A synthesis of energy development and sage-grouse: where do we go from here?

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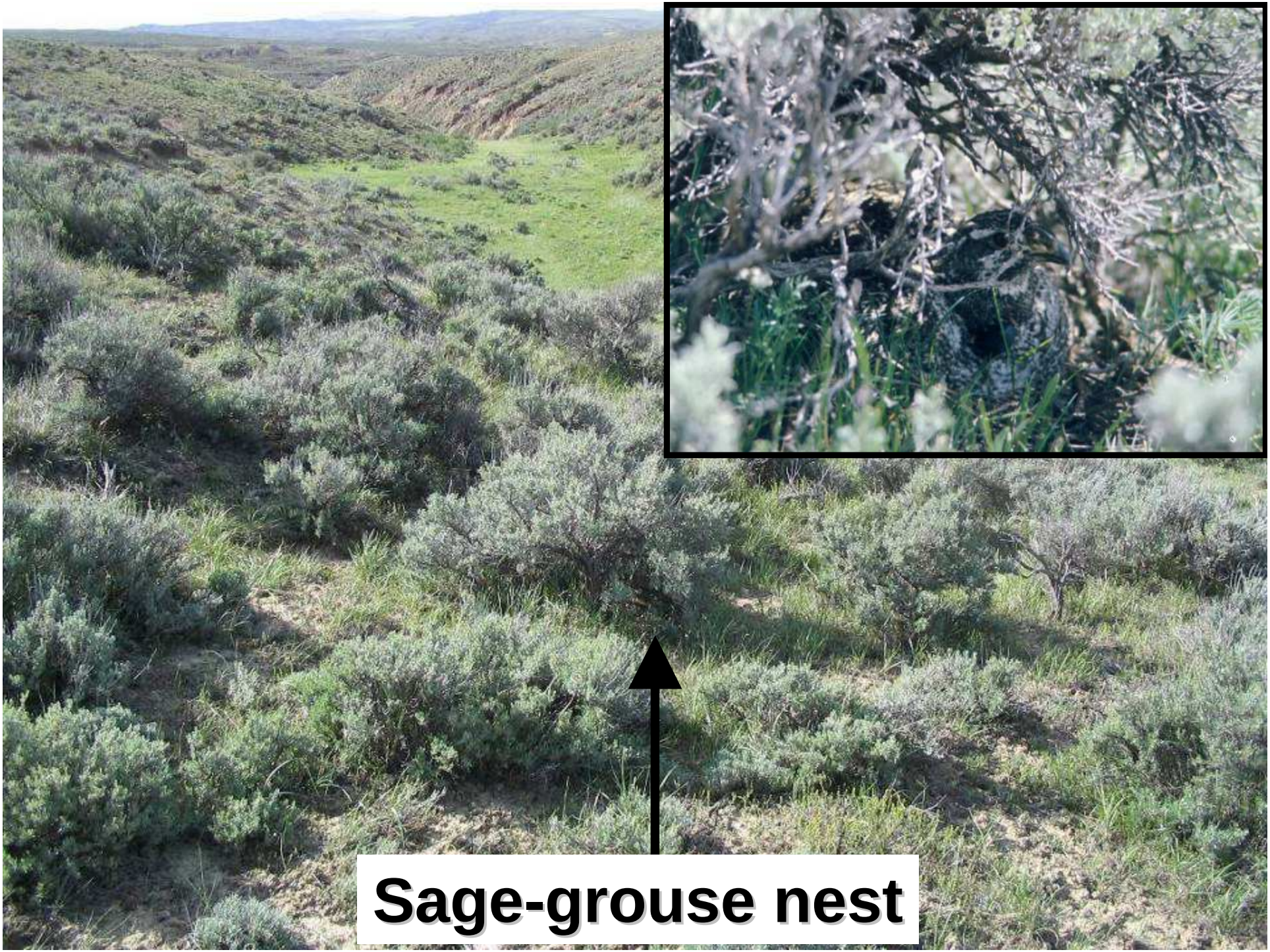
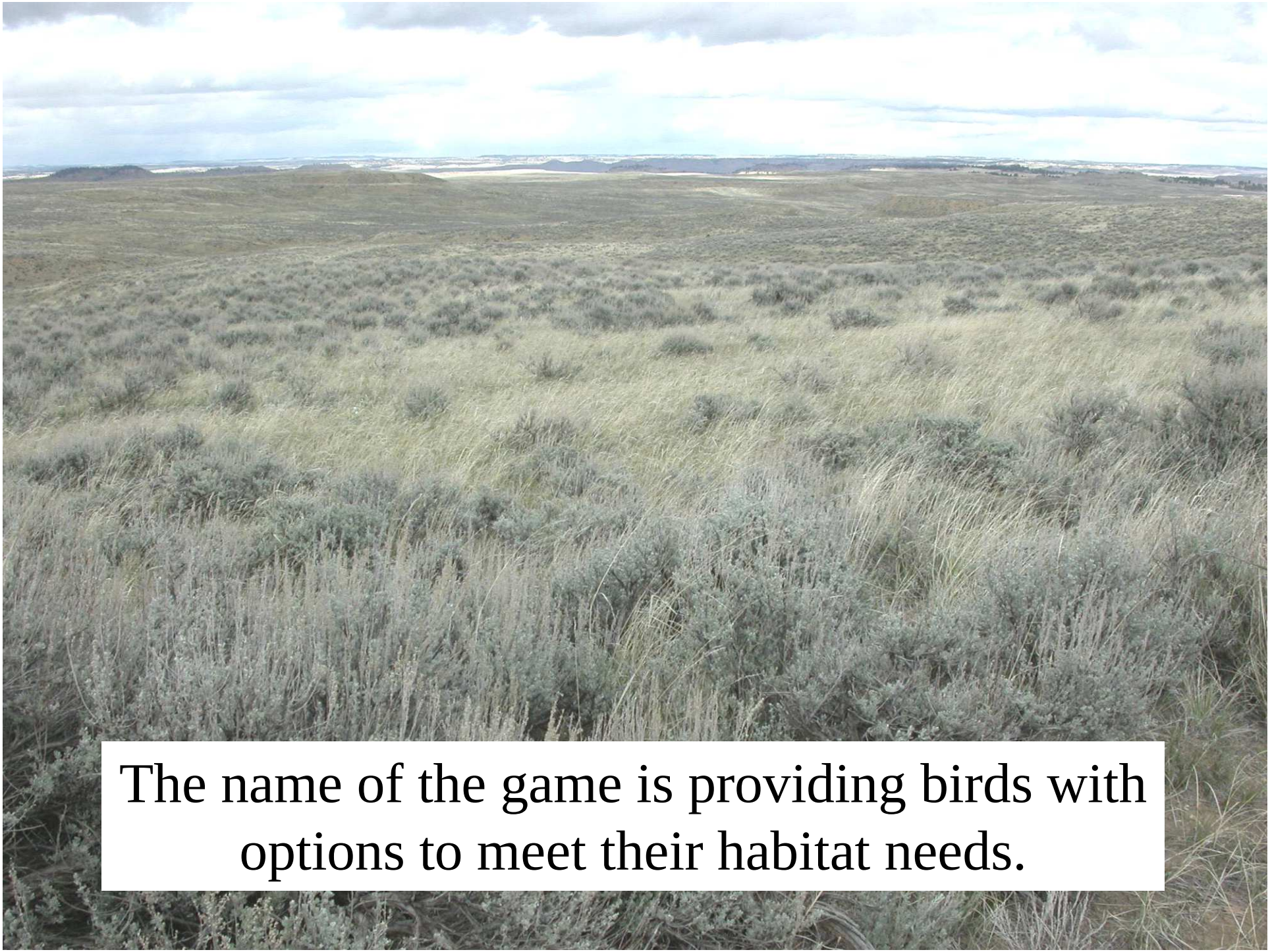
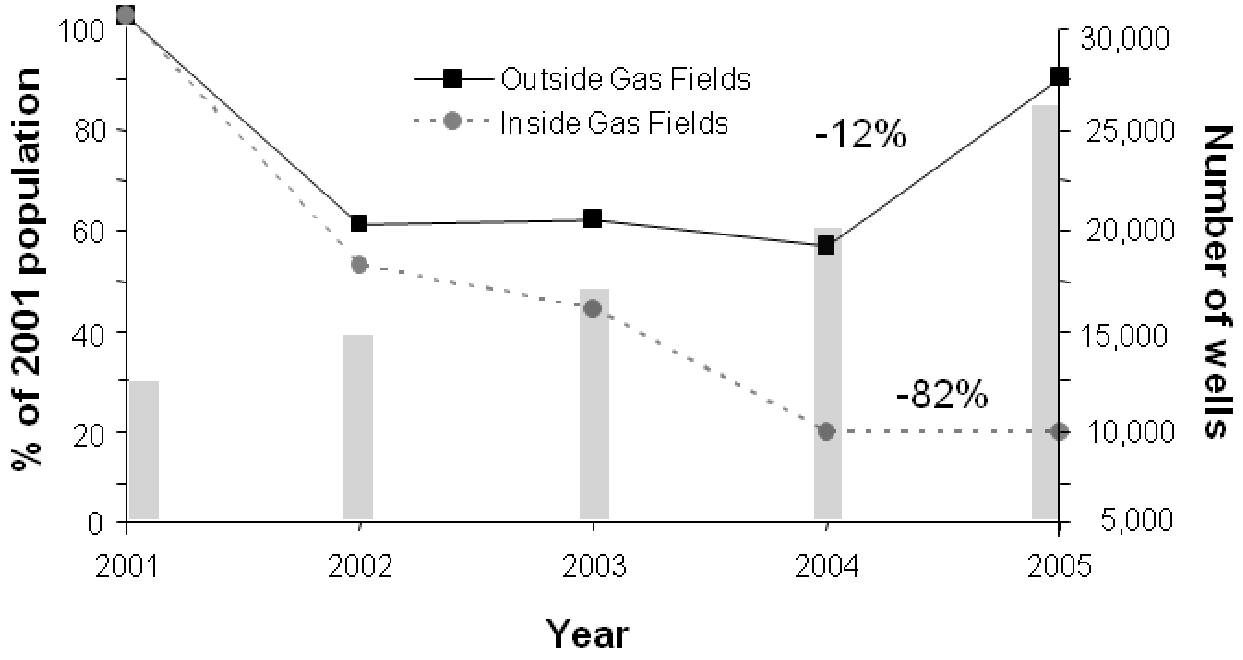
MISSOULA


Sage-grouse nest


The name of the game is providing birds with options to meet their habitat needs.

Population trends lower inside than outside gas fields

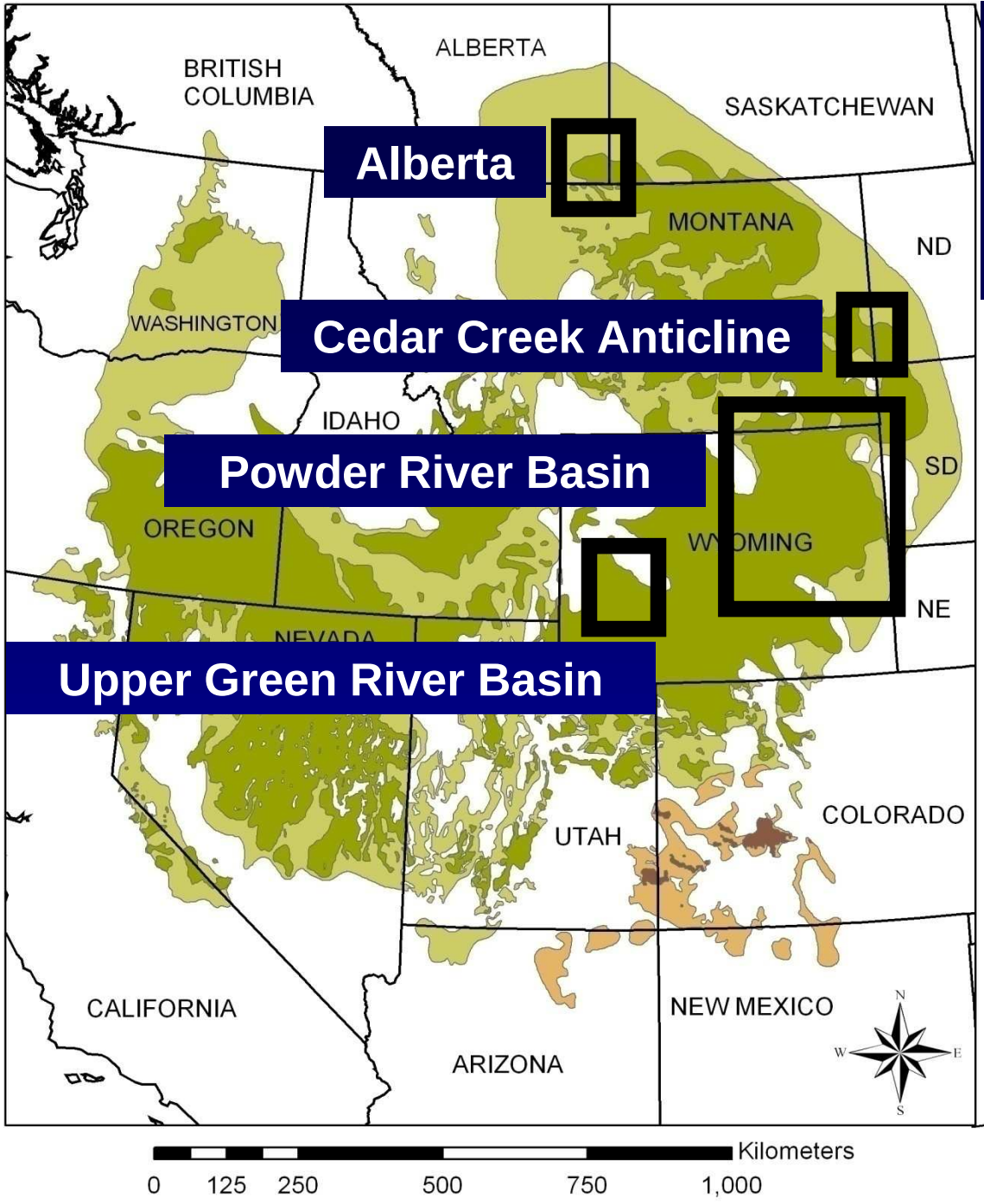


Walker and Naugle, et al. (2007) Journal of Wildlife Management

Wintering sage-grouse avoid otherwise suitable habitat that has been developed for energy

Doherty and Naugle, et al. (2008) Journal of Wildlife Management

Consistency in patterns across studies of energy development



Produced by C.L. Aldridge, after Schroeder et al. 2004, Condor 106:363-376

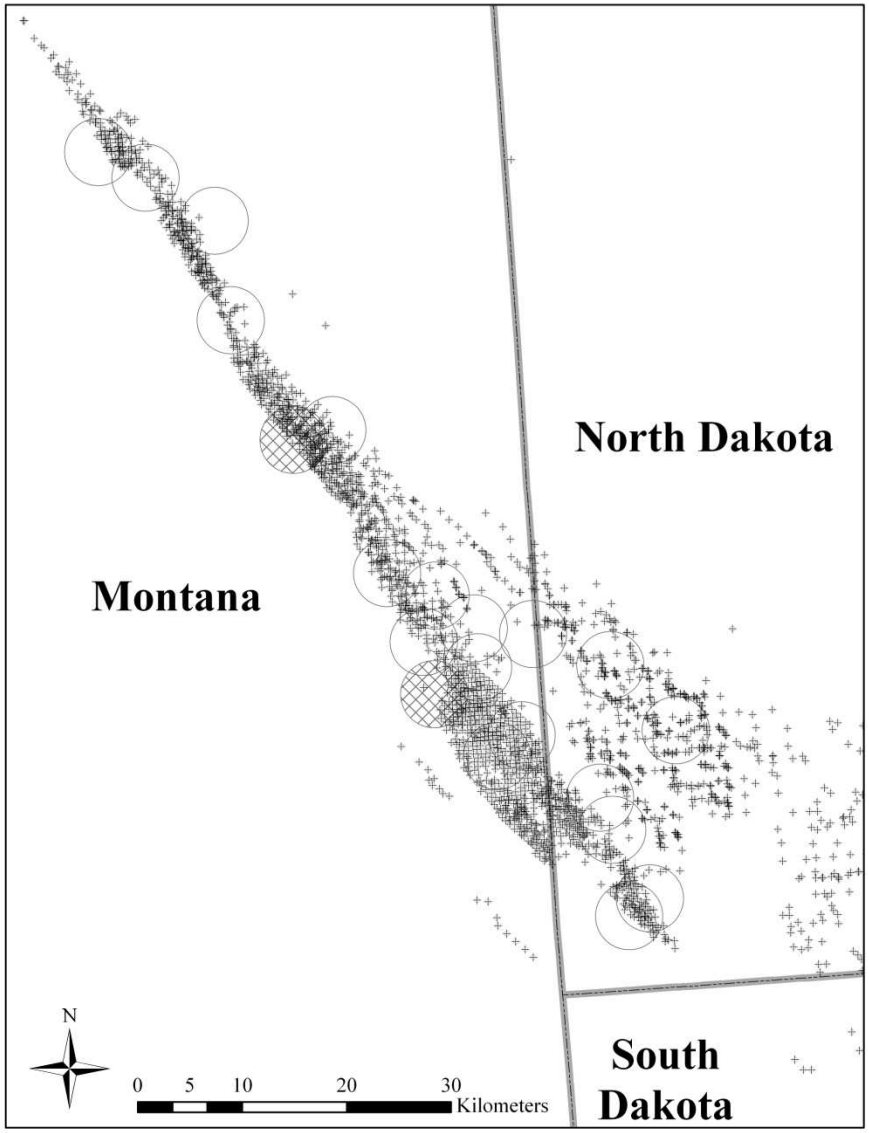
Sage-grouse in Alberta

Manyberries Oil Field – Chicks go to development where succulent forbs abundant, but mortality 1.5x higher for each additional well within 1 km

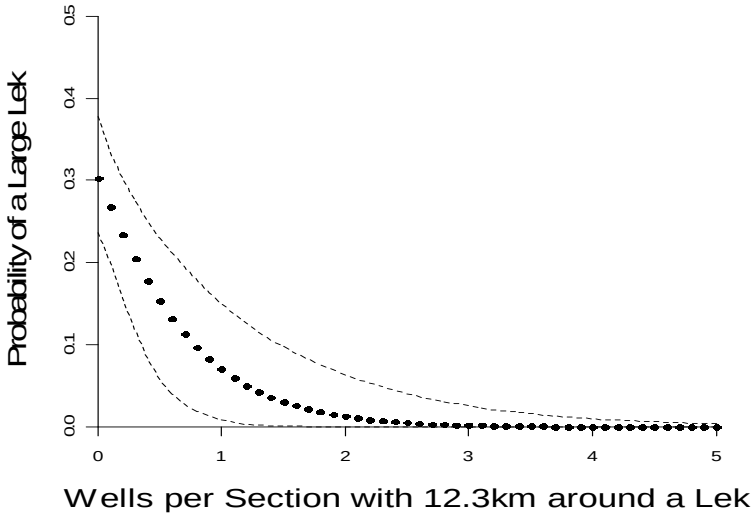
Chick Survival = 13.3% <400 birds left Canada

Alberta asking MT for birds to augment their population

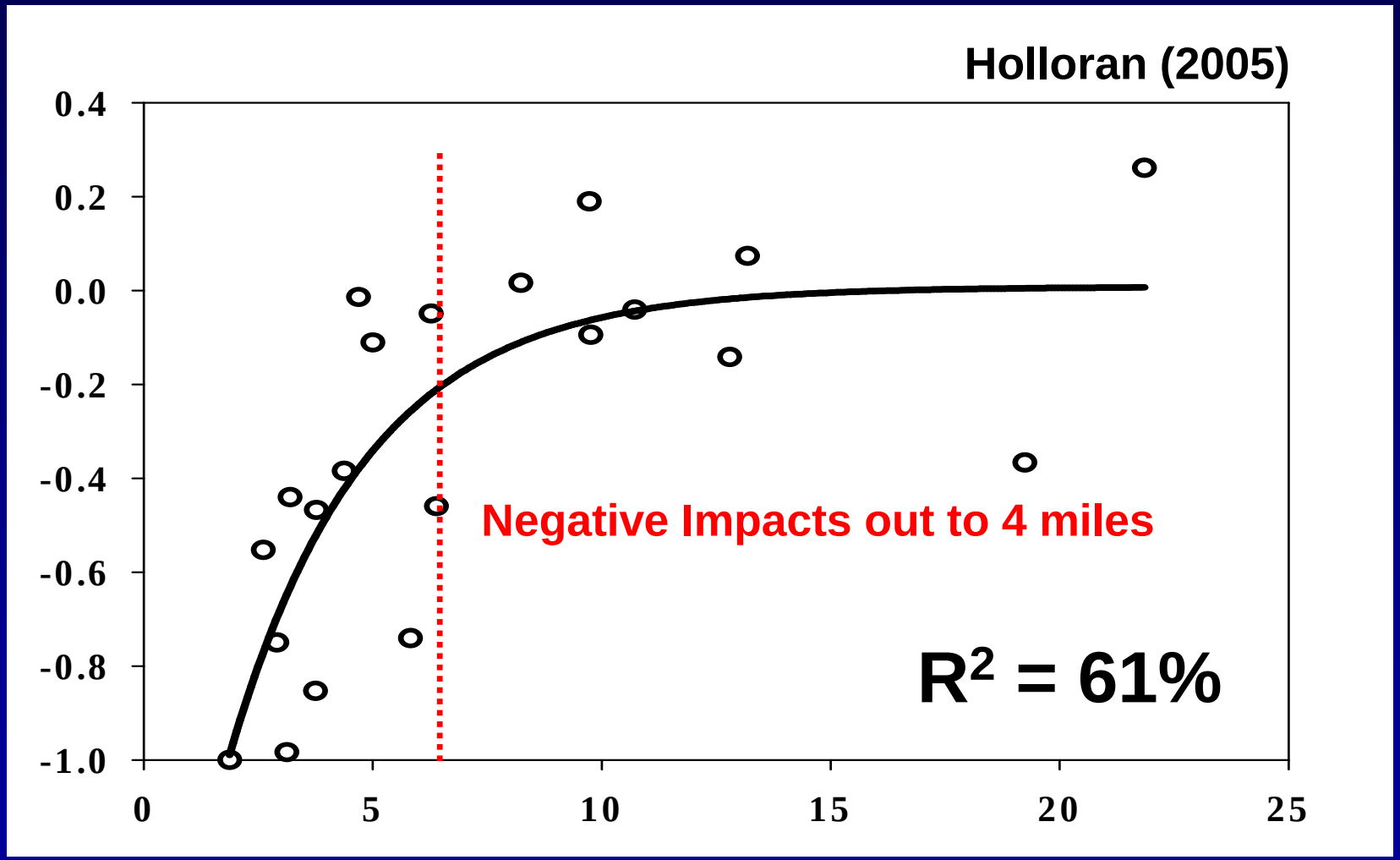
Cedar Creek Anticline

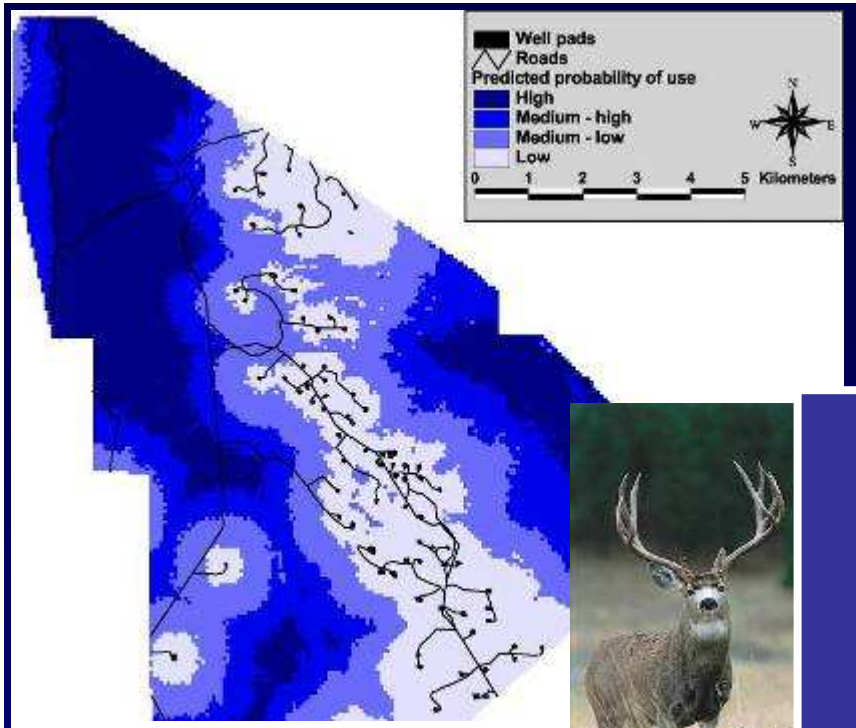


- 4 new inactive leks 2009
- Pops cut in half in one year



Distance to Closest Drilling Rig by Lek





Sawyer et al. 2006 JWM

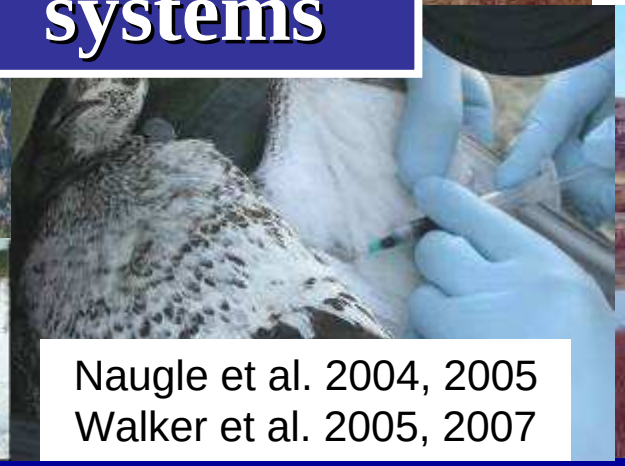
Ingelfinger and Anderson 2004

Bayne et al. 2008

Impacts emerging across differing taxa and systems

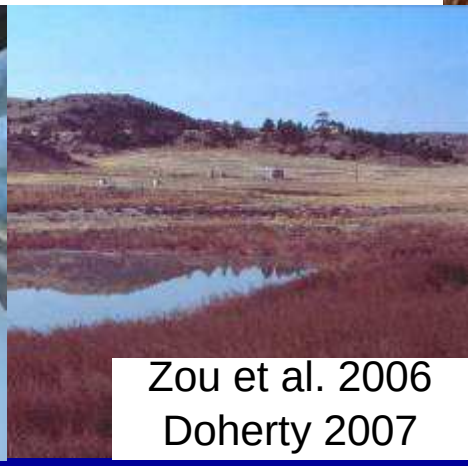
Bergquist et al. (2007)

Sorenson et al. 2007 JWM



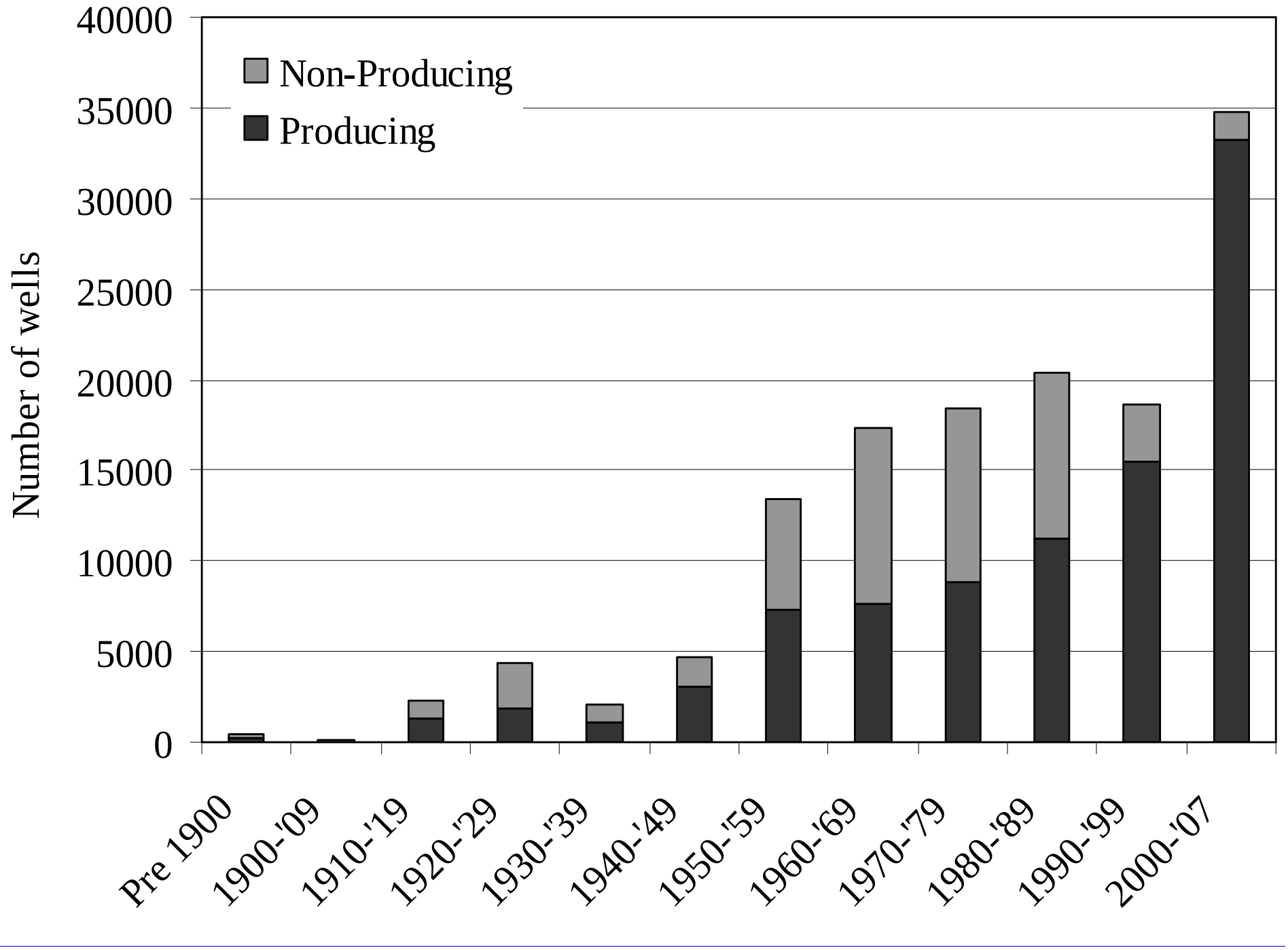
Naugle et al. 2004, 2005

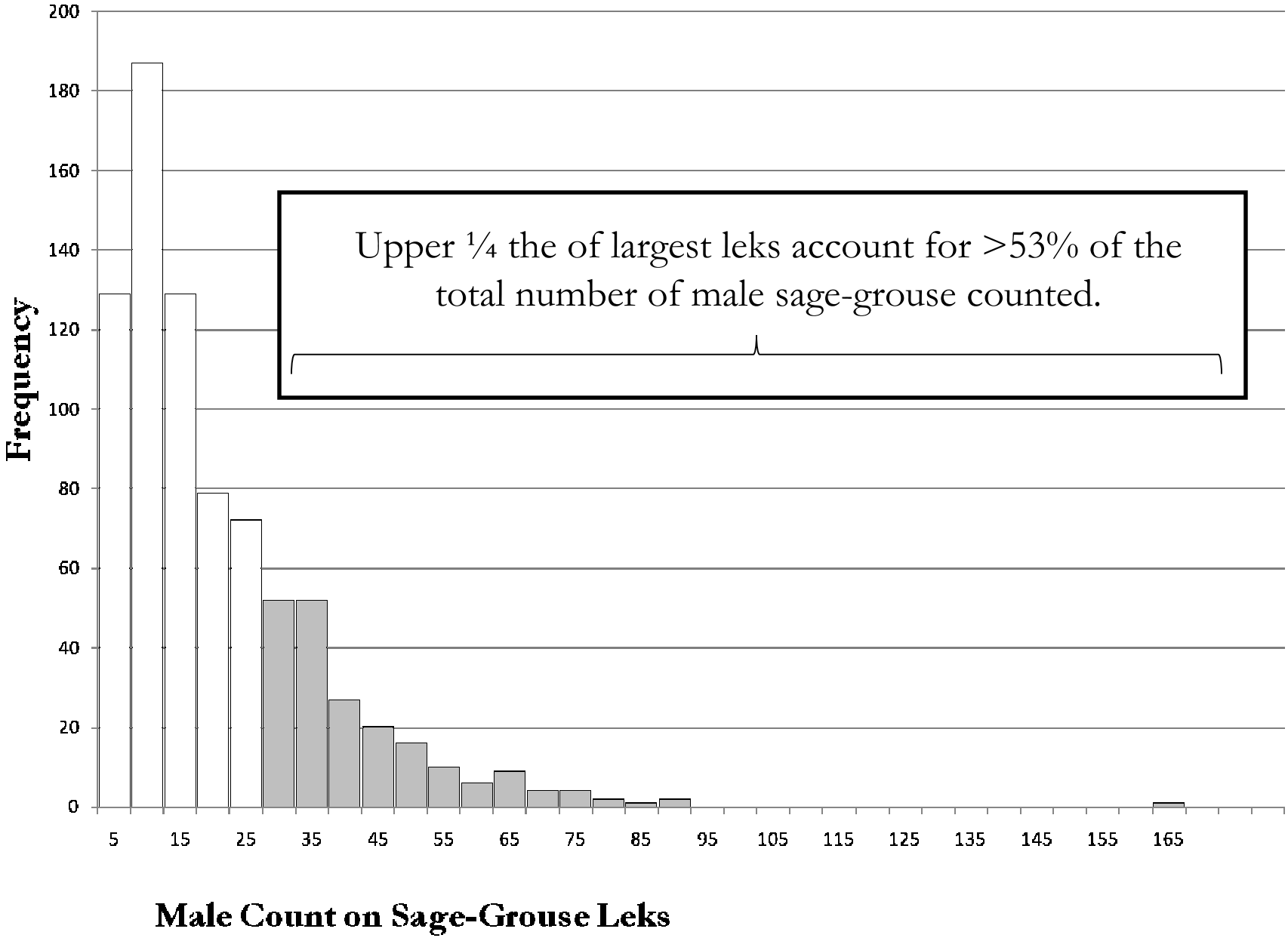
Walker et al. 2005, 2007



Zou et al. 2006

Doherty 2007

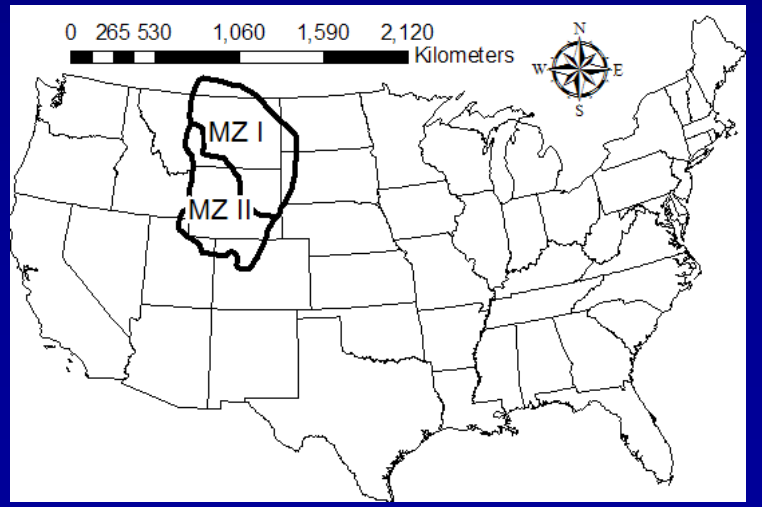

Non-Producing
Producing
Number of wells
40000
35000
30000
25000
20000
15000
10000
5000
0
Pre 1900
1900-'09
1910-'19
1920-'29
1930-'39
1940-'49
1950-'59
1960-'69
1970-'79
1980-'89
1990-'99
2000-'07

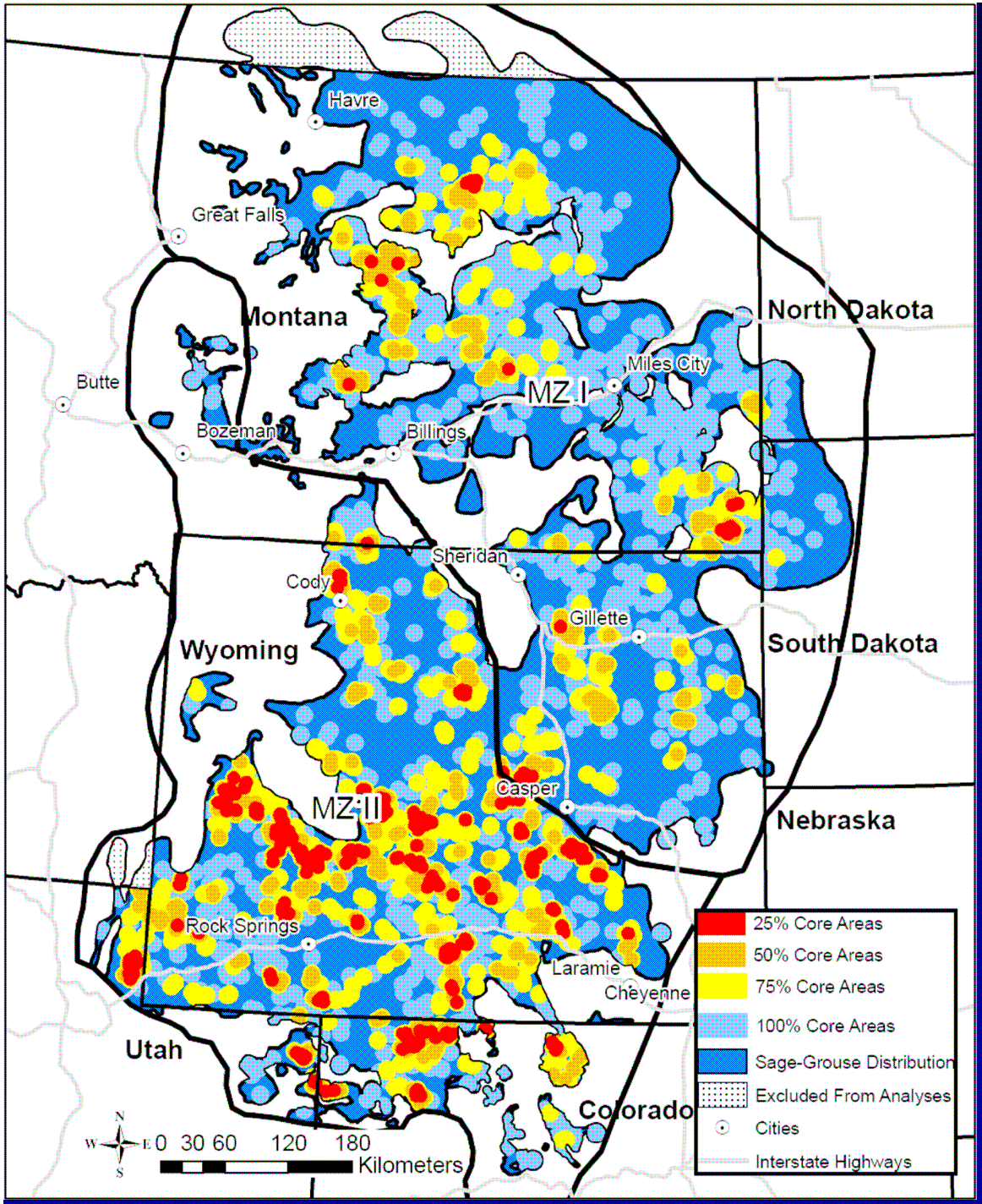

Upper ¼ the of largest leks account for >53% of the total number of male sage-grouse counted.
Frequency
200
180
160
140
120
100
80
60
40
20
0
5
15
25
35
45
55
65
75
85
95
105
115
125
135
145
155
165
Male Count on Sage-Grouse Leks

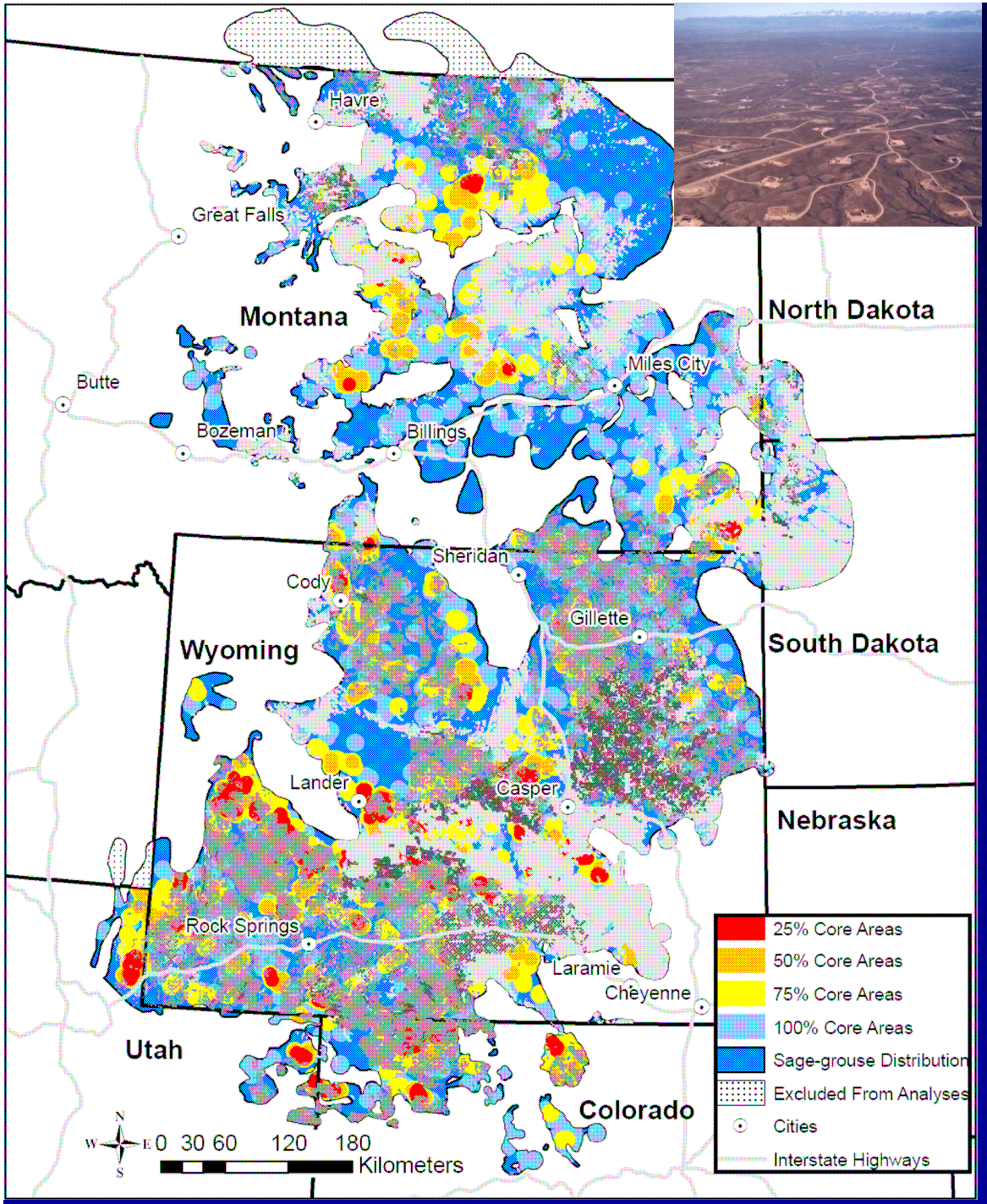
Landscape Planning to Reduce Impacts

Sage-grouse Breeding Core Area Analyses in the Eastern Range:

Management Zones I + II



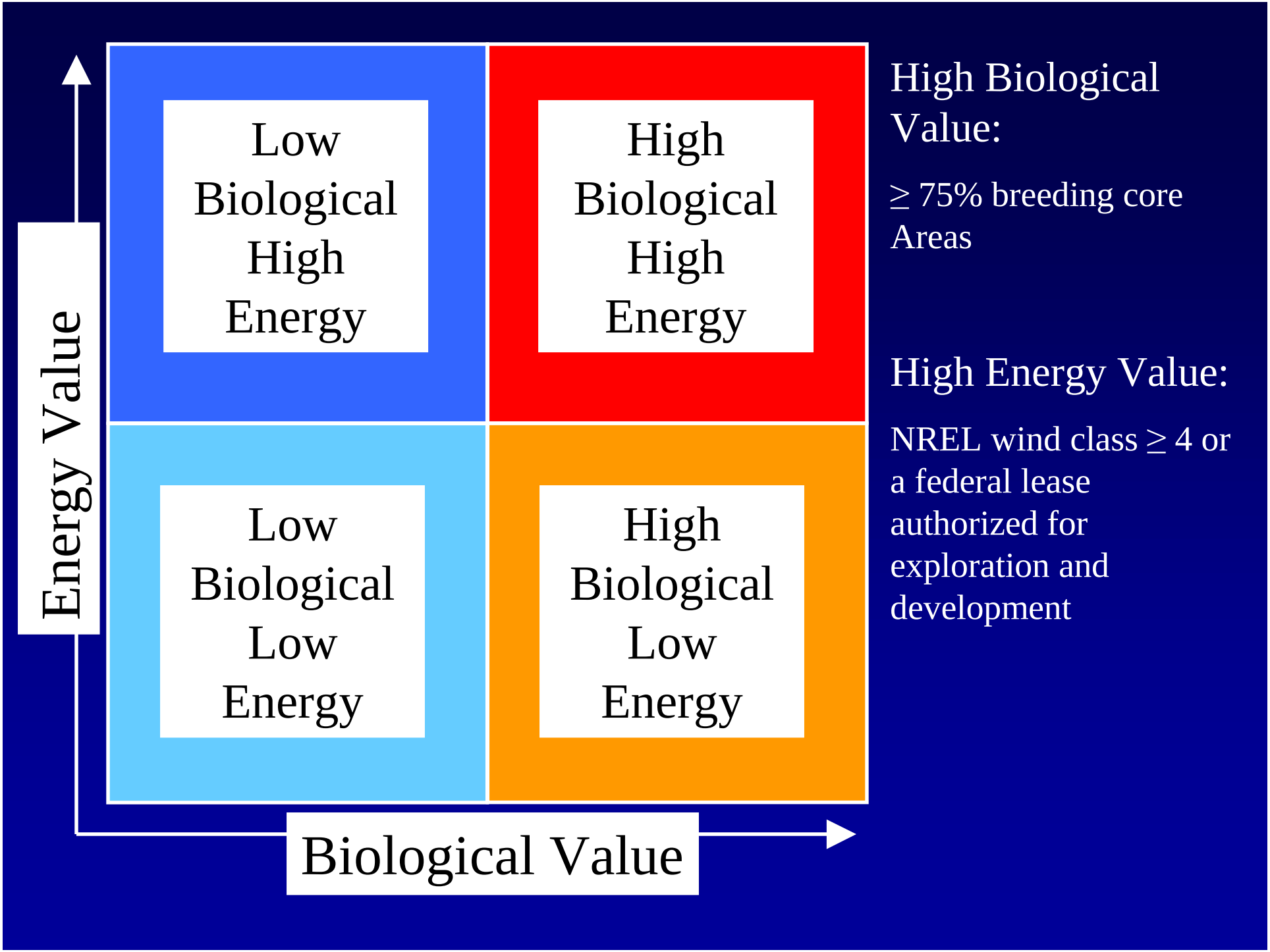




Potential for energy development:

-Wind Potential = NREL wind class ≥ 4

-Gas Potential = Leases authorized for exploration and development on or before 1 June 2007 for all states except Utah (1 May 2007)

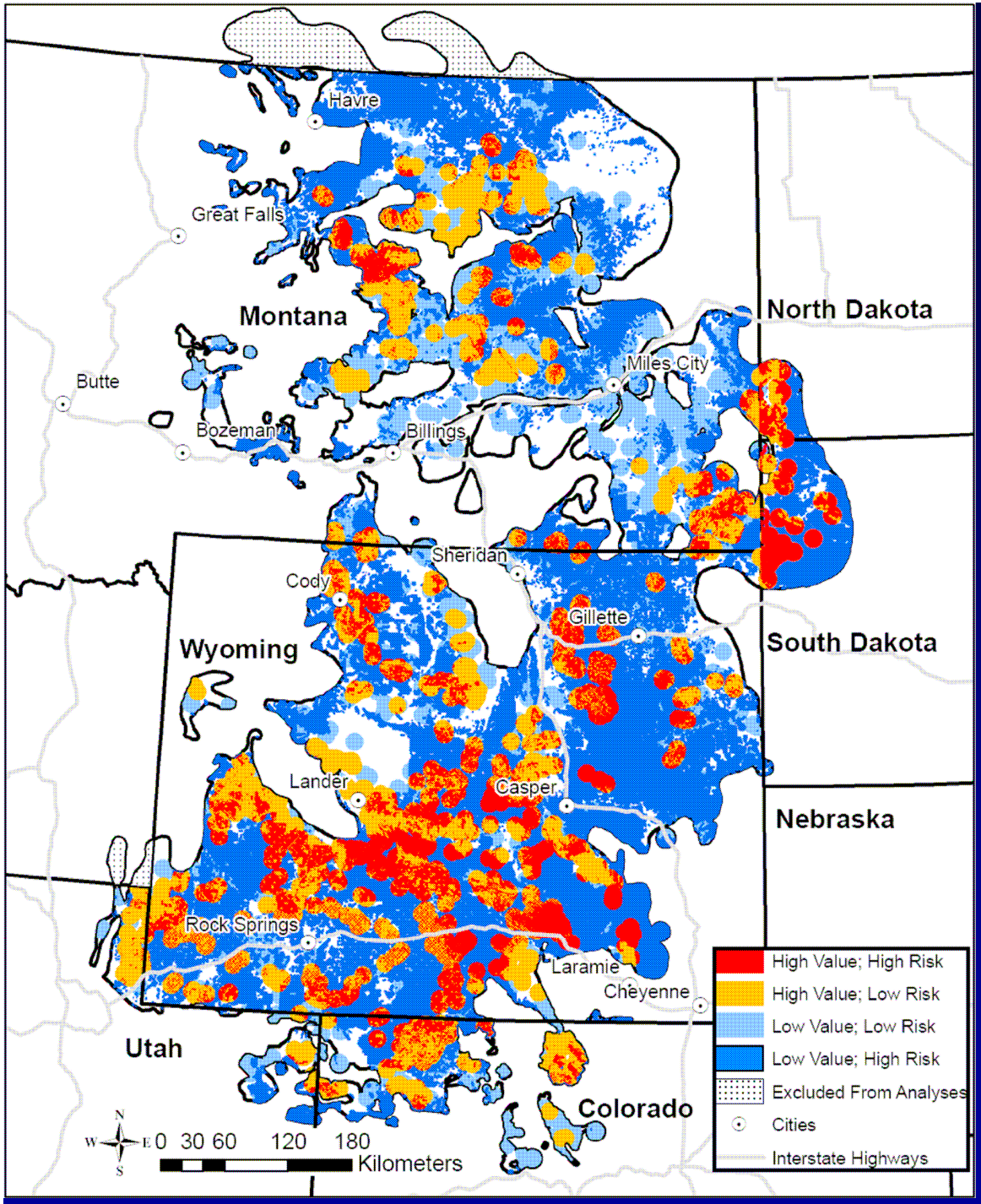


High Biological Value:

≥ 75% breeding core Areas

High Energy Value:

NREL wind class ≥ 4 or a federal lease authorized for exploration and development



Overlay of Risks of energy development:

High Value; High Risk =13% of distribution

High Value; Low Risk = 17% of distribution

Low Value; Low Risk = 19% of distribution

Low Value; High Risk = 25% of distribution

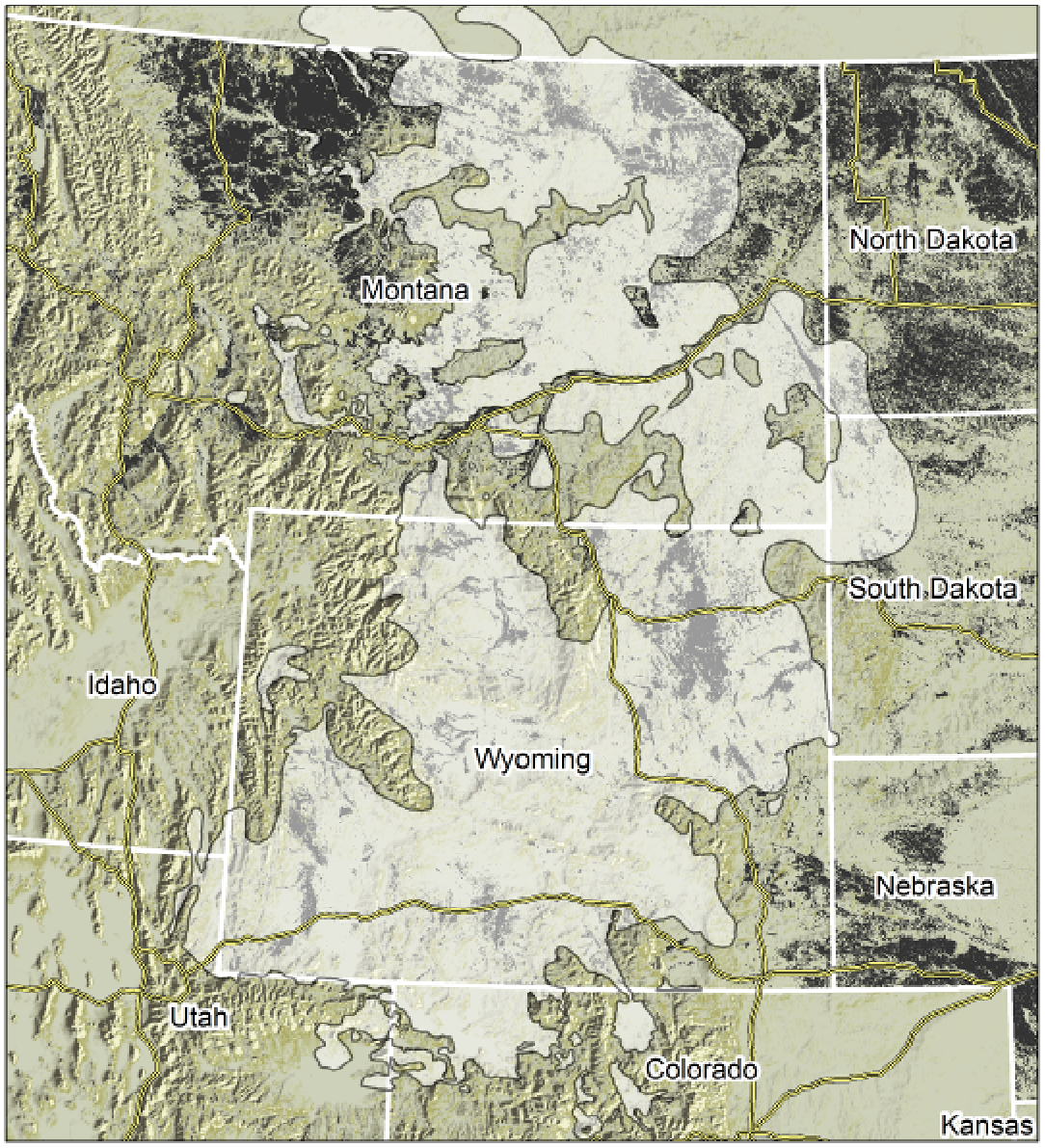
Oil & Gas

Wind

Oil Field

Coal Mine

Transmission



Greater sage-grouse core areas

Greater sage-grouse eastern distribution

0 35 70 140 210 280 Kilometers

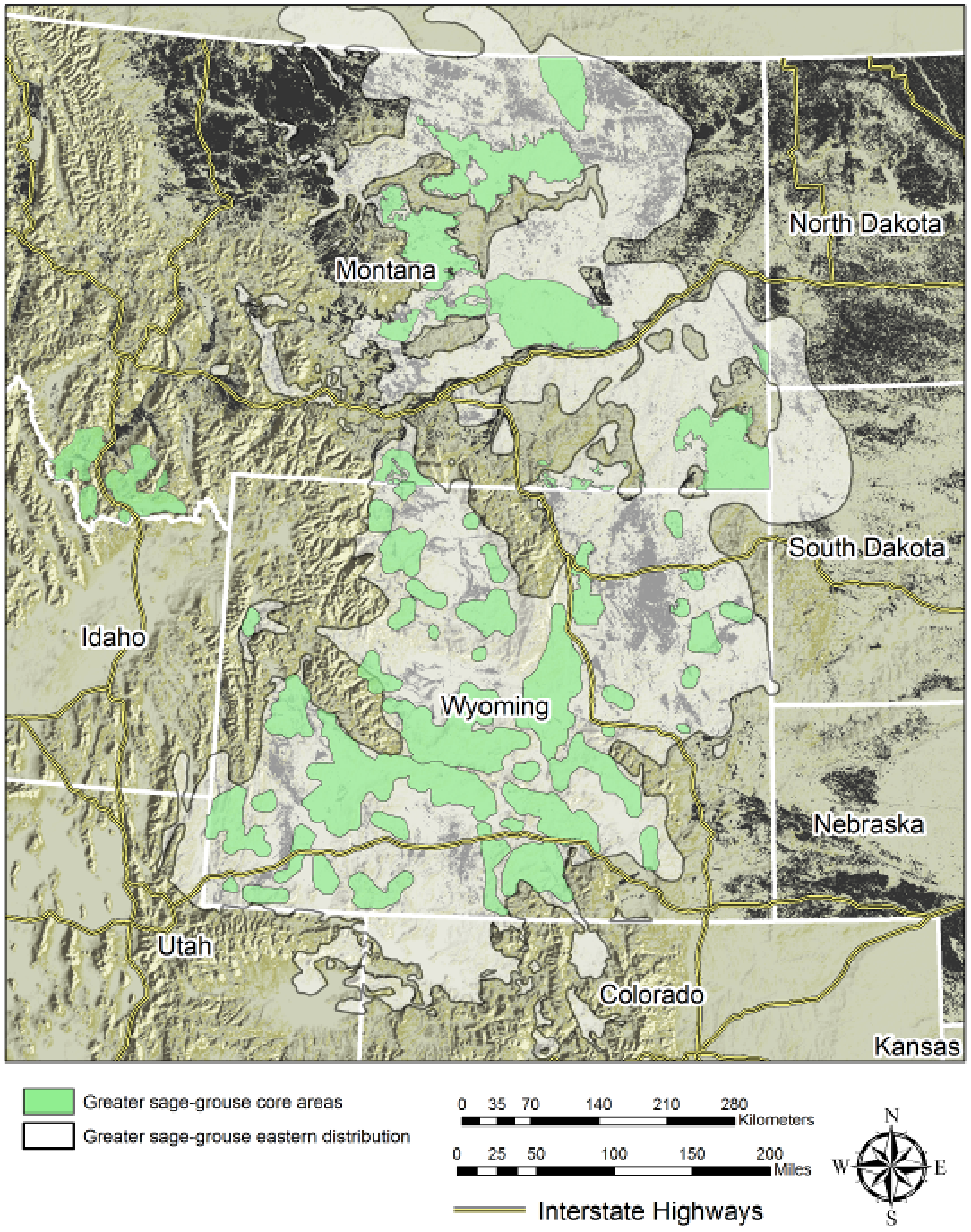
0 25 50 100 150 200 Miles

Interstate Highways

N

W E

S



Can we have large populations and development in the same areas?

Birds are telling us no. It will be one or the other.

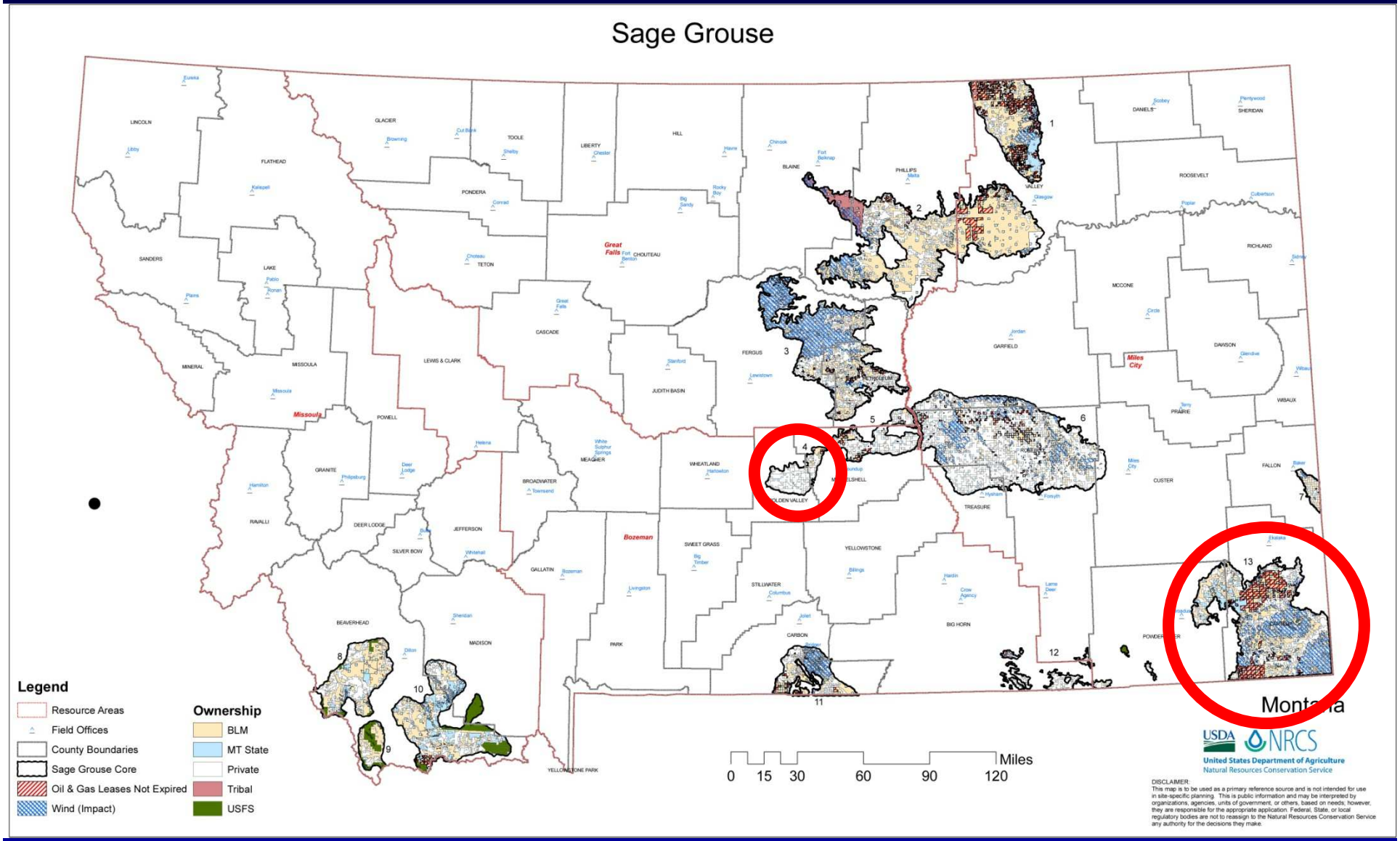
If so, how do we meet energy goals and ‘no net loss’ of birds?

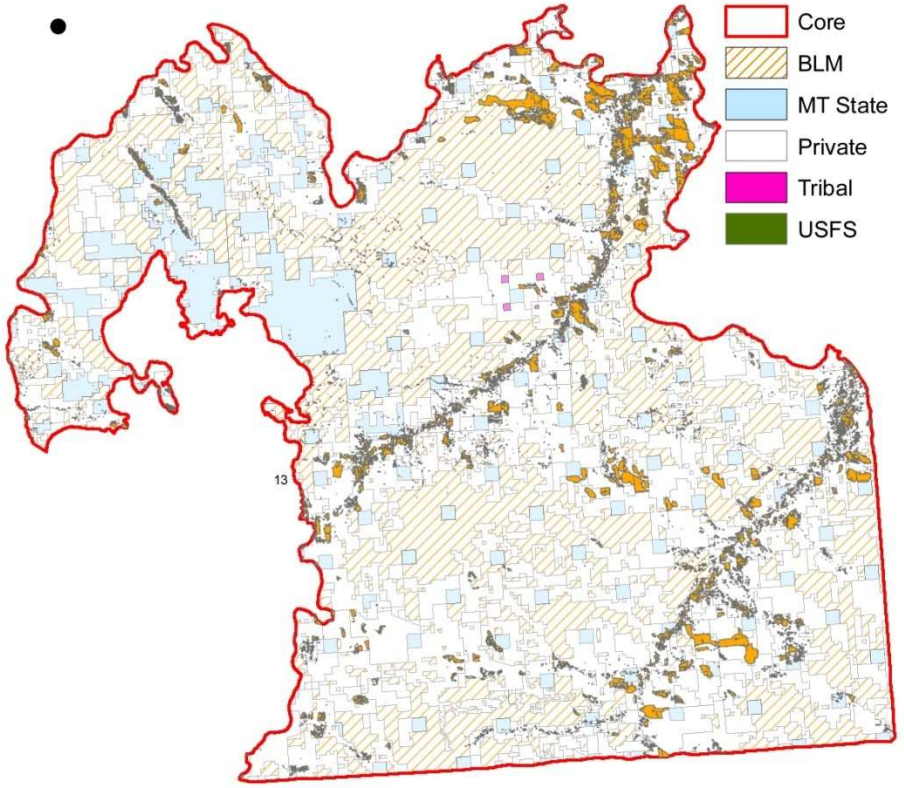
Where Science can Help

- **Birds rather than acres as the biological currency**
- **We need creative tools to aid decision-makers**
- **Here's a tool that might help**

Well Spacing	Decline in Active Leks (%)	Decline in Males (%) on remaining active leks
640 ac	-0.7	-2.1
160 ac	-11.5	-31.4
80 ac	-47.2	-32.6
40 ac	-55.1	-77.3

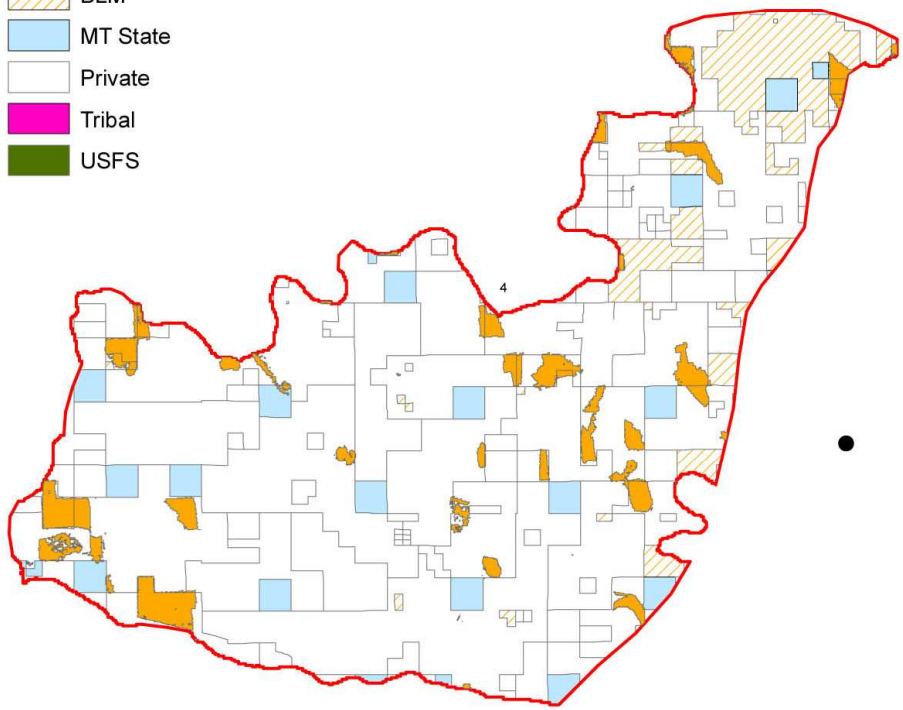
A Challenge to Conservation





0 2 4 8 12 16 Miles

Sage Grouse Core 13



0 1 2 4 6 8 Miles

Thanks for listening, questions or comments?