

Sage-grouse Conservation Issues – An Overview

Montana Sage-grouse Habitat Conservation
Advisory Council

May 22, 2013



**Montana Fish,
Wildlife & Parks**

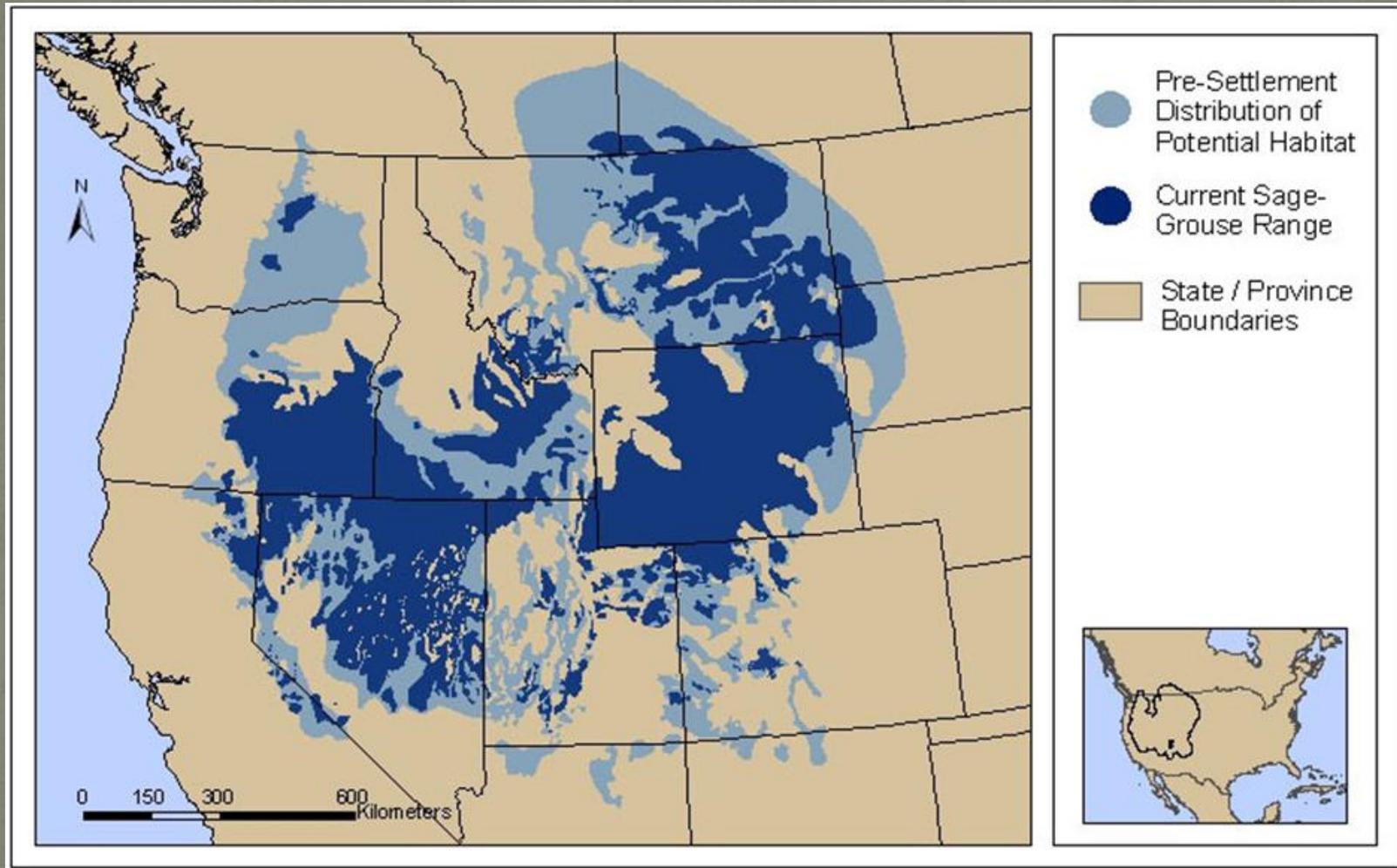
Outline

1. Background
2. Range-wide Overview of Conservation Issues
3. Habitat Conservation Issues in Montana



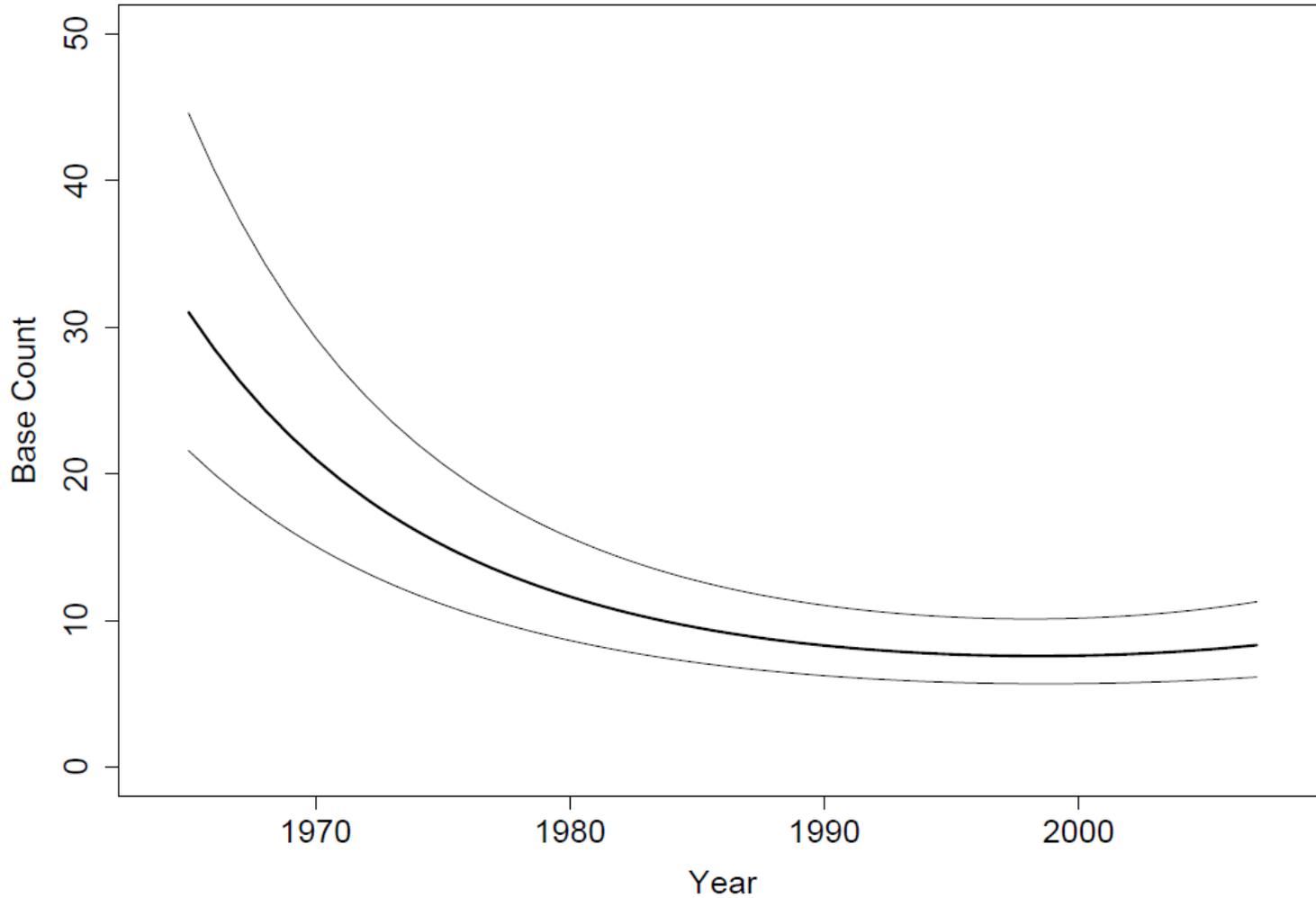
Background

Distribution of Sage-grouse

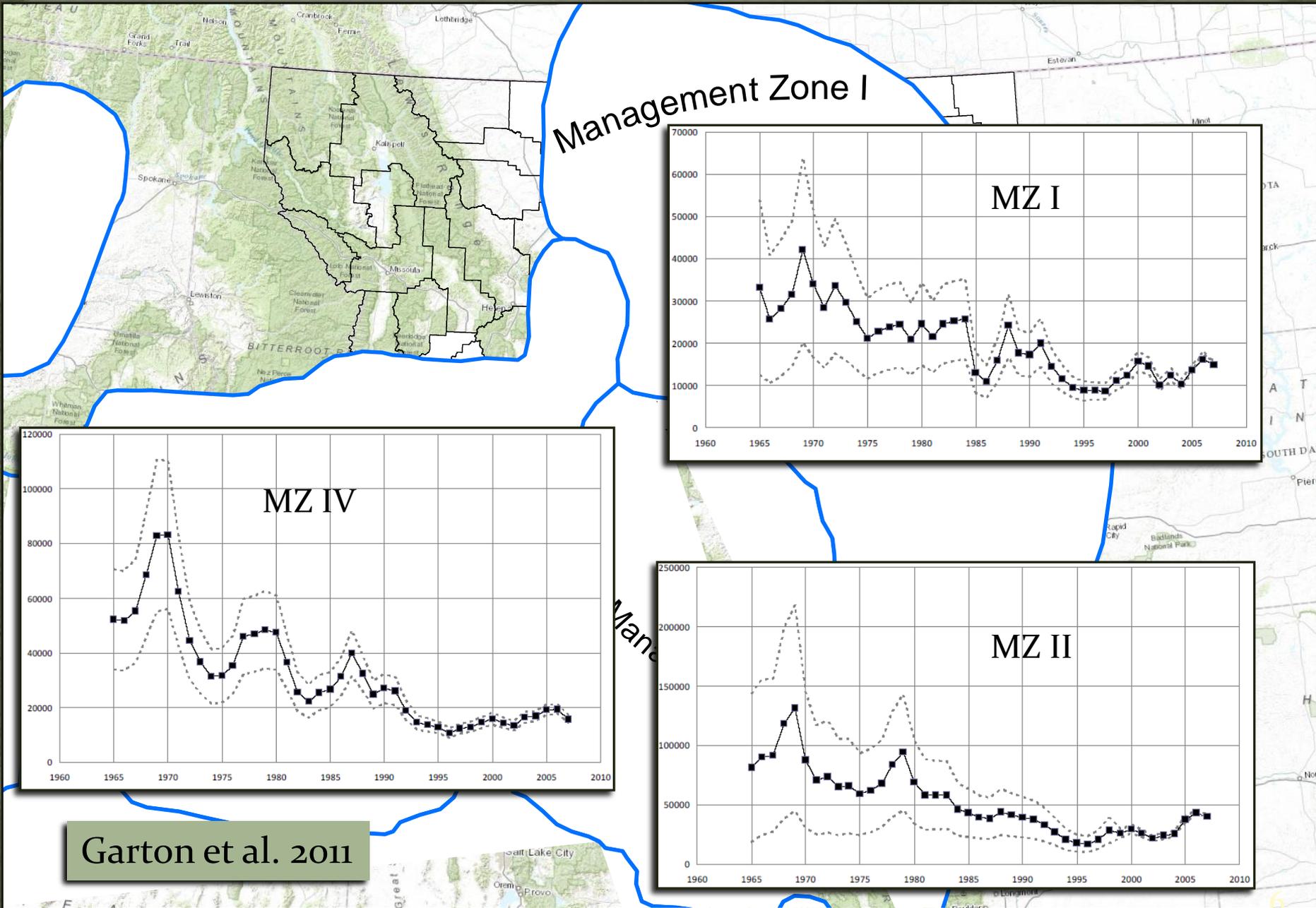


(USGS image, based on Schroeder et al. 2004)

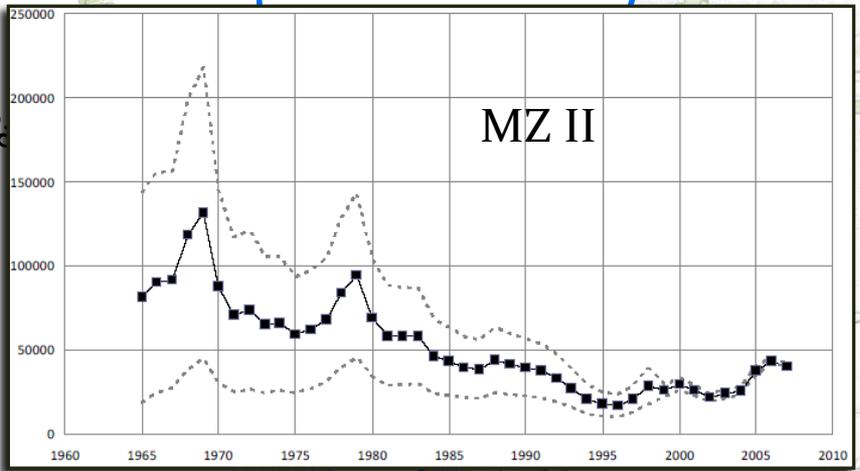
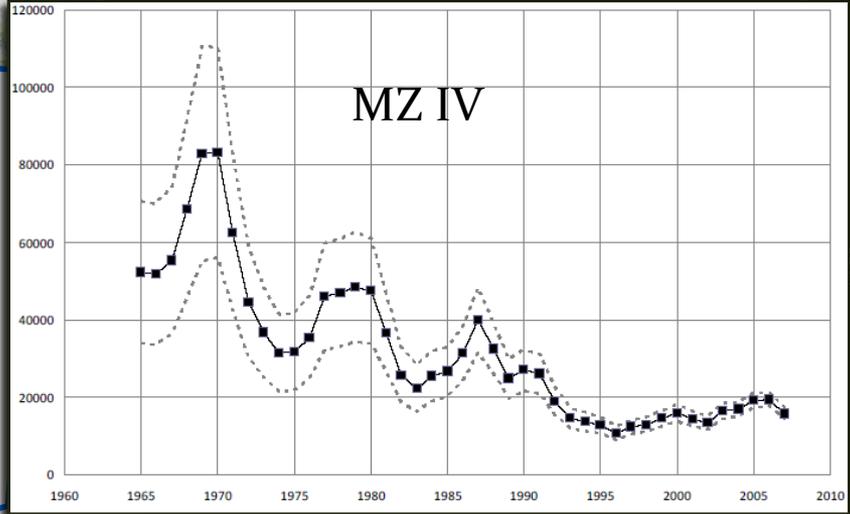
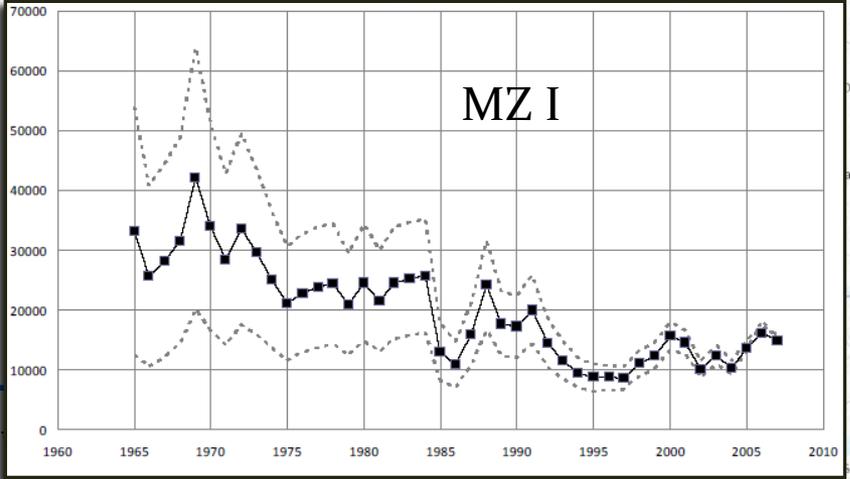
Rangewide 1965-2007



Rangewide Analysis of sage-grouse lek counts (WAFWA 2008)



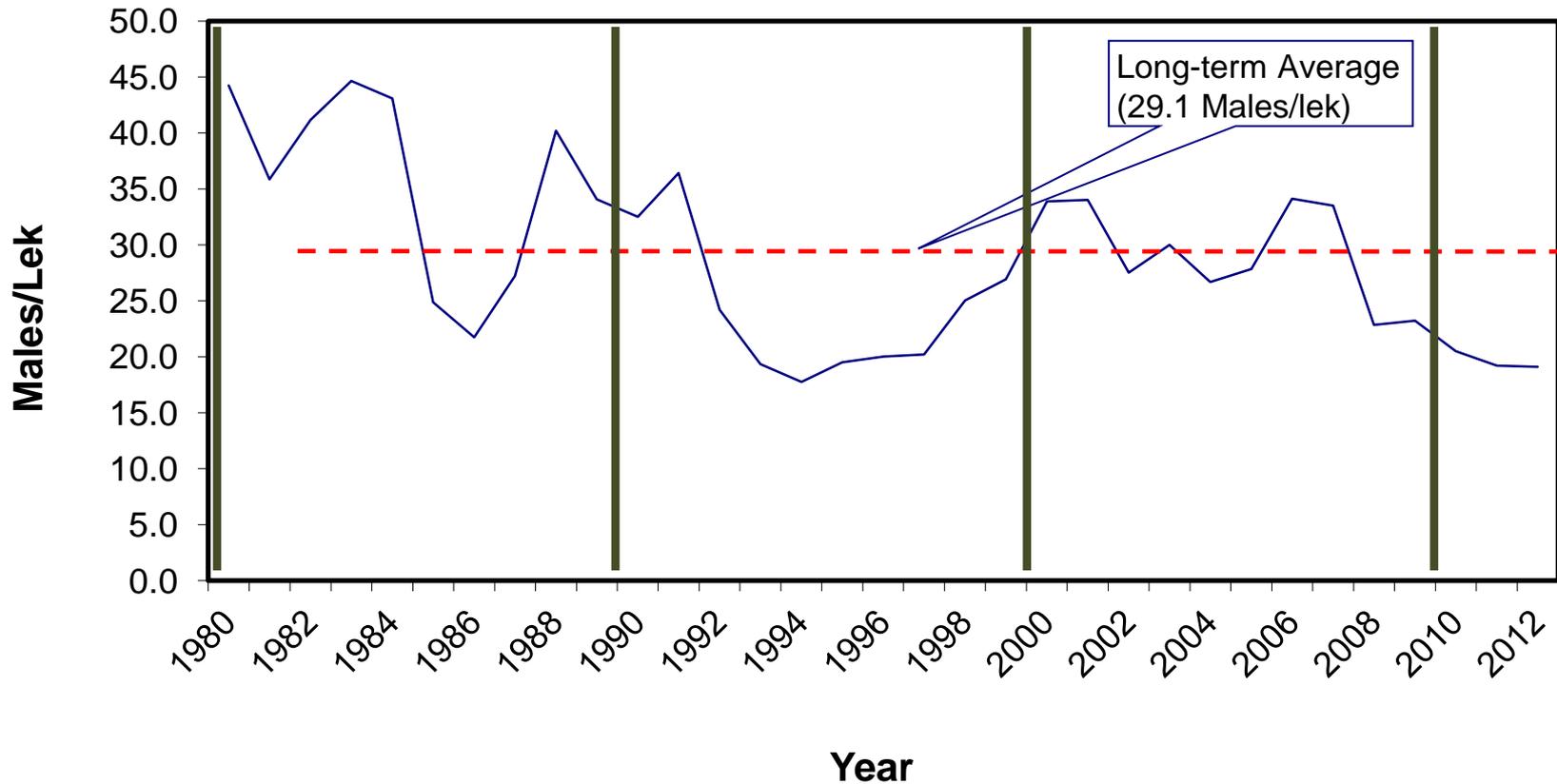
Management Zone I



Garton et al. 2011

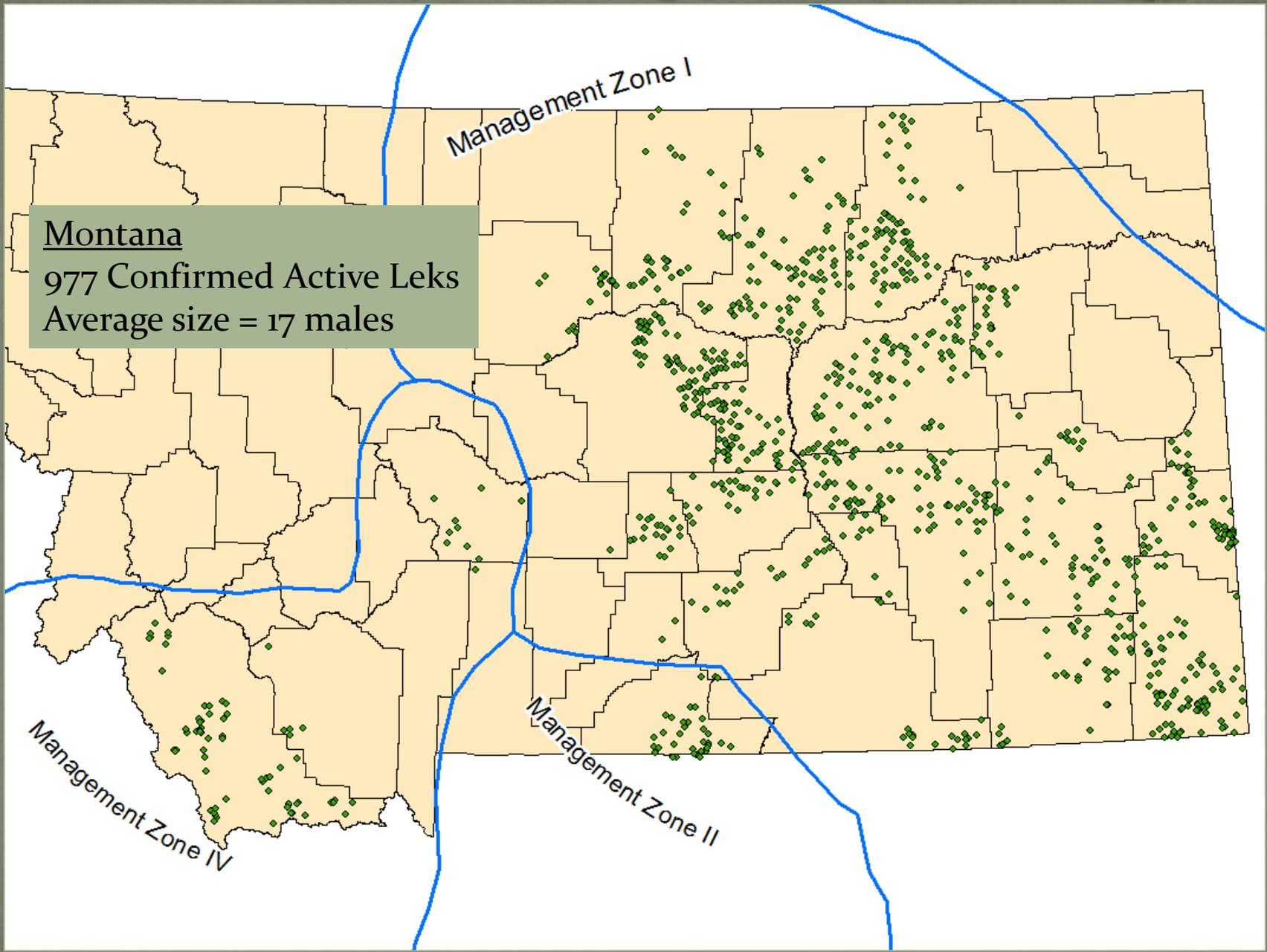
Short Term Abundance Trends in Montana

Sage-Grouse Male Counts on Leks 1980-2012

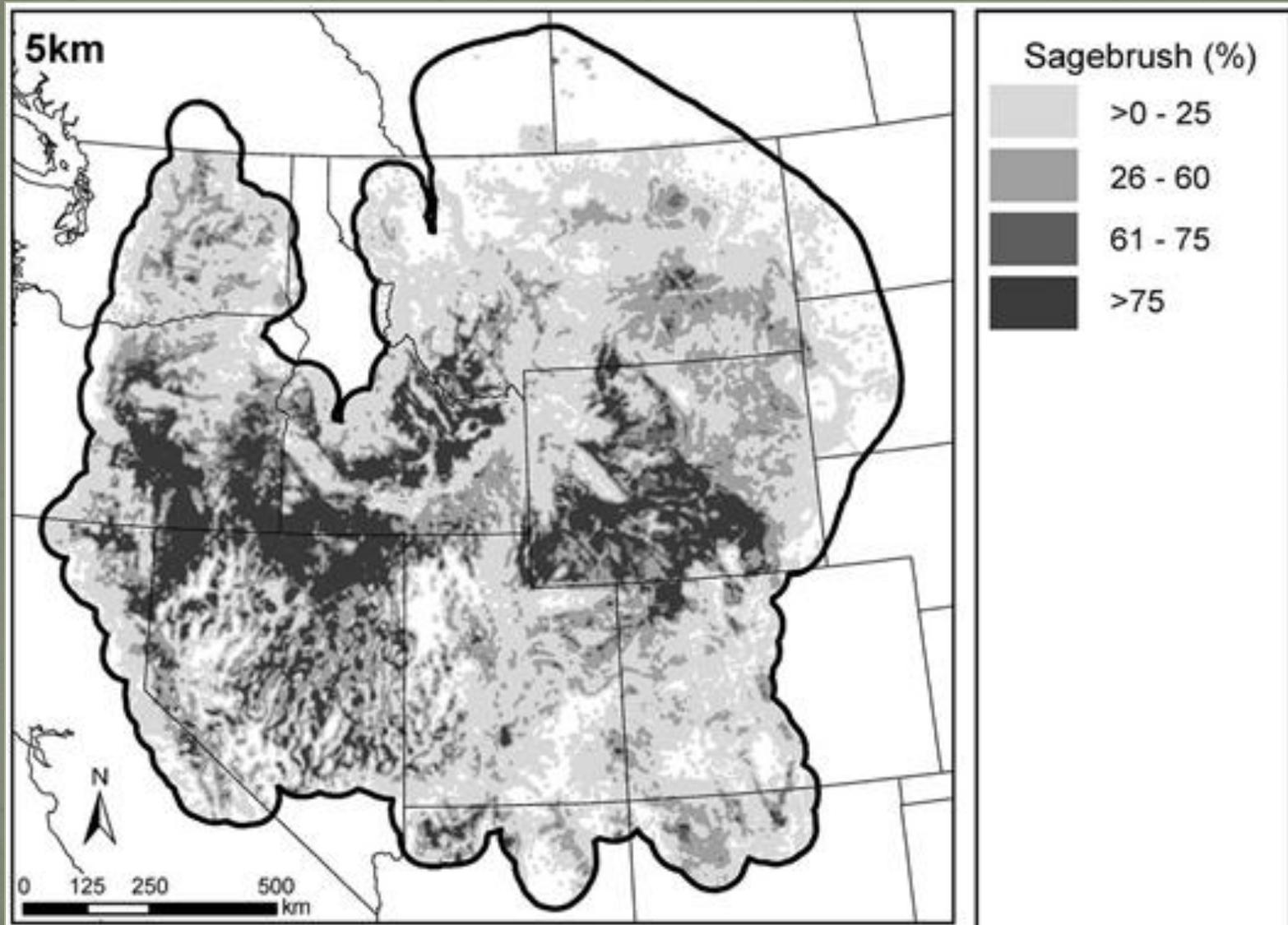


Distinguishing Trends in Abundance

- Short term
 - Weather
 - Fluctuations in predator/prey abundances
 - Disease outbreaks
- Long term
 - Changes affecting population vital rates on a more permanent basis (habitat issues)

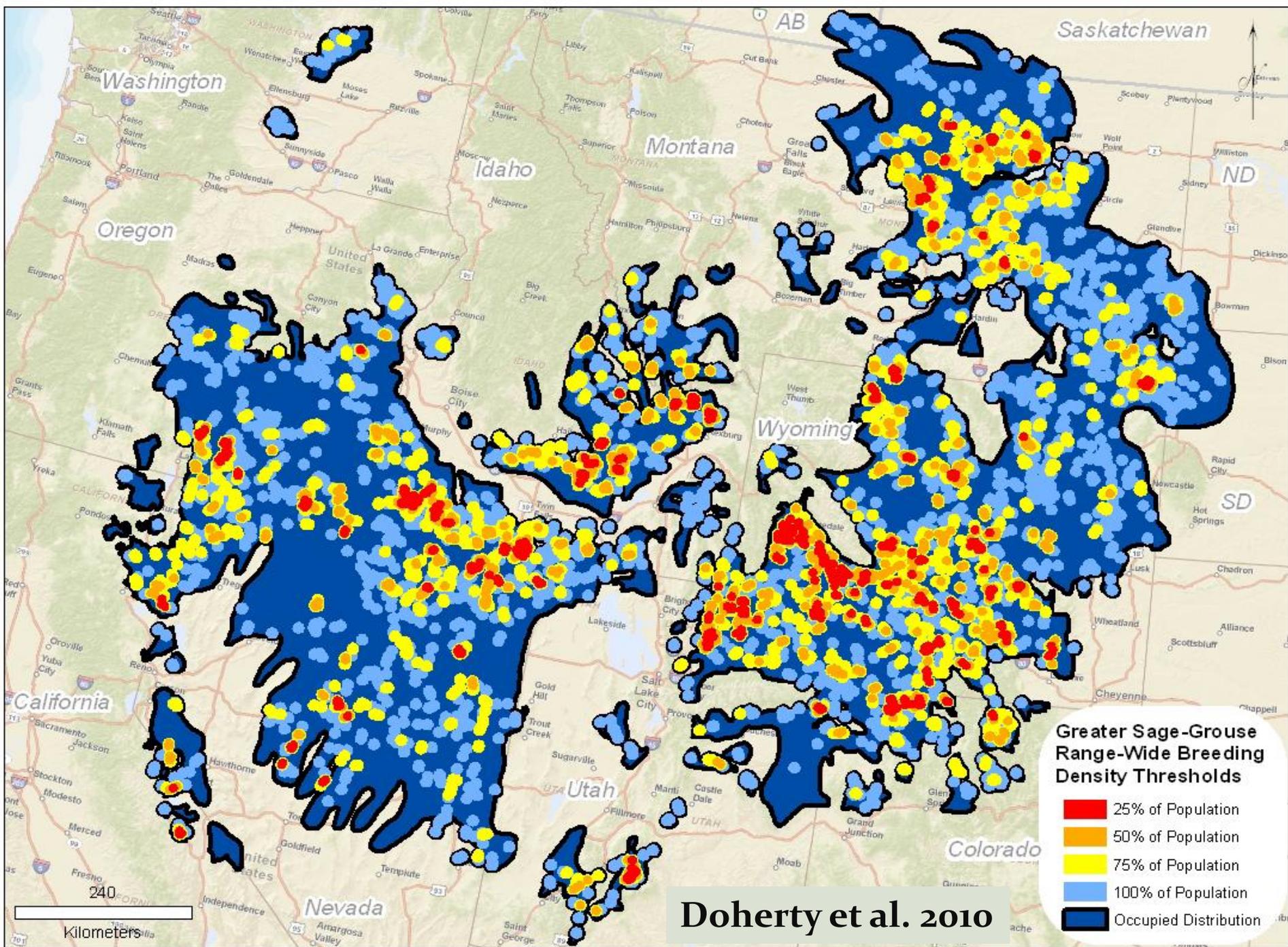


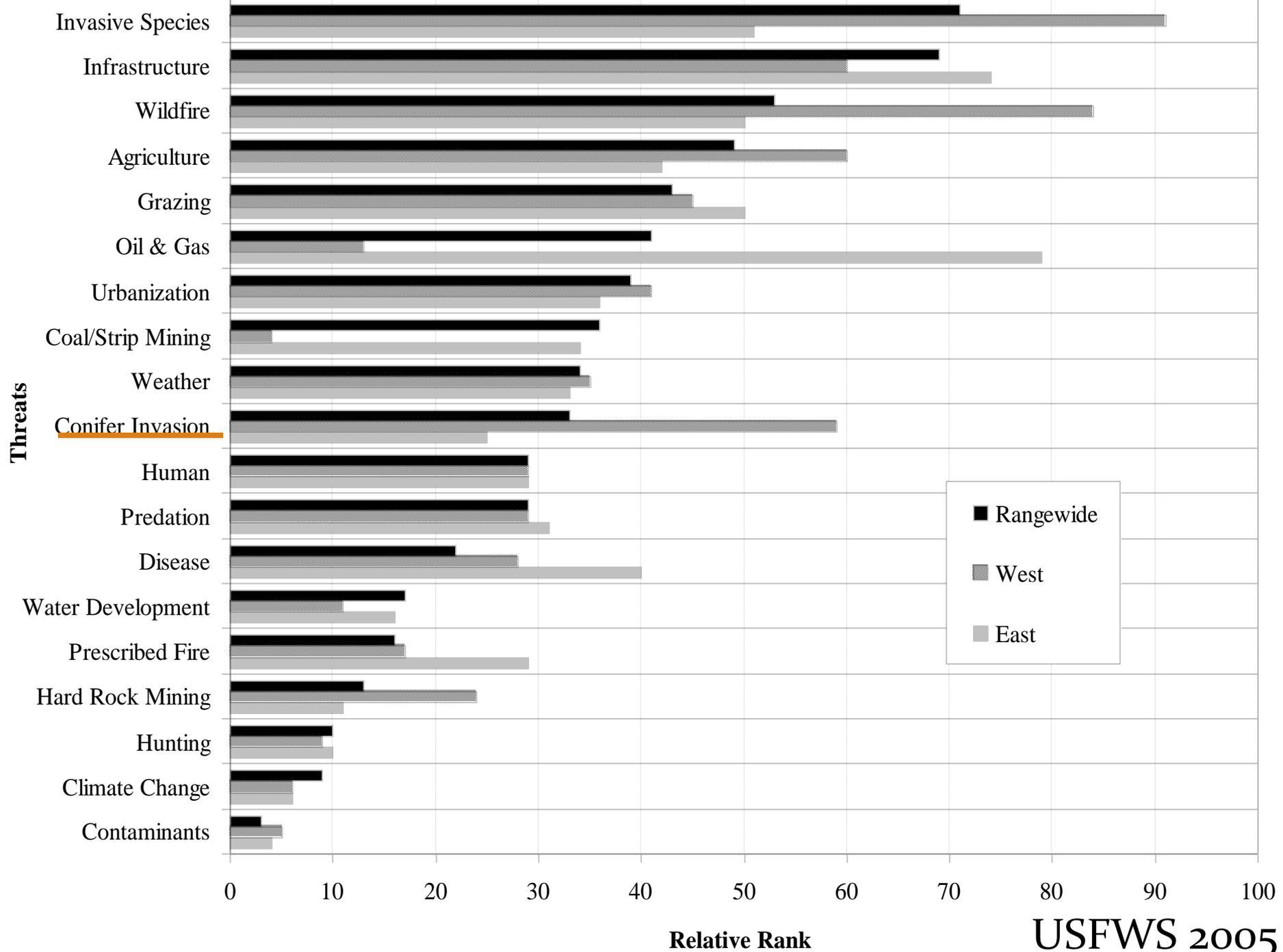
Where's the sagebrush in MT?



Percent of landscape dominated by sagebrush (Knick and Hanser 2011).

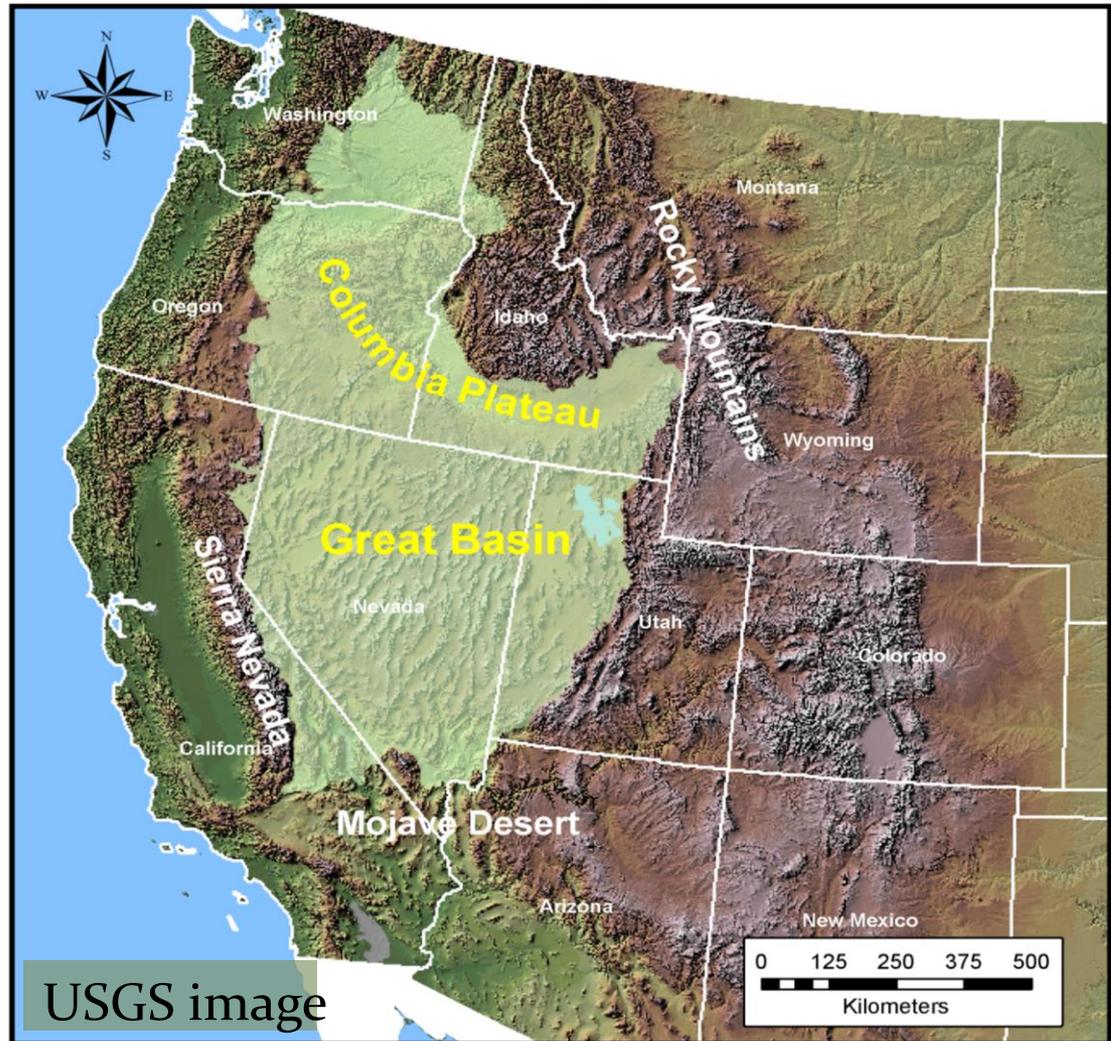
Conservation Issues: Range-wide



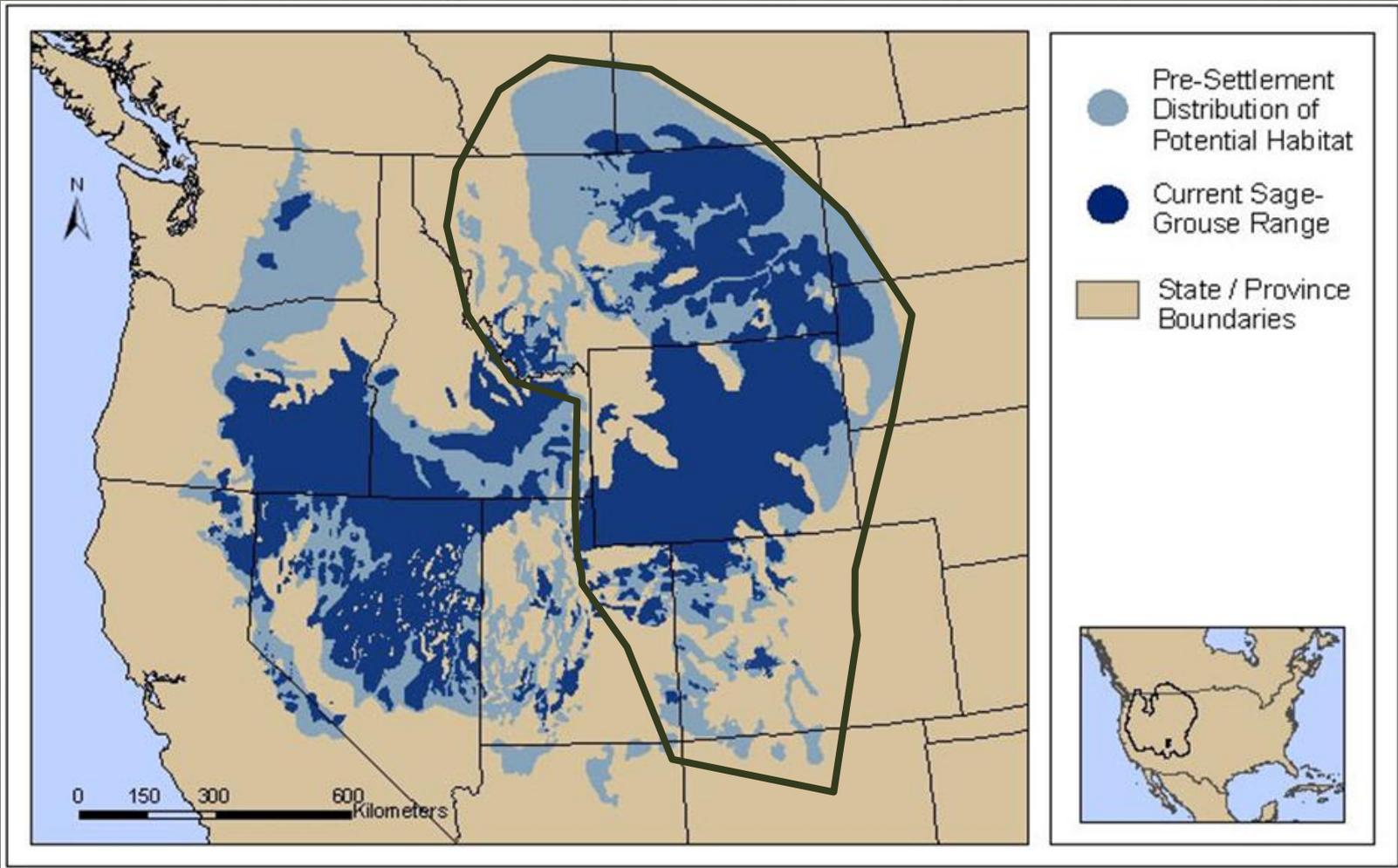


The western portion of sage-grouse range is generally within the Columbia Plateau and Great Basin

Great Basin and Columbia Plateau Regions in the western United States



Distribution of Sage-grouse



(USGS image, based on Schroeder et al. 2004)

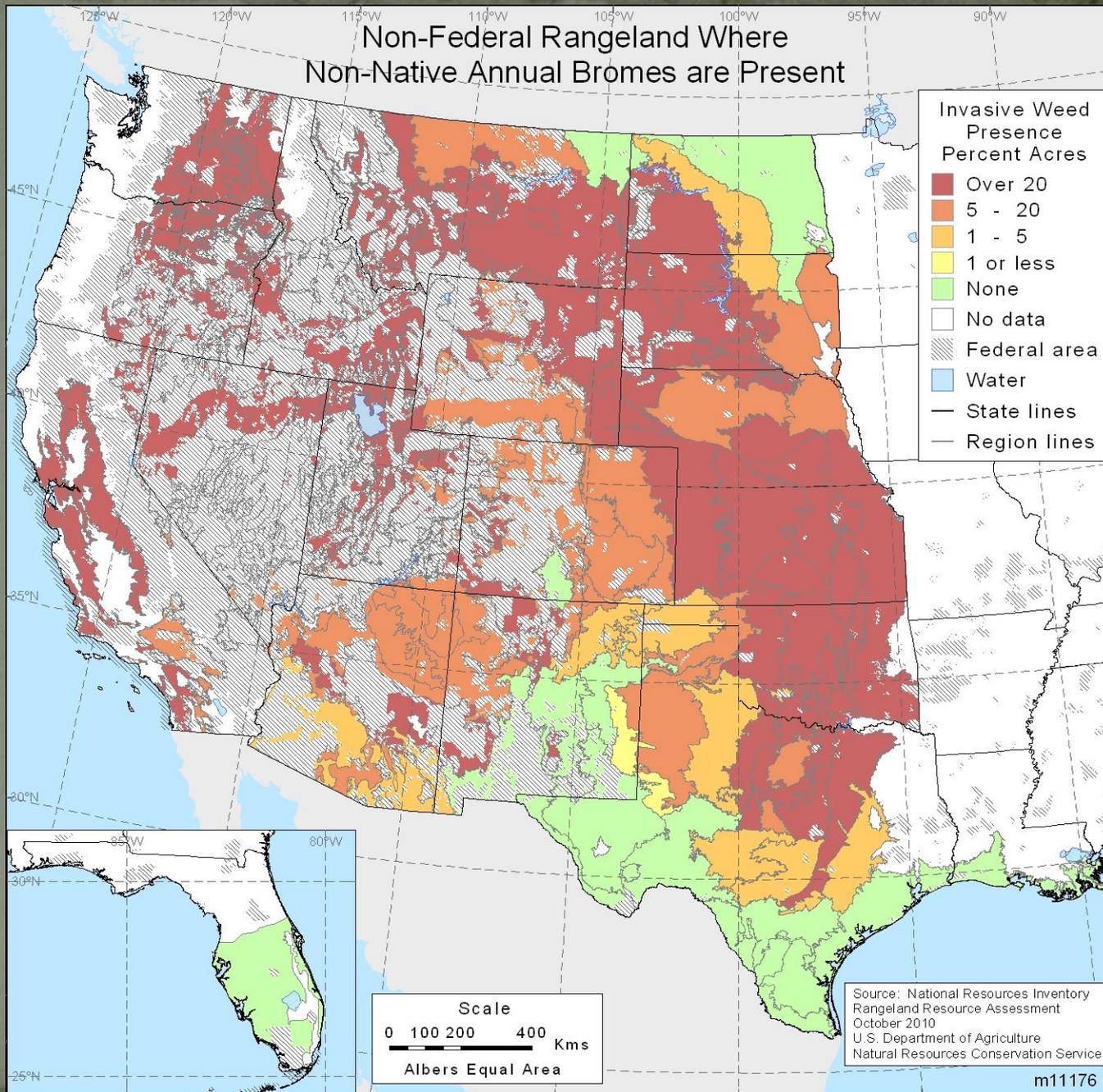
Invasive Species



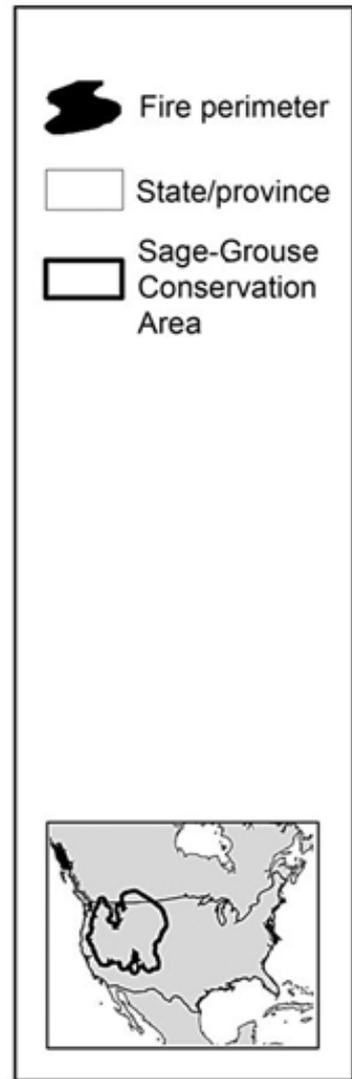
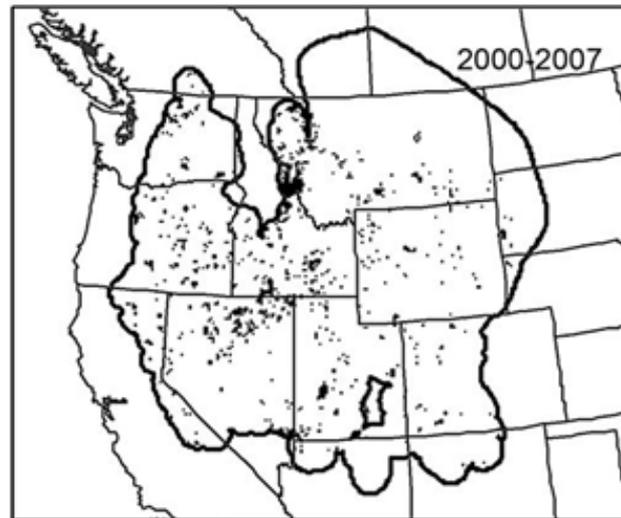
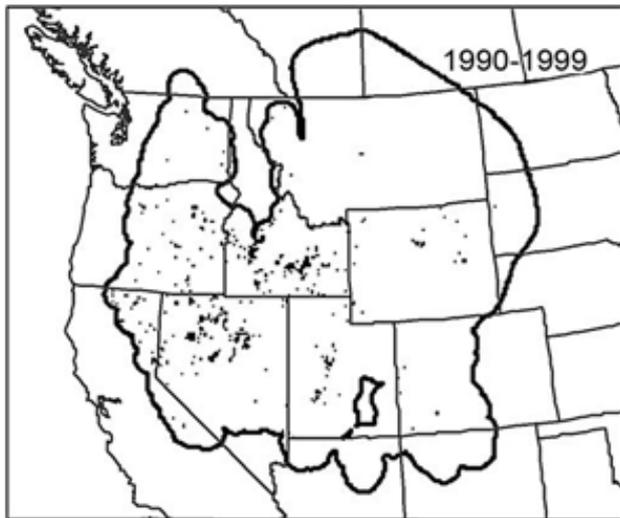
5-17-2013



Non-Federal Rangeland Where Non-Native Annual Bromes are Present



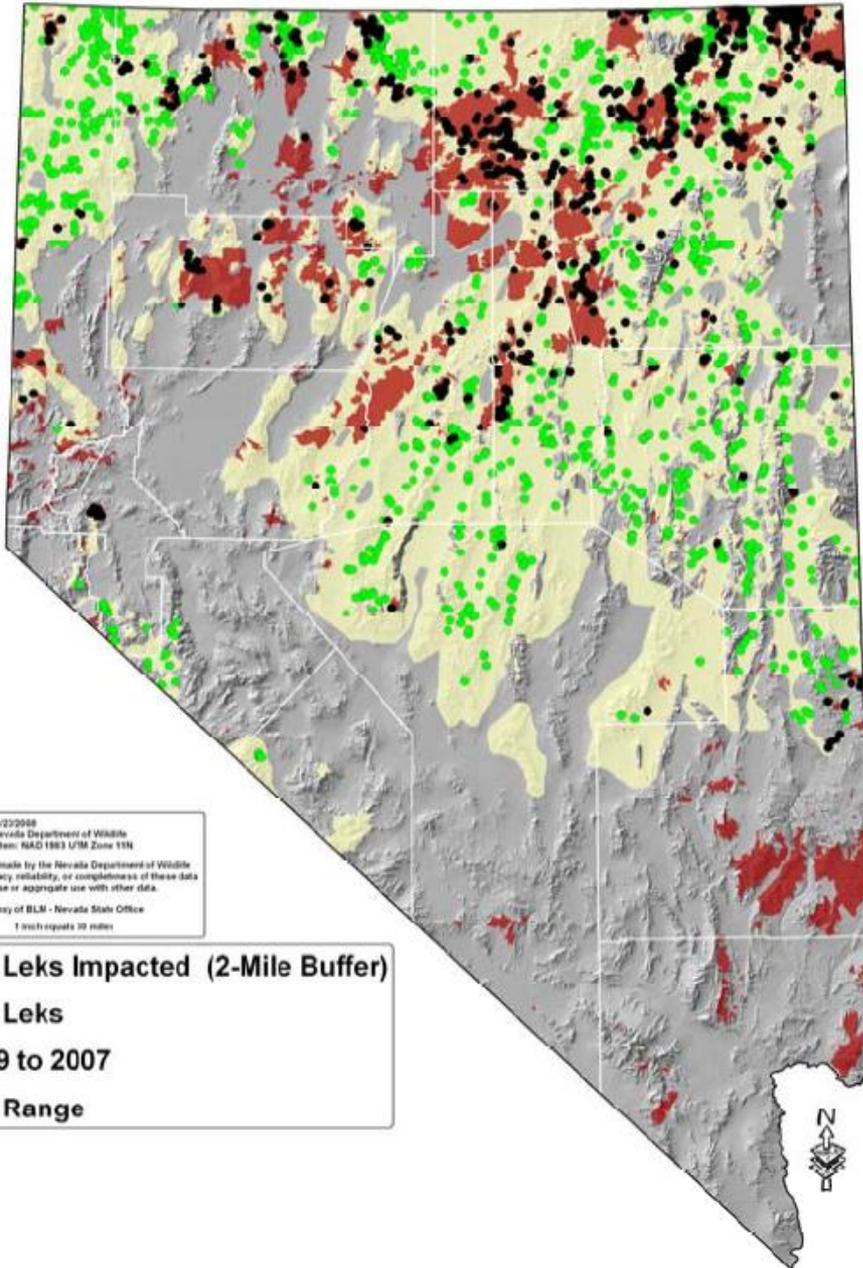
Wildfire



0 37 75 1,500 km

(Miller et al. 2011)

Effects of Wildfires (1999 to 2007) on Greater Sage-grouse



WILDFIRES

--An Example--

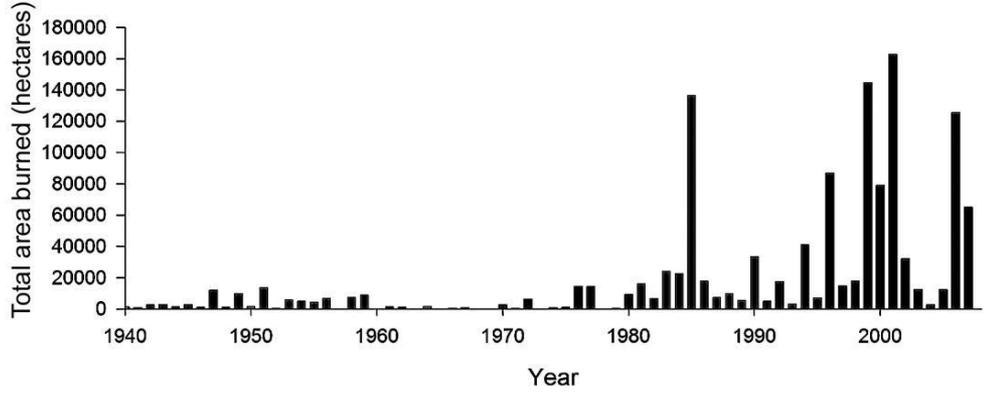
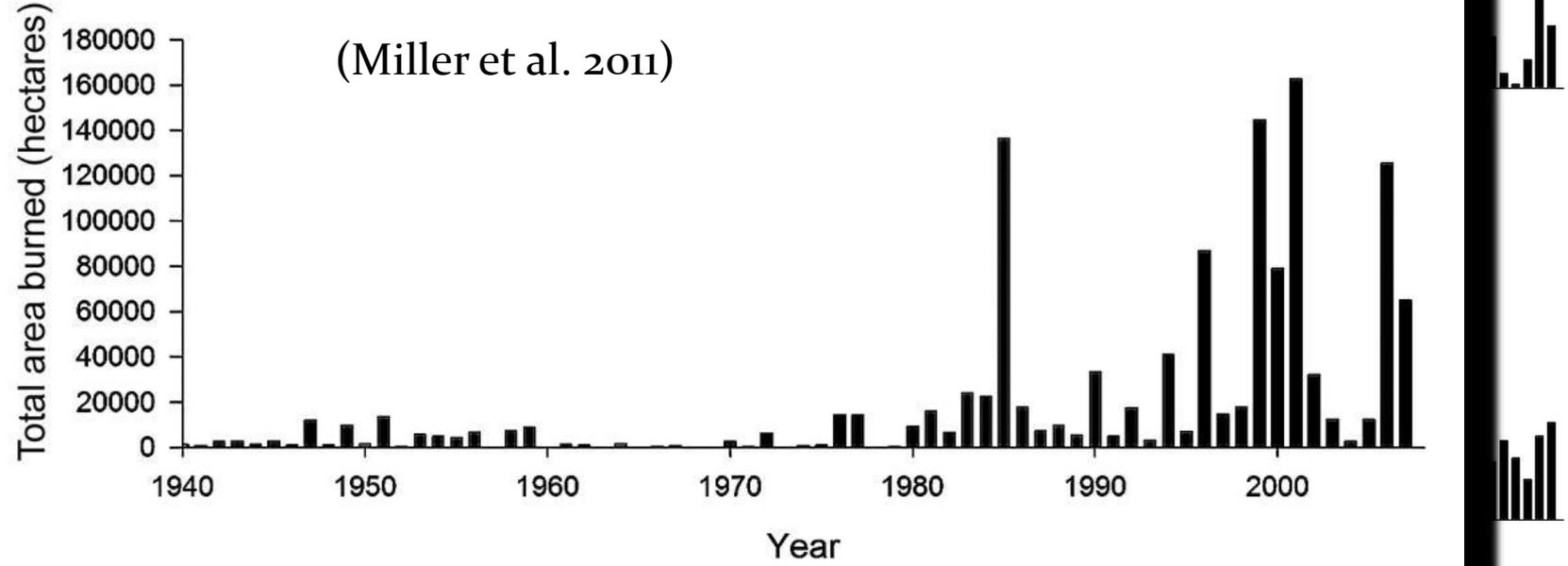
11.6% or
2.5 million ac.
of sage-grouse
habitats
burned in NV,
1999-2007.

(Espinosa and
Phenix 2008)

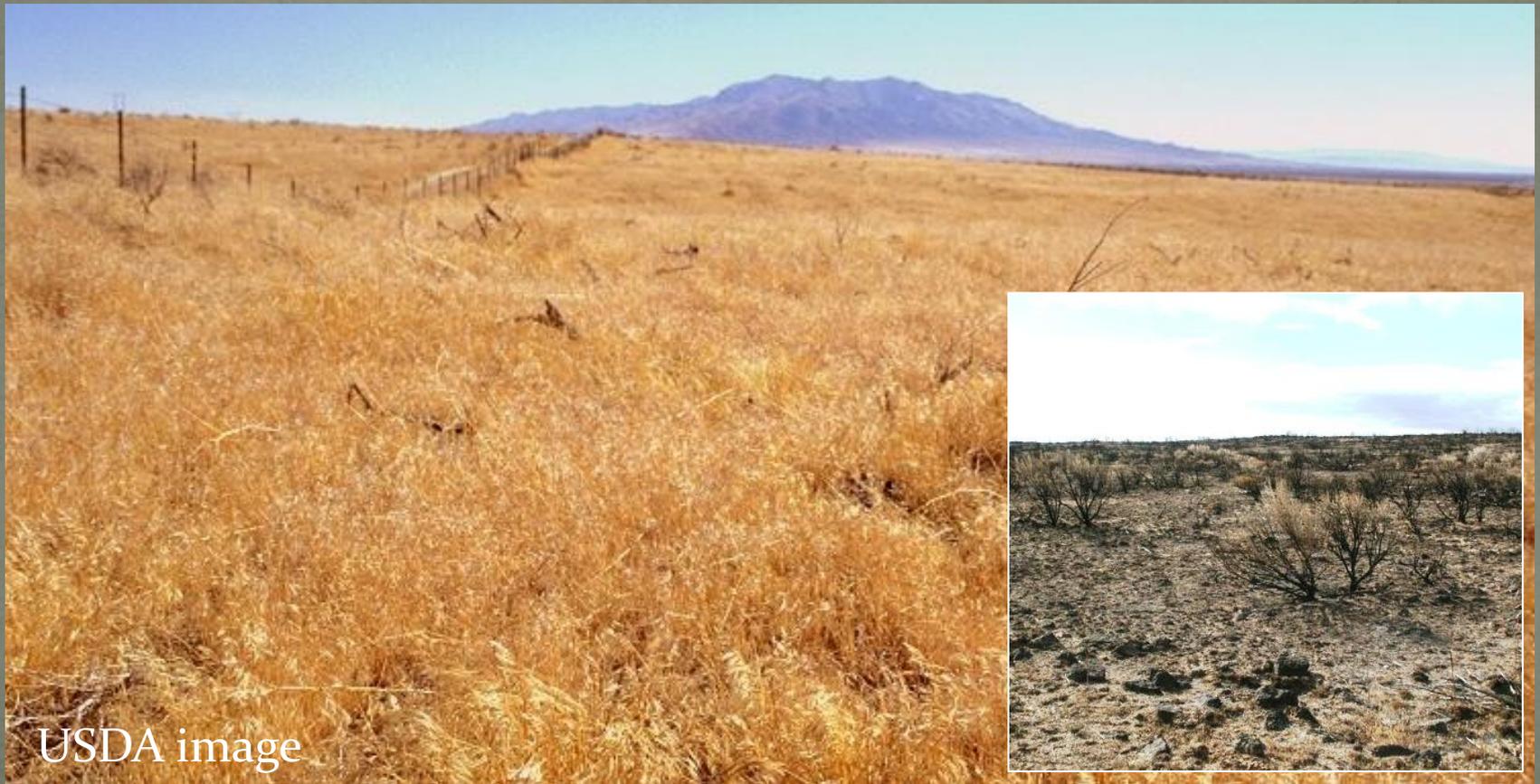
Northern Great Basin

of fires
250
200
150

(Miller et al. 2011)



Wildfire frequency is linked to invasion by annual brome grass species – the vicious cycle.

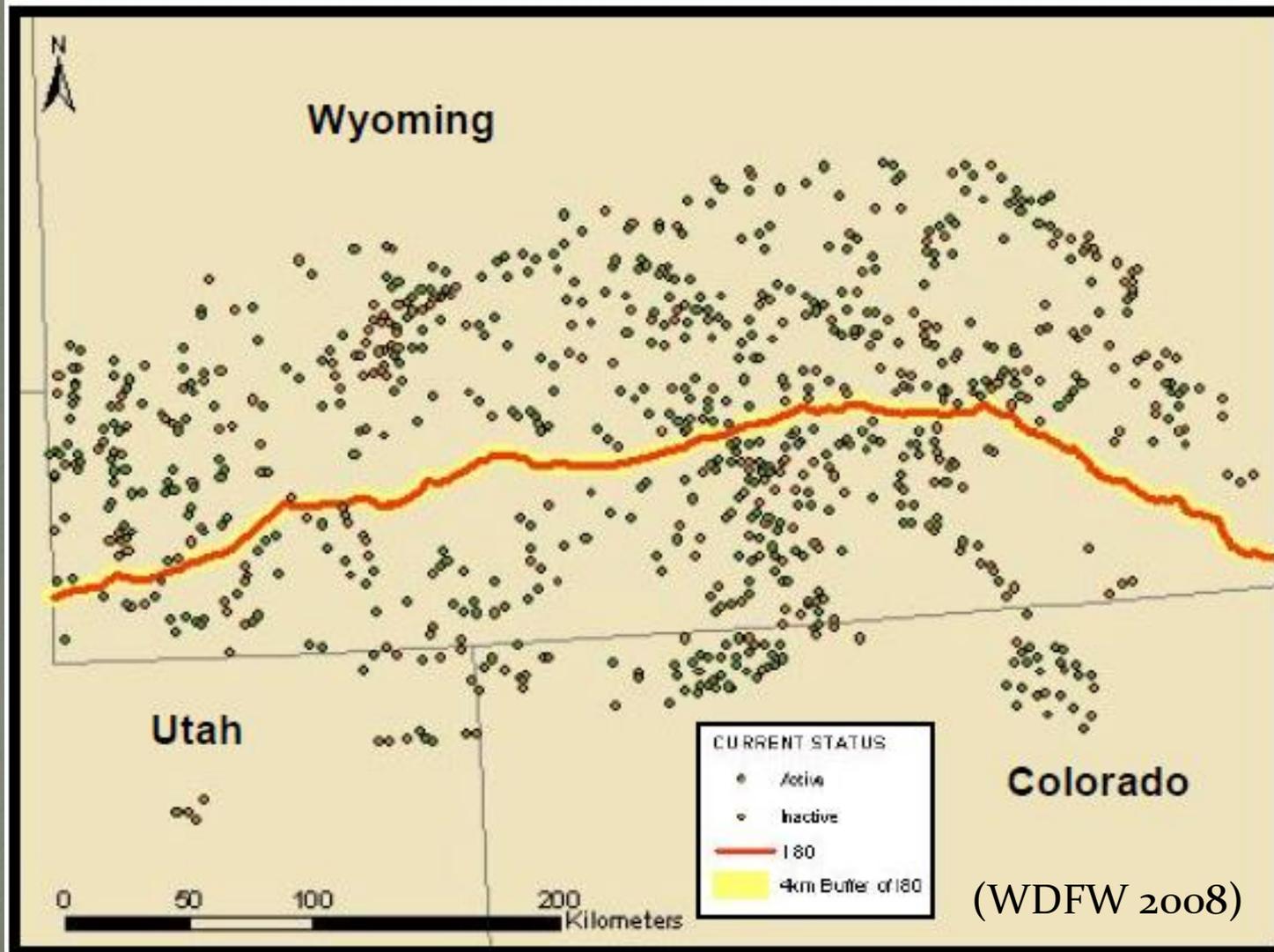


USDA image

Infrastructure and Fragmentation

Infrastructure and Fragmentation:
*Transmission (roads, power
lines, pipelines, etc.)*

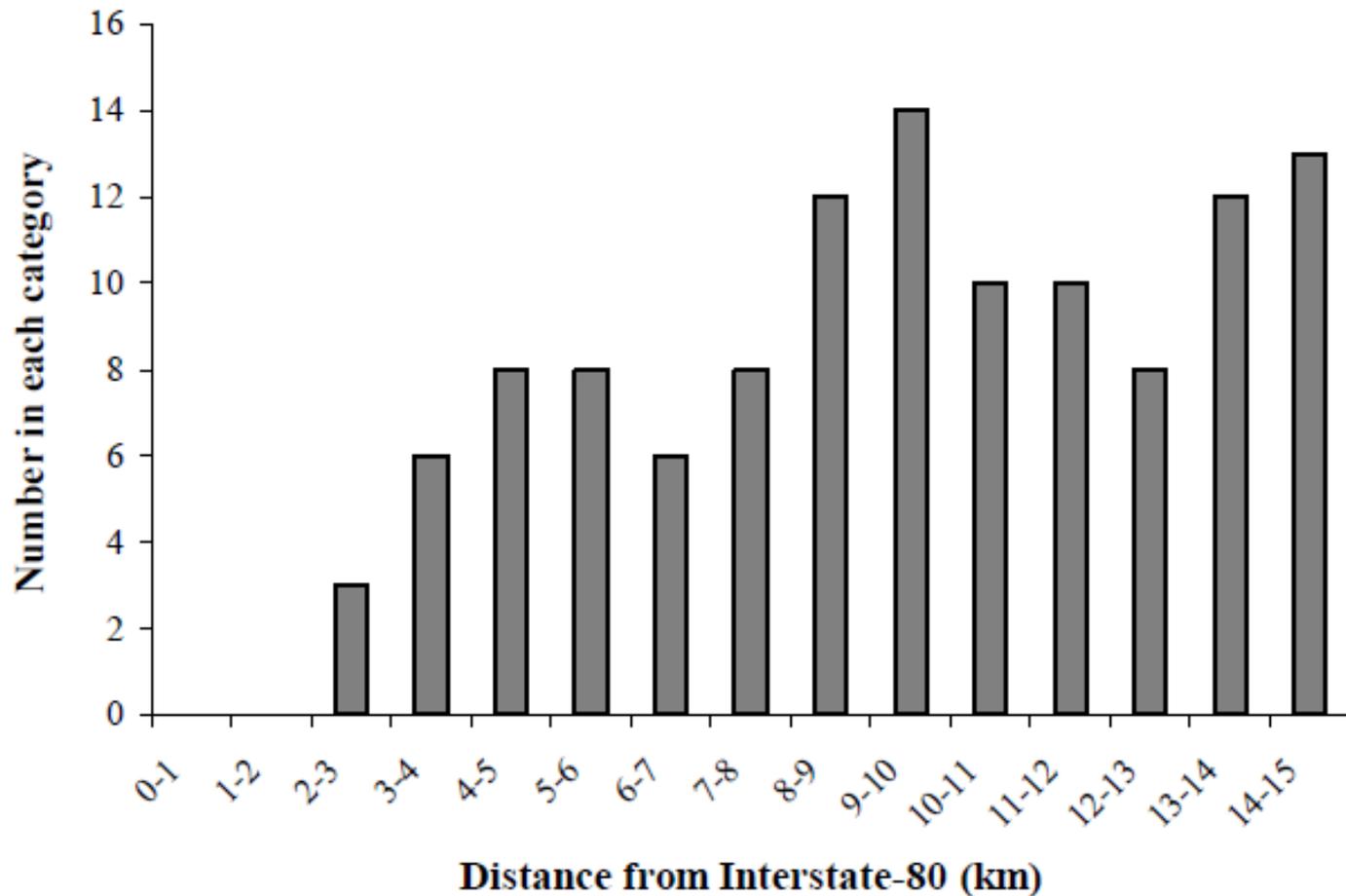
Example: Interstate 80, WY and UT



Example: Interstate 80, WY and UT

Figure 13.2. Distribution of greater sage-grouse leks with respect to Interstate 80 in Wyoming and northeastern Utah, 2003.

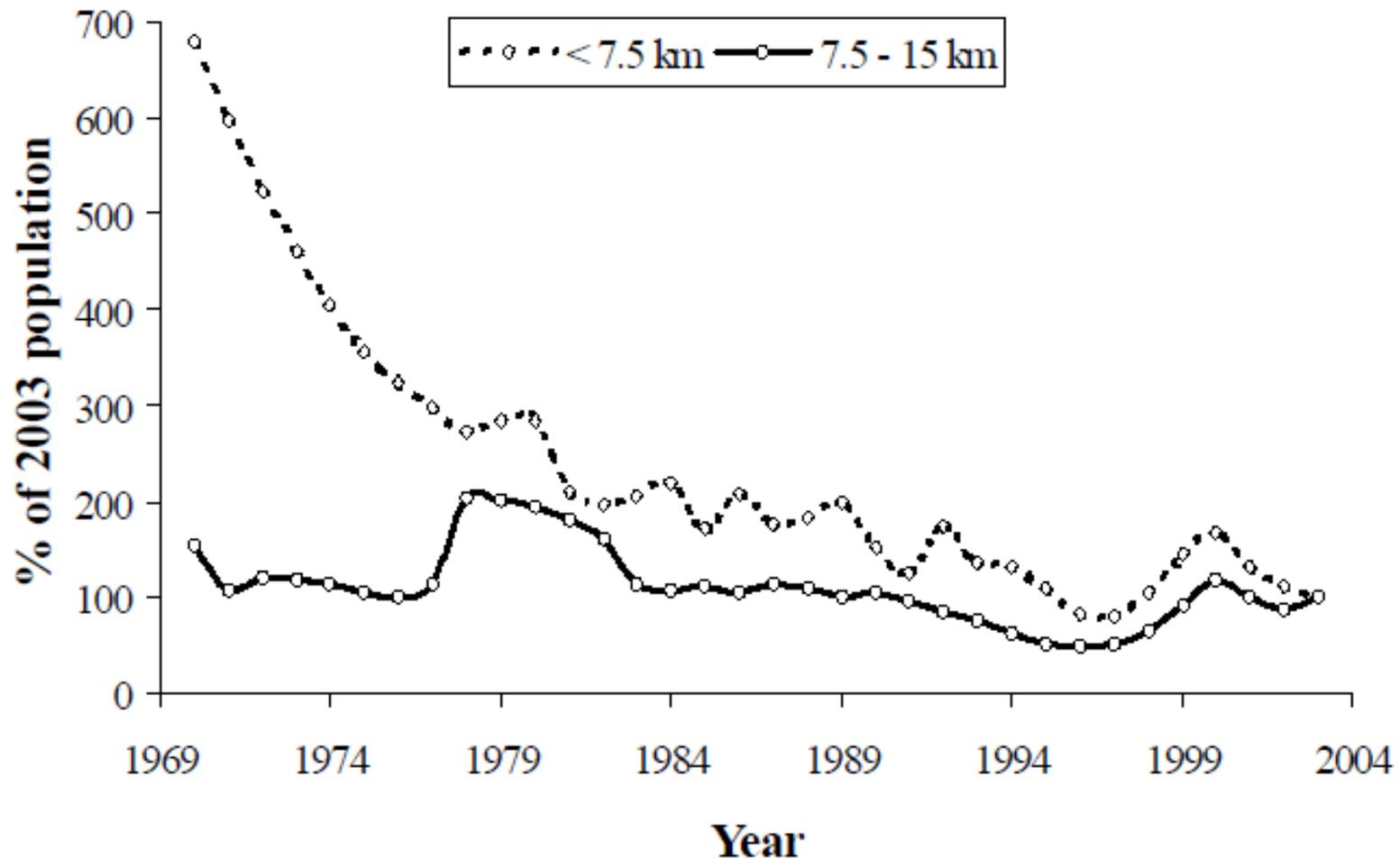
(Connelly et al. 2004)



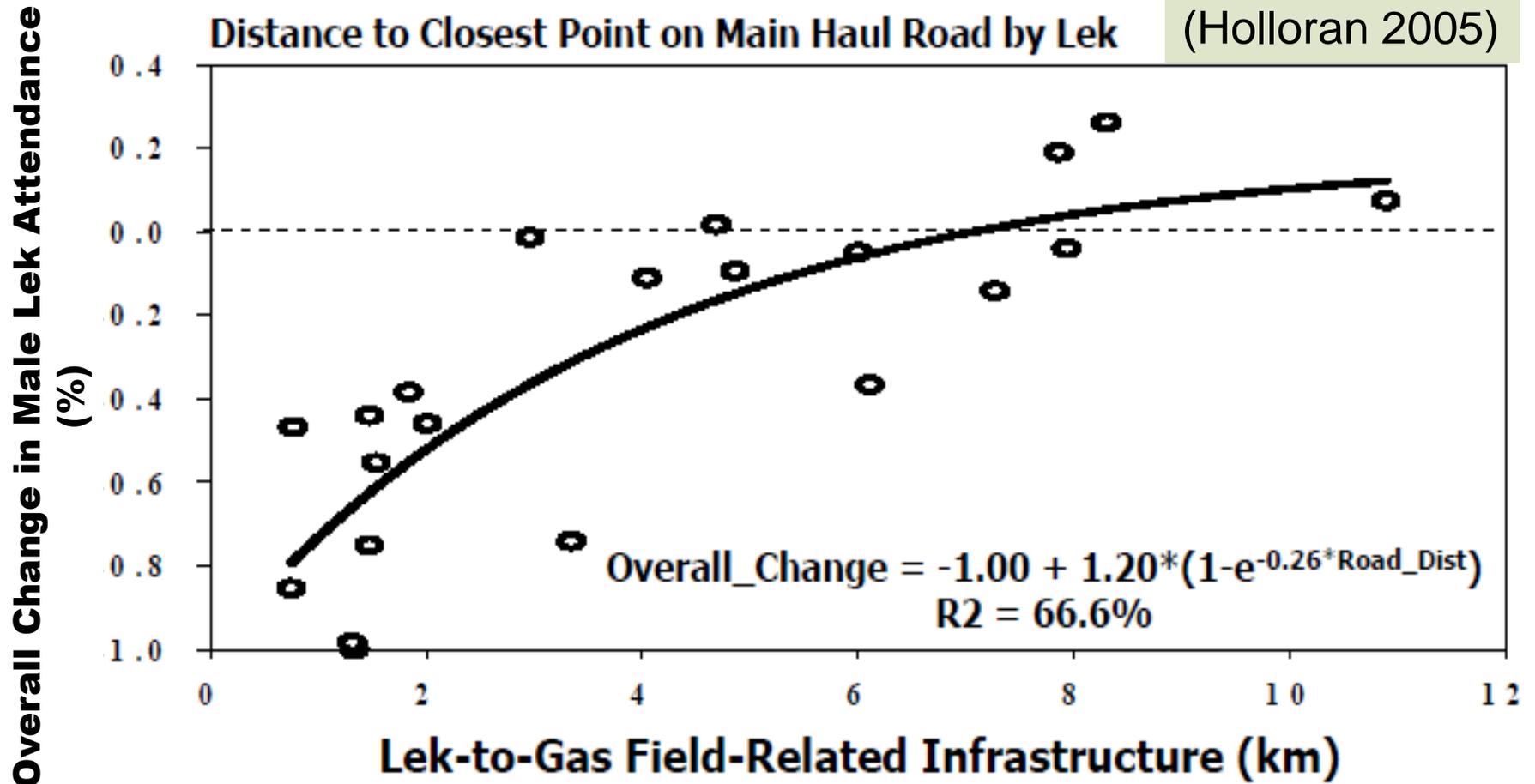
Example: Interstate 80, WY and UT

Figure 13.3. Population trends for leks relatively close to and far from I-80 in Wyoming and northeastern Utah.

(Connelly et al. 2004)



More on road effects...



Transmission Lines



(BLM/California)

Transmission Lines

- Unclear as to the impacts on sage-grouse populations
- Collisions
- Avoidance?
- Raven and raptor response – effectively expanding nesting and hunting range for some avian predators

Pipelines



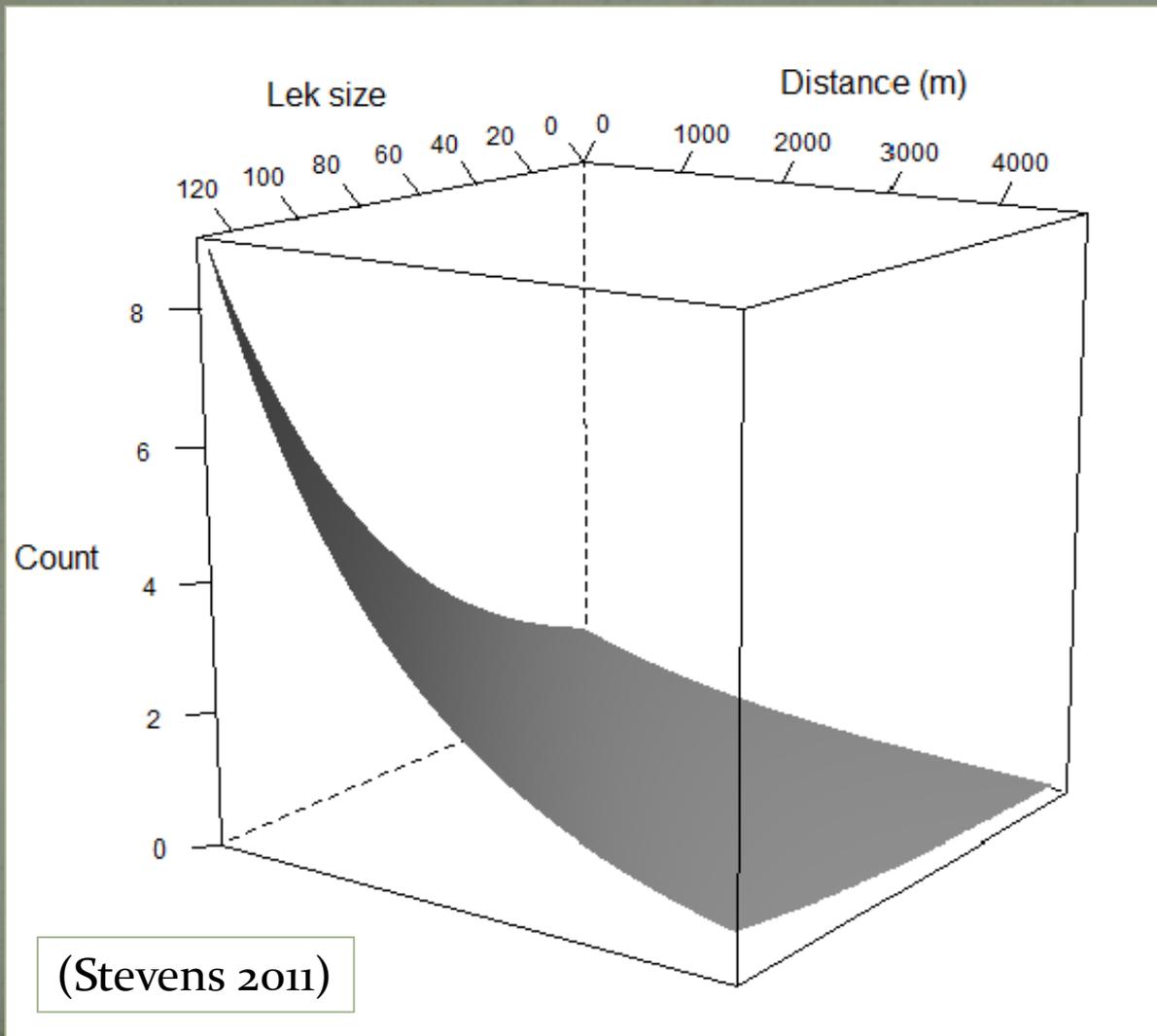
Pipeline Compressors



(BLM/Wyoming)

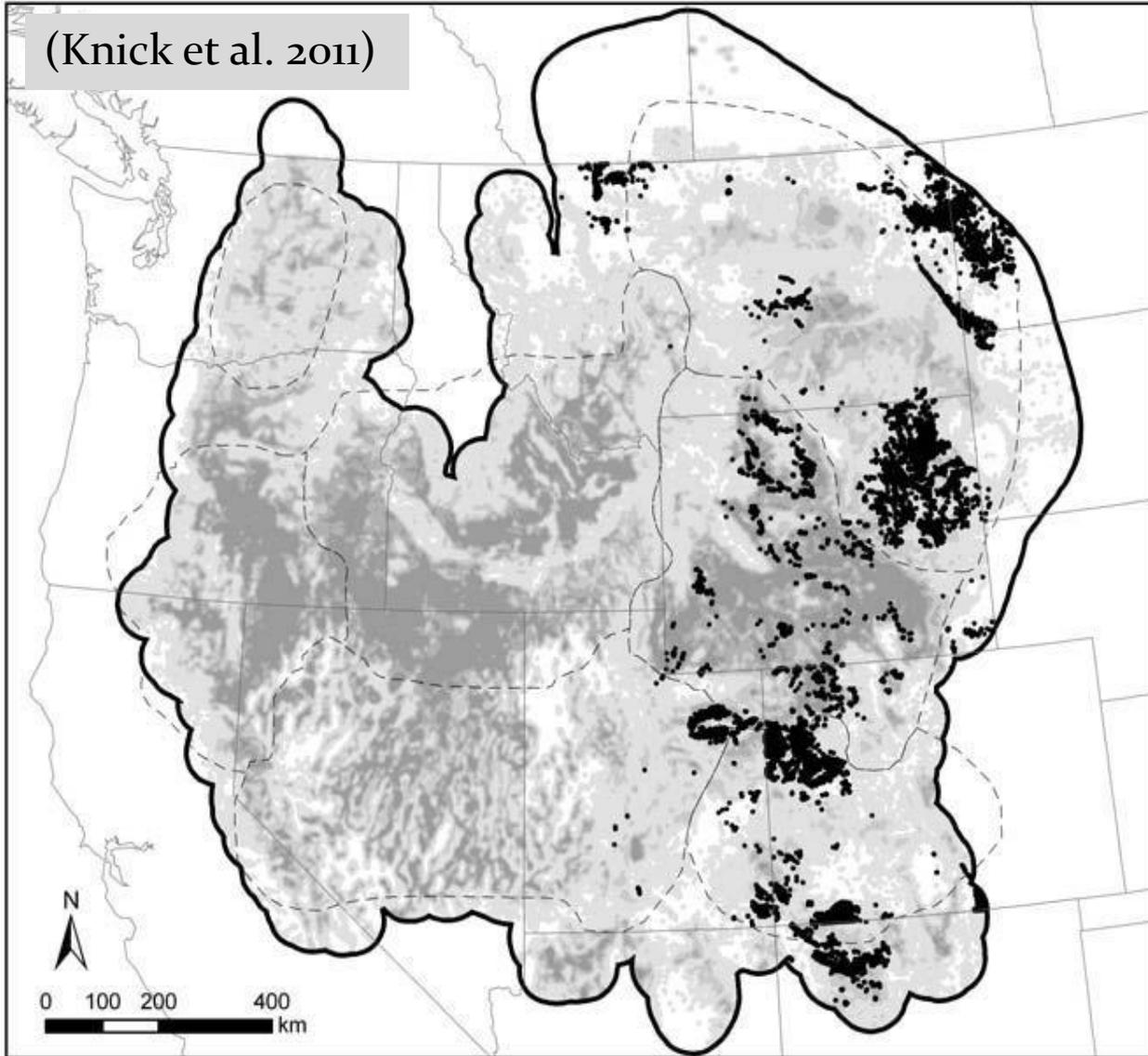
Infrastructure and Fragmentation: *Fences*

Fence Collisions – an Idaho Study, estimated for 500m fence segments



Infrastructure and Fragmentation:
Energy Development

(Knick et al. 2011)



● Approved oil wells

Sagebrush (%)

□ >0-25

□ 26-50

□ 51-75

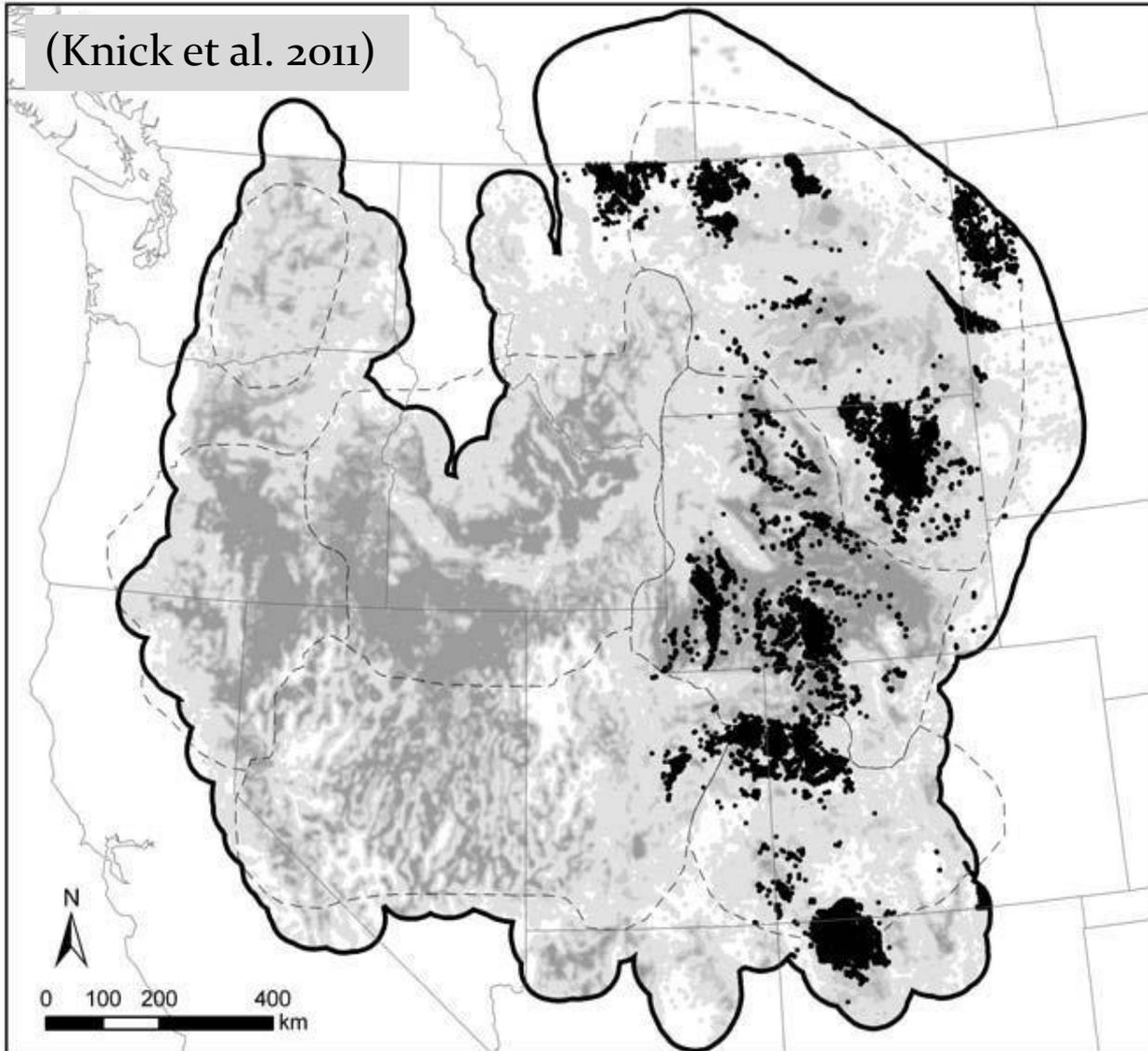
□ 76-100

□ Sage-Grouse Management Zones

□ State/Province Boundaries

□ Sage-Grouse Conservation Area

(Knick et al. 2011)



• Approved gas wells

Sagebrush (%)

>0-25

26-50

51-75

76-100

Sage-Grouse Management Zones

State/Province Boundaries

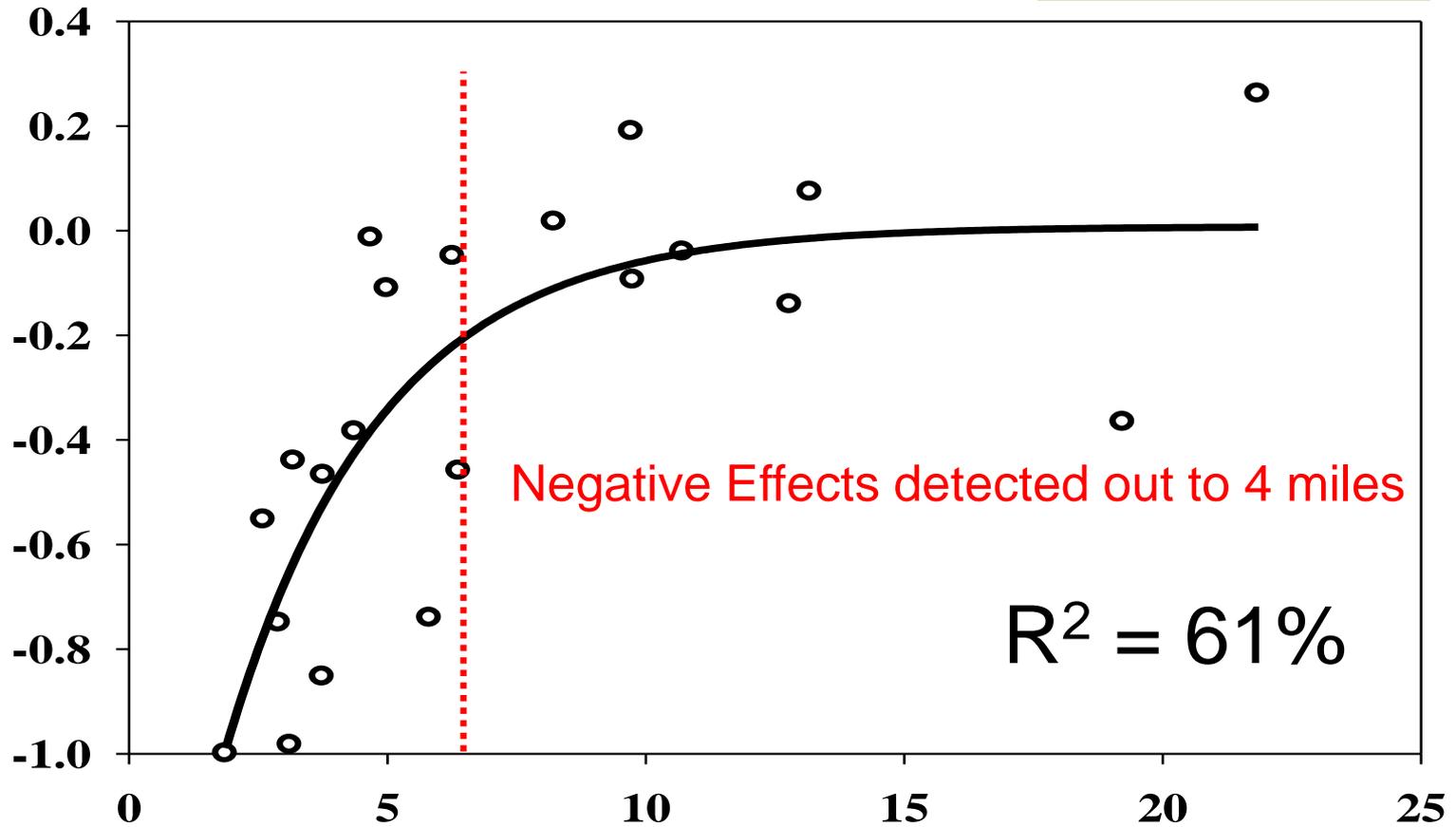
Sage-Grouse Conservation Area

Gas well research

Overall Change in Male Lek Attendance

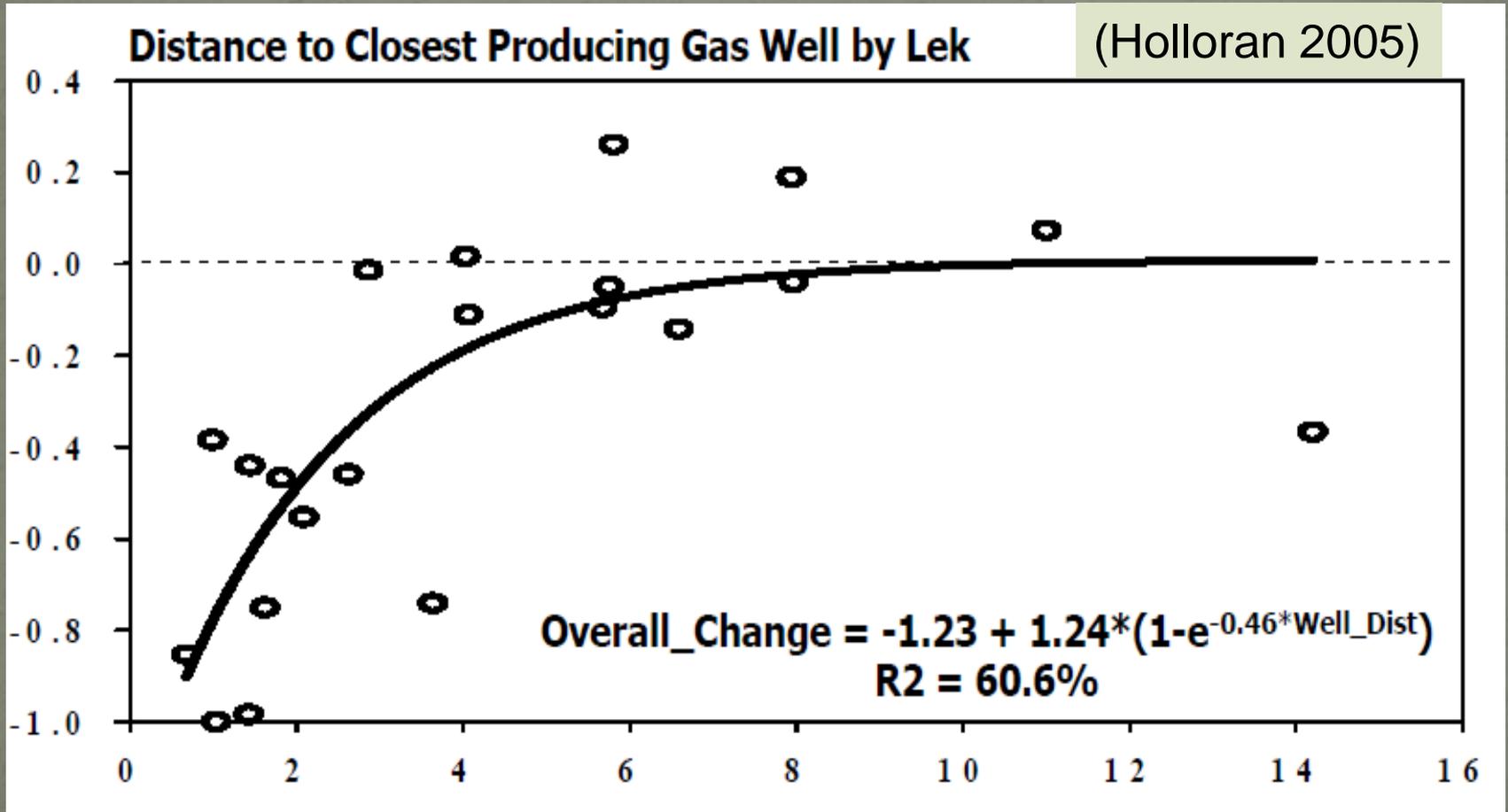
Well Development Phase

(Holloran 2005)



Distance Lek-to-Drilling Rig (Km)

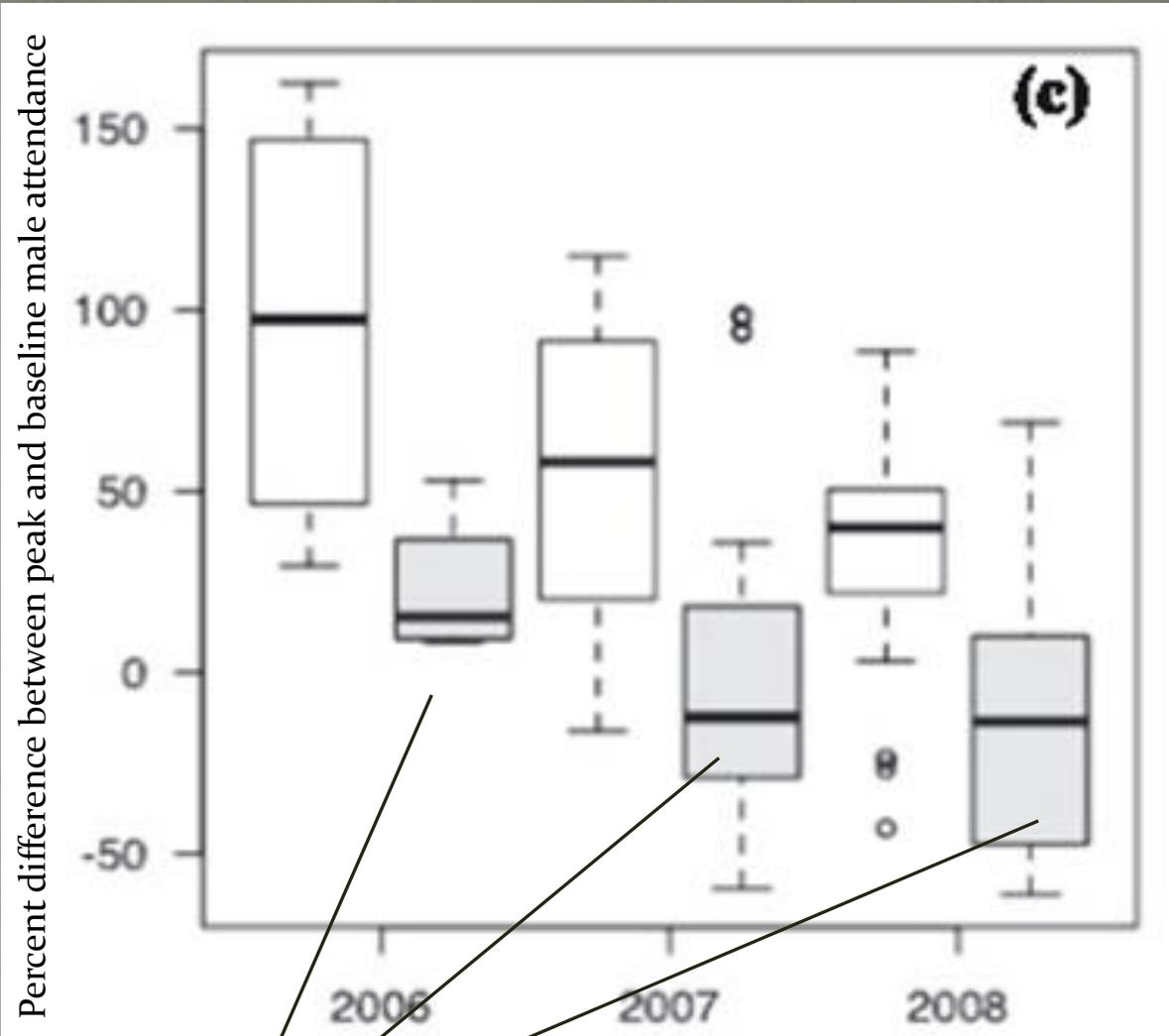
Gas well research



Developments can involve habitat fragmentation, infrastructure, ongoing activity, and noise.



Noise Effects

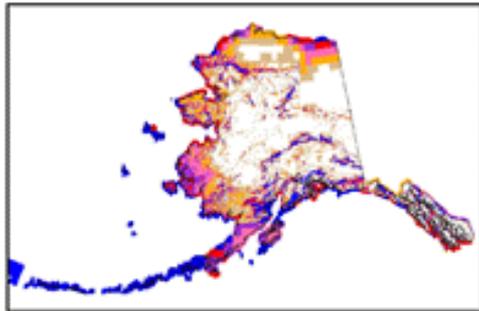


Noise treatments (simulated traffic and well production)





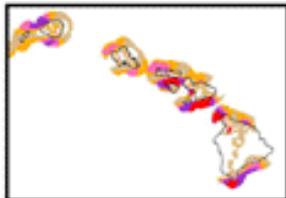
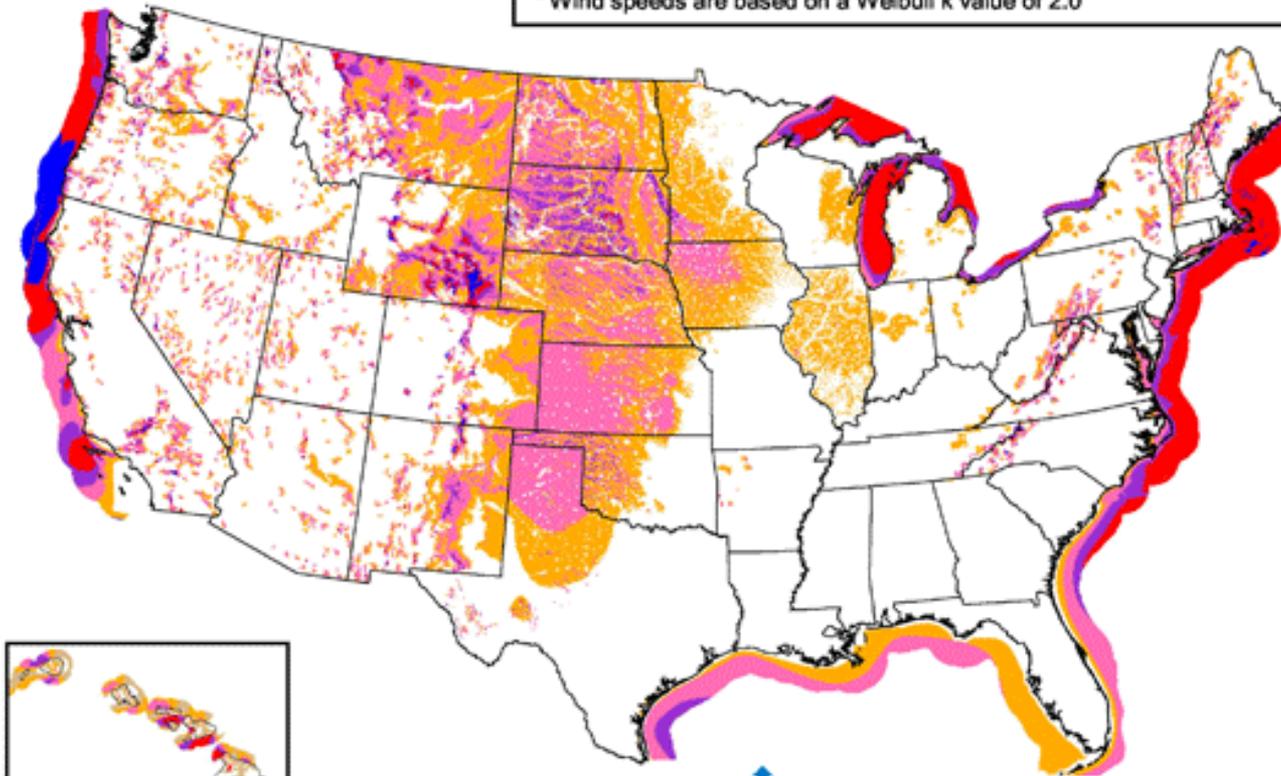




Wind Power Classification

Wind Power Class	Resource Potential	Wind Power Density at 50 m W/m ²	Wind Speed ^a at 50 m m/s	Wind Speed ^a at 50 m mph
3	Fair	300 - 400	6.4 - 7.0	14.3 - 15.7
4	Good	400 - 500	7.0 - 7.5	15.7 - 16.8
5	Excellent	500 - 600	7.5 - 8.0	16.8 - 17.9
6	Outstanding	600 - 800	8.0 - 8.8	17.9 - 19.7
7	Superb	800 - 1600	8.8 - 11.1	19.7 - 24.8

^a Wind speeds are based on a Weibull k value of 2.0



Infrastructure and Fragmentation:
Urban Development

Infrastructure: Urban Development



(NAIP 2011)

Agricultural Conversion

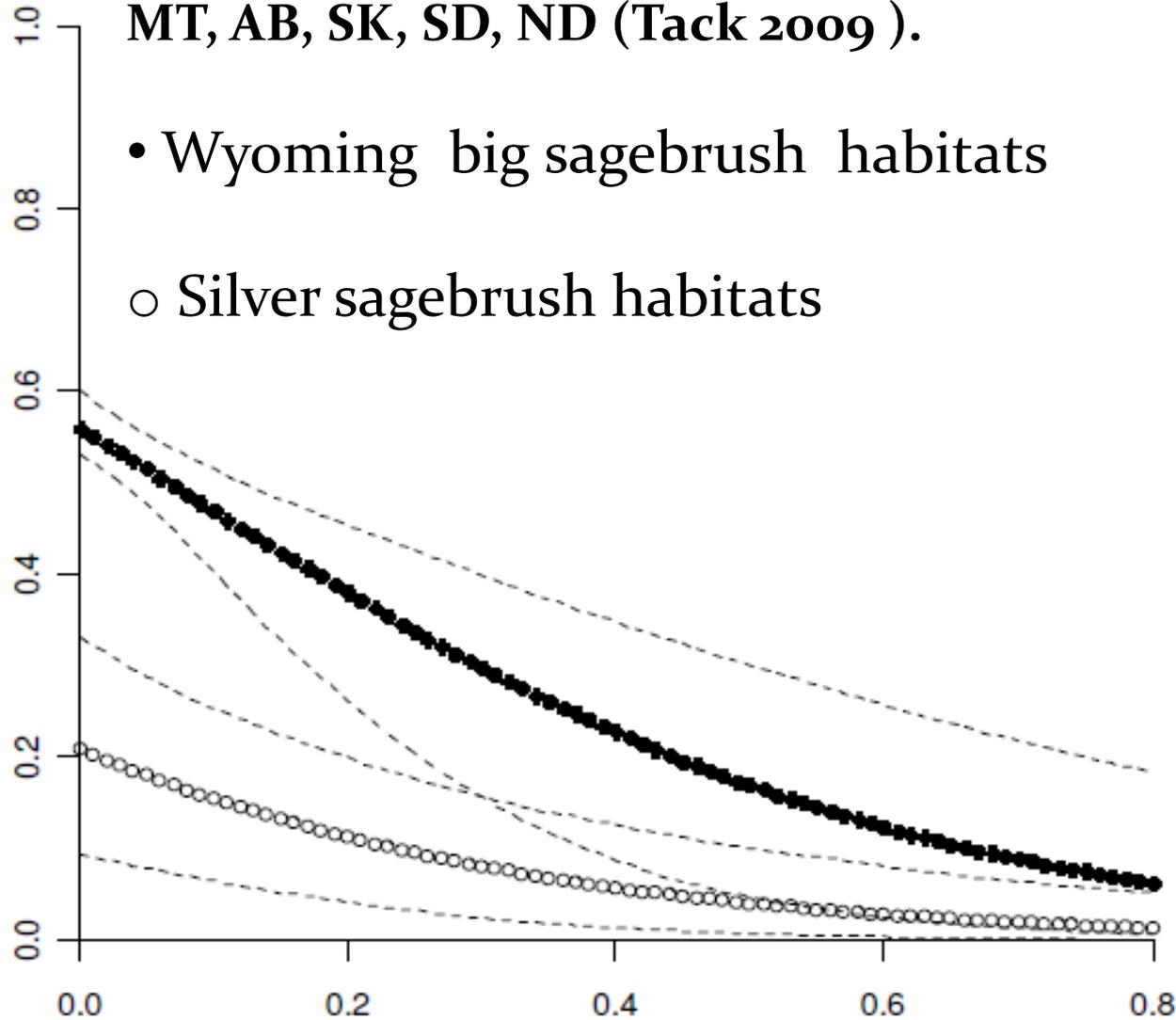
Direct conversion to cropland or domestic grass pastures



Probability of an Active Lek with > 25 Males

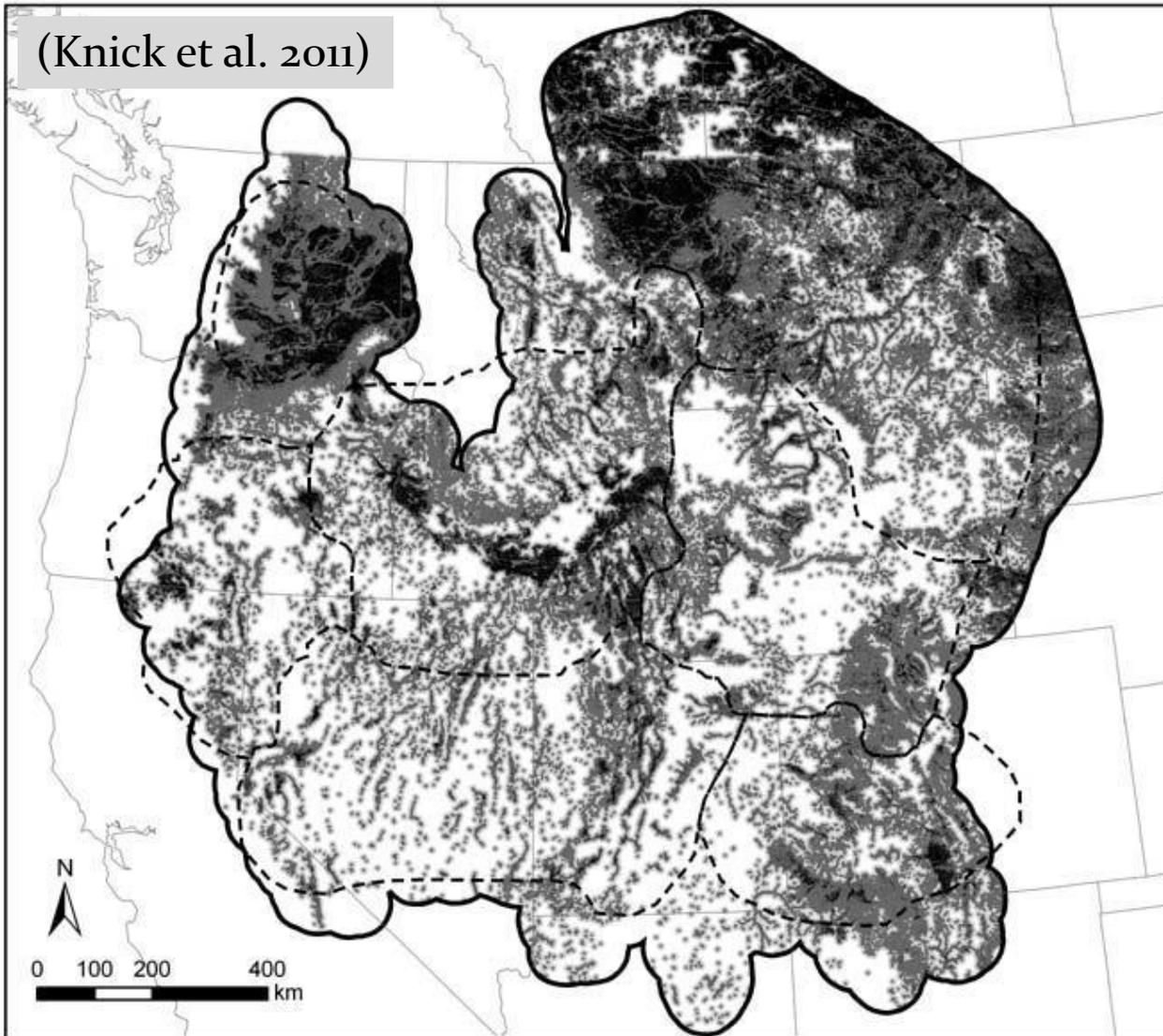
Sage-grouse and agricultural conversion in MT, AB, SK, SD, ND (Tack 2009).

- Wyoming big sagebrush habitats
- Silver sagebrush habitats



Proportion Cropland within 1.0km of a Lek

(Knick et al. 2011)



Agriculture

- Existing
- 2.5km effect area
- 6.9km effect area

Sage-Grouse Management Zones

State/Province Boundaries

Sage-Grouse Conservation Area

Conifer Expansion



Livestock Grazing

- Unsustainable grazing leads to deterioration of plant communities
- Annual consumption of forage affects residual cover
- Sagebrush treatments often tied to livestock production
- Invasibility of native rangeland
 - Reduced plant community integrity = increased vulnerability to invasion

“Non-habitat” Factors

- Disease
 - West Nile Virus – does have a tie to some habitat features
 - May have been the cause of 2008 decline in ND and SE MT
- Predation
 - Cause of direct mortality
 - Predators generally benefit from habitat alteration
- Regulated Hunting

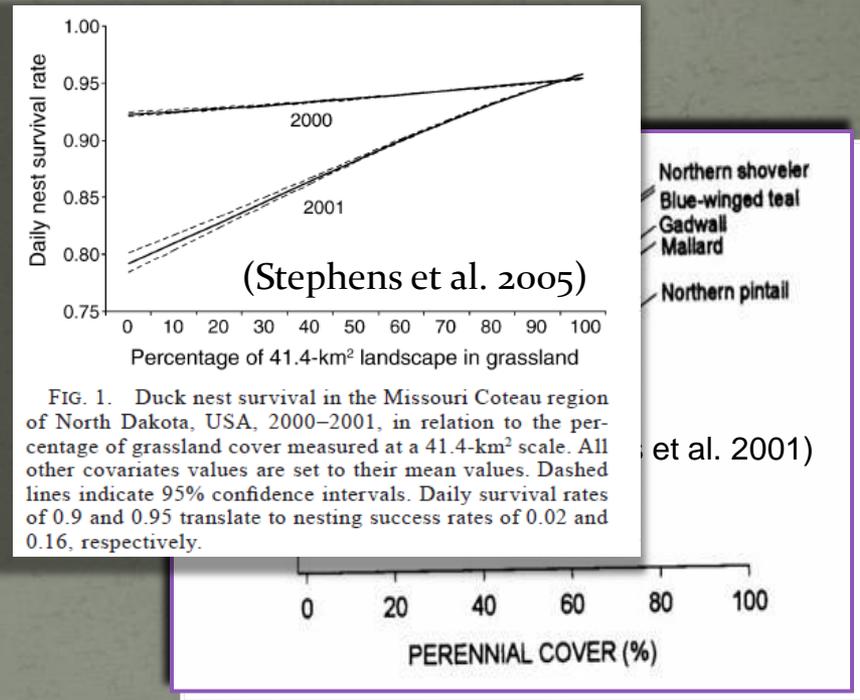
Predation and Fragmentation: General findings from ground-nesting waterfowl research.

1) As landscapes become more fragmented, nests are easier for predators to find – more edge, nest concentration.

2) As landscapes become more fragmented, predator communities become more diverse.

3) Dominant predator of intact sage-grouse habitats is the coyote.

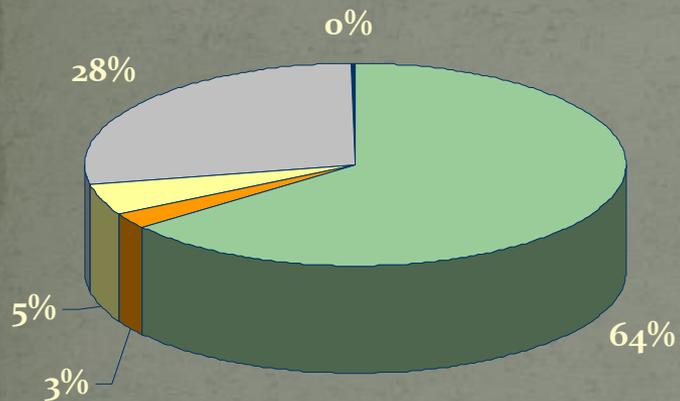
4) Coyote-dominated landscapes tend to support higher nest success.



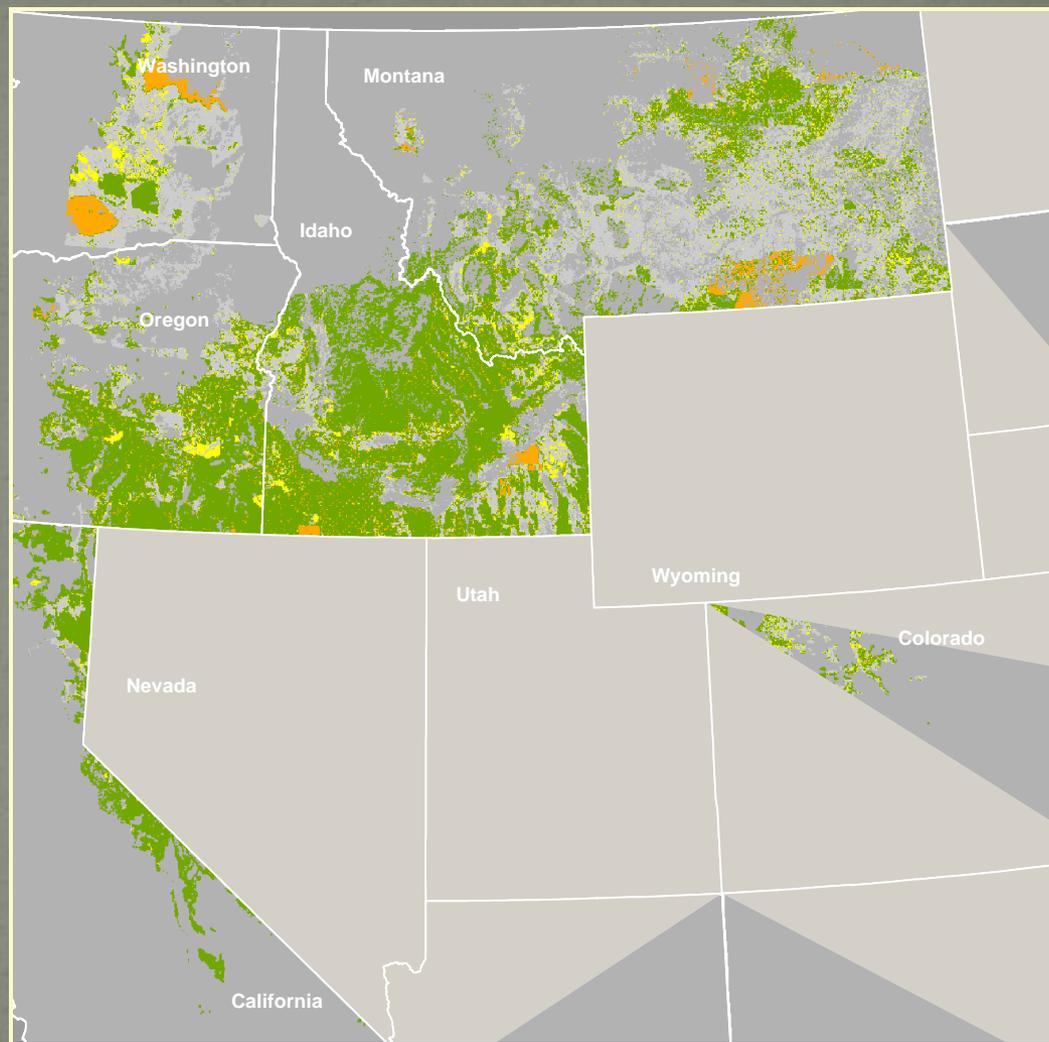
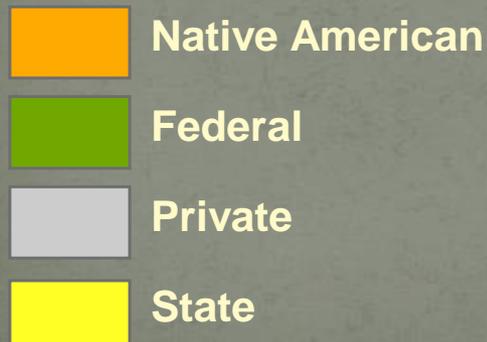
(Higgins 1977, Greenwood 1987, Cowardin et al. 1985, Greenwood et al. 1995, Sovada et al. 1995)

Montana Conservation Issues

Who manages the sagebrush?



Land Steward



(Broad Scale Vegetation Map)

Montana Conservation Issues

- Habitat Fragmentation
- Infrastructure
- Habitat Deterioration

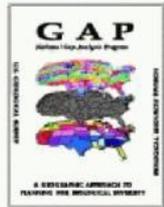
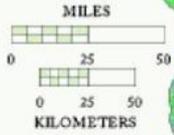
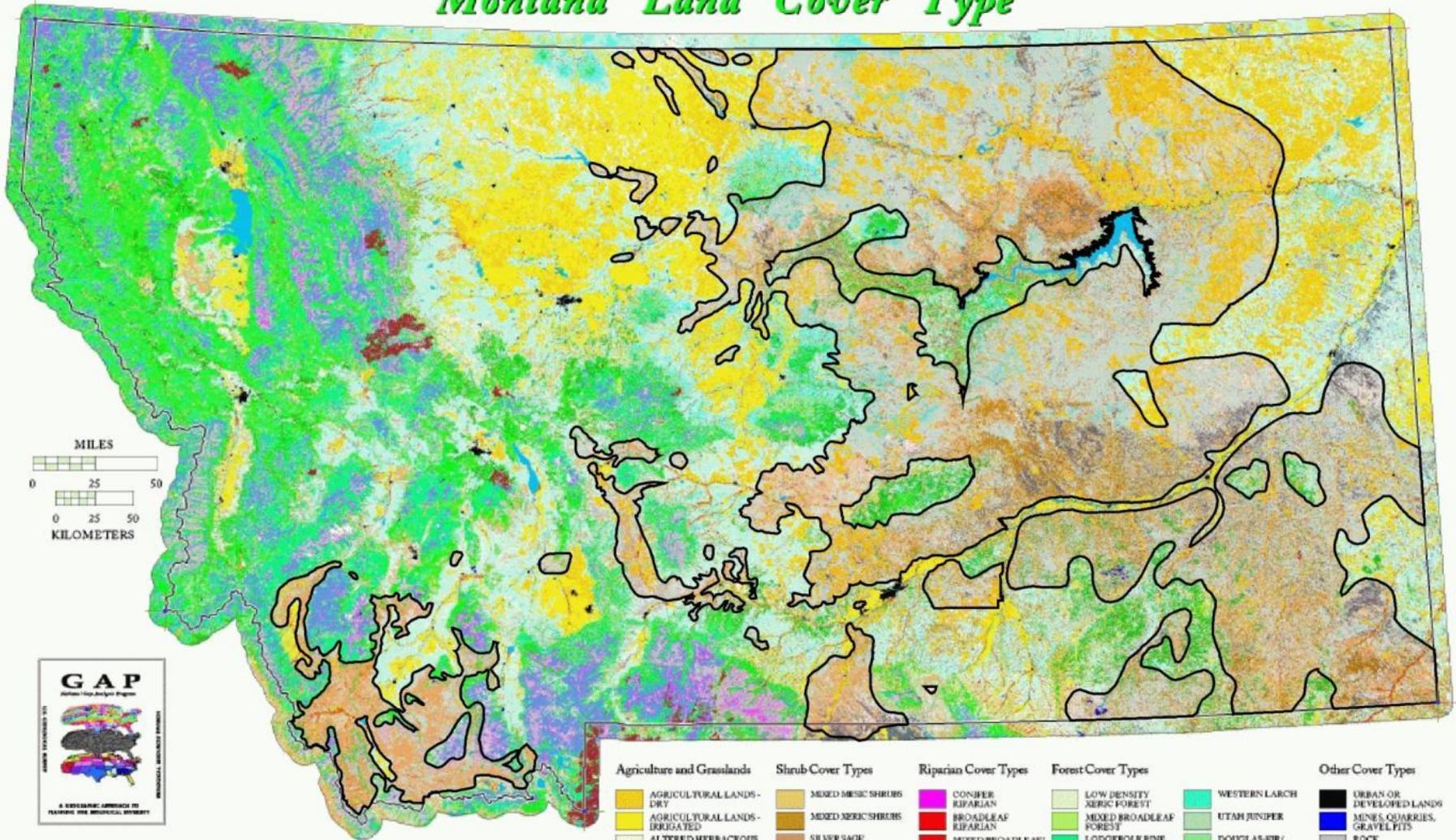
Montana Conservation Issues: Habitat Fragmentation

- Agricultural conversion
- Energy developments (oil, gas, wind)
- Energy Transmission (transmission lines, pipelines)
- Fences, roads
- Sagebrush control treatments

Montana Conservation Issues: Habitat Fragmentation

- Cropland conversion
- Rangeland re-seeding
 - Conversion of native plant community to an exotic planting
 - Loss of sagebrush and plant diversity
 - May work well for livestock, but detrimental to sage-grouse

Montana Land Cover Type



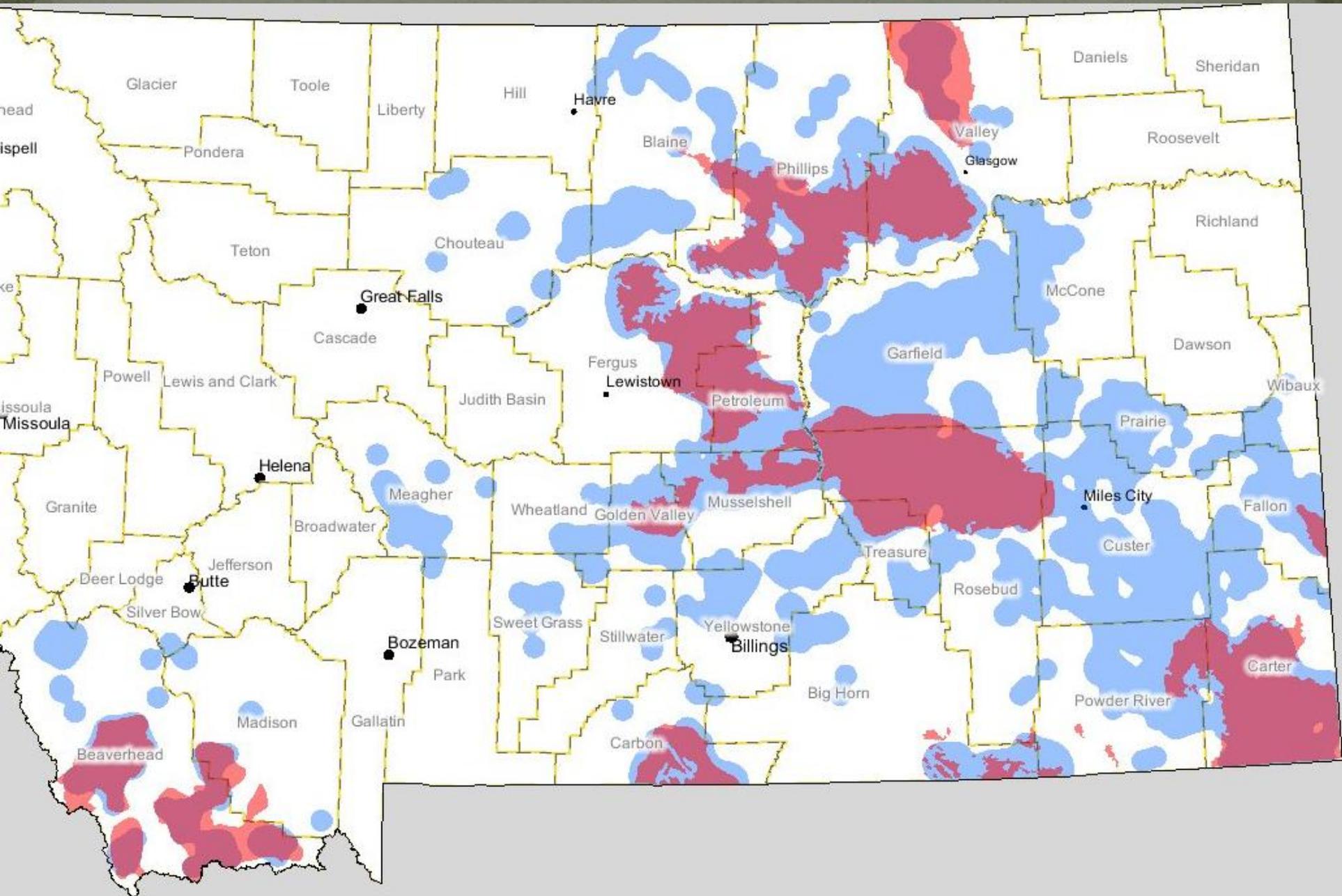
Agriculture and Grasslands	Shrub Cover Types	Riparian Cover Types	Forest Cover Types	Other Cover Types
AGRICULTURAL LANDS - DRY	MIXED MESC SHRUBS	CONIFER RIPARIAN	LOW DENSITY XERIC FOREST	URBAN OR DEVELOPED LANDS
AGRICULTURAL LANDS - IRRIGATED	MIXED XERIC SHRUBS	BROADLEAF RIPARIAN	MIXED BROADLEAF FOREST	MINE QUARRIES, GRAVEL PITS
ALTERED HERBACEOUS	SILVER SAGE	MIXED BROADLEAF/ CONIFER RIPARIAN	LODGEPOLE PINE	ROCK
VERY LOW COVER GRASSLANDS	SALTY-DESERT SHRUB/ DRY/SALT PLATS	SHRUB RIPARIAN	LIMBER PINE	BADLANDS
LOW/MODERATE COVER GRASSLANDS	SAGEBRUSH	MIXED RIPARIAN	PONDEROSA PINE	MISSOURI BREAKS
MODERATE/HIGH COVER GRASSLANDS	MESC-SHRUB-GRASS ASSOCIATIONS	GRAMINOID & FORB RIPARIAN	GRAND FIR	MIXED BARREN SITES
	XERIC SHRUB-GRASS ASSOCIATIONS		WESTERN RED CEDAR	MONTANE PARKLANDS/ SUBALPINE MEADOWS
			WESTERN HEMLOCK	ALPINE MEADOWS
			DOUGLAS-FIR	SNOWFIELDS OR ICE
			ROCKY MTN. JUNIPER	WATER
				WESTERN LARCH
				UTAH JUNIPER
				DOUGLAS-FIR/ LODGEPOLE PINE FOREST
				MIXED SUBALPINE FOREST
				MIXED MESC FOREST
				MIXED XERIC FOREST
				MIXED BROADLEAF/ CONIFER FOREST
				STANDING BURNT FOREST

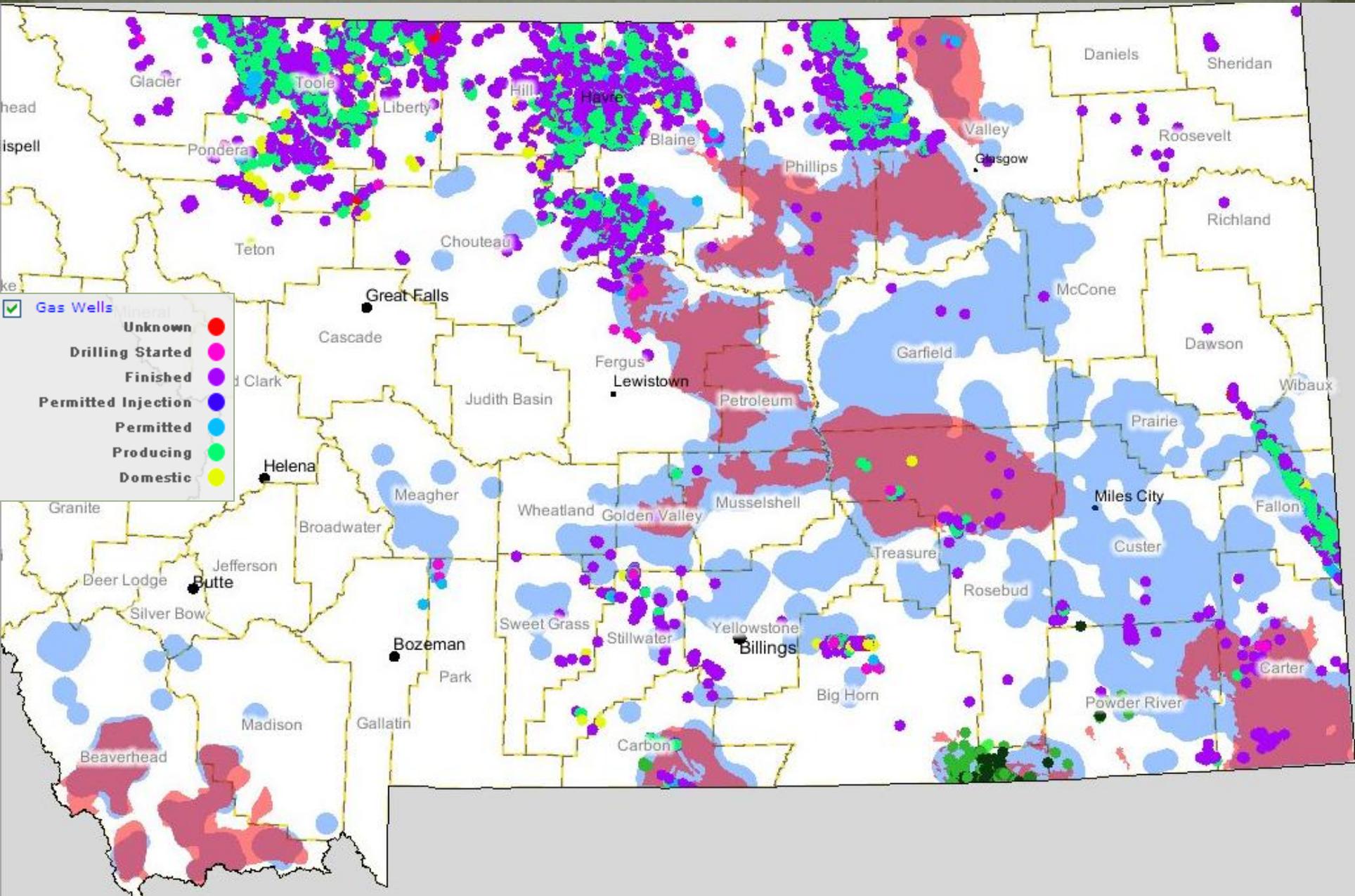


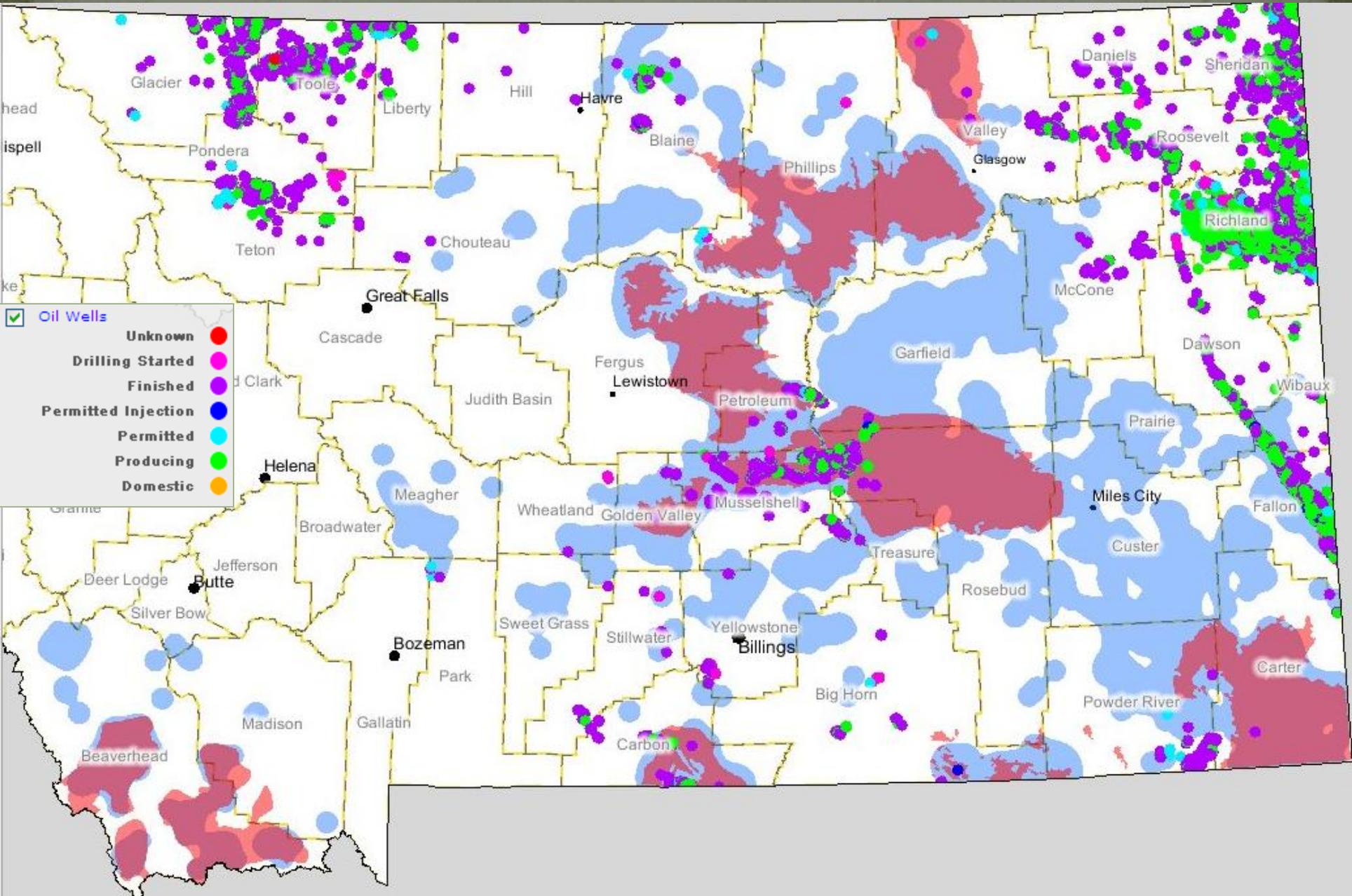
May 28, 1998
 Wildlife Spatial Analysis Lab
 Montana Cooperative Wildlife Research Unit
 The University of Montana
 Missoula, Montana 59812
 www.wru.umt.edu

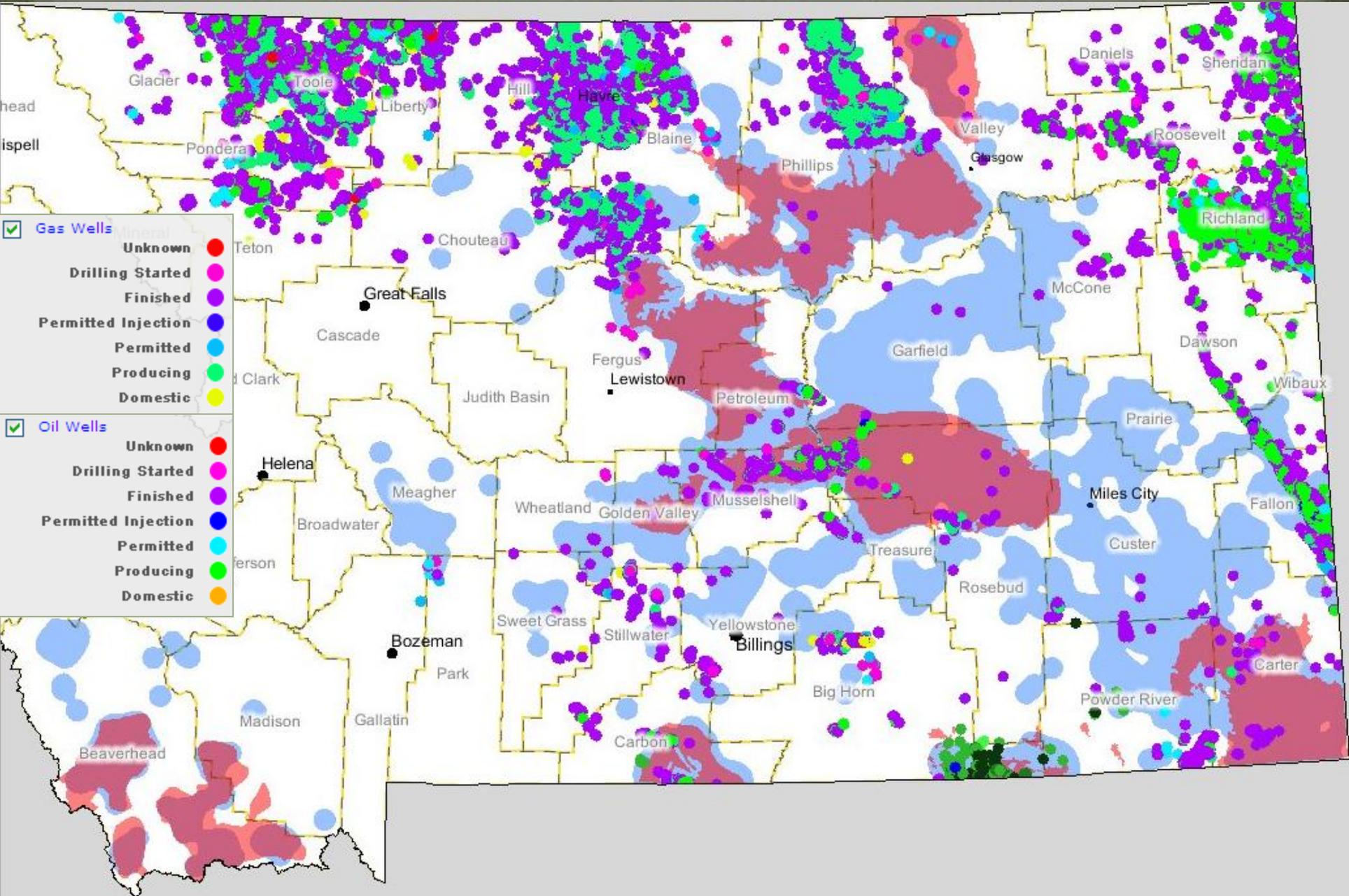
Montana Conservation Issues: Habitat Fragmentation

- Energy development
 - Oil Production
 - Gas Production
 - Wind Energy
 - Coal Mining









(Becker et al. 2009)

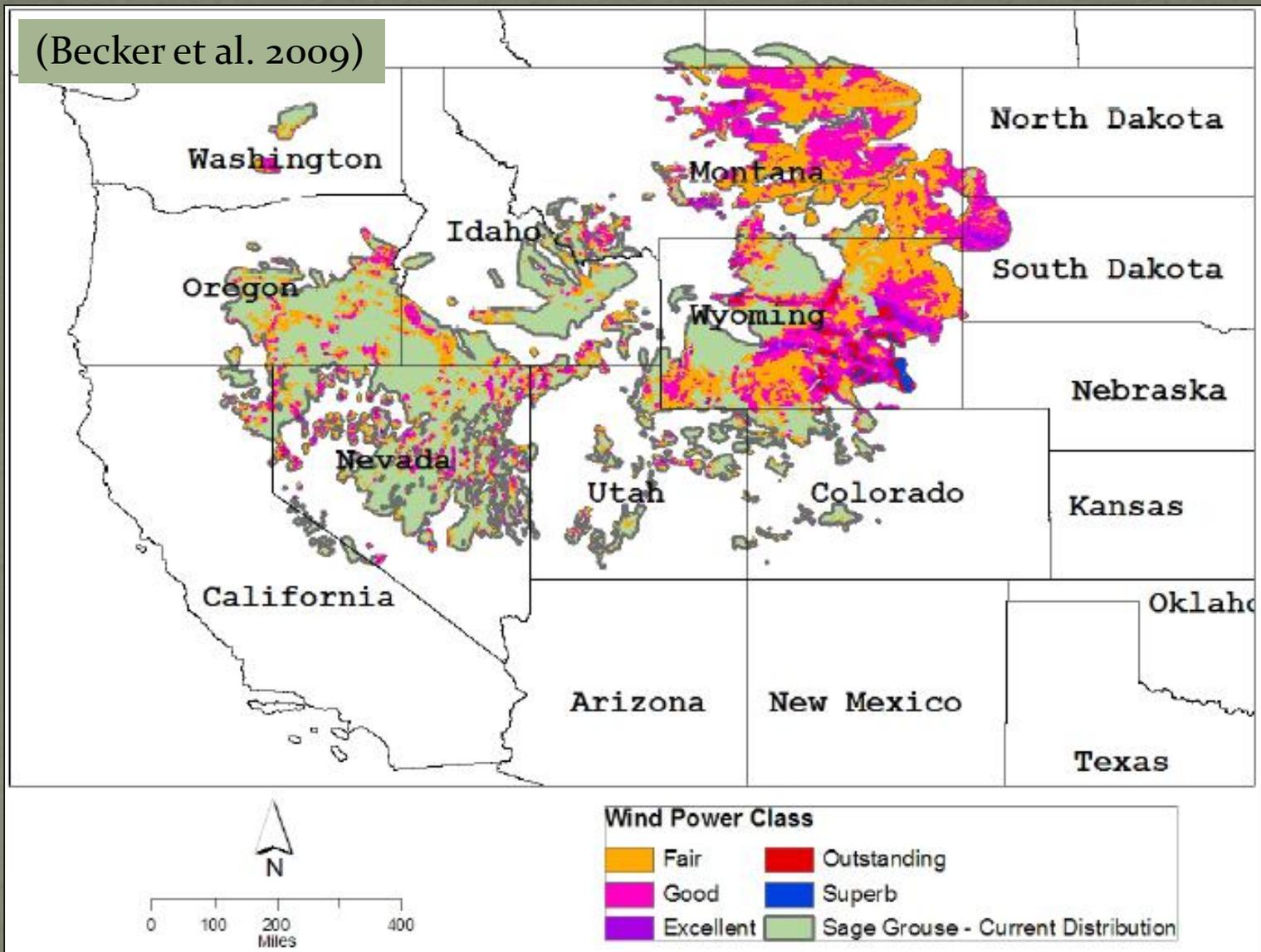


Figure 2.2. Overlay of Current Sage-Grouse Distribution with State Wind Energy Resources

Montana Conservation Issues: *Infrastructure*

- Powerlines/transmission lines
- Buildings
- Towers and guy wires
- Fences

Montana Conservation Issues:

Habitat Deterioration

- Improper livestock grazing
- Invasion by weeds

Ranching has been a key driver for
conserving native habitat landscapes



Livestock grazing occurs on the vast majority of sage-grouse habitats



Livestock grazing management can influence long-term habitat quality

SAGEBRUSH IS A PRODUCT OF THE RANGE,
RANGE CONDITION IS NOT A PRODUCT OF SAGEBRUSH



Two big sagebrush sites with similar brush canopy cover. The profoundly different ground cover is not related to sagebrush density. (Photo by FWP)



Livestock grazing management affects short term habitat productivity



Hierarchy of Priorities for Conservation

1. Maintain vast intact landscapes of sagebrush habitat
2. Maintain or restore plant community integrity
3. Provide for annual (short term) productivity
4. Restore habitats that have been converted to other cover types (a relatively low priority in MT – costly, higher risk of failure)