

Ms. Julie Fedorchak
Public Service Commissioner

Mr. Brian Kroshus
Public Service Commissioner

Mr. Randy Christmann
Public Service Commissioner

Re: Proposed Northern Divide Wind, LLC

Dear Commissioners:

We, Coteau Preservation Alliance, are presenting information to Public Service Commission by email when written public testimony will be accepted, April 17, 2020 through April 27, 2020 regarding the Northern Divide Wind, LLC project. This 24 page report provides information why this project should not be accepted based on adverse affects to the natural resources, unknown plans for disposing of spent turbine blades with associated potential harm to natural resources, and Covid-19 concerns during the project's planned construction starting in May 2020 and to be completed in November 2020.

This report was written by Karen Smith with review from those in the Coteau Preservation Alliance.

Outline of Report

A. History of Burke Wind, LLC	2
B. Burke Wind, LLC's Name Change	2
C. Northern Divide Wind, LLC Project and Adjacent Areas	3
D. Impacts from Roads, Collection Lines, and Turbines and their Pads	5
E. Three Publications Regarding Wind Facilities Effect on Avian Species	6
F. ebird Data of Wildwood Park	12
G. Wildlife That Will Be Affected by Northern Divide Wind	20
H. Perhaps There Has Been a Lack of Intensive, Frequent Surveys Over a Period of Two or More Years	21
I. Other Aspects of the Northern Divide Wind, LLC of Concern	22
J. Last Comments	23
Literature Cited	23

A. History of Burke Wind, LLC

NextEra began their first Burke Wind, LLC project, a Foreign Limited Liability Company, on 31 May 2016 when they became authorized to transact business in ND. The first plan was for a 46,515-acre project area stretching from one mile east of the Divide County line eastward across the Coteau to just north of Lostwood National Wildlife Refuge, all in Burke County. The application for a Certificate of Site Compatibility was submitted to NDPSC in September of 2018. The plan had 128 wind turbines – a 300 MW project – that required roads, collection lines, transmission lines, and other facilities affecting the Coteau’s native grasslands, diverse and abundant wetlands, and croplands.

The Coteau across Burke County is a major migration corridor for migrating avian species that includes waterfowl, shorebirds, wading birds, raptors, warblers and other passerines. Also, the proposed wind project area contains the breeding habitats for many declining grassland avian species, habitat critical to retain without being fragmented, as explained in Docket #76 pages 4-7 and 9, a report completed by the Coteau Preservation Alliance (North Dakota PSC web site, Case #: PU-18-302, Docket Item #76, hereafter referred to as Docket Item #76). The first Burke Wind project ran into much opposition from federal and state wildlife agencies, and local citizens.

The Burke Wind, LLC then altered the 46,515-acre footprint down to 24,539 acres in hopes to reduce the opposition of the original Burke Wind project. The new plan, still called Burke Wind (referred to here as Burke Wind-2), was basically in the identical same area except the eastern third of the original Burke Wind project area was no longer included (from Burke County Road 11 to the original eastern edge).

The new version of Burke Wind met the same opposition from federal and state wildlife agencies, and local citizens as the original Burke Wind, LLC. Regardless, Burke Wind-2 project managers applied to North Dakota Public Service Commission in the fall of 2019 to obtain PSC approval. After reviewing all comments, the Commission found, based on Code 69-06-08-01(5), the weight of the evidence to show the proposed Burke Wind, LLC project (Burke Wind-2) would have too much adverse effects upon animal health and safety. Their application was denied.

B. Burke Wind, LLC’s Name Change

This denial has not deterred the company’s drive and desire to construct a wind field in the center of the major migration corridor along the highest geographic figure in Burke County – the Coteau. Burke Wind LLC, amended the certificate of authority of Burke Wind, LLC on August 29, 2019 to Northern Divide Wind, LCC. This “new” project (or maybe it could be called Burke Wind-3) is in the western half of Burke Wind-2 project, reducing the project area to 10,912 acres.

It remains a proposed 200 MW wind field with 74 turbines, like Burke Wind-2, across the Coteau but now begins at the Divide County line traversing east across the Coteau to State Highway 40. What changed is the addition of about 3,280 acres along the Divide County line and the extreme northwest edge of the Burke Wind-2's boundary. The company also added two additional areas north of the Burke Wind-2's north boundary, totaling about 640 acres that is along the Coteau's escarpment—a sharp drop in topography below the Coteau into the geological feature known as the northern glaciated plains.

C. Northern Divide Wind, LLC Project and Adjacent Areas

Northern Divide Wind, LLC will have the same negative impacts on the natural resources as did the other Burke Wind projects to native grasslands, wetlands, and the associated nesting and migrating avian species associated with the Coteau. These negative effects have been described in the Coteau Preservation Alliance report (Docket Item #76) submitted to NDPS on March 8, 2019 at the public hearing in Bowbells. Even though there is less native grasslands found in the current proposed project area as compared to Burke Wind-2, what remains of native grasslands will be negatively affected (D. Road, Collection Lines, and Turbines and their Pads section, page 5) and should not be further fragmented (importance of fragmentation to habitat is discussed in Docket Item #76, pages 4-7 & 9).

Even though there is less native grassland in the Northern Divide Wind project, it does not change the important fact that this project is squarely in the middle of the major spring and fall migration routes of many avian species traversing from their wintering grounds to their nesting habitats in and around the Coteau and north into Canada. Many of these species are found to be very sensitive to wind fields, as will be shown from three studies presented below (starting on page 6). The importance of this migration corridor is one of the important reasons why wildlife federal and state agencies and local citizens have opposed the Burke Wind projects – both of them.

Along the northern edge of the Coteau is the escarpment. In many places along this escarpment there are woody habitats very attractive to migrating passerines, raptors, and other species that will migrate through the coulee and straight into a wind field's wall of turbines. There will be seven new turbine and four old turbine locations very near these woodland coulees, some roads and collection lines actually appear, according to the company's plan, to traverse through these wooded areas which is fragmenting the woody habitat.

The extensive use by migrating avian species of these wooded coulees is demonstrated by bird counts completed by expert North Dakota birders at Wildwood Park, very near two new turbine sites, #62 and 63. Details about migrating bird use of this site are presented below in the section titled: F. ebird Data of Wildwood Park (page 12). These recordings demonstrate and validate the number of avian species that use Burke County traversing through the Coteau during their annual spring and fall migrations, and this is just at one location along the entire stretch.

This wind company is persistent and determined to establish a wind field in a major migration corridor route on the Coteau. There are so many other places to put a wind field that is not in the center of a major migration route. It is easy to find locations of high wind with low wildlife impact by consulting published reports that are presented in the Docket Item #76. Quotes taken from Coteau Preservation Alliance's report stresses this, and we are repeating some of this information:

“One of the data sources was the 2001 National Land Cover Dataset. They found that of all the areas on the Great Plains, the one area of **primary concern was the Northern Great Plains**. The authors expressed “...globally, the temperate grasslands biome is the most converted and least protected (Hoekstra et al. 2005) and the Northern Great Plains is home to much of North America's remaining temperate grasslands.”

What is extremely helpful is they combined data and developed maps to identify **Low Impact** areas with good wind, versus **High Impact** intact native grassland/wildlife areas that should be discouraged or avoided for use by the wind industry. There are ample areas with low impact and enough wind to meet the goals established by the U.S, Department of Energy that 20% of United States electrical needs come from wind energy by year 2030 (Department of Energy 2008).

Let us give a little more detail. From the 2012 publication, “**Goals for wind energy development in the NGP are roughly 30 GW of nameplate capacity by 2030** [bold added]. Our analyses demonstrate that there are large areas where wind development would likely have few additional impacts on wildlife. We estimate there are, 1,056 GW of potential wind energy available across the NGP on areas likely to have Low Impact for biodiversity, **over 35 times development goals**. New policies and approaches will be required to guide wind energy development to Low Impact areas.” (Fargione et al. 2012)

The entire Coteau in Burke County is not within the Low Impact areas for wind development as seen on Map 1. The Coteau is recognized as a High Impact area, an area that should be avoided by the wind industry”

Having Northern Divide Wind to remain on the Coteau, a major migration route, and placed closer to the escarpment where some of the wind turbines are adjacent to the woodland drainages where numerous species of migrants pass through, is not a “green” wind project. The need to keep wind project as green as possible is very important and will be expressed by many others later in this report.

As identified by be the 2001 National Land Cover Dataset (Fargione et al. 2012), any place on the Coteau in Burke County is not a green site, and is not acceptable due to the loss of critical nesting and migration habitats, and impact to migrating avian species (impacts described in E. Three Publications Regarding Wind Facilities Effect on Avian Species, page 6). . This location is

just wrong, and has been proven wrong before based on the history of what has happened to Burke Wind, LLC!

NextEra's company, Northern Divide Wind, LLC hopes to get permission to complete the project starting in May of 2020 and completing in November of 2020. If they are given permission to proceed, there will be outsiders coming into northwestern North Dakota, an area almost void of people affected by the coronavirus. We are going to increase the chances of introducing this deadly disease into Burke County during a period of time when health experts stress the importance to keep travel to only essential trips (J. Last Comments, page 22).

D. Impacts from Roads, Collection Lines, and Turbines and their Pads

Roads, collection lines, and turbines and their pads will adversely affect habitats in the Northern Divide Wind project's footprint. This will be direct through loss of habitat and indirect by traffic disturbances, that includes noise and dust that many of these areas have never had or at least have had very little.

There are approximately 146 wetlands in the Northern Divide Wind that will be affected by roads, collection lines, and turbine pads. New roads with traffic adjacent to any wetland will disturb wildlife and increased disturbance not present before. Dust, if travelled frequently enough, will settle on wetlands affecting water quality, and on vegetation that can reduce plant's photosynthesis. Tower #9 has wetland right up to the tower pad, #50 has three wetlands either in or surrounded by the pad; #58 has 2 wetlands in the pad, #59 borders along the entire east side of a large wetland, and #60 is right adjacent to a large wetland, ALT 3 & 4 have wetlands in the pads, #66 destroys two wetlands, and #71 destroys one small wetland.

There are less native grassland areas in the current proposed project area than in NextEra's other proposed project areas, however there remains adverse affects to what native grasslands are present, in part due to further fragmentation (Docket Item #76, pages 4-7 & 9). For native grasslands, roads will adversely affect four native grassland areas, of significance are:

- ~½ mile in length that is immediately adjacent to or in native grassland (Section 35 T162N R94W).
- ~ ½ mile stretch of road either in or immediately adjacent to native grassland (Section 8 T161N R93W)
- ~1/4 mile stretch of road along edge or in native going to Pad #51 (Section 11 T161N R94W)
- ~1/4 mile of crane path will tear native sod bisecting across the middle of an 80-acre block of native (Section 11 T161N R94W)

For road affect on Tame Grasslands habitat, there are seven sites that will likely adversely affect this grassland type, most pronounced is road to Pad #13 that appears to be build in tame grass, as well as the pad (Section 30 T162N R94W).

Collection lines will adversely affect four native grasslands:

- one of which cuts through a half section of native grassland, cutting through the sod for ½ mile (Section 11 T161N R94W);
- ¼ mile of native (Section 18 T161N R93W).
- between #14 and 23, ~ ¼ mile either in or immediately adjacent to native
- < ¼ mile northwest of #34 cutting through section of native

Collection lines will cross tame grasslands at about 17 locations.

There are six Pad locations that will adversely affect native grassland habitat and species using of such habitats either because of such close proximity to native or in native:

- #14 Section 11 T161N R94W
- #23 (Section 11 T161N R94W)
- #45 and #46 (Section 35 T162N R94W)
- #52 (Section 11 T161N R94W)
- #67 adjacent to east end of ~80 acres of native

There are four locations where the pad location adjacent to tame grassland will likely adversely affect wildlife species due to disturbance from traffic to pads:

- Pad #9 and #12 (Section 30 T162N R94W)
- Pad #31 (Section 27 T162N R94W)
- Pad #66 (Section 5 T161N R93W)

There are nine locations where collection lines either go through woodland/shrubland habitats or are immediately adjacent to. Collection lines that traverse west of tower #39 cut straight through a woodland drainage. There are three locations in Section 35 T162N R94W where the turbine pads will disturb woodland habitat wildlife, pad #40 to 41. Section 35 T162N R94W there are major potentials to adversely affect migrating woodland birds using the woody drainages migrating north and south due to four pad locations: #39,40,41, and 42.

E. Three Publications Regarding Wind Facilities Effect on Avian Species

Publication #1 (all bolding of print is for this report)

In Beston et al. (2016), a group of scientists “...developed a prioritization system to identify the avian species most likely to experience population declines from wind facilities based on their current conservation status and their expected risk from turbines.” They “... developed 3 metrics of turbine risk that incorporate data on collision fatalities at wind facilities, population size, life history, species’ distributions relative to turbine locations, number of suitable habitat types, and species’ conservation status.”

To help the reader grasp the depth at which these scientists went to determine how different species would be affected by wind development, they used three metrics:

- 1) fatalities due to turbines (FT) derived through a variety of studies,
- 2) fatality risk index (FRI) "...to estimate the difference in risk from wind between long-lived, slow reproducing species and short-lived, rapidly reproducing species."
- 3) indirect risk index (IRI) where "...Bird species that occur in and around wind facilities may infrequently collide with turbines ... yet still experience population consequences due to disturbance, displacement, and habitat fragmentation and loss."

The authors used taxonomic orders to help identify groups of species affected. To reduce confusing of taxonomic order names used in this study, we have identified below what groups of species are within:

Accipitriformes is one of three major orders of birds of prey and includes the osprey, hawks, eagles, kites, and vultures. Falcons (Falconiformes) and owls (Strigiformes) are the other two major orders. Most all of these species can be found either nesting or migrating through the Coteau.

Pelecaniformes are pelicans, cormorants, and These use Coteau's wetlands.

Charadriiformes are e.g., shorebirds and gulls, several species commonly use the Coteau's wetlands for reproduction and migrate through the Coteau.

Podicipediformes are grebes, several species commonly use the Coteau's wetlands.

The authors determined "The values for the turbine risk measures varied considerably among and within some taxonomic orders. Accipitriformes and Pelecaniformes had two of the three highest means for both fatality metrics, with Strigiformes and Charadriiformes in the top three for FT and FRI, respectively. Cuculiformes and Podicipediformes had the highest order means for IRI, but Gruiformes, Passeriformes, and Pelecaniformes had individual species with higher IRI values."

"In particular, Accipitriformes had a higher median priority than all species combined..., and 39% of Accipitriformes had average priority scores of four or above. On the other hand, passerines had a low median priority..., and only 7% of species in this order had average priority scores of four or above."

"Birds of prey that we identified to be at greatest relative risk of experiencing population declines from wind energy included the **long-eared owl**, **Swainson's hawk**, **ferruginous hawk**,

and **golden eagle**. Notably, the golden eagle has been the focus of much concern and debate about wind energy development due to its suspected susceptibility to population decline. Charadriiformes and Pelecaniformes are two orders that also include long-lived species that ranked highly, many of which are also habitat specialists.”

“The use of multiple metrics in the turbine risk element of our prioritization causes species to be highly ranked for different reasons.The **American bittern** may be impacted by wind energy because it is a habitat specialist and some of its habitat overlaps with wind turbines. For **long-eared owls**, collisions with wind turbines caused the highest percentage of annual fatality for any bird species assessed.”

Other examples of their findings (bolded species are those found on the Coteau and escarpment’s woody habitats:

“Species with >1.5% of annual US fatalities attributable to turbines included the **long-eared owl** (*Asio otus*), **golden eagle** (*Aquila chrysaetos*), and **gray partridge** (*Perdix perdix*)....”

“For FRI, species with high values included the great black-backed gull (*Larus marinus*), **Swainson’s hawk** (*Buteo swainsoni*), **great blue heron** (*Ardea herodias*), and Harris’s hawk (*Parabuteo unicinctus*)....”

“The **blackpoll warbler** (*Setophaga striata*) also had a high FRI value despite a relatively high ratio of maternity to age at first reproduction. This warbler breeds primarily in Canada but has a small breeding population in the northeastern US that overlaps several wind facilities, resulting in >30% of its US breeding population exposed to turbines. The high overlap with turbines also resulted in the blackpoll warbler having the highest IRI value of any species analyzed. Other species with high IRI values included ..., **sora** (*Porzana Carolina*)....” [In the ebird report section below, blackpoll warbler were using the escarpment, a migrant species that uses nesting habitats in Canada.]

American bitterns are common on Coteau wetlands, although it varies from year to year based on wetland water conditions and available prey. Long-eared owls are found in wooded habitats, including aspen groves on the Great Plains, and in wooded coulees, as found on the escarpment. Long-eared owl numbers will fluctuate depending on availability of voles, which numbers vary from year to year based on such variables as snowless winters exposing them to the elements of winter. These are examples where one or two years of sparse monitoring, as done by NextEra, will result in missing species and abundance thereof.

One conclusion was "...several birds of prey, such as the **long-eared owl**, **ferruginous hawk**, **Swainson's hawk**, and **golden eagle**, were at relatively high risk of population decline across a wide variety of cutoff values, whereas many passerines were at relatively low risk of decline..."

Beston et al. (2016) stressed Accipitriformes had a higher median priority than all species combined..., and 39% of Accipitriformes had average priority scores of four or above. Species of raptors that nest on the Coteau's grassland or adjacent woody habitats include red-tailed hawk, Swainson's hawk, ferruginous hawk, sharp-shinned hawk, Cooper's hawk, northern harrier, American kestrel, short-eared owl, long-eared owl, and great-horned owl. Species that migrate through the escarpment and Coteau include the nesters, above, and rough-legged hawk, bald eagle, golden eagle, northern goshawk, peregrine falcon, prairie falcon, turkey vulture, broad-winged hawk, American kestrel, merlin, and gyrfalcon. Those that will use the Coteau and the Escarpment during winter include rough-legged hawk, golden eagle, northern goshawk, and gyrfalcon. Their numbers each year will vary but they have always used this area for migration, feeding, and some for nesting.

The escarpment is used as a lift for hunting the grasslands adjacent to the escarpment, while the varying topography of the Coteau also produces varying lifts for many raptor species for migration and hunting of prey.

This group of raptors had some of the highest means for fatality metrics shown by Beston et al. (2016) from wind energy development. The turbines on the Northern Divide Wind project will adversely affect raptors because it is squarely in the main migration corridor crossing the Coteau. [*Karen Smith observed golden eagles twice on the Coteau the winter of 2019-20, even when she was seldom outside.*] This location is also squarely in the nesting range of the 10 raptor species identified above. NextEra through the Northern Divide Wind project need to stop pursuing a wind field on the Coteau! This will adversely affect birds of prey, both nesters and migrants. This is not a "green" location for a wind farm. This project needs to be denied.

Publication #2 (all bolding is for this report to PSC)

Loss et al. (2013) modeled bird collision mortality with hub height of solid monopole wind turbines, using average hub height for the Great Plains of 63.7 m. "Because we found a strong correlation between turbine hub height and rotor diameter, it is important to note that increased bird mortality may be a result of both increased turbine height and increased rotor diameter. As turbines get taller, greater mortality may occur due to turbines extending further into altitudes that contain large numbers of flying birds. As rotor diameter increases, a greater area of airspace is swept by the turbine blade and therefore exposed to collision risk. Recent well-publicized research indicates that larger wind turbines may provide more efficient energy generation.... Given that we found evidence for increased bird mortality with increasing height of monopole turbines along with a move toward increasing turbine size, we argue that wildlife collision risk

should be incorporated with energy efficiency considerations when evaluating the “greenness” of alternative wind energy development options.”(page 207)

“Development and production of U.S. wind energy represents a promising opportunity to decrease global carbon emissions and increase energy independence. However, our results suggest that the amount of U.S. bird mortality caused by collisions at monopole wind turbines is non-trivial. Furthermore, the projected trend for a continued increase in turbine size coupled with our finding of greater bird collision mortality at taller turbines suggests that precaution must be taken to reduce adverse impacts to wildlife populations when making decisions about the type of wind turbines to install. Despite an apparent lower magnitude of bird mortality at wind turbines compared to other anthropogenic mortality sources (e.g., windows/buildings,...; communication towers,... feral and pet cats, ...), mortality at wind facilities should not be dismissed offhand. Instead, we stress the importance of considering species-specific and location-specific risks and the potential for cumulative impacts of multiple wind facilities and multiple mortality threats. The total amount of bird collision mortality at U.S. wind facilities will likely increase with increased wind energy development in the coming decades. Scaling our estimates to the scenario projected to meet the DOE’s 20% goal (a six-fold increase from current generation capacity,...) produces a mean annual mortality estimate of roughly 1.4 million birds. This estimate assumes that average wind turbine height will not increase. **Installation of increasingly larger turbines could result in a greater amount of mortality. Multi-scale decisions about where to site wind facilities and individual wind turbines in the context of risks to individual bird species will be crucial to minimizing this mortality....** (page 208)”

The hub height used for the Great Plains portion was 63.7 m (209 feet). The hub height for the 2.72 GE towers to be used on the Northern Divide Wind is 90 m (295.3 feet). When considering that the turbines to be used are taller than those in the study, and the metrics of risk factors presented by Beston et al. (2016) incorporated into this fact, the picture of setting a wind field in a major migration corridor/route, such as the Coteau in Burke County is just not acceptable. It most certainly is not a “green location”.

Publication #3 (all bolding is for this report to PSC)

Wulff et al. (2016) assessed **diurnal** wind turbine collision risk for grassland birds on the southern Great Plains. They characterized distributions of diurnal flight heights for 66 bird species on the southern Great Plains, which allows application to wind turbines with different wind turbine swept zone (RSZ). Table 1 shows 21 species they had in southern Texas that are on the Coteau.

Table 1. Flight height range, mean, and proportion within wind turbine rotor swept zone (RSZ; 32–124 m) observed during October 2008–August 2009 in Gray and Donley counties, Texas.

Species	n	Flight height (m)			
		Min.	Max.	Mean	SD
American goldfinch <i>Spinus tristis</i>	5	7.4	169.7	75.0	83.13
American kestrel <i>Falco sparverius</i>	29	3.9	107.5	28.4	22.94
Bald eagle <i>Haliaeetus leucocephalus</i>	3	36.9	75.4	57.2	19.36
Barn swallow <i>Hirundo rustica</i>	61	1.8	71.1	13.4	12.74
Eastern kingbird <i>Tyrannus tyrannus</i>	7	2.5	48.9	11.9	16.61
Grasshopper sparrow <i>Ammodramus savannarum</i>	12	2.9	17.1	7.9	5.16
Horned lark <i>Eremophila alpestris</i>	168	1.7	372.2	19.9	35.01
Meadowlark species <i>Sturnella</i> spp.	240	1.7	76.5	11.4	10.53
Spring	101	1.7	76.5	11.2	10.69
Summer	56	2.8	59.0	17.0	12.98
Autumn	52	1.7	30.5	8.4	5.93
Merlin <i>Falco columbarius</i>	3	3.4	14.5	7.5	6.09
Mourning dove <i>Zenaidura macroura</i>	276	1.7	164.7	29.8	23.72
Northern harrier <i>Circus cyaneus</i>	149	1.7	144.8	18.6	20.44
Red-tailed hawk <i>Buteo jamaicensis</i>	15	1.7	79.0	36.0	26.11
Savannah sparrow <i>Passerculus sandwichensis</i>	6	2.7	26.7	10.9	12.10
Swainson's hawk <i>Buteo swainsoni</i>	24	3.4	238.3	79.3	65.39
Tree swallow <i>Tachycineta bicolor</i>	7	2.3	47.3	12.0	15.86
Blue-winged teal <i>Anas discors</i>	5	17.3	77.5	49.2	24.80
Gadwall <i>Anas strepera</i>	4	13.7	130.4	71.6	47.91
Green-winged teal <i>Anas crecca</i>	3	13.7	115.5	53.2	54.57
Mallard <i>Anas platyrhynchos</i>	57	2.0	329.4	51.6	51.25
Northern pintail <i>Anas acuta</i>	15	13.7	142.5	48.1	37.00
Northern shoveler <i>Anas chlypeata</i>	10	13.7	111.7	61.7	49.98

Northern Divide Wind's hub height for the GE 2.82 and 90 m 2.32 was 90 m (295.3 feet) and 80 m (262.5 feet) respectively – the Loss et al. (2013) study towers were 63.7 m.

Northern Divide Wind's towers height from their base to the tip of an upright blade is 148 m (485.6 feet) and 138 m (452.7 feet) for 2.72 GE and 2.32 GE respectively.

The diameter of the rotors for both 2.72 and 2.32 GE towers are 116 m (380.6 feet) (116 m is the RSZ for the Northern Divide Wind project).

From the ground/base of a tower to the bottom edge of the blade when closest to the ground is about 22 m. Birds flying below 22 m will not be hit by the rotor blades, although the turbulent created by the rotor blades may cause problems (Docket Item #76, pages 8, 12, 28-29). From the ground up 22 m begins the edge of the rotating blades with a RSZ of 116 m (for 2.32 GE towers), the area where bird strikes can occur. Looking at Table 1, the minimum diurnal flight height shows all species but the bald eagle would avoid flying into the moving blades. The maximum diurnal flight height, however, shows all species but seven will be within the RSZ diameter; the seven have a maximum height that is above the towers height of 138 m. There are

12 species with the mean height within the RSZ rotor diameter. There will be bird collisions on the major migration corridor that occurs on the Coteau each spring and fall if the Northern Divide Wind, LLC is completed.

Wulff et al. (2016) state: **“Our results indicated that raptors and wetland-associated species are the avian groups at greatest risk of collision with wind turbines at our study sites due to their diurnal flight heights. We found that the flight heights of six bird species varied among seasons, indicating their risk of collision changed throughout the year.** Flight heights tended to increase during summer for some passerines and killdeer, but sandhill crane exhibited riskier flight heights during winter.” (page 135)

“To lessen the risk of turbine collisions by wetland associated birds, it may be prudent to avoid placement of wind turbines near playas and riparian systems. Mitigation of raptor fatality, however, may require additional considerations such as avoiding migratory routes, distance to nesting and perching habitat (i.e., trees in grassland-dominated communities), and prey availability (Hoover and Morrison 2005; Marques et al. 2014).” (page 136) **“Flight heights within or above the RSZ suggested that raptors and vultures may be a group at greater risk of collision with wind turbine blades than other species groups.”** (page 136)

The Coteau has abundant wetlands, thus this project site needs to be avoided by any commercial wind project. Then there are the migrating raptors; these authors state it may require avoiding migration routes. The Coteau is a major migration route and needs to be avoided by wind fields, including the Northern Divide Wind. To make matters worse, the Northern Divide Wind field traverses east and west, perpendicular to the migration path that is north and south.

“In the northern Great Plains, Osborn et al.(1998) also found that the majority of birds flew below the RSZ (21–51 m) and fewer (16–18%) birds flew in the RSZ; however, they observed that waterfowl and raptors were at greatest risk and passerines were at least risk of collision. We also observed few passerines in which their mean diurnal flight heights were within the RSZ (Table 1). However, **migratory flights during nocturnal hours**, which we were unable to observe, may be an important contribution to collision risk (e.g., Fijn et al. 2015).” (page 137)

“As indicated by flight heights, we found raptor and wetland-associated species were at greatest risk of collision with wind turbines in the southern Great Plains. In prairie regions, we recommend avoiding wind turbine placement in locations with high concentrations of trees and shrubs that provide nesting and perching habitat for many raptor species. We recommend avoiding wind turbine placement in areas of high raptor prey densities where raptors may concentrate to feed (e.g., prairie dog towns). Also, we recommend avoiding placement of wind turbines near playa wetlands because many wetland-associated species, which were at greater risk of collision due to their flight heights, concentrate around them to feed, roost, and nest.” (page 138)

There are so many published reports about not establishing wind fields in high impact wildlife areas. We need to keep wind development off the Coteau and other high impact wildlife areas! The Coteau is an extremely high wildlife impact area for both nesters and migrants. The Northern Divide Wind, LLC project should be denied by the PSC

F. ebird Data of Wildwood Park (ebird/Hotspots/Wildwood Park Burke County/View Details/Recent Visits)

There are wooded habitats along the escarpment, some in wooded coulees. There is one in particular, open to the public, with extensive woody habitats with large green ash and aspen trees that has been explored by North Dakota birding experts. Table 2 gives an idea how frequently Wildwood Park is used for birding by birders who report their observations to the ebird’s web site (shown above).

The Northern Divide Wind project borders this park with two turbines immediately adjacent. There is an intermittent water drainage that originates on the Coteau and drains through this woodland. Expert birders have been recording nesting and migrant bird use of this Park with excellent records. There were a total of 105 species observed North Dakota birders from Dec 17 to October 2019 (Table 3). Some of these species are rare to find in western North Dakota, including eastern species known to nest* in Wildwood Park:

Chestnut-sided Warbler <i>Dendroica pensylvanica</i>	Eastern Screech Owl <i>Otus asio</i>
Eastern Wood Pewee* <i>Contopus virens</i>	Canada Warbler <i>Wilsonia Canadensis</i>
Spotted Towhee* <i>Pipilo maculates</i>	Bay-breasted Warbler <i>Dendroica castanea</i>
Morning Warbler <i>Oporornis philadelphia</i>	Blackburnian Warbler <i>Dendroica fusca</i>
Philadelphia Vireo <i>Vireo philadelphicus</i>	Blue-headed Vireo <i>Vireo solitarius</i>
Great Created Flycatcher <i>Myiarchus crinitus</i>	Eastern Phoebe <i>Sayornis phoebe</i>
Black-throated Blue Warbler <i>Dendroica caerulescens</i>	
Yellow-bellied Flycatcher <i>Empidonax flaviventris</i>	

From December of 2017 to October of 2019, known birders logged 36.55 hours, walking 18.78 miles (Table 2) to observe birds present at Wildwood Park, Burke County. This is not that many hours for over a two year period. This means there are a lot of bird species that use the Coteau and escarpment during their spring and fall migrations. Four mornings that highlight the number of species observed are in Tables 4 - 7. These birders have provided important data to show the diversity of species that use the Coteau during the spring and fall migrations, species that can be adversely affected by the Northern Divide Wind, LLC project.

Table 2. Wildwood Park visitor use by expert birders identifying nesting and migrating birds using the woody habitat, December 2017 to October 2019.

Year	Month	# of visits	# birders /month	Min # of spp observed
2017	Dec	1	1	3
2018	Jan	1	1	1
	May	3	3	15
	July	1	2	16
	Aug	3	10	53
	Sept	3	11	48
2019	Feb	1	2	4
	May	3	5	31
	Jun	1	3	37
	Aug	4	21	31
	Sept	2	5	42
	Oct	1	2	25

Table 3. List of bird species observed in Wildwood Park, Burke County from Dec 2017 to October of 2019. There were at least 105 species observed with Ron Martin, a renown expert birder, as one of main observer.

<u>Species Observed</u>		
Double-crested Cormorant	Ruby-crowned Kinglet	Baltimore Oriole
American White Pelican	White-breasted Nuthatch	Brown-headed Cowbird
Baird’s Sandpiper	House Wren	Western Meadowlark
Solitary Sandpiper	Sedge Wren	American Goldfinch
Sandhill Crane	Gray Catbird	Pine Siskin
Canada Goose	American Robin	Chipping Sparrow
Mallard	Swainson’s Thrush	Clay-colored Sparrow
Ring-necked Pheasant	Ovenbird	Song Sparrow
Red-tailed Hawk	Brown Thrasher	Savannah Sparrow
Swainson’s Hawk	Gray-cheeked Thrush	White-throated Sparrow
American Kestrel	Veery	White-crowned Sparrow
Merlin	Blue-headed Vireo	Spotted Towhee
Turkey Vulture	Philadelphia Vireo	Vesper Sparrow
Great Horned Owl	Red-eyed Vireo	Dark-eyed Junco
Sharp-shinned Hawk	Warbling Vireo	Harris’s Sparrow
Broad-winged Hawk	Northern Waterthrush	Lincoln’s Sparrow
Morning Dove	Black-and-white Warbler	Swamp Sparrow
Gull spp.	Tennessee Warbler	Fox Sparrow
Downy Woodpecker	Morning Warbler	Spotted Towhee
Hairy Woodpecker	Common Yellowthroat	Rose-breasted Grosbeak
Northern Flicker (yellow-shafted)	American Redstart	Eastern Screech-owl
Olive-sided Flycatcher	Magnolia Warbler	Cooper’s Hawk
Yellow-bellied Flycatcher	Bay-breasted Warbler	Northern Harrier
Alder Flycatcher	Blackburnian Warbler	Wilson’s Phalarope
Great Crested Flycatcher	Yellow Warbler	Great Blue Heron
Least Flycatcher	Blackpoll Warbler	Wislon’s Snipe
Eastern Phoebe	Chestnut-sided Warbler	Yellow-headed Blackbird
Eastern Wood-Pewee	Canada Warbler	Black-billed Magpie
Eastern Kingbird	Wilson’s Warbler	Lapland Longspur
Horned Lark	Orange-crowned Warbler	Common Redpoll
Cedar Waxwing	Yellow-rumped Warbler	Franklin Gull
Barn Swallow	Pal m Warbler	Purple Martin
Tree Swallow	Red-winged Blackbird	Brown Creeper
Blacked-capped Chickadee	Common Grackle	European Startling
	American Crow	Eurasian Collared-dove
	Common Raven	

Table 4**Ron Martin, Diana Dugall, Jack Lefor**

Morning: 3 hr, 2 min, 1.5 mi

16-Jun-19

37 species observed

FALCONIFORMES		PASSERIFORMES continued	
Turkey Vulture	1	Red-eyed Vireo	20
Swainson's Hawk	1	Black-and-white Warbler	5
Red-tailed Hawk	1	Common Yellowthroat	2
Great Horned Owl	1	Yellow Warbler	40
		Western Meadowlark	1
ANSERIFORMES		Red-winged Blackbird	1
Mallard	2	Brown-headed Cowbird	10
		Baltimore Oriole	2
GALLIFORMES		Common Grackle	5
Ring-necked Pheasant	3	American Goldfinch	30
		Clay-colored Sparrow	15
CHARADRIIFORMES		Vesper Sparrow	5
gull spp.	1	Song Sparrow	20
		Spotted Towhee	4
COLUMBIFORMES		Savannah Sparrow	1
Morning Dove	6	Rose-breasted Grosbeak	2
PICIFORMES			
Downy Woodpecker	1		
Northern Flicker (yellow-shafted)	1		
PASSERIFORMES			
Eastern Wood-Pewee	1		
Least Flycatcher	50		
Eastern Kingbird	1		
Cedar Waxwing	5		
Tree Swallow	4		
Barn Swallow	1		
Black-capped Chickadee	5		
White-breasted Nuthatch	3		
House Wren	25		
Gray Catbird	4		
Veery	4		
American Robin	8		

Table 5**Ron Martin, Corey Ellingson, Jack Lefor**

Morning: 3 hr, 7 min, 0.5 mi

21-Sep-19

42 species observed

FALCONIFORMES		PASSERIFORMES continued	
Sharp-shinned Hawk	1	American Restart	1
Broad-winged Hawk	1	Bobolink	1
Red-tailed Hawk	1	American Crow	1
Merlin	1	Common Raven	1
		Pine Siskin	2
ANSERIFORMES		American Goldfinch	20
Canada Goose	5	Chipping Sparrow	12
		Fox Sparrow	1
PICIFORMES		Dark-eyed Junco (Slate-colored)	6
Hairy Woodpecker	2	Harris's Sparrow	1
Northern Flicker (yellow-shafted)	8	White-throated Sparrow	25
		Lincoln's Sparrow	5
PASSERIFORMES		Swamp Sparrow	1
Least Flycatcher	1	Spotted Towhee	1
Cedar Waxwing	60		
Barn Swallow	7		
Black-capped Chickadee	6		
Ruby-crowned Kinglet	5		
White-breasted Nuthatch	3		
House Wren	4		
Sedge Wren	1		
Gray Catbird	2		
Brown Thrasher	1		
Swainson's Thrush	1		
American Robin	50		
Blue-headed Vireo	1		
Red-eyed Vireo	1		
Philadelphia Vireo	1		
Northern Waterthrush	1		
Tennessee Warbler	1		
Orange-crowned Warbler	50		
Bay-breasted Warbler	1		
Palm Warbler	5		
Yellow-rumped Warbler (Myrtle)	50		

Table 6**Ron Martin, Corey Ellingson, Diana Dugall**

morning: 4 hr, 56 min, 1.25 mi

8/19/2018

53 species observed

PELECANIFORMES		PASSERIFORMES Continued	
Double-crested Cormorant	2	Gray Catbird	6
CHARADRIIFORMES		American Robin	11
Baird's Sandpiper	1	Swainson's Thrush	2
Solitary Sandpiper	2	Ovenbird	8
FALCONIFORMES		Blue-headed Vireo	1
Red-tailed Hawk	2	Philadelphia Vireo	3
Merlin	1	Warbling Vireo	8
ANSERIFORMES		Red-eyed Vireo	40
Canada Goose	4	Northern Waterthrush	3
COLUMBIFORMES		Black-and-white Warbler	18
Morning Dove	12	Tennessee Warbler	14
PICIFORMES		Morning Warbler	9
Downy Woodpecker	1	Common Yellowthroat	1
Hairy Woodpecker	4	American Redstart	22
Northern Flicker (yellow-shafted)	2	Magnolia Warbler	5
PASSERIFORMES		Bay-breasted Warbler	4
Olive-sided Flycatcher	3	Blackburnian Warbler	1
Yellow-bellied Flycatcher	2	Yellow Warbler	37
Alder Flycatcher	1	Chestnut-sided Warbler	6
Least Flycatcher	31	Blackpoll Warbler	2
Great Crested Flycatcher	1	Canada Warbler	4
Eastern Wood-Pewee	13	Wilson's Warbler	7
Eastern Kingbird	2	Brown-headed Cowbird	1
Cedar Waxwing	6	Baltimore Oriole	3
Barn Swallow	2	Red-winged Blackbird	5
Black-capped Chickadee	6	American Goldfinch	24
White-breasted Nuthatch	2	Chipping Sparrow	14
House Wren	21	Clay-colored Sparrow	30
		Song Sparrow	1
		Spotted Towhee	5
		Rose-breasted Grosbeak	13

Table 7**Ron Martin, Corey Ellingson, Diana Dugall**

Morning: 2 hr, 59 min, 1.2 mi

9-Sep-18

48 species observed

PELECANIFORMES			
American White Pelican	235		
GRUIFORMES		PASSERIFORMES continued	
Sandhill Crane	30	American Pipit	2
FALCONIFORMES		Blue-headed Vireo	1
Red-tailed Hawk	3	Philadelphia Vireo	1
American Kestrel	1	Warbling Vireo	1
ANSERIFORMES		Red-eyed Vireo	3
Canada Goose	2	Black-and-white Warbler	1
COLUMBIFORMES		Tennessee Warbler	1
Morning Dove	20	Orange-crowned Warbler	5
PICIFORMES		Magnolia Warbler	1
Downy Woodpecker	1	Bay-breasted Warbler	1
Northern Flicker (yellow-shafted)	6	Yellow Warbler	1
PASSERIFORMES		Blackpoll Warbler	1
Alder Flycatcher	1	Yellow-rumped Warbler (Myrtle)	12
Least Flycatcher	6	Wilson's Warbler	2
Eastern Phoebe	1	American Redstart	2
Horned Lark	1	Red-winged Blackbird	60
Cedar Waxwing	10	Common Grackle	8
Barn Swallow	2	Clay-colored Sparrow	45
Black-capped Chickadee	3	White-crowned Sparrow	3
House Wren	4	White-throated Sparrow	5
Gray Catbird	4	Savannah Sparrow	1
Brown Thrasher	1	Chipping Sparrow	120
Gray-cheeked Thrush	1	Spotted Towhee	2
Swainson's Thrush	3	Rose-breasted Grosbeak	4
American Robin	20		
Ovenbird	2		

G. Wildlife That Will Be Affected by Northern Divide Wind

Whooping cranes and piping plovers, from the Docket Item #76, page 12 and page 13:

“There is one study that analyzes whooping crane data collected in the spring of 1990 through the spring of 2014 to determine their migration route through the Dakotas. This, published in 2018 (Niemuth et al. 2018), shows the most probable migration route whooping cranes will use through North Dakota and South Dakota. **The Burke Wind Project Area is squarely in the middle of the most probable migration route of the endangered whooping cranes** (see Figures 1, 3A, and 3B in the attached Niemuth et al. 2018 publication).”

“I believe Smith and Dwyer (2016) may have presented a summary of how setting a wind field in a migratory corridor, like the Coteau, will affect specific species. They said ‘Although both direct and indirect effects appear site-, species-, and infrastructure-specific, generalities across energy sectors are apparent. For example, large-bodied species with high wing loading and relatively low maneuverability appear to be especially susceptible to direct effects of tall structures, and the risk of collision is likely greater when structures are placed perpendicular to flight paths.’”

“Whooping cranes with their large bodies fit this description, as well as eagles and others just listed. **The wind project is positioned on the Coteau, some of the highest elevations through central North Dakota squarely in the perpendicular flight path of this endangered crane.**”

An above quote from Wulff et al. (2016), stated: **“Our results indicated that raptors and wetland-associated species are the avian groups at greatest risk of collision with wind turbines at our study sites due to their diurnal flight heights. We found that the flight heights of six bird species varied among seasons, indicating their risk of collision changed throughout the year.”**

From the Docket Item #76, page 12:

“Piping plover, an ESA threatened species, is a migrant and a nester on alkaline shorelines found throughout the Coterau. This species has been studied extensively. Their alkaline wetland shorelines are not common in the Project Area but they return each spring to fly about checking shoreline conditions for appropriate nesting and feeding conditions. These flights can occur across North Dakota, Montana, and southern Provinces of Canada checking out shorelines to locate appropriate nesting and feeding habitats. Once a territory has been selected, adults still fly about, sometimes visiting other feeding sights on other wetlands.”

“Nesting season flights of the threatened piping plover, and their spring and fall migrations to and from Canada, Montana, and North Dakota traverse through the Coteau in Burke County. Turbines located on the Coteau will increase their chances of turbine collisions.”

Whooping cranes are endangered species (Docket #76 page 2), and piping plovers are a threatened, both are wetland-associated species, species shown at greater risk for impact, as shown in studies presented above.

H. Perhaps There Has Been a Lack of Intensive, Frequent Surveys Over a Period of Two or More Years

In the Northern Divide Wind plan submitted to PSC, the company identified the timing and frequencies of their field studies. Details are lacking but the summary is:

- Bi-weekly eagle use surveys were completed from April 2017 through March 2018
- General avian use surveys were completed from April 2017 through March 2018
- Eagle and raptor nest aerial surveys were completed in April 2017
- Sharp-tailed grouse (*Tympanuchus phasianellus*) lek surveys were completed in April 2017
- Breeding waterfowl use surveys were completed from May 2017 through July 2017
- Sensitive breeding grassland bird surveys were completed from June 2017 through July 2017
- Dakota Skipper surveys were completed in 2017 through 2019
- Desktop whooping crane (*Grus americana*) habitat assessment was completed in 2019
- Northern long-eared bat (NLEB; *Myotis septentrionalis*) habitat assessment was completed in 2019

Biological monitoring and surveys are needed in all habitats with many transects, point counts, or other methods on the entire project area and surrounding habitats over at least two years for accurate information of species population presence and use of the various habitats. Species fluctuate in occupancy based on many environmental measures from one year to the next. The approaches used to survey wildlife populations to determine presence and time of year, seems inadequate to fully learn the diversity of wildlife use across the project areas throughout different years. Wildlife populations fluctuate from year to year based on a variety of environmental variables so to monitor only one year is inadequate.

If a specific species needs specific information of whereabouts because it determines where turbines will be located, such as sharp-tailed grouse dancing grounds, then there is a need for very intensive surveys over more than one year, again due to fluctuating population numbers and difficulty in finding all the ground in the project area.

Sharp-tailed dancing grounds were not all located on the original Burke Wind project (see pages 3-4 in Docket Item #76). That was more than likely due to too few listening mornings in only one year for locating grounds. What might be surprising to some, grouse do establish dancing grounds in croplands, particularly at a site that once was a dancing ground. If there is some form of nesting habitat available, hens will come and the males will establish a dancing ground. Because intensive cropped lands are habitats so inadequate for these birds to survive in any large numbers, the number of dancing males may often only have two or three male displaying (I have searched intensive croplands on the glaciated plains southeast of Bowbells and found grounds in the past 10 years for a ND Game & Fish study.)

Every mile needs to have stops every quarter mile to stop and listen for grounds. In the mid-1960s, a Fish and Wildlife Service scientist M. Hammond, established listening methods to find grounds. There needs to be listening routes on mornings with low wind and no rain, stopping every quarter mile on trails and public roads, and where there are no roads, walking transects through roadless areas. This thorough survey needs to be run at least two years because of the fluctuation of grouse populations. We doubt the company's contractors completed such surveys, otherwise they would have found the three grounds we knew of within the project area, grounds that had over a dozen males on each. At least two of these ground locations would have altered where a turbine would have been placed.

Using this species as an example, were enough surveys conducted and repeated each spring in April, May and June across the project area to determine what species are present? These surveys need run over three years to get more accurate information.

I. Other Aspects of the Northern Divide Wind, LLC of Concern

What has not ever been addressed in the plans submitted to PSC is what will be done with the spent/worn-out 58-meter blades – all 222 of them. This can begin to happen in eight years. The fine fiberglass slowly wearing off the cutting edges of the blades, drifting across the landscape and landing who knows where and into who's lungs. We need to know now how and where the spent blades will be deposited:

- Will they be buried at the turbine site or someplace elsewhere into grasslands, croplands, under wetlands ... where exactly will this be?
- Will they be cut up at the site (fiberglass drifting around?), hauled away and cut up?

There needs to be answers and plans for the disposal of these monster wind blades if any permit is approved. We, the people who live on the land need to have this knowledge so the current and future occupancies do not have to deal with these huge problems. The spent blades potentially will involve destruction of native habitats, and the safety concerns for North Dakota citizens where these blades will end up.

J. Last Comments

If there ever is an indication of the lack of rural support for commercial development on the landscape, it is when the local people take matters into their own hands. Many in rural parts of Burke County have been discouraged by their Burke County Commissioners decisions in approving the Burke Wind and Northern Divide Wind proposals. It seems they approved this without significant input from the people that will receive the impact from this development – the rural residences, particularly those who reside on the Coteau or near adjacent habitats. There are many people in Burke County that oppose the bladed wind turbines on their land. The approach used by Burke County commissioners to approve these wind projects has caused several Burke County’s townships to develop their own ordinances for more control over big business establishments in rural areas.

One important issue is the safety of rural northwestern North Dakota residents in the difficult times of 2020. Northern Divide Wind, LLC wants to begin construction in May with completion of the project in November of 2020. We all understand the policies of “social spacing” during the novel coronavirus pandemic. Northwestern North Dakota has very few cases of Covid-19 disease caused by this virus. We desire the PS Commissioners to carefully consider how the influx of strangers from around the United States that will be brought into northwestern North Dakota to complete this project. There is a safety concern for Burke County rural and small town citizens of Burke County. Why would the state of North Dakota approve such activities when we are suppose to keep safe distances, and if we are returning from outside the area, we are to quarantine ourselves for at least 14 days?

K. Summary

Northern Divide Wind, LLC is not a green wind project. It has not avoided the high impact wildlife area known as the Coteau, a high glacier formed ridge that basically traverses across Burke County in a southeast-northwest direct. NextEra, through Northern Divide Wind LLC, has proposed 74 wind turbines placed in the western edge of the county’s Coteau that is basically perpendicular to avian’s in spring and fall migrations. The Coteau Preservation Alliance opposes the Northern Divide Wind, LLC, just as we opposed all the others in the same basic location for all the reasons presented in Docket #76 and those presented above in this report.

Literature Cited

Beston, J.A., Diffendorfer, J.E., Loss, S.R., and Johnson, D.H., 2016, Prioritizing avian species for their risk of population-level consequences from wind energy development: PLoS One, v. 11, no. 3, p. e0150813. [Also available at <https://doi.org/10.1371/journal.pone.0150813>.]

Bluemle, F.P. 1980. Guide to the geology of northwestern North Dakota. Educational Series 8. North Dakota Geological Survey, Bismarck.

Department of Energy. 2008. Twenty percent wind energy by 2030: Increasing wind energy's contribution to U.S. electricity supply. Oak Ridge, Tennessee: U.S. Department of Energy.

Fargione J, Kiesecker J, Slaats MJ, Olimb S (2012) Wind and Wildlife in the Northern Great Plains: Identifying Low-Impact Areas for Wind Development. PLoS ONE 7(7): e41468. <https://doi.org/10.1371/journal.pone.0041468>

Fijn RC, Krijgsveld KL, Poot MJM, Dirksen S. 2015. Bird movements at rotor heights measured continuously with vertical radar at a Dutch offshore wind farm. *Ibis* 157:558–566.

Hammond, M. C. 1969. Notes on conducting waterfowl breeding population surveys in the north central states. p. 238-254 in Saskatoon Wetlands Seminar. Canadian Wildlife Report Series Vol. 6. Canadian Wildlife Service, Ottawa, Ontario.

Hoekstra J.M., Boucher T.M., Ricketts T.H., Roberts C. 2005. Confronting a biome crisis: global disparities of habitat loss and protection. *Ecology Letters* 8: 23–29.

Hoover SL, Morrison ML. 2005. Behavior of red-tailed hawks in a wind turbine development. *Journal of Wildlife Management* 69:150–159.

Loss, S.R., Will, T., and Marra, P.P., 2013, Estimates of bird collision mortality at wind facilities in the contiguous United States: *Biological Conservation*, v. 168, p. 201–209. [Also available at <https://doi.org/10.1016/j.biocon.2013.10.007>.]

Marques AT, Batalha H, Rodriques S, Costa H, Pereira MJR, Fonseca C, Mascarenhas M, Bernerdino J. 2014. Understanding bird collisions at wind farms: an updated review on the causes and possible mitigation strategies. *Biological Conservation* 179:40–52.

Niemuth, N.D., A.J. Ryba, A.T. Pearse, S.M. Kvas, D.A. Brandt, B. Wangler, J.E. Austen, and M.J. Carlisle. 2018. Opportunistically collected data reveal habitat selection by migrating whooping cranes in the U.S. Northern Plains. *The Condor* 120:343-356. DOI: 10.1650/Condor-17-80.1.

Osborn RG, Dietter CD, Higgins KF, Usgaard RE. 1998. Bird flight characteristics near wind turbines in Minnesota. *American Midland Naturalist* 139:29–38.

Smith, F.A. and J.F. Dwyer. 2016. Avian interactions with renewable energy infrastructure: An update. *Condor* 118(2): 411-423. <https://doi.org/10.1650/CONDOR-15-61.1>

Wulff, S.J., Butler, M.J., and Ballard, W.B., 2016, Assessment of diurnal wind turbine collision risk for grassland birds on the southern Great Plains: *Journal of Fish and Wildlife Management*, v. 7, no. 1, p. 129–140. [Also available at <https://dx.doi.org/10.3996/042015-JFWM-031>.]