Environmental
& Statistical
Consultants

Prairie Grouse and Sage Grouse and Response to Wind Energy Development

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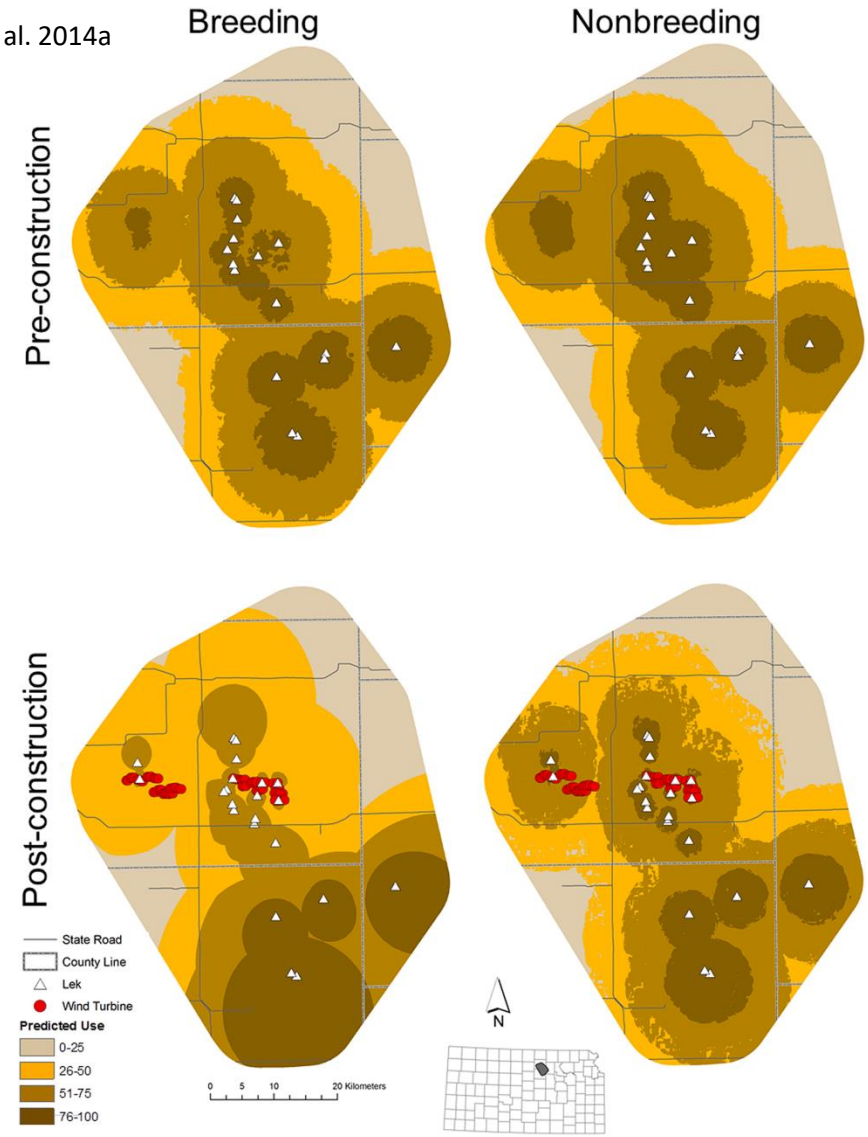
Background

- 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

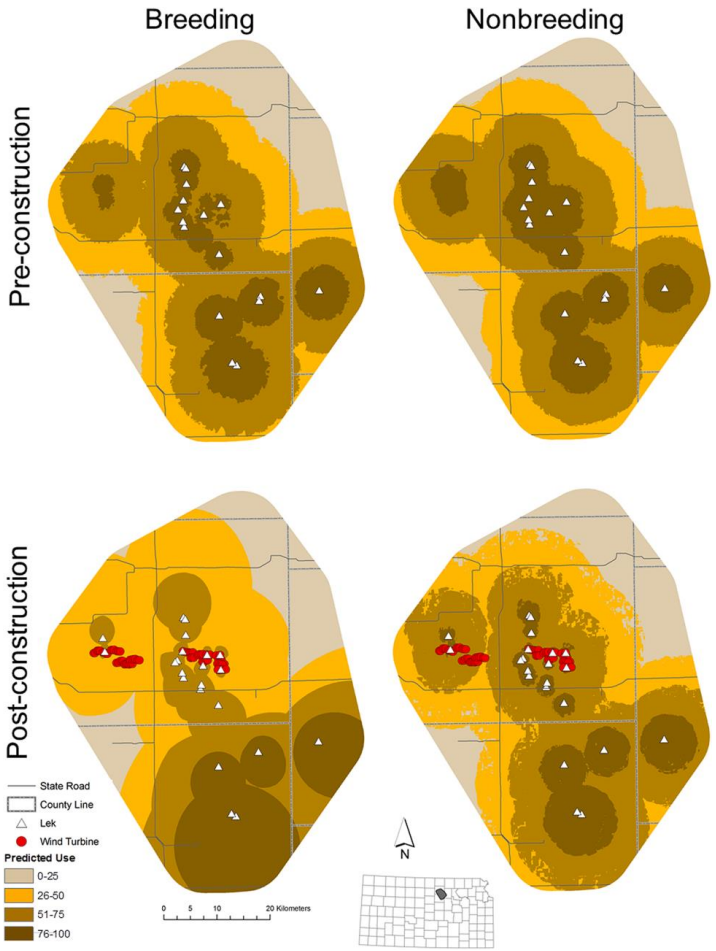
- Nest Site Selection
  - Greater Prairie-Chicken
    - No effect (KS; McNew et al. 2014)
    - No effect (NE; Harrison 2015)
  - Columbian Sharp-tailed Grouse
    - No effect (ID; Proett 2017)
  - Greater Sage-Grouse
    - No effect (WY; LeBeau et al. 2017)

General Summary - Displacement

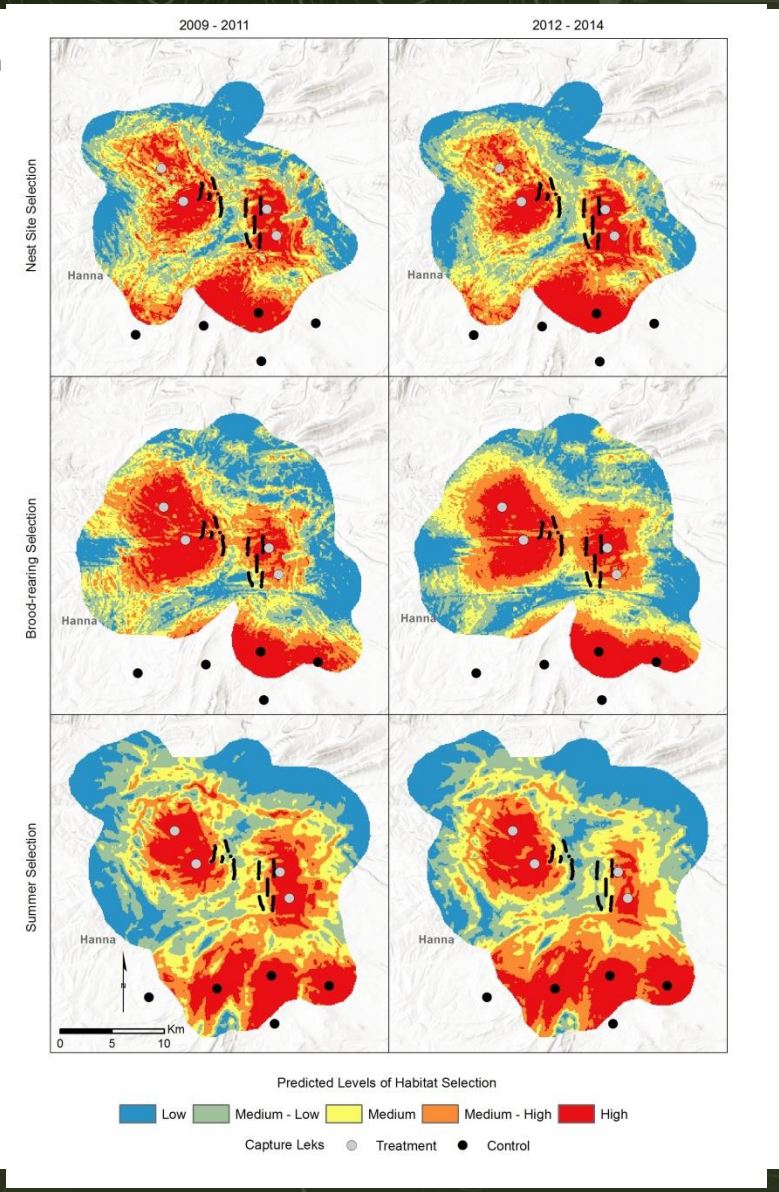
- Habitat Selection
  - Greater Prairie-Chicken
    - No effect (brood-rearing; NE; Harrison 2015)
    - Negative change in space use during breeding season (KS; Winder et al. 2014a)
  - Greater Sage-Grouse
    - Avoided habitat with higher density of turbines (brood-rearing and summer; WY; LeBeau et al. 2017a)

General Summary - Displacement

Winder et al. 2014a



LeBeau et al. 2017a



General Summary - Displacement

- Male Lek Attendance
  - Greater Prairie-Chicken
    - Lek abandonment was high within 8 km of turbines (Winder et al. 2015)
    - Probability of lek persistence depended on lek size and habitat type and not proximity to turbine (Winder et al. 2015)
  - Greater Sage-Grouse
    - No significant negative differences in males attending leks between a control area and the treatment area pre to post development ; WY; LeBeau et al. 2017b)

General Summary - Fitness

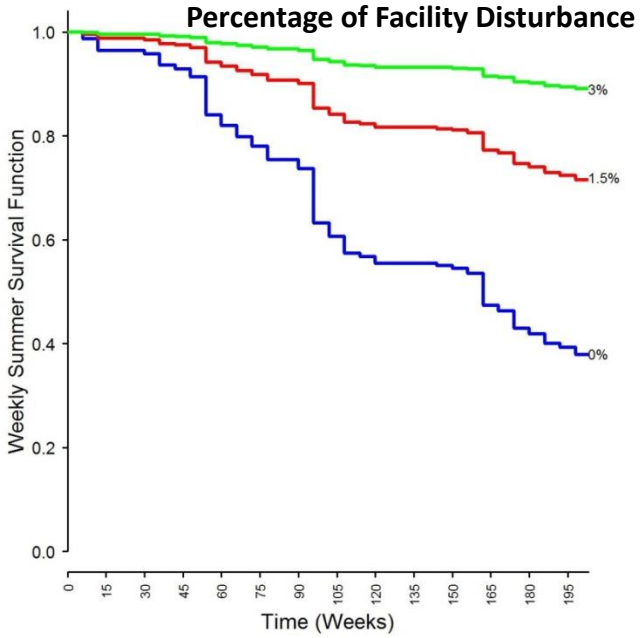
- Nest Survival
  - Greater Prairie-Chicken
    - No effect (KS; McNew et al. 2014)
    - No effect (NE; Harrison 2015)
  - Columbian Sharp-tailed Grouse
    - No effect (ID; Proett 2017)
  - Greater Sage-Grouse
    - No effect (WY; LeBeau et al. 2017a)

General Summary - Fitness

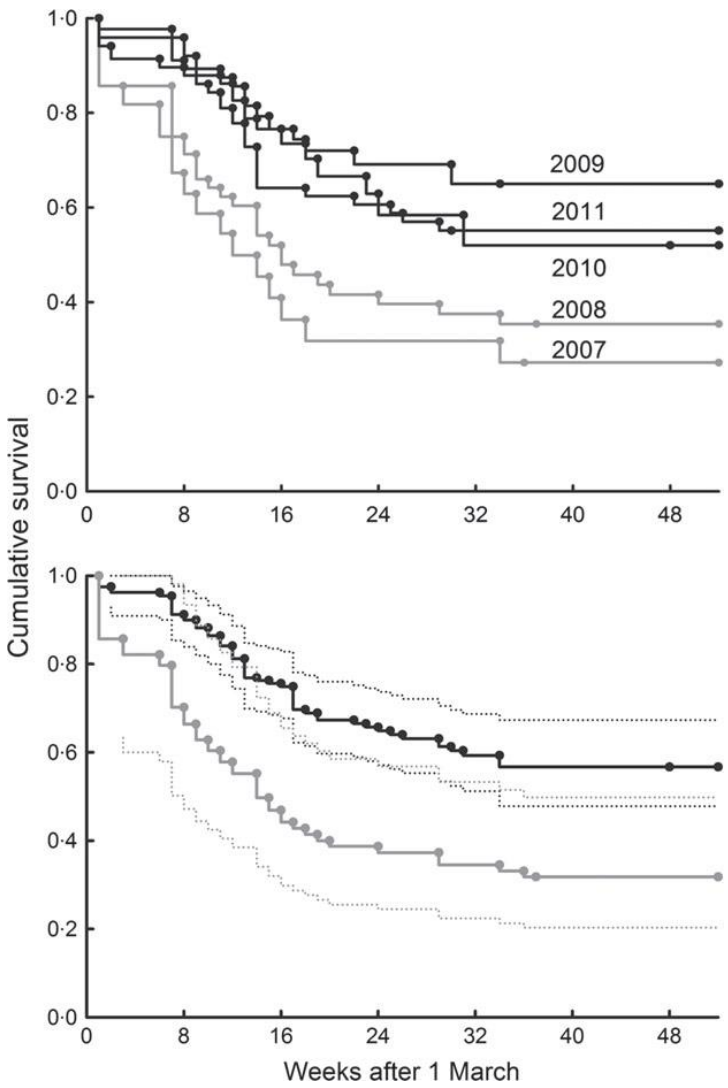
- Brood Survival
  - Greater Prairie-Chicken
    - No effect (NE; Harrison 2015)
  - Columbian Sharp-tailed Grouse
    - Negative effect in habitats with higher density of turbines (ID; Proett 2017)
  - Greater Sage-Grouse
    - No effect (WY; LeBeau et al. 2017a)

General Summary - Fitness

- Female Survival
  - Greater Prairie-Chicken
    - No effect (NE; Smith et al. 2017)
    - No negative effect (Winder et al. 2014b)
  - Greater Sage-Grouse
    - No negative effect (WY; LeBeau et al. 2017a)

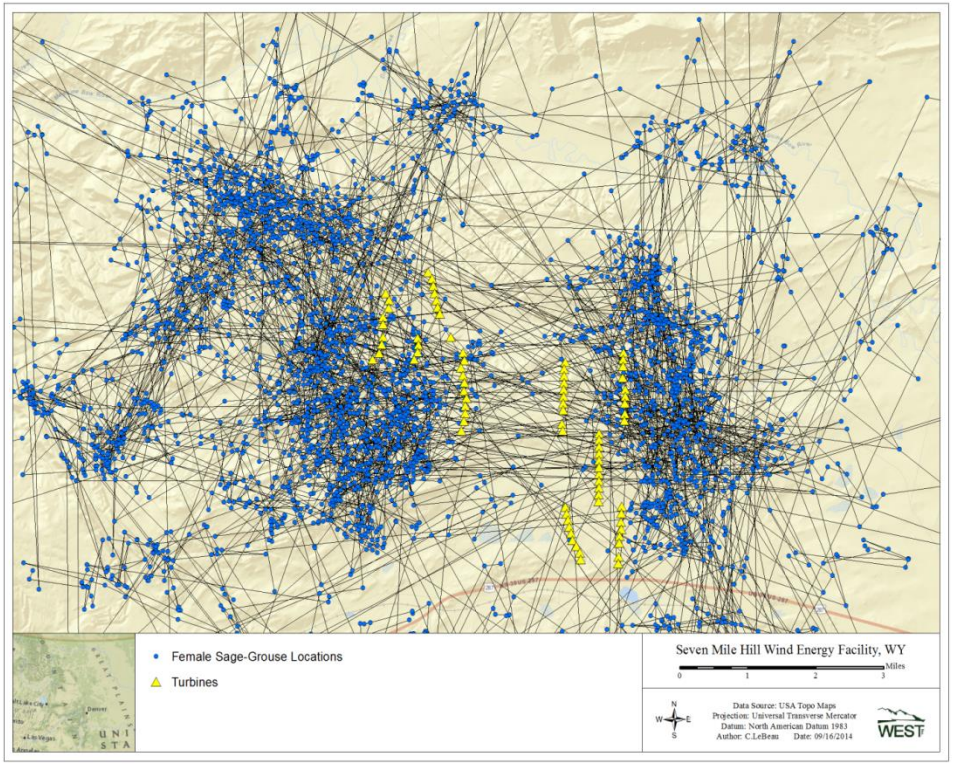


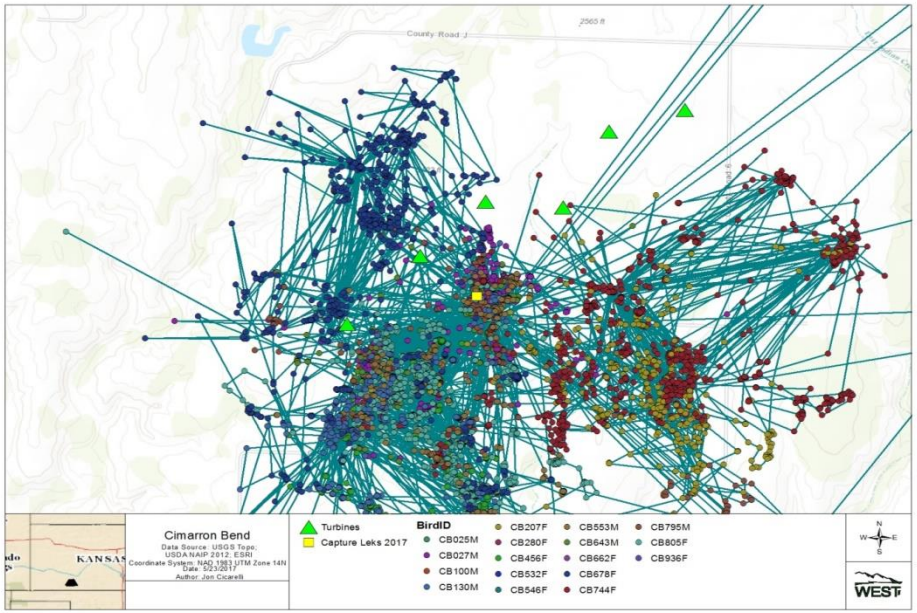
Winder et al. 2014b



Research Needs

- Multiple studies
  - 1 (GRSG), 1 (CSTG), 2 (GPCH)
- Connectivity between key habitats
- Research on responses of lesser prairie-chicken to wind energy development
  - Cimarron Bend





Cumulative Assessment

- Based on best available science

Parameter	Greater Sage-Grouse	Columbia Sharp-tailed Grouse	Greater Prairie-Chicken
Nest Survival	*No effect*	*No effect*	*No effect*
Brood Survival	*No effect*	*Negatively affected*	*No effect*
Annual female Survival	*Positively affected*	*Unknown*	*Positively affected/No effect*
Nest Site Selection	*No effect*	*No effect*	*No effect*
Brood selection	*Negatively affected*	*Unknown*	*Unknown*
Female breeding selection	*Negatively affected*	*Unknown*	*Negatively affected*
Changes in Males attending leks	*No effect*	*Unknown*	*No effect*

Research References

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