

**LOCATION OF SHARP-TAILED GROUSE AND GREATER
PRAIRIE-CHICKEN DISPLAY GROUNDS IN RELATION TO
NPPD AINSWORTH WIND ENERGY FACILITY
2006-2011**



NEBRASKA GAME AND PARKS COMMISSION

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Introduction

Wind energy is a rapidly developing renewable energy technology, not only in Nebraska, but across the country and around the world. Some members of the conservation community have recently voiced concerns that wind energy facilities have the potential for adversely affecting aerial wildlife (e.g., birds, bats) and the habitats they occupy. Habitat fragmentation, disturbance, or mortality through collisions with turbine blades or support structures are suggested adverse effects. The primary objective of this cooperative project between Nebraska Public Power District (NPPD), Nebraska Game and Parks Commission (NGPC), and private landowners was to conduct a comprehensive and systematic search to map and collect baseline data on prairie grouse display ground locations in the vicinity of the wind energy facility.

The NPPD Wind Energy Facility, six miles south of Ainsworth, Nebraska, consists of 36 turbines, one meteorological tower and a central substation. NPPD has lease options with property owners on approximately 11,520 acres of open pasture including old and existent farmsteads, and small groves of trees, ponds, and wetlands. Less than 50 acres of grassland were taken out of production (for roads, substations, and turbines). Ground breaking on the facility took place in April of 2005 with operations beginning in September of the same year.

Plains sharp-tailed grouse (*Tympanuchus phasianellus jamesi*) and greater prairie-chicken (*Tympanuchus cupido pinnatus*), collectively known as prairie grouse, are species native to the Sandhills prairie and larger grassland landscapes. The U.S. Fish and Wildlife Service identified the greater prairie-chicken as a species of concern due to loss from much of its historic range and one of the highest priority species for conservation. The Nebraska Natural Legacy Project, a collaborative planning effort lead by the Nebraska Game and Parks Commission and comprehensive wildlife conservation strategy for Nebraska, also identifies the greater prairie-chicken as a priority species for management focus.

Methods

Sharp-tailed grouse and greater prairie-chicken display grounds were surveyed during spring (2006-2011) on the facility and within a 1-2 mile radius of the facility (approximately 25 sections). Prairie grouse populations are generally monitored and evaluated based on spring breeding male counts and display ground counts in a defined geographic area. Surveys were conducted between April 24-May 12, 2006; April 12-May 13, 2007; April 15-22, 2008; April 6-20, 2009; April 7-28, 2010; and April 14-26, 2011. The surveys consisted of listening for display ground activity along existing roads and trails and from prominent hills and then attempting to approach and locate each display ground. Surveying was conducted during peak breeding activity, generally beginning one half to one hour prior to sunrise and terminating approximately two hours after sunrise. Some display grounds were also located by visual sightings of birds while en route to other sites. A global positioning system was used to determine the universal transverse mercator (UTM) coordinates for the center of each display ground. Once display grounds were located, at least two attempts were made to count both displaying males and the total number of birds present.

Results

Eight sharp-tailed grouse dancing grounds and 8 greater prairie-chicken booming grounds (Figure 1) have been recorded since the project was started in 2006. Table 1 gives the UTM-coordinates of each display ground. Of the 16 grounds located, 6 sharp-tailed grouse and 4 greater prairie-chicken display grounds were located within the 11,000 acres that NPPD leases for its facility. The remaining sharp-tailed grouse and greater prairie-chicken display grounds were found on privately owned land adjacent to the facility. Based on the number of display grounds located across the survey area, we recorded a display ground density of approximately 10 grounds per 50 square kilometers or 0.2 display grounds per square kilometer. Five greater prairie-chicken booming grounds and 5 sharp-tailed grouse dancing grounds were located in lowland sites consisting of valleys, wetland complexes, lowland windmill flats and mowed sub-irrigated meadows. Four greater prairie-chicken booming grounds and 4 sharp-tailed grouse dancing grounds were located on upland sites in the hills and elevated pasture grounds. The closest distance a greater prairie-chicken display ground was located to the nearest wind turbine was 2,809.8 feet and the closest sharp-tailed grouse display ground to the nearest wind turbine was 2,547.3 feet (Table 3). The farthest distance that a greater prairie-chicken display ground was located from the nearest wind turbine was 8,167.6 feet and the farthest sharp-tailed grouse display ground from the nearest wind turbine was 7,278.5 feet (Table 3).

In 2006, a total of 70 greater prairie-chickens and 66 sharp-tailed grouse were counted on the 13 grounds (Table 2). An attempt was made to count displaying males but was unsuccessful for several of the grounds due to inability to obtain a vantage point to view and sex birds on the ground without flushing. Prairie-chicken booming grounds ranged from 2 to 15 birds with an average of 10 birds per ground. Sharp-tailed grouse dancing grounds ranged from 8 to 20 birds with an average of 11 birds per ground.

Sharp-tailed grouse and greater prairie-chicken display grounds were monitored again in 2007. Six sharp-tailed grouse dancing grounds and 7 greater prairie-chicken booming grounds were monitored, but one prairie-chicken ground was not present (Figure 1). A total of 80 greater prairie-chickens and 55 sharp-tailed grouse were observed (Table 2). Greater prairie-chicken booming grounds ranged from 2 to 37 birds with an average of 13.3 birds per ground. The sharp-tailed grouse dancing grounds ranged from 3 to 15 birds with an average of 9.2 birds per ground. There was an effort once again to count displaying males but was unsuccessful on many grounds.

All sharp-tailed grouse and greater prairie-chicken display grounds previously visited were monitored in 2008 and a greater effort was placed on sexing grounds (Figure 1). Males were counted, but on several of the display grounds, not all males could be seen prior to flushing the ground to obtain a total count. A total of 81 greater prairie-chickens were on 5 grounds and 53 sharp-tailed grouse were observed on 4 grounds (Table 2). Greater prairie-chicken grounds ranged from 9 to 29 birds with an average of 16.2 birds per ground. Chicken booming grounds had 50 displaying males that ranged from 5 to 21 males per ground with an average of 10 males per ground. Sharp-tailed grouse grounds ranged from 11 to 18 with an average of 13.2 birds per ground. Sharp-tailed grouse

dancing grounds had 32 displaying males that ranged from 7 to 10 males per ground with an average of 8 males per ground.

In the spring of 2009, all sharp-tailed grouse and prairie-chicken display grounds previously recorded were checked. Six greater prairie-chicken display grounds had a total of 95 birds and sharp-tailed grouse had a total of 56 birds on 5 display grounds. Greater prairie-chicken grounds ranged from 2 to 27 birds and an average of 13.6 birds per ground. Chicken grounds had 79 displaying males that ranged from 2 to 21 males per ground with an average of 11.2 males per ground. Sharp-tailed grouse display grounds ranged from 6 to 20 birds with an average of 11.2 birds per ground. Sharp-tailed grouse grounds had 54 displaying males that ranged from 6 to 19 males per ground with an average of 10.8 males per ground.

In the spring of 2010, all sharp-tailed grouse and greater prairie-chicken display grounds previously recorded were checked along with the discovery of one new sharp-tailed grouse and one greater prairie-chicken display ground (GPC 9 and STG 8; Table 1). Seven greater prairie-chicken display grounds had a total of 94 birds and sharp-tailed grouse had a total of 73 birds on 6 display grounds. Greater prairie-chicken grounds ranged from 3 to 29 birds and an average of 13.4 birds per ground. Chicken grounds had 73 displaying males that ranged from 3 to 24 males per ground with an average of 10.4 males per ground. Sharp-tailed grouse display grounds ranged from 8 to 22 birds with an average of 12.2 birds per ground. Sharp-tailed grouse grounds had 58 displaying males that ranged from 6 to 18 males per ground with an average of 9.6 males per ground.

Monitoring of all previously documented display grounds was continued during the spring of 2011. All grounds that were located since 2006 were checked at least twice. One new sharp-tailed grouse display ground was discovered (STG 7; Table 1; Fig. 1). A total of 46 greater prairie-chickens and 37 sharp-tailed grouse were observed on 4 grounds for each species (Table 2). Greater prairie-chicken display grounds had between 6 and 24 birds present, averaging 12 birds per ground. Chicken booming grounds had 41 displaying males ranging from 6 to 20 males per display ground, with an average of 10 males per ground. Sharp-tailed grouse display grounds had between 6 to 12 birds, averaging 9 birds per ground. Grouse dancing grounds had 32 displaying males ranging from 5 to 10 males per display ground, with an average of 8 males per ground.

Discussion

The ideal scenario would include pre- and post- installation monitoring of display grounds to assess the impacts of facility development, but no preliminary monitoring was conducted at this site. This inventory reveals that prairie grouse are using the habitat within and surrounding the facility. There is a wide range of expectations for population densities in the Sandhills. However, based on data obtained during similar surveys along NGPC Spring Grouse Routes in Brown and Rock counties, population densities for both species are within range of what we might expect. Of interest now would be to determine if the towers influence the numbers of birds and the distribution of display grounds over a relatively long period.

Dr. John Toepfer, a wildlife research scientist for Society Tympanuchus Cupido Pinnatus, Ltd. in Wisconsin spent three days observing the facility in early May 2006. In addition to our observations of activity on display grounds, John noted that single prairie-chicken and sharp-tailed grouse hens probably in egg laying were regularly observed along the roads and in close proximity to the towers. Also observed within proximity of individual towers were upland sandpipers, meadowlarks, and waterfowl. Gadwalls, Canada geese, mallards, widgeon, and blue-winged teal pairs were observed on the ponds within the complex.

Birds observed in 2007 included Canada geese, mallards, pintail, bufflehead, ring-necked duck, northern shoveler, meadowlark, red-winged blackbird, mourning dove, cardinal, great-horned owl, northern flicker, red-tailed hawk, American crow, American kestrel, eastern bluebird, eastern phoebe, American robin, downy woodpecker, cooper's hawk, killdeer, eastern screech owl, nighthawk, northern harrier, dark-eyed junco, and horned lark. There were no upland sandpipers observed in 2007.

Birds recorded in 2008 included Canada geese, mallards, pintail, bufflehead, ring-necked duck, northern shoveler, gadwall, blue-winged teal, lesser scaup, redhead, widgeon, wood duck, lesser yellowlegs, Wilson's phalarope, long-billed curlew, upland sandpiper, great blue heron, killdeer, brown-headed cowbird, red-winged blackbird, meadowlark, mourning dove, American robin, horned lark, grackle, European starlings, tree swallow, eastern phoebe, white crowned sparrow, prairie falcon, and northern harrier. There were a large abundance of upland sandpipers observed in the spring of 2008.

Birds observed while conducting the 2009 sharp-tailed grouse and greater prairie-chicken survey included mallard, pintail, bufflehead, northern shoveler, blue-winged teal, upland sandpiper, killdeer, brown-headed cowbird, red-winged blackbird, horned lark, meadowlark, mourning dove, American robin, white crowned sparrow, American kestrel, red-tailed hawk, and turkey vulture.

Birds observed while conducting the 2010 sharp-tailed grouse and greater prairie-chicken survey included mallards, northern shoveler, blue-winged teal, killdeer, yellow-headed blackbird, red-winged blackbird, horned lark, meadowlark, morning dove, American robin, turkey vulture, grackle, white crowned sparrow.

Other bird species were not recorded during the 2011 prairie grouse survey.

The number of male (and total) prairie grouse observed while conducting the 2011 survey appeared to decline considerably compared to the 2010 counts (Table 2). Male greater prairie-chickens and total chicken numbers were 44% and 51% less, respectively, than the number of birds counted in 2010. Male sharp-tailed grouse and total grouse numbers were 45% and 49% lower, respectively, than those observed during the 2010 prairie grouse survey. We believe the decline in numbers is attributed to poor nesting success and/or brood survival due to the cold, wet weather experienced during June 2010. The spring census counts for all breeding routes in the Sandhills for 2011 is not available at

this writing, but it is believed that breeding male counts will be down substantially due to June 2010 weather. June 2011 weather was similar to 2010, thus counts could be lower in 2012.

Prior to the 2011 spring census counts, seasonal employees obtained the display ground counts with some initial guidance and recommendations by the project leader, Bill Vodehnal. During 2011, Bill conducted all counts and visited each display ground that was recorded in previous years 2-3 times in April. It was determined that 2 GPC grounds (GPC 4 and GPC 8) and 2 STG grounds (STG 4 and STG 7) were actually the same ground due to distance between grounds and only one visit recorded, thus grounds were combined to represent GPC 4 and STG 4 in this report.

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Table 1. Prairie grouse display ground locations.

GPS Identifier	UTM Prefix	UTM x-coordinate	UTM y-coordinate
GPC 1	14T	426984	4697465
GPC 2	14T	428416	4698410
GPC 3	14T	425473	4701318
GPC 4	14T	427514	4696967
GPC 5	14T	424652	4701592
GPC 6	14T	422631	4703258
GPC 7	14T	422145	4700458
GPC 9	14T	427201	4699260
STG 1	14T	422832	4700938
STG 2	14T	425256	4699039
STG 3	14T	425474	4697892
STG 4	14T	426946	4698608
STG 5	14T	421199	4702254
STG 6	14T	422038	4700301
STG 7	14T	423565	4702483
STG 8	14T	427536	4697497

Table 2. Greater prairie-chicken (GPC) and sharp-tailed grouse (STG) display ground counts.

Ground Number	Species/Lek	2006			2007			2008			2009			2010			2011		
Greater prairie-chicken		♂	♀	Total	♂	♀	Total	♂	♀	Total	♂	♀	Total	♂	♀	Total	♂	♀	Total
1	GPC 1			15			8			0	17	4	21	10	4	14	6	0	6
2	GPC 2		5	5			0			0			0	0	0	0	0	0	0
3	GPC 3	11		11	6		6	10	3	13	17	3	20	13	3	16	8	1	9
6	GPC 4			12			9	5	2	7	9	2	11	3	0	3	0	0	0
9	GPC 5	9	3	12			18	7	3	10	2		2	7	2	9	7	0	7
12	GPC 6	11	2	13			37	21	6	27	21	6	27	24	5	29	20	4	24
13	GPC 7	2		2	2		2	7	4	11	9	1	10	6	2	8	0	0	0
15	GPC 9													10	5	15	0	0	0
Total GPC		33	10	70	8		80	50	18	68	75	16	91	73	21	94	41	5	46
Sharp-tailed grouse																			
4	STG 1			8			13	8	5	13			0	0	0	0	0	0	0
5	STG 2			20			15	10	2	12	19	1	20	18	4	22	10	2	12
7	STG 3			9			3			0	7		7	8	2	10	0	0	0
8	STG 4			13			15	7	2	9	14		14	12	4	16	0	0	0
10	STG 5			8			4	7	4	11	8	1	9	7	1	8	5	1	6
11	STG 6			8			5			0	6		6	6	2	8	0	0	0
17	STG 8													7	2	9	9	1	10
16	STG 7																8	1	9
Total STG		66			55			32	13	45	54	2	56	58	15	73	32	5	37

Table 3. Greater prairie-chicken (GPC) and sharp-tailed grouse (STG) display ground distance to the nearest wind turbine.

Ground Number	Species/Lek	Display ground distance from wind turbine
1	GPC 1	5,854.3 ft
2	GPC 2	7,122.1 ft
3	GPC 3	3,403.2 ft
6	GPC 4	7,932.6 ft
9	GPC 5	3,020.5 ft
12	GPC 6	3,150.1 ft
13	GPC 7	4,220.3 ft
15	GPC 9	2,809.8 ft
4	STG 1	2,968.5 ft
5	STG 2	3,733.7 ft
7	STG 3	4,943.4 ft
8	STG 4	2,566.7 ft
10	STG 5	2,547.3 ft
11	STG 6	4,294.3 ft
16	STG 7	2,576.1 ft
17	STG 8	7,278.5 ft

Figure 1. Distribution of Prairie Grouse Display Grounds at NPPD Ainsworth Wind Energy Facility, 2006-2011

