

GREATER PRAIRIE-CHICKEN (*TYMPANUCHUS CUPIDO*)

Background and Identification of Interaction with Wind Development

Greater prairie-chickens were once widespread but they currently exist in only a small fraction of their historic range.^{1,2} Approximately 10,000 to 12,000 birds are found in Colorado; they can be found in Logan, Morgan, Phillips, Sedgwick, Washington, and Yuma Counties.³ Greater prairie-chickens require large blocks of relatively open grassland habitats. Habitat loss due to human disturbance, in particular row crop agriculture, is the primary cause for the decline in population numbers of this species. Little research has been conducted on the response of greater prairie-chicken to energy development; much of the information is extrapolated from other closely related grouse species. The greater prairie-chicken is a member of the sub-family Tetraoninae. For purposes of this BMP, all species in this sub-family are assumed to serve as reasonable proxies for each other.

Prairie grouse species such as greater prairie-chicken rarely fly high enough to be at risk for collision with wind turbines; however, these prairie specialists are sensitive to habitat alteration and the presence of manmade vertical structures and noise in their habitat. Research has shown that lesser prairie-chicken locate their nest sites farther from buildings, transmission lines, and improved roads than would be expected at random. There is also some evidence that oil and gas wellheads negatively influence nest site selection and habitat use.^{4,5} Researchers in Oklahoma used radio telemetry to demonstrate that both greater and lesser prairie-chickens avoided crossing beneath overhead powerlines.⁶ Finally, sharp-tailed grouse will abandon nests and leks if construction occurs while those areas are under active use by the birds.⁷

Prairie grouse require large blocks of grassland to meet all their requirements for breeding and foraging.^{1,2} Mating takes place at relatively open areas (e.g. low visual obstruction and low horizontal cover) of the prairies (called leks) where males congregate to perform a courtship dance. After mating, most females will make a nest within 1.6 km (1 mile) of the lek site. Appropriate nest sites have high visual obstruction and horizontal cover for brooding hens. Once the chicks have hatched, they move to another part of the prairie with high amounts of bare ground for foraging but with some residual cover for hiding from predators. Winter habitat requirements are different again. In winter, birds require areas with high food potential; these include areas with seeds, residual vegetation, waste grain, etc. It is estimated that greater prairie-chickens require 10,000 or more acres (> 4046 ha) of unfragmented prairie to maintain one healthy breeding population.¹ Habitat requirements in fragmented landscapes increase as does predation risk in such landscapes.⁸ The presence of vertical structure and sound can fragment large blocks of grassland, making them less suitable for prairie grouse.

State of the Science

Little research has been conducted on the effects of energy development on greater prairie-chicken. Many of the conservation concerns and recommendations come from research on closely related grouse species, such as lesser prairie-chicken. However, research on the impacts of wind energy development on greater prairie-chickens is ongoing; therefore additional information will be available in the near future.

Best Management Practices

Conduct surveys in suitable habitat on the proposed development site, within the site boundary, and within a one-mile radius where possible to determine presence of greater prairie-chicken. Consult Colorado Division of Wildlife for appropriate survey methods.

Avoid

“The Federal Advisory Committee Draft Recommendations for wind energy development recommend the following: “Avoid locating wind energy facilities in areas identified as having a demonstrated and unmitigatable high risk to birds...” (Chapter 3, page 44; Draft Recommendations 3/2010).⁹

- Wind energy development should avoid large contiguous grassland blocks¹⁰ of 10,000 or more acres (> 4046 ha) occupied by greater prairie-chicken because of potential displacement of birds, depressed productivity, or other associated impacts.

Minimize

1. The Federal Advisory Committee Draft Recommendations for wind energy development recommend the following to avoid habitat fragmentation: “Consider alternative locations and development configurations to minimize fragmentation of habitat in communication with species experts, for all species of habitat fragmentation concern in the area of interest.” (Chapter 3, page 31; Draft Recommendations 3/2010)⁹
 - In Colorado, if occupied habitats cannot be avoided then an effort should be made to site the wind energy development at the edge of the habitat and away from core areas¹⁰ to keep fragmentation¹¹ to a minimum.
2. When large occupied areas^{8,10} of sand sage grassland are identified, the edge should be identified as the boundary between large areas of occupied habitat and unoccupied habitat. It is desirable to place turbine rows in the unsuitable habitat sufficiently distant from the suitable habitat. Please refer to the fragmentation BMP for a longer description of fragmentation. Consult with Colorado Division of Wildlife biologist or environmental consultants to help to make siting decisions.
3. Placing wind turbines or other associated infrastructure greater than 0.6 miles (1.0 km) from a lek will reduce habitat abandonment.¹²
4. Conducting site construction of wind development areas outside of the breeding season (March - June) in areas within 0.6 miles (1.0 km) of a lek will reduce habitat abandonment¹²
5. If within 0.6 miles (1.0 km) of a lek, “Instruct employees, contractors, and site visitors to avoid harassing or disturbing wildlife, particularly during reproductive season.” (Recommendation from the Federal Advisory Committee Draft Recommendations for wind energy development).⁹ Reducing disturbance during the lekking period (March - mid-May) can be accomplished by:
 - educating operations and maintenance crews of leks located within 0.6 miles (1.0 km) of a turbine and
 - restricting construction and maintenance to after 9:00 am and before 4:00 pm.
6. The Federal Advisory Committee Draft Recommendations for wind energy development recommend the following: “To reduce avian collisions, place low and medium voltage connecting power lines associated with the wind energy development underground to the extent possible, unless burial of the lines is prohibitively expensive (e.g., where shallow bedrock exists) or where greater adverse impacts to biological resources would result: a. Overhead lines may be acceptable if sited away from high bird crossing locations, to the extent practicable, such as between roosting and feeding areas or between lakes, rivers, prairie grouse and sage grouse leks, and nesting habitats...” (Chapter 3, page 44; Draft Recommendations 3/2010).⁹
 - Burying these power lines will reduce the incidence of mortality of greater prairie-chicken related to raptor predation by reducing perch availability.

Conservation Offsets (Mitigation)

True Offsets (actions that increase habitat quantity):

There are many phenomena and land uses that render otherwise useable habitat inhospitable to prairie grouse. Actions that counter the impacts of these phenomena:

1. Removal of invasive woody vegetation (e.g. eastern red cedar) is one option to restore and improve greater prairie-chicken habitat. If woody vegetation adjacent to occupied prairie is removed and controlled with fire or other means, greater prairie-chicken populations can be maintained.
2. Companies may work with landowners adjacent to blocks of occupied habitat to restore sandhills grasslands through appropriate restoration prescriptions. Plots receiving these treatments should

also be secured indefinitely through an organization that specializes in easements or is a land trust; on-going maintenance should be provided.

3. Work with landowners within occupied greater prairie-chicken habitat to implement a more wildlife-friendly long-term management plan (i.e. >10 years) with a strategy to maintain the habitat in the long-term, potentially including an endowment. The plan should specify vegetation conditions desired and allow ranchers to utilize their expertise in adjusting stocking rates, grazing system, and fire frequency to meet those conditions. Most of the rangelands within greater prairie-chicken range are poorly managed for this species; implementation of range management plans could substantially improve greater prairie-chicken populations.
4. Degraded rangeland within greater prairie-chicken range may be purchased and restored to suitable habitat equivalent to the amount that was disturbed by the wind energy development. During acquisition, preference should be given to larger contiguous tracts and/or tracts that adjoin unfragmented habitats currently occupied by greater prairie-chicken. An endowment should be created for each of these properties to provide the monetary resources required for regular management activities including tree removal, wildlife-friendly grazing, and periodic burning.

Mitigation and Other Offset Options:

Conservation easements may be created on already occupied grasslands or on land within the historic distribution of greater prairie-chicken that could be restored to suitable habitat.

Acknowledgments:

This BMP was originally drafted by Anne Bartuszevige, Conservation Science Director at the Playa Lakes Joint Venture. Terry Bidwell, Dwayne Elmore and Michael Patten provided valuable scientific review. The final draft of this BMP is a result of a collaborative review by CRCC participants.

Additional Information and Resources Consulted:

1. Bidwell, T., S. Fuhlendorf, S. Harmon, R. Horton, R. Manes, R. Rodgers, S. Sherrod, and D. Wolfe. 2003. Ecology and Management of the Greater Prairie-Chicken in Oklahoma. Oklahoma State University Extension Circular E969.
2. Schroeder, M.A. and L.A. Robb. 1993. Greater Prairie-Chicken (*Tympanuchus cupido*). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/036>. doi:10.2173/bna.36
3. Greater Prairie-Chicken. Colorado Division of Wildlife Species Descriptions. <http://wildlife.state.co.us/WildlifeSpecies/Profiles/Birds/GreaterPrairieChicken.htm>. Accessed on 20 October 2009.
4. Pittman, J.C., C. A. Hagen, R. J. Robel, T. M. Loughin, and R. D. Applegate. 2005. Location and success of lesser prairie-chicken nests in relation to vegetation and human disturbance. *Journal of Wildlife Management* 69:1259-1269.
5. Hagen, C. A., J. C. Pitman, T. M. Loughin, B. K. Sandercock, R. J. Robel, and R. D. Applegate. 2010. Potential impacts of anthropogenic features on Lesser Prairie-Chicken habitat use. *Studies in Avian Biology* 39: in press.
6. Pruett, C.L., Patten, M.A., and D.H. Wolfe. 2009. Avoidance behavior by prairie grouse: implications for wind energy development. *Conservation Biology* 23:1253-1259.
7. Division of Natural Resources. 2002. Strategic Management Plan for Columbia Sharp-tailed Grouse. State of Utah, Division of Natural Resources. Publication 02-19.
8. Patten, M.A., C.L. Pruett, and D.H. Wolfe. 2010. Ecological aspects of diurnal home range size and movements of the Greater Prairie-Chicken. *Studies in Avian Biology* 39:*In Press*.
9. U.S. Fish and Wildlife Service Wind Turbine Recommendations Advisory Committee. March 4, 2010.

10. Colorado Division of Wildlife is developing a model that describes the core habitat areas for Greater Prairie-Chicken. Referring to this model when making decisions about turbine placement will assist in making conservation decisions.
11. Fragmentation: “Breaking up of a habitat or cover type into smaller, disconnected parcels.” From: Turner, M.G., R.H. Gardner, and R.V. O’Neill. 2001. *Landscape Ecology in Theory and Practice: Pattern and Process*. Springer-Verlag, New York City, New York.
12. Geisen, K. M. 1991. Population inventory and habitat use by lesser prairie-chickens in southeast Colorado. Federal Aid in Wildlife Restoration Report W-152-R, Colorado Division of Wildlife, Colorado, USA.