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# Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program

*Final*

U.S. Department of Energy
Western Area Power Administration

and

U.S. Department of the Interior
U.S. Fish and Wildlife Service

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# 1 INTRODUCTION

Executive Order 13212 (“Actions to Expedite Energy-Related Projects” [U.S. President 2001]), directed Federal agencies to expedite their review of permits or to take other actions that will increase the production, transmission, or conservation of energy while maintaining safety, public health, and environmental protections. Additional requirements for departments and agencies to consider and to facilitate the development of renewable energy and electric power transmission projects have been promulgated in the Energy Policy Act of 2005 (EPAct) and the American Recovery and Reinvestment Act of 2009, along with other policies and initiatives. On March 11, 2009, the Secretary of the Interior issued a secretarial order establishing renewable energy production as a top priority for the U.S. Department of the Interior (DOI). Wind energy development is likely to be a major component of renewable energy development. This programmatic Biological Assessment (BA) and the associated Programmatic Environmental Impact Statement (PEIS) support goals and objectives of the administrative actions identified above, as well as Executive Order 13423 (“Strengthening Federal Environmental, Energy, and Transportation Management” [U.S. President 2007]); Executive Order 13604 (“Improving Performance of Federal Permitting and Review of Infrastructure Projects” [U.S. President 2012]); the *President’s Climate Action Plan* (Office of the President 2013); and the Department of Energy’s (DOE’s) 2014 Strategic Plan, Strategic Objectives 1 and 2 (DOE 2014).

To better address environmental concerns associated with increased development of wind energy production, DOE’s Western Area Power Administration (Western) and DOI’s U.S. Fish and Wildlife Service (USFWS) are considering the implementation of environmental evaluation procedures and mitigation strategies for wind energy interconnection requests within Western’s Upper Great Plains Customer Service Region (UGP Region), which encompasses all or parts of the States of Iowa, Minnesota, Montana, Nebraska, North Dakota, and South Dakota, and for wind energy project development associated with the USFWS’s landscape-level grassland and wetland easements[1] located within the same area (figure 1-1). The UGP area of the United States has a high potential for wind energy development because of the availability of an excellent wind resource regime. In the six-State region considered in this programmatic BA and the associated PEIS, installed commercial wind energy generation capacity has grown from about 0.5 gigawatts (GW) to more than 12 GW from 2000 through 2014 (DOE 2015). Much of this growth has occurred in the past 5 years, and it is anticipated that the industry’s installed generating capacity within the UGP Region will continue to increase at a rapid pace.

Western and the USFWS have interests in streamlining their procedures for conducting environmental reviews of wind energy applications by implementing evaluation procedures and identifying measures to address potential environmental impacts associated with wind energy

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1 **Wetland Easement**: A wetland easement is a legal agreement through which the USFWS pays the landowner to permanently protect wetlands. Wetlands covered by an easement cannot be drained, filled, leveled, or burned. When these wetlands dry up naturally, they can be farmed, grazed, or hayed.

**Grassland Easement**: A grassland easement is a legal agreement through which the USFWS pays the landowner to permanently keep land in grass. Land covered by a grassland easement may not be cultivated. Mowing, haying, and grass seed harvesting must be delayed until after July 15 each year to help grassland nesting species, such as ducks and pheasants, complete their nesting before the grass is disturbed. Grazing is not restricted in any way.

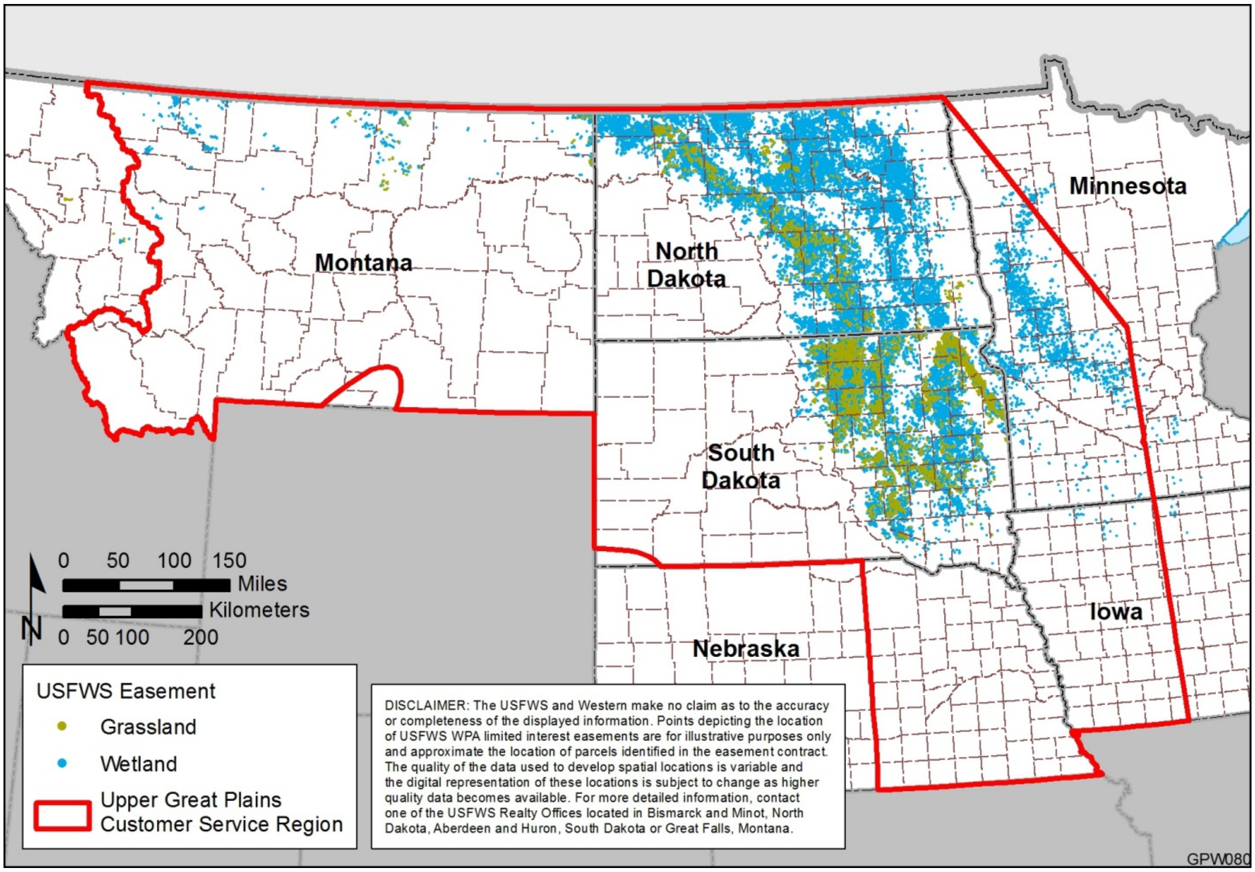


**FIGURE 1-1 Western's UGP Region and Distribution of USFWS Wetland and Grassland Easements within the UGP Region (Note: the area contained within easements is not indicated)**

projects in the UGP area. Western and the USFWS have cooperatively prepared a PEIS to (1) assess the potential environmental impacts associated with wind energy projects within the UGP Region that may connect to Western's transmission system or that may propose the placement of project elements on grassland or wetland easements managed by the USFWS; and (2) evaluate how environmental impacts would differ under alternative sets of environmental evaluation procedures, best management practices (BMPs), and mitigation measures that the agencies would require project developers to implement (as appropriate for specific wind energy projects).

This programmatic BA has been jointly prepared by Western and the USFWS to evaluate the potential for impacts on federally listed, proposed, or candidate species from wind energy projects requesting interconnection to Western's electrical transmission systems within the UGP Region or requesting placement of facilities on wetland or grassland easements within the UGP Region that are managed under agreements with the USFWS. This programmatic BA also identifies avoidance criteria and measures that could be applied to address adverse impacts on listed species that occur in areas being considered for wind energy projects. Under the proposed program, projects for which applicants commit to implementing appropriate and applicable measures identified in this programmatic BA would benefit from the agencies' ability to expedite Section 7 consultation under the Endangered Species Act (ESA) for those species that are addressed. In the event an applicant does not wish to agree to implementation of the appropriate and applicable measures identified in this programmatic BA, Western and/or the USFWS (as applicable) would be required to initiate Section 7 consultations to address potential impacts on listed species from those projects, including preparation of separate, project-specific BAs.

# 2 PROJECT DESCRIPTION

## 2.1 PROPOSED ACTION

Interconnection of wind energy projects to Western's transmission system and requests for easement exchanges to accommodate wind energy facilities that may affect wetland and grassland easements managed by the USFWS are currently managed through evaluation processes that have been developed by each agency, and individual project-specific consultations under ESA Section 7 are conducted for all projects. Western and the USFWS have now established programmatic evaluation procedures for environmental review of wind energy interconnection requests and proposals to site wind energy facilities on USFWS easements, including implementation of a programmatic approach for conducting ESA Section 7 consultation.

Western and the USFWS propose to streamline the environmental reviews for wind energy projects that will interconnect to Western's transmission facilities or that would require an easement exchange to accommodate placement of project facilities on easements managed by the USFWS. The proposed action for this BA is to establish review/environmental evaluation criteria and process for a program that combines these two Federal actions, and then consult programmatically under Section 7 of the ESA on the likely effects on listed species from wind energy projects that meet those criteria and follow the established process.

It should be noted that the proposed action does not authorize planning, construction, or operation of any specific projects, but only identifies the programmatic elements that would be implemented by Western and the USFWS when considering applications for interconnection (Western) or for easement exchanges to accommodate development of project elements affecting easements (USFWS). The criteria include BMPs and conservation measures (avoidance and minimization measures) to reduce impacts on listed, proposed, and candidate species. In fact, this BA finds that if these measures are adhered to, the remaining effects on the affected species will fall into either the "No Effect" or "May Affect, Not Likely to Adversely Affect" effects categories for consultation.

This programmatic BA addresses a need to complete programmatic ESA Section 7 consultation for federally listed, candidate, or proposed threatened and endangered species within the action area boundaries. The BA evaluates the potential effects on these species within the UGP Region from wind energy projects that would be constructed under the purview of the proposed programmatic approach. The BA also identifies species-specific avoidance measures and species-specific minimization measures[2] to address those effects, and presents determinations regarding the potential for adverse effects on federally listed, candidate, or proposed species if the avoidance criteria and minimization measures are implemented. Although Western does not have the authority to require project proponents to implement the appropriate conservation measures, applicants that choose not to take advantage of this program's criteria and process will not be a part of this programmatic ESA consultation and will

[2] Minimization measures are species-specific measures, such as seasonal timing restrictions for activities, restricting the types of activities that can occur, or specific actions or design features to be implemented in order to reduce the potential for adverse impacts on federally listed, candidate, or proposed species in areas remaining once the avoidance criteria have been applied. In comparison, BMPs refer to measures intended to limit or reduce potential impacts on all natural resources, including federally listed, candidate, or proposed species.

require individual review and analysis by Western and the USFWS, which includes separate consultation under Section 7 of the ESA as necessary.

Under the ESA, effects from Federal actions on federally listed species are examined through a BA and analyzed by the action agency through a consultation process that involves the USFWS, consistent with section 7(a)(2) of the ESA. While proposed species are not protected under the ESA (until listed), action agencies are required to conference with the USFWS if the proposed action is likely to jeopardize the species or result in destruction or adverse modification of proposed critical habitat. Candidate species have no protection under the ESA and no conference process is required for them. By policy, the USFWS treats candidates as proposed species for the purposes of evaluating any proposed actions (intra-Service consultations).

However, the action agency may elect, and often the USFWS encourages, voluntary conferencing for both proposed and candidate species during proposed action analysis. Voluntarily conferencing before listing works to streamline the ESA consultation process if the species becomes listed, and the proposed action continues after the listing goes into effect. Voluntary conferencing follows the same information requirements as standard consultations, the same criteria for effect determinations (not likely to adversely affect or likely to adversely affect), and the same document styles for concurrence or issuance of a biological opinion. When an action agency proposes voluntarily conference on candidate and/or proposed species, the effects analysis and determination may treat the species as if they were listed species.

For the purposes of this BA and informal consultation under the ESA, Western has requested to voluntarily conference and the USFWS has agreed; thus, candidate and proposed species are treated as if they were listed species. The evaluation of impacts and the determination of effects on all 28 species addressed in the BA utilize the threshold for listed species as the basis for the analysis and determinations. With this voluntary approach, the BA also suffices as conferencing under the ESA for the candidate and proposed species. If the determinations for all species are either insignificant or discountable and receive concurrence from the USFWS, the proposed project does not change, and no new information becomes available to suggest otherwise, the completed conference helps to streamline the process if the candidates or proposed species become listed in the future. At that time, additional consultation to meet ESA requirements on the proposed species that were listed would not have to occur since they were addressed adequately during the voluntary conference process.

Through this informal consultation, Western and the USFWS have determined that additional ESA Section 7 consultation is not required for projects for which the project developers commit to implementing the appropriate and applicable programmatic avoidance, minimization, and mitigation measures that would result in a determination (1) of no effect, or (2) not likely to adversely affect listed, candidate, or proposed species addressed in the BA. Conversely, project-specific ESA Section 7 consultation will be required for any projects for which project developers are unwilling or unable to implement the programmatic avoidance, minimization, or mitigation measures for applicable species.

Any newly listed, candidate, or proposed species not considered in the programmatic consultation will need to be addressed through an amendment to the BA. In general, adaptive management is important as Western and the USFWS gain a better understanding of issues related to wind energy development and conservation of species. The Department of the

Interior sponsored the development of a Technical Manual on Adaptive Management (Williams et al. 2009) to clearly and consistently define adaptive management and describe conditions for its implementation. Relative to the BA, adaptive management is a process that will allow adjustments to the conservation measures to reflect new information derived from research, surveys, and monitoring. If the conservation measures are not producing the desired protection, adjustments can be made to achieve the desired resource goal. Alternatively, if monitoring indicates that the conservation measures exceed that necessary for species protection, the measures can be scaled back. Thus, if new information reveals effects on species or critical habitat not considered in this BA that warrants modification of the current avoidance and minimization measures, the BA will be amended accordingly in consultation with the USFWS. ESA Section 7 consultation for individual projects that comply with the provisions of the programmatic BA will be documented using the Section 7 Project and Species Consistency Evaluation Forms found in Appendix B. Guidance for completion of the forms is also provided in Appendix B. The Consistency Evaluation Forms are to be used for documenting compliance with the BMPs, avoidance measures, and minimization measures identified in the narrative and in tables 4.5-1 and 5-1 of the BA that are to be implemented so that the individual projects, reviewed and approved pursuant to this programmatic process, will not have adverse effects on listed, candidate, or proposed species and will comply with the informal consultation requirements of the ESA.

The Project Consistency Evaluation Form (see Appendix B) guides the project proponent through the wind energy project description, allowing the proponent to provide details about the project location and design. The proponent would then be responsible for using the Environmental Conservation Online System (ECOS) and the programmatic BA project Web site to identify the applicable species for the proposed project. The proponent would then be required to review this BA to determine the BMPs, avoidance criteria, and the appropriate and applicable minimization measures for the species identified. If the project proponent agrees to abide by the listed measures, the appropriate Species Consistency Evaluation Form would be filled out for each species applicable to the project area. The completed Project and Species Consistency Evaluation Forms would then be submitted to the Lead Agency for review. The Lead Agency would work with the developer to identify and resolve any outstanding issues or to help correctly fill out the Consistency Evaluation Forms. Once the Lead Agency can verify that the proponent's project information is complete, complies with the provisions of the programmatic BA, and is consistent with the tiered approach identified in the voluntary Land-Based Wind Energy Guidelines developed by the USFWS and industry, the Lead Agency will sign the Project Consistency Evaluation Form and submit the Project Consistency Evaluation Form and the applicable Species Consistency Evaluation Forms to the appropriate USFWS Ecological Services Office for review. If the proponent's project meets the programmatic consultation requirements, the USFWS signs the Project Consistency Evaluation Forms, signifying consistency with the programmatic letter of concurrence issued by the USFWS. Thus, the project-specific review by the action agency (or action agencies) and USFWS is a consistency review rather than a review for a decision under Section 7 of the ESA. The process and decision points for conducting ESA Section 7 consultation under the proposed programmatic approach are diagrammed in figure 2-1.

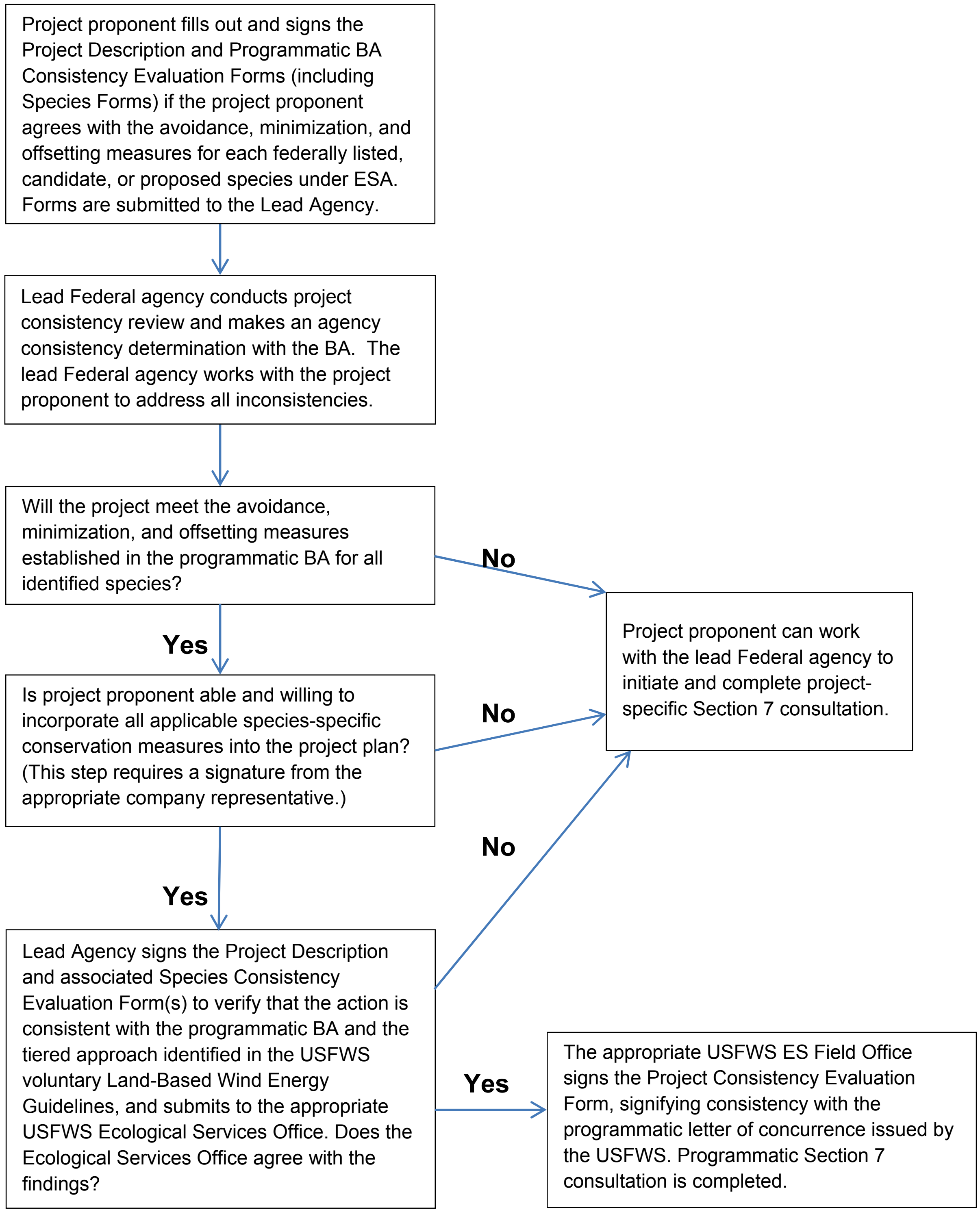


**FIGURE 2-1 Conducting ESA Section 7 Consultation under the UGP Wind Energy Programmatic Consultation Process**

## 2.2 PROJECT AREA

Under the proposed action, applications for interconnection to Western's transmission system could originate from any proposed wind energy project that would be located within the UGP Region (figure 1-1). The UGP Region encompasses an area of approximately 360,000 $mi^2$ (932,396 $km^2$) in all or parts of the States of Iowa, Minnesota, Montana, Nebraska, North Dakota, and South Dakota.

The proposed action also addresses potential placement of wind energy facilities on landscape-level grassland and wetland easements that are managed under agreements with the USFWS and that are located within the boundaries of the UGP Region (figure 1-1). There are approximately 30,000 landscape-level grassland and wetland easements located in the States of North Dakota, South Dakota, and Montana, encompassing approximately 2.7 million ac (4,200 $mi^2$, or 10,926 $km^2$) of land (table 2.2-1; figure 1-1), that would fall under the purview of the proposed programmatic approach. Additional easement lands are present in the States of Minnesota, Iowa, and Nebraska.

However, not all of the lands within the UGP Region are suitable for development of wind energy projects because of factors such as lack of suitable wind regimes, land cover types, steep slopes, open water and wetland areas, urban development, and Federal and State land use restrictions. The distribution of land cover types within the UGP Region is shown in figure 2.2-1. Section 2.3 provides additional discussion regarding the suitability of lands within the UGP Region for wind energy development and the potential for wind energy projects within specific areas to request interconnection to transmission facilities managed by Western.

**TABLE 2.2-1 Area Encompassed by USFWS Easements within the UGP Region**

| State | Wetland Easements (ac) | Grassland Easements (ac) | Total (ac) |
|---|---|---|---|
| North Dakota | 912,320 | 303,001 | 1,215,321 |
| South Dakota | 534,054 | 786,233 | 1,320,287 |
| Montana | 32,954 | 147,755 | 180,709 |
| Total | 1,479,328 | 1,236,989 | 2,716,317 |

## 2.3 PROJECTED WIND ENERGY DEVELOPMENT IN THE UGP REGION THROUGH 2030

Standardized wind energy development scenarios for the UGP Region were used to estimate the amount of wind energy development likely to occur in the UGP Region in the future. The development timeframe analyzed is from the present to 2030 to be consistent with modeling conducted by DOE to explore how 20 percent of the Nation's electricity could be generated from wind energy by 2030 (DOE 2008). Two estimates for wind energy development within the region were used to bound analyses of potential natural resource impacts:


**FIGURE 2.2-1 Land Cover within the UGP Region**

1. Scenario 1 – Projected wind energy development based on levels of development within the UGP Region States from 2000 through 2010; and

2. Scenario 2 – Projected wind energy development based on modeling conducted by the National Renewable Energy Laboratory (NREL) to identify how 20 percent of the Nation's electrical generation could be produced by wind energy by the year 2030 (DOE 2008).

For Scenario 1, it was assumed that the trajectory for the increase in installed wind energy capacity during the next 20 yr would remain similar to the annual rate of increase during the past 10 yr. Overall, installed capacity within each of the UGP States has increased substantially during the previous 10-yr period (figure 2.3-1). The rate of increase has slowed in some States in recent years (e.g., Iowa) and has increased in others (e.g., South Dakota). For Scenario 1, the estimated level of wind energy development within the UGP Region by 2030 was calculated by developing a best-fit linear relationship using reported values of installed wind energy capacity for each of the UGP States from 2000 to 2010 (DOE 2011; see also table 2.3-1). Those relationships were used to predict the amount of installed capacity that would be present in each State in 2030 (table 2.3-1). To estimate the number of turbines that would be needed to meet the projected capacity, it was assumed that each turbine would generate 1.5 MW of electricity. Typical wind turbines currently being installed in the UGP Region generate between 1.5 and 3.5 MW per turbine. Predicted levels of generation and the estimated number of turbines to meet the generation capacity estimates under Scenario 1 are presented in table 2.3-1.

For Scenario 2, estimates of future installed wind energy capacity between 2010 and 2030 were based on an analysis conducted by NREL using its Wind Deployment System (WinDS) model. The model used a variety of inputs and assumptions, as described in Appendix B of the DOE (2008) report, to modify a base case version of the model (Denholm and Short 2006). The revised model indicated that wind turbines required to supply 20 percent of the Nation's electricity (more than 300 GW) would be broadly distributed across the United States, and that at least 100 MW would be installed in 43 of the 48 contiguous States.

The revised model identified one way that the national goal could be accomplished. The specific assumptions used in the model significantly affect each State's projected wind capacity, and the DOE (2008) report stated that the projected levels would vary significantly as electricity markets evolve and State policies promote or restrict wind energy production. Table 2.3-2 shows the modeled levels of wind energy capacity that would be developed in each State in the UGP Region to meet a national goal for 20 percent of the Nation's electrical generation to be from wind energy by 2030 (as presented by Kiesecker et al. 2011). The number of turbines needed to meet the projected capacity (table 2.3-2) was estimated by assuming that each turbine would generate 1.5 MW of electricity.

While the analytical scenarios identify potential levels of future wind energy development activities that may occur within the UGP Region through the year 2030, a variety of factors (e.g., economic, social, and political constraints) beyond the control or influence of Western or the USFWS are likely to limit wind energy development within the UGP Region to some level below that projected in the upper bound of the analytical scenarios. However, the analytical scenarios are used to bound potential levels of additional wind energy development that could

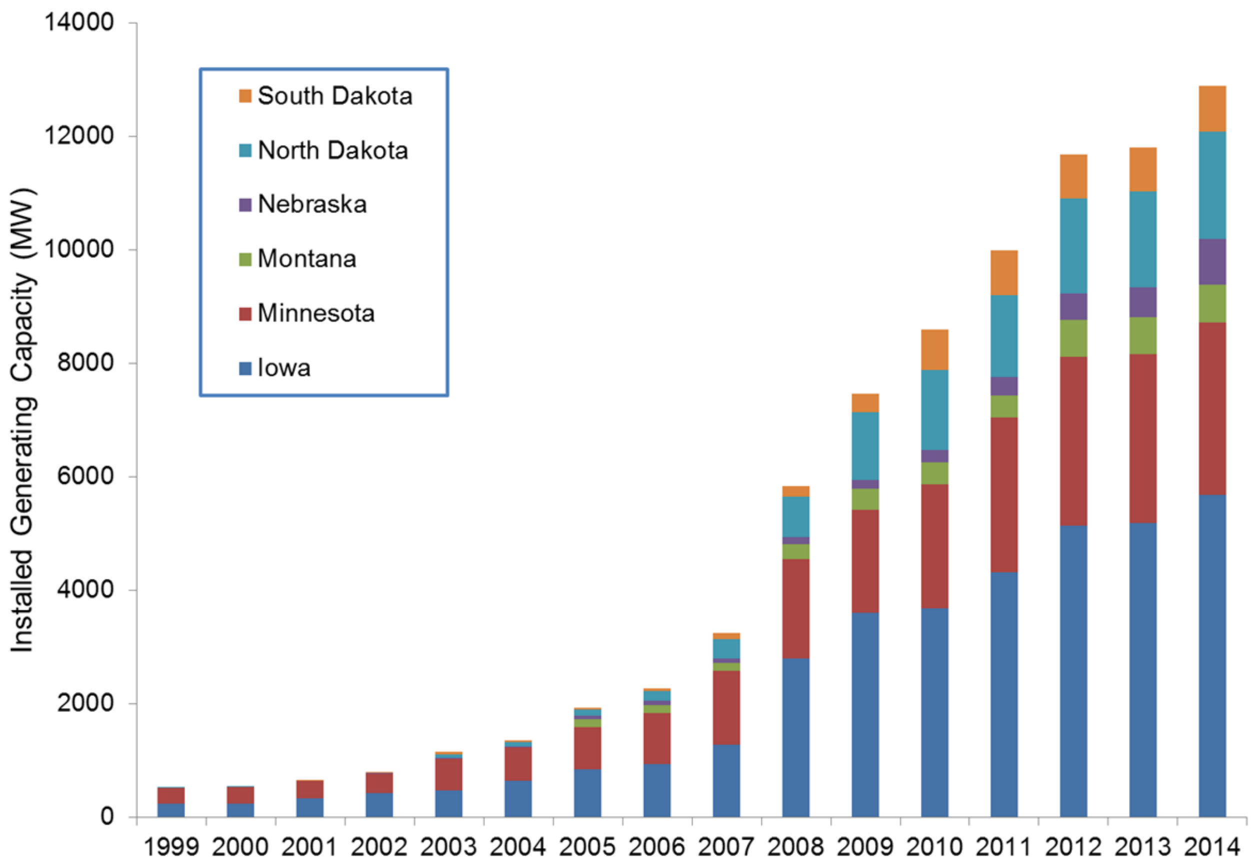


**FIGURE 2.3-1 Installed Wind Generation Capacity in UGP Region States from 1999 to 2013 (Source: DOE 2015)**

occur within the UGP Region by 2030. Projected levels of overall and new generation capacity under the two projection scenarios are compared in table 2.3-3.

Estimates of the number of turbines and the amount of land that would be affected by construction and operation of wind energy facilities within the UGP Region were developed using the projected levels of generation capacity. Depending upon the method used to estimate future wind energy development, it is estimated that approximately an additional 8,600 to 30,000 wind turbines and associated infrastructure would be installed in the UGP Region by 2030. Based upon information about generation capacity and number of turbines for 25 wind energy projects built within the UGP Region between 2000 and 2010 (table 2.3-4), it is assumed that a typical project would be composed of 75 turbines and would have a generation capacity of approximately 112 MW. Using information from Denholm et al. (2009), which estimates a wind energy project will encompass 84 ac (34 ha) of land per MW of capacity, it is estimated that the area encompassed by a typical project would be approximately 9,500 ac (3,845 ha) (including permanently disturbed, temporarily disturbed, and undisturbed lands). Combining these estimates, it is anticipated that about 115 to 400 new wind energy projects, encompassing a total area of about 1.1 to 3.8 million ac (0.4 to 1.5 million ha) could be developed within the

**TABLE 2.3-1 Current and Predicted Development of Wind Energy Capacity and Estimated Number of Wind Turbines under the Scenario 1 Projection for the UGP Region**

| | Capacity (MW) | | | Number of Turbines[a] | | |
|---|---|---|---|---|---|---|
| State | 2010[b] | 2030[c] | Increase | 2010 | 2030 | Increase |
| Iowa | 3,675 | 9,597 | 5,922 | 2,450 | 6,398 | 3,948 |
| Minnesota | 2,192 | 5,475 | 3,283 | 1,461 | 3,650 | 2,189 |
| Montana | 386 | 1,115 | 729 | 257 | 743 | 486 |
| Nebraska | 213 | 514 | 301 | 142 | 343 | 201 |
| North Dakota | 1,424 | 3,451 | 2,027 | 949 | 2,301 | 1,352 |
| South Dakota | 709 | 1,274 | 565 | 473 | 850 | 377 |
| UGP Region | 8,599 | 21,427 | 12,828 | 5,733 | 14,285 | 8,522 |

[a] Number of turbines estimated by assuming each turbine would generate 1.5 MW.

[b] Source: DOE (2011).

[c] Capacity for 2030 was estimated by assuming that the rate of increase would be similar to the annual rate of increase in wind energy capacity from 2000 through 2010.

**TABLE 2.3-2 Current and Predicted Development of Wind Energy Capacity and Estimated Number of Wind Turbines under the Scenario 2 Projection for the UGP Region**

| | Capacity (MW) | | | Number of Turbines[a] | | |
|---|---|---|---|---|---|---|
| State | 2010[b] | 2030[c] | Increase | 2010 | 2030 | Increase |
| Iowa | 3,675 | 19,910 | 16,235 | 2,450 | 13,273 | 10,823 |
| Minnesota | 2,192 | 9,940 | 7,748 | 1,461 | 6,627 | 5,165 |
| Montana | 386 | 5,260 | 4,874 | 257 | 3,507 | 3,249 |
| Nebraska | 213 | 7,880 | 7,667 | 142 | 5,253 | 5,111 |
| North Dakota | 1,424 | 2,206 | 836 | 949 | 1,507 | 557 |
| South Dakota | 709 | 8,060 | 7,351 | 473 | 5,373 | 4,901 |
| UGP Region | 8,599 | 53,310 | 44,711 | 5,733 | 35,540 | 29,807 |

[a] Number of turbines estimated by assuming each turbine would generate 1.5 MW.

[b] Source: DOE (2011).

[c] Sources: DOE (2008) and Kiesecker et al. (2011).

**TABLE 2.3-3 Current and Projected Wind Energy Generation Capacity (MW) for the UGP Region States under Different Development Scenarios[a]**

| | | Overall Capacity by 2030 | | New Capacity by 2030 | |
|---|---|---|---|---|---|
| State | 2010[b] | Projected Trend (Scenario 1)[c] | 20 Percent Wind Energy (Scenario 2)[d] | Projected Trend (Scenario 1)[c] | 20 Percent Wind Energy (Scenario 2)[d] |
| Iowa | 3,675 | 9,597 | 19,910 | 5,922 | 16,235 |
| Minnesota | 2,192 | 5,475 | 9,940 | 3,283 | 7,748 |
| Montana | 386 | 1,115 | 5,260 | 729 | 4,874 |
| Nebraska | 213 | 514 | 7,880 | 301 | 7,667 |
| North Dakota | 1,424 | 3,451 | 2,260 | 2,027 | 836 |
| South Dakota | 709 | 1,274 | 8,060 | 565 | 7,351 |
| UGP Region Total | 8,599 | 21,427 | 53,310 | 12,828 | 44,711 |

[a] See appendix B of the *UGP Wind Energy PEIS* for description of methodology used to develop projections.

[b] Installed generation capacity as of the end of 2010. Source: DOE (2011).

[c] Projected wind energy generation capacity based on trend in wind energy development for UGP Region States from 2000 through 2010.

[d] Projected wind energy generation capacity based on estimates for levels of development needed to achieve generation of 20 percent of electricity from wind energy by 2030. Sources: DOE (2008); Kiesecker et al. (2011).

UGP Region States by 2030; most of this land area would not be directly disturbed by project activities.

On the basis of information provided by Denholm et al. (2009) for 172 individual wind energy projects totaling 26,462 MW of capacity, the average amount of land that would be permanently affected, the average amount of land that would be temporarily affected, and the average overall project area was estimated using values of 0.7, 1.7, and 84 ac (0.3, 0.7, and 34 ha) per MW of generation, respectively. Using these values, which are based on information for modern wind power plants in the United States and incorporate disturbance for areas affected by turbine towers, access roads, substations, and transmission facilities associated with development of wind farms, between 15,000 and 40,000 ac (6,070 and 16,187 ha) of land within the UGP Region could be permanently affected by existing and new wind energy development by 2030; an additional 37,000 to 92,000 ac (14,973 to 37,231 ha) of land could be affected by temporary disturbance from development activities, resulting in a total of about 52,000 to 132,000 ac (21,043 to 53,419 ha) of land that could be disturbed by existing and new wind energy development (table 2.3-5).

It is estimated that 8,500 to 30,000 additional turbines would need to be installed in the UGP Region by 2030 to generate the increased capacity. This would result in approximately 9,500 to 33,000 ac (3,845 to 13,355 ha) of land being permanently affected by the footprints of turbine towers and other infrastructure associated with this level of development (table 2.3-6). An additional 22,000 to 77,000 ac (8,903 to 31,160 ha) would be temporarily affected by new development activities, resulting in a total of about 32,000 to 110,000 ac (12,950 to 44,515 ha)

**TABLE 2.3-4 Installed Capacity and Number of Turbines for Existing Wind Energy Projects within the UGP Region from 2000 to 2010**

| State | Project Name | Capacity (MW) | Number of Turbines |
|---|---|---|---|
| IA | Endeavor | 100 | 40 |
| IA | Endeavor II | 50 | 20 |
| IA | Intrepid | 160 | 107 |
| IA | Pomeroy Wind Phase I | 123 | 87 |
| MN | Chanarambie | 85 | 57 |
| MN | Elm Creek Wind Farm | 99 | 66[a] |
| MN | Elm Creek II | 150 | 62 |
| MN | Trimont Area Wind Farm | 100 | 67 |
| MN | Fenton Wind Farm | 205 | 137 |
| MN | Jeffers Wind Farm | 50 | 20 |
| MN | Moraine Wind | 51 | 34 |
| MN | Moraine Wind II | 48 | 23 |
| MN | Stoneray Wind Power | 105 | 70 |
| NE | Elkhorn Ridge Wind Energy | 80 | 27 |
| SD | Buffalo Ridge | 306 | 204 |
| SD | Wessington Springs[b] | 51 | 34 |
| SD | South Dakota Wind[b] | 100 | 66 |
| SD | MinnDakota Wind II | 54 | 36 |
| ND | Ashtabula Wind Phase II | 200 | 133 |
| ND | Wilton Wind[b] | 200 | 133 |
| ND | Tatanka Wind | 180 | 120 |
| ND | North Dakota Wind[b] | 116 | 77 |
| ND | Langdon Wind | 159 | 106 |
| MT | Glacier McCormick Ranch Phase I | 120 | 60 |
| MT | Judith Gap | 135 | 90 |
| Total within UGP Region | | 3,027 | 1,876 |

[a] Value not reported, but the number of turbines was calculated based on capacity, using an assumption of 1.5 MW per turbine.

[b] Interconnected to Western's transmission system.

of additional land that could be disturbed by new wind energy development by 2030 (table 2.3-5).

Because the siting and construction of new transmission facilities is expensive, difficult, and time consuming, minimizing the amount of new transmission line is a high priority for developers. Consequently, there are many instances where wind energy developments have been sited next to existing transmission facilities; however, opportunities like these are not unlimited and as the wind energy industry matures, these opportunities will decrease. Just as is the case with the location of wind farms, the location of future transmission facilities also cannot be predicted. The following assumptions were used to estimate the extent of potential development: (1) since Western's Transmission Area contains about 50 percent of the lands rated as highly suitable for wind energy development in the UGP Region, it is assumed that from 58 to 200 of the new wind energy projects anticipated in the UGP Region by 2030 would

**TABLE 2.3-5 Comparison of Projected Overall Land Area Disturbance[a] for Wind Energy Development in the UGP Region States by 2030 under Alternate Development Projection Scenarios**

| State | Permanent Disturbance (ac)[b] | | Temporary Disturbance (ac)[c] | | Total Disturbance (ac) | | Project Area (ac)[d] | |
|---|---|---|---|---|---|---|---|---|
| | Projected Trend (Scenario 1) | 20 Percent Wind Energy (Scenario 2) | Projected Trend (Scenario 1) | 20 Percent Wind Energy (Scenario 2) | Projected Trend (Scenario 1) | 20 Percent Wind Energy (Scenario 2) | Projected Trend (Scenario 1) | 20 Percent Wind Energy (Scenario 2) |
| Iowa | 7,111 | 14,753 | 16,593 | 34,424 | 23,705 | 49,178 | 805,964 | 1,672,042 |
| Minnesota | 4,057 | 7,366 | 9,467 | 17,186 | 13,524 | 24,552 | 459,824 | 834,761 |
| Montana | 826 | 3,898 | 1,927 | 9,095 | 2,753 | 12,992 | 93,597 | 441,735 |
| Nebraska | 381 | 5,839 | 890 | 13,625 | 1,271 | 19,464 | 43,207 | 661,762 |
| North Dakota | 2,558 | 1,675 | 5,968 | 3,908 | 8,525 | 5,582 | 289,856 | 189,795 |
| South Dakota | 944 | 5,972 | 2,203 | 13,936 | 3,147 | 19,908 | 107,013 | 676,879 |
| UGP Region Total | 15,878 | 39,503 | 37,048 | 92,173 | 52,925 | 131,676 | 1,799,462 | 4,476,974 |

[a] Values were calculated based on information in Denholm et al. (2009) and include estimated land disturbance for existing and future wind energy projects.

[b] Permanent disturbance area estimated using a value of 0.7 ac (0.3 ha) per MW of capacity.

[c] Temporary disturbance area estimated using a value of 1.7 ac (0.7 ha) per MW of capacity.

[d] Project area estimated using a value of 84 ac (34 ha) per MW of capacity.

**TABLE 2.3-6 Comparison of Additional Land Area Disturbance[a] Needed to Meet Wind Energy Development in the UGP Region States by 2030 under Alternate Development Projections**

| State | Permanent Disturbance (ac)[b] | | Temporary Disturbance (ac)[c] | | Total Disturbance (ac) | | Project Area (ac)[d] | |
|---|---|---|---|---|---|---|---|---|
| | Projected Trend | 20 Percent Wind Energy | Projected Trend | 20 Percent Wind Energy | Projected Trend | 20 Percent Wind Energy | Projected Trend | 20 Percent Wind Energy |
| Iowa | 4,388 | 12,030 | 10,239 | 28,070 | 14,628 | 40,100 | 497,338 | 1,363,415 |
| Minnesota | 2,433 | 5,741 | 5,677 | 13,396 | 8,110 | 19,138 | 275,740 | 650,677 |
| Montana | 540 | 3,612 | 1,260 | 8,427 | 1,799 | 12,039 | 61,180 | 409,319 |
| Nebraska | 223 | 5,681 | 521 | 13,256 | 745 | 18,937 | 25,319 | 643,875 |
| North Dakota | 1,502 | 619 | 3,506 | 1,445 | 5,008 | 2,065 | 170,269 | 70,207 |
| South Dakota | 419 | 5,447 | 977 | 12,710 | 1,396 | 18,157 | 47,471 | 617,337 |
| UGP Region Total | 9,506 | 33,131 | 22,180 | 77,305 | 31,686 | 110,436 | 1,077,318 | 3,754,830 |

[a] Values were calculated based on information in Denholm et al. (2009).

[b] Permanent disturbance area estimated using a value of 0.7 ac (0.3 ha) per MW of capacity.

[c] Temporary disturbance area estimated using a value of 1.7 ac (0.7 ha) per MW of capacity.

[d] Project area estimated using a value of 84 ac (34 ha) per MW of capacity.

connect to Western's facilities; (2) for the average-sized wind energy facility, a 69-kV capacity transmission line with a 50-ft (15-m) permanent transmission line right-of way (ROW) width would be required, along with a 20-ft (6-m) construction road ROW width, and together these require about 8.5 ac/mi (2.1 ha/km) of surface area; and (3) the average length of a transmission line would be 12.5 mi (20 km). Based on these assumptions, it is estimated that about 6,163 to 21,200 ac (2,494 to 8,579 ha) of land would be encompassed by transmission-related ROWs. This is likely an overestimate, since it assumes a construction-width road ROW for the full length of the average transmission line (a permanent road is not required for the full length of a transmission line in many cases), and a permanent road ROW is usually only 12–14 ft (3.6–4.3 m) wide. In addition, the largest long-term disturbance associated with a transmission line in prairie country most likely would be a permanent access road, because most of the land in the transmission ROW either is never disturbed or is restored following temporary disturbance during construction.

Predicting exactly where future wind energy development is likely to occur within the UGP Region is difficult. While not all of the lands within the UGP Region are suitable for the development of wind energy projects because of factors such as lack of suitable wind regimes, unsuitable land cover types, steep slopes, open water and wetland areas, urban development, and Federal and State land use restrictions, most of the area is predicted to have suitable wind resources for energy development. NREL has modeled and mapped the wind resources in each of the UGP Region States and has determined that wind resources of Class 3 and higher could be economically developable by 2030 (i.e., during the timeframe under consideration). Therefore, for the purposes of evaluating the impact of the likely wind energy development, the focus is on those areas where the wind resource potential is Class 3 or greater (figure 2.3-2).

In addition to the wind resource, a number of other factors that affect the appropriateness of particular locations for wind energy development were used to better identify which areas within the UGP Region would be most suitable for wind energy development. A similar analysis was conducted by the Western Governors' Association to evaluate the suitability of lands in the Western United States for development of renewable energy facilities (WGA and DOE 2009), and information and assumptions regarding suitability criteria for utility-scale wind energy development for that analysis were incorporated into the analysis for the UGP Region. In general, the suitability analysis incorporated information about land cover, slope, wind power class, protected lands, and proximity to existing energy infrastructure to develop an overall index of wind development suitability for locations within the UGP Region; these index values were categorized as low, medium, and high suitability. The methods for calculating suitability index values are described in appendix E of the PEIS and the results of the analysis are presented in figure 2.3-3.

Due to the expense of acquiring ROWs and building transmission lines, the cost of a wind energy project would increase significantly with increasing distance from existing transmission systems to which it could connect. Therefore, to further delineate the areas within the UGP Region where wind energy projects are likely to request interconnection to Western's transmission facilities, areas within 25 mi (40 km) of existing transmission infrastructure, particularly substations, operated by Western were identified (figure 2.3-4). Areas managed as wetland and grassland easements by the USFWS within the UGP Region are also indicated in figure 2.3-4. Overall, the areas within 25 mi (40 km) of Western's transmission facilities encompass more than 92 million ac (151,561 $mi^2$) (37 million ha [392,541 $km^2$]) within the UGP Region (table 2.3-7).

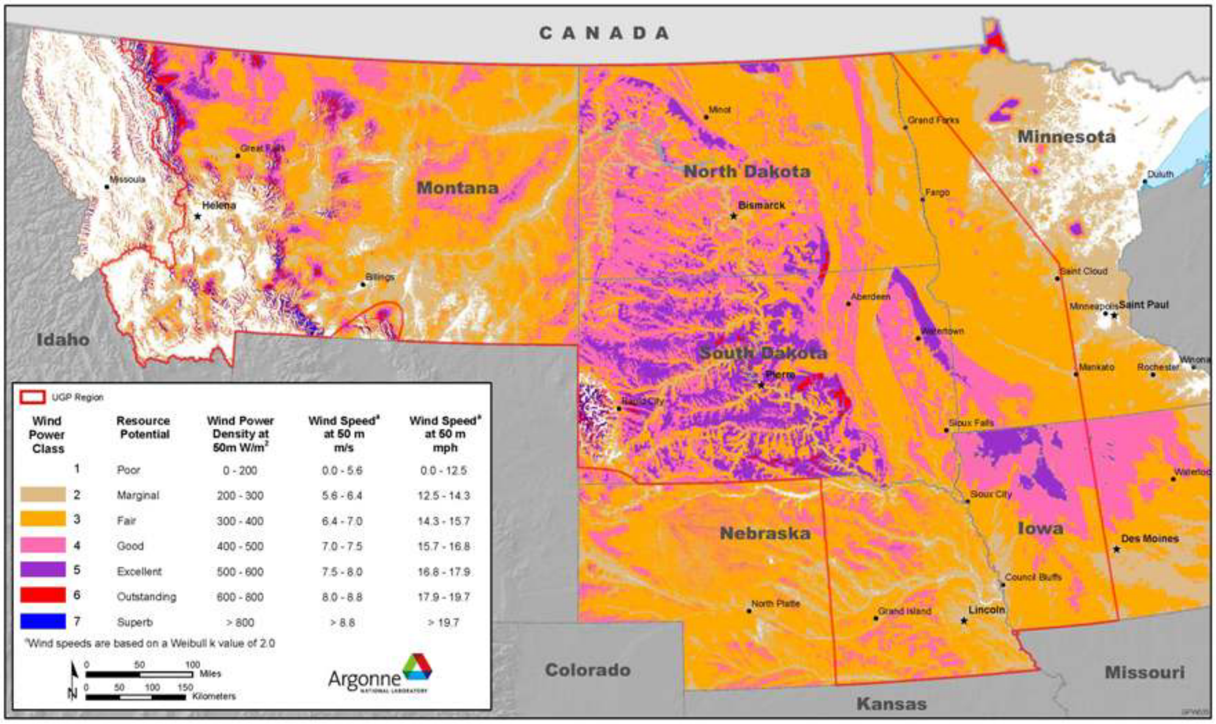


**FIGURE 2.3-2 Distribution of Wind Energy Resources in the UGP Region**

Based on the analyses conducted, it is estimated that the land area needed to accommodate new projects (1.1 to 3.8 million ac [0.4 to 1.5 million ha] for 115 to 400 projects) would encompass about 2.1 to 7.2 percent of the lands identified as having high suitability for wind energy development within the UGP Region (table 2.3-7). It is unknown what proportion of new development within the UGP Region would request interconnection to Western's transmission facilities or would request easement exchanges to accommodate facilities affecting easements managed by the USFWS. To date, portions of four wind energy projects and a total of 33 turbines have been placed on USFWS easements within the UGP Region. Since it is anticipated that areas with high wind energy potential would be preferred over areas with lower wind development potential, the areas within 25 mi (40 km) of Western's transmission facilities are shown together with wind development potential categories in figure 2.3-5; the acreages of lands in different wind development suitability categories are presented in table 2.3-7.

The actual level of future wind energy development will be influenced by many factors including electricity markets, development of additional transmission capability within the region, Federal tax credits and other incentives for renewable energy development, and future changes in renewable portfolio standard legislation for the UGP Region States. From 2000 to 2010, approximately 37 percent of the wind energy development in the UGP Region connected to Western's transmission system. If it is assumed that these interconnections represent wind energy development with Federal involvement, that the remaining (63 percent) wind energy development within the UGP Region was privately developed (i.e., no Federal involvement), and that the proportion of non-Federal wind energy development will remain similar in the future, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030.

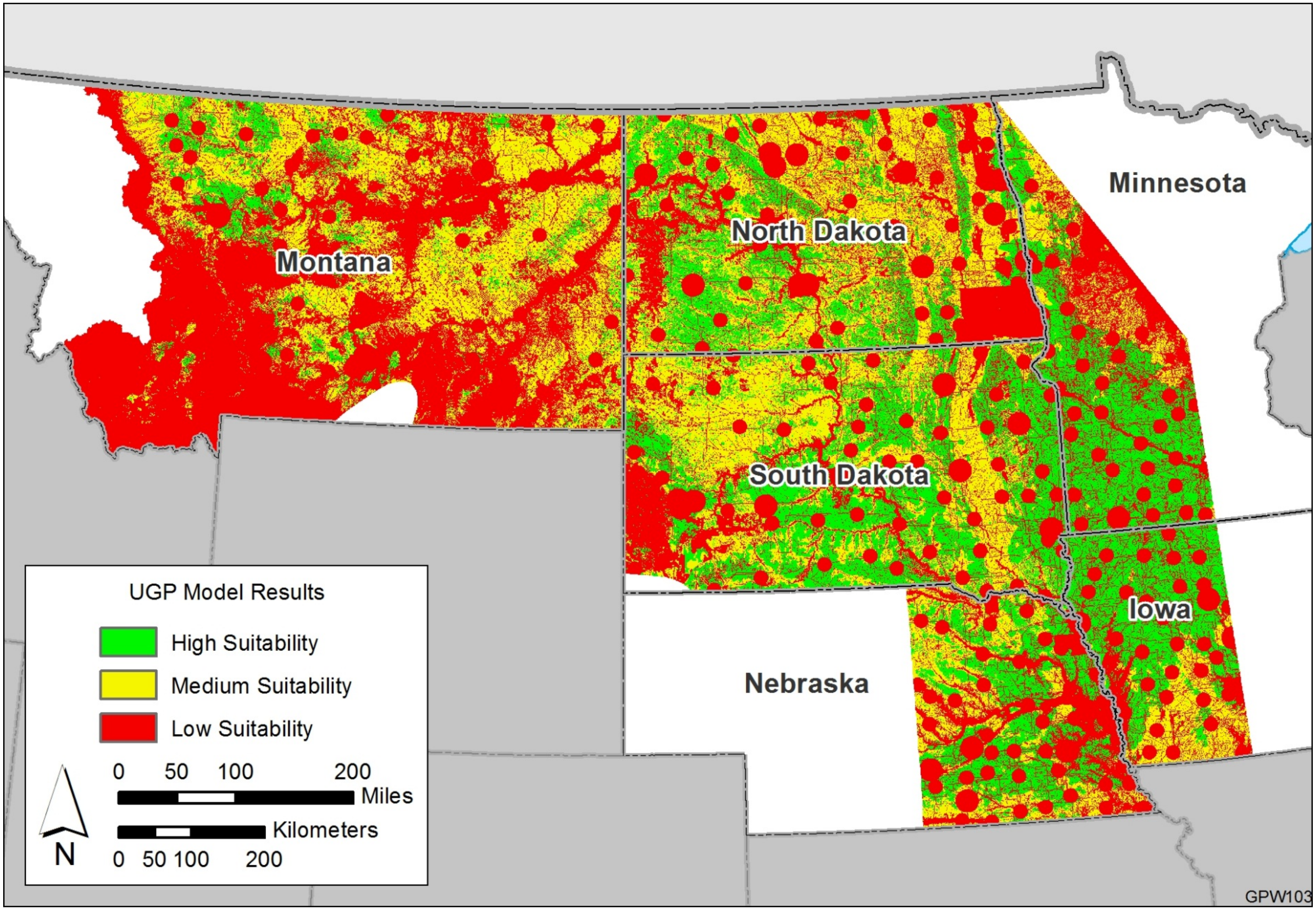


**FIGURE 2.3-3 Wind Energy Development Suitability for Lands within the UGP Region**

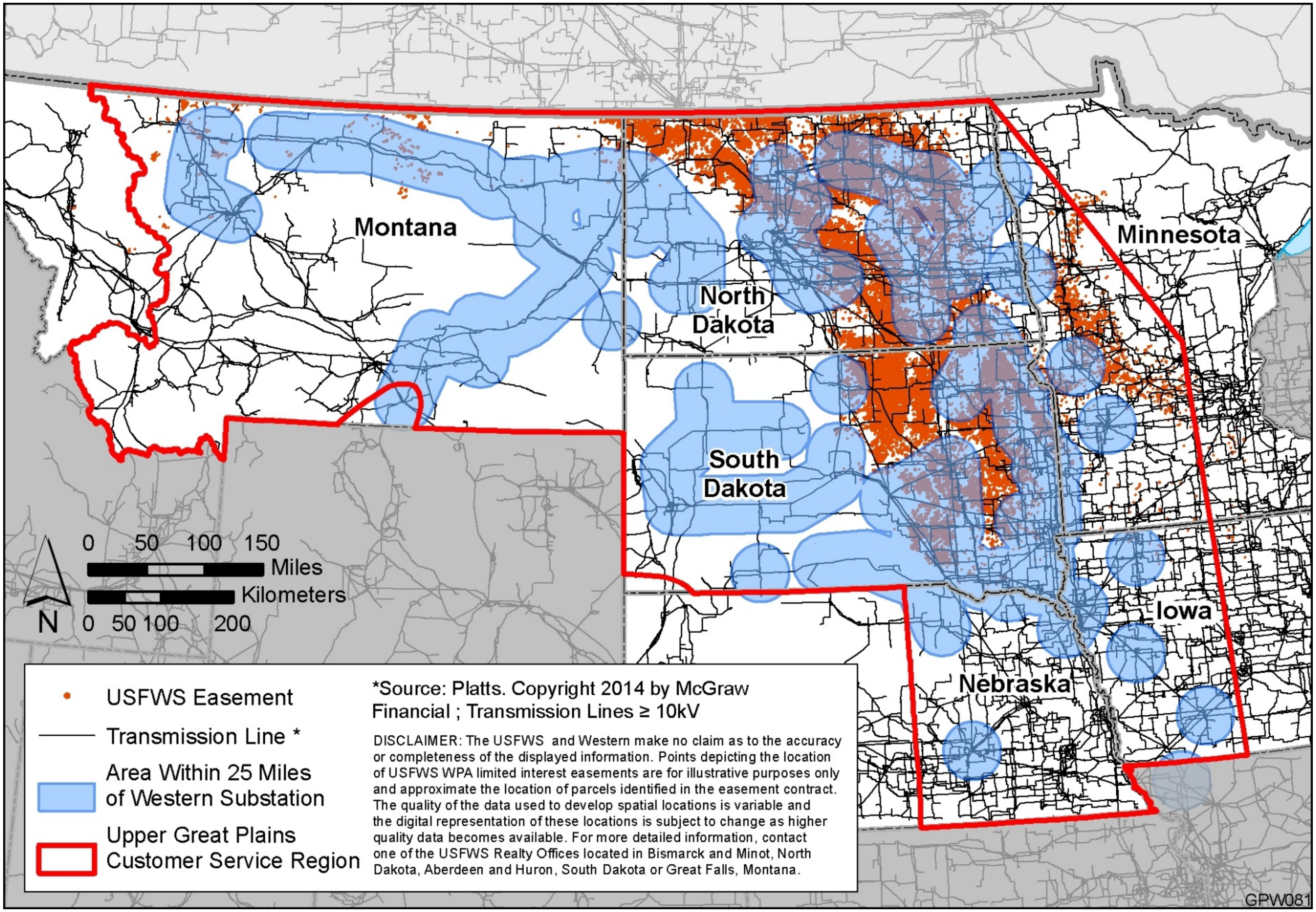


**FIGURE 2.3-4 Areas within 25 mi (40 km) of Western's Transmission Substations within the UGP Region, Together with General Locations of USFWS Wetland and Grassland Easements**

## TABLE 2.3-7 Estimated Acreages of Lands within Wind Development Suitability Categories for the UGP Region[a]

| Potential for Wind Energy Development | UGP Region | Within 25 mi (40 km) of Western Transmission | Portions of States Within Region | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Iowa | Minnesota | Montana | Nebraska | North Dakota | South Dakota |
| Low[b] | 110,868,000 | 39,847,845 | 6,796,498 | 9,973,053 | 47,537,348 | 10,380,614 | 18,756,672 | 17,394,058 |
| Medium | 65,093,977 | 27,476,285 | 2,486,997 | 2,488,954 | 23,952,728 | 4,770,103 | 16,032,379 | 15,338,596 |
| High | 52,621,694 | 25,101,575 | 6,546,237 | 8,429,032 | 5,288,550 | 5,765,765 | 10,457,785 | 16,126,897 |
| Total | 228,583,671 | 92,425,705 | 15,829,733 | 20,891,040 | 76,778,625 | 20,916,482 | 45,246,836 | 48,859,552 |

[a] Units are measured in acres.

[b] Includes lands classified as unsuitable for wind energy development.

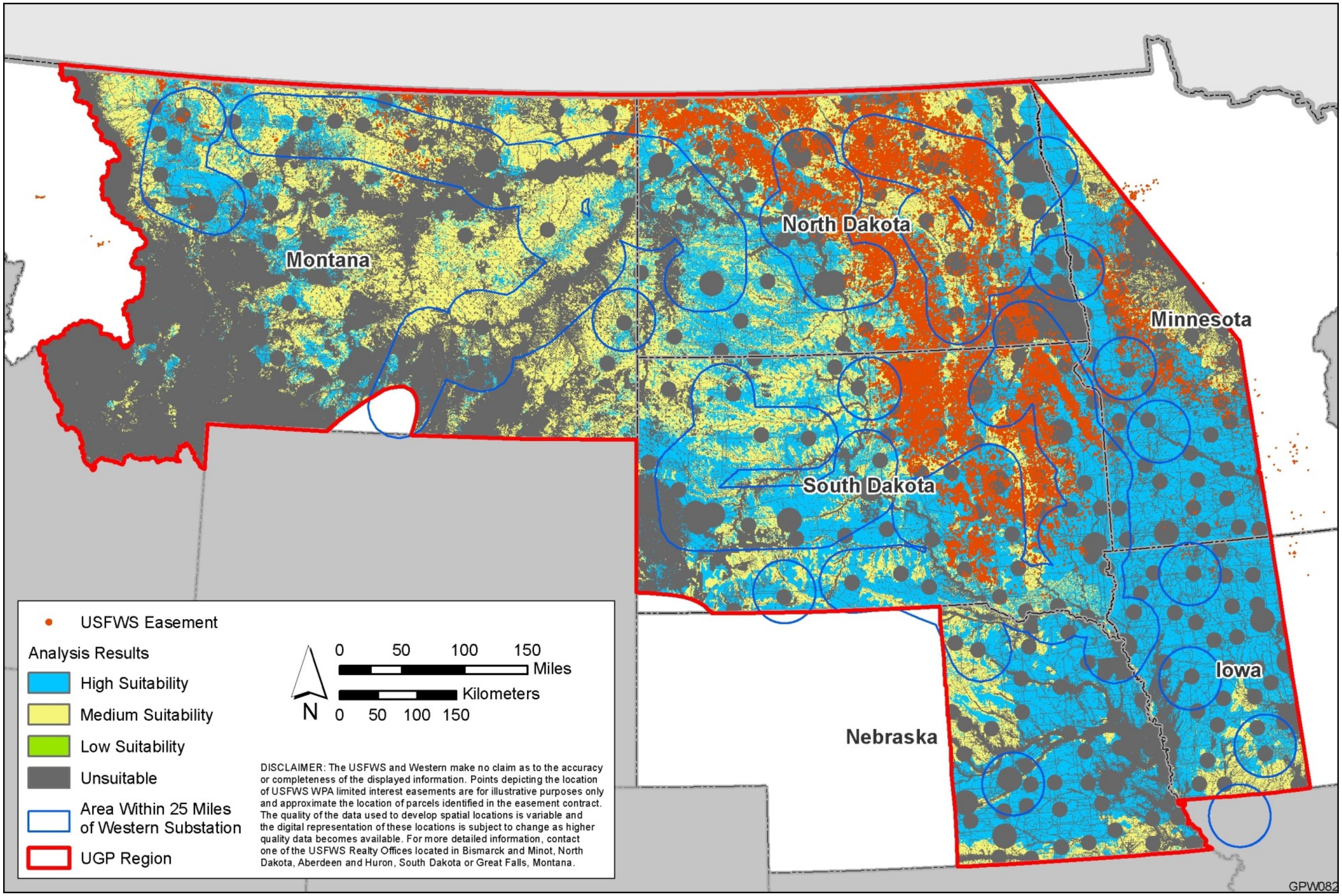


**FIGURE 2.3-5 Wind Energy Development Suitability for Lands within the UGP Region, Together with Areas within 25 mi (40 km) of Western's Transmission Substations and General Locations of USFWS Wetland and Grassland Easements**

# 3 LISTED AND PROPOSED SPECIES WITHIN THE PROJECT AREA

In a July 30, 2009, response to Western's request for information about listed species that could occur within the UGP Region, the USFWS indicated 24 species that may occur in the project area. Of the original 24 species identified in the response, two species – the sheepnose mussel (*Plethobasus cyphyus*), a proposed species for listing under the ESA, and the Eskimo curlew (*Numenius borealis*), a species listed as endangered under the ESA – are not considered in this BA because they are presumed to be extirpated from the UGP Region. Subsequent to the original response, two additional species, the Dakota skipper (*Hesperia dacotae*) and the Poweshiek skipperling (*Oarisma poweshiek*), were listed as threatened and endangered, respectively, and the rufa red knot (*Calidris canutus rufa*) was listed as a threatened species. Three species (whitebark pine [*Pinus albicaulis*], greater sage-grouse [*Centrocercus urophasianus*], and Sprague's pipit [*Anthus spragueii*]) became candidates for listing under the ESA since the original request and may occur in the project area. For purposes of the assessment presented here, candidate species are considered as if they have been proposed for listing. Overall, the 28 endangered, threatened, and candidate species that are under consideration in this BA and that may occur in the project area are listed in table 3-1.

Endangered, threatened, and candidate species that the USFWS has indicated may occur in the project area are discussed and evaluated in the following sections. Tables and maps summarizing the county-level distribution of each species are included in appendix A and are based on county occurrences as listed by the USFWS field offices within the UGP Region. These maps provide a reference point for future proposed projects, but should not be considered solely authoritative. For the purposes of this assessment, all counties within the UGP Region have been included, although some of these areas may not be subject to future wind or transmission development.

**TABLE 3-1 Federally Listed and Candidate Species and Designated Critical Habitat under the ESA That May Occur in the UGP Region[a]**

| Common Name | Scientific Name | ESA Status[b] | Critical Habitat Locations[c] |
|---|---|---|---|
| **Plants** | | | |
| Eastern prairie fringed orchid | *Platanthera leucophaea* | Threatened | |
| Mead's milkweed | *Asclepias meadii* | Threatened | |
| Prairie bush clover | *Lespedeza leptostachya* | Threatened | |
| Ute ladies'-tresses | *Spiranthes diluvialis* | Threatened | |
| Western prairie fringed orchid | *Platanthera praeclara* | Threatened | |
| Whitebark pine | *Pinus albicaulis* | Candidate | |
| **Invertebrates[d]** | | | |
| American burying beetle | *Nicrophorus americanus* | Endangered | |
| Dakota skipper | *Hesperia dacotae* | Threatened | |
| Higgins eye | *Lampsilis higginsii* | Endangered | |
| Poweshiek skipperling | *Oarisma poweshiek* | Endangered | |
| Salt Creek tiger beetle | *Cicindela nevadica lincolniana* | Endangered | Nebraska |
| Scaleshell mussel | *Leptodea leptodon* | Endangered | |
| **Fish** | | | |
| Bull trout | *Salvelinus confluentus* | Threatened | Montana |
| Pallid sturgeon | *Scaphirhynchus albus* | Endangered | |
| Topeka shiner | *Notropis topeka (=tristis)* | Endangered | Iowa, Minnesota, Nebraska |
| **Reptiles** | | | |
| Eastern massasauga | *Sistrurus catenatus catenatus* | Candidate | |
| **Birds[e]** | | | |
| Greater sage-grouse | *Centrocercus urophasianus* | Candidate | |
| Interior least tern | *Sternula antillarum* | Endangered | |
| Piping plover | *Charadrius melodus* | Threatened | Montana, Nebraska, N. Dakota, S. Dakota |
| Rufa red knot | *Calidris canutus rufa* | Threatened | |
| Sprague's pipit | *Anthus spragueii* | Candidate | |
| Whooping crane | *Grus americana* | Endangered | Nebraska |
| **Mammals** | | | |
| Black-footed ferret[f] | *Mustela nigripes* | Endangered | |
| Canada lynx | *Lynx canadensis* | Threatened | Montana |
| Gray wolf | *Canis lupus* | Endangered | |
| Grizzly Bear | *Ursus arctos horribilis* | Threatened | |
| Indiana bat | *Myotis sodalis* | Endangered | |
| Northern Long-eared bat | *Myotis septentrionalis* | Threatened | |

[a] Greater detail regarding counties with known occurrences of federally listed species and Designated Critical Habitat are provided in appendix A.

[b] The following definitions are applicable to the species listing categories under the ESA:

- *Endangered:* any species that is in danger of extinction throughout all or a significant portion of its range.
- *Threatened:* any species that is likely to become endangered within the foreseeable future throughout all or a significant part of its range.

**Footnotes continued on next page**

**TABLE 3-1 (Cont.)**

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- *Candidate:* species for which the USFWS has sufficient information on their biological status and threats to their continued existence to propose them as threatened or endangered under ESA but for which development of a proposed listing regulation is precluded by other higher-priority listing actions. For the purposes of the evaluations in the PEIS, species that are candidates for Federal listing as threatened or endangered are treated as if they are proposed for listing.

[c] *Critical habitat:* specific areas within the geographical area occupied by the species at the time it is listed, on which are found physical or biological features essential to the conservation of the species and which may require special management considerations or protection. Except when designated, critical habitat does not include the entire geographical area that can be occupied by the threatened, endangered, or other special status species.

[d] The sheepnose mussel (*Plethobasus cyphyus*) is a proposed species for listing under the ESA but it is presumed extirpated from the UGP Region and is not included in this BA.

[e] The Eskimo curlew (*Numenius borealis*) is an endangered species on the USFWS list but it is presumed extirpated or extremely rare in the UGP Region and is not included in this BA. The rufa red knot is transient throughout the UGP during migration. No range map is provided in that it can occur within suitable habitat anytime during migration.

[f] Some black-footed ferret populations have been reestablished as nonessential experimental populations and are treated as a proposed species for Section 7 consultation purposes.

# 4 IMPACTS OF WIND ENERGY DEVELOPMENT ON FEDERALLY LISTED RESOURCES

This section summarizes typical impacts that could occur to federally listed resources on lands in the UGP Region during the site characterization, construction, operations, and decommissioning phases for a wind energy project and associated facilities; it also identifies common measures for avoiding, minimizing, or offsetting these potential impacts. Table 4.4-1 summarizes possible ecological effects on different groups of biota that could result from activities that would occur during the various development phases of development for wind energy projects; these impacts would be lessened to the extent that the listed activities could be minimized or avoided. An example would be if the project proponent elected to use existing access routes to reach meteorological tower sites located on areas that did not require grading or clearing.

The types of federally listed resources that could be affected by wind energy development in the UGP Region would depend on the specific location of the proposed project and its environmental setting. Federally listed resources that could be affected include plants, terrestrial and aquatic invertebrates, fish, and terrestrial and avian wildlife, as well as their habitats. These groups of biota include species that are endangered, threatened, proposed, or candidates for listing under the ESA in the six States that encompass the UGP Region. Section 5 provides specific evaluations of wind energy development impacts on federally listed species that may be present in the UGP Region and species-specific avoidance, as well as conservation (both minimization and mitigation) measures to address impacts on those species.

## 4.1 SITE CHARACTERIZATION

Site characterization would generally include the installation of meteorological towers in off-road locations, as well as vehicle traffic, and may include the use of drilling rigs for geotechnical sampling. Little site modification would be necessary for these activities, and impacts on vegetation and wildlife would typically be minor. Existing access is normally used during the site characterization phase and road construction and excavation activities would typically be very limited; some minor clearing or grading might be needed to install monitoring equipment or to access a site. If needed, road clearing and grading would remove native vegetation, eliminate habitat for terrestrial wildlife species, and potentially cause habitat fragmentation effects, and could allow establishment of invasive plant species. Plant and animal species could be directly impacted by vehicle and foot traffic. Vehicle operation could also promote the introduction and establishment of invasive plant species. Vegetation removal and soil disturbance from geotechnical sampling or the installation of meteorological towers could result in small localized losses of habitat, particularly if tower foundations are required. Ground disturbances associated with these activities could increase soil erosion and runoff, which could lead to increases in sedimentation and turbidity in downgradient surface water habitats, possibly affecting aquatic biota. Some bird and bat mortality would also be expected at meteorological towers, especially those that utilize guy wires.

TABLE 4.1-1 Summary of Ecological Effects on Different Groups of Biota during Various Phases of Wind Energy Development

| | | | Biota Potentially Affected[a] | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Potential Effect | Project Activity | Project Phase | Plants[b] | Arthropods[c] | Molluscs[d] | Fish[e] | Amphibians and Reptiles[f] | Birds[g] | Mammals[h] |
| Habitat disturbance | Vehicle and foot traffic; meteorological tower placement; soil sampling; access road development; site clearing and grading | Site Characterization, Construction, Decommissioning | + | + | + | + | + | + | + |
| Injury or mortality of biota | Vehicle and foot traffic; meteorological tower placement; soil sampling; access road development; site clearing and grading; mowing at turbine locations and support facilities | Site Characterization, Construction, Operations, Decommissioning | + | + | + | + | + | + | + |
| Collisions with turbines, towers, and transmission lines | Presence and operation of turbines, transmission and meteorological towers, and transmission lines | Operations | – | – | – | – | – | + | + |
| Erosion, sedimentation, and runoff to nearby wetland habitats | Site clearing and grading; turbine, access road, and tower construction; vehicle and foot traffic | Construction, Operations, Decommissioning | + | + | + | + | + | – | – |
| Exposure to contaminants | Accidental spill during equipment refueling; accidental release of stored fuel or regulated or hazardous materials | Construction, Operations, Decommissioning | + | + | + | + | + | + | + |
| Fugitive dust damage to plant surfaces and impairment of photosynthesis; respiratory impairment in wildlife | Site clearing and grading; access road construction; turbine, access road, and tower construction | Construction, Operations, Decommissioning | + | + | – | – | + | + | + |

**TABLE 4.1-1 (Cont.)**

| Potential Effect | Project Activity | Project Phase | Biota Potentially Affected[a] Plants[b] | Arthropods[c] | Molluscs[d] | Fish[e] | Amphibians and Reptiles[f] | Birds[g] | Mammals[h] |
|---|---|---|---|---|---|---|---|---|---|
| Introduction of invasive plant species | Vehicle traffic; access road development; site clearing and grading | Site Characterization, Construction, Operations, Decommissioning | + | + | + | + | + | + | + |
| Behavioral disturbance | Vehicle and foot traffic; soil sampling; access road development; site clearing and grading; presence and operation of turbines, transmission and meteorological towers, and transmission lines | Site Characterization, Construction, Operations, Maintenance, Decommissioning | – | – | – | + | + | + | + |

[a] A “+” indicates effects expected for at least some biota; a “–” indicates no biota expected to be affected.

[b] Plant species included in this BA: eastern prairie fringed orchid, Mead’s milkweed, prairie bush clover, Ute ladies’-tresses, western prairie fringed orchid, and whitebark pine.

[c] Arthropod species included in this BA: American burying beetle, Dakota skipper, Poweshiek skipperling, and Salt Creek tiger beetle.

[d] Mollusk species included in this BA: Higgins eye and scaleshell mussel.

[e] Fish species included in this BA: bull trout, pallid sturgeon, and Topeka shiner.

[f] Amphibian and reptile species included in this BA: eastern massasauga rattlesnake.

[g] Bird species included in this BA: greater sage-grouse, interior least tern, piping plover, rufa red knot, Sprague’s pipit, and whooping crane.

[h] Mammal species included in this BA: black-footed ferret, Canada lynx, gray wolf, grizzly bear, Indiana bat, and northern long-eared bat.

## 4.2 CONSTRUCTION

During construction of a wind energy project and its ancillary facilities, plants and wildlife would be affected as a result of various stressors associated with specific construction activities (table 4.1-1). The overall impact of construction activities on plants and wildlife at a wind energy site would depend on the type and amount of habitat that would affected by a given stressor, the length of time that the effect would persist (e.g., complete, permanent reduction because of tower placement, or temporary disturbance in construction support areas), the timing of the construction, and the plant and wildlife species that occupy the project site and surrounding areas. The impacts associated with construction activities can be broadly categorized as direct or indirect impacts. Direct impacts are immediate consequences of construction activities, including habitat disturbance, wildlife disturbances, and wildlife injury or mortality. Indirect impacts may result from factors not immediately related to construction activities but that could occur beyond the construction site. Indirect impacts include wildlife avoidance of construction areas and factors associated with fugitive dust generation, exposure to contaminants, introduction of invasive species, and erosion and sedimentation.

The construction of a wind development project and its ancillary facilities would impact federally listed resources through direct impacts on species (e.g., mortality or injury during excavations, equipment laydown, or collisions with construction equipment), and through habitat reduction, alteration, and fragmentation. The amount of habitat affected would be a function of the size of the wind energy project (e.g., the number of turbines and the overall project area), the amount of associated infrastructure, and the existing degree of disturbance in the project area. All vegetation would be cleared from turbine foundation areas, construction laydown areas, substation sites, and equipment assembly and staging areas. There is typically a large amount of space between turbines that is not directly affected during construction activities. During construction, wildlife disturbance may be of greater concern than the disturbance caused by habitat loss (Arnett et al. 2008). The response of wildlife to disturbance caused by noise, activity levels, and human presence would be highly variable and species-specific. Intraspecific responses could also be affected by the physiological or reproductive condition of individuals; distance from the disturbance; and type, intensity, and duration of the disturbance. Wildlife could respond to disturbance in various ways, including attraction, habituation, or avoidance (Knight and Cole 1991). In addition to direct habitat loss, clearing, grading, drilling, and trenching activities could result in the direct injury or death of wildlife species that were not mobile enough to avoid construction operations (e.g., reptiles, small mammals), those that used burrows (e.g., ground squirrels and burrowing owls [*Athene cunicularia*]), or those that defend nest sites (e.g., ground-nesting birds). Construction activities during breeding and nesting seasons for ground-nesting birds could result in destruction of nests and mortality of any eggs or chicks that might be present.

Indirect impacts may result from habitat fragmentation from new roads, avoidance of turbines and roads by some wildlife species, contaminants (e.g., fuel spills), fugitive dust generation, introduction of invasive species, and erosion and sedimentation. The effects of contamination on federally listed resources may vary and would depend on the chemistry of the contaminant, the volume of contaminant, the location, the species exposed, and the effectiveness of cleanup efforts. Typically, only relatively small amounts of contaminants or fuel would be present on a wind energy construction site and large spills that could have significant impacts would be unlikely. Clearing activities may promote fugitive dust, which can accumulate on nearby plants and reduce growth and reproduction. Clearing activities may also increase erosion rates, enhance runoff, and result in sedimentation of nearby waterways or wetlands, potentially affecting downgradient plant communities and aquatic biota. Construction equipment and vehicles brought to a project site may introduce seeds or other propagules of invasive plant species. Such species can become established and spread rapidly, displacing native species, and often form monocultures over extensive areas, resulting in a decrease in habitat quality. Invasive species could become established in undisturbed native communities near a project site or become established on soils disturbed by project activities and spread to adjacent areas.

## 4.3 OPERATION AND MAINTENANCE

Table 4.1-1 summarizes potential impacts on the different groups of federally listed resources from operation and maintenance activities for wind energy projects. Activities associated with the operation and maintenance of a wind energy project would include turbine operation, operation of associated transmission lines, maintenance and repair actions, vehicle and foot traffic, and, in some cases, vegetation management and weed control as part of a site vegetation management program. The continued presence of project structures, including turbines, buildings, transmission lines, and substations, may result in continuing habitat fragmentation.

Turbine operation may increase habitat fragmentation and affect bird and bat populations through direct mortality from collisions and by altering the behavior of resident and migrating individuals. Herd animals such as elk, deer, and pronghorn could potentially be affected if turbines occur within or intersect migration paths. Sage-grouse could be deterred from active leks. Grassland nesting birds could avoid suitable habitat adjacent to roads, turbines, and transmission lines. Transmission lines could provide perch sites for some bird species, thereby allowing some bird species (such as raptors) to nest or perch in otherwise treeless landscape, potentially affecting predation rates for other species.

For some projects, vegetation management near turbines and along transmission line ROWs may be necessary to maintain plant communities in early stages of ecological succession and could prevent reestablishment of some desirable plant species; in such cases, it is anticipated that plant community succession would remain restricted over the lifetime of the facility. In some cases, however, such as prairie areas in the UGP Region where the vegetation has a low stature, only minimal vegetation management activities would be needed throughout the life of the project. In some cases, the licensed application of herbicides or mowing could be used to control vegetation along access roads, utility and transmission corridors, and around support buildings and turbine towers. If used, herbicide applications can sometimes result in impacts on nontarget species as a result of aerial drift during application or herbicides transported by surface water runoff. Although mowing and herbicide applications would not be expected to directly result in the establishment and spread of invasive vegetation, the establishment of some invasive species could be encouraged due to the control of native species that compete for space and nutrients.

Hazardous materials, such as transmission lubricating oils, coolants (e.g., radiator fluids or transmission coolants), paints or other corrosion-control coatings, herbicides, solvents, and fuels, would be present on the project site in limited quantities. Spills of these materials could affect exposed federally listed resources. The accidental spill of herbicides could result in environmental concentrations exceeding label application rates, and these herbicides could migrate offsite and affect native vegetation in surrounding areas. However, because of the relatively small amount of fuel and pesticides expected to be stored and used at a wind energy development project, an accidental release of these materials would be expected to affect only a small area of the site, and the vegetation at the spill locations would likely be vegetation already affected by mowing or herbicide application. Thus, impacts on vegetation from exposure to accidental fuel or pesticide releases are expected to be very localized and minor. If needed, herbicides used within transmission line ROWs would pose little or no risk to federally listed resources and would be applied according to label requirements by a licensed applicator.

The increased access to previously less-accessible areas may act to disperse seeds of invasive vegetation. Visitors or workers may carry seeds on their clothing and equipment, and motorized vehicles can carry seeds on tires and in vehicle mud. Establishment of invasive species within an area could result in long-term or permanent changes in vegetation communities and the potential to spread both onsite and offsite.

Increased human activity also increases the potential for fires. Common causes for human-caused grassland fires include poorly maintained and extinguished campfires, contact with hot engine parts during use of off-highway vehicles, and careless use of matches or cigarettes. The potential for such fires would be greatest during late summer and autumn, when native and invasive grasses have died back and dried out and natural fuel loads are greatest.

Sediments generated from disturbed areas, access roads, or work areas could periodically enter streams or wetlands throughout the operational life of the project. In these habitats, aquatic vegetation and biota may be adversely affected by increased sedimentation and turbidity. However, sedimentation impacts on downgradient wetlands during the operations phase would generally be minor compared to the construction phase, especially if appropriate remediation of disturbed areas is completed. Sedimentation may increase temporarily following regrading or other maintenance activities for access roads.

## 4.4 DECOMMISSIONING

Potential effects on federally listed resources from activities associated with decommissioning of wind energy projects are summarized in table 4.1-1. In many respects, impacts on federally listed resources during decommissioning would be similar in nature to the impacts resulting from original site development and construction. The disturbance of habitats would be expected to primarily occur in the same areas that were previously disturbed during project construction. Storage and work areas would likely be required for decommissioning; in some cases, fuel or waste storage areas established for operations may be expanded to accommodate increased temporary fuel needs or salvaged materials. These areas would likely be the same ones used for construction staging. Disturbance due to excavation would be less than that associated with new construction at those locations where tower foundations and buried power cables can be left in place. Typically, disturbed areas are returned to original grade, compacted soils are restored, and disturbed areas are reseeded or planted with native plant species.

During decommissioning, federally listed resources could be affected by (1) increased human presence in the project area, (2) erosion and runoff from project locations where excavation activities are occurring, (3) vehicle and foot traffic, and (4) accidental releases of regulated or hazardous materials such as fuels. As with project construction, plants and animals could be affected during the removal of project infrastructure. In addition, decommissioning vehicle and foot traffic along access roads and transmission line ROWs could disturb habitats and injure or kill plants and animals. Most federally listed resources would avoid affected areas while decommissioning activities were taking place. Avoidance would be a short-term impact and would likely involve few individual organisms at any given time. Habitat restoration activities for plants and animals would usually be conducted at the completion of the decommissioning phase.

The accidental release of fuels, lubricants, solvents, or hazardous materials during decommissioning could affect plant communities in the vicinity of a spill or in wetlands located downgradient from the project site. Contaminants that enter groundwater could affect wetlands that receive groundwater discharge. The probability that terrestrial federally listed resources would be exposed to such spills would be small and limited to a few individuals. Accidental releases of hazardous materials could affect aquatic habitats and biota in nearby water bodies. Because of the relatively small amount of hazardous materials that would be expected to be present during decommissioning of wind energy projects, the probability of impacts would be low and affected areas would be small.

## 4.5 GENERAL BEST MANAGEMENT PRACTICES

Under the proposed action, a variety of general BMPs would be required of all project applicants, where appropriate, during each phase of a wind energy project to reduce the potential for ecological impacts as part of the project design. These BMPs are presented in table 4.5-1. In addition, species-specific conservation measures deemed necessary by Western and the USFWS to address remaining potential effects on listed species within the UGP Region are presented in section 5.

Under the proposed action, project developers will be asked to employ a risk-based evaluation approach to identify project-specific concerns related to wildlife and other ecological resources, and the results of the evaluation will be incorporated into project-specific NEPA documentation. The risk evaluation approach used by developers should be consistent with the tiered approach identified in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012c). These documents describe a decision framework for collecting information to evaluate environmental risks to wildlife and other ecological resources during project planning and, in some cases, after project development has been completed.

Using an evaluation process that is consistent with that identified in the USFWS Land-Based Wind Energy Guidelines (USFWS 2012c) during wind farm development would provide project developers with a stepwise method for evaluating environmental concerns in their decision-making process. The evaluation process would help identify ecological resources that have a reasonable likelihood to be significantly affected by planned project designs and activities, as well as those ecological resources that are unlikely to be significantly affected. Proper identification of resources that could be significantly affected would allow the focus to be on modifying the design of the proposed project or identifying BMPs and mitigation measures to avoid, reduce, or otherwise compensate for potentially significant impacts and would reduce the potential for unexpected impacts on natural resources and subsequent delays in project development. In addition, requesting developers to implement a method for evaluating the

## TABLE 4.5-1 Best Management Practices (BMPs) to Reduce the Effects of Wind Energy Development on Federally Listed Resources

| Effect | Project Activity | Project Phase | BMPs |
| --- | --- | --- | --- |
| Habitat disturbance | Vehicle and foot traffic; meteorological tower placement; soil sampling; access road development; site clearing and grading, water use for foundations and dust abatement | Project Planning and Site Characterization | • Contact appropriate State and Federal agencies early in the planning process to determine whether listed species or their habitat (including designated critical habitat) may be present in the area of the proposed project.<br>• Conduct predisturbance surveys following USFWS-approved protocols in the proposed project area to identify known and potential habitats where listed species may occur. If listed species or their habitat (including designated critical habitat) has been found in the proposed project area the following actions should be taken:<br>o Avoid all designated critical habitat;<br>o Avoid or minimize disturbance of sensitive biological resources and habitats in areas where testing activities are being conducted (sensitive habitats may include but are not limited to unique vegetation communities, aquatic habitats, and roost and nest sites);<br>o Avoid impacts to the greatest extent possible by using previously disturbed areas for characterization activities;<br>o Avoid or minimize disturbance of known and potential locations of wildlife use areas (e.g., active nest sites, colonies, roosts, leks, occupied waterways, and migration corridor);<br>o Keep the area disturbed during the installation of meteorological towers (i.e., the tower footprint and its associated laydown area) to a minimum, and do not locate meteorological towers in or near sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present;<br>o Meteorological towers should be freestanding where practicable, but where this is impracticable, install approved bird flight diverters on guy wires of guyed meteorological towers;<br>o Implement measures to reduce the potential for accidentally starting fires from vehicle use, building of campfires, or smoking during periods when fire risk is high;<br>o Source water for project elements from a municipal source with sufficient existing rights; and<br>o Use existing access roads and trails to the maximum extent practicable and locate meteorological towers near existing access if possible. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Habitat disturbance (Cont.) | | Construction | • The size of all areas to be disturbed during construction will be minimized to the extent possible.<br>• Initiate habitat restoration activities as soon as possible after construction activities are completed. Establish criteria to gauge success of restoration activities and conduct monitoring to evaluate reclamation effectiveness. If initial restoration efforts are not successful, initiate follow-up restoration activities.<br>• Reduce the extent of habitat disturbance by requiring vehicles to use established access roads, and minimize foot and vehicle traffic through undisturbed areas.<br>• Establish speed limit guidelines to reduce generation of airborne dust from vehicles.<br>• If site evaluations show that proposed construction activities would pose a significant risk to species of concern, establish buffer zones around nests, roosts, leks, and biota and habitats of concern.<br>• Use existing municipal water source for all foundation construction. |
| | | Decommissioning | • Minimize the size of areas that will be disturbed during decommissioning activities.<br>• Reduce the extent of habitat disturbance by requiring vehicles to use established access roads, and minimize foot and vehicle traffic through undisturbed areas.<br>• Initiate habitat restoration activities as soon as possible after construction activities are completed. Establish criteria to gauge success of restoration activities and conduct monitoring to evaluate reclamation effectiveness. If initial restoration efforts are not successful, initiate follow-up restoration activities.<br>• Reclaim disturbed areas using salvaged topsoil, weed-free native shrubs, grasses, and forbs appropriate for the local area. Where applicable, native seed mixes should include a mixture of nectar plants and milkweed indigenous to the area of reclamation |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Injury or mortality of federally listed resources | Vehicle and foot traffic; meteorological tower placement; soil sampling; access road development; site clearing and grading; mowing at turbine locations and support facilities; electrocution from or collision with transmission line | Site Characterization | • Contact appropriate State and Federal agencies early in the planning process to identify potentially sensitive ecological resources that may be present in the area of the wind energy development. Avoid or minimize disturbance of sensitive biological resources and habitats in the testing area. Avoid wildlife habitat impacts to the greatest extent possible by seeking out previously disturbed areas for wind energy facilities.<br>• Develop an ecological evaluation plan and conduct preconstruction monitoring to determine species presence/density/diversity for comparison with post-construction monitoring.<br>• Minimize the area disturbed during the installation of meteorological towers (i.e., the tower footprint and its associated laydown area).<br>• Consult/adhere to 2013 USFWS guidelines (or subsequent updates) regarding communications towers before installation of temporary and permanent meteorological towers.<br>• To the extent possible, avoid the nesting season for sensitive ecological resources that may be present.<br>• Establish low speed limits in project areas to reduce the potential for striking and killing federally listed resources. |
| | | Construction | • Minimize the size of areas that will be disturbed during construction.<br>• Reduce the extent of habitat disturbance by requiring vehicles to use established access roads and minimize foot and vehicle traffic through undisturbed areas.<br>• Establish low speed limits in project areas to reduce the potential for striking and killing federally listed resources.<br>• To the extent practicable, avoid construction during nesting season for ground nesting birds.<br>• Adhere to guidelines identified in *Reducing Avian Collisions with Powerlines: The State of the Art in 2012* (APLIC 2012) and *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* (APLIC 2006).<br>• Mark new overhead transmission lines in areas where warranted.<br>• If site evaluations show that proposed construction activities would pose a significant risk to species of concern, establish buffer zones around nests, roosts, leks, and biota and habitats of concern. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Injury or mortality of federally listed resources (Cont.) | | Operations | • Survey areas around turbines, meteorological towers, and other facilities for the presence of listed species prior to mowing or other vegetation maintenance activities. If listed species are found, the activities should be deferred until the appropriate Federal and State agencies have been notified and an appropriate course of action has been identified.<br>• Develop and implement a Bird and Bat Conservation Strategy (BBCS) as described in the *Land-Based Wind Energy Guidelines* that includes survey protocols acceptable to the USFWS in the project area during the spring and fall bird and bat migration seasons. Mortality monitoring will help to identify individual turbines that contribute to avian and bat mortality. This information could be used to provide design layout information for future wind development projects and to reduce the potential for future avian and bat mortality.<br>• Implement adaptive management strategies for identifying and mitigating collision mortality at turbines and overhead lines; apply new strategies as they evolve. |
| | | Decommissioning | • Reduce the extent of habitat disturbance by requiring vehicles to use established access roads and minimize foot and vehicle traffic through undisturbed areas. |
| Collisions with turbines, towers, and transmission lines | Presence and operation of turbines, transmission and meteorological towers, and transmission lines | Operations | • Observations of potential wildlife problems, including wildlife mortality, should be immediately reported to the facility manager. Wildlife issues involving species listed under the ESA, or those species proposed or candidates for listing under the ESA, should be immediately reported to the USFWS.<br>• Install approved bird flight diverters on new overhead transmission lines in areas where warranted.<br>• Consult/adhere to 2013 USFWS guidelines (or subsequent updates) regarding communications towers before installation of temporary and permanent meteorological towers.<br>• Develop wildlife mortality monitoring procedures in coordination with the USFWS and the appropriate State wildlife agencies.<br>• Develop and implement a BBCS as described in the *Land-Based Wind Energy Guidelines* that includes survey protocols acceptable to the USFWS in the project area during the spring and fall bird and bat migration seasons. Mortality monitoring will help to identify individual turbines that contribute to avian and bat mortality. This information could be used to provide design layout information for future wind development projects and to reduce the potential for future avian and bat mortality. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Collisions with turbines, towers, and transmission lines (Cont.) | | | • Implement adaptive management strategies for mitigating collision mortality at turbines and overhead lines; apply new strategies as they evolve.<br>• Collector lines from the turbine to the substation shall be buried, where practicable, to minimize collision risk to birds and bats.<br>• Unnecessary lighting should be turned off at night and downward reflecting shields should be added to turbine tower entrance lights to limit attracting migratory birds.<br>• Any guy wires on permanent project facilities shall be appropriately marked with approved bird flight diverters.<br>• Remove carrion from project area to avoid attraction of raptors. |
| Erosion, sedimentation, and runoff to nearby wetland habitats | Site clearing and grading; turbine, access road, and tower construction; vehicle and foot traffic | Construction | • The size of all disturbed areas should be minimized.<br>• Initiate habitat restoration activities as soon as possible during or after construction activities are completed. Establish criteria to gauge success of restoration activities and conduct monitoring to evaluate reclamation effectiveness. If initial restoration efforts are not successful, initiate follow-up restoration activities.<br>• Areas of disturbed soil should be reclaimed using weed-free native grasses, forbs, and shrubs. Reclamation activities should be undertaken as early as possible on disturbed areas and monitored with plans for remedial actions to ensure reclamation is successful. Where applicable, native seed mixes should include a mixture of nectar plants and milkweed indigenous to the area of reclamation.<br>• Effective and comprehensive sediment and erosion controls that meet or exceed county, State, and Federal standards should be applied and monitored, with remedial efforts implemented to ensure effectiveness. Practices such as the use of jute netting, silt fences, and check dams should be applied and maintained near disturbed areas. |
| | | Decommissioning | • All areas of disturbed soil should be reclaimed using weed-free native shrubs, grasses, and forbs, and gradients should be contoured to approximate undisturbed conditions (especially needed if turbine foundations are removed and/or collector lines recovered). Where applicable, native seed mixes should include a mixture of nectar plants and milkweed indigenous to the area of reclamation.<br>• The vegetation cover, composition, and diversity should be restored to values commensurate with the ecological setting. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Exposure to contaminants | Accidental spill during equipment refueling; accidental release of stored fuel, regulated, or hazardous materials | Construction | • All onsite refueling should occur in a designated fueling area that includes a temporary berm to limit the spread of any spill.<br>• Drip pans should be used under fuel pump and valve mechanisms of any bulk fueling vehicles, as well as during refueling, to contain accidental releases.<br>• Spills should be immediately addressed per the appropriate spill management plan, and soil cleanup and soil removal should be initiated by personnel trained in spill response. Maintain appropriate cleanup material available for immediate use in areas where potential contaminants are present.<br>• Limit pesticide use to nonpersistent immobile pesticides. Applications should be made by appropriately licensed applicators, where required, and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. |
| | | Operations | • All onsite refueling should occur in a designated fueling area that includes a temporary berm to limit the spread of any spill.<br>• Drip pans should be used under fuel pump and valve mechanisms of any bulk fueling vehicles, as well as during onsite refueling, to contain accidental releases.<br>• Limit pesticide use to nonpersistent immobile pesticides. Applications should be made by appropriately licensed applicators, where required, and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.<br>• Spills should be immediately addressed per the appropriate spill management plan, and soil cleanup and soil removal should be initiated by personnel trained in spill response. Maintain appropriate cleanup material available for immediate use in areas where potential contaminants are present. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Exposure to contaminants (Cont.) | | Decommissioning | • All onsite refueling should occur in a designated fueling area that includes a temporary berm to limit the spread of any spill.<br>• Drip pans should be used under fuel pump and valve mechanisms of any bulk fueling vehicles, as well as during refueling, to contain accidental releases.<br>• Spills should be immediately addressed per the appropriate spill management plan, and soil cleanup and removal should be initiated by personnel trained in spill response. Maintain appropriate cleanup material available for immediate use in areas where potential contaminants are present.<br>• Limit pesticide use to nonpersistent immobile pesticides. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. |
| Fugitive dust damage to plant surfaces and impairment of photosynthesis; respiratory impairment in wildlife | Site clearing and grading; access road construction; turbine, access road, and tower construction | Construction | • Areas of disturbed soil should be reclaimed using weed-free native grasses, forbs, and shrubs. Reclamation activities should be undertaken as early as possible on disturbed areas. Dust abatement techniques should be used on unpaved unvegetated surfaces to minimize airborne dust.<br>• Municipal sources should be used to provide the water used for dust abatement.<br>• Construction materials and stockpiled soil should be covered if they are potential sources of fugitive dust.<br>• If extraction of water from nearby surface water sources is necessary, evaluate volume to be extracted to ensure adequate flow is available for fish and other aquatic species and apply measures to avoid entraining or impinging biota. |
| | | Operations | • Dust abatement techniques should be used on unpaved unvegetated surfaces to minimize airborne dust.<br>• If extraction of water from nearby surface water sources is necessary, evaluate volume to be extracted to ensure adequate flow is available for fish and apply measures to avoid entraining or impinging biota (must obtain permit from State to withdraw water).<br>• Stockpiled soil should be covered if it is a potential source of fugitive dust. |
| | | Decommissioning | • Dust abatement techniques should be used on unpaved unvegetated surfaces to minimize airborne dust.<br>• Topsoil from all decommissioning activities should be salvaged and reapplied during final reclamation.<br>• All areas of disturbed soil should be reclaimed using weed-free native shrubs, grasses, and forbs. Where applicable, native seed mixes should include a mixture of nectar plants and milkweed indigenous to the area of reclamation. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Introduction of invasive plant species | Vehicle traffic; access road development; site clearing and grading | Site Characterization | • Vehicle and foot traffic in the project area should be monitored and kept to a minimum so as not to facilitate the spread of seeds and propagules of noxious or invasive plants. |
| | | Construction | • Habitat restoration activities should be initiated as soon as possible after construction activities are completed.<br>• Operators should develop a plan for control of noxious weeds and invasive plants, which could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. The use of certified weed-free mulching should be required.<br>• If trucks and construction equipment are arriving from locations with known invasive vegetation problems, a controlled inspection and cleaning area should be established to visually inspect construction equipment arriving at the project area and to remove and contain seeds that may be adhering to tires and other equipment surfaces.<br>• Access roads and newly established utility and transmission line corridors should be monitored regularly for the establishment of invasive species, and weed-control measures should be initiated immediately upon evidence of the introduction of invasive species.<br>• Fill materials that originate from areas with known invasive vegetation problems should not be used.<br>• Certified weed-free mulch should be used when stabilizing areas of disturbed soil.<br>• Habitat restoration activities and invasive vegetation monitoring and control activities should be initiated as soon as possible.<br>• All areas of disturbed soil should be reclaimed using weed-free native shrubs, grasses, and forbs. Where applicable, native seed mixes should include a mixture of nectar plants and milkweed indigenous to the area of reclamation. |
| | | Operations | • Access roads, utility and transmission line corridors, and tower site areas should be monitored regularly for the establishment of invasive species, and weed-control measures should be initiated immediately upon evidence of the introduction of invasive species. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Introduction of invasive plant species (Cont.) | | Decommissioning | • All reclaimed areas should be monitored regularly for the establishment of invasive species, and weed-control measures should be initiated immediately upon evidence of the introduction of invasive species. |
| Behavioral disturbance | Vehicle and foot traffic; soil sampling; access road development; site clearing and grading; presence and operation of turbines, transmission and meteorological towers, and transmission lines | Site Characterization | • Review existing information on species and habitats in the project area.<br>• Identify important, sensitive, or unique habitat and biota in the project vicinity and site, and design the project to avoid (if possible), minimize, or mitigate potential impacts on these resources. The design and siting of the facility should follow appropriate guidance and requirements from the USFWS and other resource agencies, as available and applicable.<br>• Avoid wildlife habitat impacts to the greatest extent possible by seeking out disturbed areas for wind energy facilities.<br>• Individual meteorological towers should not be located in or near sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.<br>• Installation of meteorological towers should be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors (e.g., periods of sage-grouse nesting). |
| | | Construction | • In consultation with appropriate natural resource agencies, construction activities should be scheduled to avoid important periods of wildlife courtship, breeding, nesting, lambing, or calving. Avoid wildlife habitat impacts to the greatest extent possible by seeking out disturbed areas for wind energy facilities. If activities must be conducted during nesting periods, conduct surveys using a qualified biologist to ensure that nesting birds are not present in the immediate areas to be disturbed.<br>• Construction employees should be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship, nesting) seasons. In addition, pets should not be permitted onsite during construction.<br>• Buffer zones should be established around nests, roosts, and biota and habitats of concern if site evaluations show that proposed construction activities would pose a significant risk to species of concern.<br>• Noise-reduction devices (e.g., mufflers) should be maintained in good working order on vehicles and construction equipment.<br>• Explosives should be used only within specified times and at specified distances from sensitive wildlife or surface waters as established by the appropriate Federal and State agencies. |

**TABLE 4.5-1 (Cont.)**

| Effect | Project Activity | Project Phase | BMPs |
|---|---|---|---|
| Behavioral disturbance (Cont.) | | Operations | • Unnecessary lighting should be turned off at night and downward reflecting shields should be added to turbine tower entrance lights to limit attracting migratory birds.<br>• Employees, contractors, and site visitors should be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, to avoid harassment and disturbance of wildlife, pets shall not be allowed.<br>• Implement adaptive management strategies; apply new strategies as they evolve. |
| | | Decommissioning | • Employees, contractors, and site visitors should be instructed to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. In addition, pets shall not be allowed onsite to avoid harassment and disturbance of wildlife. |

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 address project-specific concerns related to protection of eagles under the Bald and Golden Eagle Protection Act, 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.

Project developers should review the Land-Based Wind Energy Guidelines (USFWS 2012c) for specific details and useful information prior to project development. In general, the risk evaluation approach in the guidelines involves five iterative tiers of evaluation:

Tier 1 – Preliminary evaluation or screening of potential sites.
Tier 2 – Site characterization.
Tier 3 – Field studies to document site wildlife conditions and predict project impacts.
Tier 4 – Post-construction studies to estimate impacts.
Tier 5 – Other post-construction studies.

The first three tiers would be conducted during the preconstruction evaluation and/or survey phase of wind energy projects. For purposes of this BA and to provide consistency, this coordination is referred to as "preconstruction evaluations and/or surveys" in each of the species narratives. For each of these three tiers, the guidelines developed by the USFWS (2012c) provide sets of questions to assist developers with the evaluation, along with recommended methods and metrics to use in answering the questions. Some questions are repeated at each tier, with successive tiers requiring a greater investment in data collection to answer certain questions. For example, while Tier 2 investigations may identify existing information on federally or State-listed species that suggests that one or more species of concern have a potential to be present at the proposed development site, it may be necessary to collect empirical data in Tier 3 studies to determine whether federally or State-listed species are actually present or likely to be present at the site. Timely communication with Western and/or the USFWS regarding results of the initial steps of the risk evaluation is encouraged; this would allow the opportunity for the agencies to provide, and developers to consider, technical advice about ways to modify the project design or to identify BMPs and mitigation measures that could be considered to avoid, reduce, or otherwise compensate for potentially significant impacts. For example, as described in the *Land-Based Wind Energy Guidelines* (USFWS 2012), a Bird and Bat Conservation Strategy (BBCS) should be developed for all projects. The overall goal of a BBCS is to reduce or eliminate avian and bat mortality. The wind energy facility developer should work closely with the USFWS and the appropriate State wildlife agencies to identify protective measures to include in the plan. These would include project design measures, construction phase measures, operational phase measures, and decommissioning phase measures. A minimum of 1 yr of preconstruction surveys are important to document species occurrence while a minimum of 1 yr of post-construction monitoring is needed to validate the preconstruction risk assessment, document mortality, and allow the facility owner to adjust operations based on identified problems. BMPs and mitigation measures identified in tables 4.5-1 and 5-1 shall be applied, as appropriate, to address concerns regarding site-specific ecological impacts identified as a result of the risk-based evaluation approach. In some cases, additional BMPs and mitigation measures may need to be developed to address specific concerns.

# 5 SPECIES ACCOUNTS, EFFECTS, AND EFFECTS DETERMINATIONS

This section discusses the distribution, ecology, and life history of each species within the UGP Region and the potential for impacts as they relate to the proposed action in the PEIS. The ESA requires the action agencies to consider the direct and indirect impacts of the proposed action on species and critical habitats, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). Impacts on the species under discussion can be short term (one or two reproductive seasons) or long term (affecting several generations). They can be direct (an immediate effect on an individual, population, or its habitat) or indirect (an effect that may occur over time or result from other actions). In addition, cumulative impacts may affect some of the species. For purposes of this BA, "cumulative effects" will be defined as in 50 CFR 402.02. That is, "those effects of future Tribal, State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Table 5-1 provides a summary of potential impacts and conservation measures (both avoidance and minimization measures) that were used to develop effect determinations for each species. This table assumes that the proper BMPs will be in place and that the species-specific avoidance measures and minimization measures (table 5-1) will be fully implemented in order to reach the effect determination listed. Throughout the document, the terms "avoid" and "do not site" are often used interchangeably, especially related to avoidance and minimization measures, and they are synonymous in meaning. The intent is to stay out of areas or require a certain buffer distance to minimize the exposure of species to risks, not to merely avoid if possible or minimize. If the conservation measures are not fully implementable for the proposed project, then the programmatic consultation cannot be used. For some species, additional project-specific measures may be appropriate to accommodate the general framework of this consultation but will require additional consultation discussion.

The distribution of predicted suitable habitat for terrestrial vertebrate species considered in this BA was evaluated to provide additional information on species habitat distribution and to help inform effects determinations. Predicted suitable habitat for terrestrial vertebrates was determined using animal distribution models from State-level Gap Analysis Programs (GAP) (USGS 2011). This information was used to determine the amount of predicted suitable habitat within 25 mi (40 km) of Western substations relative to the total amount of predicted suitable habitat in the UGP Region. It is important to note that GAP models (inferred predicted suitable habitat distributions) are only available for the terrestrial vertebrates considered in this BA.

## 5.1 PLANTS

### 5.1.1 Eastern Prairie Fringed Orchid

The eastern prairie fringed orchid (*Platanthera leucophaea*) is one of the largest and showiest of the native North American orchids and was federally listed as threatened on September 28, 1989 (USFWS 1989a). It is State-listed as endangered in Iowa. Historic records of occurrence within the UGP Region include four counties in southwestern Iowa (table A-1; figure A-1). Most remaining populations are small (fewer than 50 plants), and only about

**TABLE 5-1 Summary of Potential Impacts and Species-Specific Avoidance and Minimization Measures Used to Develop Effect Determinations for Each Species Evaluated in this Biological Assessment[a]**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Plants** | | | | | |
| *Platanthera leucophaea* | Eastern prairie fringed orchid | Existing remnant plants may be affected by site clearing for construction and access roads necessary for wind energy development.<br><br>Negative impacts are unlikely because wind energy development would be avoided in moist wetland habitats where the Eastern prairie fringed orchid occurs. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.<br><br>Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.<br>• Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.<br>• Avoid actions that could alter surface-water flow, infiltration, and groundwater levels in suitable habitat (this determination can potentially be based on soil survey data).<br>• Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs. | May affect, but is not likely to adversely affect |
| *Asclepias meadii* | Mead's milkweed | Negative impacts are unlikely because wind energy development would be avoided in native prairie remnants where the Mead's milkweed occurs. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.<br><br>Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.<br>• Only perform control measures from October to March in order to avoid the species growing season.<br>• Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Plants (Cont.)** | | | | | |
| *Lespedeza leptostachya* | Prairie bush clover | Wind energy facility construction (including access roads and transmission lines) may eliminate individual bush clover plants and gravelly soils where plants could become established in the future. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.<br><br>Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.<br>• Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.<br>• Avoid mowing along access roads or transmission line ROWs in areas containing suitable habitat.<br>• Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs. | May affect, but is not likely to adversely affect |
| *Spiranthes diluvialis* | Ute ladies'-tresses | Culvert and bridge construction for access roads may lead to bank erosion, sediment loading, or impacts on downstream flows that could result in alteration or loss of habitat. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.<br><br>Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.<br>• Avoid vehicle traffic in areas where suitable habitat is present.<br>• Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat.<br>• Use appropriate or additional project-specific BMPs during and after construction to control erosion and reestablish vegetation in disturbed areas near suitable habitat.<br>• Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Plants (Con.t)** | | | | | |
| *Platanthera praeclara* | Western prairie fringed orchid | Existing remnant plants may be affected by site clearing for construction and access roads necessary for wind energy development.<br><br>Negative impacts are unlikely because wind energy development would be avoided in moist wetland habitats where the Western prairie fringed orchid occurs. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.<br><br>Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.<br>• Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.<br>• Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat.<br>• Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs. | May affect, but is not likely to adversely affect |
| *Pinus albicaulis* | Whitebark pine | Negative impacts are unlikely, due to the lack of suitable habitat in the vicinity of areas best suited for wind energy development. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities in montane habitats occupied by the whitebark pine. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the whitebark pine have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | No effect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Invertebrates** | | | | | |
| *Nicrophorus americanus* | American burying beetle | Habitat loss or degradation may occur due to movement of construction equipment along access roads, clearing/grading for turbine pads and substations, construction of transmission lines from turbines to the electrical grid, construction of access roads, and storage of equipment. Direct mortality may also occur if soil is disturbed during the breeding season or overwintering period. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>If surveys are warranted, obtain a permit from the USFWS to survey for the beetle within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Avoid using herbicides or pesticides within occupied habitat within the current range of the American burying beetle (refer to current range map within the State). Contact the local USFWS Ecological Services Field Office to determine whether activities in the project area are within American burying beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides. | May affect, but is not likely to adversely affect |
| *Hesperia dacotae* | Dakota skipper | Direct impacts include mortality due to ground/ vegetation disturbance, application of pesticides, or collisions with vehicles. Indirect impacts include a loss of native plants used by Dakota skippers due to construction of access roads, turbines, substations, or transmission lines. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat. | For projects that encompass suitable, but unoccupied, habitat farther than 0.6 mi (1 km) from occupied habitat:<br>• Obtain a grassland easement of native prairie, equal to the amount disturbed that contains obligate plant species to minimize additional loss of suitable habitat or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.<br>• Avoid broadcast applications of pesticides or herbicides that may be harmful to Dakota skippers or their nectar plants in Dakota skipper habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides. | May affect, but is not likely to adversely affect |

## TABLE 5-1 (Cont.)

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Invertebrates (Cont.)** | | | | | |
| *Hesperia dacotae* (Cont.) | Proposed critical habitat for Dakota skipper | | Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6-mi (1-km) buffer zone. | | No effect |
| *Lampsilis higginsii* | Higgins eye | Negative impacts are unlikely because wind energy development would not occur in areas adjacent to potential Higgins eye habitat. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where Higgins eye mussels may be present. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the Higgins eye mussel have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | No effect |
| *Oarisma poweshiek* | Poweshiek skipperling | Direct impacts include mortality due to ground/vegetation disturbance, application of pesticides, or collisions with vehicles. Indirect impacts include a loss of native plants used by skipperlings due to construction of access roads, turbines, substations, or transmission lines. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat. | For projects that encompass suitable, but unoccupied, habitat farther than 0.6 mi (1 km) from occupied habitat:<br>• Obtain a grassland easement of native prairie, equal to the amount disturbed, that contains obligate plant species to minimize additional loss of suitable habitat or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.<br>• Avoid broadcast applications of pesticides or herbicides that may be harmful to the Poweshiek skipperling or their nectar plants in Poweshiek skipperling habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Invertebrates (Cont.)** | | | | | |
| *Oarisma poweshiek* (Cont.) | Proposed critical habitat for the Poweshiek skipperling | | Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6-mi (1-km) buffer zone. | | No effect |
| *Cicindela nevadica lincolniana* | Salt Creek tiger beetle | Mortality could occur if wind energy facility construction causes flooding and sediment transport that inundates burrows along creek habitats in Nebraska. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of occupied saline wetland and stream complexes. | Should wind farms be developed near saline wetlands, measures should be taken to:<br>• Avoid changing existing surface water flows that would alter existing saline wetland habitat in the Salt Creek and Rock Creek watersheds.<br>• Avoid using herbicides or pesticides within occupied habitat within the current range of the Salt Creek tiger beetle within the State. Contact the local USFWS Ecological Services Field Office to determine whether activities in the project area are within Salt Creek tiger beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides. | May affect, but is not likely to adversely affect |
| | Designated critical habitat for Salt Creek tiger beetle | Critical habitat has been designated for four areas of Salt Creek, totaling approximately 1,933 ac (782 ha) in Lancaster and Saunders Counties, Nebraska. Saline wetland and stream complexes found along Little Salt Creek and Rock Creek comprise the critical habitat designation. | Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of designated critical habitat. | | No effect |

## TABLE 5-1 (Cont.)

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Invertebrates (Cont.)** | | | | | |
| *Leptodea leptodon* | Scaleshell mussel | Negative impacts are unlikely because wind energy development would not occur in areas where scaleshell mussels are present. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where scaleshell mussels may be present. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the scaleshell mussel have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | No effect |
| **Fish** | | | | | |
| *Salvelinus confluentus* | Bull trout | Stream flow may be altered by installation of crossing structures or sediments and pollutants may enter the water through consumptive use of water for cleaning or erosion and runoff during project development, operation, and decommissioning. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of occupied aquatic habitat.<br><br>Do not cross occupied streams, lakes, or designated critical habitat for any activities associated with siting, construction, operation, maintenance procedures, or decommissioning for wind power developments.<br><br>No sediment can enter occupied streams, lakes or designated habitat from any activities associated with siting, construction, operation, | For projects that encompass areas within drainages occupied by bull trout:<br>• Avoid using herbicides or pesticides within 300 ft (91.4 m) of the OHW mark of occupied aquatic streams, lakes, or designated critical habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.<br>• Avoid actions that would alter surface water flow in occupied habitat.<br>• Employ BMPs (additional and project-specific) during and after construction to control erosion and runoff to aquatic habitats, designated core areas, spawning or rearing habitat, and migratory corridors. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Fish (Cont.)** | | | | | |
| *Salvelinus confluentus* **(Cont.)** | | | maintenance procedures, or decommissioning for wind power developments. | | |
| | Designated critical habitat for bull trout | Designated critical habitat within the UGP Region includes approximately 37 mi (59 km) of streams and 4,107 ac (1,662 ha) of lakes within the Saint Mary-Belly River Basins in Glacier County, Montana. | Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of designated critical habitat. | | No effect |
| *Scaphirhynchus albus* | Pallid sturgeon | Stream flow may be altered by installation of crossing structures or sediments and pollutants may enter the water through consumptive use of water for cleaning or erosion and runoff during project development, operation, and decommissioning. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in or immediately adjacent to aquatic habitat where pallid sturgeon occurs. | For projects that encompass areas within drainages occupied by pallid sturgeon:<br>• Employ BMPs (additional and project-specific) during and after construction to control erosion and runoff to aquatic habitats.<br>• Avoid broadcast applications of pesticides or herbicides that may be harmful to the pallid sturgeon in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.<br>• Employ measures to minimize the amount of stream habitat disturbance when transmission lines and access roads must be constructed across streams.<br>• Ensure that upstream and downstream fish passage is maintained in any areas where stream habitat disturbance occurs.<br>• Avoid actions that would alter surface water flow in occupied habitat. | No effect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Fish (Cont.)** | | | | | |
| *Notropis topeka (=tristis)* | Topeka shiner | Stream flow may be altered by installation of crossing structures or sediments and pollutants may enter the water through consumptive use of water for cleaning or erosion and runoff during project development, operation, and decommissioning. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>If surveys are warranted, obtain a permit from the USFWS to survey for the Topeka shiner within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in or adjacent to aquatic and riparian habitat where Topeka shiners occur. | For projects that encompass areas within drainages with suitable aquatic habitat for the Topeka shiner:<br>• Avoid broadcast applications of pesticides or herbicides that may be harmful to the Topeka shiner in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.<br>• Install buried utility lines by directionally boring beneath streams, adjacent wetlands, and floodplains, using comprehensive and effective BMPs to ensure excavated materials do not reach the waterway.<br>• Access roads that cannot avoid crossing known or potentially occupied Topeka shiner streams must completely span the stream and floodplain with a bridge, with no in-stream work involved.<br>• Avoid actions that would alter surface water flow of known occupied habitat and potentially occupied habitat.<br>• Avoid actions that would alter groundwater levels/connections to known or potentially occupied habitat.<br>• Avoid actions that would alter off-channel habitats (e.g., natural wetlands, dugouts, or oxbows in the floodplain).<br>• Employ comprehensive and effective (additional, project-specific) BMPs during and after construction to prevent erosion and runoff to aquatic habitats. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Fish (Cont.)** | | | | | |
| *Notropis topeka (=tristis)* (Cont.) | Designated critical habitat for Topeka shiner | Designated critical habitat within the UGP Region includes the Boone River, North Raccoon River, and Rock River watersheds in Iowa, the Big Sioux/Rock River watershed in Minnesota, and the Elkhorn River watershed in Nebraska. | Do not site turbines, transmission line supports, access roads, or other project facilities in or adjacent to designated critical habitat. | | No effect |
| **Reptiles** | | | | | |
| *Sistrurus catenatus catenatus* | Eastern massasauga | Direct mortality may occur from ground-breaking activities associated with construction or from vehicle collisions along access roads. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat. | For projects that encompass occupied habitat or that occur near occupied habitat:<br>• Minimize disturbance (e.g., mowing, burning, excessive foot traffic) in suitable mesic grassland and prairie habitats, especially during the spring months.<br>• Maintain ecological connectivity between parcels of suitable habitat within project boundaries.<br>• Identify and implement strategies to reduce potential for road mortality on access roads (e.g., close roads or limit traffic during migration times, create road diversion structures to detour snakes, or post signs). | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds** | | | | | |
| *Centrocercus urophasianus* | Greater sage-grouse | Loss of shrub-dominated habitat may occur from construction of access roads, turbine pads, transmission lines, and substations. Sage-grouse may also avoid suitable habitat due to the presence of tall structures such as turbines, construction work crews and equipment, and vehicular traffic. Core Areas (Priority Protection Areas) in Montana, North Dakota (Bowman, Slope and Golden Counties), and South Dakota (Butte and Harding Counties). | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat, known core population areas, and lek locations within project boundaries.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within greater sage-grouse core habitats in Montana, North Dakota, and South Dakota, or within State-defined greater sage-grouse connectivity areas in Montana. | For projects that encompass occupied sage-grouse habitat outside of core areas in Montana:<br>• Contact Montana Fish, Wildlife and Parks Statewide Habitat Coordinator (406-444-3377) to obtain sage-grouse distribution information in early planning stages for the wind farm to determine how best to site facility structures to avoid sage-grouse habitat to the extent possible.<br>• Avoid placing meteorological towers and/or turbines, and restrict surface use activities within 4 mi (6.4 km) of active sage-grouse leks.<br>• Do not use guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with approved bird flight diverters.<br>• Do not build new fences within 1.25 mi (2 km) of occupied leks (unless unavoidable, then mark fence with approved bird flight diverters). Remove or mark existing fences with approved fence bird flight diverters (BLM 2011).<br>• Disturbed areas around turbines in shrub/grassland habitat used by sage-grouse should be maintained to allow a shrub cover >10 percent and grasses greater than 6–7 in (16–18 cm) tall to improve nest success.<br>• Limit the number of access roads through sagebrush to decrease fragmentation of habitat.<br>• Limit noise at active lek perimeters to 10 db above ambient or maximum of 34 db.<br>• Bury all project-related collector and distribution lines, if practicable; | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Centrocercus urophasianus* (Cont.) | | | Outside of core areas in Montana, do not site turbines, access roads, transmission lines, or other project facilities within 4 mi (6.4 km) of sage-grouse leks. (There are no known greater sage-grouse occupied habitats outside core areas in North and South Dakota.) | • Do not place overhead power lines in suitable sage-grouse nesting habitat located within 4 mi (6.4 km) of a known lek.<br>• Mark new overhead power lines that traverse or are located within 0.25 mi (0.4 km) of occupied sage-grouse habitat with approved bird flight diverters.<br>• Report all incidents of mortality or injury from wind facility construction and operation to the appropriate USFWS Ecological Services Field Office and State Wildlife offices. | |
| *Sternula antillarum* | Interior least tern | Direct mortality may occur from collision with turbine blades during periods of low visibility. Loss of habitat may also occur due to erosion along access roads and tern avoidance of suitable habitat near construction. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone River system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the interior least tern have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Sternula antillarum* (Cont.) | | | Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than 1.5 mi (2.4 km) from known/suitable riverine habitat.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system. | | |
| *Charadrius melodu*s | Piping plover | Direct mortality may occur from collision with turbine blades during periods of low visibility. Habitat loss may occur due to construction of wind energy facilities, access roads, and transmission lines. Erosion due to construction of access roads may affect nesting and foraging habitat. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone River system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than | Additional minimization measures specifically intended to reduce the potential for adverse effects on the piping plover have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Charadrius melodus* (Cont.) | | | 1.5 mi (2.4 km) from known/suitable riverine habitat.<br><br>Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.<br><br>Do not site turbines, transmission lines, access roads, or other project facilities within 3.0 mi (4.8 km) of alkali lakes where piping plover nesting has been documented or those designated as critical habitat.<br><br>Do not site turbines, transmission lines, access roads, or other project facilities between any alkali lakes identified with a 3.0-mi (4.8-km) buffer where the outer limit of the buffer zones are less than 3.0 mi (4.8 km) apart. | | |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Charadrius melodus* (Cont.) | Designated critical habitat for piping plover | Designated critical habitat within the UGP Region consists of 19 critical habitat units totaling approximately 183,400 ac (74,228.4 ha) and portions of four rivers totaling approximately 1,200 river mi (1,943.3 km) in the States of Minnesota, Montana, Nebraska, North Dakota, and South Dakota. This includes designated critical habitat along the Missouri River from Fort Randall Dam, South Dakota, south to Ponca State Park, Nebraska (this includes Lake Oahe and Lake Sharpe (USFWS 2002b). | Do not site turbines, transmission lines, access roads, or other project facilities within 1.5 mi (2.4 km) of riverine designated critical habitat or within 3.0 mi (4.8 km) of alkali wetlands designated as critical habitat. | | No effect |
| *Calidris canutus rufa* | Rufa red knot | Wind turbines can have a direct (e.g., collision mortality) and indirect (e.g., migration disruption, displacement from habitat) impact on shorebirds. Habitat loss may occur as a result of wind energy projects. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the rufa red knot have not been identified at this time. The identified general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.<br><br>Coordinate with the local USFWS field office regarding new species information or conservation measures during planning stages. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Anthus spragueii* | Sprague's pipit | Fragmentation of habitat from roads, substations, and turbine placement in grassland communities is likely the greatest impact on Sprague's pipits. Direct mortality may occur from collision with turbine blades or overhead transmission lines during aerial breeding displays or during periods of low visibility. Sprague's pipits may also avoid suitable habitat due to vehicular traffic and the presence of tall structures such as turbines. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Avoid placement of meteorological towers, turbines, access roads, and transmission lines within 1,000 ft (304.8 m) of occupied native prairie tracts 160 ac (65 ha) or larger. | Design layouts to minimize further fragmentation of native prairie habitats that are suitable for Sprague's pipit.<br><br>All new meteorological towers should be self-supporting and not guyed. If guy wires are unavoidable, they should be marked with approved bird flight diverters. | May affect, but is not likely to adversely affect |
| *Grus americana* | Whooping crane | Mortality may occur from collision with turbine blades or overhead power lines. Suitable wetland habitat may be avoided as a result of construction activities or may be degraded by erosion and runoff from access roads. | For projects that occur within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings:<br>• Conduct preconstruction evaluations and/or surveys to identify wetlands that provide potentially suitable stopover habitat[b] and areas of occurrence within project boundaries.<br>• Do not site turbines, transmission lines, access roads, or other project facilities within 1 mi (1.6 km) of wetlands that provide suitable stopover habitat[b] or within 5 mi (8 km) of the Platte or Niobrara Rivers in Nebraska. | For projects that that occur within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings:<br>• Place approved bird flight diverters on the top static wire on any new or upgraded overhead collector, distribution, and transmission lines within 1 mi (1.6 km) of suitable stopover habitat.[b]<br>• Establish a procedure for preventing whooping crane collisions with turbines during operations by establishing and implementing formal plans for monitoring the project site and surrounding area for whooping cranes during spring and fall migration periods throughout the operational life of the project (or as determined by the local USFWS field office) and shutting down turbines and/or construction activities within 2 mi (3.2 km) of whooping crane sightings. Monitoring can be done by existing onsite personnel trained in | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| *Grus americana* (Cont.) | | | | whooping crane identification. Specific requirements of the monitoring and shutdown plan will be determined during preconstruction evaluations. Sightings of whooping cranes in the vicinity of projects will be reported to the appropriate USFWS field office immediately.<br>• Instruct workers in the identification and reporting of sandhill and whooping cranes, and to avoid disturbance of cranes present near project areas.<br>• The acreage of wetlands that are potentially suitable migratory stopover habitat located within a 0.5-mi (0.8-km) radius of turbines may be mitigated based upon site-specific evaluations. | |
| | Designated critical habitat for whooping crane | Designated critical habitat within the UGP Region is present in the Platte River bottoms between Lexington and Denman, Nebraska. | Do not site turbines, transmission lines, access roads, or other project facilities within 5 mi (8 km) of designated critical habitat. | | No effect |
| **Mammals** | | | | | |
| *Mustela nigripes* | Black-footed ferret | Potential impacts include loss of habitat and prey, predation by larger carnivores, disease transport, and direct mortality from vehicle collisions. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Avoid siting turbines, transmission lines, access roads, or other project facilities on prairie dog colonies where black-footed ferrets have been reintroduced or are known to occur.<br><br>If project facilities cannot avoid prairie dog colonies where ferrets are | Report observations of ferrets, their sign, or carcasses on the project area to the USFWS within 24 hours and work with the black-footed ferret coordinator or local USFWS Ecological Services Office to determine whether additional measures need to be undertaken.<br><br>Do not commence construction activities until any needed ferret surveys are completed and reviewed by the local USFWS Ecological Services Office.<br><br>Ensure that prairie dog colonies are not poisoned or compromised due to wind development on the site. | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Mammals (Cont.)** | | | | | |
| *Mustela nigripes* (Cont.) | | | expected to live, conduct preconstruction surveys in areas of suitable habitat where the project may impact prairie dog colonies. | If black-footed ferrets have been reintroduced or are being considered for reintroduction at a location where wind development is proposed, project proponents will partner with the local ferret recovery team to exchange information and provide assistance or management as may be appropriate at that site. | |
| *Lynx canadensis* | Canada lynx | Negative impacts are unlikely, due to the lack of suitable habitat in the vicinity of areas best suited for wind energy development. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, transmission lines, access roads, or other project facilities in core lynx habitat as defined in the USFWS September 2005 Canada lynx recovery outline. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the Canada lynx have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | May affect, but is not likely to adversely affect |
| | Designated critical habitat for Canada lynx | Designated critical habitat within the UGP Region includes boreal forest landscapes that provide specific beneficial habitat elements in the Carbon, Gallatin, Glacier, Lewis and Clark, Park, Pondera, Stillwater, Sweet Grass, and Teton counties of Montana. | Do not site turbines, transmission lines, access roads, or other project facilities within designated critical habitat. | | No effect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Mammals (Cont.)** | | | | | |
| *Canis lupus* | Gray wolf | Wolves may be displaced or migratory corridors may be altered due to fragmentation of previously undeveloped habitats. Mortality may occur from vehicle collisions in previously undisturbed areas. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.<br><br>Do not site turbines, transmission lines, access roads, or other project facilities in habitats occupied by the gray wolf. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the gray wolf have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | May affect, but is not likely to adversely affect |
| *Ursus arctos horribilis* | Grizzly bear | Negative impacts are unlikely due to the lack of suitable habitat in the vicinity of areas best suited for wind energy development. | Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas in which grizzly bears may occur within project boundaries.<br><br>Do not site turbines, power lines, access roads, or other project facilities within 0.5 mi (0.8 km) of locations known to be occupied by grizzly bears. | Additional minimization measures specifically intended to reduce the potential for adverse effects on the grizzly bear have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. | May affect, but is not likely to adversely affect |
| *Myotis sodalis* | Indiana bat | Mortality may occur from collision with turbine blades. | Throughout the range of the Indiana bat within the UGP Region (southern Iowa), conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable foraging and roosting habitat within project boundaries and to identify the distance from project boundaries to hibernacula used by Indiana bats. Disturbance of hibernacula is prohibited throughout the year<br><br>Do not site turbines in areas within 20 mi (32 km) of hibernacula used by Indiana bats or within 1,000 ft (300 m) | A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.<br><br>Increase turbine cut-in speeds to 22.6 ft/sec (6.9 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates) to avoid mortality to the Indiana bat. Use of feathering below the cut-in speed of 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Mammals (Cont.)** | | | | | |
| *Myotis sodalis* (Cont.) | | | of known or presumed occupied foraging and roosting habitat (edges along forested areas with dense forest canopy, riparian areas, and small wetlands). Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning. | and avoid mortality of migrating Indiana bats. Increased cut-in speed and feathering can be suspended between 0.5 hour after sunrise and 0.5 hour before sunset.<br><br>In the event that preconstruction surveys or post-construction monitoring indicate species occurrence or occupancy of habitat adjacent to the project area, the higher turbine cut-in speeds described above will be required during the spring bat migration season to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.<br><br>Immediately report observations of Indiana bat mortality to the appropriate USFWS office. | |
| *Myotis septentrionalis* | Northern long-eared bat | Mortality may occur from collision with turbine blades. | Throughout the range of the northern long-eared bat within the UGP Region, conduct preconstruction evaluations and/or surveys to identify suitable foraging, roosting, and commuting habitat within project boundaries and to identify the distance from project boundaries to hibernacula known/presumed to be used by northern long-eared bats. Disturbance of hibernacula is prohibited throughout the year. | A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.<br><br>The need for implementation of cut-in speeds higher than manufacturers recommendations during the fall bat migration period will be based on the following site-specific, project-by-project risk assessments by the State Ecological Services Field Office of the USFWS: | May affect, but is not likely to adversely affect |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Mammals (Cont.)** | | | | | |
| *Myotis septentrionalis* (Cont.) | | | Avoid all suitable habitat (do not site turbines) in areas within 5 mi (8 km) of hibernacula used by northern long-eared bats or within 0.5 mi (0.8 km) of known or presumed occupied foraging, roosting, and commuting habitat. Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning. | • During the preconstruction evaluation and survey stage, and based on a collision risk assessment of location of the project, proximity to potential summer habitat, distance to known occurrences, distance to known hibernacula, and suspected migration patterns, the applicant will coordinate with Western, Refuges, and the local Ecological Services Field Offices of the USFWS to determine if the risk of injury or mortality is sufficiently high to warrant higher cut-in speeds.<br>• In the event that preconstruction surveys indicate species occurrence or occupancy of habitat adjacent to the project area, higher turbine cut-in speeds will be required to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.<br>• When warranted by either of the two aforementioned conditions for specific projects, turbine cut-in speeds will be increased to 16.4 ft/sec (5.0 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates in each State) for northern long-eared bats in the western and central areas of the UGP Region. In the eastern fringe of the UGP Region, a minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates in each State) for northern long-eared bats is required. For administrative purposes as well as an implementation consistency in meeting these requirements, areas within the UGP Region that occur east of the western borders of Minnesota | |

**TABLE 5-1 (Cont.)**

| Scientific Name | Common Name | Potential Impacts | Species-Specific Avoidance Measures | Species-Specific Minimization Measures | Effect Determination |
|---|---|---|---|---|---|
| **Mammals (Cont.)** | | | | | |
| *Myotis septentrionalis* (Cont.) | | | | and Iowa will be used as the line of demarcation where the minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) will be used. Use of feathering below the respective cut-in speed of 16.4 ft/sec (5.0 m/sec) or 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating northern long-eared bats. Increased cut-in speed and feathering can be suspended from 0.5 hour after sunrise to 0.5 hour before sunset.<br><br>Immediately report observations of northern long-eared bat mortality to the appropriate USFWS office. | |

[a] See individual species accounts for additional information regarding ecology, natural history, and potential impacts for each species. Species-specific avoidance and minimization measures would be required under the proposed programmatic approach; species-specific mitigation measures would not be required but may assist in reducing impacts. The effect determination was developed to account for the potential impact after required avoidance and minimization measures were applied.

[b] Potentially suitable migratory stopover habitat for whooping cranes is considered to consist of wetlands with areas of shallow water without visual obstructions (i.e., high or dense vegetation) and submerged sandbars in wide, unobstructed river channels that are isolated from human disturbance (USFWS 2009a).

20 percent of these have adequate protection and management. The species is also found in Canada, but is now known from only 12 populations (USFWS 1999a; Brownell 1984).

The eastern prairie fringed orchid is a perennial orchid with an upright leafy stem extending up to 40 in. (1 m) high from an underground tuber. Its leaves sheath the stem and are 2–8 in. (5–20 cm) long, elliptical to lance-shaped, and progressively larger toward the stem base. The inflorescence extends above the leaves, with 5–40 creamy white flowers subtended by lance-shaped bracts. The flowers are distinguished by a three-parted fringed lip 0.6–1.2 in. (1.5–3 cm) long and a nectar spur 1–2 in. (2.5–5 cm) long (USFWS 1999a). Flowering occurs over a 7–10 day period from late June to early July. Flowers depend on sphinx moths for pollination. Seed capsules mature over the growing season and are dispersed by the wind from late August through September (USFWS 2010a).

The eastern prairie fringed orchid is found in tallgrass silt-loam or sand prairies, sedge meadows, fens, lakeshore grasslands, and occasionally sphagnum bogs in the eastern part of its range (USFWS 1999a). It requires full sun for optimum growth in grass-type habitat without woody species (USFWS 2010a). The eastern prairie fringed orchid is known from historic records in only four counties of the UGP Region of southwestern Iowa (Adair, Clarke, Decatur, and Ringgold). It may have been extirpated in Decatur County (NatureServe 2013). It also may no longer occur elsewhere in southwestern Iowa. No information was found on the size of existing populations or recent population trends in these counties.

The eastern prairie fringed orchid has declined in the United States by more than 70 percent from its original county records. This decline is due mainly to habitat loss for cropland and pasture. The 30 percent of original populations that remain is threatened by invasion of non-native species, illegal collection, and continued habitat loss (USFWS 1999a, 2010a). The current decline in the species is also attributed to the drainage and development of wetlands, succession to woody vegetation, competition from non-native species, and over-collection (USFWS 2010a).

#### 5.1.1.1 Direct and Indirect Effects of the Action

Wind energy development in the UGP Region would likely not adversely affect eastern prairie fringed orchids in Iowa. The restricted moist wetland habitats where they occur could be easily avoided in planning wind energy facilities.

#### 5.1.1.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Drainage of wetlands for conversion to agricultural crop production has been a major reason for the decline of the eastern prairie fringed orchid. Wetland communities such as sedge meadows, marsh edges, and even bogs have been affected by drainage over time (USFWS 1999a). As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the eastern prairie fringed orchid within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.1.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed programmatic approach are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the eastern prairie fringed orchid. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning plans prior to development of projects proposed in any county for which the eastern prairie fringed orchid has been recorded (table A-1; figure A-1). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists, to determine the potential for the occurrence of individual eastern prairie fringed orchids and to evaluate the position of the project footprint relative to existing populations. Onsite surveys by qualified biologists may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, several species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats; and
- Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on the eastern prairie fringed orchid would also be required. In general, areas occupied by the eastern prairie fringed orchid will be limited in size and individual plants will only be present in areas with specific site conditions. Because habitat disturbance from wind energy developments is often limited to a small percentage of the total project area, these specialized habitats can generally be avoided during facility siting. Identification of suitable habitat and adjustment of project plans to avoid them will serve as the preferred means of avoiding or minimizing impacts on the eastern prairie fringed orchid. Many of the measures identified below will only be applicable if total avoidance is not possible (e.g., in cases where habitat occurs along drainages that have to be crossed by access roads), and then only on that portion of the project likely to affect suitable habitat.

If suitable habitat cannot be avoided, additional measures include (by impacting factor):

***Habitat Disturbance***

- Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

***Erosion, Sedimentation, and Runoff to Nearby Wetland Habitats***

- Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat;

- Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat (this determination can potentially be based on soil survey data); and

- Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

#### 5.1.1.4 Effect Determination

It is highly unlikely that construction of wind energy facilities will impact the eastern prairie fringed orchid. Given its known distribution in only four southwestern Iowa counties within the UGP Region, proper planning in siting wind turbines, access roads, transmission lines, and meteorological towers can be implemented to avoid existing orchid populations and areas considered suitable habitat. The proposed wind energy development program **may affect, but is not likely to adversely affect** the eastern prairie fringed orchid.

### 5.1.2 Mead's Milkweed

The Mead's milkweed (*Asclepias meadii*) was federally listed as threatened in 1988 (USFWS 1988a). It is currently known from 171 sites in 34 counties in eastern Kansas, Missouri, south-central Iowa, and southern Illinois. Seventy-five percent of the Mead's milkweed populations are in the Osage Plains Physiographic Region in Kansas and Missouri. The remainder of the population occurs in the Shawnee Hills of Illinois; the Southern Iowa Drift Plain in Iowa; the Glaciated Plains, Ozark Border, Ozark Springfield Plateau, and the Ozark-St. Francois Mountains of Missouri; and the Glaciated Physiographic Region of Kansas (USFWS 2003).

The Mead's milkweed is State-listed as endangered in Iowa. Within the UGP Region, it is known from past observations in five southwestern Iowa counties (Adair, Clarke, Decatur, Ringgold, and Warren) (table A-1; figure A-1). The species may now be extirpated in Clarke, Decatur, and Ringgold Counties (NatureServe 2013).

This species of milkweed differs from most other milkweeds by producing an unbranched stem that terminates in a single inflorescence projected above the top pair of leaves. Mature Mead's milkweed plants reach up to 20 in. (51 cm) high. They have four to eight pairs of smooth blue-green leaves with a distinctive herringbone leaf-vein pattern. The nodding inflorescence contains about 12 flowers, which change from green to ivory as they mature, first appearing in late May, finally fading to a pale cream-color. The flowers produce large amounts of nectar and are pollinated by small bees.

Mead's milkweed occurs primarily in tallgrass prairie with a late successional bunch-grass structure, but also occurs in hay meadows and in thin soil glades or barrens (USFWS 2003). Habitat for the milkweed can be defined as sites that have never been plowed and only lightly grazed and hay meadows that are cropped annually for hay.

Mead's milkweed is known from recent observations in Woodside Prairie (Adair County), Flaherty Prairie (Clarke County), and Powell Prairie (Taylor County) (USFWS 2003, 2010b). All populations consist of 10 or fewer plants growing on clay-loam and silty clay-loam mollisols developed from weathered Kansas age drift covered with a moderate to thick layer of loess. Woodside Prairie in Adair County, one of the best remaining prairies in southern Iowa, occurs on Adair clay loam with 5–9 percent slopes (NatureServe 2013).

Mead's milkweed is threatened by the destruction and alteration of tallgrass prairie due to intense agricultural use; urban growth; urban residential, industrial, and commercial development; recreational use of sites; and hay mowing that disrupts the species' sexual reproductive cycle. The milkweed populations that are managed by prescribed burning show an increase in flowering, reproduction, and seedling establishment and are more genetically diverse than sites that are mowed (USFWS 2003).

#### 5.1.2.1 Direct and Indirect Effects of the Action

Construction and operation of wind energy facilities in the UGP Region may affect but is not likely to adversely affect the Mead's milkweed. Its limited distribution, restricted to remnant native prairie in southwestern Iowa, can easily be avoided during project design and construction. Access roads for wind turbine sites and associated power lines or substations also can avoid native prairie patches where the milkweed might occur. Native prairie remnants are typically identified as avoidance areas during project design and layout to avoid impacts on several species of concern.

#### 5.1.2.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The loss of native prairie to agriculture use and grazing, invasion of woody and herbaceous species, and mowing grasslands for hay just prior to flowering and/or seed production by Mead's milkweed have collectively contributed to the decline and extirpation of the species from its historic range. Insects are believed to contribute to the decline of the species (USFWS 2003). Adult milkweed cerambycid beetles (*Tetraopes* sp.) feed on the leaves and flowers. Their larvae, which feed on the roots, could kill the plant. Milkweed weevils (*Rhyssematus* sp.) can also damage Mead's milkweeds through the actions of females girdling the flowering stems, causing the umbel to collapse and fall downward. In addition, the adult females of this genus insert their eggs into the stem, where their larvae feed on the pith tissue. Both the ovipositing by females and larvae feeding within the stem can weaken the stem or topple the umbel, and thus prevent seed production. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is a potential for this level of non-Federal wind energy development to affect the Mead's milkweed within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.1.2.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting adverse effects on Mead's milkweed. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning plans for projects proposed in any county for which the Mead's milkweed has been recorded (table A-1; figure A-1). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of individual Mead's milkweeds and to evaluate the position of the project footprint relative to existing populations. Onsite surveys by qualified biologists may be needed to complete such evaluations.

Windfarm developers will contact the Iowa Department of Natural Resources (DNR) and the USFWS's Midwest Region Office to obtain information on the current distribution of Mead's milkweed for projects proposed to be developed in southwestern Iowa counties from which the species has been reported. These agencies may also be able to provide guidance on appropriate survey methods to determine the presence or absence of the species in tallgrass prairie within the proposed project area.

If it is determined through preconstruction evaluations and/or surveys that Mead's milkweed or its habitat may occur in the project area, several species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats; and

- Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

A number of additional minimization measures specifically intended to reduce adverse effects on Mead's milkweed would also be required. In general, areas occupied by Mead's milkweed will be limited in size and individual plants will only be present in areas with specific site conditions. Because habitat disturbance from wind energy developments is often limited to a small percentage of the total project area, these specialized habitats can generally be avoided during facility siting. Identification of suitable habitat and adjustment of project plans to avoid them will serve as the preferred means of avoiding or minimizing impacts on Mead's milkweed. The measures identified below will only be applicable if total avoidance is not possible (e.g., in cases where habitat occurs in areas that have to be crossed by access roads), and then only on that portion of the project likely to affect suitable habitat. The species recovery plan identifies several measures that are applicable for protection and enhancement of existing Mead's milkweed habitat on windfarms in Iowa (USFWS 2003). These include the following:

- Employ additional project-specific BMPs to control invasive species in areas of suitable habitat disturbed by project activities;

- Only perform control measures from October to March in order to avoid the species' growing season; and

- Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

#### 5.1.2.4 Effects Determination

Based on current information on the status of the Mead's milkweed populations in the UGP Region, it is unlikely that wind energy facilities construction or operation would result in losses to existing populations. With careful surveys and proper planning within southwestern Iowa where the species is known to occur, existing populations and suitable habitat for the species can be avoided. With the implementation of all conservation measures identified above (summarized in table 5-1) and the incorporation of the BMPs (in table 4.5-1), as well as the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** Mead's milkweed.

### 5.1.3 Prairie Bush Clover

Prairie bush clover (*Lespedeza leptostachya*) was federally listed as threatened on January 9, 1987 (USFWS 1987). Critical habitat for this species currently has not been designated. Within the UGP Region, it is State-listed as threatened in both Iowa and Minnesota.

The prairie bush clover is an herbaceous perennial that is a member of the legume family. It is endemic to Midwestern tallgrass prairies, and is known from 36 sites in four States. It produces a single stem that can grow up to 40 in. (1 m) tall, with typical pea-like leaves widely spaced along the stem, with three leaflets each. The stem and leaves appear somewhat silvery, because they are densely covered with fine hairs. When plants reach maturity, typically after 6–9 years, they produce pale pink flowers on open, branching stems beginning in July and extending into September. Flowers can remain closed or open to admit pollinators, and both types of flowers are capable of producing seeds without the aid of insect pollen transfer.

Prairie bush clover can often be found on the north-facing slopes of dry upland prairies. On these north-facing slopes, it grows either in thin soil at the margins of rocks or in gravelly loamy soil.

Commonly associated species include little bluestem (*Schizachyrium scoparium*), side-oats gamma (*Bouteloua curtipendula*), prairie dropseed (*Sporobolus heterolepsis*), porcupine grass (*Stipa spartea*), penn sedge (*Carex pennsylvanica*), copper-shouldered sedge (*Carex bicknellii*), sand bracted sedge (*Carex muhlenbergii*), lead plant (*Amorpha canescens*), rough blazing star (*Liatris aspera*), purple prairie clover (*Dalea purpureum*), showy goldenrod (*Solidago speciosa*), grass leaved goldenrod (*S. graminifolia*), prairie gentian (*Gentiana puberulenta*), hoary puccoon (*Lithospermum canescens*), blue eyed grass (*Sisyrinchium albidum*), cream wild indigo (*Baptisia leucophaea*), flax-leaved aster (*Aster linariifolius*), silky aster (*A. sericeus*), pale prairie coneflower (*Echinacea pallida*), milkwort (*Polygola polygama*), and bird's foot violet (*Viola pedata*) (Bittner and Kleiman 1998).

The prairie bush clover is known from seven counties in northwestern Iowa and eight counties in southwestern Minnesota (table A-1; figure A-2). No information was found regarding recent surveys.

Specific threats to occurrences include herbicide use, runoff containing herbicides, quarry operations, grazing, woody species invasion, invasion by weedy species, roadside mowing prior to seed production, and hybridization with *Lespedeza capitata* (NatureServe 2013).

#### 5.1.3.1 Direct and Indirect Effects of the Action

Prairie bush clover could be directly affected by construction of access roads for wind energy facilities and associated transmission lines. Grasslands on gravelly soils should be surveyed prior to surface disturbance to determine the presence of bush clover.

#### 5.1.3.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Wind energy development in northwestern Iowa and southwestern Minnesota counties where the prairie bush clover is known to occur could add to the cumulative impacts from other activities in these areas, including herbicide runoff from agricultural fields, conversion of grassland to row crops, and mowing of road ROWs where the species occurs. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is a potential for this level of non-Federal wind energy development to affect the prairie bush clover within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.1.3.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will help limit the potential for adverse effects on the prairie bush clover. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning plans for projects proposed in any county for which the prairie bush clover has been recorded (table A-1; figure A-2). Within these counties, project applicants will also be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of prairie bush clover individuals and stands and to evaluate the position of the proposed project footprint relative to known populations or suitable habitat. Onsite surveys by qualified biologists may be needed to complete such evaluations.

Windfarm developers for projects proposed for development in counties in Iowa and Minnesota from which prairie bush clover has been reported will contact the USFWS's Midwest Region Office and appropriate State agency staff in Iowa and Minnesota to obtain information on current distribution of prairie bush clover. If a potential for this species to occur is deemed to exist within the project area, appropriate survey methods should be developed, through discussions with these agencies, to determine the presence or absence of the species in the project area.

If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, several species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats; and
- Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on prairie bush clover would also be required. In general, areas occupied by prairie bush clover will be limited in size and individual plants will only be present in areas with specific site conditions. Because habitat disturbance from wind energy developments is often limited to a small percentage of the total project area, these specialized habitats can generally be avoided during facility siting. Identification of suitable habitat and adjustment of project plans to avoid them will serve as the preferred means of avoiding or minimizing impacts to prairie bush clover. The measures identified below will only be applicable if total avoidance is not possible (e.g., in cases where habitat occurs in areas that have to be crossed by access roads), and then only on that portion of the project likely to affect suitable habitat. If needed, minimization measures that will be implemented by project proponents include (by impacting factor):

***Habitat Disturbance***

- Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities;
- Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat; and
- Avoid mowing along access roads or transmission line ROWs in areas containing suitable habitats.

***Exposure to Toxic Chemicals***

- Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

#### 5.1.3.4 Effects Determination

Based on current information on the status of prairie bush clover in the UGP Region, it is possible that individual plants or stands could be affected by new wind energy facilities and associated transmission lines. With the implementation of conservation measures identified above (summarized in table 5-1) and the incorporation of the BMPs listed in table 4.5-1, as well as the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the prairie bush clover.

### 5.1.4 Ute Ladies'-Tresses

The Ute ladies'-tresses (*Spiranthese diluvialis*) was federally listed as threatened on January 17, 1992 (USFWS 1992). Although federally threatened in Montana, the State Endangered Species Act covers only animal species, so it is not afforded protection under State law. The Ute ladies'-tresses is known from five southwestern Montana counties within the UGP Region (table A-1; figure A-1). It is a perennial terrestrial orchid with cream-colored flowers that grows in moist soils on primary or secondary floodplains of rivers or wet, open meadows and springs. This species is known from populations in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming. The orchid occurs along riparian edges, gravel bars, old oxbows, high-flow channels, and moist to wet meadows along perennial streams. It also is found in wetland and seep areas near freshwater lakes or springs (USFWS and CUWCD 2005). Montana populations seem restricted to low-elevation, calcareous microhabitats within old river meanders that are temporarily inundated and remain moist throughout the growing season. The plant is adapted to relatively sparse vegetation, possibly as a result of grazing, but not season-long grazing. It also appears to be adapted to disturbance from flooding (NRCS 2010).

Ute ladies'-tresses is a perennial herb with erect, glandular-pubescent stems that are 5–24 in. (12–60 cm) tall, arising from tuberous-thickened roots. Basal leaves are narrowly linear and persist at the time of flowering, which occurs over a four- to six-week period in July and August. The inflorescence is a sparsely pubescent spike of numerous small white or ivory-colored flowers arranged in a gradual spiral; individual flowers are faintly fragrant (with a vanilla-like scent) (USFWS and CUWCD 2005).

Ute ladies'-tresses is known to occur in 10 known locations in four Montana counties: Jefferson, Madison, Gallatin, and Beaverhead. No Ute ladies'-tresses are currently known from Broadhead County, where it previously occurred, based on information provided by the Natural Resources Conservation Service (NRCS) in 2005. The largest Montana population consists of about 500 plants (NRCS 2010).

The decline in the orchid population is due to the conversion of suitable habitat for agriculture, heavy grazing, and drainage of natural surface waters. It depends on natural stream processes and probably on the type of nomadic grazing typical of native ungulates. Dams and diversions have interrupted stream flooding cycles that have created habitat and helped to inundate areas typically encroached on by weedy competitor species. Grazing prior to flower stem formation may be beneficial because it limits competition from taller, more aggressive species. Season-long grazing, however, is detrimental. Heavy recreational use of riparian habitats can result in trampled plants. The Ute ladies'-tresses has a very low reproductive rate, which makes it even more vulnerable to the above threats (NRCS 2010).

#### 5.1.4.1 Direct and Indirect Effects of the Action

If access roads in riparian areas occupied by Ute ladies'-tresses require culvert and bridge construction, the Ute ladies'-tresses orchid could be adversely affected by bank erosion or sediment loading during bridge construction. In addition, new bridges could affect downstream flows that in turn lead to habitat loss for the species. Construction of turbines, power line transmission towers or poles, and substations needed for wind farms could be sited to avoid affecting the species and could use BMPs in and near riparian habitats where the species occurs. Although turbines would typically be located on ridges or other upland areas and would not be expected to affect Ute ladies'-tresses, the possibility exists that access roads could affect riparian areas. Such impacts are expected to be minor, if design and layout considerations are geared to avoiding riparian areas wherever possible.

#### 5.1.4.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Heavy livestock grazing and extensive recreational use are likely to continue having adverse effects on the Ute ladies'-tresses. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Ute ladies'-tresses within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.1.4.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Ute ladies'-tresses. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the Ute ladies'-tresses has been recorded (table A-1; figure A-1). Windfarm developers for projects proposed for development in counties from which Ute ladies'-tresses has been reported will contact the USFWS Montana Ecological Services Field Office to obtain information on current distribution of Ute ladies'-tresses. If a potential for this species to occur is deemed to exist within the project area, appropriate methods will be developed to determine the presence or absence of the species in the project area and to evaluate the position of the project footprint relative to known populations. Onsite surveys by qualified biologists may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that Ute ladies'-tresses or its habitat are present in the project area, several species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats; and

- Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects to Ute ladies'-tresses would also be required. In general, areas occupied by Ute ladies'-tresses will be limited in size and individual plants will only be present in areas with specific site conditions. Because habitat disturbance from wind energy developments is often limited to a small percentage of the total project area, these specialized habitats can generally be avoided during facility siting. Identification of suitable habitat and adjustment of project plans to avoid occupied habitat will serve as the preferred means of avoiding or minimizing impacts on Ute ladies'-tresses. The measures identified below will only be applicable if total avoidance is not possible (e.g., in cases where habitat occurs in areas that have to be crossed by access roads), and then only on those aspects of the project likely to affect suitable habitat. If needed, minimization measures that will be implemented by project proponents include (by impacting factor):

***Habitat Disturbance***

- Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities;
- Avoid vehicle traffic in areas where suitable habitat is present; and
- Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat.

***Sedimentation and Erosion Control***

- Use appropriate or additional project-specific BMPs during and after construction to control erosion and reestablish vegetation in disturbed areas near suitable habitat.

***Exposure to Toxic Chemicals***

- Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

#### 5.1.4.4 Effects Determination

Based on current information on the status of the Ute ladies'-tresses in the UGP Region, it is unlikely that the species would be adversely affected by new wind energy facilities and associated transmission lines. With the implementation of conservation measures identified above (summarized in table 5-1), the incorporation of the BMPs listed in table 4.5-1, as well as the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the Ute ladies'-tresses.

### 5.1.5 Western Prairie Fringed Orchid

The western prairie fringed orchid (*Platanthera praeclara*) was listed as a federally threatened species on September 28, 1989 (USFWS 1989a). Within the UGP Region, its historic range included two counties in North Dakota, 15 in South Dakota, 46 in Nebraska, 10 in Minnesota, and 10 in Iowa (table A-1; figure A-2). The species is known to occur in North Dakota, western Minnesota, western Iowa, and eastern Nebraska within the UGP Region. It is State-listed as endangered in Minnesota and threatened in Nebraska. Its existence in South Dakota is uncertain, since no recent survey records have documented its existence in tallgrass prairie within the State (USFWS 1989a).

Western prairie fringed orchids are associated primarily with intact, native tallgrass prairie; however, they have occasionally been found in disturbed sites. Possible habitat within these grassland areas includes moist areas in upland sites, wet prairies, sedge meadows, sub-irrigated prairies, and swales in sand dune complexes (Sather 1991).

The orchid is an herbaceous perennial that grows from a fusiform tuber. It achieves a height of roughly 1 to 3 ft (30 to 91 cm). The stalk emerges in May and the flowers bloom in June and July. The blooms are nocturnally fragrant and are chiefly pollinated by sphinx moths (family *Sphingidae*). The orchid is presumed to overwinter as a tuber that divides after pollination (Bragg and Stubbendieck 1989).

The decline in the orchid population is due to conversion of prairie grasslands to cropland, heavy grazing, fire protection, intensive mowing of hay, and drainage (USFWS 1989a).

The geographic range of the western prairie fringed orchid was historically associated with tallgrass prairie. With the elimination of tallgrass prairie and its conversion to agricultural use, the species has declined to small numbers in isolated remnants of the UGP. Western prairie fringed orchids occur in the Sheyenne National Grassland, a tract of over 70,000 ac (28,340 ha) in Ransom County located in southeastern North Dakota (Ransom County 2010). Approximately 3,000 individual plants are known from the Sheyenne National Grassland (NatureServe 2013), which is believed to be one of the four largest remaining populations (i.e., >1,000 individuals) of the species. The Sheyenne National Grassland is the largest publicly owned tract in the United States and is adjacent to 64,769 ac (26,222 ha) of privately owned grassland in Ransom and adjacent Richland Counties. Another large population (several thousand plants) exists at the Pembina Trail Preserve State Natural Area in northwestern Minnesota (NatureServe 2013). The official Nebraska government Web site for the State's pesticide program indicates that about 900 western prairie fringed orchid plants are known from various sites in eastern Nebraska, typically in moderate- to high-quality tallgrass prairies with high soil moisture (State of Nebraska 2010).

In 2008, the USFWS provided funds to the Iowa DNR for habitat improvements on sites with federally listed vascular plant species (USFWS 2010c). Several sites have known populations of western prairie fringed orchids that could benefit from habitat management actions designed to increase the chance for species recovery (table 5.1.5-1).

**TABLE 5.1.5-1 Habitat Management of Iowa Prairie Remnants in the UGP Region with Federally Listed Plant Species**

| Prairie Name | County | Federally Listed Species | Actions |
|---|---|---|---|
| Cayler Prairie | Dickinson | Western prairie fringed orchid, prairie bush clover | Control musk thistle, Canadian thistle, reed canary grass |
| Dinesen Prairie | Shelby | Western prairie fringed orchid | Hand cut, stump treat trees and shrubs |
| Kalsow Prairie | Pocahontas | Western prairie fringed orchid | Herbicide reed canary grass; cut and hand pull yellow and white sweet clover and Canadian thistle |
| Powell Prairie | Taylor | Western prairie fringed orchid, Mead’s milkweed | Brush cutting, stump treatment; control wild parsnip, bird’s-foot trefoil by hand pulling, spot spraying |
| Sheeder Prairie | Guthrie | Western prairie fringed orchid | Control poison hemlock, yellow and white sweet clover by hand pulling; cut trees and shrubs |

#### 5.1.5.1 Direct and Indirect Effects of the Action

The decline in the western prairie fringed orchid population is primarily linked to the conversion of native grassland prairie habitat to agriculture use, heavy livestock grazing, and drainage (USFWS 1989a). Wind energy development in the UGP Region could affect existing remnant plants because of site clearing for construction and access roads in western Minnesota, southeastern North Dakota, and eastern Nebraska. Substation construction and access roads needed for power line tower erection and conductor stringing could also affect fringed orchid populations unless surveys are conducted to identify the locations of individual plants before construction begins in order to avoid effects on existing plants.

#### 5.1.5.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Conversion of native prairie to croplands, overgrazing of native grasslands, intensive mowing of grasslands for hay, control of natural fires, and drainage have adversely affected the fringed orchid (USFWS 1989a). As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the fringed orchid within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

### 5.1.5.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the western prairie fringed orchid. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the western prairie fringed orchid has been recorded (table A-1; figure A-2). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of western prairie fringed orchids and to evaluate the position of the project footprint relative to known populations. Onsite surveys may be needed to complete such evaluations.

Windfarm developers for projects proposed to for development in counties from which western prairie fringed orchid has been reported will contact the appropriate USFWS Ecological Services Field Office to obtain information on current distribution of the western prairie fringed orchid. If a potential for this species to occur is deemed to exist within the project area, appropriate methods will be developed to determine the presence or absence of the species in the project area and to evaluate the position of the project footprint relative to known populations. Protocols for surveys to determine presence or absence should be consistent with those utilized by Young et al. (2007) and similar range-wide survey protocols for the western prairie fringed orchid (Shelley 2013) and should be conducted by qualified biologists. If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, several species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats; and

- Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on western prairie fringed orchid would also be required. Because habitat disturbance from wind energy developments is often limited to a small percentage of the total project area, these specialized habitats can generally be avoided during facility siting. Identification of suitable habitat and adjustment of project plans to avoid occupied habitat will serve as the preferred means of avoiding or minimizing impacts on the western prairie fringed orchid. The measures identified below will only be applicable if total avoidance is not possible (e.g., in cases where habitat occurs in areas that have to be crossed by access roads), and then only on those aspects of the project likely to affect suitable habitat. Species-specific minimization measures that will be implemented by project proponents to protect individual orchids and habitat include the following:

- Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities;
- Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat;
- Avoid actions that would alter surface water flow, infiltration, and groundwater levels in suitable habitat; and
- Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

#### 5.1.5.4 Effects Determination

Based on current information on the status of western prairie fringed orchid in the UGP Region, it is likely that habitat could be affected by new wind energy facilities and associated infrastructure. With the implementation of conservation measures identified above (summarized in table 5-1), the incorporation of the BMPs, listed in table 4.5-1, as well as the incorporation of additional project specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the western prairie fringed orchid.

### 5.1.6 Whitebark Pine

The whitebark pine (*Pinus albicaulis*) is a candidate species for listing under the ESA (USFWS 2012a). Within the UGP Region, it is known to occur in 24 counties in central and western Montana (table A-1; figure A-3). It is a slow-growing, long-lived tree with a lifespan of up to 500 years. It is considered a keystone, or foundation, species in western North America, where it increases biodiversity and contributes to critical ecosystem function. The species is a hardy conifer that is found at alpine tree line and subalpine elevations (USFWS 2012a).

The global range of the whitebark pine includes the States of Washington, Oregon, Nevada, California, Idaho, Montana, and Wyoming in the United States, as well as British Columbia and Alberta, Canada. In the United States, approximately 96 percent of land where the species occurs is federally owned or managed, primarily by the U.S. Forest Service. Primary threats to the species are disease transmission from nonnative white pine blister rust, mortality from predation by the native mountain pine beetle, and habitat loss due to fire suppression (USFWS 2012a).

#### 5.1.6.1 Direct and Indirect Effects of the Action

It is unlikely for wind energy development in the UGP Region to adversely affect the whitebark pine due to the lack of suitable habitat in the vicinity of areas that might be best sited for wind energy development under the proposed program. It is unlikely for wind energy development to occur in high-elevation coniferous forests in the regions that support whitebark pine populations (central and western Montana).

#### 5.1.6.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various factors have contributed to the loss and degradation of alpine forest communities, including climate change, habitat loss, disease, and predation. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the whitebark pine within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.1.6.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required, when site-specific conditions are applicable, of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the whitebark pine. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures and decommissioning for projects proposed in any county in which the whitebark pine has been recorded (table A-1; figure A-3). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of the whitebark pine and its habitat relative to the project footprint. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations that the whitebark pine or its habitat are present in the project area, the following species-specific avoidance measure would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in montane habitats occupied by the whitebark pine.

#### 5.1.6.4 Effects Determination

With the implementation of the conservation measures summarized in table 5-1 and the BMPs summarized in table 4.5-1, it is determined that implementation of the proposed action will have **no effect** on the whitebark pine.

## 5.2 INVERTEBRATES

### 5.2.1 American Burying Beetle

The American burying beetle (*Nicrophorus americanus*) was listed as a federally endangered species on July 13, 1989 (USFWS 1989b). A recovery plan for the beetle was prepared in 1991 (USFWS 1991). The American burying beetle is a large black insect with two distinct orange bands on each wing cover. The shield-like structure behind the head is orange with a black border. Each antenna is tipped with orange, and there is an orange patch on the head. This large beetle is about 1.5 in. (3.8 cm) long (USFWS 2010d). Throughout its geographic range, the burying beetle occupies a variety of habitats including forests, grasslands, and scrubland.

The American burying beetle has been extirpated from about 90 percent of its original range and is currently known from Rhode Island, Oklahoma, Arkansas, Nebraska, and South Dakota (USFWS 2010d). Historic data reportedly showed populations from seven counties in South Dakota and nine counties in Nebraska. The USFWS South Dakota Ecological Services Field Office reports known occurrences of burying beetles with certainty from only four counties (Bennett, Gregory, Todd, and Tripp) within the UGP Region (USFWS 2010d). The burying beetle is State-listed as endangered in Nebraska. The population in South Dakota is believed to occur over a 500 $mi^2$ (1,295 $km^2$) area, while known occurrences in Nebraska are from a large geographic area of sand hills, an area west of the UGP Region. Given the widespread distribution of known populations, it is possible that future research could discover populations within the UGP Region in eastern Nebraska grassland prairie, forest edge, and scrubland habitats (USFWS 2010d). The distribution of burying beetles in South Dakota was surveyed in 2010. In addition, searches for the species throughout its historic range are ongoing to find remnant populations.

The following characterization of breeding behavior is based on a description from the USFWS (2010d). Adults become active in early summer when they locate carcasses of small animals for food and places to lay their eggs. A male and female pair locates a carcass of appropriate size and typically moves it to a substrate soft enough to bury the corpse, or they may bury it in place if the substrate is suitable. The pair removes soil from beneath the carcass until it settles into a shallow grave several inches below the ground surface. The corpse is buried after the hair and skin are removed, and the female creates a small chamber above the carcass where she lays between 10 and 30 eggs.

The larvae receive parental care during the entire time they are feeding and growing. Both adults regurgitate food to begging larvae. The larvae grow rapidly and are soon able to feed themselves. The adults continually tend the carcass, removing fungi and covering the carrion ball with an antibacterial secretion. After about a week, the larvae have consumed all but the bones of the carcass, and the adults fly away. Adults live only one season. The young pupate in the nearby soil and emerge as adults about a month later. Beetles overwinter underground in the adult stage.

Within the UGP Region, the American burying beetle is currently known from nine counties in northern Nebraska and four counties in the south-central part of South Dakota (table A-1; figure A-4). Since annual surveys were initiated in 1995, the greatest number of captures has occurred in Tripp County south of the town of Winner (USFWS 2008a). The American burying beetle is believed to have a stable South Dakota population of 500 or more individuals (CBD 2010a).

A recent study of the American burying beetle population in Tripp County, South Dakota, indicates the species is doing well at several locations. Habitat in the area is characterized by sandy grasslands with scattered stands of trees dominated by eastern cottonwood (*Populus deltoides*). Most of the study area was native grassland and was primarily used for range and hayland. Annual surveys conducted since 1995 show the population to be stable in number and distribution. Surveys using baited pit-fall traps in June and August 2005 resulted in capture of 168 specimens in June and 323 in August. Mark-recaptures and models conducted by Backlund et al. (2008) produced population estimates of 442 in June and 901 beetles in an area of about 85 $mi^2$ (220 $km^2$).

A study of one large population in Nebraska south of the North Platte River in Dawson, Gosper, and Lincoln Counties recorded nearly 1,000 individual burying beetles trapped or collected in upland grasslands and cedar tree savanna habitats between 1995 and 1997. The population was estimated to consist of 3,000 adults (Peyton 2003). The three counties Peyton (2003) studied are west of the UGP Region, but their recent discovery suggests that other remnant populations could occur elsewhere in Nebraska in other grassland or forest habitats. As the search for remnant populations continues in Nebraska and South Dakota, new populations may be found with the UGP Region.

A multitude of complex factors has likely led to the decline of the American burying beetle. The reduction in carrion because of lower numbers of birds and mammals present in many habitats compared with historic populations is believed to be one factor. Others include loss of forest habitat and disturbance and loss of native grasslands to agriculture, which made carrion predators better able to compete with and eliminate burying beetles from their range (CBD 2010a). Various carrion consumers such as crows, raccoons, foxes, opossums, and skunks have competed with the burying beetle for available carrion. Fragmented habitats today support fewer or lower densities of native species that historically may have supported burying beetle populations, which has resulted in much more competition for those limited resources between species that comprise current the predator/scavenger community (SDGFP 2010). Other threats include insecticide and bug-zapper use and disturbance of soils (NatureServe 2013).

#### 5.2.1.1 Direct and Indirect Effects of the Action

Habitat for burying beetles could be affected directly by construction equipment moving along access roads and clearing/grading for turbine pads or substations. Other habitat loss could occur during construction of transmission lines from wind farms to the electrical grid. Access roads needed for constructing the transmission lines, equipment storage during construction, and vehicle movement in these areas could cause temporary compaction of soils that would degrade burying beetle habitat. Direct mortality of beetle adults, eggs, larvae, and/or pupae may occur if soil is disturbed during the species' breeding season or overwintering period.

The presence of construction workers and maintenance employees may have indirect effects on burying beetles by affecting the distribution of mammals and birds in localized areas. Any reduction of these species would presumably lower the ability of burying beetles to find medium-sized carrion needed for food and reproduction. Alternatively, increased traffic, the presence of transmission lines, and the presence of turbines could result in increased collision mortalities for birds, bats, and other biota, thereby resulting in an increase in the presence of carcasses. Because new remnant populations of burying beetles have been discovered recently, it is possible that Nebraska counties within the UGP Region could also provide suitable habitat.

#### 5.2.1.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Burying beetles may be adversely affected by habitat loss from agriculture, which eliminates forest and grassland habitat in South Dakota and Nebraska within the UGP Region. Global warming may affect grassland and riparian habitats in the UGP Region. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the American burying beetle within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.2.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the American burying beetle. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the American burying beetle has been recorded (table A-1; figure A-4). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of American burying beetles and to evaluate the position of the project footprint relative to known populations. Onsite surveys may be needed to complete such evaluations. Surveys should follow USFWS survey guidelines developed for Oklahoma and Nebraska populations when attempting to document burying beetle presence in areas of known and historical occurrence (USFWS 2010e, 2011a) (the procedures developed by the Oklahoma Field Office [USFWS 2010e] are undergoing revision). Project applicants will contact the appropriate USFWS Ecological Services Field Office to obtain information on the requirements for survey permits. The USFWS is currently drafting a programmatic Section 10 permit that will afford a streamlined and expedited process to acquire a take permit to cover liability risk during burying beetle surveys.

If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, the following avoidance measure would be required:

- If surveys are warranted, obtain a permit from the USFWS to survey for the beetle within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat.

An additional minimization measure specifically intended to reduce the potential for adverse effects on American burying beetles would also be required:

- Avoid using herbicides or pesticides within occupied habitat within the current range of the American burying beetle (refer to current range map within the State). Contact the local USFWS Ecological Services Field Office to determine whether activities in the project area are within American burying beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

#### 5.2.1.4 Effects Determination

Based on current information on the status of American burying beetle in the UGP Region, it is possible that habitat could be affected by new wind energy facilities and associated transmission lines. With the implementation of conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the American burying beetle.

### 5.2.2 Dakota Skipper

The Dakota skipper (*Hesperia dacotae*) is a small butterfly found in the tallgrass and mixed-grass prairies of the Northern Great Plains. The butterfly was listed as a Candidate 2 species as early as 1982, but was removed from candidate status in 1995 when the candidate lists were revised. It was placed back on the list as a candidate that may warrant listing but was given a priority of 11 in June 2002 (USFWS 2002a). On October 24, 2013, the USFWS proposed the Dakota skipper as a threatened species (USFWS 2013a). The USFWS also proposed a special rule under Section 4(d) of the ESA that outlines the prohibitions necessary and advisable for the conservation of the Dakota skipper, if it is listed as a threatened species. On October 24, 2014, the USFWS listed the Dakota skipper as a threatened species (USFWS 2014a). The ESA requires that critical habitat be designated to the maximum extent prudent and determinable for species determined to be endangered or threatened species. Therefore, the USFWS has proposed the designation of critical habitat for the Dakota skipper (USFWS 2013b).

The Dakota skipper is a State-listed endangered species in Minnesota, State-listed endangered species in Iowa, and a sensitive species (State rank S2 – imperiled) in South Dakota. The most significant remaining populations of Dakota skipper occur in western Minnesota, northeastern South Dakota, north-central North Dakota, and southern Manitoba. Within the UGP Region, it is known from 16 counties in North Dakota, 14 counties in Minnesota, 12 counties in South Dakota, and one county in Iowa (table A-1; figure A-5). It has been observed in Brookings County, South Dakota (confirmed records by Northern Prairie Wildlife Research Center).

The Dakota skipper is described as a small to medium-sized butterfly with a wingspan of 1–1.4 in (2.4–3.2 cm). The dorsal surfaces of adult male wings vary in color from tawny-orange to brown, with a prominent mark on the forewing. The ventral surface is dusty yellow-orange (BCI 2010). Dakota skippers are found in high-quality native prairie containing a high diversity of wildflowers and grasses. Habitat includes two prairie types: low (wet) prairie dominated by little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), wood lily (*Lilium philadelphicum*), and camas (*Camassia* sp.); and upland (dry) prairie dominated by both bluestems, needlegrass (*Stipa* sp.), purple coneflowers (*Echinacea purpurea*), and common blanketflower (*Gaillardia aristata*) (USFWS 2002a). It can also occur in moderately grazed pastures in upland prairie (NatureServe 2013).

Adult Dakota skippers are usually seen in June and July, and larvae may be found throughout the year. They hibernate as fourth or fifth instar larvae just below the soil surface near the base of food plants (NatureServe 2013). Dakota skipper larvae feed on a variety of native prairie grasses, particularly little bluestem. Documented adult nectar plants include purple coneflower, white prairie clover (*Dalea candida*), fleabanes (*Erigeron* sp.), blanketflowers (*Gaillardia* sp.), black-eyed Susans (*Rudbeckia* sp.), and evening primrose (yellow sundrops, *Calylophus serrulatus*). Based on field observation data from South Dakota sites, the Dakota skipper seems to show a preference for purple coneflowers (USFWS 2009b).

Because grasslands and native prairie habitat are limited in many portions of its historic range, the Dakota skipper is found in widely disjunct populations. Given the conversion of grasslands to row crops, overgrazing, and the influence of non-native species on native grassland forb and grass composition, isolated Dakota skipper populations are likely to decline in the coming years unless habitat conservation plans are developed and implemented to maintain a diversity of adult nectar plants and larval food plants.

Survey data for Dakota skippers suggests that they are difficult to detect at known sites in subsequent years. In South Dakota, some sites had few or no observations for one or more years and then several observations three or four years later (USFWS 2009b). Any sites with recent observations of skippers (e.g., the last 10–15 yr) should be considered viable sites if native vegetation has persisted during this time or managed burns have created new grassland habitat that supports purple coneflowers and other forbs used by adults. The best available information, based primarily on the expert opinions of biologists and researchers, suggests that the Dakota skipper may disperse more than 0.6 mi (1km) from occupied habitat and that protection of these areas are important to the conservation of the species (Delphey 2014).

Any activities that disturb native prairie communities from June through August would adversely affect the Dakota skipper. Conversion of grasslands to row crops, grazing, early summer or mid-summer haying, hog farms, controlled burning, wildfires, succession, habitat fragmentation, and invasive species also threatened remnant and isolated subpopulations of the Dakota skipper. Invasive non-native species such as smooth brome, Kentucky bluegrass, Canada thistle, and leafy spurge are the principal threats to Dakota skippers at known sites in South Dakota. Once these plants invade a site, they often become dominant and replace or reduce the coverage of native forbs and grasses used by Dakota skipper adults and larvae, respectively (USFWS 2009b). Excessive prescribed burning and wildfire have recently contributed to the decline of the species. To avoid adverse effects on populations, burns must be rotated among units within a management area to avoid killing a disproportionate number of larvae, and fire return intervals must allow populations to rebuild between fires. Herbicide use may kill nectar plants used by skippers (NatureServe 2013). Summer hayfield mowing in July eliminates nectar plants (USFWS 2009b).

#### 5.2.2.1 Direct and Indirect Effects of the Action

Direct impacts on Dakota skippers may include mortality of eggs, larvae, and pupae via ground/vegetation disturbance or application of pesticides. Adult skippers may experience collision mortality (more likely vehicular than turbine) because they typically fly just above the top of vegetation, resembling a “skipping” pattern. Indirect effects would occur if land management between turbines and around other wind farm facilities eliminated native forbs and grasses or introduced non-native plants. In addition, access roads may destroy some native plants used by Dakota skippers, as would the construction of wind turbines, substations, or transmission lines, resulting in habitat losses and increased fragmentation of the prairie on which this species depends. Proper planning and use of BMPs should allow developers to minimize these effects during construction. Offsetting measures to protect, enhance, and restore Dakota skipper habitat offsite are necessary to compensate for losses and assist in this species' recovery.

#### 5.2.2.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Climate change effects may alter the makeup of native plant species in the UGP Region (see discussion of potential climate change presented earlier). Oil and gas development coupled with wind energy facilities and conversion of native grasslands to agricultural use for row crops, hay production, and overgrazing will together have cumulative adverse effects on Dakota skipper survival in localized areas, especially where isolated remnant populations of skippers exist. Conversion of land to wind farm development will add to cumulative impacts from the sources mentioned above. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Dakota skipper within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.2.2.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

Protection of native grasses is a key factor in the continued survival of Dakota skippers. General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Dakota skipper. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the Dakota skipper has been recorded (table A-1; figure A-5). Acquisition of suitable native prairie habitat easements can further promote the conservation of the species under Section 7(a)(1) of the ESA. Wind energy developers should contact the local USFWS Ecological Services Office and State land management or fish and game agencies to determine where current Dakota skippers are known to occur near proposed wind energy facilities. Surveys to document the existence of skippers at the project site may be the outcome of discussions with appropriate agency staff.

If it is determined through preconstruction evaluations and/or surveys that the Dakota skipper or its habitat occurs in the project area, species-specific avoidance measures specifically intended to reduce the potential for adverse effects on Dakota skipper would be required (as summarized in table 5-1):

- Do not site turbines, access roads, transmission line towers or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat.

- Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6-mi (1-km) buffer zone.

Two additional minimization measures specifically intended to reduce the potential for adverse effects to Dakota skippers would also be required. For projects that encompass suitable, but unoccupied, habitat farther than 0.6 mi (1 km) from occupied habitat, the following measures would be required:

- Obtain a grassland easement of native prairie, equal to the amount disturbed, that contains obligate plant species to minimize additional loss of suitable habitat or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.

- Avoid broadcast applications of pesticides or herbicides that may be harmful to Dakota skippers or their nectar plants in Dakota skipper habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

#### 5.2.2.4 Effects Determination

Based on the current information on the status of the Dakota skipper in the UGP Region, it is likely that habitat could be affected by new wind energy facilities and associated transmission lines. With the implementation of the conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect,** the Dakota skipper. Proposed critical habitat for the Dakota skipper will be avoided and therefore, it is also determined that implementation of the proposed action will have **no effect on proposed critical habitat** for the Dakota skipper.

### 5.2.3 Higgins Eye

Higgins eye (*Lampsilis higginsii*) was first listed as an endangered species on June 14, 1976 (USFWS 1976a). It is a large river species of pearlymussel that occupies stable sand to boulder substrates; it does not occur in firmly packed clay, flocculent silt, organic material, bedrock, concrete, or unstable sand (USFWS 2004a). Within the UGP Region, the Higgins eye is State-listed as endangered in Minnesota and Iowa and listed as a State sensitive species (State rank S1 – critically imperiled) in South Dakota. Historical records indicate the species was once present in the main stem of the Mississippi River from just north of St. Louis, Missouri, to just south of St. Paul, Minnesota; in the Sangamon and Rock Rivers in Illinois; in the Cedar and Wapsipinicon Rivers in Iowa; in the Wisconsin and St. Croix Rivers in Wisconsin; and in the Minnesota River in Minnesota. The current distribution of the mussel in the UGP Region has been reduced to a single county (Yankton) in South Dakota (USFWS 2004a). A fresh dead shell of a Higgins eye pearlymussel was found below Gavins Point Dam on October 27, 2004 (USFWS 2011b). No live pearlymussels have been found in this stretch of the Missouri River. According to recent USFWS field office county-level lists, the Higgins eye is currently known from Des Moines County, Iowa, and Yankton County, South Dakota (table A-1; figure A-6).

Dam construction on the Missouri and Mississippi Rivers has eliminated a large amount of habitat for the Higgins eye and other threatened or endangered mussels. Invasive zebra mussels occurring at high densities harm native mussels and entire beds by competing for food, preventing opening/closing of shells, degrading habitat conditions, and preventing successful reproduction and recruitment (USACE 2007). Although invasive zebra mussels are currently the most important threat to the Higgins eye, construction activities and environmental contaminants may also pose significant threats to water quality, causing further impacts on the species (USFWS 2004a).

#### 5.2.3.1 Direct and Indirect Effects of the Action

Wind energy development in the UGP Region is unlikely to have any direct effects on the Higgins eye pearlymussel, and no indirect effects are likely with BMPs used to decrease erosion that would enter the Missouri River below the Gavins Point Dam, the only habitat where the species could still exist. Whether the species occurs at this location is uncertain, since the last specimen was a shell of a dead mussel collected in 2004. Since that time, no live pearlymussels have been found in this stretch of the river. It is unlikely that construction associated with new wind energy facilities would occur adjacent to the Missouri River or that it could adversely affect potential Higgins eye habitat.

#### 5.2.3.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The Higgins eye has been affected by loss of habitat caused by dam construction. In addition, erosion has increased sediment load in streams and rivers throughout its geographic range. Agricultural chemicals and other pollutants have degraded water quality, further affecting the species. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Higgins eye within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.2.3.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

There currently is no recent evidence that the Higgins eye exists in the Missouri River system. In the event that subsequent monitoring by the U.S. Army Corps of Engineers (USACE) documents presence of the species, wind energy developers will meet with the USFWS's South Dakota Ecological Services staff and USACE staff to determine what, if any, avoidance or minimization is necessary. General conservation measures provided in table 4.5-1 may be implemented to reduce or eliminate impacts of wind energy development in the UGP Region on the Higgins eye, particularly those measures that pertain to the protection of aquatic resources.

If it is determined through preconstruction evaluations with the USACE or the USFWS that the Higgins eye or its habitat occurs in the project area, the following species-specific avoidance measure would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where Higgins eye mussels may be present.

#### 5.2.3.4 Effects Determination

The proposed wind energy program will have **no effect** on the Higgins eye.

### 5.2.4 Poweshiek Skipperling

The Poweshiek skipperling (*Oarisma poweshiek*) is a small, slender-bodied butterfly that was considered for Federal candidate species status, with a Listing Priority Number (LPN) of 2, on October 26, 2011 (USFWS 2011c). On October 24, 2013, the USFWS proposed the Poweshiek skipperling as an endangered species (USFWS 2013a) and proposed the designation critical habitat under the ESA (USFWS 2013b). On October 24, 2014, the USFWS listed the Poweshiek skipperling as an endangered species (USFWS 2014a). The distribution of the Poweshiek skipperling ranges from southern Manitoba, Canada, and eastern North and South Dakota, east to Indiana and Michigan, including Minnesota and Wisconsin, and south to Illinois and Iowa (Selby 2005). It is presumably extirpated from Illinois and Indiana (USFWS 2011c). Within the UGP Region, it is known from two counties in Iowa, 13 counties in Minnesota, one county in North Dakota, and nine counties in South Dakota (table A-1; figure A-5). The species is listed as threatened by the State of Iowa and endangered by the State of Minnesota. It is not listed by the States of North Dakota or South Dakota.

The Poweshiek skipperling inhabits high-quality native tallgrass prairies, as well as prairie fens, grassy lakes, stream margins, moist meadows, and grasslands. Preferred nectar plants vary across the range of the species and include yellow ox-eye (*Heliopsis helianthoides*), purple coneflower (*Echinacea angustifolia*), tickseed (*Coreopsis palmata*), black-eyed susan (*Rudbeckia hirta*), and pale-spike lobelia (*Lobelia spicata*) (Selby 2005).

The Poweshiek skipperling has a wingspan ranging from 1 to 1.2 in. (2.3 to 3.0 cm) in length. The upper wing surface is dark brown with a band of orange along the leading edge of the forewing. This species is univoltine (having a single flight per year), with an adult flight from the middle of June through the end of July. Females emerge slightly later than males. In Iowa and Minnesota, their emergence appears to be closely synchronous with the Dakota skipper. This species does not migrate and has very poor dispersal capability (Selby 2005).

As reported in Selby (2005), the availability of larval food plants is likely a factor of major importance to the conservation of Poweshiek skipperling populations. Until recently, the larval food species was presumed to be elliptic spikerush (*Eleocharis elliptica*) or sedges, but this was based on limited observations, mostly from the Michigan populations. More recent observations have shown that for some populations the preferred larval food plant is prairie dropseed; larval feeding has also been observed on little bluestem (*Schizachyrium scoparium*) and sideoats grama (*Bouteloua curtipendula*).

The Poweshiek skipperling is threatened by the degradation of its native prairie habitat by overgrazing, invasive species, gravel mining, and herbicide applications. It is also threatened by inbreeding, population isolation, and prescribed fires, as well as prairie succession to shrubland or forest habitats (USFWS 2011c).

Local extinctions of Poweshiek skipperling on isolated habitat fragments are likely permanent unless one or more populations within 0.6–1.24 mi (1–2 km) are large enough to produce enough immigrants to reestablish populations, or if the capability to artificially rear the species is developed (Selby 2005). The best available information, based primarily on the expert opinions of biologists and other researchers, suggests that the Poweshiek skipperling may disperse more than 0.6 mi (1 km) from occupied habitat and that protection of these areas are important to the conservation of the species (Delphey 2014). Human fragmentation of tallgrass prairie began in about 1830 and approximately 99 percent of the original prairie is now gone across the species' range (Samson and Knopf 1994). This has generally left Poweshiek skipperling populations scattered among fragments of this once vast ecosystem.

An aggressive survey program in Iowa, Minnesota, and South Dakota during the 1990s and early 2000s dramatically increased the number of sites from which the Poweshiek skipperling was known. At those sites where regular surveys were conducted, the populations appeared to be fairly secure. Even in North Dakota, where the skipperling was assumed to be on the verge of extinction, and in Michigan, where the only known populations had disappeared by 1969, surveys of new areas led to the discovery of new populations. These populations are, however, prone to dramatic fluctuations that place small, isolated populations at risk. Recently, a dramatic population crash appears to have occurred across a large portion of the skipperling's range, including what had been considered some of the healthiest populations. If this crash is as widespread as it appears and if there is not a significant recovery, then the Poweshiek may be at risk throughout its range. A comprehensive assessment of a representative set of populations throughout the Poweshiek's range needs to be done over the next couple years to clearly establish the status of the species (Selby 2005).

#### 5.2.4.1 Direct and Indirect Effects of the Action

Direct impacts on the Poweshiek skipperling may include mortality of eggs, larvae, and pupae via ground/vegetation disturbance or application of pesticides. Adult skipperlings may experience collision mortality with vehicles or turbines. Indirect effects would occur if land management between turbines and around other wind farm facilities eliminated native forbs and grasses or introduced non-native plants. In addition, access roads may destroy some native plants used by the species, as would the construction of wind turbines, substations, or transmission lines, resulting in habitat losses and increased fragmentation of the prairie on which this species depends. Proper planning and use of BMPs should allow developers to minimize these effects during construction. Offsetting measures to protect, enhance, and restore Poweshiek skipperling habitat offsite are necessary to compensate for losses and assist in precluding the Federal listing of this species.

#### 5.2.4.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Climate change effects may alter the makeup of native plant species in the UGP Region (see discussion of potential climate change presented earlier). Oil and gas development coupled with wind energy facilities and conversion of native grasslands to agricultural use for row crops, hay production, and overgrazing will together have cumulative adverse effects on Poweshiek skipperling survival in localized areas, especially where isolated remnant populations of skipperlings exist. Conversion of land to wind farm development will add to cumulative impacts from sources mentioned above. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Poweshiek skipperling within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.2.4.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

Protection of native grasses is a key factor in the continued survival of the Poweshiek skipperling. General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Poweshiek skipperling. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the Poweshiek skipperling has been recorded (table A-1; figure A-5). Acquisition of suitable native prairie habitat easements can further promote the conservation of the species under Section 7(a)(1) of the ESA. Wind energy developers should contact the local USFWS Ecological Services Office and State land management or fish and game agencies to determine where the skipperling is known to occur near proposed wind energy facilities. Surveys to document the existence of the skipperling at the project site may be the outcome of discussions with appropriate agency staff.

If it is determined through preconstruction evaluations and/or surveys that the Poweshiek skipperling or its habitat occurs in the project area, species-specific avoidance measures specifically intended to reduce the potential for adverse effects on the Poweshiek skipperling would be required (as summarized in table 5-1):

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat.

- Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6-mi (1-km) buffer zone.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on the Poweshiek skipperling would also be required. For projects that encompass suitable, but unoccupied habitat farther than 0.6 mi (1 km) from occupied habitat, the following measures would be required:

- Obtain a grassland easement of native prairie, equal to the amount disturbed that contains obligate plant species to minimize additional loss of suitable habitat or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.

- Avoid broadcast applications of pesticides or herbicides that may be harmful to the Poweshiek skipperling or its nectar plants in Poweshiek skipperling habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

#### 5.2.4.4 Effects Determination

Based on the current information on the status of the Poweshiek skipperling in the UGP Region, it is likely that habitat could be affected by new wind energy facilities and associated transmission lines. With the implementation of the conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect,** the Poweshiek skipperling. Proposed critical habitat for the Poweshiek skipperling will be avoided; therefore it is also determined that implementation of the proposed action will have **no effect on proposed critical habitat** for the Poweshiek skipperling.

### 5.2.5 Salt Creek Tiger Beetle

The Salt Creek tiger beetle (*Cicindela nevadica lincolniana*) was federally listed as endangered on October 6, 2005 (USFWS 2005a). It is endemic to the State of Nebraska, where it is also State listed as endangered. On April 6, 2010, critical habitat was designated on approximately 1,933 ac (782 ha) located in Lancaster and Saunders Counties, Nebraska (USFWS 2010f; table A-1; figure A-4). Within the UGP Region, it is known from eastern Nebraska saline wetlands and associated streams and tributaries of Salt Creek in the northern third of Lancaster County. The insect may have disappeared from the southern margin of Saunders County. The four areas designated as critical habitat include (1) Upper Little Salt Creek North in Lancaster County; (2) Little Salt Creek – Arbor Lake in Lancaster County; (3) Little Salt Creek – Roper in Lancaster County; and (4) Rock Creek – Jack Sinn Wildlife Management Area in Lancaster and Saunders Counties. Saline wetland and stream complexes found along Little Salt Creek and Rock Creek comprise the critical habitat designation.

The Salt Creek tiger beetle is an active, ground-dwelling, predatory insect that is metallic brown to dark olive green above with a metallic dark green underside. This insect measures about 0.5 in. (1.3 cm) in total length. It is distinguished from other tiger beetles by its distinctive form and the color pattern on its dorsal and ventral surfaces (USFWS 2010g). Tiger beetle larvae live in permanent burrows. They have a 2-yr life cycle, spending 11 months of the year underground and coming to the surface from about mid-June through July.

The Salt Creek tiger beetle has very specific habitat requirements and occurs in saline wetlands, on exposed saline mud flats or along mud banks of streams and seeps that contain salt deposits and are sparsely vegetated. Adults are found in moist, muddy areas within just a few yards of wetland and stream edges. Salt Creek tiger beetles require open, barren salt flat areas for construction of larval burrows, thermoregulation, foraging, and dispersal corridors. They have adapted to brief periods of high water inundation and highly saline conditions but are known to be eliminated during long flooding events that carry sediment resulting in filling of tiger beetle burrows. They feed on passing invertebrates from the burrow entrance (USFWS 2010g).

Only three small populations of this subspecies remain, and the known adult population size in 2005 was only 153 individuals (USFWS 2010g).

The Salt Creek tiger beetle is threatened by prolonged flooding, habitat loss from siltation, and habitat loss from invasion of *Typha angustifolia* (cattail) and *Phalaris arundinacea* (reed canary grass), which create a herbaceous cover on barren beach areas. Changes in salinity from flooding may also reduce habitat.

#### 5.2.5.1 Direct and Indirect Effects of the Action

Death of tiger beetles could occur in the unlikely event that wind energy facility construction causes flooding and sediment transport that inundates burrows along the Salt Creek and Rock Creek in Lancaster County, Nebraska.

#### 5.2.5.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Because of the very restricted distribution of the Salt Creek tiger beetle, other activities adjacent to critical habitat may have greater effects on the species than proposed wind energy facilities in the area. Land use changes within the Salt Creek and Rock Creek watersheds have affected periodicity of high water events and sedimentation in tiger beetle habitat. Changes in soil salinity affect the ability of Salt Creek tiger beetles to lay eggs and causes a breakdown in habitat partitioning with other tiger beetles using similar habitat, increasing competition between similar tiger beetle subspecies using similar substrates (USFWS 2005a).

#### 5.2.5.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

It is unlikely that wind energy facilities will be developed in Lancaster County, Nebraska where the Salt Creek tiger beetles occur. General BMPs provided in table 4.5-1 may be implemented to reduce or eliminate impacts of wind energy development in the UGP Region on the Salt Creek tiger beetle – particularly those measures that pertain to the protection of aquatic resources. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the Salt Creek tiger beetle has been recorded (table A-1; figure A-4).

If it is determined through preconstruction evaluations and/or surveys that the Salt Creek tiger beetle, its critical habitat, or suitable habitat occurs in the project area, species-specific avoidance measures would be required (as summarized in table 5-1):

- Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of occupied saline wetland and stream complexes.

- Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of designated critical habitat.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on Salt Creek tiger beetles would also be required. These additional minimization measures include the following:

- Avoid changing existing surface water flows that would alter existing saline wetland habitat in the Salt Creek and Rock Creek watersheds.

- Avoid using herbicides or pesticides within occupied habitat within the current range of the Salt Creek tiger beetle within the State. Contact the local USFWS Ecological Services Field Office to determine whether activities in the project area are within Salt Creek tiger beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

#### 5.2.5.4 Effects Determination

The likelihood of wind energy facilities being located near known Salt Creek tiger beetle populations is low. The known distribution is restricted to Lancaster County, Nebraska, and is located in saline wetlands and tributaries that would be unsuitable for siting wind energy facilities, particularly since these wetlands are protected by the critical habitat designation. The proposed action **may affect but is not likely to adversely affect** the Salt Creek tiger beetle. Critical habitat for the Salt Creek tiger beetle will be avoided; therefore it is also determined that implementation of the proposed action will have **no effect on proposed critical habitat** for the Salt Creek tiger beetle.

### 5.2.6 Scaleshell Mussel

The scaleshell mussel (*Leptodea leptodon*) was listed as federally endangered on October 9, 2001 (USFWS 2001). Within the UGP Region it is State-listed as sensitive (S1) in South Dakota, and State-listed as endangered in Nebraska. It occurs in medium to large rivers with low to medium gradients, where it is found in stable riffles and runs with gravel or mud substrate and moderate current velocity. The scaleshell requires good water quality, and can be found in diverse mussel beds with mixed species compositions. As a unique species characteristic, the scaleshell must complete a parasitic phase on freshwater drum (*Aplodinotus grunniens*) to complete its life cycle. This, coupled with the extreme rarity of the species, hinders its ability to reproduce (USFWS 2004b).

The scaleshell historically occurred in 55 rivers within the Mississippi River Drainage, which included 12 States (USFWS 2001): Alabama, Arkansas, Illinois, Indiana, Iowa, Kentucky, Missouri, Ohio, Oklahoma, South Dakota, Tennessee, and Wisconsin. Historical records also exist in Minnesota. The current distribution of the mussel in the UGP Region has been reduced to two counties in South Dakota, based on surveys in 1982 and 1983 (USFWS 2004b) (table A-1; figure A-6). Subsequent surveys conducted below Gavins Point Dam where the fresh live shells of scaleshell were originally found have not discovered additional shells or live scaleshells.

Although zebra mussels are a threat to the scaleshell mussel, construction activities and environmental contaminants (such as those from agricultural runoff) may pose a more significant threat to water quality, which would degrade mussel habitat (USFWS 2004b). Human barriers to reproduction, as well as drought conditions, also affect the survival success of the scaleshell.

#### 5.2.6.1 Direct and Indirect Effects of the Action

Wind energy development in the UGP Region will not have any direct effects on the scaleshell. Indirect effects are not expected because wind energy development would not occur adjacent to the Missouri River below Gavins Point Dam, where scaleshells might occur based on surveys conducted in the early 1980s.

#### 5.2.6.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The scaleshell has been affected by loss of habitat caused by dam construction. In addition, erosion has increased sediment load in streams and rivers throughout its geographic range. Agricultural chemicals and other pollutants have degraded water quality, further affecting the species. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the scaleshell mussel within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.2.6.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

There currently is no recent evidence that the scaleshell exists in the Missouri River system. In the event subsequent monitoring by the USACE documents presence of the species, wind energy developers should meet with the USFWS's South Dakota Ecological Services staff and USACE to determine what, if any, minimization is necessary. Implementation of the appropriate general BMPs provided in table 4.5-1 would reduce or eliminate impacts of wind energy development in the UGP Region on the scaleshell mussel – particularly those measures that pertain to the protection of aquatic resources.

If it is determined through preconstruction evaluations with the USACE or the USFWS that the scaleshell mussel or its habitat occurs in the project area, the following species-specific avoidance measure would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where scaleshell mussels may be present.

#### 5.2.6.4 Effects Determination

The proposed wind energy program will have **no effect** on the scaleshell mussel.

## 5.3 FISH

### 5.3.1 Bull Trout

The bull trout (*Salvelinus confluentus*) was listed as a threatened species under the ESA on June 10, 1998 (USFWS 1998a); critical habitat for this species was designated on September 26, 2005 (USFWS 2005b). Bull trout exhibit two forms: resident and migratory. Resident bull trout range up to 10 in. (25 cm) long and migratory forms may range up to 35 in. (89 cm) long and weigh up to 32 lb (15 kg). The bull trout is native to major river drainages in the Pacific Northwest United States and western Canada. The global range of this fish species includes the States of Idaho, northwestern Montana, northeast Nevada, eastern Oregon, Washington, British Columbia, Canada, and southeast Alaska (USFWS 1998a). Designated critical habitat for this species is currently located in the States of Idaho, Montana, Oregon, and Washington. The designated critical habitat includes approximately 4,813 mi (7,700 km) of stream habitats (including marine shoreline) and 143,218 ac (57,958 ha) of lake habitats. On January 14, 2010, the USFWS proposed to revise the designation of critical habitat to approximately 22,679 mi (36,286 km) of stream habitats and 533,426 ac (215,870 ha) of lake habitats within the States of Idaho, Montana, Oregon, and Washington (USFWS 2010h).

Resident bull trout spend their entire lives in the same stream. Migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish. Resident bull trout complete their entire life cycle in the tributary streams in which they spawn and rear. Migratory bull trout spawn in tributary streams where juvenile fish rear from 1 to 4 yr before migrating to a lake, river, or saltwater, where maturity is reached in one of the three habitats. Bull trout distribution and abundance is based on water temperature, cover, channel form and stability, valley form, spawning and rearing substrates, and migratory corridors. Bull trout typically spawn from August to November during periods of decreasing water temperatures (NatureServe 2013; USFWS 1998a).

Within the UGP Region, the bull trout is known from four counties in western Montana (table A-1; figure A-7). The species is listed as threatened by the State of Montana. Within this area in the UGP Region, approximately 37 mi (59 km) of streams and 4,107 ac (1,662 ha) of lakes within the Saint Mary-Belly River Basins are designated critical habitat in Glacier County, Montana (figure A-7).

The primary threat to the bull trout population is hybridization due to isolated or remnant resident populations that overlap with introduced brook trout that have similar spawning times and conditions (NatureServe 2013). Bull trout are also threatened by activities that damage riparian areas and cause stream siltation; logging, road construction, mining, and overgrazing may be harmful to spawning habitat. Timber harvest and associated activities may have negative impacts on stream channels through sedimentation and/or increasing flooding or scour events (NatureServe 2013).

#### 5.3.1.1 Direct and Indirect Effects of the Action

The decline in the bull trout population is primarily attributable to hybridization with introduced salmonid species. However, the species is also threatened by activities that degrade stream habitat function and quality, such as sedimentation, water pollution, and channelization. Wind energy projects have the potential to alter nearby aquatic habitats through direct consumptive use of water for cleaning; erosion and runoff during project development, operation, and decommissioning that could allow sediments and pollutants to enter aquatic habitats; and the installation of crossing structures to connect transmission that may modify physical aspects of the aquatic habitat (i.e., flow). However, wind energy development throughout the majority of the UGP Region is unlikely to occur in areas that could support bull trout populations, and the implementation of BMPs and avoidance and minimization measures (see below) would eliminate the impacts on potentially suitable habitats on Federal lands in the UGP Region. In consultation with the USFWS, predisturbance surveys in areas that could support bull trout populations, as well as measures to control erosion and sedimentation and to minimize stream crossing configurations, would further eliminate impacts.

#### 5.3.1.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The habitats containing bull trout populations in the UGP Region are adjacent to areas currently experiencing various non-Federal land use practices (e.g., agricultural, commercial, and urban developments). These activities have already affected historically suitable habitats for the bull trout. As described in Section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is a potential for this level of non-Federal wind energy development to affect the bull trout within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.3.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the bull trout. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the bull trout has been recorded (table A-1; figure A-7). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of bull trout and to evaluate the position of the project footprint relative to known populations. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the bull trout occupies streams or lakes in the project area, or its designated critical habitat occurs in the project area, the following species-specific avoidance measures would be required (as summarized in table 5-1):

- Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of occupied aquatic habitat.

- Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of critical habitat.

- Do not cross occupied streams, lakes, or designated critical habitat for any activities associated with siting, construction, operation, maintenance procedures and decommissioning for wind power developments.

- No sediment can enter occupied streams, lakes or designated habitat from any activities associated with siting, construction, operation, maintenance procedures and decommissioning for wind power developments.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on bull trout would also be required. These additional minimization measures include (by impacting factor) the following:

***Habitat Disturbance***

- Avoid using herbicides or pesticides within 300 ft (91.4 m) of the OHW mark of occupied aquatic habitat or designated critical habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

- Avoid actions that would alter surface water flow in occupied habitat.

***Erosion, Sedimentation, and Runoff***

- Employ BMPs (additional and project-specific) during and after construction to control erosion and runoff to aquatic habitats, designated core areas, spawning or rearing habitat, and migratory corridors.

#### 5.3.1.4 Effects Determination

It is unlikely that any wind energy facilities would be placed in riparian habitat or waterways that support bull trout. Proper planning by developers in conjunction with the USFWS and State agencies will further reduce the likelihood of adverse impacts. With the implementation of BMPs and conservation measures listed above (summarized in table 5-1) and in table 4.5-1, the proposed wind energy program **may affect, but is not likely to adversely affect** the Bull trout and will have **no effect** on bull trout designated critical habitat.

### 5.3.2 Pallid Sturgeon

The pallid sturgeon (*Scaphirhynchus albus*) was listed as an endangered species by the USFWS on September 6, 1990 (USFWS 1990a). Critical habit for this species currently has not been designated. The pallid sturgeon evolved in the turbid river systems of the Missouri, Yellowstone, and Mississippi river systems (USFWS 1993a). It is one of the largest fishes found in these drainages, with specimens weighing up to 86 lb (39 kg). The pallid sturgeon is described as having a flattened, shovel-shaped snout and a long, slender, and completely armored caudal peduncle, and lacking a spiracle (USFWS 1993a). The principle features of the pallid sturgeon are the absence of bony plates on the belly, 24 or more anal fin rays, 37 or more dorsal fin rays, and inner barbells under the snout. The global range of this fish species includes the States of Arkansas, Illinois, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Montana, Nebraska, North Dakota, South Dakota and Tennessee (NatureServe 2013; USFWS 1993a).

Pallid sturgeons require a free-flowing riverine habitat that is typical of historical conditions in the Missouri River. They prefer rocky or sandy substrate in turbid water ranging from 3 to 26 ft (1 to 8 m) in depth. Little is known about reproductive ecology of pallid sturgeon, although they are believed to spawn in swift water over gravel, cobble, or other hard surfaces. Females do not spawn until they are 15 to 20 years old; males reproduce at a much younger age (NatureServe 2013; USFWS 1993a).

Within the UGP Region , the pallid sturgeon is known from six counties in Iowa, 11 counties in North Dakota, 15 counties in Montana, 18 counties in South Dakota, and 19 counties in Nebraska (table A-1; figure A-7). The species is listed as endangered by the States of Iowa, Montana, Nebraska, and South Dakota and is a level II Species of Conservation Priority in North Dakota.

Primary threats to the existence of the pallid sturgeon are a result of damming, channelizing, and diking of the river systems. These activities have caused the destruction or inundation of spawning and rearing habitats; restricted migration within river reaches; disrupted natural flow and temperature regimes; and lowered the turbidity preferred by the pallid sturgeon. Any action that impairs the quality of suitable aquatic habitat would adversely affect the pallid sturgeon. Other contributions that are influencing the population of the species include modification of habitats, apparent lack of natural reproduction, commercial harvest, and hybridization in parts of its range (NatureServe 2013; USFWS 1993a).

#### 5.3.2.1 Direct and Indirect Effects of the Action

The decline in the pallid sturgeon population is primarily attributable to activities that have degraded riverine habitat function and quality, such as sedimentation, water pollution, and channelization. Wind energy projects have the potential to alter nearby aquatic habitats through direct consumptive use of water for cleaning or cooling; erosion and runoff during project development, operation, and decommissioning that could allow sediments and pollutants to enter aquatic habitats; and the installation of crossing structures to connect transmission, which may modify physical aspects of the aquatic habitat (i.e., flow). However, the implementation of BMPs and minimization measures would eliminate impacts of wind energy developments on suitable habitat for this species. In consultation with the USFWS, predisturbance surveys in areas that could support pallid sturgeon populations, measures to control erosion and sedimentation, and measures to minimize stream crossing configurations would further eliminate impacts.

#### 5.3.2.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The habitats containing pallid sturgeon populations in the UGP Region are adjacent to areas currently experiencing various non-Federal land use practices (e.g., agricultural, commercial, and urban developments). These activities have already affected historically suitable habitats for the pallid sturgeon. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the pallid sturgeon within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.3.2.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the pallid sturgeon. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the UFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the pallid sturgeon has been recorded (table A-1; figure A-7). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of pallid sturgeon and to evaluate the position of the project footprint relative to known populations. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the pallid sturgeon or its habitat occurs in the project area, the following species-specific avoidance measure would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in or immediately adjacent to aquatic habitat where the pallid sturgeon occurs.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects to pallid sturgeon would also be required. These additional minimization measures include (by impacting factor) the following:

***Habitat Disturbance***

Prior to making decisions, wind farm developers will take the following measures to avoid potential impacts to the pallid sturgeon:

- Avoid broadcast applications of pesticides or herbicides that may be harmful to the pallid sturgeon in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.;

- Employ measures to minimize the amount of stream habitat disturbance when transmission lines and access roads must be constructed across streams;

- Ensure that upstream and downstream fish passage is maintained in any areas where stream habitat disturbance occurs; and

- Avoid actions that would alter surface water flow in occupied habitat.

***Erosion, Sedimentation, and Runoff***

- Employ BMPs (additional and project-specific) during and after construction to control erosion and runoff to aquatic habitats.

#### 5.3.2.4 Effects Determination

It is highly unlikely that any wind energy facilities would be placed in riparian habitat or streams that support pallid sturgeon. Proper planning by developers in conjunction with the USFWS and State agencies will further reduce the likelihood of adverse impacts. With the implementation of BMPs and required conservation measures listed above (summarized in table 5-1) and in table 4.5-1, the proposed wind energy program will have **no effect** on the pallid sturgeon.

### 5.3.3 Topeka Shiner

The Topeka shiner (*Notropis topeka*) was listed as an endangered species under the ESA on December 15, 1998 (USFWS 1998b). Critical habitat for this species was designated on July 27, 2004 (USFWS 2004c). The small, silvery minnow (usually less than 3 in. [7.5 cm] in total length) occurs in small prairie, or former prairie, streams in the Missouri River Basin and upper Mississippi River Basin. The current global range of this fish species includes portions of South Dakota, Minnesota, Nebraska, Iowa, Kansas, and Missouri. Within this range, the Topeka shiner exists in pools containing clear, clean water with clean gravel, rock, or sand bottoms. Most streams containing Topeka shiner are perennial, but in small ephemeral streams the shiners will survive in small pools maintained by groundwater seepage. Off-channel habitats such as livestock dugouts and oxbows may also harbor the species. Recent documentation has shown that the shiner can inhabit areas previously considered degraded.

The Topeka shiner swims midwater or near the surface, in schools. The species' diet consists of zooplankton, vegetative material, and small aquatic insects. Sexual maturity is reached in 2 yr, and spawning generally occurs in silt-free gravel from late May to mid-July, into August at times, near sunfish (*Lepomis* spp.) nests. The male shiner, distinguished in summer by their colorful orange fins, will defend territories near these nests (NatureServe 2013).

Within the UGP Region, the Topeka shiner may occur in 28 counties in eastern South Dakota, 16 counties in central Iowa, five counties in southwestern Minnesota, and two counties in Nebraska (Panella 2012) (table A-1; figure A-7). If a known occupied stream crosses into an adjacent county, the species presence is considered possible in that adjacent county, even if it has not been documented there.

The Topeka shiner is listed as threatened by the State of Iowa, a species of concern by the State of Minnesota, and endangered by the State of Nebraska. The species is not listed by the State of South Dakota. Designated critical habitat within the UGP Region occurs within the Boone River, North Raccoon River, and Rock River watersheds in Iowa; Big Sioux/Rock River watershed in Minnesota; and Elkhorn River watershed in Nebraska (USFWS 2004c; figure A-7).

Primary threats to the continued existence of the Topeka shiner include land and water practices that result in long-term degradation of stream habitats by increasing silt and sedimentation, increasing water pollution, and altering the natural hydrology of stream habitats. Such practices include but are not limited to, agricultural cultivation of prairie sod, construction of dams, overgrazing, water withdrawals that lower groundwater levels, drainage of wetlands, residential and commercial development, and channelization of prairie streams. This species is also affected by introduced or non-native predatory fishes (USFWS 1998b; NatureServe 2013).

#### 5.3.3.1 Direct and Indirect Effects of the Action

The decline in the Topeka shiner population is primarily attributable to activities that have degraded or reduced stream habitat. Wind energy projects have the potential to alter nearby aquatic habitats through direct consumptive use of water for cleaning or cooling; erosion and runoff during project development, construction, operation, and decommissioning that could allow sediments and pollutants to enter aquatic habitats; and the installation of crossing structures to connect transmission lines that may modify physical aspects of the aquatic habitat (i.e., flow). The implementation of BMPs and conservation measures (see below) would eliminate long-term impacts of wind energy developments on suitable habitat for this species. In consultation with the USFWS, measures to control erosion and sedimentation and to ensure fish passage would mitigate impacts, but in-stream work has the potential to adversely impact the species. Therefore, avoidance of in-stream activities would avoid direct adverse impacts.

#### 5.3.3.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. The habitats containing Topeka shiner populations in the UGP Region are adjacent to areas currently experiencing various non-Federal land use practices (e.g., agricultural, transportation, utility, commercial, and urban developments). These activities have already affected historically suitable habitats for the Topeka shiner. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Topeka shiner within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.3.3.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Topeka shiner. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the Topeka shiner has been recorded (table A-1; figure A-7). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of Topeka shiner and to evaluate the position of the project footprint relative to known populations. Onsite surveys may be needed to complete such evaluations. Project applicants will contact the appropriate USFWS Ecological Services Field Office to obtain information on the requirements for survey permits.

If it is determined through preconstruction evaluations and/or surveys that the Topeka shiner, its critical habitat, or suitable habitat occurs in the project area, the following species-specific avoidance measures would be required (as summarized in table 5-1):

- If surveys are warranted, obtain a permit from the USFWS to survey for the Topeka shiner within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.

- Do not site turbines, access roads, transmission line towers, or other project facilities in or adjacent to aquatic and riparian habitat where the Topeka shiners occur.

- Do not site turbines, access roads, transmission line towers, or other project facilities in or adjacent to designated critical habitat.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on Topeka shiner would also be required. These additional minimization measures include (by impacting factor) the following.

***Habitat Disturbance***

Prior to making siting decisions for projects in areas where streams containing Topeka shiner population may be present, wind farm developers will take the following measures to avoid potential impacts to the Topeka shiner:

- Avoid broadcast applications of pesticides or herbicides that may be harmful to the Topeka shiner in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent, immobile pesticides.

- Install buried utility lines by directionally boring beneath streams, adjacent wetlands, and floodplains, using comprehensive and effective BMPs to ensure excavated materials do not reach the waterway.

- Access roads that cannot avoid crossing known or potentially occupied Topeka shiner streams must completely span the stream and floodplain with a bridge, with no in-stream work involved.

- Avoid actions that would alter surface water flow of known occupied habitat and potentially occupied habitat.

- Avoid actions that would alter groundwater levels/connections to known or potentially occupied habitat.

- Avoid actions that would alter off-channel habitats (e.g., natural wetlands, dugouts, or oxbows in the floodplain).

***Erosion, Sedimentation, and Runoff***

- Employ comprehensive and effective (additional, project-specific) BMPs during and after construction to prevent erosion and runoff to aquatic habitats.

#### 5.3.3.4 Effects Determination

It is highly unlikely that any wind energy facilities would be placed in riparian habitat or streams that support Topeka shiner. Proper planning by developers in conjunction with USFWS and State agencies will further reduce the likelihood of adverse impacts. With the implementation of the conservation measures listed above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, the proposed wind energy program **may affect, but is not likely to adversely affect** the Topeka shiner. The proposed wind energy program requires avoidance of areas containing designated critical habitat for the Topeka shiner; therefore, there will be **no effect** on designated critical habitat for the Topeka shiner.

## 5.4 REPTILES

### 5.4.1 Eastern Massasauga Rattlesnake

The eastern massasauga (*Sistrurus catenatus catenatus*) was considered for Federal candidate species status on October 25, 1999 (USFWS 1999b). The eastern massasauga is a small snake with a thick body, heart-shaped head, and vertical pupils (USFWS 2010i). The average length of an adult is about 24 in. (60 cm). Adult massasaugas are gray or light brown with large, light-edged chocolate-brown blotches on the back and smaller blotches on the sides. The snake's belly is marbled dark gray or black and there is a narrow, white stripe on its head. Its tail has several dark brown rings and is tipped by gray-yellow horny rattles. Young snakes have the same markings, but are more vividly colored. The global range of this reptile species includes Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, New York, Ohio, Pennsylvania, and Wisconsin (NatureServe 2013; USFWS 1999c).

The eastern massasauga prefers wet prairies, marshes, and low areas along rivers and lakes and uses adjacent uplands during part of the year. Individuals frequently hibernate in the burrows of crayfish or small mammals and hide under logs or tree roots. Massasaugas' diets consist of small rodents, frogs, and other snakes. They hunt by sitting, waiting, feeling vibrations, and sensing heat and odors given off by their prey. They are solitary hibernators and bear live litters of 5 to 19 young in late summer or early fall once a year or every other year, depending on the health of the female (NatureServe 2013; USFWS 2010i).

Within the UGP Region, the eastern massasaugas are found in two counties in Iowa and possibly within six counties in Nebraska (table A-1; figure A-8). This species is listed as endangered in the States of Iowa and Minnesota.

Predicted suitable habitat models for the eastern massasauga rattlesnake exist for the States of Iowa and Nebraska. Although predicted suitable habitat for this species may occur within the UGP Region in these two States, there is no predicted suitable habitat for this species within 25 mi (40 km) of a Western substation (table A-2; figure A-17).

Primary threats to the eastern massasaugas population are mainly caused by human developments that lead to habitat loss and direct mortality of the species. Specific impacts on the eastern massasaugas include loss of both wet and upland habitats, habitat fragmentation caused by development, and the resulting genetic isolation (NatureServe 2013).

#### 5.4.1.1 Direct and Indirect Effects of the Action

Wind energy development in the UGP Region would not likely occur in areas that support eastern massasauga populations. For potential wind energy developments in the State of Iowa, the restricted moist prairie habitats that the species prefers could be easily avoided in planning wind energy facilities. However, there is potential for the species to occur in open grassland or partially forested habitats, which may be adjacent to preferred wet prairie habitats, where wind energy development may occur. In these areas, snakes may be affected by direct mortality from ground-breaking activities associated with construction or by vehicle collisions along access roads. In consultation with the USFWS, predisturbance surveys in areas that could support eastern massasauga populations and avoidance of suitable habitat would reduce impacts on this species.

#### 5.4.1.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various human land use practices have contributed to the loss of suitable wet prairie and upland habitats, which have adversely affected the eastern massasauga rattlesnake. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the massasauga rattlesnake within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.4.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy development are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the eastern massasauga rattlesnake. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the massasauga has been recorded (table A-1; figure A-8). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of massasaugas and their habitat relative to the project area. Onsite surveys may be needed to complete such evaluations. Predisturbance surveys should be conducted for massasaugas by qualified biologists throughout the project area and in areas that may be indirectly affected by project activities in accordance with the *Recommended Standard Survey Protocol for the Eastern Massasauga* (Casper et al. 2001).

If it is determined through preconstruction evaluations and/or surveys that the eastern massasauga or its habitat occurs in the project area, the following species-specific avoidance measure would be required:

- Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects to the eastern massasauga would also be required in areas of occupied habitat or adjacent to occupied habitat. These additional minimization measures include (table 5-1) the following:

- Minimize disturbance (e.g., mowing, burning, excessive foot traffic) in suitable mesic grassland and prairie habitats, especially during the spring months;

- Maintain ecological connectivity between parcels of suitable habitat within project boundaries; and

- Identify and implement strategies to reduce potential for road mortality on access roads (e.g., close roads or limit traffic during migration times, create road diversion structures to detour snakes, or post signs).

#### 5.4.1.4 Effects Determination

As mentioned above, the eastern massasauga occupies a limited range in the UGP Region and no predicted suitable habitat for this species occurs within 25 mi (40 km) of a Western substation. Based on this information, and with the implementation of conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that the proposed action is **may affect, but is not likely to adversely affect,** the eastern massasauga rattlesnake.

## 5.5 BIRDS

### 5.5.1 Greater Sage-Grouse

The greater sage-grouse (*Centrocercus urophasianus*) is a candidate species for listing under the Endangered Species Act. A 12-month review finding concluded that the species warranted Federal listing, but other species had a higher priority for listing (USFWS 2010j). Sage-grouse are native to the sagebrush steppe of western North America and their distribution closely follows that of sagebrush, primarily big sagebrush (*Artemisia tridentata*). The species occurs in 11 western States and in southern Alberta and Saskatchewan in Canada (NDGFD 2005).

The greater sage-grouse is the largest North American grouse species. Adult males vary in length from 26 to 30 in. (66 to 76 cm) and weigh between 4 and 7 lb (2 and 3 kg). Adult females are smaller, ranging in length from 19 to 23 in. (48 to 58 cm) and weighing between 2 and 4 lb (1 and 2 kg). Males and females both have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark green toes (USFWS 2010j).

Greater sage-grouse nesting occurs in the spring. Males gather together on bare areas called leks (also known as strutting ground) where males display during the breeding season. These areas typically consist of bare soil, short-grass steppe, windswept ridges, exposed knolls, and other relatively open areas. Nests are in grass areas near shrubs (mostly big sagebrush, but the birds also use areas with other sagebrush species) (USFWS 2010j). Clutch size is highly variable, ranging from 7 to 10 eggs (SDGFP 2008). The average clutch size is about seven per nest (USFWS 2010j). The nesting period begins in early April. Incubation lasts about 28 days. The young usually stay with the hen until September or October (SDGFP 2008).

Nesting generally occurs 1 to 4 mi (1.6 to 6.4 km) from lek sites, although it may range up to 11 mi (17.7 km) away. Sagebrush at nesting/early brood-rearing habitat is 12 to 32 in. (30.5 to 81.3 cm) above ground with 15 to 25 percent canopy cover. Tall, dense grass combined with tall shrubs at nest sites decreases the likelihood of nest depredation. Sagebrush at late brood-rearing habitat is 12 to 32 in. (30.5 to 81.3 cm) tall with a canopy cover of 10 to 25 percent. Greater sage-grouse nest in big-sagebrush-dominated areas in southwestern North Dakota (Herman-Brunson et al. 2009). Nests are generally under or adjacent to sagebrush. Nest survival was greater in areas where big sagebrush percent cover was greater than 9 percent and grasses were taller than 10 in. (16 cm).

Adult greater sage-grouse feed primarily on sagebrush leaves; however, during early brood-rearing activities female sage-grouse will feed on insects as well. During the first 4–6 weeks post-hatch, chicks will feed on a combination of insects and forbs and then switch to primarily forbs. As the summer continues and vegetation dries, both adults and young will consume mostly sagebrush leaves (SDGFP 2008).

The greater sage-grouse is a Priority 1 level Species of Special Concern in North Dakota (NDGFD 2005) and it is listed as an S2 (imperiled) species in Montana (MNHP 2010). Within the UGP Region the greater sage-grouse is known from 35 counties in Montana and three counties in North Dakota (MNHP 2010; NDGFD 2005) (table A--1; figure A-10). The USFWS South Dakota Field Office lists the species as occurring in three counties in South Dakota (USFWS 2012b), while the South Dakota Game and Fish and Parks Department lists the greater sage-grouse in five counties in the western part of the State (SDGFP 2008).

The Montana Natural Heritage Program database has occurrence records for the greater sage-grouse in the following counties: Beaverhead, Big Horn, Blaine, Carbon, Carter, Chouteau, Custer, Dawson, Deer Lodge, Fallon, Fergus, Gallatin, Garfield, Golden Valley, Hill, Liberty, Madison, McCone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Roosevelt, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Valley, Wheatland, Wibaux, and Yellowstone (MNHP 2010). An estimated 27 million acres of sagebrush habitat exist in Montana but are not of suitable quality or geographically spaced to support sage-grouse populations (MNRCS 2009).

The greater sage-grouse occurs in southwestern North Dakota in an area of about 800 $mi^2$ (2,072 $km^2$) in western Bowman County, western Slope County, and southern Golden Valley County (NDGFD 2005).

Within South Dakota, the vast majority of sage-grouse are found in Harding and Butte counties in the northwestern part of the State, with incidental observations found in the western portions of Perkins and Meade County. Monitoring of a historical lek in Fall River County between Edgemont and the Wyoming border has resulted in only a few birds observed, none of which have been counted since 2006 (and those were not counted on the historical lek) (SDGFP 2008).

Predicted suitable habitat models for the greater sage-grouse exist for the States of Montana, North Dakota, and South Dakota. Approximately 29 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-17).

Threats to the greater sage-grouse include clearing of sagebrush habitat for agriculture, overgrazing, oil and gas development, predation by mammals and birds, roads through sagebrush areas, disease, increased predation by hawks and other birds of prey that use power poles as perches, habitat loss from mining, reduced habitat quality from invasion of weedy species, and increased recreational use (Montana Sage Grouse Work Group 2005; USFWS 2010j).

In order to avoid adverse effects on sage-grouse that would worsen its current status, this programmatic Section 7 consultation will not consider designated Sage Grouse Core or Priority Habitat areas or State-defined connectivity areas for wind-generated power developments. Currently, *Montana's Draft Greater Sage-Grouse Habitat Conservation Strategy* excludes wind energy development from sage-grouse Core Areas (Greater Sage-Grouse Habitat Conservation Advisory Council 2013). Avoidance of sage-grouse core areas should help maintain large and intact landscapes rather than maintaining small declining populations at the cost of further loss in the best remaining areas. Although sage-grouse populations occupy extremely large landscapes, their distribution tends to aggregate them in comparably smaller identifiable core areas.

A recent study shows that in Wyoming, Montana, Colorado, Utah, and North and South Dakota, areas with greater densities of sage-grouse are represented by a breeding density dataset illustrating population centers (Doherty et al. 2010; figure 5.5.1-1). This sage-grouse breeding density dataset identifies areas containing 25, 50, 75, and 100 percent of known breeding populations and has been used as a surrogate for greater sage-grouse core areas in an effort to maintain large and stable populations (e.g., USDA 2010).

Two States, Wyoming and Montana, have already developed core areas, vetted through State wildlife agencies. Wyoming sage-grouse core areas represent just 25 percent of the occupied range within the entire State, but support more than 80 percent of all known breeding birds. Similarly, Montana core areas represent 32 percent of occupied range and contain more than 75 percent of Montana populations. Recognizing the applicability and desire to establish sage-grouse core areas rangewide, the Bureau of Land Management (BLM) and Western Association of Fish and Wildlife Agencies (WAFWA) are currently developing sage-grouse core areas for each State. Both North Dakota and South Dakota have recently identified core areas (figure 5.5.1-2).

#### 5.5.1.1 Direct and Indirect Effects of the Action

Sage-grouse could be directly affected by wind energy development in the UGP Region. Infrastructure that is associated with renewable energy has substantial negative direct effects on sage-grouse (NGSGCT 2010). Sage-grouse typically would not fly at heights where they would strike turbine rotors and would not likely experience mortality from striking turbine poles. However, upland gamebirds are some of the more common collision victims found during post-construction fatality surveys at wind energy facilities (Johnson and Holloran 2010). One reported incident of sage-grouse mortality occurred at the Foote Creek Rim windfarm in south-central Wyoming. An adult was found dead about 150 ft (48 m) from a turbine but was also near a meteorological tower; thus the cause of death could not be conclusively attributed to collision with the turbine rotors (Johnson and Holloran 2010). If distribution lines traverse sagebrush habitat, sage-grouse could be killed or injured striking wires during takeoff or landing when visibility is low. Walker et al. (2007) found that lek persistence was negatively influenced by the proportion of transmission lines and coal bed methane development within 3 mi (6.4 km) of the lek. Braun et al. (2002) found displacement of nests near overhead transmission lines.

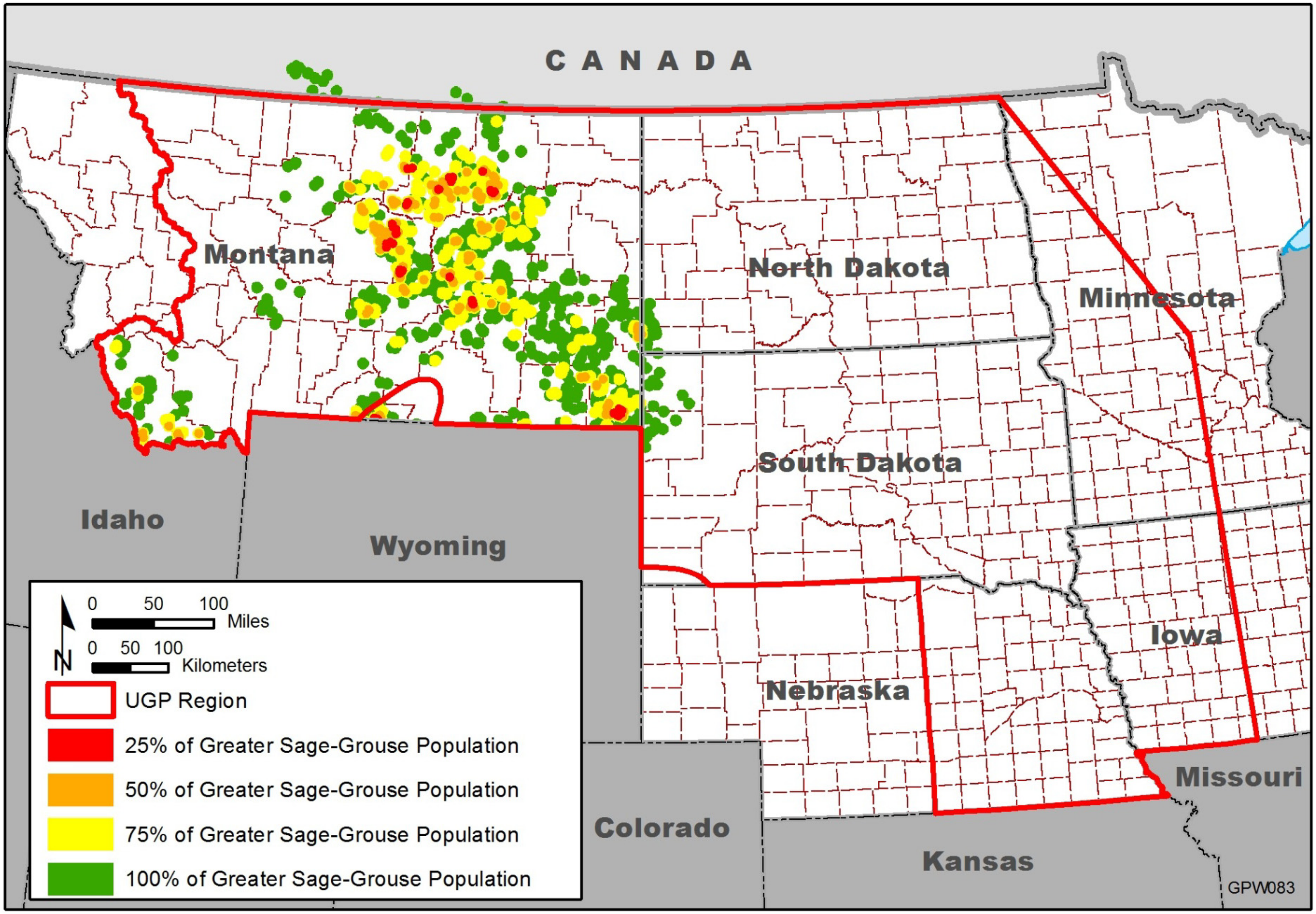


**FIGURE 5.5.1-1 Distribution of Greater Sage-Grouse Breeding Density Areas (Source: Doherty et al. 2010)**

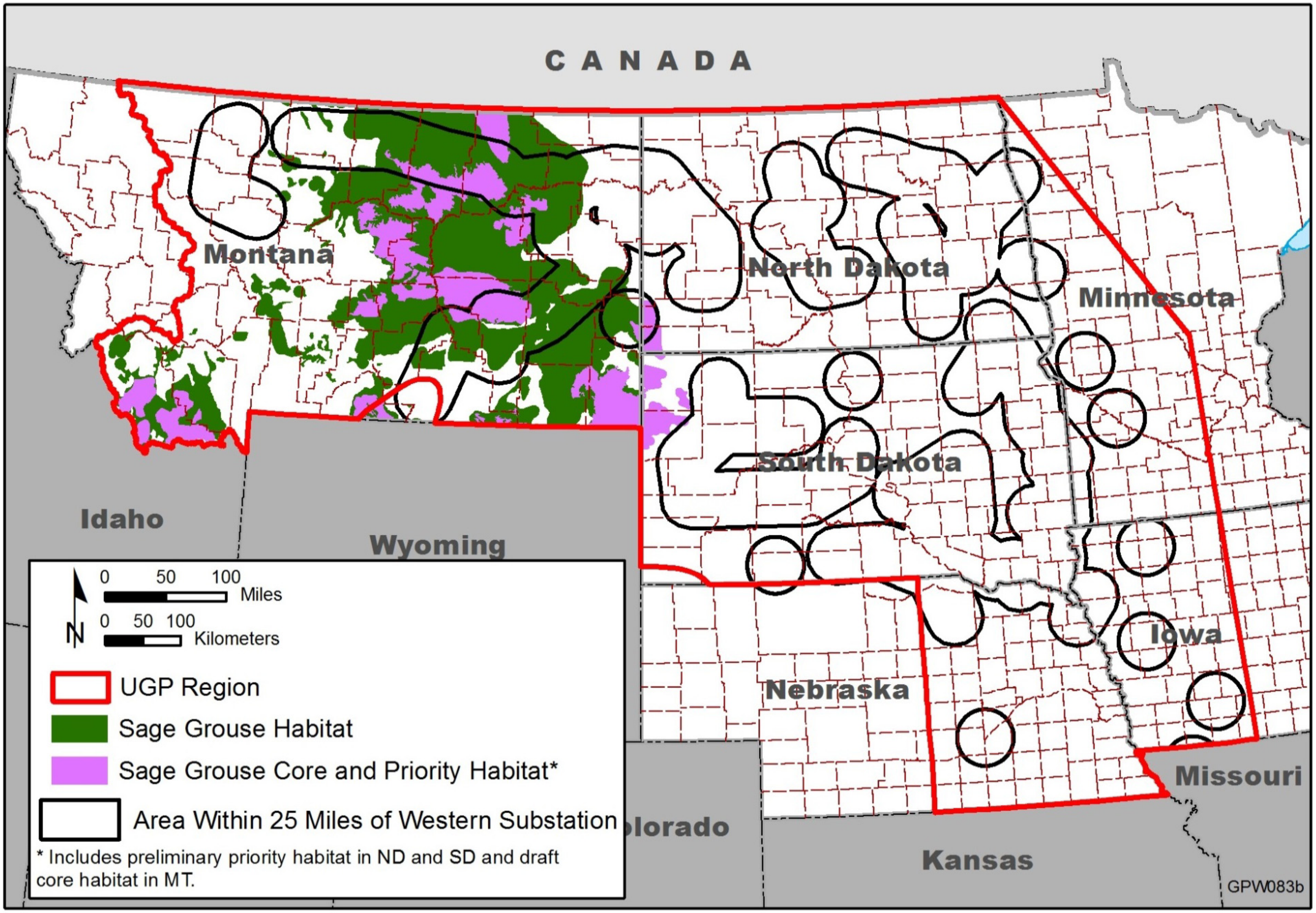


**FIGURE 5.5.1-2 Distribution of Greater Sage-Grouse Habitat and Core Areas**

The greatest effect on sage-grouse from wind energy development would likely come from loss of shrub-dominated habitat from construction of access roads, turbine pads, power lines, and substations needed for wind energy transmission, and the tendency of sage-grouse to avoid areas with development and infrastructure. Habitat fragmentation and proximity to leks and wintering habitat have been demonstrated to cause sage-grouse avoidance and abandonment of areas near roads and structures in oil and gas fields (USFWS 2010j); such effects could also occur at windfarms. The presence of tall structures such as wind turbines is thought to cause sage-grouse to avoid suitable sagebrush habitat (Johnson and Holloran 2010). Evidence from studies conducted in the Great Plains and Wyoming Basin suggests that high-density development of energy resources excludes sage-grouse from developed areas (Holloran 2005; Walker et al. 2007; Doherty 2008). Tall structures such as transmission towers are thought to contribute indirectly to elevated predation rates on sage-grouse nests (NGSGCT 2010). A review of recent research studies showed that the presence of powerline poles in sagebrush habitat provides perches for raptors that may prey on sage-grouse in leks (USFWS 2010j). Raptors are predators of young and adult grouse (Schroeder et al. 1999). Ravens are also known to be important nest predators of greater sage-grouse. Howe et al. (2014) found that ravens were most likely to nest near the edges of adjoining big sagebrush and landcover types that were associated with direct human disturbance such as transmission lines. However, some recent field reports indicate that transmission and power lines may not be detrimental to sage-grouse (LeBeau 2012; Nonne et al. 2013). The presence of access roads on windfarms is likely to increase invasive species encroachment along road ROWs and adjacent areas, reducing habitat quality for sage grouse. Construction work crews and equipment would likely adversely affect sage-grouse, causing them to avoid areas adjacent to work sites, at least during the construction period. The presence of maintenance crews and vehicular traffic along access roads could also cause sage-grouse to avoid or abandon nearby habitat and disturb breeding activities on leks.

The most-studied responses of breeding activities to human disturbance are adverse effects of disturbance on lek attendance. Those adverse effects are minimized through the use of buffered zones around sage-grouse leks. Energy development within 4 mi (3.9 km) of a lek was associated with decreased male attendance (Walker et al. 2007). Walker et al. (2007) found that leks more than 4 mi (6.4 km) from coal bed methane disturbance had an average persistence of 85 percent. Johnson et al. (2011) found that across the range of the species, trends on leks within 3 mi (5 km) of a producing oil or natural gas well were depressed. Naugle et al. (2011) suggested that impacts on sage-grouse leks from energy development remained discernable out to distances of 4 mi (6.4 km) at study sites in the western Wyoming Basin and southern Great Plains. Based on these and other cumulative scientific findings, a 4 mi (6.4 km) buffer around sage-grouse leks will be required for most activities and infrastructure associated with wind generation development to significantly minimize adverse effects on sage-grouse populations.

#### 5.5.1.2 Cumulative Effects

The States of Montana, North Dakota, and South Dakota all identify the same cumulative effects factors that are threatening continued survival of the greater sage-grouse. Factors that have historically affected and continue to threaten the species in the three State area include clearing of sagebrush-dominated areas for agriculture, overgrazing, oil and gas development, mining, wind energy development, presence of power lines, roads and motorized vehicle use, recreation and sage-grouse monitoring, noxious weed invasion, and fire. These activities combined have led to a decline of suitable shrub habitat for nesting and foraging throughout the geographic range of the sage-grouse in the western United States (Montana Sage Grouse Work Group 2005; NDGFD 2005; SDGFP 2008). In Wyoming, gas development has resulted in wide-scale extirpation or reduction of populations at distances as great as 4 mi (6.5 km) from leks (Martin et al. 2009). In addition, a study in Idaho showed that sage-grouse apparently abandoned suitable habitat because of towers erected to gather data for a commercial wind power facility. Eight meteorological towers, 30 to 150 ft (9 to 46 m) in height and topped with anemometers, were installed to measure wind velocity. Over a period of 5 yr, seven of nine sage-grouse leks were abandoned and the overall population declined about 75 percent (Martin et al. 2009).

The USFWS believes that continued oil and gas development will impact sage-grouse survival in Montana, North Dakota, and South Dakota. Future development will eliminate some sage-grouse habitat and reduce habitat quality of adjacent areas (USFWS 2010j). Currently, large oil fields are located in the Bowdoin Dome area of north-central Montana and the 120-mi (193-km) long Cedar Creek Anticline area of southeastern Montana, southwestern North Dakota, and northwestern South Dakota. Extensive energy development in the Bowdoin Dome area of north-central Montana and the Cedar Creek Anticline area may result in the isolation of the small sage-grouse population in southwestern North Dakota from populations in the northern Powder River Basin and central Montana populations (USFWS 2010j). During 2008–2009, 136 wells were put into production in the Williston Basin north of the Missouri River in the area of the northern Montana sage-grouse population. The Bowdoin Dome area had 1,500 oil and gas wells in production in 2010 with another 1,200 new or replacement wells approved for the near future. Wind energy development in these areas may further fragment and eliminate sage-grouse habitat and have a regional effect on population abundance when windfarms are sited in areas adjacent to oil and gas operations.

The Montana NRCS has developed plans to implement recommendations of the Montana Sage-grouse Working Group to improve sage-grouse habitat in Montana (MNRCS 2009). The NRCS will undertake actions to improve the existence of springs used for livestock to better maintain grasses, forbs, and associated insects used as food by sage-grouse; modify existing power poles to reduce the likelihood that birds of prey use them as perches; control cattle grazing to maintain native grass and forb species; mark fences that are known to cause death of sage-grouse from collisions; design passages through tightly woven fences; and cut invading coniferous trees in sagebrush areas in the western mountain foothills.

In 2005, Montana created its first sage-grouse conservation plan, *Management Plan and Conservation Strategies for Sage-Grouse in Montana* (Montana Sage Grouse Work Group 2005). However, new research and science, coupled with new or expanded potential threats to sage-grouse habitat and populations, have combined with new court decisions to create a need for Montana to update its State sage-grouse conservation plan, policies, and actions.

The Draft *Greater Sage-Grouse Habitat Conservation Strategy* (Greater Sage-Grouse Habitat Conservation Advisory Council 2013) will guide sage-grouse management when the strategy is made final. As of January 31, 2014, the State of Montana shall adopt a sage-grouse population target based on number of displaying males. Displaying males are an index to sage-grouse abundance and distribution trends over time. This index to sage-grouse populations will be estimated regularly using a consistent protocol and will serve as a primary metric for quantifying the success or failure of the *Greater Sage-Grouse Habitat Conservation Strategy*. Project developers should contact the Montana Fish, Wildlife and Parks for established protocol for surveys.

Management by all Montana State agencies will focus on the maintenance and enhancement of greater sage-grouse habitats, populations, and connectivity areas, including interstate and international connectivity areas. Core Areas play a critical role and general habitat plays an important role in sage-grouse conservation. Connectivity habitat may be mapped when additional information becomes available.

General sage-grouse habitats are areas that provide sage-grouse nesting, brood-rearing, and wintering habitat but are not identified as Core Areas. In the Montana strategy, wind energy development will be excluded from sage-grouse Core Areas. The health of general habitat areas is a critical element in the effort to maintain the abundance and distribution of sage-grouse in Montana. The goal in general areas is to maintain habitat conditions by implementing appropriate management practices that minimize sagebrush loss and disturbance.

Outside of Core Areas, new wind energy facilities are not recommended within 4 mi (6.4 km) of the perimeter of active sage-grouse leks. The project developer should work cooperatively with agencies, utilities, and landowners to use topography, vegetative cover, site distance, and so forth to effectively protect identified sage-grouse habitat.

Although not required of developers by this programmatic BA, Montana wants all activities to be evaluated within the context of maximum allowable disturbance (disturbance percentages, and location and number of disturbances). The maximum disturbance allowed will be analyzed via a standardized mapping tool process conducted by the land management agency on Federal land and the project proponent on non-Federal (private, State) land.

The conservation measures presented in this programmatic BA for areas outside core habitat may be more protective than those presented in the *Montana Draft Greater Sage-Grouse Habitat Conservation Strategy* (Greater Sage-Grouse Habitat Conservation Advisory Council 2013). Conservation measures required in this programmatic BA include protective stipulations that may reduce adverse effects on the greater sage-grouse to insignificant or discountable levels in the event the species is listed under the ESA.

The effects of climate change on sagebrush-steppe habitat are unknown at this time. Any prolonged drought conditions that affect the current distribution of shrubs, grasses, and forbs could adversely affect the sage-grouse.

As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the greater sage-grouse within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

### 5.5.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

Wind energy development in northwestern South Dakota, southwestern North Dakota, and Montana can eliminate or reduce the quality of sagebrush habitat used by greater sage-grouse. The potential also exists for injury or death of sage-grouse from collisions with power lines or wind turbines associated with new wind farm development. As applicable, general BMPs (table 4.5-1) will be implemented throughout all project phases to reduce impacts of wind energy development on the greater sage-grouse.

In North and South Dakota, habitat occupied by sage-grouse is so limited that all occupied habitat is considered priority habitat or identified as a core area that should not be affected by development. Therefore, this programmatic BA excludes consideration of projects in North and South Dakota that are within the designated sage-grouse core and priority habitat identified in figure 5.5.1-2. There are no required conservation measures in North or South Dakota because there are no sage-grouse outside the core or priority areas. In South Dakota, designated core areas are preliminary. As South Dakota moves forward with revising their State Sage-Grouse Management Plan, sage-grouse core areas may change. In the event sage-grouse are identified outside North Dakota's preliminary Priority Habitat, it is the intent of this programmatic assessment to treat those areas as core areas. In South Dakota, project proponents should refer to South Dakota Department of Game, Fish and Parks, Division of Wildlife (2014) and check with South Dakota Game, Fish and Parks biologists. In North Dakota, for sage-grouse priority habitat, proponents should refer to Robinson (2013) and check with the North Dakota Game and Fish Department biologists.

In Montana, outside designated Sage-Grouse Core Areas, general BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the greater sage-grouse. Although the greater sage-grouse was determined to warrant listing as threatened or endangered under the ESA, the USFWS precluded it from listing because of higher priorities (USFWS 2010j). However, Western and the USFWS will treat this species as if it were listed when imposing required conservation measures on new wind energy projects. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning plans prior to project approval for projects proposed in any county where the greater sage-grouse is known to occur outside designated sage-grouse core areas in Montana (table A-1; figures A-10 and A-18).

If it is determined through preconstruction evaluations and/or surveys that the greater sage-grouse, its core habitat (preliminary or final), or suitable habitat for the species occurs in the project area, the following species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission lines, or other project facilities within greater sage-grouse core habitats in Montana, North Dakota, and South Dakota or within State-defined greater sage-grouse connectivity areas in Montana. Refer to *Management Plan and Conservation Strategies For Sage Grouse In Montana* (Montana Sage Grouse Work Group 2005), the *Draft Greater Sage-Grouse Habitat Conservation Strategy* (Greater Sage-Grouse Habitat Conservation Advisory Council 2013), and the Conservation Objectives Team report (USFWS 2013c) for guidance in avoiding impacts on sage-grouse outside Core areas. Until new information or science indicates otherwise, the *Montana Draft Greater Habitat Conservation Strategy* (Greater Sage-Grouse Habitat Conservation Advisory Council 2013) has excluded all wind energy development from sage-grouse Core Areas.

- Outside of core areas in Montana, do not site turbines, access roads, transmission lines, or other project facilities within 4 mi (6.4 km) of sage-grouse leks. (There are no known greater sage-grouse occupied habitats outside core areas in North and South Dakota.)

Based in part on measures suggested by the USFWS for avoiding direct and indirect threats to greater sage-grouse from wind energy facilities (USFWS 2010j), as well as those discussed in the USFWS's *Greater Sage-Grouse Conservation Objectives Final Report* (USFWS 2013c), a number of species-specific minimization measures that would be required of applicants for projects proposed within areas in Montana outside sage-grouse core areas and occupied by sage-grouse include (by impacting factor) the following.

***Habitat Disturbance***

Based on a review of the literature by the USFWS in its decision to list the greater sage-grouse (USFWS 2010j), several possible minimization measures are implicit that would afford habitat protection. Applicable species-specific minimization measures include the following:

- Contact Montana Fish, Wildlife and Parks Statewide Habitat Coordinator (406-444-3377) to obtain sage-grouse distribution information in early planning stages for the wind farm to determine how best to site facility structures to avoid sage-grouse habitat to the greatest extent possible;

- Avoid placing meteorological towers or turbines, and restrict surface use activities, within 4 mi (6.4 km) of active sage-grouse leks;

- Do not use guy wires for turbine or meteorological tower supports (all existing guy wires should be marked with approved bird flight diverters);

- Do not build new fences within 1.25 mi (2 km) of occupied leks (unless unavoidable, then mark fence with approved bird flight diverters), and remove or mark existing fences with approved fence bird flight diverters (BLM 2011);

- Disturbed areas around turbines in shrub/grassland habitat used by sage-grouse should be maintained to allow a shrub cover greater than 10 percent and grasses greater than 6–7 in. (16–18 cm) tall to improve nest success;

- Limit the number of access roads through sagebrush to decrease fragmentation of habitat; and

- Limit noise at active lek perimeters to 10 db above ambient or maximum of 34 db.

***Injury or Mortality (Including Collisions)***

- Bury all project-related collector and distribution lines where practicable;

- Do not place overhead power lines in suitable sage-grouse nesting habitat located within 4 mi (6.4 km) of a known lek;

- Mark new overhead power lines that traverse or are located within 0.25 mi (0.4 km) of occupied sage-grouse habitat with approved bird flight diverters; and

- Report all incidents of mortality or injury from wind facility construction and operation to the appropriate USFWS Ecological Services Field Office and State Wildlife offices.

#### 5.5.1.4 Effects Determination

Wind energy developers will be required to have a conference with the USFWS Montana Ecological Services Field Office personnel on planned conservation activities in the early stages of project planning to reduce or avoid impacts on the greater sage-grouse for projects located outside core or priority area but within occupied greater-sage-grouse habitat. By avoiding development within sage-grouse core or priority areas and, with the implementation of the conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities outside core or priority areas in Montana, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect,** the greater sage-grouse. Project development will not occur within sage-grouse occupied habitat in North and South Dakota.

### 5.5.2 Interior Least Tern

The interior population of the least tern (*Sternula antillarum*) was federally listed as endangered under the ESA on May 28, 1985 (USFWS 1985a). Critical habitat for the least tern has not been designated. The interior least tern is State-listed as endangered in Montana, South Dakota, Nebraska, and Iowa within the UGP Region. The interior least tern is the smallest member of the tern family, with a wingspan of 20 in. (50 cm). It has a grayish back and wings, and snowy white undersides. Least terns can be distinguished from all other terns by their combination of a black crown, white forehead, and a variable black-tipped yellow bill. The interior population of the least tern breeds in the Mississippi, Missouri, and Rio Grande river systems. The birds usually stay in close proximity to the rivers and nest on unvegetated sand-pebble beaches and islands of large rivers and reservoirs (USFWS 1990b). Least terns and piping plovers share nesting habitat along the Missouri River. Within the UGP Region, least terns are known from 10 counties in Montana, 11 counties in North Dakota, 18 counties in South Dakota, 27 counties in Nebraska, five counties in Minnesota, and two counties in Iowa (table A-1; figure A-9).

The least tern arrives in the UGP Region in April and remains until August, when it presumably migrates to winter habitat in the Gulf Coast and barrier islands along the United States–northeastern Mexico coast and the Caribbean islands (Brown and Jorgensen 2009). Least terns are colonial nesters, and as such, territoriality is limited to within 3.2 ft (1 m) of the nest (Brown et al. 2011). Terns nest in a shallow hole scraped in an open sandy area, gravelly patch, or exposed flat. The chicks leave the nest after only a few days and are able to fly about 21 days after hatching. Chicks find shelter in nearby grasses and are fed small fish by adults.

Interior least terns nesting on sand pits use adjacent rivers to meet various needs, including foraging, loafing, and staging prior to migration (Lingle 1993). Terns usually feed close to their nesting sites (USFWS 1990b). On the Central Platte River, adult terns forage along the river at distances of 0.25–1.5 mi (0.4–2.4 km) from nest sites at sand pits (Lingle 1993; Brown et al. 2011; Sherfy et al. 2012). Although Brown and Jorgensen (2008, 2009) found that sand pits are located within 3 mi (5 km) of rivers in Nebraska, those utilized by terns and plovers are within 1.5 mi (2.4 km) of the river (Sherfy et al. 2012). Sherfy et al. (2012) documented movements of least terns as much as 9.9 mi (16 km) to 12.4 mi (20 km) within the Platte River corridor and the adjacent sandpits. Terns consume small fish, which compose their main diet, although they also are known to eat various invertebrates such as crustaceans, mollusks, and annelids (NatureServe 2013). They forage along the river corridor and shorelines of reservoirs along the Missouri and Yellowstone River systems.

The first attempt at a complete rangewide survey for interior least tern was completed in June–July of 2005 (Lott 2006). A total of 17,591 interior least tern were counted in association with 489 different colonies. Birds from the interior population winter along the Gulf of Mexico, Central American coast, and the northern cost of South America (USFWS 1990b). In Montana, least terns nest on beaches and islands of large reservoirs and rivers in northeastern and southeastern Montana, along the Yellowstone and Missouri river systems (Atkinson and Dood 2006a). The species occurs primarily on the lower Missouri River below Fort Peck Dam and the lower Yellowstone River downstream from Miles City (Atkinson and Dood 2006a). Montana surveys conducted from 2001 to 2005 showed annual fluctuations of 49–58 least terns counted (Atkinson and Dood 2006a), which exceeded the goal of 50 individuals set forth in the USFWS Recovery Plan in 1990 (USFWS 1990b). In North Dakota, the least tern is found mainly on the Missouri River from Garrison Dam south to Lake Oahe, and on the Missouri and Yellowstone Rivers upstream of Lake Sakakawea. Approximately 100 pairs breed in North Dakota on sand bars that they share with piping plovers (USFWS 2010k); although it is close, this number is still below the goal of 250 adults in North Dakota set forth in the Recovery Plan (USFWS 1990b). In South Dakota, breeding habitat is limited to a few stretches of the Missouri River below Ft. Randall and Gavins Point dams that still contain sandbar nesting habitat suitable for least terns (USFWS 2010l), as well as isolated reaches of the Cheyenne River west of the Missouri River (Gates 2014). Discharge of water from hydroelectric power plants and navigation threaten interior least terns in these river segments. Annual variations in river flow can also change availability of nest sites during periods of flooding. In Iowa, nesting of interior least terns is known only from two sites located along the Missouri River near Council Bluffs and near Sioux City (both nesting sites are on fly ash deposits from coal-fired power plants). Piping plovers also nest at these locations. Nesting surveys conducted on the lower Platte River and off-river locations since 1987 showed yearly fluctuations in the numbers of adults and nest sites based on how flooding affected nesting habitat (Brown and Jorgensen 2010). The total number of adult terns counted fluctuated from 200 to 500 between 2000 and 2009. The total off-river counts at active and inactive sand and gravel pits varied from 60 to 350 during the same period. Within the UGP Region of Nebraska, 27 off-river sites supported nesting least terns and piping plovers in 2009 (Brown and Jorgensen 2010). In 2005, during the first rangewide survey, 1,933 interior least terns were counted within the UGP Reggion (Lott 2006).

Predicted suitable habitat models for the interior least tern exist for the States of Iowa, Montana, Nebraska, North Dakota, and South Dakota. Approximately 62 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-18).

Interior least tern populations face threats that are very similar to those confronting piping plover recovery. Although early declines were attributable to shorebird hunting, the principal cause of decline is now habitat loss. Alterations of water regimes brought on by the construction of dams have significantly changed natural stream flow in the Missouri River, reducing or destroying nesting habitat. Flows in the Platte River and its tributaries also have been altered, reducing nesting habitat on sandbars and along the river shorelines. The other primary threats to the interior least tern are human-caused disturbance/recreation, oil spills, agricultural runoff, and the presence of other environmental contaminants (USFWS 1990b).

The USFWS provided notice of the 5-yr review of the interior least tern in the *Federal Register* (73 FR 21643) and released the final 5-yr review on October 24, 2013. In the review, the USFWS concluded that the interior least tern is biologically recovered and recommended delisting the species. The USFWS does not recommend the initiation of a delisting proposal until it completes and reviews a rangewide population model to confirm its assessment, obtains commitments to maintain management through conservation agreements, and prepares a rangewide monitoring strategy and plan (USFWS 2013d).

#### 5.5.2.1 Direct and Indirect Effects of the Action

Interior least terns may be killed by colliding with wind turbine blades, particularly during periods of fog when visibility is low. Martin et al. (2009) references a 2-yr study of three tern species in Belgium, at a wind farm along the coast, which recorded 6.7 tern deaths/turbine/year. However, those mortalities may not be comparable to inland wind farms in the UGP Region. Poor visibility may cause terns to strike power lines associated with wind farms. Given the tendency for least terns to nest along the shorelines of reservoirs and interior sandbars in rivers and tributaries in the UGP Region, as well as the low likelihood of siting wind turbines or substations in these areas (typically low-lying areas have lower wind resources), the direct effects on tern habitat may be discountable.

Some least tern habitat loss could result from erosion along access roads that cross or are adjacent to rivers and streams. Implementation of the BMPs in table 4.5-1 should afford protection to nesting and foraging habitat near water bodies.

The presence of construction workers and equipment in the vicinity of streams and rivers may cause least terns to avoid using historic nesting areas. Noise from construction equipment may also adversely affect tern use of nesting areas.

Direct impacts on least tern habitats are easily avoided by the use of buffer zones around riverine or reservoir habitats; impacts such as potential bird strikes during local movements or migration are less well understood. Based on the current knowledge base related to tern movements within river and reservoir systems, migration altitudes, and no documented mortality, a 1.5-mi (2.4-km) buffer was determined to be adequate to protect both the least tern and its habitat. As new information is gained through research or post-construction monitoring, as determined during the preconstruction evaluations with the USFWS, revisions may be made to these avoidance measures in the BA through adaptive management.

#### 5.5.2.2 Cumulative Effects

Several factors have decreased or altered interior least tern nesting and resting habitat along rivers and reservoirs within the UGP Region. Dams along the Missouri River have eliminated nesting sites by inundating sandbars. Changes in river flow downstream of the dams created wooded riparian habitat in river stretches that previously supported sandbars and shorelines used by terns. Recreation on the rivers causes least terns to abandon nests, further affecting recruitment and recovery of the species. In Nebraska, least tern habitat has been affected by dam and reservoir construction, river channelization, bank stabilization, island armoring, hydropower generation, and water diversion. Continued operation of dams along the Missouri River in South Dakota will affect least tern sandbar nesting and resting habitat. The potential exists for erosion to occur from surface disturbance activities at windfarms. If runoff reaches the tributaries of the Missouri River inhabited by least terns, shoreline loafing, feeding, and nesting areas could be adversely affected.

Climate change is predicted to increase average annual temperatures by as much as 2.5–3.0°F (1.4–1.7°C) by the year 2020 and up to 5–5.5°F (2.8–3.1°C) by 2050. Temperature increases will cause higher evapotranspiration rates during the summer months in the UGP (GCRP 2009). In northern portions of the region, wetter conditions are expected between 2020 and 2100. Increased precipitation will change water management within the Missouri River and Platte River basins, which in turn can affect the availability of nesting sites for the interior least tern. The impacts of global climate change are uncertain but could affect the distribution of native plants and associated wildlife. Of particular concern in the UGP Region are the effects of climate change on wetlands throughout the prairie-pothole region of North and South Dakota.

Agricultural water demands would likely increase during the summer growing season, and evapotranspiration rates would be elevated by rising temperatures. Groundwater pumping would increase, affecting the near-surface aquifers that supply wetlands. The extent to which additional groundwater use will affect least tern summer habitat is unknown and will warrant monitoring to allow necessary changes in water management within the UGP Region.

As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is a potential for this level of non-Federal wind energy development to affect the interior least tern within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.5.2.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the interior least tern. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the interior least tern has been recorded (see table A-1; figures A-11 and A-19). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of individual interior least terns and to evaluate the position of the project footprint relative to known summer breeding and foraging habitat. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the interior least tern, its habitat, or its migration corridors may occur in the project area, the following species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone river system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas.

- Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than 1.5 mi (2.4 km) from known/suitable riverine habitat.

- Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.

Additional minimization measures specifically intended to reduce the potential for adverse effects on the interior least tern have not been identified at this time. The above BMPs and avoidance measures adequately address the conservation measures.

#### 5.5.2.4 Effects Determination

Based on current information on the status of the interior least tern population in the UGP Region, it is unlikely that nesting and foraging habitat would be directly adversely affected by wind energy facility construction and operation. Direct mortality of the species from collisions with land-based wind turbines in the UGP Region has not been documented and is considered discountable. Current estimated mortality rates come from coastal wind farms with high densities of breeding terns, which may not accurately reflect the conditions along the riverine systems in the UGP Region. Since least terns limit nesting and foraging activities within riverine (including use of adjacent sandpits) and reservoir shoreline habitats, avoiding these areas will greatly minimize the risk of adversely affecting the least tern. With the implementation of all conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, as well as the incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the interior least tern.

### 5.5.3 Piping Plover

The piping plover (*Charadrius melodus*) Northern Great Plains population was federally listed as a threatened species under the ESA on December 11, 1985 (USFWS 1985b). It is State listed as threatened in Montana, South Dakota, and Nebraska and State listed as endangered in Iowa within the UGP Region. The USFWS designated 19 areas as critical habitat, including alkali wetlands, inland lakes, and reservoirs totaling approximately 183,422 ac (74,228.4 ha) and portions of four rivers totaling approximately 1,207.5 river mi (1,943.3 km) in the States of Minnesota, Montana, Nebraska, North Dakota, and South Dakota (USFWS 2002b). In 2005, the U.S. District Court for the District of Nebraska revoked all critical habitat parcels in Nebraska. The USFWS has designated critical habitat for this species along the Missouri River from Nelson and Fort Peck Reservoir, south to Ponca State Park, Nebraska. This stretch includes Lake Sakakawea, Lake Oahe, and Lake Sharpe (USFWS 2002b). Also included were certain alkali wetlands in northeastern Montana and western North Dakota. The critical habitat designation includes only those areas that contain “primary constituent elements” (habitat requirements) for the essential lifecycle requirements of the species (SDGFP 2005). There are three piping plover populations within the United States: the Northern Great Plains, Atlantic Coast, and Great Lakes populations. The Northern Great Plains population is the largest of the three breeding populations and consisted of approximately 4,462 adults in 2006 (Eliott-Smith et al. 2009). Piping plovers can be found nesting on sparsely vegetated sand or gravel beaches adjacent to alkali wetlands, and on sparsely vegetated interior riverine sand bars, often sharing the same sandbar nesting habitat with interior least terns.

Piping plovers are small, relatively stocky migratory shorebirds. Adults weigh between 1.4 and 2 oz (46 and 64 g) and measure 7 in. (17 cm) long with a wingspan of approximately 15 in. (38 cm). Adult females and males are roughly similar in size, but females are slightly heavier than males (1.96 oz [55.6 g] vs. 1.94 oz [54.9 g]) and have slightly shorter tail lengths (1.99 in. [50.5 mm] vs. 2.02 in. [51.3 mm]). Piping plovers are one of six species of belted plovers, which are characterized by the presence of at least one breast band. They also are characterized by the sand-colored upper parts and white undersides that are typical of their genus. The piping plover's short stout bill, large dark eyes isolated on a pale face, and bright orange legs make it easily recognizable. The Northern Great Plains population migrates from Gulf Coast wintering grounds to parts of Canada (southeast Alberta, southern half of Saskatchewan, and southwestern Manitoba), Montana, North Dakota, South Dakota, Nebraska, and extreme western Iowa along the Missouri River. Piping plovers arrive on their breeding grounds in late April and early May and stay until migrating south again in September (NatureServe 2013; SDGFP 2005). Piping plovers typically nest on a variety of substrates including sandy or gravelly surfaces in dry areas around alkali lakes, shorelines of sand pits, lakes, and reservoirs.

Piping plovers utilize alkali lakes in the Coteau region of northeast Montana and northwest North Dakota; on interior sandbars on the Missouri, Yellowstone, and Platte river systems; along the shoreline of Missouri River reservoirs; and on manmade sandpits along the Platte River system in Nebraska. Adult females lay 2–4 eggs in slight depressions in sand, gravel, or dry alkaline shoreline microhabitats of lakes, reservoirs, or rivers (Atkinson and Dood 2006b). Peak nesting in the Northern Great Plains extends from late April through August, with the majority of nesting taking place in May. Females lay an egg every other day until a four-egg clutch is complete, and both sexes share incubation duties that last for 25–31 days (USFWS 1988b). Fledging time varies from 21 days in the Northern Great Plains to 30–35 days on the Atlantic Coast (USFWS 1988b); at that time, chicks are capable of sustained flight.

The piping plover consumes mainly benthic invertebrates along the sandy beaches and shores of water bodies. Adults typically feed within about 15 ft (5 m) of the shoreline, while chicks tend to wander farther to feed on invertebrates in dryer microhabitats (NatureServe 2013; SDGFP 2005). Piping plovers produce precocial young that forage for invertebrates alongside adults (Elliott-Smith and Haig 2004). Thus, breeding habitats must contain nesting areas and foraging habitat to support both adults and flightless young. Since adult piping plovers are constrained to forage within their nesting colonies during brood rearing (Sherfy et al. 2012), they may not significantly move between nesting habitats. Sherfy et al. (2012) found that most movements by piping plover at sand pit colonies were within the colony, but documented piping plovers moving up to 20 river miles (32 km) between sand pits within the Platte River corridor. Those movements may not be indicative of piping plovers in alkali lakes or reservoir shorelines. Although Brown and Jorgensen (2008, 2009) found that there are sand pits located within 3 mi (5 km) of rivers in Nebraska, those utilized by tern and plovers are within 1.5 mi (2.4 km) of the river (Sherfy et al. 2012). Piping plovers wintering on the Texas coast moved an average distance of 2 mi (3.3 km) (range 0–18 mi or 0–30 km) from wintering sites while foraging, and nearly 80 percent of all movements took place over a distance of less than 3 mi (5 km) (Drake et al. 2001).

There is a lack of data on the movements of piping plover between alkali lakes. Ongoing studies by the USGS on movements of piping plover between alkali wetlands and between the

Missouri River and alkali wetlands may provide new information in the future and result in modifications to the required conservation measures in the programmatic BA.

Obtaining accurate estimates of piping plover populations within the Northern Great Plains States has been difficult and no coordinated survey efforts were carried out prior to 1980 (Atkinson and Dood 2006a). Within the UGP Region, the piping plover is known to occur in eight counties in Montana (mostly in northeastern counties), 26 counties in North Dakota, 21 counties in South Dakota, 26 counties in Nebraska, and two counties in western Iowa that border the Missouri River (table A-1; figure A-11). Most of the occurrences reported in North Dakota, South Dakota, Nebraska and Iowa are from annual surveys by the USACE within the Missouri River Basin (see https://rsgisias.crrel.usace.army.mil/intro/dms.dmsintro.main). The global piping plover population has been monitored by the International Piping Plover Census on both wintering and breeding grounds every 5 years since 1991. The 2006 breeding census resulted in the observation of 8,092 adult piping plovers at 1,925 sites (Elliott-Smith et al. 2009), with 4,662 adults counted for the Northern Great Plains. Within the UGP Region (including all of Minnesota, Iowa, and Nebraska) a total of 2,935 adult plovers were reported in 2006 (Elliott-Smith et al. 2009).

The USFWS has compared recent annual plover survey data with recovery plan goals and concluded that the Northern Great Plains population numbers did not meet recovery goals (USFWS 2009c). Fluctuation in the numbers of breeding pairs between years occurs when flooding or high water levels exist, especially along the Missouri River. Flooding can inundate shoreline and sandbar habitat used for nesting. A drought period followed the high water levels on reservoirs in both the late 1990s and the mid-2000s. This exposed more shoreline habitat that could be used by piping plovers, which likely increased survey numbers. Some habitats occasionally have attracted more plover pairs than set forth in the goals for recovery, but have not supported those numbers on a regular basis. Missouri River plover nesting pairs in North Dakota have increased to sustain more than 300 pairs each year from 2000 to 2008. However, the number of pairs using alkali lakes in North Dakota was below the goal of 550 pairs; between 2000 and 2008, the plover pairs varied from 180 to 400 pairs per year (USFWS 2009c). South Dakota survey data also showed increases in breeding pairs at known nesting locations (Lake Oahe, Fort Randall River reach, and Lewis and Clark Lake) along the Missouri River. In the Platte River of Nebraska, the number of plover pairs has remained at or slightly above the recovery goal of 140 pairs. Iowa has recorded nesting pairs in two counties along the Missouri River. Breeding has also occurred on ash disposal sites near coal-fired power plants (Iowa Department of Agriculture 2010).

The USFWS Spotlight Species Action Plan activities identified several measures to monitor piping plover populations and improve habitat for the Northern Great Plains population. In Nebraska, some Platte River sandpits and Missouri River sandbars are being cleared of vegetation to improve nesting habitat (USFWS 2009c). In Montana and North Dakota, the USFWS is working with refuge personnel, the Nature Conservancy, and landowners to improve the quality of nesting habitat in alkali lakes. Activities have included removal of buildings and trees near shorelines to reduce predation pressure on piping plovers, finding other water sources for cattle, reducing herbicide application, and fencing to exclude cattle and predators.

The USACE has the responsibility of monitoring nesting areas along the Missouri River in Montana, North Dakota, South Dakota, and Nebraska. High water conditions along rivers and reservoirs in Nebraska have eliminated piping plover nesting habitat. In 2009, an effort was carried out to remove vegetation that grew on islands created by the high water conditions on the Lower Platte River. Following the vegetation removal, 47 piping plover nests and 264 interior least tern nests were found on the islands (USFWS 2009c).

Atkinson and Dood (2006b) reported that each summer, 60 percent of the Northern Great Plains piping plover population nests on open beaches associated with alkali wetlands in an eight-county area of northwestern North Dakota and northeastern Montana, and that most of the remaining birds nest on the Missouri River system. In Montana, piping plovers are primarily located on alkali wetlands in Sheridan County, with a smaller population associated with sandbar habitat on the Missouri River below Fort Peck Dam and on barren beaches associated with Fort Peck Reservoir. A few nesting pairs are periodically found at Bowdoin National Wildlife Refuge; Nelson Reservoir in Phillips County, Montana; and Alkali Lake in Pondera County, Montana (Martin et al. 2009).

Predicted suitable habitat models for the piping plover exist for the States of Iowa, Montana, Nebraska, North Dakota, and South Dakota. Approximately 48 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-19).

The USFWS recovery plan for the piping plover (USFWS 1988b) cites habitat loss and its influence on the species' reproductive success as the primary reasons for listing. Several factors have caused population declines, including shorebird hunting and losses of nests or chicks from mammalian and avian predators. Currently, alterations in water regimes are resulting in population declines. Six dams have been constructed on the Missouri River: Fort Peck Dam in Montana, Garrison Dam in North Dakota, and four dams within South Dakota at Lake Oahe, Big Bend, Fort Randall, and Gavins Point. The construction of these dams has significantly altered the natural stream flow of the river and resulted in the alteration and destruction of nesting habitats along the Missouri River. Before the dams were constructed, natural rises in the water level of the river occurred in March or April as a result of snowmelt on the plains and in-channel ice breaks, and again in June when the mountain snow melted. The operation and management of the dams and the associated reservoirs by the USACE to meet the authorized purposes (e.g., navigation) affects reservoir levels, the downstream water regimes, and thus the availability of suitable nesting habitat. Current management has altered the natural river hydrograph of higher spring flows and lower summer flows (USFWS 2013d). In addition, times of low-flow regimes have altered the vegetative composition and expanse of sandbar habitat along the Missouri River. Low flows increase the available sandbar habitat for the piping plover, but they also encourage additional human disturbance and make the birds more susceptible to predation. In addition, dams trap sediment that would normally flow downstream and improve sandbar habitats for plovers (Sidle et al. 1991). Trapping sediment increases sandbar and bank erosion along the river. Other threats to the piping plover include human-caused disturbance/recreation, oil spills, agricultural runoff, and the presence of other environmental contaminants (Johnson and Adolf 1997).

#### 5.5.3.1 Direct and Indirect Effects of the Action

Population survey data collected since 1986 suggest that piping plover populations have varied between years due to many factors. High water levels on reservoirs and lakes that persist for 1–2 yr followed by successive drought years create additional nesting habitat as more shoreline is exposed. The extent to which wind energy facilities may affect survival of piping plovers is unknown. Martin et al. (2009) references a 2-yr study of three tern species in Belgium, at a wind farm along the coast, which resulted in 6.7 tern deaths/turbine/year. The applicability of this study, which was conducted in a coastal environment in Europe, to wind turbine mortality of plovers in the Northern Great Plains of the United States is not known. It is also unknown how adept plovers are in avoiding collisions with turbine blades. Within the Northern Great Plains population of piping plovers, there is no documentation of piping plovers colliding with wind turbine blades. Other causes of plover mortality in the United States include collisions with vehicles and power line strikes (USFWS 2009c).

In a study to look at local and long-distance shorebird movements using NEXRAD radar, Melcher et al. (2006) found that most shorebirds making flights between foraging sites and roosting sites fly remarkably close to the ground, often barely skimming over the habitat surface. Interior populations of piping plovers migrate nonstop to the Gulf of Mexico, and stopovers by plovers are very rare (Elliott-Smith and Haig 2004). Generalized information on flight heights of shorebirds during migration suggests that the piping plover would migrate at between 1,000 and 13,000 ft (305 and 3962 m) in elevation (Smithsonian 1998), which is well above current wind generator rotors or any transmission line height. Generally, the risk of collision with transmission or wind turbines would be more of a concern at night or during bad weather conditions. This risk may be minimized since flight heights tend to be higher for migrating birds at night or with tailwinds than during daylight hours or with a headwind (Dolbeer 2006).

Required conservation measures will provide adequate buffers between wind development facilities and piping plover activity associated with staging, breeding, and nesting areas. New transmission lines will be minimal or unnecessary for the vast majority of projects that would be considered under this programmatic BA. In the unlikely event plovers do stray from the river, shorelines of reservoirs, or alkali wetlands, the risk of collision will be reduced by installing approved bird flight diverters on any new transmission line as indicated in table 5-1.

Habitat loss may occur from wind energy projects. Construction access roads can lead to erosion into shoreline areas used as nesting and foraging habitat by plovers. Alkali lakes can also be affected by erosion during construction of wind turbines, power lines, and associated substations. The presence of the construction workforce near reservoirs and alkali lakes may cause piping plovers to avoid potential habitat. Alkali lakes in North Dakota, South Dakota, and northeastern Montana could be affected by workers during the plover breeding season. Until more research is conducted on the impacts wind energy facilities have on piping plovers, the extent of such impacts is uncertain. In the Northern Great Plains, most piping plovers nest on the unvegetated shorelines of alkali lakes, reservoirs, or river sandbars, as described in the 1988 recovery plan. They are known to occasionally select atypical nesting sites (USFWS 2009c). In the alkali lakes area, plovers have been documented to successfully nest and raise young on dry alkali lake basins, with similar fledge ratios (the number of young able to fly divided by the number of adult pairs) to those in nearby lakes with water. Fewer birds use the lakes when they are dry, compared with years when water is present at the start of nesting (USFWS 2009c). On the Missouri River, plovers are known to nest among cottonwood seedlings in habitat previously thought too densely vegetated for plovers to select (McGowen et al. 2007). Plovers have also nested much farther from water than previously believed possible (USFWS 2009c). This has been observed on reservoirs as water levels declined during the drought of the 2000s (USFWS 2009c). On Lake Sakakawea in North Dakota, 19 nests were documented to be more than 1,000 ft (305 m) from water, with one nest more than 0.5 mi (0.8 km) away. On the riverine stretches of the Missouri River, most nests (255) on the Gavins Point Dam river reach were in unvegetated areas, with only one nest in less-typical tall vegetation (USFWS 2009c). Based on observations of plover nesting at sites other than typical shoreline habitat, activities in riparian vegetated areas may also affect breeding success.

Direct impacts on piping plover habitats are easily avoided by use of buffer zones around riverine, reservoir, or alkali wetland habitat; however, impacts such as potential bird strikes during local movements or migration are more problematic. In light of the uncertainties related to piping plover movements, a geo-based analysis was performed of important and/or designated critical habitats and potential buffer zones for the alkali wetlands within the Prairie Coteau Region of North Dakota and northeastern Montana. Based on that analysis and the information presented earlier on this species, buffers were identified to directly protect habitats and reduce the potential for bird strikes to a discountable level (figure 5.5.3-1).

For the river and floodplain systems where the researchers report most movements are within the river corridors, a 1.5 mi (2.4 km) buffer was determined to be adequate to protect both the piping plover and its habitat. However, inter-distance movements of piping plovers between the Missouri River and alkali wetlands and between alkali wetlands and complexes occurs, but such movements are less well understood. Based on available information and discussion with USFWS experts, Western has concluded that a 3.0-mi (4.8-km) buffer is justified for alkali wetlands designated as critical habitat or where piping plover nesting has been documented. Further, to protect the movements within complexes of alkali wetlands, an additional 3.0-mi (4.8-km) inter-distance buffer is warranted to reduce the potential for strikes. As new information is gained through research or post-construction monitoring, as determined during the preconstruction evaluations with the USFWS, revisions may be made to these avoidance measures in the BA through adaptive management.

#### 5.5.3.2 Cumulative Effects

Future wind energy development in the UGP Region may also occur in areas where other energy-related activities are occurring. Oil field development in Montana and North Dakota has increased substantially in recent years. In North Dakota and Montana, oil production near plover nesting habitat has increased substantially since 1988, and many oil wells are near known plover nesting areas. Oil drilling is concentrated in the alkali lakes area where up to 83 percent of plovers in the Northern Great Plains have nested (USFWS 2009c). The impacts from oil development are largely unknown but potentially substantial. Prior to production, seismic surveys are performed over an extensive area to determine the likely location of oil reserves. This requires large equipment that can compact soils and leave deep ruts in the soil surface. Seismic surveys performed prior to drilling can adversely affect plover nesting areas by leaving permanent tracks in nesting areas, even when equipment moves through the area in frozen conditions during winter. Drill pads usually require about 3–5 ac (1.2–2 ha) per pad and are spaced 1–2 per section (640 ac [260 ha]). Noise generated by equipment may cause plovers to avoid using nearby habitat. Oil fields require new power lines to run equipment and need additional access roads that can adversely affect piping plover nesting habitat at alkali lakes. Global warming may change rainfall patterns and temperature regimes across the UGP Region, affecting the quality and distribution of plover nesting habitat in future decades.

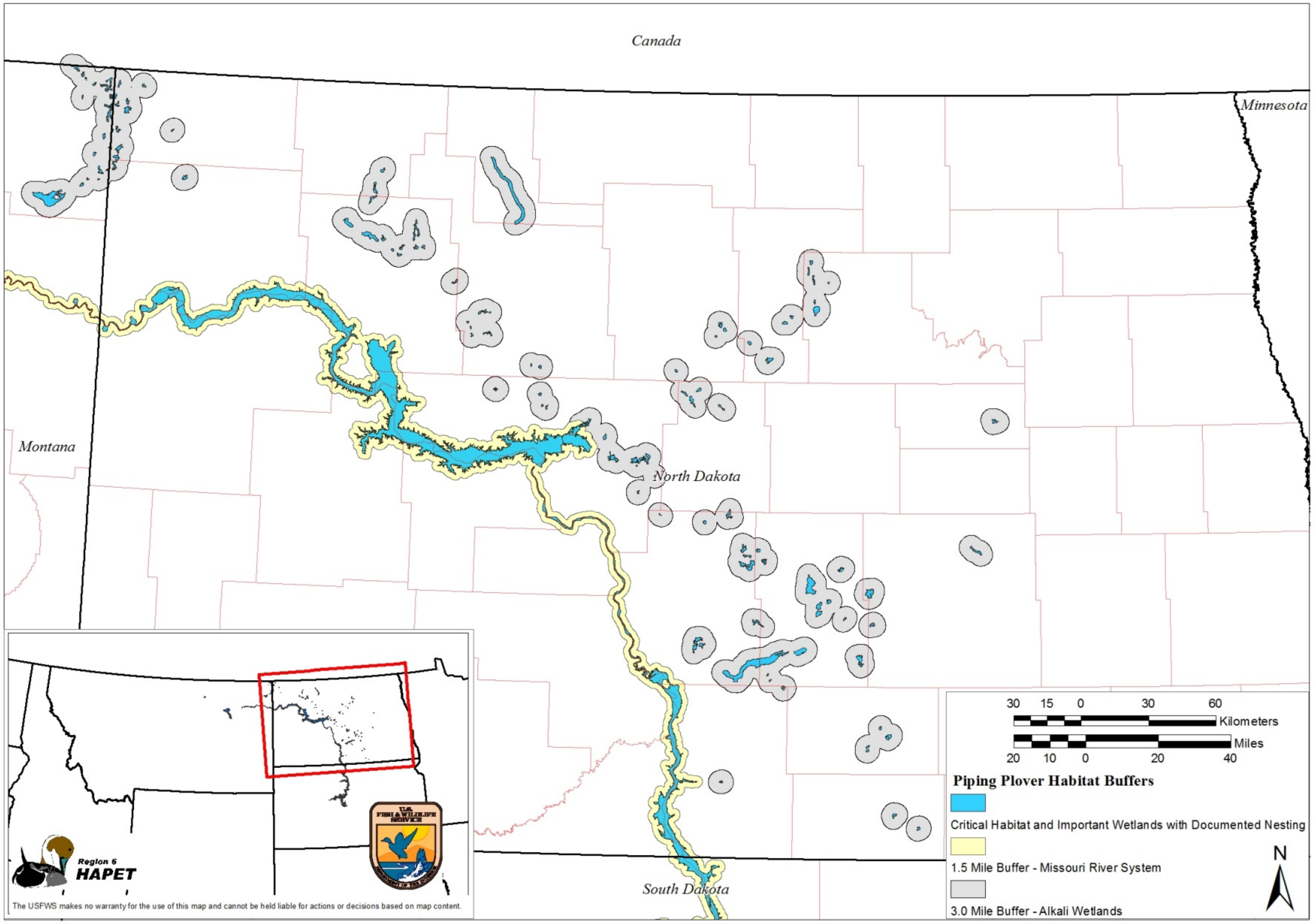


**FIGURE 5.5.3-1 Habitat Buffers in North Dakota and Northeastern Montana for Piping Plover Designated Critical Habitat on the Missouri River System and Prairie Coteau Alkali Wetlands, and Important Alkali Wetlands with Documented Nesting (1994–2013)**

The extent to which wind energy facilities have a cumulative effect on piping plover habitat depends on the distance between wind energy farms; proximity to reservoirs, rivers, and alkali lakes; and timing of construction of facilities in the same localized area within the UGP Region. Some wind energy farms will cover a large geographic area. For example, Hartland Wind Farm, LLC, is proposing to build a 2,000-MW facility consisting of 1,333 turbines covering a 720 $mi^2$ (1,865 $km^2$) area in Ward, Burke, and Mountrail counties in northwestern North Dakota. The company also plans to construct two 275-MW natural-gas-powered or natural gas combined-cycle power plants in the same vicinity to insure a reliable power supply to supplement wind power (Hartland Wind Farm 2010). Such facilities have the potential to adversely affect piping plovers over a relatively large geographical area. The operation of the dams along the Upper Missouri River and its effects on sandbar habitat have also adversely affected the piping plover. Oil spills such as the BP spill in 2010 and associated impacts on wintering habitat of piping plovers along the Gulf Coast have yet to be determined, but they could affect winter food supply and shoreline habitats in general. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the piping plover within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.5.3.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the piping plover. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the piping plover has been recorded (table A-1; figures A-12 and A-20). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of piping plover individuals and to evaluate the position of the project footprint relative to known habitat. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the piping plover, its critical habitat, or suitable habitat for the species occurs in the project area, the following species-specific avoidance measures would be required:

- Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone river system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas.

- Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than 1.5 mi (2.4 km) from known/suitable riverine habitat.

- Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.

- Do not site turbines, transmission lines, access roads, or other project facilities within 3.0 mi (4.8 km) of alkali lakes where piping plover nesting has been documented or those designated as critical habitat (figure 5.5.3-1).

- Do not site turbines, transmission lines, access roads, or other project facilities in between any alkali lakes identified, with a 3.0-mi (4.8-km) buffer (figure 5.5.3-1) where the outer limit of the buffer zones are less than 3.0 mi (4.8 km) apart.

- Do not site turbines, transmission lines, access roads, or other project facilities within 1.5 mi (2.4 km) of riverine designated critical habitat or within 3.0 mi (4.8 km) of alkali wetlands designated as critical habitat.

Additional minimization measures specifically intended to reduce the potential for adverse effects on the piping plover have not been identified at this time. The above BMPs and avoidance measures adequately address the conservation measures.

#### 5.5.3.4 Effects Determination

Based on current information on the status of the piping plover population, and its migratory corridor through the UGP Region, it is likely that some migratory and breeding habitat could be affected by new wind energy facilities, associated power lines, and substations. Direct mortality of the species from collisions with land-based wind turbines in the UGP Region has not been documented and is considered discountable. Pre- and post-construction monitoring data can be useful in defining the best adaptive management strategy to avoid adverse effects on nesting habitat and direct mortality of piping plovers.

With the implementation of all conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the piping plover. The proposed action will have **no effect** on designated critical habitat for the piping plover.

In addition to the proposed conservation measures, which would reduce the potential for adverse effects from wind energy projects, the additional project-specific measures that may be considered as compensation for potential effects include (1) the funding of land acquisition, enhancement, and protection as piping plover habitat to compensate for any habitat potentially lost or compromised by wind energy development; and (2) actions to enhance shoreline habitat used by piping plovers.

### 5.5.4 Rufa Red Knot

The rufa red knot (*Calidris canutus rufa*) is a shorebird that was listed as threatened under the Endangered Species Act on December 11, 2014. The red knot is a large (9 to 10 in. [22.9 to 25.4 cm] long), bulky sandpiper with a short, straight, black bill. During the breeding season, the legs are dark brown to black, and the breast and belly are a characteristic russet color that ranges from salmon-red to brick-red. Males are generally brighter shades of red, with a more distinct line through the eye. When not breeding, both sexes look alike: plain gray above and dirty white below with faint, dark streaking (NatureServe 2013; Niles et al. 2007; USFWS 2013e).

The red knot makes one of the longest annual migrations of any bird, traveling up to 18,000 mi (30,000 km) between Arctic breeding grounds in northern latitudes to nonbreeding areas in South America. Red knots are also known to occupy nonbreeding habitats along the U.S. Atlantic coast (Delaware Riverkeeper Network et al. 2005). Long-distance migrant shorebirds are highly dependent on the continued existence of quality habitat at a few key staging areas.

During migration, red knots stop in only a few key sites for feeding. One stopover site frequently visited during migration is the Delaware Bay in New Jersey, with many of the birds having flown directly from wintering habitats from South America. Red knots are attracted to the Delaware Bay in the spring because the bay annually hosts large congregations of spawning horseshoe crabs (*Limulus polyphemus*), the eggs of which represent a major food source to migrating red knots. Mussel beds along the U.S. Atlantic coast are also an important food source for migrating knots. Birds arrive at stopover areas with depleted energy reserves and must quickly rebuild their body fat to complete their migration to Arctic breeding areas. During their brief 10- to 14-day spring stay in the mid-Atlantic, red knots can nearly double their bodyweight. Red knots feed on invertebrates, especially small clams, mussels, and snails, but they also feed on crustaceans, marine worms, and horseshoe crab eggs. On the breeding grounds, knots mainly eat insects (Niles et al. 2007; NatureServe 2013).

The red knot ranges from winter habitats in Chile, Argentina, and Brazil in South America; to the Caribbean; to the U.S. coasts from Texas to North Carolina; with smaller numbers north along the Atlantic as far as southern Canada. The species breeds in the central Canadian Arctic from northern Hudson Bay to the southern Queen Elizabeth Islands. Migration occurs throughout the Atlantic and Gulf coasts of South America, the United States, and Canada; the Caribbean; interior flyways across South America; and interior flyways across the United States and Canada west as far as Alberta (Canada), Montana, Wyoming, Colorado, and Texas. Most red knot occurrences in the United States are individuals migrating along the Atlantic coast. Transient individuals are rarely observed in interior flyways. Small numbers (<10 individuals) can be found during migration in almost every inland State over which the knot flies between its wintering and breeding grounds. These reported sightings are mainly in Canada, concentrated along the Great Lakes (USFWS 2013e). Texas knots follow an inland flyway to and from the breeding grounds, using spring and fall stopovers along western Hudson Bay in Canada and in the Northern Great Plains (Newstead et al. 2013; Skagen et al. 1999).

Threats to the red knot include sea-level rise, coastal development, shoreline stabilization, dredging, reduced food availability at stopover areas, and disturbance by vehicles, people, dogs, aircraft, and boats. A primary factor in the recent decline of the species was reduced food supplies in Delaware Bay and other stopover sites along the Atlantic coast due to commercial harvest of horseshoe crabs. In addition, coastal wind turbine farms and climate change represent emerging threats (USFWS 2013e).

#### 5.5.4.1 Direct and Indirect Effects of the Action

The red knot is considered to be a rare transient throughout the UGP Region, and little is known about its use of stopover sites in the UGP Region. As a shorebird species, red knots utilizing any stopover sites in the UGP Region would select wetland habitats similar to those selected by other shorebirds such as the interior least tern and piping plover. It is unknown how adept red knots are in avoiding collisions with turbine blades. Martin and Piersma (2009), studying other subspecies, found that red knots did not show comprehensive panoramic vision as found in some other tactile-feeding shorebirds, but have a binocular field surrounding the bill and a substantial blind area behind the head. This forward-focused visual field may enable the red knot to avoid approaching turbine blades.

Information on flight heights of shorebirds during migration suggests that the red knot migrates between 1,000 and 13,000 ft (305 and 3,962 m) in elevation (Smithsonian 1998), which is well above current wind generator rotors (or any transmission line height). Generally, risk of collision with transmission or wind generators would be more of a concern at night. This risk may be minimized because flight heights tend to be higher for migrating birds at night (Curry and Kerlinger 1998; Dolbeer 2006).

Wind turbines can have a direct (e.g., collision mortality) and indirect (e.g., migration disruption, displacement from habitat) effect on shorebirds. Habitat loss may occur from wind energy projects.

Construction access roads can lead to erosion into the shoreline areas used as foraging habitat by migrating red knots. Alkali lakes can also be affected by erosion during construction of wind turbines, power lines, and associated substations. The presence of the construction workforce near reservoirs and alkali lakes may cause red knots to avoid potential habitat. However, due to the rarity and transient nature of the species in the UGP Region, it is unlikely for red knots to encounter a windfarm and ancillary facilities there. In general, shorebirds have been an uncommon mortality associated with wind turbines. Compiling estimated mortality rates from nine U.S. wind facilities (including four in California), Erickson et al. (2001) calculated an average of 2.19 avian fatalities per turbine per year for all bird species combined, and found that shorebirds constituted only 0.2 percent of the total. The number of land-based wind turbines installed within the United States range of the red knot has increased substantially in the past decade.

Unless facilities are constructed at key stopover or wintering habitats, the USFWS does not expect wind energy development to cause significant direct habitat loss or degradation or displacement of red knots from otherwise suitable habitats (USFWS 2013e).

#### 5.5.4.2 Cumulative Effects

The extent to which wind energy facilities have a cumulative effect on red knot habitat depends on the distance between wind energy farms; their proximity to reservoirs, rivers, and alkali lakes; and the timing of construction of facilities in the same localized area within the UGP Region. As discussed for previous species such as the piping plover, some wind energy farms will cover a large geographic area. Such facilities have the potential to adversely affect red knots over a relatively large geographical area. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the red knot within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species. Other factors occurring outside of the UGP Region, such as those related to overharvesting of horseshoe crab populations, could further contribute to cumulative effects.

#### 5.5.4.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

Due to the rarity and transient nature of the red knot in the UGP Region, measures identified for other shorebirds evaluated in this BA (e.g., interior least tern and piping plover) would also afford protection to the red knot. No new measures have been identified for the red knot. However, developers will be required to conduct preconstruction evaluations and coordinate with the local USFWS field office regarding new species information or conservation measures. General measures and BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the red knot. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such practices into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the rufa red knot has been recorded.

#### 5.5.4.4 Effects Determination

Based on the limited information on the occurrence of the red knot in the UGP Region, it is possible for potential stopover habitat to be affected by new wind energy facilities, associated powerlines, and substations. However, due to the rarity and transient nature of the species in the UGP Region, it is unlikely for individuals to encounter wind energy facilities and ancillary structures in the UGP Region where they may be directly affected. Pre- and post-construction monitoring data can be useful in defining the best adaptive management strategy to avoid adverse effects on stopover foraging areas and direct mortality of red knots.

With the implementation of all conservation measures summarized in table 5-1, incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect,** the rufa red knot.

### 5.5.5 Sprague's Pipit

Sprague's pipit (*Anthus spragueii*) was designated a candidate species under the ESA in September 2010 (USFWS 2010m). It is State-listed as endangered in Minnesota. Sprague's pipit is about 3.9 to 5.9 in. long (10 to 15 cm) and weighs 0.8 to 0.9 oz (22 to 26 g), with buff and blackish streaking on its crown, nape, and underparts. Males and females are similar in appearance. The Sprague's pipit has a plain buffy face with a large eye ring. The bill is relatively short, slender, and straight, with a blackish upper mandible. The wings and tail have two indistinct wing-bars, and the outer tail feathers are mostly white (USFWS 2010m). Adult diet consists mostly of insects during the spring and summer months with limited consumption of grass and forb seeds. Adults depend more on seeds during the winter months.

Sprague's pipits use grasslands of intermediate height, with sparse to intermediate vegetation density. They will use exotic vegetation such as crested wheatgrass but are significantly more abundant in native prairie grassland (Dechant et al. 2001). They appear to avoid areas with low visibility and low litter cover and have been observed using dry lake bottoms and alkali lake borders. Within grazed mixed-grass areas in North Dakota, abundance of Sprague's pipits was positively associated with percent clubmoss (*Selaginella densa*) cover and plant communities dominated by native grasses (Stipa, Bouteloua, Koeleria, and Schizachyrium) (Dechant et al. 2001).

Sprague's pipits arrive on their breeding grounds in late April and depart for wintering grounds in September and October. In North Dakota, they have two periods of breeding activity, the first from late April to early June, and the second from mid-July to early September (Dechant et al. 2001). Dome-shaped nests are generally constructed from woven grasses in areas of relatively dense cover, low forb density, and little bare ground (USFWS 2010m).

The Sprague's pipit may occur in suitable grassland habitats in Montana, North Dakota, and South Dakota (table A-1; figure A-10). Within the UGP Region, the Sprague's pipit is listed as occurring in 45 counties in Montana, 46 counties in North Dakota, 19 counties in South Dakota, and 25 counties in Minnesota (USFWS 2011b, 2012b, 2013l). Some historic records in the UGP Region are from observations of migrants. Its breeding range includes north central

Alberta southward to the U.S. border (including the northern portion of the UGP Region), the southern half of Saskatchewan, and southwest Manitoba in Canada (Dechant et al. 2001).

Several studies have documented the presence of Sprague's pipit in the UGP Region. Lenard et al. (2006) surveyed grassland birds in mixed grass prairie along 63–69 transects (each transect consisting of three observation points) in Valley County, Montana, during 2001–2005. Sprague's pipits were observed at an average of 150 points (75.7 percent of total) with about four individuals observed along transects during 2002–2005. Pipits arrived in Valley County in early May and departed in mid-September. Nesting occurred from late May through mid-July with incubation lasing 9–14 days.

The SDGFP (2001) conducted a bird survey during June and August of 2001 of the Grand River National Grassland in Perkins County and western portions of Corson County. The Sprague's pipit was observed on eight of the 10 routes, which covered 150 mi (241 km), and at 14 percent of the 133 observation stations. Thirty-nine observations of 49 Sprague's pipits (1.3 birds/observation) were made during the survey work in June and August. The Sprague's pipit was found throughout most of the Grand River National Grassland except for the badlands portion and appeared to be associated with broad areas of upland prairie with a significant native grass component.

Predicted suitable habitat models for the Sprague's pipit exist for the States of Montana, North Dakota, and South Dakota. Approximately 46 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-20).

Sprague's pipits have experienced loss of native grassland habitat from a variety of factors. Historically, native grasslands were affected by bison grazing and fire (USFWS 2010m), which tended to create the disturbance necessary to maintain native prairie. Without these types of disturbances shrub invasion would have occurred in grasslands, reducing habitat quality for pipits. The USFWS concluded, "ongoing habitat loss and land conversion is a significant threat (i.e., a threat that, alone or in combination with other factors, is causing the species to be in danger of extinction, now or in the foreseeable future) to Sprague's pipit throughout its range" (USFWS 2010m). The principal causes for the declines in Sprague's pipit populations described in the *Sprague's Pipit Recovery Plan* are habitat conversion to seeded pasture, hayfield, and cropland, and overgrazing by livestock (Jones 2010). The conversion of native grasslands to agricultural crops (wheat and hay fields) has eliminated extensive tracts of the grasslands needed to support sustainable populations of Sprague's pipits. Although livestock grazing is not considered to be a major threat to the Sprague's pipit, mowing (especially in places and times where nests may occur) could be an important factor that affects the quality of pipit habitat (USFWS 2010n). Mowing eliminates breeding habitat, likely at the time of fledging or late incubation phase of their life cycle; makes nestlings more susceptible to dying from rain or cold air temperatures; and exposes nests to predators (Jones 2010). The lack of fires in the Northern Great Plains has also allowed woody species to invade some grassland areas, thereby lowering habitat quality. Brood parasitism by brown-headed cowbirds is a threat to this species (USFWS 2010n). In Manitoba, parasitism by cowbirds was greater on a 54 ac (22 ha) site than on two 158 ac (64 ha) sites (Dechant et al. 2001). In the United States, cowbird parasitism of Sprague's pipit nests was documented in only 2.4 percent of 128 nests examined on Bowdoin National Wildlife Refuge in Phillips County, Montana (Jones et al. 2010).

Sprague's pipits appear to need approximately 160 ac (65 ha) in mixed grass prairie to set up a breeding territory (Jones 2010). This figure was derived from an analysis of area and patch size and represents the lower end of a 95 percent confidence interval (Davis 2004). However, the species also appears to choose habitat at a landscape scale. The strongest predictor of Sprague's pipit presence is the amount of grassland habitat within a circle with a 1,312–2,625 ft (400–800 m) radius (125 to 500 acres; 51 to 202 ha). The more grassland in that area, the more likely the species is to use it (Davis 2004; Davis et al. 2013). While native prairie is strongly preferred, the species will also nest in non-native grassland if it has the appropriate vegetation structure (Davis 2004; Fisher and Davis 2011).

#### 5.5.5.1 Direct and Indirect Effects of the Action

The Sprague's pipit may be directly affected by wind turbines, associated transmission lines, or associated substation operations. Individual birds might strike turbine blades or overhead power lines during aerial breeding flight displays or when weather conditions decrease visibility. Males were documented displaying in aerial flights 164–328 ft (50–100 m) above the surface at the Lostwood National Wildlife Refuge in Burke County, North Dakota (Robbins 1998). At these heights males could conceivably collide during aerial breeding displays with 1.5-MW wind turbines that have hub heights of 213–262 ft (65–80 m) and rotor diameters of 252–270 ft (77–82.5 m) (GE 2010). However, no data or studies documenting pipits that have been injured or killed from collisions with wind turbines or power lines have been identified. Based on the observations of Robbins (1998) and information on breeding biology in the Sprague's Pipit Conservation Plan (Jones 2010), males are not likely to collide with wind turbines. Although Sprague's pipit display bouts are prolonged (lasting a maximum of 3 hours) compared to other passerines, display behavior appears to be limited to two separate periods consisting of a few weeks between May and August and to be limited to a relatively small area. Typical displays average 11 to 35 minutes, and males usually spend most of the daylight hours feeding or resting on the ground. Certainly any flights by pipits other than time spent in aerial displays occur below the impact zone of turbine blades.

The presence of tall structures (e.g., turbines and power poles), as well as roads and associated traffic, may cause Sprague's pipits to avoid otherwise suitable habitats at wind energy developments, resulting in greater habitat impacts than the actual footprint of the project. However, a recent study on the effects of wind turbines on grassland birds at a wind farm in Texas showed no evidence for displacement of several grassland birds including Sprague's pipit (Stevens et al. 2013). Fragmentation of habitat caused by roads, substations, and placement of turbines in grassland communities is likely the greatest effect of wind farms on Sprague's pipits.

Construction access roads, wind turbine pads, and substations may cause loss of nesting habitat if constructed in native prairie grasslands. The presence of workers and construction noise may interfere with pipits during the nesting season. Recent evidence suggests the Sprague's pipit is adversely affected by other human activities in grassland habitats. Koper et al. (2009) found that the relative abundance of pipits was lower in grassland habitats adjacent to the edges of agricultural fields in southeastern Alberta. They surveyed birds at 290 points in a 75 × 81 mi (120 × 130 km) area over a 3-yr period. Sprague's pipit relative abundances declined by 25 percent from the maximum predicted relative abundance within 2,953 ft (900 m) (CI = 2,165–4,199 ft [660–1,280 m]) of croplands or forage crops, and within 1,115 ft (340 m) (CI = 917–1,509 ft [280–460 m]) of wetlands. They found no effects caused by roads on the abundance of pipits in the study area. Sutter et al. (2000) found a lower relative abundance of Sprague's pipits in areas that incorporated road ROWs in mixed grasslands of southern Saskatchewan. In a comparison of bird abundance along roads versus trails, they found Sprague's pipits were more abundant along trails (Wilcoxon $Z = 2.28$, $P = 0.05$). The authors suggest that pipits, being grassland specialists, see roads as a barrier or break in their habitat, which reduces their abundance in grassed ROWs and adjacent areas. Dale et al. (2009) found that pipit territories did not cross roads in oil and gas fields in southern Alberta and did not contain non-native vegetation. In this area, road and pipeline ROWs had been seeded with crested wheatgrass (*Agropyron cristatum*) since development started in the 1980s. These results showed that roads through grassland habitats with long-term drilling and associated facilities had negatively affected Sprague's pipit abundance. Pipit abundance declined with increased gas well density, comparing count data for 1995 and 2005. These studies suggest that oil and gas development have affected and will likely continue to affect Sprague's pipits in northern portions of the UGP Region.

#### 5.5.5.2 Cumulative Effects

The States of Montana, North Dakota, and South Dakota all identify the same cumulative effects factors that are threatening the continued survival of the Sprague's pipit. Factors that have historically affected and continue to threaten the species in the UGP Region include conversion of native grassland to wheat production, hay fields, and grazing lands; overgrazing; oil and gas development; mining; presence of power lines; roads and motorized vehicle use; noxious weed invasion; and fire (USFWS 2010m; Jones 2010). The dissection of large grassland tracts has also reduced habitat quality for pipits, presumably making them more susceptible to nest predators and avoidance of small patches and linear patches that could be used as breeding sites (USFWS 2010m). Climate change effects on grassland distribution in the Northern Great Plains may affect Sprague's pipit survival over the long term. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Sprague's pipit within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.5.5.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Sprague's pipit. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the Sprague's pipit has been recorded (table A-1; figures A-10 and A-21). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of Sprague's pipits individuals. Onsite surveys may be needed to complete such evaluations.

Habitat may be assessed either remotely or on the ground; a combined approach is recommended to improve accuracy. Landcover data can be used (e.g., GAP data), although available data is several years old and may have inaccurate data. Alternatively, aerial imagery may be used to visually assess grassland areas and map those areas remotely. Some ground truthing should be used in conjunction with this method to ensure that the operator is accurately identifying grassland and not including or excluding habitat types inappropriately. Alternatively, habitat can be mapped on the ground via site visits. This may be a more accurate approach, but may limit the area that can be assessed quickly to site a project, and access may be an issue. Since the strongest predictor of Sprague's pipit presence is the amount of grassland habitat within a circle with a 1,312–2,625 ft (400–800 m) radius, a moving circle GIS analysis of the proposed project footprint may provide valuable information on the habitat suitability.

The USFWS has concluded that future wind energy development and oil and gas development in remaining native grasslands may adversely affect recovery of Sprague's pipits (USFWS 2010m). As new information becomes available, modified and/or additional conservation measures may be warranted to avoid and minimize effects on Sprague's pipits. Monitoring of pipits in the project area should be based upon USFWS guidelines to monitor for presence of pipits and nesting territories.

If it is determined through preconstruction evaluations and/or surveys that the species occupies the project area, the following species-specific avoidance measure would be required (table 5-1):

- Avoid placement of meteorological towers, turbines, access roads, and transmission lines within 1,000 ft (304.8 m) of occupied native prairie tracts 160 ac (65 ha) or larger.

A number of additional species-specific minimization measures specifically intended to reduce the potential for adverse effects on Sprague's pipits would also be required. These additional minimization measures include the following:

- Design layouts to minimize further fragmentation of native prairie habitats that are suitable for Sprague's pipit; and

- All new meteorological towers should be self-supporting and not guyed; if guy wires are unavoidable, they should be marked with approved bird flight diverters.

#### 5.5.5.4 Effects Determination

With the implementation of the conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the Sprague's pipit as long as wind energy development activities do not occur in known occupied habitat.

In addition to the proposed conservation measures, which would reduce the potential for adverse effects from wind energy projects, additional project-specific measures that may be considered as compensation for potential effects include the funding of land acquisition, enhancement, and protection of Sprague's pipit habitat to compensate for any suitable habitat potentially lost or compromised by wind energy development.

### 5.5.6 Whooping Crane

Whooping cranes are currently listed as endangered except where nonessential experimental populations exist. In the United States, the whooping crane (*Grus americana*) was listed as threatened with extinction in 1967 and endangered in 1970 (USFWS 1967, 1970); both listings were "grandfathered" into the Endangered Species Act of 1973. Critical habitat for the whooping crane was designated in 1978 (USFWS 1978). Migration areas within the United States that are designated as critical habitat include the Platte River between Lexington and Denman, Nebraska; Cheyenne Bottoms State Waterfowl Management Area and Quivira National Wildlife Refuge, Kansas; and Salt Plains National Wildlife Refuge, Oklahoma. The Aransas National Wildlife Refuge (ANWR), Texas, and vicinity has been designated by the USFWS as critical wintering grounds for the conservation of the species (USFWS 1978). A species recovery plan was finalized in 2007 (CWS and USFWS 2007).

Within the UGP Region, the whooping crane is State-listed as endangered in Montana, South Dakota, and Nebraska and has been sighted in many counties within the region: 13 counties in Montana (mostly extreme northeastern counties), 53 counties in North Dakota, 56 counties in South Dakota, and 33 counties in Nebraska (see table A-1; figure A-12). Predicted suitable habitat models for the whooping crane exist only for the State of Montana. Approximately 41 percent of the predicted suitable habitat for this species in the State of Montana occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-21).

The whooping crane occurs in three locations in the wild and at nine captive sites (CWS and USFWS 2007). The only self-sustaining wild population is the Aransas-Wood Buffalo population (AWBP), which migrates more than 2,400 mi (3,864 km) twice annually between summer nesting grounds in Wood Buffalo National Park in Canada and winter habitat in the coastal marshes of Aransas National Wildlife Refuge in Texas. Spring migration begins in late March to early April and is completed within 2–4 weeks, while the fall migration south begins in mid-September (Austin and Richert 2001); the fall migration is also usually completed in 2–4 weeks (USFWS 2009a).

The migration corridor for the AWBP follows an approximate straight path, with the cranes traveling through Alberta, Saskatchewan, extreme eastern Montana, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, and Texas. The migration route approximately follows the Missouri River corridor through the midwestern United States. The primary migration corridor can be over 200 mi (320 km) wide, as cranes are pushed east or west by winds. The migration corridor where the most whooping cranes have been observed is shown in figure 5.5.6-1. Based on an analysis of the observation data, approximately 75 percent of the whooping crane sightings occur in an 80-mi (129-km) wide area around the centerline for all observations, and approximately 95 percent of the sightings occur in a 220-mi (353-km) wide area around the centerline (figure 5.5.6-1).

Most of the breeding habitat for the AWBP is located in the Wood Buffalo National Park (WBNP) and areas immediately adjacent to the park boundaries in the Northwest Territories of Canada. Whooping cranes have been known to start nesting, defined as laying eggs, as early as 3 yr of age, although the average age of first egg-laying is 5 yr. Experienced pairs arrive at WBNP in late April and begin nest construction in marshes. Egg-laying occurs from late April to mid-May, and incubation varies from 29 to 31 days. Based on 25 yr of data on clutch size gathered between 1966 and 1991, the typical clutch consists of 2 eggs (90.8 percent of 514 clutches observed; 1 egg was found in 43 clutches [8.6 percent]). Breeding territories are usually more than 0.6 mi (1 km) apart. Banding studies showed that pairs nest in the same territories year after year, with several pairs observed using the same areas for 22 consecutive years. Activities of breeding pairs, family groups, and chicks occur within the same territories until the chicks are a few months old. Immature cranes typically stay near adult pairs near the territory margins. Nesting territories vary in size with an average size of 2.5 $mi^2$ (4.1 $km^2$). Whooping cranes will re-nest if eggs are lost or destroyed during the first half of the incubation period. Research has shown that typically only one of the two hatched chicks are fledged and less than 10 percent of fledged chicks reach the Aransas National Wildlife Refuge at the end of their initial fall migration (CWS and USFWS 2007).

The fall migration of whooping cranes typically starts in mid-September and is usually completed in 2–4 weeks (USFWS 2009a). The last migrants usually arrive on the wintering grounds at Aransas National Wildlife Refuge and adjacent coastal marshes in Texas by mid-November. Whooping cranes migrate singly or sometimes in large groups of up to 30 birds that use the same stopover locations for resting and feeding. Migrants can make 7–9 stopovers lasting from one to several days during the fall migration (Stehn 2008). Once whooping cranes leave staging areas in Canada (see below), the remainder of the migration occurs quickly, typically lasting only a few days (USFWS 2009a). Whooping cranes are frequently observed in mixed flocks with sandhill cranes.

An important stopover area (considered a staging area for fall migrants) is located in south-central Saskatchewan in a diamond-shaped area between Meadow, Swift Current, Estevan, and Quill Lakes. Staging areas within this region were found to be located mostly on private lands with an abundance of wetlands and adjacent to post-harvest grain fields (i.e., wheat and barley stubble) where cranes feed on remaining grain (Johns et al. 1997). It was found that different lakes were used in consecutive years within the staging area, potentially because of variations in annual precipitation that changes the extent and quality of wetlands. Characteristics of the staging area include presence of palustrine wetlands that experience permanent or semi-permanent flooding, have gradual slopes (less than 5 percent), soft mud bottoms, and range in size from less than 1.25 ac (0.5 ha) to several thousand hectares (Johns et al. 1997). Roost sites in the staging areas had water depths of about 5 in. (13 cm), were located about 1.3 mi (2 km) from agricultural fields, and more than 0.7 mi (1 km)

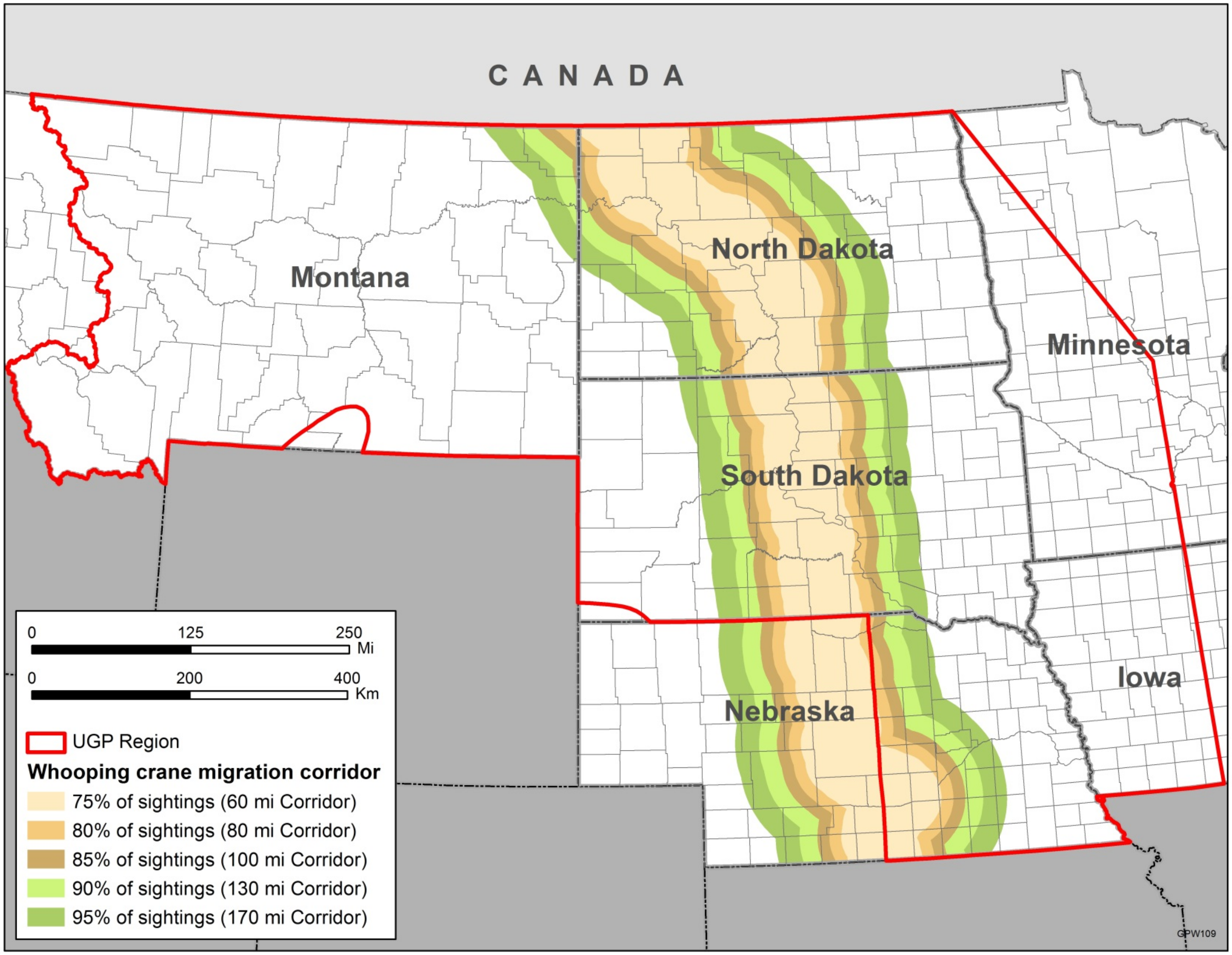


**FIGURE 5.5.6-1 Percentage of Whooping Crane Observations in the UGP Region as a Function of Distance from the Migration Corridor Centerline (Sources: Shelley 2011; USFWS 2009c)**

from human residences. Large, shallow roost areas likely allow cranes greater visibility of potential predators.

Stopover wetland areas in the Northern Great Plains States that are used by migrating whooping cranes have many of the same characteristics as the staging habitats described by Johns et al. (1997). In USFWS Region 6, potentially suitable migratory stopover habitats for whooping cranes are considered to include wetlands with areas of shallow water without visual obstructions (i.e., high or dense vegetation) and submerged sandbars in wide, unobstructed river channels that are isolated from human disturbance (USFWS 2010n).

The spring migration of whooping cranes begins in late March as individual birds and flocks depart the Texas coastal area. Most cranes arrive at the WBNP by mid-April and initiate breeding activity between that time and early May (CWS and USFWS 2007). Recent data on whooping crane observations during the spring of 2008 were summarized by Martha Tacha of the USFWS, Grand Island, Nebraska (Stehn 2008). Tacha reported that 266 cranes comprised the winter flock in 2008 and that the first individuals observed north of Aransas National Wildlife Refuge were in Kansas on March 25. General spring and fall migration windows for Aransas whooping cranes in Montana, North Dakota, South Dakota, and Nebraska, as provided by the USFWS, are shown in table 5.5.6-1. Histograms of whooping crane observation dates within the 95 percent migration corridor are illustrated in figure 5.5.6-2.

Between March 30 and April 2, 2008, six groups totaling 24 cranes were confirmed in south-central and central Nebraska. On April 14, 2008, a strong weather front pushed these and other migrating whooping cranes farther north. The initial or final observation of nearly half of the sightings in the flyway (19 or 49 percent) occurred during the 5 days from April 13 to April 17, 2008, inclusive. The last sighting in the U.S. Central Flyway north of Aransas occurred on May 8, 2008, when a single crane left Medicine Lake National Wildlife Refuge in northeastern Montana. Many observations involved crane groups. Most groups migrated quickly through the Central Flyway; 27 groups were sighted on a single day. In Nebraska, one group stopped for 16 days and two groups each rested for 15 days. These three groups rested in the Nebraska rainwater basins.

Migrating whooping cranes appear to avoid areas near human residences and to prefer areas with good visibility. Austin and Richert (2001) found that most locations where whooping cranes have been observed in Nebraska were more than 0.5 mi (0.8 km) away from any human structures or developments. Most were more than 0.3 mi (0.5 km) from the nearest power or phone lines, and about half of all the roost sites and two-thirds of the foraging sites had

**TABLE 5.5.6-1 General Spring and Fall Migration Dates of Whooping Cranes within the UGP Region (dates from USFWS)**

| State | Spring Migration | Fall Migration |
|---|---|---|
| Montana | 4/15 to 5/15 | 9/15 to 10/31 |
| North Dakota | 4/15 to 5/15 | 9/10 to 10/31 |
| South Dakota | 3/24 to 5/19 | 9/14 to 11/18 |
| Nebraska | 3/23 to 5/10 | 10/1 to 11/15 |

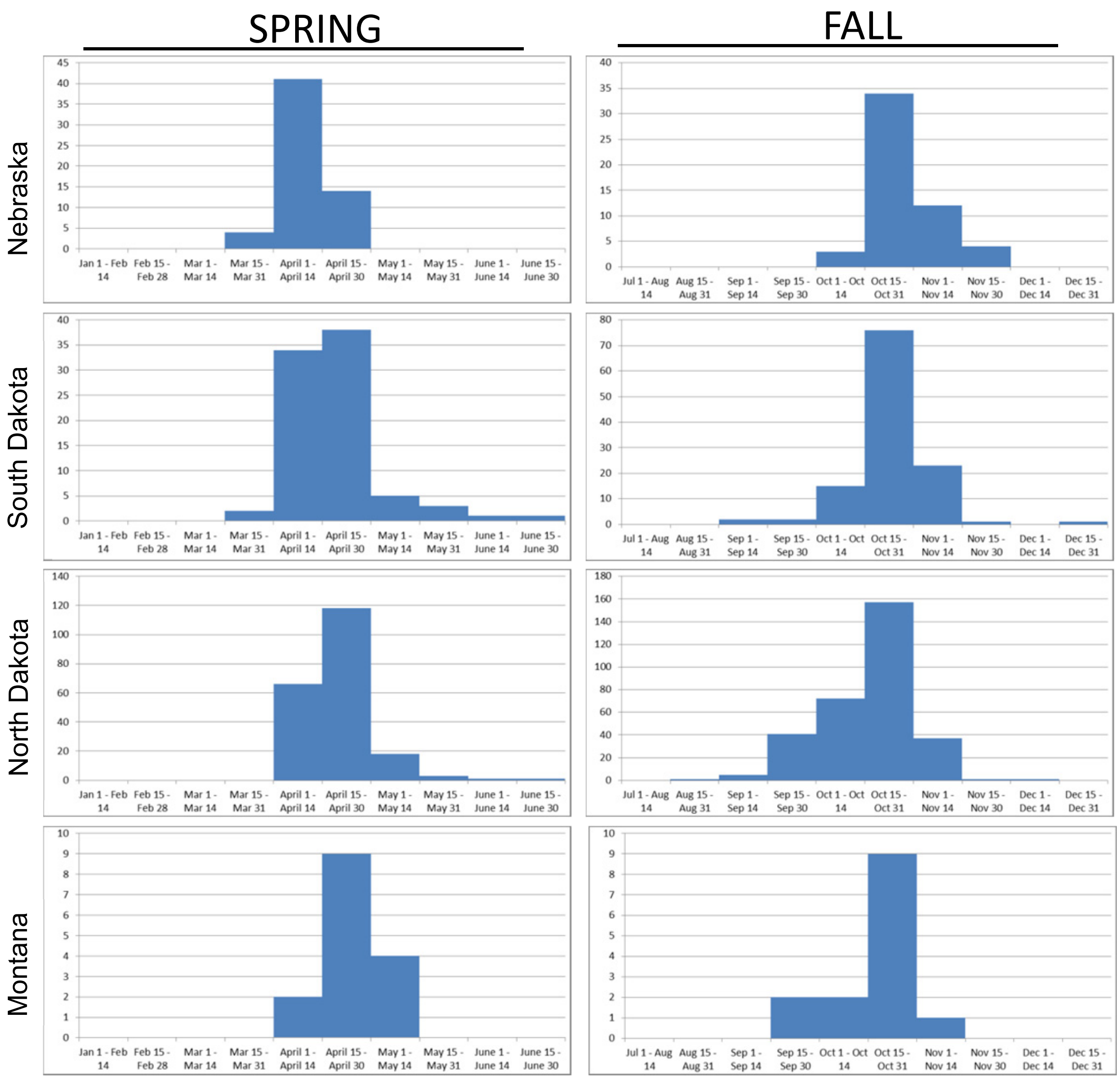


**FIGURE 5.5.6-2 Histograms of Whooping Crane Observation Dates within the 95 Percent Migration Corridor in the UGP Region (dates from USFWS)**

unobstructed visibility for more than 0.25 mi (0.4 km) and were associated with river widths greater than 700 ft (213 m). Visibility and adequate distance from human activity may be important whooping crane requirements during the spring and fall migration periods. They also need access to wetlands for both foraging and nocturnal roosting; individuals prefer to roost in shallow water, well away from heavy shoreline or island vegetation.

Stopover occurrences during migration are common throughout South Dakota; there were 570 observations of whooping cranes in South Dakota between 1957 and April 2009. The majority of sightings were in the central portion of the State along the Missouri River corridor (USFWS sighting database, Grand Island, Nebraska). Whooping crane data analyzed by

Gil-Weir and Johnsgard (2010) showed a total overwintering population of 269 in 2009–2010 at the Aransas National Wildlife Refuge. Their analysis of spring migrating crane sightings in Nebraska showed observations from seven to nine counties during the period of 2006–2010. In the spring of 2010, the largest number of confirmed sightings in Nebraska were from Custer (19), Kearney (8), and Buffalo (8) counties. The variations between years in the counties where sightings have occurred are likely related to changes in strength and direction of prevailing winds and local weather conditions during migration, which force cranes to use different stopover locations from one year to the next. Most historic sightings of migrating whooping cranes in Nebraska have occurred along the central Platte River, but there have been fewer sightings in the Niobrara, Middle Loup and North Loup rivers. The greatest numbers of observations of whooping cranes in Nebraska from 1989–2009 were in Buffalo, Cherry, Custer, Hall, Kearney, Keya Paha, Rock, Lincoln, Loup, Phelps, Sherman, Valley, Howard, Holt, Harlan, Hamilton, Adams, Garfield, Dawson, and Blaine counties (Gil-Weir and Johnsgard 2010). Austin and Richert (2001) analyzed whooping crane sightings in the Central Flyway during the period of 1943–1999. Their study evaluated various habitat factors including wetland type, distance of roost sites from feeding sites, foraging sites, diet, and wetland physical features. Analyses showed that the greatest number of sightings occurred in Nebraska and North Dakota, but they cautioned against making sweeping generalizations, drawing conclusions, and making inferences from the data. The following excerpt from their report identifies some of the difficulties in drawing conclusions from spatial and temporal data gathered from the sighting data:

> *[W]hooping cranes that stop in an area with a higher density of farmers and ranchers (e.g., loess region of Nebraska) are more likely to be detected than cranes that stop in less populated ranching areas like the Nebraska Sandhills region. Compared to other places in the flyway, whooping cranes may be more commonly reported on refuges, State management lands, or other conservation areas because biologists are actively looking for birds or are more available for confirmation of citizen-reported sightings. Level of interest and effort also may vary among States. For example, the numerous papers published in Nebraska Bird Review and proceedings of crane workshops indicate that biologists in Nebraska have long had a strong interest in recording whooping crane occurrences. Seasonal and yearly biases in observation data also exist. For example, many fall sightings for North Dakota are reported by hunters (S. Kohn, North Dakota Game and Fish Department, Bismarck, ND, personal communication); areas and habitats frequented by hunters likely differ from those frequented by farmers. As areas have become known over the years as whooping crane "use areas," observers have focused increased attention to these regions for further sightings. Landscape patterns also may influence detectability. For example, farmers tend to spend more time monitoring their croplands than wetlands, hence increasing the probability of seeing cranes in crop areas. Furthermore, visibility of areas used by whooping cranes may be obstructed (e.g., heavily forested river edges vs. open reaches, hills that isolate wetland areas from roads). Such spatial and temporal factors will influence the detection of whooping cranes and therefore will bias the data so that particular regions and habitat types may be over- or under-represented relative to actual use by migrants.*

Winter surveys of the AWB whooping crane population have shown continued increases, with the total count consistently remaining above 200 total individuals since 2004. The winter population recorded at Aransas National Wildlife Refuge and adjacent areas is shown in table 5.5.6-2. Barring some adverse impact on the breeding grounds or wintering areas, the population would likely continue to remain at about 250 or more individuals.

Numerous historic factors have led to the decline of the whooping crane. Major threats include limited genetic diversity in a relatively small population, loss and degradation of migration stopover habitat, collisions with utility power lines, degradation of coastal habitat, and the threat of chemical spills in Texas. Whooping cranes are faced with various natural risks both during their annual migration and while they are using wintering grounds; because of low population numbers, sources of natural mortality, including predation and severe weather events such as hurricanes, also pose significant threats.

Known causes of mortality during migration include predation, shooting, trauma from collisions, avian tuberculosis, and viral infections (USFWS 2009a). Petroleum spills along the Gulf Coast can adversely affect the food supply for wintering whooping cranes, which commonly feed in saltwater marshes. Reductions in freshwater inflow to wetlands in the wintering grounds has affected blue crab populations (important winter food for cranes) and have been implicated in declines in the condition of overwintering individuals and significant mortality within the population. Sea level rise along coastal wetlands and land development in areas adjacent to Aransas National Wildlife Refuge have also adversely affected wintering habitat (CWS and USFWS 2007).

Collisions with power lines are thought to be one of the significant threats to the survival of migrating whooping cranes (Stehn 2008). The USFWS cites power lines as the single greatest threat of mortality to fledged or juvenile whooping cranes during migration (Stehn and Wassenich 2008; USFWS 2009a). Between 1959 and 2010, 49 whooping cranes have been killed by colliding with power lines. It is important to note in this information that the bulk of

**TABLE 5.5.6-2 Winter Whooping Crane Counts of the Aransas Wood Buffalo Population**

| Year | Adult | Young | Total | Reference |
|---|---|---|---|---|
| 2000–2001 | 171 | 9 | 180 | CWS and USFWS 2005 |
| 2001–2002 | 161 | 15 | 176 | CWS and USFWS 2005 |
| 2002–2003 | 169 | 16 | 185 | CWS and USFWS 2005 |
| 2003–2004 | 169 | 25 | 194 | CWS and USFWS 2005 |
| 2004–2005 | 183 | 34 | 217 | CWS and USFWS 2005 |
| 2005–2006 | 190 | 30 | 220 | Crane Trust 2010 |
| 2006–2007 | 192 | 45 | 237 | Crane Trust 2010 |
| 2007–2008 | 227 | 39 | 266 | Stehn 2008 |
| 2008–2009 | Unknown | Unknown | 270 | Gil-Weir and Johnsgard 2010 |
| 2009–2010 | Unknown | Unknown | 263 | Gil-Weir and Johnsgard 2010 |
| 2010–2011 | 238 | 42 | 280 | Stehn 2011 |
| 2013–2014 | 265 | 39 | 304 | Carlisle 2014[a] |

[a] Six additional whooping cranes were observed outside the survey area (310 total observations).

power line mortalities have occurred in the experimental introduced flocks. Of these 49 deaths, nine have occurred in the Aransas Wood Buffalo Population (AWBP) between 1956 and 2002, 21 in the Florida Non-Migratory Flock between 1997 and 2010, 13 in the non-extant Rocky Mountain Flock between 1977 and 2000, and six in the Wisconsin-Florida Migratory Flock between 2001 and 2009 (Stehn and Wassenich 2008; USFWS 2009a). The differences between the experimental flocks and the AWBP are considerable in both biology and habitat (Nesbitt 2011) and may explain the disparity in incidences of collision with power lines.

The experimental flocks, especially the Florida and Wisconsin-Florida flocks, reside in a landscape with differing urban pressures and infrastructure density. Figure 5.5.6-3 highlights the general migration paths utilized by each population and the density of power line infrastructure. The scale of the power line infrastructure is coarse, but it is important to note that the density of transmission to distribution is proportionally linked, meaning the higher the transmission line density the higher the distribution line density.

Human disturbance and density also varies between the migrating flocks. The six central flyway States of the AWBP, Texas, Oklahoma, Kansas, Nebraska, South Dakota and North Dakota, have a human population of approximately 36.15 million, while the six States of the Wisconsin–Florida migratory flock, Florida, Georgia, Tennessee, Kentucky, Illinois, and Wisconsin, have a population of 58.68 million (U.S. Census Bureau 2013). The human density between these six-State sets is markedly different. The human population density in the flyways can be used as an indicator of the human incursion into suitable stopover habitat. Clearly there is far more human incursion along the eastern migration route than in the central flyway and the UGP Region. This can affect the availability of proper forage, safe roosting locations, and

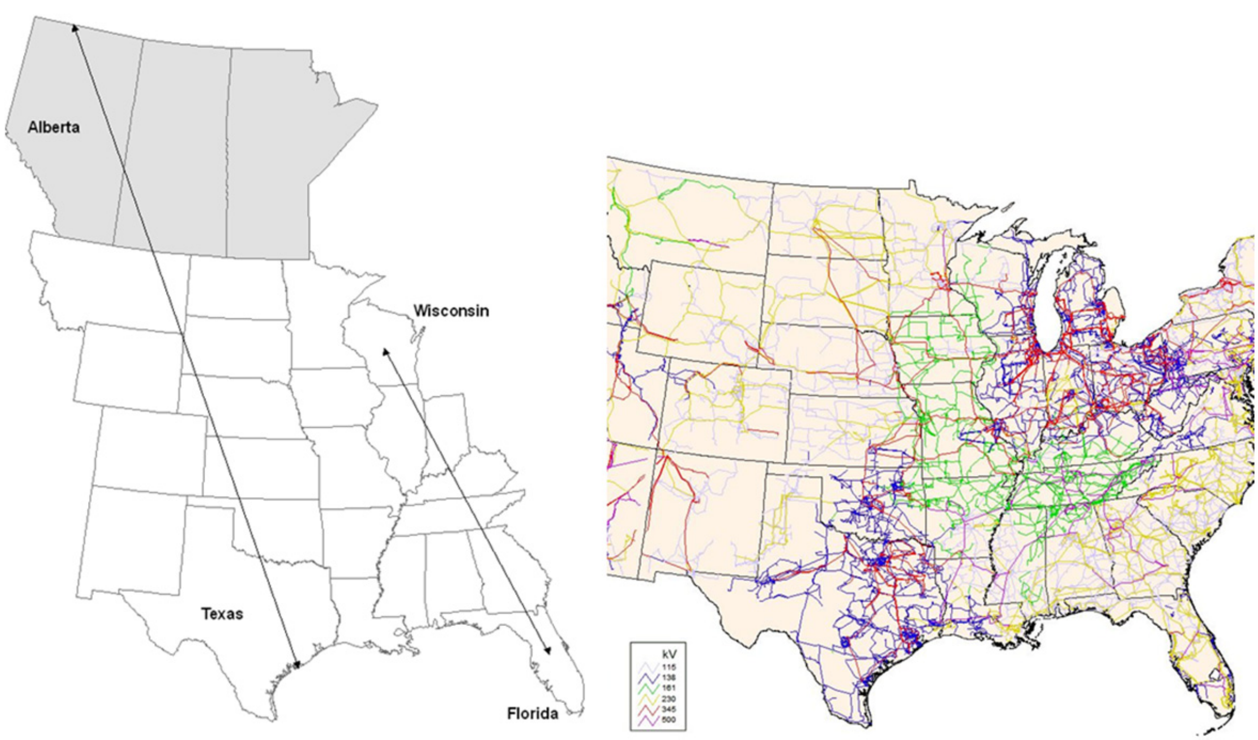


**FIGURE 5.5.6-3 Two Migration Paths for Whooping Cranes and Transmission Line Density Map (Images courtesy of Texas Parks and Wildlife and Federal Emergency Management Agency)**

successful rest during migration. Human disturbance can flush flocks (via vehicle traffic, curious domestic animals, curious people, lights and noise, etc.) from any stopover site. As the transmission line density map indicates, higher human density is linked to higher overhead line density (more people require more power). The increase in line prevalence logically results in higher risk to whooping cranes from collision with overhead lines.

Given the differences in human population density, power line density, human incursion into the habitat, differing stopover availability, and possible unique migration behavior differences, consolidating the experimental flocks together with the AWBP does not accurately assess the risk the AWBP encounters relative to mortality sources in the central flyway and UGP Region.

Clearly, whooping cranes are at risk from death resulting in collision with overhead lines when there have been nine collisions within the AWBP and UGP Region. Most whooping crane mortality from power lines comes from distribution lines (less than 69 kV) and not transmission lines that would be associated with wind generation projects. Most wind projects have minimal to no new transmission line construction, as will those projects considered under this programmatic Biological Assessment. Table 5.5.6-3 shows the nine whooping crane mortalities within the central flyway in the past 56 yr. Eight of the nine collisions have occurred with distribution lines rather than transmission lines. There have been no documented whooping crane collisions with transmission lines within the UGP Region. This may reinforce the concept that smaller-diameter lines may prove a higher risk to flying cranes (APLIC 2012). It may also support the idea that the lower-elevation lines (i.e., smaller structures and lower to the ground lines) represent a greater risk. The collision risk may simply be a function of the prevalence of distribution lines as well. The risk may be a combination of all three: the diameter of the wire, the elevation of the wire, and the ubiquitous nature of the wire.

The difference in wire diameter between distribution lines and transmission lines differs based on the voltage of the line. The increase in diameter of the distribution wire increases the visibility of the wire and can reduce the risk of collision between the two voltages (APLIC 2012). However, the overhead static wire on transmission lines is generally smaller in diameter than the energized conductor itself and can pose a similar risk to that of the distribution wire (because they average roughly the same diameter). No new distribution lines are proposed within this programmatic BA.

**TABLE 5.5.6-3 Nine Whooping Crane Collisions in AWBP Flock**

| Month | Year | State | Line Type |
|---|---|---|---|
| May | 1956 | TX | Transmission |
| November | 1965 | KS | Distribution |
| April | 1967 | KS | Distribution |
| October | 1981 | SK | Distribution |
| October | 1982 | TX | Distribution |
| October | 1988 | NE | Distribution |
| October | 1989 | NE | Distribution |
| October | 1997 | SK | Distribution |
| April | 2002 | TX | Distribution |

Collisions of migrating whooping cranes with wind turbines are a possibility, although no documentation of such occurrences currently exists. Observations of migrating whooping cranes in the vicinity of one wind farm in South Dakota suggest that migrating whooping cranes may avoid operating wind turbines while in flight (Tetra Tech 2011). Cooper (2006) suggests that crane flight speed is so slow that they may be able to detect and avoid turbines. The first documented cases of sandhill cranes being struck by wind turbine blades were from a study of wintering cranes on the Texas High Plains in 2010. Sandhill cranes are often considered as a surrogate species for evaluating potential effects on whooping cranes because they are biologically and behaviorally similar (USFWS 2010n). Other factors may have contributed to the sandhill crane strikes. Navarrete (2011) and Navarrete and Griffis-Kyle (2013) observed two separate sandhill crane strikes at different wind farms. Cranes used that area during migration and part of winter, foraging in agricultural areas and roosting at night in playas. Navarrete and Griffis-Kyle (2013) believe that, due to greater concentrations of cranes, cranes in large flocks may have lower levels of attention, concentrating on the flock's lead bird (Pattersson 2005). Navarrete and Griffis-Kyle (2013) also state that low visibility at dusk and dawn might also be a factor.

To address the possibility of turbine blade strike, the USFWS has recommended that wind energy developers cease wind turbine operation when whooping cranes are in the area and recommence turbine operation only after daytime monitoring indicates that cranes have left the area (Stehn 2008). Project proponents will develop a monitoring plan through coordination with the local USFWS office to ensure monitoring occurs by a qualified biologist or company employees trained in the identification of sandhill and whooping cranes. Implementation of such recommendations was initiated in 2010 for a wind energy project located in South Dakota, with a monitor reporting sightings of whooping cranes during spring and fall migrations and curtailment of turbine operations while whooping cranes remained in the vicinity of the wind energy project site (Tetra Tech 2011). After 3 yr of recording whooping and sandhill crane behavior at the Titan 1 Wind Farm (2010–2012), a total of 10 whooping cranes were observed in the spring and fall of 2010 (Nagy et al. 2012). Whooping crane flight behaviors did not create a risk of collision in either season. Nagy et al. (2012) concluded that whooping and sandhill cranes appear to have low risk of collision with wind turbines due to their ability to avoid turbines by flying over, around, or through gaps within a turbine string. A total of 11,330 sandhill cranes were detected flying over, around, and through the turbine string in spring and fall (no fall 2012 data) with no strikes detected. They concluded that risk of turbine collision is minimal due to crane migratory flight behavior (tendency to fly above the height of the rotor-swept area) when turbines are visible. Collision risk may increase when visibility is reduced due to weather conditions or topography.

Another instance was at the Wessington Springs Wind Energy facility in Jerauld County, South Dakota. Wessington Springs I, LLC, contracted with Western EcoSystems Technology, Inc. (WEST), to conduct whooping crane monitoring surveys in the Wessington Springs Wind Resource. In the fall of 2010, thousands of sandhill cranes were monitored within the project area, as well as 12 whooping cranes. Turbines were successfully shut down for the day until the whooping cranes left the area (WEST, Inc. 2010).

At another wind facility in South Dakota operated by Basin Electric Cooperative, a whooping crane contingency plan is also in effect. The spring whooping crane migration season runs from March 24 to May 15th each year. During both spring and fall migration seasons, trained biologists are on site at the wind park for whooping crane monitoring. At approximately

12:00 PM, April 17, 2012, two whooping cranes were identified by a biologist at the Crow Lake Wind Park. The cranes were observed flying over the southern portion of the wind park, at approximately 1,000 ft (305 m), which is roughly 600 ft (183 m) above the top of the wind turbine blades. The biologist making the identification immediately notified Basin Electric distributed generation dispatch and the Basin Electric onsite operation maintenance supervisor. Distributed generation dispatch immediately turned off the wind turbine the cranes were sighted above and all surrounding turbines. Following a call from the biologist that the cranes were flying in a northwesterly direction, additional turbines were turned off. Turbines were back in operation when the whooping cranes left the area (Witham 2012).

Derby et al. (2012) has since summarized their monitoring efforts at five operating wind facilities in North and South Dakota (including the aforementioned Wessington Springs). Over 17,000 total hours of crane use surveys were completed during 2–4 yr of surveys at each site, including mortality surveys (Derby et al. 2012). Eighteen whooping cranes were observed at four of the five sites (including the 12 whooping cranes cited above). The authors believe that they cannot state whether there was or was not displacement of cranes from wind facilities, but whooping cranes only once came close enough to turbines to warrant curtailing turbines. There were no documented crane strikes. Derby et al. (2012) concluded that cranes do not appear to be overly susceptible to turbine collision, as approximately 6000,000 sandhill cranes and 300 whooping cranes migrate through the corridor twice per year with no fatalities found. Crane monitoring and shut-down protocols have demonstrated that they are implementable and effective in removing the risk of turbine blade strikes when and while whooping cranes are within the area of an operating wind facility.

Reductions in migration stopover habitat due to human development and degradation of wetland habitats could concentrate wetland birds, including waterfowl and cranes, into remaining areas and increase the potential for spread of disease. Habitat degradation has occurred at some riverine sites where shrubs and tree growth reduces visibility of cranes at roosting sites. Reduced visibility at roost sites could make cranes more vulnerable to predators and, as described above, cranes tend to prefer roost sites with views that are unobstructed for extended distances. Breeding grounds in Canada are also being affected by changing weather patterns and reduced permafrost, which results in wetter soils and changes in the prey base.

#### 5.5.6.1 Direct and Indirect Effects of the Action

Analyses of whooping crane sighting data between 1975 and 2007 showed that about 75 percent occurred within 40 mi (64 km) of the centerline of the historic migration corridor within the Central Flyway. About 95 percent of sightings were within 110 mi (177 km) of the centerline. Any wind energy development within the migratory corridor could pose a risk to cranes through degradation or loss of wetland and foraging habitat, direct mortality of cranes through collisions with turbine blades, and collisions with overhead power lines that connect wind energy projects to the transmission system (collector lines are typically buried and, in such cases, would pose no collision mortality risk). The risk of death of cranes from colliding with wind turbines is expected to be discountable because whooping cranes typically avoid human activity or developments and because the relatively small numbers of whooping cranes are spread over a large geographic area. In South Dakota, migrating whooping cranes appeared to avoid operating wind turbines at one wind farm (Tetra Tech 2011) or flew directly overhead (Witham 2012).

There is some evidence that overwintering sandhill cranes, which may be similar to whooping cranes in terms of behavior and habitat selection, avoided areas around wind farms in Texas (Navarrete 2011). Although this may indicate that direct collisions with turbines are less likely, cranes could also be indirectly affected if areas that could provide suitable stopover habitat in the vicinity of wind farms were avoided as a result of construction activities and the presence of wind energy facilities. The presence and operation of wind turbines in close proximity to wetlands may have a similar effect of precluding the use of otherwise suitable wetland roosting habitat. In an opinion by the South Dakota Field Office (USFWS 2010n), the USFWS states that the loss of stopover habitat use (if whooping cranes avoid the entire project area) would be relatively small considering the large area within the AWAP migration corridor is over 300 million ac (121 million ha). That is, even though there may be some avoidance of potential roosting wetland habitats within the area encompassed by a proposed wind project, the small amount of affected habitat should not be limiting to or have significant adverse effects on whooping crane populations. In most cases, nearby suitable habitat would continue to be present outside the project boundaries, and migration habitat in the UGP Region is not currently believed to be limiting to the AWAP. This programmatic BA would not extend to projects sited within 5 mi (8 km) of designated critical habitat in Nebraska, within 1 mi (1.6 km) of wetlands that provide suitable stopover habitat, or within 5 mi (8 km) of the Platte or Niobrara rivers in Nebraska.

#### 5.5.6.2 Cumulative Effects

If the wind industry continues to develop wind farms within the AWBP migration corridor as is foreseen, these farms, and the overhead transmission lines typically associated with them, will present increased structural hazards to this species. The Great Plains States traversed by whooping cranes are among the windiest States in the nation. The least developed areas within these States (often due to topography not conducive to farming practices) often have high-value wind resources that appeal to the wind industry. Some of these undeveloped areas within the AWBP migration corridor also likely present attractive stopover sites and, consequently, the potential for overlap with future wind energy development is high.

Given the current economic climate and a host of other variables, it is difficult to accurately predict the actual growth of wind energy in the UGP Region, which includes a portion of the migration corridor for the AWBP population. The number of wind turbines and associated infrastructure is increasing, and will likely continue to increase in the foreseeable future. Because research on whooping crane response to wind turbines is limited, it is difficult to predict the cumulative impacts of wind energy project development and disturbance within the whooping crane corridor. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the whooping crane within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species. It can be assumed that as overall development and disturbance within the migratory corridor continue to increase, migratory stopover habitat quality and quantity would continue to degrade. Past activities that have affected habitat in the UGP Region also include conversion of native vegetation and CRP lands for farming, and construction of roads, power lines, and residences.

Development of electrical power generation and transmission within the crane migration corridor has contributed to a baseline condition that presents a risk to a small and vulnerable whooping crane population. Continued development of power generation and transmission, whether from renewable or non-renewable sources, will likely increase the potential for collisions with structures and loss or avoidance of stopover habitat. Although global warming may decrease the quality and quantity of wetland stopover habitat, its effects may not become significant until the end-life of wind projects considered in this BA and programmatic EIS.

#### 5.5.6.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting the potential adverse effects on the whooping crane. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general BMPs (table 4.5-1) and factor such measures into the siting, construction, operation, maintenance, and decommissioning plans for projects proposed in any county in which the whooping crane has been reported (table A-1; figure A-12). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys to identify the presence of designated critical habitat for the whooping crane (currently limited to Nebraska) within 5 mi (8 km) of project footprints and the presence of suitable migratory stopover habitat for the whooping crane[3] within 1 mi (1.6 km) of the project footprint. Onsite surveys by qualified biologists may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys for projects within the 95 percent migration corridor (figure 5.5.6-1) that the species, its critical habitat, or suitable migratory stopover habitat occurs in the project area as identified above, the following species-specific avoidance measures would be required:

- Do not site turbines, transmission lines, access roads, or other project facilities within 1 mi (1.6 km) of wetlands that provide suitable stopover habitat or within 5 mi (8 km) of the Platte or Niobrara Rivers in Nebraska.

[3] Suitable migratory stopover habitat for whooping cranes is considered to consist of wetlands with areas of shallow water without visual obstructions (i.e., high or dense vegetation) and submerged sandbars in wide, unobstructed river channels that are isolated from human disturbance (USFWS 2010b).

- Do not site turbines, transmission lines, access roads, or other project facilities within 5 mi (8 km) of designated critical habitat.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on whooping cranes would also be required. Identification of designated critical habitat and suitable migratory stopover habitat and adjustment of project plans to avoid such areas will serve as the preferred means of avoiding or minimizing impacts on whooping cranes. The USFWS (2009a) recommends using siting considerations during the early project planning stage to avoid direct and indirect impacts on whooping cranes and their habitats from wind energy facilities and, to the extent possible, incorporate measures into plans for construction, operation, and maintenance to minimize potential impacts. To avoid and reduce potential impacts on whooping crane individuals and habitat, proponents for wind energy projects applying for interconnection to Western's transmission facilities or placement of wind energy structures on USFWS grassland easements within the AWBP migration corridor (see figure 5.5.6-1) will be required to implement the following specific measures, which are based, in part, on USFWS (2009a, 2010n) recommendations and guidance:

- Place approved bird flight diverters on the top static wire on any new or upgraded overhead collector and transmission lines located within 1 mi (1.6 km) of suitable stopover habitat.

- Establish a procedure for preventing whooping crane collisions with turbines during operations by establishing and implementing formal plans for monitoring the project site and surrounding area for whooping cranes during spring and fall migration periods throughout the operational life of the project (or as determined by the local USFWS field office) and shutting down turbines and/or construction activities within 2 mi (3.2 km) of whooping crane sightings. Monitoring can be done by existing onsite personnel trained in whooping crane identification. Specific requirements of the monitoring and shutdown plan will be determined during preconstruction evaluations. Sightings of whooping cranes in the vicinity of projects will be reported to the appropriate USFWS field office immediately.

- Instruct workers in the identification and reporting of sandhill and whooping cranes, and to avoid disturbance of cranes present near project areas.

- Within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings, the acreage of wetlands that are suitable migratory stopover habitat located within a 0.5 mi (0.8 km) radius of turbines may be mitigated based upon site-specific evaluations.

#### 5.5.6.4 Effects Determination

Based on current information on the status of the AWB whooping crane population and its migratory corridor through the UGP Region, suitable migratory stopover habitat could be affected by new wind energy facilities and associated transmission lines placed within the AWBP migration corridor. The amount of stopover habitat that would be permanently affected by project facilities, including turbine towers, access roads, and new transmission towers needed to connect to transmission facilities, is expected to be small relative to the availability of similar habitat features within the migration corridor; indirect effects on stopover habitats, such as from surface water runoff and deposition of eroded soils in wetland areas, would be controlled through the implementation of the general conservation measures identified in table 4.5-1 and BMPs commonly used during construction, operation, and decommissioning of wind energy facilities. Although there is a potential for whooping cranes to avoid stopover habitats in the vicinity of wind energy facilities, the proportion of habitat that would be avoided would be small relative to the amount of available stopover habitat available within the migration corridor within the UGP Region, and energetic costs to whooping cranes from avoidance of such areas is also likely to be small. Avoidance of wind energy projects could further reduce the potential for whooping cranes to be killed by turbine strikes. To address the potential avoidance of suitable migratory stopover habitat, project proponents may be required to undertake measures to replace the ecological benefits for habitat located within 0.5 mi (0.8 km) of turbine towers by protecting other suitable habitat with no wind development, funding support of conservation efforts by others to protect suitable habitat, or supporting general conservation measures that protect the prairie ecosystem such as preservation of other areas containing wetlands and native prairie.

Based upon the best available information about the causes of mortality of migrating whooping cranes and sandhill cranes (considered a surrogate species for evaluating potential effects on whooping cranes), the risk of direct mortality due to collisions with wind turbines is expected to be discountable and insignificant; with implementation of the identified monitoring for the presence of whooping cranes during the spring and fall migrations and curtailment of turbine operations when individuals are in the vicinity of wind energy projects, turbine strikes are considered unlikely.

Available information about the causes of mortality of migrating whooping cranes indicates, as presented above, that fatalities from collisions with overhead power lines associated with wind energy projects, as with transmission lines for many other energy projects within the UGP Region, is more unlikely than mortality from turbine strikes. It is recognized that although collisions with power lines occur within the Central Flyway, the likelihood of whooping cranes striking overhead power lines within the AWBP migration corridor is low. The potential for collisions is considered greatest in the vicinity of stopover habitats as high-flying cranes descend or as cranes using stopover habitats move about. It should be noted that there have been no documented collisions of whooping cranes with transmission lines within the UGP Region. To address any potential for such collisions, applicants for projects to be placed within the migration corridor would be required to bury collector lines and minimize the placement of overhead transmission lines near suitable stopover migratory habitats, as practicable. Installation of approved bird flight diverters on static wires will be required for any new overhead transmission lines placed within 1 mi (1.6 km) of potentially suitable stopover habitat located within the migration corridor. In lieu of identifying suitable migratory stopover habitat, the project proponent would mark all project transmission lines with approved bird flight diverters. Marking new power lines in the vicinity of potential stopover habitat will maintain (i.e., not increase) the current baseline condition for the threat of power line strikes by whooping cranes.

With the implementation of conservation measures described above (summarized in table 5-1), including requirements to avoid development near wetlands that provide suitable stopover habitat or within 5 mi (8 km) of the Platte or Niobrara Rivers in Nebraska; incorporation of the BMPs listed in table 4.5-1; and implementation of additional project-specific BMPs if deemed necessary when siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the whooping crane. The proposed action will have **no effect** on designated critical habitat for the whooping crane.

## 5.6 MAMMALS

### 5.6.1 Black-Footed Ferret

The black-footed ferret (*Mustela nigripes*) is currently listed as endangered except where nonessential experimental populations exist. In the United States, the black-footed ferret was listed as endangered with extinction in 1967 (USFWS 1967) and the endangered listing status was revised in 1970 (USFWS 1970); both listings were "grandfathered" into the Endangered Species Act of 1973. The black-footed ferret was once considered extinct until a small population was discovered in Mellette County, South Dakota, in 1964. A second population was discovered near Meeteetse, Wyoming, in 1981. Since then, there have been 11 reintroductions of nonessential experimental populations across the species' historic range (USFWS 2010o) or recently, under an ESA Section 10(a)(1)(A) permit. Nonessential experimental populations of the black-footed ferret are currently known from south central Wyoming; southwestern South Dakota; north-central Montana; Aubrey Valley, Arizona; northwest Colorado/northeastern Utah; north-central South Dakota; and south-central South Dakota (USFWS 2008b). The reported county-level distribution of the black-footed ferret is illustrated in figure A-13 and includes nonessential experimental ferret reintroduction sites as well as ESA Section 10(a)(1)(A) permitted sites. Critical habitat for the black-footed ferret has not been designated. A species recovery plan was completed in 1988 (USFWS 1988c) and a revised draft recovery plan was published in 2013 (USFWS 2013f). Nonessential experimental populations of black-footed ferrets that occur on national wildlife refuge/National Park Service system lands are treated as threatened species for the purposes of Section 7 consultation. As such, nonessential populations are considered in this BA in counties containing national wildlife refuge/National Park Service system lands.

The black-footed ferret is a medium-sized mustelid typically weighing 1.4 to 2.5 lb (0.6 to 1.1 kg) and measuring 19 to 24 in. (48 to 61 cm) in total length (USFWS 2010o). The species has upper body parts that are yellowish and whitish buff, black feet and tail tip, and a black "mask" across the eyes (USFWS 2010o). The black-footed ferret is the only ferret species native to the Americas. The species is limited to open habitat, the same habitat used by prairie dogs throughout grasslands, steppe, and shrub steppe in the Mountain-Prairie Region of the United States. The States with designated nonessential experimental population areas are Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming (USFWS 2008b). The global range of this species includes Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming, as well as portions of Canada and Mexico.

Black-footed ferrets prey almost entirely on prairie dogs and use their burrows for shelter and denning; they are therefore considered obligate to the prairie dog. There are specimen records of black-footed ferrets from the ranges of three species of prairie dogs: black-tailed prairie dogs (*Cynomys ludovicianus*), white-tailed prairie dogs (*Cynomys leucurus*), and

Gunnison's prairie dogs (*Cynomys gunnisonii*) (Anderson et al. 1986). No documentation exists of black-footed ferrets breeding outside of prairie dog colonies (USFWS 2008b). The severe decline of prairie dogs (due to poisoning, agricultural conversion of habitat, and Sylvatic plague) in the last century resulted in the near extinction of black-footed ferrets. The ferret's decline may be partially attributable to other factors such as secondary poisoning from prairie dog toxicants (e.g., strychnine) or their high susceptibility to canine distemper and plague.

Within the UGP Region, the black-footed ferrets (endangered or nonessential experimental populations) are known from or could occur in 12 counties in South Dakota, 34 counties in Nebraska, 14 counties in North Dakota, and 27 counties in Montana (table A-1; figure A-13). The black-footed ferret is listed as endangered and a species of concern in Montana. The States of South Dakota and Nebraska list the species as endangered. The species is not listed by the State of North Dakota.

Primary threats to the continued existence of the species include poisoning of prairie dogs, climate change, and genetic fitness of the black-footed ferret. Poisoning of prairie dogs with zinc phosphide has been a prescribed practice since 1976 (USFWS 2008b). Climate change may affect the species' range through factors such as temperature increase, drought, and plague outbreaks (USFWS 2008b). Genetic fitness of current and future populations is also a concern due to the extreme genetic bottleneck that the species passed through for the captive breeding program. Gene diversity in the current ferret population is estimated to be 87 percent of that in the founder population. Two types of genetic effects that can affect a population's survival are genetic drift and inbreeding depression (USFWS 2008b).

Predicted suitable habitat models for the black-footed ferret exist only for the States of Montana and South Dakota. Approximately 46 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-22).

Reintroduction of nonessential experimental black-footed ferret populations began in 1991 in southeastern Wyoming, then southwestern South Dakota, followed by north-central Montana; Aubrey Valley, Arizona; northwestern Colorado/northeastern Utah; north-central South Dakota; and most recently south-central South Dakota (USFWS 2008b). Other reintroduction efforts not utilizing experimental, nonessential designations were initiated in Chihuahua, Mexico; Lower Brule Indian Reservation, South Dakota; Wind Cave National Park, South Dakota; northwest Arizona; central Kansas; and southeast Montana (USFWS 2008b); these technically are still considered endangered populations.

The 1988 Black-footed Ferret Recovery Plan set a goal of 200 breeding adults in a captive population by 1991. The current goal of the USFWS is to maintain a core breeding population of a minimum of 240 adults (90 males, 150 females) (Marinari and Kreeger 2006). This number addresses genetic management of the captive population by maintaining genetic diversity and provides an adequate number of surplus animals for reintroduction efforts. Although the captive population has expanded to about 290 animals, the USFWS has not endorsed the recommendation for a still larger captive population (USFWS 2008b). Currently, there are six reintroduction sites containing nonessential experimental black-footed ferret populations and three reintroduction sites under ESA Section 10 permits in the UGP Region. The locations of these populations in the UGP Region are shown in figure 5.6.1-1.

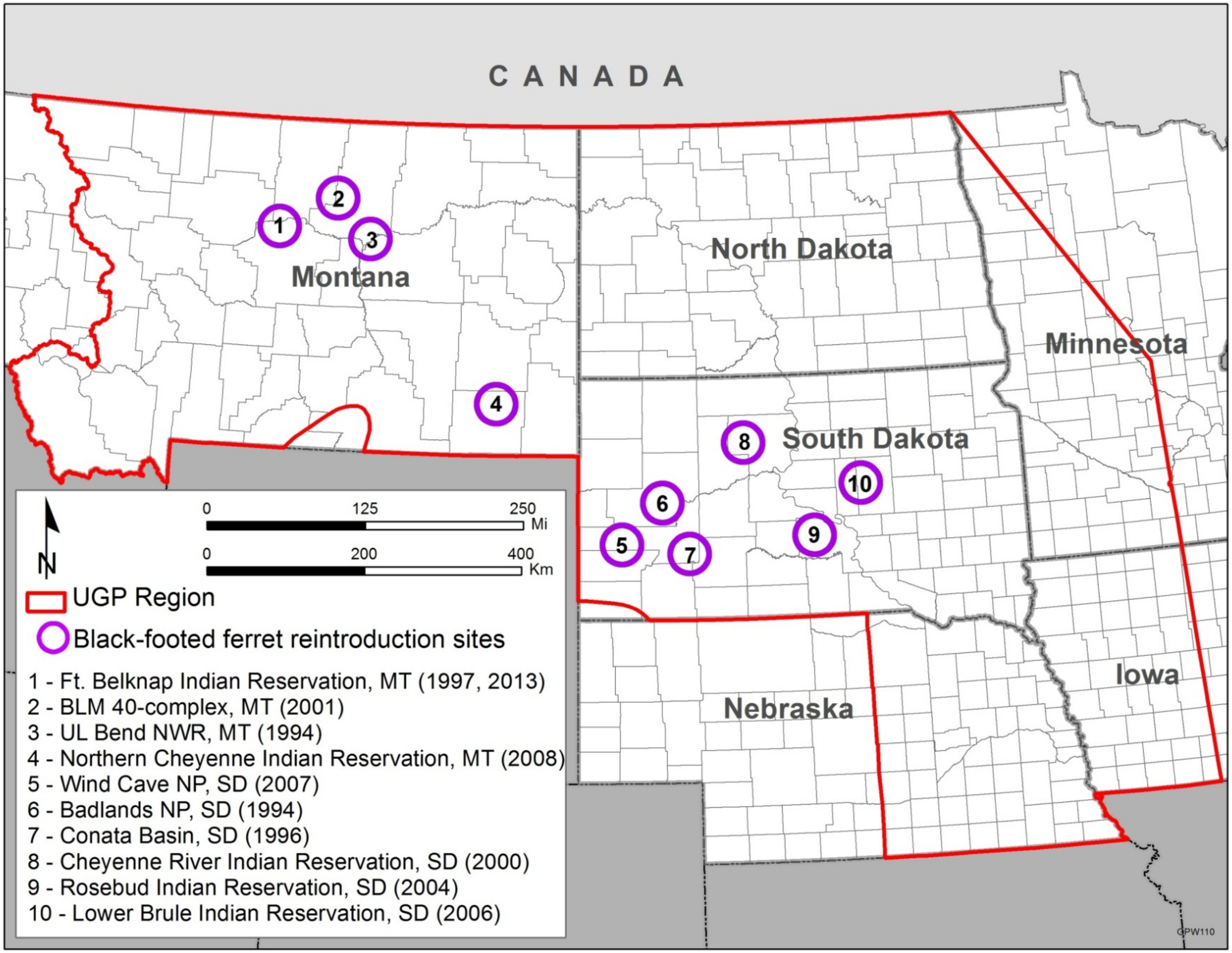


**FIGURE 5.6.1-1 Black-Footed Ferret Reintroduction Sites in the UGP Region**

#### 5.6.1.1 Direct and Indirect Effects of the Action

The distribution and abundance of the black-footed ferret is wholly dependent upon prairie dogs. Wind energy potential at habitats for these species in the UGP Region may be greater than surrounding areas due to the open, relatively flat areas selected by prairie dogs. Negative impacts of wind energy development on black-footed ferrets could occur in areas where prairie dogs are known to occur. Such impacts could result from loss of habitat and prey, predation by larger carnivores, disease transport, and direct mortality associated with project construction and operations (e.g., vehicle collisions).

#### 5.6.1.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various human land use practices have contributed to the decline in black-footed ferret populations. Most notably, the poisoning of prairie dogs is regarded as a major factor in the direct decline of prairie dogs and black-footed ferrets in areas where the species co-occur. Prairie dogs are not listed or protected where they occur in the UGP Region and are allowed to be taken or controlled through various means; poisoning is an effective way of controlling prairie dog populations. Organized prairie dog poisoning programs have been in existence since the early 1900s (USFWS 2008b). Prairie dog poisoning has been conducted by various landowners for agricultural, commercial, residential, and recreational purposes. Climate change may also have a continued impact on the black-footed ferret. A shift in the species' geographic range may occur due to an increase in temperature and drought. In addition, a strong relationship between plague outbreaks and climatic variables has been established (Stenseth et al. 2006; Snall et al. 2008). The key climatic variables appear to be maximum daily summer temperature (plague is enhanced by cooler summer temperatures) and late winter precipitation (plague is enhanced by increased precipitation) (USFWS 2008b). As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the black-footed ferret within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.1.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General measures and BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy development under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the black-footed ferret. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the black-footed ferret has been recorded (table A-1; figure A-13). It had been previously determined (Lockhart et al. 2006; Hanebury and Biggins 2006) that finding extant populations of ferrets outside black-footed ferret reintroduction sites was highly unlikely. However, recent reports from the North Dakota Ecological Services office (Shelley 2012) indicate that colonization of adult ferrets into southern North Dakota from a reintroduced population in South Dakota has occurred. This movement of wild animals may indicate successful reintroduction efforts and expanding population numbers. The USFWS Ecological Services Field Office within each State should be contacted to determine if within those counties, project applicants may be required to complete preconstruction evaluations and/or surveys, performed by qualified biologists, to determine the potential for occurrence of black-footed ferrets and their habitat in relation to the project area. Surveys should be conducted in accordance with the *Black-Footed Ferret Survey Guidelines* (USFWS 1989c) and other USFWS-approved methods. Although it is preferred that no wind energy developments occur in areas where reintroduced populations of black-footed ferret are known to occur (figure 5.6.1-1), no adverse effects of wind development have been demonstrated for black-footed ferrets. Therefore, if it is determined by USFWS Ecological Services Field Office that a significant active prairie dog complex may occur in the project area within or adjacent to a black-footed ferret reintroduction site, a number of additional conservation measures specifically intended to reduce the potential for adverse effects on the black-footed ferret would also be required. These additional avoidance and minimization measures include the following measures.

***Avoidance Measures***

- Avoid siting turbines, transmission lines, access roads, or other project facilities on prairie dog colonies where black-footed ferrets have been reintroduced or are known to occur.

- If project facilities cannot avoid prairie dog colonies where ferrets are expected to live, then conduct preconstruction surveys in areas of suitable habitat where the project may impact prairie dog colonies.

***Minimization Measures***

- Report observations of ferrets, their sign, or carcasses on the project area to the USFWS within 24 hours and work with the USFWS's black-footed ferret coordinator or local USFWS Ecological Services Office to determine whether additional measures need to be undertaken.

- Do not commence construction activities until any needed ferret surveys are completed and reviewed by the local USFWS Ecological Services Office.

- Ensure that prairie dog colonies are not poisoned or compromised due to wind development on the site.

- If black-footed ferrets have been or are being considered for reintroduction at a location where wind development is proposed, project proponents will partner with the local ferret recovery team to exchange information and provide assistance or management as may be appropriate at that site.

#### 5.6.1.4 Effects Determination

The implementation of BMPs and conservation measures to avoid or minimize the disturbance of prairie dog colonies, such as those suggested in the USFWS's *Land-Based Wind Energy Guidelines* (USFWS 2012c), should reduce impacts of wind energy development in the UGP Region on the black-footed ferret. The use of pesticides, herbicides, or other chemicals (if needed) that are approved by the USFWS as posing no risk of poisoning prairie dogs or black-footed ferrets could also limit potential impacts. With the implementation of the conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that the proposed action **may affect, but is not likely to adversely affect** the black-footed ferret.

### 5.6.2 Canada Lynx

The Canada lynx (*Lynx canadensis*) was originally listed as a threatened species by the USFWS on March 24, 2000 (USFWS 2000a). Areas of critical habitat for the Canada lynx were designated in 2006 and revised in 2009 (USFWS 2006, 2009d). The USFWS has recently proposed to revise the critical habitat designation of the Canada lynx (USFWS 2013f) and to replace the current lynx distinct population segment definition that extends the protections of the ESA to lynx wherever they occur in the contiguous United States. The Canada lynx is a medium-sized cat with long legs; large, well-furred paws; long tufts on the ears; and a short, black-tipped tail (USFWS 2000a). Adults usually measure 30 to 35 in. (76 to 90 cm) long and weigh 18 to 23 lb (8 to 10.5 kg). Lynx populations in the contiguous United States are at the southern ends of the north-central Canadian and Alaskan populations. These populations are centered in the Mountain-Prairie Region in areas of mixed deciduous-coniferous forest. The United States population is sustained by cyclic influx from northern lynx populations (NatureServe 2013; USFWS 2000a).

The Canada lynx generally occurs in boreal and montane regions dominated by coniferous or mixed forests with thick undergrowth to support prey populations. Diet for the Canada lynx consists primarily of small mammals and birds and, in particular, snowshoe hare. On occasion, the lynx feeds on squirrel, beaver, deer, moose, and muskrat. Lynx are specialized predators of the snowshoe hare (*Lepus americanus*). Lynx population numbers follow hare cycles. The association between lynx and snowshoe hare is considered a classic predator-prey relationship (USFWS 2000a). Large numbers of the hare are necessary to support survival of lynx kittens and recruitment and maintenance of the lynx population (McCord and Cardoza 1982). As a result, lynx disperse during times of low hare production. Depending on the quality of habitat, the lynx may migrate long distances or have large home ranges. Home ranges of this species can vary from 3 to 300 $mi^2$ (8 to 800 $km^2$) (USFWS 2000a). Lynx prefer to move through continuous forest, particularly use the highest terrain (such as ridges and saddles), and have been observed to avoid large openings during movements within the home range (Koehler 1990; Staples 1995).

The Canada lynx is mainly nocturnal, being most active from the hours before sunset to the hours after sunrise. Canada lynx breeds in late winter to early spring in North America and gestation lasts 62–74 days. Dens sites are selected in mature or old growth stands with a high density of fallen logs. Litter size averages 3–4 with the adult females producing one litter every 1–2 years. Population density usually is less than 10 (locally up to 20) per 38.6 $mi^2$ (100 $km^2$), depending on prey availability. The mean lynx density in areas that support the species ranges between 2 and 9 individuals per 63 $mi^2$ (100 $km^2$) (NatureServe 2013).

Within the UGP Region, the Canada lynx is found in 22 counties in Montana and three counties in Minnesota (table A-1; figure A-14). Designated critical habitat within the UGP Region occurs in the following Montana counties: Carbon, Gallatin, Glacier, Granite, Flathead, Lewis and Clark, Lincoln, Missoula, Park, Pondera, Powell, Stillwater, Sweet Grass, and Teton (table A-1; figure A-14). Areas within 25 mi (40 km) of Western's transmission lines or substations and where a few USFWS easements may occur are only within Glacier, Pondera, Teton, and Lewis and Clark counties. The recently Proposed Critical Habitat (USFWS 2013f) occurs mostly on Federal lands. Critical habitat map unit coordinates and/or plot points on which each map is based are available to the public at the USFWS's internet site (http://www.fws.gov/montanafieldoffice) and at the USFWS field office responsible for the designation.

Predicted suitable habitat models for the Canada lynx exist for the States of Minnesota and Montana. Less than 1 percent of the predicted suitable habitat for this species in the UGP Region, occurs within 25 mi (40 km) of a Western substation and transmission line (table A-2; figure A-21) and there are few USFWS easements near suitable habitat within the UGP Region.

Primary threats of the Canada lynx are related to factors that lead to habitat loss or degradation. Suitable montane forest habitats have been lost due to suppression of forest fires and ecological succession to habitats that no longer support snowshoe hares. Habitat fragmentation, resulting from forestry practices, urbanization, or other human developments, isolates suitable habitats and discourages or prevents lynx movement. The lack of immigration from Canada lynx populations is an important factor in some regions. Other factors include trapping and competition with other predators such as bobcat and coyote.

#### 5.6.2.1 Direct and Indirect Effects of the Action

It is unlikely for wind energy development in the UGP Region to adversely affect the Canada lynx due to the lack of suitable core habitat in the vicinity of areas that might be best sited for wind energy development under the proposed program. Lynx have been observed to avoid large openings (Koehler 1990; Staples 1995) during daily movements within the home range. These clearings are necessary to site and erect todays large wind generators. It is unlikely for wind energy development to occur in high-elevation coniferous forests in the regions that support Canada lynx populations (Montana and Minnesota). It is possible that wind energy developments may affect peripheral habitat (lower quality habitat that is used during lynx dispersal), but it is likely that these effects would be insignificant or discountable given the disjunction of the location of the peripheral habitat and the wind resources. Therefore, habitat connectivity should be maintained.

#### 5.6.2.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various factors have contributed to the loss and degradation of contiguous old-growth montane and boreal forest habitats for the Canada lynx. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Canada lynx within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.2.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein. Conservation measures for the Canada lynx can also be found in the *Canada Lynx Conservation Assessment and Strategy* (Ruediger et al. 2000).

General BMPs that would be required of all wind energy projects to reduce ecological impacts from wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Canada lynx. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the Canada lynx has been recorded (table A-1; figure A-14). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of the Canada lynx and its habitat relative to the project footprint. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the species, its critical habitat, or suitable habitat may occur in the project area, the following species-specific avoidance measures would be required (table 5-1):

- Do not site turbines, transmission lines, access roads, or other project facilities in core lynx habitat, as defined in the USFWS September 2005 Canada lynx recovery outline (USFWS 2005c); and

- Do not site turbines, transmission lines, access roads, or other project facilities within designated critical habitat.

#### 5.6.2.4 Effects Determination

With the implementation of the conservation measures identified above (summarized in table 5-1 and in table 4.5-1), as well as the incorporation of BMPs in siting, constructing, and operating new wind energy facilities, it is determined that the implementation of the proposed action **may affect but is not likely to adversely affect** the Canada lynx and will have **no effect** on designated critical habitat for this species.

### 5.6.3 Gray Wolf

The Northern Rocky Mountain (NRM) population of the gray wolf (*Canis lupus*), occurring in the lower 48 States outside of Minnesota and areas where the species is considered experimental or nonessential, was completely delisted under the ESA on September 10, 2012, with the recovery finding for the Wyoming segment of the population (USFWS 2012d). The Western Great Lakes (WGL) population of the gray wolf, occurring within Michigan, Minnesota, and Wisconsin, was delisted on December 28, 2011 (USFWS 2011d). On February 20, 2015, in compliance with court orders to reinstate regulatory protections for the gray wolf, the USFWS issued a final rule as it relates to gray wolves in the western Great Lakes including endangered status for gray wolves in the eastern halves of North Dakota and South Dakota and the northern half of Iowa; threatened status for gray wolves in Minnesota; critical habitat for gray wolves in Minnesota; and the rule promulgated under section 4(d) of the ESA for gray wolves in Minnesota (USFWS 2015a). The rule does not affect the status of gray wolves in Montana. The gray wolf is still listed as endangered within the UGP Region in western North Dakota (south and west of the Missouri River upstream to Lake Sakakawea and west of the centerline of Highway 83 from Lake Sakakawea to the Canadian border), western South Dakota (south and west of the Missouri River), and throughout Nebraska.

The gray wolf historically occurred across most of North America, Europe, and Asia. In North America, gray wolves formerly occurred from the northern reaches of Alaska, Canada, and Greenland to the central mountains and the high interior plateau of southern Mexico. Gray wolves have very large and highly variable home ranges, which may range from 100 to over 1,000 $km^2$ (37 to over 370 $mi^2$). Wolves have no particular habitat preference, but they avoid human developments. The wide range of habitats in which wolves can thrive includes temperate forests, mountains, tundra, taiga, and grasslands. More suitable wolf habitats are typically characterized by public land, mountainous forested habitat (in the Midwest this includes areas that are transitional between the boreal forest and the broadleaf deciduous forest), abundant year-round wild ungulate populations, low road density, low numbers of domestic livestock (present seasonally), few domestic sheep, low agricultural use, and low human populations. Non-forested rangeland and croplands associated with intensive agricultural use (prairie and high desert) preclude wolf pack establishment and persistence (NatureServe 2013; USFWS 2012d). Gray wolves prey on ungulates (wild and domestic), but wolves also readily scavenge. Beavers are among the smallest important prey, but wolves can prey upon smaller mammals, birds, and fish. Reproductive life cycles of gray wolves involve breeding first as yearlings and once a year in February, producing a litter of one to 10 pups; most of the time about 5 are born about 63 days later. The pups normally stay with pack until they are over 1 yr old and then go off on their own (NatureServe 2013).

Within the UGP Region, populations of the gray wolf that are listed as endangered under the ESA could occur in all of North Dakota, South Dakota, and Nebraska as well as 49 counties in Iowa (table A-1; figure A-13). Within the UGP Region, populations of the gray wolf that are listed as threatened under the ESA could occur in 52 counties in Minnesota.

Primary threats to the existence of the gray wolf largely include interactions with humans. Anthropogenic threats include mortality by trapping, shooting, poisoning, and habitat loss. Therefore, most populations have been pushed out of their habitat and die because they cannot adapt or they are killed by spreading human development.

#### 5.6.3.1 Direct and Indirect Effects of the Action

There is potential for wind energy development in the UGP Region to adversely affect the gray wolf by displacing wolves or altering migratory corridors as a result of the fragmentation of contiguous parcels of undeveloped habitats. There is also the potential for incidental mortality resulting from vehicle collisions due to increased traffic in previously undisturbed areas. Because the UGP Region lies between the two delisted populations, NRM and WGL, it is possible that movement of individuals between the two populations may occur across the region. It is unknown if wolves avoid wind energy developments like they avoid other human disturbances or if the limited development opportunities surrounding the wind energy developments may provide intact migratory areas for the wolves.

#### 5.6.3.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various non-Federal factors continue to threaten the continued existence of this species across its range, including the purposeful killing of individuals and the fragmentation and degradation of suitable habitat for human developments. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the gray wolf within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.3.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts of wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the gray wolf. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county for which the gray wolf has been recorded (table A-1; figure A-13). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of gray wolves and their habitat relative to the project footprint. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, the following species-specific avoidance measure would be required (table 5-1):

- Do not site turbines, transmission lines, access roads, or other project facilities in habitats occupied by the gray wolf.

#### 5.6.3.4 Effects Determination

With the implementation of the conservation measure identified above (summarized in table 5-1and in table 4.5-1), it is determined that the implementation of the proposed action **may affect but is not likely to adversely affect** the gray wolf.

### 5.6.4 Grizzly Bear

The grizzly bear (*Ursus arctos horribilis*) was listed as threatened on March 11, 1967, under the Endangered Species Preservation Act of 1966, and is currently listed as threatened under the Endangered Species Act of 1973 (USFWS 1993b). In November 2000, an experimental nonessential population was established in portions of Idaho and Montana (USFWS 2000b). On September 21, 2009, the Federal District Court in Missoula issued an order vacating the delisting of the Greater Yellowstone Area grizzly population. In compliance with this order, the Yellowstone grizzly population was once again a threatened population under the Endangered Species Act (USFWS 2011e). There were three populations outside of Yellowstone National Park that were under a status review in 2011 (USFWS 2011e). These populations occur in the North Cascades Ecosystem Recovery Zone, the Selkirk Recovery Zone, and the Cabinet-Yaak Recovery Zone. In August 2011, the USFWS published a 5-yr review for the grizzly bear in which it was determined that the uplisting of these three populations as endangered under the ESA was warranted but precluded by higher priority listing actions (USFWS 2011f); they therefore remain listed as threatened.

In the UGP Region, the average weight of grizzly bears is generally 400 to 600 lb (150 to 224 kg) for males and 250 to 350 lb (93 to 130 kg) for females; both sexes live an average of 25 yr (USFWS 1993b). Grizzly bears can be differentiated from black bears by their longer, curved claws, humped shoulders, and concave face shape. Guard hairs are frequently pale in color at the tips, while the shaft can range from light brown to black. Their coloring ranges widely across geographic areas, from blond to deep brown or black. These differences, once attributed to subspeciation, are now thought to be primarily due to the different environments these bears inhabit, particularly with regard to diet and temperature (USFWS 1993b). The grizzly has a large hump over the shoulders that is a muscle mass used to power the forelimbs in digging. The head is large and round with a concave facial profile. In spite of their massive size, these bears can run at speeds of up to 35 mph (55 km/hr) (USFWS 1993b).

In the early 1800s, an estimated 50,000 grizzly bears roamed between the Pacific Ocean and the Great Lakes. As human settlement expanded since that time, habitat for this species began to decline, which resulted in declines in numbers. Today only a few small corners of grizzly country remain, supporting about 1,200–1,400 wild grizzly bears (USFWS 2011f). Direct human-bear interaction has also had a devastating effect on bear population numbers.

Grizzly bear distribution in the lower 48 States is primarily in Recovery Zone areas. This includes the greater Yellowstone ecosystem in northwest Wyoming, eastern Idaho, and southwest Montana; the Northern Continental Divide Ecosystem of north central Montana; the North Cascades area of north central Washington; the Selkirk Mountains area of northern Idaho, northeast Washington, and southeast British Columbia; and the Cabinet Yaak area of northwest Montana and northern Idaho. There is an additional Recovery Zone known as the Bitterroot Recovery Zone in the Bitterroot Mountains of east central Idaho and western Montana, but despite numerous studies of this area, there were no verifiable sightings of grizzly bears in the last 60 yr until an adult male grizzly bear was mistakenly killed by a black bear hunter in September 2007. The current status of this Recovery Zone is unknown (USFWS 2011f).

Grizzly bears can inhabit a broad range of habitats, because they are highly mobile omnivores. The large bears typically prefer areas of relatively undisturbed mountainous habitat with a high level of topographic and vegetative diversity (USFWS 1993b). Within the UGP Region, the grizzly bear may be found in 14 counties in Montana (table A-1; figure A-15). The species is not listed to occur in the States of Iowa, Nebraska, North Dakota, South Dakota, or Minnesota. The predicted suitable habitat model for the grizzly bear exists only for the State of Montana. Less than 1 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-22).

A Northern Continental Divide Ecosystem Grizzly Bear Conservation Strategy (Conservation Strategy) is being developed by an interagency team of managers and scientists to describe the coordinated management and monitoring efforts necessary to maintain a recovered grizzly bear population in the Northern Continental Divide Ecosystem (USFWS 2013g). As described in the draft Conservation Strategy, actions evaluated under this programmatic BA would occur primarily in Management Zone 3. This zone consists of areas where grizzly bears do not have enough suitable habitat for long-term survival and occupancy. As a consequence, management emphasis in Zone 3 will be on conflict response. The Conservation Strategy notes that grizzly bears select riparian zones during all seasons and such habitats are being used by grizzly bears as travel corridors and foraging areas that provide good hiding cover (Downey 2014). Therefore, wind energy development addressed under this programmatic BA should avoid riparian areas to the extent practicable.

Primary threats to the continued existence of the species include degradation of habitat due to rural or recreational development, road building, and energy and mineral exploration. However, the biggest threat to the grizzly is human-caused mortality. Grizzly bears are accidentally killed by hunters who mistake them for black bears, which are legal game in most areas. More commonly, grizzly bears become food conditioned because of the availability of human-related “attractants,” which include garbage, pet foods, livestock carcasses, and improper camping practices. Food-conditioned bears seek out human use areas for these foods and can become dangerous. Bears can also become habituated to people when they lose their normal avoidance response, and road-side bears feeding on natural foods may not flee when vehicles stop. These activities put the bears and humans in danger and may result in mortality for both (NatureServe 2013; USFWS 1993b). Securing all food, trash, and other attractants in bear-proof storage containers in habitats occupied by grizzly bears will help to minimize these activities.

#### 5.6.4.1 Direct and Indirect Effects of the Action

It is unlikely for wind energy development in the UGP Region to adversely affect the grizzly bear due to the lack of suitable habitat in the vicinity of areas that might be best sited for wind energy development. All grizzly bear recovery zones and grizzly bear Primary Recovery Areas are more than 25 mi (40 km) from Western’s substations or transmission lines. Some USFWS easements may be located within Recovery Zones.

#### 5.6.4.2 Cumulative Effects

Cumulative effects are those effects of future non-Federal activities that are reasonably certain to occur within the UGP Region. Various non-Federal factors continue to reduce grizzly bear habitat and create human–bear conflicts that threaten the persistence of this species. As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the grizzly bear within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.4.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General BMPs that would be required of all wind energy projects to reduce ecological impacts of wind energy under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the grizzly bear. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the grizzly bear has been recorded (table A-1; figure A-15). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys performed by qualified biologists to determine the potential for occurrence of grizzly bears and their habitat relative to the project footprint. Onsite surveys may be needed to complete such evaluations.

If it is determined through preconstruction evaluations and/or surveys that the species or its habitat may occur in the project area, the following species-specific avoidance measure would be required (table 5-1):

- Do not site turbines, power lines, access roads, or other project facilities within 0.5 mi (0.8 km) of locations known to be occupied by grizzly bears.

#### 5.6.4.4 Effects Determination

With the implementation of all conservation measures identified above (summarized in table 5-1 and in table 4.5-1), it is determined that the implementation of the proposed action **may affect but is not likely to adversely affect** the grizzly bear.

### 5.6.5 Indiana Bat

The Indiana bat (*Myotis sodalis*) was originally listed as in danger of extinction on March 11, 1967, under the Endangered Species Preservation Act of 1966, and is currently listed as endangered under the Endangered Species Act of 1973, as amended (USFWS 1967, 2007). Critical habitat for this species was designated on September 24, 1976 (USFWS 1976b). The medium-sized brown bat is an insectivorous, migratory bat that hibernates in mines and caves in the winter and summers in wooded areas in temperate regions of the east-central United States. Many of the locations historically used by the Indiana bat have been disrupted by human development or disturbance. In 2007, the USFWS had records of extant winter populations at approximately 281 hibernacula in 19 States; the 2005 winter census estimate of the population was 457,000 (USFWS 2007). The USFWS 2013 range wide population estimate for the Indiana Bat is now 534,239 (USFWS 2013h). During the summer, many reproductively active females migrate short to long distances and form maternal colonies to rear their young pups (USFWS 2007); in 2007, the USFWS had records of 269 maternity colonies in 16 States. The bats will return to the hibernacula in the fall to mate and prepare for hibernation over the winter. The global range of this species includes Arkansas, Connecticut, Georgia, Illinois, Indiana, Iowa, Kentucky, Maryland, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, and West Virginia (USFWS 2007).

Indiana bats can arrive at winter hibernacula sites as early as late July. The fall migration period for the Indiana bat generally occurs between August 15 and October 15 (USFWS 2014b). However, this period is variable and dependent on the latitude and annual seasonal climatic conditions and is best determined by the local USFWS Ecological Field Office in each State. Much of the activity in the fall is focused on swarming and foraging. Swarming refers to the dusk to dawn flight activities in and out of the roost; mating occurs during swarming. Foraging is intense because this is the prime time for the bats to rebuild body fat. The average temperature favored for the hibernacula sites ranges from 40 to 50°F (4.5 to 10°C), so adequate body fat is essential for the survival of this small mammal during winter and to fuel the spring migration. The Indiana bat emerges from hibernation in early April and begins a rapid and lengthy migration to the summer colonies. The majority of Indiana bat activities in the UGP Region occur during the summer months. The formation of maternal colonies, the rearing of pups, and foraging occur during this time.

Suitable summer habitat for Indiana bats consists of a wide variety of wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures (USFWS 2014b). Indiana bats exhibit strong fidelity to their roost trees, roosting and foraging areas, and commuting corridors (USFWS 2014b). Most trees occupied by female Indiana bats in summer are dead or close to dead. The females roost under slabs of bark, longitudinal crevices, and rarely used cavities. The preferred maternal roosting trees include various ash (*Fraxinus*; 13 percent), elm (*Ulmus*; 13 percent), hickory (*Carya*; 22 percent), maple (*Acer*; 15 percent), poplar (*Populus*; 9 percent), and oak (*Quercus*; 15 percent) trees. Some common trees, such as American beech (*Fagus grandifolia*), basswood (*Tilia americana*), black cherry (*Prunus serotinus*), box elder (*A. negundo*), and willow (*Salix* spp.) have rarely or never been used, suggesting that they typically are not suitable, especially as primary roosts (USFWS 2007). However, structure rather than species is probably more important; the favored trees tend to be large in diameter, taller than surrounding trees, and located in a forested matrix (USFWS 2007). Surrounding habitat varies according to regional ecosystems, but the majority of sites occur in closed to semi-open forested habitats and forest edges.

Critical habitat for the Indiana bat has been designated in hibernacula caves and mines in Illinois, Indiana, Kentucky, Missouri, Tennessee, and West Virginia (USFWS 1976b). However, no critical habitat has been designated for the Indiana bat within the UGP Region. Within the UGP Region, the Indiana bat is known from five counties in Iowa (table A-1; figure A-15): Clarke, Decatur, Madison, Ringgold, and Union. The Indiana bat is listed as endangered by the State of Iowa. Mist net surveys in the summer of 2010 found a single occurrence of this species in Guthrie County, Iowa (Stantec Consulting Services, Inc. 2011).

Biennial census estimates have indicated that the Indiana bat's overall population has decreased in the period between its original listing in 1967 and 2003 (figure 5.6.5-1). These declines have been attributed to declines at high-priority hibernacula sites in Kentucky and Missouri. The apparent population increase between 2003 and 2007 was largely attributed to population growth at hibernacula sites in Illinois, Kentucky, New York, and West Virginia (USFWS 2009e). Recent population estimates within the State of Iowa have not been published by the USFWS (USFWS 2010p).

At this time, there is not a complete understanding of the species' distribution and ecology in Iowa, but the species is generally known to occur throughout the southern portion of

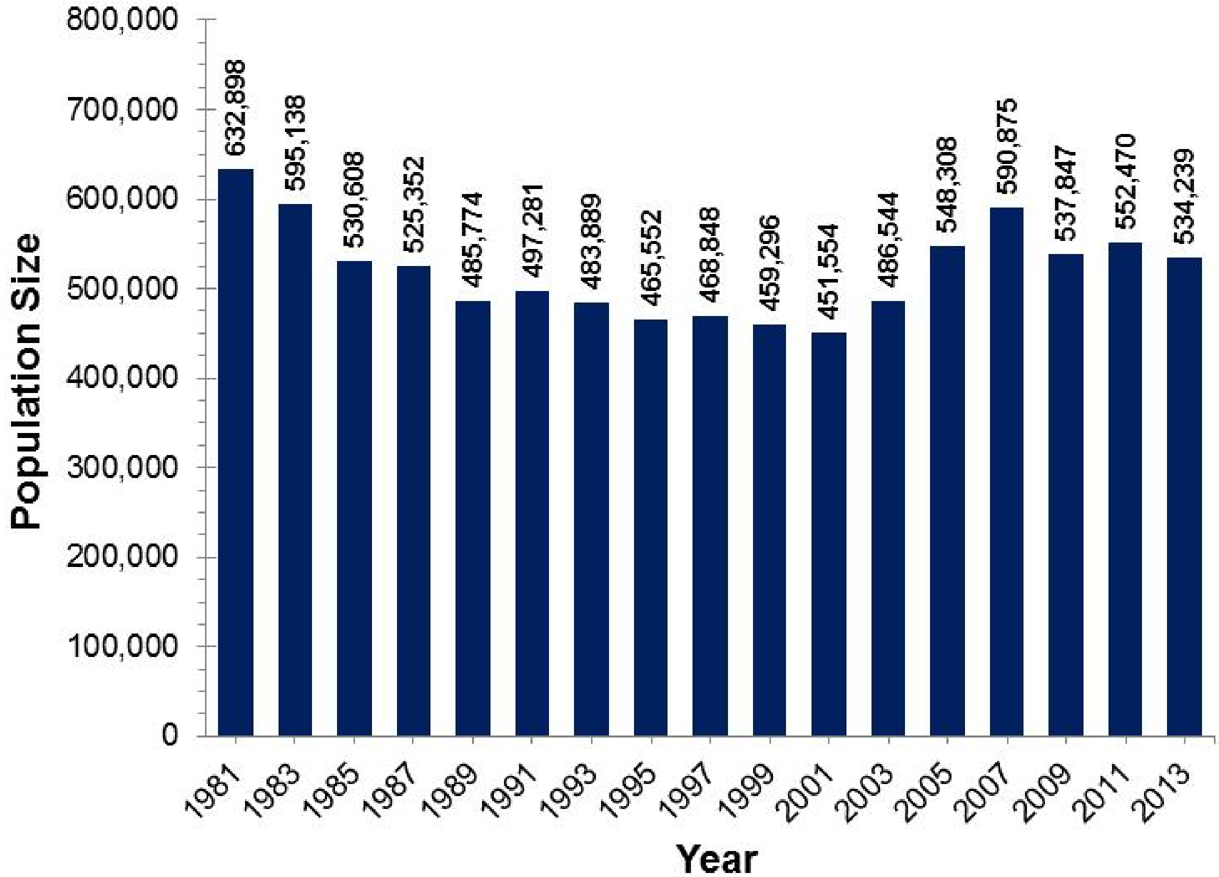


**FIGURE 5.6.5-1 Indiana Bat Rangewide Population Estimates from 1981 to 2013 (Source: USFWS 2013h)**

the State, especially as a summer resident, where suitable forested habitat exists (Clark et al. 1987). According to the USFWS and U.S. Department of Agriculture (USDA) NRCS, Indiana bat habitat may exist if (1) at least 75 ac (30 ha) of forest area exists within 0.5 mi (0.8 km) of a known location; and (2) there is a source of water within the 0.5 mi (0.8 km) area from April 1 until September 30 (USDA 2008).

The predicted suitable habitat model for the Indiana bat exists only for the State of Iowa. Approximately 37 percent of the predicted suitable habitat for this species in the UGP Region occurs within 25 mi (40 km) of a Western substation (table A-2; figure A-22).

Primary threats to the continued existence of the Indiana bat include commercialization of caves leading to an increase in disturbance, pesticides, and other contaminants; loss or degradation of hibernacula; destruction of summer habitat such as the loss of forest cover and degradation of forested habitats; human encroachment and disruption to the crucial events of gestation, postnatal development, and post-weaning maturation; hibernation; and the impacts of disease (rabies, white-nose syndrome, etc.). Of particular recent concern is the impact of white nose-syndrome (WNS), which is a skin tissue fungal infection (primarily of the wings, but also muzzle and tail) that has killed over a million bats (USFWS 2009e,f). The bats were first observed with the disease in February 2006 in New York caves and the disease has spread throughout most of the Indiana bat's range, although the fungus has not been detected in populations in the UGP Region (USFWS 2009e,f). However, *Pseudogymnoascus destructans*, the fungus that causes WNS, was discovered in eastern Minnesota in 2012–2013 (Naumann et al. 2013) and is likely continuing its expansion westward throughout the range of this species.

#### 5.6.5.1 Direct and Indirect Effects of the Action

Growing wind energy development in the United States presents an increasing threat to bat populations as a result of flying bats colliding with wind turbines (Kunz et al. 2007a). These fatalities raise concerns about potential impacts on bat populations at a time when many species of bats are known or suspected to be in decline (Racey and Entwistle 2003; Winhold et al. 2008). Collision risk for an individual bat is dependent upon a number of factors, including the species' behavior and relative abundance in the area, and weather. Bat mortalities at wind-energy facilities have been documented at many sites across the country, with fatality rates ranging from a relatively low 1.2 bats/turbine per year (Johnson et al. 2003) to an alarmingly high 63.9 bats/turbine per year (Fiedler et al. 2007). Additional research suggests that bat fatalities at windfarms occur primarily on low-wind nights but when turbines are operating at their maximum speeds (Arnett et al. 2013). In a review of publicly available Indiana bat and northern long-eared bat fatalities recorded to date at wind energy facilities in the United States and Canada, seven mortalities of Indiana bats were documented (Niver 2014). However, three migratory tree-roosting species (lasiurines), the hoary bat (*Lasiurus cinereus*), the eastern red bat (*Lasiurus borealis*), and the silver-haired bat (*Lasionycteris noctivagans*), currently compose the majority of bats reported killed at wind facilities in most regions of North America (National Academy of Sciences 2007; Johnson 2005; Kunz et al. 2007a; Arnett et al. 2008). Behavioral differences between the two groups may explain why the Indiana bat and other myotids appear to be less likely than lasiurines to suffer wind turbine fatalities (Kalko et al. 2008).

The Wind Turbine Guidelines Advisory Committee has provided recommended BMPs to the USFWS for the reduction of bat collision impacts at wind energy facilities (USFWS 2010p). These practices include, but are not limited to, avoidance of areas having demonstrated high risk to bats (e.g., areas near hibernacula) and maintaining connectivity between roosting and nesting sites and foraging areas. This information, as well as the Indiana Bat Hibernacula Survey Protocol (USFWS 2012e), and the 2014 Rangewide Indiana Bat Summer Survey Guidelines (USFWS 2014b), suggest that suitable Indiana bat habitats can be protected by buffers of 20 mi (32 km) from hibernacula and 1000 ft (300 m) from foraging and roosting habitat (edges along forested areas with dense forest canopy, riparian areas, and small wetlands). This summer habitat buffer is smaller than the buffer adopted in this document for the northern long-eared bat, a closely related species with similar habitat requirements; thus, additional protective measures will be implemented to further reduce the risk of Indiana bats colliding with turbines.

Research suggests that bat fatality rates are primarily influenced by the siting or location of turbines (Arnett et al. 2008), turbine height (Barclay et al. 2007), and wind speed, with fewer bats being killed during periods of high wind velocity (Arnett et al. 2008). A number of recent studies have demonstrated that bat fatalities could be lowered substantially by reducing the number of turbine operating hours during low-wind periods when bats are most active

(Arnett et al. 2013). This can be done by increasing the cut-in speed, feathering the turbine blades at wind speeds below the project's cut-in speed, or a combination of the two. These terms, as used in this BA, follow the terminology and definitions used by Arnett et al. (2011) and the Fish and Wildlife Service Land-based Wind Energy Guidelines (USFWS 2012c). The cut-in speed is the wind speed at which the generator is connected to the grid and producing electricity. The manufacturer's set cut-in speed for most contemporary turbines is between 9.8 ft/sec (3.0 m/sec) and 13.7 ft/sec (4.0 m/sec). Some turbines' blades will spin at full or partial rotations per minute below cut-in speed when no electricity is being produced. Feathering is an operational adjustment of the angle of the rotor blade parallel to the wind, or turning the whole unit out of the wind, to slow or stop blade rotation. Normally operating turbine blades are angled perpendicular to the wind at all times, which produces blade rotation even when energy is not being produced.

Conversely, studies at wind facilities have also documented lower bat activity during high (usually >19.7 ft/sec [6.0 m/sec]) wind speeds (Reynolds 2006; Horn et al. 2008). Another study measured bat activity at two locations in Michigan as it related to wind speed. Bowden et al. (2012) reported that 90 percent of all bat passes (determined by recorded vocalizations) occurred when wind speeds were below 13.1–14.8 ft/sec (4.0–4.5 m/sec). They also reported a 95 percent reduction in bat passes at 14.8–16.7 ft/sec (4.5–5.1 m/sec), 97 percent reduction at 16.1–18.4 ft/sec (4.9–5.6 m/sec), and 99.0 percent reduction at 17.7–19.7 ft/sec (5.4–6.0 m/sec). Non-spinning turbine blades and turbine towers do not kill bats (Horn et al. 2008), and shutting down turbines during low-wind (usually <19.7 ft/sec [6.0 m/sec]) periods in summer and fall has been demonstrated as a means for reducing bat fatalities (Kunz et al. 2007b; Arnett et al. 2008) in areas where bats are abundant.

Baerwald et al. (2009) conducted a large-scale experiment at a wind turbine facility in Alberta, Canada, during the fall migration period for bats and reported significant reductions in bat mortalities (60.0 percent and 57.5 percent, respectively) as a result of altering operational parameters (i.e., feathering of the blades and higher cut-in speeds). In 2011, at a wind facility in Indiana, a study measured the effectiveness of feathering turbine blades prior to reaching cut-in speeds for reducing bat fatality rates. Bat casualty rates were decreased by about 36 percent, 57 percent, and 73 percent compared to unfeathered control turbines when blades were feathered at 11.5 ft/sec (3.5 m/sec), 14.8 ft/sec (4.5 m/sec), and 18.0 ft/sec (5.5 m/sec), respectively. Chi-square tests showed that decreases in observed bat fatality rates between control turbines with no feathering compared to feathered turbines was statistically significant (Good et al. 2012). Gruver and Schirmacher (2014) presented the results of studies at nine wind farms that feathered turbine blades below cut-in speeds. Their data suggest that *Myotis* fatalities can be reduced by approximately 90 percent by feathering at or below 14.8 ft/sec (4.5 m/sec). Thus, feathering the blades to the wind so that revolutions per minute are minimal when wind speed is less than the manufacturer's set cut-in speed or the project's set cut-in speed, if different from the manufacturer's, is expected to reduce bat fatalities.

Arnett et al. (2011) found that relatively small changes to wind-turbine operation (cut-in speeds, from 16.4 to 21.3 ft/sec [5.0 to 6.5 m/sec]), resulted in nightly reductions in bat mortality, ranging from 44 to 93 percent, with marginal annual power loss (<1 percent of total annual output). Data available to date indicate that 99.9 percent of bat activity was observed to occur at wind speeds below 22.6 ft/sec (6.9 m/sec) (Bowden et al. 2012). Thus, incorporating the summer habitat buffer described above with cut-in speeds of 22.6 ft/sec (6.9 m/sec) as recommended by the USFWS (2014c) is expected to reduce the risk of collision for the Indiana bat to an insignificant or discountable level.

Implementation of the BMPs and other conservation measures (avoidance and minimization) for wind energy development in the UGP Region is expected to reduce the risk of injury or mortality to the Indiana bat. These conservation measures may include the avoidance of potentially suitable summer habitat in Iowa (e.g., sites that are in close proximity to forested areas and water sources; USDA 2008), feathering of turbine blades but not locking hubs below cut-in speeds, and increasing cut-in speeds above the manufacturers' set speed (the manufacturers' cut-in speeds are typically 11.5–13.1 ft/sec [3.5–4.0 m/sec]) between sunset and sunrise during migration to reduce mortality for the Indiana bat.

In accordance with the BMPs in Table 4.5-1, and consistent with the USFWS Land-Based Wind Energy Guidelines (USFWS 2012c) and development and implementation of a BBCS, wind developers will conduct a minimum of 1 yr of preconstruction surveys for the presence of Indiana bats. Depending on initial survey results and identified risks, multiple years of surveys may be required by the local USFWS Ecological Services Field Office. For example, if the Indiana bat is detected during preconstruction surveys and the developer elects not to find an alternative site for the project, additional protective measures and survey requirements pursuant to the BBCS should be assumed (see section 5.6.5.3) to ensure the species is not likely to be adversely affected during the operational periods of the wind energy development. Additional project-specific avoidance and minimization measures may be implemented based upon information gleaned from other documents such as the results of multiple Habitat Conservation Plans that are currently underway. The need for such measures should be determined in consultation with the USFWS and by conducting habitat and bat surveys following current USFWS summer and hibernacula survey protocols. Further guidance by the USFWS can be found in *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects* (USFWS 2011g).

#### 5.6.5.2 Cumulative Effects

Cumulative effects are those effects of current and future non-Federal activities that are reasonably certain to occur within the UGP Region. The loss or degradation of forested and wetland habitat that the Indiana bat utilizes for foraging and roosting continues to threaten the continued existence of the species. Currently, the greatest single cause of forest habitat loss for the Indiana bat is urbanization and development (USFWS 2007). Human disturbance of hibernacula and hibernating bats also continues to threaten the continued existence of the Indiana bat. Such disturbances occur in the form of cave commercialization, recreational caving, vandalism, and research-related activities. Some bat experts believe the largest threat to the Indiana bat may be WNS, which could reduce populations by more than 70 percent. It is from this small base of survivors that the species may have a chance of recovery over many decades or centuries. If these survivors are subjected to additional fatalities, such as from wind facilities, the recovery or survival of the species becomes more unlikely (Gosse 2014). Climate change is also expected to affect the Indiana bat, although its effects are not well understood. Climate change models have been used to investigate the range expansion of the little brown bat; such range shifts could also influence the range of the Indiana bat (Humphries et al. 2002). Roost temperature changes could also have positive or negative effects on the development of bats (USFWS 2009e). As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the Indiana bat within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge regarding locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.5.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures, as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General measures that would be required of all wind energy projects to reduce ecological impacts under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the Indiana bat. In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county in which the Indiana bat has been recorded (table A-1; figure A-15). Within these counties, project applicants will be required to complete preconstruction evaluations and/or surveys, performed by qualified bat surveyors. This effort will be used, along with other means and information, to assess the potential for occurrence of the Indiana bat, identify suitable foraging, roosting, and commuting habitat within project boundaries, and identify the distance from project boundaries to hibernacula used by Indiana bats. Methods identified in the most current rangewide Indiana bat summer survey guidance (e.g., *2014 Rangewide Indiana Bat Summer Survey Guidelines* [USFWS 2014b]) and hibernacula survey guidance (e.g., USFWS 2012e) may be used to survey for Indiana bat locations. Onsite surveys will be needed to complete such evaluations; consult with the State USFWS Ecological Services Field Office regarding the current approved Indiana bat protocol for surveys, monitoring, and reporting. Disturbance of hibernacula (at any time of year) associated with the development of a wind development is inconsistent with this programmatic framework and thus is not permissible.

Throughout the range of the Indiana bat within the UGP (southern Iowa) the following species-specific avoidance measure would be required (table 5-1):

- Do not site turbines in areas within 20 mi (32 km) of hibernacula used by Indiana bats or within 1000 ft (300 m) of known or presumed occupied foraging and roosting habitat (edges along forested areas with dense forest canopy, riparian areas and small wetlands). Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on the Indiana bat would also be required. Additional species-specific minimization measures would include the following:

- A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.

- Increase turbine cut-in speeds to 22.6 ft/sec (6.9 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates) to avoid mortality to the Indiana bat. Use of feathering (where blades are motionless or nearly motionless) below the cut-in speed of 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating Indiana bats. Increased cut-in speed and feathering can be suspended between 0.5 hour after sunrise and 0.5 hour before sunset.

- In the event that preconstruction surveys or post-construction monitoring indicate species occurrence or occupancy of habitat adjacent to the project area, the higher turbine cut-in speeds described above will be required during the spring bat migration season to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.

- Immediately report observations of Indiana bat mortality to the appropriate USFWS office.

#### 5.6.5.4 Effects Determination

Wind energy development throughout most of the UGP Region is not likely to occur in areas that support Indiana bat populations. In portions of southern Iowa, wind energy development may affect the Indiana bat through the loss of foraging or roosting habitat or through direct mortality resulting from turbine collisions. However, Indiana bats exhibit strong fidelity to forested habitat, roosting and foraging areas, and commuting corridors. Required buffers prevent turbines from being sited within 20 mi (32 km) of hibernacula and 1000 ft (305 m) of suitable summer habitat. Required cut-in speeds of 22.6 ft/sec (6.9 m/sec) during fall migration throughout the range of the Indiana bat within the UGP Region, and spring migration where bats are found to occur adjacent to the project area, reduce the probability of take because bat activity at those wind speeds is negligible; required feathering of turbine blades below the cut-in speed minimizes the risk of take at lower wind speeds when Indiana bats are active. The implementation of BMPs and conservation measures would further reduce many of these impacts. With the implementation of all conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, it is determined that implementation of the proposed action **may affect, but is not likely to adversely affect** the Indiana bat.

### 5.6.6 Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*) was proposed for listing as an endangered species under the ESA (USFWS 2013i) on October 2, 2013. Critical habitat for this species has not been proposed to date. The USFWS announced a 6-month extension of the final determination of whether to list the northern long-eared bat as endangered to April 2, 2015 (USFWS 2014d). On April 2, 2015, the northern long-eared bat was listed as threatened under the ESA and an interim 4(d) rule was established (USFWS 2015b). This small to medium-sized bat (3 to 3.7 in. [7.6 to 9.4 cm] long) is an insectivorous bat that utilizes different roost sites in different seasons. In winter, the northern long-eared bat typically hibernates in caves and mines. Its hibernation season in the UGP Region is between October 1 and April 1 (USFWS 2014c). Preferred hibernation sites have large passages and entrances, constant temperatures, and high humidity with no air currents. It is common for this species to overwinter in sites with other *Myotis* species.

Suitable forested habitat is used to describe known or potential summer habitat and known or potential spring staging and fall swarming habitat. Suitable habitat for the northern long-eared bat consists of a wide variety of wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees or snags at least 3 in. [7.6 cm] diameter at breast height [dbh] that have exfoliating bark, cracks, crevices, or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Summer habitat may include forested wind breaks and hedgerows (tree-lined linear features) used by bats for commuting between roosts and foraging areas. In a study on the movements of northern long-eared bats, Henderson and Broders (2008) found that the bats have a strong preference for foraging and commuting within forested landscapes. They also noted that if bats were located in open areas, they were clustered within 255 ft (78 m) of forest features. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000 ft (305 m) from the next nearest suitable roost tree, woodlot, or wooded fencerow (USFWS 2014c).

In addition, the northern long-eared bat is also known to roost in buildings (NatureServe 2013; USFWS 2013j). However, there are only limited records of roosting by northern long-eared bats in manmade structures (Brandon 1961; Caceres and Barclay 2000; Cope and Humphrey 1972; van Zyll de Jong 1985). Fidelity to night roosts and hibernation sites has been observed (Tigner and Stukel 2003).

The northern long-eared bat is considered a short-distance migrant, typically only traveling 40 to 50 mi (64.4 to 80.5 km) (USFWS 2013i). Henderson and Broders (2008) found that long-distance commuting flights within connected forested habitat, between roosting and foraging areas, for two female northern long-eared bats were 3,727 ft (1,163 m) and 3,608 ft (1,100m). The Wisconsin Department of Natural Resources (2013) reports that when northern long-eared bats migrate from wintering caves to summer habitat or commutes from roosts to feeding grounds, they tend to utilize edge habitat in the landscape that provides protection from wind and predators instead of flying across more open areas. Reynolds (2006), using acoustic monitoring, conducted a study of spring migratory bat activity in western New York and found most of the activity occurred at wind speeds below the cut-in speeds of a typical commercial wind turbine. Unfortunately, his study did not sample fall migration, during which most bat fatalities occur at wind-energy facilities (Arnett et al. 2008; Ellison 2012). The fall migration period for the northern long-eared bat is expected to be similar to that of the Indiana bat, with most migration occurring between August 15 and October 15 (USFWS 2014c). However, this period is variable and depends on the latitude and annual seasonal climatic conditions and is best determined by the local USFWS Ecological Field Office in each State.

Several studies report that home range size for some populations may be as high as 148 to 161 ac (60 to 65 ha) (Owen et al. 2003; NatureServe 2013). Henderson and Broders (2008) found that main roosting areas varied from 10 ac (4.13 ha) to 76 ac (31.1 ha). Female northern long-eared bats tracked by Broders et al. (2006) and Owen et al. (2003) used foraging areas of 113 ac (46 ha) and 160 ac (65 ha), respectively. Henderson and Broders (2008) recorded smaller foraging areas that encompassed 14 ac (6.0 ha). Foster and Kurta (1999), who studied northern long-eared bats in agriculturally dominated landscapes in Michigan, suggest that if forest cover is reduced in an area (i.e., most of the UGP Region), then the activities of northern long-eared bats may be constrained in landscapes where areas of suitable forest cover are limited.

The northern long-eared bat breeds in late summer and early fall when large numbers of bats congregate in and near the entrances of caves and mines. Females will store sperm during hibernation, because the gestation period ranges between 50 and 60 days. Females give birth to one pup the following spring (NatureServe 2013).

The northern long-eared bat has a diverse diet including moths, flies, leafhoppers, caddisflies, and beetles (Nagorsen and Brigham 1993; Brack and Whitaker 2001; Griffith and Gates 1985), with diet composition differing geographically and seasonally (Brack and Whitaker 2001). Feldhamer et al. (2009) noted close similarities of all *Myotis* diets in southern Illinois, while Griffith and Gates (1985) found significant differences in the diets of northern long-eared bat and little brown bat. The most common insects found in the diets of northern long-eared bats are lepidopterans (moths) and coleopterans (beetles) (Feldhamer et al. 2009; Brack and Whitaker 2001) with arachnids (spiders) also being a common prey item (Feldhamer et al. 2009). Foraging techniques include hawking (catching insects in flight) and gleaning in conjunction with passive acoustic cues (Nagorsen and Brigham 1993; Ratcliffe and Dawson 2003). Observations of northern long-eared bats foraging on arachnids (Feldhamer et al. 2009), the presence of green plant material in their feces (Griffith and Gates 1985), and non-flying prey in their stomach contents (Brack and Whitaker 2001) suggest considerable gleaning behavior. Northern long-eared bats have the highest-frequency call of any bat species in the Great Lakes area (Kurta 1995). Gleaning allows this species to gain a foraging advantage for preying upon moths because moths are less able to detect these high-frequency echolocation calls (Faure et al. 1993). The northern long-eared bat has shown a preference for contiguous tracts of forest cover for foraging (Owen et al. 2003; Yates and Muzika 2006). In the Badlands region of South Dakota, for example, this species is known to forage in wooded riparian zones in lower elevations and in dense forest at higher elevations (CBD 2010b). The bats emerge at dusk, and most hunting occurs above the understory; feeding occurs within the canopy of the forest and at much lower heights (3 to 10 ft [1 to 3 m]) above the ground within the canopy (Nagorsen and Brigham 1993, as cited in USFWS 2013i) and on forested hillsides and ridges, rather than along riparian areas (Brack and Whitaker 2001; LaVal et al. 1977). This coincides with data indicating that mature forests are an important habitat type for foraging northern long-eared bats (Caceres and Pybus 1997).

The northern long-eared bat ranges from the southeast corner of the Northwest Territory east across each Canadian province, and covers 38 States in the central and eastern part of the United States, including eastern Montana, North Dakota, South Dakota, Nebraska, and Kansas. This species uses caves and mines during hibernation, which can begin as early as August and continue through the winter months. Suitable winter habitat is used to describe known or potential hibernacula that include underground caves and cavelike structures (e.g., abandoned mines, railroad tunnels). These hibernacula typically have large passages with significant cracks and crevices for roosting; relatively constant, cooler temperatures (32–48°F [0–9°C]); and high humidity with minimal air currents (USFWS 2014c).

Within the UGP Region, there has been no comprehensive range-wide survey effort for this species. However, the northern long-eared bat to date has been recorded throughout Iowa and Minnesota, and from seven counties in Nebraska, 22 counties in South Dakota, eight counties in North Dakota, and one county in Montana, although there has not been a documented sighting in Montana in over 30 yr (figure A-16). The Midwestern and Western populations of the northern long-eared bat (two of the four U.S. populations of this species) are known to occur in the UGP Region (USFWS 2013i). Midwestern populations may occur within the UGP Region in Iowa and Minnesota. There are no hibernacula records of this species in Iowa; all observations have been made during the summer period. In Minnesota, there are 11 recorded hibernacula sites for this species Statewide (note: several of these sites may occur outside the UGP Region). This species is generally rare or less common in the western portion of its range than in other portions of its range (Amelon and Burhans 2006). Within the range of the Western population, it is considered common in only small areas (e.g., Black Hills of South Dakota). South Dakota contains seven known hibernacula sites for this species, five of which are abandoned mines (Tigner and Stukel 2003).

No hibernacula are known from North Dakota (USFWS 2013i), but hibernacula likely exist because northern long-eared bats are short distance migrants and should have winter hibernacula near where they are found in the summer. Gillam and Barnhart (2012) conducted bat surveys during the summers of 2009–2012 in five regions in North Dakota; the Red River valley, Pembina Gorge, Turtle Mountains, Missouri River Valley, and the Badlands in southwestern North Dakota. They detected or captured 14 individual northern long-eared bats at three different sites. Most captures occurred at a site within the cottonwood forested floodplain of the Missouri River in central North Dakota, but additional captures occurred within the Badlands in the Theodore Roosevelt National Park adjacent to the Little Missouri River and in the Turtle Mountains. This was the first documented capture of a northern long-eared bat in North Dakota (Gillam and Barnhart 2012). Barnhart (2014) found the northern long-eared bat to be associated with tall hardwood forests in North Dakota; these findings are similar to habitat preferences for this species in more central populations, suggesting that northern long-eared bats are not altering their habitat preferences along the periphery of their range. During the winters of 2010–2013, Barnhart (2014) also documented three bat hibernacula and 18 potential hibernacula in Theodore Roosevelt National Park. Several species were positively identified, but the group did not include the northern long-eared bat. Another study during 2010 at the Des Lacs, Upper Souris, and J. Clark Salyer National Wildlife Refuges and adjacent agricultural lands in northern North Dakota used Anabat SD1 acoustic monitoring units to assess bat activity at six study locations along and adjacent to the Des Lacs River and the Upper and Lower Souris River (Mouse River) (Coberly et al. 2011). The northern long-eared bat was found at all locations, with activity being higher in the riparian areas than in adjacent agricultural lands. Riparian areas were important during the fall migration.

Although some researchers speculate that hibernacula may exist in Nebraska, none have been documented (Koch 2013). Northern long-eared bats are thought to be present in the eastern half of Nebraska; however, not many records exist to substantiate this distribution (Benedict 2004). It is likely that hibernacula exist in Nebraska because the northern long-eared bat occurs within portions of forested floodplain along the Missouri River, Niobrara, and its tributaries. Northern long-eared bats were captured during mist net surveys along the Niobrara River in 2004 (Stantec Consulting Services 2014). Five of 14 acoustic survey stations at a windfarm in north-central Nebraska recorded northern long-eared bat calls within forested riparian corridors of tributaries of the Niobrara River and forested edge in the summer of 2014 (Mattson et al. 2014). Because waterways do not provide continuous forested corridors across the UGP, northern long-eared bat use of the large areas of grassland and cropland is likely limited (Stantec Consulting Services 2014). Western populations of this species may occur in other areas within the UGP Region in Montana. In Montana, a coal mine in Richland County was the only known hibernaculum in Montana. However, the coal mine has been sealed and is no longer considered a hibernaculum.

The primary threat to the continued existence of the northern long-eared bat is WNS (USFWS 2013i) (discussed in Indiana bat section). Other potential threats include commercialization of caves, leading to an increase in disturbance; pesticides and other contaminants; the loss or degradation of hibernacula; destruction of summer habitat such as the loss of forest cover and degradation of forested habitats; human encroachment and disruption of the crucial events of gestation, postnatal development, post-weaning maturation, and hibernation; and the impacts of wind development, which may also compound the disease stressor. As of June 2014, WNS had spread to 25 States and five Canadian provinces. Mortality of this magnitude from an infectious disease is not only unprecedented among bats worldwide, but also among wild mammals. Because WNS has not been documented in the western population of the northern long-eared bat within Western's UGP Region (CBD 2013), it is not currently a significant stressor to the population. However, *Pseudogymnoascus destructans*, the fungus that causes WNS, was discovered in eastern Minnesota in 2012–2013 (Naumann et al. 2013) and is likely continuing its expansion westward throughout the range of this species in the United States and Canada.

#### 5.6.7.1 Direct and Indirect Effects of the Action

Growing wind energy development in the United States presents an increasing threat to bat populations as a result of flying bats colliding with wind turbines (Kunz et al. 2007b). These fatalities raise concerns about potential impacts on bat populations at a time when many species of bats are known or suspected to be in decline (Racey and Entwistle 2003; Winhold et al. 2008). As referenced briefly in the discussion on WNS, siting of wind energy facilities also has the potential to adversely affect bats associated with winter hibernacula or summer habitat either through physical destruction or degradation of the habitat, or disturbances near these habitats that could adversely affect life activities such as spring or fall swarming, breeding, foraging, roosting, or natal care (USFWS 2014c).

The risk of collision or barotrauma for an individual bat is dependent upon a number of factors, including the species' relative abundance in the area, the species' behavior, and weather. Bat mortalities at wind-energy facilities have been documented at many sites across the country, with fatality rates ranging from a relatively low 1.2 bats/turbine per year

(Johnson et al. 2003) to an alarmingly high 63.9 bats/turbine per year (Fiedler et al. 2007). Additional research suggests that bat fatalities at windfarms occur primarily on low-wind nights but when turbines are operating at their maximum speeds (Arnett et al. 2013). The northern long-eared bat is known to have been killed by wind energy turbines (e.g., Kerns and Kerlinger 2004). However, three migratory tree-roosting species (lasiurines) – the hoary bat, the eastern red bat, and the silver-haired bat – currently compose the majority of bats reported killed at wind facilities in most regions of North America (National Academy of Sciences 2007; Johnson 2005; Kunz et al. 2007b; Arnett et al. 2008). Cryan et al. (2014) monitored bats at three experimentally manipulated wind turbines in Indiana. Based on the species composition of fatalities and acoustic calls recorded on the turbines, out of 993 bat video detections, most involved tree bats. A review of public documents of all bat mortalities at wind generation facilities in the United States found 15 northern long-eared bat fatalities recorded out of the 13,763 bat fatalities listed (Derby 2014). Out of those 15 northern long-eared bat fatalities, none were within the UGP Region. However, the prevalence of suitable summer habitat and winter hibernacula in the eastern portions of Western's UGP Region in Minnesota and Iowa may place the northern long-eared bat at a higher risk in those areas than in the grasslands and agriculturally dominated landscape of the other UGP States. Three northern long-eared bat mortalities were from the Midwest (Canada and Indiana). From these data, nationally, the *Myotis* species make up less than 8 percent of the portion of bats killed by wind turbines, and the northern long-eared bat comprises approximately 0.1 percent. This evidence suggests the northern long-eared bats can be adversely affected where the species is exposed to wind turbines. Gruver and Schirmacher (2014) presented data from a larger data set of 14,206 recorded bat fatalities in the United States and Canada, where 43 northern long-eared bats were recorded killed by wind turbines. All documented northern long-eared bat fatalities in the United States took place east of the UGP Region.

Another compilation of publicly available bat mortality data from wind generating facilities in the United States and Canada noted 36 northern long-eared bat mortalities (Niver 2014). To date, monitoring at operational wind generating facilities within the UGP has not documented any northern long-eared mortality, but mortality surveys by bat scientists at a wind facility in South-central North Dakota documented mortalities of tree-dwelling species (Bicknell and Gillam 2013).

Behavioral differences between the two groups may explain why Indiana and northern long-eared bats (Myotis) appear to be less likely than lasiurines to suffer wind turbine fatalities (Kalko et al. 2008). The northern long-eared bat, being similar to the Indiana bat and other myotids, will avoid traveling in open areas (Murray and Kurta 2004). Henderson and Broders (2008) found that female northern long-eared bats emerging from roosts, given the option of following a hedgerow consisting of a narrow line of trees, did not cross open fields directly. Siting turbines in open areas, away from suitable habitat edges, should reduce collision risks for the northern long-eared bat.

The northern long-eared bat also appears to be less likely than the Indiana bat to suffer wind turbine fatalities due to differences in their behaviors. The fact that northern long-eared bats forage mainly under forested canopies, are less likely to travel across open areas, commute short distances, migrate short distances, and forage by gleaning within the canopy likely explains the lower recorded frequency of mortality at wind generating facilities located in areas absent of forested habitat.

The Wind Turbine Guidelines Advisory Committee has provided recommended BMPs to the USFWS for the reduction of bat collision impacts at wind energy facilities (USFWS 2010p). These practices include, but are not limited to, avoidance of areas having demonstrated high risk to bats (e.g., areas near hibernacula) and maintaining connectivity between roosting and nesting sites and foraging areas. This information, as well as the northern long-eared bat interim guidance (USFWS 2014c), suggests that suitable northern long-eared bat habitats can be protected by buffers of 5 mi (8 km) from hibernacula and 0.5 mi (0.8 km) from foraging, roosting, and commuting habitat.

Research suggests that bat fatality rates are primarily influenced by the siting or location of turbines (Arnett et al. 2008), turbine height (Barclay et al. 2007), and wind speed, with fewer bats being killed during periods of high wind velocity (Arnett et al. 2008). A number of recent studies have demonstrated that bat fatalities could be lowered substantially by reducing the number of turbine operating hours during low-wind periods when bats are most active (Arnett et al. 2013). This can be done by increasing the cut-in speed, feathering the turbine blades at wind speeds below the project's cut-in speed, or a combination of the two. These terms, as used in this BA, follow the terminology and definitions used by Arnett et al. (2011) and the Fish and Wildlife Service Land-based Wind Energy Guidelines (USFWS 2012c). The cut-in speed is the wind speed at which the generator is connected to the grid and producing electricity. The manufacturer's set cut-in speed for most contemporary turbines is between 9.8 ft/sec (3.0 m/sec) and 13.7 ft/sec (4.0 m/sec). Some turbines' blades will spin at full or partial rotations per minute below cut-in speed when no electricity is being produced. Feathering is an operational adjustment of the angle of the rotor blade parallel to the wind, or turning the whole unit out of the wind, to slow or stop blade rotation. Normally operating turbine blades are angled perpendicular to the wind at all times, which produces blade rotation even when energy is not being produced.

Conversely, studies at wind facilities have also documented lower bat activity during high (usually >19.7 ft/sec [6.0 m/sec]) wind speeds (Reynolds 2006; Horn et al. 2008). Another study measured bat activity at two locations in Michigan as it related to wind speed. Bowden et al. (2012) reported that 90 percent of all bat passes (determined by recorded vocalizations) occurred when wind speeds were below 13.1–14.8 ft/sec (4.0–4.5 m/sec). They also reported a 95 percent reduction in bat passes at 14.8–16.7 ft/sec (4.5–5.1 m/sec), 97 percent reduction at 16.1–18.4 ft/sec (4.9–5.6 m/sec), and 99.0 percent reduction at 17.7–19.7 ft/sec (5.4–6.0 m/sec). Non-spinning turbine blades and turbine towers do not kill bats (Horn et al. 2008), and shutting down turbines during low-wind (usually <19.7 ft/sec [6.0 m/sec]) periods in summer and fall has been demonstrated as a means of reducing bat fatalities (Kunz et al. 2007a; Arnett et al. 2008) in areas where bats are abundant.

Baerwald et al. (2009) conducted a large-scale experiment at a wind turbine facility in Alberta, Canada, during the fall migration period for bats and reported a significant reduction in bat mortalities (60.0 percent and 57.5 percent, respectively) as a result of altering operational parameters (i.e., feathering of the blades and higher cut-in speeds). In 2011, at a wind facility in Indiana, a study measured the effectiveness of feathering turbine blades prior to reaching cut-in speeds for reducing bat fatality rates. Bat casualty rates were decreased by about 36 percent, 57 percent, and 73 percent compared to unfeathered control turbines when blades were feathered at 11.5 ft/sec (3.5 m/sec), 14.8 ft/sec (4.5 m/sec), and 18.0 ft/sec (5.5 m/sec), respectively. Chi-square tests showed that decreases in observed bat fatality rates between control turbines with no feathering compared to feathered turbines was statistically significant

(Good et al. 2012). Gruver and Schirmacher (2014) presented the results of studies at nine windfarms that feathered turbine blades below cut-in speeds. Their data suggest that *Myotis* fatalities can be reduced by approximately 90 percent by feathering at or below 14.8 ft/sec (4.5 m/sec). Thus, feathering the blades to the wind, so that revolutions per minute are minimal during periods when wind speed is less than the manufacturer's set cut-in speed or the project's set cut-in speed, if different from the manufacturer's, is expected to reduce bat fatalities.

Arnett et al. (2011) found that relatively small changes to wind-turbine operation (cut-in speeds, from 16.4 to 21.3 ft/sec [5.0 to 6.5 m/sec]), resulted in nightly reductions in bat mortality, ranging from 44 to 93 percent, with marginal annual power loss (<1 percent of total annual output). Arnett et al. (2011) studied bat response in areas where bat abundance was high and reported an overall pattern that higher cut-in speeds yielded fewer bat mortalities with statistically significant reductions at 16.4 ft/sec (5.0 m/sec). Bat mortality still occurred at the higher cut-in speed of 21.3 ft/sec (6.5 m/sec); however, the difference in mortality between 16.4 and 21.3 ft/sec (5.0 and 6.5 m/sec) was not statistically significant due to an inability to statistically differentiate the two treatments (Arnett et al. 2011).

For the purposes of establishing conservation measures (avoidance and minimization measures), it was assumed all phases of the species' lifecycle (hibernation, breeding, roosting, foraging, and migration) occur within the UGP Region. As extracted from the literature cited in sections 5.6.7 and 5.6.7.1, the best available information indicates the northern long-eared bat occurs at very low to moderate densities in a clustered, somewhat scattered manner throughout the UGP Region. The UGP Region is located along the northwestern margin of the species range, so we further assumed the species exhibits a general increase in the likelihood of occurrence toward the eastern extent of the UGP Region. We further assumed that the injury and/or mortality of bats are much more likely to occur when (1) projects are located in close proximity to habitats occupied by the species where individuals may collide with operating turbines during flight periods while foraging or migrating; and (2) turbines are operating during periods of low wind speed. We found no evidence in our review of the literature where the studied operational scenario achieved no (zero) bat mortality during the operational periods (even during wind speeds above 16.4 ft/sec [5.0 m/sec]); thus the goal of designing bat conservation measures was to establish siting and operational conditions such that the risk of bat mortality is extremely unlikely to occur (i.e., discountable).

Although the distribution of potentially suitable winter and breeding habitat has been mapped, there remains a high degree of uncertainty about how much of the habitat is currently occupied by the species within the UGP Region. To address this uncertainty, the assumption was made that northern long-eared bats occur wherever the habitat occurs and thus, project siting conditions were deemed to be the most appropriate and effective means to avoid injury/mortality to the northern long-eared bats during winter (hibernation) and summer (breeding and roosting). Based upon the published literature discussed above (USFWS 2010p, 2014c), the placement of turbines beyond a distance of 0.5 mi (0.8 km) away from suitable summer habitat is expected to be beyond the maximum flight distance of northern long-eared bats during foraging (summer) periods. Similarly, the placement of turbines beyond a distance of 5.0 mi (8.0 km) away from winter habitat hibernacula is expected to be sufficiently beyond flight distances associated with pre- and post-hibernation swarming activities associated with mating in the fall and foraging near a hibernaculum.

As far as foraging and swarming behavior associated with fall migration for the northern long-eared bat, there remains a high level of uncertainty as to where fall migration areas occur in the UGP Region. Acoustic-based surveys for bats can be used to locate migrating bats within their migration corridors. However, survey detection rates are expected to be very low because of the dispersed nature of migration behavior, because migration heights could exceed detection range of acoustic devices, and/or because of the generally low abundance of northern long-eared bats throughout the central and western portions of the UGP Region. Detection rates might be increased by strategic placement of more monitors on elevated locations such as meteorological towers. The anticipated higher likelihood of occurrence of the species along the eastern periphery of the UGP Region may yield higher detection rates, but this assumption is highly dependent on survey effort and the efficacy of survey methods, as well as the other factors mentioned.

After considerable effort and deliberation, the use of mapped (hypothetical) migration areas and preconstruction surveys as means to identify migration areas for northern long-eared bats may be limited in some locations. In those areas where high uncertainty remains concerning the risk for northern long-eared bat collisions and barotrauma associated with operating turbines during migration, even after surveys that yield no detections, developers and agencies have the option to incorporate the use of feathering and cut-in speeds. When the risk to northern long-eared bats is expected to be high, cut-in speeds and feathering should be applied during periods of low wind speed and higher expected levels of flight activity. This approach is considered to be the most effective means to minimize the mortality risk to the point where the risk is discountable (extremely unlikely to occur).

Based on the results of Arnett et al. (2011), it was inferred that cut-in speeds at a minimum of 16.4 ft/sec (5.0 m/sec) during periods of fall bat migration flight activity between sunset and sunrise is generally considered to be sufficient to reduce or diminish collision risk to discountable levels where and only where the northern long-eared bat has a low likelihood of occurrence (generally the western and central portions of the UGP Region. In areas where there is a higher likelihood of occurrence and assumed higher density of northern long-eared bats (eastern margin of the UGP Region), higher cut-in speeds are warranted to offset the higher likelihood of bats encountering turbines during periods of high wind speed (Bowden et al. 2012). To reduce bat exposure risk, a minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) is needed to insure barotrauma and/or strike risk is discountable in the eastern margin of the UGP Region. As an added measure to insure rotor rotation speeds remain sufficiently slow during wind speeds less than the established cut-in speeds (either 16.4 ft/sec [5.0 m/sec] or 22.6 ft/sec [6.9 m/sec]), feathering should also be used at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating northern long-eared bats. As warranted, the implementation of cut-in speeds and feathering will be required only for those projects where high-quality fall migration habitat or surveys indicate the occurrence of the northern long-eared bat or where the agencies, in consultation with industry, determine that higher cut-in speeds (above 16.4 ft/sec [5.0 m/sec] or 22.6 ft/sec [6.9 m/sec]) are deemed necessary to offset the risk of injury or mortality.

Implementation of the BMPs and conservation measures (avoidance and minimization) for wind energy development in the UGP Region is expected to reduce the risk of injury or mortality to the northern long-eared bat. We base this conclusion upon the requirement for wind energy development projects, when proposed in areas deemed of high risk to northern long-eared bats or their habitat, to include the following criteria into project plans:

1. The avoidance of potentially suitable summer (0.5 mi [0.8 km] buffer from forested areas or water sources) or winter habitat (5.0 mi [8.0 km] buffer from hibernacula);

2. Feathering of turbine blades, when minimum cut-in speeds are required, such that the blades are either motionless or are nearly motionless so to not pose a threat to bats (Baerwald et al. 2009) between 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period; and

3. Use of a minimum cut-in speed of 16.4 ft/sec (5.0 m/sec) or 22.6 ft/sec (6.9 m/sec) (dependent upon project location) between sunset and sunrise during fall migration to reduce mortality for northern long-eared bats.

As referenced earlier, the fall migration period for the northern long-eared bat rangewide occurs from August 15 to October 15 (USFWS 2014c). However, the specific migration period varies based on project location, latitude, and seasonal differences with warmer or colder falls and is best identified through coordination with the local USFWS Ecological Services Field Office in each State.

With the above-mentioned requirements for siting and operations for wind developments, the risk of injury or mortality of northern long-eared bats due to collision or barotrauma is extremely unlikely (discountable) during the winter, summer, and fall migration periods.

In accordance with the BMPs in table 4.5-1, and consistent with the USFWS Land-Based Wind Energy Guidelines (USFWS 2012c) and the required BBCS, wind developers will conduct a minimum of 1 yr of preconstruction surveys for the presence of the northern long-eared bat. Depending on initial survey results and identified risks, multiple years of surveys may be required by the local USFWS Ecological Services Field Office. For example, if the northern long-eared bat is detected during preconstruction surveys and the developer elects not to find an alternative site for the project, additional protective measures and survey requirements pursuant to the BBCS should be assumed (see section 5.6.7.3) to ensure the species will not likely be adversely affected during the operational periods of the wind energy development. Additional project-specific avoidance and minimization measures may be implemented based upon information gleaned from other documents such as multiple Habitat Conservation Plans currently under development for other bat species (e.g., *Draft Habitat Conservation Plan for the Indiana Bat and The Northern Long-Eared Bat, Pioneer Trail Wind Farm, Iroquois and Ford Counties, Illinois, June 2014*). The inclusion of such measures should be determined in consultation with the local USFWS office and based on the results of habitat and bat surveys. The USFWS has recently provided guidance for developers and agencies for Section 7 consultation, conservation planning, and survey protocol in the *Northern Long-Eared Bat Interim Conference and Planning Guidance, USFWS Regions 2, 3, 4, 5, & 6* (USFWS 2014c).

#### 5.6.7.2 Cumulative Effects

Cumulative effects are those effects of current and future non-Federal activities that are reasonably certain to occur within the UGP Region. Human disturbance of hibernacula and hibernating bats also continues to threaten populations. Such disturbance occurs in the form of cave commercialization, recreational caving, vandalism, and research-related activities. For this reason, hibernacula surveys should never disturb wintering bats within their hibernacula. The species is affected by WNS, as mentioned above. Some bat experts believe that less than 10 percent of northern long-eared bats will survive WNS. Those that survive are likely to either be immune to WNS or utilize isolated hibernacula that have not been infected. It is from this very small base that the species may have a chance of recovery over many decades or centuries. If these survivors are subjected to additional lethal stressors, such as wind facilities, the long-term viability of the species could become seriously compromised (Gosse 2014). Climate change is also expected to affect the northern long-eared bat, although the potential effects are not well understood. Climate change models have been used to investigate the range expansion of the little brown bat; such range shifts could also be used to predict the range shifts of other bat species (Humphries et al. 2002). As described in section 2.3, it is anticipated that 8,120 to 28,302 MW of new non-Federal capacity could occur in the UGP Region by 2030. Although there is potential for this level of non-Federal wind energy development to affect the northern long-eared bat within the UGP Region, it is not possible to accurately characterize the magnitude of cumulative effects without additional knowledge about locations of potential wind energy facilities relative to the distribution of the species.

#### 5.6.7.3 Required Conservation Measures

This section (summarized in table 5-1) identifies the general and species-specific conservation measures that would be required for all new wind energy applications. For those projects where applicants commit to implementation of the applicable conservation measures as described herein, ESA Section 7 consultation is assured. Western will initiate new project-specific Section 7 consultation with the USFWS for projects where the applicants do not commit to the implementation of the required general and species-specific conservation measures specified herein.

General measures that would be required of all wind energy projects to reduce ecological impacts under the proposed program are listed in table 4.5-1; these measures will assist in limiting potential adverse effects on the northern long-eared bat. A more inclusive list of suggested conservation measures can found in the *Northern Long-Eared Bat Interim Conference and Planning Guidance, USFWS Regions 12, 3, 4, 5, & 6* (USFWS 2014c). This guidance, as well as the avoidance and minimization measures below, emphasizes conservation measures for the protection of hibernacula and summer habitat, and reduction of the risk of collision during migration.

In order to be included in this programmatic Section 7 consultation and receive USFWS concurrence, applicants requesting interconnections to Western's transmission system or requesting easement exchanges to accommodate wind energy facilities that would affect easement properties managed by the USFWS within the UGP Region will be required to implement the applicable general conservation measures and factor such measures into the siting, construction, operation, maintenance procedures, and decommissioning for projects proposed in any county within the range of the northern long-eared bat in the UGP Region (figure A-16). Within this range, project applicants will be required to complete preconstruction evaluations and surveys, performed by qualified bat surveyors. This effort will be used, along with other means and information, to assess the potential for occurrence of the species, identify suitable foraging, roosting, and commuting habitat within project boundaries, and identify the distance from project boundaries to hibernacula used by northern long-eared bats. Onsite surveys will be needed to complete such evaluations. Refer to *Northern Long-eared Bat Interim Conference and Planning Guidance* (USFWS 2014c) adapted from *2014 Rangewide Indiana Bat Summer Survey Guidelines* (USFWS 2014b), and consult with the appropriate USFWS Ecological Services Field Office regarding the current approved northern long-eared bat protocol for surveys, monitoring, and reporting. Disturbance of hibernacula (at any time of year) associated with the development of a wind development is inconsistent with this programmatic framework and thus is not permissible.

Throughout the range of the northern long-eared bat within the UGP Region, the following species-specific avoidance measures would be required (table 5-1):

- Avoid all suitable habitat (do not site turbines) in areas within 5 mi (8 km) of hibernacula used by northern long-eared bats or within 0.5 mi (0.8 km) of known or presumed occupied foraging, roosting, and commuting habitat. Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning.

A number of additional minimization measures specifically intended to reduce the potential for adverse effects on the northern long-eared bat would also be required. Additional species-specific minimization measures would include the following:

- A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.

- The need for implementation of cut-in speeds higher than manufacturers' recommendations during the fall bat migration period will be based on the following site-specific, project-by-project risk assessments by the State Ecological Services Field Office of the USFWS:

  - During the preconstruction evaluation and survey stage, and based on a collision risk assessment of location of the project, proximity to potential summer habitat, distance to known occurrences, distance to known hibernacula, and suspected migration patterns, the applicant will coordinate with Western, Refuges, and the local Ecological Services Field Offices of the USFWS to determine if the risk of injury or mortality is sufficiently high to warrant higher cut-in speeds.

  - In the event that preconstruction surveys indicate species occurrence or occupancy of habitat adjacent to the project area, higher turbine cut-in speeds will be required to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.

  - When warranted by either of the two aforementioned conditions for specific projects, turbine cut-in speeds will be increased to 16.4 ft/sec

(5.0 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates in each State) for northern long-eared bats in the western and central areas of the UGP Region. In the eastern fringe of the UGP Region, a minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates in each State) for northern long-eared bats is required. For administrative purposes as well as an implementation consistency in meeting these requirements, areas within the UGP Region that occur east of the western borders of Minnesota and Iowa will be used as the line of demarcation where the minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) will be used. Use of feathering (where blades are motionless or nearly motionless) below the respective cut-in speed of 16.4 ft/sec (5.0 m/sec) or 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating northern long-eared bats. Increased cut-in speed and feathering can be suspended from 0.5 hour after sunrise to 0.5 hour before sunset.

- Immediately report observations of northern long-eared bat mortality to the appropriate USFWS office.

In summary, the best available information, gleaned from the literature cited in sections 5.6.7 and 5.6.7.1, indicates the northern long-eared bat occurs at very low to moderate densities in a clustered, somewhat scattered manner throughout the UGP Region, with generally increasing densities toward the eastern extent of the UGP Region. However, additional studies are constantly adding to the knowledge base of this species in the region. Because of these uncertainties and the current paucity of scientific data, the agencies believe a robust monitoring program (i.e., BBCS), coupled with a step-down risk assessment and an adaptive management approach is warranted for the northern long-eared bat to help direct the appropriate selection of conservation measures. This approach will assess the need for increased cut-in speeds for the fall migration period based on site-specific project location, available scientific data, monitoring results, and analysis of risk. This step-down approach is reflected in the Avoidance and Minimization Measures. Although WNS poses the greatest threat to the species, collisions with wind turbines are a risk factor. Protection of summer habitat for foraging, roosting, and maternity sites, as well as winter hibernacula, is also very important to the conservation of the species. Protection of these summer and winter habitats can be addressed readily through buffer zone conservation measures. Suspected northern long-eared bat habitat is not ubiquitous throughout the UGP Region. Summer habitat appears to be strongly correlated with mature forested areas in the floodplains of major rivers like the Missouri River or prairie river drainages west of the Missouri River with a cottonwood component, whereas winter hibernacula locations are less documented, but expected to be within short migration distances of less than 50 mi (80 km). When warranted, the risk of collisions can be reduced to an insignificant or discountable level by feathering of turbine blades below cut-in speeds and increasing cut-in speeds to 16.4 ft/sec (5.0 m/sec) during migration in the western and central portions of the UGP Region and 22.6 ft/sec (6.9 m/sec) in the eastern portion of the UGP Region within the States of Minnesota and Iowa.

#### 5.6.7.4 Effects Determination

Wind energy development may affect the northern long-eared bat through the loss of foraging or roosting habitat, or through direct mortality resulting from turbine collisions. However, the UGP Region represents the western part of the species range, an agricultural landscape typically dominated by tilled and converted lands for farming and ranching. Habitat for the northern long-eared bat is sparse and locally isolated forest cover interspersed within the open grasslands, agriculturally converted croplands, and riparian corridors. Contiguous forest cover in the UGP Region is largely confined to forested floodplains, river breaks, and mountains. This landscape differs substantially from the more thoroughly forested central and eastern portions of the species range where northern long-eared bats are much more common. Northern long-eared bats demonstrate a strong preference for forested landscapes and do not travel or forage in open areas away from tree cover; a large portion of the species' foraging is accomplished by gleaning within forested areas. Northern long-eared bats are short-distance migrants, unlike tree bats that migrate long distances. Hibernacula used by northern long-eared bats are typically located within 50 mi (80 km) of summer roost and foraging areas such as forested floodplains, river breaks, and mountains, all of which may be avoided during project siting. Although the northern long-eared bat has a strong affinity to contiguous upland forested areas and riparian forests, the species may migrate through unforested landscapes from hibernacula to reach forested summer habitat. To date, no data document such a migration pattern; however, bat survey data is sparse for these landscapes. Documented mortality, in general, for Myotis bats is relatively low, and no northern long-eared bat mortality has been documented at windfarms in the UGP Region. However, as the pool of bat mortality data increases from new and existing wind developments, the risk of injury or mortality for the northern-long eared bat from wind turbines within the UGP will be better understood over time.

The implementation of BMPs and conservation measures is expected to reduce the likelihood of significant impacts from wind energy developments within or near the species occupied habitat. With the implementation of all conservation measures identified above (summarized in table 5-1), incorporation of the BMPs listed in table 4.5-1, and incorporation of additional project-specific BMPs in siting, constructing, and operating new wind energy facilities, Western and the USFWS Refuges have determined the injury or mortality of the northern long-eared bat is extremely unlikely to occur during implementation of this programmatic framework and therefore the effects are discountable. It is therefore determined that implementation of the proposed action **may affect, but is not likely to adversely affect,** the northern long-eared bat.

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# APPENDIX A:

# SPECIES DISTRIBUTION TABLES AND FIGURES

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# APPENDIX A:

## SPECIES DISTRIBUTION TABLES AND FIGURES

This appendix presents information pertaining to the county distributions of species of plants and animals that are listed as threatened or endangered under the Endangered Species Act (ESA), or that are proposed or candidates for listing under the ESA. Information about the status and distributions of special status species for each of the States within the Western Area Power Administration's (Western's) Upper Great Plains Customer Service Region (UGP Region) was derived from data published online by the U.S. Fish and Wildlife Service (USFWS) through the Environmental Conservation Online System (http://ecos.fws.gov/tess_public/StateListing.do?state=all), as well as information obtained from individual USFWS field offices within the UGP Region (table A-1). The distribution of predicted suitable habitat for terrestrial vertebrate species considered in this Biological Assessment (BA) was evaluated to provide additional information on species habitat distribution and to help inform effects determinations. Predicted suitable habitat for terrestrial vertebrates (table A-2) was determined using animal distribution models from State-level Gap Analysis Programs (GAP) (USGS 2011). This information was used to determine the amount of predicted suitable habitat within 25 mi (40 km) of Western substations relative to the total amount of predicted suitable habitat in the UGP Region. It is important to note that GAP models (inferred predicted suitable habitat distributions) are only available for the terrestrial vertebrates considered in this BA.

The reported county-level distributions of the species evaluated in the UGP Wind Energy Programmatic BA are depicted in figures A-1 through A-18. Predicted habitat suitability for terrestrial vertebrates is depicted in figures A-19 through A-24.

TABLE A-1 Known Occurrence of Federally Listed Species and Presence of Federally Designated Critical Habitat in Counties within the UGP Region[a]

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Plants** | | | | |
| *Asclepias meadii* | Mead's milkweed | T | IA – Adair, Clarke, Decatur, Ringgold, Warren | |
| *Lespedeza leptostachya* | Prairie bush-clover | T | IA – Buena Vista, Clarke, Clay, Dickinson, Emmet, Kossuth, O'Brien, Osceola, Warren<br>MN – Brown, Cottonwood, Jackson, Martin, Nobles, Redwood, Renville, Rock | |
| *Pinus albicaulis* | Whitebark pine | C | MT – Beaverhead, Broadwater, Carbon, Cascade, Chouteau, Deer Lodge, Flathead, Gallatin, Glacier, Granite, Jefferson, Judith Basin, Lewis and Clark, Madison, Meagher, Park, Pondera, Powell, Ravalli, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland | |
| *Platanthera leucoaea* | Eastern prairie fringed orchid | T | IA – Decatur | |
| *Platanthera praeclara* | Western prairie fringed orchid | T | IA – Adair, Buena Vista, Cherokee, Clay, Crawford, Guthrie, Kossuth, Mills, Polk, Pocahontas, Taylor<br>MN – Clay, Kittson, Lincoln, Nobles, Norman, Pennington, Pipestone, Polk, Red Lake, Rock<br>NE – Antelope, Boone, Boyd, Buffalo, Burt, Butler, Cass, Cedar, Clay, Colfax, Cuming, Dakota, Dixon, Douglas, Dodge, Fillmore, Gage, Garfield, Greeley, Hall, Hamilton, Holt, Howard, Jefferson, Johnson, Knox, Lancaster, Madison, Merrick, Nance, Nemaha, Otoe, Pawnee, Pierce, Platte, Polk, Richardson, Saline, Sarpy, Saunders, Seward, Sherman, Stanton, Thurston, Valley, Washington, Wayne, Wheeler, York<br>ND – Ransom, Richland<br>SD – Bennett, Brookings, Clay, Hutchinson, Lake, Lincoln, McCook, Miner, Minnehana, Moody, Roberts, Shannon, Todd, Turner, Union, Yankton | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Plants (Cont.)** | | | | |
| *Spiranthese divuvialis* | Ute ladies'-tresses | T | MT – Beaverhead, Broadwater, Gallatin, Jefferson, Madison | |
| **Mollusks** | | | | |
| *Lampsilis higginsii* | Higgins eye (pearlymussel) | E | SD – Yankton<br>IA – Des Moines | |
| *Leptodea leptodon* | Scaleshell mussel | E | NE – Cedar<br>SD[d] – Clay, Union, Yankton | |
| **Arthropods** | | | | |
| *Cicindela nevadica lincolniana* | Salt Creek tiger beetle | E | NE – Lancaster, Saunders | |
| *Hesperia dacotae* | Dakota skipper | T | IA – Dickinson<br>MN – Big Stone, Chippewa, Clay, Lac qui Parle, Kittson, Lincoln, Murray, Norman, Pipestone, Polk, Pope, Swift, Traverse, Yellow Medicine<br>ND – Bottineau, Burke, Dunn, Eddy, McHenry, McKenzie, McLean, Mountrail, Oliver, Ransom, Richland, Rolette, Sargent, Stutsman, Ward, Wells<br>SD – Brookings, Brown, Codington, Day, Deule, Edmunds, Grant, Hamlin, Marshall, McPherson, Moody, Roberts | |
| *Nicrophorus americanus* | American burying beetle | E | NE – Antelope, Boone, Boyd, Garfield, Greeley, Holt, Knox, Valley, Wheeler<br>SD – Bennett, Gregory, Todd, Tripp | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Arthropods (Cont.)** | | | | |
| *Oarisma poweshiek* | Poweshiek skipperling | E | IA – Dickinson, Kossuth<br>MN – Big Stone, Chippewa, Clay, Kittson, Lac Qui Parle, Lincoln, Murray, Norman, Pipestone, Pope, Swift, Traverse, Yellow Medicine<br>ND – Richland<br>SD – Brookings, Codington, Day, Deuel, Grant, Hamlin, Marshall, Moody, Roberts | |
| **Fishes** | | | | |
| *Notropis topeka* (=*tristis*) | Topeka shiner | E | IA – Boone, Buena Vista, Calhoun, Carroll, Dallas, Green, Hamilton, Humboldt, Kossuth, Lyon, Osceola, Pocahontas, Sac, Sioux, Wright, Webster<br>MN – Lincoln, Murray, Nobles, Pipestone, Rock<br>NE – Madison, Stanton<br>SD – Aurora, Beadle, Bon Homme, Brookings, Brown, Clark, Clay, Codington, Davison, Deuel, Douglas, Grant, Hamlin, Hanson, Hutchinson, Jerauld, Kingsbury, Lake, Lincoln, McCook, Miner, Minnehaha, Moody, Sanborn, Spink, Turner, Union, Yankton | IA – Boone, Calhoun, Carroll, Dallas, Greene, Hamilton, Humboldt, Lyon, Osceola, Sac, Webster, Wright<br>MN – Lincoln, Murray, Nobles, Pipestone, Rock<br>NE – Madison |
| *Salvelinus confluentus* | Bull trout | T | MT – Deer Lodge, Glacier, Lewis and Clark, Silver Bow | MT – Deer Lodge, Glacier, Lewis and Clark |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Fishes (Cont.)** | | | | |
| *Scaphirhynchus albus* | Pallid sturgeon | E | IA – Freemont, Harrison, Mills, Monona, Pottawattamie, Woodbury<br>MT – Blaine, Chouteau, Custer, Dawson, Fergus, Garfield, McCone, Petroleum, Phillips, Prairie, Richland, Roosevelt, Rosebud, Valley, Wibaux<br>NE – Boyd, Burt, Butler, Cass, Cedar, Colfax, Dakota, Dixon, Dodge, Douglas, Knox, Nemaha, Otoe, Platte, Richardson, Sarpy, Saunders, Thurston, Washington<br>ND – Burleigh, Dunn, Emmons, McKenzie, McLean, Mercer, Morton, Mountrail, Oliver, Sioux, Williams<br>SD – Bon Homme, Brule, Buffalo, Campbell, Charles Mix, Clay, Corson, Dewey, Gregory, Hughes, Lincoln, Lyman, Potter, Stanley, Sully, Union, Walworth, Yankton | |
| **Reptiles** | | | | |
| *Sistrurus catenatus catenatus* | Massasauga rattlesnake | C | IA – Mills, Pottawattamie<br>NE – Colfax, Dodge, Jefferson, Johnson, Pawnee, Richardson | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Birds** | | | | |
| *Centrocercus urophasianus* | Greater Sage-Grouse | C | MT – Beaverhead, Big Horn, Blaine, Carbon, Carter, Chouteau, Custer, Dawson, Fallon, Fergus, Gallatin, Garfield, Golden Valley, Hill, Liberty, Madison, McCone, Meagher, Musselshell, Park, Petroleum, Phillips, Powder River, Prairie, Richland, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>ND – Bowman, Golden Valley, Slope<br>SD – Butte, Fall River, Harding | |
| *Charadrius melodus* | Piping plover, except Great Lakes watershed | T | IA – Pottawattamie, Woodbury<br>MT – Garfield, McCone, Phillips, Pondera, Richland, Roosevelt, Sheridan, Valley<br>NE – Boyd, Buffalo, Butler, Cass, Cedar, Colfax, Cuming, Dixon, Dodge, Douglas, Hall, Hamilton, Holt, Howard, Kearney, Knox, Madison, Merrick, Nance, Platte, Polk, Sarpy, Saunders, Sherman, Stanton, Valley<br>ND – Benson, Burke, Burleigh, Divide, Dunn, Eddy, Emmons, Foster, Kidder, Logan, McHenry, McIntosh, McKenzie, McLean, Mercer, Morton, Mountrail, Oliver, Pierce, Renville, Sheridan, Sioux, Stutsman, Ward, Wells, Williams<br>SD – Bon Homme, Brule, Buffalo, Campbell, Charles Mix, Clay, Corson, Day, Dewey, Gregory, Haakon, Hughes, Kingsbury, Lyman, Potter, Stanley, Sully, Union, Walworth, Yankton, Ziebach | MT – Garfield, McCone, Phillips, Richland, Roosevelt, Sheridan, Valley<br>ND – Benson, Burke, Burleigh, Divide, Dunn, Eddy, Emmons, Kidder, Logan, McHenry, McIntosh, McKenzie, McLean, Mercer, Morton, Mountrail, Oliver, Pierce, Renville, Sheridan, Sioux, Stutsman, Ward, Williams<br>SD – Bon Homme, Campbell, Charles Mix, Clay, Corson, Dewey, Gregory, Hughes, Potter, Stanley, Sully, Union, Walworth, Yankton, Ziebach |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Birds (Cont.)** | | | | |
| *Anthus spragueii* | Spragues Pipit | C | MN – Aitkin, Big Stone, Clay, Cottonwod, Dakota, Hennepin, Hubbard, Kandiyohi, Kittson, Lac qui Parle, Mahnomen, Marshal, Martin, Norman, Pennington, Pipestone, Polk, Red Lake, Rock, Roseau, St. Louis, Stevens, Traverse, Wadena, Wilkin<br>MT – Big Horn, Blaine, Broadwater, Carbon, Carter, Cascade, Chouteau, Custer, Daniels, Dawson, Fallon, Fergus, Gallatin, Garfield, Glacier, Golden Valley, Hill, Jefferson, Judith Basin, Lewis and Clark, Liberty, Madison, McCone, Meagher, Musselshell, Park, Petroleum, Phillips, Pondera, Powder River, Prairie, Richland, Roosevelt, Rosebud, Sheridan, Stillwater, Sweet Grass, Teton, Toole, Treasure, Valley, Wheatland, Wibaux, Yellowstone<br>ND – Adams, Barnes, Benson, Billings, Bottineau, Bowman, Burke, Burleigh, Cavalier, Dickey, Divide, Dunn, Eddy, Emmons, Foster, Golden Valley, Grant, Hettinger, Kidder, Lamoure, Logan, McHenry, Mcintosh, McKenzie, Mclean, Mercer, Morton, Mountrail, Oliver, Pembina, Pierce, Ramsey, Ransom, Renville, Rolette, Sargent, Sheridan, Sioux, Slope, Stark, Stutsman, Towner, Walsh, Ward, Wells, Williams<br>SD – Butte, Campbell, Corson, Custer, Dewey, Fall River, Haakon, Harding, Jackson, Jones, Lawrence, Lyman, McPherson, Meade, Pennington, Perkins, Shannon, Stanley, Ziebach | |

TABLE A-1 (Cont.)

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Birds (Cont.)** | | | | |
| *Grus americana* | Whooping crane | E | MT – Custer, Daniels, Dawson, Fallon, McCone, Phillips, Prairie, Richland, Roosevelt, Sheridan, Valley, Wibaux, Yellowstone<br><br>NE – Adams, Antelope, Boone, Boyd, Buffalo, Butler, Clay, Fillmore, Franklin, Garfield, Greeley, Hall, Hamilton, Holt, Howard, Jefferson, Johnson, Kearney, Knox, Madison, Merrick, Nance, Nuckolls, Platte, Polk, Saline, Seward, Sherman, Thayer, Valley, Webster, Wheeler, York<br><br>ND – Adams, Barnes, Benson, Billings, Bottineau, Bowman, Burke, Burleigh, Cass, Cavalier, Dickey, Divide, Dunn, Eddy, Emmons, Foster, Golden Valley, Grand Forks, Grant, Griggs, Hettinger, Kidder, LaMoure, Logan, McHenry, McIntosh, McKenzie, McLean, Mercer, Morton, Mountrail, Nelson, Oliver, Pembia, Pierce, Ramsey, Ransom, Renville, Richland, Rolette, Sargent, Sheridan, Sioux, Slope, Stark, Steele, Stutsman, Towner, Traill, Walsh, Ward, Wells, Williams<br><br>SD – Aurora, Beadle, Bennett, Bon Homme, Brown, Brule, Buffalo, Butte, Campbell, Charles Mix, Clark, Codington, Corson, Custer, Davidson, Day, Dewey, Douglas, Edmunds, Faulk, Gregory, Haakon, Hamlin, Hand, Hanson, Harding, Hughes, Hutchinson, Hyde, Jackson, Jerauld, Jones, Kingsbury, Lawrence, Lyman, McCook, Marshall, McPhearson, Meade, Mellette, Miner, Pennington, Perkins, Potter, Sanborn, Shannon, Spink, Stanley, Sully, Todd, Tripp, Turner, Walworth, Yankton, Ziebach | NE – Buffalo, Kearny |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Birds (Cont.)** | | | | |
| *Sternula antillarum* | Interior least tern | E | IA – Polk, Woodbury, Pottawattamie<br>MN – Lincoln, Lyon, Marshall, Murray, Nobles<br>MT – Custer, Dawson, Garfield, McCone, Prairie, Richland, Roosevelt, Rosebud, Valley, Wibaux<br>NE – Boyd, Buffalo, Butler, Cass, Cedar, Colfax, Cuming, Custer, Dixon, Dodge, Douglas, Hall, Hamilton, Holt, Howard, Kearney, Knox, Madison, Merrick, Nance, Platte, Polk, Sarpy, Saunders, Sherman, Stanton, Valley<br>ND – Burleigh, Dunn, Emmons, McKenzie, McLean, Mercer, Morton, Mountrail, Oliver, Sioux, Williams<br>SD – Bon Homme, Brule, Buffalo, Campbell, Charles Mix, Clay, Corson, Dewey, Gregory, Haakon, Hughes, Lyman, Meade, Pennington, Potter, Stanley, Sully, Union, Walworth, Yankton, Ziebach | |
| **Mammals** | | | | |
| *Myotis sodalis* | Indiana bat | E | IA – Clarke, Decatur, Madison, Ringgold, Union | |
| *Canis lupis* | Gray wolf, Lower 48 States | E | ND – Adams, Barnes, Benson, Billings, Bottineau, Bowman, Burke, Burleigh, Cass, Cavalier, Dickey, Divide, Dunn, Eddy, Emmons, Foster, Golden Valley, Grand Forks, Grant, Griggs, Hettinger, Kidder, LaMoure, Logan, McHenry, McIntosh, McKenzie, McLean, Mercer, Morton, Mountrail, Nelson, Oliver, Pembina, Pierce, Ramsey, Ransom, Renville, Richland, Rolette, Sargent, Sheridan, Sioux, Slope, Stark, Steele, Stutsman, Towner, Trail, Walsh, Ward, Wells, Williams<br>SD – Aurora, Beadle, Bennett, Bon Homme, Brookings, Brown, Brule, Buffalo, Butte, Campbell, Charles Mix, | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Mammals (Cont.)** | | | | |
| *Canis lupis* (Cont.) | | | Clark, Clay, Codington, Corson, Custer, Davison, Day, Deuel, Dewey, Douglas, Edmunds, Fall River, Faulk, Grant, Gregory, Haakon, Hamlin, Hand, Hanson, Harding, Hughes, Hutchinson, Hyde, Jackson, Jerauld, Jones, Kingsbury, Lake, Lawrence, Lincoln, Lyman, Marshall, McCook, McPherson, Meade, Mellette, Miner, Minnehaha, Moody, Pennington, Perkins, Potter, Roberts, Sanborn, Shannon, Spink, Stanley, Sully, Todd, Tripp, Turner, Union, Walworth, Yankton, Ziebach<br><br>NE – Adams, Antelope, Boone, Boyd, Buffalo, Burt, Butler, Cass, Cedar, Clay, Colfax, Cuming, Dakota, Dixon, Dodge, Douglas, Fillmore, Franklin, Gage, Garfield, Greeley, Hall, Hamilton, Holt, Howard, Jefferson, Johnson, Kearney, Knox, Lancaster, Madison, Merrick, Nance, Nemaha, Nuckolls, Otoe, Pawnee, Pierce, Platte, Polk, Richardson, Saline, Sarpy, Saunders, Seward, Sherman, Stanton, Thayer, Thurston, Valley, Washington, Wayne, Webster, Wheeler, York<br><br>IA – Adair, Adams, Audubon, Boone, Buena Vista, Calhoun, Carroll, Cass, Cherokee, Clarke, Clay, Crawford, Dallas, Decatur, Dickinson, Emmet, Fremont, Greene, Guthrie, Hamilton, Hancock, Hariison, Humboldt, Ida, Kossuth, Lyon, Madison, Mills, Monona, Montgomery, O'Brien, Osceola, Page, Palo Alto, Plymouth, Pocahontas, Polk, Pottawattamie, Ringgold, Sac, Shelby, Sioux, Taylor, Union, Warren, Webster, Winnebago, Woodbury, Wright | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Mammals (Cont.)** | | | | |
| *Canis lupis* (Cont.) | Gray wolf, Lower 48 States | T | MN – Becker, Benton, Big Stone, Blue Earth, Brown, Cass, Chippewa, Clay, Clearwater, Cottonwood, Douglas, Faribault, Grant, Hubbard, Jackson, Kandiyohi, Kittson, Lac qui Parle, Le Sueur, Lincoln, Lyon, Mahnomen, Marshall, Martin, McLeod, Meeker, Morrison, Murray, Nicollet, Nobles, Norman, Otter Trail, Pennington, Pipestone, Polk, Pope, Red Lake, Redwood, Renville, Rock, Sherburne, Sibley, Stearns, Stevens, Swift, Todd, Traverse, Wadena, Watonwan, Wilkin, Wright, Yellow Medicine | |
| *Lynx canadensis* | Canada lynx | T | MN – Cass, Clearwater, Marshall<br>MT – Beaverhead, Broadwater, Carbon, Cascade, Chouteau, Deer Lodge, Fergus, Gallatin, Glacier, Golden Valley, Jefferson, Judith Basin, Lewis and Clark, Madison, Meagher, Park, Pondera, Silver Bow, Stillwater, Sweet Grass, Teton, Wheatland | MT – Carbon, Gallatin, Glacier, Lewis and Clark, Park, Pondera, Stillwater, Sweet Grass, Teton |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Mammals (Cont.)** | | | | |
| *Mustela nigripes* | Black-footed ferret | E | MT – Big Horn, Blaine, Carbon, Carter, Chouteau, Custer, Fergus, Garfield, Golden Valley, Hill, Jefferson, Lewis and Clark, Liberty, McCone, Musselshell, Petroleum, Phillips, Powder River, Prairie, Rosebud, Stillwater, Sweet Grass, Toole, Valley, Wheatland, Yellowstone<br>NE – Adams, Antelope, Boone, Boyd, Buffalo, Butler, Clay, Colfax, Fillmore, Franklin, Garfield, Greeley, Hall, Hamilton, Holt, Howard, Jefferson, Kearney, Knox, Madison, Merrick, Nance, Nuckolls, Pierce, Platte, Polk, Saline, Seward, Sherman, Thayer, Valley, Webster, Wheeler, York<br>ND – Adams, Billings, Bowman, Dunn, Golden Valley, Grant, Hettinger, McKenzie, Mercer, Morton, Oliver, Slope, Sioux, Stark<br>SD – Corson, Custer, Lyman | |
| *Mustela nigripes* | Black-footed ferret | XN | MT – Philips<br>SD – Dewey, Gregory, Jackson, Mellette, Pennington, Shannon, Todd, Tripp, Ziebach | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Mammals (Cont.)** | | | | |
| *Myotis septentrionalis* | Northern long-eared bat | T | IA - Adair, Adams, Audubon, Boone, Buena Vista, Calhoun, Carroll, Cass, Cherokee, Clarke, Clay, Crawford, Dallas, Decatur, Dickinson, Emmet, Fremont, Greene, Guthrie, Hamilton, Hancock, Harrison, Humboldt, Ida, Kossuth, Lyon, Madison, Mills, Monona, Montgomery, O'Brien, Osceola, Page, Palo Alto, Plymouth, Pocahontas, Polk, Pottawattamie, Ringgold, Sac, Shelby, Sioux, Taylor, Union, Warren, Webster, Winnebago, Woodbury, Wright<br>MN – Becker, Benton, Big Stone, Blue Earth, Brown, Cass, Chippewa, Clay, Clearwater, Cottonwood, Douglas, Faribault, Grant, Hubbard, Jackson, Kandiyohi, Kittson, Lac qui Parle, Le Sueur, Lincoln, Lyon, Mahnomen, Marshall, Martin, McLeod, Meeker, Morrison, Murray, Nicollet, Nobles, Norman, Otter Trail, Pennington, Pipestone, Polk, Pope, Red Lake, Redwood, Renville, Rock, Sherburne, Sibley, Stearns, Stevens, Swift, Todd, Traverse, Wadena, Watonwan, Wilkin, Wright, Yellow Medicine<br>MT – Richland<br>ND – Billings, Bottineau, Bowman, Hettinger, McHenry, McKenzie, Oliver, Ward<br>NE – Dakota, Dixon, Franklin, Holt, Jefferson, Pawnee, Thurston<br>SD – Bennett, Bon Homme, Brule, Butte, Charles Mix, Clay, Custer, Fall River, Gregory, Harding, Hughes, Jackson, Lawrence, Lyman, Meade, Mellette, Pennington, Perkins, Shannon, Stanley, Union, Yankton | |

**TABLE A-1 (Cont.)**

| Scientific Name | Common Name | Listing Status[b] | Counties within the UGP Region from Which the Species Have Been Reported | Counties within the UGP Region in Which Critical Habitat for the Species Is Located |
|---|---|---|---|---|
| **Mammals (Cont.)** | | | | |
| *Ursus arctos horribilis* | Grizzly bear | T | MT – Beaverhead, Carbon, Deer Lodge, Gallatin, Glacier, Jefferson, Lewis and Clark, Madison, Park, Pondera, Silver Bow, Stillwater, Sweet Grass, Teton | |

[a] County distributions can change and companies should coordinate accordingly with the USFWS to ensure that the most recent county distributions are considered.

[b] E = listed as endangered under the ESA; T = listed as threatened under the ESA; C = candidate for listing under the ESA; XN = experimental, nonessential population.

Source: USFWS Environmental Conservation Online System (http://ecos.fws.gov/tess_public/StateListing.do?state=all) and information obtained from individual USFWS field offices within the UGP Region.

**TABLE A-2 Availability and Distribution of Predicted Suitable Habitat for Terrestrial Vertebrate Species in the UGP Region (Note that not all species included in this Biological Assessment have GAP models for predicted suitable habitat)**

| Species | States in Which Species May Occur[a] | States in Which GAP Models are Available[b] | Amount of Suitable Habitat in UGP Region (acres) | Amount of Suitable Habitat in Substation Buffers (acres) | Percent of Suitable Habitat in 25-mi (40-km) Substation Buffers |
|---|---|---|---|---|---|
| **Reptiles** | | | | | |
| Eastern massasauga (*Sistrurus catenatus*) | IA, NE | IA, NE | IA: 89,000<br>NE: 1,082,000 | IA: 0<br>NE: 0 | 0 |
| **Birds** | | | | | |
| Greater sage-grouse (*Centrocercus urophasianus*) | MT, ND, SD | MT, ND, SD | MT: 9,714,000<br>ND: 1,161,000<br>SD: 9,000 | MT: 2,756,500<br>ND: 390,000<br>SD: 4,950 | 29 |
| Interior least tern (*Sternula antillarum*) | IA, MT, ND, NE, SD | IA, MT, ND, NE, SD | IA: 12,600<br>MT: 256,000<br>ND: 543,500<br>NE: 2,188,700<br>SD: 2,600,500 | IA: 3,500<br>MT: 178,200<br>ND: 435,700<br>NE: 776,300<br>SD: 2,069,000 | 62 |
| Piping plover (*Charadrius melodus*) | IA, MT, ND, NE, SD | IA, MT, ND, NE, SD | IA: 8,700<br>MT: 126,000<br>ND: 1,020,500<br>NE: 2,189,000<br>SD: 615,000 | IA: 4,150<br>MT: 82,000<br>ND: 579,000<br>NE: 768,000<br>SD: 478,000 | 48 |
| Sprague's pipit (*Anthus spragueii*) | MT, ND | MT, ND, SD | MT: 2,087,000<br>ND: 8,411,500<br>SD: 9,046,000 | MT: 750,000<br>ND: 3,876,500<br>SD: 4,442,000 | 46 |

**TABLE A-2 (Cont.)**

| Species | States in Which Species May Occur[a] | States in Which GAP Models are Available[b] | Amount of Suitable Habitat in UGP Region (acres) | Amount of Suitable Habitat in Substation Buffers (acres) | Percent of Suitable Habitat in 25-mi Substation Buffers |
|---|---|---|---|---|---|
| **Birds (Cont.)** | | | | | |
| Whooping crane (*Grus americana*) | MT, ND, NE, SD | MT | MT: 460,000 | MT: 187,100 | 41 |
| **Mammals** | | | | | |
| Black-footed ferret (*Mustela nigripes*) | MT, ND, NE, SD | MT, SD | MT: 2,095,500<br>SD: 1,107,700 | MT: 921,000<br>SD: 677,000 | 50 |
| Canada lynx (*Lynx canadensis*) | MN, MT | MN, MT | MN: 251,500<br>MT: 4,508,000 | MN: 6,500<br>MT: 21,500 | <1 |
| Gray wolf (*Canis lupis*) | MN, MT, ND, NE, SD | MN, MT | MN: 3,814,000<br>MT: 8,818,500 | MN: 460,000<br>MT: 241,000 | 6 |
| Grizzly bear (*Ursus arctos horribilis*) | MT | MT | MT: 5,527,000 | MT: 20,500 | <1 |
| Indiana bat (*Myotis sodalis*) | IA | IA | IA: 359,000 | IA: 133,000 | 37 |

[a] States in which species may occur were determined from information obtained using the USFWS Environmental Conservation Online System (http://ecos.fws.gov/tess_public/StateListing.do?state=all).

[b] Habitat suitability was determined using State-level Gap Analysis Programs accessed through the U.S. Geological Survey (USGS) GAP Analysis Program Web site. (USGS, 2011, State Gap Analysis Data, USGS GAP Analysis Program. Available at ftp://ftp.gap.uidaho.edu/products. Accessed Feb. 2, 2011.)


**FIGURE A-1 Reported County Distributions of Mead's Milkweed, Ute Ladies'-Tresses, and Eastern Prairie Fringed Orchid in the UGP Region**

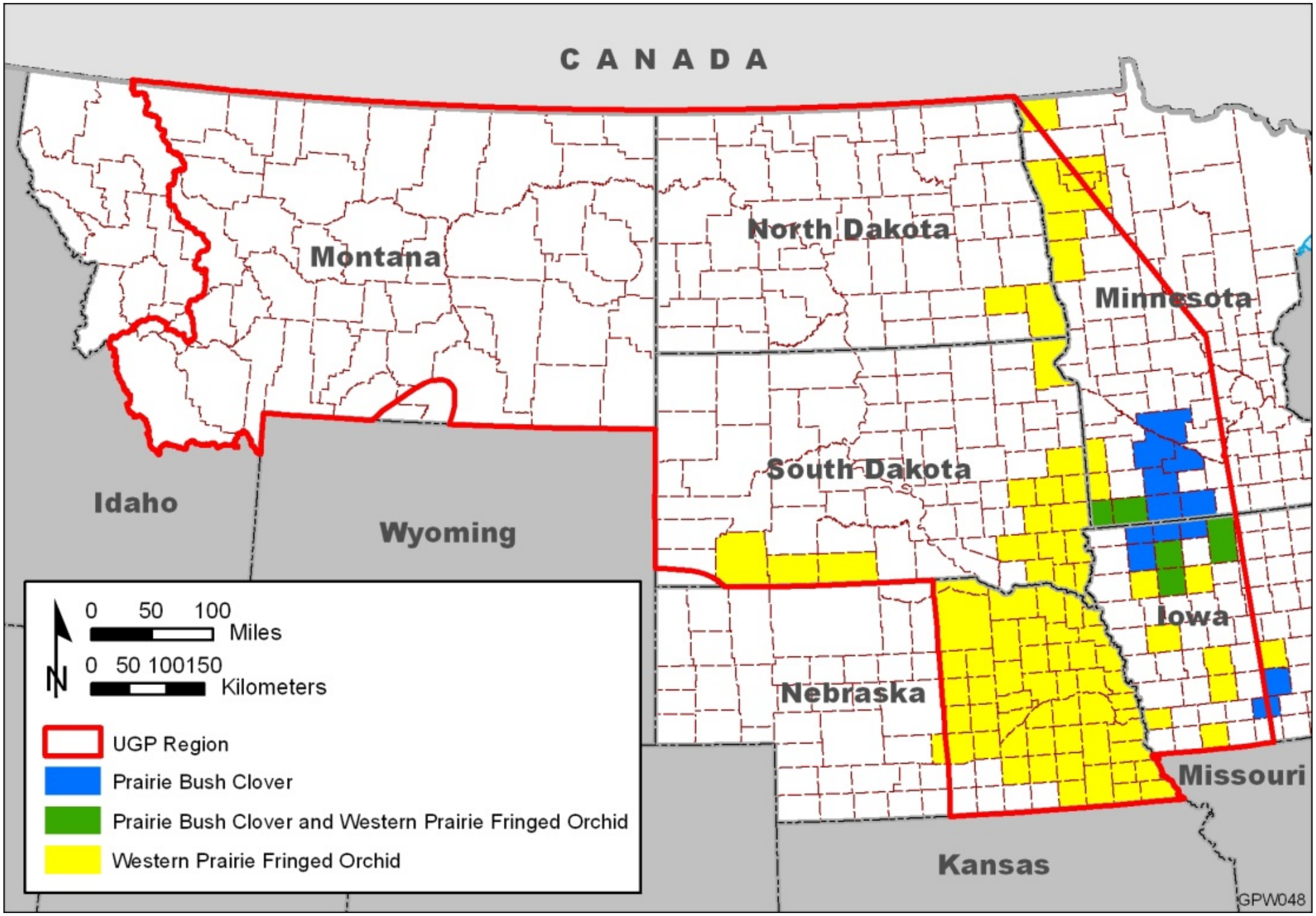


**FIGURE A-2 Reported County Distributions of Prairie Bush Clover and Western Prairie Fringed Orchid in the UGP Region**


**FIGURE A-3 Reported County Distribution of Whitebark Pine in the UGP Region**

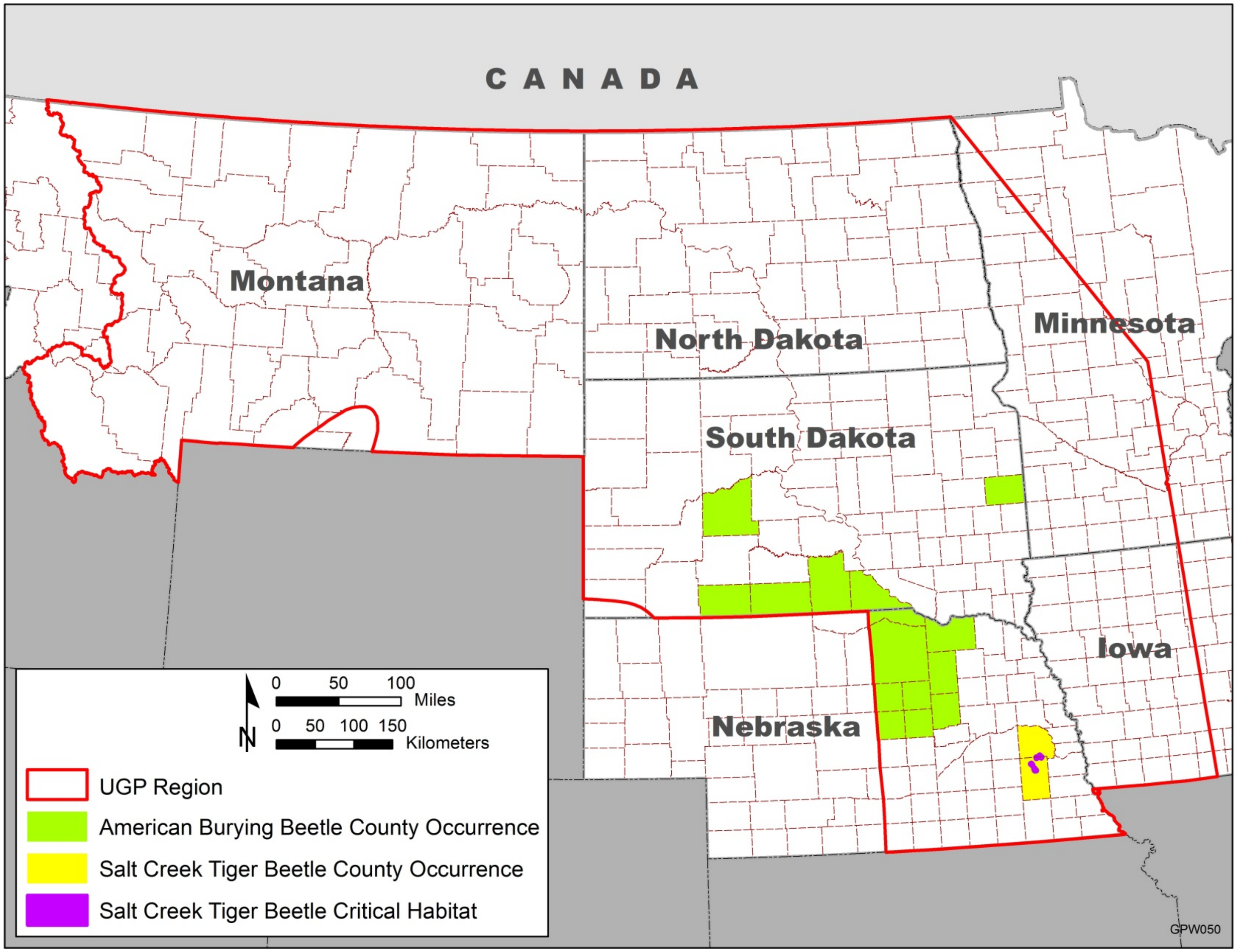


**FIGURE A-4 Reported County Distributions of American Burying Beetle and Salt Creek Tiger Beetle, and Location of Designated Critical Habitat for Salt Creek Tiger Beetle, in the UGP Region**

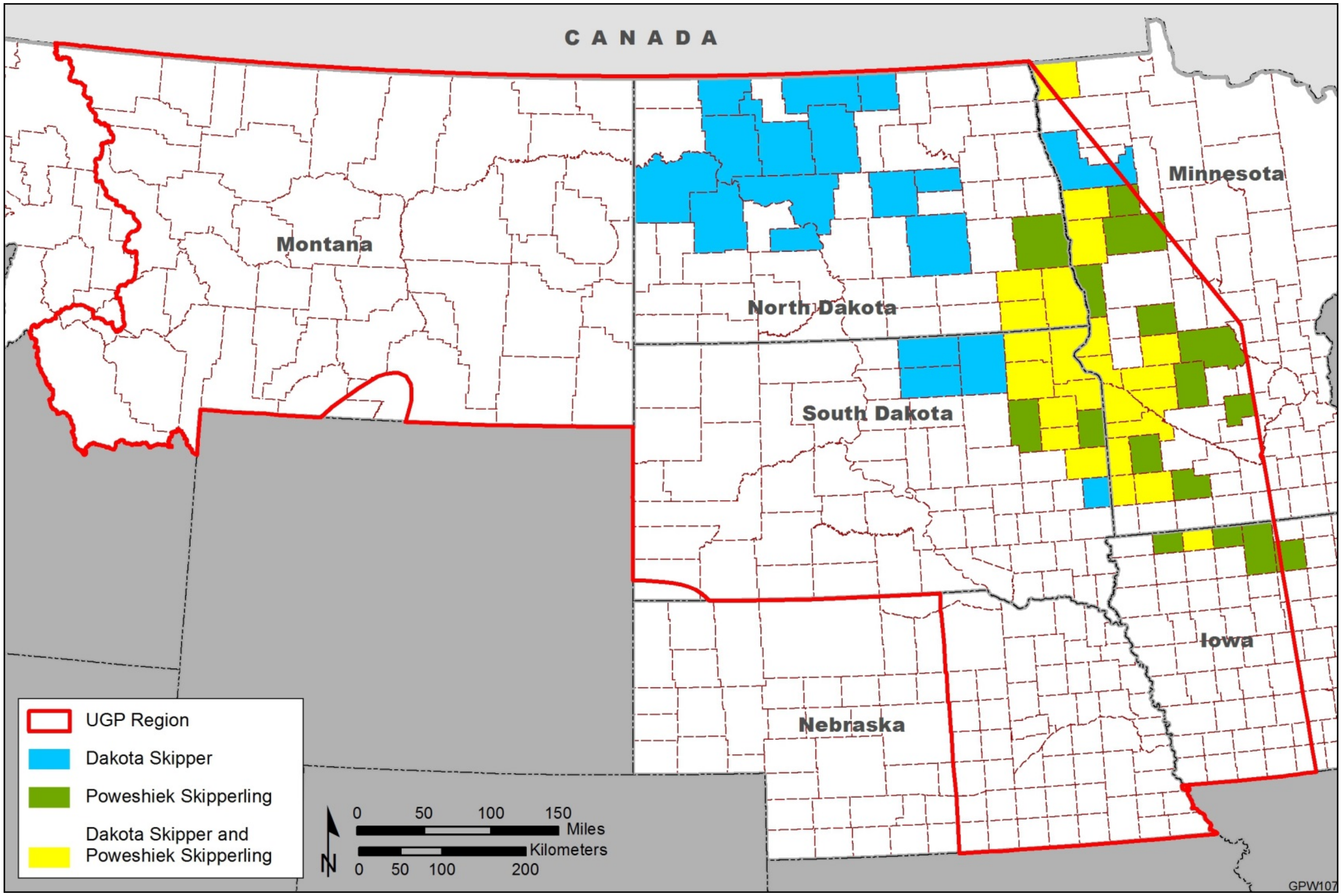


**FIGURE A-5 Reported County Distributions of Dakota Skipper and Poweshiek Skipperling in the UGP Region**


**FIGURE A-6 Reported or Suspected County Distributions of Higgins Eye (Pearlymussel) and Scaleshell Mussel in the UGP Region**

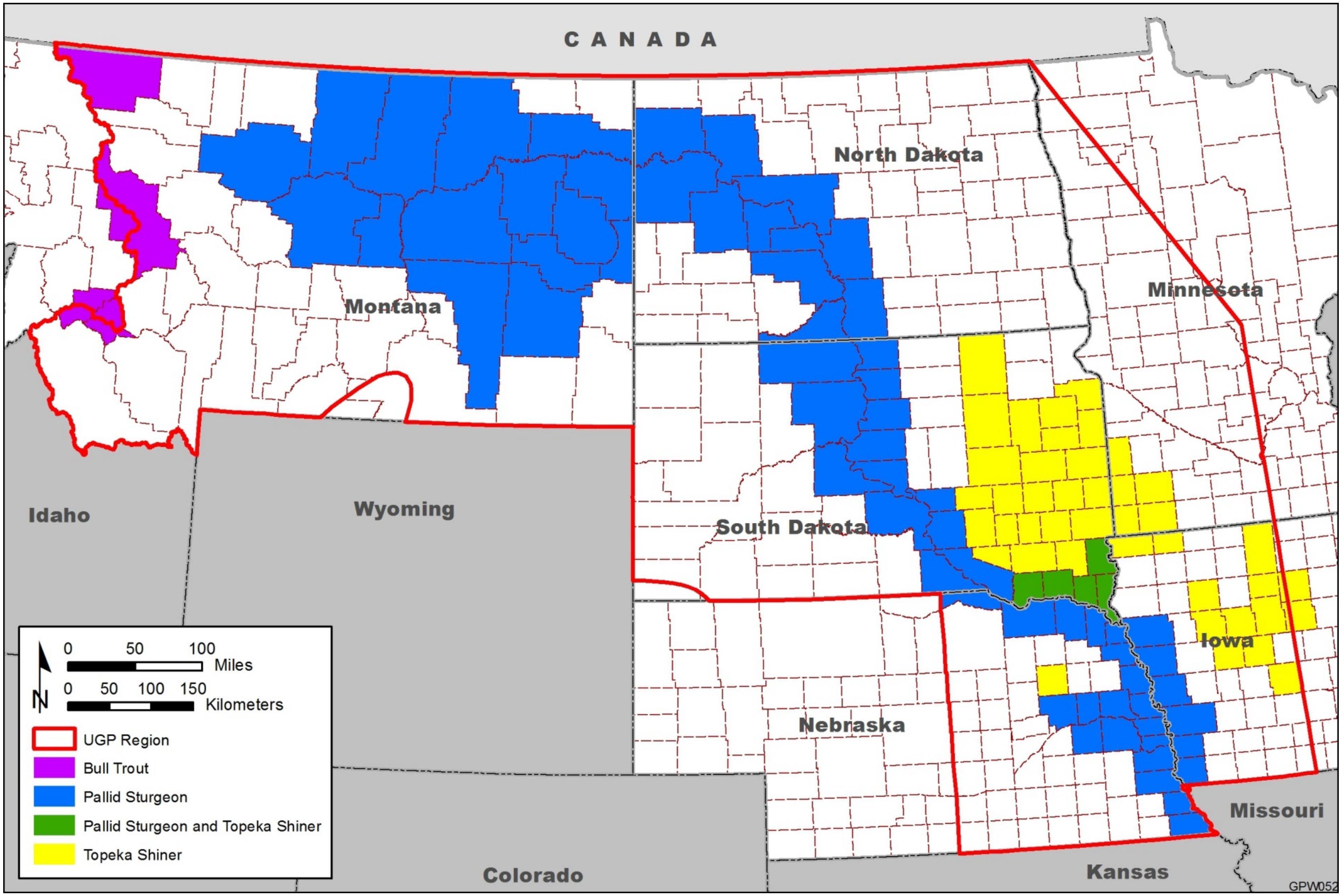


**FIGURE A-7 Reported County Distributions of Bull Trout, Pallid Sturgeon, and Topeka Shiner, and Locations of Designated Critical Habitat for Bull Trout and Topeka Shiner, in the UGP Region**

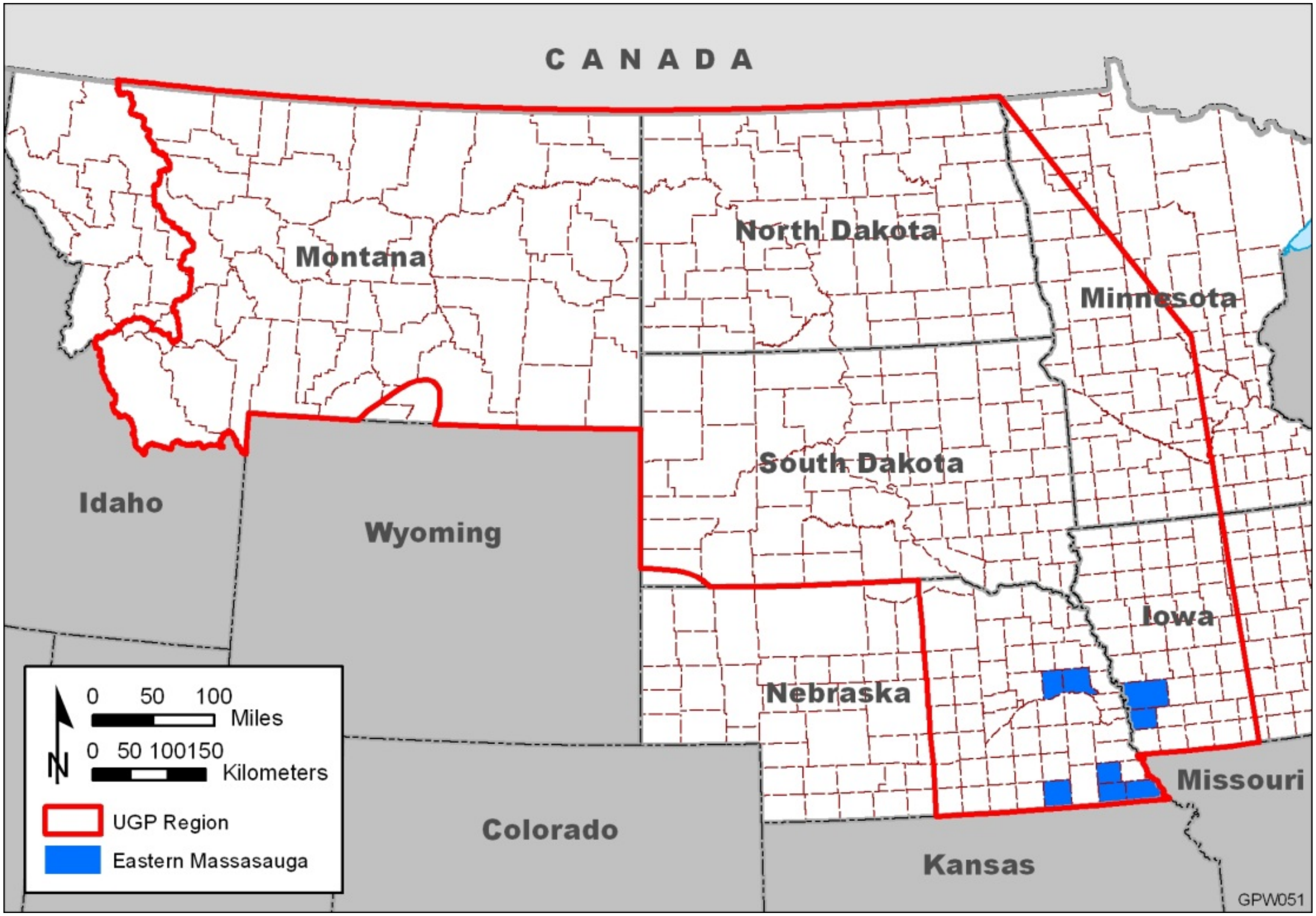


**FIGURE A-8 Reported County Distribution of Eastern Massasauga in the UGP Region**

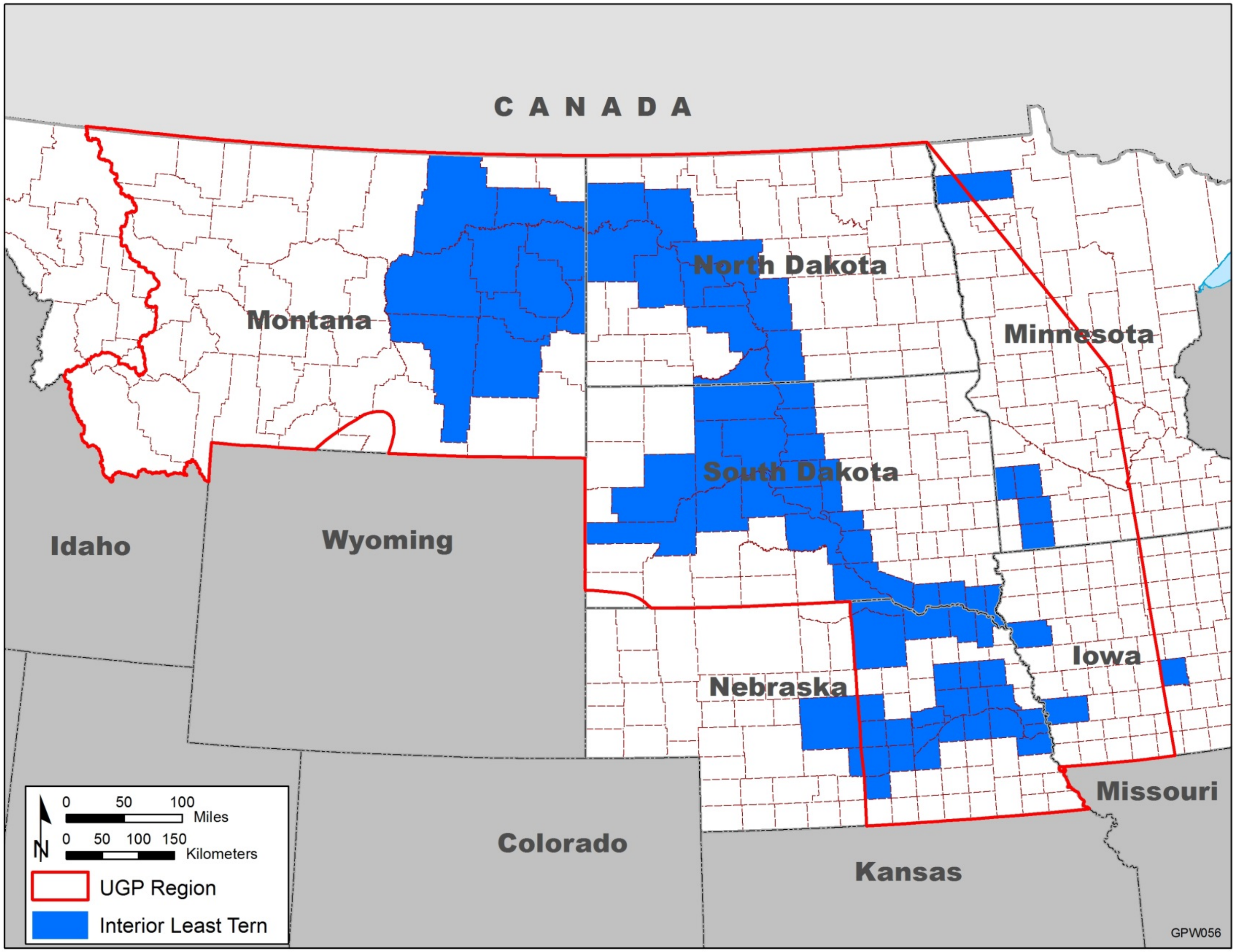


**FIGURE A-9 Reported County Distributions of Interior Least Tern in the UGP Region**

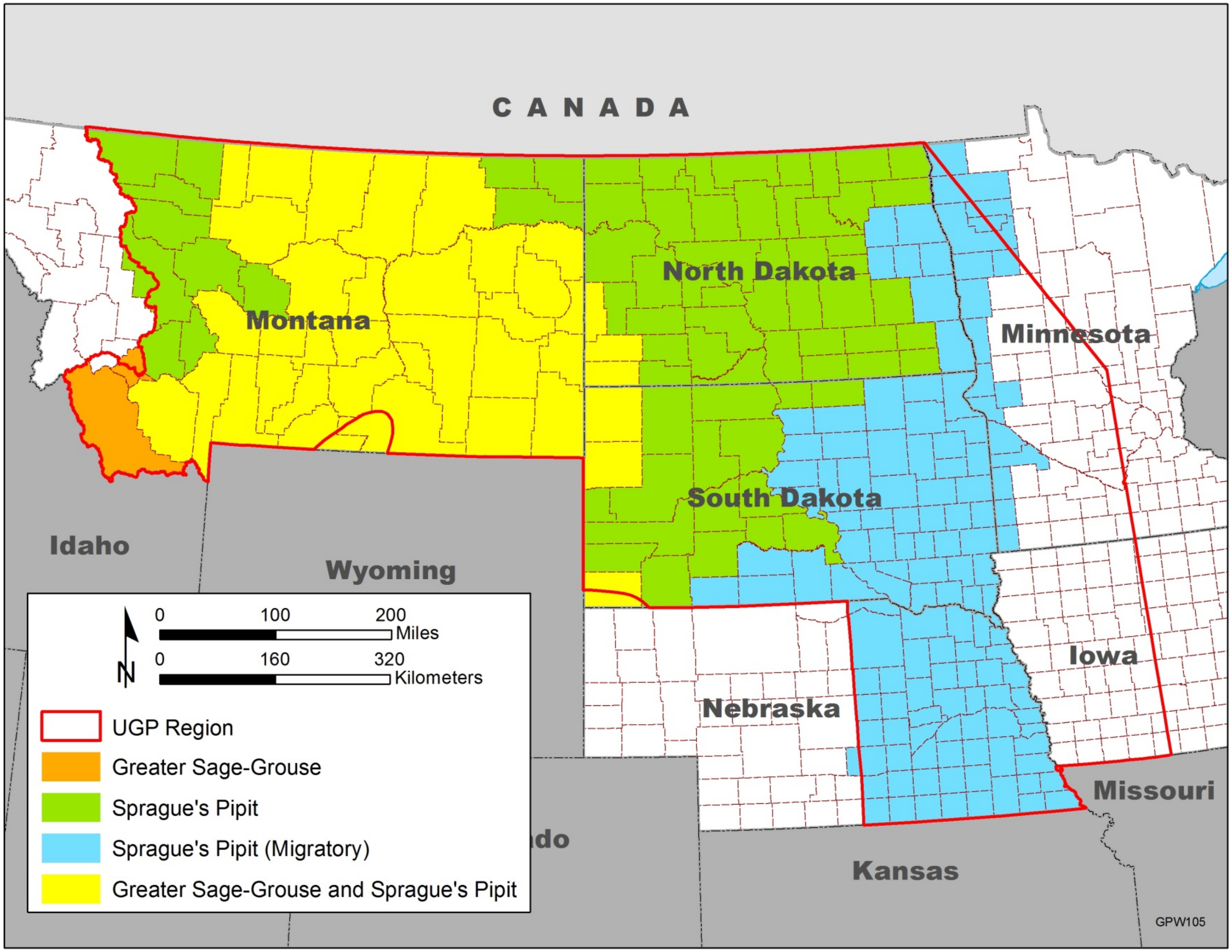


**FIGURE A-10 Reported County Distribution of Greater Sage-Grouse and Sprague's Pipit in the UGP Region**

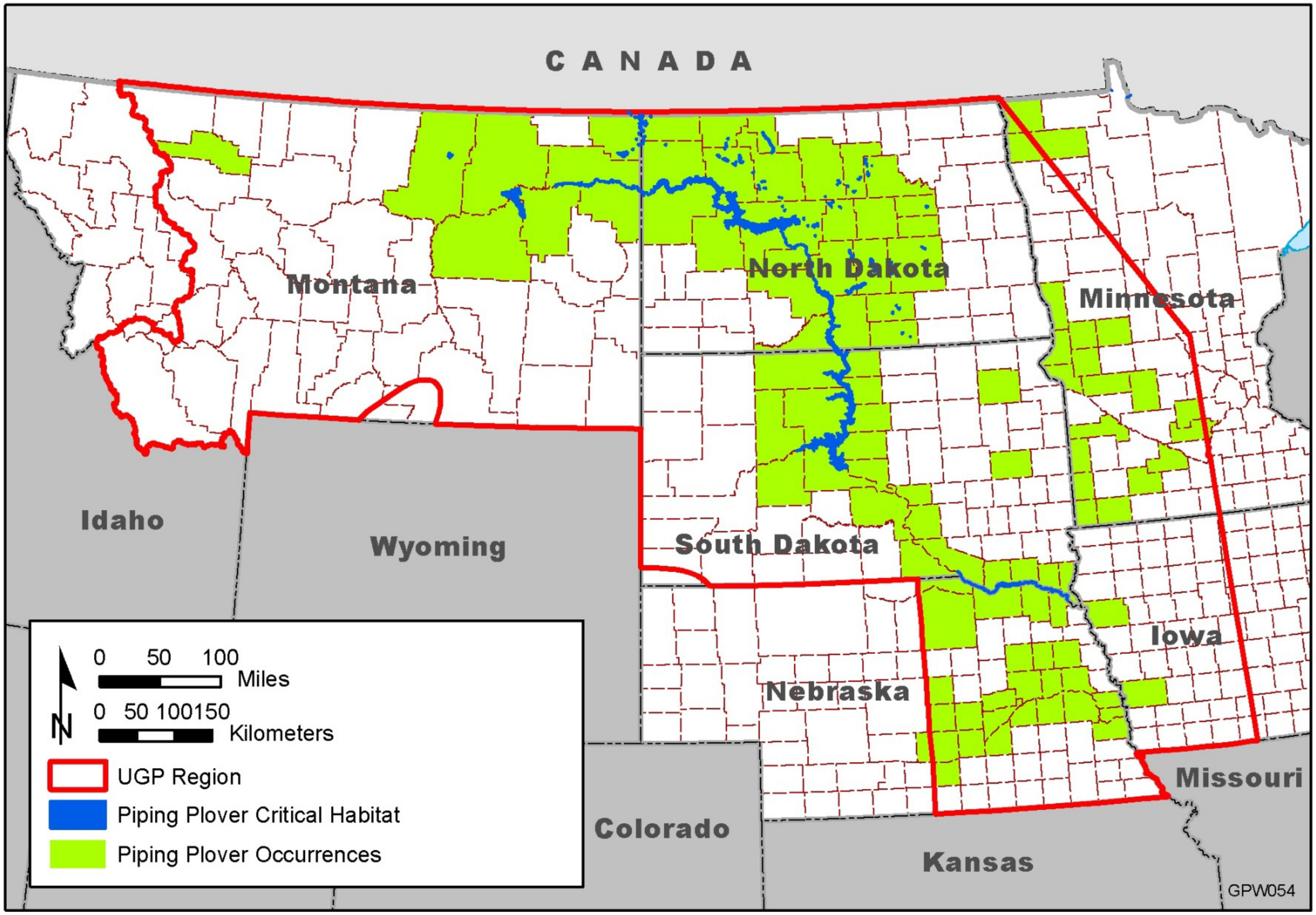


**FIGURE A-11 Counties in the UGP Region from Which Piping Plover Has Been Reported and Where Critical Habitat for Piping Plover Has Been Designated**

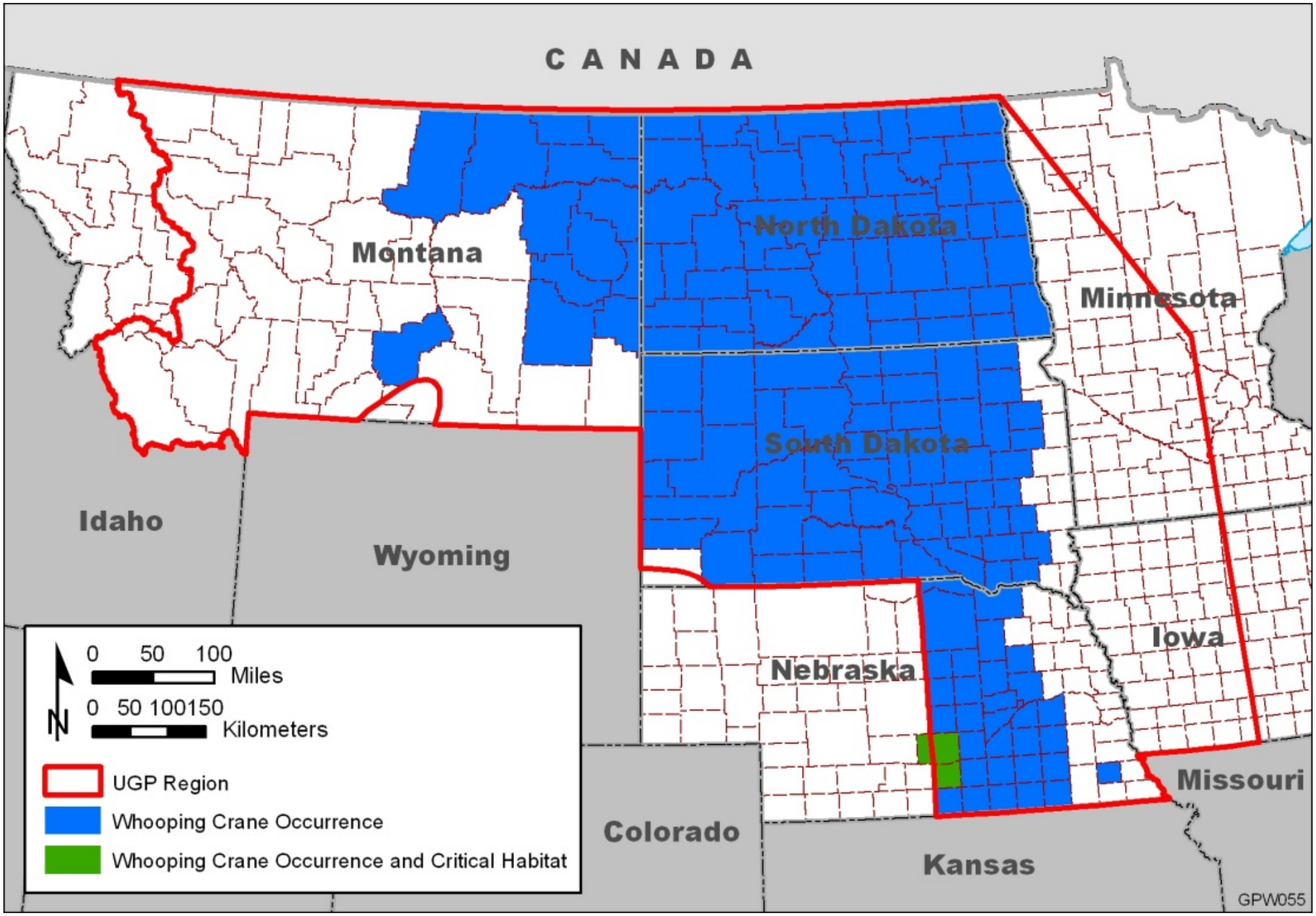


**FIGURE A-12 Counties in the UGP Region from Which Whooping Crane Has Been Reported and Where Critical Habitat for Whooping Crane Has Been Designated**

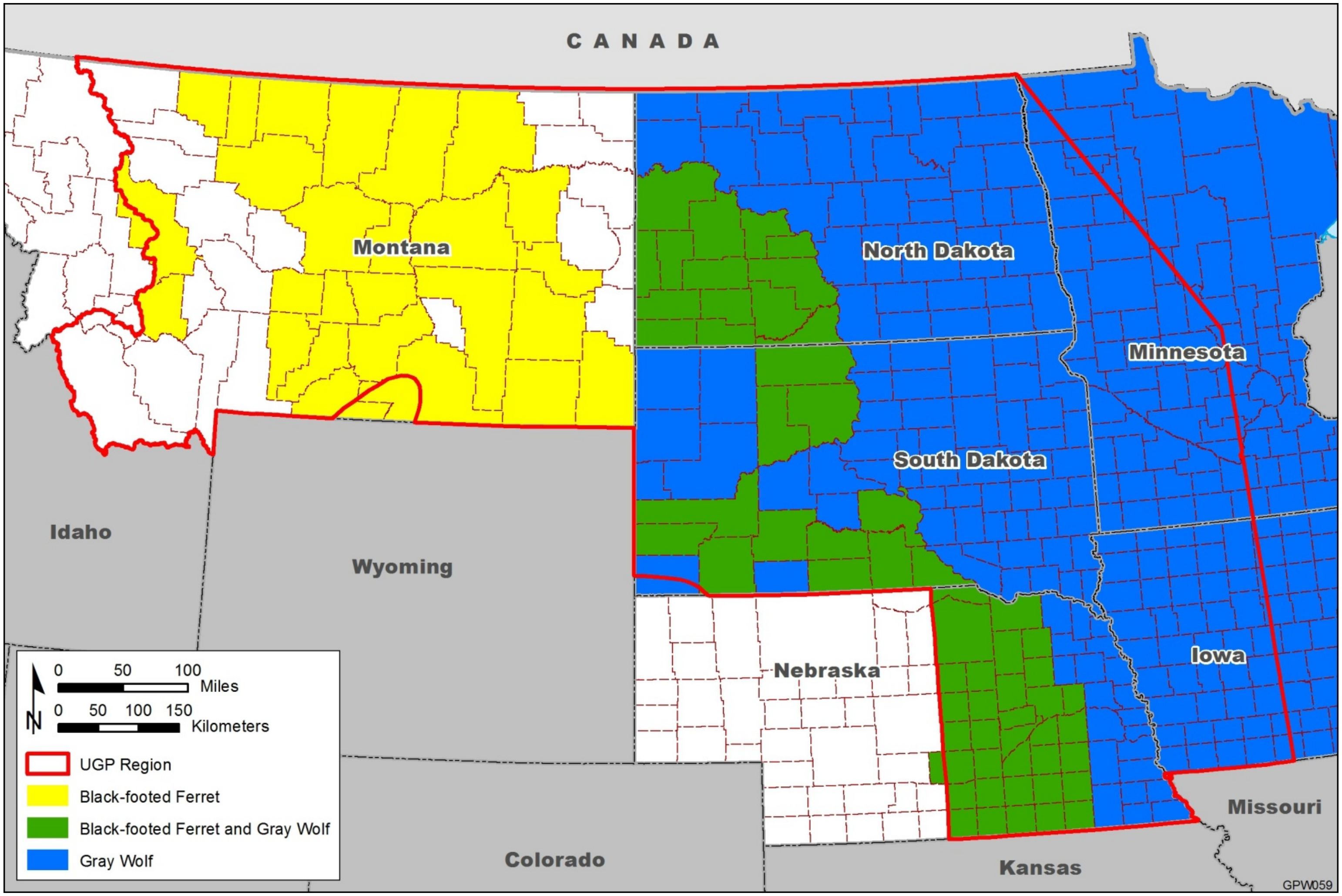


**FIGURE A-13 Reported County Distributions of Black-Footed Ferret and Gray Wolf in the UGP Region**

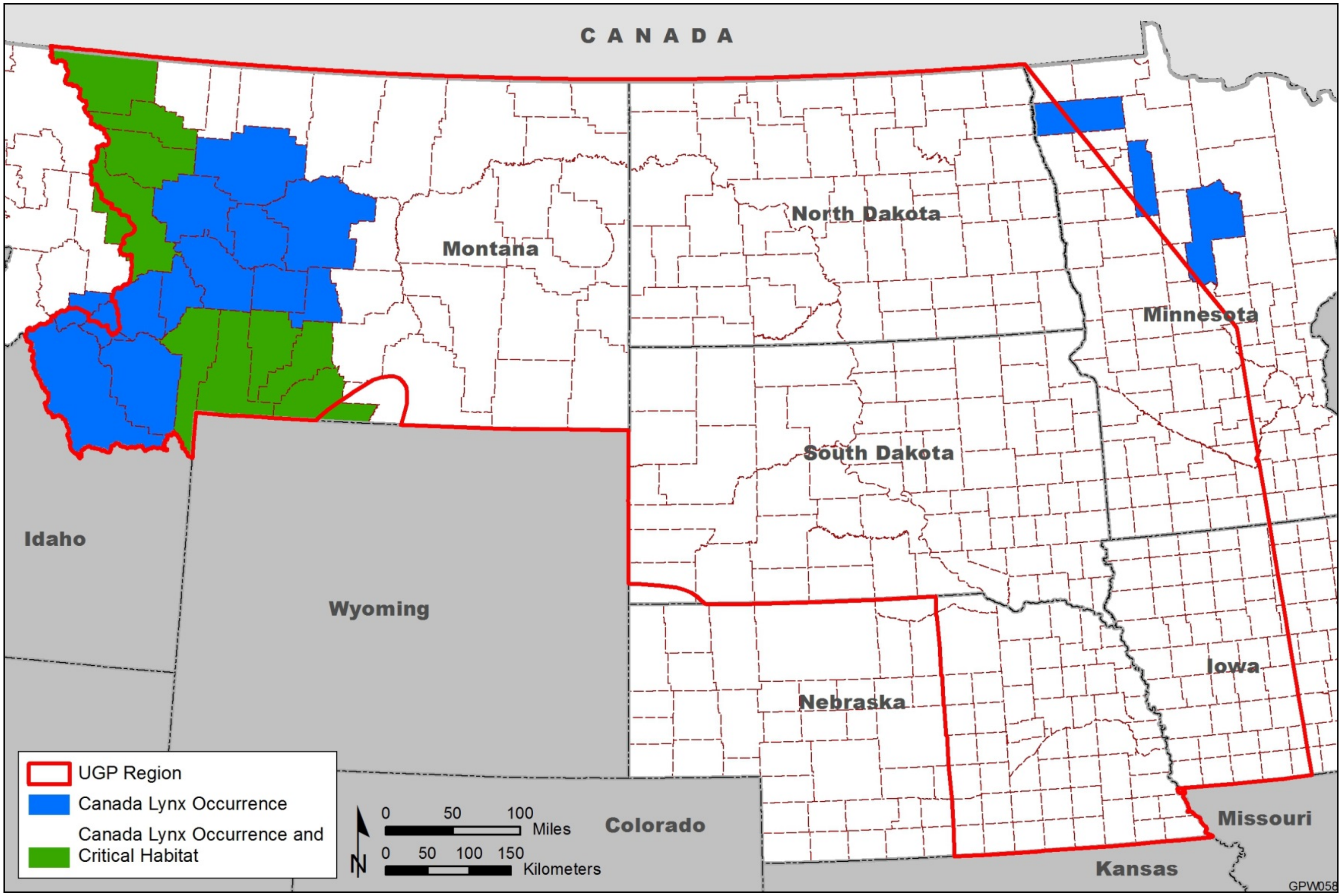


**FIGURE A-14 Reported County Distribution of Canada Lynx in the UGP Region**

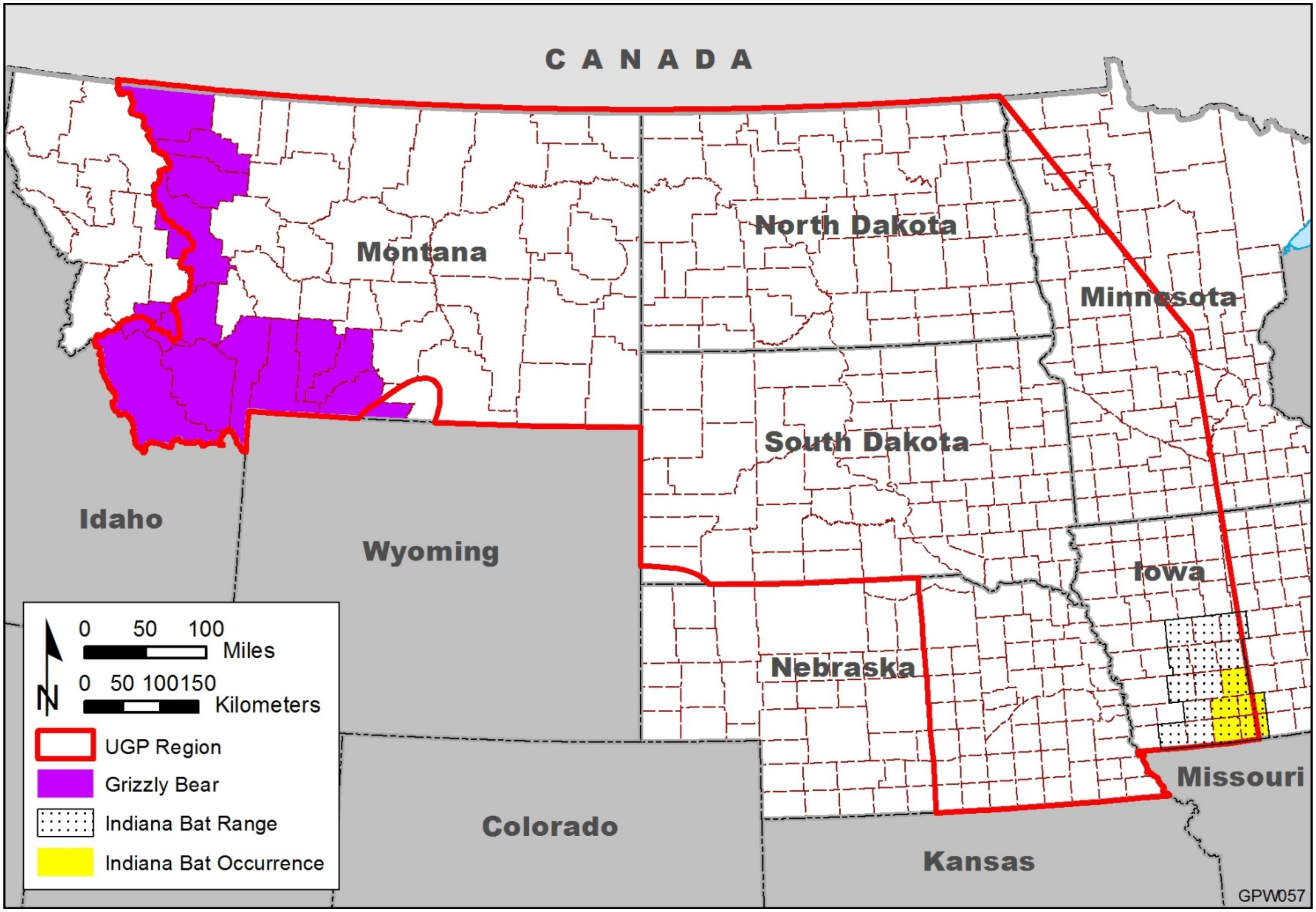


**FIGURE A-15 Reported County Distributions of Grizzly Bear and Indiana Bat in the UGP Region**

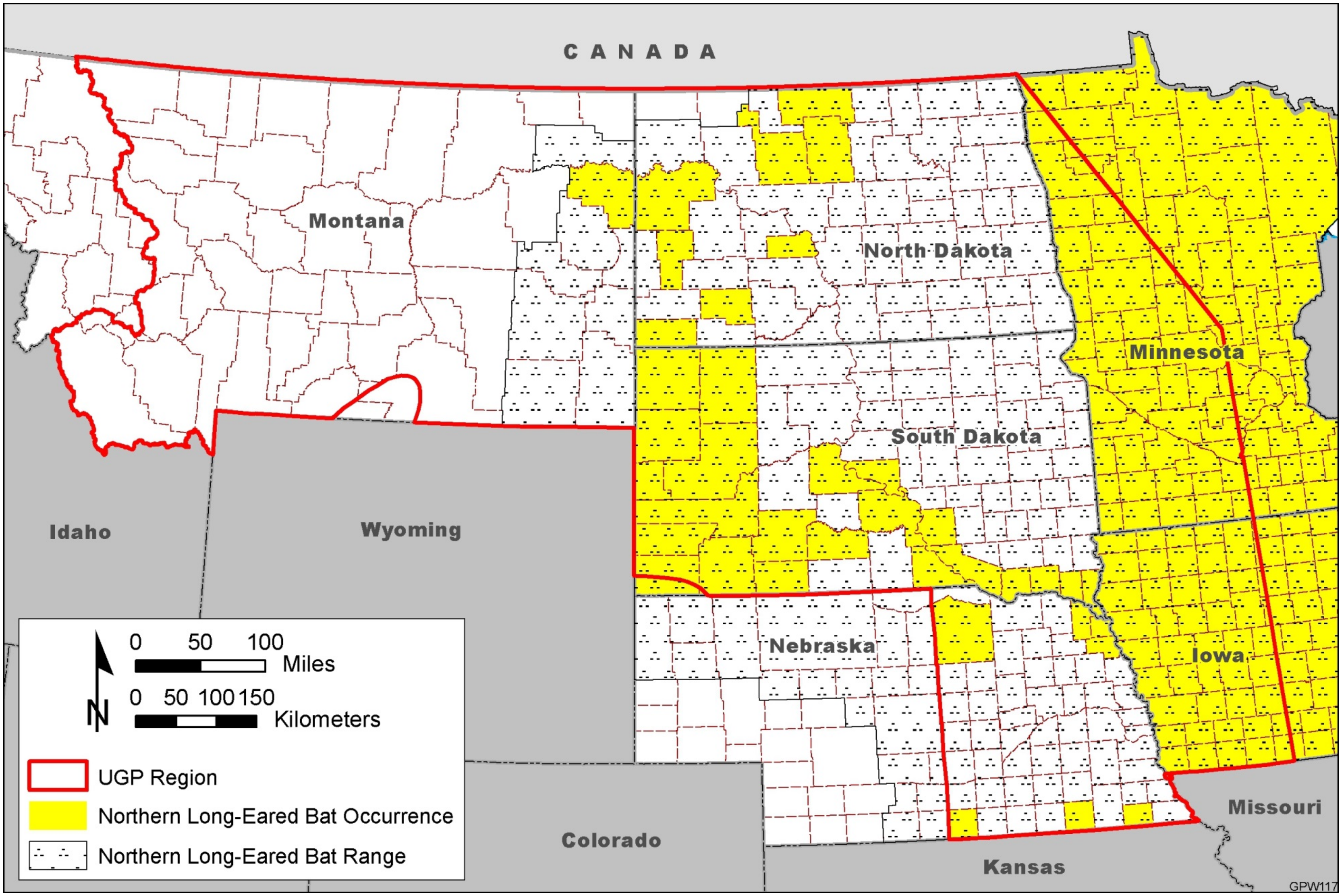


**FIGURE A-16 Range and Reported County Distribution of Northern Long-Eared Bat in the UGP Region**


**FIGURE A-17 Predicted Suitable Habitat for Eastern Massasauga and Greater Sage-Grouse in Relation to Western's Electrical Substations in the UGP Region**

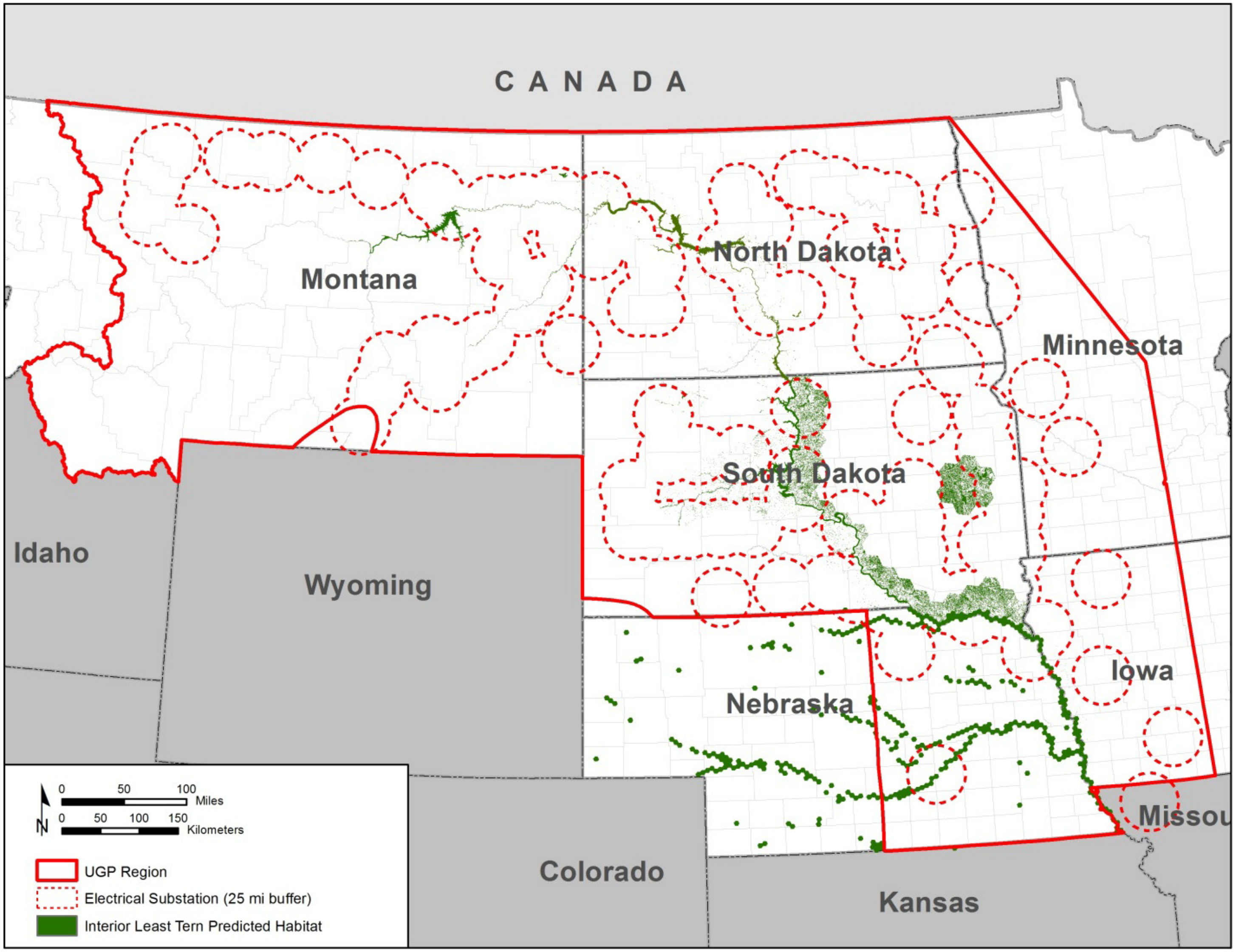


**FIGURE A-18 Predicted Suitable Habitat for Interior Least Tern in Relation to Western's Electrical Substations in the UGP Region**


**FIGURE A-19 Predicted Suitable Habitat for Piping Plover in Relation to Western's Electrical Substations in the UGP Region**

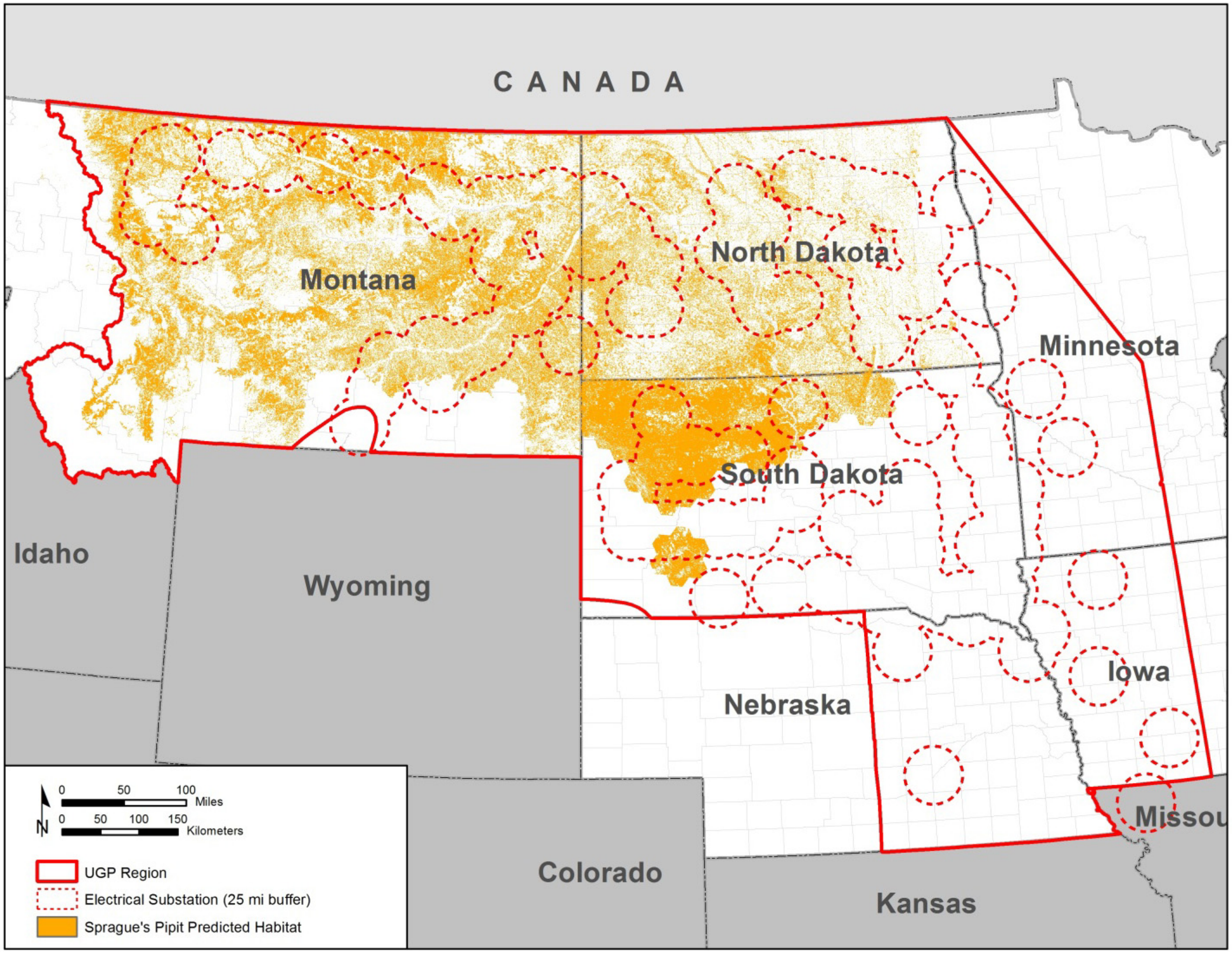


**FIGURE A-20 Predicted Suitable Habitat for Sprague's Pipit in Relation to Western's Electrical Substations in the UGP Region**


**FIGURE A-21 Predicted Suitable Habitat for Whooping Crane and Canada Lynx in Relation to Western's Electrical Substations in the UGP Region**


**FIGURE A-22 Predicted Suitable Habitat for Black-Footed Ferret, Grizzly Bear, and Indiana Bat in Relation to Western's Electrical Substations in the UGP Region**

# APPENDIX B:

# GUIDANCE FOR COMPLETION OF PROGRAMMATIC BIOLOGICAL ASSESSMENT PROJECT AND SPECIES CONSISTENCY EVALUATION FORMS UPPER GREAT PLAINS REGION WIND ENERGY DEVELOPMENT PROGRAM

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# APPENDIX B:

## GUIDANCE FOR COMPLETION OF PROGRAMMATIC BIOLOGICAL ASSESSMENT PROJECT AND SPECIES CONSISTENCY EVALUATION FORMS UPPER GREAT PLAINS REGION WIND ENERGY DEVELOPMENT PROGRAM

The following narrative provides an explanation and rationale for the Project and Species Consistency Evaluation forms for the Upper Great Plains Region Wind Energy Programmatic Biological Assessment (BA) and guidance for completion of the forms. The Project and Species Consistency Evaluation forms are provided in this appendix. The forms can also be downloaded from the Western Area Power Administration's (Western's) Upper Great Plains Region Web site (http://www.wapa.gov/ugp/Environment/default.htm) as electronic forms in PDF format. The BA identifies conservation measures for federally listed, candidate, or proposed species; these measures include programmatic Best Management Practices (BMPs) and avoidance and minimization measures that would be required of project applicants during each phase of a wind energy project (i.e., site characterization, construction, operation, maintenance, and decommissioning) if the project applicants choose to benefit from Western's expedited programmatic Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS). This information is provided within the BA narrative for each species. The BMPs are summarized in table 4.5-1 of the BA, whereas the species-specific impacts and avoidance and minimization measures are summarized in table 5-1 of the BA. A voluntary commitment by the project proponent to fully implement all of the measures would result in an effects determination of "no effect" or "not likely to adversely affect" for each species and would meet Western's responsibilities under the Endangered Species Act (ESA). If a project proponent cannot or chooses not to implement the BMPs and the avoidance and minimization measures for the species identified for a project, the programmatic consultation cannot be used and an individual project-specific National Environmental Policy Act of 1969 (NEPA) analysis and ESA Section 7 consultation will be required.

Thus, compliance with the programmatic BA can result in considerable savings of time and expense for a company by tiering from Western's programmatic NEPA process and the programmatic endangered species consultation with the USFWS for wind energy projects in the Upper Great Plains Region. It also provides an up-front confirmation of expectations relative to conservation measures for federally listed, candidate, or proposed species.

For the programmatic consultation, a Project Consistency Evaluation Form (project CEF) and individual Species Consistency Evaluation Forms (species CEFs) have been developed for the listed, candidate, or proposed species that may occur within the Upper Great Plains (UGP) Region. These forms are included in this appendix. The project and species CEFs will be used for documenting and verifying that project proponents have complied with the requirements of the Programmatic BA (i.e., that the project will not have adverse effects on listed, candidate, or proposed species) and are consistent with Tiers I, II, III of the *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* (USFWS 2012c). The USFWS and Western will independently review the forms to document or verify compliance or non-compliance with the BA. The process for complying with the elements resulting from the programmatic consultation specific to wind energy projects in the UGP Region is represented by the flow chart in figure 2-1 of the programmatic BA.

## B.1 PROJECT CONSISTENCY EVALUATION FORM

The project CEF provides basic project information for an overview of the project and federally listed, candidate, or proposed species of concern. The form requires basic information about the project proponent, Federal agency contacts, project description overview, land cover types affected, applicable species, and maps of the project area and any species habitat and needed buffer zones. Checkboxes are available to document familiarity with associated wind energy and resource documents, as well as signatory blocks for the project proponent's commitment to implement the applicable general BMPs, species-specific BMPs, and the avoidance and minimization measures into the project design, construction, operation, and decommissioning. The form also has signatory blocks for Western and the USFWS for verification of compliance with the programmatic BA.

## B.2 SPECIES CONSISTENCY EVALUATION FORMS

At the early stages of project consideration and planning (consistent with Tiers I, II, and III of the *U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines* [http://www.fws.gov/windenergy/docs/WEG_final.pdf]), project proponents are encouraged to coordinate with the local USFWS Ecological Services Field Office or other agencies as appropriate. In each of the species narratives in the BA, this coordination is referenced as "preconstruction evaluations and/or surveys." Through this coordination, the project proponent and the USFWS will address available information, presence/absence of listed, candidate, or proposed species and their habitats, and evaluate the need for and current protocol for surveys or monitoring. At that time, the proponent should begin to fill out the project CEF and applicable species CEFs and coordinate with Western and the USFWS as warranted (see flow chart in figure 2-1) to discuss the conservation measures and determine whether they can meet the requirements of the programmatic consultation. A single project CEF and only the applicable species CEFs should be completed for each project. Forms should be self-explanatory with check boxes and information lines.

One species CEF is provided for each of the 28 listed, candidate, or proposed threatened and endangered species that can be found within the UGP Region. Each of the species CEFs includes sections on BMPs (general and species-specific), species-specific avoidance measures, species-specific minimization measures, impact information, and effects. The project proponent should check each box in the first three sections to document that their project will meet all these conservation measures, and then provide responses in the Impact Information section. A narrative must be provided in the "Effects" section of the appropriate CEFs to explain what the project proponents have done or will do for the conservation of the species and how that is consistent with meeting the effects determination in the programmatic BA (i.e., either "no effect" or "is not likely to adversely affect" the species). Western and the USFWS will use these forms for each species to verify compliance with the conservation measures identified in the programmatic BA and to fulfill the requirements of the programmatic ESA consultation.

## Programmatic Biological Assessment Project Consistency Evaluation Form*
## Upper Great Plains Region Wind Energy Development Program

(for USFWS Internal Use Only) TAILS S7 Bundle #: ______
Individual TAILS Log #: ______

### Project Proponent

Project Name: ______ Developer: ______
State: ______ City: ______
County: ______ State: ______
Township, Range & Sections: ______ POC: ______
Phone: ______

### Federal Agency/Point of Contact

| Fish & Wildlife Service Ecological Services Field Office | Western Area Power Administration |
|---|---|
| City: ______ | City: ______ |
| State: ______ | State: ______ |
| POC: ______ | POC: ______ |
| Phone: ______ | Phone: ______ |

For actions involving USFWS Land interests:

USFWS Wetland Management District: ______
City: ______ State: ______
POC: ______
Phone: ______

| | Y | N |
|---|---|---|
| USFWS Property Interest | ☐ | ☐ |
| Grassland Easement Exchange | ☐ | ☐ |

### Project Description Overview with Best Estimates

Construction Initiation Date: ______ Max. Turbine Ht: ______ Project Area Size: ______
Construction Completion Date: ______ Turbine Pad Size: ______ Wind Reserve Area Size: ______
Number Turbines: ______ Miles (km) of New Road: ______ Power Generating Initiation Date: ______
Turbine Tower Height (ft/m): ______ Miles (km) Improved Road: ______ Project Termination Date: ______
Turbine RSA: ______ Miles (km) Existing County Rd: ______

Turbine Size (MW), Make & Model: ______

Collector Lines from Turbine to Substation: Miles Buried: ______ Miles Overhead: ______

To help demonstrate compliance with the BMPs, Species Specific Avoidance and Minimization Measures, a complete application must include maps of the project area and associated species/habitat/buffer zones. Maps attached Yes ☐ No ☐

### Land Cover Types Affected

| | Yes | No | Acres: Private | State | Federal | Subtotal | % Total | Description/Comments |
|---|---|---|---|---|---|---|---|---|
| Native Grass | ☐ | ☐ | | | | | | |
| Tame Grass | ☐ | ☐ | | | | | | |
| Agricultural | ☐ | ☐ | | | | | | |
| Wetland | ☐ | ☐ | | | | | | |
| Riparian | ☐ | ☐ | | | | | | |
| Trees | ☐ | ☐ | | | | | | |
| Other | ☐ | ☐ | | | | | | |
| Total | | | | | | | 100% | |

### ESA Listed (L), Proposed (P) and Candidate (C) Species Affected (Check Boxes)

| Plants | Invertebrates | Fish | Reptiles | Birds | Mammals |
|---|---|---|---|---|---|
| ☐ EP Fringed Orchid (L) | ☐ American Burying Beetle (L) | ☐ Bull Trout (L) | ☐ Eastern Massasauga (C) | ☐ G. Sage Grouse (C) | ☐ Black-footed Ferret (L) |
| ☐ Mead's Milkweed (L) | ☐ Dakota Skipper (L) | ☐ Pallid Sturgeon (L) | | ☐ Int. Least Tern (L) | ☐ Canada Lynx (L) |
| ☐ Prairie Bush Clover (L) | ☐ Higgins Eye (L) | ☐ Topeka Shiner (L) | | ☐ Piping Plover (L) | ☐ Gray Wolf (L) |
| ☐ Ute Ladies'-Tresses (L) | ☐ Poweshiek Skipperling (L) | | | ☐ Rufa Red Knot (L) | ☐ Grizzly Bear (L) |
| ☐ WP Fringed Orchid (L) | ☐ Salt Creek Tiger Beetle (L) | | | ☐ Sprague's Pipit (C) | ☐ Indiana Bat (L) |
| ☐ Whitebark Pine (C) | ☐ Scaleshell Mussel (L) | | | ☐ Whooping Crane (L) | ☐ N. Long-Eared Bat (L) |

***Programmatic Biological Assessment Project Consistency Evaluation Form****
***Upper Great Plains Region Wind Energy Development Program***

☐ **Project proponent has reviewed the Programmatic Wind Energy EIS and BA, Appendix B of the BA relating to Species Consistency Evaluation Forms, and the U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines.**

**Commitment to incorporate applicable BMPs and Species-Specific Avoidance & Minimization Measures into the project plan:**

| Project Proponent (Point of Contact) | Signature | Date |
|---|---|---|

**Agency Verification of Compliance with the Programmatic Wind Energy Biological Assessment:**

| | | |
|---|---|---|
| Western Area Power Administration (Point of Contact) | Signature | Date |
| U.S. Fish & Wildlife Service (Point of Contact) | Signature | Date |
| U.S. Fish & Wildlife Service (ES Field Office Lead Biologist) | Signature | Date |

***Version 3: March 2015**

**_Programmatic Biological Assessment Species Consistency Evaluation Form_**
**_Upper Great Plains Region Wind Energy Development Program_**
**Impact Information and Consistency Determination**

## Eastern prairie fringed orchid (*Platanthera leucophaea*)

Project Name: ____________________

Company: ____________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards. Restore hydrological function.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.

☐ Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

### Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

☐ Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.

☐ Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat (this determination can potentially be based on soil survey data).

☐ Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

### Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded eastern prairie fringed orchid? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ____________________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | ☐ Not occupied (species not detected) | |
| If occupied, 100 ft (30.5 m) buffer zones delineated? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
***Impact Information and Consistency Determination***

**Mead's milkweed *(Asclepias meadii)***

Project Name: ______________________

Company: ______________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (native tall grass prairie, hay meadows).
- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.

☐ Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

## Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

☐ Only perform control measures from October to March in order to avoid the species' growing season.

☐ Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded Mead's milkweed? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ______ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ______ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| If occupied, 100 ft (30.5 m) buffer zones delineated? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

## *Programmatic Biological Assessment Species Consistency Evaluation Form*
## *Upper Great Plains Region Wind Energy Development Program*
## Impact Information and Consistency Determination

### Prairie bush clover (*Lespedeza leptostachya*)

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (gravelly north-facing slopes of dry upland prairies).
- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.

☐ Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

### Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

☐ Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.

☐ Avoid mowing along access roads or transmission line ROWs in areas containing suitable habitat.

☐ Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

### Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded prairie bush clover? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| If occupied, 100 ft (30.5 m) buffer zones delineated? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Ute ladies'-tresses (*Spiranthes diluvialis*)**

Project Name: ____________________

Company: ____________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (riparian areas).
- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.

☐ Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

## Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

☐ Avoid vehicle traffic in areas where suitable habitat is present.

☐ Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat.

☐ Use appropriate or additional project-specific BMPs during and after construction to control erosion and reestablish vegetation in disturbed areas near suitable habitat.

☐ Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

## Impact Information

| | | | | |
|---|---|---|---|---|
| Project within county with recorded Ute ladies'-tresses? | ☐ Yes | ☐ No | | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: | ____________ |
| Parties involved: ____________ | | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | | |
| Distance from suitable habitat: | ____________ | Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: | ____________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) | |
| If occupied, 100 ft (30.5 m) buffer zones delineated? | ☐ Yes | ☐ No | | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Ute ladies'-tresses (*Spiranthes diluvialis*)**

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| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Western prairie fringed orchid (*Platanthera praeclara*)**

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs, in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries. Surveys should include proper identification and survey techniques based on recommendations from the USFWS on the most current survey protocols.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitats.

☐ Clearly delineate buffer zones around locations of plants within the project area and restrict activities within 100 ft (30.5 m) of those locations.

## Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Employ additional project-specific BMPs to control invasive plants in areas of suitable habitat disturbed by project activities.

☐ Employ additional project-specific BMPs during and after construction to control erosion and runoff along access roads adjacent to suitable habitat.

☐ Avoid actions that could alter surface water flow, infiltration, and groundwater levels in suitable habitat.

☐ Do not use herbicides within 100 ft (30.5 m) of areas where the species occurs.

## Impact Information

Project within county with recorded western prairie fringed orchid? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ____________

Parties involved: ______________________________

Suitable habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: ________ Miles

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: ____________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

If occupied, 100 ft (30.5 m) buffer zones delineated? ☐ Yes ☐ No

Map of project footprint and species habitat attached? ☐ Yes ☐ No

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Whitebark pine *(Pinus albicaulis)***

Project Name: ______________________

Company: ______________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, one of the more important BMPs for the conservation of this species follows.

- ☐ Existing roads shall be used to the maximum extent feasible. Meteorological towers shall be installed and other characterization activities (e.g., geotechnical testing, buried power collection cables) shall be conducted as close as practicable to existing access roads. If new roads are necessary, they shall be designed and constructed to the appropriate standard. No whitebark pine trees can be removed.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in montane habitats occupied by the whitebark pine.

## Species-Specific Minimization Measures

The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded whitebark pine? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable coniferous montane habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**American burying beetle (*Nicrophorus americanus*)**

Project Name: ____________________

Company: ____________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (American burying beetle occupied habitat).
- ☐ Projects shall be designed to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of new roads, laydown areas, and borrow areas.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ If surveys are warranted, obtain a permit from the USFWS to survey for the beetle within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat.

## Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Avoid using herbicides or pesticides within occupied habitat within the current range of the American burying beetle (refer to current range map within the State). Contact the local USFWS Ecological Services Field office to determine whether activities in the project area are within American burying beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

## Impact Information

Project within county with recorded American burying beetles? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ____________

Parties involved: ____________

Suitable habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: ____________ Miles

Section 10(a)(1)(a) permit or sub-permit obtained from the USFWS for surveys? ☐ Yes ☐ No

Date issued: ____________

Attach copy of permit? ☐ Yes ☐ No

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: ____________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

Map of project footprint and species habitat attached? ☐ Yes ☐ No

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**American burying beetle (*Nicrophorus americanus*)**

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|---|
| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Dakota skipper (*Hesperia dacotae*)**

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Projects shall be designed to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of new roads, laydown areas, and borrow areas.
- ☐ Locate stationary construction equipment (e.g., compressors or generators) outside of and as far as practical from Dakota skipper occupied habitat and proposed critical habitat.
- ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
- ☐ When disturbed areas are reclaimed, reseed with obligate plant species of suitable habitat.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6 mi (1 km) buffer zone.

## Species-Specific Minimization Measures

For projects that encompass suitable, but unoccupied, habitat farther than 0.6 mi (1 km) from occupied habitat:

☐ Obtain a grassland easement of native prairie, equal to the amount disturbed that contains obligate plant species to minimize additional loss of suitable habitat, or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.

☐ Avoid broadcast applications of pesticides or herbicides that may be harmful to Dakota skippers or their nectar plants in Dakota skipper habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

## Impact Information

| | | | | |
|---|---|---|---|---|
| Project within county with recorded Dakota skippers? | ☐ Yes | ☐ No | | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: | ________ |
| Parties involved: ________ | | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | | |
| Distance from suitable habitat: | ________ | Miles | | |
| Distance from proposed critical habitat? | ________ | Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: | ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) | |
| If occupied, 0.6 mi (1km) buffer zones delineated? | ☐ Yes | ☐ No | | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Dakota skipper (*Hesperia dacotae*)**

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| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

# *Programmatic Biological Assessment Species Consistency Evaluation Form*
# *Upper Great Plains Region Wind Energy Development Program*
# Impact Information and Consistency Determination

## Higgins eye (*Lampsilis higginsii*)

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, one of the more important BMPs for the conservation of this species follows.

- ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed to minimize the possibility of erosion and runoff into Higgins eye occupied habitat.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where Higgins eye mussels may be present.

## Species-Specific Minimization Measures

The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded Higgins eye? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Poweshiek skipperling (*Oarisma poweshiek*)**

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

- ☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.
    - ☐ Projects shall be designed to utilize existing roads and utility corridors to the maximum extent feasible, and to minimize the number and length/size of new roads, laydown areas, and borrow areas.
    - ☐ Locate stationary construction equipment (e.g., compressors or generators) outside of and as far as practical from Poweshiek skipperling occupied habitat and proposed critical habitat.
    - ☐ Minimize the size of areas in which soil would be disturbed or vegetation would be removed.
    - ☐ When disturbed areas are reclaimed, reseed with obligate plant species of suitable habitat.

## Species-Specific Avoidance Measures

- ☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.
- ☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat or suitable habitat within 0.6 mi (1 km) of occupied habitat.
- ☐ Do not site turbines, access roads, transmission line towers, or other project facilities in proposed critical habitat or within a 0.6 mi (1 km) buffer zone.

## Species-Specific Minimization Measures

For projects that encompass suitable, but unoccupied habitat farther than 0.6 mi (1 km) from occupied habitat:

- ☐ Obtain a grassland easement of native prairie, equal to the amount disturbed that contains obligate plant species to minimize additional loss of suitable habitat, or improve existing nearby grassland easements to incorporate obligate plants to provide additional suitable habitat.
- ☐ Avoid broadcast applications of pesticides or herbicides that may be harmful to the Poweshiek skipperling or their nectar plants in Poweshiek skipperling habitat. Ensure that field crews recognize target weeds to avoid adverse effects on important native species. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded Poweshiek skipperlings? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Distance from proposed critical habitat: | ________ | Miles | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| If occupied, 0.6 mi (1 km) buffer zones delineated? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Poweshiek skipperling (*Oarisma poweshiek*)**

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|---|
| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

# *Programmatic Biological Assessment Species Consistency Evaluation Form*
# *Upper Great Plains Region Wind Energy Development Program*
## Impact Information and Consistency Determination

## Salt Creek tiger beetle (*Cicindela nevadica lincolniana*)

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (saline wetlands, exposed saline mudflats, and saline mud banks of streams).
- ☐ Apply standard erosion control BMPs to all construction activities and disturbed areas (e.g., sediment traps, water barriers, erosion control matting) as applicable to minimize erosion and protect water quality.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of occupied saline wetland and stream complexes.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities within 1 mi (1.6 km) of designated critical habitat.

### Species-Specific Minimization Measures

Should wind farms be developed near saline wetlands, measures should be taken to:

☐ Avoid changing existing surface water flows that would alter existing saline wetland habitat in the Salt Creek and Rock Creek watersheds.

☐ Avoid using herbicides or pesticides within occupied habitat within the current range of the Salt Creek tiger beetle within the State. Contact the local USFWS Ecological Services Field office to determine whether activities in the project area are within Salt Creek tiger beetle range or within occupied habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

### Impact Information

Project within county with recorded Salt Creek tiger beetle? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ____________

Parties involved: ______________________________

Suitable saline wetland and stream complex habitat (i.e., Salt Creek or Rock Creek watersheds, NE) in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: ____________ Miles

Distance from designated critical habitat: ____________ Miles

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: ____________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

Map of project footprint and species habitat attached? ☐ Yes ☐ No

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Salt Creek tiger beetle (*Cicindela nevadica lincolniana*)**

| |
|---|
| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Scaleshell mussel (*Leptodea leptodon*)**

Project Name: ____________________

Company: ____________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

☐ None.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in aquatic habitat where scaleshell mussels may be present.

## Species-Specific Minimization Measures

The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded scaleshell mussel? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ______ | Miles | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ______ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Bull trout (*Salvelinus confluentus*)**

Project Name: ______________________

Company: ______________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (occupied streams).
- ☐ No refueling vehicles and equipment within 100 ft (30.5 m) of the ordinary high water mark or wetland boundary.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of occupied aquatic habitat.

☐ Do not cross occupied streams, lakes, or designated critical habitat for any activities associated with siting, construction, operation, maintenance procedures, or decommissioning for wind power developments.

☐ No sediment can enter occupied streams, lakes or designated habitat from any activities associated with siting, construction, operation, maintenance procedures, or decommissioning for wind power developments.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities within 300 ft (91.4 m) of designated critical habitat.

## Species-Specific Minimization Measures

For projects that encompass areas within drainages occupied by bull trout:

☐ Avoid using herbicides or pesticides within 300 ft (91.4 m) of the ordinary high water mark (OHW) of occupied aquatic habitat or designated critical habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

☐ Avoid actions that would alter surface water flow in occupied habitat.

☐ Employ BMPs (additional project-specific) during and after construction to control erosion and runoff to aquatic habitats, designated core areas, spawning or rearing habitat, and migratory corridors.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded bull trout? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Distance from designated critical habitat? | ________ | Miles | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| Project within drainages of occupied habitat? | ☐ Yes | ☐ No | |
| Species-specific minimization measures employed | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Bull trout (*Salvelinus confluentus*)**

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| **Effects -** Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Pallid sturgeon (*Scaphirhynchus albus*)**

Project Name: ____________________

Company: ____________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- ☐ No refueling vehicles and equipment within 100 ft (30.5 m) of the ordinary high water mark or wetland boundary.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in or immediately adjacent to aquatic habitat where pallid sturgeon occurs.

## Species-Specific Minimization Measures

For projects that encompass areas within drainages occupied by pallid sturgeon:

☐ Employ BMPs (additional project-specific) during and after construction to control erosion and runoff to aquatic habitats.

☐ Avoid broadcast applications of pesticides or herbicides that may be harmful to the pallid sturgeon in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

☐ Employ measures to minimize the amount of stream habitat disturbance when transmission lines and access roads must be constructed across streams.

☐ Ensure that upstream and downstream fish passage is maintained in any areas where stream habitat disturbance occurs.

☐ Avoid actions that would alter surface water flow in occupied habitat.

## Impact Information

| | | | | |
|---|---|---|---|---|
| Project within county with recorded pallid sturgeon? | ☐ Yes | ☐ No | | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: | ____ |
| Parties involved: ____ | | | | |
| Suitable aquatic habitat in or near project footprint? | ☐ Yes | ☐ No | | |
| Distance from suitable habitat: | ____ | Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: | ____ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) | |
| Project within drainages of occupied habitat? | ☐ Yes | ☐ No | | |
| Species-specific minimization measures employed? | ☐ Yes | ☐ No | | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Pallid sturgeon (*Scaphirhynchus albus*)**

| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |
| --- |
| |

**_Programmatic Biological Assessment Species Consistency Evaluation Form_**
**_Upper Great Plains Region Wind Energy Development Program_**
**Impact Information and Consistency Determination**

## Topeka shiner (*Notropis topeka*)

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors (occupied streams).
- ☐ Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials.
- ☐ Avoid or minimize disturbance to sensitive biological resources and habitats in areas where testing activities are being conducted. Sensitive habitats may include but are not limited to: unique vegetation communities, aquatic habitats, and roost and nest sites.
- ☐ Initiate habitat restoration activities as soon as possible after construction activities are completed. Establish criteria to gauge success of restoration activities and conduct monitoring to evaluate reclamation effectiveness. If initial restoration efforts are not successful, initiate follow-up restoration activities.
- ☐ Establish buffer zones around habitats of concern, if site evaluations show that proposed construction activities would pose a significant risk to species of concern.
- ☐ Use existing municipal water source for all foundation construction.
- ☐ Effective and comprehensive sediment and erosion controls that meet or exceed county, State, and Federal standards should be applied and monitored, with remedial efforts implemented to ensure effectiveness. Practices such as jute netting, silt fences, and check dams should be applied near disturbed areas.
- ☐ All onsite refueling should occur in a designated fueling area that includes a temporary berm to limit the spread of any spill.
- ☐ Drip pans should be placed under fuel pump and valve mechanisms of any bulk fueling vehicles and during refueling to contain accidental releases.
- ☐ Limit pesticide use to non-persistent immobile pesticides. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- ☐ Spills should be immediately addressed per the appropriate spill management plan and soil cleanup and soil removal initiated, by personnel trained in spill response. Maintain appropriate cleanup material available for immediate use in areas where potential contaminants are present.
- ☐ If extraction of water from nearby surface water sources is necessary, evaluate volume to be extracted to ensure adequate flow is available for fish and apply measures to avoid entraining or impinging biota (must obtain permit from State to withdraw water). Water withdrawal cannot occur from streams within drainages occupied by the Topeka shiner.
- ☐ No refueling vehicles and equipment within 100 ft (30.5 m) of the ordinary high water mark or wetland boundary.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ If surveys are warranted, obtain a permit from the USFWS to survey for the Topeka shiner within the project boundaries. Contact the local USFWS Ecological Services Field Office for details.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in or adjacent to aquatic and riparian habitat where the Topeka shiner occurs.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in or adjacent to designated critical habitat.

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Topeka shiner (*Notropis topeka*)**

## Species-Specific Minimization Measures

For projects that encompass areas within drainages occupied by the Topeka shiner:

☐ Avoid broadcast applications of pesticides or herbicides that may be harmful to the Topeka shiner in aquatic habitat. Applications should be made by appropriately licensed applicators where required and applied only in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. Limit pesticide use to non-persistent immobile pesticides.

☐ Install buried utility lines by directionally boring beneath streams, adjacent wetlands, and floodplains, using comprehensive and effective BMPs to ensure excavated materials do not reach the waterway.

☐ Access roads that cannot avoid crossing known or potentially occupied Topeka shiner streams must completely span the stream and floodplain with a bridge, with no instream work involved.

☐ Avoid actions that would alter surface water flow of known occupied habitat and potentially occupied habitat.

☐ Avoid actions that would alter groundwater levels/connections to known or potentially occupied habitat.

☐ Employ comprehensive and effective BMPs (additional project-specific) during and after construction to prevent erosion and runoff to aquatic habitats.

☐ Avoid actions that would alter off-channel habitats (e.g., natural wetlands, dugouts, or oxbows in the floodplain).

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded Topeka shiner? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable aquatic habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ______ | Miles | |
| Distance from designated critical habitat: | ______ | Miles | |
| Section 10(a)(1)(a) permit or sub-permit obtained from the USFWS for surveys? | ☐ Yes | ☐ No | Date issued: ______ |
| Attach copy of permit | ☐ Yes | ☐ No | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ______ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| Project within drainages of occupied habitat? | ☐ Yes | ☐ No | |
| Species-specific minimization measures employed? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

## *Programmatic Biological Assessment Species Consistency Evaluation Form*
## *Upper Great Plains Region Wind Energy Development Program*
## Impact Information and Consistency Determination

### Eastern massasauga (*Sistrurus catenatus catenatus*)

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, one of the more important BMPs for the conservation of this species follows.

- ☐ All vehicles traveling within and around the project area should operate in accordance with posted speed limits and should avoid snakes in the road.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission line towers, or other project facilities in occupied habitat.

### Species-Specific Minimization Measures

For projects that encompass occupied habitat or that occur near occupied habitat:

☐ Minimize disturbance (e.g., mowing, burning, excessive foot traffic) in suitable mesic grassland and prairie habitats, especially during the spring months.

☐ Maintain ecological connectivity between parcels of suitable habitat within project boundaries.

☐ Identify and implement strategies to reduce potential for road mortality on access roads (e.g., close roads or limit traffic during migration times, create road diversion structures to detour snakes, or post signs).

### Impact Information

Project within county with recorded eastern massasauga ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: __________

Parties involved: ______________________________

Suitable habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: __________ Miles

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: __________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

Species-specific minimization measures employed? ☐ Yes ☐ No

Document type ______________________________

Map of project footprint and species habitat attached? ☐ Yes ☐ No

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Greater sage-grouse (*Centrocercus urophasianus*)**

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

- ☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.
  - ☐ Select equipment with the lowest noise levels available and no prominent discrete tones, when possible.
  - ☐ All vehicles traveling within and around the project area should operate in accordance with posted speed limits.
  - ☐ If a transformer becomes a noise issue, a new transformer with reduced flux density generating noise levels as much as 10–20 dB lower than National Electrical Manufacturers Association (NEMA) standard values could be installed. Alternatively, barrier walls, partial enclosures, or full enclosures could be adopted to shield or contain the transformer noise, depending on the degree of noise control needed.
  - ☐ Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. Pets should not be allowed on the project area.
  - ☐ Initiate habitat restoration of disturbed soils and vegetation as soon as possible after construction activities are completed. Restore areas of disturbed soil using weed-free native grasses, forbs, and shrubs (sage brush), in consultation with land managers and appropriate agencies such as State or county extension offices or weed boards.
  - ☐ Develop a plan for control of noxious weeds and invasive plants (i.e., cheat grass) that could occur as a result of new surface disturbance activities at the site. The plan should address monitoring, weed identification, the manner in which weeds spread, and methods for treating infestations. Require the use of certified weed-free mulching.
  - ☐ Access roads, utility and transmission line corridors, and tower site areas should be monitored regularly for the establishment of invasive species, and weed control measures should be initiated immediately upon evidence of the introduction of invasive species.

## Species-Specific Avoidance Measures

- ☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat, known core population areas, and lek locations within project boundaries.
- ☐ Do not site turbines, access roads, transmission lines, or other project facilities within greater sage-grouse core habitats in Montana, North Dakota, and South Dakota or within State-defined greater sage-grouse connectivity areas in Montana.
- ☐ Outside of core areas in Montana, do not site turbines, access roads, transmission lines, or other project facilities within 4 mi (6.4 km) of sage-grouse leks. (There are no known greater sage-grouse occupied habitats outside core areas in North and South Dakota.)

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Greater sage-grouse (*Centrocercus urophasianus*)**

## Species-Specific Minimization Measures

For projects that encompass occupied sage-grouse habitat outside of core areas in Montana:

- ☐ Contact Montana Fish, Wildlife and Parks Statewide Habitat Coordinator (406-444-3377) to obtain sage-grouse distribution information in early planning stages for the wind farm to determine how best to site facility structures to avoid sage-grouse habitat to the extent possible.
- ☐ Avoid placing meteorological towers or turbines, and restrict surface use activities within 4 mi (6.4 km) of active sage-grouse leks.
- ☐ Do not use guy wires for turbine or meteorological tower supports. All existing guy wires should be marked with approved bird flight diverters.
- ☐ Do not build new fences within 1.25 mi (2 km) of occupied leks (unless unavoidable, then mark fence with bird flight diverters). Remove or mark existing fences with approved fence bird flight diverters.
- ☐ Disturbed areas around turbines in shrub/grassland habitat used by sage-grouse should be maintained to allow a shrub cover >10 percent and grasses greater than 6–7 in. (16–18 cm) tall to improve nest success.
- ☐ Limit the number of access roads through sagebrush to decrease fragmentation of habitat.
- ☐ Limit noise at active lek perimeters to 10 db above ambient or maximum of 34 db.
- ☐ Bury all project-related collector and distribution lines, if practicable.
- ☐ Do not place overhead power lines in suitable sage-grouse nesting habitat located within 4 mi (6.4 km) of a known lek.
- ☐ Mark new overhead power lines that traverse or are located within 0.25 mi (0.4 km) of occupied sage-grouse habitat with approved bird flight diverters.
- ☐ Report all incidents of mortality or injury from wind facility construction and operation to the appropriate USFWS Ecological Services Field Office and State Wildlife offices.

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

## Greater sage-grouse (*Centrocercus urophasianus*)

| Impact Information | | | |
|---|---|---|---|
| Project within county with recorded greater sage-grouse? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat, core population areas, or leks in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ______ Miles | | |
| Distance from core areas: | ______ Miles | | |
| Distance from leks: | ______ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ______ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| New underground distribution/collector lines proposed? | ☐ Yes | ☐ No | |
| New overhead distribution/transmission lines proposed? | ☐ Yes | ☐ No | |
| Distance from a known lek: | ______ Miles | | |
| Distance from occupied sage-grouse habitat: | ______ Miles | | |
| Marking with bird flight diverters proposed? | ☐ Yes | ☐ No | |
| Meteorological towers proposed? | ☐ Yes | ☐ No | |
| Guyed? | ☐ Yes | ☐ No | |
| Marked with approved bird flight diverters? | ☐ Yes | ☐ No | |
| Fences (old or new) in occupied habitat? | ☐ Yes | ☐ No | |
| Marked with approved fence bird flight diverters | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Interior least tern (*Sternula antillarum*)**

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Meteorological towers shall not be located in sensitive habitats or in areas where resources known to be sensitive to human activities (e.g., wetlands, cultural resources, and listed species) are present. Installation of towers shall be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors, and the disturbed area will be minimized.
- ☐ The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with bird flight diverters.
- ☐ Place approved marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone River system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than 1.5 mi (2.4 km) from known/suitable riverine habitat.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.

## Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the interior least tern have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded interior least tern? | ☐ Yes ☐ No | | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes ☐ No | Dates: | ________ |
| Parties involved: | ________ | | |
| Suitable habitat in or near project footprint? | ☐ Yes ☐ No | | |
| Distance from suitable Missouri River system habitat: | ________ Miles | | |
| Distance from suitable Platte River system riverine habitat | ________ Miles | | |
| Distance from suitable Platte River system sandpit habitat: | ________ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes ☐ No | Dates of survey: | ________ |
| Result of survey: | ☐ Occupied (species detected) | ☐ Not occupied (species not detected) | |
| New overhead distribution/transmission lines proposed? | ☐ Yes ☐ No | | |
| Distance from occupied habitat: | ________ Miles | | |
| Marking with bird flight diverters proposed? | ☐ Yes ☐ No | | |
| Map of project footprint and species habitat attached? | ☐ Yes ☐ No | | |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
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**Interior least tern (*Sternula antillarum*)**

| |
|---|
| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

## *Programmatic Biological Assessment Species Consistency Evaluation Form*
## *Upper Great Plains Region Wind Energy Development Program*
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### Piping plover *(Charadrius melodus)*

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Meteorological towers shall not be located in sensitive habitats or in areas where resources known to be sensitive to human activities (e.g., wetlands, cultural resources, and listed species) are present. Installation of towers shall be scheduled to avoid disruption of wildlife reproductive activities or other important behaviors, and the disturbed area will be minimized.
- ☐ The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with approved bird flight diverters.
- ☐ Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within the Missouri (including Niobrara River) and Yellowstone River system floodplains or any closer than 1.5 mi (2.4 km) from known/suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within the Platte River (including Loup and Elkhorn Rivers) system floodplain or any closer than 1.5 mi (2.4 km) from known/suitable riverine habitat.

☐ Do not site turbines, access roads, transmission lines, or other project facilities within 1.5 mi (2.4 km) of known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.

☐ Do not site turbines, transmission lines, access roads, or other project facilities within 3.0 mi (4.8 km) of alkali lakes where piping plover nesting has been documented or those designated as critical habitat.

☐ Do not site turbines, transmission lines, access roads, or other project facilities in between any alkali lakes identified with a 3.0 mi (4.8 km) buffer where the outer limit of the buffer zones are less than 3.0 mi (4.8 km) apart.

☐ Do not site turbines, transmission lines, access roads, or other project facilities within 1.5 mi (2.4 km) of riverine designated critical habitat or 3.0 mi (4.8 km) of alkali wetlands designated as critical habitat.

### Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the piping plover have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Piping plover *(Charadrius melodus)***

| Impact Information | | | |
|---|---|---|---|
| Project within county with recorded piping plovers? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable riverine, reservoir, or alkali lake habitat: | ______ Miles | | |
| Distance from designated critical habitat: | ______ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ______ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| New overhead distribution/transmission lines proposed? | ☐ Yes | ☐ No | |
| Distance from occupied piping plover habitat: | ______ Miles | | |
| Marking with bird flight diverters proposed? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

## Rufa red knot (*Calidris canutus rufa*)

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with approved bird flight diverters.
- ☐ Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

### Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the rufa red knot have not been identified at this time. The identified general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species. Additional minimization measures specifically intended to reduce the potential for adverse effects on the rufa red knot have not been identified at this time. The identified general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

Coordinate with the local USFWS field office regarding new species information or conservation measures during planning stages.

### Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded rufa red knot as a transient? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable stopover habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| New overhead distribution/transmission lines proposed? | ☐ Yes | ☐ No | |
| Distance from suitable stopover habitat? | ________ | Miles | |
| Marking with approved bird flight diverters proposed? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
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**Sprague's pipit *(Anthus spragueii)***

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Reseed (non-cropland) disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Avoid placement of meteorological towers, turbines, access roads, and transmission lines within 1,000 ft (304.8 m) of native prairie tracts 160 ac (65 ha) or larger.

## Species-Specific Minimization Measures

☐ Design layouts to minimize further fragmentation of native prairie habitats that are suitable for Sprague's pipit.

☐ All new meteorological towers should be self-supporting and not guyed. If guy wires are unavoidable, they should be marked with approved bird flight diverters.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded Sprague's pipit? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable native prairie habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable native prairie habitat: | ________ | Miles | |
| Block size of suitable habitat: 160 ac (65 ha) or larger | ☐ Yes | ☐ No | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | | ☐ Not occupied (species not detected) |
| Distance from turbines, access roads, and transmission lines to occupied native prairie tracts 160 ac (65 ha) or larger: | ________ | Feet or ________ | Miles |
| Meteorological towers proposed? | ☐ Yes | ☐ No | |
| Guyed? | ☐ Yes | ☐ No | |
| Marked with approved bird flight diverters? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Whooping crane *(Grus americana)***

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

- [ ] All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.
  - [ ] The use of guy wires on meteorological towers shall be avoided or minimized. Any needed guy wires shall have guys appropriately marked with approved bird flight diverters.

## Species-Specific Avoidance Measures

For projects that occur within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings:

- [ ] Conduct preconstruction evaluations and/or surveys to identify wetlands that provide potentially suitable stopover habitat and areas of occurrence within project boundaries.
- [ ] Do not site turbines, transmission lines, access roads, or other project facilities within 1 mi (1.6 km) of wetlands that provide suitable stopover habitat or within 5 mi (8 km) of the Platte or Niobrara Rivers in Nebraska.
- [ ] Do not site turbines, transmission lines, access roads, or other project facilities within 5 mi (8 km) of designated critical habitat.

## Species-Specific Minimization Measures

For projects that that occur within the portion of the whooping crane migration corridor that encompasses 95 percent of historic sightings:

- [ ] Place approved bird flight diverters on the top static wire on any new or upgraded overhead collector, distribution, and transmission lines within 1 mi (1.6 km) of suitable stopover habitat.
- [ ] Establish a procedure for preventing whooping crane collisions with turbines during operations by establishing and implementing formal plans for monitoring the project site and surrounding area for whooping cranes during spring and fall migration periods throughout the operational life of the project (or as determined by the local USFWS field office) and shutting down turbines and/or construction activities within 2 mi (3.2 km) of whooping crane sightings. Monitoring can be done by existing onsite personnel trained in whooping crane identification. Specific requirements of the monitoring and shutdown plan will be determined during preconstruction evaluations. Sightings of whooping cranes in the vicinity of projects will be reported to the appropriate USFWS field office immediately.
- [ ] Instruct workers in the identification and reporting of sandhill and whooping cranes and to avoid disturbance of cranes present near project areas.
- [ ] The acreage of wetlands that are potentially suitable migratory stopover habitat located within a 0.5 mi (0.8 km) radius of turbines may be mitigated based upon site-specific evaluations.

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Whooping crane *(Grus americana)***

| Impact Information | | | |
|---|---|---|---|
| Project within county with recorded whooping crane? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable stopover habitat: | ______ | Miles | |
| Distance from designated critical habitat? | ______ | Miles | |
| Distance from the Platte or Niobrara River? | ______ | Miles | |
| New overhead distribution/transmission lines proposed? | ☐ Yes | ☐ No | |
| Distance from suitable stopover habitat? | ______ | Miles | |
| Marking with approved bird flight diverters proposed? | ☐ Yes | ☐ No | |
| Monitoring plan for spring/fall migration (copy attached)? | ☐ Yes | ☐ No | |
| Employees trained in identification of whooping cranes? | ☐ Yes | ☐ No | |
| Shut-down protocol for sitings within 2 mi (3.2 km) (attached)? | ☐ Yes | ☐ No | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

## *Programmatic Biological Assessment Species Consistency Evaluation Form*
## *Upper Great Plains Region Wind Energy Development Program*
## Impact Information and Consistency Determination

### Black-footed ferret *(Mustela nigripes)*

Project Name: ____________________

Company: ____________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

☐ None.

### Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Avoid siting turbines, transmission lines, access roads, or other project facilities on prairie dog colonies where black-footed ferrets have been reintroduced or are known to occur.

☐ If project facilities cannot avoid prairie dog colonies where ferrets are expected to live, then conduct preconstruction surveys in areas of suitable habitat where the project may impact prairie dog colonies.

### Species-Specific Minimization Measures

☐ Report observations of ferrets, their sign, or carcasses on the project area to the USFWS within 24 hours and work with the black-footed ferret coordinator or local Ecological Services Office to determine whether additional measures need to be undertaken.

☐ Do not commence construction activities until any needed ferret surveys are completed and reviewed by the local USFWS Ecological Services Office.

☐ Ensure that prairie dog colonies are not poisoned or compromised due to wind development on the site.

☐ If black-footed ferrets have been or are being considered to be reintroduced at a location where wind development is proposed, project proponents will partner with the local ferret recovery team to exchange information and provide assistance or management as may be appropriate at that site.

### Impact Information

Project within county with recorded black-footed ferret? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ____________

Parties involved: ____________________

Suitable habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat (per 1989 survey protocols): ________ Miles

Distance from reintroduction or proposed reintroduction sites: ________ Miles

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: ____________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

Observations of ferrets, sign, or carcasses? ☐ Yes ☐ No

Documentation provided? ☐ Yes ☐ No

Map of project footprint and species habitat attached? ☐ Yes ☐ No

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Black-footed ferret *(Mustela nigripes)***

| |
|---|
| **Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect": |

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Canada lynx *(Lynx canadensis)***

Project Name: ______________________

Company: ______________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

☐ None.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, transmission lines, access roads, or other project facilities in core lynx habitat as defined in the USFWS September 2005 Canada lynx recovery outline.

☐ Do not site turbines, transmission lines, access roads, or other project facilities within designated critical habitat.

## Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the Canada lynx have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

Project within county with recorded Canada lynx? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ______________________

Parties involved: ______________________

Suitable boreal forested habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: ______________ Miles

Distance from designated critical habitat: ______________ Miles

Map of project footprint and species habitat attached? ☐ Yes ☐ No

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Gray wolf *(Canis lupus)***

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

☐ None.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.

☐ Do not site turbines, transmission lines, access roads, or other project facilities in habitats occupied by the gray wolf.

## Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the gray wolf have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded gray wolf? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ | Miles | |
| Established gray wolf pack in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from wolf pack: | ________ | Miles | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Grizzly bear *(Ursus arctos horribilis)***

Project Name: ______________________________

Company: ______________________________

## Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Secure all food, trash, and other attractants in bear-proof storage containers in habitats occupied by grizzly bears.

## Species-Specific Avoidance Measures

☐ Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas in which grizzly bears may occur within project boundaries.

☐ Do not site turbines, transmission lines, access roads, or other project facilities within 0.5 mi (0.8 km) of locations known to be occupied by grizzly bears.

## Species-Specific Minimization Measures

Additional minimization measures specifically intended to reduce the potential for adverse effects on the grizzly bear have not been identified at this time. The identified avoidance measures together with general BMPs to reduce ecological impacts from wind energy under the proposed program adequately address the conservation measures for this species.

## Impact Information

| | | | |
|---|---|---|---|
| Project within county with recorded grizzly bears? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ______ |
| Parties involved: ______ | | | |
| Suitable habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable/occupied habitat or Grizzly Bear Management Unit: | ______ | Miles | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

## Indiana bat *(Myotis sodalis)*

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

- [ ] All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.
    - [ ] Activities with continuous periods (i.e., longer than 24 hours) of noise disturbances greater than 75 db measured on the A scale (e.g., loud machinery) should be avoided within a 1-mi (1.6-km) radius of known or assumed Indiana bat hibernacula.
    - [ ] Restrict use of herbicides for vegetation management near known or assumed Indiana bat hibernacula to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands).
    - [ ] Avoid clearing of suitable habitat (spring staging, fall swarming, summer roosting) within a 5-mi (8.0-km) radius of known or assumed Indiana bat hibernacula. Retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥3-in. (7.6-cm) diameter at breast height (dbh) in areas ≤1 mi (1.6 km) from water.
    - [ ] Develop and implement a Bird and Bat Conservation Strategy (BBCS) as described in the *Land-Based Wind Energy Guidelines* that includes survey protocols acceptable to the USFWS in the project area during the spring and fall bird and bat migration seasons. Mortality monitoring will help to identify individual turbines that contribute to avian and bat mortality. This information could be used to provide design layout information for future wind development projects and to reduce the potential for future avian and bat mortality.

### Species-Specific Avoidance Measures

- [ ] Throughout the range of the Indiana bat within the UGP Region (southern Iowa), conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable foraging and roosting habitat within project boundaries and to identify the distance from project boundaries to hibernacula used by Indiana bats. Disturbance of hibernacula is prohibited throughout the year
- [ ] Do not site turbines in areas within 20 mi (32 km) of hibernacula used by Indiana bats or within 1000 ft (300 m) of known or presumed occupied foraging and roosting habitat (edges along forested areas with dense forest canopy, riparian areas and small wetlands). Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning.

### Species-Specific Minimization Measures

- [ ] A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.
- [ ] Increase turbine cut-in speeds to 22.6 ft/sec (6.9 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates) to avoid mortality to the Indiana bat. Use of feathering below the cut-in speed of 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating Indiana bats. Increased cut-in speed and feathering can be suspended between 0.5 hour after sunrise and 0.5 hour before sunset.
- [ ] In the event that preconstruction surveys or post-construction monitoring indicate species occurrence or occupancy of habitat adjacent to the project area, the higher turbine cut-in speeds described above will be required during the spring bat migration season to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.
- [ ] Immediately report observations of Indiana bat mortality to the appropriate USFWS office.

***Programmatic Biological Assessment Species Consistency Evaluation Form***
***Upper Great Plains Region Wind Energy Development Program***
**Impact Information and Consistency Determination**

**Indiana bat *(Myotis sodalis)***

**Impact Information**

| | | | |
|---|---|---|---|
| Project within county with recorded Indiana bat? | ☐ Yes | ☐ No | |
| Preconstruction evaluations conducted with USFWS? | ☐ Yes | ☐ No | Dates: ________ |
| Parties involved: ________ | | | |
| Suitable foraging or roosting habitat in or near project footprint? | ☐ Yes | ☐ No | |
| Distance from suitable habitat: | ________ Miles | | |
| Distance from hibernacula: | ________ Miles | | |
| Has habitat been surveyed to protocol? | ☐ Yes | ☐ No | Dates of survey: ________ |
| Result of survey: | ☐ Occupied (species detected) | ☐ Not occupied (species not detected) | |
| Turbine cut-in speed: | ________ m/sec | | |
| Map of project footprint and species habitat attached? | ☐ Yes | ☐ No | |

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

## *Programmatic Biological Assessment Species Consistency Evaluation Form*
## *Upper Great Plains Region Wind Energy Development Program*
## Impact Information and Consistency Determination

### Northern long-eared bat *(Myotis septentrionalis)*

Project Name: ______________________________

Company: ______________________________

### Best Management Practices

☐ All general BMPs, as stated in the final *Programmatic Environmental Impact Statement for the Upper Great Plains Region Wind Energy Program* and table 4.5-1 of the final *Programmatic Biological Assessment for the Upper Great Plains Region Wind Energy Program,* will be implemented where appropriate, during each phase of the project (i.e., site characterization, construction, operations, and decommissioning). Although not all-inclusive, several of the more important BMPs for the conservation of this species follow.

- ☐ Activities with continuous periods (i.e., longer than 24 hours) of noise disturbances greater than 75 db measured on the A scale (e.g., loud machinery) should be avoided within a 1-mi (1.6-km) radius of known or assumed northern long-eared bat hibernacula..
- ☐ Restrict use of herbicides for vegetation management near known or assumed northern long-eared bat hibernacula to those specifically approved for use in karst (e.g., sinkholes) and water (e.g., streams, ponds, lakes, wetlands).
- ☐ Avoid clearing of suitable habitat (spring staging, fall swarming, summer roosting) within a 5-mile (8.0 km) radius of known or assumed northern long-eared bat hibernacula. Retain snags, dead/dying trees, and trees with exfoliating (loose) bark ≥3-in. (7.6-cm) diameter at breast height (dbh) in areas ≤1 mi (1.6 km) from water.
- ☐ Develop and implement a Bird and Bat Conservation Strategy (BBCS) as described in the *Land-Based Wind Energy Guidelines* that includes survey protocols acceptable to the USFWS in the project area during the spring and fall bird and bat migration seasons. Mortality monitoring will help to identify individual turbines that contribute to avian and bat mortality. This information could be used to provide design layout information for future wind development projects and to reduce the potential for future avian and bat mortality.

### Species-Specific Avoidance Measures

☐ Throughout the range of the northern long-eared bat within the UGP Region, conduct preconstruction evaluations and/or surveys to identify suitable foraging, roosting, and commuting habitat within project boundaries and to identify the distance from project boundaries to hibernacula known/presumed used by northern long-eared bats. Disturbance of hibernacula is prohibited throughout the year.

☐ Avoid all suitable habitat (do not site turbines) in areas within 5 mi (8 km) of hibernacula used by northern long-eared bats or within 0.5 mi (0.8 km) of known or presumed occupied foraging, roosting, and commuting habitat. Habitat evaluations should be coordinated with the local USFWS Ecological Services Office prior to or during turbine site planning.

### Species-Specific Minimization Measures

☐ A robust survey developed and implemented as part of the BBCS program, consistent with the Wind Energy Guidelines and approved by the USFWS during the preconstruction evaluation and survey stage, will be implemented for a minimum of 1 yr preconstruction.

☐ The need for implementation of cut-in speeds higher than manufacturers' recommendations during the fall bat migration period will be based on the following site-specific, project-by-project risk assessments by the State Ecological Services Field Office of the USFWS:

- During the preconstruction evaluation and survey stage, and based on a collision risk assessment of location of the project, proximity to potential summer habitat, distance to known occurrences, distance to known hibernacula, and suspected migration patterns, the applicant will coordinate with Western, Refuges, and the local Ecological Services Field Offices of the USFWS to determine if the risk of injury or mortality is sufficiently high to warrant higher cut-in speeds.
- In the event that preconstruction surveys indicate species occurrence or occupancy of habitat adjacent to the project area, higher turbine cut-in speeds will be required to offset the increased risk for injury or mortality. The monitoring must be rigorous enough to meet standards acceptable to the local USFWS State office.
- When warranted by either of the two aforementioned conditions for specific projects, turbine cut-in speeds will be increased to 16.4 ft/sec (5.0 m/sec) or greater from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for the established migration dates in each State) for northern long-eared bats in the western and central areas of the UGP Region. In the eastern fringe of the UGP Region, a minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) from 0.5 hour before sunset to 0.5 hour after sunrise during the fall migration period (generally August 15–October 15, but consult with the USFWS for established migration dates in each State) for northern long-eared bats is required. Areas within the UGP Region that occur east of the western borders of Minnesota and Iowa will be used as the line of demarcation where the minimum cut-in speed of 22.6 ft/sec (6.9 m/sec) will be used. Use of feathering below the respective cut-in speed of 16.4 ft/sec (5.0 m/sec) or 22.6 ft/sec (6.9 m/sec) will also be implemented at night during the fall migration season to eliminate turbine rotation and avoid mortality of migrating northern long-eared bats. Increased cut-in speed and feathering can be suspended from 0.5 hour after sunrise to 0.5 hour before sunset.

☐ Immediately report observations of northern long-eared bat mortality to the appropriate USFWS office.

### *Programmatic Biological Assessment Species Consistency Evaluation Form*
### *Upper Great Plains Region Wind Energy Development Program*
### Impact Information and Consistency Determination

**Northern long-eared bat *(Myotis septentrionalis)***

**Impact Information**

Project within county with recorded northern long-eared bat? ☐ Yes ☐ No

Preconstruction evaluations conducted with USFWS? ☐ Yes ☐ No Dates: ____________

Parties involved: ____________

Suitable foraging or roosting habitat in or near project footprint? ☐ Yes ☐ No

Distance from suitable habitat: ____________ Miles

Distance from hibernacula: ____________ Miles

Has habitat been surveyed to protocol? ☐ Yes ☐ No Dates of survey: ____________

Result of survey: ☐ Occupied (species detected) ☐ Not occupied (species not detected)

Turbine cut-in speed: ____________ m/sec

Map of project footprint and species habitat attached? ☐ Yes ☐ No

**Effects—**Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":