

Appendix C-7: Avian Point Count Survey – Spring and Fall 2012 (March 4, 2013)

March 4, 2013

Ms. Melissa Peterson
 Project Manager
 EDF Renewable Energy
 10 Second Street NE, Suite 400
 Minneapolis, Minnesota 55413

*Re: Spring and Fall 2012 Avian Point Count Survey
 Stoneray Wind Project
 Burns & McDonnell Project No. 62823*

Dear Ms. Peterson:

Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) is providing environmental support services for the EDF Renewable Energy (EDF) proposed 105-megawatt (MW) wind energy facility, Stoneray Wind Project (Project), to be located in Pipestone and Murray counties in southwestern Minnesota (Figure 1). The Project will consist of up to 62 wind turbine generators (WTGs), access roads, an underground electrical collector system, and a small electrical switchyard situated within the Project area. The Project area is generally located north, east, and southeast of Woodstock, Minnesota, and consists of all or portions of the following Sections (Table 1), which are also depicted in Figure 2.

Table 1. Project Location

Township (North)	Range (West)	Sections
107	44	7-10, 14-29, 32-36
107	43	30, 31
106	44	3, 4, 9, 10, 12, 13, 24, 25
106	43	6, 7, 17-20, 29, 30

Per recommendations of the U.S. Fish and Wildlife Service (USFWS) and Minnesota Department of Natural Resources (MDNR), Burns & McDonnell conducted spring and fall avian point count (APC) surveys for the proposed Project area (approximately 22,400 acres). The goals of the surveys were to determine avian species diversity during the 2012 summer breeding season and migrations, the potential presence of species of interest to agencies (*i.e.*, listed or protected species, raptors), as well as the diversity of species that are protected under the Migratory Bird Treaty Act (16 U.S.C. 703-712) (MBTA), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) (BGEPA), and Minnesota’s endangered species statute (2012 Minnesota Statutes, Chapter 84, Section 0895). The state statute imposes a variety of restrictions for species designated as endangered or threatened. Other avian species, such as the American

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crow (*Corvus brachyrhynchos*), are managed by MDNR through hunting season regulations. Methodology and results of the survey are discussed below.

Site Description

The surveyed Project area is approximately 22,400 acres; however, it is anticipated that only a fraction of the overall site would be disturbed for construction and operation of the Project. The Project area is used primarily for row-crop grain production with portions also allocated for pasture and cattle grazing, hay production, or fallow. Historically, the Project area was dominated by tallgrass prairie; however, very little of this habitat remains. Remnants of the tallgrass prairie can be observed on relatively steep south-, east-, and west-facing slopes in the areas not used for row-crop agriculture. The Project area ranges in elevation from approximately 1,560 to 1,972 feet above mean sea level (MSL) and contains a few trees, windbreaks created by tree plantings, pasture and hay production fields, row-crop agriculture, remnant uplands, riparian areas, streams, ponds, and wetlands.

County roads, county highways, and state highways are present throughout the Project area. The Project is irregularly shaped; therefore numerous county roads and county highways constitute the boundaries of the Project area. County Highway 3 is located along the southern Project perimeter. State Highway 30, County Highway 6, and County Highway 7 bisect the Project east and west. County Highway 8 is located along the northern Project perimeter. County Line Avenue bisects the eastern portion of Project area north and south. County Line Avenue runs north and south through the eastern portion of the Project. County Road 84 is located on the east boundary of the Project and 140th Avenue is located on the west boundary of the Project (Figures 1 and 2). The Project area contains high-voltage and low-voltage electrical transmission and distribution lines, radio towers, meteorological towers, agricultural infrastructure, abandoned out buildings, fence lines, and other human intrusions and features. Existing wind generation turbines are located north, east, and south of the Project area as well as intermixed within the Project area.

Methods

Burns & McDonnell conducted the APC surveys (also known as variable circular plot counts) during the regional spring and fall avian migration periods as well as in consultation with the USFWS and MDNR. The intent of the surveys was to produce a quantitative assessment of the local species diversity at the time of the study, which can be used to get a better understanding of what avian species migrate through the Project area or may inhabit the area.

Morning observations were completed during April 5, 6, 10, 11, 24, and 25; May 15 and 16; June 5 and 6; August 16 and 17; September 5, 6, 27, and 28; and October 16 and 17, 2012. APC surveys were conducted at ten locations throughout the Project area representing wetland, upland, and agricultural areas. The distribution of the ten APC locations was determined using a desktop analysis and adjusted after field reconnaissance. The APC locations included areas of representative habitat within the current Project boundary while minimizing overlap within the Project area to ensure as complete coverage as practicable (Figures 1 and 2, Appendix A-1).

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This distribution and timing allowed point count surveys to be conducted throughout the entire Project area during each survey event. Surveys were conducted starting shortly after sunrise and concluded approximately three hours after sunrise. Each APC location was visited during each day of surveying.

Point counts were conducted at each APC location for five-minute intervals by at least one wildlife biologist. A five-minute observation period was employed (Peitz et al. 2004), rather than a ten-minute interval indicated in the USFWS Landbird Monitoring Protocol (Knutson et al. 2008). The five-minute interval was used to minimize the chance of duplicate observations of species of potentially high density (*i.e.*, sparrows, horned lark, gulls, waterfowl, or shorebirds). Individual avian species observed or heard were recorded in a tally format at each location. The observation radius maximum during ideal conditions was approximately 400 meters (0.25 miles), but was variable depending on wind, terrain, and species observed. For example, stationary waterfowl on a pond can be identified at a longer distance relative to sparrow species flying very near an observer. High winds decrease the ability to hear and identify bird calls. Additionally, considerable effort was given to identify all raptors observed. Qualitative observations were also recorded for soaring species (*i.e.*, raptors, herons, or vultures) while in transit between APC locations during opportunistic observations. The qualitative and point count data were recorded and analyzed separately.

APC data are collected for the purpose of determining species diversity. In field applications where large APC radii are employed, calculations of species abundances are not warranted unless considerable effort has been given during data collection to minimize replication of individual observations (*i.e.*, many APC locations over an extended period and determination of call or flight directions). For purposes of this study, estimates of species diversity were the primary goal and therefore species abundances were not determined for the Project.

References employed as necessary for species identification and differentiation included *Field Guide to the Birds of North America* (National Geographic Society 1997), *Field Guide to the Birds of Western North America* (Dunn and Alderfer 2008), *Hawks at a Distance: Identification of Migrant Raptors* (Liguori 2011), and two scientifically robust and updatable applications for mobile devices that include comparative bird calls (iBird Explore: Interactive Field Guide to Birds of North America – Version 5.1 2012 and Audubon Birds: A Field Guide to North American Birds 2011).

The average temperature and wind speed at each point count location were recorded using a Kestrel 3500 meter. The survey route was changed throughout the study to minimize bias in the timing or sequencing of point count location observations. Inquiries regarding study methods during informal state and federal agency consultations resulted in no modifications to the study design, with the exception that surveys were started in early spring due to a warmer winter and spring in 2012 than recent years past. As a result, the survey started on April 5, 2012.

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Results

The point count survey route was completed 18 times, which yielded 63 species and 5,868 observations (Appendix A-2). Many of the species observed are known to breed in the general area; however, some species and individuals are migrants through the area. Migrants were found roosting in woody vegetation, as well as feeding or resting in the grasslands, ponds and streams, standing seasonal water in crop fields, and non-flooded crop fields, in addition to in flight. A total of nine soaring species were also recorded during qualitative observations while in transit on the Project area. Implementation of these methods yielded a total of 67 observed species (Appendix A-3). Only four of the 67 observed species are not included under the protection of the MBTA; greater prairie-chicken (*Tympanuchus cupido*), house sparrow (*Passer domesticus*), European starling (*Sturnus vulgaris*), and rock dove (*Columba livia*). The MBTA affords protection to avian species including birds, their parts, their active nests, and their eggs.

The surveyed areas included areas that do not receive considerable annual impacts, such as wetlands dominated by reed canary grass (*Phalaris arundinacea*), reeds (*Phragmites* spp.), and cattails (*Typha* spp.); small isolated wetland areas generally near road rights-of way; wetlands that included ponds, streams, or beaver dammed areas; upland areas that were not annually hayed or grazed; upland areas that received annual haying or grazing; habitat within trees; as well as impacted areas such as cropland. The APC locations included areas that are used for agriculture in several capacities including upland areas that were used for pasture or hay production, dedicated pasture areas that were heavily grazed (*i.e.*, near farm developments), farm developments, and row-cropped agricultural fields (Appendix A-1).

No species were observed with protection status at the state or federal levels as threatened or endangered in Pipestone or Murray counties under the Endangered Species Act (7 U.S.C. § 136, 16 U.S.C. § 1531) (ESA) or the Minnesota endangered species statute. One greater prairie-chicken (*Tympanuchus cupido*), an upland game species designated by MDNR as a special concern species in the State, was heard performing a courtship/breeding display near APC 8 on April 11, 2012. The greater prairie-chicken is a state-listed special concern species, but is not listed within Pipestone and Murray counties, or in adjacent counties. Unlike, state-listed threatened and endangered species, species of special concern are not protected by the Minnesota endangered species statute. There were zero eagles observed in the Project boundary, with protection under the BGEPA. Bald eagles are not commonly known to occur in or near the Project area.

Grassland Bird Species

Grassland birds and avian species common to diverse habitat, such as American robin (*Turdus migratorius*), killdeer (*Charadrius vociferus*), and red-winged blackbird (*Agelaius phoeniceus*) were observed in relatively high numbers. Typical grassland species filling a variety of niches were observed using grassy areas, crop fields, and wet areas (Table 2).

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Table 2 continued. Grassland Bird Species Observations During 2012 APC Surveys[^]

Species	Point Count Locations										Species Total
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
western meadowlark*	9	19	11	44	20	22	31	39	17	24	236
yellow warbler	0	0	0	0	1	0	0	0	0	0	1
yellow-bellied sapsucker	0	0	0	0	0	0	1	0	0	0	1
APC Location Total	488	256	474	784	936	285	522	318	634	626	5323
Number of Species	23	19	23	19	23	21	24	24	21	21	41

[^] Common habitats for observations included upland, agriculture, areas with trees, and wetlands, during flight.

* Species considered generalists in this region or likely to be observed in diverse habitats in northern prairie regions dominated by agriculture and prairies (*i.e.*, southwest Minnesota).

Some observations of these species included large migrating flocks (*i.e.*, longspur species) at specific APC locations. The five most commonly observed species by total number included:

- red-winged blackbird (*Agelaius phoeniceus*)
- longspur species (*Calcarius spp.*)
- common grackle (*Quiscalus quiscula*)
- European starling
- brown-headed cowbird (*Molothrus ater*)

Shorebirds and Wading Bird Species

Shorebirds and wading birds were noted in areas of standing water, such as ponds, beaver dams, and streams; flying throughout the Project area; and in crop fields within and near the Project area. A total of seven species of shorebirds and wading birds species were observed (Table 3).

Double-crested cormorant observations include one flock of this species flying east to west over the Project area at APC 10 on April 25, 2012. Great blue heron observations may be related to the rookery for this species identified approximately 1.5 miles south of the Project area. Great blue herons were observed during the APC surveys (Table 3) and qualitative observations (16 individuals scattered throughout the survey periods). Common snipe were observed in five locations in the Project area with numerous individuals observed in flight over their assumed foraging and breeding areas during the spring breeding period.

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Table 3. Shorebird and Wading Bird Species Observations During 2012 APC Surveys[^]

Species	Point Count Locations										Species Total
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
American bittern	0	0	0	0	0	0	0	0	1	0	1
common snipe	0	0	1	0	4	0	0	6	4	2	17
double-crested cormorant	0	0	0	0	0	0	0	0	0	37	37
great blue heron	0	0	0	0	0	0	1	0	0	3	4
semipalmated plover	0	0	0	0	0	0	0	0	1	0	1
shortbilled dowitcher	0	0	0	0	0	0	1	0	0	0	1
spotted sandpiper	0	0	0	0	2	0	0	0	0	0	2
APC Location Total	0	0	1	0	6	0	2	6	6	42	63
Number of Species	0	0	1	0	2	0	2	1	3	3	7

[^] Common habitats for observations included standing water in agricultural fields, ponds, streams, and wetlands, during flight.

Waterfowl Species

Waterfowl, like shorebird species, were documented in areas of standing water, flying throughout the Project area, and in crop fields within and near the Project area. Blue-winged teal were the most numerous species and were observed at five APC locations on waterbodies or in flight. A total of seven waterfowl species were observed (Table 4).

Table 4. Waterfowl Species Observations During 2012 APC Surveys[^]

Species	Point Count Locations										Species Total
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
American coot	5	0	0	0	0	0	0	0	1	1	7
blue-winged teal	0	0	24	0	8	0	0	3	59	17	111
Canada goose	0	4	2	2	5	4	0	13	16	10	56
gadwall	0	0	0	1	0	0	0	0	2	0	3
hooded merganser	0	0	0	0	0	0	0	0	5	0	5
mallard	0	2	0	0	4	3	0	9	5	7	30
redhead (duck)	0	0	0	0	0	0	0	0	1	0	1
wood duck	0	0	0	0	0	0	0	6	50	0	56
APC Location Total	5	6	26	3	17	7	0	31	139	35	269
Number of Species	1	2	2	2	3	2	0	4	8	4	8

[^] Common habitats for observations included standing water in agricultural fields, ponds, streams, and wetlands, during flight.

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Upland Game Bird Species

Three upland game bird species were observed. Ring-necked pheasants were relatively common throughout the Project area. One greater prairie-chicken was heard during one survey on the Project area in Pipestone County performing its mating display (*i.e.*, booming) near APC 8 on April 11, 2012 (Table 5).

Greater prairie-chickens are an MDNR-designated species of special concern. This species was considered an upland game bird in this analysis because they are hunted in the majority of their range, including in Minnesota. The Project area is not within the currently accepted range for greater prairie-chickens in Minnesota. The current southern extent of the range of the greater prairie-chicken in Minnesota is recorded as Lac Qui Parle and Chippewa counties (MDNR 2012a). These counties are three counties north of Pipestone and Murray counties and the Project area. The southernmost game management unit for hunting greater prairie-chickens in Minnesota is in Wilkin and Otter Tail counties (Unit 811A), six counties north of the Project area (MDNR 2012b). At the time of audible documentation of the greater prairie-chicken, Project land access to the area was not secured for surveys; therefore, flushing the species to determine the actual total number present was not possible.

Table 5. Upland Game Bird Species Observations During 2012 APC Surveys[^]

Species	Point Count Locations										Species Total
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
greater prairie-chicken	0	0	0	0	0	0	0	1	0	0	1
mourning dove	8	11	1	15	10	3	17	4	2	7	78
ring-necked pheasant	14	2	3	11	4	10	11	24	15	11	105
APC Location Total	22	13	4	26	14	13	28	29	17	18	184
Number of Species	2	2	2	2	2	2	2	3	2	2	3

[^] Common habitats for observations included standing water in agricultural fields, wetlands or wet areas, during flight.

Raptor and Soaring Species

A total of eight raptor and other soaring species were observed during APC surveys and qualitative documentation (Tables 6, 7, and 8). American kestrel, northern harrier, red-tail hawk, and rough-legged hawk were the raptor species observed during APC surveys.

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Table 6. Raptor and Soaring Species Observations During 2012 APC Surveys[^]

Species	Point Count Locations										Species Total
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
American kestrel	0	1	0	0	0	0	0	1	0	0	2
northern harrier	0	0	1	0	0	0	0	0	1	0	2
red-tailed hawk	1	1	2	1	7	3	3	2	3	1	24
rough-legged hawk	0	0	0	0	1	0	0	0	0	0	1
APC Location Total	0	1	0	0	0	0	0	1	0	0	29
Number of Species	0	1	0	0	0	0	0	1	0	0	4

[^] Common habitats for observations included near or in areas with trees, power lines (perching areas), during flight.

Table 7. Raptor and Soaring Species Observations During Spring Qualitative Observations[^]

Species	Event Date - Spring 2012										Species Total
	April 5	April 6	April 10	April 11	April 24	April 25	May 15	May 16	June 5	June 6	
American kestrel	4	4	2	1		1			1		13
common raven											0
northern harrier	3	1	1	3					1		9
osprey		1									1
red-tailed hawk	5		2	4	1	2			2	1	17
rough-legged hawk											0
Swainson's hawk								1			1
turkey vulture					1						1
TOTAL	12	6	5	8	2	3	0	1	4	1	42
TOTAL DAILY Species	3	3	3	3	2	2	0	1	3	1	

[^] Common habitats for observations included near or in areas with trees, power lines (perching areas), agricultural areas, during flight.

Table 8. Raptor and Soaring Species Observations During Fall Qualitative Observations[^]

Species	Event Date - Fall 2012								Species Total
	Aug 16	Aug 17	Sept 5	Sept 6	Sept 27	Sept 28	Oct 16	Oct 17	
American kestrel	1		2	3	3				9
common raven	1								1
northern harrier					1				1
osprey									0
red-tailed hawk	1	1		1	1	3	1		8
rough-legged hawk								1	1
Swainson's hawk									0
turkey vulture									0
TOTAL	3	1	2	4	5	3	1	1	20
TOTAL DAILY Species	3	1	1	2	3	1	1	1	

[^] Common habitats for observations included near or in areas with trees, power lines (perching areas), agricultural areas, during flight.

Observations of other species which do not generally exhibit high altitude soaring behavior were made. For example, American kestrels were observed perching and then flushed incidentally. Male and female northern harriers have characteristic low flying heights while hunting and were observed flying within the Project area. A total of 25 qualitative red-tail hawk observations were recorded, including adults and juveniles perching or soaring throughout the Project area. A total of two raptor stick-nests were documented within the Project area; however, no correlation to a specific species was made (see Burns & McDonnell 2012, *Avian Stick Nest Survey: Stoneray Wind Project*). A determination on whether the nests were active was not made during the study.

Additionally, one migrating osprey was observed on April 6, 2012, perched on the ground in an agricultural field, west of 120th Ave/County Road 79, north of County Highway 6/County Road 85, and south of 141st Street/County Road 82. This location is approximately 2.0 to 2.5 miles west of the Project area. One rough-legged hawk was observed on the ground several miles northeast of APC 5; however, this species was observed during the same day while conducting the point count survey at APC. It is likely both observations were the same individual, however, documentation must include these observations independently.

Abiotics

During the surveys, weather conditions varied from clear skies to clouds and light mist. Steady precipitation did not occur during the surveys. Wind speed varied from a recorded average low of 0.0 miles per hour (mph) on September 27 and 28 to an average recorded high of 18.3 mph on

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October 17. The temperatures recorded during the individual point counts varied from a recorded low of 21.2 degrees Fahrenheit (°F) (-6.0 degrees Centigrade (°C)) on April 11 to a high of 74.7 °F (23.7 °C) on September 28. The average recorded temperature throughout the point count surveys was 52.8 °F (11.5 °C).

Summary

The avian surveys conducted for the Project from April 5, 2012 through June 6, 2012, and August 16 through October 17 were scheduled to take advantage of the spring migration and breeding periods as well as the fall migration period in order to identify species that may use the Project area. Identification and quantitative species data for each APC location was recorded throughout the survey. The survey yielded no species with federal protection under the ESA or BGEPA. Consultation with the USFWS under within the ESA or BGEPA should not require additional measures for avian species.

Raptors were not observed in high numbers or large concentration and it is probable that these highly visible species (when foraging or roosting) were counted in duplication in multiple survey periods. A visible prey base (*i.e.* small mammals, reptiles) for raptors was not observed in high concentrations in the Project area with the exception of game birds, such as ring-necked pheasant, as well as small mammals and reptiles.

Avian observations during the survey included documentation of one greater prairie-chicken, which is a state-listed species of special concern. Visible identification of the greater prairie-chicken was not possible to follow up on the audible identification. The location of the individual was on land not accessible to the Project during the survey. This location was a hilltop grassland area with relatively little recent disturbance. The current southern extent of the range of the greater prairie-chicken in Minnesota is recorded as Lac Qui Parle and Chippewa counties (MDNR 2012a). These counties are three counties north of Pipestone and Murray counties and the Project area. The southernmost game management unit for hunting greater prairie-chickens in Minnesota is in Wilkin and Otter Tail counties (Unit 811A), six counties north of the Project area (MDNR 2012b). Avian species observations outside of “known” or “accepted” ranges occur frequently as a result of migration, changes in land use, or species movement into new habitats. It is very feasible that populations of greater prairie-chickens extend beyond this known range, such as to the Project area. The observation by mating call of greater prairie-chickens in the Project area (Pipestone County) indicates the presence of this species during mating season, but does not indicate the presence of a breeding population in this area. Additional studies would be required to make such a determination of the activity and habitat usage of the species. It is not anticipated that the Project would have a negative impact on greater prairie-chicken due to the potential for low numbers of the species in the area. Additionally, the presence of many existing wind generation facilities nearby and within the Project area in a variety of locations indicates that the birds currently present are adapted or not being disturbed and that additional wind generation facilities would not likely add to any cumulative impacts to the greater prairie-chicken.

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A total of 67 species were observed during the surveys. Sixty-three observed species have federal protection under the MBTA. Spring surveys yielded higher numbers of species relative to fall surveys, as expected due to spring migration. The fall surveys resulted in large flocks of relatively common species such as red-winged blackbird and brown-headed cowbird.

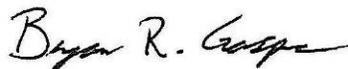
As a result of the surveys, the Project site is determined to have a relatively low risk for potential impacts to avian species. Additional consultation with the USFWS and MDNR, should the Project proceed, may include the following topics:

- Species that may use the Project area that are protected by the MBTA
- Presence and diversity of raptors in the Project area
- Presence of greater prairie-chicken near APC 8

Depending upon timing of proposed construction, follow-up surveys for avian species or targeted species may need to be performed to determine on-site habitat use by those species. Depending upon the habitat usage of avian species relative to proposed construction activities, a construction monitoring or mitigation plan may need to be developed.

If you have questions or are in need of further assistance regarding this Project, please contact Bryan Gasper at (816) 349-6770 or bgasper@burnsmcd.com or Robert Everard at (816) 363-7251 or reverard@burnsmcd.com.

Sincerely,



Bryan R. Gasper
Senior Environmental Scientist/Wildlife Biologist
Burns & McDonnell Engineering Company, Inc.
9400 Ward Parkway
Kansas City, Missouri 64114
816.349.6770 – office
816.822.4299 – fax
bgasper@burnsmcd.com

Enclosures

cc: Andy Kim, EVS
Robert Everard, Burns & McDonnell

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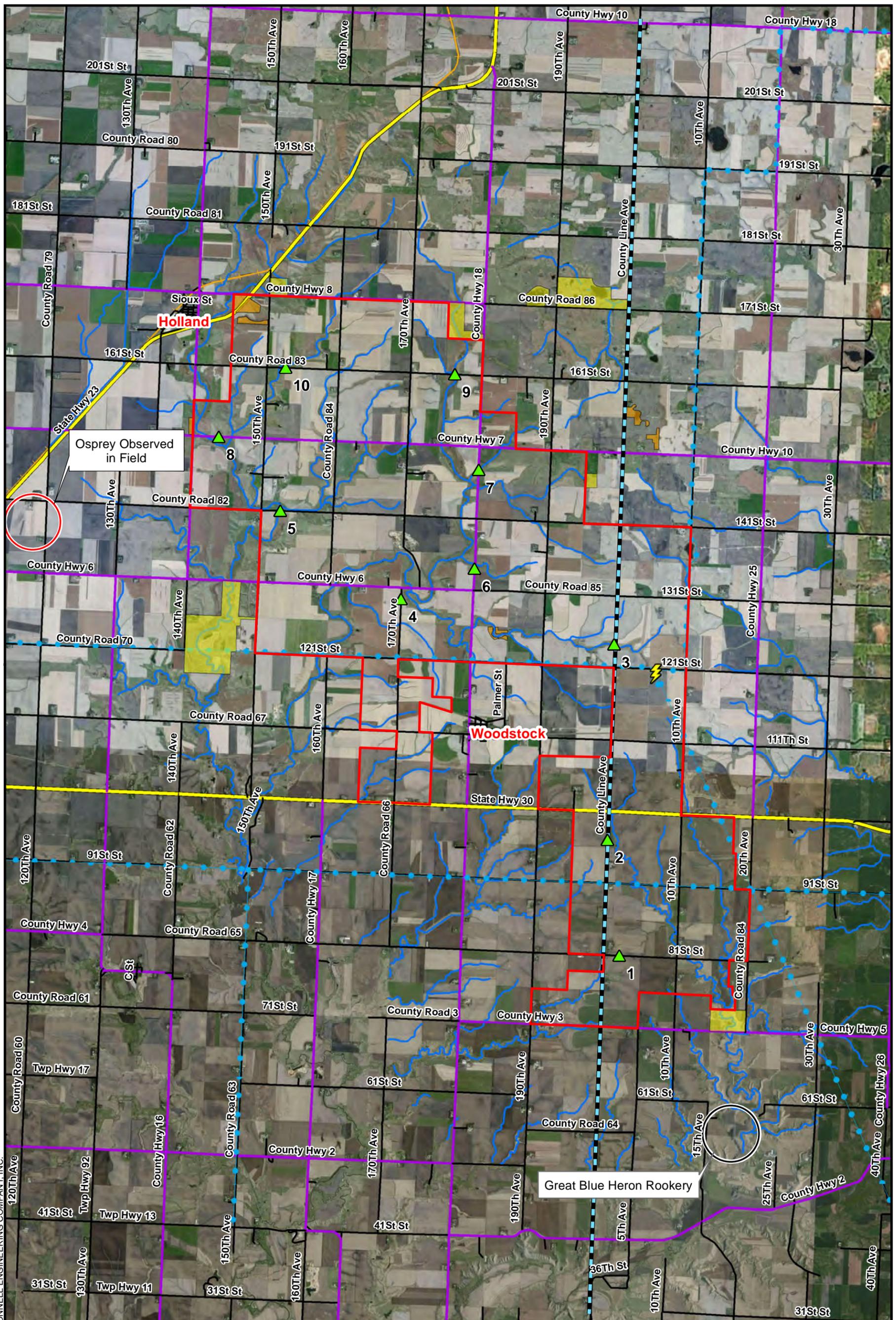
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FIGURES

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0 4,000 8,000 Feet

FOR INTERNAL REFERENCE ONLY

Legend

- Proposed Project Boundary
- Stream
- ⚡ Substation
- ▲ Avian Survey Point Count
- Railroad
- Wildlife Management Area
- County Line
- Road
- Reinvest in MN Easement Area
- Transmission Line
- County Hwy
- State Hwy



Figure 1
Avian Point Count
Survey Locations
Stoneray Wind Project
Murray & Pipestone
Counties, Minnesota

Source: Street Atlas (2010), NAIP (2010), MN DNR (2011), ESRI (2012), and Burns & McDonnell (2012)

45W 44W RANGE 44W 43W



TOWNSHIP
107N
106N



0 4,000 8,000 Feet

FOR INTERNAL REFERENCE ONLY

Legend

- Proposed Project Boundary
- Township and Range Sections
- Wildlife Management Area
- Reinvest in MN Easement Area
- ▲ Avian Survey Point Count
- County Line
- Transmission Line
- Stream
- + Railroad
- Major Roads
- ⚡ Substation



Figure 2
Avian Point Count
Stoneray Wind Project
Murray & Pipestone
Counties, Minnesota

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Source: Street Atlas (2010), NAIP (2010), MN DNR (2011), ESRI (2012), and Burns & McDonnell (2012)

APPENDIX A

Appendix A-1. Habitats Included in 2012 Avian Point Count Species Observations

Avian Point Count Location	Habitat Summary Description
APC 1	Row-crop agriculture; pasture; farm development; small wet areas
APC 2	Upland used for pasture/hay; row-crop agriculture; a few mature trees
APC 3	Wetlands dominated by reed canary grass, reeds, and cattails; row-crop agriculture
APC 4	Upland used for pasture/hay; row-crop agriculture; stream
APC 5	Wetlands dominated by reed canary grass, reeds, and cattails; stream; upland used for pasture/hay
APC 6	Upland; a few mature trees; row-crop agriculture
APC 7	Wetland and upland; a few mature trees; pasture; row-crop agriculture
APC 8	Upland; wetlands with pond; pasture
APC 9	Wetland; stream/beaver dam areas; pasture; farm development
APC 10	Wetland/pond; pasture; upland used for pasture/hay

+ Habitats listed from most prevalent to least (determined by qualitative observation) at each APC location.

Appendix A-2. 2012 Avian Point Count Species Observations

Species	Point Count Locations										Species Totals
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
American bittern	0	0	0	0	0	0	0	0	1	0	1
American coot	5	0	0	0	0	0	0	0	1	1	7
American crow	17	15	7	6	5	12	19	5	9	24	119
American goldfinch	4	14	3	4	19	13	4	2	15	3	81
American kestrel	0	1	0	0	0	0	0	1	0	0	2
American robin	23	21	6	3	27	9	3	1	0	10	103
barn swallow	37	2	5	4	6	4	5	7	8	5	83
black-capped chickadee	1	1	0	0	0	0	0	0	0	0	2
blue jay	2	1	2	0	0	0	0	0	0	3	8
blue-winged teal	0	0	24	0	8	0	0	3	59	17	111
bobolink	0	13	5	0	0	4	1	11	2	0	36
brown-headed cowbird	82	3	9	4	85	36	62	2	48	22	353
Canada goose	0	4	2	2	5	4	0	13	16	10	56
chipping sparrow	0	0	1	0	0	0	0	0	2	0	3
clay-colored sparrow	0	0	1	4	0	1	10	2	0	0	18
cliff swallow	0	0	0	0	0	0	0	2	0	0	2
common grackle	22	33	27	12	112	50	27	19	35	228	565
common snipe	0	0	1	0	4	0	0	6	4	2	17
common yellowthroat	0	0	9	0	6	0	1	0	12	1	29
dickcissel	5	0	2	8	13	3	6	9	0	5	51
double-crested cormorant	0	0	0	0	0	0	0	0	0	37	37
downy woodpecker	0	1	0	0	0	0	0	0	0	0	1
eastern kingbird	0	0	0	0	1	0	4	2	2	2	11
eastern phoebe	0	0	0	0	0	1	0	0	0	0	1
eastern towhee	0	0	0	0	0	0	1	0	0	0	1
European starling~	86	16	1	45	17	33	215	3	48	18	482
gadwall	0	0	0	1	0	0	0	0	2	0	3
grasshopper sparrow	0	0	1	12	3	0	2	1	5	15	39
great blue heron	0	0	0	0	0	0	1	0	0	3	4
greater prairie-chicken~*	0	0	0	0	0	0	0	1	0	0	1
hooded merganser	0	0	0	0	0	0	0	0	5	0	5
horned lark	15	5	9	16	1	0	6	6	3	9	70

Appendix A-2 continued. 2012 Avian Point Count Species Observations

Species	Point Count Locations										Species Totals
	APC 1	APC 2	APC 3	APC 4	APC 5	APC 6	APC 7	APC 8	APC 9	APC 10	
house finch	5	0	0	0	0	0	0	0	0	0	5
house sparrow~	15	0	0	0	0	0	0	0	0	0	15
killdeer	13	26	12	5	17	2	7	6	7	73	168
longspur species	34	0	0	559	75	4	13	0	0	0	685
mallard	0	2	0	0	4	3	0	9	5	7	30
marsh wren	0	0	9	0	2	0	0	2	43	1	57
mourning dove	8	11	1	15	10	3	17	4	2	7	78
northern cardinal	1	0	0	0	0	0	0	0	0	0	1
northern flicker	1	7	4	0	2	6	4	1	1	2	28
northern harrier	0	0	1	0	0	0	0	0	1	0	2
northern mockingbird	0	0	0	0	0	1	0	0	0	0	1
northern rough-winged swallow	23	0	1	31	15	0	3	18	7	27	125
redhead (duck)	0	0	0	0	0	0	0	0	1	0	1
red-headed woodpecker	1	0	0	0	0	1	0	0	0	0	2
red-tailed hawk	1	1	2	1	7	3	3	2	3	1	24
red-winged blackbird	39	73	341	23	495	76	80	171	344	120	1762
ring-necked pheasant	14	2	3	11	4	10	11	24	15	11	105
rock dove~	45	2	0	0	11	0	5	1	17	32	113
rough-legged hawk	0	0	0	0	1	0	0	0	0	0	1
savannah sparrow	0	2	0	2	0	3	0	0	0	0	7
sedge wren	0	0	0	0	0	0	0	3	3	2	8
semipalmated plover	0	0	0	0	0	0	0	0	1	0	1
shortbilled dowitcher	0	0	0	0	0	0	1	0	0	0	1
song sparrow	8	2	7	1	2	3	12	4	6	0	45
spotted sandpiper	0	0	0	0	2	0	0	0	0	0	2
upland sandpiper	0	0	1	0	1	1	0	1	0	0	4
western kingbird	0	0	0	1	0	0	0	0	0	0	1
western meadowlark	9	19	11	44	20	22	31	39	17	24	236
wood duck	0	0	0	0	0	0	0	6	50	0	56
yellow warbler	0	0	0	0	1	0	0	0	0	0	1
yellow-bellied sapsucker	0	0	0	0	0	0	1	0	0	0	1
Total Observations	516	277	508	814	981	308	555	387	800	722	5,868
Number of Species	27	25	30	24	32	26	29	34	36	31	63

~ Species not protected under the jurisdiction of the MBTA.

* MDNR state-listed species of special concern.

Appendix A-3. Total Project 2012 Avian Species List: Avian Point Counts and Qualitative Observations

Species (All Observations)			
Common Name	Scientific Name	Common Name	Scientific Name
American bittern	<i>Botaurus lentiginosus</i>	house sparrow	<i>Passer domesticus</i>
American coot	<i>Fulica americana</i>	killdeer	<i>Charadrius vociferus</i>
American crow	<i>Corvus brachyrhynchos</i>	longspur species	<i>Calcarius</i> spp.
American goldfinch	<i>Carduelis tristis</i>	mallard	<i>Anas platyrhynchos</i>
American kestrel	<i>Falco sparverius</i>	marsh wren	<i>Cistothorus palustris</i>
American robin	<i>Turdus migratorius</i>	mourning dove	<i>Zenaida macroura</i>
barn swallow	<i>Hirundo rustica</i>	northern cardinal	<i>Cardinalis cardinalis</i>
black-capped chickadee	<i>Poecile atricapillus</i>	northern flicker	<i>Colaptes auratus</i>
blue jay	<i>Cyanocitta stelleri</i>	northern harrier	<i>Circus cyaneus</i>
blue-winged teal	<i>Anas discors</i>	northern mockingbird	<i>Mimus polyglottos</i>
bobolink	<i>Dolichonyx oryzivorus</i>	northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
brown-headed cowbird	<i>Molothrus ater</i>	osprey	<i>Pandion haliaetus</i>
Canada goose	<i>Branta canadensis</i>	redhead (duck)	<i>Aythya americana</i>
chipping sparrow	<i>Spizella passerina</i>	red-headed woodpecker	<i>Melanerpes erythrocephalus</i>
clay-colored sparrow	<i>Spizella pallida</i>	red-tailed hawk	<i>Buteo jamaicensis</i>
cliff swallow	<i>Petrochelidon pyrrhonota</i>	red-winged blackbird	<i>Agelaius phoeniceus</i>
common grackle	<i>Quiscalus quiscula</i>	ring-necked pheasant	<i>Phasianus colchicus</i>
common raven	<i>Corvus corax</i>	rock dove	<i>Columba livia</i>
common snipe	<i>Gallinago gallinago</i>	rough-legged hawk	<i>Buteo lagopus</i>
common yellowthroat	<i>Geothlypis trichas</i>	savannah sparrow	<i>Passerculus sandwichensis</i>
dickcissel	<i>Spiza americana</i>	sedge wren	<i>Cistothorus platensis</i>
double-crested cormorant	<i>Phalacrocorax auritus</i>	semipalmated plover	<i>Charadrius semipalmatus</i>
downy woodpecker	<i>Picoides pubescens</i>	short-billed dowitcher	<i>Limnodromus griseus</i>
eastern kingbird	<i>Tyrannus tyrannus</i>	song sparrow	<i>Melospiza melodia</i>
eastern phoebe	<i>Sayornis phoebe</i>	spotted sandpiper	<i>Actitis macularia</i>
eastern towhee	<i>Pipilo erythrophthalmus</i>	Swainson's hawk	<i>Buteo swainsoni</i>
European starling	<i>Sturnus vulgaris</i>	turkey vulture	<i>Cathartes aura</i>
gadwall	<i>Anas strepera</i>	upland sandpiper	<i>Bartramia longicauda</i>
grasshopper sparrow	<i>Ammodramus savannarum</i>	western kingbird	<i>Tyrannus verticalis</i>
great blue heron	<i>Ardea herodias</i>	western meadowlark	<i>Sturnella neglecta</i>
greater prairie-chicken	<i>Tympanuchus cupido</i>	wood duck	<i>Aix sponsa</i>
hooded merganser	<i>Lophodytes cucullatus</i>	yellow warbler	<i>Dendroica petechia</i>
horned lark	<i>Eremophila alpestris</i>	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>
house finch	<i>Carpodacus mexicanus</i>		

Species observed during qualitative observations only.

~ Species not protected under the jurisdiction of the MBTA.

* MDNR state-listed species of special concern.