



Environmental  
& Statistical  
Consultants

# Greater Sage-Grouse and Wind Energy Development

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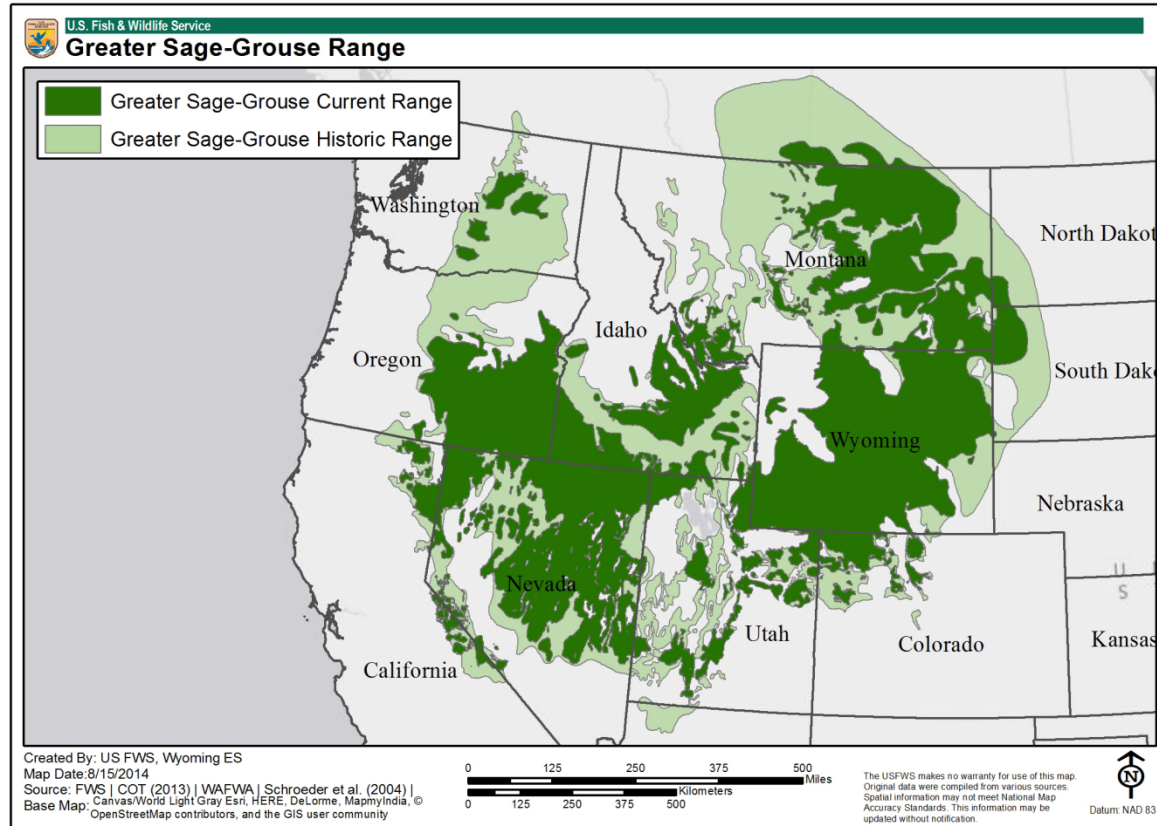
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10.03.17

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# Background

- 11 U.S. States
- Rangewide Population Declines
- Wyoming is the stronghold (37% of male population and ¼ of habitat)
- USFWS listing decisions



# Background

- Wind energy development is a new form of anthropogenic disturbance to sage-grouse and prairie grouse (indirect vs direct)
- Few peer-reviewed studies exist documenting potential impacts to greater sage-grouse, prairie chickens, and sharp-tailed grouse

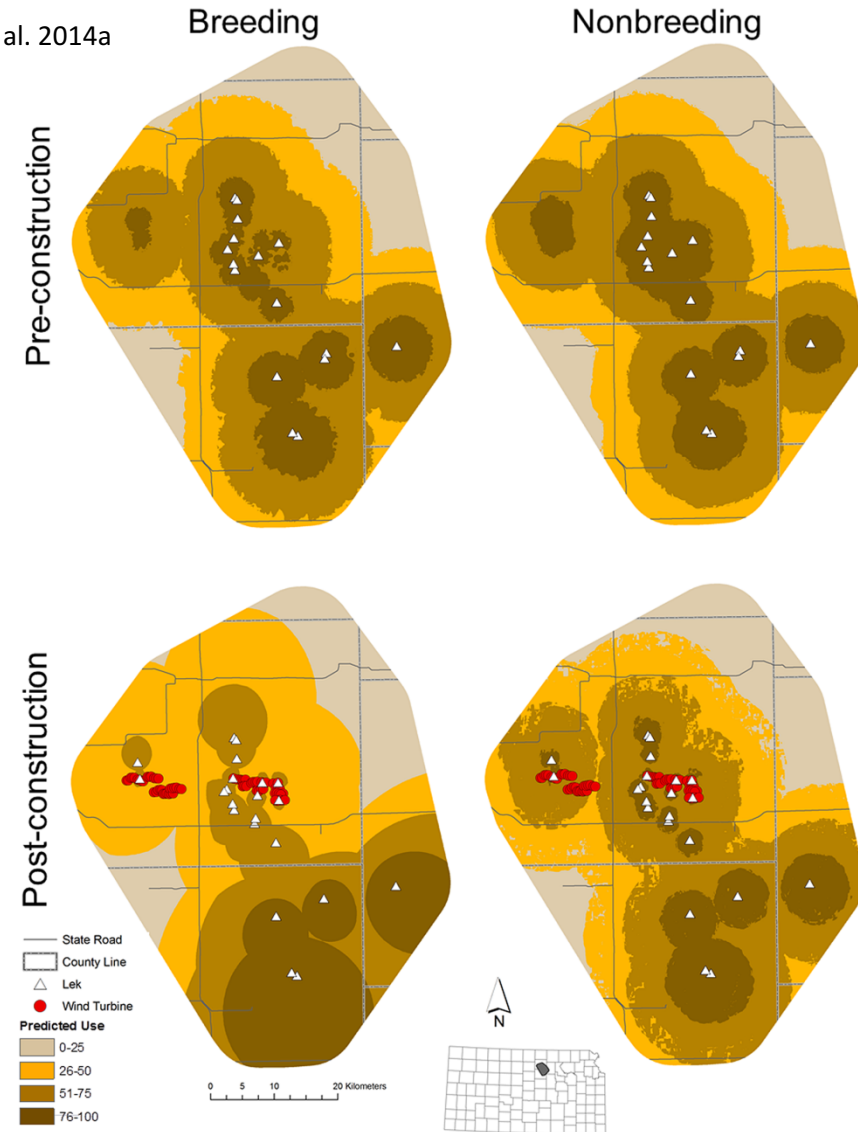


# Background – Potential Concerns

- Direct habitat loss
- Displacement
- Reduced fitness
- Reduced Connectivity



Winder et al. 2014a





# Background – Study Locations

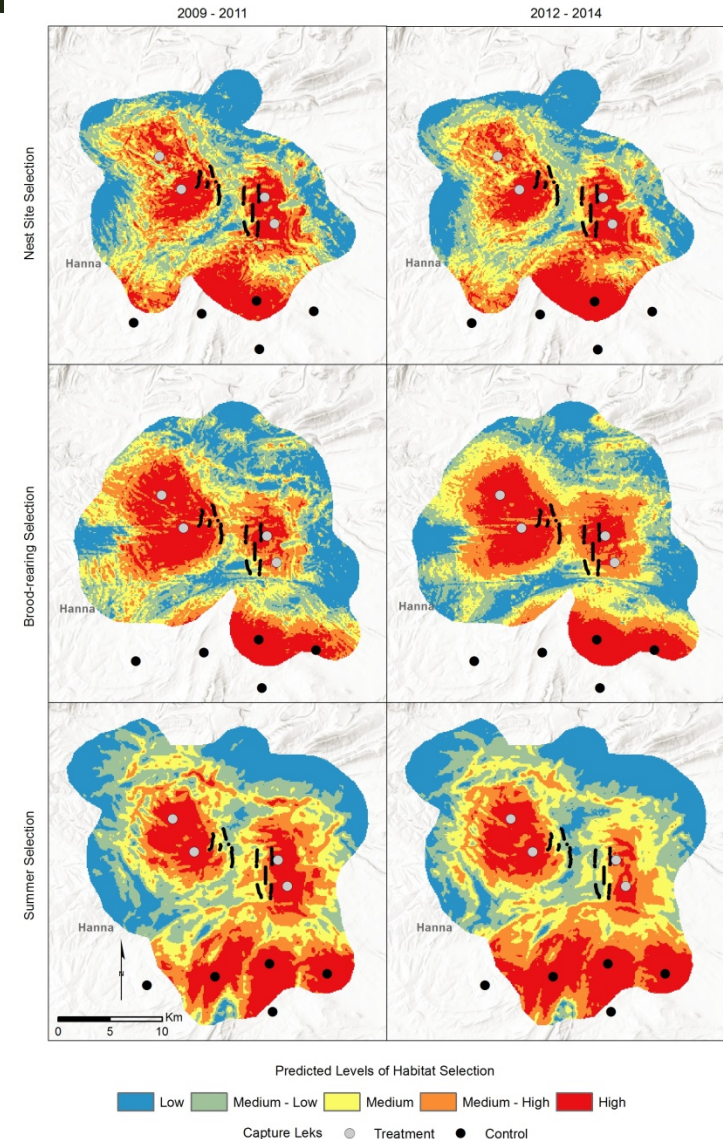
- Meridian Way North Central Kansas
  - Greater Prairie-Chicken
    - McNew et al. 2014
    - Winder et al. 2014a
    - Winder et al. 2014b
    - Winder et al. 2015
- Four Wind Projects in Idaho near Idaho Falls
  - Columbia Sharp-tailed Grouse
    - Proett 2017
- Ainsworth Sandhills of Nebraska
  - Greater Prairie-Chicken
    - Harrison 2015
    - Smith et al. 2017
- Seven Mile Hill South central Wyoming
  - Greater Sage-Grouse
    - LeBeau et al. 2012
    - LeBeau et al. 2014
    - LeBeau et al. 2017a
    - LeBeau et al. 2017b

# General Summary – Direct Habitat Loss



# General Summary - Displacement

- Are sage-grouse using habitats farther from turbines?
- Some displacement occurs during the brood-rearing and summer periods
- No displacement during the nesting period
- No displacement during the lekking season





## General Summary - Fitness

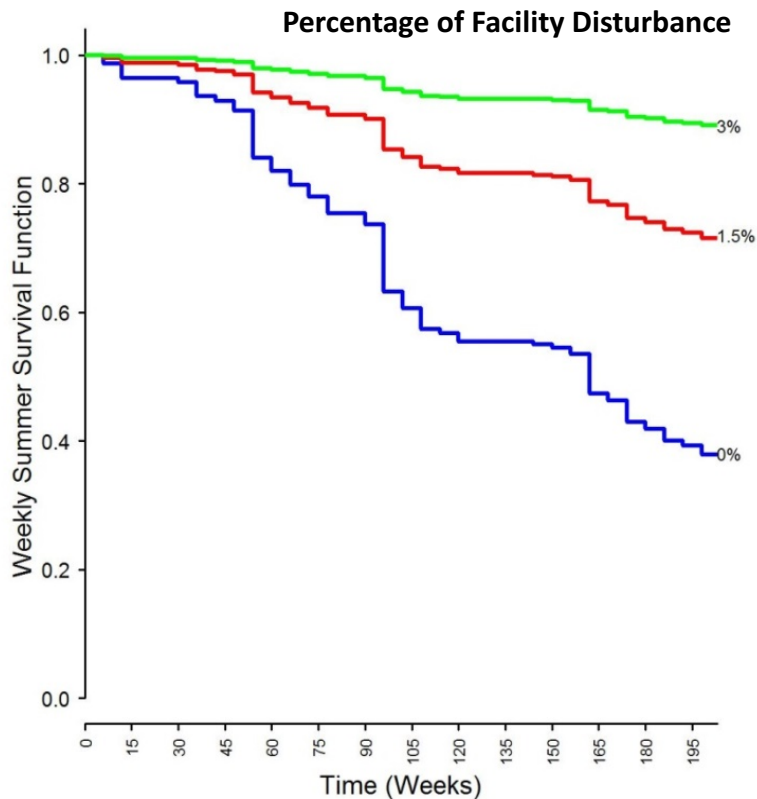
- Do the presences of turbines impact sage-grouse fitness parameters?
  - No effect on nest or brood survival



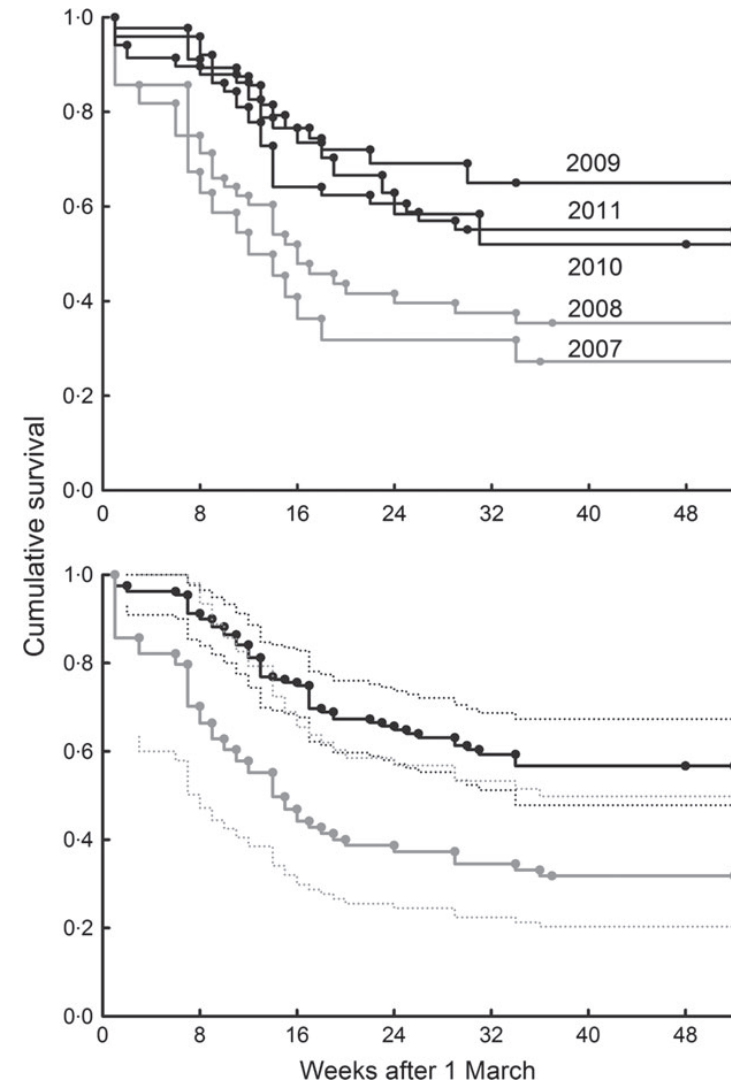


# General Summary - Fitness

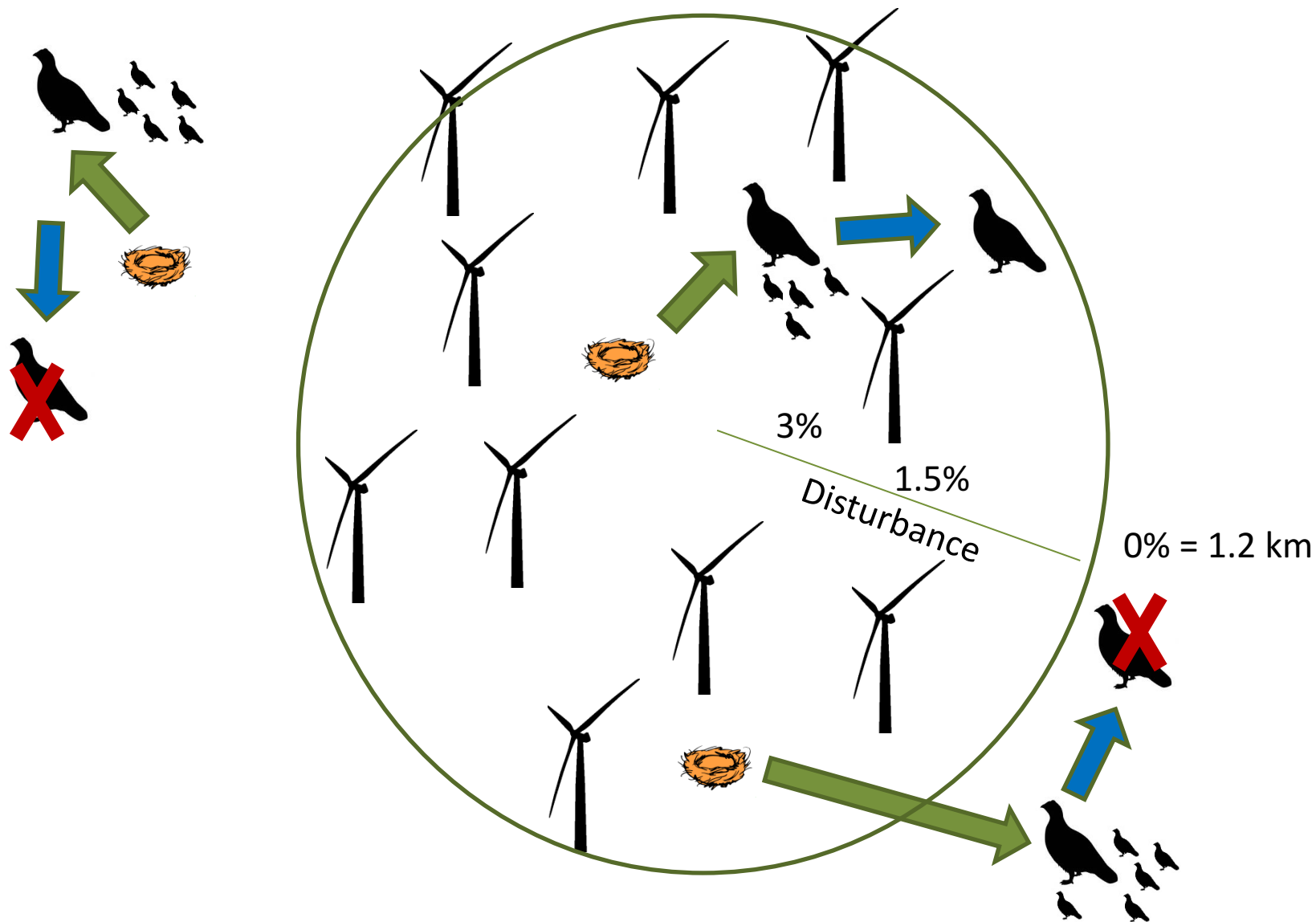
- No negative effect on female survival



Winder et al. 2014b

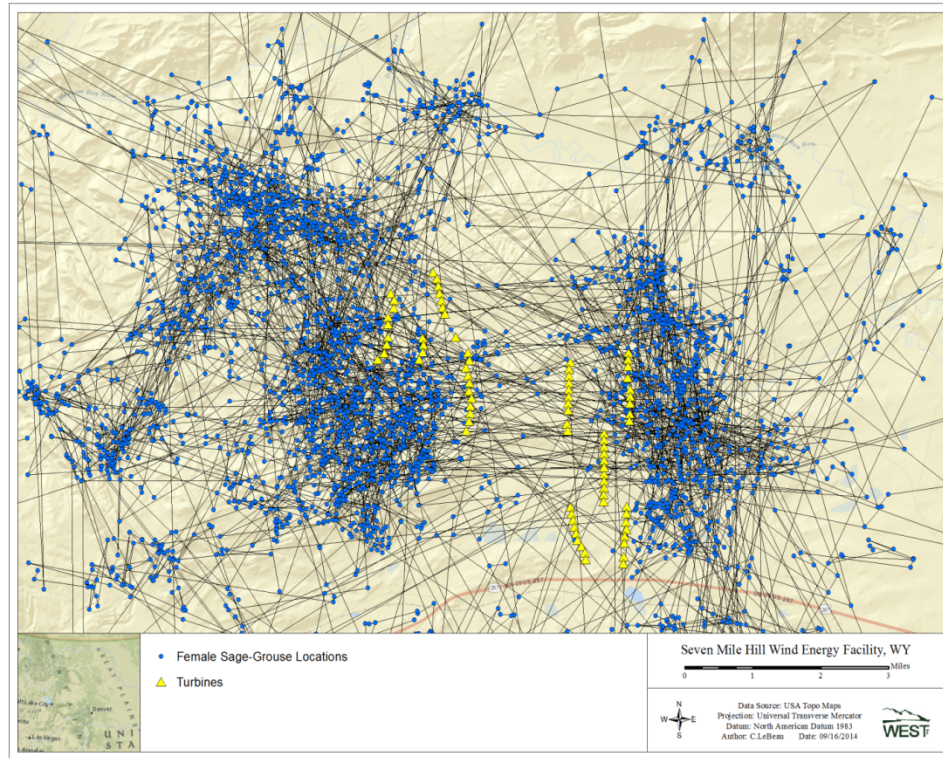


# General Summary - Conclusion



# Research Needs

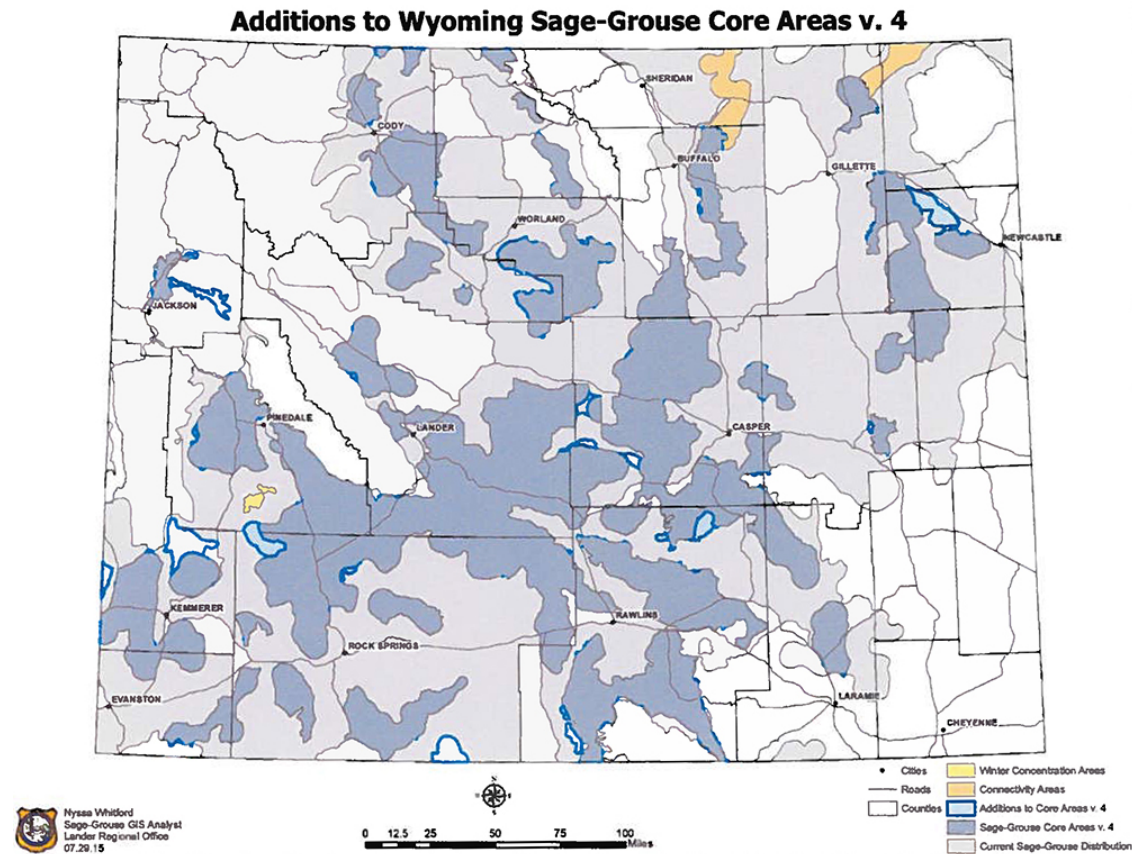
- Scientific certainty
- Multiple studies across the range of sage-grouse
- Connectivity between key habitats
- Impacts to local populations
  - Available habitat varies
  - Facility layout varies
- Cumulative impacts





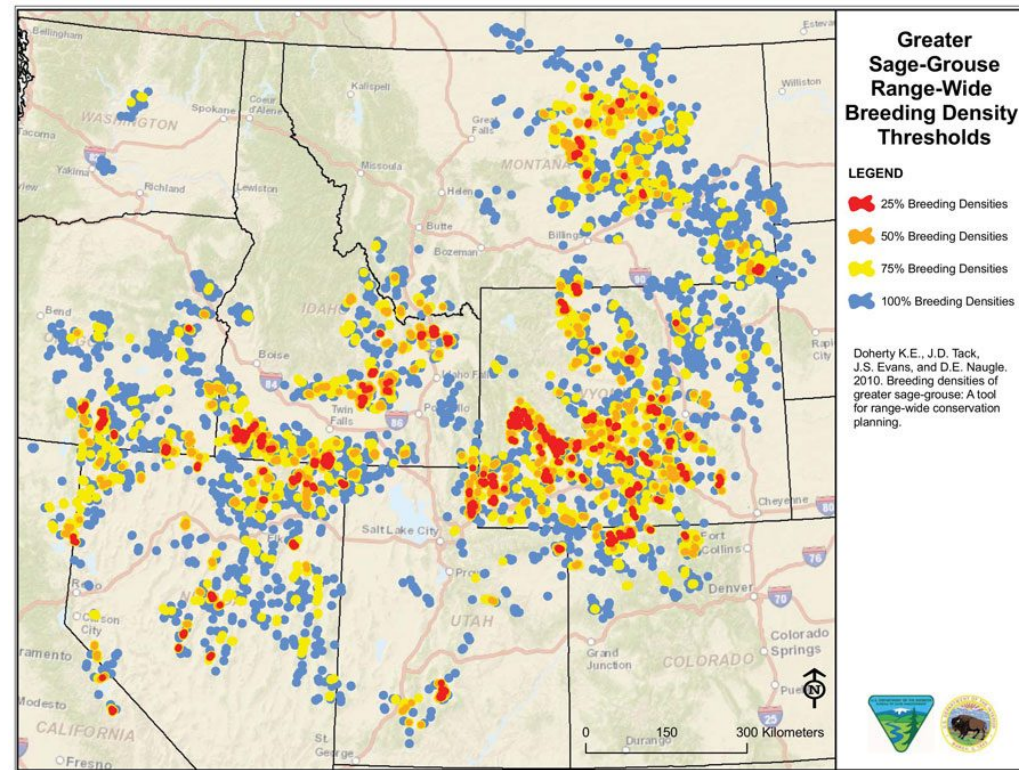
# Emerging Mitigation Approaches

- Mitigation Framework
  - Avoiding
  - Minimizing
  - Compensating
- Policies that drive mitigation approaches
  - State of Wyoming Executive Order 2015-4
  - BLM management plans



# Emerging Mitigation Approaches

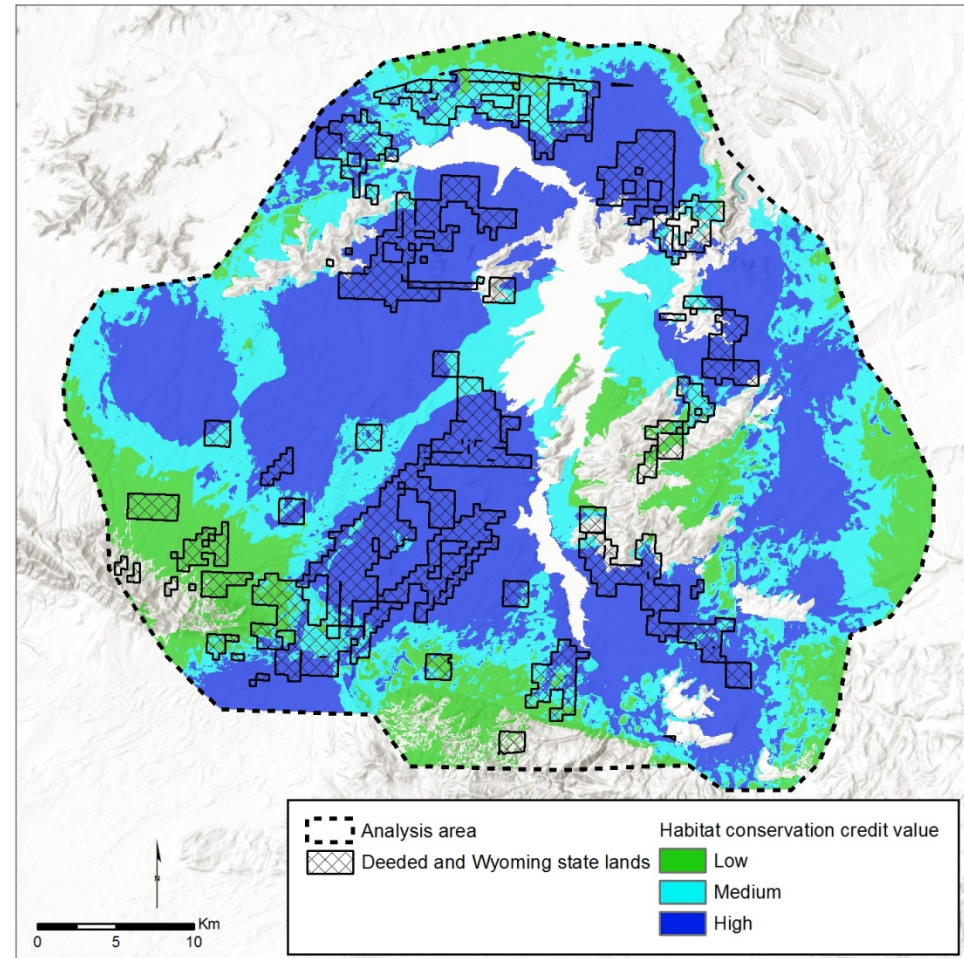
- Avoidance
  - Landscape level
  - Site specific
- Minimize
  - Construction timing stipulations
  - Disturbance thresholds
  - Lek buffers
  - Habitat assessments





# Emerging Mitigation Approaches

- Mitigation
  - State of Wyoming Mitigation Framework
  - Estimate impacts
  - Offset impacts by acquiring credits
  - Habitat Conservation Banks
  - Habitat Exchanges





# Conclusion

- Very little information specific to sage-grouse
- Low inference on the overall impacts across the range of sage-grouse
- Based on best available science, some displacement has been documented but does not affect overall population viability
- Multiple studies across the range are necessary
- State and Federal Policies are driving the mitigation framework specific to sage-grouse and impacts from wind energy



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