

Sage-grouse and Sagebrush Steppe

**Ecological science for the Idaho Alternative
Part 1. Setting the Stage**



Presentation Outline

- Studies in Avian Biology book
- Why conservation is so difficult
- Hierarchy and Metapopulations
- What has changed



Greater Sage-Grouse

- Depend on sagebrush habitats
- Relatively long-lived (3-7 years)
- Low reproductive output
- Large annual range
- Long distances between seasonal ranges (>80 miles)



Greater Sage-Grouse

Why is conservation so challenging?

- Broad range-wide distribution
- Diversity of sagebrush environments
 - Complex dynamics
- Wide variety of system stressors
- Multiple land ownerships
 - Public lands managed for multiple use
 - Not all lands are equal





Sagebrush fragmentation

Low

High

Percent landcover in sagebrush habitat

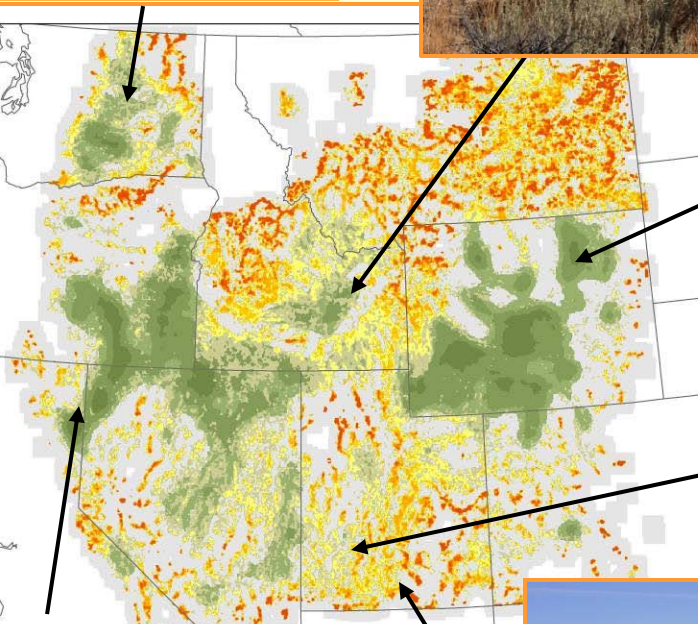
< 40

41 - 60

61 - 80

81 - 100

State boundaries



Sage-Grouse Extirpation

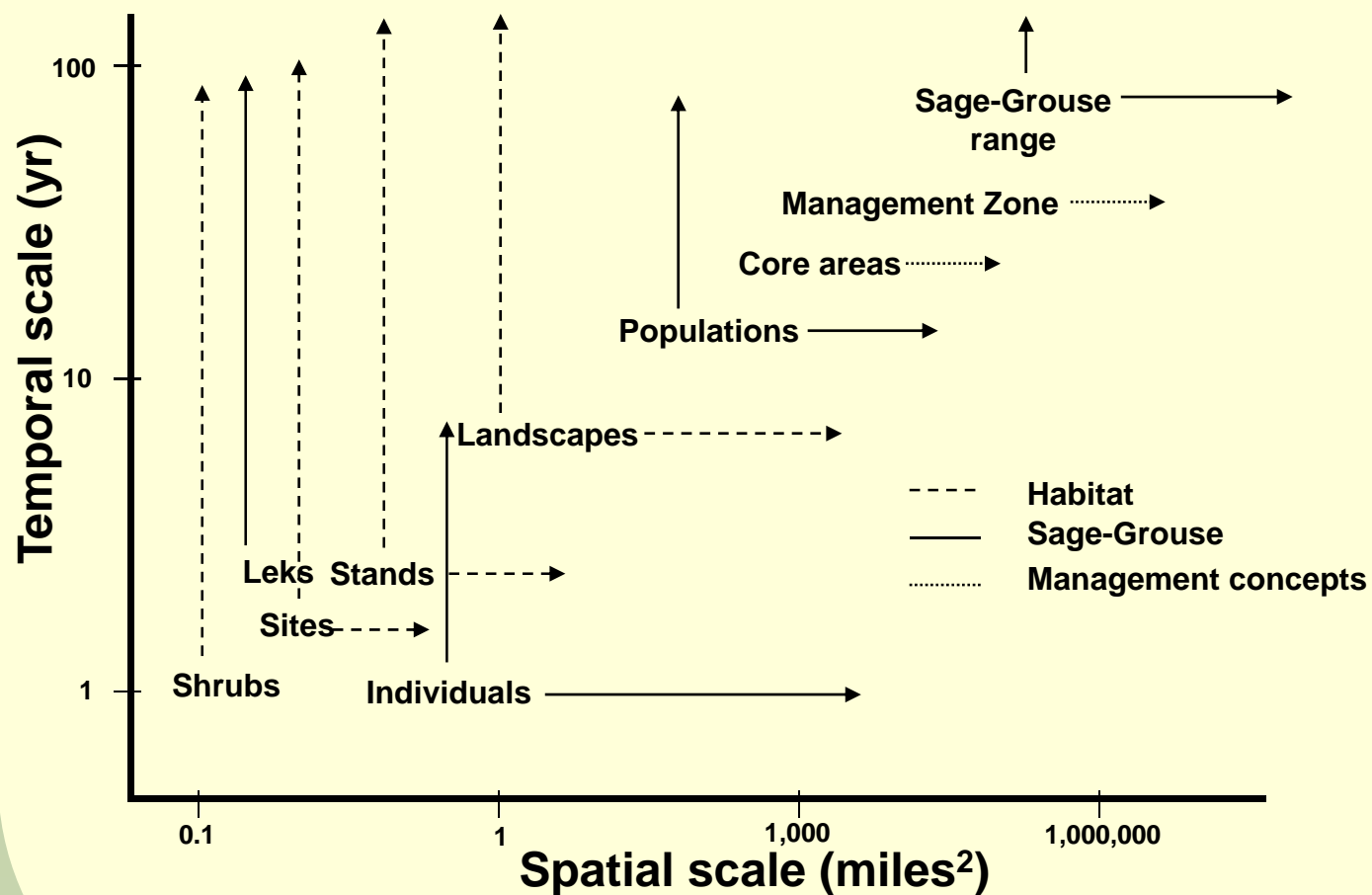
- Range-wide analysis
 - <25% sagebrush in landscape
 - >6 persons/mile²
 - >25% cultivated agriculture
 - Distance to towers and tall structures

Northern Nevada



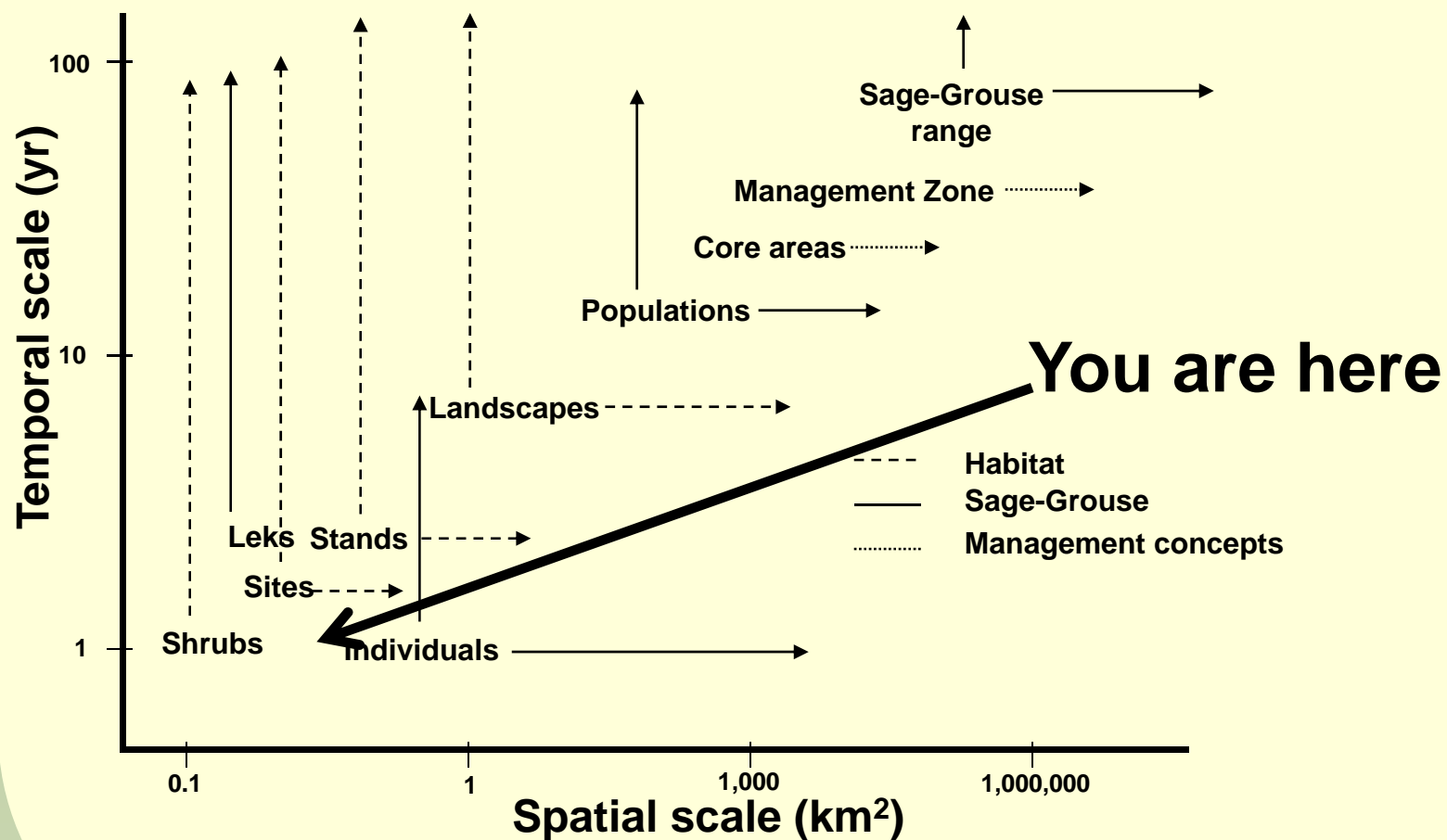
Sage-Grouse and Sagebrush

Space-time dimensions



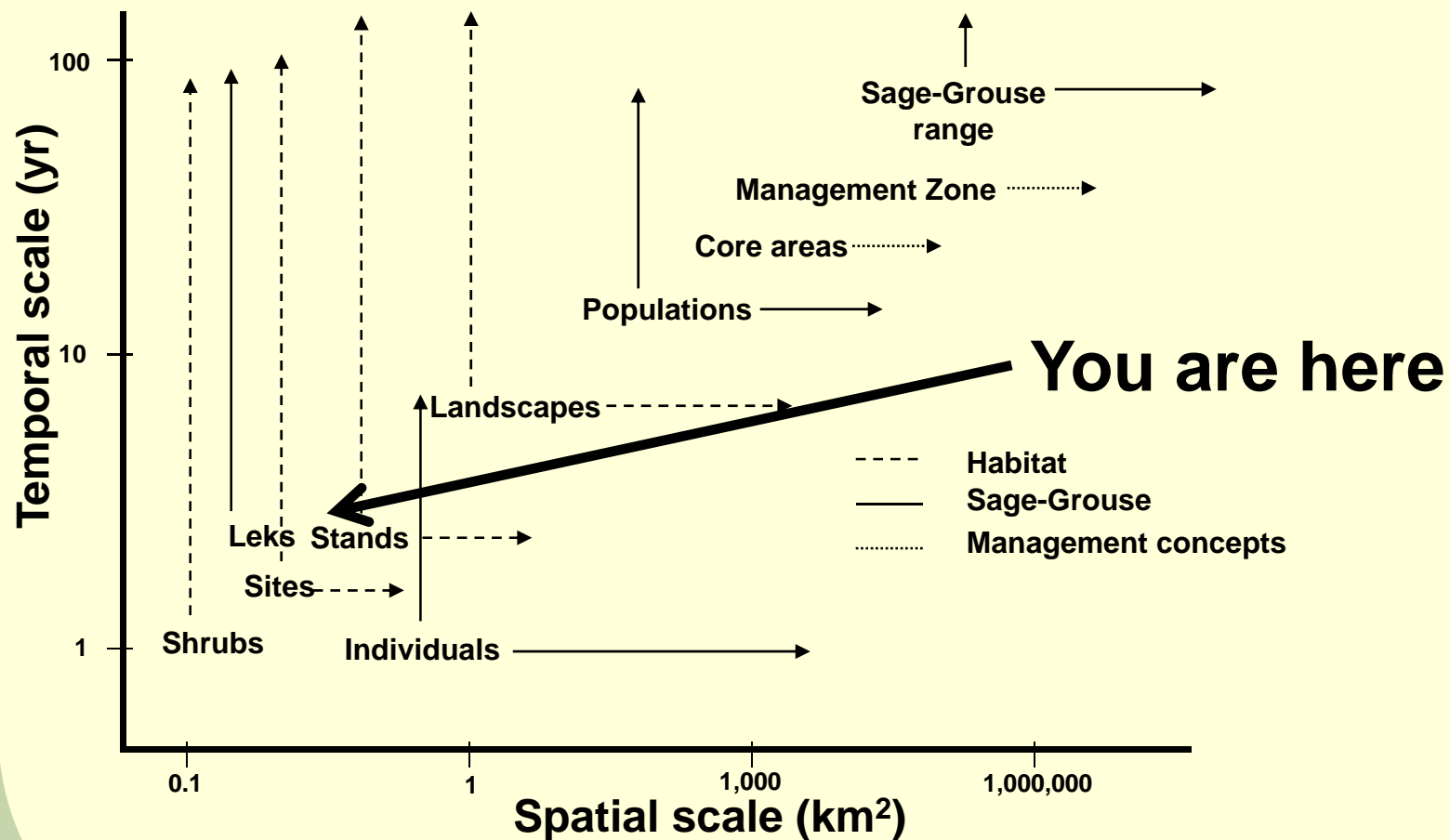
Sage-Grouse and Sagebrush

Space-time dimensions



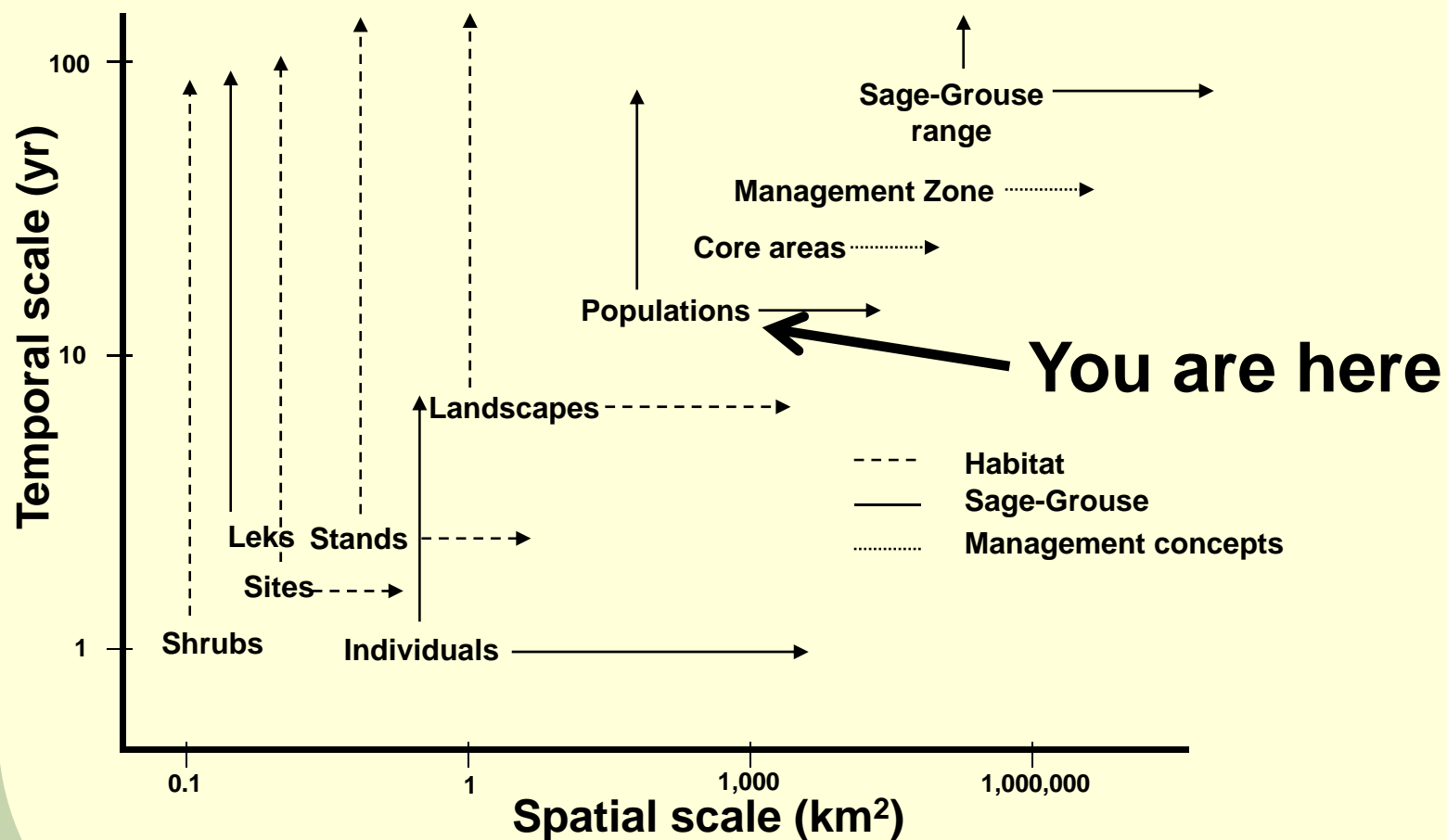
Sage-Grouse and Sagebrush

Space-time dimensions



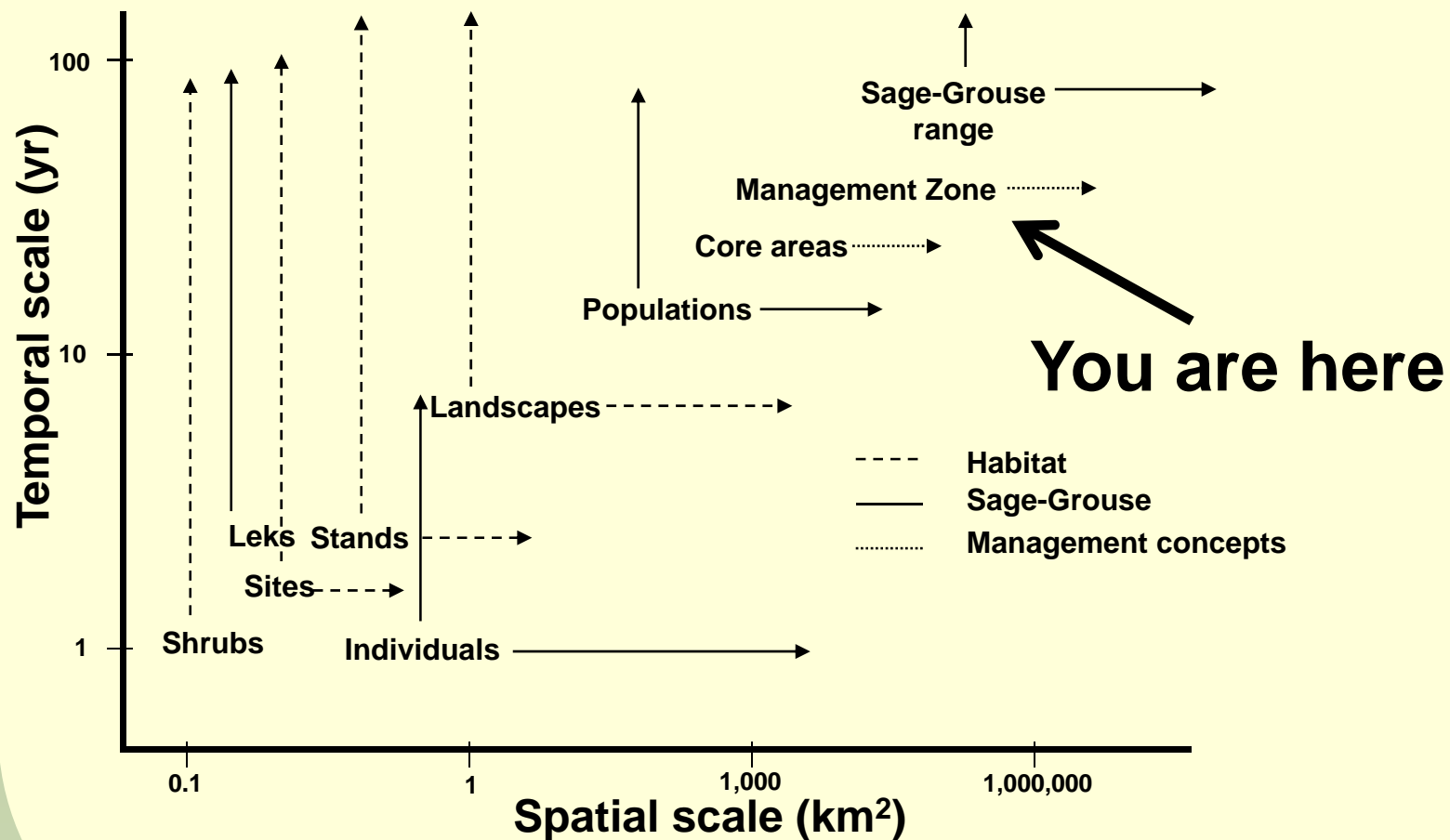
Sage-Grouse and Sagebrush

Space-time dimensions



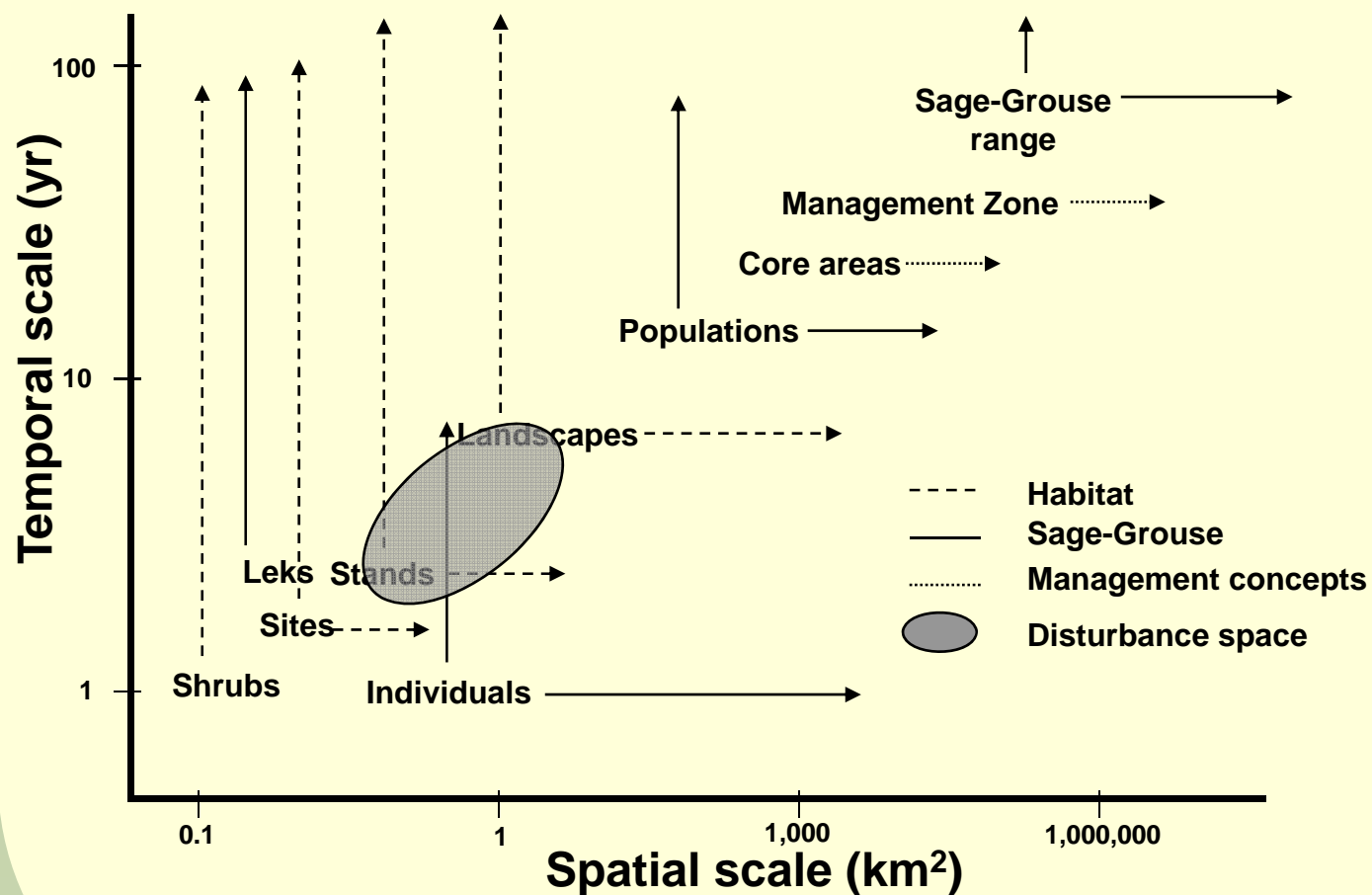
Sage-Grouse and Sagebrush

Space-time dimensions

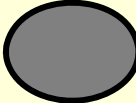


Sage-Grouse and Sagebrush

Space-time dimensions

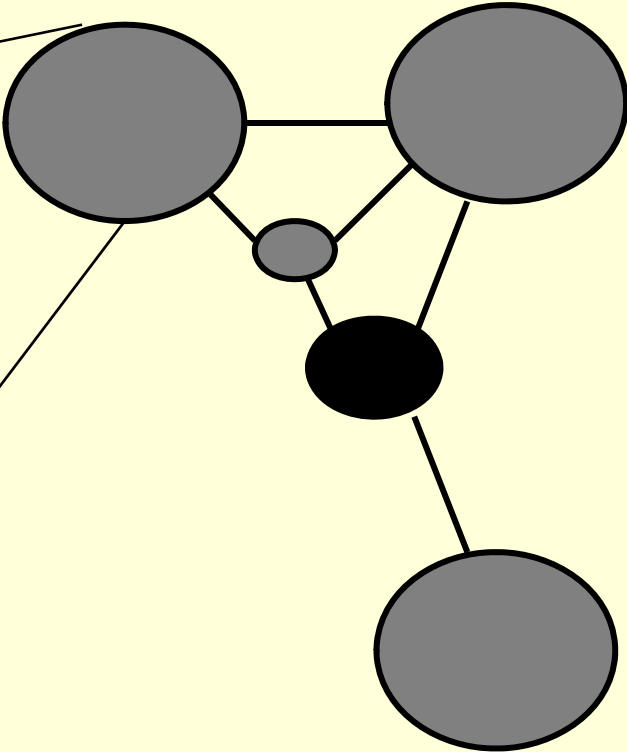
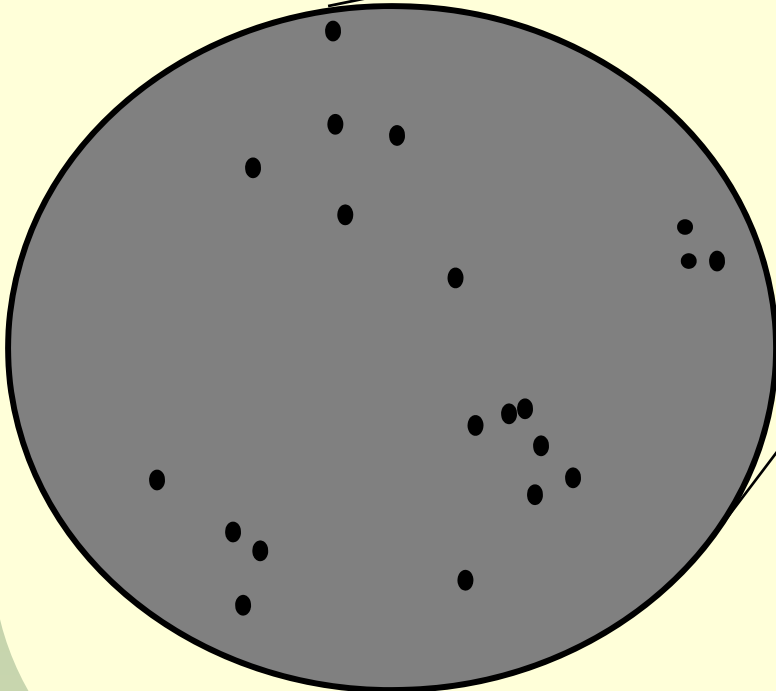


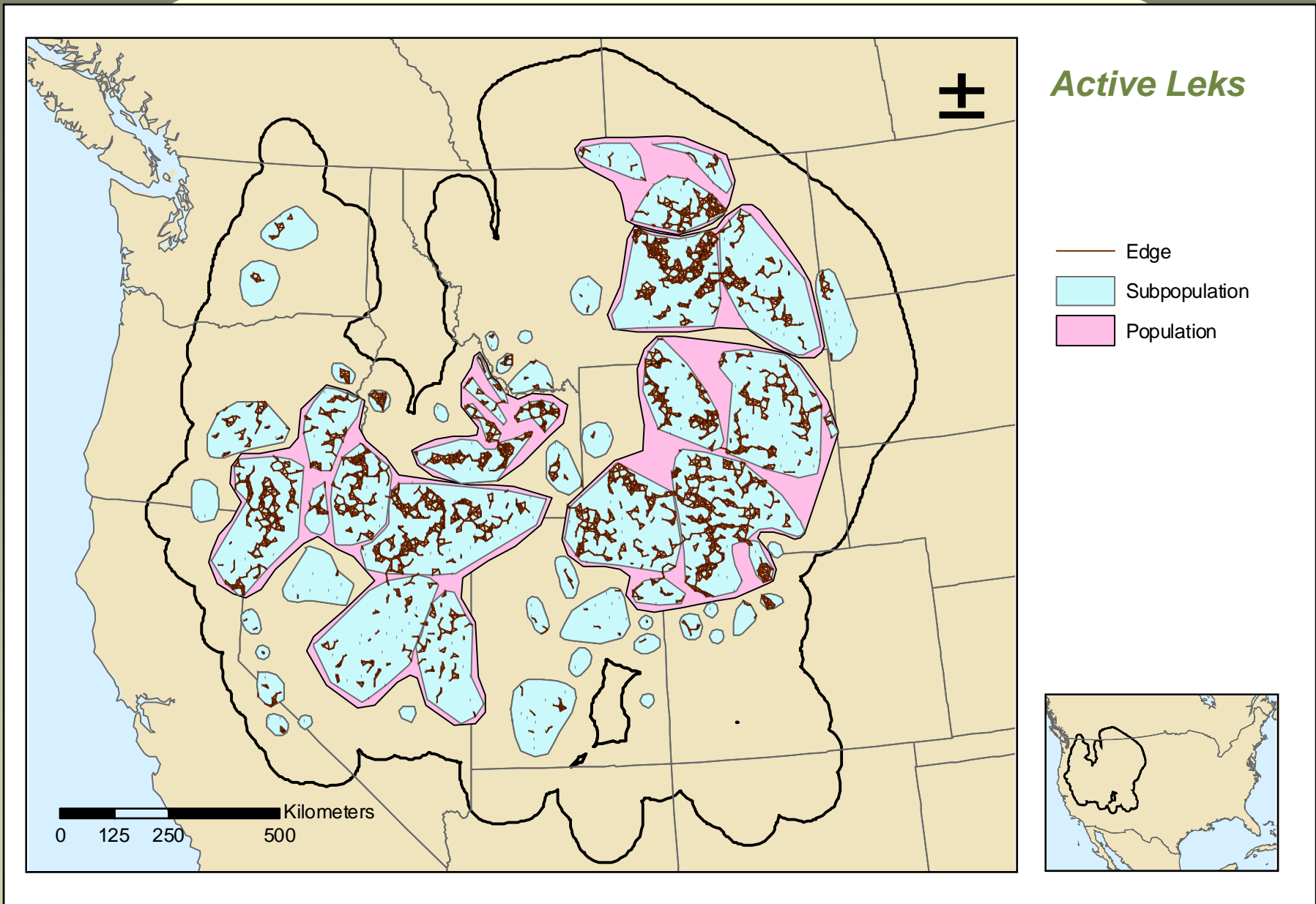


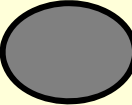


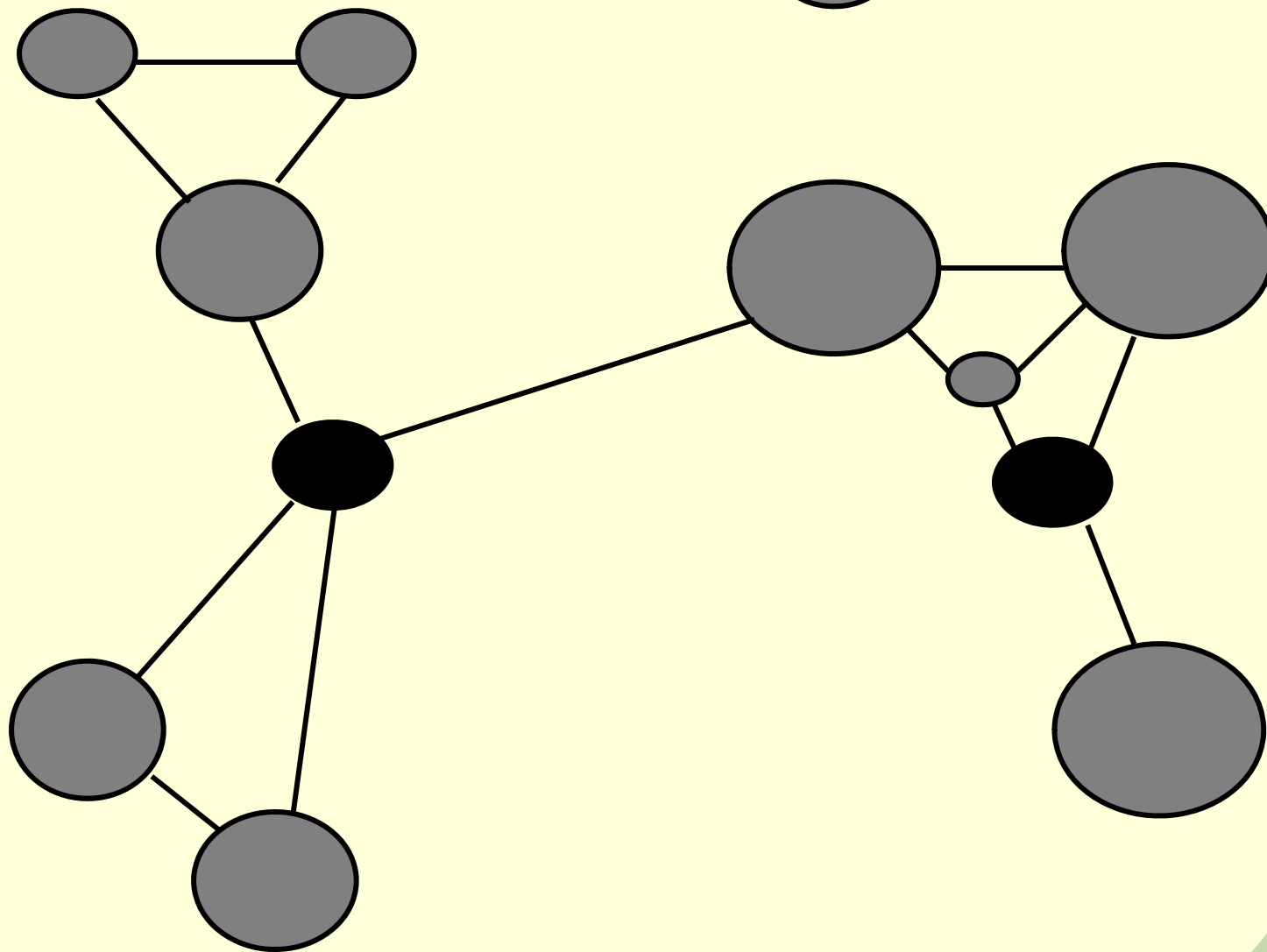
Sage-grouse population

- Sage-grouse lek





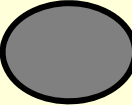
 Sage-grouse population

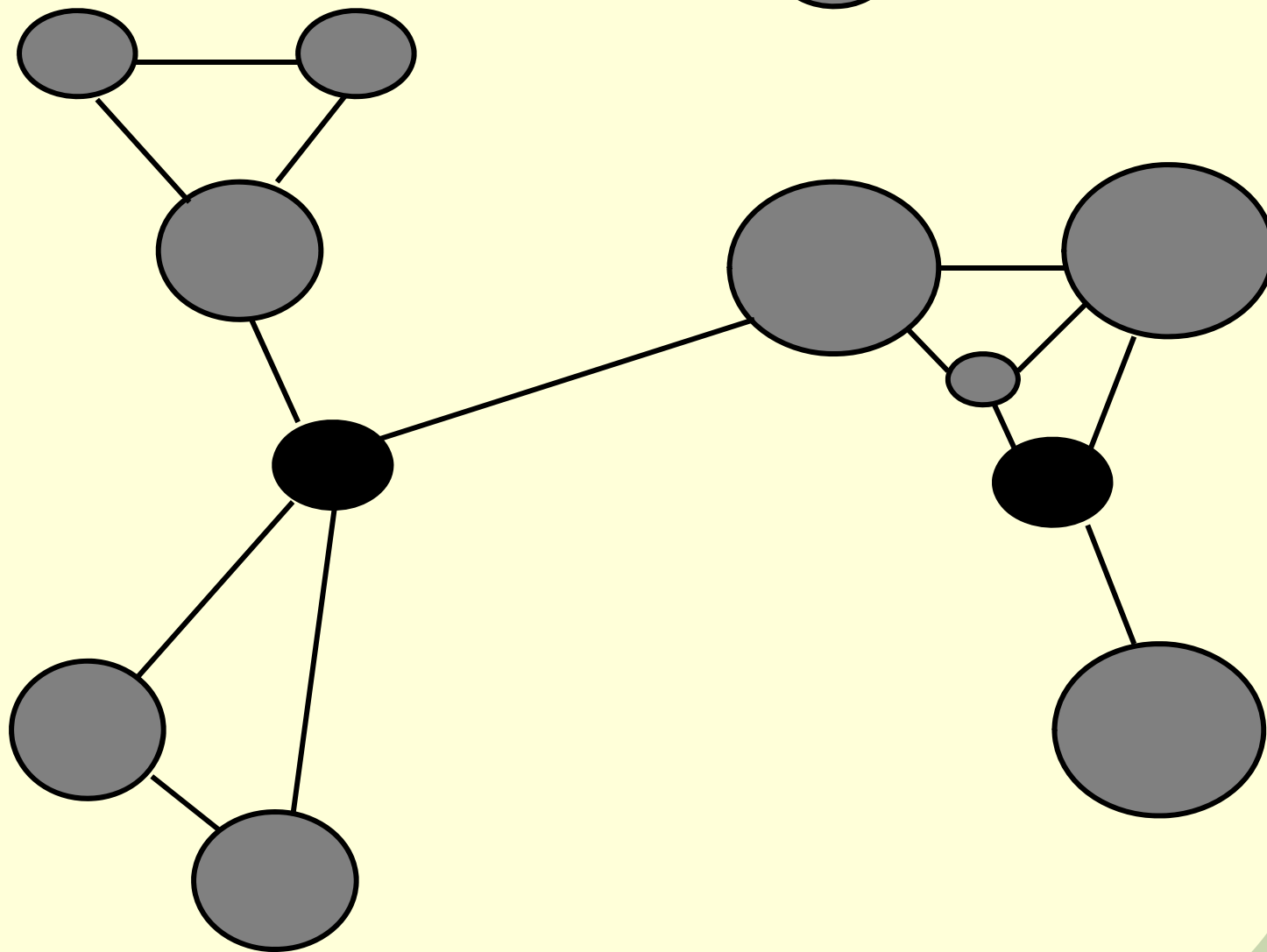


Sage-Grouse Populations: Factors Influencing Persistence

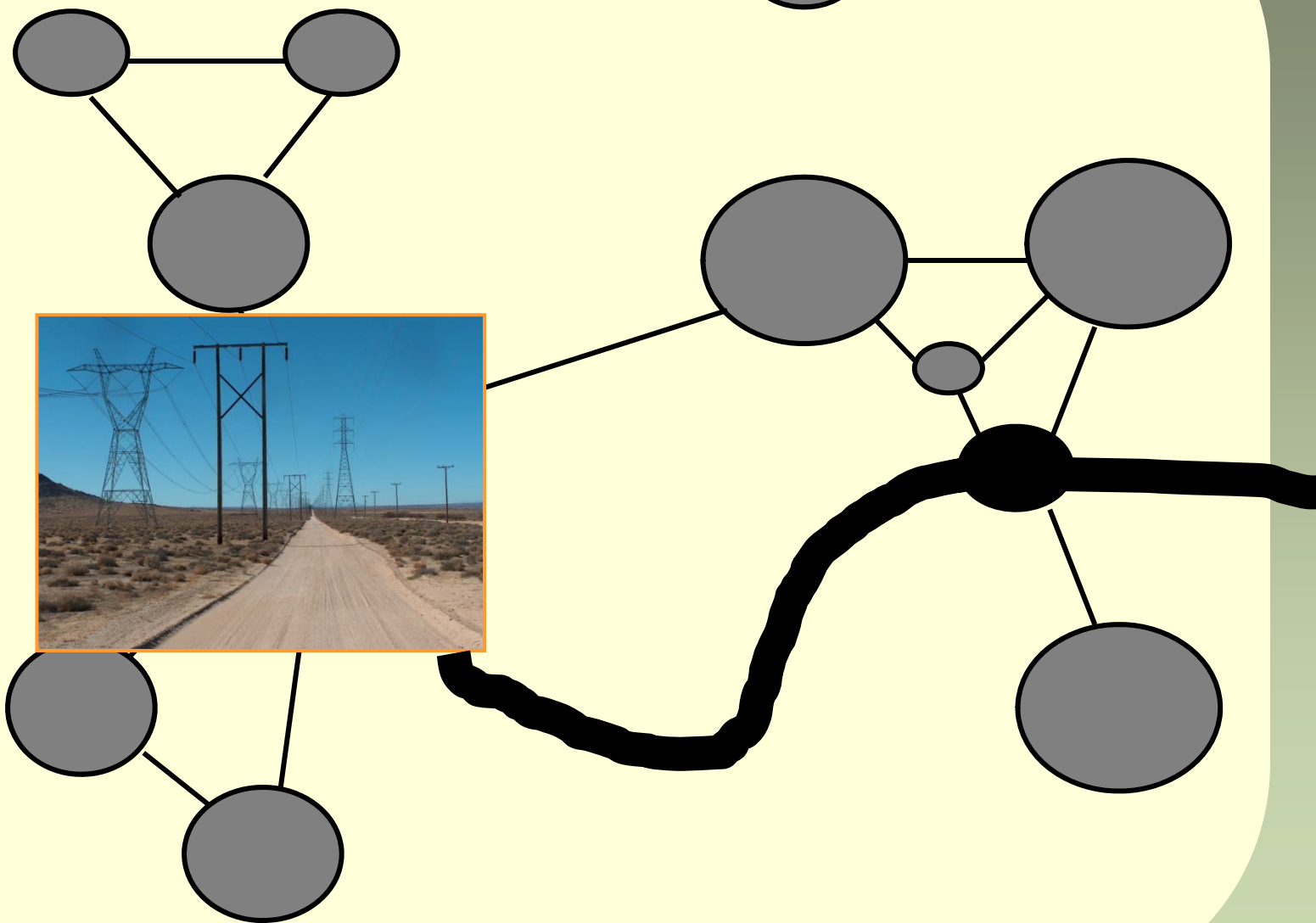
- Size and isolation (bigger and better connected)

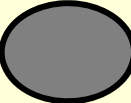


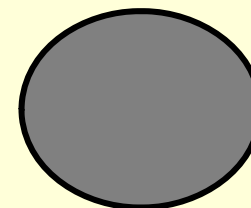
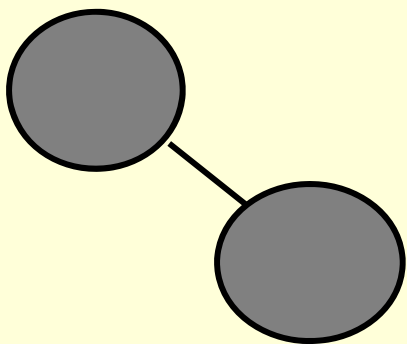
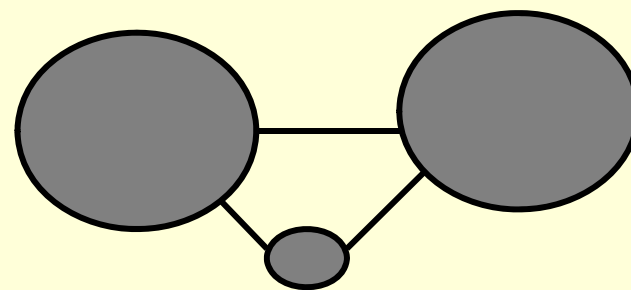
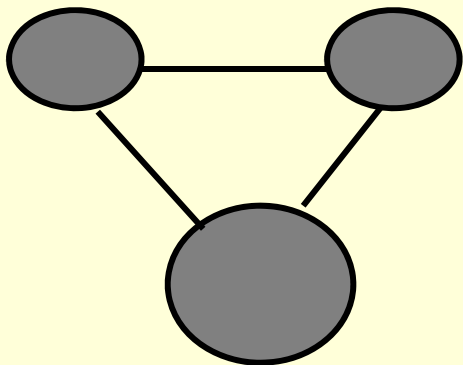
 Sage-grouse population



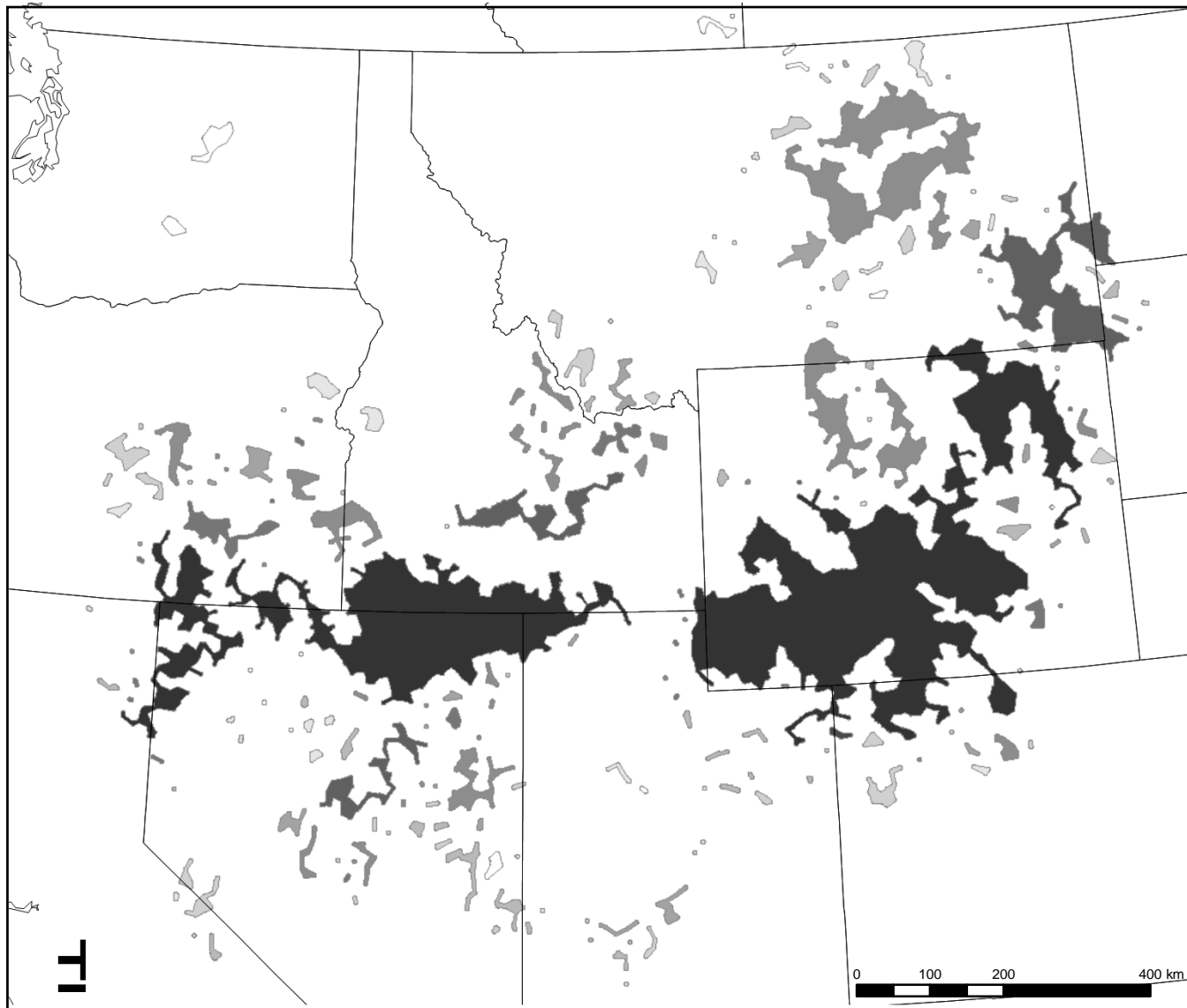
● Sage-grouse population



 Sage-grouse population



Sage-Grouse: Breeding Units



Component Importance

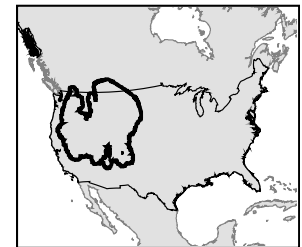
Least



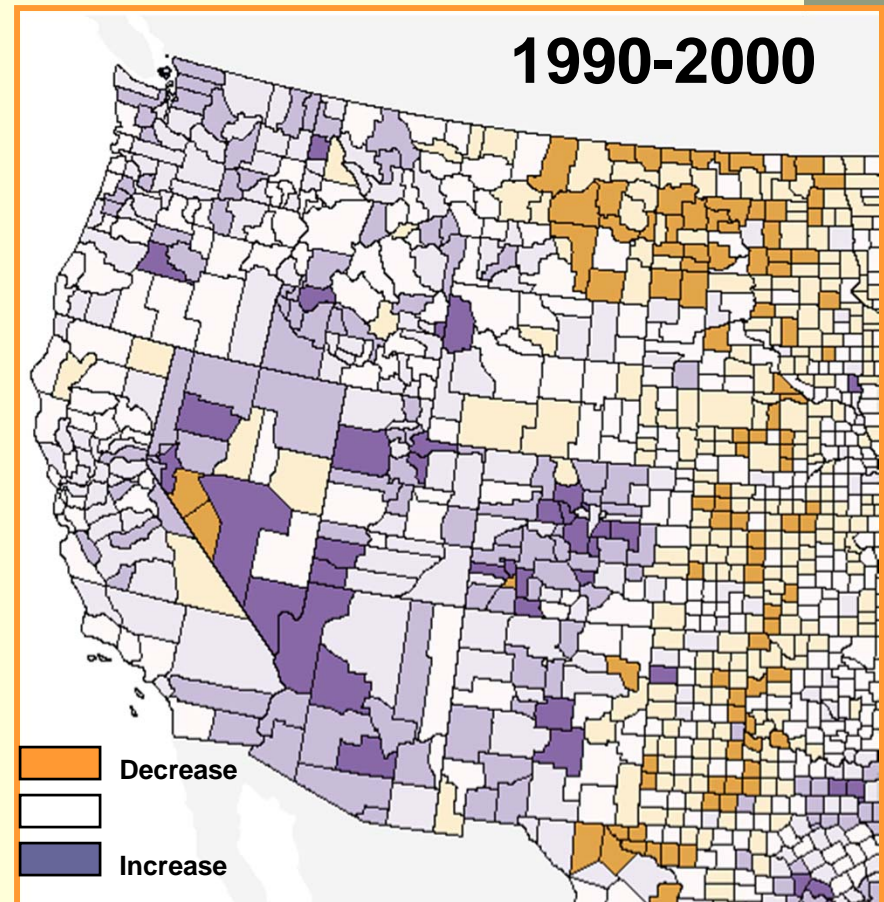
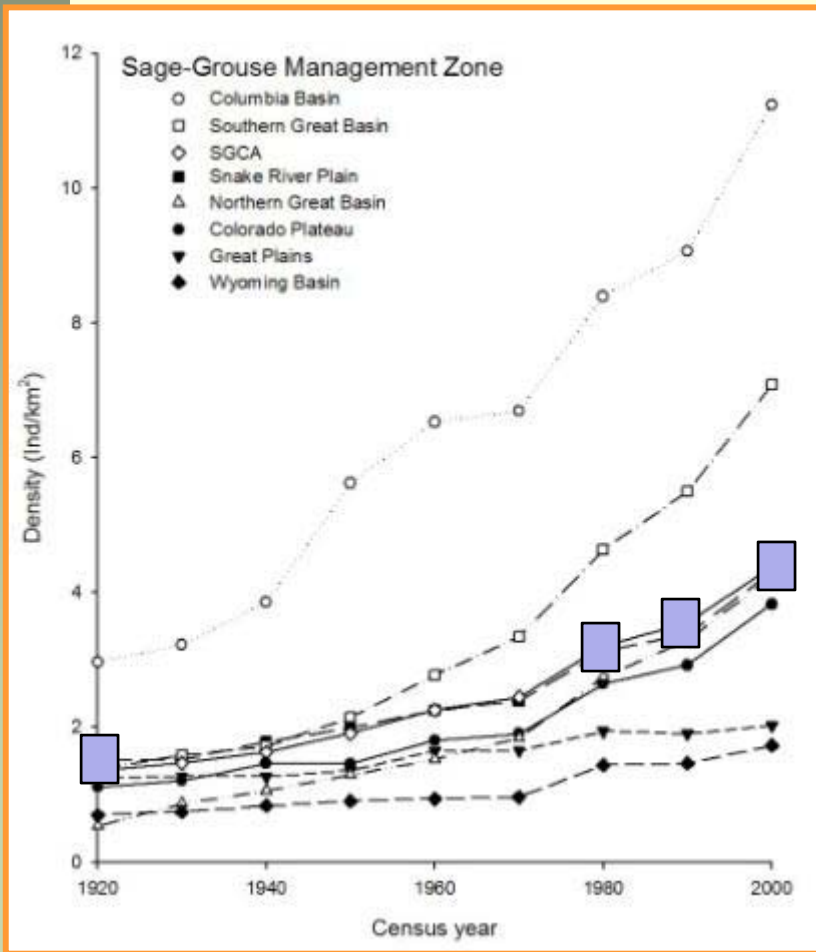
Most



State/Province
Boundaries



Human Population Growth



Sagebrush

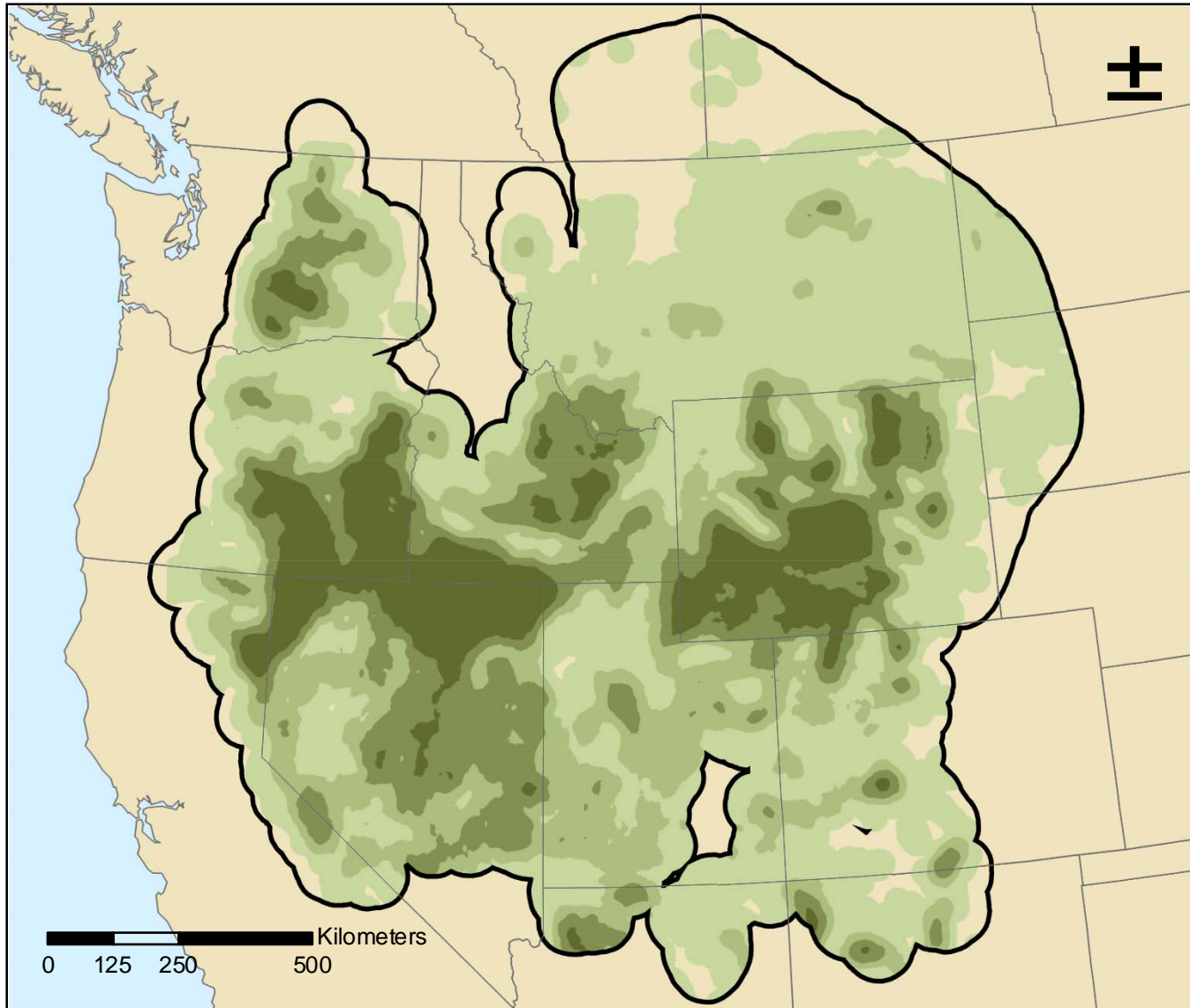
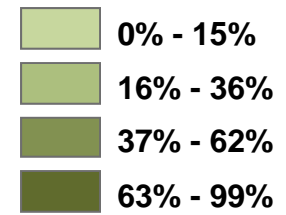
Land use

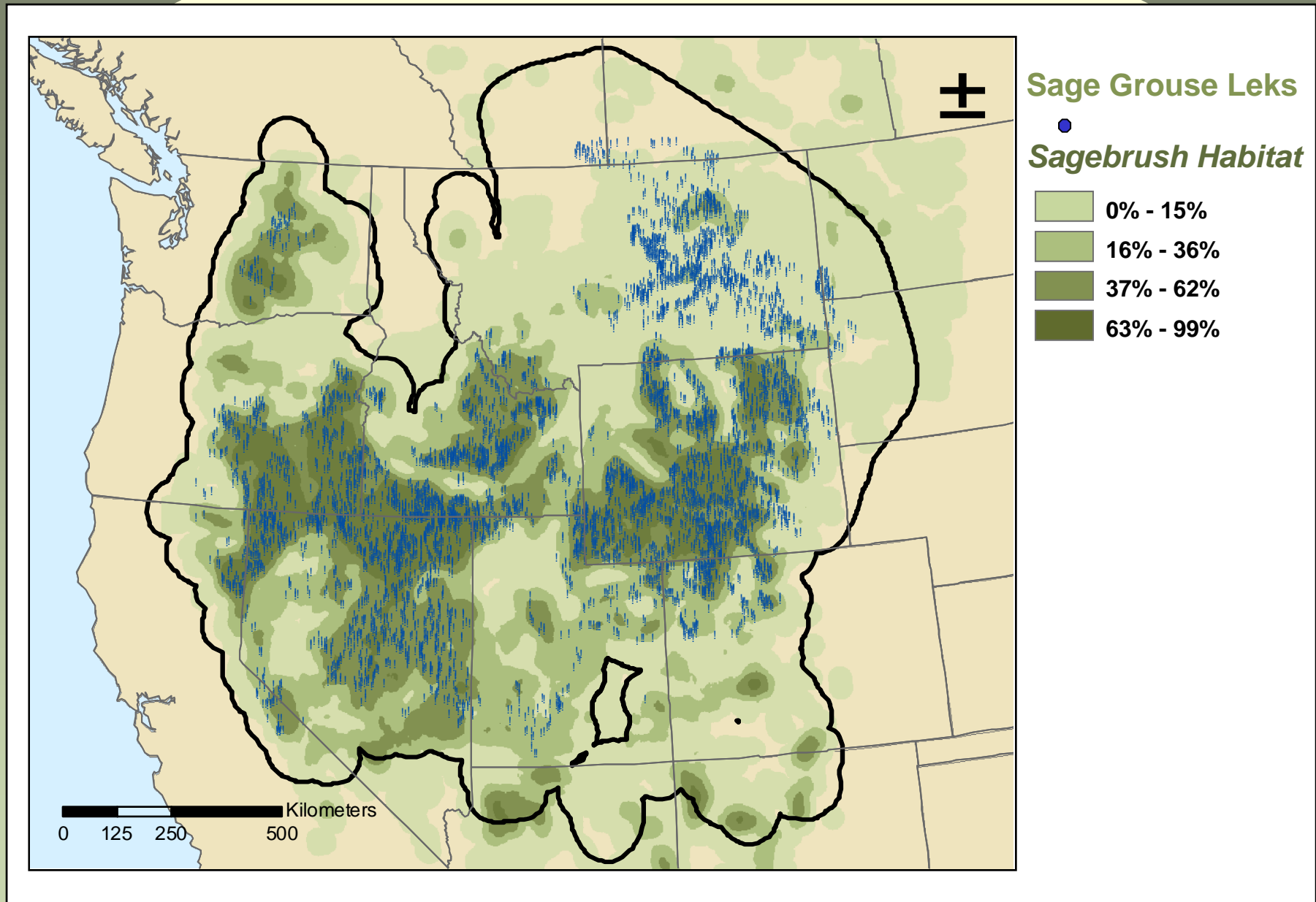


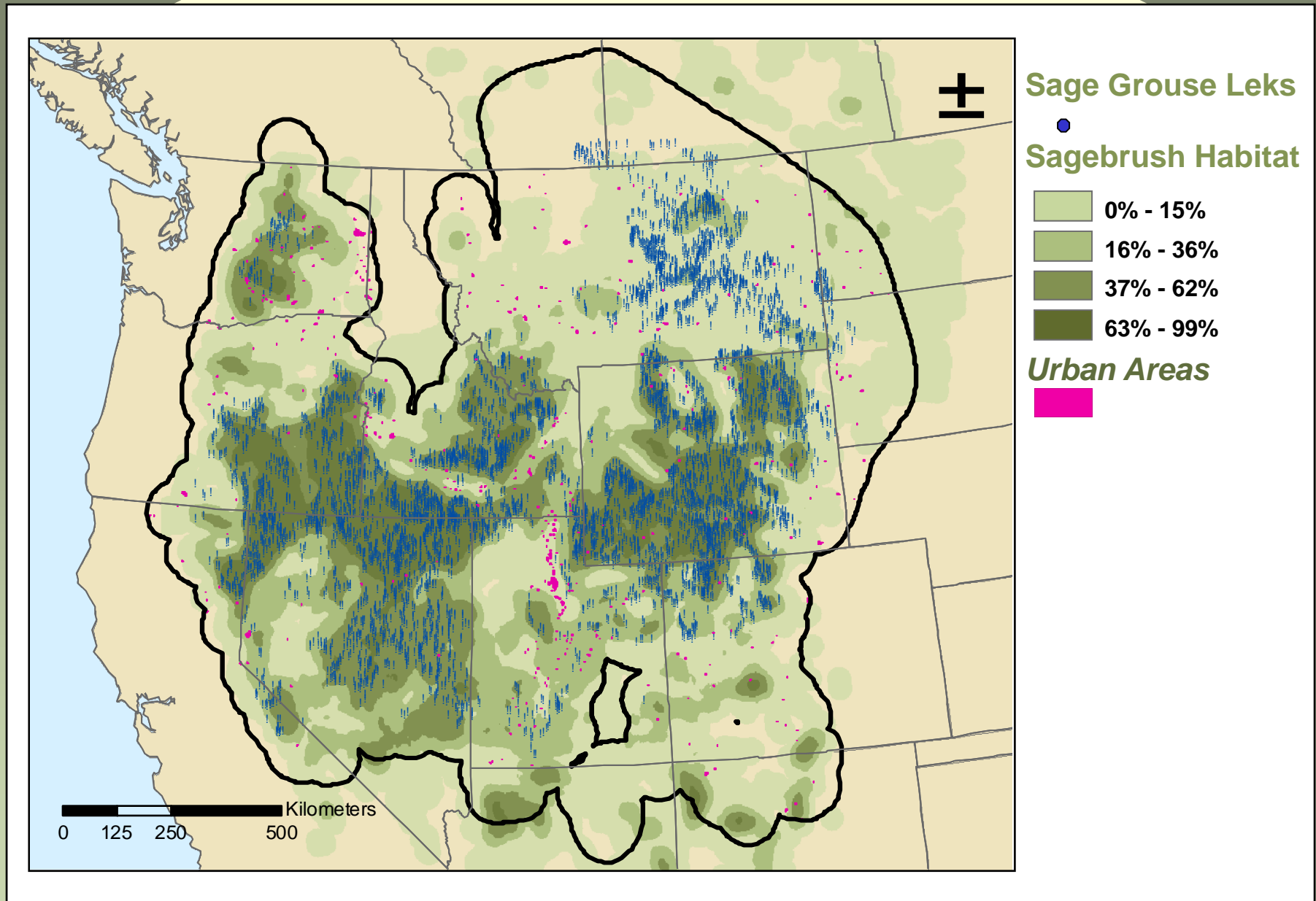
Agriculture
Urbanization
Infrastructure (roads, powerlines, towers)
Recreation and OHV use
Livestock grazing and management
Energy development (Oil and gas, wind, geothermal)
Military training

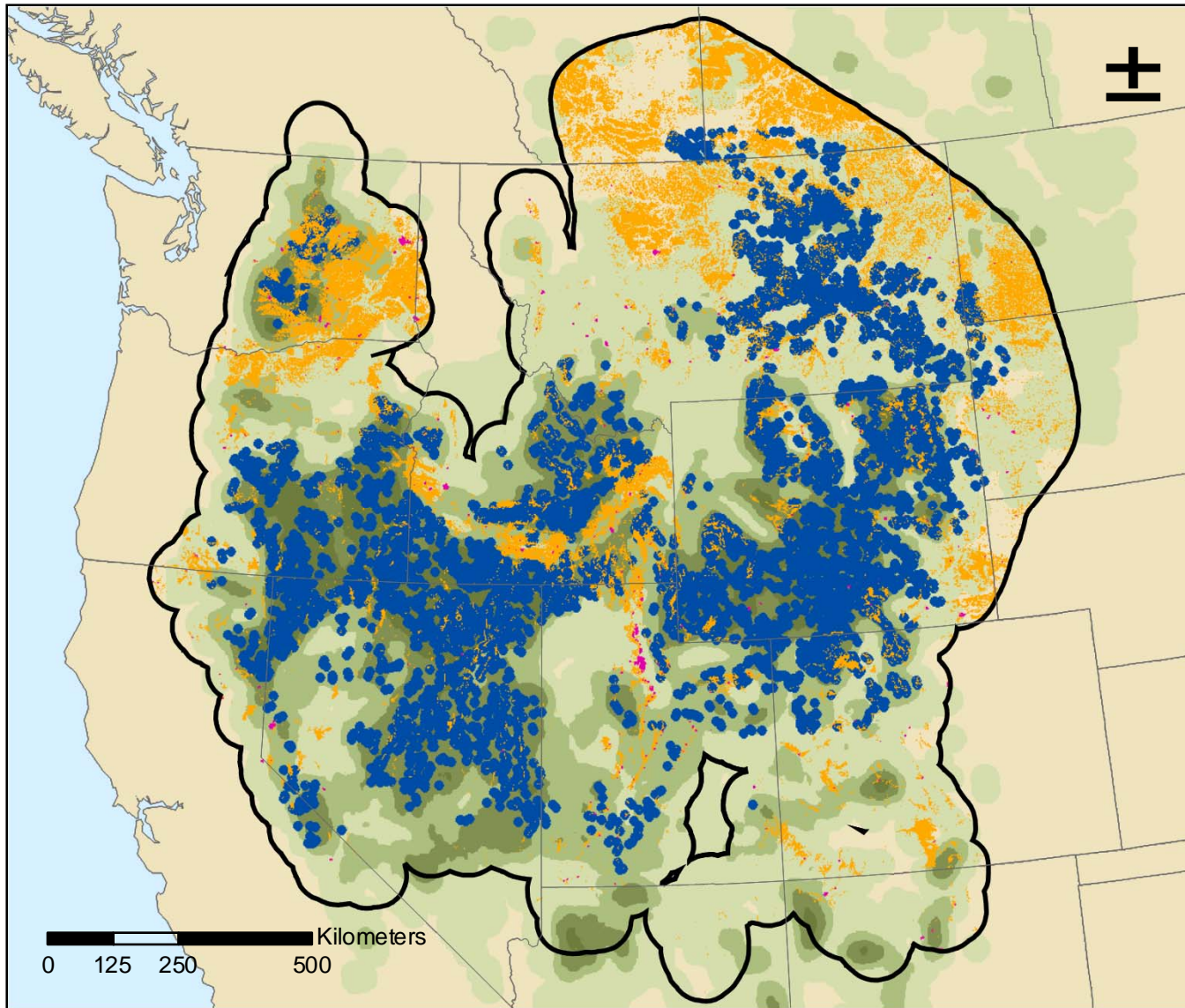


Sagebrush Habitat





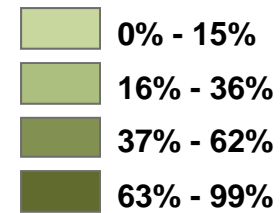




Sage Grouse Leks



Sagebrush Habitat

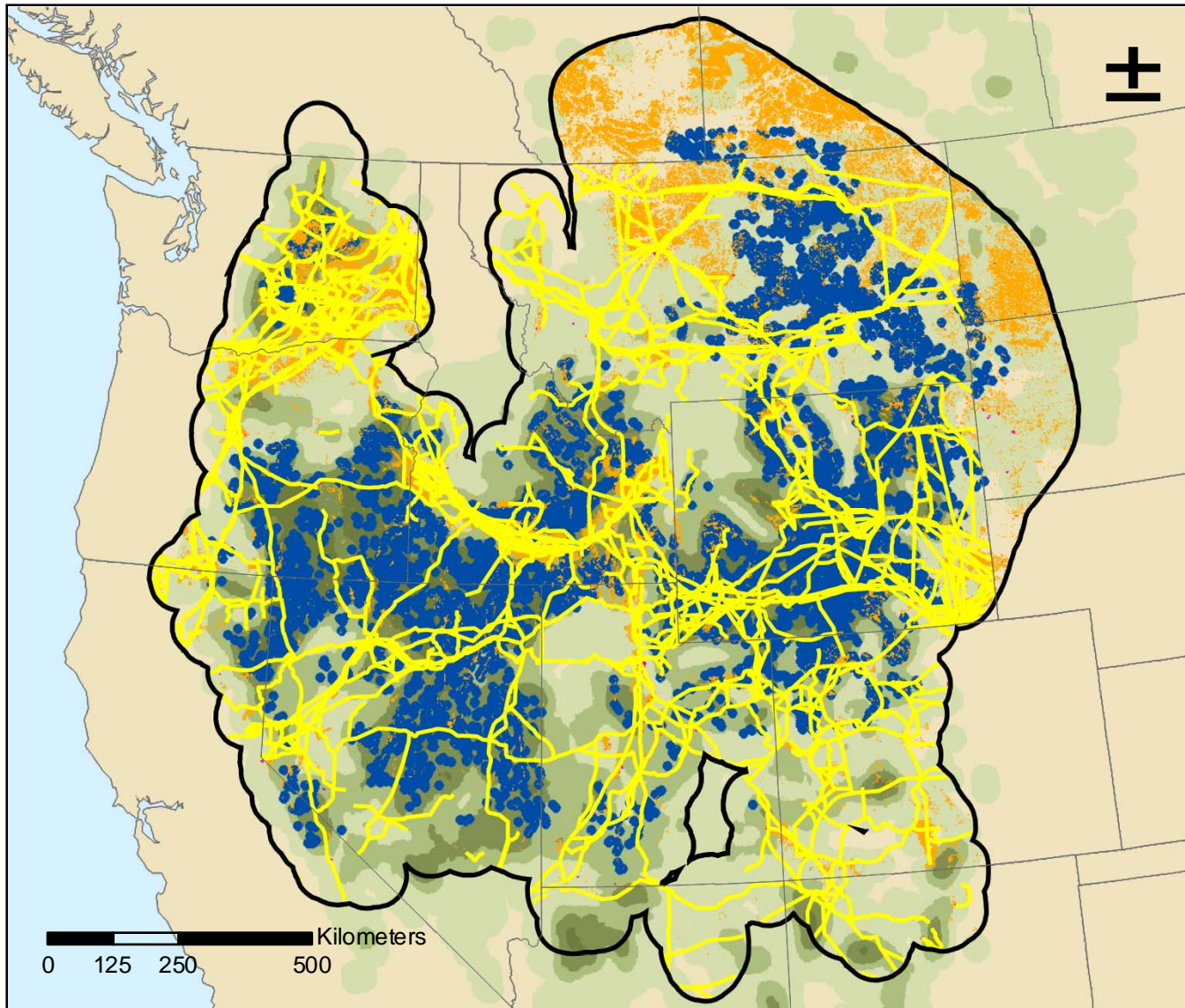


Urban Areas



Agricultural Land









Sage Grouse Leks



Sagebrush Habitat

-  0% - 15%
-  16% - 36%
-  37% - 62%
-  63% - 99%

Urban Areas

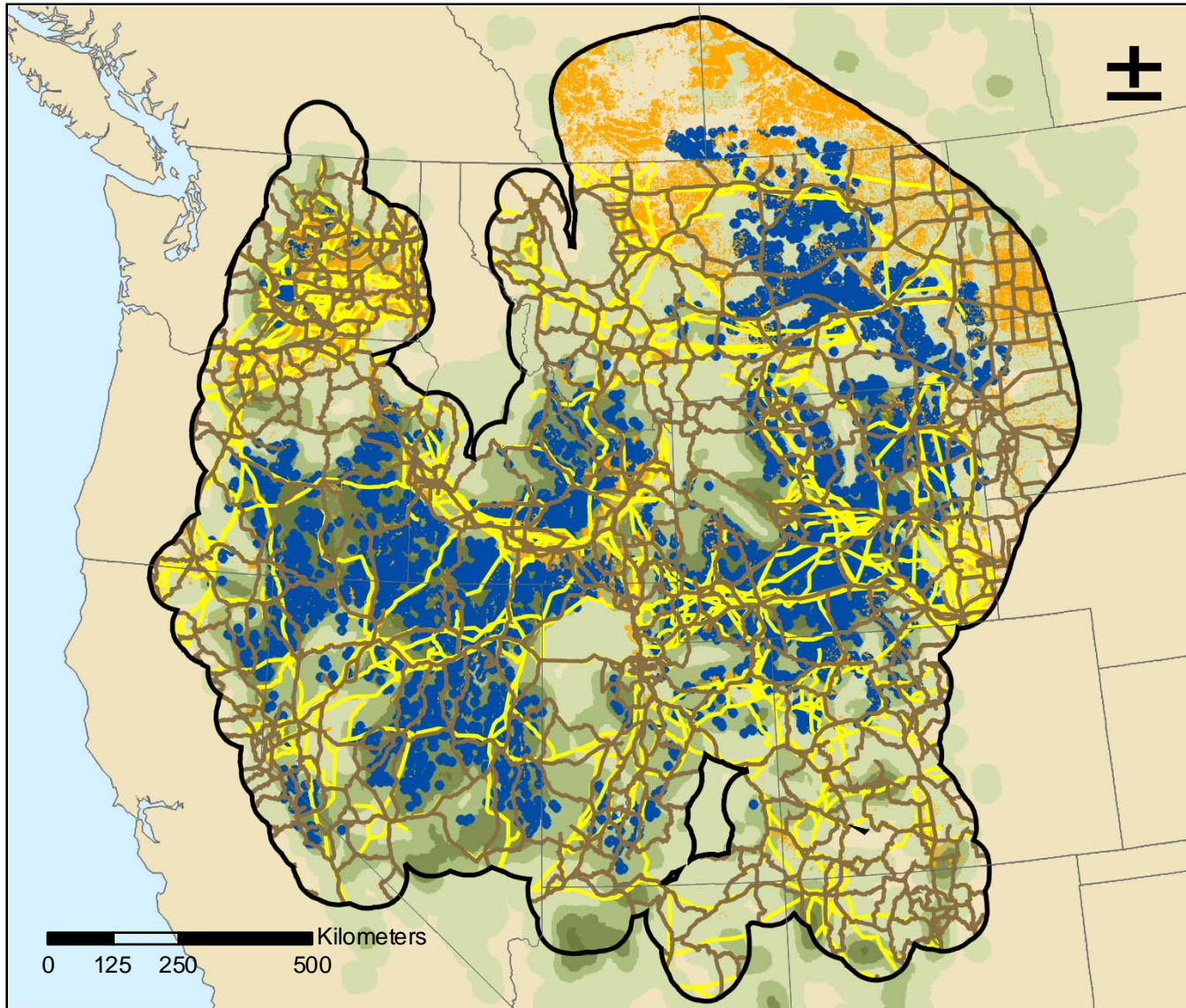


Agricultural Land



Power Lines

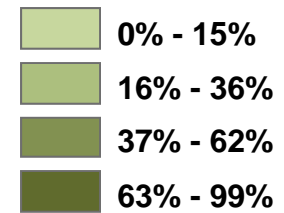




Sage Grouse Leks



Sagebrush Habitat



Urban Areas



Agricultural Land

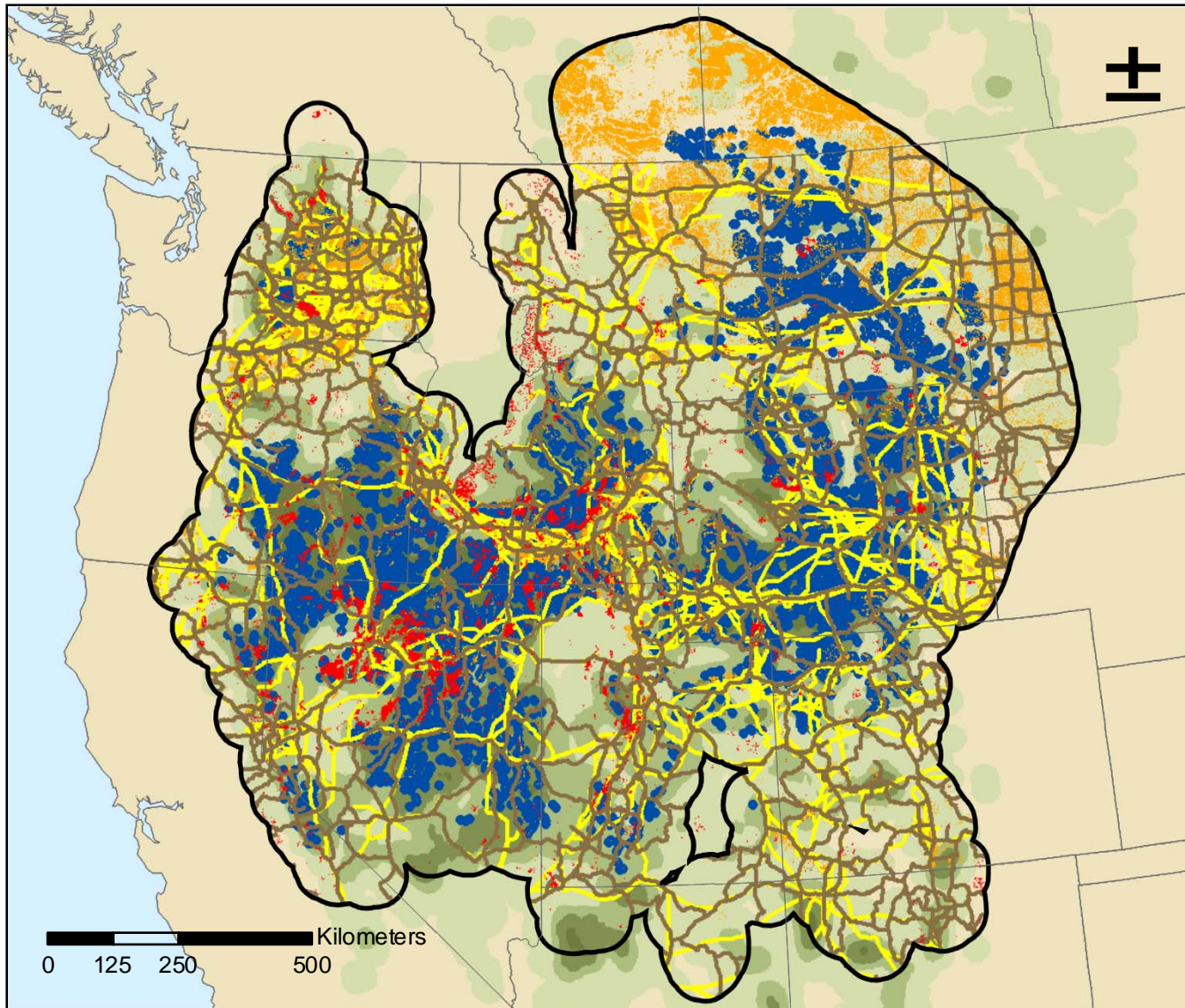


Power Lines



Major Roads

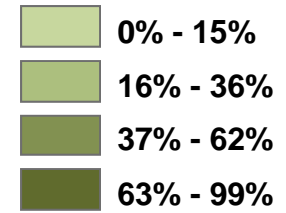




Sage Grouse Leks



Sagebrush Habitat



Urban Areas



Agricultural Land



Power Lines

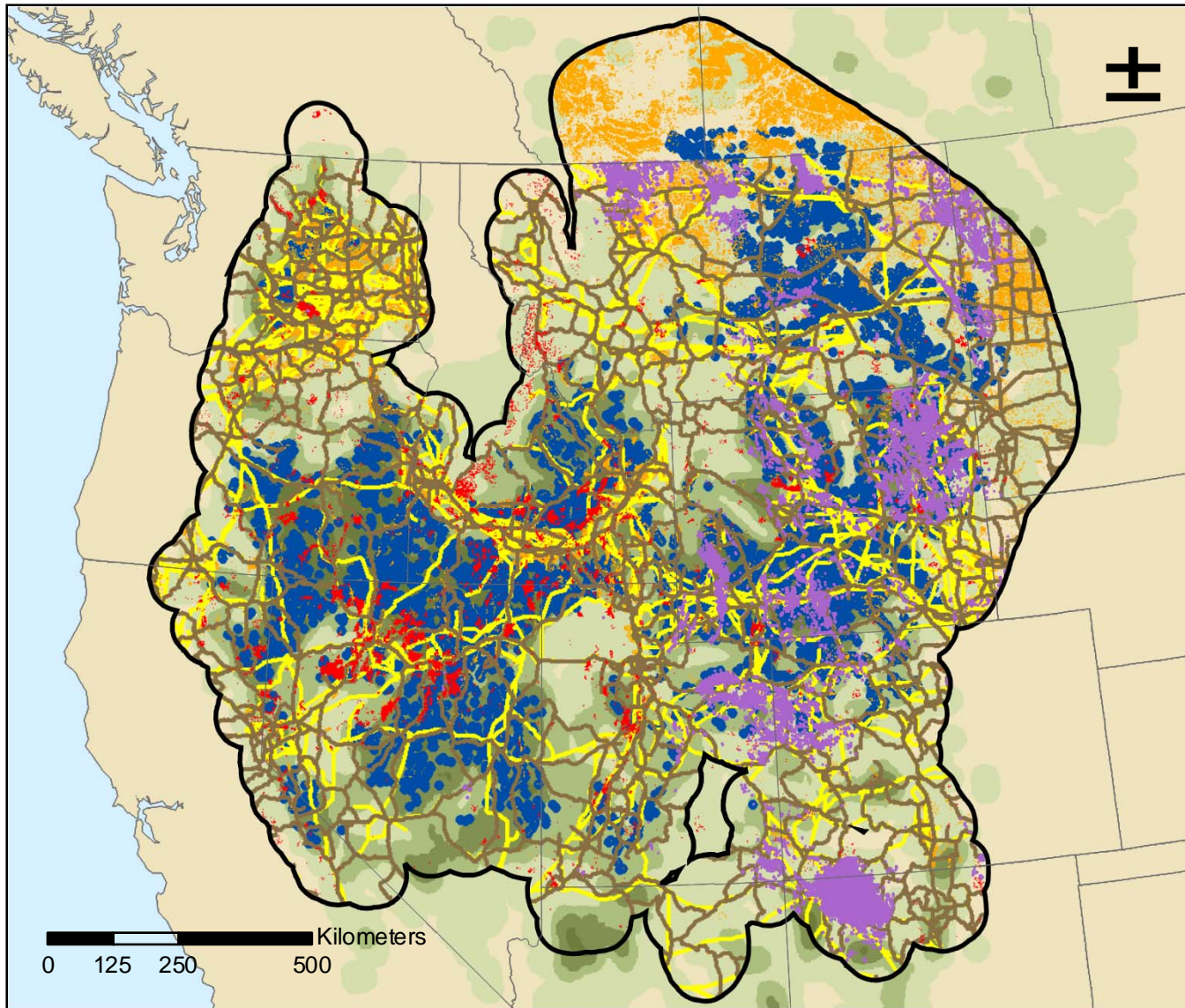


Major Roads



Fires

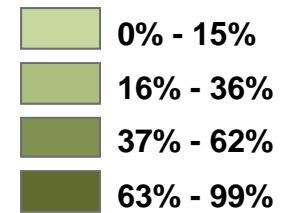




Sage Grouse Leks



Sagebrush Habitat



Urban Areas



Agricultural Land



Power Lines



Major Roads



Fires



Oil and Gas Wells

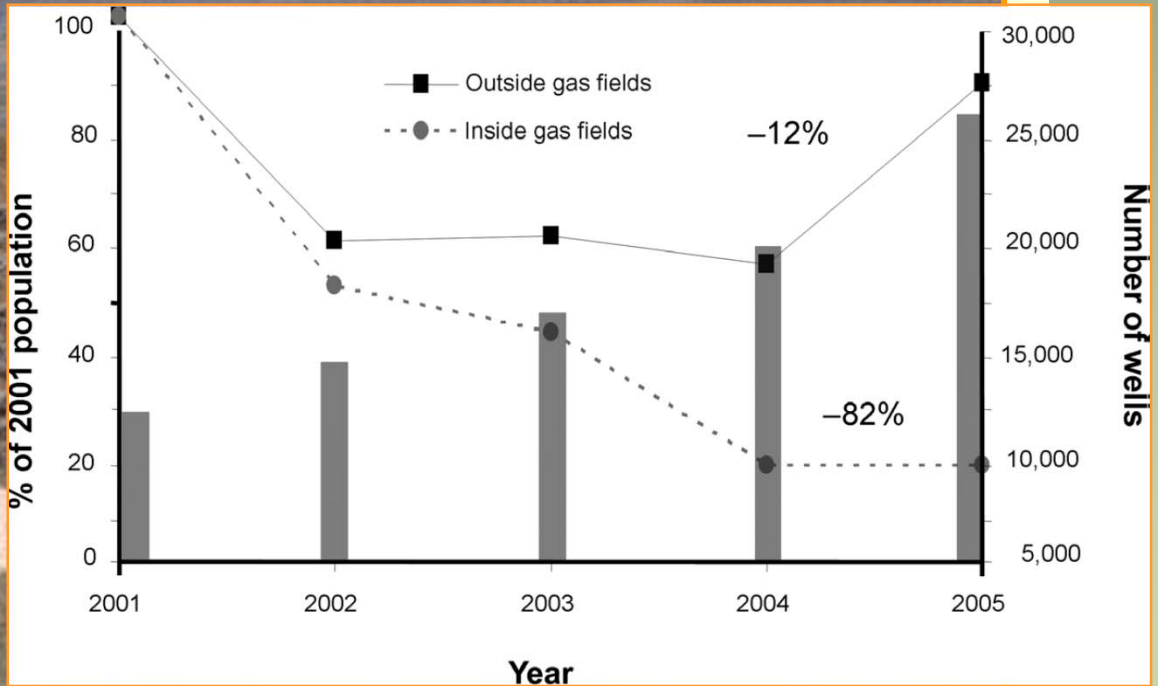
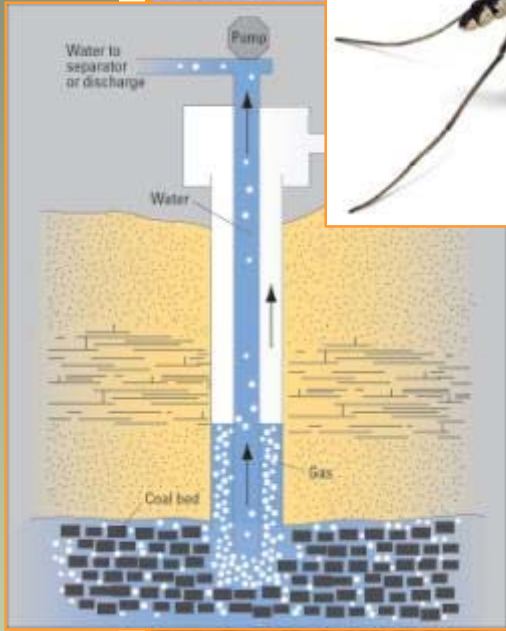


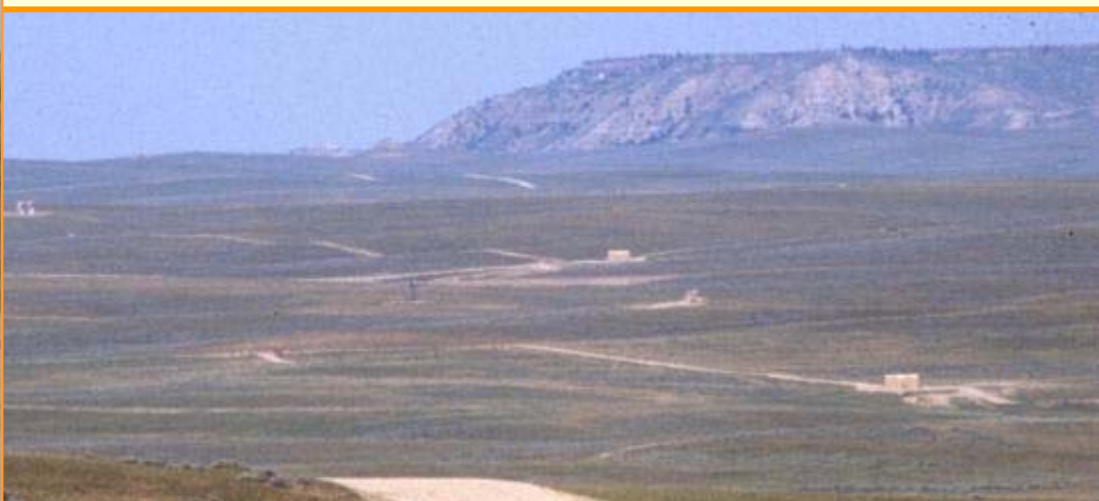
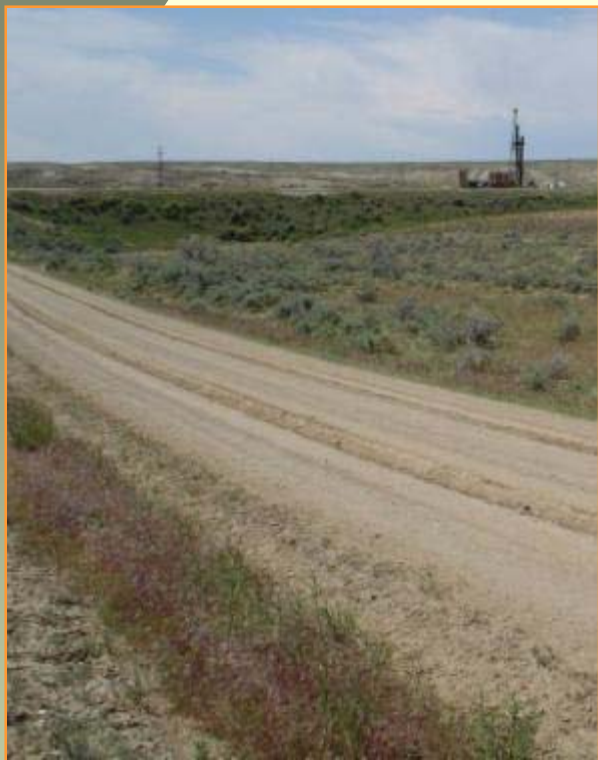
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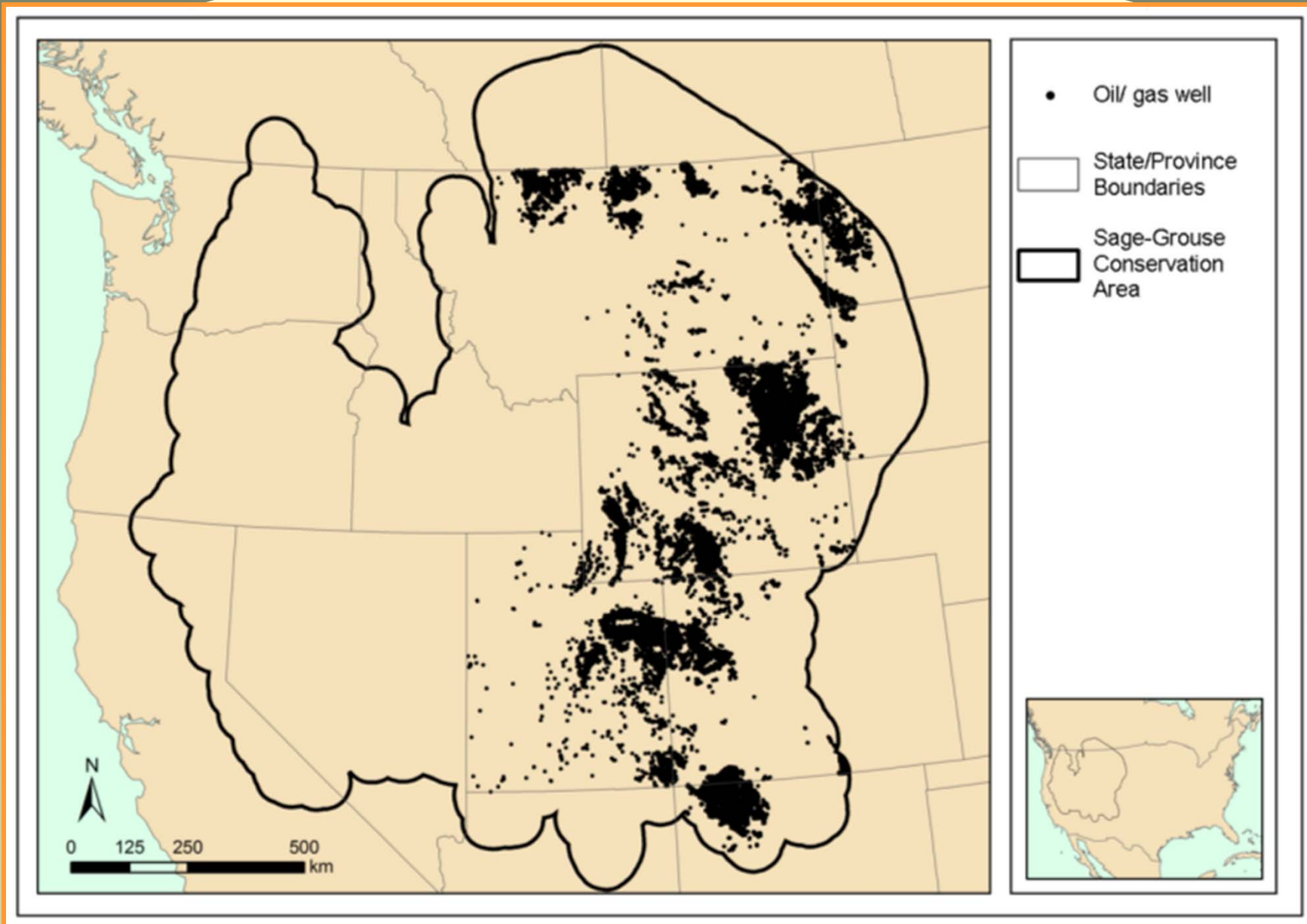
- Size and isolation (bigger and better connected)
- >60% sagebrush in landscape
- Fire
- Human footprint

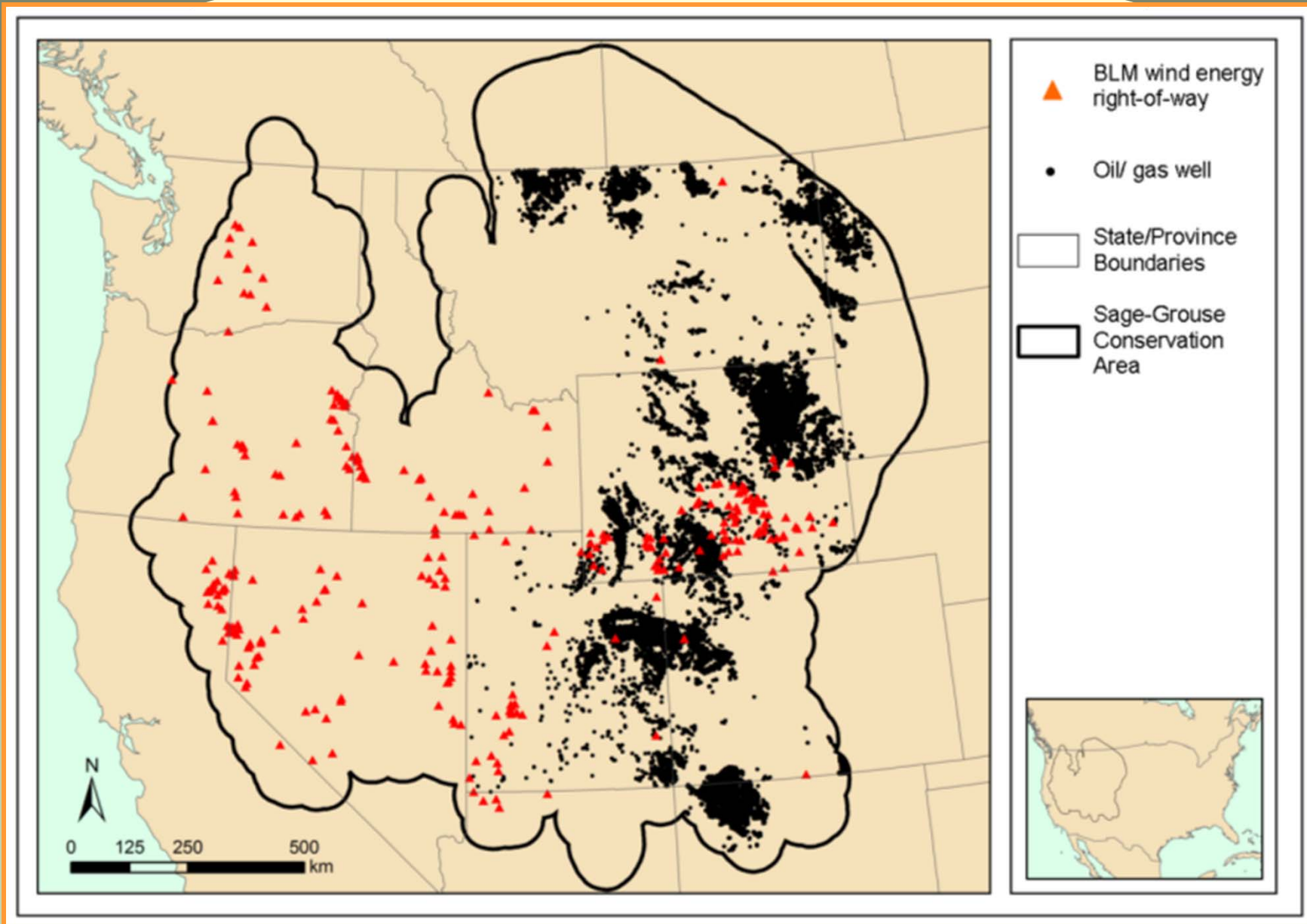


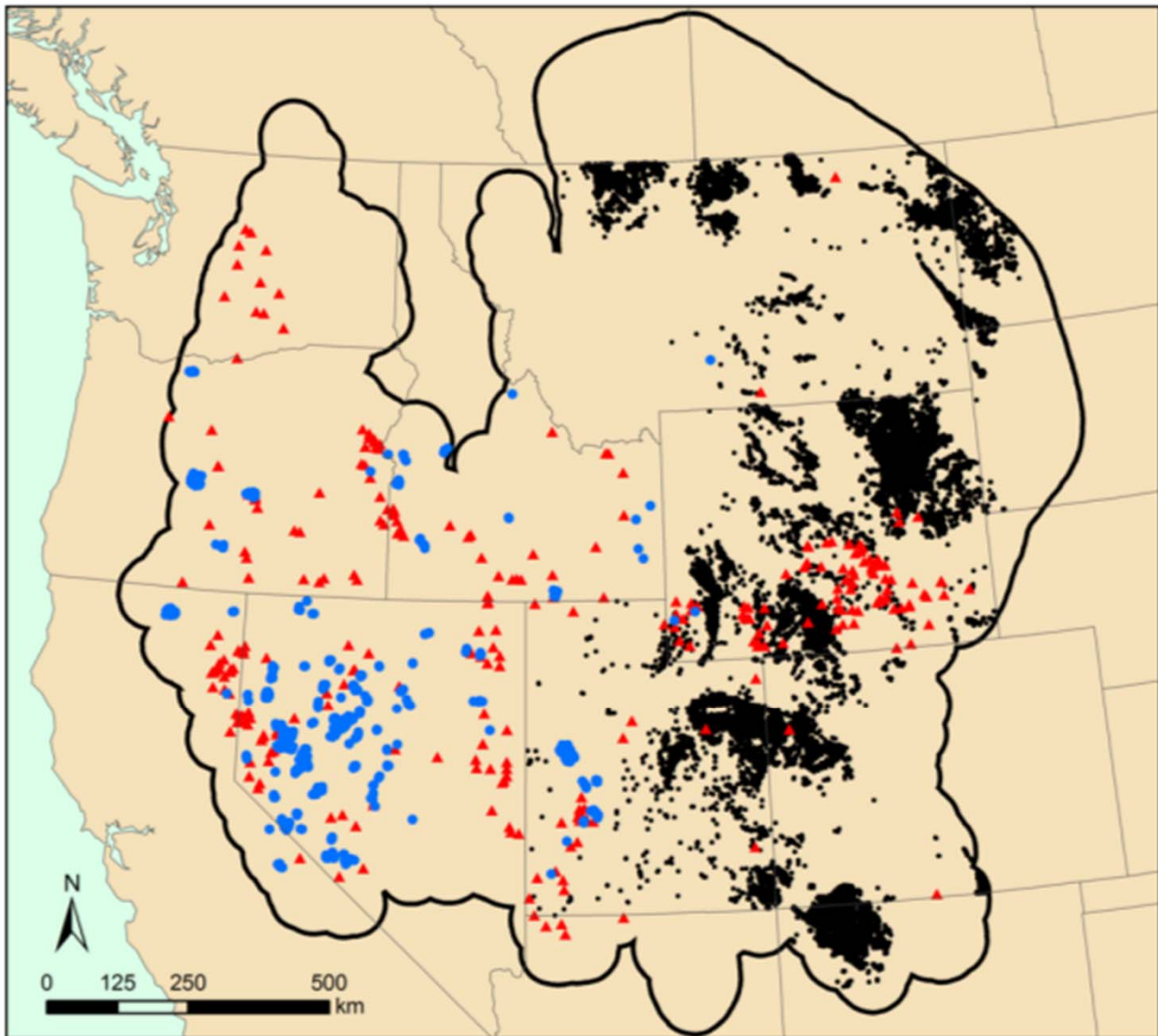









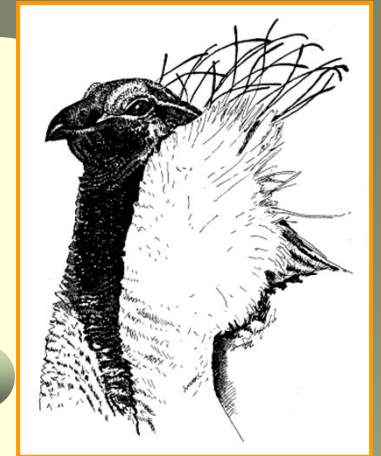




- Geothermal leases
- ▲ BLM wind energy right-of-way
- Oil/ gas well
- State/Province Boundaries
- Sage-Grouse Conservation Area



Conclusions



- Conservation challenges
 - Sage-grouse biology
 - Size of range-wide distribution
 - Complexity of the system
- Ecosystem structure provides understanding of population and habitat dynamics
- Primary changes in sagebrush ecosystems
 - Increased human populations
 - Exotic plant and fire disturbances

History and our current use of the vast landscapes dominated by sagebrush can tell us much about land use, priorities, values, and resource management. The future will tell others about the effectiveness of conservation actions we implement today.

(Knick and Connelly, Introduction)