EXHIBIT 14
2013 Spring Avian Survey Report

2013 Spring Avian Surveys

Courtenay Wind Farm
Stutsman County, North Dakota

Prepared for

GERONIMO ENERGY

Prepared by

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EXECUTIVE SUMMARY

Tetra Tech was contracted by Geronimo Energy (Geronimo) to undertake spring avian surveys for the proposed Courtenay Wind Farm project (Project) in Stutsman County, North Dakota. The Courtenay Wind Farm project area (Project Area) is approximately 24,200 acres and is located in the Northern Glaciated Plains ecoregion. A qualified field biologist conducted the surveys to identify potential avian impacts associated with building and operating the Project. The biologist performed weekly surveys at the Project Area from March 25 to June 12, 2013 at nine point count locations distributed throughout the Project Area.

A majority of the Project Area is agricultural and is utilized primarily for cultivated crops (corn and soybeans). The remaining land within the Project Area is made up of wetlands, developed areas (farmsteads), and grasslands. A mix of deciduous and coniferous trees planted for windbreaks surround most farmsteads within the Project Area. The topography in the vicinity of the Project is generally flat to gently rolling and the vegetation cover is uniformly low.

Weekly avian surveys were conducted during the spring migration period in 2013 at nine locations distributed throughout the Project Area. A total of 99 20-minute surveys were conducted from March 25, 2013 to June 12, 2013. No surveys were conducted during the week of April 15, 2013 due to poor weather conditions. During the study period, a total of 8,547 birds from 78 species (plus an additional 101 unidentified birds) were observed within the Project Area. Overall avian mean use at the observation points was 86.33 birds per 20-minute survey (birds/20 min).

The majority of the birds observed within the Project during the spring avian survey were primarily songbird, waterbird, and waterfowl species. The most commonly observed species (making up over 50 percent of the total birds observed) include Canada goose, red-winged blackbird, snow bunting, double-crested cormorant, and yellow-headed blackbird. With the exception of snow bunting, which was not observed flying within the rotor swept area (RSA), these species were observed flying within the RSA at varying rates. Based on high mean use of the Project Area and observed flight behavior, some turbine-related mortality of these species may occur. However, these species have low observed mortality at operating wind farms and population level impacts are not anticipated given these species' large, stable populations.

Raptor Species

Seven raptor species were observed within the Project Area during the avian surveys: bald eagle, Cooper's hawk, ferruginous hawk, northern goshawk, northern harrier, red-tailed hawk, and Swainson's hawk. Special consideration is often given to raptor species at wind farms because diurnal raptors are generally at higher risk for collision with turbines than are many other avian species. High raptor use has been associated with high raptor mortality at new generation wind farms. Conversely, raptor mortality appears to be low when raptor use is low. Based on mean use, the Project would be considered a low risk site for raptor mortality.

Listed and Sensitive Species

Four bald eagles were observed within the Project Area during the spring point count surveys, and one was observed flying within the RSA. The presence of bald eagles within the Project Area will require compliance with the Bald and Golden Eagle Protection Act (BGEPA). The very limited number of collision mortality records for bald eagles at other wind farms indicates that bald eagles will likely be at low risk of collision mortality at the Project Area (Manville 2005, Pearce 2010). Risk to bald eagles will be more formally evaluated in the context of the United States Fish and Wildlife Service (USFWS) Eagle Conservation Plan (ECP) Guidance.

The USFWS North Dakota Ecological Services Field Office has identified eleven Species of Habitat Fragmentation Concern for the state. Two Species of Habitat Fragmentation Concern were observed during the spring avian surveys: northern harrier and bobolink, which both exhibited relatively low mean use (0.04 birds/20 min and 0.25 birds/20 min, respectively) of the Project Area and did not exhibit high risk flight behavior.

At the state level, North Dakota does not have a list defined by statute for threatened or endangered species comparable to the ESA. North Dakota has instead identified 100 Species of Conservation Priority under the State Wildlife Action Plan. The following state-designated Species of Conservation Priority were observed during the spring avian surveys: American avocet, American white pelican, bald eagle, black tern, bobolink, canvasback, ferruginous hawk, Franklin's gull, northern harrier, northern pintail, redhead, Swainson's hawk, willet, and Wilson's phalarope. With the exception of Franklin's gull (4.23 birds/20 min) and American white pelican (1.16 birds/20 min), these species exhibited mean use less than 1.0 birds/20 min. Studies of waterfowl and waterbirds have found low fatalities rates even with high mean use.

Crane Surveys

In addition to general avian surveys, crane surveys were conducted weekly from March 26 through May 14, 2013 for two hours before sunset and for two hours after sunrise on consecutive days. No surveys were conducted during the week of April 15, 2013 due to poor weather conditions. No sandhill cranes or whooping cranes were observed within the Project Area during the crane surveys or incidentally outside of survey hours.

Raptor Nest Survey

The Project Area and a two-mile buffer were surveyed for raptor nests on March 26, 2013. One unoccupied stick nest was observed within the Project Area, and an additional unoccupied stick nest was observed within a two-mile buffer of the Project Area.

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1.0 INTRODUCTION

Research and monitoring completed to date has revealed the following impacts to avian species as a result of wind energy development: 1) direct impacts to habitat from the footprint of the facilities and infrastructure, 2) impacts through displacement through mechanisms not yet determined, and 3) direct mortality from turbine collision (Kuvlesky et al. 2007, Stewart et al. 2007, Johnson et al. 2002, Leddy et al. 1999). However, because potential avian impacts depend on a number of factors (project size, turbine models used, geographic location, etc.), assessment of risks to avian species on a project-by-project basis is important.

Geronimo Energy (Geronimo) is proposing to construct the Courtenay Wind Farm (Project) in Stutsman County, North Dakota. The Project is located approximately 15 miles north of the Jamestown, North Dakota in northeast Stutsman County and will consist of approximately 100 to 133 turbines. Geronimo is committed to environmental due diligence and contracted Tetra Tech to conduct spring avian surveys at the Project Area. The following report contains the results of the avian baseline study for the period March 25 to June 12, 2013. This baseline study provides data for characterizing the avian use at the Project during spring migration to quantify potential avian impacts associated with building and/or operating the proposed Project. Information and results from this baseline study will be used in the overall environmental impact assessment for the Project.

2.0 STUDY AREA

The Project Area is approximately 24,200 acres and is located in the Northern Glaciated Plains ecoregion (Figure 1), which is characterized by a flat to gently rolling landscape composed of glacial drift. Soil and weather conditions in this region promote a transition zone between short and tallgrass prairie species. High concentrations of seasonal and temporal wetlands are interspersed throughout the landscape. Grain farming is the major land use of this region (USGS 2013).

The Project Area is located within the Central Flyway, one of the main migratory bird routes. Most birds that move along the Central Flyway travel from Canada through the central states, eventually reaching the tropics of South America via the Gulf of Mexico (USFWS 2013). The Project area also lies within North American Bird Conservation Region (BCR) 11 (Prairie Potholes). According to the North American Bird Conservation Initiative (NABCI), this BCR is the most important waterfowl producing region on the North American continent despite extensive wetland drainage and tillage of native grasslands. The region comprises the core of the breeding range of most dabbling duck and several diving duck species and provides critical breeding and migration habitat for over 200 other birds (American Bird Conservancy 2013).

3.0 METHODS

Standardized protocols for pre-construction point counts have been established and were used in this study. Data collected from these counts are used to identify species or species groups that may be at risk from project development and may provide additional information for siting facilities to minimize impacts to birds. Results in this report are presented in terms of species groups, and highlight federal listed species and North Dakota Species of Conservation Priority.

Dawn and dusk crane surveys and raptor nest surveys were also conducted to understand how cranes and breeding raptors use the area.

3.1 Fixed-Point Surveys

The primary objective of the fixed-point surveys was to estimate use of the Project Area by raptors and other birds during spring migration. Point counts (circular plots) were conducted within the Project Area using standardized protocol (Appendix A). Tetra Tech distributed nine point count locations within the Project Area boundaries (Figure 2). Point count locations were chosen to provide a representative coverage of the habitat types present within the Project Area and were sited to give the greatest possible viewshed at each location.

3.1.1 Survey Design

Surveys at each point count location lasted for 20 minutes, during which time the biologist continuously scanned for birds and recorded any visual or auditory observations. The biologist collected data for all birds seen or heard within an 800-meter radius of each of the nine point count locations. Rangefinders and reference points were used to identify flight height and the distance of birds from each point count location. Data recorded during each survey included: date, start and end time of the observation period, species or best possible identification of species, number of individuals, behavior, distance from observer, flight height, flight direction, and weather (temperature, wind speed, wind direction, precipitation, and cloud cover). Tetra Tech selected survey dates to capture the spring migration period and the beginning of breeding season. Biologists conducted weekly surveys from March 25 to June 12, 2013. No surveys were conducted during the week of April 15, 2013 due to poor weather conditions.

The survey protocol used in this study is designed to collect data on all bird specimens and to provide results that are comparable with other studies of avian use at wind farms rather than to target specific taxa. The benefit of using this method is that it captures activity by a variety of bird species. The survey method used in this study encompasses all daylight hours and is therefore appropriate for the bird community using the Project Area.

Tetra Tech chose 20-min survey periods because they provide adequate time to detect both raptors and non-raptors. However, time periods of 20 min may lead to double-counting of songbirds (i.e., counting the same individual more than once) because individuals may appear and disappear from view. For example, if a horned lark is detected perched on a fence then disappears from view and, 6 minutes later, a horned lark is seen flying, these birds are recorded as separate observations because it is not possible to distinguish individuals. Double-counting of birds is not problematic for this type of survey because the objective is to document use in terms of number of birds noted per 20-min survey, not number of distinct individual birds.

Detectability varies among species and potentially not all individuals within the 800-m radius were counted. This variation in detectability results in an overestimate of mean use for conspicuous species and an underestimate of mean use for reclusive species (Thompson 2002). Birds not easily identifiable, such as those seen under low light conditions or small birds seen at a distance were identified to the lowest taxonomic level possible. Hence, unidentified birds are included in the results.

3.1.1 Analysis

Tetra Tech derived avian use (mean use) of the Project Area by calculating the average number of birds observed per 20-min survey at each point. To evaluate the diversity and composition of avian species using the Project, Tetra Tech first summarized the number of individuals (birds/20 min) and species. In addition, the number of observations is also presented, where an observation can be either an individual bird or a discrete flock of birds. This information helps evaluate whether high mean use is driven by a single event (e.g., a large flock of birds moving through the Project on migration). Because individual birds are not uniquely marked and identified, actual population size or abundance cannot be determined. One individual may be counted multiple times during a survey period or across survey periods. Therefore, avian mean use does not equate to abundance.

Flight behavior was evaluated by calculating the proportion of flying birds that were observed below, within, or above the turbine rotor swept area (RSA). The RSA is considered to be the height interval through which turbine blades are expected to pass. Geronimo is currently considering several turbine models with a variety of hub height options. For the purposes of estimating risk to avian species, Tetra Tech used an overly conservative RSA of 29. 5 meters to 130.0 meters above ground surface based on the lowest and highest possible rotor swept heights of the turbine models and hub heights being considered (GE 1.6-87, Gamesa G97, Goldwind GW-87, and Vestas V100 models). A bird was considered to have flown within the RSA if any of its recorded heights overlapped the RSA.

3.1.2 Crane Surveys

The purpose of the crane surveys was to determine if whooping cranes occur, or have the potential to occur, within the Project Area based on direct observation and available stopover habitat. Although the primary objective was to document occurrence of whooping cranes (*Grus americana*), observations of whooping cranes are rare events due to the small number of whooping cranes in the wild. In contrast, sandhill cranes (*Grus canadensis*) are numerous in the wild and utilize similar stopover habitat as whooping cranes. Therefore, a secondary objective of the survey was to identify use of the Project and surrounding areas by sandhill cranes to identify areas that may be suitable for whooping crane stopover.

The biologist conducted weekly crane surveys from approximately March 26 through May 14, 2013. No surveys were conducted during the week of April 15, 2013 due to poor weather conditions. The biologist conducted crane surveys for 2 hours before sunset and for 2 hours after sunrise on consecutive days to encompass potential movements to and from roosting areas. The biologist visited areas in and around the Project Area that could serve as potential crane habitat. After potential habitat was visited, the biologist then traveled through the rest of the Project Area looking for cranes in flight or on the ground. The field biologist collected data on all cranes observed and recorded the following data: number of individuals, time of observation, flight height aboveground, behavior, flight direction and habitat. The biologist estimated flight heights using existing structures, local transmission lines, and topographic maps for reference.

3.1.2 Raptor Nest Survey

A raptor nest survey was conducted to identify raptor nests within the Project Area and a two-mile buffer. The biologist conducted field reconnaissance of the Project Area and a two-mile buffer from the nearest public right-of-way using binoculars and a spotting scope. The field reconnaissance was conducted on March 26, 2013, before leaf out of deciduous trees to allow for visibility of nests. The biologist recorded the location of all potential raptor nests observed and took photographs of the nests. The biologist recorded species, activity status, nest height, nest condition, nest substrate and other relevant data for each nest.

4.0 RESULTS

4.1 Observed Habitat

The land cover of the Project Area was consistent with the land cover described for the ecoregion as a whole and was observed to consist of a mix of agricultural lands used for grain crops, wetlands, developed land (farmsteads), and small tracts of grasslands. A mix of deciduous and coniferous trees planted for windbreaks surround most farmsteads within the Project Area. The topography in the vicinity of the Project is generally flat to gently rolling and the vegetation cover is uniformly low. Photographs of the Project Area taken from the point count locations are included in Appendix D.

4.2 Avian Use of the Project Area

The nine point count locations were surveyed eleven times, resulting in a total of 99 20-minute surveys. During the study period, a total of 8,547 birds from 78 species (plus an additional 101 unidentified birds) were observed at the point count locations. Overall avian mean use at the observation points was 86.33 birds/20 min (Table 1). Of the species groups observed, songbirds exhibited the highest mean use (35.44 birds/20 min), and approximately 41 percent of the total birds observed were songbird species (Table 1). The songbird species with the highest mean use were red-winged blackbird (*Agelaius phoeniceus*) at 9.21 birds/20 min, snow bunting (*Plectrophenax nivalis*) at 8.08 birds/20 min, yellow-headed blackbird (*Xanthocephalus xanthocephalus*) at 6.58 birds/20 min, common grackle (*Quiscalus quiscula*) at 4.40 birds/20 min, brown-headed cowbird (*Molothrus ater*) at 1.44 birds/20 min, and horned lark (*Eremophila alpestris*) at 1.44 birds/20 min (Table 1). The remainder of the songbird species observed exhibited mean use less than 1 bird/min (Table 1).

Among waterbirds (the species group with the second highest mean use [26.03 birds/20 min]), the species with the highest mean use were double-crested cormorant (*Phalacrocorax auritus*) at 7.61 birds/20 min, ring-billed gull (*Larus delawarensis*) at 4.80 birds/20 min, American coot (*Fulica americana*) at 4.23 birds/20 min, and Franklin's gull (*Larus pipixcan*) at 4.23 birds/20 min (Table 1). The remainder of the waterbird species observed exhibited mean use less than 1 bird/min (Table 1).

Waterfowl exhibited the third highest mean use of the Project Area of any species group (23.93 birds/20 min). The waterfowl species with the highest mean use were Canada goose (*Branta canadensis*) at 12.38 birds/20 min, snow goose (*Chen caerulescens*) at 3.03 birds/20 min, mallard (*Anas platyrhynchos*) at 2.42 birds/20 min, lesser scaup (*Aythya affinis*) at 1.20 birds 20/min, American white pelican (*Pelecanus erythrorhynchos*) at 1.16 birds/20 min, blue-winged teal (*Anas discors*) at 1.08 birds/20 min, and northern shoveler (*Anas clypeata*) at 1.01 birds/20 min (Table 1). The remainder of the waterfowl species observed exhibited mean use less than 1 bird/min (Table 1).

Table 1. Avian species, by species grouping, observed during the Spring 2013 avian surveys

Species Grouping	Number of Birds	Number of Observations	Mean Use # birds per 20 min	Percent Composition # birds/grand total
Songbirds	**3,509**	**353**	**35.44**	**41.06%**
Red-winged blackbird	912	88	9.21	10.67%
Snow bunting	800	5	8.08	9.36%
Yellow-headed blackbird	651	60	6.58	7.62%
Common grackle	436	58	4.40	5.10%
Brown-headed cowbird	143	23	1.44	1.67%
Horned lark	143	26	1.44	1.67%
Barn swallow	78	17	0.79	0.91%
Dark-eyed junco	63	4	0.64	0.74%
Brewer's blackbird	51	5	0.52	0.60%
Lincoln's sparrow	50	1	0.51	0.59%
Bank swallow	40	9	0.40	0.47%
Tree swallow	29	5	0.29	0.34%
Bobolink*	25	4	0.25	0.29%
American robin	14	11	0.14	0.16%
Eastern kingbird	11	10	0.11	0.13%
Western meadowlark	10	3	0.10	0.12%
Fox sparrow	8	1	0.08	0.09%
Purple martin	8	6	0.08	0.09%
American goldfinch	7	6	0.07	0.08%
Chipping sparrow	7	1	0.07	0.08%
Cliff swallow	7	1	0.07	0.08%
Unidentified sparrow	7	2	0.07	0.08%
Field sparrow	3	2	0.03	0.04%
Northern rough-winged swallow	3	2	0.03	0.04%
Brown thrasher	1	1	0.01	0.01%
Eastern phoebe	1	1	0.01	0.01%
Vesper sparrow	1	1	0.01	0.01%
Waterbirds	**2,577**	**259**	**26.03**	**30.15**
Double-crested cormorant	753	14	7.61	8.81%
Ring-billed gull	475	47	4.80	5.56%
American coot	419	39	4.23	4.90%

Species Grouping	Number of Birds	Number of Observations	Mean Use # birds per 20 min	Percent Composition # birds/grand total
Franklin's gull	419	27	4.23	4.90%
Western grebe	113	13	1.14	1.32%
Killdeer	89	46	0.90	1.04%
Unidentified gull	71	9	0.72	0.83%
Black tern*	52	11	0.53	0.61%
Common tern	29	4	0.29	0.34%
Spotted sandpiper	23	3	0.23	0.27%
Unidentified sandpiper	23	1	0.23	0.27%
American avocet*	19	11	0.19	0.22%
Forster's tern	18	4	0.18	0.21%
Sanderling	17	1	0.17	0.20%
Willet	10	6	0.10	0.12%
Pied-billed grebe	9	7	0.09	0.11%
Cattle egret	7	1	0.07	0.08%
Bonaparte's gull	5	1	0.05	0.06%
Lesser sandpiper	5	1	0.05	0.06%
Black-crowned night-heron	4	4	0.04	0.05%
White-faced ibis	4	3	0.04	0.05%
Wilson's phalarope	4	1	0.04	0.05%
Lesser yellowlegs	3	1	0.03	0.04%
California gull	2	1	0.02	0.02%
Common snipe	2	1	0.02	0.02%
Eared grebe	1	1	0.01	0.01%
Great blue heron	1	1	0.01	0.01%
Waterfowl	**2,369**	**441**	**23.93**	**27.72%**
Canada goose	1,226	189	12.38	14.34%
Snow goose	300	1	3.03	3.51%
Mallard	240	78	2.42	2.81%
Lesser scaup	119	22	1.20	1.39%
American white pelican*	115	11	1.16	1.35%
Blue-winged teal	107	37	1.08	1.25%
Northern shoveler	100	36	1.01	1.17%
Northern pintail	53	24	0.54	0.62%
Redhead	29	12	0.29	0.34%

Species Grouping	Number of Birds	Number of Observations	Mean Use # birds per 20 min	Percent Composition # birds/grand total
Ruddy duck	27	11	0.27	0.32%
Canvasback	18	5	0.18	0.21%
Gadwall	15	8	0.15	0.18%
Ring-necked duck	11	3	0.11	0.13%
Bufflehead	4	2	0.04	0.05%
Common merganser	4	1	0.04	0.05%
Hooded merganser	1	1	0.01	0.01%
Pigeons/Doves	**33**	**15**	**0.33**	**0.39%**
Mourning dove	18	11	0.18	0.21%
Rock dove	15	4	0.15	0.18%
Crows and Allies	**30**	**8**	**0.30**	**0.35%**
American crow	30	8	0.30	0.35%
Raptors	**29**	**25**	**0.29**	**0.34%**
Red-tailed hawk	14	12	0.14	0.16%
Bald eagle*	4	4	0.04	0.05%
Northern harrier*	4	3	0.04	0.05%
Swainson's hawk*	3	2	0.03	0.04%
Cooper's hawk	2	2	0.02	0.02%
Ferruginous hawk*	1	1	0.01	0.01%
Northern goshawk	1	1	0.01	0.01%
Grand Total	**8,547**	**1,101**	**86.33**	**100%**

* North Dakota Species of Conservation Priority

4.2.1 Federal and State Listed Species

No federally endangered, threatened, or candidate species were observed during the spring avian surveys.

Four bald eagles (*Haliaeetus leucocephalus*) were observed within the Project Area during the spring point count surveys (Table 1). Although no longer protected under the Endangered Species Act (ESA), the bald eagle is still protected by the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA).

The United States Fish and Wildlife Service (USFWS) North Dakota Ecological Services Field Office has identified eleven Species of Habitat Fragmentation Concern for the state: Baird's sparrow (*Ammodramus bairdii*), bobolink (*Dolichonyx oryzivorus*), chestnut-collared longspur (*Calcarius ornatus*), grasshopper sparrow (*Ammodramus savannarum*), greater prairie-chicken (*Tympanuchus cupido*), greater sage-grouse (*Centrocercus urophasianus*), northern harrier (*Circus cyaneus*), sedge wren (*Cistothorus platensis*),

sharp-tailed grouse (*Tympanuchus phasianellus*), Sprague's pipit, and upland sandpiper (*Bartramia longicauda*) (USFWS 2012). Species of Habitat Fragmentation concern are defined as species of concern for which a relevant federal, state, tribal, and/or local agency has found that separation of their habitats into smaller blocks reduces connectivity such that the individuals in the remaining habitat segments may suffer from effects such as decreased survival, reproduction, distribution, or use of the area. The USFWS states that habitat fragmentation from a wind energy project may create significant barriers for such species (USFWS 2012). Two Species of Habitat Fragmentation Concern were observed during the spring avian surveys: northern harrier and bobolink, which both exhibited relatively low mean use (0.04 birds/20 min and 0.25 birds/20 min, respectively) of the Project Area (Table 1).

At the state level, North Dakota does not have a list defined by statute for threatened or endangered species comparable to the ESA. North Dakota has instead identified 100 Species of Conservation Priority under the North Dakota Comprehensive Wildlife Conservation Strategy. This list includes 45 avian species. The designation of Species of Conservation Priority describes a species identified as in decline at the national, regional, or state level, or a species whose population status is not well known, but is thought to be in decline in North Dakota. Species of Conservation Priority receive special attention from state agencies, but do not require take permits or have other regulatory implications (Hagen et al. 2005). The following state-designated Species of Conservation Priority were observed during the spring avian surveys: American avocet (*Recurvirostra americana*), American white pelican, bald eagle, black tern (*Chlidonias niger*), bobolink (*Dolichonyx oryzivorus*), canvasback (*Aythya valisineria*), ferruginous hawk (*Buteo regalis*), Franklin's gull, northern harrier, northern pintail (*Anas acuta*), redhead (*Aythya americana*), Swainson's hawk (*Buteo swainsoni*), willet (*Catotrophorus semipalmatus*), and Wilson's phalarope (*Phalaropus tricolor*). With the exception of Franklin's gull (4.23 birds/20 min) and American white pelican (1.16 birds/20 min), these species exhibited relatively low mean use of the Project Area (Table 1).

4.2.2 Raptors

Raptors are a group of special interest when considering impacts from wind energy development due to their propensity to fly at heights similar to turbine RSAs. Seven raptor species were observed within the Project Area during the avian surveys: bald eagle, Cooper 's hawk (*Accipiter cooperii*), ferruginous hawk, northern goshawk (*Accipiter gentilis*), northern harrier, red-tailed hawk (*Buteo jamaicensis)*, and Swainson's hawk. Overall mean use for raptors was 0.29 birds/20 min, and the raptor species with the highest mean use was red-tailed hawk (0.14 birds/20 min) (Table 1).

4.4 Flight Behavior

During spring avian use surveys, the biologist collected behavioral data for all avian species observed visually. Of the total number of birds observed, the biologist observed approximately 45 percent of birds exhibiting some form of flight behavior. Of the birds observed in flight, 56 percent were observed flying below RSA height, 38 percent were observed flying at RSA height, and six percent were observed flying above RSA height (Table 2).

Table 2. Avian Flight Height Characteristics in Relation to the RSA

Species Grouping	Total Number of Birds	No. Observed in Flight	Percent Flying Below RSA	Percent Flying within RSA	Percent Flying Above RSA
Songbirds	**3,509**	**1,390**	**92%**	**8%**	**0%**
Horned lark	143	76	51%	49%	0%
Yellow-headed blackbird	651	54	78%	22%	0%
Bank swallow	40	32	81%	19%	0%
Dark-eyed junco	63	63	84%	16%	0%
Red-winged blackbird	912	242	84%	16%	0%
Barn swallow	78	75	89%	11%	0%
American goldfinch	7	3	100%	0%	0%
American robin	14	1	100%	0%	0%
Bobolink*	25	13	100%	0%	0%
Brewers blackbird	51	23	100%	0%	0%
Brown-headed cowbird	143	64	100%	0%	0%
Common grackle	436	152	100%	0%	0%
Field sparrow	3	2	100%	0%	0%
Purple martin	8	5	100%	0%	0%
Snow bunting	800	550	100%	0%	0%
Tree swallow	29	21	100%	0%	0%
Unidentified sparrow	7	6	100%	0%	0%
Western meadowlark	10	8	100%	0%	0%
Waterbirds	**2,557**	**625**	**92%**	**48%**	**0%**
Great blue heron	1	1	0%	100%	0%
Cattle egret	7	7	0%	100%	0%
American coot	419	30	0%	100%	0%
Double-crested cormorant	753	38	5%	95%	0%
Forster's tern	18	18	17%	83%	0%
Black tern*	52	50	42%	58%	0%
Ring-billed gull	475	166	45%	55%	0%
Common tern	29	25	52%	48%	0%
Franklin's gull*	419	164	63%	35%	2%
Black-crowned night-heron	4	3	67%	33%	0%
Unidentified gull	71	70	77%	23%	0%
Killdeer	89	47	94%	6%	0%
American avocet*	19	2	100%	0%	0%

Species Grouping	Total Number of Birds	No. Observed in Flight	Percent Flying Below RSA	Percent Flying within RSA	Percent Flying Above RSA
Common snipe	2	2	100%	0%	0%
Willet*	10	2	100%	0%	0%
Waterfowl	**2,369**	**1,141**	**15%**	**69%**	**16%**
Snow goose	300	300	0%	100%	0%
Canada goose	1,226	595	12%	67%	21%
Gadwall	15	3	33%	67%	0%
Northern pintail*	53	13	46%	54%	0%
Mallard	240	111	49%	51%	0%
American white pelican*	115	71	0%	20%	80%
Northern shoveler	100	7	86%	14%	0%
Redhead*	29	7	86%	14%	0%
Blue-winged teal	107	24	100%	0%	0%
Bufflehead	4	2	100%	0%	0%
Lesser scaup	119	8	100%	0%	0%
Pigeons/Doves	**33**	**21**	**90%**	**10%**	**0%**
Mourning Dove	18	9	78%	22%	0%
Rock dove	15	12	100%	0%	0%
Crows and Allies	**30**	**26**	**4%**	**96%**	**0%**
American Crow	30	26	4%	96%	0%
Raptors	**29**	**23**	**43%**	**52%**	4%
Ferruginous hawk*	1	1	0%	100%	0%
Red-tailed hawk	14	12	42%	58%	0%
Cooper's hawk	2	2	50%	50%	0%
Northern harrier*	4	4	50%	50%	0%
Bald eagle*	4	3	33%	33%	33%
Northern goshawk	1	1	100%	0%	0%
Grand Total	**8,547**	**3,226**	**56%**	**38%**	**6%**

Notes
[1] Only birds observed in flight were included in Table 2.

* North Dakota Species of Conservation Priority

4.3 Crane Surveys

No visual or auditory observations of sandhill cranes or whooping cranes were made during the spring 2013 crane surveys.

4.4 Raptor Nest Survey

One unoccupied stick nest was observed within the Project Area during the raptor nest survey. The nest was approximately three to four feet in diameter. The nest appeared to be in usable condition; however, no raptors or other birds were observed to be using the nest either during the raptor nest survey or spring avian point count surveys. One additional unoccupied stick nest was observed within a two-mile buffer of the Project Area. This nest was observed to be approximately two to three feet in diameter and appeared to be in usable condition.

5.0 DISCUSSION AND CONCLUSIONS

5.1 Risk to Non-raptor Species

The prairie region of the northern Great Plains is one of the most important areas for duck reproduction in North America (Samson et al. 1998, Jones-Farrand et al. 2007). This region is also a major migration corridor during fall and spring for ducks, geese, shorebirds, and other waterbirds (Skagen and Knopf 1994, Samson et al. 1998, Jones-Farrand et al. 2007). A large number of wetlands providing migratory stopover habitat are present within the Project Area. Accordingly, waterbirds and waterfowl exhibited high mean use of the Project Area relative to all other species groups observed with the exception of songbirds, and approximately 57 percent of the total birds observed were either waterbird or waterfowl species. Studies of these taxa found low fatality rates even with high mean use (Erickson et al. 2002, Kerns and Kerlinger 2004, Jain 2005). Further, studies have demonstrated that waterfowl avoid wind energy projects during migration (Masden et al. 2009). This discrepancy may occur because these species often fly within flocks during daylight hours, which increases their ability to detect the turbines. Based on a review of mean use and estimated fatality rates of goose species at operating wind facilities, a collision model was created that estimated the average turbine collision avoidance rate for geese (Canada and snow geese) was high (99.93 percent; Fernley et al. 2006). Additionally, the most commonly observed waterfowl and waterbird species (Canada goose, snow goose, and mallard; and double-crested cormorant, ring-billed gull, and American coot, respectively) have stable to increasing populations, largely due to their adaptability to changing habitats and human disturbance (Drilling et al. 2002; Hatch and Weseloh 1999; Mowbray et al. 2000; Mowbray et al. 2002; Rich et al. 2004; Sauer et al. 2008). Given their wide-spread status, high numbers, and stable to increasing populations, population-level impacts are unlikely as a result of any turbine-related mortality that may occur.

Songbirds exhibited the highest mean use of the Project Area. Red-winged blackbird, snow bunting, yellow-headed blackbird, and common grackle were the most commonly observed songbird species. Given the high mean use of the Project Area by these four species, turbine-related fatalities may occur. However, any fatalities that do occur are unlikely to have population-level impacts due to the species large, stable populations (Lyon and Montgomerie 1995; Rich et al. 2004; Sauer et al. 2008; Twedt 1995).

5.2 Risk to Raptor Species

Special consideration is often given to raptor species at wind farms because diurnal raptors are generally at higher risk for collision with turbines than are many other avian species (National Wind Coordinating Collaborative [NWCC], 2010). High raptor use has been associated with high raptor mortality at new generation wind farms (Erickson 2007). Conversely, raptor mortality appears to be low when raptor use is low, as defined by Erickson (2007) as less than 1.0 birds/20 min. Based on mean use, the Project would be considered a low risk site for raptor mortality with a group mean use of 0.29 birds/20 min.

5.3 Risk to Listed and Sensitive Species

The biologist did not detect any species listed as candidate, threatened, or endangered under the ESA during the spring avian point count surveys or the spring crane surveys.

Four bald eagles were observed within the Project Area during the spring point count surveys, and one was observed flying within the RSA. The presence of bald eagles within the Project Area will require compliance with the BGEPA. The very limited number of collision mortality records for bald eagles at other wind farms indicates that bald eagles will likely be at low risk of collision mortality at the Project Area (Manville 2005, Pearce 2010). Risk to bald eagles will be more formally evaluated in the context of the USFWS Eagle Conservation Plan (ECP) Guidance.

The USFWS North Dakota Ecological Services Field Office has identified eleven Species of Habitat Fragmentation Concern for the state (USFWS 2012). Two Species of Habitat Fragmentation Concern were observed during the spring avian surveys: northern harrier and bobolink, which both exhibited relatively low mean use (0.04 birds/20 min and 0.25 birds/20 min, respectively) of the Project Area and did not exhibit high risk flight behavior. The surveys were not designed to evaluate breeding locations; therefore, it is unknown if the species were breeding in the area and would be affected by project development.

At the state level, North Dakota does not have a list defined by statute for threatened or endangered species comparable to the ESA. North Dakota has instead identified 100 Species of Conservation Priority under the State Wildlife Action Plan. The following state-designated Species of Conservation Priority were observed during the spring avian surveys: American avocet, American white pelican, bald eagle, black tern, bobolink, canvasback, ferruginous hawk, Franklin's gull, northern harrier, northern pintail, redhead, Swainson's hawk, willet, and Wilson's phalarope. With the exception of Franklin's gull (4.23 birds/20 min) and American white pelican (1.16 birds/20 min), these species exhibited relatively low mean use of the Project Area. As stated above, studies of waterfowl and waterbirds have found low fatalities rates even with high mean use (Erickson et al. 2002, Kerns and Kerlinger 2004, Jain 2005).

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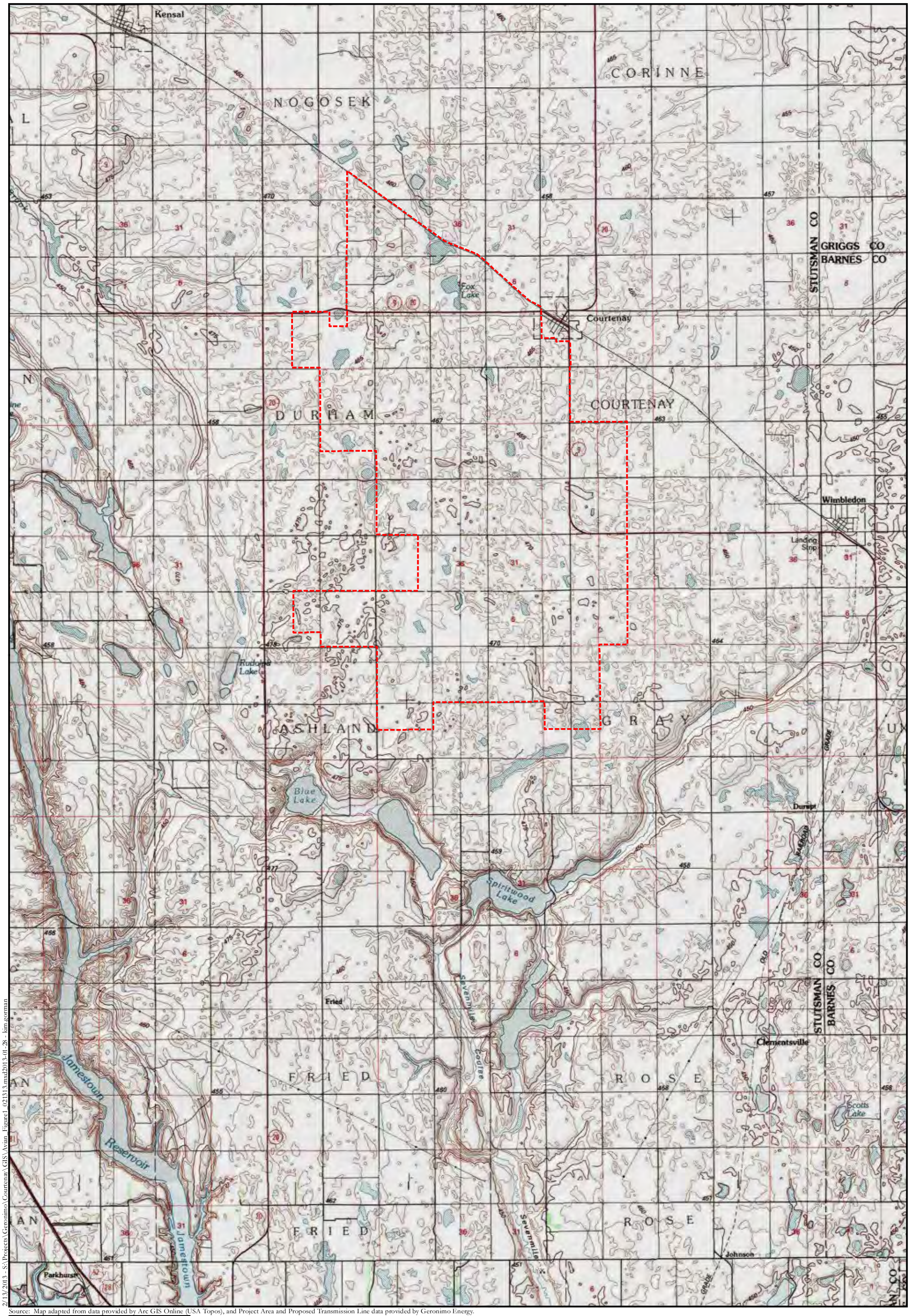
APPENDIX A
Figures



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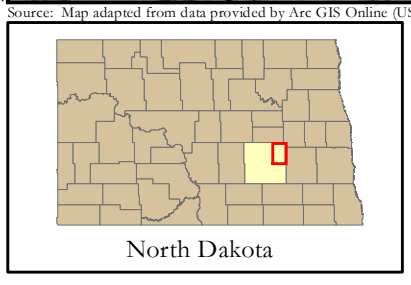
Source: Map adapted from data provided by Arc GIS Online (USA Topos), and Project Area and Proposed Transmission Line data provided by Geronimo Energy.



Project Area

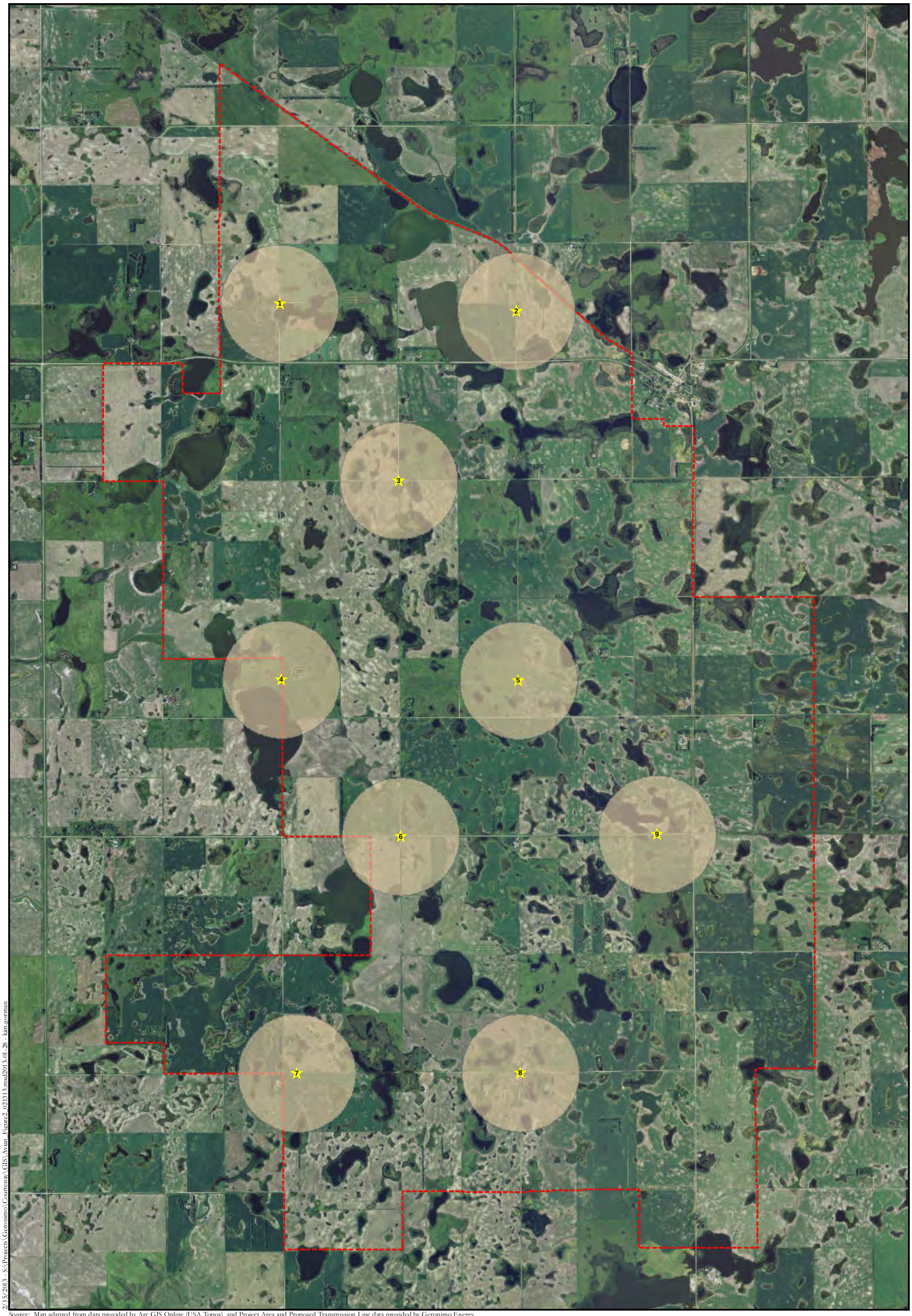
0 1 2 3 Miles

N

Figure 1 - Project Area Vicinity
Courtenay Wind Farm Project
Stutsman County, North Dakota

COURTENAY WIND FARM
Stutsman County, ND

TETRA TECH



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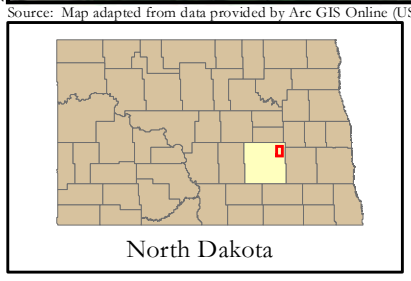

Point Count Location

800-meter Radius of Point Count Location

Project Area

0 0.5 1 1.5 Miles N

Figure 2 - Project Area and Point Count Locations
Courtenay Wind Farm Project
Stutsman County, North Dakota

COURTENAY WIND FARM
Stutsman County, ND

TETRA TECH

APPENDIX B
Avian Survey Protocol

Point Count Survey Protocol

1.0 Methods

The methodology employed here is a wind industry standard avian point count survey designed to determine the overall avian use of the area. To this end, 20-minute (min) point counts within an 800-meter (m) radius over the course of 1-2 days (depending on number of points) are utilized.

1.1. Prior to Conducting Surveys

Land Owner Contact
In many cases, projects will have a lease agent which will provide you with information. If you are asked to contact landowners directly, ask the following:

- Are there any locked gates? If so, what is the combination?
- Are there any places that I should not go?
- Are there hunters on the property?
- Are there any time restrictions as to when I can be on the property?
- Is there anything else that I should know (e.g., road conditions, fences, cattle, lambing season)?

Equipment List

- Binoculars
- Watch that displays in 24-hour time
- GPS unit
- Compass
- Field map with turbine strings if available
- Field notebook
- Digital camera
- Pens/Pencils
- Flagging tape
- Clip board (preferably with weather protection)
- Bird book
- Range finder that registers both horizontal and vertical (for example, OPTi-LOGIC 1000 LH Rangefinder Hypsometer)
- Anemometer (Kph)
- Thermometer
- Data sheets (point count, incidental, point count schedule, distance/height calibration worksheet)
- List of 4-letter species codes/List of unknown bird codes

1.2. Conducting Surveys

- Key Points
- Your safety is the highest priority. If there is a situation that feels unsafe (e.g., lightning storm, confrontational person, washed-out road), do not survey that point and remove yourself to a safe location.

- Documenting bird use of the area is the goal of the point count survey. Thus, the priority is to identify “Species”, “Number of individuals” and “Activity.” Individual birds’ characteristics are secondary.
- Surveys are meant to capture avian use throughout the day and, therefore, are conducted during all weather (except when visibility is reduced (see section 1.2.2) or the situation is unsafe) and during all daylight hours. Keep track of when during the day points are surveyed using the Time Tracker Data Table.
- For any weekly survey all points must be surveyed within 7 days and there shall be no less than 4 days from the date of the last survey to the beginning of next survey week.
- Legible handwriting is key; please make every effort to write legibly, preferably using a dark pencil or waterproof pen.
- If you observe any federal or state-listed Threatened & Endangered species, take detailed notes of observations on the appropriate data sheet.

1.2.1. Point Count Datasheets

All fields

- All blanks on the datasheet should be filled in. If you are unable to determine a value (e.g., sex or age) then draw a dash in the box so that it is clear that the information was not available and not that the observer forgot to write it down. You must check the data sheet for errors and omitted information from top to bottom following the survey before moving on to the next point location.

Point data (top of the datasheet):

Date:

- Date survey was conducted.

Observer:

- Initials of the surveyor of record.
- NOTE: If there are two people at a point, one person is the official observer and the other person should act only as the recorder.

Start time and End time:

- Time survey begins and ends. If at any time during the survey period you are interrupted for less than 1 minute you may suspend the survey and continue when the interruption has ended. Record the time that the interruption occurred and the time it ended. However, if an interruption lasts more than 1 minute you will need to stop the survey and restart the 20- (or 30-) min survey clock. The data you collected prior to the interruption are no longer valid.

Visibility:

- Distance in meters you are able to see.
- If you are able to see the entire 800-m circle during your survey, mark “Clear”
- If you did not mark “Clear”:
    - As overall visibility may change within a survey period, we ask you to record both the minimum (Min) and maximum (Max) visibility you had during the survey period.

- Example: If you can see 1000m to the north, but only 200m to the south , write “Min: 200m and Max: 1000m”.
- Example: If you can see 400m in the beginning of the survey and 700m by the end write “Min:400m and Max: 700m”.

- If at any time you are unable to see less than 50% of the 800-m radius circle and/or the cloud ceiling drops below 100m, you either need to postpone or stop the survey. When you are able to see at least 50% of the circle and the cloud ceiling is higher than 100m you may resume the survey. However, if the break was greater than 1min you will need to start the survey over again. The data you collected prior to the reduction in visibility are no longer valid.

Wind Direction:

- Record the direction the wind is originating from (not the direction it is traveling).

Wind Speed (km/h):

- Record the range of wind speeds that occur during the survey period. Fill in both a minimum and maximum wind speed. All wind speed data must be recorded in kilometers per hour (km/h).

Precipitation:

- Circle the appropriate precipitation. If “other” please define in the Notes section.
  - Do not conduct survey if the precipitation limits your visibility to less than 50% of the 800-m circle.

Temp (oF):

- Temperature during survey period. Please record all temperatures in degrees Fahrenheit.

Cloud Cover (%):

- Record the percentage of clouds covering the 800-m circle.
  - Do not conduct survey if the cloud cover is 100% and the cloud ceiling is lower than 150 m.

Observation data(bottom section of datasheet): Species codes:

- A state-specific species list with the codes we use will be provided to you at the beginning of the field season. We use the 4-letter codes from Pyle’s Identification guide to North American Birds”. Most of these codes are the same as BBL codes; however, there are some differences. Please check your codes the first time out to ensure that you use the correct code.
- If you are unable to identify the species, a separate list for unknown birds is provided.
- If you are unsure of the species code, write the full name of the bird you saw in the Notes section and fill in the appropriate code when you are able to check the code list sent you.
- If a mixed species flock is observed, please note the observation by recording each species on a separate line and estimating the number of individuals for each species. You should write in the notes column that the species was part of a mixed species flock (see example datasheet).
- For unidentified species please write out any additional information that might refine the possibilities in the notes column. For example, if you record UNSW, in the Notes

column, you might write “tree swallow or violet-green swallow.”

Time:

- Time is the time you first saw the bird.
- Time is recorded using a 24-hour clock (to avoid am/pm time confusion).

Sex:

- Field should be filled in as male (M), female (F), or both (B).
- If you know the number of males and females, write in the Notes.
- If unknown, draw a line through the box.

Age:

- Field should be filled in as adult (A) or juvenile (J) or both (B).
- If you know the number of adults and/or juveniles, write in the notes column.
- If unknown, draw a line through the box.

Number of individuals:

- Always fill in this field, even in “auditory-only” detections.
- Estimate this number when uncertain.
- Estimates are most accurate at time of observation and do not need any numerical symbols (e.g., ~ or ±) to accompany them.

Activity:

- Circle the first activity observed.
- Put a check mark over the second activity.
  - Walking: bird was on the ground (height is 0).
  - Perching: bird was perched above ground (e.g., tree, fence).
  - Flying: bird was in the air.
  - Other: only select if the activity could not be categorized as an activity listed (e.g., swimming). Please explain any “OT” selection in the Notes..
    - e.g., “mobbing” is a flying activity so select “FL” and write in Notes “mobbing”).
- Additional, relevant behavioral information should be included in Notes.

Height data:

- Use a range finder to measure reference heights within the point count circle.
  - When driving by tall structures not on point counts (e.g., telephone poles, met towers, barns) use the range finder to test your ability to estimate heights.
- Two heights are recorded: lowest and highest.
- Heights should be filled in for all birds observed.
- If a bird’s height does not change while observed (e.g., a perched bird), simply write the same height in each column.
- Heights should be recorded in meters (m).
- If you cannot see a bird and, therefore, cannot estimate its height, draw lines through the blanks.

Flight direction:

- This applies only to birds that do not land within the 800-m circle.
  - Example: If you see a flock of sandhill cranes flying through or above the count circle.
  - Example: You see a TUVU circle soaring and moving with thermals.
- If a bird is making localized flight movements (e.g., tree to tree) or if a bird is not flying, simply put a line through this space on the data sheet.
  - Example: If a robin changed perches by flying from one tree to another.
  - Example: A flock of blackbirds gets flushed by a passing car and settles nearby.
- Flight direction is the direction to which the bird is flying.
  - If the bird is flying from the north to the south, then the flight direction would be south.
  - The overall directionality of a circle soaring bird should be filled out (as opposed to recording "variable").

Horizontal distance:

- This is a key piece of information!
- Distance is recorded as first distance and closest distance.
- If first and closest distance are the same, use ditto marks (") in the blank.
- Record all distances in meters (m).
- Use a rangefinder and topographic map to identify the distances of distinctive features in the landscape to help with distance estimation.

Habitat types:

- Circle the primary habitat type in which birds were seen.
- Check second habitat type in which birds where seen.
- Other: only select if the habitat could not be categorized as a habitat listed (e.g., agriculture). Please explain any "OT" selection in the Notes.
- NOTE: Habitat types and codes should be identified prior to first survey. Use Habitat Codes Table for code selection. Point count description sheets should be filled out and sent in to Tetra Tech office with first survey.

Aud?/Vis? Columns:

- Check the auditory box if the bird(s) were heard.
- Check the visual box if the bird(s) was seen.
- Check both if the bird(s) was seen and heard.

Notes:

- Use the Notes column for any additional details you consider important.
- This may include, but is not limited to:
  - Behavior of the bird (e.g., male displaying to female).
  - Location of the bird (e.g., kestrel sitting on wire).
  - Taxonomic grouping of bird if species is unknown (e.g., *Buteo*).
  - If species is unknown, any characters you observed or hunches about what it was (e.g., light head, dark body, song a descending trill; or likely a HOLA or LALO).
  - Full species name, if uncertain about 4-letter code (e.g., ring-necked pheasant, unknown *Buteo*).

Additional Notes:

- Use this section at the bottom of the page for any notes that relate to the survey in general (e.g., “Snowing on and off”).
- Additionally, use this section if you run out of room in the notes column for a specific observation. If you use it for this reason, write the observation number in the Obs #/Time column.

1.2.2. Pausing and/or Halting a Point Count

There may be times while conducting your point count surveys that you will need to pause or halt a point count survey(s). Some example circumstances are:

- Weather/Visibility
  - If you are unable to see at least 50% of the point count circle and/or the cloud ceiling has dropped below 100m.
  - If you are unable to reach a point due to road conditions.
- Interruptions
  - If someone approaches you to speak to you while you are conducting a survey and the interruption last more than 1 min.
  - Some activity (e.g., equipment moving through the area, field within the circle is being actively plowed) interferes with your ability to conduct the survey.
  - You get a flat tire and are unable to delay getting help until after you have finished your surveys.

Depending on the particular circumstances there are several options as to how to proceed:

- If the situation is temporary (e.g., fog rapidly moving through the area), then either wait for the situation to clear or proceed surveying other unaffected points and return to the affected point(s). Note: If you already started to survey a point and the interruption lasts more than 1 minute, you must restart the 20- (or 30-) min survey clock. The data you collected prior to the interruption are no longer valid.
- If this situation is likely to persist for the weekly survey (the number of days it typically takes you to completely survey all points) simply send a blank datasheet(s) for this point(s) with the other data you collected with an explanation written in the Notes as to why you skipped the point(s).

1.2.3. Examples of Common Problems during Surveys and What to do

Someone stops and talks to you during a survey

- If survey is stopped for greater than 1 minute, the survey must start over. The data collected prior to the interruption are no longer valid.
- Talk to the person. Be polite, respectful and discrete. Remember that wind farms can be controversial and the all information you have, including survey data, is confidential.
- Tell the person, “I am in the middle of a bird survey right now and I have five minutes left. I can talk to you when I am finished if you would like to wait?”
- Record in your notes the name the person you spoke with.
- Refer the person to the development company’s (client) contact.
- As maps contain confidential information, keep them out of view.

You are unsure if you have counted a bird

- Try to keep track of each bird.
- If you lose track, assume they are new individuals.
- Each unique bird should only have one line of data; therefore, if the activity/behaviors or habitat use changes during the survey, check or add in the appropriate information on the original line of data. Do not create a new line for this existing bird.
- QUICK TIP: To help keep track of birds, in the Notes box write the direction the bird was observed in.
    - Example: You have 1 singing male 200 m away to the north and 2 singing males 30 m away to the south. In 15 minutes when you hear a singing male 100 m away to the northeast, you can assume it is a new male.

You are unsure how many individuals are present

- The "number of individuals" field always MUST be filled in.
- Exact numbers are better, but if exact numbers are not possible, make a reasonable estimate.
- Using orders of magnitude (e.g., 1, 10, 50, 100) is an appropriate tool for estimating. Remember, without a number, we cannot count a record.
- "At least 1" is acceptable.
- QUICK TIP: To estimate large flocks of birds, count a group of birds (e.g., 50 individuals) and get an idea of what a group of 50 looks like. Then begin counting in groups of 50.
- QUICK TIP: To estimate singing males when there is an abundance of singing occurring, imagine dividing the circle into a pie. Concentrate on listening to one slice of that pie or one quadrant. Estimate the number of males in that quadrant only and put those male as one line item on the data sheet (noting the direction you were listening in the Comments box, so you don't lose track). Then continue in the next quadrant until you have covered the entire circle.

You are unsure of the species

- Record the species to the most specific taxonomic level possible (e.g., unidentified warbler is more specific than unidentified passerine, unidentified *Buteo* is more specific than unidentified hawk).
- Examples of possible choices, from broadest to most specific:
    - Unknown hawk
    - Unknown *Buteo*
    - Red-tailed hawk
- Check the species list to look for the appropriate unknown code.
- If an appropriate code is not listed, leave the code blank and put your species determination in the Notes field.

How do you record a perching bird?

- Perched birds should be recorded at the height they are perched.
    - Example: a bird is perched on a fence post at 1.5 m height. It flies to 4 m and lands on the ground.
        - First behavior = perching (circled)
        - Second behavior = flying (checked)
        - Third behavior = walking (checked)

        - Low height = 0 m (landed on the ground)
        - High height = 4 m
    - Example: a bird is perched on a fence post at 1.5 m height. It flies to 4 m and returns to the same fence post.
        - First behavior = perching (circled)
        - Second behavior = flying (checked)
        - Low height = 1.5 m
        - High height = 4 m

How do you record flight heights over variable topography?

- Record the height above the ground over which the bird is directly located.
- No negative height values should be recorded.

The weather changes during the survey

- If the change is dramatic then note the time and continue the survey unless the situation is dangerous or visibility is obscured in greater than 50% of the survey circle.
- If the situation is dangerous, 50% of the 800-m circle is obscured, or there is 100% cloud cover with a cloud ceiling of less than 100 m, cancel survey and return later.

Common problems with data we receive from field biologists

- Number of individuals is missing.
- Species codes are incorrect.
- Species are missing.
- Low height is higher than the maximum height observed.
- Activity or habitat is “Other”, but is not explained in the Notes.
- Activity or habitat has been left blank.

1.2.4. Incidental Observation Datasheets

Not all birds need to be recorded! Only record observations of state or federal threatened and endangered species, novel species not seen during point counts, raptors or other large birds, grouse species, common birds behaving in a way that puts them at higher risk of being affected by a turbine or large flocks (25+ individuals). Do not record unidentified birds!

- Record birds viewed outside of survey time, outside of 800-m radius of survey circle and those seen while traveling between points.
    - These observations should be made in transit. Do not stop to go birding.
- If you see a threatened or endangered species, provide detailed notes on the data sheet.
- You may also include observations of non-bird species that are of particular interest (e.g., the observation of a carcass near a point as it may draw in birds). We do not have 4-letter codes for non-bird species so if a non-bird observation is important, write the species in the Notes column and record all pertinent info.
- Familiarize yourself with general habitats outside the project area, and think about how they may be affecting the bird activity within the site (e.g., large reservoir within a mile of the site likely drawing in the water fowl flocks you are seeing). Include any information such as this you deem helpful in understanding the big picture of the site on incidental forms.

1.2.5. Time Tracker Data Table

To ensure that all points are being visited at different times of the day and that all daylight hours are being covered, record the hour in which each point was visited in the Time Tracker data table. Include this table with your last data set for the survey season.

- Record the survey date above the appropriate survey number.
- Sunrise and sunset times can be found on-line (http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html). Obtain before going into the field.
- At the time the point is surveyed, write the HOUR in the given cell. If the survey covers two hours, then write the hour that is in the majority.
  - Example: If you start the survey at 6:10am, write 6.
  - Example: If you start the survey at 2:30pm, write 14.
  - Example: If you start the survey at 2:55pm, write 15.
- All points should be visited in the first hour after sunrise at least once during the season.
- Surveys can begin approximately 15 minutes before sunrise, depending on weather and lighting conditions.
- IMPORTANT: If you are driving to the field in the morning and it is already light, you are starting surveys too late!
- IMPORTANT: If unforeseen events prevent a survey from being conducted at the normal scheduled time, two consecutive surveys must be at least 4 days apart.
  - Example: Snow prevented you to go to the field on week 1. Therefore you needed to do survey 1 on week 2. Then survey 2 must not occur until 4 days have elapsed. Survey 2 can be conducted on the 5th day.

1.2.6 Quality Assurance/Quality Control (QA/QC)

In order to produce the highest quality data Tetra Tech asks surveyors to carefully adhere to the following QA/QC standards.

- Data should **NEVER** be transcribed from one datasheet to another or from a notebook to a datasheet. We recognize the nature of fieldwork and expect sheets with cross outs, dirt. etc. If for some unavoidable reason you transcribed data, you **MUST** send both the datasheet you transcribed the data to and the original sheet the data were originally collected on (even if it is a napkin)!
- DO NOT ERASE DATA ON DATASHEETS-If you make an error simply put a line through it.
- Check your data sheets at the end of each point before moving on to the next point in order to catch any missing information while you still remember what happened.
- If data are unavailable, then please place a dash the appropriate space on the datasheet so that it is clear that this piece of data was not forgotten during the data collection.
- Each week prior to surveys, calibrate yourself for height measurements using your range finder to determine accuracy. Because we use height data to determine bird activity within the rotor swept area, it is imperative that height information is accurate. Whenever possible, determine the height of known objects within the point count circle for reference and familiarize yourself with these heights each time that point is surveyed. Additionally, practice on objects outside of the point count circle to verify

your accuracy.

Note: Do not be surprised if you get an email from the person entering the data from your project asking for data clarifications.

APPENDIX C
Sample Avian Survey Data Sheet

Courtenay Wind Project
Stutsman County, ND

Avian Fixed Point Observation Data Sheet

Date (mmddyy) _____ Observer (init.) _____ Start Time _____ End Time _____ Obs Pt.

Visibility: Clear or Min _____ Max_____ (m) Page ____ of _____

Wind Direction from (circle one): Calm N NE E SE S SW W NW Variable **Speed**: Low____ High _____ (km/h)

Precipitation (circle one): none light rain rain snow sleet hail fog other **Temp:** _____ (ºF) **Cloud Cover**: _____%

Obs #	Species Code	Time	Sex	Age	# of ind.	Activity (circle 1st, X others)		Height (m) Low	Height (m) High	Flight Dir (to)	Horizontal Distance (m) 1st	Horizontal Distance (m) closest	Habitat Type (circle 1st, X others)			Aud?	Vis?	Notes
1						WA	PE											
						FL	OT											
2						WA	PE											
						FL	OT											
3						WA	PE											
						FL	OT											
4						WA	PE											
						FL	OT											
5						WA	PE											
						FL	OT											
6						WA	PE											
						FL	OT											
7						WA	PE											
						FL	OT											
8						WA	PE											
						FL	OT											
9						WA	PE											
						FL	OT											
10						WA	PE											
						FL	OT											
11						WA	PE											
						FL	OT											
12						WA	PE											
						FL	OT											
13						WA	PE											
						FL	OT											
14						WA	PE											
						FL	OT											
15						WA	PE											
						FL	OT											
16						WA	PE											
						FL	OT											
17						WA	PE											
						FL	OT											
18						WA	PE											
						FL	OT											

Activity Codes: WA-walking on ground, PE-perched above ground, FL-flying, OT-other (please specify)
Habitat Codes:

OBS. # (Time)	ADDITIONAL NOTES

APPENDIX D
Representative Photographs

Photograph 1: A view from point count location 1 to the north.

Photograph 2: A view from point count location 1 to the east.

Photograph 3: A view from point count location 1 to the south.

Photograph 4: A view from point count location 1 to the west.

Photograph 5: A view from point count location 2 to the north.

Photograph 6: A view from point count location 2 to the east.

Photograph 7: A view from point count location 2 to the south.

Photograph 8: A view from point count location 2 to the west.

Photograph 9: A view from point count location 3 to the north.

Photograph 10: A view from point count location 3 to the east.

Photograph 11: A view from point count location 3 to the south.

Photograph 12: A view from point count location 3 to the west.

Photograph 13: A view from point count location 4 to the north.

Photograph 14: A view from point count location 4 to the east.

Photograph 15: A view from point count location 4 to the south.

Photograph 16: A view from point count location 4 to the west.

Photograph 17: A view from point count location 5 to the north.

Photograph 18: A view from point count location 5 to the east.

Photograph 19: A view from point count location 5 to the south.

Photograph 20: A view from point count location 5 to the west.

Photograph 21: A view from point count location 6 to the north.

Photograph 22: A view from point count location 6 to the east.

Photograph 23: A view from point count location 6 to the south.

Photograph 24: A view from point count location 6 to the west.

Photograph 25: A view from point count location 7 to the north.

Photograph 26: A view from point count location 7 to the east.

Photograph 27: A view from point count location 7 to the south.

Photograph 28: A view from point count location 7 to the west.

Photograph 29: A view from point count location 8 to the north.

Photograph 30: A view from point count location 8 to the east.

Photograph 31: A view from point count location 8 to the south.

Photograph 32: A view from point count location 8 to the west.

Photograph 33: A view from point count location 9 to the north.

Photograph 34: A view from point count location 9 to the east.

Photograph 35: A view from point count location 9 to the south.

Photograph 36: A view from point count location 9 to the west.