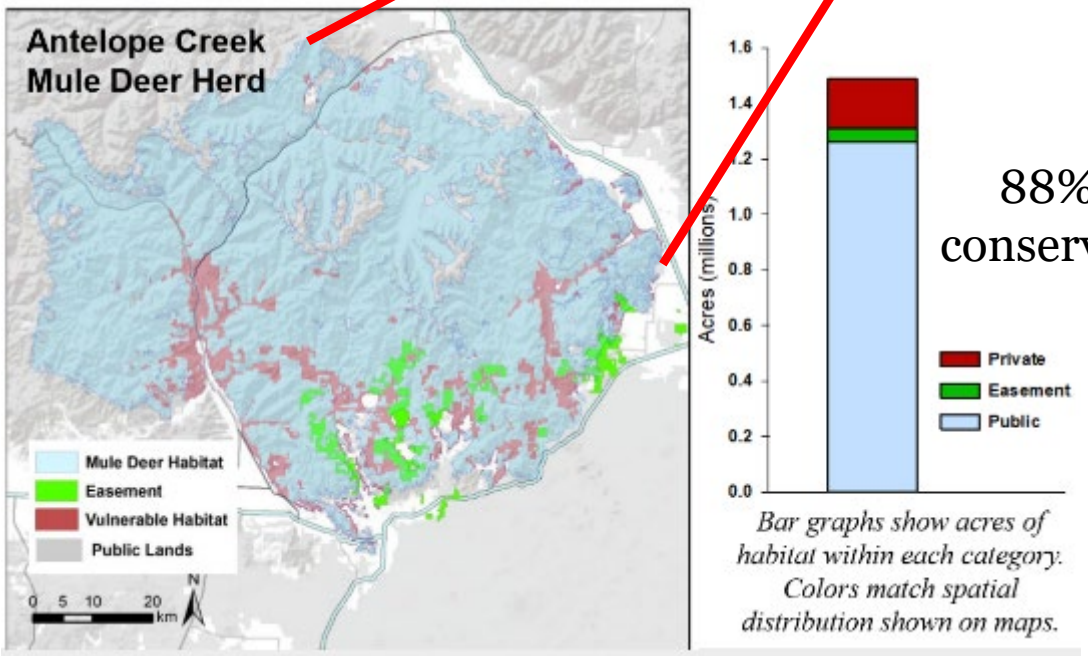
H. E. Copeland,[1,†] H. Sawyer,[2] K. L. Monteith,[3] D. E. Naugle,[4] A. Pocewicz,[1] N. Graf,[5] and M. J. Kauffman[6]





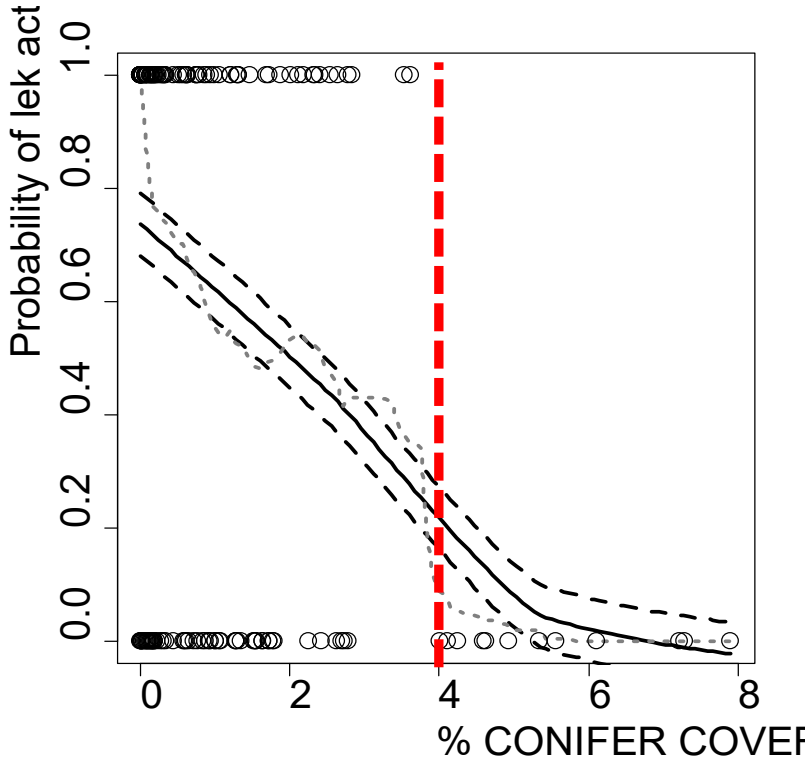
Today





Woodland expansion not considered a threat a decade ago...

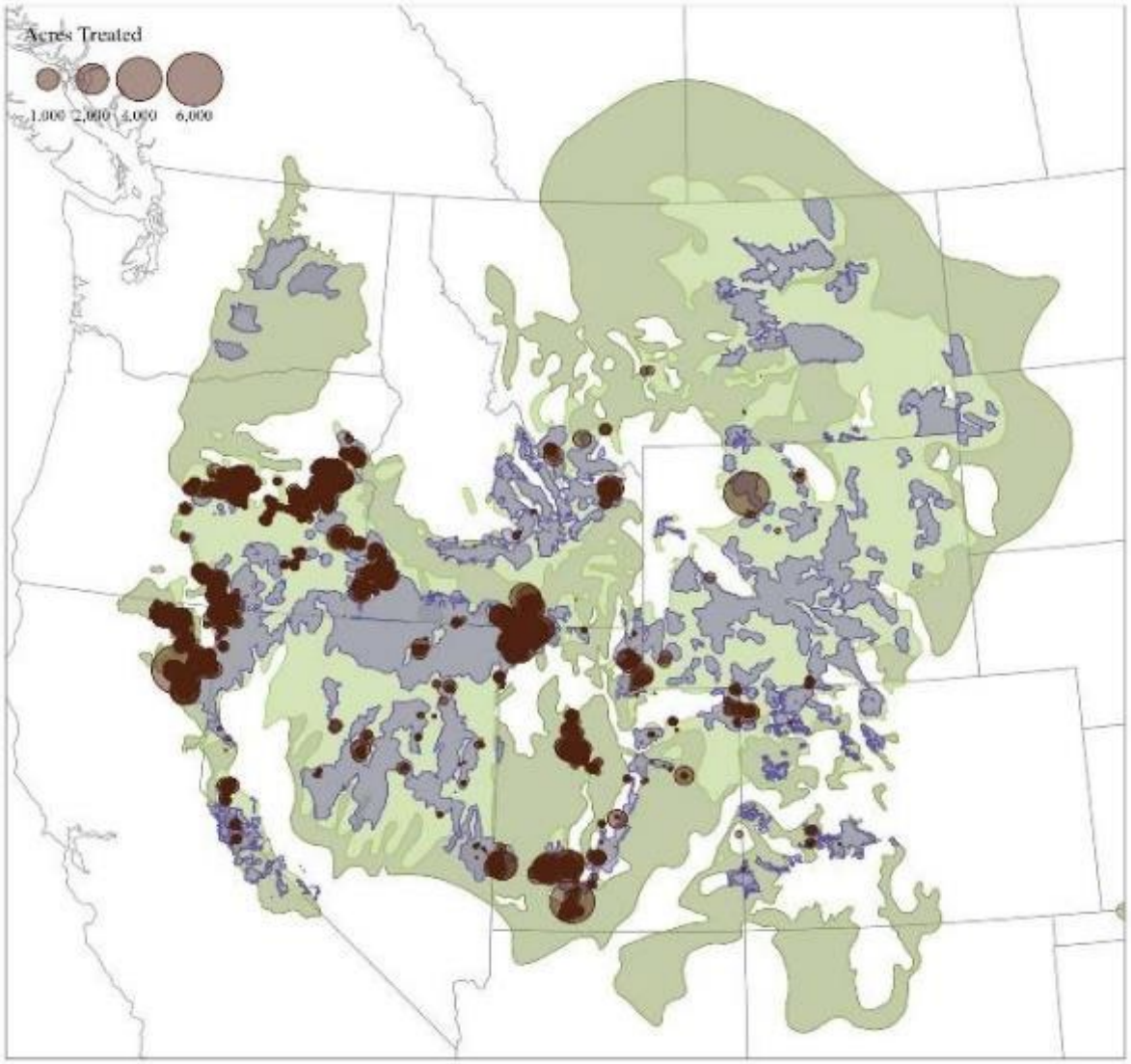
random acts

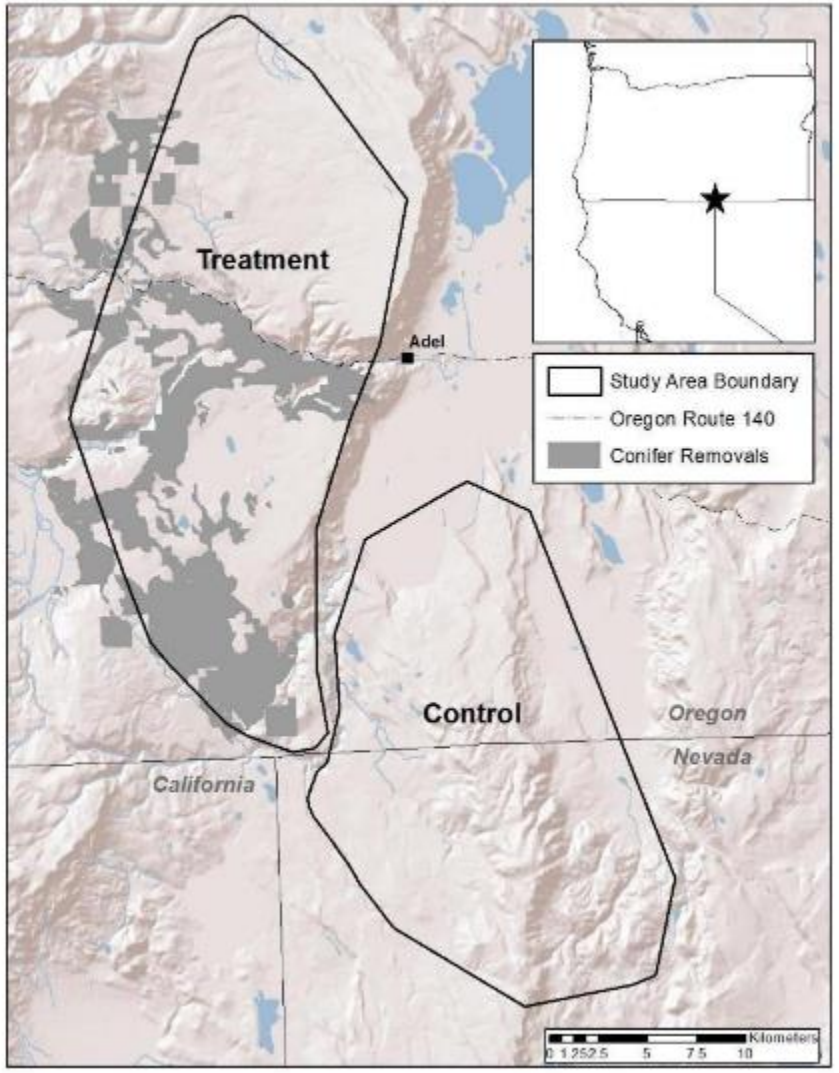


Saving sage-grouse from the trees

Baruch-Mordo et al. 2013

Upscaled and targeted!

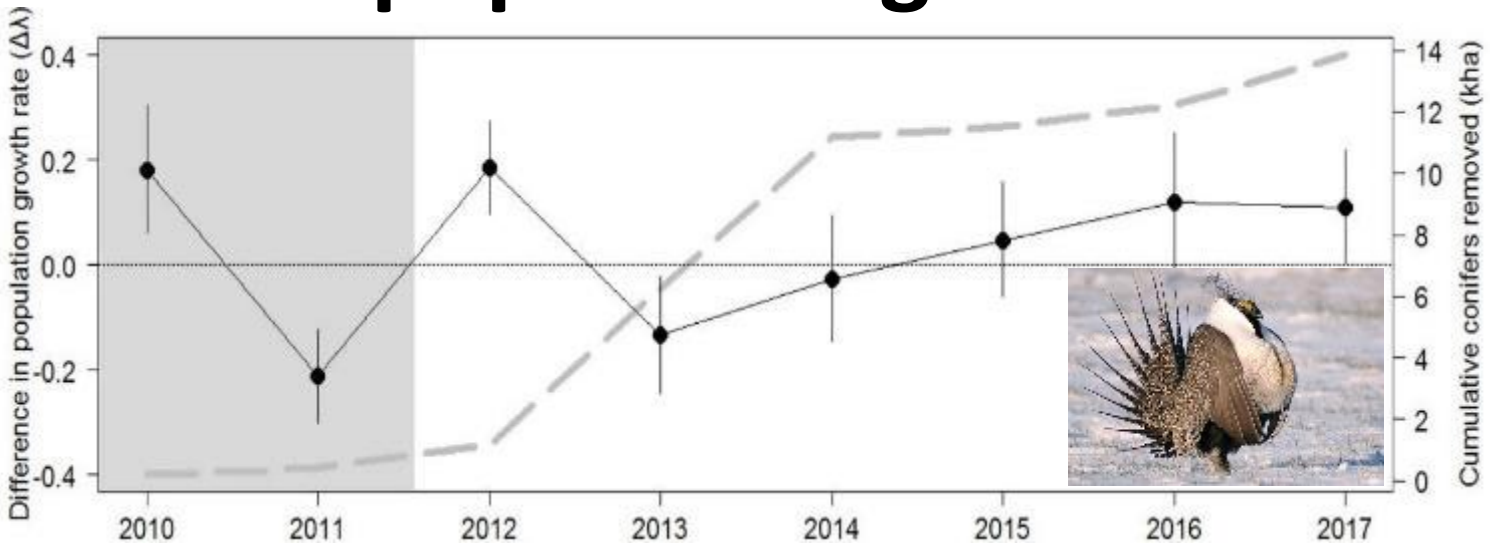




Warner Mountains

Restoration of whole landscape

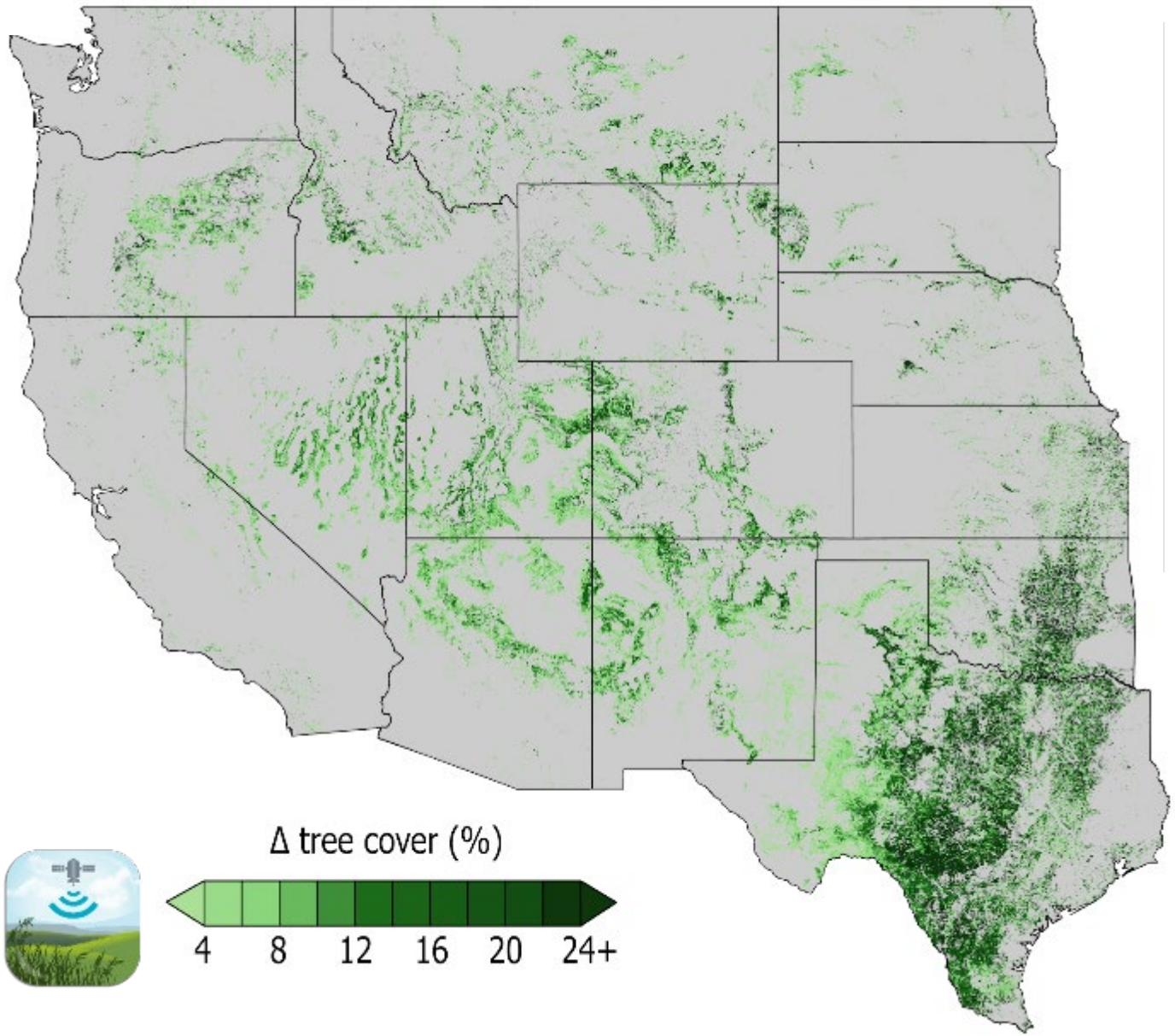
+12% population growth rate

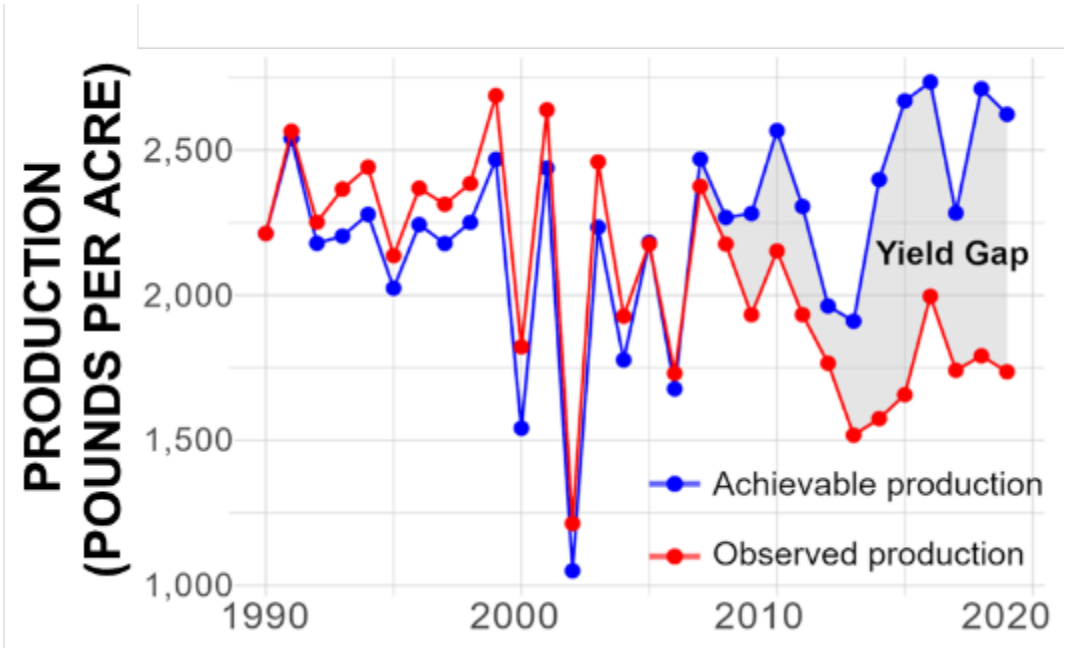


Olsen et al. 2021 – Ecosphere journal

Woodland expansion and production losses across U.S. Rangelands

1990 - 2019





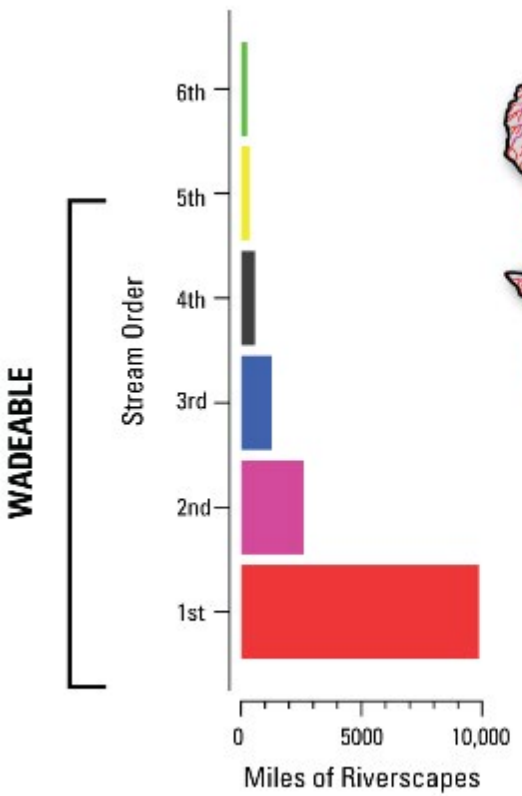
Yield gap on the web @

https://rangelands.app/yield-gap/

In the West, Water is Life

Photo by: MT Stockgrowers Assoc.

We needed scalable solutions

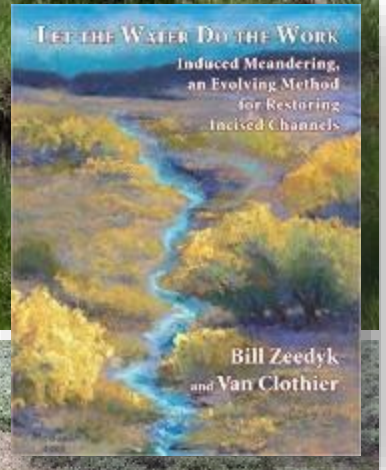


“Sticks and Stones”

ELR – Steve Bennett

ELR – Nick Weber

Zeedyk Structures



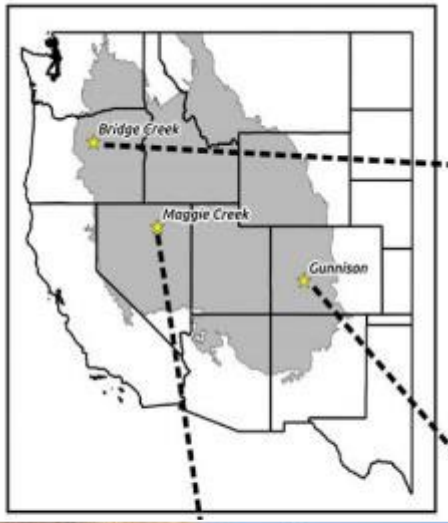
Beaver Dam Analogues (BDAs), Post-Assisted Log Structures (PALS)

Nick Weber

Gunnison Basin Working Group

Spatial Targeting Tools Available to Everyone

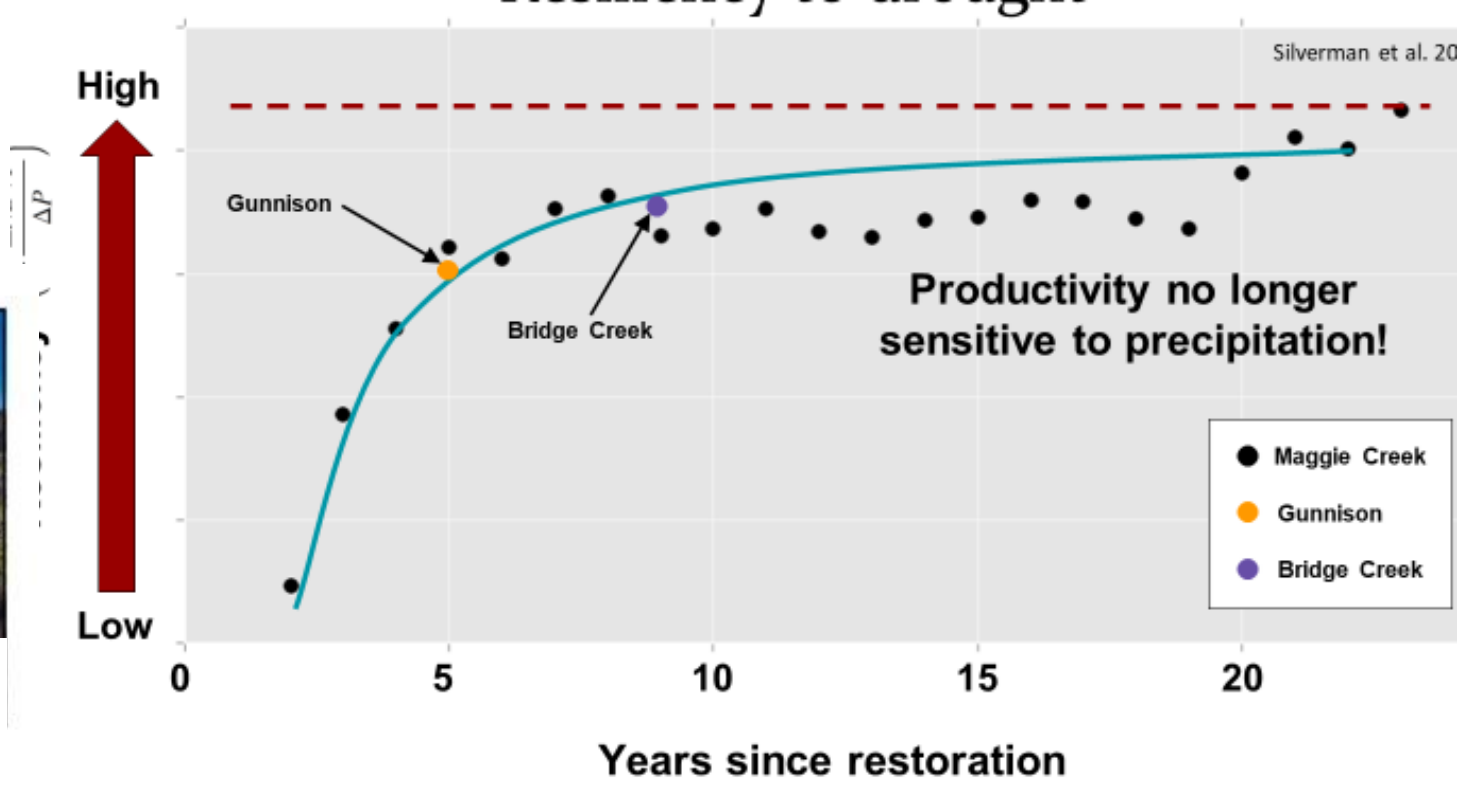
https://map.sagegrouseinitiative.com/ecosystem/mesic-resources



Beaver Dam Analogues
(Mid-term: 9 yrs)

Grazing Management
(Long-term: 20+ yrs)

Zeedyk Structures
(Short-term: 2-5 yrs)

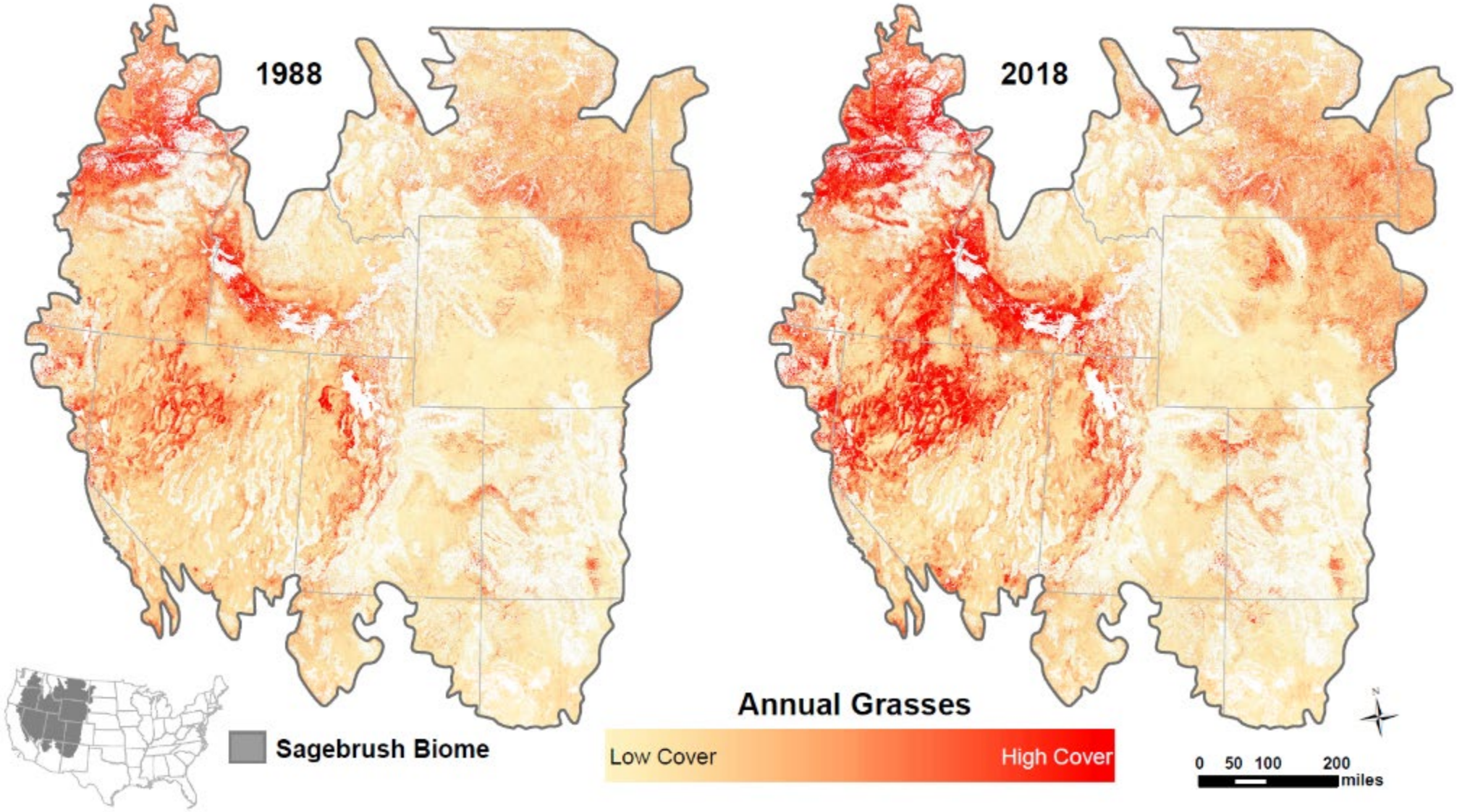


Low-Tech Restoration Works

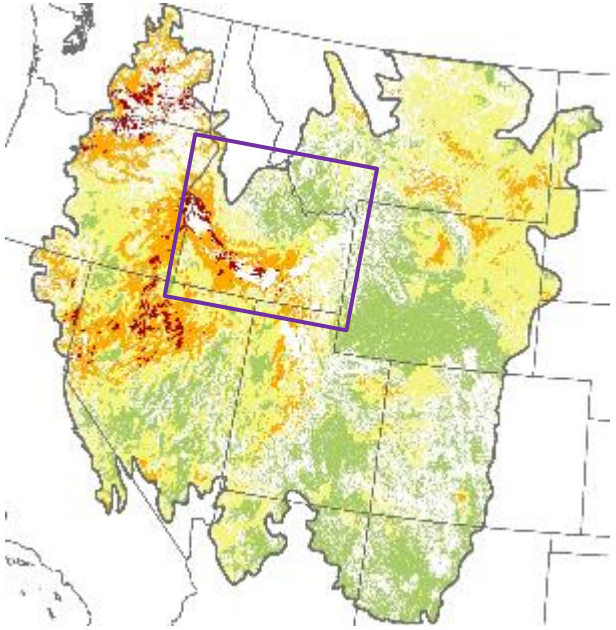
1. Revise technical standards
2. Develop payment scenarios
3. Provide knowledge & skills to implement at landscape scales

Empowering people to be part of the solution

Annual Invasives: A Spatial Game Plan for Local Management



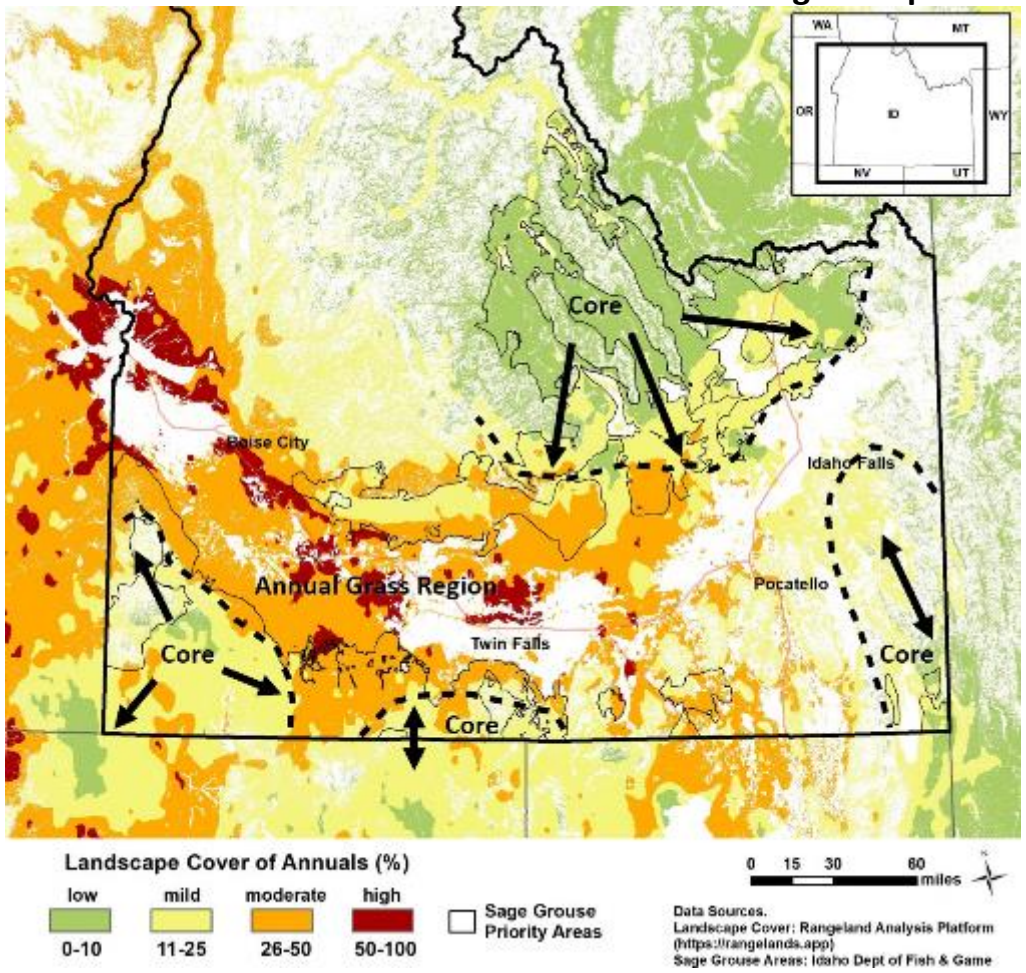
Applications for Strategic Planning



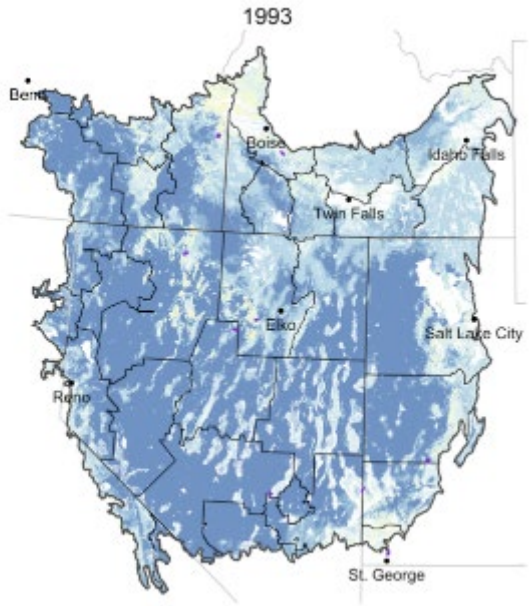
1. Defend intact core from annual grasses with early and aggressive control
2. Grow the cores over time
3. Mitigate severe impacts for life and property

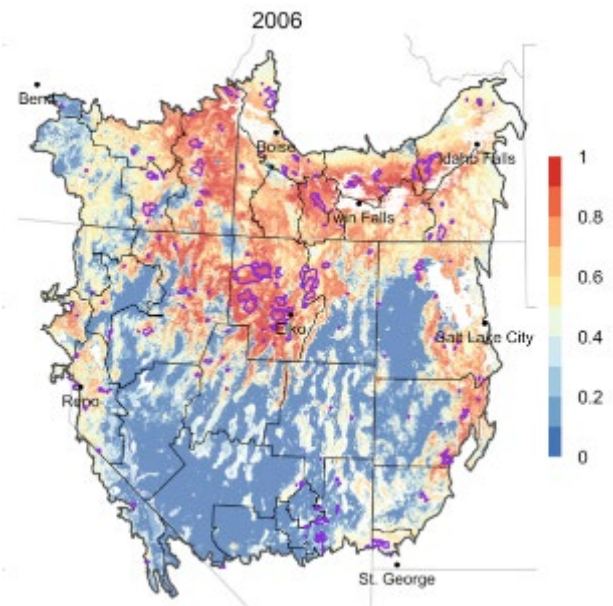
Idaho's Cheatgrass Challenge Strategy

Defend the core → Grow the core → Mitigate impacts

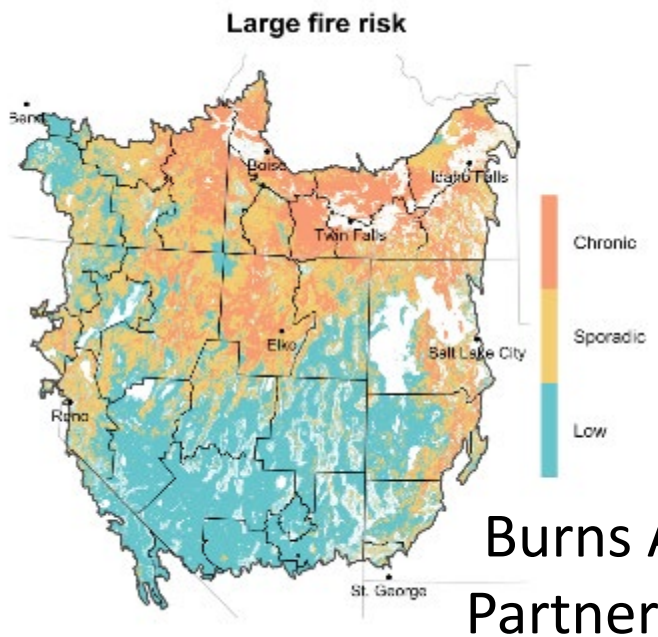


Great Basin Fire Probability Modeling

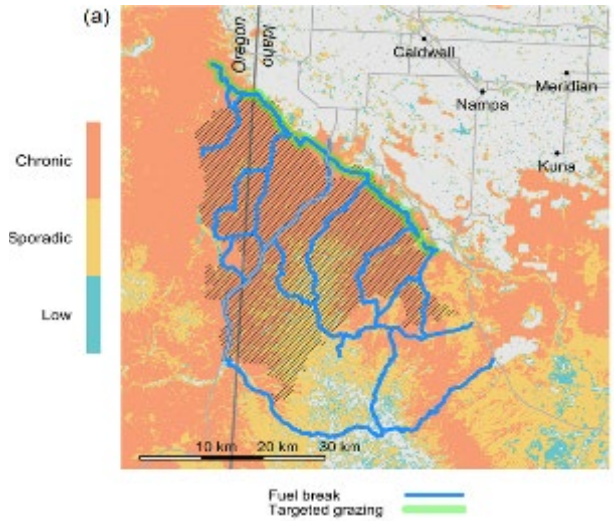




=



Burns ARS Partnership



Targeted Grazing

Fuel break placement

Effective Suppression

Microhabitat and Grazing: A 50-year tradition

Management and Conservation Article

Nest Predation of Greater Sage-Grous in Relation to Microhabitat Factors and Predators

PETER S. COATES, DAVID J. DELEHANTY

Research Article

Microsite Selection and Survival of Greater Sage-Grouse Nests in South-Central Wyoming

CHRISTOPHER P. HANSEN, LESLIE A. SCHREIBER, MARK A. RUMBLE, JOSHUA J. MILLSPAUGH, R. SCOTT GAMO

The Condor 114(1):75–89
© The Cooper Ornithological Society 2012

MICROHABITAT SELECTION FOR NESTING AND BROOD-REARING BY THE GREATER SAGE-GROUSE IN XERIC BIG SAGEBRUSH

CHRISTOPHER P. KIROL[1,3], JEFFREY L. BECK[1], JONATHAN B. DINKINS[2], AND MICHAEL R. CONOVER[2]

[1]*Department of Ecosystem Science and Management, University of Wyoming, Laramie, WY 82071*
[2]*Department of Wildland Resources, Utah State University, Logan, UT 84322-5230*

Abstract. Understanding selection of breeding habitat is critical to conserving and rest
Greater Sage-Grouse (*Centrocercus urophasianus*), particularly in xeric landscapes (≤25
dio-marked female sage-grouse in south-central Wyoming in 200
nesting and brood rearing. For each model we grouped variables into
it of support from previous research (a priori information). We used b
used by grouse to that at random locations and used an informatio

RESEARCH ARTICLE

Microhabitat Conditions in Wyoming's Sage-Grouse Core Areas: Effects on Nest Site Selection and Success

Jonathan B. Dinkins[1]*, Kurt T. Smith[1], Jeffrey L. Beck[1], Christopher P. Kirol[1], Aaron C. Pratt[1], Michael R. Conover[2]

1 Department of Ecosystem Science and Management, University of Wyoming, Laramie, Wyoming, United

USGS

Prepared in cooperation with the Bureau of Land Management and Nevada Department of Wildlife

Greater Sage-Grouse (*Centrocercus urophasianus*) Nesting and Brood-Rearing Microhabitat in Nevada and California—

Human–Wildlife Interactions 9(2):219–228, Fall 2015

Microhabitat selection by greater sage-grouse hens during brood rearing

Scott T. Mabray, Department of Wildland Resources, Utah State University, Logan UT 84322-5230
Michael R. Conover, Department of Wildland Resources, Utah State University, Logan UT 84322-5230 *mike.conover@usu.edu*

Abstract: Greater sage-grouse (*Centrocercus urophasianus*) populations have declined throughout the western United States over the past century. Loss of large stands of sagebrush is a major factor leading to the decline of sage-grouse populations. We captured, marked, and tracked hen sage-grouse in Wyoming during the summer of 2012 to study where sage-grouse hens keep their chicks given the dual needs to provide them with food and to keep them safe

Table 3. Characteristics of sagebrush rangeland needed for productive sage grouse habitat.

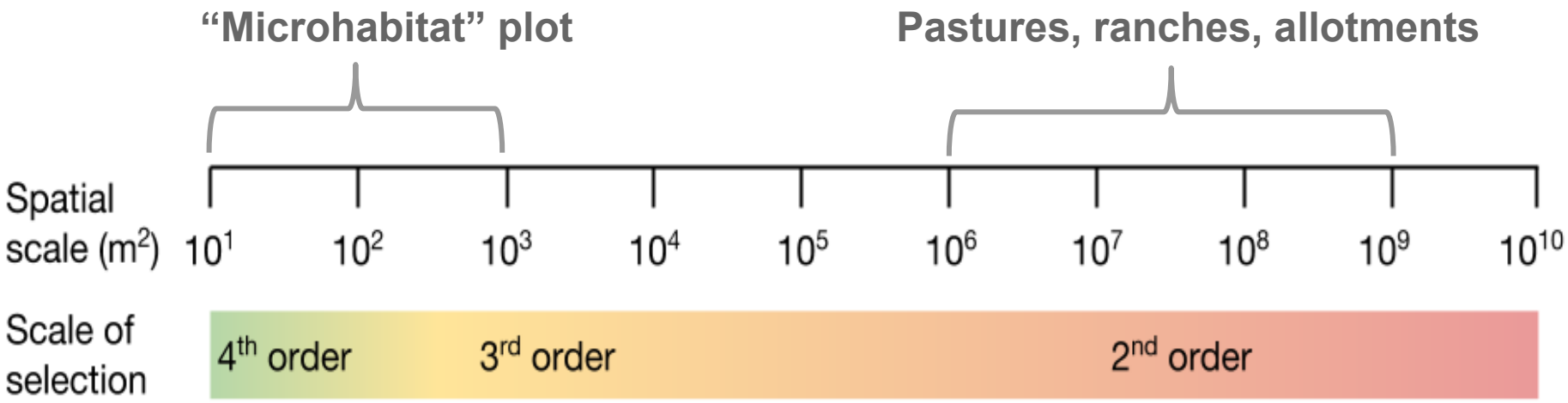
	Breeding		Brood-rearing		Winter[e]	
	Height (cm)	Canopy (%)	Height (cm)	Canopy (%)	Height (cm)	Canopy (%)
Mesic sites[a]						
Sagebrush	40–80	15–25	40–80	10–25	25–35	10–30
Grass–forb	>18[c]	≥25[d]	variable	>15	N/A	N/A
Arid sites[a]						
Sagebrush	30–80	15–25	40–80	10–25	25–35	10–30
Grass/forb	>18[c]	≥15	variable	>15	N/A	N/A
Area[b]	>80		>40		>80	

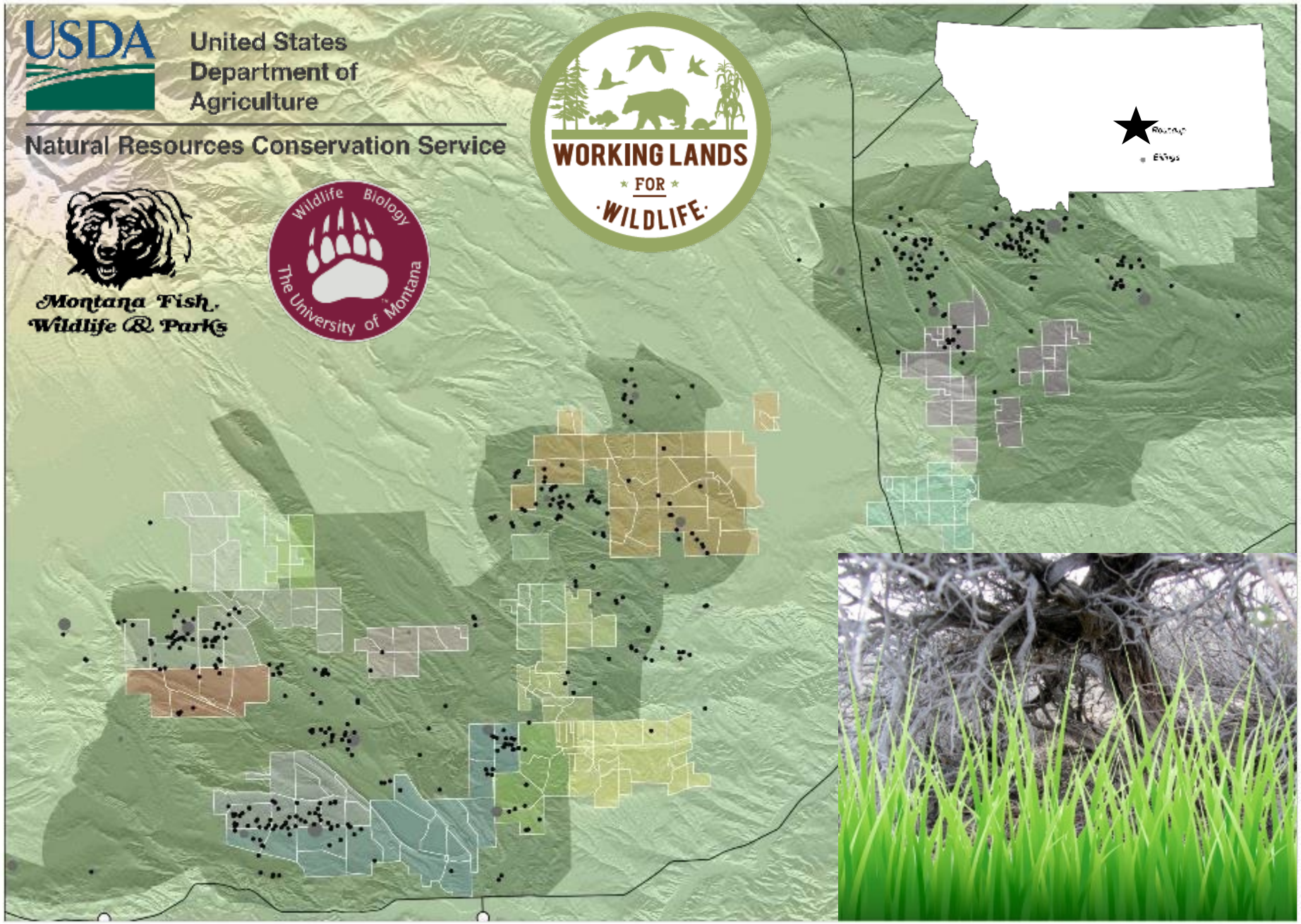
Connelly, J. W., et al.. 2000. *Wildlife Society Bulletin* 28:967–985.

Management guidelines reflect this narrow perspective

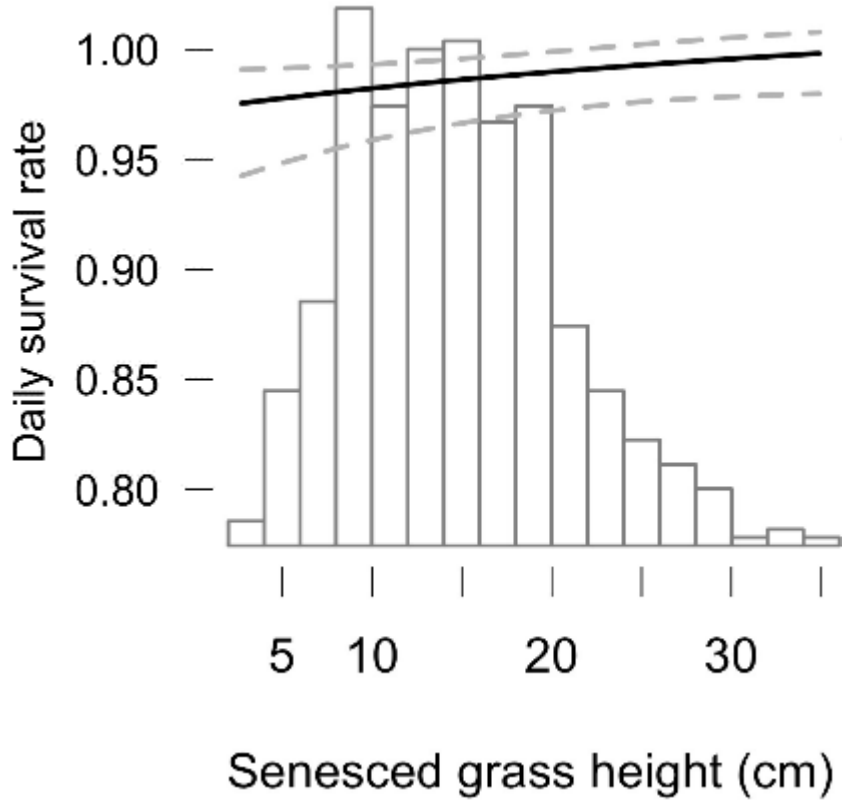
What the science tells us

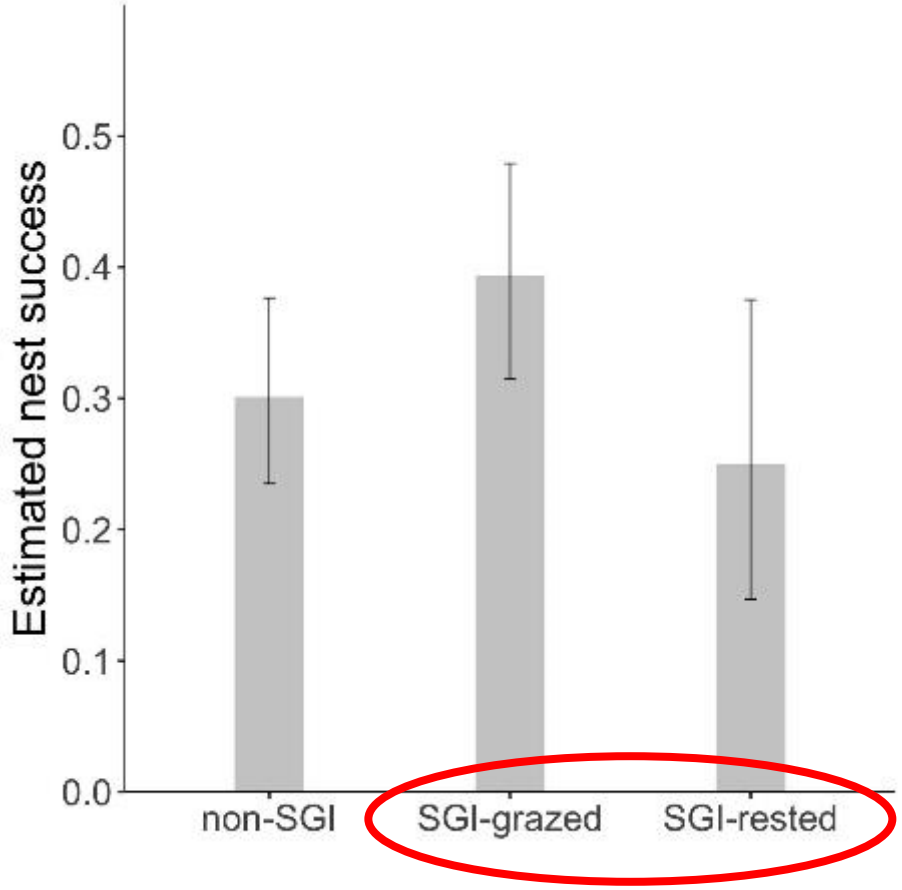
...is not what managers need to know




USDA
United States Department of Agriculture
Natural Resources Conservation Service
Montana Fish, Wildlife & Parks
Wildlife Biology
The University of Montana
WORKING LANDS
FOR
WILDLIFE

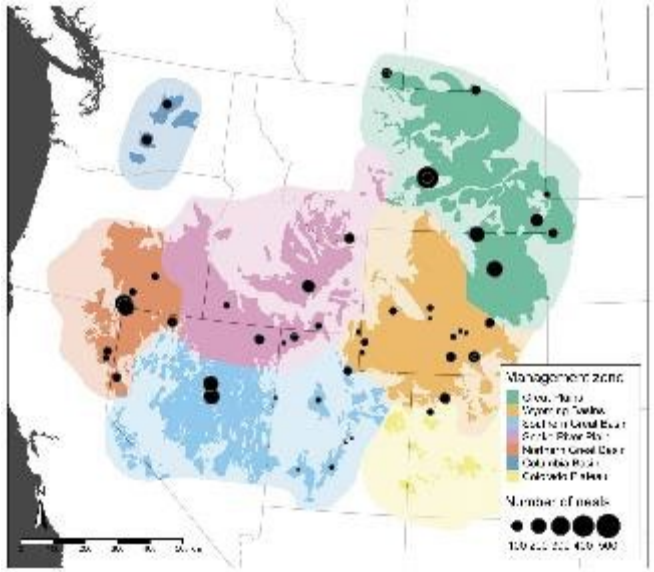
Micro-scale patterns did not ‘scale up’ to predict management outcome

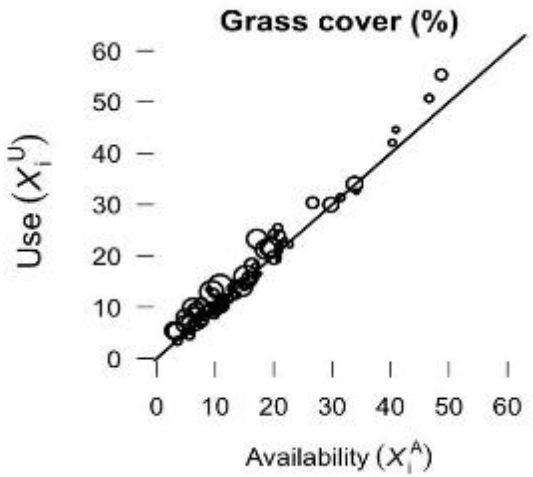


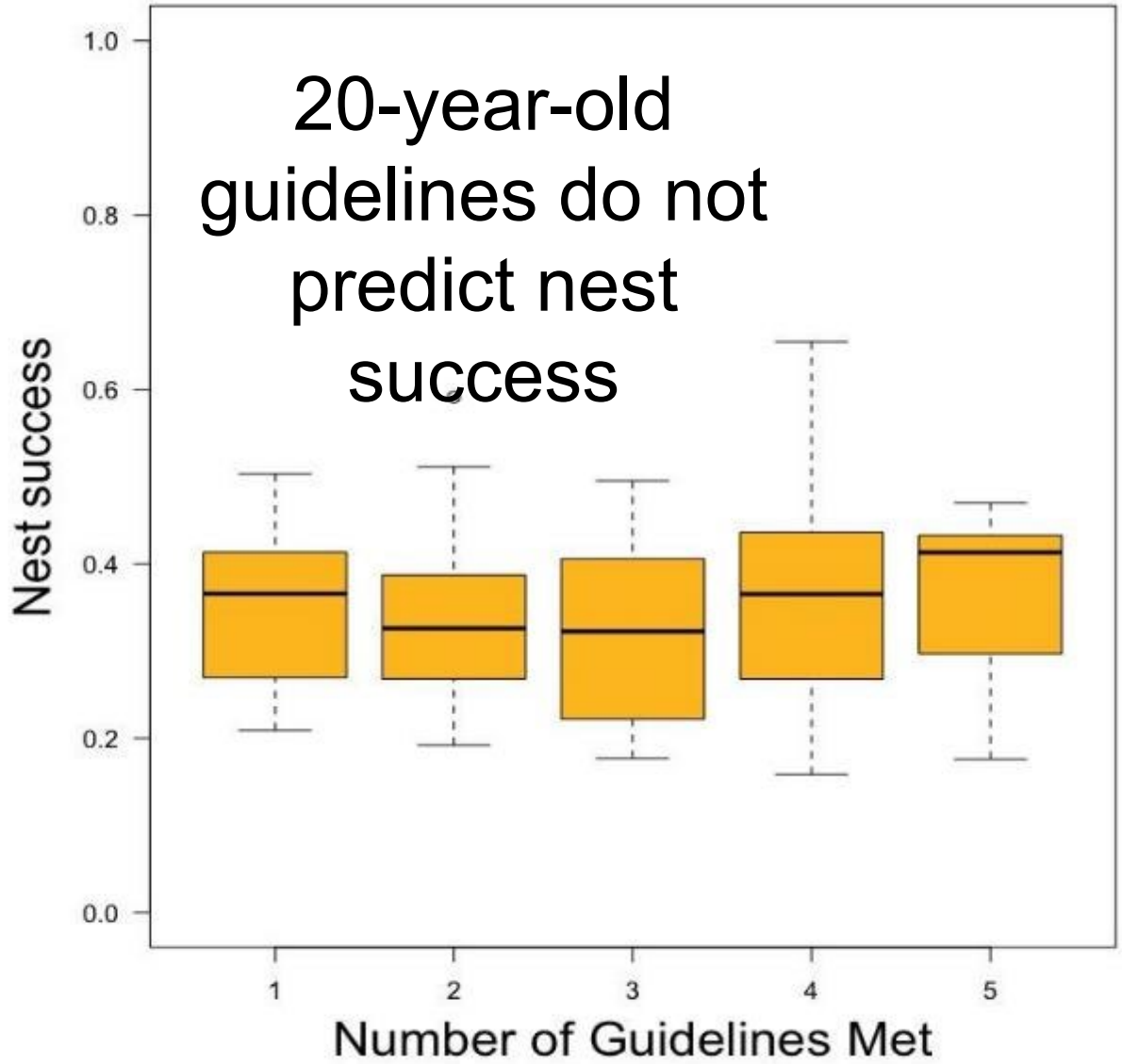


Smith et al. 2018. *Journal of Wildlife Management* 82:1503-1515
Smith et al. 2018. *Journal of Wildlife Management* 82:103-112

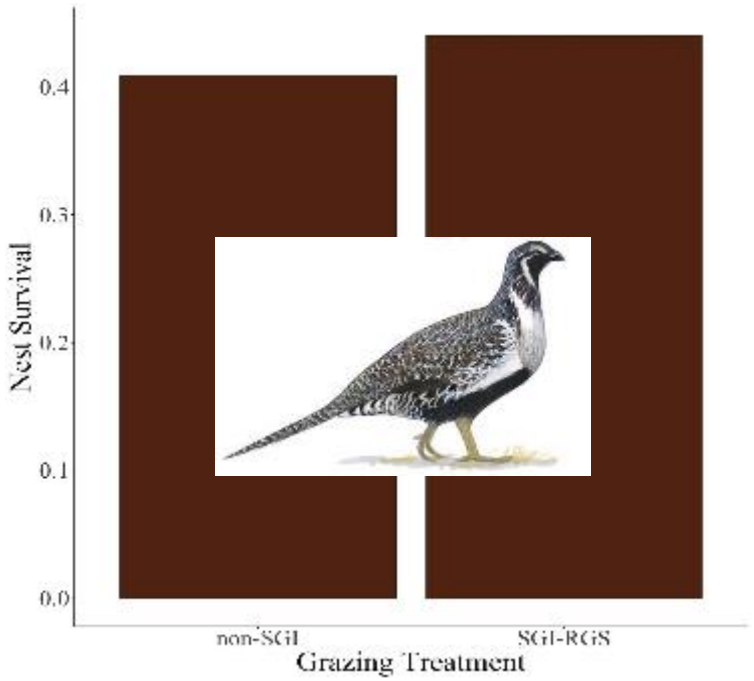
Sage-grouse not that picky

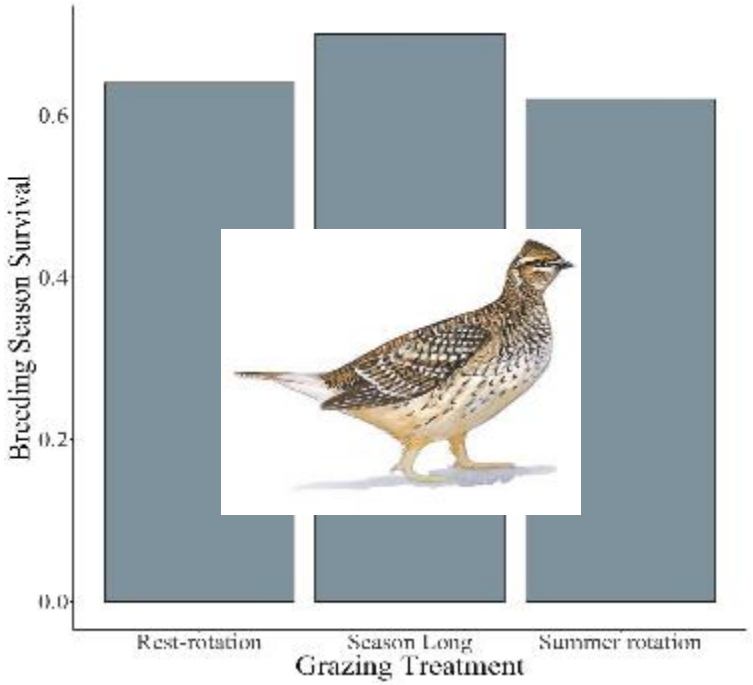


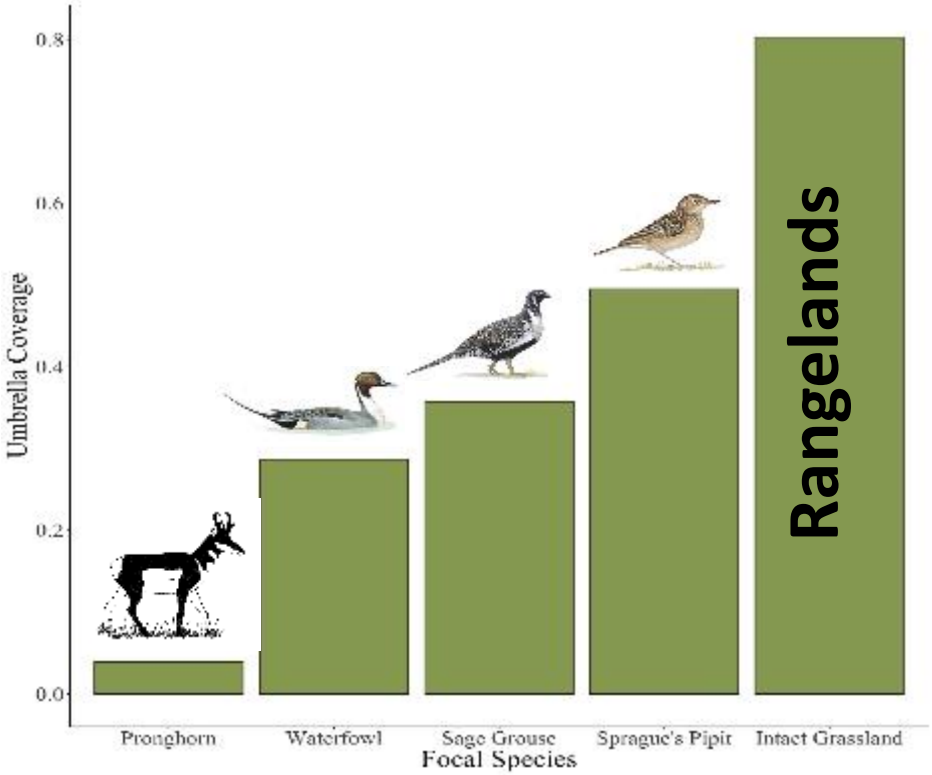




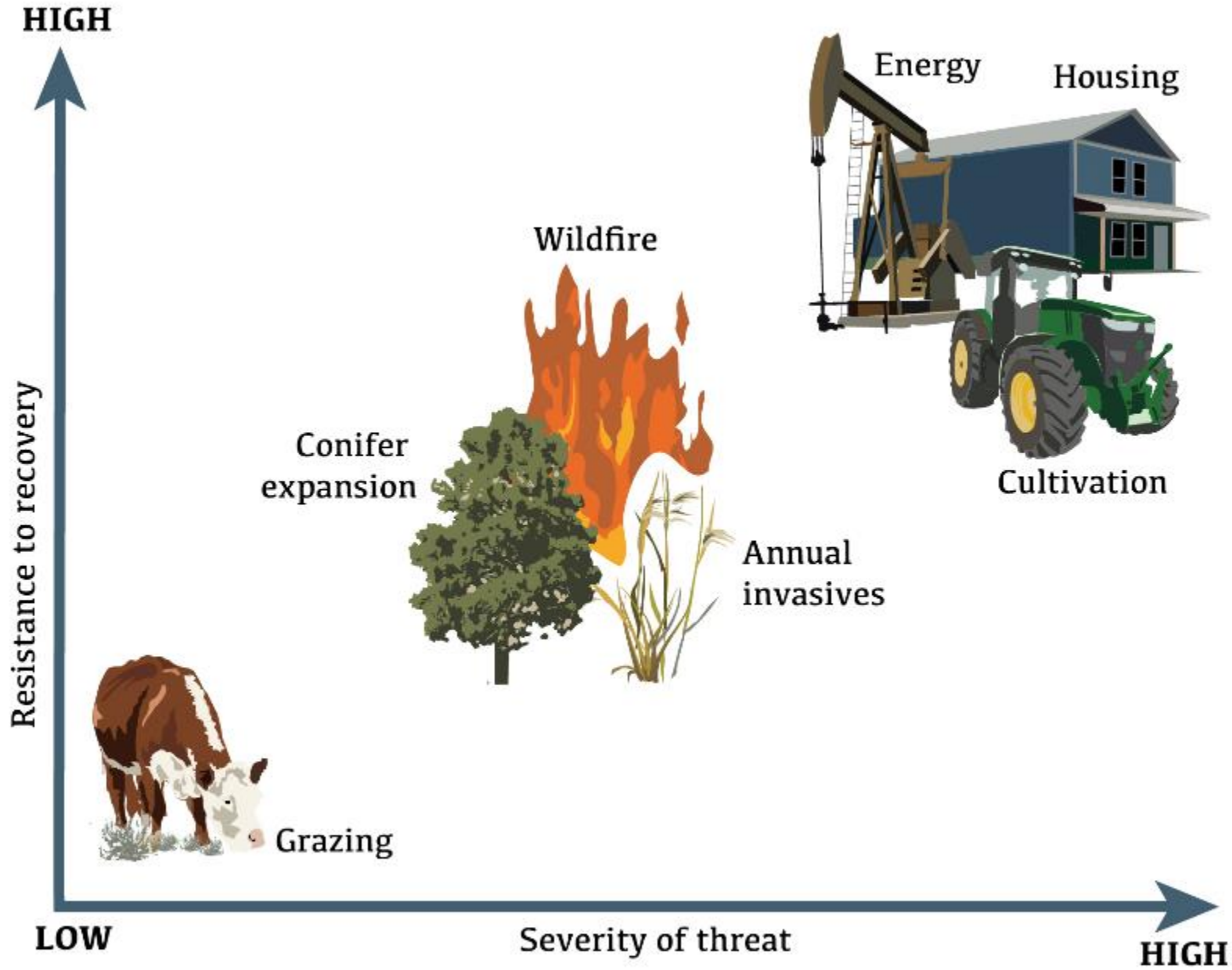
Science Coalescing Around Critical Message





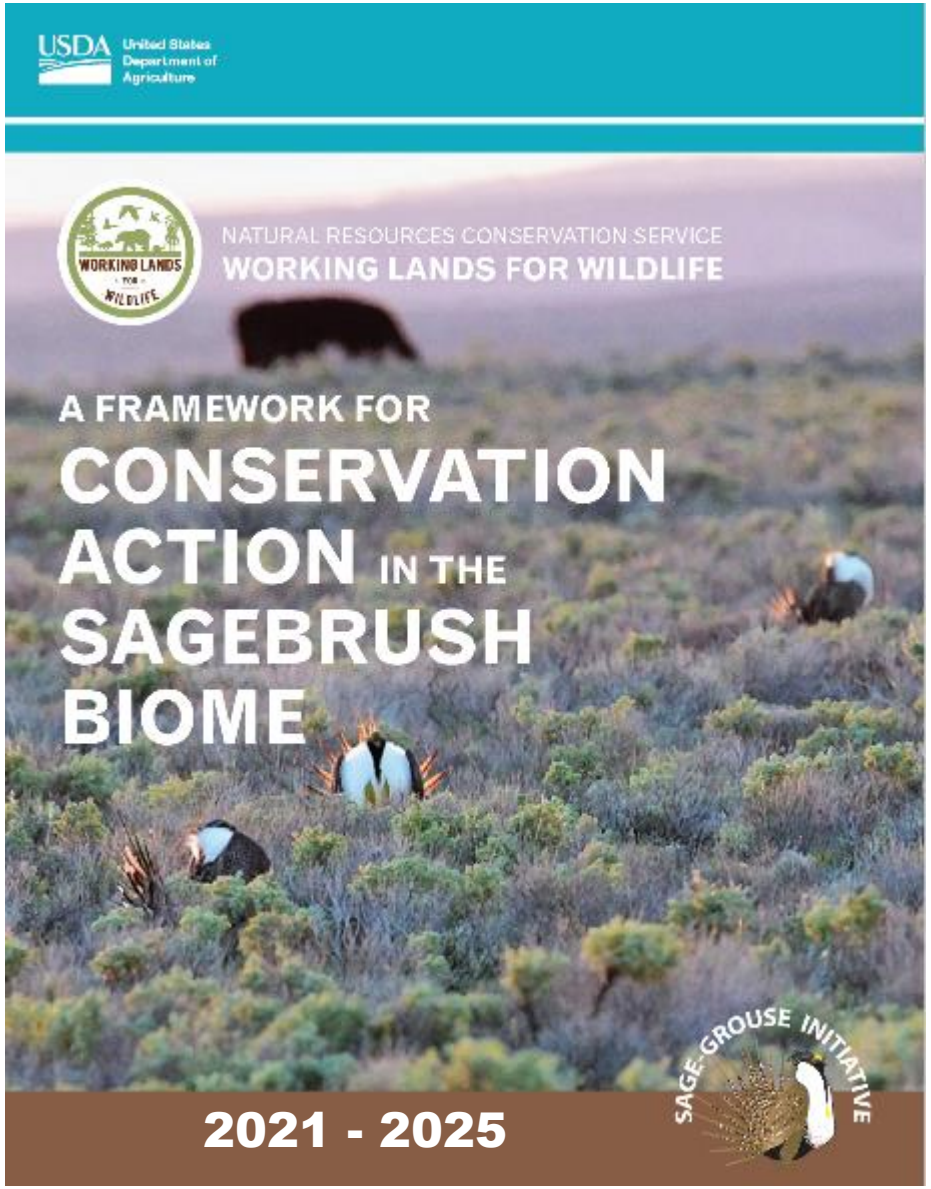


Intact grasslands are the best umbrella for multi-species conservation



Credit: USDA-NRCS, Working Lands for Wildlife

A decade of science is baked into our current 5-year Framework



Thanks!