



IN REPLY REFER TO:
Crocker Wind Farm/ EA

United States Department of the Interior



FISH AND WILDLIFE SERVICE
South Dakota Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

May 8, 2018

Crocker Wind EA comments
Attn: Connie Mueller
Waubay NWR Complex
44401 134 A Street
Waubay, SD 57273

Dear Ms. Mueller:

We respectfully submit this letter and list of specific comments (attachment) in response to the March 2018, Crocker Wind Farm Draft Environmental Assessment (EA). We appreciate all the coordination your office has undertaken on this project and believe your involvement was key to achieving reductions of negative impacts to the National Wildlife Refuge System. We also acknowledge the importance of your efforts to encourage mitigation for the unavoidable impacts to Trust Resources, and we remain available to assist you as you make future decisions for this project.

This letter highlights what we view as the most important issues regarding this project and the EA, as well as some additional information presented in the attached detailed comments. The attachment notes specific comments and identifies the sections, page number, paragraph number and lines/bulleted items of concern so that these items might more easily be addressed in development of a final EA.

The Crocker Wind Farm is a 400 MW project with up to 120 turbines and is the second proposed wind energy facility to tier to the Upper Great Plains Wind Energy Programmatic Environmental Impact Statement (PEIS) (Western Area Power Administration and U.S. Fish and Wildlife Service 2015). It is, however, the first such facility under the PEIS which proposes construction on or within U.S. Fish and Wildlife Service (USFWS) conservation easements, with 14 turbines proposed to be placed on grassland easements. That PEIS was intended to provide overarching National Environmental Policy Act (NEPA) compliance for projects if an applicant was able to fit their project within the parameters evaluated in that process. Since Western Area Power Administration (WAPA) is not involved in the Crocker Project, the USFWS is the lead federal agency for this project. Therefore, we are providing detailed comments intended to help tier the project back to the PEIS, linking the EA to that previous NEPA effort.

The PEIS stresses adhering to the USFWS's *Land-Based Wind Energy Guidelines* (WEG) (U.S. Fish and Wildlife Service 2012) and further describes the intended benefits of doing so. Page ES-14 in the PEIS states:



“...requesting developers to implement a method for evaluating the potential for ecological resources to be affected by wind energy projects that is consistent with the *Land-Based Wind Energy Guidelines* would facilitate the ability of Western and the USFWS to (1) identify and address project-specific concerns related to species protected under the ESA; (2) identify and address project-specific concerns related to protection of eagles under the Bald and Golden Eagle Protection Act (BGEPA); and (3) meet responsibilities of Federal agencies to protect migratory birds as directed by Executive Order 13186 and to accomplish terms and objectives identified in a 2006 Memorandum of Understanding between the DOE and the USFWS regarding implementation of the Executive Order.”

Further information regarding our concerns in the EA regarding the last two subjects of eagles and migratory birds are presented below.

Eagle Conservation Plan Guidance

As with the WEG, the PEIS indicates the importance of compliance with the USFWS’s *Eagle Conservation Plan Guidance* (ECPG) (U.S. Fish and Wildlife Service 2013) including evaluation of whether an Eagle Conservation Plan (ECP) should be developed. The need for an ECP and an eagle take permit are informed by use of the model within the ECPG to determine risk to eagles. The ECPG modeling results in categorization of the project’s risk of future take of eagles as category 1 (high), 2 (high or moderate) or 3 (minimal), and the PEIS requires that in order to tier to the PEIS, projects in the category 1 or 2 risk levels must prepare an ECP.

The EA currently states that the risk to eagles is “low”; however, we are unable to tell if this determination was informed via use of the ECPG model, or any other equivalent/approved model. Given that bald eagles nest in the vicinity of the project, are known to occur at times in high numbers near the site during waterfowl migration (i.e. Reid Lake), and eagle use has been documented within the project boundaries per pre-construction surveys, we continue to recommend the proponents apply an appropriate, scientific method (preferably the ECPG model) to inform whether an eagle take permit may be needed for this project.

We recognize that the ECPG are voluntary for developers, as is the decision to apply for an eagle take permit. However, the PEIS clearly indicates adherence to these guidelines is expected, and as noted above, the concerns related to eagles are based on compliance with the BGEPA. Take of bald and golden eagles without authorization/permit is a violation of BGEPA. The PEIS summarizes use of the ECPG as related to eagle take permits on page ES-40 of the document:

“In order to be able to tier off of this PEIS, proponents of projects within Categories 1 and 2 are required to work with the USFWS to implement the *Eagle Conservation Plan Guidance*. It is recommended that project developers use a standardized approach to categorize the likelihood that a site or operational alternative will meet standards in 50 CFR 22.26 for issuance of a programmatic eagle permit.”

Page ES-40 of the PEIS also states:

“Regardless of when and whether a permit is authorized, the project developer should demonstrate due diligence in avoiding and minimizing take of eagles. Due diligence would be documented through the completion of an ECP and implementation of agreed-upon advanced conservation practices.”

As noted above, the EA states there is “low” risk to eagles, but to our knowledge they have not applied appropriate and/or recommended methods to determine that risk, nor have they indicated specific measures will be taken to reduce the risk of eagle take. These decisions lie with Crocker, but we encourage the EA disclose the basis for Crocker’s determination of “low” risk to eagles. Further, we suggest evaluation of whether the project can be tiered to the PEIS under these circumstances, since it does not appear to comply with the PEIS in terms of the ECPG.

Avian Displacement

Avian displacement (avoidance of habitats near wind turbines by bird species) is a known environmental effect of wind farms, and is acknowledged in the PEIS. Concerted efforts have been made from the beginning of coordination with Crocker to:

- alert them to the high wildlife and habitat values of the entire project area (as evidenced by high density of state and federally protected lands in and adjacent to the project area)
- steer them away from construction on grasslands on the entire project area, including grassland easements
- highlight the impacts (i.e. displacement of birds) to birds that occur by constructing turbines in grasslands (and near wetlands) in the entire project area
- inform them of means to identify and calculate the level of unavoidable direct and indirect impacts on the entire project area
- address direct and indirect impacts appropriately via an adequate mitigation plan to compensate for the displacement of grassland nesting birds and waterfowl on the entire project area

In addition to the above efforts, we have provided Crocker with several relevant peer reviewed and published studies that found grassland birds and waterfowl exhibit avoidance of wind turbines (Leddy et al. 1999, Shaffer and Buhl 2016, Loesch et al. 2013). Of these, the research by Shaffer and Buhl (2016) of U.S. Geological Survey, and Loesch et al. (2013) of our own USFWS, are recognized as highly relevant to the Crocker project. These are scientifically rigorous U.S. Government research projects conducted at multiple wind farms in North and South Dakota, within the Prairie Pothole Region, and involving the same avian species as occur at Crocker. These involved large sample sizes, multiple years of data, and use of control (reference) sites which further validate the results of these studies. Shaffer and Buhl (2016) also had the benefit of pre-construction data, thus their work was a Before-After-Control-Impact study; a robust study design recommended by our own WEG. Their results: Loesch et al. (2013) determined that five waterfowl species reduced their use of wetlands located within 0.5 miles of turbines with a negative median displacement rate of 21%, and Shaffer and Buhl (2016) determined seven of nine grassland-nesting bird species experienced displacement in 100, 200,

and 300 m bands surrounding turbines, and in some instances displacement was detected beyond the 300 m distance.

While the EA mentions the Shaffer and Buhl (2016) and Loesch et al. (2013) studies, and acknowledges that avian displacement is anticipated at the Crocker Wind Farm, the EA clearly downplays the importance of these publications. The EA minimizes their value partially by citing older, contested published literature as well as grey literature that has neither been peer-reviewed nor published. We previously provided feedback regarding use of these and other studies per previous drafts of the EA and provide further details in this regard within the attached comments. In short, Shaffer and Buhl (2016) and Loesch et al. (2013) are highly relevant informational resources and currently represent the best available science on the issue of avian avoidance of wind facilities in South Dakota and neighboring states with similar habitats. We recommend the EA reflect that, and incorporate the supporting logic herein so that it is clear the USFWS relied upon the best available science when making our recommendations.

As noted above, the PEIS recognizes avian displacement at wind farms, as well as the need for mitigation (more on that below). Though largely completed prior to completion of some bird avoidance research, the PEIS included reference to the above studies and others, stating the effects of wind turbines on wildlife and USFWS easement values beyond the wind farm footprint:

- Page 5-1: “In addition, the conservation value of easements is affected indirectly by wind projects, because these developments can fragment habitat and result in adverse impacts on the behaviors of some wildlife species. These indirect effects will be evaluated and mitigation may be adjusted for impacts to conservation value outside the project footprint.”
- Page 5-1: “Waterfowl can also be affected by establishment of turbines on easements (Loesch and Niemuth 2011); evidence for waterbirds and shorebirds is equivocal, but research along the North Dakota–South Dakota border suggests possible avoidance of wind towers by some species of shorebirds (Niemuth et al. 2013). If the USFWS continues its policy of accommodating requests for wind energy development through easement exchanges for areas affected by turbine tower construction, the direct and indirect impacts on land cover and consequences to the conservation value of fragmented easements will need to be evaluated. Mitigation may be required to offset indirect impacts (i.e., outside the project footprint) caused by fragmentation.”
- Page 5-10, in a discussion regarding easements: "As recent research has shown (e.g., Shaffer et al. 2012; Loesch and Niemuth 2011), fragmentation and avoidance of wind facilities by wildlife is a known result of this development, which reduces its conservation value and the reason for which it was acquired."

In the middle bullet above, Neimuth et al. (2013) is yet another peer-reviewed published USFWS study which garnered a significant sample size (i.e. 10,321 wetland visits on 3,542 individual wetland basins) and revealed consistent avoidance of wind turbines by three species of shorebirds at one of the study sites. In the final bullet above, “Shaffer et al. 2012” is a

presentation by J. Shaffer based on the data used to develop their final publication, Shaffer and Buhl (2016); “Loesch and Niemuth 2011” is a fact sheet intended to make publicly available the results of the Loesch et al. (2013) paper prior to its official publication. These preliminary documents were important to include in the PEIS, and now that we have final papers and tools from that research, it is possible to develop acreage-specific impacts (and mitigation plans, see below) that seem to fit the intent of the PEIS well.

The tools we currently recommend are directly linked to the Shaffer and Buhl (2016) and Loesch et al. (2013) publications. Per requests by USFWS and others interested in how to apply the latest avian displacement information to future wind energy facilities, the authors of those studies (Chuck Loesch of USFWS Bismarck, North Dakota, and Jill Shaffer of USGS, Jamestown, North Dakota), went back to their research data and analyzed it in new ways that would allow for the quantification of these indirect impacts to waterfowl and grassland-nesting birds. These methods were coordinated by Shaffer and by Loesch with other federal researchers and statisticians, and they are based on the data collected for Shaffer and Loesch’s respective peer-reviewed publications. They have each presented these methods in both North and South Dakota to federal, state, and non-government entities and are currently preparing these methods for formal publication. These methods were provided to Crocker, with the intent they be applied to the Crocker Wind Farm.

Despite their apparent utility in determining the level of avian displacement at Crocker and establishing appropriate offsets, these methods are not described in the EA, anticipated indirect impacts of avian displacement are not quantified in the EA, nor is a mitigation plan developed that would adequately offset these impacts. The EA would benefit from inclusion of Shaffer’s and Loesch’s methods by affording disclosure of this known environmental effect at wind farms.

Mitigation Plan

As noted above, avian displacement impacts are acknowledged in the EA, but are not quantified. The PEIS makes repeated references to indirect effects and habitat fragmentation to trust resources caused by wind development, and it recognizes that additional mitigation measures could be necessary to offset impacts of individual projects that want to tier to this existing NEPA document. Quantification of avoidance impacts is important in order to ensure the EA adequately describes the anticipated environmental impacts of the project, and to provide the basis for development of appropriate mitigation. Accordingly, we believe use of Shaffer’s and Loesch’s research and associated tools are important to help formulate a mitigation plan that would compensate for these impacts, either separately as an attachment to the EA or incorporated into the EA itself, and to ensure that tiering this EA to the PEIS is appropriate.

Compensatory mitigation proposed in the EA is offered at a 2:1 ratio for replacement for the footprint impacts of Crocker on easement properties. Per Table 4-1 in the EA, the permanent impacts to grassland easements equate to 15.1 acres, thus the offset would be replacement with 30.2 grassland easement acres (i.e. purchase of easement on existing grasslands) in another location. However, avian displacement at Crocker is expected to occur in grasslands and wetlands, on easement and non-easement lands, and at distances much further-reaching (805 m and over 300 m per Loesch et al. (2013) and Shaffer and Buhl (2016) respectively) than the footprint of turbine towers on easements alone. Application of Shaffer’s and Loesch’s methods

is valuable to establish the acreage of the anticipated level of displacement impacts, but it is apparent that the 2:1 proposed offset ratio (30.2 acres) does not approach the level of mitigation that would compensate for this significant indirect impact to wildlife habitat.

We recognize easements are an important part of the National Wildlife Refuge System of lands and there is value in achieving mitigation for both footprint impacts and bird avoidance impacts in order to keep the System whole. Grasslands without easement protections are also valuable for wildlife conservation, thus we recommend inclusion of the entire project area in mitigation planning. We believe doing so, would be in accordance with NEPA and our USFWS 1981 Mitigation Policy (FR 46, January 23, 1981, 7656). The Mitigation Policy describes the purpose of mitigation and outlines methods for accomplishing those goals. Some the policy's concepts have been well addressed in the EA through avoidance and minimization of impacts by reducing the number of turbines and changing locations of some project features. We recommend Crocker take the above outlined steps to identify all the impacts from the project and measures to offset those unavoidable impacts.

We routinely encourage federal agencies to address the direct and indirect effects of their actions for entire projects. We have also recommended avoidance and compensation of indirect impacts to grassland birds and waterfowl to other wind energy facilities whose proponents have acknowledged the impact and carried out compensatory measures. Accordingly, we recommend that standard for this project and encourage Crocker to apply the best science available to develop appropriate measures to avoid, minimize, and compensate for environmental impacts of their entire wind energy facility.

The No Action Alternative

The No Action alternative in the EA is proposed as if USFWS did not approve the grassland easement exchange for the purposes of constructing the project on USFWS easements, and the project is then built on other lands. Early in the EA, Crocker noted that the placement of 14 turbines on grasslands is necessary for the overall project, and inclusion of the northern part of the project where easements cannot be avoided is necessary for project viability. If so, another "no action" alternative could evaluate a scenario where none of the impacts occur because the project isn't built. This would provide a straight forward elevation and comparison with the other alternatives.

In summary, we enclose a detailed review of the EA in the attached pages, and draw your attention in this letter to a few of our primary suggestions, including:

- Adhere to the *Land-based Wind Energy Guidelines* and ECPG including the use of modeling to evaluate eagle risk; identify methods and/or adhere to the ECPG model to facilitate tiering to the PEIS,
- Ensure Shaffer and Buhl (2016) and Loesch et al. (2013) research is highlighted as the best available science, and use the methods based on those publications to quantify avian displacement levels for the entire Crocker Wind Farm and disclose the results in the EA,
- Develop a mitigation plan that compensates for both direct and indirect impacts of the entire Crocker Wind Farm project, and

- Consider if the “no action” alternative accurately describes what is intended.

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,



Field Supervisor
South Dakota Field Office

Attachment

Cc: FWSR6/Refuges, Barbara Boyle

LITERATURE CITED

- Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. *The Wilson Bulletin* 111(1):100-104.
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USFWS. 2012. United States Fish and Wildlife Service Land-based Wind Energy Guidelines (WEG). Available online at: https://www.fws.gov/ecological-services/es-library/pdfs/WEG_final.pdf.

USFWS. 2013. Eagle Conservation Plan Guidance. Module 1 - Land-Based Wind Energy. Version 2 (ECPG). Division of Migratory Bird Management, USFWS. April 2013. Available online at: <https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf>.

Western Area Power Administration and U.S. Fish and Wildlife Service. 2015. Final Upper Great Plains Wind Energy Programmatic Environmental Impact Statement. Available at: <http://plainswindeis.anl.gov/Documents/index.cfm>.

Attachment to South Dakota Ecological Services, May 8, 2018, letter in response to Draft Crocker Wind Farm Draft Environmental Assessment

Suggestions and recommendations relative to the March 2018, Crocker Draft Environmental Assessment are listed below. Numbered sections are provided, and bullets within each section identify the location under that section to which the comments refer. Note that paragraph numbers are relative to the section under which they occur (not the page number) and the line numbers cited within them are relative to the paragraph in which they occur.

Section 1.2.2 Agency Purpose and Need

- Page 14, paragraph 9, lines 2-3: turbines on USFWS easements are deemed necessary “in order to connect the collection system to off easement turbines”. While it would seem underground collector lines could potentially be needed on easement property to connect off easement turbines, it is not clear why a turbine on the easement would also be required. Further support statement that turbine is needed on easement or remove justification.
- Page 14, paragraph 9, lines 3-5: “...the northern portion of the project is necessary to make the project large enough to be viable and due to the density of protected grasslands in this northern area they cannot be avoided.” Expansion of the project into the northern area where there is a high density of USFWS easements. Ecological Services continues to recommend avoidance of impacts to grassland habitats including the northern area.
- Page 15, paragraph 1, line 2: use of the word “minimize” occurs in numerous locations throughout the EA. Minimization implies impacts have been reduced as much as possible. In many cases impacts have been reduced to levels determined to be “practicable” or “feasible” rather than “possible”. Recommend scanning the document for use of the term “minimize” and evaluate the term “reduce” as a more accurate replacement to reflect the actions that have, or will be, taken for this project.

Section 1.3.2 U.S. Fish & Wildlife Service Land-Based Wind Energy Guidelines

- Page 16, 2nd paragraph under this heading, line 1: “WEG’s” is written as the acronym Wind Energy Guidelines; note that “Wind Energy Guidelines” is plural and non-possessive. Consider removing the apostrophe or replace WEG’s with WEG throughout document.
- Page 18, Tier 3: Field Studies and Impact Prediction:
 - Paragraph 2, line 5; “The project is anticipated to pose a moderate risk to birds...”. Wind energy facilities kill and displace birds. Define “moderate” here or refer reader to where “moderate” is defined in the EA.
 - Paragraph 4, entire: the SDGFP siting guidelines are presented, and some differences from the WEG are noted. While the previous paragraphs explain Crocker compliance with the WEG, compliance with SDGFP siting guidelines are not indicated. Make clear to the reader the efforts made to comply and/or refer the reader to another section of the EA if appropriate for those details.

Section 2.1.1.5 Operations and Maintenance Facility

- Page 27, only paragraph under this heading: recommend this facility be located in an already disturbed (e.g. cropland) area to avoid additional impacts to grasslands.

Section 2.1.1.8 Project Substation

- Page 28, only paragraph in this section, line 2: define “good utility practices” or cite a source for these practices and recommend project substation be located in an already disturbed (e.g. cropland) area to avoid additional impacts to grasslands.

Section 2.1.2.3 Temporary Laydown/Staging Area

- Page 29, only paragraph under this heading: recommend this facility be located in an already disturbed (e.g. cropland) area to avoid additional impacts to grasslands.

Section 2.1.2.4 Interconnection Switchyard

- Page 29, only paragraph under this heading: recommend this facility be located in an already disturbed (e.g. cropland) area to avoid additional impacts to grasslands.

Section 2.1.4 Wind Farm Facility Construction, Restoration, Operations, and Maintenance Procedures

- Page 30, paragraph 1, lines 4-6: “Per the PEIS BMPs, on USFWS easement land, Crocker will clear outside the nesting season and drive cranes over access roads, on construction mats, or on dry or frozen ground to the extent practicable.” Recommend these BMPs be adhered to, not limited to “the extent practicable” and apply the BMPs to all grasslands on the project, not limited to USFWS easements.

Section 2.1.5.1. Mobilization, Site Preparation, and Clearing

- Page 35, paragraph 2, line2: “Isolated trees may need to be cleared...”. Recommend any vegetation clearing be conducted outside the breeding season.

Section 2.2 No Action Alternative

- Page 37, paragraph 1, entire:
 - Typically, the no action alternative is the opposite of building the project, i.e. not building the project. Consider revising this alternative to reflect that.
 - This alternative seems to indicate that the Crocker project could still be built without any turbines occurring on USFWS easements. Thus it appears avoiding all USFWS easements is possible. This option is recommended to preclude adverse impacts to the National Wildlife Refuge System of lands.
 - Regardless of whether the No Action Alternative is revised to indicate the project will not be built or remains as-is, this section requires expansion. If the project is not built, none of the proposed impacts would occur. If the project is built without easement impacts, the direct and indirect impacts to grasslands, wildlife, wetlands, etc. would change via the removal of 14 turbines and associated facilities from easement lands.

Section 3.0 Affected Environment

- Page 38, paragraph 2, line 3: an “environmental survey corridor” is mentioned and defined as areas that will have above ground direct disturbance. It does not appear that this “corridor” is identified in any figures. Provide additional information on this survey corridor, e.g. the fraction of existing habitats it represents, what this survey corridor does not include, and identify it on a map. Surveys in this corridor that do not reveal a given species or habitat do not necessarily mean the species or habitat does not occur in the project area, thus limiting surveys to this corridor and stating lack of discovery could be misleading.

Section 3.6.1 Plant Communities

- Page 55, Table 3-9: “Pasture/Hay” is included in the class “Agricultural Vegetation”. Recommend that the EA indicate (asterisk?) that pasture is typically grassland, which is the next class identified.
- Page 56, Table 3-9: without “Pasture/Hay” included in the grassland class, the 20.5% subtotal in the Shrubland and Grassland Subtotal row would be too low. Recommend making note of this issue in the table and/or in a footnote to the table.
- Page 57, paragraph 3, line 3: “...and wetland easement program...” – add an “s” to “program”.
- Page 58, paragraph 3, line 1-2: USFWS prioritizes easement purchases based on “quantity and not quality of habitat.” Is this an accurate statement? Appears simplistic and somewhat counter to the thunderstorm maps, but ES defers to Refuges Program on this.
- Page 61, paragraph 3, line 5: “Raptor use was relatively low.” Provide standards for comparison.
- Page 66, only paragraph under this heading, line 5: ten leks were located 1 to 5 miles from the project area, but this paragraph does not reiterate that sharp-tailed grouse were documented in or near the project area. Consider changing so the reader understands grouse likely use the project area for nesting, etc. even though leks weren’t identified in the initial survey.
- Page 67, paragraph 2, lines 5- 6: the ECPG risk category is mentioned; clarify if Crocker used the ECPG model to determine the appropriate risk category for this project. USFWS continues to recommend Crocker follows the ECPG including use of the model to determine the appropriate risk category for eagles in order to make an informed decision on the need for an eagle take permit.
- Page 67, paragraph 3, line 7: survey results conducted April 2016-November 2017 are stated to be “representative of future eagle use”. To the contrary, one year of data is likely not representative of future eagle use, as eagle populations continue to rise in South Dakota, new nests appear each year, including a new nest discovered 2.6 miles from the Crocker site in 2018.

- Page 68, paragraph 1, line 3-5: active bald eagle nests near the project are listed. The Final EA should include the newest nest on the Graves WPA detected in 2018.

Section 3.6.4.3 Topeka Shiner

- Page 72, paragraph 2, line 1: clarify that critical habitat is not present in the Project Area because no critical habitat was designated in South Dakota at all for this species.

Section 3.6.4.5 Whooping Crane

- Page 72, only paragraph in this section, lines 6-8: South Dakota sightings of whooping cranes have been recorded in a wider band in the state than the normalized migration corridor indicates. The South Dakota-specific whooping crane migration corridor map has been provided to Crocker and Crocker is aware that the project falls within the 95% SD migration corridor. Past records listed in the EA clearly show that whooping cranes have been documented in the area. The potential for whooping cranes to occur at the Crocker site exists. Revise this paragraph to clarify that the project occurs in the SD-specific 95% migration corridor band and the EA could reiterate Crocker's commitments for whooping crane conservation here.

Section 4.1.3.1 Mitigation Measures for Conservation Easements

- Page 84, paragraph 2: driving cranes over dry or frozen ground and avoiding clearing during the nesting season are proposed to be done "as practicable". During the coordination process, these actions had been conveyed to Crocker as requirements on USFWS easements. Clarify whether these measures will be required and adhered to.
- Page 84, paragraph 3, line 5: "...Crocker has volunteered to mitigate at a 2:1 ratio." While greater than the 1:1 compensation required by current USFWS Refuges Program policy for the impact of the project footprint to easement lands, the proposed 2:1 ratio is woefully inadequate to compensate for indirect impacts, particularly avian avoidance of turbines. We previously provided general comments on this and note that USFWS has provided Crocker with means to calculate the level of impact to birds based on highly relevant bird avoidance, multi-year, peer reviewed and published studies. Those levels of indirect bird avoidance impact are missing from this document, as are the mitigation ratios appropriate to compensate for this impact. The Upper Great Plains Wind Energy Programmatic Environmental Impact Statement (PEIS) clearly acknowledges (e.g. pages 5-1, 5-10, 5-11) the issue of avoidance of turbines by birds, cites literature by the some of the same authors (Shaffer, Loesch, Neimuth), notes that the impact of turbines on easements is greater than the footprint, and that mitigation beyond the footprint is appropriate to compensate for that impact. The Shaffer and Buhl (2016) and Loesch et al. (2013) studies and their subsequent efforts to use those publications to create useable tools that provide acreage figures for mitigation represent the best available science on this issue. We encourage that information be included in a mitigation plan for the project to offset those impacts to easements and grasslands identified in this EA. Doing this will help the EA tier back to the PEIS.

Section 4.6.1 Impacts to Vegetation

- Page 110, paragraph 5, lines 2 and 5: permanent and temporary impacts on easements are described as occurring to “Agricultural Vegetation” and “predominantly Agricultural” respectively. While these grasslands used for livestock grazing, use of the agricultural term implies these are impacts to crops verses prairies that USFWS believed were worthy of a grassland easement. Recommend changing the language to indicate these are impacts to grasslands instead of “agricultural vegetation”.

Section 4.6.1.1 Shrubland and Grassland

- Page 110, paragraph 2, line 11: 47 turbines on potentially undisturbed grasslands equates to approximately 40% of the turbines. This is significant. USFWS continues to recommend avoidance of grasslands, regardless of easements, and encourages placement of turbines and other facilities on previously disturbed ground (e.g. cropland).
- Page 110, paragraph 3, line 2 and paragraph 4, line 3: clarify that “low quality” prairie (e.g. heavily grazed or invaded by non-native plants) are used by wildlife, preferred by some species, can be improved with appropriate management and have value.
- Page 111, paragraph 5, lines 6-8: “Once the topsoil is disturbed, it becomes subject to erosion, pulverization, and compaction and is difficult if not impossible to restore to previous conditions”. This is true of the native prairie system, thus impacts described in the EA as “temporary” may not be so if they occur on native prairie. Reevaluate “temporary” impacts, as well as discussions of “restoring” native prairie (e.g. replace “restore” with “efforts to restore” native prairie throughout document).
- Page 111, paragraph 6: the “degraded prairie” description is true, but the implication is that it has no value – see above comment regarding management to improve it and its inherent value for wildlife despite lower quality.

Section 4.6.1.2 Mitigation Measures for Vegetation

- Page 113, 1st bullet: USFWS recommends using existing roads to the maximum extent “possible” rather than “feasible”.

Section 4.6.2 Impacts to Wildlife

- Page 114, paragraph 1, line 4-5: edit from “Indirect impacts to wildlife may include avoidance...” to “Indirect impacts to wildlife will include avoidance...”
- Page 116, paragraph 13, line 6-7: “Impacts due to Project construction and operations on bats are expected to be minimal.” This could use some substantiating information since preconstruction survey data on bats has not necessarily been indicative of wind farm impacts, given migration patterns and overall bat declines in the United States. Also, see Frick et al. (2017) paper regarding the possibility that wind turbines may threaten population viability of hoary bats.

Section 4.6.2.1. Birds

- Page 117, FATALITY – Tower Collision: The Wessington Springs project is missing from this list. This is notable due to the first year avian mortality reported at this wind facility, which was higher than the national average. Second-year fatalities were lower.
- We appreciate the turbine/bird collision discussion being included in the EA and encourage Crocker to consider ways to reduce those collisions and ways they may offset those losses through habitat improvement or conservation actions elsewhere.
- Page 118, last paragraph in section, line 1: with 3 to 6 birds/MW/year, the Crocker wind farm would result in the deaths of 360-720 birds per year or 10,800-21,600 avian deaths over the 30 year life of the project. How much less mortality does Crocker anticipate? This information in the EA would help the reader understand what the rates (birds/MW/year) translate to in terms of total numbers of birds.
- Page 118, Construction, line 2-3: direct impacts to birds during nesting season are discussed; USFWS continues to recommend avoidance of the nesting season for construction of the project.
- Page 119, Avoidance: add Shaffer and Buhl (2106) and Loesch et al. (2013) to this bulleted list (and edit paragraphs below that further describe these papers to avoid any repetition); they are both local, relevant, robust, multi-year studies that represent the best available science in the prairie pothole region and should be highlighted in this list. Also, the EA can indicate that the papers listed found grassland birds avoid turbines, even those studies limited to one year of study. In general the studies cited in this bulleted list were of shorter duration, occurred in other states and habitats, and/or were conducted by consultants to wind companies who implemented considerably less rigorous study designs than that of Shaffer and Buhl (2016) and Loesch et al. (2013). The alternate studies need not be completely discounted; they add to the body of information on this issue, and indeed avian avoidance of wind facilities (mainly grassland birds) was also detected in most of those studies, albeit at reduced levels compared to Shaffer and Buhl (2016). This is not surprising, given the lowest levels of avian avoidance detected by Shaffer and Buhl (2016) occurred in the first year of post-construction observation and the level of avoidance increased continuously until the study concluded with 5 years of data; information clearly missing from other 1-2 year studies that lack preconstruction data.
 - 1st bullet: the published professional dispute over Hale et al. (2014) indicates this publication needed additional scrutiny; recommend not including it in the EA.
 - 2nd bullet: Shaffer and Johnson was a preliminary analysis of the research that resulted in the Shaffer and Buhl 2016 publication: replace it with Shaffer and Buhl 2016 which clearly shows displacement of grassland species out to 300 meters and beyond for some species and increasing over time.
 - 3rd bullet: also note that Leddy et al. (1999) was a one-summer study in CRP, post construction surveys only (no pre-construction survey info available, not at multiple wind farms, not in native grasslands, not multi-year), yet still detected

- displacement of grassland birds. This study recommended turbines be sited to minimize this impact (e.g put in cropland).
- 4th bullet: note that Young et al. (2006) is grey literature (not peer reviewed/published). This is also a one-year study, with post-construction surveys only (no preconstruction), yet still detected displacement. They suggest this effect is minor but it didn't consider how these impacts might interact with grassland birds of conservation concern that the USFWS has determined to be in a state of decline and in need of management to arrest that decline. Note that in Shaffer and Buhl (2016) the lowest displacement values were detected in the first year post-construction. The Young et al. (2006) publication was not multiyear, thus would not detect increasing avoidance trends. There is recent peer review literature to rely upon for assessing bird avoidance impacts and including this older grey literature may only serve to confound the reader. If retained in final EA, these older short term grey literature studies should be put in proper context.
 - 5th bullet: Erickson et al (2004) is also grey literature, another 1 year study. They had low sample sizes, but still found displacement. Shaffer/Buhl found that the first year post-construction displacement was relatively low, but averaged 55.44% at 5 years for certain bird species. The trend of increasing avoidance over time (Shaffer and Buhl's 2016 paper) is significant and cannot be surmised from Erickson et al. and other short term studies listed here.
 - 6th bullet: we do not currently have the Johnson et al 2000 citation, though it appears to be grey literature, not peer-reviewed. We recommend comparison of this and Strickland (2004) (a workshop, not published and peer reviewed) in the next paragraph with Shaffer and Buhl 2016 study design to inform their relative value.
 - Page 120, top of page, line 1-2: regarding the need for additional research to determine whether grassland species will habituate to turbines over time, close this paragraph with what we do know: the best available information (Shaffer and Buhl 2016) indicates that grassland bird avoidance of turbines increases over time, up to 5 years.
 - Page 120, fourth paragraph (excluding above bullets), discussion of Shaffer Buhl (Conservation Biology 2016) paper:
 - We have provided Crocker with the means to calculate the impact to migratory birds and determine the level of compensation appropriate for this impact on the entire (not limited to easements) wind farm per J. Shaffer (personal communication 2017). This method has been updated in 2018 and already provided to Waubay Wetland Management District for use on this project. We are willing to assist Crocker in developing mitigation for this project.

- We continue to recommend the full impact of avian avoidance be calculated, presented herein, and offset per the Shaffer and Buhl (2016) paper upon which the method to calculate offsets is based, but we recognize these are recommendations.
 - The calculations and offset should include impacts of the entire project, not only those anticipated to occur on easements so that the EA accurately reflects what the USFWS believe are the impacts of the project. If Crocker is unable to undertake offsets for the entire project, that is valuable to know, but shouldn't detract from our best efforts to identify those impacts.
 - The characterization of the Shaffer and Buhl paper should be revised to accurately represent the results as follows: "Seven of nine species of grassland birds showed displacement within 300 meters of wind turbines. Detection of statistical significance varied somewhat across species, sites, distances, and time periods; however, trends were consistently negative for all 7 of the species. For the 33 immediate effects examined within 300 m for the 7 species, effects were negative for 76% of them. For the 51 delayed effects examined for the 7 species, effects were negative for 88% of them. Even though statistical significance could not always be detected, this consistent trend of negative effects indicates that displacement of the 7 species is occurring within 300 meters of the turbines. Delayed 2-5 year effects are compared to pre-turbine numbers; therefore, these delayed effects represent a cumulative effect after the turbines have been in place for 2-5 years. For species such as the Grasshopper Sparrow, Western Meadowlark, Bobolink, and Chestnut-collared Longspur, the effects were usually greater in the 2-5-year time period than in the 1-year time period, indicating that effects of the turbines are continuing to accumulate over time. In other words, abundance within 300 meters of turbines increasingly declined compared to the reference sites. The take-home message from this research is that the average displacement effect kept increasing, indicating that the effects continued to accumulate (i.e., get larger) throughout the time period evaluated during the study (i.e., 1-5 years post-construction)."
- Page 120, fifth paragraph, discussion of Loesch et al. (2013) paper:
 - We have provided Crocker with the means to calculate the impacts to migratory birds and determine the level of compensation appropriate for this impact on the entire (not limited to easements) wind farm per C. Loesch (personal communication 2017).

- We continue to recommend the full impacts to waterfowl (reduced use of wetlands within 1/2 mile of turbines) be calculated, presented herein, and offset per the Loesch et al. 2013 data.
- Calculations of impacts and for appropriate offsets should be for the entire project, not limited to easements.
- Page 123, Habitat Loss, paragraph 4, last two sentences: the review of displacement impacts and fragmentation lead to a conclusion of “low” risk to birds. These concluding sentences at best minimize, and at worst ignore the most relevant, rigorous, local and recent scientific information available regarding the issue of avian displacement. Information previously presented to Crocker to a) calculate avian displacement levels and b) determine appropriate mitigation to offset that displacement is completely disregarded in the EA and no mitigation is proposed to offset significant avian displacement issues. We continue to recommend application of methods developed by these authors and provided to Crocker, based on the data from their published research (Loesch et al. (2013) and Shaffer and Buhl (2016)). The calculations and results are valuable additions to the EA to help inform the public of the impacts and appropriate mitigation.
- Page 123, first paragraph, lines 3-4: for the final EA, note in addition to the nests listed in the Draft EA the new (2018) nest identified at Graves Waterfowl Production Area, 2.6 miles from the nearest proposed turbine location, as conveyed to Crocker in March, 2018. We encourage Crocker to utilize this nest when performing the modeling recommended in the USFWS ECP Guidance to determine risk category to eagles and evaluate the need for an Eagle Conservation Plan and application for an eagle take permit. Also note the new Graves WPA nest on top of page 124, and wherever other references to nesting eagles near Crocker occur in the Draft EA.
- Page 123, second paragraph, last sentence: we are not aware of any documentation of travel corridors of eagles nesting in vicinity of Crocker Wind Farm – if this information exists, present it in the final EA to demonstrate relative risk, or lack thereof, to eagles.
- Page 123, fourth paragraph, line 4: the sentence “...and evaluate the risk to eagles based on the data collected” should clarify what methods are used to evaluate this risk, as again, the USFWS ECPG modeling has to our knowledge not been conducted and is not presented herein, nor are any alternatives to this modeling effort. Risk evaluation appears to be subjective.
- Page 123, fifth paragraph, line 1: “Crocker believes there is a low level of risk for potential bald eagle mortality at the site.” Identify the criteria used to make that determination. We continue to recommend use of ECPG model.
- Page 124, first paragraph, line 3: raised meteorological tower stations were used as mounts for bat detection devices, but the EA should disclose that such areas are not necessarily near habitats that would be frequented by bats and results of such surveys could underrepresent bat presence.

- Page 124, second paragraph, line 6: Wessington Springs bat fatality data is presented herein, but was notably omitted from discussions of avian fatality in the draft EA. The first year of avian fatality estimates were higher than national average and then were lower in the second year. Consider presenting Wessington Springs' avian fatality data in the EA.
- Page 125, first paragraph after bulleted list, line 2-3, and lines 3-5:
 - Lines 2-3: "...the impact of the Project on bats is expected to be similar than the post-construction fatality rates at the above wind facilities." Present the bat mortality rate expected at the Crocker Wind Farm, and convert the number of bats expected to be killed per year, and over the 30 year life of the project.
 - Lines 3-5: "Tree roosting bats that migrate...which were detected during the Project's preconstruction studies, may have the highest risk..." - note the publication Frick et al. 2017 which suggests the impacts of wind energy fatalities to at least one species (hoary bat) could have population impacts, reducing the population 90% in next 50 years. Add the following paper to Literature Cited: Frick, W. F., E. F. Baerwald, J. F. Pollock, R. M. R. Barclay, J. A. Szymanski, T. J. Weller, A. L. Russel, S. C. Loeb, R. A. Medellin, and L. P. McGuire. 2017. Fatalities at wind turbines may threaten population viability of a migratory bat. *Biological Conservation* 209:172-177.

Section 4.6.2.4 Mitigation Measures for Wildlife

- Page 126, fourth paragraph, lines 1-5: guidance from SDGFP and USFWS is presented, but the EA does not state that Crocker will implement that guidance. We recommend the EA to clearly state whether these guidelines will or will not be applied to the Crocker Wind Farm.
- Page 126, Construction: add to bulleted list the avoidance of the nesting season for all construction on grasslands, not limited to easement properties. Also add monitoring of known nests (eagles, raptors, other known nests) to detect disturbance and risk of abandonment. Recommend ceasing construction activities near nests that agitates nesting birds and could negatively affect reproduction. Also recommend a bullet demonstrating a commitment to adaptive management, so that as additional successful mitigative measures are developed to reduce wildlife impacts Crocker will implement them.
- Page 128, Operations, fifth bullet: identify the specific cut-in speeds to be implemented at the Crocker Wind Farm to protect bats, and identify the times when bats may be active to be clear what will be done and when.

Section 4.6.4.3 Topeka Shiner

- Page 130: Ensure that water withdrawals for the project do not occur in Topeka shiner streams. A list and map of known streams has already been provided to the Waubay WMD.

Section 4.5.4.5 Whooping Crane

- Page 130, lines 1 and 4: utilize the South Dakota-specific whooping crane corridor – the Crocker Wind Farm falls within it.
- Page 130, line 8: “...only four whooping cranes have been documented within 20 miles...” - add here than only an estimated 4% of stopovers are documented and the flock is only 300 + birds strong at this time. The primary point is that the birds have occurred in the area in the past and the potential exists for future stopovers, whether documented or not.
- Page 130, lines 10-11: true that whooping crane mortality has not yet been reported at wind farms, but note that sandhill crane mortalities have been reported in Texas. Sandhill cranes are a sister-species to the whooping crane; whooping cranes often travel in flocks of sandhills.
- Page 130, lines 20-22: the Draft EA notes what the PEIS recommends for whooping cranes within the migration corridor (monitoring and shutdowns of turbines), but does not clearly state what will occur at the Crocker Wind Farm. Crocker is in the whooping crane migration corridor, the potential for whooping crane occurrence at the site exists. State clearly here whether Crocker will implement this measure for the whooping crane.

Section 5.0 Cumulative Impacts

- Page 141, second paragraph
 - lines 2-3: regarding the discussion of identifying commonalities with other projects as criteria for evaluating cumulative impacts, it would seem appropriate to evaluate other wind farms proposed in the Tallgrass Prairie Region and/or Prairie Pothole Region, at least those occurring in eastern South Dakota.
 - Lines 8-9: limiting the “ROI” for most resources to the area “within or adjacent to the construction workspace” appears too limited, and not appropriate for an industrial facility the size of the Crocker Wind Farm that is recognized to have impacts beyond the footprint of the infrastructure.
- Page 141, Table 5-1: reevaluate the Regions of Influence for each Resource; they generally appear to be severely, and potentially inappropriately limited in scope, particularly the “Wildlife” resource.

Section 5.1.1 Local Land Use

- Page 143, paragraph 3, line 3-4: “Crocker is not aware of any new wind farm plans in the vicinity of the Project Area.” The “vicinity” appears to be too limited; at a minimum, include the other wind farms currently being proposed in the Waubay Wetland Management District, and perhaps extend to those in neighboring WMDs that harbor similar habitats as at Crocker.

Section 5.1.2 Recreation

- Page 144, second paragraph

- lines 2-3: “Mortality and displacement of waterfowl species will occur, but is unlikely to affect recreation in the fall.” It is not clear whether this is opinion or is based on literature – clarify.
- lines 3-4: “Cumulative effects with the other two wind facilities may be limited...”. Again, looking only at immediately adjacent wind farms, rather than those proposed in the Tallgrass Prairie Region and/or Prairie Pothole Region in eastern South Dakota appears to be an inadequate evaluation of cumulative impacts.

Section 5.1.3 Conservation Easements

- Page 144, second paragraph, line 2: “Additionally, the Project will temporary impact...” Change “temporary” to “temporarily”. In general, consider whether temporary impacts to native grasslands can truly be classified as temporary given the difficulty to near impossibility of restoring these habitats once disturbed. It appears much larger areas will be dug up for the foundation of the turbines but then attempts will be made to reclaim those areas. The EA has articulated the challenges with native prairie restorations leaving one to wonder if those are temporary impacts or if future reclamation after decommissioning of the project will be able to restore native prairie.
- Page 145, second paragraph, final sentence: “Therefore, Crocker will offset the permanent impacts on grassland easements.” Offsets should not be limited to direct impacts and should not be limited to easements. We recommend the indirect effects of bird avoidance also be included so that the System is made whole. We believe it best to calculate, disclose, and mitigate all environmental impacts for the entire project, and develop a clear mitigation plan to be enacted before, during and after completion of the project.
- Page 145, last sentence in this section: “Therefore, Crocker will offset the permanent impacts on grassland easements.” We continue to submit that indirect effects are significantly larger than the direct footprint of the project, should be calculated for the entire project area, disclosed in the final EA, and a mitigation plan that adequately evaluates and offsets these impacts should be developed and made public. At a minimum, this should occur for impacts to easements given the intent of their acquisition.

Section 5.5. Vegetation

- Page 147, first paragraph, lines 2-4: given that tallgrass prairie is a highly endangered ecosystem, it would seem relevant to look at cumulative impacts in a much larger area than currently evaluated in this EA.

Section 5.6 Wildlife

- Page 147, first paragraph:
 - lines 1-3: this sentence is somewhat confusing. Suggest breaking down further with examples to clarify beneficial effects and adverse affects.

- page 148, Line 16: mention again of waterfowl and grassland birds in the Prairie Pothole Region; it would seem appropriate to expand cumulative effects analysis further in this area than the draft EA currently offers.
- Page 148, third paragraph:
 - line 7: good to acknowledge that potential impacts may be greatest on grassland birds and waterfowl either via collision or displacement. We believe it is valuable to calculate this information, disclose it to the public, and develop a mitigation plan that offsets these impacts.
 - line 9-10: again only two wind facilities are mentioned for cumulative impacts when several new wind farms are being proposed in the Waubay WMD – expand cumulative effects analysis to this area at the very least.
- Page 148, fifth paragraph, lines 5-6: “...long-term, permanent, and incremental negative cumulative effects on wildlife...may be partially offset by easement exchange.” Note that the easement exchange process would likely be via preservation of existing grassland, and would be in very small quantity (30.2 acres) at the currently proposed 2:1 ratio. This offset is small relative to the indirect effects that are not yet quantified in the EA or currently proposed to be offset at all. The EA should make this clearer: a 2:1 ratio of offset for direct impacts to only grassland easements does not mitigate the anticipated indirect impacts to easements, grassland birds and waterfowl. We encourage Crocker to reconsider this approach and appreciate the challenges this puts our agency in as we are tasked with conservation of these trust resources. We have detailed policies on mitigation, NEPA and appropriate use of National Wildlife Refuge System lands and the EA and project proponents could be much more helpful in meeting those responsibilities.

Section 5.7 Federally Listed Species (Whooping Crane)

- Page 149, last sentence in only paragraph: “...therefore, no cumulative effects are anticipated” for the whooping crane. While whooping crane effects may not yet be obvious (e.g. mortality) it does not preclude the possibility of cumulative effects, particularly if whooping cranes actively avoid wind farms. The large footprint of wind farms can potentially prevent cranes from using large swaths of otherwise suitable stopover habitat. As more wind farms are developed, the loss of habitat has the potential to become significant. Alternatively, if whooping cranes do not avoid wind farms, they may be at relatively high risk, particularly in inclement weather, if they use areas in and around wind farms. Cumulative effects to whooping cranes by Crocker and other activities may be difficult to discern and quantify, but are not necessarily nonexistent.

Section 6.1.1 United States Fish and Wildlife Service

- Page 150, Threatened/Endangered species bullet, 1st sub-bullet: “Per USFWS guidance, Crocker will implement a whooping crane monitoring plan”. This plan should be summarized in the mitigation segment of the EA and perhaps elsewhere within the EA

where whooping cranes are discussed to be clear what the plan is and that it conforms to monitoring requirements of the PEIS.

- Page 151, Bald Eagles: USFWS recommends application of the ECPG model to evaluate risk to eagles; the determination of “low” risk appears to be subjective rather than application of the empirical data collected during preconstruction surveys. This section is described as Crocker’s responses to USFWS recommendations: clarify that this recommendation has been ignored by Crocker Wind throughout the coordination process.
- Page 151, BCC and Other Grassland Birds: USFWS recommends proactive conservation for BCC species, avoidance of grassland habitats to the extent possible, and appropriate mitigation to offset habitat loss and fragmentation anticipated to occur. This section is described as Crocker’s responses to USFWS recommendations; clarify whether these measures will be undertaken.
 - page 151, sub-bullet: while this mentions a discussion of migratory birds (including BCC and/or grassland birds) in the BCCS and Crocker having been provided specific siting issues; clarify what Crocker’s response to these recommendations have been.

Section 6.2.1 South Dakota Game, Fish and Parks

- Page 152, Grasslands, sub-bullet 1: this highlights high quality grassland only. Both USFWS and SDDGFP have reiterated to Crocker that high-quality grasslands are important, but are not the only habitats of concern, and even degraded prairie has value for wildlife. Additionally, this evaluation of impact is direct impacts only, and as noted throughout the coordination process, indirect effects are anticipated to be much larger than these direct effects and thus should be calculated, disclosed, and offset via an appropriate mitigation plan.
- Page 153, Grassland birds, sub-bullet: while Crocker has conducted the avian surveys described, USFWS has been clear that the intended use of these surveys is to direct placement of wind energy facilities (or inform whether facilities should be built in the proposed area at all). This section is described as Crocker’s responses to SDGFP recommendations; clarify how Crocker utilized avian survey data to minimize impacts.
- Page 153, Post construction, sub-bullet: Crocker has committed to one year of post-construction avian and bat fatality monitoring, but this segment does not describe what Crocker will do with the resulting information. We encourage that information be provided to the USFWS and an adaptive management strategy incorporated so if new measures are discovered that could reduce impacts or bird collisions there is an opportunity to do so. “Operational monitoring by staff” is submitted as an action item, but the level at which this will occur and what actions will be taken as a result are not described. More specificity regarding on how Crocker will conduct monitoring by staff and what will be done with this information would be helpful.