



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE North Dakota Ecological Services

IN REPLY REFER TO:  
Burke County Wind  
Energy Center

3425 Miriam Avenue  
Bismarck, North Dakota 58501-7926

March 6, 2019

Kimberly Wells  
NextEra Energy Resources, LLC  
601 Travis Street  
Houston, Texas 77002

Steven Kahl  
Interim Executive Secretary  
North Dakota Public Service Commission  
600 E. Boulevard, Dept. 408  
Bismarck, North Dakota 58505-0480



Dear Ms. Wells and Mr. Kahl:

This letter concerns NextEra's proposed Burke County Wind Energy Center in Burke County, North Dakota. NextEra has submitted permit application materials to the Public Service Commission (PSC) for this project and its associated transmission line (PSC-18-344 and PSC-18-302). We request that today's letter and its attachment be included as part of the record of evidence regarding this project. Our November 25, 2018, comment letter on this project is also enclosed, and we request that it be included as part of the record of evidence for this project as well.

Staff from this office and the Service's South Dakota Ecological Services Office have provided guidance and recommendations to NextEra and its consultants regarding this project via correspondence, meetings, calls and electronic mail. We, and the North Dakota Game and Fish Department (NDGF), have indicated to NextEra that the location of the proposed project falls within an unusually high-value wildlife resource area, and significant negative direct and indirect impacts to wildlife are anticipated if this project proceeds to construction and operation.

Our primary recommendation has been to avoid development of the project at the current proposed location. Our secondary recommendation has been to develop and implement a comprehensive and effective mitigation plan to address the anticipated impacts if the project moves forward.

The intent of this letter is to reiterate and clarify the anticipated impacts to wildlife and natural resources resulting from the Burke Wind Energy Center project, and help ensure decisions made by NextEra and the PSC are well informed.

Our overarching concerns are that the wetlands and grasslands in the project area and surrounding landscape support:

- a) some of the highest concentrations of waterfowl documented in North Dakota and the entire Prairie Pothole Region, and
- b) a diverse array of numerous other species such as raptors including bald and golden eagles, grouse, shorebirds and grassland birds, and some federally listed species.

We acknowledge that NextEra has reduced the project size and contracted from the eastern side of the project that harbors more grasslands. The current project proposal, however, remains on the Missouri Coteau in an area dense with wetlands and still includes plans for numerous turbines to be sited in grasslands. The area serves as a haven for native wildlife in the primarily agricultural landscape of North Dakota. Natural resource agencies have focused their limited conservation resources on this area for decades. In short, the project area is still within a high-value natural resource area, thus our primary recommendation remains that development not occur in this area.

Please see the attached information for specific project concerns as well as our responses to a recent proposal to offset project impacts.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above recommendations can be reconsidered.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates at (605) 224-8693, Extension 227.

Sincerely,



*For* Scott Larson  
Field Supervisor  
Ecological Services  
North and South Dakota Field Offices

Attachment

Enclosure

cc: Kory Richardson, USFWS Lostwood NWR, Kenmare, ND  
Chuck Loesch, USFWS HAPET, Bismarck, ND  
Greg Link, NDGF, Bismarck, ND

**Attachment: U.S. Fish and Wildlife Service additional information, concerns, and response to proposed offsets for the proposed Burke Wind Energy Center – March 7, 2019**

The high wetland density in the Burke project area is one characteristic indicating this area is highly valuable for wildlife. The Prairie Pothole Region is often referred to as North America's "duck factory", due to those wetlands and associated nesting habitat. The numerous wetlands are easily visible on aerial photos and are in stark contrast to more disturbed surrounding areas. For further clarity, our Habitat and Population Evaluation Team (HAPET) in Bismarck analyzed the November 2018 layout of the Burke Project (to our knowledge, the most current version) to compare the density of wetlands, and associated use by one group of migratory birds (waterfowl) in the Burke project area to other areas of North Dakota. The following points further illustrate what is apparent in aerial photos, and correlates the high wetland density of the Burke project area with high waterfowl use:

- Less than 1% (0.17%; 85 of 49,849) of one-square mile sections in North Dakota contain wetland communities that harbor over 200 pairs of breeding waterfowl. It is rare to find such productive areas in the state. However, at Burke, that percentage of that rare habitat is much higher than the state average: 24% (8 of 34) of the square mile sections within the project area have densities of 200+ pairs.
- Relatively more one-square mile sections in North Dakota contain wetland communities that harbor breeding waterfowl densities of over 100 pairs per square mile (which includes sections with 200+ pairs), but the percentage is still low at 11% statewide (5,767 of 49,849). In contrast, the same statistic at the Burke project area is significantly higher: 85% (29 of 34) of one-square mile sections in the wind project area support over 100 pairs of breeding waterfowl.
- Most one-square mile sections in North Dakota have wetland communities that harbor less than 100 pairs of breeding waterfowl. In this primarily agricultural state, it is not surprising that 89% of sections fall into that category. At Burke, however, the percentage of one-square mile sections containing wetland communities that attract less than 100 pairs is lower than the state average: only 14% (5 of 34 one-square mile sections). In other words, only a small portion of the Burke project contains a wetland community that attracts less than 100 pairs.
- Based on a peer-reviewed published study that documented avoidance of turbines by breeding pairs of waterfowl of wind turbines, an estimated 1004 breeding pairs of waterfowl may be displaced by the Burke wind farm (C. Loesch, USFWS, personal communication, 2019). This is based on an approximately 20% displacement rate from wetlands that are situated within ½ mile of wind turbines (Loesch et al. 2013). As a metric to estimate offsets necessary to compensate for waterfowl displacement,

236, 2.0-acre wetlands would need to be created or restored to compensate for this loss (C. Loesch, USFWS, personal communication, 2019).

Grassland are another feature easily visible from aerial photography that stand out from disturbed cropland areas. These areas include pasture and haylands, which are sometimes characterized as “disturbed” or “agricultural” lands when they may in fact be native prairie. Grassland areas in general, but particularly native prairie, are highly valuable habitats that support a diverse array of native wildlife species. These areas exist today at a fraction of their former expanse, and many of the species associated with them are steadily declining.

As we have noted in previous correspondence, grassland birds are known, like waterfowl, to be behaviorally impacted by industrial wind turbines on the landscape. Results of a robust, multi-year, multi-facility, before-after-control-impact (BACI) study conducted by U.S. Geological Service (USGS) revealed that grassland nesting birds tend to avoid industrial turbines placed in their grassland habitats. Seven of nine grassland species showed turbine avoidance out to 300 m, and the displacement rate, which averaged 53%, increased every year of the study up to 5 years post-construction (Shaffer and Buhl 2016). The Shaffer and Buhl (2016) study received NextEra funding and was conducted on operating NextEra wind facilities in North and South Dakota. We commend NextEra for funding this research and opening up their facilities for study. We encourage application of that science to the Burke project and other existing/future projects by calculating the number of acres of grasslands that fall within the 300 m buffer of turbines, and using the 53% displacement rate to determine appropriate grassland nesting bird offsets.

We consistently mention grasslands to wind developers as sensitive areas to avoid. Since the original Burke project area proposal, NextEra has removed 55 proposed turbines from grasslands. NextEra now indicates that 57 turbines are proposed in cropland and 19 more are proposed in native prairie or other types of grassland. The size of the wind farm has been reduced from 300MW to 200MW and the project boundary has been moved further from Lostwood National Wildlife Refuge. These actions have reduced the level of impact that the Burke facility would have had on wildlife, and we applaud NextEra for those efforts.

Herein, we also provide some feedback to a Burke Wind, LLC, February 15, 2019, letter from John Di Donato. The letter outlines actions taken by Burke Wind, LLC to reduce the impacts of the Burke project and proposes a monetary transfer to NDGF to compensate for residual effects.

The February 15, 2019, letter, was followed by a February 26, 2019, conference call (with staff from NextEra, NDGF, the Service, and consultants) to discuss that letter and the means by which NextEra calculated the proposed offsets to project impacts to wildlife. During that call, NextEra revealed that the current proposal includes indirect effects to migratory birds and we believe this is appropriate, but this wasn't clear in the February 15, 2019, letter. We have encouraged NextEra to offset both direct and indirect impacts on the Burke project, should development

proceed, and are encouraged to learn indirect impacts are part of the current offset proposal. A written description from NextEra regarding the methods, justifications, and calculations used to develop their current proposed monetary donation to NDGF was provided to us on March 5, 2019, and we are currently reviewing it. As discussed during the February 26, 2019, call, the March 5, 2019, proposal includes compensation for direct and indirect effects. We acknowledge that the proposal is voluntary and applaud the good-faith effort by NextEra to provide compensation for wildlife impacts. We plan to continue discussions with NextEra on this issue, and recommend that if a PSC permit is issued for this project, the offset plan is finalized and submitted as an integral part of the project prior to authorization.

We also note that the February 15, 2019, letter states that the Burke project was initially sited “to adhere to the voluntary U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines” (WEG). Based on that statement, it seems NextEra’s understanding of the purpose and intent of the WEG is not the same as our understanding of the role of this document in siting wind energy facilities. The Burke project location, particularly the original project footprint (since reduced from 300MW to 200MW in fall 2018), was placed within some of the most productive remnants of prairie pothole wildlife habitat remaining today that serves as breeding, wintering, and migration habitat for numerous native wildlife species. The WEG are designed to help developers identify environmentally sensitive areas such as these early in their development process, thereby precluding significant investments in projects that would ultimately be environmentally deleterious, protecting the environment as well as developers from substantial risk and cost. The grassland and wetland mosaic of the Missouri Coteau in the Burke project area represents the type of high wildlife value area the WEG should have red-flagged for NextEra as environmentally concerning.

We acknowledge the WEG are voluntary; permitting authority does not lie with our agency, and developers may proceed with development in environmentally sensitive areas despite anticipated impacts to wildlife. However, developers who do so will proceed with the knowledge that their project’s impacts in such areas are likely to be relatively high, thus higher levels of offsets would be necessary to be commensurate with those impacts. Chapter 8 of the WEG describes effects to wildlife that should be considered when developing offsets for wind development impacts, as well as supporting policy for those efforts. Both direct and indirect effects to wildlife are discussed and stressed as considerations throughout the WEG. The tiered system starts at a broad level, with increasingly detailed analysis in the first three tiers, which each serve as a decision point to either abandon the project site, or investigate further. The early indicators of the high wildlife value of the Burke project area have been supported by additional information gathered by NextEra per Tier 3 of the WEG (on-the-ground surveys for wildlife). NextEra has certainly applied other avoidance measures per the WEG, and again, we applaud the efforts to reduce impacts of the original project proposal and offset residual effects. However, in our view project site abandonment was supported per information gathered in the first tiers of the WEG, which is why we continue to recommend relocation of the project to a more disturbed area.

Some additional items outlined in the February 15, 2019, Burke Wind LLC letter are provided below, with our responses in italics:

- The Burk project will avoid all jurisdictional wetlands under purview of the U.S. Army Corps of Engineers (USACOE).
  - *Wetlands are certainly habitats to be avoided during wind energy development for reasons other than environmental consciousness, and such avoidance obviously benefits the resource. However, the term "jurisdictional" implies that non-jurisdictional wetlands at the Burke project location will not necessarily be avoided. We recommend avoidance, minimization, and finally compensation, in that order, for impacts to wetland resources at Burke for the benefit of wildlife – regardless of USACOE jurisdictional authority.*
- All Dakota skipper habitat will be avoided.
  - *With native prairie in the project area it could be possible for the Dakota skipper to be present, thus a habitat analysis was completed by a consultant. However, the consultant's report indicated that due to the timing (winter) and habitat conditions (senescent plants, under snow) of some survey information would benefit from additional surveys done at the appropriate time of year. Dakota skippers are reliant on specific habitat types with specific native plant species present. Remnant micro-patches of such habitats can exist within larger areas that may appear generally unsuitable for the species. In other words, multiple and thorough vegetative surveys, as well as surveys for adults during the flight period, may be needed to establish lack of Dakota skipper presence with high confidence. We encourage avoidance of all native plant areas to preclude impacts to this species if appropriate time of year surveys aren't feasible.*
- The project avoids as many wetlands as possible that represent suitable whooping crane stopover habitat.
  - *This effort appears to be based on an evaluation of whooping crane habitat on the Burke project area by Watershed Institute, Inc. However, per our records in Burke County, over 30 whooping crane stopover locations have been reported since the Service began collecting such reports (only 4% of actual stopovers are estimated to actually be reported), and these sightings occur within, and on all sides of, the proposed turbine locations. Modeling done by our HAPET Office in Bismarck (Niemuth et al. 2018), based on known whooping crane sightings as they relate to landscape features, confirms that much of the Burke project area suitable stopover habitat, ranked in the top decile of predicted use by whooping cranes (i.e. relatively high-probability areas for whooping crane occurrence). The project is near the center of the known whooping crane migration corridor of the only self-sustaining wild migratory population of whooping cranes in existence today.*

- *A whooping crane contingency plan is mentioned in the February 15, 2019, letter. We have requested, but not received this plan, as of this writing. Our understanding of such contingency plans on other projects, is that a protocol is typically established for staff to follow when or if whooping cranes are observed within two miles of turbines so that the turbines can be shutdown to protect the birds while they are in the area. Notably, this does not include observers tasked with actively looking for whooping cranes (monitoring) both inside and outside the wind project boundaries so that incoming birds may be spotted before reaching the wind facility. Instead the plans rely on staff who may or may not be present in or near areas where the birds may be observed, and are already dedicated to tasks that do not involve searches for these birds. As a result, contingency plans are viewed as less effective at lowering risks to whooping cranes due to the lower likelihood of detecting the birds.*
- *Next Era has verbally informed us that all overhead transmission lines will be marked with avian flight diverters, which would offer some protection of whooping cranes; transmission line collision is a significant known mortality factor for this species. However, note that this would reduce, not completely preclude, collisions with transmission lines and turbine collision remains a potential risk. No known whooping crane collisions have occurred at wind energy facilities to date; it may be that whooping cranes are generally not susceptible to such mortality. At this point, NextEra/Burke Wind LLC has not developed a Habitat Conservation Plan, and by avoiding USACOE jurisdictional wetlands, Service easements, and other potential forms of a federal nexus, section 7 of the Endangered Species Act (consultation by federal agencies) is not an option. Should a whooping crane mortality occur as a result of the Burke wind project facilities, section 9 (prohibitions) of the ESA would apply regarding unlawful take.*
- *Buffers have been established around raptor nests and sharp-tailed grouse leks.*
  - *These measures are appropriate, even though raptor nest locations may change before, during, and after construction, and grouse leks may shift as well, particularly post-construction if the buffer size from turbines is not large enough. Given the large project area, it is also possible that additional grouse leks exist in the project area that have not yet been identified and are not buffered from turbines. We recommend follow-up studies if the project proceeds to construction and operation, to document any changes in raptor nest and lek numbers and locations. In areas with surrounding available habitat in South Dakota, grouse have been observed to shift to areas outside wind farm boundaries rather than continue use of lekking areas among turbines, though the actual impact of that shift has not been assessed. Grouse, like waterfowl, are a species subject to recreational hunting, and like waterfowl and grassland birds, their populations*

*are best kept intact by ensuring their habitat remains intact - particularly the most productive areas, such as that within the proposed project area.*

- The Burke project avoids all Service easements in the project area.
  - *We commend the effort by NextEra to preclude direct footprint impacts on easement lands. The placement of turbines within the high concentration of easements in the Burke project area; however (which, like wetland density, serves as an early red-flag regarding the relatively high value of the project area), will result in displacement of breeding waterfowl and grassland birds on easements within ½ mile and 300 m of turbines, respectively.*
- A year of post-construction mortality is proposed to determine whether anticipated levels pre-construction are exceeded during operation.
  - *Monitoring by itself is not an offset for impacts. Monitoring is recommended in the WEG, and serves as a means to identify whether additional offsets are needed. If the project proceeds to construction, we recommend application of an adaptive management approach that includes consideration of additional offsets to appropriately account for impacts. The same concept applies to NextEra's proposed Wildlife Reporting and Response System which is cited in the letter. We certainly appreciate efforts to identify post-construction impacts and resulting data will help inform future projects, but the value of these items exists within the actions taken when after the data is obtained.*

Notably missing from the February 15, 2019, letter is any mention of eagles. Per the Prec-Construction Eagle and Avian Use Study for this project dated January 31, 2019, there were 50 bald eagles and eight golden eagles observed both incidentally and during point counts at the Burke project area. Most of these sightings were in the spring and fall, i.e. coinciding with migration. This is not surprising, as eagles frequently prey on waterfowl and the project area supports high waterfowl concentrations likely to draw eagles to the area. While the eagle and avian use study for the Burke project indicates survey protocols adhered to the Service's Eagle Conservation Plan Guidance (ECPG), the report lacks a determination of the risk posed to eagles as a result of this project. Both bald and golden eagles are known to suffer mortality via wind turbine collisions. Per the ECPG, preconstruction survey data is used to determine risk categories posed to eagles at the site with associated ability to reduce risk; those categories are:

- Category 1 – High risk to eagles, potential to avoid or mitigate impacts is low
- Category 2 – High or moderate risk to eagles, opportunity to mitigate impacts
- Category 3 – Minimal risk to eagles

A permit may not be appropriate for projects posing a Category 3 risk to eagles, but that is not necessarily the case for Categories 1 and 2. Eagle take permits may be attained via development of an Eagle Conservation Plan and submittal of an application to our Migratory Birds Division. Such a permit offers compliance with the Bald and Golden Eagle Protection Act. It is not clear

whether the ECPG modeling effort was conducted to determine which risk category applies to the Burke project area – we are not aware of whether this step was taken by NextEra, and if so, what the risk category may apply to the Burke project. We also unaware of any intent to develop an Eagle Conservation Plan or pursue an eagle take permit. We recommend using the ECPG recommended model to determine the risk category to eagles for this project, and if appropriate, pursuing an eagle take permit. Based solely on the documented eagle use and associated prey base at the Burke project site, it appears at first glance that unauthorized take of eagles may occur if this project proceeds to construction.

The Burke project area encompasses a high concentration of significant, relatively rare, high quality breeding waterfowl habitat in North Dakota that also supports high numbers of other wildlife species. Drainage of wetlands and conversion of grasslands to crops in the entire Great Plains, and particularly the Prairie Pothole Region, have incurred negative impacts to wildlife populations since European settlement of the prairie. Many of the species that persist today are at levels much below those of historical times and are still in decline. We acknowledge that many waterfowl populations currently appear to be relatively stable; the continued existence of important breeding areas such as those encompassed by the Burke project area and surrounding landscape are likely an important factor in that stability. Waterfowl are important both as a component of the prairie pothole ecosystem and of North Dakota's natural resource heritage, offering both consumptive and non-consumptive forms of recreation to the public. Conservation of areas with the most valuable breeding habitat, such as that within the Burke project area, will help ensure current stable and/or positive waterfowl population trends continue. Grassland nesting birds are generally not as fortunate, with most species experiencing steady declines today, primarily due to habitat loss, but conservation of waterfowl habitat that includes grasslands of the Prairie Pothole Region also helps mitigate impacts to declining species as well.

#### Literature Cited

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Niemuth, N. D., A. J. Ryba, A. T. Pearse, S. M. Kvas, D. A. Brandt, B. Wangler. 2018. Opportunistically collected data reveal habitat selection by migrating whooping cranes in the U.S. Northern Plains. *Condor* 120:343-356.

Shaffer, J. A. and D. A. Buhl. 2016. Effects of wind-energy facilities on breeding grassland bird distributions. *Conservation Biology* 30(1):59-71.



# United States Department of the Interior



## FISH AND WILDLIFE SERVICE

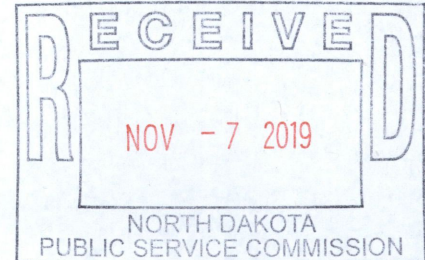
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IN REPLY REFER TO:  
NORTHERN DIVIDE  
WIND ENERGY  
CENTER

October 30, 2019

Ms. Lindsey Churchill  
AECOM  
Environmental Project Manager  
1000 East Calgary Avenue, Suite 1  
Bismarck, North Dakota 58503



Dear Ms. Churchill:

This letter is in response to your request dated August 16, 2019, for environmental comments regarding the above referenced Northern Divide Wind Energy Center (NDWEC) (formerly known as the Burke County Wind Energy Center (BCWEC)) under development by NextEra. This 200 MW facility with 79 turbines and associated infrastructure is proposed within Burke County, North Dakota and includes a 345 kV, 41-mile transmission line that extends into Mountrail County, North Dakota. Your letter requested a response within 30 days, indicating that if a response is not received by that date, it will be assumed we have no comment on the project. Please note that the 30-day deadline for our response set by your request is inappropriate. The developer of this project, NextEra, still must avoid violating section 9 of the Endangered Species Act, regardless of whether we are able to respond within your timeframe, and our position on a project cannot be assumed without our official response.

Earlier this year, the North Dakota Public Service Commission denied a permit for NextEra's BCWEC in this location, citing anticipated environmental impacts. Since that time, the primary changes to this wind facility are its rename to NDWEC, the shifting of turbines away from high duck density as well as from grasslands into croplands, and improvements on draft plans to offset habitat and wildlife impacts.

NextEra is in receipt of our written comments on this project via coordination under its previous BCWEC title, which includes information and recommendations regarding important wildlife habitats and U.S. Fish and Wildlife Service (Service) trust resources including federally listed species, eagles, birds of conservation concern, and other migratory birds that may occur in the project area and vicinity. Our November 25, 2018, letter (copy enclosed), includes guidelines and methods that apply to various components of any wind farm including turbines, meteorological towers, and power lines in order to avoid, minimize and/or compensate for impacts to trust resources and assist developers in achieving compliance with Federal laws. This information still applies to the renamed project, NDWEC.

More site-specific information on this project area was provided to NextEra in our March 6, 2019, BCWEC letter (copy enclosed). Based on project boundary maps of BCWEC and NDWEC, it appears that about 1/3 of the eastern portion of the former BCWEC is not part of the current project, but there is much overlap with the remaining 2/3 of the area. Due to overall project location, many of the comments and resource concerns provided in our March 6, 2019, letter still apply:

- The NDWEC project area is still within the Missouri Coteau and encompasses high density wetland areas clearly visible from aerial photos; this remains a red-flag issue regarding whether to develop the project in this area due to relatively greater risk for impacts to wildlife attracted to those wetlands. The high wetland density supports a correspondingly high density of waterfowl and other species.
- A diverse array of numerous other species are still anticipated to occur in the NDWEC project area including raptors, eagles, grouse, shorebirds, grassland birds and federally listed species, although we acknowledge that by placing turbines in cropland, the risk of anticipated impacts to some of these groups should be reduced.
- Direct impacts are still expected on native prairie at NDWEC, albeit reduced to 8 acres of “temporary” impact. Note that impacts to native prairie are not necessarily temporary, depending on the nature of the activity. Effective and comprehensive restoration actions are often needed, but are not always successful. For this reason, we continue to recommend complete avoidance of native prairie to the maximum extent possible. We do commend NextEra for the significant reduction of impacts to this habitat overall.
- Regarding the potential presence of the Dakota skipper in the NDWEC project area, the above recommendation to completely avoid native prairie would likely be effective in precluding impacts to this species. Absent that complete avoidance, we continue to recommend multiple and thorough vegetative surveys, as well as surveys for adults during the flight period either to determine Dakota skipper absence with confidence, or to identify occupied habitats to avoid. The majority of this species’ life cycle is spent on the ground, thus, moving forward with construction activities in native prairie – including temporary actions - without adequate information regarding this species presence/absence may directly impact any eggs, larva, pupa, and perhaps adults existing in the impacted area.
- We continue to advise that whooping cranes may occur in this area. The project location is in the whooping crane migration corridor and previous sightings, as well as suitable habitat, exist in/around the project area. We are in receipt of NextEra’s general whooping crane curtailment procedure for projects in the whooping crane corridor, but it is our understanding that a specific plan to address potential presence of the species at NDWEC has not yet been developed. If the project moves forward in the corridor, we recommend this plan incorporate adequate staffing levels and active monitoring actions to purposefully detect the species, as opposed to incidentally observe birds while performing other duties. Protective measures initiated once a whooping crane is sighted will need to be implemented in a timely manner in order to be effective. Be aware that such a plan will not necessarily preclude all risk to whooping cranes at NDWEC. It also does not prevent collisions with overhead power lines; line markers are known to reduce, but not preclude, power line collision mortality, which is a known threat to this species.

Installation of bird flight diverters had been planned for the BCWEC transmission line and are still proposed under the NDWEC project proposal. Note that these markers will need to be monitored and maintained after installation to ensure long-term effectiveness.

- Since the turbines have been relocated from grasslands to cropland, impacts to grouse leks are anticipated to be lower at NDWEC, but we do not have updated information in regard to proximity of the relocated turbines to existing leks. We recommend establishing distance buffers to these sensitive areas as per our Land-based Wind Energy Guidelines mentioned in our November 25, 2018, letter on BCWEC. The North Dakota Game and Fish (NDGF) staff can provide more guidance on recommended size of buffers as well as survey protocols should additional surveys be necessary to identify lek locations.
- We still do not have an indication of whether NextEra will seek an eagle take permit for this facility. Both bald and golden eagles were detected during preconstruction surveys in the area, and risk to these species may be high in this location due to concentrations of prey associated with the intact grasslands/wetlands in/around the project area. If you wish to seek an eagle take permit, please contact us for more information and updated regional guidance. We recommend close adherence to the Service's Eagle Conservation Plan Guidance mentioned in our November 25, 2018, letter on BCWEC.

We acknowledge that anticipated project impacts are reduced at NDWEC from the BCWEC project proposal, and we commend NextEra's efforts in that regard - particularly the relocation of all turbines to cropland. This is an action we recommend for every wind facility in North Dakota, yet is seldom undertaken even when cropland is abundant in a given project area. We recommend avoidance to the maximum extent possible, rather than to the extent "feasible" or "practicable" as is typically proposed. Placing NDWEC turbines in cropland is a significant step toward that end. Direct habitat loss and displacement of grassland nesting birds, including species of habitat fragmentation concern in North Dakota and Birds of Conservation Concern (online: <https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>) is expected to be lower at NDWEC than at BCWEC. Displacement of waterfowl pairs from wetlands within ½ mile of turbines is also expected to be lower as facilities were retracted from areas of northern pintail concentration, likely reducing impacts to other waterfowl species as well. Despite these measures, some impacts to prairie from roads and/or other project infrastructure/activities remain and avian displacement, among other impacts to wildlife, is still anticipated.

NextEra has indicated a commitment to implement a plan to address some of the remaining impacts anticipated with development at this site. NextEra's current draft of this proposal is outlined in a letter to NDGF dated October 1, 2019, plus an updated wetland offset via an October 23, 2019, email from Northern Divide Wind, LLC (effectively considered by the Service to be NextEra). Proposals by two entities, Ducks Unlimited and Magnolia, were also provided with some information on how wetland and grassland offsets for NDWEC impacts might be achieved on behalf of NextEra. The plan includes:

- A commitment to avoid future NextEra development in the Northern Missouri Coteau as defined by Bryce et al. (1996), should the NDWEC project be approved. [*Note: the Bryce et al. (1996) citation is a U.S. Geological Survey ecoregion map of North and*

*South Dakota. We have a 1998 version of this map and presume it to be similar to the cited 1996 version, which identifies the Northern Missouri Coteau as a small portion of the larger Missouri Coteau within the northwestern corner of North Dakota. If this is not the case, please indicate any differences or provide the 1996 map].* This commitment precludes additional phases to the NDWEC and would result in abandonment of a separate project identified as Hartland, which was being considered by NextEra.

- Habitat offsets addressing displacement impacts to grassland birds and waterfowl as identified in Shaffer and Buhl (2015)\* and Loesch et al. (2013). Additional relevant information (53% displacement value) used to calculate offsets per Shaffer et al. (2019) was applied, and the Service's Habitat and Population Evaluation Team (HAPET) provided input as well.

The commitment by NextEra to avoid additional development in the Northern Missouri Coteau is helpful, although it appears to be caveated with the condition that the proposed NDWEC progresses to construction/operation. Note that other highly valuable grassland/wetland complexes of the Prairie Pothole Region exist outside this particular area, many within the larger Missouri Coteau, thus avoidance of the Northern Missouri Coteau alone cannot preclude the potential for significant environmental impacts that may result from future projects. In determining areas to avoid, we recommend NextEra seek landscapes dominated by cropland with limited grassland/wetland habitats for development of their wind energy facilities. By avoiding these habitats, impacts to many species of wildlife will be significantly reduced as would the need for associated offset measures.

The NDWEC is anticipated to displace 487 pairs of waterfowl from adjacent wetlands and the aforementioned October 23, 2019, email indicates 196 wetland acres, or 98.2 2-acre wetlands are needed to compensate for that impact. That coincides closely with HAPET office calculations based on Loesch et al. (2013) as our office and NDGF have recommended.

Also per the October 1, 2019, letter to NDGF, it appears unbroken grasslands within a 300 m radius of turbines were tallied (188 acres) and used to calculate displacement of grassland birds (using a 53% displacement value) as our office and NDGF have recommended. Note that our office continues to recommend that any offset plans for this project address avian displacement known to occur in replanted grasslands as well, not just those that occur in native prairie (per Leddy et al. 1990); this impact and an associated offset is currently not included in the NDWEC plan. We suggest it be revised in that regard.

We also suggest that the October 1, 2019, plan provide the exact methods/criteria used to reach proposed offset values. A range of 39-116 pairs of grassland birds are estimated to be displaced at the NDWEC. This is based on two different estimates of breeding bird density (0.4 and 1.2 grassland birds per acre) at this site per George et al. (1992) and Shaffer and Buhl (2015)\*. However, the George et al. (1992) estimate of density does not appear to be an appropriate representative of density at the NDWEC. It was a study conducted on the Little Missouri National Grasslands in western North Dakota – a significantly drier landscape than the prairie pothole region within which the NDWEC is proposed – and included a year of severe drought, during which nesting density declined overall. We were also unable to find the 0.4 grassland birds per acre value that NextEra identified as being from the George et al. (1992) publication.

Similarly, we were unable to find the 1.2 density identified as being from the Shaffer and Buhl (2015)\* paper. If the current plan moves forward, we recommend either clarification of how these values were identified and applied, or they be removed from the plan as it does not appear these densities were used to determine grassland bird displacement offsets.

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 227.

Sincerely,



Scott Larson  
Field Supervisor  
North and South Dakota Field Offices

#### Enclosures

Cc: Greg Link, NDGF, Bismarck, ND  
Kory Richardson, USFWS, Lostwood NWR, Kenmare, ND  
Steve Kahl, NDPSC, Bismarck, ND

\*Shaffer and Buhl (2015) is the early release version of Shaffer and Buhl (2016) cited below

#### Literature cited

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Leddy, K. L, K. F. Higgins, D. E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. *Wilson Bulletin* 111(1):100-104.

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Shaffer, J. A. and D. A. Buhl. 2016. Effects of wind-energy facilities on breeding grassland bird distributions. *Conservation Biology* 30(1):59-71.

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# United States Department of the Interior



## FISH AND WILDLIFE SERVICE North Dakota Ecological Services

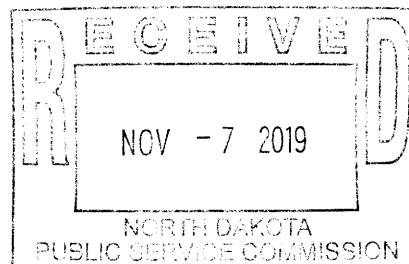
3425 Miriam Avenue  
Bismarck, North Dakota 58501-7926



IN REPLY REFER TO:  
2018-CPA-0037

November 25, 2018

Mr. Bourke Thomas  
Director, Environmental Services  
Atwell, LLC  
143 Union Boulevard, Suite 700  
Lakewood, CO 80228



Dear Mr. Thomas:

The purpose of this letter is to provide environmental comments and recommendations regarding the proposed Burke County Wind Energy Center (BCWEC) and transmission line in Burke and Mountrail Counties, North Dakota. Per your May 1, 2018, letter, the proposed wind facility was to have a nameplate capacity of up to 300 megawatts (MW) and would consist of a maximum of 123 turbines (111 GE 2.5 wind turbine generators and 12 GE 1.715 wind turbine generators) with associated access roads and collection lines. The BCWEC would interconnect to the electrical grid via approximately 39 miles of new overhead transmission line from the BCWEC substation. In the time since receipt of your letter, limited staff and high workload precluded a timely U.S. Fish and Wildlife Service (Service) response. We appreciate your patience and the informal coordination thus far via meetings, emails and phone calls that have occurred between our agency, yourself and WEST, Inc. as consultants on this project, and the BCWEC developer, NextEra.

Herein we provide our written response to the BCWEC project proposal, with information and recommendations regarding important wildlife habitats and Service trust resources including federally listed species, eagles, birds of conservation concern, and other migratory birds that may occur in the project area and vicinity. We have included guidelines and methods to be applied to various components of a wind farm including turbines, meteorological towers, and power lines in order to avoid, minimize and/or compensate for impacts to trust resources and assist NextEra, in achieving compliance with Federal laws. While some of the information below has been provided via informal coordination, additional pertinent details are mentioned below that serve to reiterate and supplement the information we have conveyed on the BCWEC to date.

The Service's most recent involvement regarding the BCWEC since your May 1, 2018, project proposal letter includes two events: a September 19, 2018, meeting and an October 10, 2018, conference call. At both of these events, the Service was represented by staff from the South Dakota Ecological Services Field Office (SDES), who are assisting this office in reviewing wind energy projects in North Dakota.

Per that coordination and review of the project area, our foremost recommendation regarding the BCWEC is to relocate the project to an area that would have less impact to natural resources.

If the project will not be relocated, our secondary recommendation is to submit a robust mitigation plan to offset the relatively high environmental impacts anticipated as a result of this project.

The project details noted above that were provided in your May 1, 2018, letter, to our knowledge still applied during the September 19, 2018, meeting at the SDES office in Pierre, South Dakota. NextEra and consultants provided SDES with background on the project and pertinent information regarding natural resources collected to date at the project site. Significant resource concerns exist at the current project location and were discussed at this meeting, e.g. the amount/number of grasslands and wetlands (approximately 7,000 prairie potholes); the proximity to Lostwood National Wildlife Refuge (NWR); the potential/known existence of federally listed species; and the likely impacts to other sensitive species at this site such as grassland nesting birds, raptors (about 40 known nests), waterfowl, and grouse (nearly 30 known/possible grouse leks). The project is also immediately adjacent to a state wildlife management area. These are indicators of the high resource value of the proposed project area. The information collected via the tiered approach outlined in our wind energy guidelines (see below), is intended to help developers make a decision on whether development plans should continue or not at a given site. As noted above, our primary recommendation at the closing of that September 19, 2018, meeting was that the BCWEC be constructed elsewhere. From an environmental perspective, it is a highly sensitive location to the detrimental impacts of wind energy development.

Also as noted above, our secondary recommendation by the SDES at that meeting - if NextEra chose to move forward with the project at this location - was that an appropriate mitigation plan be developed to compensate for the relatively high level of anticipated environmental impacts of BCWEC. We stressed that offsets in that plan, for indirect impacts in particular, should be based on the best available science regarding avian avoidance of wind turbines (Loesch et al. 2013 and Shaffer and Buhl 2016 – more information on these studies is provided below). NextEra indicated a desire to move forward with development, and committed to formulating a voluntary mitigation plan for review by the SDES (as well as to the North Dakota Game and Fish Department (NDGFD) with whom coordination has also occurred) by October 31, 2018. As of this writing, we have not received such a plan.

The primary topic of the October 10, 2018, conference call was a project update from NextEra. The project was proposed to be reduced in size from 300 MW to 200 MW, and a shift of a portion of the project boundary was proposed to put increased distance between the BCWEC and Lostwood NWR. We acknowledge that these actions would likely serve to lower the environmental impact of the project, but without the details of the turbine locations we are unable to quantify what the reductions would be. Furthermore, the project is still located in an area of high resource value, and significant impacts to those resources are still anticipated. With no mitigation plan in place to offset those resource impacts, the Service continues to recommend relocation of this project to an area with fewer natural resources at stake, preferably an area dominated by crop ground.

We reiterate the importance of the following comments provided by the NDGFD in their response letter to this project dated May 22, 2018, specifically: *“the proposed project area is some of the “best of the best” prairie-wetland habitat in North America”, and “Native prairie is the most endangered habitat type in North Dakota and, as a grassland state, the majority of our native wildlife species are linked to prairie. Disturbance, fragmentation, and loss of native prairie have adversely impacted a wide variety of species and these negative impacts will only continue to compound as more development takes place on the landscape.”*

Note that native prairie, once disturbed, can be difficult if not impossible to fully restore. Impacted wetlands may be restored depending on the type or degree of disturbance, but created wetlands are typically not equivalent to undisturbed wetlands in terms of function and quality for wildlife. Thus any removal of native prairie (regardless of patch size) and wetlands, including such actions often identified as “temporary impacts” actually become permanent impacts as the original value of these areas cannot be fully replaced. Wildlife, particularly some species of grassland nesting birds will be displaced both via direct habitat loss by establishment of infrastructure and the associated avoidance of this infrastructure on the landscape. Tools to quantify these impacts are described later in this letter.

Below we provide additional information typically included in response letters to developers. NextEra and consultants are likely aware of much of the information below; however, our intent is to ensure we have conveyed the pertinent information regarding the BCWEC project.

### **2012 Land-Based Wind Energy Guidelines**

Per ongoing coordination regarding this project you are aware of our voluntary 2012 *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (WEG) (available online at: <http://www.fws.gov/windenergy/>) which were developed in consultation with wind industry companies. We recommend close adherence to these guidelines, using the information gathered to first determine whether the project should be placed in the area of interest at all. The WEG invokes a tiered approach in which information is collected with increasing levels of detail in order to evaluate risk posed to habitats and wildlife at potential wind energy sites. Tiers 1-3 each represent a preconstruction decision point to either move forward to development, gather more information (i.e. move to the next tier), or to abandon project plans at a given site, thereby avoiding areas where development is precluded or where wildlife impacts are likely to be high and difficult or costly to remedy or mitigate at a later stage. If the project is to proceed at the chosen location, then the information gathered per the WEG is to be used to guide project specifics, such as turbine locations, and any needed mitigation measures. Wind energy facility effects to wildlife may be direct and indirect, including collision mortality, loss of habitat due to the footprint of the turbines/roads/other facilities, habitat fragmentation impacts, wildlife avoidance of turbines on the landscape, encroachment of invasive weeds, and more. Currently, the best strategy to avoid impacts to wildlife is to place wind energy facilities within existing cropland wherever possible, precluding impacts to valuable wildlife habitats. We request the results of any pre-/post-construction wildlife monitoring for this project.

## U.S. Fish and Wildlife Service Land Interests

The location of the proposed BCWEC falls within an area under the jurisdiction of the Service's Crosby WMD (Burke County), as well as the Lostwood Wetland Management District (WMD) (Montrail County). Existence of numerous Service easements and fee title properties in or near the project vicinity is typically a testament to the high wildlife value of a given area and the relatively greater environmental impacts that may be anticipated if a project is constructed there. We recommend avoidance, minimization of direct and indirect impacts to these areas, or compensatory measures for any direct or indirect unavoidable impacts. This must be coordinated with the appropriate Service office. If you have not already done so, please contact the Service's Crosby Wetland Management District (for Burke County), and the Lostwood WMD (for Mountrail County) to determine the exact locations of these properties and any additional restrictions that may apply regarding those sites. Contact information for each office may be found online at: <https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=38>.

## Eagle Guidance

Golden eagles (*Aquila chrysaetos*) and bald eagles (*Haliaeetus leucocephalus*) may occur in the proposed BCWEC project area. These birds are protected from a variety of harmful actions via take prohibitions in both the Migratory Bird Treaty Act<sup>1</sup> (MBTA; 16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668d). The BGEPA, enacted in 1940 and amended several times, prohibits take of bald eagles and golden eagles, including their parts, nests, young or eggs, except where otherwise permitted pursuant to federal regulations. Incidental take of eagles from actions such as electrocutions from power lines or wind turbine strikes are prohibited unless specifically authorized via an eagle incidental take permit from US Fish and Wildlife Service (Service). BGEPA provides penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." BGEPA defines take to include the following actions: "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Service expanded this definition by regulation to include the term "destroy" to ensure that "take" also encompasses destruction of eagle nests. Also the Service defined the term disturb which means to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.

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<sup>1</sup> On December 22, 2017, the Department of the Interior's (DOI) Office of the Solicitor Memorandum M-37050 titled The Migratory Bird Treaty Act Does Not Prohibit Incidental Take (<https://www.doi.gov/sites/doi.gov/files/uploads/m-37050.pdf>) concludes that the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same apply only to affirmative actions that have as their purpose the taking or killing of migratory birds, their nests, or their eggs. The MBTA list of protected species includes bald and golden eagles, and the law has been an effective tool to pursue incidental take cases involving eagles. However, the primary law protecting eagles is the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S. Code § 668), since the bald eagle was delisted under the Endangered Species Act in 2007. Memorandum-37050 does not affect the ability of the Service to refer entities for prosecution that have violated the take prohibitions for eagles established by the BGEPA.

The Service has developed guidance for the public regarding means to avoid take of bald and golden eagles:

- The 2007 *National Bald Eagle Management Guidelines* serve to advise landowners, land managers, and others who share public and private lands with bald eagles when and under what circumstances the protective provisions of BGEPA may apply. They provide conservation recommendations to help people avoid and/or minimize such impacts to bald eagles, particularly where they may constitute “disturbance,” which is prohibited by the BGEPA.  
<https://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf>
- The 2013 *Eagle Conservation Plan Guidance, Module 1- Land-based Wind Energy, Version 2* is specific to wind energy development and provides in-depth guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities. Development of an Eagle Conservation Plan per these guidelines may serve as the basis for applying for an eagle incidental take permit for wind energy facilities. Applications for such eagle incidental take permits must include an Eagle Conservation Plan.  
<https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>

The Service also has promulgated new permit regulations under BGEPA:

- New eagle permit regulations, as allowed under BGEPA, were promulgated by the Service in 2009 (74 FR 46836; Sept. 11, 2009) and revised in 2016 (81 FR 91494; Dec. 16, 2016). The regulations authorize the limited take of bald and golden eagles where the take to be authorized is associated with otherwise lawful activities. These regulations also establish permit provisions for intentional take of eagle nests where necessary to ensure public health and safety, in addition to other limited circumstances. The revisions in 2016 included changes to permit issuance criteria and duration, definitions, compensatory mitigation standards, criteria for eagle nest removal permits, permit application requirements, and fees in order to clarify, improve implementation and increase compliance while still protecting eagles.  
<https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/pdf/2016-29908.pdf>

The Service’s Office of Law Enforcement carries out its mission to protect eagles through investigations and enforcement, as well as by fostering relationships with individuals, companies, industries and agencies that have taken effective steps to avoid take, including incidental take of these species, and encouraging others to implement measures to avoid take. The Office of Law Enforcement focuses its resources on investigating individuals and entities that take eagles without identifying and implementing all reasonable, prudent, and effective

measures to avoid that take. Those individuals and entities are encouraged to work closely with Service biologists to identify available protective measures, and to implement those measures during all activities or situations where their action or inaction may result in the take of an eagle(s).

Note that the Service has also developed recommendations for wind developers specific to the Mountain-Prairie Region (Region 6):

- *Region 6 Recommendations for Avoidance and Minimization of Impacts to Golden Eagles at Wind Energy Facilities* –The goal of these recommendations is to contribute to maintaining stable or increasing breeding populations of eagles by recommending conservation measures that will maintain breeding territories and minimize impacts to other important eagle use areas (e.g., eagle nests, foraging areas, and communal roosts). [https://www.fws.gov/coloradoes/documents/Final\\_GOEA\\_Buffer\\_Recommendations\\_AvoidanceMinimization\\_WindFacilities\\_April\\_10\\_2013.pdf](https://www.fws.gov/coloradoes/documents/Final_GOEA_Buffer_Recommendations_AvoidanceMinimization_WindFacilities_April_10_2013.pdf).
- *Final Outline and Components of an Eagle Conservation Plan (ECP) for Wind Development: Recommendations from USFWS Region 6* – In the event a project proponent intends to develop an ECP, this Region 6 document provides recommendations, in an outline format, for developing and organizing the content of an ECP, and includes additional details on topics that should be addressed in the plan. [https://www.fws.gov/coloradoes/documents/Final\\_USFWS\\_R6\\_ECP\\_guidance.pdf](https://www.fws.gov/coloradoes/documents/Final_USFWS_R6_ECP_guidance.pdf).

We recommend close adherence to the guidelines above, including modeling of eagle data to determine the level of risk posed by the project and possible need for an eagle take permit. We request results of any eagle data collected at the BCWEC.

### **Threatened/Endangered Species**

In accordance with section 7(c) of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), we have determined that the following federally listed species may occur in the project area (this list is considered valid for 90 days):

<u>Species</u>	<u>Status</u>	<u>Expected Occurrence</u>
Northern Long-eared bat ( <i>Myotis septentrionalis</i> )	Threatened	Summer resident, seasonal migrant
Least Tern ( <i>Sterna antillarum</i> )	Endangered	Summer resident, seasonal migrant
Piping Plover ( <i>Charadrius melodus</i> )	Threatened	Summer resident, seasonal migrant
Whooping Crane	Endangered	Spring and fall migration

*(Grus americana)*Dakota Skipper  
*(Hesperia dacotae)*

Threatened

Possible seasonal resident

Rufa Red Knot  
*(Calidris canutus rufa)*

Threatened

Rare seasonal migrant

Northern Long-eared Bat

The northern long-eared bat is a medium-sized brown bat listed as threatened under the Endangered Species Act. Northern long-eared bats are known to be present in North Dakota, primarily roosting singly or in colonies underneath bark, in cavities or in crevices of both live and dead trees. The species has been documented in forested areas in the state during the summer months. Summer survey guidelines for this species are identical for those established for the Indiana Bat (available online at:

<https://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html>).

White nose syndrome - a fungus affecting hibernating bats - is considered a significant threat to this species, but individuals may be harmed by other activities such as modifications to hibernacula, timber harvest, human disturbance, and collisions with wind turbines. Currently, feathering turbine blades and increasing cut-in speeds beyond manufacturers' levels are recommended measures to reduce the risk of bat mortality at wind generation facilities. A 4(d) rule has been published that exempts take of Northern long-eared bats in certain circumstances. For more information, see:

<https://www.fws.gov/Midwest/Endangered/mammals/nleb/index.html>.

Least Tern and Piping Plover

Least terns and piping plovers occur along the Missouri River and piping plovers also use alkaline wetlands/lakes in in North Dakota. Their habitats include sparsely vegetated interchannel sandbars, islands, and shorelines used for nesting, foraging and brood-rearing. They are sensitive to human disturbances which can limit reproduction. No construction should take place within 1/4 mile of any known piping plover or least tern nest. The specific migration habits of the least tern and piping plover in North Dakota are not known, but in addition to the potential nesting of these species in the area, they may also occur onsite as they move to/from adjacent nesting areas when foraging, dispersing from natal areas, and/or migrating. Both species typically occur in North Dakota May through August.

Whooping Crane

The BCWEC is located within an important area for migrating whooping cranes. The proposed project location is within the documented migration corridor of the Aransas/Wood Buffalo population - the only self-sustaining migratory population of whooping cranes in existence. Potential whooping crane habitat in North and South Dakota has been identified by the Service's Habitat and Population Evaluation Team (HAPET) in Bismarck and is described in Niemuth et al. (2018). Per the model developed via that work, the proposed project footprint encompasses an area of high relative probability of landscape-level habitat use by migrating whooping cranes. For more information you may contact the Service's HAPET office to request the Whooping Crane model of predicted use of landscapes to better assess the risks to whooping cranes from

development within the project area. Numerous whooping crane sightings during migration have been reported in and around the BCWEC project area, including, as you know, an observation that occurred during wildlife surveys for this project. Whooping cranes migrate through North Dakota twice annually on their way to northern breeding grounds and southern wintering areas, occupying numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which to stand and rest. Whooping cranes are large birds with low maneuverability. Line strike mortality is the greatest known threat to fledged whooping cranes. Mortality via turbine strikes may also pose a risk if the birds utilize habitat near wind farm sites. Loss of stopover habitat in the migration corridor is a concern that may be realized if whooping cranes tend to avoid wind farms. Additionally, should construction occur during spring or fall migration, the potential for disturbance (flushing the birds) of whooping cranes exists. Disturbance stresses them at critical times of the year and should be avoided. These issues should be addressed prior to wind farm development. Sightings of whooping cranes at any time should be reported to this office. Please note that use of the proposed project area by sandhill cranes may be indicative of the potential presence of whooping cranes since the two species are often observed utilizing the same habitats and migrating together.

#### Dakota Skipper

The Dakota skipper is a small prairie butterfly listed as a threatened species under the Endangered Species Act (see: <http://www.gpo.gov/fdsys/pkg/FR-2014-10-24/pdf/2014-25190.pdf>). Dakota skippers are obligate residents of high quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed grass prairie that may harbor such species as purple coneflower (*Echinacea angustifolia*), wood lily (*Lilium philadelphicum*) and mountain deathcamas (smooth camas; *Zigadenus elegans*) (see listing above listing rule for detailed habitat descriptions). Their dispersal ability is very limited due in part to their short adult life span and single annual flight. Extirpation from a site may be permanent unless it occurs within about 0.6 miles of an inhabited site that generates a sufficient number of emigrants. Avoidance of impacts to native prairie habitat is recommended to reduce the risk of adverse effects to this species. Survey protocols have recently been developed for North Dakota; the *2018 Dakota Skipper (Hesperia dacotae) North Dakota Survey Protocol* is available online at: [https://www.fws.gov/mountain-prairie/es/protocols/2018\\_FINAL%20Dakota%20Skipper%20Survey%20Protocol\\_4202018.pdf](https://www.fws.gov/mountain-prairie/es/protocols/2018_FINAL%20Dakota%20Skipper%20Survey%20Protocol_4202018.pdf). The species is difficult to detect and identify; only experienced, qualified personnel can accurately conduct surveys for this species.

#### Rufa Red Knot:

The rufa red knot is a robin-sized shorebird listed as threatened under the Endangered Species Act. The red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the Southeast United States, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. Although it is primarily a coastal species, small numbers of rufa red knots are reported annually across the interior United States (i.e., greater than 25 miles from the Gulf or Atlantic Coasts) during spring and fall migration. These reported sightings are concentrated along the Great Lakes, but multiple reports have been made from nearly every interior State, including North Dakota. The species does not breed in this state.

## **Wetlands**

According to the National Wetlands Inventory numerous (and as indicated earlier, approximately 7,000 per our September 19, 2018 meeting) wetlands exist within the proposed project area. If a project may impact wetlands or other important fish and wildlife habitats, the Service, in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible; then minimization of any adverse impacts; and finally, replacement of any lost acres; in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland acres to be impacted and the methods of replacement should be prepared and submitted to the resource agencies for review. We recognize an effort has been made to identify wetlands in the project area that may be deemed jurisdictional to the U.S. Army Corps of Engineers (USACOE) in order to determine the need for a permit at the BCWEC location; however, our recommendation to avoid, minimize, and compensate for impacts applies to all wetlands regardless of USACOE determinations.

## **Birds of Conservation Concern**

The Migratory Birds Division of the Service has published *Birds of Conservation Concern 2008*, which may be found online at:

<https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>. This document is intended to identify species in need of coordinated and proactive conservation efforts among State, Federal, and private entities, with the goals of precluding future evaluation of these species for ESA protections and promoting/conserving long-term avian diversity. There are 27 species listed in the BCC document that occur within Bird Conservation Region 11 (Prairie Potholes), many of which undoubtedly inhabit the BCWEC project area. Some of these species are also identified as species of habitat fragmentation concern (as described in the WEG; list provided to you previously by this office) and the NDGFD has indicated that Species of Conservation Priority per their *North Dakota State Wildlife Action Plan* exist in the project area as well. Many of the same species appear on each of these different lists, highlighting the need for proactive measures to address their decline. Direct and indirect effects to these species will occur with establishment of the BCWEC. In accordance with Executive Order 13186 regarding migratory bird protection, we recommend avoidance, minimization, and finally compensation to reduce the impacts to these species which are also protected by the MBTA. Compliance with this law may be partially addressed in a Bird and Bat Conservation Strategy (BBCS) (identified within the WEG and explained further below).

## **Avian Avoidance of Wind Turbines**

As indicated in the WEG, wind turbines are known to impact migratory birds directly, with post-construction mortality surveys typically recommended for 1-2 years (or more) in order to identify mortality levels. Importantly, the WEG also identifies the indirect effects of wind energy facilities such as fragmentation effects and avian avoidance of turbines resulting in displacement to other habitats. While direct impacts can readily be observed and quantified,

these indirect impacts are more difficult to quantify and require more time and effort. The Before-After-Control-Impact (BACI) method for avian studies is recommended in the WEG. This study design is particularly useful in determining indirect effects of wind projects on wildlife, but such studies are rarely conducted typically due to those time/effort constraints. In the absence of robust project-specific research at every wind farm, two relatively recent studies are of particular importance to this issue of quantifying avoidance/displacement: Loesch et al. (2013) and Shaffer and Buhl (2016).

Loesch et al. (2013) evaluated breeding waterfowl pairs on wetlands at existing wind farms and reference sites in the Prairie Pothole Region. Displacement within 805 meters (0.5 mile) of wind turbines was detected at an average rate of 21% by five waterfowl species.

Similarly, Shaffer and Buhl (2016) evaluated wind farms and reference sites in the Prairie Pothole Region, but their research was on grassland nesting birds and also included pre-construction data thus this study applied the BACI method. Their results also detected avoidance of turbines by seven species. The average rate of displacement out to 300 meters (0.19 mile) from wind turbines was 55% by the 5<sup>th</sup> year post-construction. This research also detected a trend: displacement rates of grassland nesting birds continued to increase annually during those 5 years post-construction.

Both of these peer reviewed, published studies were conducted over multiple years, on multiple wind farms, involved large sample sizes, used reference sites for comparison, and were conducted on wind farms in North and South Dakota where many of the same species likely to occur at BCWEC were observed to avoid wind turbines. If the BCWEC proceeds, we recommend quantification of wetlands within ½ mile of turbines, of grasslands within 300 m of turbines, and then application of the displacement rates from the Loesch et al. (2013) and Shaffer and Buhl (2016) studies to determine and disclose anticipated indirect impacts. This information is needed to adequately develop an appropriate mitigation plan to offset this form of habitat loss, and we encourage NextEra to provide that plan as part of the project.

## **Mitigation**

The Service's mitigation policy was established in 1981 to help assure consistent and effective mitigation recommendations that help Federal action agencies and developers plan for mitigation measures early, avoid delays, and assure equal consideration of fish and wildlife resources with other project features and purposes. Our policy adopts the definition of the term "mitigation" as stated in the NEPA regulations which includes: "(a) avoiding the impact altogether by not taking a certain action or parts of an action; (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; (c) rectifying the impact by restoring the affected environment; (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and (e) compensating for the impact by replacing or providing substitute resources or environments." As noted above, direct and indirect effects to wildlife are known to occur at wind energy facilities. We encourage analysis of both types of impact and quantification of those impacts whenever possible. The mitigation methods above can be applied to reduce direct and indirect effects at any point in the process of project

development; however, we recommend early planning to help ensure full implementation of any necessary mitigation measures.

### **Bird and Bat Conservation Strategy**

Bird and bat conservation strategies are recommended in the WEG. We have developed a regional document to further assist companies in following our established national guidance on BBCSs, *U.S. Fish and Wildlife Service, Region 6, Mountain-Prairie Region Outline for a Bird and Bat Conservation Strategy: Wind Energy Projects* available online at: <https://www.fws.gov/coloradoes/documents/Final%20R6%20BBCS%20Outline%20with%20anotation.pdf>. As stated in the introduction of that document: a BBCS "...is a life-of-a-project framework for identifying and implementing actions to conserve birds and bats during wind energy project planning, construction, operation, maintenance, and decommissioning. It is the responsibility of wind energy project developers and operators to effectively assess project-related impacts to birds, bats and their habitats, and to work to avoid and minimize those impacts." A BBCS explains the actions taken by developers as they progress through the tiers of the WEG, describing the analyses, studies, and reasoning implemented with the purpose of mitigating for potential avian and bat impacts. It also addresses post-construction monitoring and habitat impacts. We recommend completion of a BBCS for this proposed energy wind facility.

### **Meteorological Towers**

Communication towers are a known mortality hazard to wildlife, particularly birds. To assist developers in establishing communications towers that are more compatible with wildlife, we have developed our 2018 *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning*, available online at: <https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php>. These recommendations incorporate the state of the science and the 2015 Federal Aviation Administration's *Obstruction Marking and Lighting Advisory Circular AC 70/7460-1L*, online at: [https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_70\\_7460-1L\\_with\\_chg\\_1.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_70_7460-1L_with_chg_1.pdf). Among the primary concerns addressed within our guidelines are the establishment of new towers on the landscape, the heights of these towers, their lighting scheme, and means of structural support. Collocation of communications tower facilities on an existing structure is strongly recommended to avoid any additional impacts to migratory birds. If a new tower is necessary, placement of the new tower near other existing structures is recommended to concentrate the risk posed by the towers to relatively small areas. Minimization of tower height (below 200 feet to preclude the need for Federal Aviation Administration lighting requirements), use of only strobe or flashing lights (avoid steady-burning lights), and avoidance of guy wires (a great deal of avian mortality is a result of collisions with supporting guy wires) are important components intended to minimize potential impacts to migratory birds. The habitat at a tower location and surrounding area can also affect its level of risk to wildlife. Tower placement should occur in degraded sites avoiding ridgelines, coastal areas, wetlands or other bird concentration areas such as staging areas, rookeries, leks, and state or federal refuges. Please see the website provided above for additional information.

## Overhead Power Lines

The construction of additional overhead power lines associated with wind farms creates the threat of avian electrocution, particularly for raptors. Thousands of these birds, including endangered species, are killed annually as they attempt to utilize overhead power lines as nesting, hunting, resting, feeding, and sunning sites. The Service recommends the installation of underground, rather than overhead, power lines whenever possible/appropriate to minimize environmental disturbances. For all new overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent avian electrocutions. The publication entitled *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* includes many measures to reduce risk to birds including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute via their website at: <http://www.eei.org/resourcesandmedia/products/Pages/products.aspx>, or by calling 202-508-5000.

Please note that utilizing just one of the "*Suggested Practices . . .*" methods may not entirely remove the threat of electrocution to raptors. In fact, improper use of some methods may increase electrocution mortality. Perch guards, for example, may be only partially effective as some birds may still attempt to perch on structures with misplaced or small-sized guards and suffer electrocution as they approach too close to conducting materials. Among the most dangerous structures to raptors are poles that are located at a crossing of two or more lines, exposed above-ground transformers, or dead end poles. Numerous hot and neutral lines at these sites, combined with inadequate spacing between conductors, increase the threat of raptor electrocutions. Perch guards placed on other poles has, in some cases, served to actually shift birds to these more dangerous sites, increasing the number of mortalities. Thus, it may be necessary to utilize other methods or combine methods to achieve the best results. The same principles may be applied to substation structures.

Please also note that the spacing recommendation within the "*Suggested Practices . . .*" publication of at least 60 inches between conductors or features that cause grounding may not be protective of larger raptors such as eagles. This measure was based on the fact that the skin-to-skin contact distance on these birds (i.e., talon to beak, wrist to wrist, etc.) is less than 60 inches. However, an adult eagle's wingspan (distance between feather tips) may vary from 66 to 96 inches depending on the species (golden or bald) and gender of the bird, and unfortunately, wet feathers in contact with conductors and/or grounding connections can result in a lethal electrical surge. Thus, the focus of the above precautionary measures should be to a) provide more than 96 inches of spacing between conductors or grounding features, b) insulate exposed conducting features so that contact will not cause raptor electrocution, and/or c) prevent raptors from perching on the poles in the first place.

Additional information regarding simple, effective ways to prevent raptor electrocutions on power lines is available in video form. *Raptors at Risk* may be obtained by contacting EDM International, Inc. at 4001 Automation Way, Fort Collins, Colorado 80525-3479, Telephone No. (970) 204-4001, or by visiting their website at:

<https://www.edmlink.com/component/zoo/item/video-raptors-at-risk>.

In addition to electrocution, overhead power lines also present the threat of avian line strike mortality. Particularly in situations where these lines are adjacent to wetlands or where waters exist on opposite sides of the lines, we recommend marking them in order to make them more visible to birds. For more information on bird strikes, please see *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* which, again, may be obtained by contacting the Edison Electric Institute via their website at:

<http://www.eei.org/resourcesandmedia/products/Pages/products.aspx>, or by calling 202-508-5000.

While marking of power lines reduces line strike mortality, it does not preclude it entirely. Thus, marking of additional, existing, overhead lines is recommended to reduce the impacts from avian line strike mortality. As noted above, the whooping crane is particularly susceptible to this type of mortality, and the proposed BCWEC occurs within the whooping crane migratory corridor. Marking of additional existing lines elsewhere in the species' corridor is recommended per the Service's whooping crane line marking policy (enclosed).

### Summary

Below we reiterate items above that are pertinent to the proposed project and links to further resources:

- First consider alternate project sites to avoid impacts to high value habitat and wildlife
- Second, if development proceeds, submit plans to offset impacts
- Wind energy guidelines
  - *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines*  
<http://www.fws.gov/windenergy/>
- Service land interests
  - Contact Crosby and Lostwood WMDs
- Eagle guidance
  - Bald and Golden Eagle Protection Act (BGEPA)
  - *National Bald Eagle Management Guidelines*  
<https://www.fws.gov/northeast/ecologicalservices/pdf/NationalBaldEagleManagementGuidelines.pdf>
  - *Eagle Conservation Plan Guidance, Module 1 – Land-based Wind Energy Version 2*  
<https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>
  - Eagle take permit  
<https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/pdf/2016-29908.pdf>
  - *Region 6 Recommendations for Avoidance and Minimization of Impacts to Golden Eagles at Wind Energy Facilities*

- [https://www.fws.gov/coloradoes/documents/Final\\_GOEA\\_Buffer\\_Recommendations\\_AvoidanceMinimization\\_WindFacilities\\_April\\_10\\_2013.pdf](https://www.fws.gov/coloradoes/documents/Final_GOEA_Buffer_Recommendations_AvoidanceMinimization_WindFacilities_April_10_2013.pdf)
- *Final Outline and Components of an Eagle Conservation Plan (ECP) for Wind Development: Recommendations from USFWS Region 6*  
[https://www.fws.gov/coloradoes/documents/Final\\_USFWS\\_R6\\_ECP\\_guidance.pdf](https://www.fws.gov/coloradoes/documents/Final_USFWS_R6_ECP_guidance.pdf)
  - Threatened/endangered species - Endangered Species Act (ESA)
    - Northern long-eared bat
    - Least tern
    - Piping plover
    - Whooping crane
    - Dakota skipper
    - Rufa red knot
  - Wetlands - avoid, minimize, compensate for unavoidable impacts  
<https://www.fws.gov/wetlands/>
  - Birds of Conservation Concern - *Birds of Conservation Concern 2008*  
<https://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf>
  - Avian Avoidance of Wind Turbines - indirect effects
    - Loesch et al. (2013) - waterfowl avoidance
    - Shaffer and Buhl (2016) - grassland nesting bird avoidance
  - Mitigation - 1981 Service Mitigation Policy  
[https://www.fws.gov/policy/a1npi89\\_02.pdf](https://www.fws.gov/policy/a1npi89_02.pdf)
  - Bird and Bat Conservation Strategy - WEG and *U.S. Fish and Wildlife Service, Region 6, Mountain-Prairie Region Outline for a Bird and Bat Conservation Strategy: Wind Energy Projects*  
<https://www.fws.gov/coloradoes/documents/Final%20R6%20BBCS%20Outline%20with%20annotation.pdf>
  - Meteorological Towers
    - *2018 Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning*  
<https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds/collisions/communication-towers.php>
    - 2015 Federal Aviation Administration Obstruction Marking and Lighting Advisory Circular AC70/7460-1L  
[https://www.faa.gov/documentLibrary/media/Advisory\\_Circular/AC\\_70\\_7460-1L\\_with\\_chg\\_1.pdf](https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_70_7460-1L_with_chg_1.pdf)
  - Overhead Power Lines
    - *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*

- <http://www.eei.org/resourcesandmedia/products/Pages/products.aspx>
- *Raptors at Risk* video  
<https://www.edmlink.com/component/zoo/item/video-raptors-at-risk>
- *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*  
<http://www.eei.org/resourcesandmedia/products/Pages/products.aspx>

If changes are made in the project plans or operating criteria, or if additional information becomes available, the Service should be informed so that the above determinations can be reconsidered.

We appreciate the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates at (605) 224-8693, Extension 227.

Sincerely,

Scott Larson  
Field Supervisor  
North and South Dakota Field Offices

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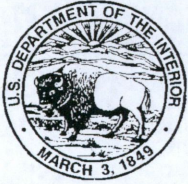
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Shaffer, J. A. and D. A. Buhl. 2016. Effects of wind-energy facilities on breeding grassland bird distributions. *Conservation Biology* 30(1):59-71.

#### Enclosure

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# United States Department of the Interior



## FISH AND WILDLIFE SERVICE Mountain-Prairie Region

IN REPLY REFER TO:  
FWS/R6  
ES

MAILING ADDRESS:  
P.O. Box 25486, DFC  
Denver, Colorado 80225-0486

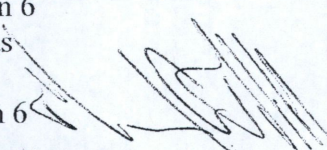
STREET LOCATION:  
134 Union Boulevard  
Lakewood, Colorado 80228-1807

FEB 04 2010



### Memorandum

To: Field Office Project Leaders, Ecological Services, Region 6  
Montana, North Dakota, South Dakota, Nebraska, Kansas

From: Assistant Regional Director, Ecological Services, Region 6 

Subject: Region 6 Guidance for Minimizing Effects from Power Line Projects Within the Whooping Crane Migration Corridor

This document is intended to assist Region 6 Ecological Services (ES) biologists in power line (including generation lines, transmission lines, distribution lines, etc.) project evaluation within the whooping crane migration corridor. The guidance contained herein also may be useful in planning by Federal action agencies, consultants, companies, and organizations concerned with impacts to avian resources, such as the Avian Power Line Interaction Committee (APLIC). We encourage action agencies and project proponents to coordinate with their local ES field office early in project development to implement this guidance.

The guidance includes general considerations that may apply to most, but not every, situation within the whooping crane migratory corridor. Additional conservation measures may be considered and/or discretion may be applied by the appropriate ES field office, as applicable. We believe that in most cases the following measures, if implemented and maintained, could reduce the potential effects to the whooping crane to an insignificant and/or discountable level. Where a Federal nexus is lacking, we believe that following these recommendations would reduce the likelihood of a whooping crane being taken and resulting in a violation of Endangered Species Act (ESA) section 9. If non-Federal actions cannot avoid the potential for incidental take, the local ES field office should encourage project proponents to develop a Habitat Conservation Plan and apply for a permit pursuant to ESA section 10(a)(1)(B).

Finally, although this guidance is specific to impacts of power line projects to the whooping crane within the migration corridor, we acknowledge that these guidelines also may benefit other listed and migratory birds.

If you have any questions, please contact Sarena Selbo, Section 7 Coordinator, at (303) 236-4046.

**Region 6 Guidance for Minimizing Effects from Power Line Projects  
Within the Whooping Crane Migration Corridor**

- 1) Project proponents should avoid construction of overhead power lines within 5.0 miles of designated critical habitat and documented high use areas (these locations can be obtained from the local ES field office).
- 2) To the greatest extent possible, project proponents should bury all new power lines, especially those within 1.0 mile of potentially suitable habitat<sup>1</sup>.
- 3) If it is not economically or technically feasible to bury lines, then we recommend the following conservation measures be implemented:
  - a) Within the 95-percent sighting corridor (see attached map)
    - i) Project proponents should mark<sup>2</sup> new lines within 1.0 mile of potentially suitable habitat and an equal amount of existing line within 1.0 mile of potentially suitable habitat (preferably within the 75-percent corridor, but at a minimum within the 95-percent corridor) according to the U.S. Fish and Wildlife Service (USFWS) recommendations described in APLIC 1994 (or newer version as updated).
    - ii) Project proponents should mark replacement or upgraded lines within 1.0 mile of potentially suitable habitat according to the USFWS recommendations described in APLIC 1994 (or newer version as updated).
  - b) Outside the 95-percent sighting corridor within a State's borders

Project proponents should mark new lines within 1.0 mile of potentially suitable habitat at the discretion of the local ES field office, based on the biological needs of the whooping crane.
  - c) Develop compliance monitoring plans

Field offices should request written confirmation from the project proponent that power lines have been or will be marked and maintained (i.e., did the lines recommended for marking actually get marked? Are the markers being maintained in working condition?)

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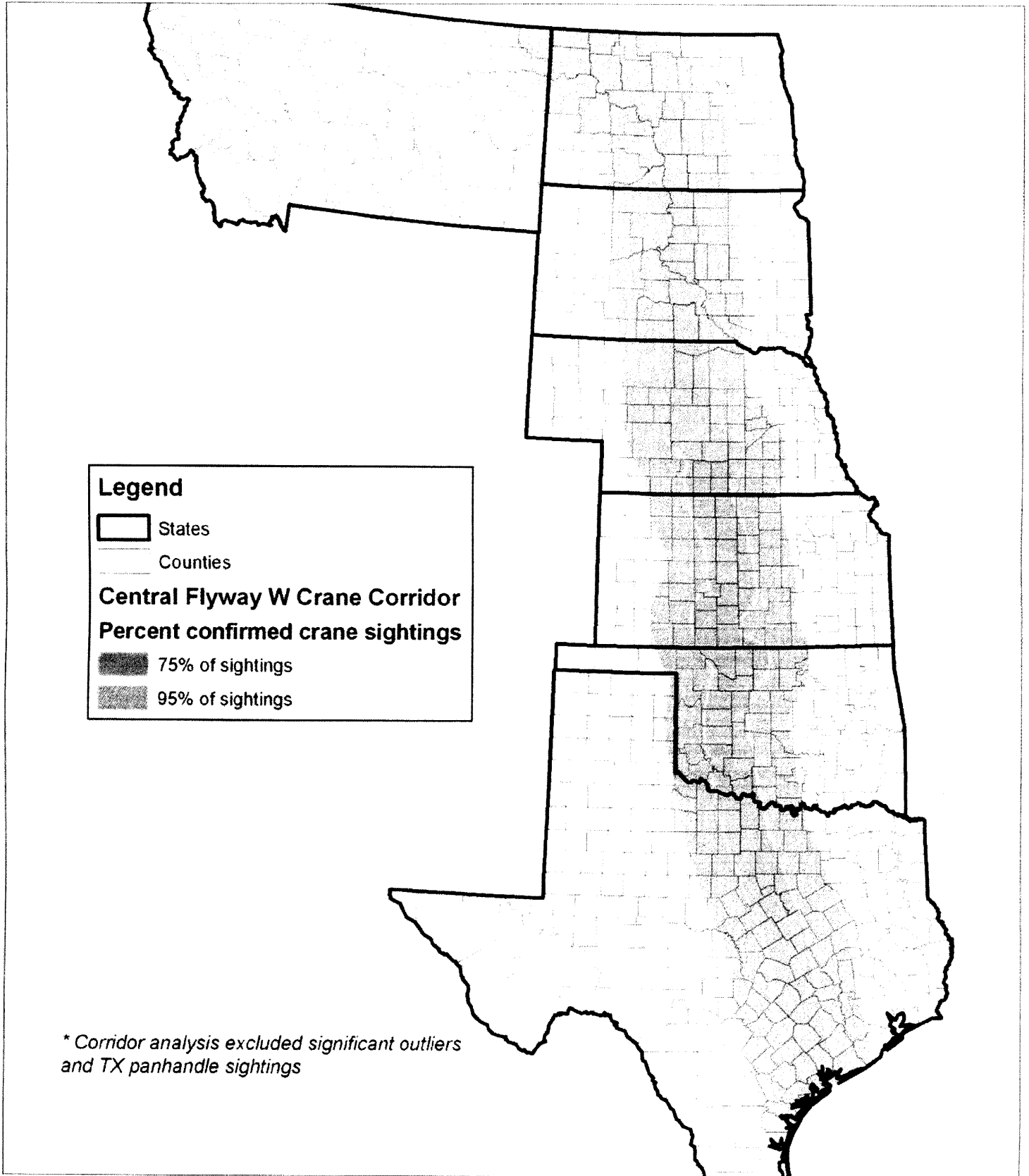
<sup>1</sup> Potentially suitable migratory stop over habitat for whooping cranes includes wetlands with areas of shallow water without visual obstructions (i.e., high or dense vegetation) (Austin & Richert 2001; Johns et al. 1997; Lingle et al. 1991; Howe 1987) and submerged sandbars in wide, unobstructed river channels that are isolated from human disturbance (Armbruster 1990). Roosting wetlands are often located within 1 mile of grain fields. As this is a broad definition, ES field office biologists should assist action agencies/applicants/companies in determining what constitutes potentially suitable habitat at the local level.

<sup>2</sup> Power lines are cited as the single greatest threat of mortality to fledged whooping cranes. Studies have shown that marking power lines reduces the risk of a line strike by 50 to 80 percent (Yee 2008; Brown & Drewien 1995; Morkill & Anderson 1991). Marking new lines and an equal length of existing line in the migration corridor maintains the baseline condition from this threat.

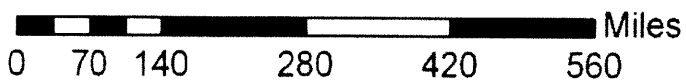


U.S. Fish & Wildlife Service

United States Central Flyway Whooping Crane Migration Corridor \*



Produced for Ecological Services  
 Grand Island, NE  
 Current to: 2008  
 Basemap (Date): U.S. Counties  
 Meridian:  
 File:



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