APPENDIX I

Environmental Assessment

Philip Wind Energy Center Interconnection Request

Final Environmental Assessment
Haakon County, South Dakota

Western Area Power Administration

DOE/EA-2094
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Western Area Power Administration (WAPA) is aware that on February 25, 2025, the Council on Environmental Quality (CEQ) issued an interim final rule to remove its National Environmental Policy Act (NEPA) implementing regulations at 40 Code of Federal Regulations (CFR) 1500–1508. Based on CEQ guidance, and to promote completion of its NEPA review in a timely manner and without delay, in this Environmental Assessment, WAPA is voluntarily relying on the CEQ regulations, in addition to the U.S. Department of Energy's own regulations implementing NEPA at 10 CFR 1021, to meet its obligations under NEPA, 42 United States Code 4321 et seq.

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ABBREVIATIONS

ADLS	aircraft detection lighting system
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
BBCS	Bird and Bat Conservation Strategy
BCA	Beaver Creek Archaeology, Inc.
BCC	Bird of Conservation Concern
BLM	Bureau of Land Management
BLS	Bureau of Labor Statistics
BMP	best management practice
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CO_2e mt	metric ton CO_2 equivalent
dB	decibel
dBA	A-weighted decibel
DOE	U.S. Department of Energy
EA	environmental assessment
EMF	electric and magnetic field
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FR	*Federal Register*
ft	feet
gen-tie line	generation tie line
GHG	greenhouse gas
GIS	geographic information system
HAP	hazardous air pollutant
HUC	hydrologic unit code
Invenergy	Invenergy Wind Development LLC
IPaC	Information for Planning and Consultation
kV	kilovolt
mt	metric tons
MET tower	meteorological tower
MOVES3	Motor Vehicle Emission Simulator
MW	megawatt
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NLCD	National Land Cover Database
NLEB	northern long-eared bat
NRCS	Natural Resources Conservation Service

NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O&M	operations and maintenance
OATT	Open Access Transmission Tariff
PBA	Programmatic Biological Assessment
PEIS	programmatic environmental impact statement
PFYC	Potential Fossil Yield Classification
Philip Wind Partners	Philip Wind Partners, LLC
PM	particulate matter
PM_{10}	PM with a diameter of 10 microns or less
$PM_{2.5}$	PM with a diameter of 2.5 microns or less
PTRCS	property of traditional religious and cultural significance
Project	Philip Wind Energy Center, consisting of the Philip North Switchyard and the private Philip Wind Facility
ROI	region of influence
SCBB	Suckley's cuckoo bumble bee
SDDANR	South Dakota Department of Agriculture and Natural Resources
SDGFP	South Dakota Game, Fish and Parks
SDPUC	South Dakota Public Utilities Commission
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SPP	Southwest Power Pool
SWCA	SWCA Environmental Consultants
Switchyard	Philip North Switchyard
t-line	transmission line
TCB	tricolored bat
TCS	Tribal Cultural Specialist
TWI	The Wetlands Institute
UGP	Upper Great Plains
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WAPA	Western Area Power Administration
WEST	Western EcoSystems Technology, Inc.
Wind Facility	Philip Wind Facility

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1 INTRODUCTION

Western Area Power Administration (WAPA) is one of four power-marketing administrations within the U.S. Department of Energy (DOE). WAPA's mission is to "safely provide reliable, cost-based hydropower and transmission to [its] customers and the communities [it] serve[s]." WAPA's customers include federal and state agencies, cities and towns, rural electric cooperatives, public utility districts, irrigation districts, and Native American Tribes. WAPA's customers, in turn, provide retail electric service to millions of consumers in the west.

Since October 2015, WAPA's Upper Great Plains (UGP) Region has been a transmission owner member of the Southwest Power Pool (SPP), and its qualifying facilities are under the functional control of SPP. Transmission capacity above the amount WAPA requires for the delivery of long-term firm capacity and energy to current contractual electrical service customers of the federal government is offered in accordance with SPP's Open Access Transmission Tariff (OATT), which is approved by the Federal Energy Regulatory Commission. Excess transmission capacity on and interconnection to WAPA-UGP's facilities must be done in accordance with SPP's OATT.

Philip Wind Partners, LLC (Philip Wind Partners or Applicant), requested interconnection to WAPA's existing Oahe to New Underwood 230-kilovolt (kV) transmission line (t-line) at a new Philip North Switchyard (Switchyard) for the Applicant's proposed private Philip Wind Facility (Wind Facility) (i.e., the wind energy generating facility, generation tie line [gen-tie line], and related infrastructure). Together, the Switchyard and private Wind Facility make up the Philip Wind Energy Center (Project). The Wind Facility would be on ≈ 68,300 acres of private land north of the town of Philip in Haakon County, South Dakota (proposed Project area) (Figures 1-1 and 1-2). Philip Wind Partners has secured leases for over 50,000 acres of land in the proposed Project area. On these leases, the Project would temporarily disturb 1,247 acres and permanently disturb 117 acres for the life of the Project.

The proposed Project area represents the greater area studied to site Project infrastructure. However, the Project infrastructure would be permanently sited on a much smaller area (≈ 1,247 acres would be temporarily disturbed during construction, and 117 acres would be permanently disturbed during operation). For the Wind Facility to interconnect with the existing line, WAPA would need to construct the Switchyard to control transmission to WAPA's existing system. Philip Wind Partners executed an interconnection agreement with WAPA and SPP. Prior to executing an interconnection agreement, Philip Wind Partners' interconnection request was studied in accordance with SPP's OATT and the Federal Power Act.

Since WAPA's decision to respond to Philip Wind Partners' interconnection request constitutes a "major Federal action" under the National Environmental Policy Act (NEPA), WAPA must conduct an environmental review of the Federal action and connected actions in accordance with NEPA. WAPA's consideration of the approval of the Switchyard constitutes the proposed Federal action, and the private Wind Facility constitutes a connected action to the proposed Federal action. Together, approval of the Federal action and the connected action make up the Proposed Action evaluated by WAPA pursuant to NEPA. WAPA follows the DOE's regulations implementing NEPA at 10 Code of Federal Regulations (CFR) 1021 to meet the agency's obligations under NEPA (42 United States Code [USC] 4321 et seq).

This environmental assessment (EA) analyzes and discloses potential environmental impacts associated with the Proposed Action, consistent with NEPA. This EA tiers to the analysis conducted in the UGP Wind Energy Final Programmatic Environmental Impact Statement (PEIS), a document prepared jointly

by WAPA and the U.S. Fish and Wildlife Service (USFWS) (WAPA and USFWS 2015).[1] The UGP PEIS was prepared to assess environmental impacts associated with wind energy development in the UGP and to streamline future individual wind project environmental reviews by identifying best management practices (BMPs) to avoid, minimize, and mitigate potential impacts. As stated in the Executive Summary of the UGP PEIS, wind energy projects willing to implement the applicable evaluation process, BMPs, and conservation measures identified in the UGP PEIS may tier the NEPA evaluation for that wind energy project to the analyses in the UGP PEIS. Applicable material from the UGP PEIS is incorporated by reference in this EA in accordance with 10 CFR 1021.210(e). The analysis in this EA is Project-specific and focuses on site-specific issues not already addressed in detail in the UGP PEIS. This EA is intended to be read with the UGP PEIS, and this EA and the UGP PEIS comprise WAPA's NEPA evaluation for the proposed Federal action.

This EA is supplemented by several appendices. Appendix A provides the Preconstruction Wind Turbine Noise Analysis. Appendices B through I are results of natural resources surveys conducted in the proposed Project area. Appendix J is Philip Wind Partners' responses to public comments and public involvement outreach efforts to date. Appendix K contains the USFWS Programmatic Biological Assessment (PBA) Consistency Evaluation Forms. Appendix L is the Whooping Crane Monitoring and Contingency Plan. Appendix M is the Shadow Flicker Report. Appendix N contains the archaeological and architectural resources survey reports and correspondence with the South Dakota State Historic Preservation Office (SHPO). Appendix O is a list of BMPs based on resource-specific BMPs identified in the UGP PEIS. Appendix P is the Project's Bird and Bat Conservation Strategy (BBCS).

1.1 PURPOSE AND NEED FOR THE FEDERAL ACTION

In accordance with SPP's OATT and the Federal Power Act, as detailed in Section 1.1.1 of the UGP PEIS, WAPA must consider whether to proceed with the Applicant's interconnection request at WAPA's existing Oahe to New Underwood 230-kV t-line, which includes the construction and operation of a new WAPA-owned Switchyard.

1.2 PHILIP WIND PARTNERS, LLC, GOAL AND OBJECTIVE

Philip Wind Partners' goals and objectives for the Project are to provide a source of domestic, clean energy to the power grid. To accomplish this, the Project must be technically, environmentally, and economically feasible.

1.3 PROJECT HISTORY AND DESIGN REFINEMENT

The Project was originally proposed by Philip Wind Partners (formerly owned by Southern Power Company) to WAPA in 2017. The Project is in an area of "excellent" wind energy resource with "high suitability" for wind energy development (WAPA and USFWS 2015). When Invenergy Wind Development LLC (Invenergy) acquired Philip Wind Partners (and with it the Project) from Southern Power Company in September 2019, the former Project area encompassed ≈ 71,000 acres and was designed with a layout focused on maximizing energy production. Since Invenergy's acquisition of Philip Wind Partners, Invenergy modified the Project area to address comments from regulatory agencies and the public to avoid, minimize, or mitigate potential adverse impacts to environmental resources based on collected field data (see Figure 1-2). For example, the Project layout Invenergy acquired included turbines sited on grasslands, including unbroken grasslands (see Appendix H for additional information on

[1] The UGP PEIS is referred to frequently throughout this EA, and therefore the author-date citation is provided here at first mention only.

grasslands). Through design refinements, Philip Wind Partners shifted turbine locations to avoid unbroken grasslands (Table 1-1, Figure 1-3).

Invenergy conducted additional natural resources surveys and introduced the new Philip Wind Partners Project team to the USFWS and South Dakota Game, Fish and Parks (SDGFP). During an initial meeting with USFWS and SDGFP in May 2022, the Project team shared the natural resources survey methods and incorporated the agencies' feedback into the survey plans. In addition, Philip Wind Partners kicked off monthly meetings with WAPA in September 2022 and incorporated WAPA's resource specialists' feedback into survey plans. Philip Wind Partners met with the USFWS and the SDGFP again in January 2023 to provide updates on previously completed studies and plans for 2023 through 2024. In that meeting, Philip Wind Partners demonstrated how field data was incorporated into the Project design to avoid and minimize potential impacts to species habitat and sensitive resources.

Philip Wind Partners presented to the USFWS the Project's proposed approach to Endangered Species Act (ESA) compliance pursuant to the USFWS's PBA, which provides for expedited programmatic Section 7 consultation through adherence to the BMPs and conservation measures in the PBA, as documented in the PBA Consistency Evaluation Forms (see Appendix K). A project applicant's voluntary commitment to implement the measures in the PBA Consistency Evaluation Forms results in an effects determination of "no effect" or "not likely to adversely affect" pursuant to the ESA Section 7 process. Between September 2022 and April 2023, Philip Wind Partners worked with the USFWS and WAPA to ensure the Project's adherence with the PBA's Consistency Evaluation Forms to address ESA compliance. The PBA Consistency Evaluation Forms were finalized and signed by Philip Wind Partners, the USFWS, and WAPA in April 2023; updated Consistency Evaluation Forms were signed again in April 2025.

Philip Wind Partners presented findings of the 2023 prairie grouse (sharp-tailed grouse [*Tympanuchus phasianellus*] and greater prairie-chicken [*Tympanuchus cupido*] collectively) lek and raptor nest surveys to the USFWS and the SDGFP in July 2023, along with changes to the turbine layout made in response to survey results. Philip Wind Partners removed four turbine locations from the layout due to proximity to prairie grouse leks and Tier 3 modeled priority sharp-tailed grouse habitat (Runia et al. 2021) (see Section 3.8.2.3.7 and Figure 1-3). Also, six turbines were relocated to comply with BMPs identified in the UGP PEIS. Revisions to the Project design by removal and relocation of turbines, and minor shifts in other Project infrastructure described in Section 2.1, resulted in reductions of impacts to environmental resources. Overall impacts by removing or modifying turbines are now < those described in the Draft EA. Philip Wind Partners will continue to coordinate with the USFWS and the SDGFP throughout Project development using the established collaborative process.

In January 2023, Philip Wind Partners engaged the Bureau of Land Management (BLM) in Project consultation, providing a data package before the scoping meeting, and confirmed during a March 18, 2024, meeting that no new Project infrastructure would be sited on the BLM inholding in the proposed Project area, with existing road right-of-way deemed sufficient to access Project components adjacent to the BLM inholding.

Table 1-1 and Figure 1-3 demonstrate design revisions and setbacks Philip Wind Partners applied to turbine sites to minimize disturbance to natural resources. Turbine sites were selected to minimize impacts to sensitive resources identified in natural resources surveys (see Appendices B–I) and in adherence to the PBA Consistency Evaluation Forms (see Appendix K), thus complying with Section 7 of the ESA. Natural resources and PBA Consistency Evaluation Forms setbacks were applied to all turbine sites (see Table 1-1 and Figure 1-3).

Philip Wind Partners worked with WAPA to support consultation with federally recognized Native American governments early in the planning process. In 2018, Philip Wind Partners' third-party

archaeological consultant, Beaver Creek Archaeology, Inc. (BCA), and Tribal Cultural Specialists (TCSs) from several Native American governments participated in cultural resources surveys. In 2023, Philip Wind Partners engaged BCA to continue evaluating the area of potential effects (APE) for potential archaeological sites. Philip Wind Partners and WAPA also requested that TCSs evaluate the APE for potential traditional cultural properties. Philip Wind Partners and WAPA have continued to rely on Native American governments to complete site-specific assessments to inform the cultural resources survey and support WAPA's consultation under Section 106 of the National Historic Preservation Act (NHPA).

Table 1-1. Applicant-Committed Natural Resources Setbacks for Turbine Locations

Category	Setback	Description	Setback Origination
Wetlands with TWI scores of 4–11	1,000 ft	No turbines ≤ 1,000 ft from wetlands with TWI scores of 4–11.	Applicant-committed setback based on natural resources surveys
Wetlands with TWI scores of 12–14	0.5 mile	No turbines ≤ 0.5 mile from wetlands with TWI scores of 12–14.	Applicant-committed setback based on natural resources surveys
Native (unbroken) sod grasslands	–	No turbines on native (unbroken) sod grasslands.	Applicant-committed setback based on natural resources surveys
Prairie grouse leks	1 mile	No turbines on unbroken grasslands ≤ 1 mile from active prairie grouse leks.	Applicant-committed setback based on natural resources surveys
Prairie grouse habitat models	–	No turbines on the SDGFP Tier 1 or 2 modeled priority habitat areas.	Applicant-committed setback based on natural resources surveys
Prairie dog colonies	500 meters	No turbines ≤ 500 meters from active prairie dog colonies.	Applicant-committed setback based on natural resources surveys
Eagle nests	2 miles	No turbines ≤ 2 miles from eagle nests.	Applicant-committed setback based on natural resources surveys
Red-tailed hawk nests	800 meters	No turbines ≤ 800 meters from red-tailed hawk nests.	Applicant-committed setback based on natural resources surveys
Northern long-eared bat (NLEB)	0.5 mile	No turbines ≤ 0.5 mile from known or presumed occupied foraging, roosting, and commuting NLEB habitat.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
NLEB	10 miles	No turbines ≤ 10 miles from NLEB hibernacula (nearest known is ≈ 68 miles away).	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
Piping plover	1.5 miles	No turbines in the Missouri (including Niobrara River), Platte (including Loup and Elkhorn Rivers), and Yellowstone River system floodplains or < 1.5 miles from suitable sandbar habitat and reservoir shorelines with nesting, resting, and foraging areas. The nearest piping plover record is a 2014 sighting ≈ 20 miles south of the proposed Project area. Designated critical habitat is ≈ 30 miles northeast.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
	1.5 miles	No turbines < 1.5 miles from known sandpit nesting, resting, and foraging areas along the Platte River (including Loup and Elkhorn Rivers) system.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
	3 miles	No turbines < 3 miles from alkali lakes with documented piping plover nesting or those designated as critical habitat.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
	3 miles	No turbines between alkali lakes identified with a 3-mile buffer where the outer limit of the buffer zones is < 3 miles apart.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms
	1.5 miles	No turbines < 1.5 miles from designated riverine critical habitat or < 3 miles from designated alkali wetland critical habitat.	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms

Category	Setback	Description	Setback Origination
Whooping crane	5 miles	No turbines ≤ 5 miles from designated critical habitat (the nearest is > 200 miles away near Lexington, Nebraska).	Applicant-committed setback in adherence with PBA Consistency Evaluation Forms

Note: TWI = The Wetlands Institute.

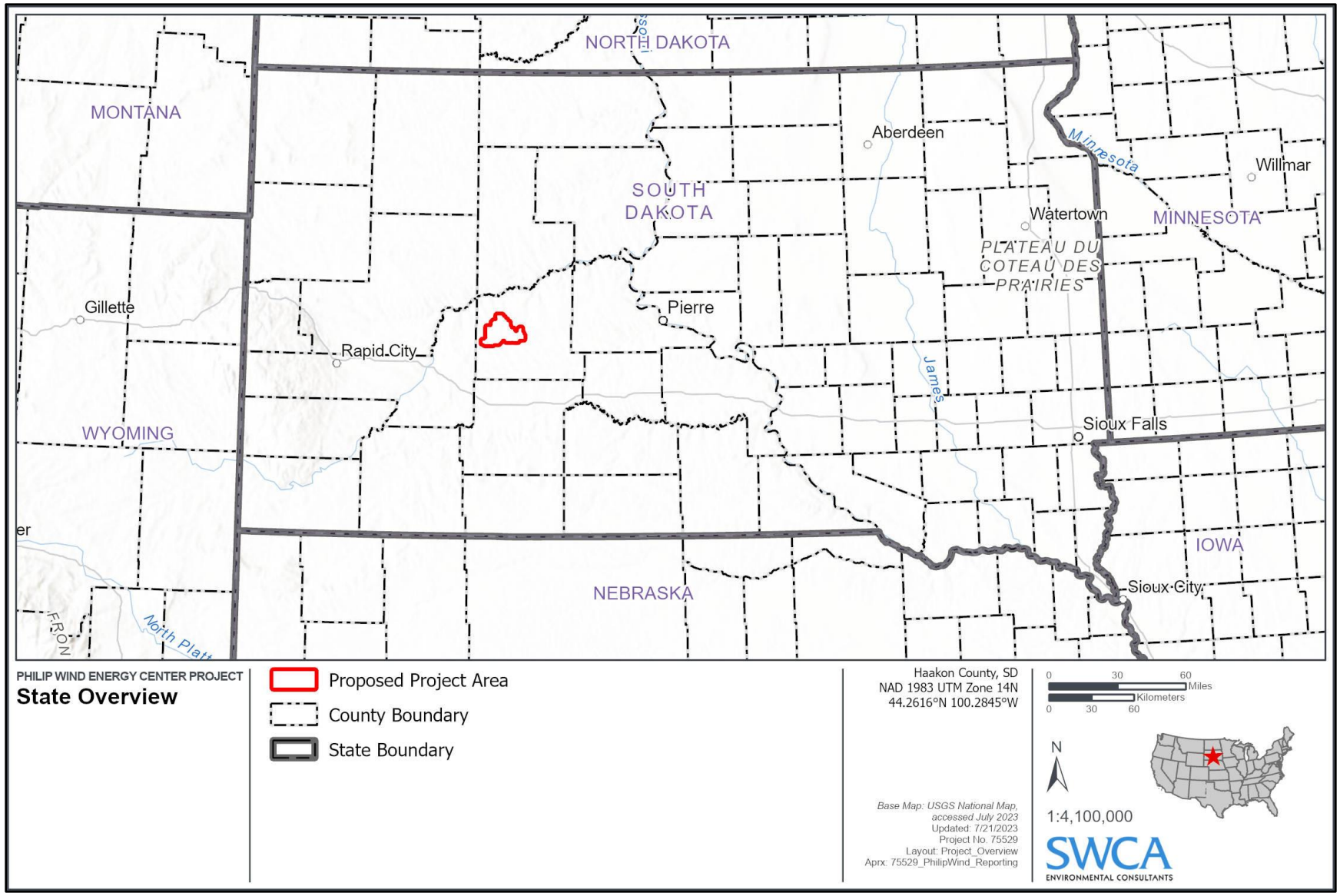

Figure 1-1. Proposed Project area in South Dakota.

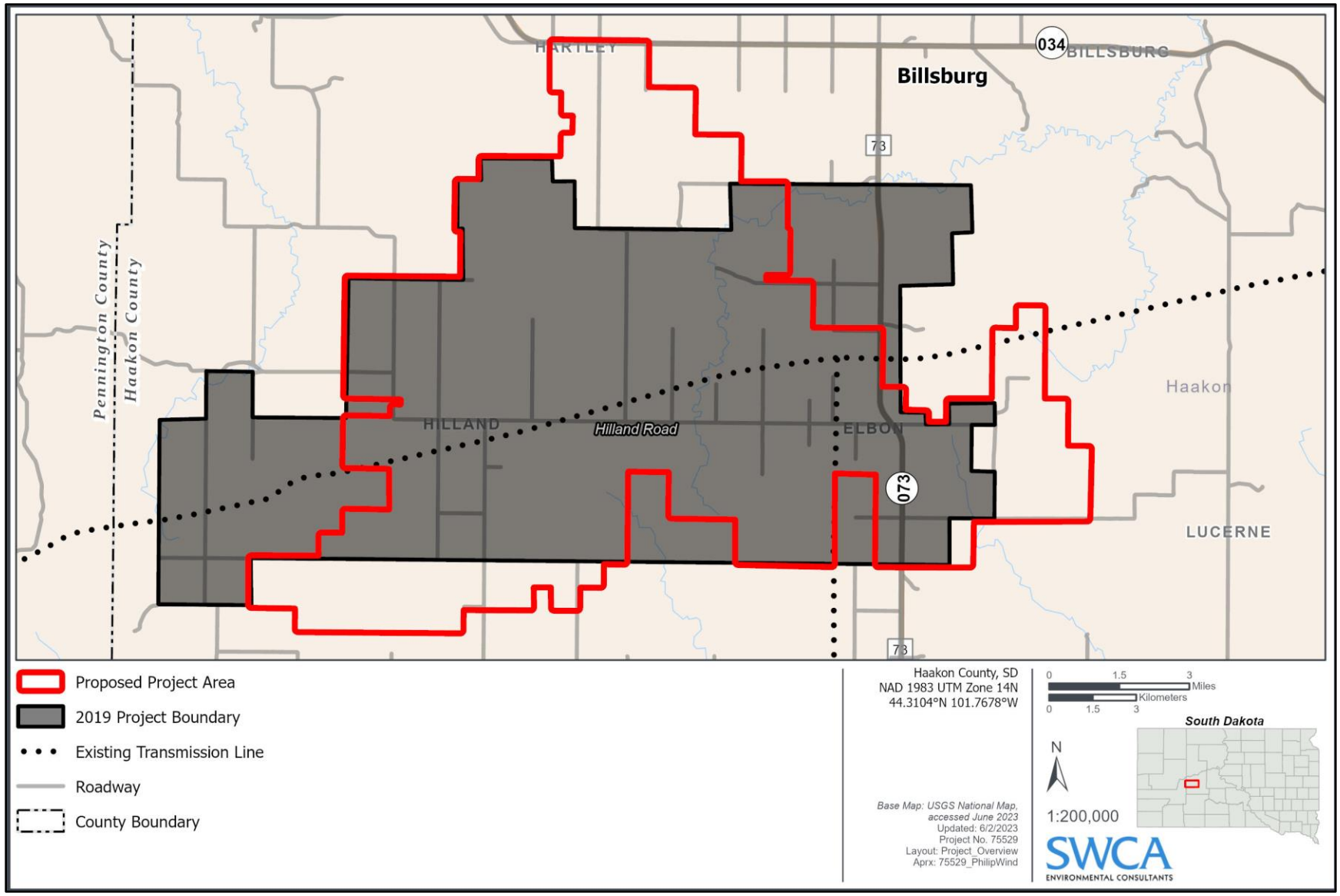

Figure 1-2. Proposed Project area and former boundary.

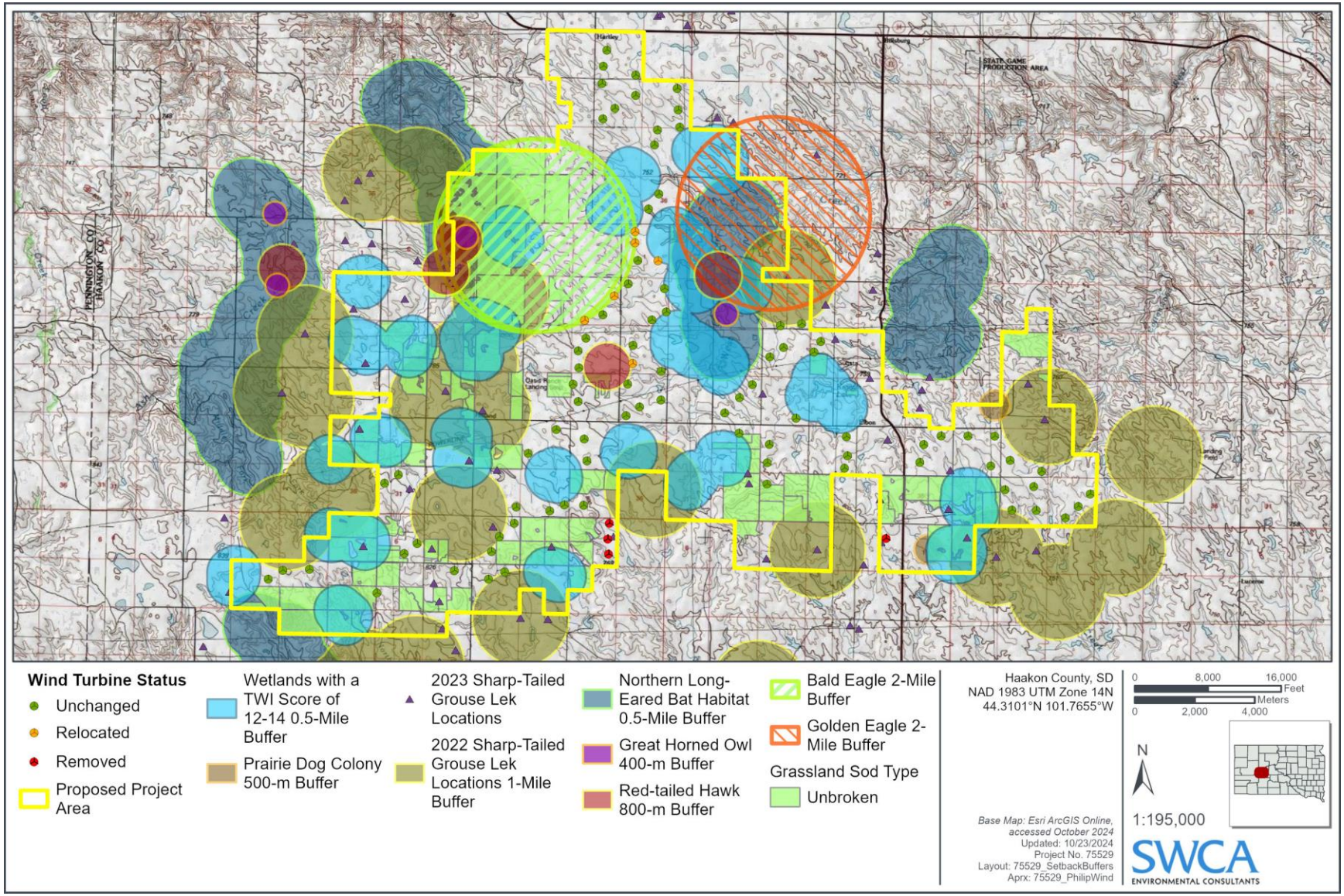

Figure 1-3. Natural resources setbacks and turbine locations.

Notes: Wetlands with TWI scores of 4–11 and tiered prairie grouse habitat not depicted for clear viewability; sharp-tailed grouse lek locations represent 2023 survey results finalized as of publication.

2 DESCRIPTION OF PROPOSED ACTION AND NO ACTION ALTERNATIVES

This EA analyzes two alternatives, the Proposed Action and the No Action Alternative.

2.1 PROPOSED ACTION

WAPA must consider whether to proceed with Philip Wind Partners' interconnection request in accordance with SPP's OATT and the Federal Power Act. The proposed Federal action is for WAPA to proceed with construction and operation of a new WAPA-owned Switchyard to interconnect Philip Wind Partners' privately owned and operated Wind Facility at the existing Oahe to New Underwood 230-kV t-line. WAPA has regulatory authority to consider and act upon requests for interconnection; these requests are evaluated on a case-by-case basis.

As defined in Section 2.1.1 of the UGP PEIS, "WAPA uses the NEPA process to evaluate and disclose potential environmental effects of granting interconnection requests" (WAPA and USFWS 2015). Although WAPA has decision-making authority to act upon interconnection requests, WAPA "does not directly authorize or permit developer projects, including wind energy development projects[,]" such as the Project (WAPA and USFWS 2015).

The proposed Wind Facility is a private action; Philip Wind Partners would construct, own, and operate the private Wind Facility. As part of the NEPA scoping process and requirements of 10 CFR 1021.410(b)(3), WAPA determined the private Wind Facility (i.e., the wind energy generating facility, gen-tie line, and related infrastructure) is a connected action to the proposed Federal action because if WAPA were to approve the interconnection request, Philip Wind Partners would develop the Project. For the purpose of analyzing and disclosing potential environmental impacts of the proposed Federal action, this EA evaluates both WAPA's proposed Federal action and Philip Wind Partners' private development of the Wind Facility (the connected action). Collectively, these activities make up the Proposed Action and are referred to as the Project. Table 2-1 provides a summary of the maximum potential disturbance associated with the Project, and Figure 2-1 displays the current Project layout.

Proposed infrastructure listed in Table 2-1 for the Project includes factors resulting in an overestimation of potential impacts. The Project's calculated disturbances are based on a conservative design incorporating extra facilities to be refined through final engineering. Since release of the Draft EA, Philip Wind Partners refined designs to minimize impacts while still accounting for an overestimation of impacts. This resulted in adjustments throughout Section 2.1 and Table 2-1 to represent the updated design. This analysis assumes the largest turbine model would be built at each of the potential turbine sites, although based on these assumptions, the Project would exceed the total nameplate generation capacity of 300 megawatts (MW). For the purposes of this EA analysis, overestimation of actual disturbance was intentional to ensure the maximum potential for Project impacts is considered.

Table 2-1. Maximum Potential Project Impact Summary

Proposed Infrastructure	Assumptions	Temporary Construction & Decommissioning Footprint (dimensions)	Temporary Construction & Decommissioning Footprint (acres)	Permanent O&M Footprint (dimensions)	Permanent O&M Footprint (acres)
Switchyard	1 switchyard	≈ 300 × 300 ft	2 acres	≈ 515 × 515 ft	5 acres
Subtotal for the Switchyard	–	–	*2 acres*	≈ 515 × 515 ft	*5 acres*
Wind Facility					
Wind turbines*	≤ 90 turbines on 91 potential sites	225-foot radius	296 acres	50-foot radius	14 acres
Access roads	≤ 44 miles	40 ft wide	124 acres	16 ft wide	84 acres
Crane paths	≤ 46 miles	75 ft wide	257 acres	–	–
Underground collection lines†	≤ 109 miles; 700 aboveground junction boxes	40 ft wide	415 acres	5 × 5 ft per junction box	< 1 acre
Project substation	1 substation location	–	–	≈ 600 × 600 ft	8 acres
Meteorological towers (MET towers)	≤ 3 MET towers (free-standing)	150-foot radius	4 acres	35 × 35 ft	< 1 acre
Aircraft detection lighting system (ADLS) towers	≤ 3 ADLS towers	150-foot radius	4 acres	35 × 35 ft	< 1 acre
O&M facility	1 O&M building	–	–	470 × 470 ft	5 acres
Temporary laydown yards (x3)	1 ≈ 15 acres 2 ≈ 10 acres	1 ≈ 810 × 810 ft 2 ≈ 660 × 660 ft	35 acres	–	–
Gen-tie line structures footprint & work area easement	≤ 7 miles long; 62 structures spaced 600 ft & 2 poles/structure	200 ft wide	82 acres	14-inch radius per pole	< 1 acre
Gen-tie line access road	1 access road ≤ 7 miles long	15 ft wide	9 acres	–	–
Basin Electric t-line structures footprint & work area easement	≤ 1 mile long; 9 structures spaced 600 ft, 2 poles/structure	200 ft wide	14 acres	14-inch radius per pole	< 1 acre
Basin Electric t-line access road	1 access road ≤ 1 mile long	15 ft wide	2 acres	–	–
WAPA transmission tie-in line structure footprint & work area easement	≤ 0.25 mile long; 4 structures spaced 600 ft, 2 poles/structure	200 ft wide	2 acres	14-inch radius per pole	< 1 acre
Subtotal for the Wind Facility	–	–	*1,245 acres*	–	*112 acres*
Project total (Switchyard & Wind Facility)	**–**	**–**	**1,247 acres**	**–**	**117 acres**

Note: Sum of values may not equal total shown due to rounding. Acreage calculations do not include areas of overlapping infrastructure (i.e., areas used for more than one purpose, such as access roads through turbine pads).

* Number of wind turbines depends on final turbine model selected but would be ≤ 90 turbines.

† Underground collection line design includes multiple collection line routes per turbine, which overestimates collection line distance. Final collection line design would require one connection between each set of turbines (e.g., linear connection network instead of mesh connection network).

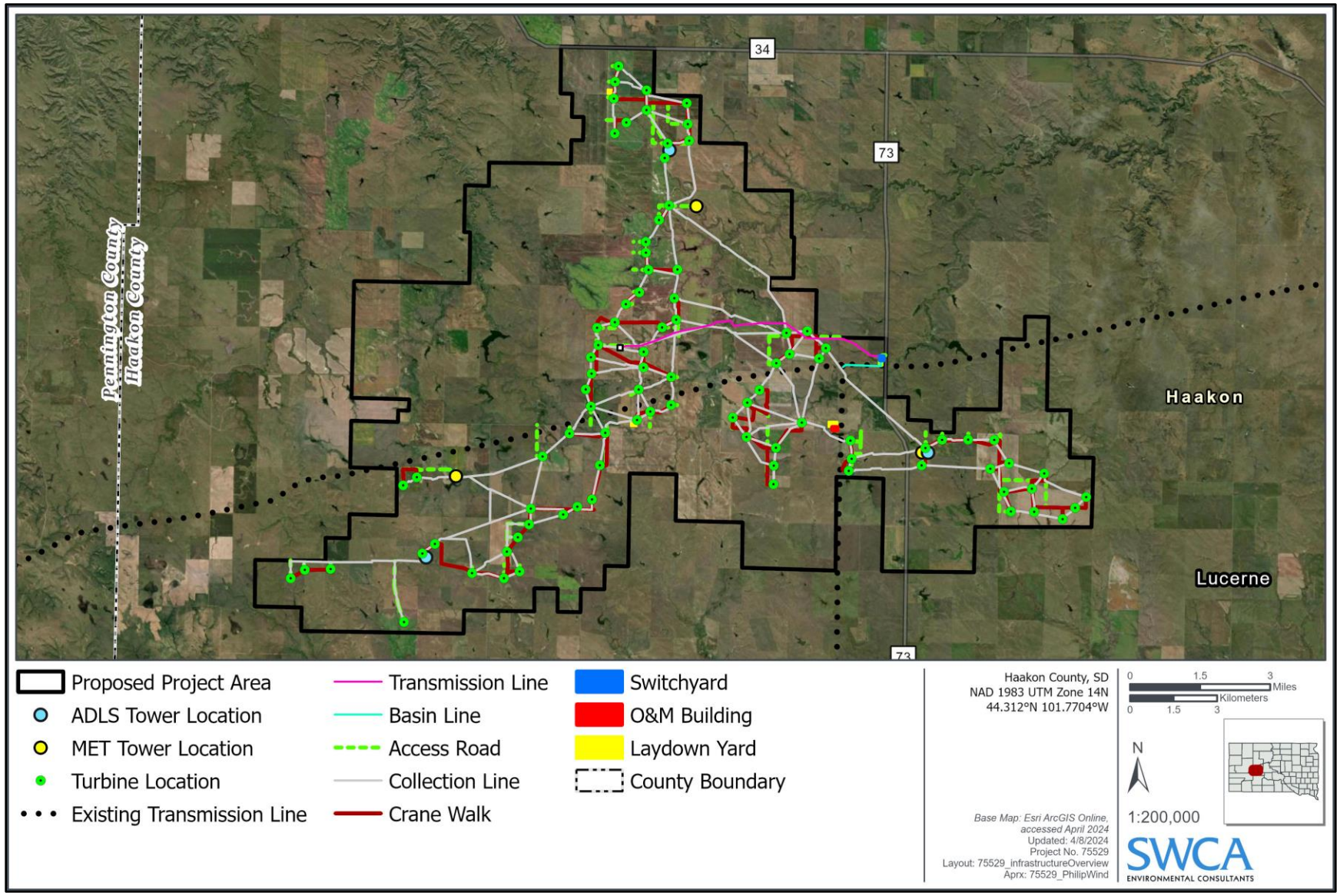

Figure 2-1. Project layout.

2.1.1 Switchyard

The Switchyard would be at the northeast corner of the proposed Project area along South Dakota Highway 73 and 213th Street. An existing transmission facility is nearby: the Philip Tap, which is the interconnection point for the Basin Electric 230-kV t-line to WAPA's Oahe to New Underwood 230-kV t-line. The Switchyard would be ≈ 1 mile east of Philip Tap (see Figure 2-1). To accommodate the existing Basin Electric interconnection, the Project interconnection, and improve access to the Switchyard, WAPA proposes to construct the Switchyard at the more accessible site in the proposed Project area. The Switchyard would replace the existing Philip Tap, and t-lines for the Project and Basin Electric would interconnect at the proposed Switchyard.

The Switchyard would be a WAPA-owned 230-kV switchyard and consist of four breaker ring buses with four 230-kV circuit breakers, twelve 230-kV disconnect switches, instrument transformers, associated control and protection equipment, high-voltage buses, four t-line take-off structures, one conductor, one overhead optical ground wire, communication equipment, and new t-line structures to re-terminate the four lines (Oahe 230-kV t-line, New Underwood 230-kV t-line, Basin Electric 230-kV t-line, and the Project 230-kV t-line) in the Switchyard.

Construction and operation of the Switchyard would result in ≈ 5 acres of permanent land disturbance and 2 acres of temporary land disturbance (see Table 2-1).

2.1.2 Wind Facility

2.1.2.1 Wind Turbines

The Wind Facility would consist of installation of ≤ 90 turbines on 91 potential sites (see Figure 2-1). Multiple turbine models are being considered, with the highest turbine rating ≤ 6.1 MW. The number and model of turbines selected would have a total nameplate generation capacity ≤ 300 MW. The wind turbine generators would be supported by three-section tubular towers ≤ 370 feet (ft) tall and have rotors ≤ 545 ft in diameter. Anticipated blade tip height would be ≤ 644 ft. Towers, blades, and generators would be white. Table 2-2 lists representative turbine options; a specific model has not yet been finalized. For purposes of impact assessment in this EA, the largest turbine model and the highest number of turbines were analyzed, representing an overestimation of potential impacts.

Table 2-2. Representative Turbine Options

Model Name	Current Nameplate Capacity (MW)	Hub Height (ft)	Rotor Diameter (ft)	Tip Height (ft)	Rotor-Swept Area (square ft)
GE 140	3.4	334	460	564	165,700
Vestas 166	6.1	370	545	644	190,285
Vestas 163	4.5	370	535	637.5	190,210

2.1.2.2 O&M Facility

The operations and maintenance (O&M) building, as shown in Figure 2-1, would result in ≈ 5 acres of permanent, long-term disturbance. To support the construction of the O&M building and other Project infrastructure, 35 total acres would be required for the use of three temporary laydown yards (see Table 2-1). One laydown yard would be sited in the same location as the O&M building, and the other two would be sited elsewhere in the proposed Project area (see Figure 2-1). All three laydown yards, apart from the O&M building footprint and gravel parking area, would be revegetated once construction is complete.

The O&M building would be a two-story building to house operating personnel, offices, operations and communication equipment, and storage for parts and maintenance. Construction tools, materials, equipment, and vehicles would be stored at the laydown yard until needed for construction activities. The O&M building would include a gravel parking area and outdoor storage area for larger equipment and materials, which would be fenced for safety and security. The building would have running water provided by the existing rural system.

2.1.2.3 Project Substation

The Project substation would be in the eastern portion of the proposed Project area (see Figure 2-1) and surrounded by a security fence. At the Project substation, voltage would be stepped up from 34.5 kV from the underground collection lines to 230 kV for the Project gen-tie line. Construction of the substation would cause ≈ 8 acres of permanent land disturbance (see Table 2-1). No temporary land disturbance would be needed for construction of the substation. The substation would consist of two transformers, circuit breakers, switching devices, auxiliary equipment, a control enclosure (with equipment for controls, protection, monitoring, and communications), and other miscellaneous equipment.

2.1.2.4 Generation Tie Line, Basin Electric T-Line Extension, and WAPA Transmission Tie Lines

Originating from the Project substation, a 7-mile gen-tie line would connect the Project to the new Switchyard. The gen-tie line would be a single-circuit power line with a structure height of ≤ 200 ft tall. The gen-tie line would be supported by ≈ 62 transmission structures (two poles per structure) spaced 600 ft apart. An access road to each structure would be required during construction, and access road areas would be reclaimed upon completion of construction. The 230-kV gen-tie line would transmit power from the Project substation to the Switchyard.

The gen-tie line would avoid USFWS wetland and grassland easements, as none exist in the proposed Project area. Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms (see Appendix K) would be installed and maintained for the life of the Project on constructed overhead lines following Avian Power Line Interaction Committee (APLIC) suggestions.

The Project would require the extension of the existing Basin Electric t-line by ≈ 1 mile from its current interconnection point at the Philip Tap to the new Switchyard, requiring ≈ nine new transmission structures. No other lines would be upgraded as part of the Proposed Action.

During construction of the gen-tie line, the construction easement would be 200 ft wide and include transmission structures. Ground disturbance would occur at structure erection sites, temporary work areas, and access roads during construction; these areas would be reclaimed when construction is completed. Following construction, Philip Wind Partners would retain 32 acres of right-of-way for O&M; permanent disturbance would be the physical transmission structure locations, which would require a total operational footprint of < 1 acre (see Table 2-1).

The Basin Electric t-line relocation construction easement would be 200 ft wide and require ≈ 14 acres of temporary work areas. Permanent disturbance resulting from the Basin Electric t-line relocation would be 16 t-line pole foundations, requiring a total operational footprint of < 1 acre (see Table 2-1).

The proposed Switchyard would be offset to the north from the existing Oahe to New Underwood 230-kV t-line by ≈ 500 ft, requiring construction of two new WAPA transmission tie-in lines. The tie-in lines would need a 200-foot-wide construction easement and a temporary work area of ≈ 2 acres of temporary

disturbance. Permanent disturbance would be eight t-line pole foundations, requiring a total operational footprint of < 1 acre (see Table 2-1).

2.1.2.5 Access Roads and Crane Paths

For construction and maintenance of the wind turbines, existing, temporary, and permanent access roads would be used. Existing access roads (e.g., public and private roads) would be used to the extent possible. Philip Wind Partners expects to use ≤ 44 miles of new access roads; however, some existing access roads may require improvements (e.g., adding gravel, widening, or repairing potholes). During construction, new and improved access roads would be maintained at 40 ft wide for a temporary disturbance total of 124 acres. Following construction, access roads would be maintained at 16 ft wide for a permanent disturbance total of 84 acres (see Table 2-1). Following construction, 40 acres of land used for access roads would be reclaimed.

In addition to access roads, ≤ 46 miles of crane paths would be needed for construction. The crane paths would be 75 ft wide and only used during construction. Following construction, 257 acres of temporary disturbance needed for crane paths would be revegetated. If soils are firm enough to support the weight of the crane, minimal matting would be placed as the crane would be able to crawl over the land. For reclamation, compacted soils would be tilled following construction. Philip Wind Partners would use pads and crane mats for crane paths on soft soils.

2.1.2.6 Underground Collection Lines

An underground 34.5-kV collector system would be used to route power from each turbine to the aboveground collector Project substation, which would consist of two main transformers where electrical voltage would be stepped up from 34.5- to 230-kV. Communication fiber-optic lines would be co-located with the collector system, facilitating direct communication between the turbines and the O&M facility and/or remote-control locations.

Construction of the underground collection lines would temporarily disturb a 40-foot-wide path for ≈ 109 miles, or 415 acres (assuming construction of 90 turbines). The collection lines would be buried to ≥ 48 inches, with marking tape and tracer wire to meet appropriate national electrical codes. Ground surface above the lines would be revegetated, but no trees would be permitted above the lines. Philip Wind Partners estimates 700 permanent aboveground junction boxes would be needed, and the total permanent disturbance would be < 1 acre (see Table 2-1).

2.1.2.7 Meteorological Towers

Five temporary MET towers are currently in the proposed Project area. These towers would be removed as part of Project construction; however, three new permanent free-standing MET towers would be installed as part of the Project activities at new locations shown in Figure 2-1.

Permanent MET towers would be ≤ 200 ft tall, marked and lighted as specified by the Federal Aviation Administration (FAA), and would have FAA-approved aircraft detection lighting systems (ADLSs).

Construction of the MET towers would temporarily disturb ≤ 4 acres (a 150-foot radius area per tower). O&M of the MET towers would permanently impact < 1 acre.

2.1.2.8 Aircraft Detection Lighting System Towers

South Dakota Codified Law 49-41B-25.2 requires wind energy facilities to include ADLS towers meeting requirements set forth by the FAA. The Project would construct ≤ three ADLS towers, requiring temporary disturbance of 4 acres during construction. Total permanent disturbance would be < 1 acre.

2.1.2.9 Project Life Cycle and Decommissioning

Section 2 of the UGP PEIS describes activities likely to occur during major phases of a typical wind energy project's lifecycle as: site testing and monitoring, construction, O&M, and decommissioning. The same project phases, with similar types of activities for each phase, would occur for the Project. Construction would begin as soon as 2025, with the Project expected to become operational as early as 2026. The expected life of the Project is ≈ 30 years, after which time the Project would either be repowered or decommissioned. Any future decommissioning activities would be completed consistent with general requirements described in Sections 3.5 – Site Decommissioning; 3.6.4 – Hazardous Materials and Wastes; and 3.6.6 – T-Line Decommissioning, of the UGP PEIS; and applicable federal, state, and local requirements at that time. According to the South Dakota Codified Law § 49-41B 27 (2021), any retrofits and/or upgrades after 30 years may require further approvals from the South Dakota Public Utilities Commission (SDPUC).

2.1.2.10 Environmental Protection Measures

Philip Wind Partners has committed to BMPs based on the resource-specific BMPs identified in the UGP PEIS (see Appendix O) and to the BMPs and species-specific conservation measures identified in the PBA Consistency Evaluation Forms (see Appendix K). In addition to the Applicant-committed natural resources setbacks described above (see Table 1-1), Philip Wind Partners has committed to implementing additional voluntary environmental protection measures to further minimize the Project's impact to the landscape during construction and operation (Table 2-3).

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, WAPA would not enter into an interconnection agreement with SPP and Philip Wind Partners and would not allow the Project to interconnect with WAPA's transmission system. The new Switchyard would not be constructed. Although this would not preclude the Project from being constructed and connected to a non-WAPA-managed transmission system, for the purposes of analysis, this EA assumes the Project would not be built. However, WAPA recognizes Philip Wind Partners would seek an alternative interconnection point for the Project. For comparison in this EA, the No Action Alternative assumes Philip Wind Partners would not construct the Project.

Table 2-3. Applicant's Additional Voluntary Environmental Protection Measures

Resource	Applicant's Additional Voluntary Environmental Protection Measures
Land use & public facilities	• Coordinate turbine siting and operation activities with landowners to reduce interference with farming or livestock operations. This may include agreed-upon turbine sites, maintenance of gates and cattle guards where access roads cross existing fence lines, access control, signing of open range areas, traffic management (e.g., vehicle speed management), and safe operations of agricultural aviation activities.
Geology, soil resources, & paleontology	• Perform soil borings at wind turbine sites to assist with specific designs and construction parameters. • Test soil samples to determine engineering characteristics of the site subgrade soils. • Obtain coverage under the General Permit for Stormwater Discharges Associated with Construction Activities issued by the South Dakota Department of Agriculture and Natural Resources (SDDANR). This permit requires development and implementation of a stormwater pollution prevention plan. The Project's Stormwater Pollution Prevention Plan would be developed during civil engineering design of the Project and include BMPs to control erosion and sedimentation. • Regularly inspect access roads, utility and t-line corridors, and structure site areas for damage from erosion, washouts, and rutting. Initiate corrective measures immediately upon evidence of damage. • Correct drainage problems caused by construction to avoid damage to agricultural fields. • De-compact subsoil in temporarily disturbed areas following completion of construction and during decommissioning. • Salvage and segregate topsoil from excavation and construction activities to reapply to disturbed areas once construction is completed. • Remove turbines and ancillary structures from the proposed Project area during decommissioning. Do not bury or leave in place excess concrete in active agricultural areas, excluding belowground portions of decommissioned turbine foundations intentionally left in place. • Where practicable, place ground-disturbing activities and structures in areas previously disturbed through prior human activities. • Based on the presence of Potential Fossil Yield Classification (PFYC) 4 and U (unknown) geological units, a qualified paleontologist would review the final Project design and conduct field reconnaissance of exposures of geological units designated as PFYC 4 and a portion (at least 50% of exposures, e.g., drainage cuts and human-made exposures) of units designated as PFYC U. • If paleontological resources are found in the proposed Project area, their disposition would be in accordance with agreements between the surface estate owner and the Project proponent.
Wildlife	• Design and construct the Project's aerial power lines to minimize avian electrocution and collision risks as outlined in APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC 2006, 2012). • Implement a Bird and Bat Conservation Strategy (BBCS) (see Appendix P) in accordance with the USFWS's *Land-Based Wind Energy Guidelines* (USFWS 2012) to minimize impacts to avian and bat species during construction and operation of the Project. • Turbine blades will be feathered below the cut-in wind speed November 1 to August 15. Curtailment will occur from 30 minutes before sunset to 30 minutes after sunrise when the temperature is above 40 degrees Fahrenheit and following the cut-in wind speeds and related timeframes specified below (adapted from USFWS [2024a, 2024b, 2024c, 2024d]; Jordan 2020): August 16 to October 31 at 5 meters per second. • Train O&M staff to recognize sensitive species as described in the BBCS (see Appendix P). Report observations of listed species fatalities to the appropriate state or federal agency within 48 hours of species identification. • Instruct employees, contractors, and visitors to avoid harassment/disturbance of wildlife, especially during reproductive (e.g., courtship and nesting) seasons. • Use designs for permanent MET towers that do not require guy wires. • Dispose of garbage or human waste generated on-site promptly to avoid attracting nuisance wildlife.
Hazardous materials & solid waste	• If contamination is caused by or encountered during on-site construction activity, report the contamination to the SDDANR at (605) 773-3296. Contaminated soil that has been excavated would be segregated from clean soil and sampled to determine disposal requirements. Piping, equipment, or other material to be placed in locations where it would be in contact with contaminated soil or groundwater would be evaluated to determine compatibility with the contaminant.

2.3 ALTERNATIVES CONSIDERED BUT DISMISSED

The Applicant and WAPA considered several alternative interconnection location options for interconnection to WAPA's Oahe to New Underwood 230-kV t-line. One option considered was a line break and construction of a new switchyard ≈ 5 miles west of the existing Philip Tap. Interconnection at this location would have required a new interconnection switchyard and upgrade of the Philip Tap to a switchyard. Construction of two switchyards would be more expensive than one improved switchyard, so WAPA evaluated alternative locations for placement of a single switchyard to facilitate interconnection to WAPA's Oahe to New Underwood 230-kV t-line. Three alternative options for removing the existing tap and replacing it with a switchyard were evaluated: 1) a new switchyard south of the existing Philip Tap, 2) the existing Philip Tap location, and 3) the preferred location carried forward for detailed analysis.

New Switchyard South of the Existing Philip Tap: Construction of a new switchyard ≈ 1 mile south of the existing Philip Tap Basin Line would have involved building two parallel WAPA lines traversing south for 1.3 miles from the existing tap and removing 1.3 miles of Basin line. This alternative switchyard location would require space for the Project gen-tie to access this switchyard site. Access to this site would be from Hilland Road, which is unpaved and not as regularly plowed in the winter as South Dakota Highway 73. This alternative would involve construction of 8.6 miles of new t-line. Due to the difficulty of routing 1.3 miles of WAPA's lines in parallel to this location and still allowing space for the Project gen-tie and the impracticability of accessing the site from an unpaved road, WAPA determined this was not a reasonable alternative due to the access constraints and increased t-line length.

New Switchyard at Existing Philip Tap Location: Constructing a new switchyard adjacent to the north of the existing Philip Tap would minimize the need for ≈ 6 miles of new gen-tie lines to be built for the interconnection of the Project. Constructing the switchyard at the existing Philip Tap would avoid extending the existing Basin Electric t-line and would reduce the length of the new gen-tie line by ≈ 1 mile; however, current road access to the Philip Tap requires travel on 2.7 miles of unpaved road from the paved South Dakota Highway 73. The route from the highway onto unpaved roads traverses private land, passes through a homesite, and crosses a private reservoir's dam. Philip Wind Partners proposed a new route to avoid the homesite and dam by improving 1 mile of 213th Street and constructing 0.5 mile of a new north-south access road to the current tap location.

This option was eliminated by WAPA because the preferred location of the switchyard is already sited adjacent to South Dakota Highway 73, providing better year-round access to the new facility and reducing the need for new road construction. Based on the lack of access to the switchyard from a paved road with year-round maintenance, WAPA determined this was not a reasonable alternative.

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3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section identifies baseline environmental conditions and analyzes potential impacts for the Proposed Action and No Action alternative, organized by resource. The Proposed Action section for each resource is separated into potential impacts associated with the Switchyard and those associated with the Wind Facility, to clearly define the impacts associated with each Proposed Action component. This analysis tiers to the analysis conducted in the UGP PEIS, which analyzes potential direct, indirect, and cumulative environmental impacts of wind energy development across the UGP Region and identifies BMPs to reduce impacts. This section incorporates and tiers to the UGP PEIS analysis, focusing on site-specific information and potential impacts relevant to the Proposed Action.

Each resource section identifies existing baseline conditions in a specified analysis area. Depending on resources, the analysis areas may be the same as the proposed Project area (see Figure 2-1). Temporary and permanent disturbance acreages are disclosed by facility type in Table 2-1.

Each section describes potential impacts of the Proposed Action to the relevant resource. The analysis identifies environmental protection measures (i.e., resource-specific BMPs identified in the UGP PEIS [see Appendix O], BMPs and species-specific conservation measures identified in the PBA Consistency Evaluation Forms [see Appendix K], and the Applicant's additional voluntary environmental protection measures [see Table 2-3]) to be incorporated in the Proposed Action to reduce potential impacts.

Each section has a conclusion evaluating impacts of the Proposed Action in terms of context and intensity to determine the significance of the impact. The issue of context considers the geographic, biophysical, and social context in which the effects would occur. The issue of intensity refers to the severity of the impact and is classified in this EA using the following definitions:

- **Negligible:** Resources would be essentially unchanged or unaltered from the Project; these changes would not be detectible and/or measurable beyond normal environmental variability.
- **Minor:** Project would cause a slight change or alteration to specific resources; changes to resources may be detectable and/or measurable; resources as a whole would continue to function as prior to the Project.
- **Moderate:** Project would have an obvious, appreciable impact on resources; changes to resources would be detectable and/or measurable; resources may be affected through decreased functionality or may continue to function but in a diminished capacity.

Each resource section concludes with a determination of the significance of the impact. One of two conclusions is reached: either the Project would not have a significant impact on the resource considering context and intensity, or the Project would not have a "new" significant impact on the resource compared to what was analyzed in the UGP PEIS to which this EA is tiered. For Project impacts that may be significant, those impacts must have been fully analyzed in the UGP PEIS to reach a finding of no "new" significant impact.

Finally, the sections conclude with a description of the anticipated impact of the No Action Alternative to the resource.

3.1 LAND USE AND PUBLIC FACILITIES

3.1.1 Existing Conditions

3.1.1.1 Land Use

Land use in the proposed Project area was determined by use of the National Land Cover Database (NLCD) (U.S. Geological Survey [USGS] 2019). The proposed Project area and proposed Project features were compared to the NLCD, and areas of overlap were extracted using a geographic information system (GIS). The comparison provides a table of land cover types and allows for determination of temporary and permanent impacts from development of the Proposed Action.

Land use in the proposed Project area consists predominantly of herbaceous and planted/cultivated land. Herbaceous land is prairie and grasslands dominated by native or naturalized grasses. Planted/cultivated land is pasture/hayland and cultivated cropland and is referred to as "agricultural" land in this section. Developed land is areas of anthropogenic modification for commercial, residential, and industrial use. This includes buildings, impervious surfaces, and other constructed features. Vegetation associated with developed land is primarily lawn grass and landscaping in association with constructed facilities. Water represents open water such as rivers, ponds, and lakes with < 1% cover by vegetation or soil. Wetlands include forested and herbaceous vegetation where soil is periodically inundated or saturated. Forest and shrubland are dominated by woody plant species, which cover ≥ 2% of the land surface. Forest and shrubland land cover types differ in that forest cover is generally > 16 ft tall, and shrubland cover is < 16 ft tall. Barren land comprises exposed soil, bedrock, sand, talus, strip mines, or gravel pits. Vegetation represents < 15% of the land surface in the barren land cover type (USGS 2019).

The extent and distribution of land cover types in the proposed Project area are shown in Table 3-1 and Figure 3-1.

Table 3-1. Land Cover Types in the Proposed Project Area

National Land Cover Database Type	Acres	% of Proposed Project Area
Herbaceous	35,491	52%
Agricultural	30,721	45%
Developed	878	1%
Water	616	< 1%
Wetlands	543	< 1%
Forest	54	< 1%
Shrubland	14	< 1%
Barren	4	< 1%
Total	**68,318**	**100%**

Source: USGS (2019).
Note: Sums of values may not add to total value shown, due to rounding.

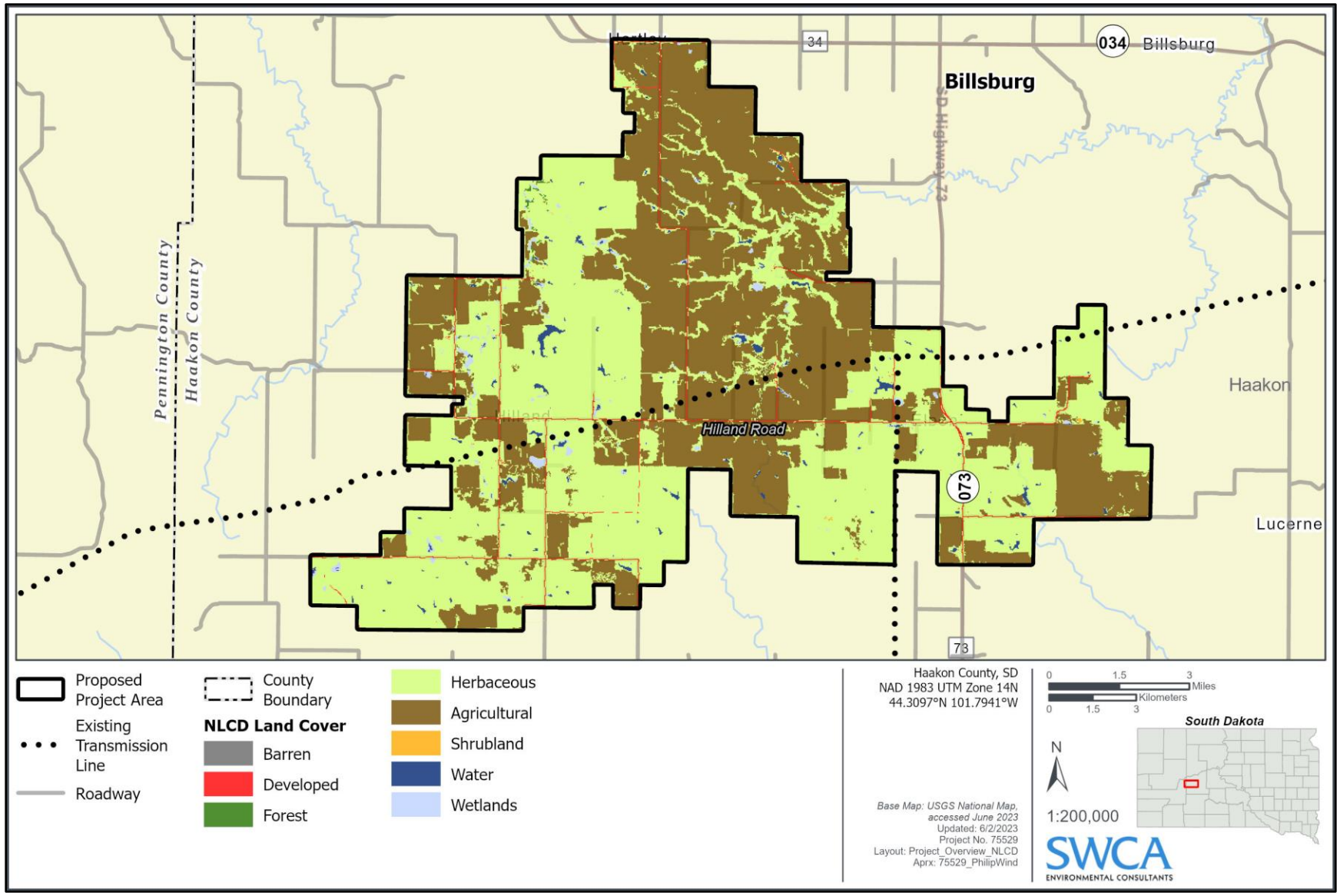

Figure 3-1. National Land Cover Database types in the proposed Project area.

3.1.1.2 Public Facilities

The closest public facilities to the proposed Project area are in the town of Philip, ≈ 13 miles south. In Philip, there is a hospital, police department, fire station, ambulance services, schools, places of worship, parks, and recreational facilities. In the proposed Project area, there is one cemetery; however, all Project infrastructure would avoid the cemetery. There are no places of worship or other public spaces or publicly accessible facilities in the proposed Project area. There are no municipal or commercial airports in the proposed Project area. The closest airport is the Philip Municipal Airport, ≈ 14 miles south of the proposed Project area. Commercial airports < 100 miles from the proposed Project area consist of Rapid City Regional Airport and Pierre Regional Airport, 86 miles to the west and 92 miles to the east, respectively. Google Earth aerial imagery shows one possible private landing strip in the proposed Project area, the Ferguson Landing Strip, near the intersection of 213th Avenue and 215th Street.

One BLM inholding is in the proposed Project area, and three State of South Dakota School and Public Land parcels are outside but directly adjacent to the boundary of the proposed Project area. As discussed in Section 5, BLM attended the agency scoping meeting held by Philip Wind Partners in January 2023. Prior to the meeting, Philip Wind Partners provided BLM with a data package of the proposed Project area to help engage BLM in Project consultation. Philip Wind Partners verified no infrastructure would be sited on the BLM inholding in the proposed Project area. Philip Wind Partners held a meeting with BLM on March 18, 2024, to provide updates regarding layout and transportation of Project components adjacent to the BLM inholding. Philip Wind Partners confirmed with BLM the width of the existing road right-of-way maintained by the county would be sufficient for the Project and no encroachment onto the BLM inholding would be anticipated to occur.

Primary access to the proposed Project area is via South Dakota Highway 73, which cuts south from South Dakota Highway 34. Secondary points of entry to the proposed Project area off South Dakota Highway 73 are via 213th Street heading west, Hilland Road heading west, Noack Road heading east, and 217th Street heading west. Additional access roads in the proposed Project area that would be used are listed in Table 3-2.

Table 3-2. Existing Access Roads in the Proposed Project Area

Road	Surface Type	≈ Width (ft)
211th Avenue	Gravel or crushed rock	14
211th Street	Gravel or crushed rock	16
213th Street	Gravel or crushed rock	16
215th Avenue	Gravel or crushed rock	22
216th Avenue	Gravel or crushed rock	18
217th Avenue	Gravel or crushed rock	14
217th Street	Primitive	10
218th Avenue	Primitive	10
224th Avenue	Primitive	10
Hilland Road	Gravel or crushed rock	24
Noack Road	Gravel or crushed rock	24
West Fork Road	Gravel or crushed rock	16

Source: South Dakota Department of Transportation (2022).

Along South Dakota Highway 73 and surrounding highways, average daily traffic volumes in 2021 ranged from 500 to 700 vehicles/day (South Dakota Department of Transportation 2021). In the proposed Project area, existing access roads would be used to the extent practicable. New access roads would be required to support construction and O&M of the Proposed Action infrastructure (see Figure 2-1).

3.1.1.3 Conservation Easements and Protected Lands

There are no USFWS wildlife refuges, USFWS conservation easements, USFWS wetland management district properties, U.S. Department of Agriculture (USDA) Agricultural Conservation Easement Program lands, SDGFP properties, or State of South Dakota School and Public Land parcels in the proposed Project area. There is one BLM inholding in the proposed Project area; however, no new Project infrastructure would be sited on the BLM inholding.

3.1.2 Environmental Consequences: Proposed Action

3.1.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. BMPs relating to land use and public facilities include the following (see Appendix O and Table 2-3):

- Plan and site wind energy development to minimize impacts to other land uses.
- Coordinate turbine siting with landowners to minimize interference with agricultural production.

3.1.2.2 Switchyard

Construction and O&M of the Switchyard would disturb ≈ 7 acres of land, including 5 acres of permanent disturbance and 2 acres of temporary disturbance. Of the 2 acres of temporary disturbance, < 1 acre would take place on already developed land; the remaining temporary disturbance would occur on herbaceous land. This disturbance would occur due to construction access, construction activities, and staging of equipment and supplies. Following construction, the Switchyard would permanently impact < ½ acre of developed land and ≈ 4.5 acres of herbaceous land. No other land cover types would be impacted by permanent disturbance associated with the Switchyard. No USFWS wetland easements, wildlife refuges, or USDA Agricultural Conservation Easement Program lands would be impacted by permanent disturbance associated with the Switchyard.

3.1.2.3 Wind Facility

Construction of the Wind Facility would temporarily disturb ≤ 1,245 acres of land (Table 3-3). This disturbance would be land used for construction access, construction activities, and staging of equipment and supplies. Existing land cover types that would be temporarily disturbed are agricultural, herbaceous, developed, and wetlands, in descending order. Much of the existing land cover in these areas would be revegetated or returned to prior land use immediately following construction. Temporary land use for construction is anticipated to last only one or two growing seasons at any given location.

Table 3-3. Wind Facility Disturbances by Land Cover Type

Land Cover Type	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Agricultural	914	90
Herbaceous	314	21
Developed	16	1
Wetlands	1	0
Water	< 1	0
Forest	0	0
Shrubland	0	0
Barren	0	0
Total	**1,245**	**112**

Source: USGS (2019).
Note: Sums of values may not add to total value shown, due to rounding.

Following construction, ≤ 112 acres of land would be permanently impacted during the operation of the Wind Facility (see Table 3-3). Existing land cover types that would be permanently disturbed are classified as agricultural, herbaceous, developed, and wetlands, in descending order. The remaining 1,133 acres of land would be returned to their existing land cover types following construction. During O&M, agricultural activities may still occur up to the edge of access roads and turbine pads because no fences or gates would surround the access roads and turbine pads, unless installed by the landowner. The collector system would be buried underground and would not permanently affect agricultural activities. Permanently impacted land cover types would be converted to primarily turbine pads and access roads.

Existing access roads may require improvement for construction, which may include adding gravel and repairing potholes. Philip Wind Partners would obtain an appropriate South Dakota Department of Transportation permit for any highway use and a haul route agreement with Haakon County to acquire the appropriate access and use permits to conduct this work and to minimize and mitigate temporary impacts to area transportation during improvements. New access roads would provide unrestricted and improved access to landowners and livestock based on provisions in lease agreements and local statutes, resulting in overall improvements in transportation use.

No impacts to public facilities or publicly accessible facilities are anticipated. No public facilities are in the proposed Project area, apart from public roads. No infrastructure would be sited on BLM land in the proposed Project area. No impacts to airports are anticipated, as the nearest airport is ≈ 14 miles from the proposed Project area. Philip Wind Partners would follow FAA regulations for marking structures and would implement necessary safety lighting.

Decommissioning impacts would be ≤ those described for construction. Temporary impacts would occur while land is used for deconstruction and removal of infrastructure. Permanently impacted land would be restored to pre-Wind Facility land uses.

Post-construction impacts to land use would be minimal, as ≈ 1,133 acres of the 1,245 acres of disturbed land would be returned to their existing land cover types. No impacts to public facilities are expected.

3.1.2.4 Land Use and Public Facilities Conclusion

Of the 68,318 acres in the proposed Project area, 1,247 acres would be temporarily disturbed by construction of the Project, and ≤ 117 acres would be permanently disturbed by the Project. Remaining

acres would be returned to their previous land cover and land use. Public roads may require improvements such as new gravel and pothole repair, but no other impacts to public facilities are anticipated. Although there is one BLM inholding in the Project area, this property would not host facilities or Project infrastructure. Based on these findings, disturbance throughout the Project area to existing land uses and public facilities would be minor. The proposed Project's impacts to current land uses and public facilities would be less than significant.

3.1.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts to land uses and public facilities, and existing activities would continue.

3.2 GEOLOGY, SOIL, AND PALEONTOLOGICAL RESOURCES

3.2.1 Existing Conditions

Geology, soil, and paleontological resources in the proposed Project area were determined by use of the Mineral Resources Data System (USGS 2023a) and Quaternary Fault and Fold Database for the United States (USGS 2023b), other geological publications cited below, the Web Soil Survey (Natural Resources Conservation Service [NRCS] 2023), and the BLM National Potential Fossil Yield Classification (PFYC) Geologic Formation 2022 Polygons (BLM 2022a). The proposed Project area and proposed Project features were compared to the reference data, and areas of overlap were extracted using a GIS. The comparison provides a table of mapped resources and features and allows for determination of temporary and permanent impacts from Project development.

The physiographic features of the proposed Project area consist of rolling plains, hills, and ridges with shallow meandering drainages. These features formed due to erosion of softer underlying bedrock through actions of wind and water along tributaries to the Cheyenne and Bad Rivers. Soils in the proposed Project area consist of clay to silty clay textures derived from weathering of underlying shale and siltstone bedrock (National Cooperative Soil Survey 2023). These soils are moderately susceptible to rill erosion and can lose on average 5 tons of soil through water and wind erosion without affecting crop productivity (NRCS 2023). Other soil properties include a low resistance and medium susceptibility to compaction and are moderately well drained (NRCS 2023). The depth to bedrock in the proposed Project area ranges from 20–80 inches (NRCS 2023).

Prime farmland and farmland of statewide importance are subject to protection under the Farmland Protection Policy Act (Public Law 97-98; 7 USC 4201–4209). The proposed Project area is classified as ≈ 51% farmland of statewide importance, ≈ 42% as not prime farmland, and ≈ 7% as prime farmland if irrigated (Table 3-4, Figure 3-2).

Table 3-4. Farmland Types in the Proposed Project Area

Farmland Type	Area (acres)	% of Proposed Project Area
Farmland of statewide importance	34,821	51%
Not prime farmland	28,835	42%
Prime farmland if irrigated	4,662	7%
Total	**68,318**	**100%**

Source: NRCS (2023).

Commercially viable mineral deposits in Haakon County are limited to sand and gravel. Information from the South Dakota Department of Agriculture and Natural Resources (SDDANR) Minerals and Mining Program and a review of USGS 7.5-minute quadrangles shows no such deposits developed in the proposed Project area. The closest gravel pit to the proposed Project area is ≈ 14 miles south (USGS 2023a).

Geological hazards in the proposed Project area may include seismic ground shaking, ground rupture, liquefaction, slope instability, subsidence, expansive soils, and flooding. The seismic risk is low in the proposed Project area, with no active faults or earthquakes recorded in Haakon County, South Dakota (South Dakota Geological Survey 2023; USGS 2023b). Subsidence risk is considered negligible because the underlying bedrock is not known to develop karst topography or contain layers susceptible to dissolution by water. There are no reclaimed or underground mining operations in the proposed Project area (USGS 2023a). Landslide incidence is low, but susceptibility is high, which can result in slumping especially along steep slopes, in channel cuts, or during excavations (Radbruch-Hall et al. 1982). No other geological hazards were reported from the proposed Project area.

Bedrock geology in the proposed Project area mainly consists of dark shales of the shallow marine Pierre Shale and tan to dark-gray sandstones, siltstones, and shale of the marginal marine Fox Hills Sandstone (Martin et al. 2004; Patrick et al. 2002; Waage 1968) (Table 3-5). Bedrock outcrops may exist at the surface in places but are likely to be weathered and eroding into unlithified soils. Other geological units present in the proposed Project area make up < 10% when combined and include Quaternary alluvial and eolian deposits (see Table 3-5).

Previously the BLM assigned each geological unit a PFYC value from 1 (very low) to 5 (very high), or in some cases U (unknown). These values are based on taxonomic diversity and abundance of previously recorded scientifically important paleontological resources associated with the unit and the potential for future discoveries (BLM 2022b). PFYC U values represent geological units that may exhibit conditions suggesting important paleontological resources may be present but lack information about the presence of these resources in the unit. Guidelines suggest these units be treated as high to very high (like PFYCs 4 or 5) until a provisional for formal assignment is made (BLM 2022b).

Paleontological resources are nonrenewable fossilized remains, traces, or imprints of organisms, preserved in or on the Earth's crust, that are of paleontological interest and provide information about the history of life on Earth. BLM PFYC 2022 data and published geological mapping (Martin et al. 2004) indicate the proposed Project area contains one PFYC 2 geological unit (Quaternary eolian deposits), two PFYC 4 geological units (Pierre Shale and Fox Hills Sandstone), and one PFYC U geological unit (Quaternary alluvium) (BLM 2022a). Table 3-5 summarizes the PFYC value, typical fossils, and acreage for each geological unit in the proposed Project area.

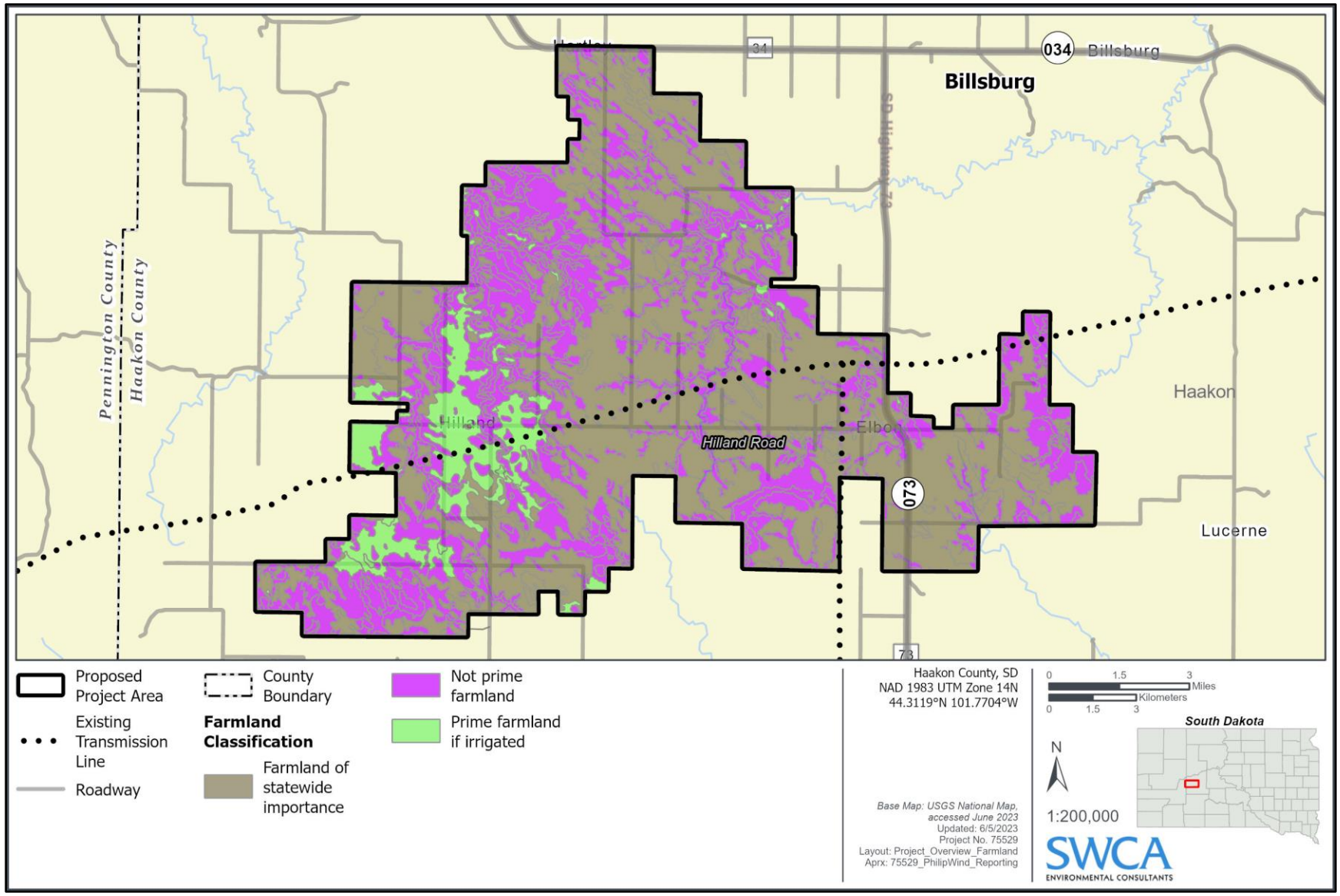

Figure 3-2. Farmland types in the proposed Project area.

Table 3-5. Geological Units, Potential Fossil Yield Classification, and Typical Fossils within the Proposed Project Area

Geological Unit*	Period	PFYC	Typical Fossils	Area (acres)	% of Proposed Project Area
Alluvium	Quaternary	U	Unknown; possible depending on age and environmental setting of deposits. Holocene-age deposits are too young to contain in situ fossils but may contain unfossilized remains of modern taxa. Pleistocene-age deposits may contain mineralized or partially mineralized mammoth, camel, bison, horse, and rodent remains (fossils).	1,734	3%
Eolian deposits	Quaternary	2	Unlikely; possible depending on age of deposits. Holocene-age deposits are too young to contain in situ fossils but may contain unfossilized remains of modern taxa. Pleistocene-age deposits may contain mineralized or partially mineralized plant and animal remains (fossils).	4,174	6%
Fox Hills Sandstone	Cretaceous	4	Invertebrates: bivalves, cephalopods, and gastropods; vertebrates: fish, sharks, mosasaurs, amphibians, turtles, crocodiles, dinosaurs, birds, and mammals.	15,824	23%
Pierre Shale	Cretaceous	4	Invertebrates: bivalves, cephalopods, decapods; vertebrates: fish, sharks, sea turtles, marine reptiles, flying reptiles, dinosaurs, and birds.	46,586	68%
Total				**68,318**	**100%**

Source: Martin et al. (2004).

* In descending stratigraphic order (youngest to oldest).

Pierre Shale and Fox Hills Sandstone have a long history of geological and paleontological research in western South Dakota and surrounding regions. Locally, Fox Hills Sandstone contains mostly sandy sequences with some thin zones of coal-bearing beds and gradates rapidly into the underlying Pierre Shale (Waage 1968). In South Dakota and North Dakota, Fox Hills Sandstone contains numerous fossils, including invertebrates (bivalves, cephalopods, and gastropods) and vertebrates (fish, sharks, rays, marine reptiles, amphibians, turtles, crocodiles, dinosaurs, birds, and mammals) (Case and Martin 2007; Chamberlain et al. 2023; Hoganson et al. 2007; Waage 1968). Pierre Shale locally comprises black marine shales, mudstone, and claystones and contains numerous fossils mostly representing marine fauna, including invertebrate (bivalves, cephalopods, and decapods) and vertebrates (fish, sharks, sea turtles, and marine reptiles), and, on rare occasion, terrestrial vertebrates (flying reptiles, dinosaurs, and birds) (Carpenter 1996; Gregory 1948; Ross 2004; Waage 1968; Wieland 1896). Based on literature reviews, review of the Paleobiology Database (2023) locality data, and results of a previous locality search request received from the South Dakota School of Mines and Technology, no previously recorded localities are ≤ 1 mile from the proposed Project area. The closest localities contain Pleistocene-age fossils documented ≈ 9 miles to the northeast and 15 miles to the south (Fox 2023). Paleontological resources are most likely to exist in PFYC 4 geological units (i.e., Pierre Shale and Fox Hills Sandstone), which are more extensive in the proposed Project area.

SWCA Environmental Consultants (SWCA) conducted a desktop analysis in relation to the proposed infrastructure components that included background research for the analysis area and an aerial imagery review of the Project infrastructure. SWCA used that information and the PFYC ranking of the underlying geological unit to evaluate the paleontological potential of the analysis area and to assess the possibility for construction to disturb paleontological resources. SWCA's research included previous paleontological resources reports, geological maps, and literature reviews; previous locality data searches; and discussion with paleontologists conducting active research in the area. The purpose of the analysis of existing data was to 1) determine whether previously recorded fossil localities are in the Project area, 2) assess potential for disturbance of these localities during construction, and 3) evaluate paleontological potential in the Project area. The desktop analysis included a review of preliminary geotechnical

subsurface boring logs near the proposed wind turbine locations, where construction excavations would be the deepest for foundations. No potential fossil-bearing units were identified in the proposed excavation depths. Following the desktop analysis, a paleontologist conducted a field survey to evaluate the analysis area for 1) surface fossils, 2) exposures of potentially fossiliferous rock, and 3) areas where future construction would expose or affect potentially fossiliferous rock. Results of this analysis and field survey indicated a low potential of encountering paleontological resources during construction.

Fossils, including paleontological resources, are the property of the surface estate owner. Because the proposed Project infrastructure would be on private land, there are no federal or state laws requiring assessment, management of, or protection for paleontological resources other than NEPA. General guidelines and best practices for mitigating paleontology can be found in Murphey et al. (2019). BMPs for projects tiering from the UGP PEIS are stated in UGP PEIS Section 5.8.1.6.

3.2.2 Environmental Consequences: Proposed Action

3.2.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. BMPs related to geology, soil, and paleontological resources include (see Appendix O and Table 2-3):

- Preserve the health and function of soils by minimizing or controlling ground-disturbing activities.
- Complete regular inspections of disturbed areas or newly reclaimed areas for damage from erosion, washouts, and rutting.
- Correct adverse impacts such as erosion or compaction.
- Plan placement of turbines and access roads to minimize erosion and geological risks.
- Based on the presence of PFYC 4 and U geological units, a qualified paleontologist would review the final Project design and conduct field reconnaissance of exposures of geological units designated as PFYC 4 and a portion (≥ 50% of exposures; e.g., drainage cuts and human-made exposures) of units designated as PFYC U.
- If paleontological resources are found in the proposed Project area, their disposition would be in accordance with agreements between surface estate owners and the Project proponent.

3.2.2.2 Switchyard

Primary impacts to soil resources include ground-disturbing activities (e.g., grading, trenching, and excavating) that cause effects such as increased compaction, horizon mixing, erosion and deposition by wind or water, and soil contamination. Such impacts to farmland of statewide importance and prime farmland may reduce the quality, quantity, or productivity of the soils.

Direct impacts to paleontological resources may include breakage, crushing, or displacement or similar indirect impacts caused from increased erosion of newly exposed sediments and resources they contain through ground-disturbing activities such as grading, excavation, or trenching. Increased human activity during Project activities and from improved access may result in impacts to paleontological resources by increasing the potential for displacement, removal, or breakage of fossils by unauthorized collection or vandalism. Risk of impacts to paleontological resources would be highest where Project-related ground-disturbing activities or increased human activity overlap PFYC 4 and PFYC U geological units.

Construction and O&M of the Switchyard would temporarily and permanently disturb 7 acres of soil, comprising 2 acres of farmland of statewide importance and 5 acres of not prime farmland. Impacts to 7 acres of PFYC 4 Pierre Shale (5 acres of permanent disturbance and 2 acres of temporary disturbance) would occur during construction of the Switchyard. In accordance with the UGP PEIS, Philip Wind Partners engaged SWCA to conduct a desktop review and paleontological resources fieldwork in fall 2023. The desktop analysis and field survey results indicate a low potential to encounter paleontological resources at or near the surface due to few bedrock outcrops present across most of the Project area. Risk of geological hazards at the Switchyard is low, other than the potential for slumping during excavations.

3.2.2.3 Wind Facility

Impacts to geology, soil, and paleontological resources from the Wind Facility would be the same as those described for the Switchyard. Heavy equipment would compact soils; however, in areas temporarily disturbed by construction and not needed for O&M, disturbed subsoil would be decompacted and salvaged and segregated topsoil would be redistributed.

Construction of the Wind Facility would temporarily impact 1,245 acres (Table 3-6), of which 960 acres would be farmland of statewide importance, 39 acres of prime farmland if irrigated, and 246 acres of not prime farmland. The Wind Facility would temporarily disturb ≈ 1,118 acres of PFYC 4 geological units, 115 acres of PFYC 2 units, and 12 acres of PFYC U units.

The Wind Facility would permanently impact 112 acres of soils, of which 84 acres would be farmland of statewide importance, 3 acres of prime farmland if irrigated, and 25 acres of not prime farmland. The Wind Facility would permanently disturb ≈ 101 acres of PFYC 4 geological units, 11 acres of PFYC 2 units, and no acres of PFYC U units. Risk of geological hazards in the proposed Project area is low, aside from slumping potential that exists along steeper slopes, in channel cuts, and during excavations.

Table 3-6. Wind Facility Disturbances by Farmland Types in the Proposed Project Area

Soil Category	Temporary Disturbance (acres)	Permanent Disturbance (acres)
Farmland of statewide importance	960	84
Not prime farmland	246	25
Prime farmland if irrigated	39	3
Total	**1,245**	**112**

Source: NRCS (2023).
Note: Sums of values may not add to total value shown, due to rounding.

During decommissioning, impacts to soils would be similar to those during construction. Temporary impacts would occur while land is used for deconstruction and removal of infrastructure. Impacts to paleontological resources during decommissioning would include increased human activity in the area and ground-disturbing activities extending into areas outside the Wind Facility's previous disturbance.

The Wind Facility would temporarily and permanently impact 960 acres of the 34,821 total acres of farmland of statewide importance (3%) and 39 acres of the 4,662 total acres of prime farmland if irrigated (< 1%). The Wind Facility would disturb 1,188 acres of the 62,410 total acres (2%) of paleontological resource sensitivity (PFYC 4) and 12 acres of the 1,734 total acres of PFYC U. In accordance with the UGP PEIS, Philip Wind Partners engaged SWCA to conduct a desktop review and paleontological resources fieldwork in fall 2023. Based on the results of the desktop analysis and field survey, there is a low potential to encounter paleontological resources at or near the surface due to few bedrock outcrops

present across most of the Project area. Impacts to geology, soil, and paleontological resources would be minor. Unanticipated discoveries of paleontological resources would comply with the UGP PEIS.

3.2.2.4 Geology, Soil, and Paleontological Resources Conclusion

Of the 34,821 acres of farmland of statewide importance in the proposed Project area, ≤ 960 acres would be temporarily disturbed, and 86 acres would be permanently disturbed. Of the 4,662 acres of prime farmland if irrigated, ≤ 3 acres would be permanently disturbed. Of the 62,410 acres with PFYC 4 classification, indicating an increased potential for paleontological resources, ≤ 105 acres would be permanently impacted. To minimize impacts, the Project has committed to voluntary environmental protection measures, such as minimizing erosion and compaction, and hiring a qualified paleontologist to assess the final Project design for paleontological resources. Based on the results of the desktop analysis, preliminary geotechnical boring logs review, and field survey, there is a low potential to encounter paleontological resources at or near the surface due to lack of outcrops across most of the Project area. The Project's impact on the geology, soils, and paleontological resources is minor, and the proposed Project's impacts to such resources would be less than significant.

3.2.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts to geology, soil, and paleontological resources, and existing activities would continue.

3.3 HYDROLOGIC SETTING AND WATER RESOURCES

3.3.1 Existing Conditions

Hydrologic setting and water resources of the proposed Project area were determined through desktop analysis of watershed data from the National Map Viewer and Watershed Boundary Dataset (USGS 2023c, 2023d); mapped waterbodies, including ponds, lakes, streams, and rivers, from the National Hydrography Dataset (NHD) (USGS 2023e); wetlands from the National Wetlands Inventory (NWI) (USFWS 2023a); and groundwater from the Ground Water Atlas of the United States (USGS 1996).

The NHD and NWI databases include some categories redundant with the NLCD database used in Section 3.1, such as open water and wetlands. Discrepancies among different databases are common. The NLCD is used for a coarse assessment of land use and land cover. The NHD and NWI databases are much more sensitive to aquatic features through consideration of topography, soil types, and evidence of inundation and soil saturation. The NHD and NWI databases use different classification systems. Some aquatic features are mapped by both but labelled differently. For example, streams and rivers are mapped as one-dimensional flowlines by the NHD but are mapped as two-dimensional riverine wetlands by the NWI. Under the NWI mapping, riverine polygons may include stream channels and associated emergent wetlands adjacent to the channels. For the impact assessment, a linear distance is provided for temporary and permanent impacts to NHD flowlines, whereas an acreage is provided for impacts to NWI polygons.

A site reconnaissance visit was conducted October 13 and 14, 2022, and NWI and NHD features inconsistent with the desktop analysis were documented if observed while traveling publicly accessible roads. Based on the site visit, the desktop analysis overestimated water resources; several wetland polygons mapped by the NWI and NHD waterbodies appeared absent when viewed from publicly accessible roads. The extent of inaccuracy of the NWI data cannot be quantified using these methods. For this reason, the impact assessment relies on the desktop methods while recognizing estimated impacts are likely overestimated. The Water Resource Analysis Report is provided in Appendix I.

Wetland delineations were conducted in accordance with the U.S. Army Corps of Engineers (USACE) *Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Great Plains Region (Version 2.0)* (USACE 1987, 2010) methodologies from June 13–16, 2023, and June 19–22, 2023. Field wetland delineations focused on a survey area of ≈ 2,068 acres, covering the wind turbines, access roads, O&M building, and associated buffers rather than the entire proposed Project area. The objective of the wetland delineations was to identify and map the extent of potential USACE- or state-jurisdictional wetlands and waterways within the survey area. A certified wetland scientist identified probable locations of wetlands and other potential waters of the United States by reviewing desktop data and aerial photography. The pedestrian survey was completed to identify wetlands and water bodies and to record locations and boundaries via GPS.

Although the NWI and NHD features used in this section have not been field-verified and do not represent an official jurisdictional determination of waters of the United States, key infrastructure siting was informed by the results of the completed in-field wetland delineations. Additional delineation surveys will be conducted for the remaining infrastructure prior to construction. The completed and planned delineations will determine the location and extent of potential jurisdictional water features on site, allowing for a more refined quantification of water resources to inform siting decisions. Following finalization of the Project design, Philip Wind Partners would obtain required Clean Water Act permits.

The proposed Project area is ≈ 2,270 to 2,806 ft above mean sea level (USGS 2023c) in the following watersheds: Ash Creek (hydrologic unit code [HUC] 012011204), Bridger Creek (HUC 1012011205), Buzzard Creek-Bad River (HUC 1014010208), Grindstone Creek-Bad River (HUC 1014010206), Harding Creek-Cheyenne River (HUC 1012011206), North Fork Bad River (HUC 1014010204), and West Plum Creek (HUC 1012011208) (USGS 2023d). No Wild and Scenic Rivers are in the proposed Project area (National Wild and Scenic Rivers System 2023). No impaired waters listed under Clean Water Act Section 303(d) are in the proposed Project area (U.S. Environmental Protection Agency [EPA] 2015). According to the Federal Emergency Management Agency, a study to determine flood hazards has not been completed for Haakon County (Federal Emergency Management Agency 2021).

A desktop analysis of the watersheds in the proposed Project area was conducted to review the watersheds' existing NHD water features; the results are summarized below. In the proposed Project area, there are 1,190 NHD features (USGS 2023e). Stream/River Intermittent accounted for most of the NHD features. Table 3-7 and Figure 3-3 provide NHD features in the proposed Project area. Drainages occurring in the proposed Project area are tributaries to the Cheyenne and Bad Rivers.

Table 3-7. National Hydrography Dataset Features Mapped in the Proposed Project Area

Resource Type	Count	Length (miles)	Area (acres)
Stream/River Intermittent	556	325.1	N/A
Artificial Path	278	32	N/A
Lake/Pond	350	N/A	814
Stream/River Perennial	5	20.5	N/A
Swamp/Marsh	1	N/A	4
Total	**1,190**	**377.6**	**818**

Source: USGS (2023e).
Note: N/A = not applicable.

There are 1,691 NWI features in the proposed Project area (USFWS 2023a) (Table 3-8; see Figure 3-3). Freshwater emergent wetlands account for most of the NWI features.

Table 3-8. National Wetlands Inventory Features Mapped in the Proposed Project Area

Resource Type	Count	Area (acres)
Freshwater Emergent Wetland	480	751
Riverine	973	682
Freshwater Pond	224	333
Freshwater Forested/Shrub Wetland	14	34
Total	**1,691**	**1,800**

Source: USFWS (2023a).

The proposed Project area is located over the regional Northern Great Plains aquifer system (USGS 1996). In this aquifer system, water movement occurs from recharge areas at high elevations, down the dip of the aquifers, and then upward to discharge into shallower aquifers or discharge to the land surface. Recharge to this aquifer system is primarily from precipitation or snowmelt. Local recharge includes seepage of excess irrigation water. Discharge from this aquifer system is primarily from upward leakage of water into shallower aquifers where the hydraulic head in a shallower aquifer is < that of a deeper aquifer. Permeable rocks of this aquifer system were grouped into five major aquifers, including lower Tertiary, upper Cretaceous, lower Cretaceous, upper Paleozoic, and lower Paleozoic (USGS 1996).

A sole-source aquifer is defined by the EPA as an aquifer that supplies ≥ 50% of the drinking water for its service area (EPA 2023a). The proposed Project area lies outside of sole-source aquifers (EPA 2023b).

The SDDANR developed surface water quality standards for waters of the state based on beneficial uses assigned to each waterbody, as required by the Clean Water Act and the state's administrative rules. One surface water feature in the Project area, Kroetch Lake, has assigned beneficial uses (SDDANR 2023):

- (6) Warmwater marginal fish life propagation waters
- (8) Limited contact recreation waters
- (9) Fish and wildlife propagation recreation, and stock watering waters
- (10) Irrigation waters

Water quality standards for Kroetch Lake are based on these beneficial uses and consist of daily maximum total suspended solids of 263 mg/L and 30-day average total suspended solids of 150 mg/L.

3.3.2 Environmental Consequences: Proposed Action

3.3.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. These measures would reduce long-term erosion and runoff from disturbance areas, protecting water resources. Impact summaries below consider water-resources-specific BMPs (see Appendix O and Table 2-3):

- Reduce impacts to water resources to the extent practicable through Project layout and design.
- Use appropriate erosion and sediment and spill control measures.
- Remove temporary fills where aquatic features are crossed for construction, restoration, or preconstruction elevations and revegetation (where applicable for nonagricultural use).

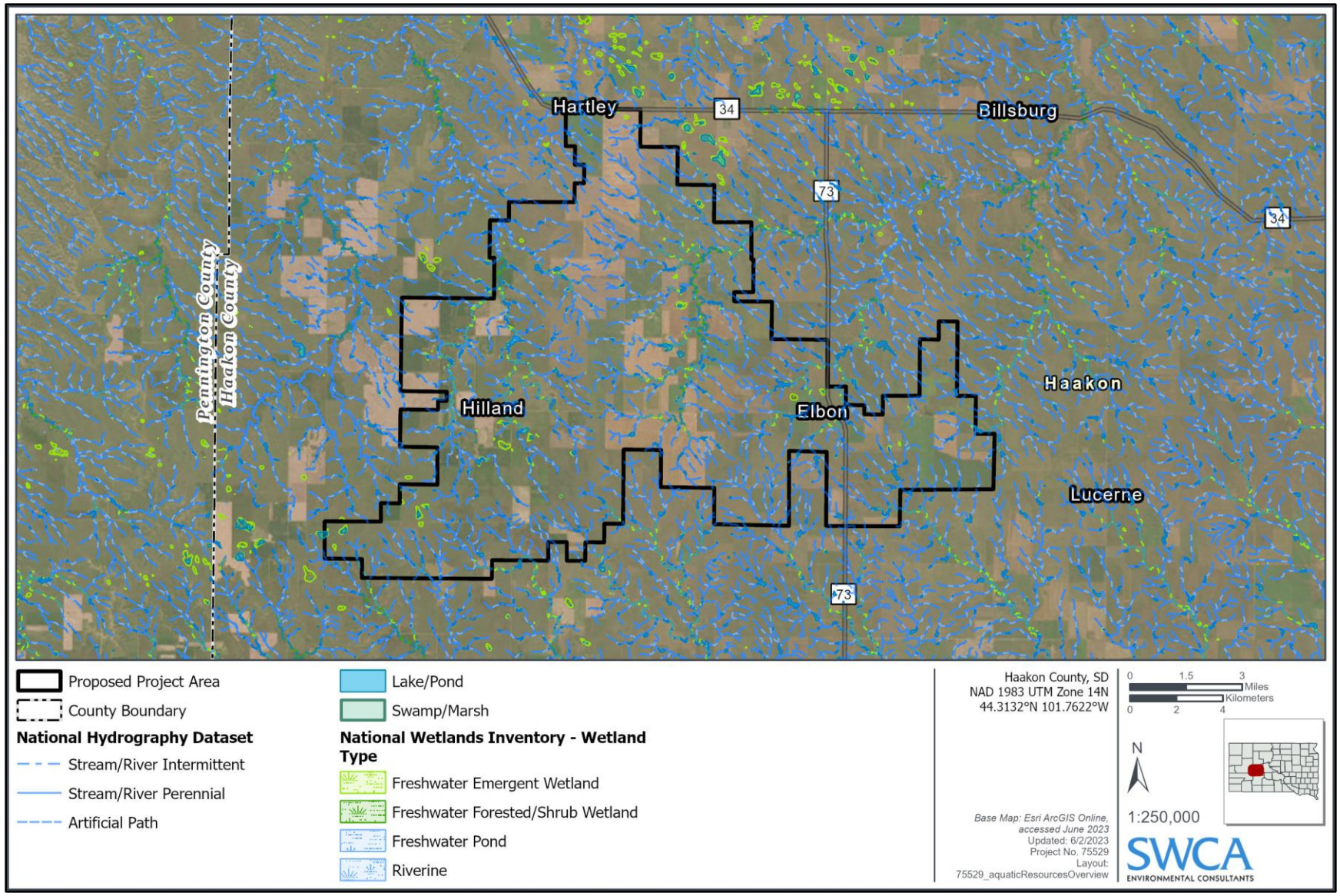

Figure 3-3. National Hydrography Dataset and National Wetlands Inventory features in the proposed Project area.

Note: Width of map symbols for aquatic features are expanded for visibility and are not to scale.

3.3.2.2 Switchyard

The Switchyard would be in upland areas with one waterbody (Kroetch Lake) ≈ 50 ft from its southwest corner. Because of the beneficial uses defined for Kroetch Lake by the SDDANR, Philip Wind Partners would use stormwater control measures to limit erosion and sediment transport from the Switchyard site to comply with water quality standards listed in Section 3.3.1. No temporary or permanent impacts to water resources are expected to occur with construction or operation of the Switchyard.

3.3.2.3 Wind Facility

Estimated impacts to the NHD and NWI features are summarized in Tables 3-9 and 3-10. The NHD and NWI databases track many of the same resources but classify and quantify them slightly differently. Therefore, the impacts, as presented in Tables 3-9 and 3-10, are largely redundant. The NHD data in Table 3-9 describes crossings of linear waterbodies as one-dimensional crossings with the length of the features expressed in ft. The NWI data in Table 3-10 describes impacts as two-dimensional construction footprints expressed in acres. Potential impacts to water resources are primarily temporary in nature and relate to construction of collection lines, use as crane paths, construction of t-lines, and access roads across streams (classified as riverine wetlands by NWI). For estimation of impacts, maximum widths were assumed for access and construction work areas (see Table 2-1), although smaller areas may be needed on-site.

The dispersed nature of turbines allows for strategic placement of turbines, access roads, collection lines, and other infrastructure to reduce impacts to water resources. Temporary and permanent impact assumptions represent an overestimation of impacts, as noted in Section 2.1. The proposed Project assumes multiple paths for collection to a turbine to maintain flexibility in siting, but not all collection paths would be built. Permanent impacts may result from access roads requiring stream crossings to access turbine locations.

Impacts to water resources defined through the NHD (i.e., streams or drainages) are listed in Table 3-9 where the number of impact sites identifies the count of water features intersected by Project facilities (i.e., one site is one stream crossing), the average length is the length of stream at each site that would be directly disturbed by the Project facility, and the total length of stream is the sum of the length of individual features impacted. Temporary impacts are estimated to occur at 220 NHD features, with a cumulative linear distance of 14,989 ft (≈ 2.8 miles) of the NHD flowlines affected. Permanent impacts may occur at 35 NHD features with a cumulative linear distance of 994 ft (≈ 0.2 mile) of the NHD flowlines.

Impacts to water resources defined through the NWI (i.e., wetlands) are listed in Table 3-10 where the number of impact sites identifies the count of water features intersected by Project facilities (one site is one wetland crossing), the average impact is the area of wetland at each site directly disturbed by the Project facility, and the total area of wetland is the sum of areas of individual features impacted. For NWI features, these estimates are temporary impacts at 198 individual resources with a cumulative area of 7 acres and permanent impacts at 32 individual resources with a cumulative area < 1 acre. While no direct impacts would occur in Kroetch Lake, because of the beneficial uses defined for Kroetch Lake by the SDDANR, special construction measures may be incorporated upslope of Kroetch Lake to maintain water quality standards listed in Section 3.3.1.

Table 3-9. Maximum Wind Facility Impacts to National Hydrography Dataset Features

Feature Type	Infrastructure	Temporary Impacts			Permanent Impacts		
		# of Sites	Average Stream Length (ft)	Total Stream Length (ft)	# of Sites	Average Stream Length (ft)	Total Stream Length (ft)
Stream/River	Access roads	35	38	1,341	35	28	994
	Basin Electric t-line	3	294	882	–	–	–
	Collection lines	124	54	6,756	–	–	–
	Crane paths	34	73	2,492	–	–	–
	T-lines	11	191	2,105	–	–	–
	Wind turbines	4	203	812	–	–	–
	WAPA tie-in lines	1	204	204	–	–	–
	MET towers	1	128	128	–	–	–
	ADLS towers	–	–	–	–	–	–
Artificial Flow Path	Access roads	7	38	269	–	–	–
Total		**220**	**N/A**	**14,989**	**35**	**N/A**	**994**

Note: N/A = not applicable.

Table 3-10. Maximum Wind Facility Impacts to National Wetlands Inventory Features

Feature Type	Infrastructure	Temporary Impacts			Permanent Impacts		
		# of Sites	Avg. Impact (acres)	Total Impact (acres)	# of Sites	Avg. Impact (acres)	Total Impact (acres)
Freshwater Emergent Wetland	Access roads	–	–	–	–	–	–
	Basin Electric t-line	2	< 1	< 1	–	–	–
	Collection lines	11	< 1	< 1	–	–	–
	Crane paths	–	–	–	–	–	–
	T-lines	2	< 1	< 1	–	–	–
	Wind turbines	–	–	–	–	–	–
	MET towers	–	–	–	–	–	–
	WAPA tie-in lines	–	–	–	–	–	–
	ADLS towers	–	–	–	–	–	–
Freshwater Forested/Shrub Wetland	Access roads	1	< 1	< 1	1	< 1	< 1
	Basin Electric t-line	–	–	–	–	–	–
	Collection lines	2	< 1	< 1	–	–	–
	Crane paths	–	–	–	–	–	–
	T-lines	1	< 1	< 1	–	–	–
	Wind turbines	–	–	–	–	–	–
	MET towers	–	–	–	–	–	–
	WAPA tie-in lines	–	–	–	–	–	–
	ADLS towers	–	–	–	–	–	–

Feature Type	Infrastructure	Temporary Impacts			Permanent Impacts		
		# of Sites	Avg. Impact (acres)	Total Impact (acres)	# of Sites	Avg. Impact (acres)	Total Impact (acres)
Riverine	Access roads	32	< 1	< 1	31	< 1	< 1
	Basin Electric t-line	1	< 1	< 1	–	–	–
	Collection lines	99	< 1	3	–	–	–
	Crane paths	32	< 1	1	–	–	–
	T-lines	7	< 1	< 1	–	–	–
	Wind turbines	6	< 1	< 1	–	–	–
	MET towers	1	<1	<1	–	–	–
	WAPA tie-in lines	–	–	–	–	–	–
	ADLS towers	–	–	–	–	–	–
Freshwater Pond	Access roads	–	–	–	–	–	–
	Basin Electric t-line	–	–	–	–	–	–
	Collection lines	1	< 1	< 1	–	–	–
	Crane paths	–	–	–	–	–	–
	T-lines	–	–	–	–	–	–
	Wind turbines	–	–	–	–	–	–
	MET towers	–	–	–	–	–	–
	WAPA tie-in lines	–	–	–	–	–	–
	ADLS towers	–	–	–	–	–	–
Total		**198**	**N/A**	**7**	**32**	**N/A**	**< 1**

Note: N/A = not applicable.

Where streams are crossed for access roads, a wider access road width is assumed for construction (40 ft on average) than for permanent operation (16 ft on average), consistent with Table 2-1. Whether water resources are defined by the NHD or NWI databases, permanent impacts represent < 5% of the stream length or wetland area of temporary impacts (i.e., 95% of temporary impacts would be reclaimed).

Although a wetland delineation was conducted in June 2023 as discussed in Section 3.3.1, the NWI and NHD features used in this section have not been field-verified and do not represent an official jurisdictional determination of waters of the United States. Additional in-field water resources delineation surveys, however, will be conducted with the methodologies provided in Section 3.3.1 to determine precise locations of potential waters of the United States, which will be used to determine the final temporary and permanent impacts. Following finalization of the Project design, Philip Wind Partners would obtain required Clean Water Act permits.

No impacts to the Northern Great Plains aquifer system are projected. If dewatering were required for construction of turbine foundations, the dewatering would be temporary and of limited spatial extent. Post-construction groundwater levels would be anticipated to return to preconstruction conditions.

Decommissioning impacts would be the same or fewer than those described for construction. Temporary impacts would occur while streams and wetlands are crossed for deconstruction and removal of infrastructure; however, decommissioning would not use large cranes for disassembly, and therefore

would not require the disturbance of crane paths. Permanently impacted land would be restored to pre-Wind Facility land use.

Philip Wind Partners would minimize ground disturbance and control stormwater through runoff, erosion, and sediment control measures. Average disturbance at wetlands and waterbodies would be < 0.1 acre during construction at 220 crossings according to the NHD and 198 crossings according to the NWI; all but 35 streams (NHD) or 31 riverine (drainage channel crossings) and one wetland crossing (NWI) would be returned to preconstruction conditions after completion of construction. Permanent impacts to water resources that may occur are crossings of streams for access roads, which would be < 1 acre total. As a result, impacts to hydrologic setting and water resources would be negligible.

3.3.2.4 Hydrologic Setting and Water Resources Conclusion

Of the 378 miles of waterways in the proposed Project area, ≤ 0.2 mile would be permanently impacted, and ≤ 2.8 miles would be temporarily impacted. Of the 1,800 acres of wetlands in the proposed Project area, < 1 acre would be permanently impacted, and ≤ 7 acres would be temporarily impacted by the proposed Project. These impacts would be dispersed throughout the proposed Project area. The Project committed to BMPs including use of erosion and sediment controls and restoring areas impacted temporarily during construction. Impacts to water features under the jurisdiction of the state or USACE would be permitted as required. The proposed Project's impacts to the hydrologic setting and water resources would be negligible and considered less than significant.

3.3.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts to hydrology or water resources and existing activities would continue.

3.4 AIR QUALITY

3.4.1 Existing Conditions

The Clean Air Act requires the EPA to set National Ambient Air Quality Standards for six criteria air pollutants: carbon monoxide, lead, ground-level ozone, nitrogen dioxide, particulate matter (PM), and sulfur dioxide (EPA 2022a). Volatile organic compounds (VOCs) are also regulated by the EPA due to their ability to participate in photochemical reactions that form ozone, and VOCs are often components of petroleum fuels, hydraulic fluids, paint thinners, and dry-cleaning agents.

The EPA tracks emissions of greenhouse gases (GHGs). GHGs are gases that trap heat in the atmosphere and include carbon dioxide (CO_2), methane, nitrous oxide, and fluorinated gases. In 2020, CO_2 made up most GHGs at 79% (EPA 2022b). GHGs enter the atmosphere through burning fossil fuels, solid waste, trees, and other biological material. GHGs also are released through production and transport of coal, natural gas, and oil, and from livestock and other agricultural uses (EPA 2022b).

Hazardous air pollutants (HAPs) are monitored by the EPA and are known to cause cancer and damage immune systems, among other serious health problems (EPA 2023c). The Clean Air Act requires the EPA to regulate 188 toxic air pollutants, including those that can deposit from the air into soils or surface waters (EPA 2023c).

Primary emission sources close to the proposed Project area are agriculture equipment and emissions from vehicles driving on South Dakota Highway 73. The nearest ambient air quality monitoring site is the Badlands of South Dakota, 45 miles southwest of the proposed Project area. At this site, PM, sulfur

dioxide, nitrogen dioxide, and ozone levels are tested. The Badlands site monitors daily levels of PM with a diameter of 10 microns or less (PM_{10}), PM with a diameter of 2.5 microns or less ($PM_{2.5}$), sulfur dioxide, nitrogen dioxide, and ozone (SDDANR 2020). According to the *South Dakota Ambient Air Monitoring Network 5-Year Assessment of Air Monitoring Sites*, the trend for PM_{10} annual average shows decreasing concentrations, and the trend for $PM_{2.5}$ shows slightly increasing concentrations. $PM_{2.5}$ usually comes from fuel combustion and burning activities (SDDANR 2020). PM_{10} usually comes from roads, construction projects, and farm tillage. For sulfur dioxide, the trend for the yearly 99th percentile, 1-hour concentrations during the 5 years (2014–2019) shows increasing concentrations (SDDANR 2020). The trend for nitrogen dioxides average annual concentrations has been steady. Lastly, the trend for ozone 8-hour daily maximum concentrations during the 5-year segment shows slightly increasing levels.

The air quality analysis below was conducted for the Project using the EPA's Motor Vehicle Emission Simulator model (MOVES3). The MOVES3 model is a state-of-the-science emission modeling system estimating emissions for mobile sources at the national, county, and project level for criteria air pollutants, GHGs, and air toxics (EPA 2022c). For this Project, primary GHGs of concern are CO_2, methane, nitrogen dioxide, and sulfur hexafluoride.

Emissions of CO_2 lead to long-lasting increases in atmospheric concentrations, persisting for thousands of years, whereas methane typically remains in the atmosphere for ≈ 20 years, and nitrous oxide for ≈ 100 years (EPA 2023d). The results of the GHG emissions from the Project are displayed in a 20-year and 100-year timeframe because the global warming potential of CO_2, methane, and nitrogen dioxide changes over time. Emissions were separated into three time periods: direct emissions associated with Project construction, assumed to occur in 2025; direct emissions associated with Project O&M, assumed to occur from 2026–2055; and direct emissions associated with Project decommissioning, assumed to occur in 2056.

3.4.2 Environmental Consequences: Proposed Action

3.4.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O). Impact summaries below consider air-quality-specific BMPs (see Appendix O):

- Use surface access roads, on-site roads, and parking lots with aggregates or that maintain compacted soil conditions to reduce dust generation.
- Water unpaved roads, disturbed areas (e.g., scraping, excavation, backfilling, grading, and compacting), and loose materials impacted by Project activities to reduce fugitive dust generation.
- Install wind fences around disturbed areas if windborne dust is likely to impact sensitive areas beyond site boundaries (e.g., nearby residences).

3.4.2.2 Switchyard

Table 3-11 represents typical equipment used for the Switchyard construction period. These estimates are conservative (more equipment than anticipated) based on construction of wind projects of equal size. Associated air quality impacts were analyzed with the Wind Facility in Section 3.4.2.3.

Table 3-11. Switchyard Construction Equipment List

Type of Equipment	# of Units
Bulldozer	1
Compactor	1
Concrete truck	2
Crane	1
Excavator	1
Grader	1
Haul truck	1
Passenger truck (workers commuting)	10
Semi delivery truck	2
Telehandler	1

Air quality may temporarily be impacted by construction of the Switchyard through fugitive dust created from soil disturbances and engine exhaust from vehicles and equipment. Fugitive dust, measured in the form of PM_{10}, from increased vehicle traffic on dirt roads has a higher impact to ambient air quality than machinery engine exhaust, which is measured as $PM_{2.5}$.

The operation period of the Switchyard would not directly result in air emissions. Operation associated with the t-line would produce very small amounts of VOCs and HAPs during inspection and maintenance. During operation, emissions would include fugitive dust and engine exhaust from vehicles during regular Switchyard site inspections, infrequent maintenance activities, and wind erosion from access roads. Negligible VOC emissions may be released during routine maintenance activities such as applying lubricants, cooling fluids, and greases, which are used in the wind turbines. Combustion-related emissions may be released when using diesel emergency generators during routine preventative maintenance. Emissions from dust, vehicles exhaust, and combustion-related emissions would not exceed air quality standards (WAPA and USFWS 2015).

Decommissioning activities, including dismantling the Switchyard and associated structures, would mimic construction activities, but would be on a smaller scale and for shorter duration. Potential emissions impacting ambient air quality would be temporary, minor, and less than for construction, and the same mitigation measures would be applied during decommissioning.

3.4.2.3 Wind Facility

Table 3-12 contains typical construction equipment used for the Wind Facility. These estimates are conservative (more equipment than anticipated) based on construction of wind projects of this size.

Table 3-12. Wind Facility Construction Equipment List

Type of Equipment	# of Units
Belt truck	2
Boring drill	2
Bucket truck	5–6
Bulldozer	8

Type of Equipment	# of Units
Cable truck/trailer	2
Compactor	8
Concrete truck	10–30
Crane	9–12
Dump truck	8
Excavator	8
Generator	5
Grader	3
Haul truck	5
Heavy haul truck	10
Boom lift	3–6
Passenger truck (workers commuting)	40
Semi delivery truck	20
Street sweeper	1
Telehandler	12–15
Trencher	2
Water truck	3

Estimated emissions emitted from Project construction was calculated using the MOVES3 tool and the equipment information in Table 3-11 and Table 3-12. During a 20-year period ≈ 23,883 mt of CO_2 equivalent (CO_2e mt) would be emitted, and ≈ 23,845 CO_2e mt during a 100-year period. As mentioned in Section 3.4.1, methane emissions in the atmosphere degrade over time (approximately 20 years), so emissions in the 100-year period are typically lower than those in the 20-year period.

Project construction may release air emissions of criteria pollutants, VOCs, GHGs, CO_2, and small amounts of HAPs. Because the proposed Project area is in a rural area, nearby residences would be temporarily exposed to pollutants; however, impacts to air concentration levels would be negligible. Air quality may temporarily be impacted by O&M of the Wind Facility through fugitive dust from soil disturbances due to wind erosion and from engine exhaust due to routine maintenance. Increased levels of $PM_{2.5}$ may occur from burning fuel emitted by vehicles. Table 3-13 represents the off-road equipment that would be used during Project operation.

Table 3-13. Project Operation Equipment List

Type of Equipment	# of Units
Crane	1
Generator	5
Helicopter	1
Passenger truck (workers commuting)	10
Utility truck	5

The estimated annual emissions emitted from the operation of the Project is 275 CO_2e mt. If the Project operates for 30 years, ≈ 8,250 total CO_2e mt would be omitted by O&M activities.

During operation, fugitive dust from increased vehicle traffic on dirt roads would have a higher impact to ambient air quality than fugitive dust from vehicle or machinery engine exhaust. Additional emissions would include 1) negligible VOC emissions during routine O&M activities such as applying lubricants, cooling fluids, and greases, and 2) a small amount of combustion-related emissions using diesel emergency generators during routine preventative maintenance. Collectively, emissions from dust, vehicles exhaust, and combustion-related emissions would not exceed air quality standards (WAPA and USFWS 2015).

Table 3-14 represents the type of equipment to be expected during Project decommissioning.

Table 3-14. Project Decommissioning Equipment List

Type of Equipment	# of Units
Bulldozer	6
Compaction equipment	4
Crawler crane	1
Dump truck	5
Grader	5
Loader/backhoe	5
Boom lift	2
Passenger truck (workers commuting)	10
Rough terrain crane	4
Utility truck	7
Wire puller	2

Decommissioning activities would include dismantling the wind turbines and would mimic construction activities. During decommissioning, ≈ 10,874 CO_2e mt would be emitted over a 20-year period, and ≈ 10,860 CO_2e mt over a 100-year period. The decommissioning period is shorter and on a smaller scale than the construction period; therefore, emission impacts are 46% less than the construction period (EPA 2022c). Emissions impacting ambient air quality would be minor, temporary, and have less impact than for construction, and the same mitigation measures would be applied during the decommissioning period.

3.4.2.4 Air Quality Conclusion

Gross lifetime emissions for the construction, O&M, and decommissioning of the Project would result in reduction in CO_2 because of the Project. The proposed Project's impacts to air quality would be less than significant.

3.4.3 Environmental Consequences: No Action Alternative

Under the No Action Alternative, the Project would not be developed, existing activities and impacts to air quality would continue, and GHG emissions offsets gained from the Project would not be realized.

3.5 NOISE

3.5.1 Existing Conditions

Section 4.5 – Acoustic Environment of the UGP PEIS discusses the existing acoustic environment in the UGP Region and describes sound pressure level as a logarithmic ratio of the measured value to a reference level or "decibel" (dB). The UGP PEIS notes audible sounds ranges from 0 dB ("threshold of hearing") to ≈ 140 dB ("threshold of pain"). The UGP Region noise level estimates are relatively low due to the proposed Project area's in a rural and underdeveloped setting, with levels ranging from 33 to 47 A-weighted dB (dBA) (Section 4.5.1.5 – Background Noise Levels in the UGP Region of the UGP PEIS).

The proposed Project area is in rural Haakon County and consists of cropland, pastureland, grasslands, and scattered rural residences. This area is a windy region, and wind is a natural contributor to noise in the area. Other contributing factors to noise in the proposed Project area include farming activities and vehicle traffic. There are no noise-related federal, county, or local regulations applicable to the Project.

A preconstruction wind turbine noise analysis, which analyzed noise associated with the proposed Project, was conducted in April 2023 (see Appendix A for the Preconstruction Wind Turbine Noise Analysis report). The analysis found other projects have used county limits of 45 dBA at nonparticipating residences and local limits of 50 dBA. The range of 45 to 50 dBA is consistent with limits applied to wind turbine projects nationally. The proposed Project has been designed to meet the goal of a 48-dBA limit.

3.5.2 Environmental Consequences: Proposed Action

3.5.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. The impact summaries below consider the noise-specific BMPs, including the following (see Appendix O and Table 2-3):

- Establish suitable setback distances from sensitive receptors where practicable. Noise complaints rarely exist for people living > 1–1.5 miles from wind farms (Stewart 2006).
- Schedule noisy activities to occur at the same time when practicable, as additional sources of noise generally do not greatly increase noise levels at site boundaries.

3.5.2.2 Switchyard

Construction of the Switchyard is anticipated to take ≤ 1 year to complete. Section 5.5.1.2 – Noise Impacts of the UGP PEIS indicates combined noise level for typical construction equipment likely used at a wind turbine project site is ≈ 90 dBA at 50 ft, and noise level at ≈ 0.75 mile is ≈ 40 dBA, which would be typical of the daytime rural background level. The nearest noise receptor to the Switchyard is a nonparticipating residence, which is ≈ 0.5 mile away. Noise levels associated with the construction of the Switchyard would be temporary in nature and would occur during the daytime when background noises tend to be higher.

The Switchyard would temporarily impact noise in a small portion of the proposed Project area. Noise generated during construction of the Switchyard in the proposed Project area would return to preconstruction noise levels, except for occasional sources of sound due to regular Switchyard site

inspections and infrequent vehicle visits for routine maintenance. Noise impacts from the construction and O&M of the Switchyard would be minor.

Decommissioning noise impacts are anticipated to be ≤ those described for construction. Temporary noise impacts would occur while deconstruction and removal of infrastructure are in progress.

3.5.2.3 Wind Facility

Construction of the Wind Facility is anticipated to take ≤ 2 years to complete. During construction, noise levels would increase temporarily in the proposed Project area due to the use of construction equipment. Noise generated by construction equipment would vary depending on the type of work being conducted. Section 5.5.1.2 – Noise Impacts of the UGP PEIS indicates combined noise level for typical construction equipment likely used at a wind turbine project site is ≈ 90 dBA at 50 ft, and noise level at ≈ 0.75 mile is ≈ 40 dBA, which would be typical of the daytime rural background level.

Construction of wind turbines at one location would occur for a few days before moving to other wind turbine locations. Construction sound would vary throughout the overall proposed Project area. Construction would mostly occur during the day when background noises tend to be higher. It is possible some construction activities would carry through the night, but such activities would be infrequent and dependent on weather and timing of a concrete pour, which must be continuous.

During O&M of the Wind Facility, the wind turbines and substation would be a permanent source of sound, whereas the 230-kV gen-tie line would be representative of noise typical of background sound levels in a rural environment. The Preconstruction Wind Turbine Noise Analysis predicts noise levels for the full, continuous, and normal operation of the proposed facility at 24 nonparticipating and 13 participating residences near the Wind Facility (see Table 5-1 in Appendix A) using the loudest turbine model under consideration, the Vestas V163-4.5 with standard blades. The analysis found the highest predicted noise level at a nonparticipating residence is 44.7 dBA, which is < the 48-dBA noise level goal. Predicted noise levels at participating residences may be ≤ 48 dBA if Philip Wind Partners uses the loudest turbine model under consideration. To provide a visual demonstration of compliance, the predicted noise levels are shown in the form of noise level contours for the loudest turbine model in Figures 5-1 to 5-3 of Appendix A.

Noise levels reported in the noise analysis are the highest turbine noise levels expected because they represent the case where all turbines are operating at full capacity; lower noise levels are expected when turbines are not producing full acoustic output due to low winds or when atmospheric conditions are not being conducive to sound propagation, as assumed by the acoustic models (see Appendix A).

Underground collection lines would not be a permanent source of sound, whereas the O&M facility would be an occasional source of sound due to O&M of the diesel generator and vehicles/equipment.

The Wind Facility would temporarily and permanently impact noise levels in the proposed Project area. Increased noise levels in the proposed Project area from construction would be transient across the proposed Project area as construction progressed and would be temporary. Noise levels during O&M of the wind turbines would remain below 48 dBA, which is in the range of a rural and underdeveloped area as described in Section 3.5.1. Impacts to noise in the proposed Project area would be negligible to minor.

Decommissioning noise impacts are anticipated to be the same or less than those described for construction. Temporary noise impacts would occur while deconstruction and removal of infrastructure are in progress.

3.5.2.4 Noise Conclusion

The UGP PEIS states that background noise levels in rural and undeveloped areas in the UGP Region range from 33–47 dBA (see Section 4.5.1.5 – Background Noise Levels in the UGP Region of the UGP PEIS). Haakon County is a rural area presumed to fall in that range.

The Project initially projected a maximum operational noise level of 48 dBA, which assumed all proposed 95 turbines were operating simultaneously (see Appendix A). Philip Wind Partners has since reduced the number of proposed wind turbines to 90. This adjustment reduces the maximum operational noise level below the initially projected 48 dBA. The original analysis showed only a 1-dB difference between background noise and maximum O&M noise levels, a difference deemed negligible and "not perceptible" according to Section 4.5.1.1 – Fundamentals of Acoustics of the UGP PEIS. The reduction in turbines further reduced potential noise impacts. Due to the Project's reduced number of turbines and the initial noise analysis consistent with the analysis in the UGP PEIS, the proposed Project's impacts would not result in new or more severe significant impacts than described in the UGP PEIS.

The UGP PEIS states that most construction equipment would have noise levels ranging from 75–90 dBA and combined noise levels for typical construction equipment are ≈ 90 dBA at 50 ft (Section 5.5.1.2 – Construction of the UGP PEIS). Because this Project has noise levels from construction equipment ≤ 90 dBA, it fits in the UGP PEIS's anticipated range. The UGP PEIS states that construction noise levels at 0.75 mile would be ≈ 40 dBA; typical of daytime rural background levels (Section 5.5.1.2 of the UGP PEIS). Even if there are sensitive receptors, the UGP PEIS provides BMPs and mitigation measures applicable to this issue (e.g., limiting construction activities to times when nearby sensitive receptors are least likely to be disturbed [Section 5.5.2 – BMPs and Mitigation Measures of the UGP PEIS]). The proposed Project's impacts to noise during construction are consistent with the analysis in the UGP PEIS and would not result in new or more severe significant impacts than described in the UGP PEIS.

3.5.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no direct or indirect impacts to noise, and existing activities would continue.

3.6 VEGETATION

3.6.1 Existing Conditions

The dominant vegetation type in the proposed Project area is Northwestern Great Plains Mixedgrass Prairie, a vegetation type common to the region and makes up 25,856 acres of the proposed Project area (LANDFIRE 2023) (Table 3-15). This system is one of the most disturbed grassland systems in South Dakota (LANDFIRE 2023). The Western Cool Temperate Wheat and Western Cool Temperate Row Crop vegetation types make up 22,951 combined acres of the proposed Project area. Sections of wetlands, deciduous forests, and shrublands are very limited around the proposed Project area (Figure 3-4; see Figure 3-1). The vegetation data differ from the land use/land cover data in Section 3.1 because results were derived from two databases using different methods and classification systems. The LANDFIRE database used for vegetation in this section represents a more detailed and nuanced classification of land cover than the NLCD used in the previous section. The dominant land cover types of Section 3.1 are herbaceous and agricultural, but those categories are split into ≥ a dozen subtypes (i.e., vegetation types) in Table 3-15. For purposes of a coarse description of land use, the NLCD is appropriate. For a detailed description and impact analysis of vegetation, the LANDFIRE database is a better data source.

Table 3-15. Vegetation Types in the Proposed Project Area

LANDFIRE Database Vegetation Type	Acres	% of Proposed Project Area
Northwestern Great Plains Mixedgrass Prairie	25,856	38%
Western Cool Temperate Row Crop	13,436	20%
Western Cool Temperate Wheat	9,515	14%
Western Cool Temperate Pasture and Hayland	5,246	8%
Western Cool Temperate Fallow/Idle Cropland	3,042	5%
Western Cool Temperate Row Crop – Close Grown Crop	2,750	4%
Western Cool Temperate Close Grown Crop	2,359	4%
Northwestern Great Plains Riparian Herbaceous	2,320	3%
Northern and Central Plains Ruderal and Planted Grassland	1,411	2%
Developed-Roads	851	1%
Western Cool Temperate Urban Herbaceous	688	1%
Open Water	537	< 1%
Western Great Plains Closed Depression Wetland	147	< 1%
Western Cool Temperate Urban Shrubland	75	< 1%
Western Cool Temperate Developed Herbaceous	21	< 1%
Developed-Low Intensity	16	< 1%
Western Great Plains Tallgrass Prairie	10	< 1%
Great Plains Wooded Draw and Ravine Woodland	7	< 1%
Northwestern Great Plains Shrubland	7	< 1%
Western Cool Temperate Urban Deciduous Forest	7	< 1%
Developed-Medium Intensity	6	< 1%
Northwestern Great Plains Riparian Forest	3	< 1%
Western Cool Temperate Urban Mixed Forest	3	< 1%
Western Great Plains Badlands	2	< 1%
Northern and Central Plains Ruderal and Planted Shrubland	1	< 1%
Northwestern Great Plains Riparian Shrubland	1	< 1%
Western Cool Temperate Urban Evergreen Forest	1	< 1%
Developed-High Intensity	< 1	< 1%
Northwestern Great Plains-Black Hills Ponderosa Pine Woodland & Savanna	< 1	< 1%
Western Great Plains Open Freshwater Depression Wetland	< 1	< 1%
Total	**68,318**	**100%**

Source: LANDFIRE (2023).
Note: Sums of values may not add to total value shown, due to rounding.

3.6.1.1 Grasslands

A grassland habitat assessment was conducted in and around the proposed Project area to identify parcels of grassland and to identify sod types as unbroken or broken. Undisturbed grassland was defined as grassland (e.g., Northwestern Great Plains Mixedgrass Prairie) that has not been cultivated or mechanically disrupted for agriculture or other uses (Bauman et al. 2013) later defined as unbroken

grassland (Bauman 2021) and is more likely to represent native prairie habitat. The assessment started with a desktop analysis of the proposed Project area using available databases and aerial imagery before culminating in field surveys. Imagery was derived from the USDA (2023), and existing land cover data pulled from the NLCD (USGS 2019) and the USDA National Agricultural Statistics Service (2021) (see Appendix H). Surveys were done on the ground by a biologist who visually assessed the appearance of grassland to identify portions of broken sod. Via desktop analysis, 27,678 acres were grassland habitat (see Appendix H). Of the grassland habitat, 12,192 acres were broken grassland, and 14,915 acres were unbroken grassland. The remaining 571 acres were not surveyed due to access issues. The Grassland Habitat Assessment report in Appendix H provides details about methods and the cumulative area.

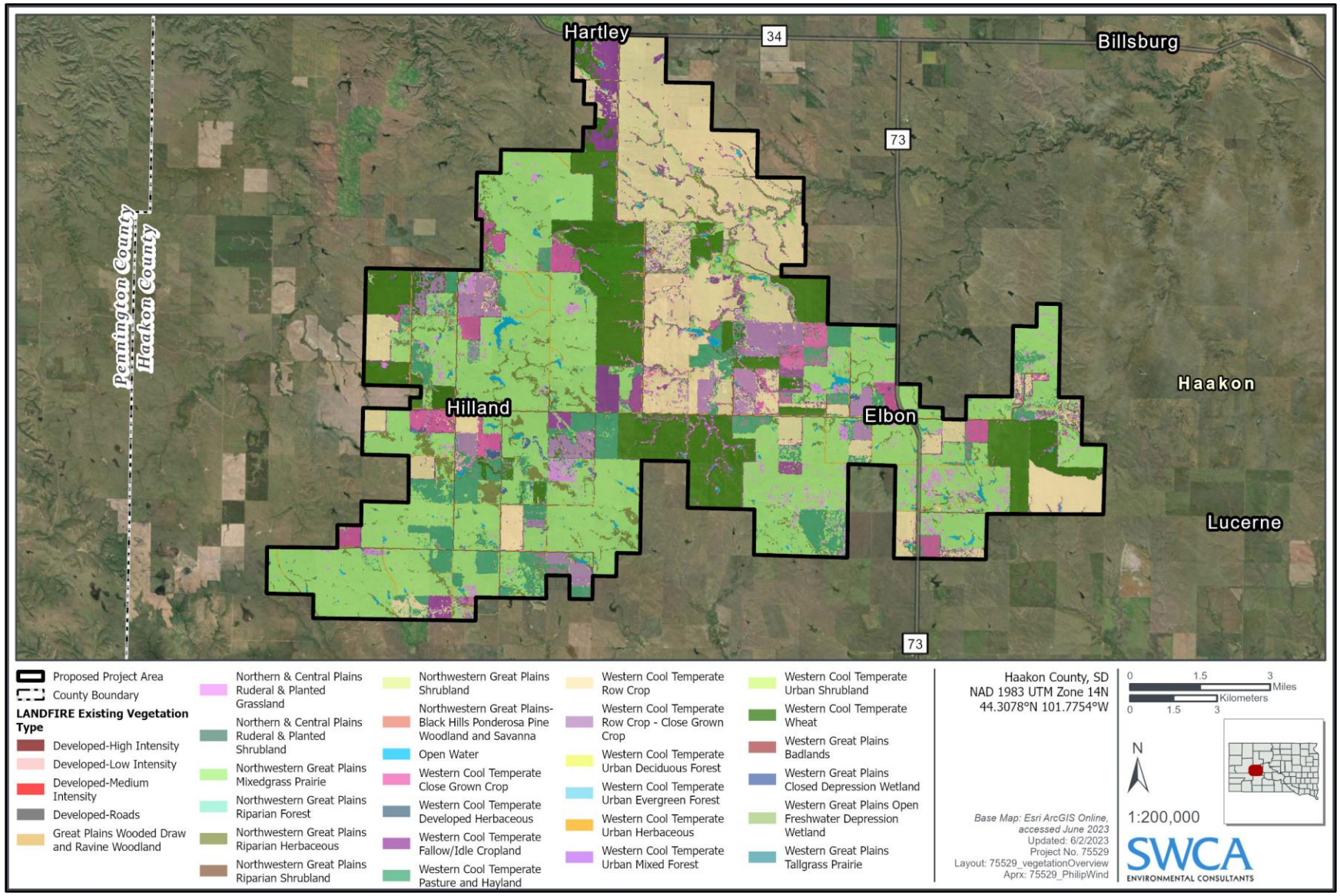

Figure 3-4. Vegetation types in the proposed Project area.

3.6.1.2 Noxious Weeds

According to the SDDANR, two state-listed and one locally recognized noxious weed species occur in Haakon County (Table 3-16).

Table 3-16. State and Local Noxious Weeds of South Dakota

State Noxious Weeds	County Noxious Weeds
Canada thistle (*Cirsium arvense*)	Common mullein (*Verbascum thapsus*)
Hoary cress (*Lepidium draba*)	–

Sources: SDDANR (2017a, 2017b).

3.6.2 Environmental Consequences: Proposed Action

3.6.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. These measures would reduce the spread of noxious weeds and minimize disturbance area to vegetation, thereby protecting vegetation resources. The impact summaries below consider the vegetation-specific BMPs (see Appendix O and Table 2-3):

- Reduce impacts to native vegetation to the extent practicable through Project layout and design.
- Use appropriate erosion, sediment, spill control, and equipment cleaning measures.
- Revegetate areas of temporary construction impacts to pre-Project conditions.

3.6.2.2 Switchyard

The main impacts to vegetation from the Switchyard would be the temporary loss of vegetation in construction access areas, laydown yards, and work areas and the permanent loss of existing vegetation and broken grasslands where new facilities are constructed. Movement of construction equipment and soil disturbance creates potential for exotic, weedy, invasive species to establish, including noxious weeds.

In accordance with LANDFIRE classifications, construction of the Switchyard would temporarily impact ≈ 2 acres of vegetation, including ≈ 1 acre of Northwestern Great Plains Mixedgrass Prairie, < 1 acre of Western Cool Temperate Pasture and Hayland, and < 1 acre of Western Cool Temperate Urban Shrubland. Broken grasslands make up ≈ 1 of these acres; no unbroken grasslands would be affected.

The Switchyard would permanently impact ≈ 5 acres of vegetation, including ≈ 4 acres of Northwestern Great Plains Mixedgrass Prairie, < ½ acre of Western Cool Temperate Pasture and Hayland, and < ½ acre of Western Cool Temperate Urban Shrubland. Broken grasslands make up ≈ 4 of these 5 acres. Impacts to vegetation from the construction and O&M of the Switchyard would be minor.

3.6.2.3 Wind Facility

Impacts to vegetation from the Wind Facility would be the same as those described for the Switchyard. Assuming construction of 90 turbines, ≤ 1,245 acres of vegetation would be temporarily disturbed by the construction of the Wind Facility. The largest affected vegetation type would be cropland (including Western Cool Temperate close grown crop, fallow/idle cropland, row crop, and row crop-close grown

crop), accounting for 681 acres of temporary disturbance. The Western Cool Temperate Wheat vegetation type accounts for 202 acres of temporary disturbance.

The largest vegetation disturbance would come from construction of underground collection lines, estimated at ≤ 415 acres of vegetation (< 1 acre would be permanently disturbed). The Wind Facility turbine areas would disturb ≤ 310 acres of vegetation (296 acres would be temporarily disturbed and would be reclaimed after construction, leaving 14 acres of permanent disturbance). Isolated trees may need to be cleared as part of the temporary construction impacts. None of the temporary construction impacts overlap forest classifications (Table 3-17). Remaining Wind Facility components, including the O&M building, gen-tie line, t-lines, MET and ADLS towers, laydown yards, crane paths, substation, and access roads, would disturb ≤ 632 acres of vegetation (534 acres would be temporarily disturbed and would be reclaimed after construction, leaving 98 acres of permanent disturbance). Temporary vegetation disturbance would total 1,245 acres (see Table 3-17) and permanent disturbance would total 112 acres.

No turbines would be constructed on unbroken grassland. Of the 27,678 acres categorized as grassland in the proposed Project area, the Wind Facility construction disturbance would temporarily impact ≤ 41 acres of unbroken grassland and 160 acres of broken grasslands. Areas where access roads and aboveground junction boxes would be sited would result in ≤ 3 acres of permanent disturbance to unbroken grasslands. Areas where access roads, aboveground junction boxes, transmission towers, substation, and turbines would be sited would result in permanent impacts to 7 acres of broken grasslands.

Invasive and noxious weeds may be spread by construction activities. Groundbreaking activities, erosion, and sedimentation may create pathways for invasive weed establishment. Noxious weeds may travel throughout the proposed Project area on vehicles, construction equipment, or workers clothing. The proposed Project area is especially susceptible to 1) grass-like invasives because their life strategy is like that of native vegetation and 2) woody trees and shrubs, which outcompete native species and change the structure of the ecosystem (Gaskin et al. 2021).

The Wind Facility would temporarily and permanently impact 1,245 and 112 acres of vegetation resources respectively. Areas temporarily impacted during construction and not needed for O&M would be returned to pre-Wind Facility land use through revegetation. Impacts to vegetation from construction and O&M of the Wind Facility would be minor.

Decommissioning impacts would be ≤ those described for construction. Temporary impacts would occur while grasslands and other nonagricultural plant communities are crossed for deconstruction and removal of infrastructure. Permanently impacted land would be restored to pre-Wind Facility land uses.

Table 3-17. Vegetation Disturbance from the Wind Facility

LANDFIRE Classification	Permanent Disturbance Area (acres)	Temporary Disturbance Area (acres)	% of Permanent Disturbance Area	% of Temporary Disturbance Area
Northwestern Great Plains Mixedgrass Prairie	9	186	8%	15%
Western Cool Temperate Row Crop	49	518	44%	42%
Western Cool Temperate Wheat	26	202	23%	16%
Western Cool Temperate Pasture and Hayland	10	127	9%	10%
Western Cool Temperate Fallow/Idle Cropland	5	59	5%	5%
Western Cool Temperate Row Crop – Close Grown Crop	5	64	5%	5%
Western Cool Temperate Close Grown Crop	2	40	2%	3%

LANDFIRE Classification	Permanent Disturbance Area (acres)	Temporary Disturbance Area (acres)	% of Permanent Disturbance Area	% of Temporary Disturbance Area
Northwestern Great Plains Riparian Herbaceous	0	10	0%	< 1%
Northern and Central Plains Ruderal and Planted Grassland	<1	10	< 1%	< 1%
Developed-Roads	<1	16	< 1%	1%
Western Cool Temperate Urban Herbaceous	3	11	3%	< 1%
Open Water	0	0	0%	0%
Western Great Plains Closed Depression Wetland	<1	2	< 1%	< 1%
Western Cool Temperate Urban Shrubland	1	1	< 1%	< 1%
Western Cool Temperate Developed Herbaceous	< 1	<1	< 1%	< 1%
Developed-Low Intensity	0	0	0%	0%
Western Great Plains Tallgrass Prairie	0	0	0%	0%
Great Plains Wooded Draw and Ravine Woodland	0	0	0%	0%
Northwestern Great Plains Shrubland	0	0	0%	0%
Western Cool Temperate Urban Deciduous Forest	0	0	0%	0%
Developed-Medium Intensity	0	0	0%	0%
Northwestern Great Plains Riparian Forest	0	0	0%	0%
Western Cool Temperate Urban Mixed Forest	0	0	0%	0%
Western Great Plains Badlands	0	0	0%	0%
Northwestern Great Plains Riparian Shrubland	0	0	0%	0%
Western Cool Temperate Urban Evergreen Forest	0	0	0%	0%
Developed-High Intensity	0	0	0%	0%
Northwestern Great Plains-Black Hills Ponderosa Pine Woodland and Savanna	0	0	0%	0%
Western Great Plains Open Freshwater Depression Wetland	0	0	0%	0%
Total	**112**	**1,245**	**100%**	**100%**

Source: LANDFIRE (2023).

Note: Sums of values may not add to total value shown, due to rounding.

3.6.2.4 Vegetation Conclusion

During Project construction, ≤ 1,247 acres would be temporarily disturbed and 117 acres would be permanently disturbed. The dominant vegetation type in the proposed Project area is Northwestern Great Plains Mixedgrass Prairie (25,856 acres), and the Project has been designed to reduce temporary impacts to 187 acres and permanent impacts to 14 acres. The second most dominant vegetation type is Western Cool Temperate Row Crop; 518 acres of which may be temporarily disturbed and 49 of which may be permanently disturbed by construction activities.

Of the 12,192 acres of broken grassland, ≤ 12 acres would be permanently disturbed, and ≤ 161 acres would be disturbed temporarily. Of the 14,915 acres of unbroken grassland, ≤ 41 acres would be temporarily disturbed, and ≤ 3 acres would be permanently disturbed by access roads and aboveground junction boxes. No turbines would be constructed on unbroken grassland. Invasive and noxious weeds may be spread by proposed Project activities resulting in ground disturbance. According to SDDANR (2017a, 2017b), two state-listed and one locally recognized noxious weed species occur in Haakon

County. The Project has committed to limit establishment and spread of these species through industry BMPs.

Impacts to vegetation would be dispersed throughout the proposed Project area and distributed over 16 different vegetation types. The Project reduced impacts to native vegetation resources in Project layout and design and has committed to BMPs, including use of appropriate equipment cleaning measures and revegetating areas temporarily impacted during construction to pre-Project conditions. The Project's proposed impacts to vegetation would be minor and considered less than significant.

3.6.3 Environmental Consequences: No Action Alternative

The No Action Alternative would cause no impacts to vegetation, and existing activities would continue.

3.7 WILDLIFE

3.7.1 Existing Conditions

Section 4.6.2 – Wildlife of the UGP PEIS discusses general descriptions of wildlife species that may be affected by wind energy development projects in the UGP Region. The proposed Project area is in the Northwestern Great Plains Level III ecoregion (Wiken et al. 2011).

Several wildlife studies were conducted for the Project and are listed in Table 3-18. Wildlife study reports completed by Philip Wind Partners are included in Appendices B through G. Previously completed studies are considered as cited and included in the Project record. Study results are summarized below.

Table 3-18. Wildlife Studies Conducted for the Project

Study	Survey Period
Eagle use survey	August 2017–July 2018; August 2018–July 2019
Eagle nest aerial survey	April 2018
Eagle nest ground survey	June 2018
Eagle utilization distribution monitoring	May–June 2022
Prairie grouse lek survey	July 2018; April–May 2022; March–May 2023
Whooping crane habitat assessment	August 2018; February 2023
Bat acoustic survey	April–November 2018
Avian use survey	August–November 2017; March–August 2018; January 2022–March 2023; April 2023–August 2024
Prairie dog colony status and mapping	January–October 2022
NLEB habitat assessment	May–October 2022
Raptor nest survey	January–June 2022; February–June 2023

In addition to wildlife and habitat studies, Philip Wind Partners conducted grassland assessments and mapping in July 2018 and September 2022, which is discussed in Section 3.6.1.1. A water resources analysis was conducted in October 2022. Section 3.3.1 describes the findings of the desktop water resources analysis and the completed in-field wetland delineations, as well as methods for the additional in-field wetland delineations to be conducted prior to construction.

3.7.1.1 General Wildlife

Common Northwestern Great Plains Level III ecoregion species include white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), bobcat (*Lynx rufus*), cougar (*Puma concolor*), prairie dog (*Cynomys* spp.), jackrabbit (*Lepus* spp.), and prairie rattlesnake (*Crotalus viridis*) (Wiken et al. 2011).

Wildlife habitats are defined by vegetation covers identified in Section 3.6.1. Anthropogenic land uses, including cropland, have lower wildlife habitat values than higher quality habitats such as forests, wetlands, and native prairie grasslands. Wildlife is more likely to be present in quality habitats. Although birds fly over all land cover types, their nesting habitats and food sources are primarily found in forests and grassland habitats.

Prairie dog colonies provide habitat and a food source for several protected species of wildlife with their own setback requirements identified in the UGP PEIS. To define turbine setbacks from prairie dog colonies, surveys were conducted according to methodologies reported in Appendix D. Based on historical data and desktop review of aerial imagery, 12 sites were surveyed for presence of prairie dog colonies in the proposed Project area and a 2-mile buffer. Six historical colonies were surveyed; three were still active and three were absent. Six additional sites were surveyed; three were inactive based on evidence of unused burrows, two were active based on presence of fresh burrows, tracks, fecal droppings, and prairie dogs, and one site identified during the desktop digitizing as a potential prairie dog colony was determined to be nonexistent in the field.

3.7.1.2 Birds

Common Northwestern Great Plains Level III ecoregion bird species include western meadowlark (*Sturnella neglecta*), sage thrasher (*Oreoscoptes montanus*), northern pintail (*Anas acuta*), golden eagle (*Aquila chrysaetos*), and ferruginous hawk (*Buteo regalis*) (Wiken et al. 2011).

There are no Important Bird Areas or other lands designated specifically as bird habitat in the proposed Project area (National Audubon Society 2023). Point count surveys were conducted to catalog bird species observed and estimate bird use at numerous sites in the proposed Project area (Tetra Tech 2017, 2018). A site reconnaissance visit was conducted on September 13, 2022, which identified seven small and large bird species. The observed small and large bird species, exclusive of the raptors described below, were black-billed magpie (*Pica hudsonia*), common raven (*Corvus corax*), dark-eyed junco (*Junco hyemalis*), horned lark (*Eremophila alpestris*), lark bunting (*Calamospiza melanocorys*), ring-necked pheasant (*Phasianus colchicus*), and sharp-tailed grouse. No federally listed species were observed during the September 13, 2022, site reconnaissance visit. Discussion of prairie grouse is found in Section 3.8.

In addition to avian surveys conducted from 2017–2019, Philip Wind Partners reinitiated monthly avian surveys in January 2022 focusing on eagles and large birds. Large birds are defined as waterbirds, waterfowl, shorebirds, gulls/terns, diurnal raptors (i.e., kites, accipiters, buteos, eagles, falcons, harriers, and osprey), owls, vultures, upland game birds, doves/pigeons, nightjar, and large corvids. Initially 38 points were surveyed, with 12 additional survey points added in response to Project area modifications, totaling 50 survey points. A biologist documented large birds observed over 60 minutes at each point per month. There were 52 species observed throughout the 15-month survey. Large bird species observations were highest during spring (40 species) followed by summer (39), fall (25), and winter (16). Large birds observed during these surveys averaged 8.59 observations per 60-minute survey, ranging from 2.29 in winter to 18.20 in spring, showing a similar trend as number of species observed.

Between April 2023 and August 2024, Philip Wind Partners conducted additional eagle and large bird use surveys to identify temporal and spatial use of all large birds in the proposed Project area, with a focus on eagles in accordance with the USFWS's *Eagle Conservation Plan Guidance* (USFWS 2013).

Raptor nest surveys were conducted from 2017–2019 in accordance with the USFWS *Eagle Conservation Plan Guidance* (USFWS 2013) to identify and record the location and status of raptor nests in the proposed Project area, and to update results of previous raptor surveys. Between January 13 and June 15, 2022, raptor nest surveys were conducted in an earlier iteration of the proposed Project area and a 2-mile buffer surrounding the proposed Project area during six survey events (three ground-based surveys; three aerial flight surveys).

The 2022 surveys resulted in observation of one occupied bald eagle (*Haliaeetus leucocephalus*) nest in the proposed Project area and one occupied golden eagle nest in a 2-mile buffer surrounding the proposed Project area. Six non-eagle raptor nests were documented in the proposed Project area and a 2-mile buffer, consisting of three unidentified raptor nests in the proposed Project area and three occupied red-tailed hawk (*Buteo jamaicensis*) nests in the 2-mile buffer. During a site reconnaissance visit conducted on September 13, 2022, five raptor species were observed: bald eagle, golden eagle, northern harrier (*Circus hudsonius*), red-tailed hawk, and turkey vulture (*Cathartes aura*). Additional information on bald and golden eagles can be found in Section 3.8.

Additional raptor nest surveys were completed between February 2 and June 1, 2023, in the proposed Project area displayed in Figure 1-2. These surveys included two ground-based surveys and two aerial surveys in the proposed Project area and a 2-mile buffer surrounding the proposed Project area. The known bald eagle and golden eagle nests in ≤ 2 miles of the proposed Project area were occupied during the first two mobilizations (February–March 2023). During the last two mobilizations (May– June 2023), the bald eagle nest was taken over by a great horned owl with young and the golden eagle nest by a red-tailed hawk. One new eagle nest was discovered just east of the previously occupied eagle nest.

In total, 12 non-eagle raptor nests were documented in the proposed Project area and 2-mile buffer; two occupied great horned owl nests, three occupied red-tailed hawk nests, and three unidentified raptor nests were documented within the Project area; and two occupied great horned owl nests and two occupied red-tailed hawk nests were identified in the 2-mile buffer. One occupied great blue heron (*Ardea herodias*) rookery was identified in the 2-mile buffer.

3.7.1.3 Bats

According to the South Dakota Bat Management Plan, 13 species of bats occur currently or historically in South Dakota (Table 3-19) (South Dakota Bat Working Group 2004). In September 2022, the USFWS proposed listing the tricolored bat (*Perimyotis subflavus*) (TCB) as endangered under the ESA, and USFWS guidance recommends consideration of the TCB when developing a wind energy facility (USFWS 2024a, 2024b). The northern long-eared bat (*Myotis septentrionalis*) (NLEB) is a federally listed endangered species. Given these species' status under the ESA, they are both further analyzed in Section 3.8.

Table 3-19. Bat Species Potentially Occurring in the Proposed Project Area

Common Name	Scientific Name	Status (federal; state)
Big brown bat	*Eptesicus fuscus*	–
Eastern red bat	*Lasiurus borealis*	SGCN
Evening bat	*Nycticeius humeralis*	–
Fringed bat	*Myotis thysanodes*	SGCN
Hoary bat	*Lasiurus cinereus*	SGCN
Little brown myotis	*Myotis lucifugus*	SGCN

Common Name	Scientific Name	Status (federal; state)
Long-eared bat	*Myotis evotis*	SGCN
Long-legged bat	*Myotis volans*	SGCN
Northern long-eared bat	*Myotis septentrionalis*	FE; SGCN
Silver-haired bat	*Lasionycteris noctivagans*	SGCN
Townsends big-eared bat	*Corynorhinus townsendii*	SGCN
Tricolored bat	*Perimyotis subflavus*	Proposed FE; SGCN
Western small-footed myotis	*Myotis ciliolabrum*	–

Sources: SDGFP (2014, 2023).
Note: FE = federally listed endangered; SGCN = South Dakota Species of Greatest Conservation Need.

Two preconstruction studies were completed to evaluate bats. The first was a passive acoustic study using five detection stations for 892 detector nights (Tetra Tech 2019) over as many as 211 nights per detector from April to November 2018. This type of study records bat calls and uses a combination of software and manual review to analyze and classify calls to document bats species present and their activity level. This study resulted in 14,262 bat calls. A breakdown of acoustic detections is provided in Table 3-20. The most common bat species detected (32%) was the big brown bat. Other species accounting for 10% to 20% of detections included the hoary bat, little brown myotis, silver-haired bat, and western small-footed myotis. Three groups of detected bats were not identifiable to species: unidentified high frequency bats, unidentified low-frequency bats, and unidentified myotis. Each of these groups were < 1% of bat calls.

Table 3-20. Acoustic Detections of Bats in the Proposed Project Area

Common Name	Scientific Name	% of Detections
Big brown bat	*Eptesicus fuscus*	32%
Eastern red bat	*Lasiurus borealis*	4%
Hoary bat	*Lasiurus cinereus*	18%
Little brown myotis	*Myotis lucifugus*	17%
Long-legged bat	*Myotis volans*	4%
Silver-haired bat	*Lasionycteris noctivagans*	12%
Western small-footed myotis	*Myotis ciliolabrum*	12%
Unidentified high frequency bats	N/A	< 1%
Unidentified low-frequency bats	N/A	< 1%
Unidentified *Myotis* spp.	N/A	< 1%

Note: N/A = not applicable.

The second bat study was a summer foraging and roosting habitat evaluation specific to NLEB (see Appendix E), which is discussed in Section 3.8.1.

3.7.2 Environmental Consequences: Proposed Action

3.7.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. These

measures would reduce impacts to wildlife. The impact summaries below consider the wildlife-specific BMPs (see Appendix O and Table 2-3):

- Complete preconstruction surveys to identify wildlife presence and habitat areas for avoidance.
- Reduce impacts to wildlife resources to the extent practicable through Project layout and design.
- Prepare and implement a BBCS (see Appendix P) in accordance with USFWS *Land-Based Wind Energy Guidelines* (USFWS 2012).
- Revegetate areas of temporary construction impacts to pre-Project conditions to restore habitat.

3.7.2.2 Switchyard

Primary impacts to wildlife from the Switchyard would be 1) temporary and permanent loss of habitat or potential displacement of wildlife where new facilities are constructed, and 2) temporary loss of habitat in construction access areas, laydown yards, and work areas. Ground clearing would affect habitats for birds, mammals, and other wildlife species. Loss and fragmentation of prairie habitat, represented as unbroken grasslands described above, can negatively affect migratory and non-migratory birds. Construction of the Switchyard would temporarily impact ≈ 1 acre and permanently impact ≈ 4 acres of Northwestern Great Plains Mixedgrass Prairie. These grassland acres in the Switchyard are mapped as broken grassland.

During construction, wildlife may avoid the area due to increased traffic and noise, but once construction is complete this temporary impact would cease. During Switchyard construction and O&M, direct mortality may result from collisions with vehicles, but this would be minimized through BMPs derived from the UGP PEIS and the Applicant's additional voluntary environmental protection measures. Disturbance to wildlife species and habitat would be minor.

Switchyard decommissioning impacts would mirror those for construction of the Switchyard. BMPs and mitigation measures applicable to Project construction activities would be applicable to Project decommissioning activities, which would reduce direct and indirect impacts to wildlife.

3.7.2.3 Wind Facility

Ground-based impacts to wildlife from the Wind Facility would mirror those described for the Switchyard. During O&M, the Project may impact wildlife through collisions with turbines, aboveground gen-tie lines, or vehicle traffic. Ground clearing, which causes habitat degradation, alteration, loss, and fragmentation, would affect habitats for birds, mammals, and other wildlife species. Natural resources setbacks were applied to turbine sites to avoid sensitive resources and are presented in Table 1-1 and Figure 1-3. Direct and indirect impacts to wildlife species and their habitats may occur from construction of the Wind Facility, increased vehicle traffic, and long-term disturbance during Wind Facility O&M.

Temporary impacts to ≈ 186 acres and permanent impacts to ≈ 9 acres of Northwestern Great Plains Mixedgrass Prairie vegetation would be expected. Temporary impacts to ≈ 10 acres of Northwestern Great Plains Riparian Herbaceous vegetation would be expected; however, no permanent impacts would occur to this vegetation type. The Wind Facility would permanently impact ≈ 9 acres of grasslands. This would be a minor area of disturbance to wildlife habitat.

The Wind Facility may affect raptor, migratory bird, and bat species through habitat degradation or displacement of individuals. During construction, wildlife may avoid the area due to increased traffic and noise, but once construction is complete this temporary impact would cease. Potential impacts from construction may include nest or burrow abandonment or loss of eggs or young. This may result in a

decrease in reproductive success for certain individuals, but this impact would be reduced through BMPs derived from the UGP PEIS and the Applicant's additional voluntary environmental protection measures.

During Wind Facility construction and O&M, direct wildlife mortality may result from collisions with vehicles, aboveground gen-tie lines, or turbines. Turbines would be feathered to reduce collisions with bats (see Section 3.8.2.3).

Wind Facility decommissioning impacts would mirror those described for construction of the Wind Facility. BMPs and mitigation measures applicable to Wind Facility construction activities would be applicable to Wind Facility decommissioning activities.

3.7.2.4 Wildlife Conclusion

Section 5.6.1.2 – Wildlife of the UGP PEIS describes potential impacts to wildlife during a wind energy project's life cycle. The proposed Project would have limited impacts to wildlife, including habitat disturbance and mortality from collisions with vehicles, gen-tie lines, and turbines in the species types and range of impacts identified in the UGP PEIS. The Project completed preconstruction surveys to identify wildlife presence and habitat areas, and reduced impacts to wildlife resources through Project layout and design. The BBCS (see Appendix P) would be implemented, and areas of temporary construction impacts would be revegetated to pre-Project conditions to restore habitat. The proposed Project's impacts to wildlife resources are consistent with the analysis in the UGP PEIS and would not result in impacts greater than those described in the UGP PEIS.

3.7.3 Environmental Consequences: No Action Alternative

Under the No Action Alternative, the Project would not be developed, and impacts to wildlife would be anticipated to continue at existing levels.

3.8 SPECIAL-STATUS SPECIES

3.8.1 Existing Conditions

Special-status species include any species listed, or proposed for listing, as threatened or endangered by the USFWS, as well as species of special concern. Species of special concern include species listed as USFWS Birds of Conservation Concern (BCCs) (USFWS 2021a, 2024e), SDGFP South Dakota Species of Greatest Conservation Need (SGCN) (SDGFP 2014, 2023), and sensitive species such as prairie grouse.

The USFWS Information for Planning and Consultation (IPaC) report identified one federally listed endangered species, two federally listed threatened species, two federally proposed threatened species, and two federally proposed endangered species that may occur in the proposed Project area (USFWS 2024e). Species on this list and their potential for occurrence in the proposed Project area are identified in Table 3-21. The proposed Project area does not contain designated critical habitat for federally listed ESA species (USFWS 2023b, 2024e). Although not identified on the IPaC species list, the Project also occurs within the TCB and NLEB range for wind energy projects and the USFWS presumes presence of TCB in the Project area during migration (USFWS 2024a, 2024b, 2024c, 2024d).

Table 3-21. Federally Listed and Proposed Species with Potential to Occur in the Proposed Project Area

Common Name	Scientific Name	Federal Status	Potential to Occur in the Proposed Project Area
Birds			
Rufa red knot	*Calidris canutus rufa*	Threatened	Low
Piping plover	*Charadrius melodus*	Threatened	Low
Whooping crane	*Grus americana*	Endangered	Low
Mammals			
Northern long-eared bat	*Myotis septentrionalis*	Endangered	Low
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered	Low
Insects			
Monarch butterfly	*Danaus plexippus*	Proposed Threatened	Moderate
Regal fritillary	*Argynnis (Speyeria) idalia occidentalis*	Proposed Threatened	Moderate
Suckley's cuckoo bumble bee	*Bombus suckleyi*	Proposed Endangered	Low

Source: USFWS (2024e).

3.8.1.1 Rufa Red Knot

The rufa red knot (*Calidris canutus rufa*) was listed as federally threatened on January 12, 2015 (79 FR 73705 [December 11, 2014]). The rufa red knot is a medium-sized shorebird (USFWS 2023c). The rufa red knot is typically found along sandy beaches and shorelines, or on large mudflats (Cornell Lab of Ornithology 2023). The rufa red knot migrates long distances between nesting areas in mid- and high-arctic latitudes and southern nonbreeding habitats as far north as the coastal United States (low numbers) and southward to southern South America. Populations, including subspecies of rufa, migrate in large flocks northward through the contiguous United States mainly between March and early June, and southward in July and August (Harrington 2001).

The rufa red knot has potential to occur in the region during spring and fall migration periods, and every county in South Dakota is included as a potential stopover site during migration. Rufa red knots were observed along the Missouri River Valley, but there are no consistent stopovers in the Central Flyway.

The nearest reported rufa red knot observation, detected in 2002, was ≈ 74 miles east of the proposed Project area (eBird 2023). A second observation was recorded ≈ 76 miles east of the proposed Project area and included nine individuals in May 2016 (eBird 2023). As identified in the PBA Consistency Evaluation Forms, the nearest suitable habitat is 30 miles from the proposed Project area. It is unlikely for the rufa red knot to occur in the proposed Project area or in a 2.5-mile buffer surrounding the proposed Project area (Piorkowski et al. 2023). During the site reconnaissance visit conducted on September 13, 2022, and avian use studies in 2017, 2018, 2022, and 2023, no rufa red knots were observed.

3.8.1.2 Piping Plover

The piping plover (*Charadrius melodus*) was listed as federally threatened in 1985 (50 FR 50726 [December 11, 1985]), with the Northern Great Plains and Atlantic Coast populations listed as threatened and the Great Lakes population listed as endangered (USFWS 2023d). The piping plover is a small shorebird that breeds in three geographic regions of North America: The Atlantic Coast, the Northern Great Plains, and the Great Lakes (USFWS 2023d). In South Dakota, piping plovers nest mainly along

the Missouri River, and rarely on alkaline wetlands in northeastern South Dakota or along lakeshores in western South Dakota (SDGFP 2019).

The nearest reported piping plover observation was made in 2014, ≈ 20 miles southwest from the proposed Project area (eBird 2023). Most reported observations of piping plover occur around Pierre, South Dakota, ≈ 60 miles east of the proposed Project area in designated critical habitat for the species (designated critical habitat begins ≈ 30 miles to the northeast of the proposed Project area). No alkali lakes were observed in the proposed Project area (see Appendix K), but in dry years, the piping plover may occur in dried wetland habitat. There is limited to no suitable habitat in the proposed Project area. During a site reconnaissance visit conducted on September 13, 2022, and avian use studies in 2017, 2018, 2022, and 2023, no piping plovers were observed.

3.8.1.3 Whooping Crane

The whooping crane (*Grus americana*) was listed as federally endangered in 1967 (32 FR 4001 [March 11, 1967]) in the United States by the USFWS and in 1978 in Canada by the Committee on the Status of Endangered Wildlife in Canada (USFWS 2023e). Historically, population declines were caused by shooting and destruction of nesting habitat in the prairies from agricultural development. Current threats to the species include collisions with human-made objects (i.e., power lines and fences), shooting, chemical spills (in the Intracoastal Waterway in their winter habitat), predators, disease, habitat destruction, severe weather, and loss of genetic material (USFWS 2023e).

The whooping crane has one natural wild population of ≈ 543 individuals (Butler et al. 2022). Members of this population nest in and adjacent to Wood Buffalo National Park in the Northwest Territories and Alberta, Canada, and winter mainly in and adjacent to Aransas National Wildlife Refuge along the central Texas coast (Government of Canada 2015; USFWS 2023e). The proposed Project area is in the migration corridor containing 95% of the whooping crane sightings (Pearse, Rabbe, Bidwell et al. 2018; Pearse, Rabbe, Juliusson et al. 2018).

Whooping cranes may probe the soil subsurface with their bills for foods in/on the soil or vegetation substrate (USFWS 2023e). Whooping cranes are omnivores, and foods typically include agricultural grains, as well as insects, frogs, rodents, small birds, minnows, berries, and plant tubers. Whooping cranes spend the largest amount of time during migration feeding in harvested grain fields (USFWS 2023e). Studies indicate whooping cranes use a variety of habitats during migration and generally roost in small palustrine (marshy) wetlands ≤ 0.6 mile from suitable feeding areas (Howe 1987, 1989).

Philip Wind Partners conducted a whooping crane habitat assessment in the proposed Project area in February 2023 using methods defined in Appendix C. The assessment assisted Philip Wind Partners in determining potentially suitable whooping crane stopover habitat in the proposed Project area by considering three distinct methodologies of quantifying suitable habitat and whooping crane habitat use. The first methodology considers wetland habitat suitability through The Watershed Institute Wetland Suitability Model (The Watershed Institute 2012); the second considers a predicted habitat use model by Niemuth et al. (2018) that predicts the use of habitat by whooping crane; and the third considers an additional approach by Niemuth et al. (2018) that calculates high use areas by deciles (or 1/10 parts) and defines suitable wetland stopover habitat as wetlands in the five highest use deciles. Based on this three-method approach, it was determined the proposed Project area contains 415 acres of potentially suitable habitat, of which 5 acres are considered suitable wetland stopover habitat, with a 0.4% chance whooping cranes would use that habitat over any given year (see Appendix C).

3.8.1.4 Northern Long-Eared Bat

The USFWS listed the NLEB as federally threatened in 2015 (80 FR 17974 [April 2, 2015]). In November 2022, the USFWS reclassified the NLEB as federally listed endangered, resulting in removal of the species-specific rule issued under Section 4(d) of the ESA (87 FR 73488 [November 30, 2022]). The primary threat to this species is the fungus *Pseudogymnoascus destructans*, which causes white-nose syndrome; however, other factors impacting this species include wind energy development, climate variability, and habitat loss (87 FR 73488 [November 30, 2022]). White-nose syndrome has not been confirmed in Haakon County; however, occurrence was confirmed in neighboring Pennington County to the west in 2021 and 2022 (White-Nose Syndrome Response Team 2022).

The range of the NLEB extends throughout most of southern Canada, as well as the eastern and midwestern United States (excluding parts of the southeastern United States), and is primarily associated with North American forests (USFWS 2023f). The NLEB hibernates during winter months in caves and mines with constant temperatures and very high humidity (USFWS 2023g). Summer habitat for the NLEB consists of forested areas with trees > 3 inches in diameter at breast height (USFWS 2023g). NLEBs roost in live trees and/or snags that have exfoliating bark, cracks, crevices, and/or cavities (USFWS 2023g). The species typically forages in forest interiors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure (USFWS 2022). The NLEB may roost in human-made structures such as buildings, barns, bridges, and bat houses (USFWS 2023g). The NLEB migrates from summer habitat to hibernacula in the fall. NLEBs typically travel ≤ 35 miles from summer foraging habitat to hibernacula (USFWS 2022).

Two North American Bat Monitoring Program detectors in South Dakota documented NLEBs: one in Custer County in 2020 and one in Lawrence County in 2022 in the Black Hills National Forest (USGS 2023f). The proposed Project area is ≈ 68 miles from the nearest known hibernaculum in the Black Hills, South Dakota.

Two preconstruction studies were completed to evaluate bats, specifically NLEBs. The first was an acoustic study using five detection stations for 892 detector nights, as defined in methods contained in Appendix E and Tetra Tech (2019). This study resulted in 14,262 bat calls, none of which were classified as NLEB. The acoustic software used auto-classified 32 NLEB recordings; however, further manual analysis determined these to be western small-footed bat, long-legged myotis, or unidentified myotis.

The second study was a NLEB summer foraging and roosting habitat evaluation (see Appendix E) completed following guidance from the USFWS's *Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* (USFWS 2022) and field validated on September 13, 2022. Suitable summer foraging and roosting habitat was defined as patches of trees 10 acres or greater and included a 1,000-foot buffer (hereafter, connected habitat buffer) as recommended by USFWS guidance. As a result of this habitat evaluation, 65 acres of potential summer habitat and 1,508 acres of connected habitat were identified in the proposed Project area.

3.8.1.5 Tricolored Bat

On September 13, 2022, the USFWS proposed listing the TCB as an endangered species under the ESA. USFWS guidance recommends consideration of the TCB for operation of wind turbines (USFWS 2024a, 2024b). As of the date of publication of this EA, the USFWS has not issued a final listing decision on the TCB. The TCB faces extinction due to impacts of white-nose syndrome; however, other factors impacting this species' viability include habitat loss, climate variability, conservation efforts, and wind turbine operations (USFWS 2021b).

The range of the TCB extends throughout most of southern Canada, as well as the eastern, southeastern, and midwestern United States. The proposed Project area occurs at the western edge of the TCB range. The TCB hibernates during winter months in caves and mines with constant temperatures and very high humidity. The TCB is more of a habitat generalist than the NLEB. Summer habitat for the TCB consists of forested areas that may include live and dead leaf clusters of live or recently dead deciduous hardwood trees. The TCB needs suitable roosting and foraging habitat near abundant food and water in the spring, summer, and fall; habitat with appropriate microclimate conditions for extended torpor and brief arousal periods in the winter; and adequate connectivity between summer and winter habitats. The TCB migrates from summer habitat to hibernacula in the fall (USFWS 2021b).

As discussed in Sections 3.7.1.3 and 3.8.1, two preconstruction studies were completed to evaluate bats. The first was an acoustic study using five detection stations for 892 detector nights, as defined in the methods contained in Appendix E and Tetra Tech (2019). This study resulted in 14,262 bat calls. Over 99% of calls were identified to bat species other than TCB and fewer than 1% of the calls were classified as "unidentified high frequency bats," which lacked sufficient data to identify species.

The second study was a NLEB summer foraging and roosting habitat evaluation (see Appendix E) completed following guidance from the USFWS's *Range-wide Indiana Bat & Northern Long-eared Bat Survey Guidelines* (USFWS 2022) and field validated on September 13, 2022. Given the NLEB and the TCB both prefer forested habitats, this habitat evaluation is also relevant to the TCB. Suitable summer foraging and roosting habitat for the NLEB, and therefore the TCB, was defined as patches of trees 10 acres or greater, including a 1,000-foot connected habitat buffer as recommended by USFWS guidance for NLEB. As a result of the habitat evaluation, 65 acres of potential summer roosting habitat and 1,508 acres of connected summer foraging habitat were identified in the proposed Project area.

3.8.1.6 Monarch Butterfly and Regal Fritillary

The monarch butterfly (*Danaus plexippus*) was proposed as a threatened species under the ESA on December 10, 2024. Monarch butterflies breed year-round in many regions. In temperate climates, the monarch butterfly will undergo long-distance migration and live for an extended length of time. Monarch butterflies lay their eggs on obligate milkweed host plants (primarily *Asclepias* spp.). Larvae emerge after 2–5 days and develop through five larval instars (the time between molts) over 9–18 days. The larvae feed on milkweed and sequester toxic chemicals (cardenolides) as a defense against predators. Larvae pupate into a chrysalis and emerge 6–14 days later as an adult butterfly. Multiple generations of monarch butterflies are produced during the breeding season, and adults live ≈ 2–5 weeks. Overwintering adults enter reproductive diapause and live 6–9 months (USFWS 2023h). Monarch butterflies in South Dakota belong to a population that breeds east of the Rocky Mountains and overwinters in Mexico (Monarch Watch 2010).

No monarch butterflies were identified during the site reconnaissance in the proposed Project area or in the 2-mile buffer (Piorkowski et al. 2023). It is important to note that the site reconnaissance was conducted on September 13 and October 13–14, 2022, when monarch butterflies are migrating (Bird Watching HQ 2023).

The regal fritillary (*Argynnis [Speyeria] idalia occidentalis*) is a large, non-migratory butterfly belonging to the brush-footed family of butterflies. Regal fritillary larvae feed exclusively on the leaves of violets (*Viola* spp.), and adults feed on a variety of nectar sources. Adult males are generally present earlier in summer than females, beginning in mid-May, but females are generally present later into the fall, until about the end of October. Eggs are typically laid in prairie landscapes August 15–October 31, and individuals overwinter as larvae, before pupating approximately May 1–July 31 (USFWS 2023i).

On August 6, 2024, the USFWS proposed listing the regal fritillary under the ESA. The western population, whose range overlaps the proposed Project area, is proposed for listing as threatened. According to the USFWS (2023i), there are historical records of the regal fritillary occurring in Haakon County, South Dakota, but there are no current records. The proposed Project area is in the Northwestern Great Plains Regal Fritillary Species Status Assessment Analytical Unit, which has a high resiliency and habitat condition score for regal fritillaries, and even under the most extreme future scenario modeled by the USFWS was still ranked as having a medium resiliency (USFWS 2023i).

Aerial imagery analysis indicates grasslands in and adjacent to the proposed Project area have potential to contain milkweeds and violets that may be used by monarch butterflies and regal fritillaries, respectively. There is the potential for suitable habitat in the Project area, most likely in areas classified as Northwestern Great Plains Mixedgrass Prairie and Northwest Great Plains Riparian Herbaceous vegetation (see Table 3-15).

3.8.1.7 Suckley's Cuckoo Bumble Bee

The Suckley's cuckoo bumble bee (*Bombus suckleyi*) (SCBB) has a broad distribution across North America and has been known to occur in 17 U.S. states and every Canadian province and territory except Nunavut. The SCBB is one of six cuckoo bumble bee species in North America and is a medium-sized, obligate social parasite, invading the nests of bumble bees of the subgenus *Bombus* (Committee on the Status of Endangered Wildlife in Canada 2019; USFWS 2024f). Confirmed host species for the SCBB include the western bumble bee (*B. occidentalis*) and Nevada bumble bee (*B. nevadensis*). Female SCBB do not have the ability to collect pollen for their offspring and rely on worker bees from a host colony to raise young (USFWS 2024f). Both the western and Nevada bumble bee species nest underground in crevices and abandoned rodent burrows (Montana Natural Heritage Program 2025, Xerces Society for Invertebrate Conservation 2023). The SCBB is found in a wide variety of habitats including meadows, grasslands, farms, woodlands, with the transition zone between habitat types being especially valuable for nesting. Ultimately, the SCBB is entirely dependent on host bumble bee colonies, making these colonies a critical habitat need for the species (USFWS 2024f). Information on the life history, foraging, and habitat requirements for the SCBB is lacking; however, this species is considered a generalist forager that requires a wide variety of floral and nectar resources (Hines and Hendrix 2005). Threats to the SCBB include widespread use of pesticides and herbicides, competition from commercial/managed bees, decline of host species populations, and habitat loss due to conversion and fragmentation (USFWS 2024f).

The SCBB has not been detected in the United States since 2016. The most recent detection of SCBB within the state of South Dakota occurred prior to 2000, despite increased efforts to survey bumble bees in the Great Plains (USFWS 2024f; Xerces Society for Invertebrate Conservation 2025). One of the host species for the SCBB, the Nevada bumble bee, has been documented most recently near the town of Scenic in Pennington County, South Dakota, in 2024, approximately 45 miles away from the Project area. The western bumble bee has only been documented in the Black Hills region of South Dakota, approximately 80 miles west of the Project area (Xerces Society for Invertebrate Conservation 2025).

Potentially suitable habitat for the SCBB and its host species could occur wherever native flowering plants occur in the Project area. Similar to the western regal fritillary and monarch butterfly, the 27,678 acres of grassland identified in the Grassland Habitat Assessment (see Appendix H) may contain the necessary floral and nectar components to provide potential habitat for SCBB and associated host species.

3.8.1.8 Species of Special Concern

Species of special concern include species listed as USFWS BCC (USFWS 2021a, 2024e), SDGFP South Dakota SGCN (SDGFP 2014, 2023), and sensitive species, such as prairie grouse. Bald and golden eagles

are also considered species of special concern due to their protection under the Bald and Golden Eagle Protection Act of 1940.

As discussed in Section 3.7.1.2, eagle and large bird use surveys were conducted in the proposed Project area in 2022, 2023, and concluded in August 2024. The avian use surveys from January 2022 through March 2023 noted the presence of bald and golden eagles. Survey methods in the avian use surveys for eagle observations are described in Section 3.7.1.2. Data was collected for eagles based on recommendations in the USFWS *Eagle Conservation Plan Guidance* (USFWS 2013) and the 2016 Final Eagle Rule.

There were 24 observations of bald eagles and 50 observations of golden eagles. The bald eagle observations averaged 0.01 observations per survey and was highest during winter (0.08), followed by spring (0.04), summer (0.01), and fall (0.01). Golden eagle observations averaged 0.03 observations per survey and was highest during winter (0.11), followed by spring (0.10), fall (0.07), and summer (0.03).

Because one active bald eagle nest with an egg and/or nestling was identified in the proposed Project area, Philip Wind Partners conducted eagle use distribution monitoring in the proposed Project area at the nest between May 14 and June 22, 2022. The objective of eagle use distribution monitoring was to gain information on how bald eagles use the area around the active nest spatially by mapping flight paths to and from the nest. One bald eagle observation was recorded during a total of 28 hours (seven 4-hour surveys) of nest monitoring. Nest failure was confirmed on June 22, 2022, because no eagle observations were made during two consecutive surveys occurring on June 15 and June 22, 2022.

The USFWS IPaC report identified 10 species listed as USFWS BCC that may occur in the proposed Project area (USFWS 2024e): bobolink (*Dolichonyx oryzivorus*), chestnut-collared longspur (*Calcarius ornatus*), ferruginous hawk, lark bunting, lesser yellowlegs (*Tringa flavipes*), marbled godwit (*Limosa fedoa*), northern harrier, prairie falcon (*Falco mexicanus*), red-headed woodpecker (*Melanerpes erythrocephalus*), and Sprague's pipit (*Anthus spragueii*) (Piorkowski et al. 2023). The USFWS IPaC report also identified the bald eagle, which is protected under the Bald and Golden Eagle Protection Act (USFWS 2024e). As discussed above, the lark bunting and the northern harrier were observed during the September 2022 site reconnaissance visit; the bald eagle was observed during raptor nest surveys, eagle use distribution monitoring, and the September 2022 site reconnaissance visit.

The SDGFP identifies 132 animal species and 32 plant species listed as SGCN: 41 bird species, 16 mammal species, 16 reptile or amphibian species, 12 terrestrial insect species, 11 freshwater mussel species, four gastropod species, 28 fish species, and four aquatic insect species (SDGFP 2014, 2023). SGCNs observed during the September 2022 site reconnaissance visit included the bald eagle and lark bunting. Greater prairie-chicken, an SGCN, was observed in a 2-mile buffer surrounding the proposed Project area during prairie grouse lek surveys conducted in April and May 2022.

Prairie grouse lek surveys were conducted in the proposed Project area and a 2-mile buffer surrounding the proposed Project area during three aerial flights between April 4 and May 11, 2022. No ground-based surveys were conducted during the 2022 surveys. A lek is an assembly area where animals (such as prairie grouse) display courtship behaviors. Leks can vary in number and location on an annual basis. These surveys followed guidance from the SDGFP *Prairie Grouse Management Plan for South Dakota 2017–2021* (SDGFP 2017). During the surveys, 31 new and historical leks were observed. Table 3-22 presents the 2022 grouse lek survey results, with the location (in the proposed Project area or in the 2-mile buffer), species, and lek status.

Philip Wind Partners conducted additional prairie grouse lek surveys in 2023, revisiting the 2022 active leks via one aerial survey, and conducted three ground surveys per feedback received from the SDGFP. Ground surveys were conducted between March 27 and May 6, 2023 (during the active lekking period).

The aerial survey was conducted in the same timeframe to cover areas not accessible by the ground surveys. During the 2023 surveys, 69 new and historical leks were observed (see Table 3-22). Philip Wind Partners shared survey results with the USFWS and SDGFP and committed to the agencies that four turbines would be removed that had been planned in proximity to leks and suitable prairie grouse habitat.

Turbine siting modifications were completed, and Philip Wind Partners removed four turbines in proximity to leks and Tier 3 modeled priority sharp-tailed grouse habitat (Runia et al. 2021) (see Figure 1-3). Philip Wind Partners also modified the locations of six turbines in response to eagle and raptor nest field survey data. The revised layout of the infrastructure is illustrated in Figure 2-1.

Table 3-22. Prairie Grouse Lek Survey Results

Location	Species	Active Status	Inactive Status	Total
2022 Results				
Proposed Project area	Sharp-tailed grouse	11	2	13
2-mile buffer	Sharp-tailed grouse	15	2	17
Proposed Project area	Greater prairie-chicken	0	0	0
2-mile buffer	Greater prairie-chicken	1	0	1
2022 Total	*Both species*	*27*	*4*	*31*
2023 Results				
Proposed Project area	Sharp-tailed grouse	12	N/A*	12
2-mile buffer	Sharp-tailed grouse	18	N/A*	18
Proposed Project area	Greater prairie-chicken	19	N/A*	19
2-mile buffer	Greater prairie-chicken	18	N/A*	18
Proposed Project area	Mixed species	1	N/A*	1
2-mile buffer	Mixed species	1	N/A*	1
2023 Total	*Both species*	*69*	*N/A**	*69*

* N/A = not applicable. Inactive prairie grouse leks were not included in the 2023 survey results. Only prairie grouse leks identified as active during the 2022 survey were revisited in 2023.

3.8.2 Environmental Consequences: Proposed Action

3.8.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) in addition to the Applicant's additional voluntary environmental protection measures (see Table 2-3).

Philip Wind Partners also committed to BMPs and species-specific conservation measures identified in the PBA Consistency Evaluation Forms. The PBA Consistency Evaluation Forms were completed for the following federally listed, candidate, or proposed species that may occur in the proposed Project area: NLEB, piping plover, whooping crane, and rufa red knot. The Project complies with Section 7 of the ESA per the PBA Consistency Evaluation Forms for these species.

The impact summaries listed below consider threatened, endangered, and special-status-species-specific BMPs identified in Table 2-3 and measures outlined in Appendix K. Additional BMPs and mitigation measures outlined in Table 2-3 for water resources (see Section 3.3), vegetation (see Section 3.6), and

wildlife (see Section 3.7) would also apply. BMPs and mitigation measures presented for wildlife (see Section 3.7) would also be considered generally protective for threatened, endangered, and special-status species and their habitats.

- Complete pre-Project surveys to document wildlife resources and important habitat areas.
- Reduce impacts to wildlife resources to the extent practicable through Project layout and design.
- Prepare and implement a BBCS (see Appendix P) in accordance with the USFWS *Land-Based Wind Energy Guidelines* (USFWS 2012).
- Revegetate areas of temporary construction impacts to pre-Project conditions to restore habitat.

3.8.2.2 Switchyard

Sections 3.8.2.2.1 through 3.8.2.2.6 describe species identified in the USFWS IPaC report (USFWS 2024e) that may occur in the proposed Project area and the Switchyard's potential effects. Section 3.8.2.2.7 describes impacts to the species of special concern, including prairie grouse and eagles.

3.8.2.2.1 RUFA RED KNOT

The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the rufa red knot (see Appendix K). Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the rufa red knot.

3.8.2.2.2 PIPING PLOVER

The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the piping plover (see Appendix K). Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the piping plover.

3.8.2.2.3 WHOOPING CRANE

The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the whooping crane (see Appendix K). Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. A Whooping Crane Monitoring and Contingency Plan (see Appendix L) has been developed to minimize potential impacts to whooping cranes during construction and O&M of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the whooping crane.

3.8.2.2.4 NORTHERN LONG-EARED BAT

The Switchyard would be constructed in an area where summer occupancy of NLEBs is not anticipated. Switchyard construction would not remove any habitat known to be used by NLEB and no operational

effects are expected from the Switchyard. WAPA determined the Proposed Action, including the potential effects of the Switchyard, may affect but is not likely to adversely affect the NLEB.

3.8.2.2.5 TRICOLORED BAT

The Switchyard would be constructed in an area where summer occupancy of TCB is not anticipated, and construction of the Switchyard would not remove TCB habitat. There would be no construction or operational effects of the Switchyard to TCB.

If the TCB is listed as threatened or endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building the Switchyard may affect the TCB, then WAPA would initiate consultation with the USFWS regarding effects on TCB. If the TCB is listed as threatened or endangered under the ESA after conclusion of WAPA's discretionary Federal action, the Applicant would be responsible for determining risk to TCB and whether to initiate Section 10 consultation with the USFWS.

3.8.2.2.6 MONARCH BUTTERFLY AND REGAL FRITILLARY

Impacts to monarch and regal fritillary butterflies could occur from mortality to individuals during construction as well as from the conversion of potential habitat to Project infrastructure. Construction and O&M of the Switchyard would permanently disturb ≈ 5 acres of prairie habitat that may include milkweeds and/or violets. This disturbance would permanently impact a minor portion of potential habitat (<0.1% of potential habitat in the Project area) compared to the availability of similar habitat in the vicinity, and therefore would not likely cause a noticeable change in the local abundance or general distribution of either butterfly population.

If either butterfly is listed as threatened or endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building the Switchyard may affect either butterfly, then WAPA would initiate consultation with the USFWS regarding effects on the monarch or regal fritillary. If either butterfly is listed as threatened or endangered under the ESA after conclusion of WAPA's discretionary Federal action, the Applicant would be responsible for determining risk to the species and whether to initiate Section 10 consultation with the USFWS.

3.8.2.2.7 SUCKLEY'S CUCKOO BUMBLE BEE

Impacts to SCBB could occur from construction, operation, and decommissioning of Project infrastructure. Disturbance, injury, or mortality of SCBB individuals could occur while the species is active between April and October; loss, degradation, or alteration of SCBB or host bumble bee habitats or floral and nectar resources could occur, resulting in reduced survivorship or reproductive success. Construction and O&M of the Switchyard would permanently disturb ≈ 4 acres of potential habitat (Northwestern Great Plains Mixedgrass Prairie) for the SCBB or its associated host species. This disturbance would permanently impact a minor potion of potential habitat (<0.1% of potential habitat in the Project area) compared to the availability of similar habitat in the vicinity, and therefore would not likely cause a noticeable change in the local abundance or general distribution of the species.

If the SCBB is listed as endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building the Switchyard may affect the SCBB, then WAPA would initiate consultation with the USFWS regarding effects on the SCBB. If the SCBB is listed as threatened or endangered under the ESA after conclusion of WAPA's discretionary Federal action, the Applicant would be responsible for determining risk to the species and whether to initiate Section 10 consultation with the USFWS.

3.8.2.2.8 SPECIES OF SPECIAL CONCERN

Loss and fragmentation of grasslands may negatively affect species of special concern, including prairie grouse. The Switchyard would temporarily impact ≈ 1 acre and permanently impact ≈ 4 acres of Northwestern Great Plains Mixedgrass Prairie. These acres are previously broken grassland. The overall disturbance to wildlife species and habitat would be minor.

The Switchyard avoids the top two habitat tiers of both prairie grouse species' habitat (SDGFP 2023).

The Switchyard's small size and lack of large aerial components reduces its impact to bird species of special concern, including bald and golden eagles. The BBCS (see Appendix P) outlines the design features implemented that comply with the APLIC suggestions to avoid and minimize impacts from electrocution hazard and t-line collision. Because of these conservation measures, impacts to bird species of special concern, including eagles, from the Switchyard would be negligible.

3.8.2.3 Wind Facility

Sections 3.8.2.3.1 through 3.8.2.3.6 describe species identified in the USFWS IPaC report (USFWS 2024e) that may occur in the proposed Project area and the Wind Facility's potential effects. Section 3.8.2.3.7 describes impacts to the species of special concern, including prairie grouse and eagles.

3.8.2.3.1 RUFA RED KNOT

Because the rufa red knot has not been known to be in the proposed Project area, there is negligible risk of direct or indirect impacts to the rufa red knot. The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the rufa red knot (see Appendix K). Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the rufa red knot.

3.8.2.3.2 PIPING PLOVER

There is limited to no suitable piping plover habitat in the proposed Project area (Piorkowski et al. 2023). Although piping plovers can occur in open water land cover types, the proposed Project area is < 1% open water. Philip Wind has committed to turbine setbacks identified in Table 1-1 to minimize the impact to the piping plover and associated habitat, resulting in an insignificant risk of direct or indirect impacts to piping plovers. The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the piping plover (see Appendix K). Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the piping plover.

3.8.2.3.3 WHOOPING CRANE

According to the predicted habitat use model, there is potential for whooping cranes to use the proposed Project area during migration, resulting in possible direct or indirect impacts to whooping cranes consistent with those disclosed in the UGP PEIS. The PBA Consistency Evaluation Forms were completed and accepted by the USFWS, and the Project would comply with conservation measures outlined in the PBA for the whooping crane (see Appendix K). Invenergy has agreed to contribute

funding to a third-party entity to complete 5 acres of perpetual wetland easement offsets to adhere to conservation measures outlined in the whooping crane PBA Consistency Evaluation Forms. The third-party mitigation provider would be responsible to use the funding to perpetually protect wetlands in the 95% whooping crane migration corridor of South Dakota. These may include existing, restored, or created wetlands. Documentation of funding by the Project to the third-party offset provider would be provided to WAPA prior to Project interconnection. A Whooping Crane Monitoring and Contingency Plan (see Appendix L) has been developed to minimize impacts to whooping cranes during construction and operation of the Project. Bird flight diverters and marking devices specified in the PBA Consistency Evaluation Forms would be installed and maintained on newly constructed overhead lines following industry suggestions (APLIC 2012) for the life of the Project. WAPA determined the Proposed Action may affect but is not likely to adversely affect the whooping crane.

3.8.2.3.4 NORTHERN LONG-EARED BAT

No NLEBs have been detected in the proposed Project area, and it is unlikely that NLEBs would migrate through the proposed Project area given the distance from the nearest known hibernaculum (≈ 68 miles away).

The original PBA NLEB Consistency Evaluation Forms were completed and accepted by the USFWS in April 2023 and determined that the Proposed Action may affect but is not likely to adversely affect the NLEB. Since completion and acceptance of the PBA Consistency Evaluation Forms (see Appendix K), the USFWS released the final *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Northern Long-eared Bat* in October 2024 (USFWS 2024d), which includes recommended conservation measures (e.g., curtailment windows) that differ from those in the 2015 version of PBA Consistency Evaluation Form. The PBA allows for amendments to be made when new information reveals effects on species or critical habitat (WAPA and USFWS 2015). WAPA and USFWS completed an amendment to the PBA in December 2024. Philip Wind Partners has committed to the following conservation measures for the NLEB listed in the Consistency Evaluation Forms to help reduce the impacts of the proposed Project to the NLEB.

- Avoid siting turbines ≤ 0.5 mile from suitable summer NLEB habitat, following avoidance measures outlined in the UGP PEIS and PBA Consistency Evaluation Forms for NLEB. This exceeds the current NLEB guidance of 1,000 ft (0.19 mile) and would benefit NLEB by avoiding suitable NLEB summer habitats.
- The Project would be sited to minimize tree clearing. Tree clearing would occur on ≈ 2 acres (1.9% of all forested habitat in the proposed Project area).
- Tree clearing would occur outside the bat active season (tree clearing would occur only from November 1–April 14).
- Turbines would be feathered below the cut-in speed. Turbines would be curtailed following the cut-in speeds listed below during the related timeframes from half hour before sunset to half hour after sunrise when the temperature is > 40 degrees Fahrenheit (USFWS 2024d):
    - November 1–August 15: Manufacturer's cut-in speed
    - August 16–October 31: 5 meters per second
- The Project would conduct 1 year of post-construction monitoring following the first year of commercial operation and would subsequently conduct post-construction monitoring during the bat active season every 7 years.
- The Project would report any found NLEB carcass to USFWS within 24 hours of discovery and would submit annual reports by January 31.

USFWS signed the updated NLEB Consistency Evaluation Forms on March 18, 2025, and WAPA signed the updated NLEB Consistency Evaluation Forms on April 21, 2025 (see Appendix K). Based on the commitments concurred with, there is negligible risk of direct or indirect impacts to NLEB. Additionally, there is no change in the significance of impacts to NLEB between the publication of the Draft EA and the Final EA following issuance of the final NLEB guidance (USFWS 2024d). WAPA determined that the Proposed Action may affect but is not likely to adversely affect the NLEB.

3.8.2.3.5 TRICOLORED BAT

Philip Wind Partners has committed to conservation measures for the NLEB, as outlined in the final *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Northern Long-eared Bat* (USFWS 2024d) and listed in Section 3.8.2.3.4. Those conservation measures also help reduce the impacts of the proposed Project to the TCB.

Western EcoSystems Technology, Inc. (WEST), maintains a database on bird and bat fatalities associated with wind energy facilities (WEST 2023). A total of 759 TCB fatalities have been reported at wind facilities since 2001 across the United States and Canada. This analysis accounts for the following considerations regarding potential impacts of the Project to TCBs:

- There are no reported fatalities of TCB at operating wind facilities in South Dakota.
- There are no reported fatalities at any of the 19 operating wind facilities in the West-Central Semi-Arid Prairies EPA Level II Ecoregion (Omernik 1987) that submitted information to the WEST database from 2006 to 2017 (WEST 2023).
- A 5-meter-per-second cut-in speed reduces bat fatalities by an average of 62% for tree-roosting species in North America (Whitby et al. 2021).

No TCB calls were detected in the bat acoustic monitoring surveys conducted for the Project. The bat acoustic monitoring results were speciated and more than 99% of the total calls were identified to species other than TCB, with only <1% classified as “unidentified high frequency” calls. Therefore, TCB are unlikely to be present in the Project area. Based on the lack of evidence of TCB fatalities at existing wind facilities within the state and Level II Ecoregion, and the fact the Project is implementing curtailment measures that are likely to further reduce the risk of direct mortality to the TCB, the Wind Facility would pose minor risk of direct impacts to the TCB and negligible risk of indirect impacts to the TCB. Because the Project does not fully conform to the USFWS final *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Tricolored Bat* (USFWS 2024b), potential risk to TCBs should be re-evaluated further if the species is listed under the ESA.

If the TCB is listed as threatened or endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building or operating the Wind Facility may affect the TCB, then WAPA would initiate consultation with the USFWS regarding effects on TCB. If the TCB is listed as threatened or endangered under the ESA after conclusion of WAPA’s discretionary Federal action, the Applicant would be responsible for assessing the risk of take of TCB and determining whether to initiate Section 10 consultation with the USFWS.

3.8.2.3.6 MONARCH BUTTERFLY AND REGAL FRITILLARY

Impacts to monarch and regal fritillary butterflies could occur from mortality to individuals during construction as well as from the conversion of potential habitat to Project infrastructure. Construction and O&M of the Wind Facility would temporarily disturb ≈ 196 acres of Northwestern Great Plains Mixedgrass Prairie and Northwest Great Plains Riparian Herbaceous vegetation, and permanently impact ≈ 9 acres of Northwestern Great Plains Mixedgrass Prairie. There would be temporary impacts to 0.8%

and permanent impacts to <0.1% of Northwestern Great Plains Mixedgrass Prairie and Northwest Great Plains Riparian Herbaceous vegetation in the Project area. This disturbance would impact a minor portion of potential habitat compared to the availability of similar habitat in the vicinity, and therefore would not likely cause a noticeable change in the local abundance or general distribution of either butterfly.

If either butterfly is listed as threatened or endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building or operating the Wind Facility may affect the listed butterfly, then WAPA would reinitiate consultation with the USFWS regarding effects on the listed butterfly. If either butterfly is listed as threatened or endangered under the ESA after conclusion of WAPA's discretionary Federal action, the Applicant would be responsible for assessing the risk of take of western regal fritillary and/or monarch butterfly and determining whether to initiate Section 10 consultation with the USFWS.

3.8.2.3.7 SUCKLEY'S CUCKOO BUMBLE BEE

Disturbance, injury, or mortality of SCBB individuals could occur while the species is active between April and October; loss, degradation, or alteration of SCBB or host bumble bee habitats or floral and nectar resources could occur, resulting in reduced survivorship or reproductive success.

Construction and O&M of the Wind Facility would temporarily disturb ≈ 196 acres of Northwestern Great Plains Mixedgrass Prairie and Northwest Great Plains Riparian Herbaceous vegetation, and permanently impact ≈ 9 acres of Northwestern Great Plains Mixedgrass Prairie. There would be temporary impacts to 0.8% and permanent impacts to <0.1% of Northwestern Great Plains Mixedgrass Prairie and Northwest Great Plains Riparian Herbaceous vegetation in the Project area. This disturbance would impact a minor portion of potential habitat compared to the availability of similar habitat in the vicinity, and therefore would not likely cause a noticeable change in the local abundance or general distribution of SCBB or its host species.

If the SCBB is listed as endangered under the ESA while WAPA is still engaged in a discretionary Federal action and WAPA determines that building or operating the Wind Facility may affect the species, then WAPA would reinitiate consultation with the USFWS. If the species is listed as endangered under the ESA after conclusion of WAPA's discretionary Federal action, the Applicant would be responsible for assessing the risk of take of SCBB and determining whether to initiate Section 10 consultation with the USFWS.

3.8.2.3.8 SPECIES OF SPECIAL CONCERN

Loss and fragmentation of grasslands described above can negatively impact species of special concern, including prairie grouse. The Wind Facility would temporarily impact ≈ 186 acres and permanently impact ≈ 9 acres of Northwestern Great Plains Mixedgrass Prairie vegetation. The Wind Facility would also temporarily impact ≈ 10 acres of Northwestern Great Plains Riparian Herbaceous vegetation. This level of permanent disturbance (≈ 9 acres) to potential prairie habitats in the area would be considered minor and impacts to species of special concern from habitat loss or fragmentation would be negligible.

The Wind Facility avoids the top two habitat tiers of prairie grouse habitats as defined by the SDGFP (2023). In response to 2023 prairie grouse lek surveys, Philip Wind Partners coordinated with the SDGFP to remove four turbine locations to reduce impacts to sharp-tailed grouse, consistent with setbacks in Table 1-1 (see Figure 1-3). Philip Wind Partners also relocated six turbines in response to eagle and raptor nest field survey data. During Wind Facility construction and O&M, direct wildlife mortality may result from collisions with vehicles, aboveground gen-tie lines, or turbines. Impacts to eagles would be consistent with those identified in the UGP PEIS.

3.8.2.4 Special-Status Species Conclusion

Section 5.6.1.4 – Threatened, Endangered, and Special Status Species of the UGP PEIS describes impacts that may occur to threatened, endangered, and special-status species in the UGP Region during a typical wind energy project's life cycle. Section 5.6.2.6 – Threatened, Endangered, and Special Status Species of the UGP PEIS finds the BMPs and conservation measures presented in Section 5.6.2 – BMPs and Mitigation Measures of the UGP PEIS for addressing potential effects on ecological resources would also benefit many sensitive species and habitats. In conjunction with the UGP PEIS, a PBA was prepared under Section 7 of the ESA to address potential impacts of wind energy development to federally listed, candidate, and proposed threatened or endangered species in the UGP Region. The UGP PBA identified programmatic avoidance criteria and species-specific minimization measures that applicants may elect to follow to address impacts to particular species, and it presents determinations regarding the potential for adverse effects on federally listed, candidate, or proposed species if the conservation measures are met. These measures are summarized in Table 2.3-2 of the UGP PEIS.

Four federally listed species (rufa red knot, piping plover, whooping crane, and NLEB), and four federally proposed threatened or endangered species (regal fritillary, monarch butterfly, TCB, and SCBB) may occur in the Project area. Based on the lack of presence (rufa red knot); negligible suitable habitat (piping plover); minor risk according to predicted habitat use models (whooping crane); long distance to hibernacula (NLEB); and likely absence (TCB, NLEB, and SCBB), there is low potential for occurrence of these species in the proposed Project area. There is moderate potential for monarch butterfly and regal fritillary to occur in the Project area; however, impact to habitats with potential to contain milkweed species and/or violets would be minor (Piorkowski et al. 2023). WAPA has received concurrence from the USFWS on a determination of "not likely to adversely affect" for the rufa red knot, piping plover, whooping crane, and NLEB through the Project's commitment to the programmatic conservation measures identified in the UGP PBA and revised Consistency Evaluation Forms for NLEB (see Appendix K). The Project is committed to reducing impacts to these species by following the programmatic conservation measures found in the PBA and revised guidance for NLEB and by implementing the BMPs and conservation measures in Section 5.6.2 – BMPs and Mitigation Measures of the UGP PEIS. These impacts would be consistent with the analysis and findings in the UGP PEIS, and the Project would not result in new or additional significant impacts compared to those described in the UGP PEIS.

Prairie grouse are also identified as species of special concern. Out of 25,856 acres of potential prairie grouse habitat in the Project area, ≈ 9 acres would be permanently disturbed (~ 0.03% of available habitat). Given the small amount of permanent disturbance to potential prairie grouse habitat and the Project's commitment to reduce impacts by following the BMPs and conservation measures in Section 5.6.2 – BMPs and Mitigation Measures of the UGP PEIS, these impacts would be consistent with the analysis and findings in the UGP PEIS, and the Project would not result in new or additional significant impacts compared to those described in the UGP PEIS.

3.8.3 Environmental Consequences: No Action Alternative

Under the No Action Alternative, the Project would not be developed, and impacts to threatened, endangered, and special-status species would continue at existing levels.

3.9 VISUAL RESOURCES

3.9.1 Existing Conditions

Visual and scenic resources in the UGP Region are discussed in Section 4.7 – Visual Resources of the UGP PEIS. Rangeland, cropland, large open vistas, and gently rolling topography visually dominate the proposed Project area landscape. Visual impacts to the landscape attributable to the Project would depend on the extent to which the existing landscape is already altered from its natural condition, the number of viewers (i.e., residents, travelers, visiting recreational users, etc.) in visual range of the area, and the degree of public or agency concern for the landscape. Agriculture is the dominant land use with large, geometric agricultural plots occupying most of the proposed Project area. Occupied residences are scattered throughout the proposed Project area, and a few rural residences are adjacent to, but outside, the proposed Project area. South Dakota Highway 73 is the only major transportation corridor intersecting the proposed Project area from north to south. South Dakota Highway 34 directly abuts the northern edge of the proposed Project area and would likely experience visual impacts despite being outside the proposed Project area. Several rural roads bisect the proposed Project area. The current landscape includes numerous lakes and reservoirs, a cemetery, roadside ditches, and existing t-lines.

The nearest designated scenic resources to the proposed Project area are the Native American Scenic Byway (35 miles northeast), Minuteman Missile National Historic Site (25 miles south), Badlands Loop Scenic Byway (25 miles southwest), and Badlands National Park (35 miles southwest).

3.9.1.1 Shadow Flicker

Shadow flicker occurs when wind turbine blades pass in front of the sun to create reoccurring shadows. Such shadows occur under specific conditions, including sun position, wind direction, time of day, and other similar factors. Shadow flicker becomes less noticeable with increasing distance from a wind turbine, and shadow flicker becomes imperceptible beyond ≈ 4,920 ft (≈ 0.9 mile) (see Appendix M). At such distances, shadow flicker is usually caused at sunrise or sunset, when shadows are sufficiently long.

No regulations regarding shadow flicker were identified in South Dakota. Haakon County has no published ordinances regarding shadow flicker limits. Effects on nearby residences or other sensitive viewing locations would be reduced through considerations during the siting process (see Section 3.9.2).

3.9.2 Environmental Consequences: Proposed Action

3.9.2.1 Environmental Commitments

Philip Wind Partners committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. These measures would reduce visual impacts, as usually addressed during the siting process. The impact summaries below consider the visual resources-specific BMPs (see Appendix O and Table 2-3):

- Turbines would be sited to eliminate shadow flicker effects on nearby residences or other highly sensitive viewing locations, or reduce them to the lowest achievable levels, as calculated using appropriate siting software and procedures. Accurately determined shadow flicker estimates would be made available to stakeholders in advance of Project approval. If turbine sites are changed during the siting process, shadow flicker effects would be recalculated and made available to affected stakeholders.
- Turbines would be visually uniform in shape, color, and size of rotor blades, nacelles, and towers.

3.9.2.2 Switchyard

Construction activities may result in visual impacts from vegetation clearing and grading; road building or upgrading; construction and use of staging areas and laydown yards; construction of facilities; vehicles, equipment, worker presence, and activity; dust; and emissions. Construction visual impacts would vary in frequency, duration, and location throughout construction. Periods of intense activity followed by periods with less activity, and associated visual impacts, would vary in accordance with construction activity levels. Site monitoring, adherence to standard construction practices, and restoration activities would reduce potential construction impacts. Vehicle activity would be reduced once the Switchyard reached commercial O&M. Visual impacts from construction of the Switchyard would cease once the Switchyard becomes operational. Permanent visual impacts in the proposed Project area would be minor.

3.9.2.3 Wind Facility

Due to the large size of wind turbine towers, blades, and other components, the transport and installation of wind turbines would be visually conspicuous during construction (transport and installation would cease at the end of construction).

The primary direct visual impacts associated with O&M of the Wind Facility would result from the introduction of the numerous vertical lines of ≤ 90 wind turbines into the strongly horizontal landscape in the proposed Project area. The proposed gen-tie line would also be a new visual feature, but impacts would mirror those of the existing t-lines in the proposed Project area. To reduce visual impacts, the Wind Facility was designed according to SDPUC ordinances.

Turbine marker lights and other lighting on facilities would result in visual impacts. To reduce visual impacts of the Wind Facility, towers would be painted off-white to reduce glare, in accordance with FAA regulations. As required by South Dakota Codified Law 49-41B-25.2, Philip Wind Partners would install ≤ three ADLS towers to comply with FAA requirements (see Figure 2-1 for the ADLS tower locations). ADLSs involve installation of radar units around the perimeter of the Wind Facility. When radar does not detect an aircraft, it would send a signal to the wind turbine lighting to keep the light off. When radar detects an aircraft, it would stop sending a signal and the wind turbine lighting would activate. Visual impacts would be increased for a short time when an aircraft is detected. ADLS towers would reduce long-term lighting impacts as ADLS towers would use innovative technologies to eliminate the need for continuously flashing lights.

The construction and O&M of the Wind Facility would result in visual impacts. Magnitude of those visual impacts would depend on many factors, including distance of the proposed facility from viewers, weather and lighting conditions, the presence and arrangements of lights on turbines and structures, and viewer attitudes. Viewer attitudes would be subjective, and viewer reactions to visual changes may be influenced by several nonvisual factors, such as perceptions of renewable energy, wind power, and financial considerations.

Based on the UGP PEIS, visual impacts would dominate the views of casual viewers out to 3–5 miles; this would include rural residents and travelers along South Dakota Highways 73 and 34. Out to 10–12 miles, the Wind Facility would be prominent to the casual viewer but would not dominate the view; this would include the same categories of viewers. The UGP PEIS indicates that viewers from ≥ 15 miles would observe much smaller impacts; the town of Philip is ≈ 15 miles from the southern edge of the Wind Facility. According to the UGP PEIS, turbines ≈ 650 ft high would be visible ≈ 30 miles away.

Decommissioning impacts would be ≤ those described for construction. Temporary visual impacts would occur when removing infrastructure. Once the Wind Facility is decommissioned, visual resources would

return to pre-Wind Facility conditions and permanently impacted land would be restored to pre-Wind Facility land uses.

3.9.2.3.1 SHADOW FLICKER

Visual impacts from O&M of the Wind Facility may result from shadow flicker. Philip Wind Partners conducted and published a Shadow Flicker Study. Results demonstrated the Wind Facility may be operated with minimal disturbance to sensitive receptors (see Appendix M).

The Shadow Flicker Study surveyed areas within 1.25 miles of turbines to be conservative of the 0.9-mile area of perception. In the area surveyed, 16 receptors (inhabited residences, schools, hospitals, churches, and cemeteries) were identified. Participating landowners own 10 of the 16 receptors. Results of the Shadow Flicker Study were based on 95 turbine locations. If 95 turbines were constructed, 11 receptors would be expected to receive 0–10 hours of annual shadow flicker (three nonparticipating), three receptors would receive 10–20 annual hours (two nonparticipating), and two receptors would receive 20–30 annual hours (one nonparticipating) (see Appendix M). The average annual sunlight hours in South Dakota are ≈ 2,900 hours (Turbine Generator 2018). The 11 receptors that would receive ≤ 10 hours of shadow flicker annually represent 0.34% of annual sunlight hours. The three receptors receiving ≤ 20 hours of shadow flicker annually represent 0.69% of annual sunlight hours. The two receptors that would receive ≤ 30 hours of shadow flicker represent 1.0% of annual sunlight hours. Shadow flicker from the Wind Facility would be reduced through siting and design to limit duration and area of effect. Turbine numbers were reduced from 95 to 90 (on 91 potential sites) (see Figure 1-3), resulting in reduced visual impact than those reported in the Shadow Flicker Study. The remaining shadow flicker would be spread across many days, where only a small number of minutes of shadow flicker would be encountered daily. Shadow flicker may be further reduced by using window blinds and/or landscape screening.

Haakon County has no published shadow flicker regulations. To comply with SDPUC ordinances, shadow flicker effects would be reduced to the extent practicable through modeling, analysis, and proper turbine siting.

3.9.2.4 Visual Resources Conclusion

Section 5.7 – Visual Resources of the UGP PEIS describes potential visual impacts that may occur from wind energy projects, including alteration of the landscape and shadow flicker. The proposed Project is in an area where rangeland, cropland, large open vistas, and gently rolling topography visually dominate the landscape. Based on the UGP PEIS, visual impacts of a wind energy facility may dominate the views of casual viewers out to 3–5 miles. The proposed Project would be prominent to the casual viewer out to 10–12 miles but would not dominate the view. Areas ≤ 10–12 miles of the proposed Project area include rural residents and travelers along South Dakota Highways 73 and 34. The UGP PEIS indicates viewers from ≥ 15 miles would have lower visual impacts. The town of Philip is ≈ 15 miles south of the Wind Facility, and the nearest designated scenic resource to the proposed Project area is 25 miles away.

Shadow flicker has been reduced through siting and design to be limited in duration and area of effect. The remaining shadow flicker would be spread across many days, where a small number of minutes of shadow flicker would be encountered daily.

The Applicant has committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and using turbines exhibiting visual uniformity in shape, color, and size of rotor blades, nacelles, and towers. The use of ADLS technology would reduce long-term lighting impacts.

The proposed impacts to visual resources align with those discussed in the UGP PEIS, and the Project would not result in new or more severe significant impacts than those described in the UGP PEIS.

3.9.3 Environmental Consequences: No Action Alternative

The No Action Alternative would have no impact to visual resources, and existing activities would continue.

3.10 CULTURAL RESOURCES

Cultural resources can include different site types, including archaeological, historical, and architectural sites, that may or may not be eligible for the National Register of Historic Places (NRHP). Cultural resources can also include properties of traditional religious and cultural significance (PTRCSs), which are of importance to Native American Tribes. In most cases, cultural resources are unique, fragile, and nonrenewable. Cultural resources that meet the eligibility criteria for the NRHP are characterized as "historic properties" under the NHPA. Historic properties, as defined in the NHPA (54 USC 300308), consist of any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP, including artifacts, records, and material remains related to such a property or resource. Historic properties can consist of any historic or prehistoric district, site, building, structure, or object (usually) over 50 years of age.

The UGP PEIS provides a brief overview of the cultural context of what is known about the settlement and past use of the Great Plains region; however, to identify new or previously recorded cultural resources eligible or potentially eligible for the NRHP, Philip Wind Partners engaged BCA to conduct a cultural resources survey in 2018 within the original APE for the Project and BCA conducted a second cultural resources survey in 2023 for the updated APE (see Appendix N). The APE is defined in 36 CFR 800.16(d) as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." The direct APE encompasses approximately 1,641 acres and includes the locations where Project infrastructure will be built, such as turbine pads, the O&M building, and the substation/Switchyard; corridors mapped over the center of the proposed collection lines, access roads, and t-lines; as well as areas of temporary disturbance such as laydown yards and staging areas. The indirect APE includes locations where Project infrastructure might visually, or through other means, alter the characteristics and impact the integrity of a cultural resource and its eligibility for NRHP listing. In accordance with requests from SHPO, the indirect APE has been defined as a 1-mile buffer around the t-line, and a 2-mile buffer around each turbine location (actual and alternative).

3.10.1 Existing Conditions

Cultural resources surveys were initiated in 2023 for the updated direct APE. In addition, an architectural survey was completed within the indirect APE to identify historic properties that could be visually impacted by the Project. The field surveys were concluded and consultation with SHPO as part of WAPA's NHPA Section 106 consultation was completed in July 2024. The survey reports and SHPO concurrence letter are provided in Appendix N.

3.10.1.1 Records Search

In 2023, BCA searched the SHPO files to identify previously recorded archaeological resources and previously conducted cultural resources surveys within the direct APE and a 2-mile buffer. The search identified 10 previously recorded archaeological resources within the 2-mile search radius: eight sites and two isolated finds comprising Native American Tribal and historic Euro-American artifact scatters, foundations, a well, a dump, and a farmstead. One Euro-American artifact scatter site is considered

eligible for the NRHP. All sites and isolated finds were formally determined not eligible for the NRHP listing. None of these archaeological resources are located within the direct APE.

The file search also identified 12 previously conducted cultural resources surveys that have taken place within 2 miles of the direct APE, six of which intersect the direct APE. These surveys were conducted for power, telecommunication, and pipeline projects.

A search of the SHPO files for architectural resources within the 2-mile buffer identified three previously recorded historic-age structures, comprising a barn, a fence, and a series of destroyed buildings. All three sites are determined not eligible for the NRHP. None of these architectural resources are located within the direct APE.

3.10.1.2 Field Survey and Reporting Methods

3.10.1.2.1 LEVEL III PEDESTRIAN INVENTORY

Archaeologists initiated the Level III pedestrian inventory in the direct APE in fall 2023. The survey was conducted in accordance with SHPO survey requirements as well as any additional survey requirements from the Tribal Historic Preservation Officer(s) of the participating TCSs (BCA 2023). The surveys were completed in November 2023, and a summary of their findings is provided below. The results and outcomes from WAPA's consultation with SHPO are provided in Appendix N.

BCA archaeologists conducted the survey within the direct APE by walking parallel linear pedestrian transects 50 ft or less apart, based on terrain and on the probability for the presence of cultural resources. Throughout the survey, field observations were recorded as field notes, and digital photographs were taken.

During the survey, when a cultural resource was encountered, the location was marked with pin flags, and the surrounding area was intensely scrutinized to determine the nature and extent of the resource. Shovel test probes were conducted at newly documented archaeological sites and isolated finds to determine the presence of intact subsurface deposits and/or to define the extent of the cultural resource boundary. The number and placement of the shovel test probes were determined by factors encountered during the documentation of the resource, such as features, thin soils, heavy erosion, topography, or the presence of pre-Holocene gravels on the surface. All soil excavated from the shovel test probes was screened for cultural material. No cultural material was collected. As all shovel test probes were negative for cultural material at each cultural resource, the resource boundaries were thus defined by the surface expression of the resources, whether as a site or isolated find. Following the survey, the resources were evaluated for NRHP eligibility.

A cultural resources inventory report was prepared detailing the results of the Level I records search and Level III pedestrian inventory and providing recommendations regarding potential site NRHP eligibility. The report also included the results of the PTRCS inventory. WAPA submitted this report to SHPO during the Section 106 consultation process in June 2024 (see Appendix N). SHPO concurred with WAPA's finding of No Adverse Effect and the recommendations presented in the report on July 11, 2024 (see Appendix N).

3.10.1.2.2 PTRCS INVENTORY

Several federally recognized Native American Nations indicated to WAPA that they were interested in consulting on the Project, as identified in the initial Project scoping in 2018. As a result, WAPA will consult with the interested Tribes for the duration of the Project. TCSs from the Rosebud Sioux Tribe, the Standing Rock Sioux Tribe, the Cheyenne River Sioux Tribe, and the Santee Sioux Nation previously

participated in the 2018 cultural resources survey, during which time no Tribal cultural resources or PTRCSs were identified. Interested Tribes were invited again to participate in the 2023 Level III pedestrian inventory to assist the archaeologists and review the updated direct APE for potential PTRCSs. Four federally recognized Tribes, consisting of the Standing Rock Sioux Tribe, Rosebud Sioux Tribe, Cheyenne River Sioux Tribe, and Northern Cheyenne Tribe, participated in the 2023 survey effort. The results of the PTRCS inventory were included in the Level III cultural resources inventory report, which was provided to SHPO for review and concurrence in June 2024. SHPO concurred with the conclusions and recommendations presented in the report on July 11, 2024 (see Appendix N).

3.10.1.2.3 RECONNAISSANCE ARCHITECTURAL INVENTORY

As requested by SHPO, BCA conducted a reconnaissance architectural inventory within the indirect APE, which inherently includes the direct APE, in fall 2023 (BCA 2023). The purpose of the architectural inventory was to photographically document architectural buildings and structures within the indirect APE and determine their eligibility for the NRHP. The assessment followed the guidance presented in the 1994 Homesteading and Agricultural Development Context, which states that "[a]n agricultural property is an interrelated set of buildings, structures, and archaeological features, all of which are part of a production system," and "[t]herefore, whenever possible, a building, structure or archaeological feature should be evaluated as part of a whole, rather than individually" (Brooks and Jacon 1994:31).

Prior to the reconnaissance fieldwork, BCA completed a literature review of SHPO records, historic aerial imagery, and historic USGS topographic maps to identify potential architectural sites within the indirect APE. Fieldwork was then conducted from public roads, including identification and collecting photographs of each standing building or structure within the indirect APE. Upon completion of the reconnaissance fieldwork, each building and structure within the indirect APE was evaluated by an architectural historian to determine its age and NRHP eligibility based on its potential significance and integrity. A reconnaissance architectural inventory report was prepared detailing findings and recommendations for NRHP-eligible or unevaluated architectural resources within the indirect APE (BCA 2023). WAPA submitted this report to SHPO during the Section 106 consultation process in June 2024 (see Appendix N). SHPO concurred with the conclusions and recommendations presented in the report on July 11, 2024 (see Appendix N). For each property identified as historic in age (i.e., of 45 years of age or older), new structure and bridge records will be added to SHPO's Cultural Resource Geographic Research Information Display online database.

3.10.1.3 Field Survey Results

3.10.1.3.1 LEVEL III PEDESTRIAN INVENTORY RESULTS

In November 2018, archaeologists from BCA and TCSs from the Rosebud Sioux Tribe, the Standing Rock Sioux Tribe, the Cheyenne River Sioux Tribe, and the Santee Sioux Nation completed joint archaeological and PTRCS surveys within the original APE for the Project. No previously recorded cultural resources were revisited because none were present in the direct APE. No previously unrecorded cultural resources were identified during the 2018 survey.

BCA conducted a Level III pedestrian survey and a PTRCS inventory of the updated direct APE in 2023. TCSs from Standing Rock Sioux Tribe, Rosebud Sioux Tribe, Cheyenne River Sioux Tribe, and Northern Cheyenne Tribe participated in the 2023 field survey. During the intensive pedestrian survey, seven cultural resources were encountered, consisting of three historic sites (39HK0182, 39HK0183, 39HK0184) and four precontact isolated finds (39HK0089, 39HK0095, 39HK0180, and 39HK0181). All of these sites lacked integrity and significance and were recommended as not eligible for the NRHP. No

PTRCSs were identified by the TCSs during the survey. SHPO concurred with these recommendations on July 11, 2024 (see Appendix N).

3.10.1.3.2 RECONNAISSANCE ARCHITECTURAL INVENTORY RESULTS

The reconnaissance architectural survey commenced after identifying potential architectural locations using topographic maps and satellite imagery. In total, 83 locations that were or appeared to be architectural sites were investigated in accordance with SHPO reconnaissance survey requirements and photographed from the public right-of-way. Of these 83 locations, 14 had no remaining standing structures, 28 were entirely modern, two were not visible from the public right-of-way and were therefore not recorded or updated following guidance from SHPO, and 39 contained recordable, historic architectural structures. All of the architectural sites are located within the indirect APE; none of the architectural sites are within the direct APE. Of the 39 sites that possessed buildings and structures of historic age, five of these sites contained at least one building or structure that is recommended potentially eligible but unevaluated for the NRHP (see Appendix N) (BCA 2023). In WAPA's Determination of Effect for the proposed undertaking, WAPA stated that they disagreed with BCA's NRHP eligibility recommendations for certain buildings within these five sites and determined that four structures within two of these sites should be not eligible for the NRHP (see Appendix N). However, based on correspondence between WAPA and SHPO on July 11, 2024, SHPO agreed with and upheld BCA's NRHP eligibility recommendations for all sites and structures and concurred that a total of 16 structures within these five sites should be considered unevaluated and four structures should be considered not eligible for listing in the NRHP (see Appendix N).

3.10.2 Environmental Consequences: Proposed Action

3.10.2.1 Environmental Commitments

Philip Wind Partners has committed to implementing the BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. These measures would reduce impacts to cultural resources. The impact summaries below consider the cultural resources-specific BMPs, including the following (see Appendix O for more detail on these BMPs):

- The appropriate federal agency should consult with federally recognized Native American governments early in the planning process for a wind energy development to identify issues and areas of concern. Consultation is required under the NHPA. Consultation is necessary to establish whether the Project is likely to disturb PTRCSs, affect access rights to particular locations, disrupt traditional cultural practices, affect trust resources such as eagles, and/or visually impact areas important to the Tribe(s).
- The presence of archaeological sites and historic properties in the APE should be determined on the basis of a records search of recorded sites and properties in the area and/or an archaeological survey. The SHPO is the primary repository for cultural resources information.
- Cultural resources discovered during construction should be brought to the attention of the responsible federal agency immediately. Work should be immediately halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation plans are being developed.

3.10.2.2 Switchyard

Based on the results of the 2023 records search, no previously recorded cultural resources have been documented within the direct APE. The Level III survey identified seven archaeological sites within the direct APE, consisting of three historic sites and four precontact isolates. All of these sites have been determined ineligible for the NRHP. No PTRCSs were identified. During the reconnaissance architectural inventory, several sites were identified within the indirect APE; however, in a letter dated July 11, 2024, SHPO concurred with WAPA's determination that the Project as proposed would have No Adverse Effect on cultural resources (see Appendix N). Decommissioning impacts would be the same or fewer than those described for construction.

3.10.2.3 Wind Facility

Based on the results of the 2023 records search, no previously recorded cultural resources have been documented within the direct APE. The Level III survey identified seven archaeological sites within the direct APE, consisting of three historic sites and four precontact isolates. All of these sites have been determined ineligible for the NRHP. No PTRCSs were identified. During the reconnaissance architectural inventory, several sites were identified within the indirect APE; however, in a letter dated July 11, 2024, SHPO concurred with WAPA's determination that the Project as proposed would have No Adverse Effect on cultural resources (see Appendix N). Decommissioning impacts would be the same or fewer than those described for construction.

3.10.2.4 Cultural Resources Conclusion

Section 5.9 – Cultural Resources of the UGP PEIS summarizes the potential impacts that could occur to cultural resources during a typical wind energy project's life cycle and the possible mitigation measures. Determining the appropriate mitigation measures must be completed on a project-specific basis following identification of cultural resources. Findings during desktop research identified 10 previously recorded archaeological sites and three previously recorded architectural sites; none of these resources are located within the direct APE. The Level III field survey identified three historic sites and four precontact isolates within the direct APE. All of these cultural resources have been determined ineligible for the NRHP. No PTRCSs were identified during field surveys with participation from TCSs. During the reconnaissance architectural inventory, several sites were identified within the indirect APE; five of these sites possessed buildings or structures that are recommended as potentially eligible but unevaluated for the NRHP. In a letter dated July 11, 2024, SHPO concurred with WAPA's determination that the Project as proposed would have No Adverse Effect on cultural resources (see Appendix N). Given the site-specific assessments completed to identify cultural resources, and a commitment by the Project to observe the applicable mitigation measures in Section 5.9.1.6 of the UGP PEIS, including consultation under Section 106 of the NHPA to be overseen by WAPA, the cultural resources findings and analysis are consistent with the UGP PEIS, and no new or more severe significant impacts are anticipated. If affected cultural resources are identified in subsequent analysis, impacts to those resources will be avoided or managed in coordination with SHPO and WAPA.

3.10.3 Environmental Consequences: No Action Alternative

The No Action Alternative for the Project would have no impact to cultural resources, and existing activities would continue.

3.11 SOCIOECONOMICS

3.11.1 Existing Conditions

Section 5.10 – Socioeconomics of the UGP PEIS breaks down the socioeconomic environment potentially impacted by development of wind resources in the UGP Region. The UGP PEIS identifies 10 key measures of economic development: employment, unemployment, personal income, sales tax revenues, income tax revenues, population, vacant rental housing, state and local government expenditures, state and local government employment, and recreation. Since the proposed Project area is in Haakon County, it was the only county analyzed for the Project. Table 3-23 lists key measures of economic development applicable to the proposed Project area. Data for this section compares the 10 measures for Haakon County to South Dakota. South Dakota does not have state income tax, so this measure was not included in the table. The median household income is $51,016 in Haakon County, < the state median income of $63,920. The 2021 unemployment rate is 2.8% in Haakon County, < the state at 3.1% (Headwaters Economics 2021).

Table 3-23. Socioeconomic Key Measures for Haakon County and South Dakota (2021)

Socioeconomic Key Measures	Haakon County	South Dakota
Population	1,868 people	895,376 people
Employment	1,605 people (87.5%)	622,335 people (69.5%)
Unemployment rate	2.8%	3.1%
Median household (annual average)	$51,016	$63,920
State sales tax revenues	N/A	$2.7 billion (2022)*
Rental vacancy rate	2%	2%
State and local government expenditures	N/A	$6.8 billion (2021)†
Government employment‡	8.2%; 132 people	13.9%; 86,695 people
Recreation sector total employment (2021)	N/A	430,807 people

Source: Headwaters Economics (2021), unless otherwise noted.
Note: N/A = not applicable.
* South Dakota Department of Revenue (2022).
† National Association of State Budget Officers (2022:Table A-1).
‡ Federal, military, state, and local government enterprise.

3.11.2 Environmental Consequences: Proposed Action

3.11.2.1 Environmental Commitments

Philip Wind Partners committed to implementing BMPs derived from the UGP PEIS (see Appendix O) and the Applicant's additional voluntary environmental protection measures in Table 2-3. No additional separate socioeconomic measures were identified in the BMPs of the UGP PEIS.

The Project is projected to create short-term and long-term positive impacts for the local economy. There would be temporary increases in construction jobs, population, and revenue for local businesses. Construction activities would be short term, and short-term impacts to local businesses would likely be beneficial. Long-term benefits would include full-time employment for O&M of the proposed Project for ≈ 12 employees.

3.11.2.2 Switchyard

Jobs generated from construction of the Switchyard would include grid management, transmission services, and utility services. According to the Bureau of Labor Statistics (BLS), the mean annual wage of maintenance workers in the electric power generation, transmission, and distribution industry was $77,350 (BLS 2021a). The Switchyard would generate $200,000 in direct economic benefits to landowners, local and state governments, and school districts. Private landowners would benefit the most from purchase of the Switchyard land and transmission easement payment.

The Switchyard is projected to create short-term positive impacts to the local economy. There would be temporary increases in construction jobs, population, and revenue for local businesses. Nonlocal construction workers would likely be employed to construct the Switchyard. Workers would commute to the site, so the need for temporary housing would be unlikely. Construction activities would be short term, and short-term impacts to local businesses would likely be beneficial. Because a full-time employee would not be on-site and routine maintenance would occur intermittently at the Switchyard, no long-term impacts to the local economy would be expected.

3.11.2.3 Wind Facility

For every 100 MW of installed wind power, 67 short-term contracting and installation jobs are expected to be generated (Ayee et al. 2008). As such, the Wind Facility would generate ≈ 201 construction jobs. The Wind Facility would generate ≈ 12 permanent O&M jobs. Employees may be from Haakon County or brought in from outside areas, thereby bringing people to the county to positively contribute to the local economy. Construction of the Wind Facility would include crane operators, specialized transport, concrete and steel foundations, structural engineers, mechanics, construction equipment operators, and wind turbine operators.

Long-term impacts from the Wind Facility would result in permanent economic benefits from lease payments, operation, and property taxes paid to local governments, state governments, and local school districts. The mean annual salary for wind turbine operators in the electric power generation, transmission, and distribution industry was $64,830 per year (BLS 2021b), which exceeded the Haakon County household median income of $51,016. Economic benefits for O&M are calculated by multiplying the number of O&M employees by the median annual salary. The Wind Facility would generate $3,875,000 total in direct economic benefits to the entities listed above. Table 3-24 shows estimated direct economic benefits to be generated by the Wind Facility. Local spending at businesses during O&M is not included in this table but would have additional benefits. Landowners would benefit most from lease payments for wind turbines and associated roads on their property. These payments would provide a predictable source of income for the ≈ 30-year life of the Wind Facility.

Government revenue comes from an annual nameplate capacity tax and production tax. The nameplate capacity tax equals $3 per kilowatt multiplied by the generating capacity of the wind energy facility. As such, the 300-MW Project would generate $900,000 per year. Annual production tax is calculated by multiplying $0.00045 per kilowatt-hour, and revenue is deposited in the renewable facility tax fund. The renewable tax fund distributes revenue from nameplate taxes and 20% of the production taxes to the school districts, counties, and organized townships (DOE 2018). Since production tax is dependent on kilowatt-hours in real time, production tax is not incorporated in total tax revenues in Table 3-24.

Table 3-24. Direct Long-Term Economic Benefits from the Wind Facility

Payment	Direct Beneficiary	≈ $/Year
Wind lease easement payments*	Project landowners	$2,200,000
Operation	≈ 12 employees	$778,000
Taxes†	Townships, counties, school districts, and South Dakota	$900,000

* Wind lease easement payments are based on signed land as of June 2023, 300 MW of installed turbine capacity, and are the average annual value of expected payments over 30 years (i.e., payments increase over time; the annual figure is based on expected payments over 30 years divided by 30). If installed turbine capacity is < 300 MW, payments to landowners would be < this estimate.

† Taxes from South Dakota nameplate taxes.

There is no statistical evidence that property (residential) prices near wind turbines were affected during the post-construction, post-announcement, or preconstruction periods of time; and if effects exist, they are relatively small (Hoen et al. 2015). Property values would increase via wind lease payments when wind facilities, Switchyard facilities, or associated roads are constructed directly on properties.

The Wind Facility would create short-term and long-term beneficial impacts for the local economy. There would be a temporary increase in construction jobs, population, and revenue for local businesses. Nonlocal construction workers would likely be employed to construct the Wind Facility. Workers would commute to the site, so the need for temporary housing would be unlikely. Construction activities would be short term, and short-term impacts to local businesses would likely be beneficial. A small labor force would be required for O&M of the Wind Facility. Impacts to rental housing markets or to local government expenditures and employment long term would be negligible.

3.11.2.4 Socioeconomics Conclusion

During construction, the Project would generate ≈ 201 jobs and add to local economies through housing and increased use of restaurants and businesses. During O&M, ≈ 12 permanent jobs with an average annual salary of $64,830 to $77,350 per year would be expected, which significantly exceeds the Haakon County median household income of $51,016. The Project would further generate ≈ $4 million per year in direct economic benefits to landowners, local governments, state governments, and school districts. Based on the analysis of the proposed Project, impacts to the socioeconomic status of Haakon County would likely be beneficial, and adverse effects would be negligible. The proposed Project's impacts to socioeconomics would be less than significant.

3.11.3 Environmental Consequences: No Action Alternative

The No Action Alternative would result in the continuation of agricultural use within the Project area. This would result in no new jobs for construction or operation of the Project and no new tax revenue for Haakon County.

3.12 HEALTH AND SAFETY

3.12.1 Existing Conditions

Section 5.13 – Health and Safety of the UGP PEIS discusses health and safety impacts of construction and O&M of wind projects on workers and environmental health concerns in areas near wind power facilities.

3.12.1.1 Electric and Magnetic Fields

Electric and magnetic fields (EMFs) are invisible areas of energy, referred to as radiation, associated with the use of electrical power and various forms of natural and human-made lighting. Human-made sources of EMFs range in size and intensity from household objects like cellular telephones, calculators, and microwaves to large electric-producing and transmitting structures, such as t-lines, substations, and wind farms. Strength of EMFs decreases with increased distance from their source; EMF levels from high-voltage t-lines decreases by ≥ 95% at 200 ft (National Institute of Environmental Health Sciences 2023). Furthermore, EMF levels have been shown to be indistinguishable from background levels at distances < 6.5 ft from the base of a turbine (McCallum et al. 2014). There have not been substantial scientific conclusions on EMFs tied to adverse health effects in adults. The International Agency for Research on Cancer, a component of the World Health Organization, reviewed available evidence on static and extremely low-frequency EMFs and determined "static electric, magnetic, and extremely low-frequency electric fields are *not classifiable as to their carcinogenicity to humans*" (World Health Organization International Agency for Research on Cancer 2002:338).

There are no state or federal regulations related to maximum EMF intensity or exposure, but separate guidelines were issued by the International Commission on Non-ionizing Radiation Protection (1998) and the Institute of Electrical and Electronics Engineers (2002). The EPA's recommended exposure to EMFs ranges from 0.5 to 2.5 milligauss (WAPA and USFWS 2015).

3.12.1.2 Noise and Infrasound

General audible noise, typically frequencies of 20–20,000 hertz, is discussed in Section 3.5.

Human-made machinery (e.g., wind turbines) may generate infrasound. Infrasound, referred to as low-frequency sound, occurs at smaller frequencies and is typically unable to be heard by the human ear (< 20 hertz). Sources of infrasound range from very low-frequency atmospheric fluctuations to lower audio frequencies. These sources include natural occurrences, industrial installations, and low-speed machinery (Leventhall 2007). High levels of infrasound can be audible (≥ 110 dBA) and derive from human machinery or natural processes (e.g., ocean waves or volcanoes). Infrasound levels created by wind turbines is like those made by anthropogenic sources, such as heartbeats or lungs inhaling (Roberts 2018). The effect of infrasound exposure has been studied vigorously, yielding different results across studies. An independent study conducted by a panel of experts for the Massachusetts Department of Public Health and the Massachusetts Department of Environmental Protection found varied evidence suggesting wind turbines have annoyance and sleep disturbance effects, but not enough to provide a reliable link on whether this disturbance was caused by the audible levels of the turbines themselves (Schomer and Pamidighantam 2013). More recent studies have found that wind turbine noise (audible noise and infrasound) has no significant impact on sleep, given reasonable siting of turbines (studies tested impacts on sleep with simulating sounds at approximately 45 dBA) (Marshall et al. 2023; Michaud et al. 2016a; Michaud et al. 2016b; Smith et al. 2020). Testimony filed before the SDPUC found no correlation between infrasound from wind turbines and adverse health effects, including sleep disturbance or vertigo (Roberts 2018).

3.12.1.3 Occupational and Physical Hazards

Wind farms present potential physical hazards, including mechanical failure, aviation risks, intentional destructive acts, ice throw from turbine blades, fire, and occupational accidents. The proposed Project does not create additional risk of physical hazard beyond those inherent to most wind farm developments and is consistent with conclusions provided in the UGP PEIS.

As stated in the UGP PEIS, mechanical failure is a primary physical safety hazard of wind turbines, which typically occurs when operation exceeds specific turbine model operation parameters. Turbine rotor overspeed would be an example of this, and modern turbine models have safety controls to avoid such rare incidents. Blade failure is another rare example of mechanical failure, in which turbine blades fail and break, endangering nearby residents and structures.

Wind farms can be hazardous to aviation because of their tall structures with the potential to come into conflict with low-flying aircraft. FAA guidelines in 14 CFR 77 for marking and lighting of wind farms require lights that flash white during the day and twilight, and red at night (FAA 2015); terrain, weather, and other local factors may influence FAA requirements. Wind farm developers must file a notice with the FAA for construction that may present an obstruction to air navigation due to height and/or location relative to airports.

Wind projects may be targeted by intentional destructive acts ranging from vandalism and theft to sabotage and acts of terrorism. Vandalism and theft are more likely for projects in remote areas. Theft of substation and switchyard equipment containing salvageable metal (e.g., copper and aluminum) is most likely when metal prices are high. Vandalism is more likely to take place in remote areas and more likely to involve acts of opportunity (e.g., shooting out t-line insulators) than premeditated acts. Sabotage or terrorist acts would be expected to target larger electrical facilities, where a loss of service would have substantial regional impacts.

Ice throw, or ice build-up on a wind turbine blade being thrown off, may present a safety hazard as it can cause injuries to people and damage to buildings. Available data suggests many factors determine what happens to ice thrown from a wind turbine blade. Most ice falls from the blades and lands on the ground near the base of the towers as air temperatures warm. Large ice pieces may be thrown away from the tower base (Wahl and Giguere 2006). A general setback distance of 1.5 times the blade tip height is observed in the industry to avoid damages related to ice throw.

Fires have started at wind farm facilities for a variety of reasons, such as electrical shorts, insufficient equipment maintenance, contact with power lines, and lightning. Increased human activity increases potential for fires. The International Electrotechnical Commission requires the design of electrical systems for wind turbine generating systems to comply with relevant International Electrotechnical Commission standards.

Occupational physical hazards in the proposed Project area are commonplace in industrial workplaces, including slips, trips, falls, and vehicle accidents. Environmental factors may present hazards, including weather events (e.g., extreme heat/cold, thunderstorms, high winds, blizzards), poisonous plants, venomous snakes, and biting/stinging insects. See Section 3.8 – Health and Safety Aspects of Wind Energy Projects of the UGP PEIS for additional information on physical hazards.

3.12.1.4 Hazardous Materials and Solid Waste

Hazardous materials are unlikely to be encountered during Project construction in the proposed Project area. Eight known spills/environmental events and five registered storage tanks are in and around the proposed Project area, and all are either closed or inactive (SDDANR 2023). Solid waste handling and recycling would be conducted in accordance with federal, state, and local regulations. Philip Wind Partners plans to conduct a Phase I Environmental Site Assessment prior to Project construction and would develop a Spill Prevention Control and Countermeasures plan.

3.12.2 Environmental Consequences: Proposed Action

3.12.2.1 Environmental Commitments

Philip Wind Partners committed to implementing BMPs derived from the UGP PEIS and the Applicant's additional voluntary environmental protection measures. The impact summaries below consider health and safety-specific BMPs (see Appendix O and Table 2-3):

- Conduct site characterization, construction, O&M, and decommissioning activities in compliance with applicable federal and state occupational safety and health standards.
- Develop a Project health and safety program that addresses protection of public health and safety during Project site characterization, construction, O&M, and decommissioning activities.
- If on-site construction activity causes contamination or if contamination is encountered, the contamination would be reported to the SDDANR (SDDANR 2023).

3.12.2.2 Switchyard

3.12.2.2.1 ELECTRIC AND MAGNETIC FIELDS

EMFs may exist in electrical portions/devices of the Switchyard and along other existing t-lines. Portions of the Switchyard where EMFs may exist are usually not accessible to the public. The public may have greater access to transmission-related EMFs. The EPA recommended exposure to EMFs range from 0.5 to 2.5 milligauss (WAPA and USFWS 2015).

Given the National Institute of Environmental Health Sciences (2023) reports EMF levels from high-voltage t-lines decreases by ≥ 95% at 200 ft, and given the nearest residences would be ≈ 0.5 mile from the Switchyard, it is expected EMFs produced would dissipate before reaching residences, causing no measurable effect above background levels. There is little scientific consensus on adverse effects caused from EMFs created at the Switchyard.

3.12.2.2.2 NOISE AND INFRASOUND

There would be no measurable effects on public health related to noise and infrasound from the construction and O&M of the Switchyard. Further consequences due to noise are discussed in Section 3.5.2.

3.12.2.2.3 OCCUPATIONAL AND PHYSICAL HAZARDS

The Switchyard may be at risk of being a target of sabotage or terrorism. It is impossible to predict the frequency or severity of terrorism or acts of sabotage. Due to the remote nature and size of the Switchyard, damage/risk to nearby residences (the nearest is ≈ 0.5 mile away) would be negligible. Natural events, fire, and electric failure are risks that would be reduced as recommended in the UGP PEIS.

Exposure to occupational hazards by the Project staff would be minimal and would be similar to hazards present in other electrical industries. Workers would be near energized systems and would be responsible for handling heavy machinery and vehicles, which would add to hazard risks. Occupational hazards in the Switchyard would be like those in other industrial electrical facilities.

3.12.2.2.4 HAZARDOUS MATERIALS AND SOLID WASTE

Switchyard construction would use hazardous materials and generate solid waste. Hazardous materials, such as fuels and lubricants, would be handled according to regulations and industry BMPs, and disposed of at suitably permitted facilities. Solid waste generated that would not be reused would be disposed or managed at a permitted solid waste facility. Although there are eight known spills/environmental events and five registered storage tanks in and around the proposed Project area, all are closed or inactive (SDDANR 2023), so no impacts related to previous contamination within the proposed Project area are expected to occur.

Switchyard decommissioning impacts would be like those described for the construction of the Switchyard. Although decommissioning would entail increased temporary risks to worker safety due to increased activity and temporary increases from hazardous materials and solid wastes, decommissioning would ultimately remove operational risks from EMF, physical hazards, hazardous materials, and solid waste.

3.12.2.3 Wind Facility

3.12.2.3.1 ELECTRIC AND MAGNETIC FIELDS

The Wind Facility would produce the greatest EMFs near the substation, gen-tie line, and Basin Electric t-line. Given the National Institute of Environmental Health Sciences (2023) reports EMF levels from high-voltage t-lines decreases by ≥ 95% at 200 ft, and given the nearest residence would be ≈ 9,232 ft from the substation, ≈ 233 ft from a gen-tie line, and ≈ 2,310 ft from a Basin Electric t-line, it is expected EMFs produced would dissipate before reaching residences, causing no measurable effect above background levels.

3.12.2.3.2 NOISE AND INFRASOUND

Multiple studies have shown that there is no measurable correlation between infrasound from wind turbines and adverse health effects (Marshall et al. 2023; Michaud et al. 2016a; Michaud et al. 2016b; Schomer and Pamidighantam 2013; Smith et al. 2020; Roberts 2018). There would be no measurable effects on public health related to noise and infrasound from the construction and O&M of the Wind Facility. Further consequences due to noise are discussed in Section 3.5.2.

3.12.2.3.3 OCCUPATIONAL AND PHYSICAL HAZARDS

Wind farms create possibilities of physical hazards, both natural and anthropogenic. Based on the location of the nearest residents and the rarity of mechanical failure or ice throw, the proposed Project does not present a likely risk. Aviation risks will require turbine marking and lighting in compliance with the FAA's final marking and lighting plan (FAA 2015; 2020) and should not impact commercial aviation safety. Local aviation risks are consistent with the findings in the UGP PEIS. Natural hazards/events (i.e., earthquakes, intense storms, or tornadoes) may occur at all stages of the Project and may cause damage to the facility, creating economic damage and environmental consequences.

The Wind Facility may be a target for sabotage or terrorism, both of which are impossible to predict.

Exposure to occupational hazards by the Wind Facility staff would consist of similar hazards present in other electrical industries. Workers would likely be around energized systems, at high altitudes, and responsible for handling heavy machinery and vehicles, which would entail additional hazard risks.

3.12.2.3.4 HAZARDOUS MATERIALS AND SOLID WASTE

Construction of the Wind Facility would use hazardous materials and generate solid waste. Hazardous materials, such as fuels and lubricants, would be handled according to regulations and industry BMPs, and disposed of at suitably permitted facilities. Solid waste generated would be disposed of or managed at a permitted solid waste facility. Although there are eight known spills/environmental events and five registered storage tanks in and around the proposed Project area, all are closed or inactive (SDDANR 2023), so no impacts related to previous contamination within the proposed Project area are expected to occur.

Wind Facility decommissioning impacts would be like those described for construction of the Wind Facility. Decommissioning would entail increased temporary risks to worker safety due to increased activity and temporary increases from hazardous materials and solid wastes. Decommissioning would remove operational risks from EMF, physical hazards, hazardous materials, and solid waste.

3.12.2.4 Health and Safety Conclusion

The UGP PEIS assessed potential health and safety aspects of wind energy projects (Section 5.13 – Health and Safety), as well as hazardous materials and waste management (Section 5.12 – Hazardous Materials and Waste). Project components, such as the substation and t-line, may emit EMFs; however, EMFs dissipate to background levels in ≤ 200 ft (National Institute of Environmental Health Sciences 2023). Since no residences are ≤ 200 ft from these facilities, the EMF impacts of the Project would be negligible. The UGP PEIS considered potential impacts of infrasound. Sound levels of the Project would fall in ranges of those analyzed in the UGP PEIS, so effects would be consistent with those disclosed in the UGP PEIS. The UGP PEIS assessed occupational and physical hazards associated with construction and O&M of wind facilities, and expected impacts of this Project would not constitute a new or more severe significant impact. The UGP PEIS evaluated common hazardous materials and waste products associated with construction and O&M of wind facilities. This Project would use and manage those resources under relevant regulations and Project permits, so no new or more severe significant impacts would occur. The UGP PEIS analyzed health and safety risks consistent with those anticipated for the Project; therefore, no new or more severe significant impacts to health and safety would be anticipated.

3.12.3 Environmental Consequences: No Action Alternative

The No Action Alternative would not impact health and safety, and existing activities, conditions, and hazards would continue.

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4 CUMULATIVE IMPACTS

Cumulative impacts related to past, present, and reasonably foreseeable future actions on resources in the UGP Region are analyzed in Section 6 – Cumulative Impacts of the UGP PEIS. Cumulative impacts of the Project are within those analyzed in the UGP PEIS. Section 2.4 – Description of Potential Development Scenarios of the UGP PEIS projected increased wind energy development in the UGP Region through the year 2030. The geographic scope of the cumulative impacts analysis is dependent on the region of influence (ROI) for each resource. The UGP PEIS defines ROIs as the "encompassing areas of affected resources and distances at which impacts associated with the preferred alternative may occur." ROIs for the cumulative impact analysis by resource are discussed further in Table 6.1-1 of the UGP PEIS.

Past and present actions are reflected in the affected environment descriptions above in Section 3. These include conversion of native grassland to naturalized pasture and tilled cropland, water impoundments (dammed lakes and ponds), agricultural and rural residential structures, electric transmission and distribution infrastructure, and roadways (paved, gravel, and two-track roads). There are no energy conversion facilities operating, under construction, or reasonably foreseeable in or adjacent to the proposed Project area. There are no other wind projects proposed or under construction in Haakon County. No other large-scale energy developments exist or are proposed in the proposed Project area.

The construction and O&M of the Project would contribute to cumulative impacts to resources in the UGP Region. A summary of cumulative impacts associated with the UGP PEIS's preferred alternative, which the Project is a part of, is provided in Table 6.3-2 of the UGP PEIS. Table 4-1 below specifies resources with potential for cumulative impacts from the Project, and includes visual resources, cultural resources, noise, vegetation, wildlife (including special-status species), and land use. These impacts would be reduced during the construction and O&M of the Project through implementation of BMPs and conservation measures. Adverse impacts to other resources (e.g., water resources) resulting from the Project are anticipated to be negligible or nonexistent and therefore would not contribute to cumulative impacts and are not included in Table 4-1. The No Action Alternative would have no impacts to any resources, would not contribute to any cumulative impacts, and therefore is not included in Table 4-1.

Cumulative impacts would be minor due to the Applicant's implementation of associated UGP PEIS BMPs and voluntary environmental protection measures.

Table 4-1. Cumulative Impact Summary for the Proposed Action

Impacted Resource	Past, Present, & Reasonably Foreseeable Future Activities	Potential Cumulative Impact
Visual Cultural	Distribution and t-lines Residential and urban development Roads & highways	The Proposed Action would increase contrast on the surrounding landscape, which may impact cultural resources. Impacts would be reduced by adhering to UGP PEIS BMPs and voluntary environmental protection measures.
Noise	Agriculture Distribution and t-lines Hunting Residential and urban development Roads and highways	The Proposed Action would increase ambient sound. Impacts would be reduced by adhering to UGP PEIS BMPs and voluntary environmental protection measures.
Vegetation Wildlife (including special-status species) Land use	Agriculture Distribution and t-lines Grazing Hunting Residential and urban development Roads and highways	The Proposed Action would disturb vegetation, occupy land suitable for or adjacent to habitat or anthropogenic uses. These impacts are part of the historic trend of undeveloped land transitioning to development and agriculture. Impacts would be reduced by adhering to UGP PEIS BMPs, the PBA Consistency Evaluation Forms, and voluntary environmental protection measures.

5 CONSULTATION AND COORDINATION

A virtual public scoping meeting was held Thursday, January 19, 2023, from 5:00 to 7:00 p.m. Mountain Standard Time via the online meeting platform Zoom. Announcements about the scoping meeting were published in the local Pioneer Review newspaper and sent to landowners, stakeholders, and state and federal agencies. Members from WAPA, SWCA, Philip Wind Partners, and 20 individuals from the public attended this meeting.

Comments received during the public scoping period were considered while identifying issues and evaluating impacts in this EA. The public scoping meeting documentation and comments received from agencies and the public regarding the Project, as well as WAPA's responses, are provided in Appendix J.

Upon completion of the scoping meeting, agencies, the public, and stakeholders were invited to review and comment on the scope of the NEPA document during a 30-day public scoping period from January 19 to February 13, 2023. During this period, WAPA received 19 submissions. Comments were submitted verbally and by email, mail, and telephone. Submissions were received from two landowners or other stakeholders, three state agencies (SDDANR, SDGFP, and SHPO), and four federal agencies (U.S. Department of Transportation, BLM, Bureau of Indian Affairs, and EPA), which included 74 total comments. Comment topics included air quality and GHGs, wildlife and special-status species, vegetation, socioeconomics, noise, cultural resources and Native American concerns, water resources, hazardous materials and solid waste, public health and safety, the public involvement process, transportation and access, and the NEPA process. In total, 61 of the comments resulted in responses included in Appendix J, which were addressed in the Draft EA. The remaining 13 comments provided information or statements that did not require a response.

The Draft EA was released for public comment on February 14, 2024, and comments were received through March 16, 2024. During this public review period, WAPA received seven public comment submissions. Submissions were received from two landowners or other stakeholders and three state agencies (SDDANR, NRCS South Dakota State Office, and SHPO), which included 22 total substantive comments. Public review comments and responses are provided in Appendix J. Comments focused on water resources, socioeconomics, land use, air quality and GHGs, hazardous materials and solid waste, vegetation, soils, wildlife, and cultural resources. This document has addressed those comments where applicable.

5.1 FEDERAL AGENCIES

The following federal agencies were contacted for the purpose of the EA scoping process:

- Advisory Council on Historic Preservation
- Federal Emergency Management Agency, Region VIII
- Federal Energy Regulatory Commission, Office of Energy Projects
- Federal Highway Administration, South Dakota Division
- NRCS, South Dakota State Office
- USACE, South Dakota Regulatory Office
- U.S. Department of the Interior, Bureau of Indian Affairs, Great Plains Regional Office
- U.S. Department of the Interior, BLM, South Dakota Regional Office

- EPA Region 8
- USDA, Rural Utilities Service, Water and Environmental Program
- USDA, South Dakota State Farm Service Agency
- USGS, Midwest Region
- U.S. Department of Transportation, FAA, Great Lakes Region
- USFWS
- USFWS, South Dakota Field Office
- U.S. House of Representatives
- U.S. Senate

5.2 STATE AND LOCAL AGENCIES

The following state and local agencies were contacted for the purpose of the EA scoping process:

- Governor's Office of Economic Development
- Haakon County Conservation District
- Haakon County Historical Society
- SDDANR
- SDDANR, Division of Agriculture and Environmental Services
- South Dakota Department of Transportation
- South Dakota Department of Tribal Relations
- SDGFP
- South Dakota House of Representatives, District 27
- South Dakota Office of the Governor
- SDPUC
- South Dakota School and Public Lands
- South Dakota Senate, District 27
- South Dakota SHPO

5.3 NATIVE AMERICAN TRIBES

Pursuant to Section 106 of the NHPA, WAPA initiated Tribal consultations with the following 10 Tribes, by letter on December 7, 2022, regarding the Project:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes, Oklahoma
- Cheyenne River Sioux Tribe
- Crow Creek Sioux Tribe

- Fort Belknap Indian Community
- Lower Brule Sioux Tribe
- Oglala Sioux Tribe
- Rosebud Sioux Tribe
- Santee Sioux Nation
- Standing Rock Sioux Tribe

The Standing Rock Sioux, the Rosebud Sioux, the Cheyenne River Sioux, and the Northern Cheyenne Tribes all participated in consultation. No responses were received from the other invited Tribes.

5.4 NON-GOVERNMENTAL ORGANIZATIONS

The following non-governmental organizations were contacted to participate in the EA scoping process:

- Midland Historical Society
- West River Historical Society

No response to the invitation to participate was received from these organizations.

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6 LIST OF PREPARERS

Table 6-1 identifies personnel responsible for preparing this EA.

Table 6-1. List of Environmental Assessment Preparers

Name	Position	Role
John Russell	WAPA Environmental Manager	UGP NEPA compliance officer
Spenser Kuhn	WAPA Environmental Compliance Specialist	UGP NEPA coordinator
Staffan Peterson	WAPA Archaeologist	Cultural specialist and Tribal liaison
Lisa Meyer	WAPA Archaeologist	Deputy federal preservation officer
Brian Pauly	WAPA Biologist	Headquarters biologist
Hilary Morey	WAPA Biologist	UGP regional biologist
Martin Piorkowski	Western EcoSystems Technology, Inc. Consulting Ecologist	Project management
Johanna Sievewright	Philip Wind Partners, LLC	Permitting manager
Michelle Phillips	Philip Wind Partners, LLC	Permitting manager
Alexander Chandler	Philip Wind Partners, LLC	Project developer
Carleigh Houghtling	Philip Wind Partners, LLC	Project developer
Matt Zoss	SWCA Project Manager, NEPA Specialist	Project management, NEPA oversight
Julia Aaronson	SWCA Assistant Project Manager	Project management
Victoria Edwards	NEPA Specialist	Project management, land use and public facilities, noise
David Fetter	SWCA Senior NEPA Lead	Senior NEPA oversight
Sarah Lupis	SWCA NEPA Specialist	Public involvement specialist
Matt Hull	SWCA Cultural Resources Specialist	Cultural resources
Andrea Hannan	SWCA Biologist	Wildlife; threatened, endangered and special-status species; hydrologic setting and water resources
Andrew Gerwitz	SWCA Paleontologist	Geology, soil resources, paleontology
Annie Ng	SWCA NEPA Specialist	Socioeconomics, air quality
Mallory Phillips	SWCA NEPA Specialist	Visual resources
Trevor Herritt	SWCA NEPA Specialist	Vegetation, health and safety
Seth Gately	SWCA Air Quality Specialist	Air quality oversight

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APPENDIX A

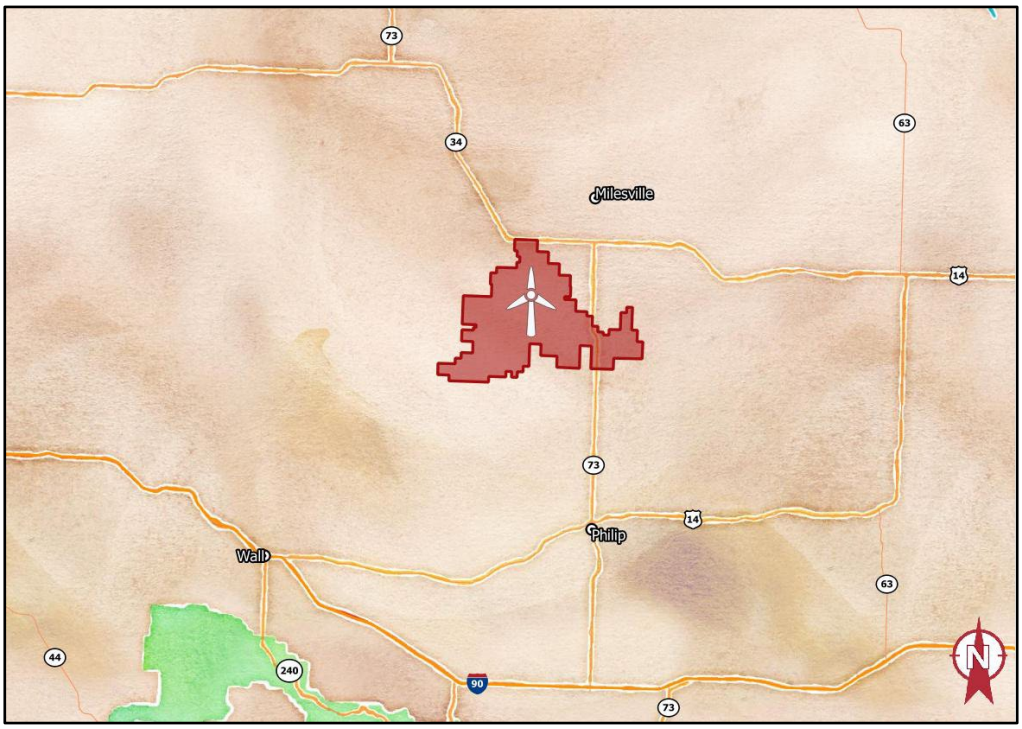
Preconstruction Wind Turbine Noise Analysis

Pre-Construction Wind Turbine Noise Analysis

for the proposed

Philip Wind Project

April 12, 2023



Prepared for:

Philip Wind Partners, LLC
Chicago, Illinois

Prepared by:

Hankard Environmental, Inc.
Verona, Wisconsin

HANKARD ENVIRONMENTAL
ACOUSTICS AND VIBRATION CONSULTING

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1. Introduction

This report describes a pre-construction noise analysis conducted by Hankard Environmental for the proposed Philip Wind Farm (Project, Facility). The Project will produce up to 300 megawatts (MW) of electrical power using up to 95 wind turbine generators, which will be located in Haakon County, South Dakota. Figure 1-1 shows the general location of the Project, which is situated about 15 miles north of Philip, South Dakota.

The noise analysis was conducted at the request of the Project proponent, Philip Wind Partners, LLC, for the purpose of demonstrating that the Project has been designed to meet the noise level limits historically applied to wind turbine projects by the South Dakota Public Utilities Commission (PUC). Described herein are the applicable noise limits, the Project and its environs, the methods and data used to predict noise levels, and the results of the noise level predictions demonstrating compliance with noise limits typically applied to wind projects in South Dakota.

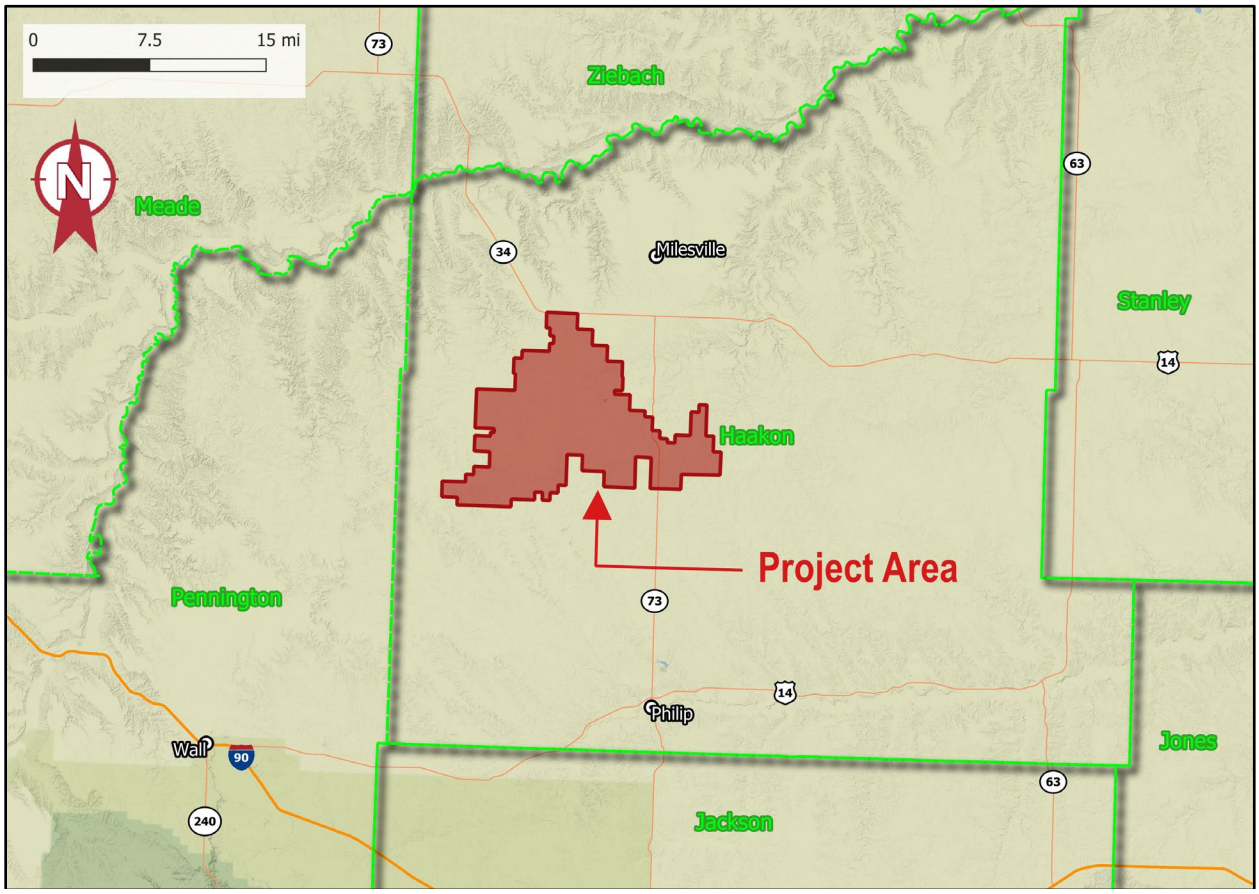

Figure 1-1. General Location of the Philip Wind Farm

2. Applicable Noise Standards

There are no noise-related federal, county, or local regulations that apply to the Project.

At the state level, South Dakota Administrative Rule 20:10:22:33.02 requires that an application for an Energy Facility Permit include "Anticipated noise levels during construction and operation." The noise levels reported herein are those expected during operation. Construction noise levels will be typical of those produced by standard construction equipment.

The South Dakota PUC does not have any specific noise limit that applies to wind turbine projects. In lieu of this, Hankard Environmental reviewed the South Dakota PUC's Wind Energy Siting Dockets to determine what noise limits have been applied to recent projects. Out of 11 dockets we reviewed from 2017 to 2021, eight had county limits of 45 dBA at non-participating residences and three had local limits of 50 dBA.

This range of 45 to 50 dBA is consistent with the limits that are typically applied to wind turbine projects nationally. To be conservative, this Project has been designed to meet the more stringent 45 dBA limit.

3. Project Description

The Project consists of up to 95 wind turbines generating up to 300 MW of electric power. Associated facilities include gravel access roads and underground cabling to collect and transmit the power to the Project substation and its two step-up transformers. The locations of the 95 wind turbine sites under consideration are shown in Figure 3-1. The Project is located entirely in Haakon County. The proposed turbine models under consideration are the Vestas V163-4.5 and the General Electric (GE) Sierra 3.4-140, both with a hub height of 98 meters. The GE turbines used will be fitted with noise-reducing blades, known as Low Noise Trailing Edge (LNTE) blades, and the Vestas turbines will be modeled with and without noise-reducing blades, termed Serrated Trailing Edge (STE) by Vestas. Also shown in Figure 3-1 is the location of the substation, approximately 2,900 meters (9,515 feet) from the nearest residence. The substation will include up to two 140 megavolt ampere (MVA) primary step-up transformers.

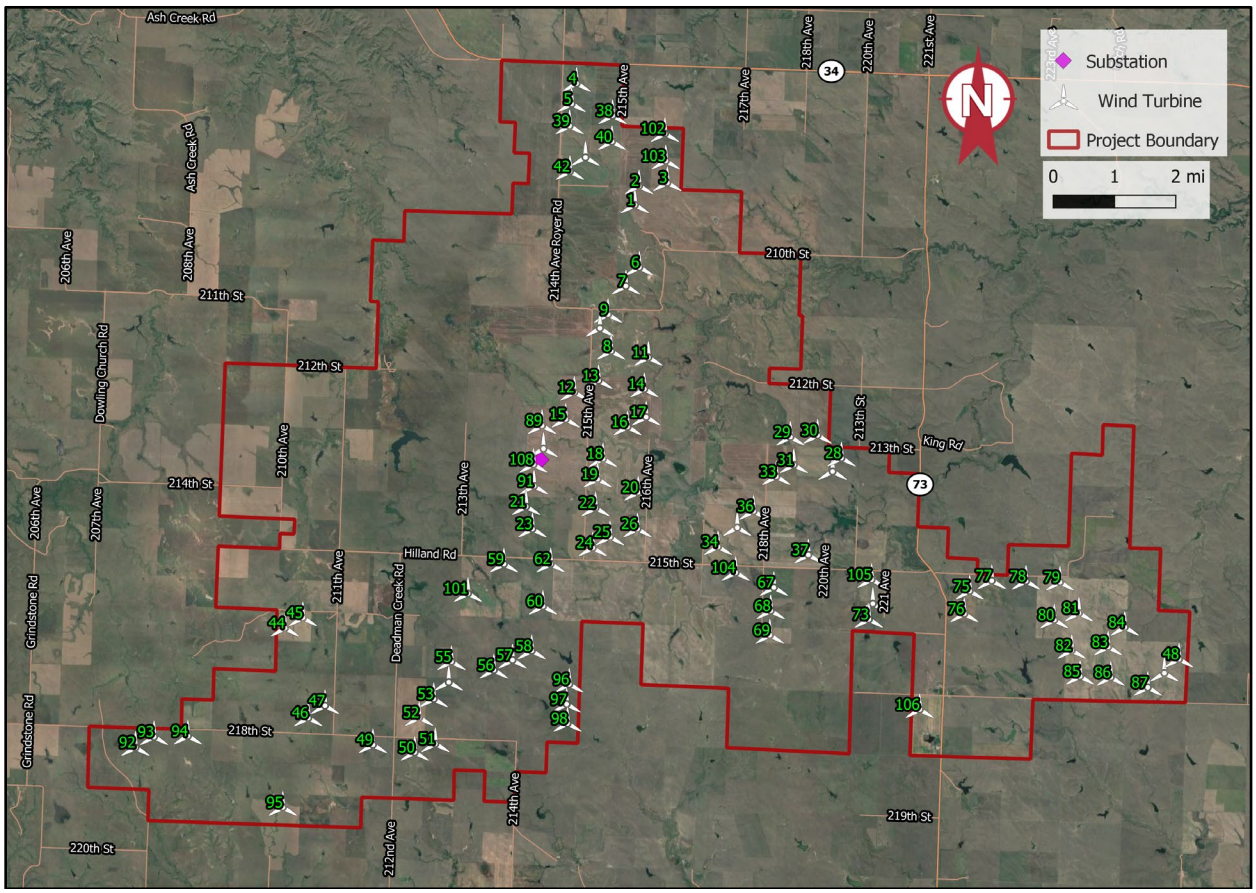

Figure 3-1. Philip Wind Project Layout (L027)

4. Noise Modeling Method

Noise levels from the proposed Project were predicted using the modeling method set forth in International Organization for Standardization (ISO) Standard 9613-2:1996 - *Attenuation of Sound During Propagation Outdoors*. The method was implemented using the SoundPLAN v8.2 acoustical modeling program. Figure 4-1 shows a representative three-dimensional view of the SoundPLAN model of the Project.

The ISO 9613-2:1996 method requires input data and the setting of certain parameters, including the locations of the noise sources and receivers, noise emission factors including frequency characteristics, terrain and ground type, and atmospheric propagation conditions. In general, the ISO method assumes optimal acoustic propagation in all directions, specifically that a "well-developed, moderate ground-based temperature inversion" is present or, equivalently, that all receptors are downwind of all noise sources at all times. The specific ISO 9613-2:1996 settings and input data used in this analysis are described below.

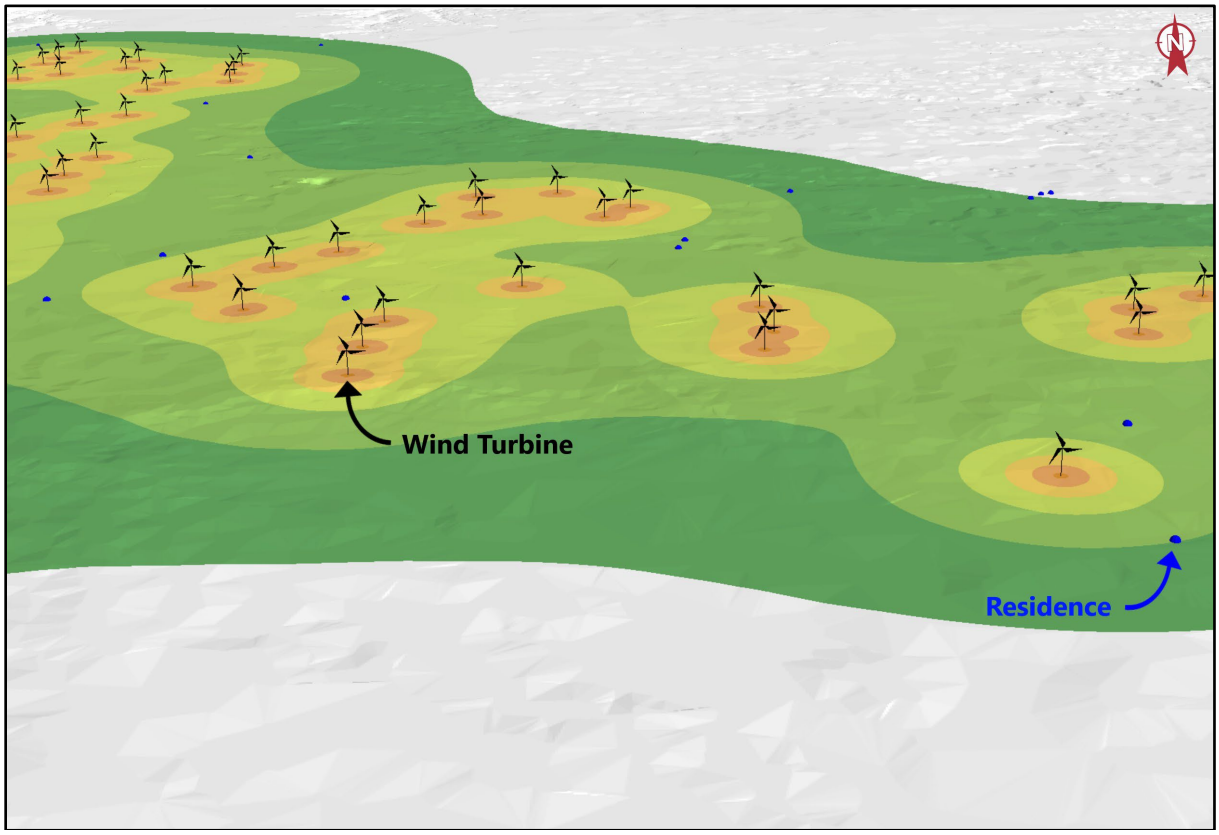

Figure 4-1. Three-Dimensional View of the SoundPLAN Noise Model

Noise Sources

In the SoundPLAN model, each of the wind turbines was represented as an acoustical point source located at its hub height. No directivity was applied to any noise source thus assuming maximum acoustic output in all directions. All turbines were assumed to be operating in normal mode (versus noise-reduced mode). The acoustic model includes two 140 MVA step-up transformers located at the Project's electrical substation. The locations of each turbine and the substation are shown in Figure 3-1 (layout L027). The geographic coordinates and ground elevation of each turbine and step-up transformer are listed in Appendix A.

Table 4-1 lists, for the wind turbine models under consideration and the step-up transformers, the height above the ground at which each source was located in the acoustic model, and each source's noise emission level (sound power level) expressed both in octave bands levels[1] and the overall level. All of the noise emission levels are expressed in terms of A-weighted decibels (dBA). The noise emission levels for the turbines were provided by the manufacturers and were determined according to International Electrotechnical Commission Standard 61400-11. Wind turbine noise emissions increase with increasing wind speeds up to approximately 10 m/s at hub-height. Noise levels do not increase when hub-height wind speeds exceed 10 m/s because the turbines reach a maximum rotational speed, and the sound emission of a turbine is directly proportional to its rotational speed. This analysis used the octave band noise levels reported by the manufacturer for a wind speed of 10 m/s at hub height.

The Project includes a substation containing two step-up transformers which are the only significant noise-producing components of the substation. The analysis assumed the simultaneous operation of both step-up transformers at their maximum rating (140 MVA), including the operation of cooling fans. The sound power levels of the step-up transformers are listed in Table 4-1 and were estimated using the methodology published in the Edison Electric Institute, "Electric Power Plant Environmental Noise Guide," 2nd Edition, BBN, 1984. The step-up transformers were modeled as point sources located three meters (10 feet) above the ground, with no barriers or directivity reductions.

Table 4-1. Source Sound Power Levels

Source	Source Height (m)	Octave Band Sound Power Level (dBA)									Overall Level (dBA)
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1,000 Hz	2,000 Hz	4,000 Hz	8,000 Hz	
GE Sierra 3.4-140	98	78.8	88.2	92.5	96.1	99.2	102.2	101.6	93.6	74.0	106.8
Vestas V163-4.5 Standard	98	71.2	85.8	96.1	102.1	104.2	102.6	96.9	88.3	76.8	108.4
Vestas V163-4.5 STE	98	74.0	86.5	95.4	100.3	101.9	100.1	94.7	86.8	76.6	106.3
140 MVA Transformer	3	57.4	76.6	88.7	91.2	96.6	93.8	90.0	84.8	75.7	100.2

[1] Nine standard frequency octave bands, as defined by the American National Standards Institute (ANSI) Standard S1.11: Specification for Octave-Band and Fractional-Octave-Band Analog and Digital Filters.

Noise Level Metric

The noise levels predicted using this method are in the form of the energy equivalent average noise level (L_{eq}) over a one-hour period of maximum acoustic emissions from the turbines.

Receptors

In the model, prediction points were located at each of the 37 residences identified in the vicinity of the Project, all in Haakon County. Of these 37 residences, 24 are non-participating in the Project and 13 are participating. The geographic locations and participation status of the receptors were obtained from the Project and Hankard Environmental reviewed the receptors for accuracy using aerial photography. Each receptor's height was set to 4 meters (13 feet) above the ground in the acoustic model.

Atmospheric Conditions

The air temperature, relative humidity, and atmospheric pressure were set to conditions of 10°C, 70%, and 1 atmosphere, respectively. These values represent the lowest amount of atmospheric absorption of sound available in the ISO 9613-2:1996 method and result in the highest levels of sound reaching the receptors.

Terrain and Ground Effect

The ground elevations in the Project area were established by importing data from the National Elevation Dataset (USGS National Map) for the state of South Dakota at a resolution of 1 arc-second (30 meters). The acoustical effect of the ground was modeled using the ISO 9613-2:1996 General Method. All reductions due to terrain acting as a barrier were removed from the analysis resulting in a more conservative model and higher predicted noise levels. The ground absorption factors for the ground near the source, near the receiver, and in between can range from 0.0 to 1.0 and represent the proportion of sound that is absorbed or reflected when sound waves interact with the ground. A value of 0.0 represents completely reflective ground material such as pavement, and results in a higher level of sound reaching a receptor. A value of 1.0 represents highly absorptive material such as thick grass or fresh snow, and results in a lower level of sound reaching a receptor. For this noise analysis, the most conservative ground factor, 0.0 (completely reflective), has been assumed. Actual ground conditions could at times be 0.0 when the ground is completely frozen but would generally be closer to 0.5 when the ground is covered with crops or new snow, or when the ground is bare and unfrozen.

Model Validation

This noise level prediction method employed on this Project is consistent with the requirements of ANSI/ACP-111-11[2]. This method has been validated by Hankard Environmental and other acoustic professionals by comparing predicted noise levels to those measured at operating wind farms. The results show that this modeling approach consistently over-predicts the measured noise level. That is, actual noise level emissions from the Project, if measured, are expected to be less than those reported herein.

[2] *Wind Turbine Sound Modeling,* ANSI/American Clean Power (ACP) Standard 111-1-2022

5. Predicted Noise Levels

Noise levels were predicted for the full, continuous, and normal operation of the proposed Facility at the 24 non-participating and 13 participating residences located near the Project. Table 5-1 lists the non-participating residences with the highest predicted noise levels. The full list of predicted noise levels at each receptor is provided in Appendix B. The highest predicted noise level at a non-participating residence 44.7 dBA, which is less than the 45 dBA noise level goal. Predicted noise levels at all participating residences are less than 48 dBA. To provide a visual demonstration of compliance, the predicted noise levels are shown in the form of noise level contours for the loudest turbine model (Vestas V163-4.5 with standard blades) in Figures 5-1 to 5-3. Contours for all other turbine models would be smaller than those shown in these Figures. For example, areas between the turbines or the substation and the 45 dBA contour have a predicted noise level above 45 dBA. Areas beyond, or outside of, the 45 dBA contour have a predicted noise level less than 45 dBA. No non-participating residences are located within the 45 dBA contours.

Table 5-1. Highest Predicted Noise Levels at Non-Participating Residences

Receptor	Overall L_{eq} (dBA)		
	Vestas V163-4.5 Standard	Vestas V163-4.5 STE	GE Sierra 3.4-140
R-011	44.7	42.8	41.0
R-012	44.0	42.1	40.2
R-248	41.3	39.3	37.6
R-027	39.9	38.1	36.0
R-008	39.2	37.5	35.2
R-033	37.0	35.3	32.9
R-004	36.0	34.3	31.8
R-028	36.0	34.4	31.9
R-007	35.3	33.7	31.1
R-006	34.8	33.3	30.7
R-005	34.7	33.2	30.5
R-001	34.3	32.7	30.2
R-269	33.9	32.2	29.7
R-017	33.0	31.6	29.0
R-029	32.4	31.0	28.4
R-018	30.9	29.6	27.1
R-024	30.9	29.6	27.1
R-179	30.8	29.5	27.0
R-030	29.1	28.0	25.6
R-022	29.0	27.4	24.9
R-163	28.4	27.1	24.7
R-020	26.3	25.2	22.9
R-019	25.9	24.9	22.7
R-021	24.2	23.1	21.0

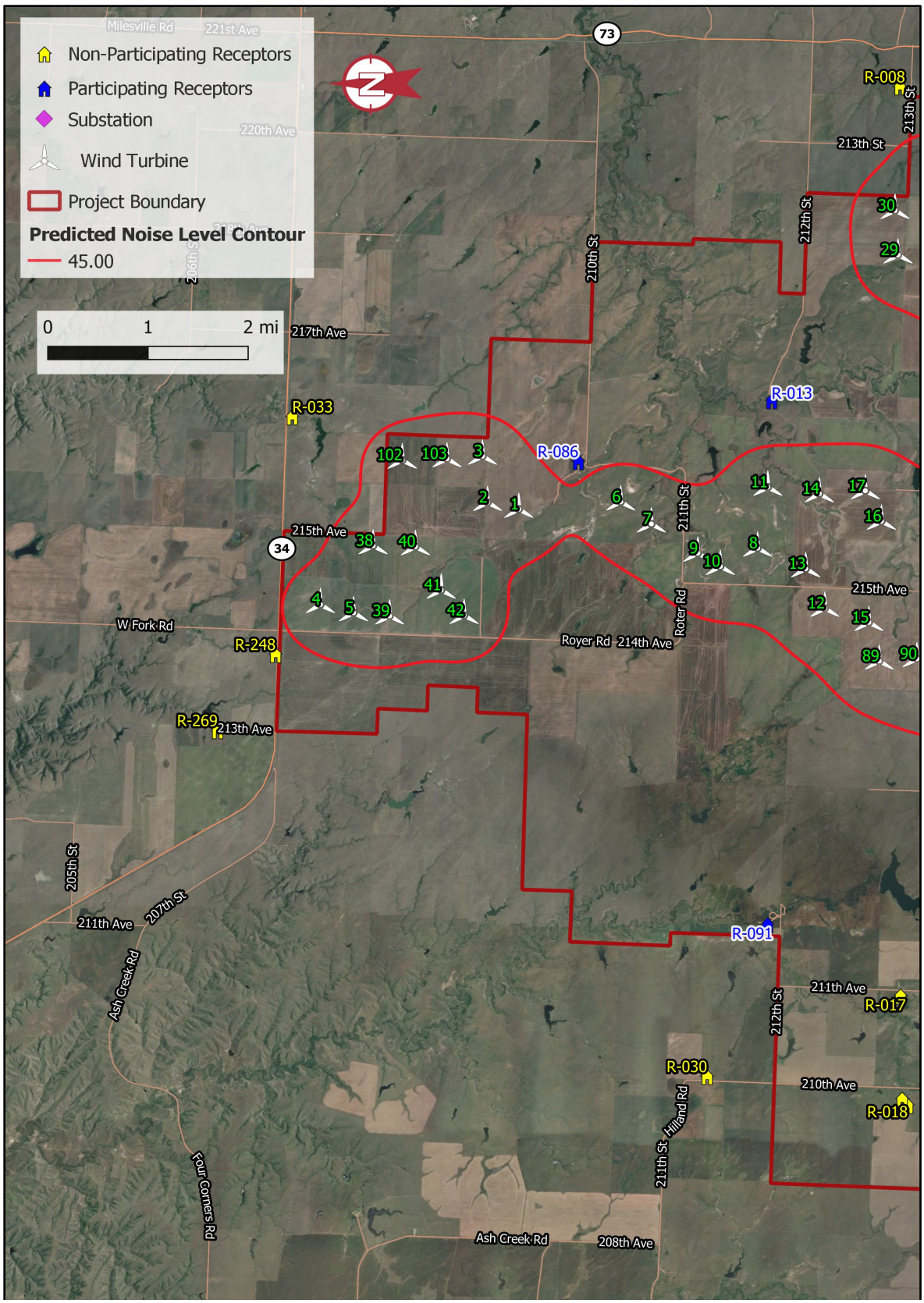

Figure 5-1. Predicted Noise Level Contours – North Area

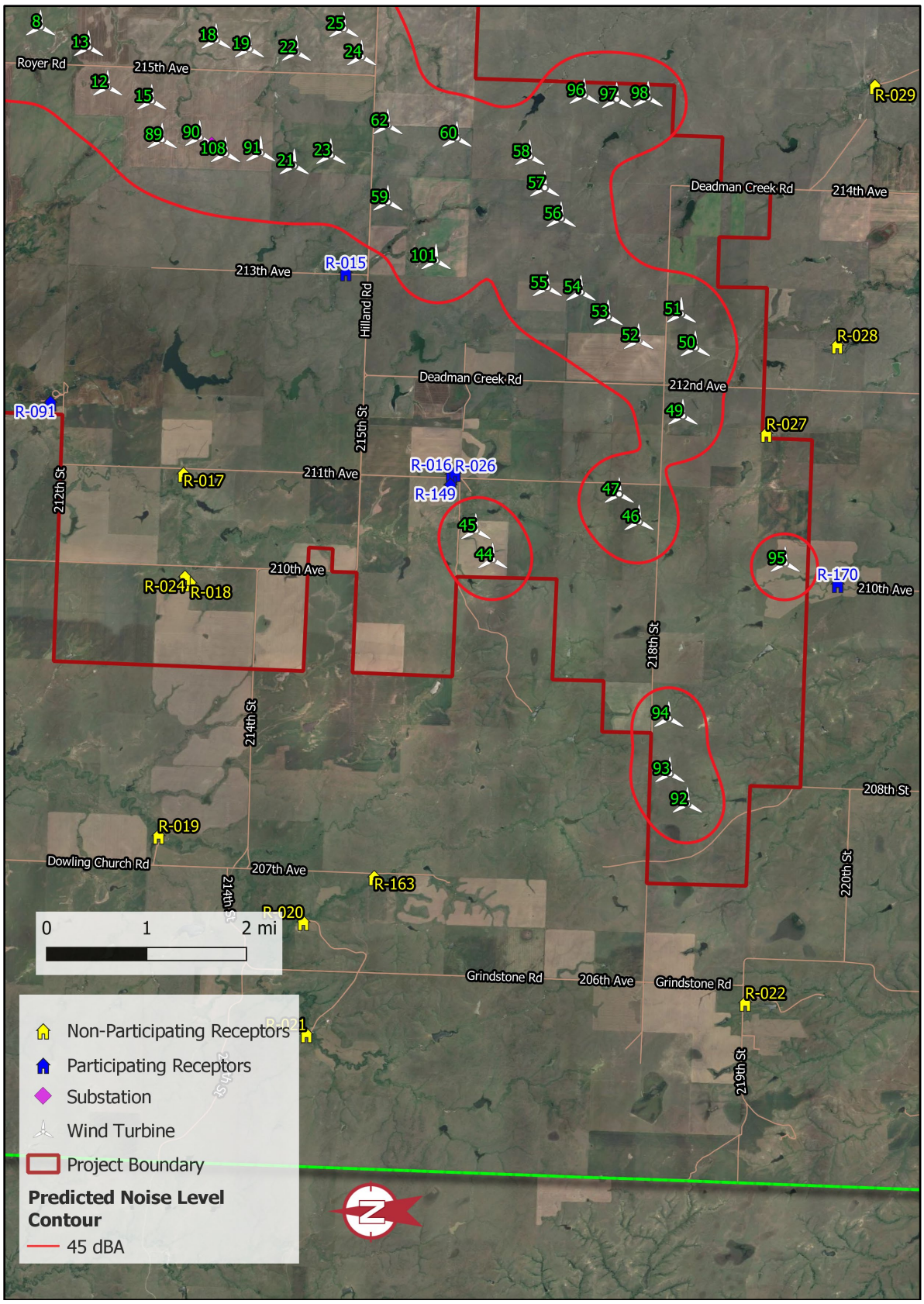

Figure 5-2. Predicted Noise Level Contours – Southwest Area

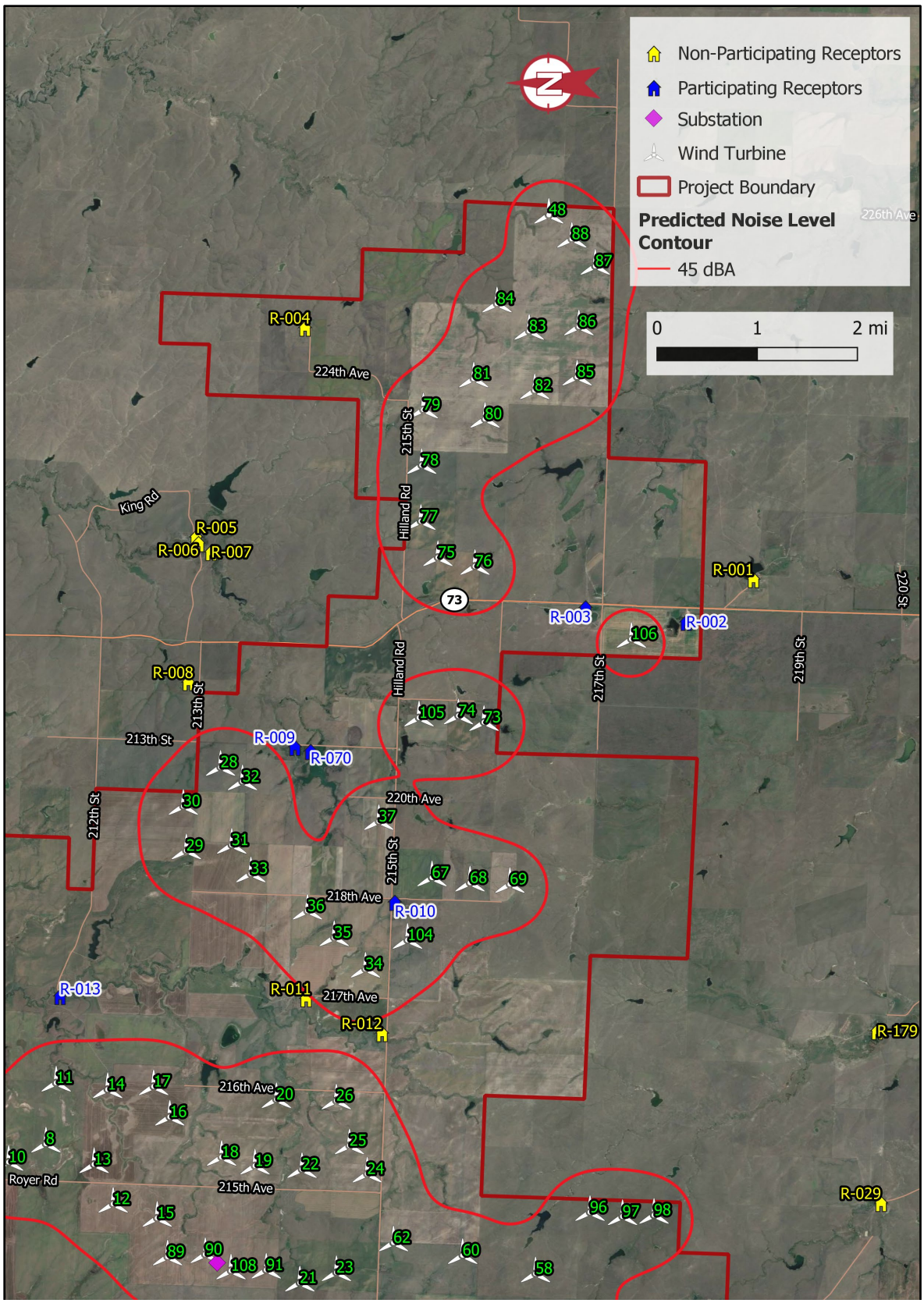

Figure 5-3. Predicted Noise Level Contours – Southeast Area

6. Conclusions

Noise levels were predicted for the full, continuous, and normal operation of turbines operating at all 95 potential sites in the proposed Facility. Noise levels were predicted at the 24 non-participating and 13 participating residences located nearest to the Project in Haakon County, South Dakota. The highest predicted noise level at a non-participating residence is 44.7 dBA, which is less than the 45 dBA Project noise level goal.

Predicted noise levels at all participating residences are 48 dBA or less for the loudest turbine model under consideration, the Vestas V163-4.5 with standard blades.

The noise level prediction method employed for this analysis is consistent with ACP-111-1 (2022) and has been validated by Hankard Environmental and other acoustic professionals by comparing predicted noise levels to those measured at operating wind farms. The results show that the modeling approach employed here consistently overpredicts measured noise levels. That is, actual noise level emissions from this Project, if measured, are expected to be less than those reported herein.

Furthermore, the noise levels reported herein are the very highest turbine noise levels expected, as they represent the case where all turbines are operating fully. A majority of the time turbine noise levels will be lower than those reported herein, when the turbines are not producing full acoustic output due to low winds, and/or atmospheric conditions not being as conducive to sound propagation as assumed by the acoustic model (e.g., an unstable atmosphere or receptors located crosswind to the nearest turbines). Additionally, during very windy periods, the noise of the wind blowing through vegetation would be louder than that from the turbines and could in many cases render noise from the turbines inaudible.

The results described herein are valid for the receptor locations analyzed, the turbine and substation layout described above, the wind turbine sound power levels provided by the manufacturer, and the mode of turbine operation. If the Project makes any significant changes, including turbine layout, turbine type, or operational mode, this noise analysis should be updated accordingly.

APPENDIX A
Noise Source Locations – Layout L027

Source Name	UTM 14N		Ground Elevation (m asl)
	Easting (m)	Northing (m)	
1	278952	4916433	760
2	279061	4916934	760
3	279805	4917016	759
4	277420	4919622	765
5	277289	4919089	770
6	279070	4914794	752
7	278715	4914302	758
8	278327	4912593	760
9	278246	4913554	760
10	278033	4913193	767
11	279306	4912429	759
12	277360	4911513	790
13	277996	4911820	770
14	279201	4911601	760
15	277133	4910805	790
16	278759	4910603	770
17	279249	4910862	770
18	278114	4909769	783
19	277974	4909233	790
20	279041	4908888	780
21	276093	4908512	799
22	277917	4908477	785
23	276259	4907924	800
24	277844	4907429	790
25	278298	4907714	790
26	279020	4907926	780
28	284381	4909787	768
29	283040	4910336	764
30	283754	4910385	770
31	283130	4909607	770
32	284150	4909434	770
33	282670	4909299	777
34	281138	4907457	778
35	281644	4907959	780

Source Name	UTM 14N		Ground Elevation (m asl)
	Easting (m)	Northing (m)	
36	282071	4908389	780
37	283511	4907242	780
38	278366	4918775	763
39	277237	4918509	780
40	278350	4918094	770
41	277653	4917680	770
42	277246	4917312	773
44	269752	4905320	802
45	270224	4905591	797
46	270367	4902964	830
47	270807	4903284	830
48	293256	4904508	770
49	272066	4902259	808
50	273165	4902059	801
51	273707	4902285	806
52	273282	4902972	830
53	273665	4903462	821
54	274060	4903901	810
55	274130	4904440	810
56	275244	4904218	810
57	275736	4904482	810
58	276240	4904723	811
59	275509	4907005	797
60	276535	4905895	810
62	276738	4907006	800
67	282605	4906387	791
68	282522	4905776	800
69	282500	4905135	818
73	285103	4905552	781
74	285208	4905963	776
75	287752	4906292	773
76	287611	4905697	777
77	288334	4906566	780
78	289233	4906553	780

Source Name	UTM 14N		Ground Elevation (m asl)
	Easting (m)	Northing (m)	
79	290126	4906526	775
80	289977	4905535	776
81	290624	4905716	780
82	290436	4904736	770
83	291391	4904825	771
84	291829	4905342	770
85	290654	4904054	768
86	291461	4904026	760
87	292435	4903763	770
88	292871	4904139	772
89	276512	4910638	790
90	276549	4910032	790
91	276300	4909052	797
92	265823	4902187	840
93	266312	4902468	847
94	267201	4902486	840
95	269696	4900614	799
96	277227	4903847	790
97	277159	4903324	790
98	277182	4902818	780
101	274565	4906231	794
102	279742	4918306	764
103	279764	4917587	763
104	281602	4906781	783
105	285175	4906596	770
106	286440	4903181	775
108	276287	4909619	796
Substation Transformer 1	276491	4909841	791
Substation Transformer 2	276480	4909841	791

APPENDIX B
Receptor Locations and Predicted Noise Levels

Receiver	Participation Status	UTM 14N		Ground Elevation (m asl)	Overall Predicted Noise Level (L_{eq}, dBA)		
		Easting (m)	Northing (m)		Vestas V163-4.5 Standard	Vestas V163-4.5 STE	GE Sierra 3.4-140
R-001	NP	287469	4901219	750	34.3	32.7	30.2
R-002	P	286782	4902300	764	40.1	38.2	36.6
R-003	P	287014	4903916	786	41.5	39.6	37.9
R-004	NP	291512	4908428	762	36.0	34.3	31.8
R-005	NP	288146	4910178	730	34.7	33.2	30.5
R-006	NP	288048	4910140	730	34.8	33.3	30.7
R-007	NP	287905	4909939	740	35.3	33.7	31.1
R-008	NP	285815	4910305	760	39.2	37.5	35.2
R-009	P	284772	4908591	760	43.1	41.2	39.3
R-010	P	282281	4906984	786	47.5	45.6	44.3
R-011	NP	280731	4908411	770	44.7	42.8	41.0
R-012	NP	280173	4907190	771	44.0	42.1	40.2
R-013	P	280769	4912366	743	41.1	39.3	37.0
R-015	P	274442	4907683	784	42.2	40.4	38.3
R-016	P	271191	4905981	802	40.8	38.9	37.1
R-017	NP	271201	4910294	770	33.0	31.6	29.0
R-018	NP	269445	4910181	775	30.9	29.6	27.1
R-019	NP	265381	4910695	760	25.9	24.9	22.7
R-020	NP	263992	4908366	780	26.3	25.2	22.9
R-021	NP	262186	4908316	790	24.2	23.1	21.0
R-022	NP	262691	4901258	840	29.0	27.4	24.9
R-024	NP	269542	4910270	771	30.9	29.6	27.1
R-026	P	271214	4905926	802	40.8	39.0	37.1
R-027	NP	271847	4900917	801	39.9	38.1	36.0
R-028	NP	273270	4899777	790	36.0	34.4	31.9
R-029	NP	277443	4899168	760	32.4	31.0	28.4
R-030	NP	269907	4913405	770	29.1	28.0	25.6
R-033	NP	280511	4920074	750	37.0	35.3	32.9
R-070	P	284707	4908337	760	42.6	40.7	38.7
R-086	P	279791	4915476	750	43.5	41.6	39.8
R-091	P	272350	4912433	750	33.2	31.9	29.3
R-149	P	271023	4905998	799	41.8	39.9	38.2
R-163	NP	264713	4907225	790	28.4	27.1	24.7
R-170	P	269428	4899770	788	40.3	38.4	37.0
R-179	NP	280207	4899231	750	30.8	29.5	27.0
R-248	NP	276690	4920342	762	41.3	39.3	37.6
R-269	NP	275468	4921275	753	33.9	32.2	29.7

APPENDIX B

Eagle Utilization Distribution Monitoring Report

(Due to sensitive information contained in this Appendix,

please contact WAPA to receive a copy.)

APPENDIX C

Whooping Crane Habitat Assessment Report

Whooping Crane Habitat Assessment

Philip Wind Project

Haakon County, South Dakota

Final Report

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1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in Haakon County, South Dakota. Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to conduct a whooping crane (*Grus americana*) habitat assessment within the August 2022 Project Area (Figure 1.1). The objective was to evaluate potentially suitable whooping crane stopover habitat within the Project Area.

Whooping cranes are endemic to North America and one of North America's largest birds, driven almost to extinction in the 1940s by hunting and habitat loss (U.S. Fish and Wildlife Service [USFWS] 2013, 2021; Urbanek and Lewis 2020). The only self-sustaining wild population of whooping cranes breeds in Wood Buffalo National Park in Canada and typically winters in the coastal marshes of Texas including in the Aransas National Wildlife Refuge (NWR, Urbanek and Lewis 2020). Surveys by the USFWS of the Aransas-Wood Buffalo (ARWB) population estimated 543 individuals during the 2021–2022 winter census (Butler et al. 2022). The ARWB population migrates between wintering and breeding habitat in the spring and fall, with 95% of whooping crane sightings occurring within a 183-mile wide corridor (Pearse et al. 2018). The Project Area is primarily located within the 95% whooping crane migration corridor (Figure 1.1).

During migration, whooping cranes stopover at resting and feeding locations, where they are typically found in shallow wetlands and marshes, edges and sandbars of shallow rivers, and agricultural fields near a water source (Baasch et al. 2019, Montana Fish, Wildlife and Parks [MFWP] 2022). During migratory stopovers, they forage in wetlands and cultivated agricultural lands on invertebrates, small vertebrates, berries, and grains (Urbanek and Lewis 2020, Caven et al. 2021). Whooping cranes typically roost in shallow-water wetlands (USFWS 2021, Urbanek and Lewis 2020, MFWP 2022, NatureServe 2021).

2 PROJECT AREA

The Project Area is located approximately 14 mi north of the city of Philip in Haakon County, South Dakota (Figure 1.1). The Project Area encompasses approximately 68,318 acres (ac) within two level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands, often referred to as prairie potholes. Topography within the Project Area is gently rolling to flat.

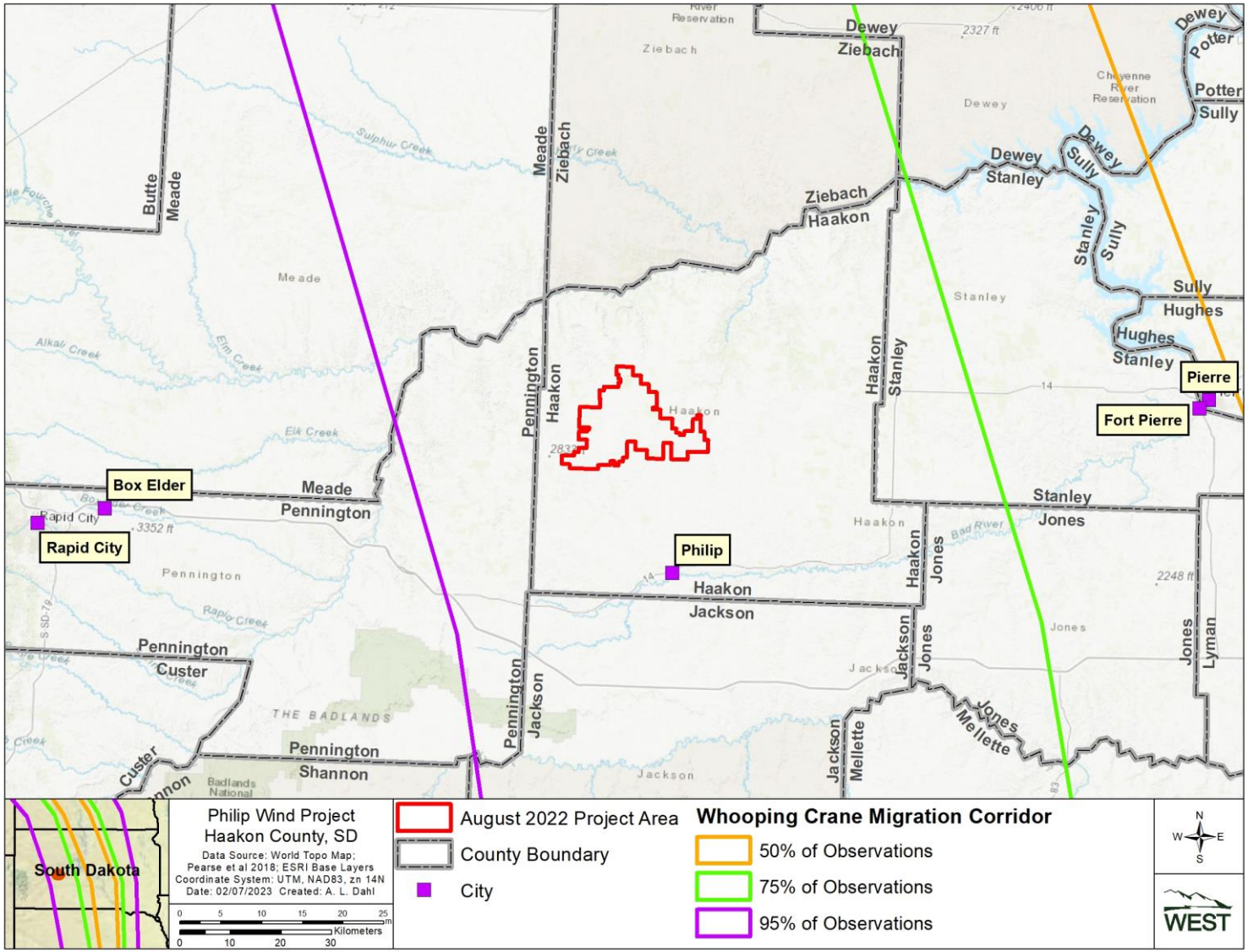

Figure 1.1 Location of the Philip Wind Project in Haakon County, South Dakota.

3 METHODS

Three methods for assessing potentially suitable whooping crane stopover habitat within the Project Area have been recommended by federal agencies including Western Area Power Administration (WAPA; B. Pauly, *pers comm.* January 13, 2023) and USFWS (N. Gates, *pers comm.* January 13, 2023) as consistent with the Upper Great Plains Programmatic Environmental Impact Statement (WAPA and USFWS 2015). These three models were used independently to analyze wetland habitat suitability:

(1) The Watershed Institute Wetland Suitability Model (TWI 2012),
(2) Predicted Habitat Use Model (Niemuth et al. 2018), and
(3) Decile Model (Niemuth et al. 2018).

3.1 The Watershed Institute Wetland Suitability Model

In 2012, The Watershed Institute (TWI) published a standardized approach to formalize and identify potentially suitable habitat for migrating whooping cranes. The TWI Model is feature specific and potentially suitable habitat was compared to habitat at Quivira National Wildlife Refuge in Kansas, which is designated Critical Habitat for the species (USFWS 1978).

This method (hereafter TWI Model) is partitioned into two steps. The first step removes National Wetland Inventory (NWI) wetlands based on proximity to anthropogenic features (buffers; Table 3.1), wetland size (≤ 0.25 ac), and visual obstructions (i.e., forests and buildings) within 328 feet of a wetland (TWI 2012). The portion of each wetland within each above classification was designated as ”unsuitable habitat” and removed from further evaluation of the wetland dataset because whooping cranes rarely use features under these conditions (Armbruster 1990 and TWI 2012) . The second step scores the remaining wetlands based on five criteria: water regime, distance to food, wetland size, wetland type, and wetland density (Table 3.2). These data are used to generate a single numeric value for each individual wetland assessed. In the TWI 2012 publication, scores of 12 or higher were considered “potentially suitable habitat” for whooping cranes. This evaluation of potentially suitable habitat was not validated with either telemetry or visual sightings in the TWI model (TWI 2012).

Table 3.1. Recommended impact distances (buffers) for anthropogenic features based on the TWI model (2012).

Anthropogenic Feature	Buffer (meters)
Urban Dwelling	800
Commercial Development	800
Paved Road	400
Railroad	400
Bridges	400
Gravel Road	200
Single Dwelling	200
Recreational Area	200
Private Road	100
Power Lines	100

Table 3.2. Wetland scoring system based on the TWI model (2012).

Wetland Characteristic	Attributes	Score Value
Water Regime[1]	Permanent (H)	5
	Intermittently Exposed (G)	4
	Semi-Permanent (F)	3
	Seasonally Flooded (C)	2
	Intermittently/Temporarily Flooded (J/A)	1
Distance to Food[2]	Within/adjacent to cropland	5
	<0.5 kilometers (km) from cropland	4
	0.51–1.00 km from cropland	3
	1.1–1.5 km from cropland	2
	>1.5 km from cropland	1
Wetland Size	>7.0 acres	5
	5.0–6.9 acres	4
	3.0–4.9 acres	3
	1.0–2.9 acres	2
	0.25 - <1.0 acre	1
Wetland Type[3]	Natural	2
	Created	0
Wetland Density[4]	Yes	3
	No	0

1. Codes in parenthesis are from the Wetlands and Deepwater Habitats Classification system (Cowardin et al. 1979) used by the U.S. Fish and Wildlife Service National Wetlands Inventory (USFWS NWI 2023) system.
2. Cropland areas are from the National Land Cover Database (2019) and include the “cultivated crops” category.
3. Based on USFWS NWI (2023) with wetland modifier “h” indicating the wetland was diked or impounded.
4. Wetland density was considered part of a mosaic if five or more wetlands were within one-quarter section (TWI 2012).

3.2 Predicted Habitat Use Model

Niemuth et al. (2018) developed a predicted habitat use model for whooping crane stopover habitat within North and South Dakota (hereafter Niemuth Model). The Niemuth Model provides a numerically continuous (0.0 – 1.0) prediction of the relative probability of habitat use by whooping cranes. The Niemuth Model was developed specifically for North and South Dakota and is a preferred model for the Ecological Service Offices for each state, respectively, (N. Gates, *pers. comm., 1/13/2023*) at the time of this habitat assessment. The model considered 12 predictor variables (Table 3.3) that were analyzed and validated using GPS location data from whooping cranes equipped with radio-telemetry transmitters (Niemuth et al. 2018).

Table[1] 3.3. Predictor variables considered in the development of models relating sightings of whooping cranes in North Dakota and South Dakota, USA, to geographic location, landscape-level habitat characteristics, and factors influencing detection (*from* Niemuth *et al.* [2018]).

Predictor Variable	Definition	Justification
Distance to centerline	Distance (km) from centerline of Whooping Crane migration corridor calculated from data	Whooping Cranes generally follow a narrow migration corridor (Howe 1989, Tacha et al. 2010)
Wetland area	Proportion of area within the buffer comprised of all temporary, seasonal, semipermanent, permanent, and lacustrine wetlands as identified by the National Wetlands Inventory (Wilen and Bates 1995)	Whooping Cranes use wetlands for roosting and foraging (Howe 1989, Johns et al. 1997, Austin and Richert 2005)
Wetland variety	Number of different wetland water regimes (temporary, seasonal, semipermanent, permanent or lake, riverine) as identified by the National Wetlands Inventory (Wilen and Bates 1995) processed to basins (Cowardin et al. 1995) within buffer	Seasonal shifts in wetland use and presence of multiple wetlands in the vicinity of Whooping Crane stopover sites (Howe 1989, Johns et al. 1997, Austin and Richert 2005) suggest that wetland complexes might be important to Whooping Cranes
Wetland number	Number of wetland basins as identified by the National Wetlands Inventory (Wilen and Bates 1995) processed to basins (Cowardin et al. 1995) within buffer	Wetlands used for roosting are generally large (Johns et al. 1997), but most prairie potholes and stock ponds are small (Kantrud et al. 1989); this variable evaluated whether multiple small wetlands of a given area were as attractive to Whooping Cranes as fewer large wetlands of the same area
Perennial cover	Proportion of buffer comprised of grassland, hay fields, and shrubs as identified by the 2001 National Land Cover Database (NLCD; Homer et al. 2007) cover classes 71, 81, and 52	Perennial cover is common at or adjacent to roosting and feeding sites (Howe 1989, Johns et al. 1997, Austin and Richert 2005)
Cropland	Proportion of buffer comprised of cultivated crops as identified by the 2001 NLCD (Homer et al. 2007) cover class 82	Whooping Cranes use agricultural fields for foraging (Howe 1989, Johns et al. 1997, Austin and Richert 2005)
Forest	Proportion of buffer comprised of forest cover as identified by the 2001 NLCD (Homer et al. 2007) cover classes 41, 42, and 43	Whooping Cranes use sites with few trees (Johns et al 1997, Austin and Richert 2005)

Table[1] 3.3. Predictor variables considered in the development of models relating sightings of whooping cranes in North Dakota and South Dakota, USA, to geographic location, landscape-level habitat characteristics, and factors influencing detection (*from* Niemuth *et al.* [2018]).

Predictor Variable	Definition	Justification
Distance to increased survey effort	Distance (km) from 24 areas of known intensive Whooping Crane observation effort, including district offices of wildlife management agencies and wildlife refuges and fish hatcheries with permanent staff	Disproportionate numbers of Whooping Crane sightings are in proximity to refuges or other sites with knowledgeable observers (Howe 1989, Tacha et al. 2010)
Human population density	Number of people per 2.6 km2, derived from U.S. Census Bureau data (Seirup and Yetman 2006)	Human observers are necessary to detect and report Whooping Cranes; sightings are biased toward urban centers (Howe 1989)
Roads	Length (km) of roads (maintained gravel or better) identified by topologically integrated geographic encoding and referencing (TIGER) data (U.S. Census Bureau 2011) within each buffer	Whooping Cranes avoid roads (Johns et al. 1997, Belaire et al. 2014), but roads may enable increased detection of Whooping Cranes
Terrain roughness	Standard deviation of cells within buffer of digital elevation model with 30-m spatial resolution	Whooping Cranes use wetlands with shallow shoreline slopes (Johns et al. 1997, Austin and Richert 2005); detection of Whooping Cranes may be influenced by topographic variation
Whooping Crane population size	Number of birds estimated to be in the Aransas–Wood Buffalo flock each year	Number of Whooping Cranes detected annually increased as population size increased during the analysis period

[1] Recreated from Niemuth et al. (2018).

3.3 Decile Model

Niemuth et al. (2018) also generated a Decile Model that divided the Niemuth Model into 10 equal areas referred as deciles, to aid in conservation planning. For this analysis, suitable wetland stopover habitat is defined as any NWI wetland within the five highest use deciles (deciles 1–5; B. Pauly, WAPA, pers. comm., 12/19/2022). The Decile Model was developed specifically for North and South Dakota and is a preferred model for the Ecological Service Offices for each state, respectively, (N. Gates, USFWS, pers. comm., 1/13/2023) at the time of this habitat assessment.

4 RESULTS

The most recently available data (USFWS 2023; Pearse et al. 2020), indicate no observations or telemetry locations of whooping cranes have been documented within the Project Area. Two observations of whooping cranes have been observed 5.5 mi west and 8.8 mi east of the Project

Area (USFWS 2023) along with two individuals < 0.5 mi south and 5.5 mi southeast of the Project Area confirmed by telemetry locations (Pearse et al. 2020).

4.1 The Watershed Institute Wetland Suitability Model

The Project Area contains 1,799 ac of NWI wetlands and of these, 872 ac of wetlands were evaluated using the TWI Model (Table 4.1). Of the scored acres of wetlands, 415 ac were considered potentially suitable habitat (scores of 12 or more; Table 4.1, Figure 4.1).

Table 4.1. The Watershed Institute (TWI 2012) scored wetlands within the Philip Wind Project Area, Haakon County, South Dakota.

TWI Score[1]	Acres of Scored Wetland	% of Total Scored Wetlands[2]
1	0	0.0
2	0	0.0
3	0	0.0
4	2.5	0.3
5	4.0	0.5
6	18.1	2.1
7	29.6	3.4
8	53.3	6.1
9	78.5	9.0
10	120.1	13.8
11	150.9	17.3
12	226.3	26.0
13	165.8	19.0
14	22.8	2.6
Total	**871.7**	**100.0**

[1] Scores 12 and greater are considered “potentially suitable habitat” based on TWI criteria (TWI 2012).

[2] Sums may not add to 100% due to rounding

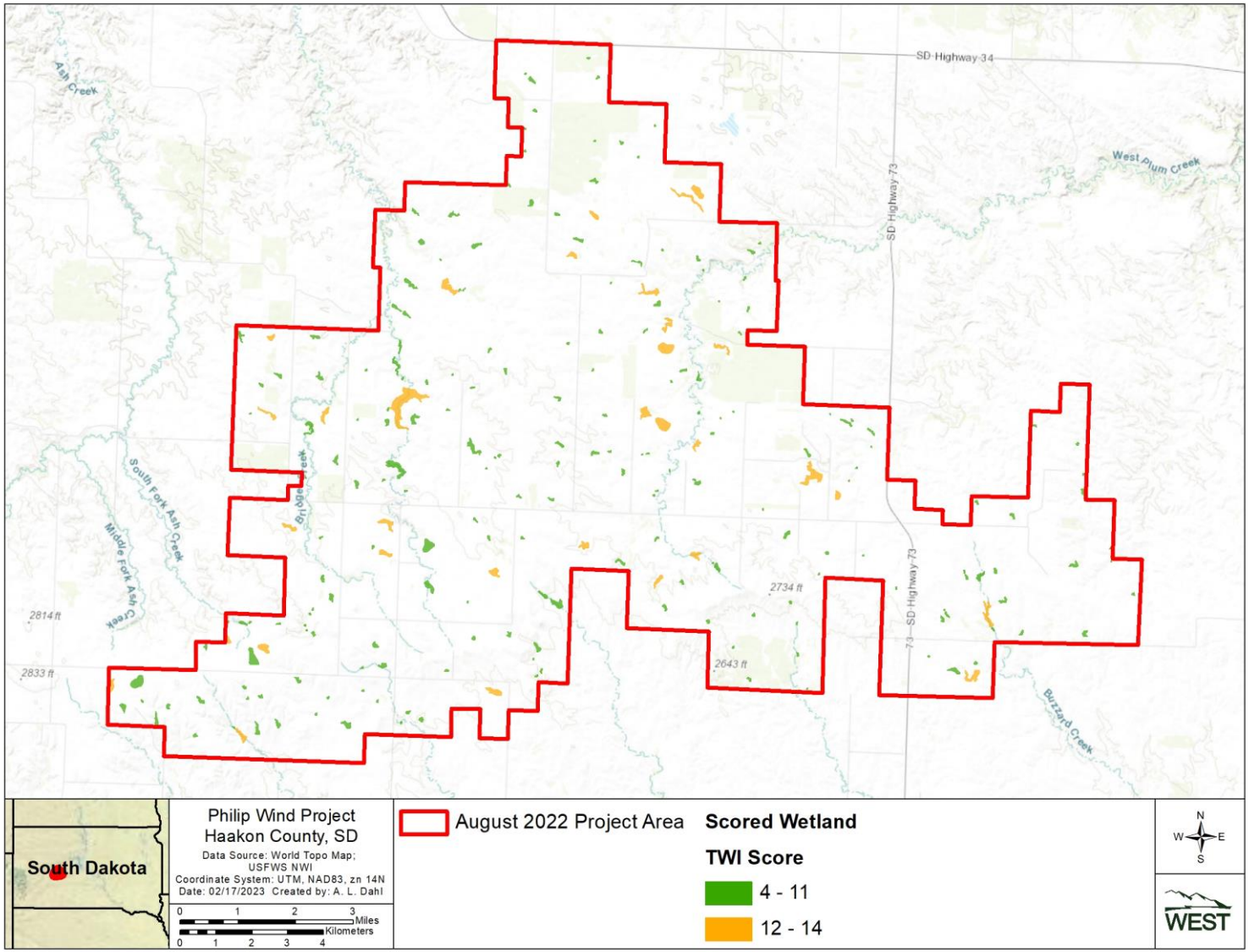

Figure 4.1. The Watershed Institute (TWI) scored wetlands classified as non-suitable habitat (scores 4-11) and potential suitable habitat (scores 12-14) within the Philip Wind Project Area, Haakon County, South Dakota.

4.2 Predicted Habitat Use Model

Predicted whooping crane habitat use within the Project Area ranged from < 0.0001 to approximately 0.0038 on a scale of 0 to 1.0 (Figure 4.2). Therefore, it is expected that habitat within the Project Area would have a maximum of a 0.38% chance of use by whooping cranes during migration.

4.3 Decile Model

Five deciles (5-9) are represented within the Project Area (Table 4.2) of which only one (Decile 5), representing 348 ac, is considered a whooping crane high use decile (Table 4.2). Five acres of NWI wetlands occur within Decile 5 (Figure 4.3).

Table 4.2. Number of acres within the Philip Wind Project for each decile (Niemuth et al. 2018), Haakon County, South Dakota.

Decile[1]	Acres
1	0
2	0
3	0
4	0
5	348.2
6	9,110.0
7	28,385.1
8	27,224.1
9	3,250.8
10	0
Total	**68,318.2**

[1] Deciles 1-5 are considered whooping crane high use deciles (B. Pauly, WAPA, pers. comm., 12/19/2022)

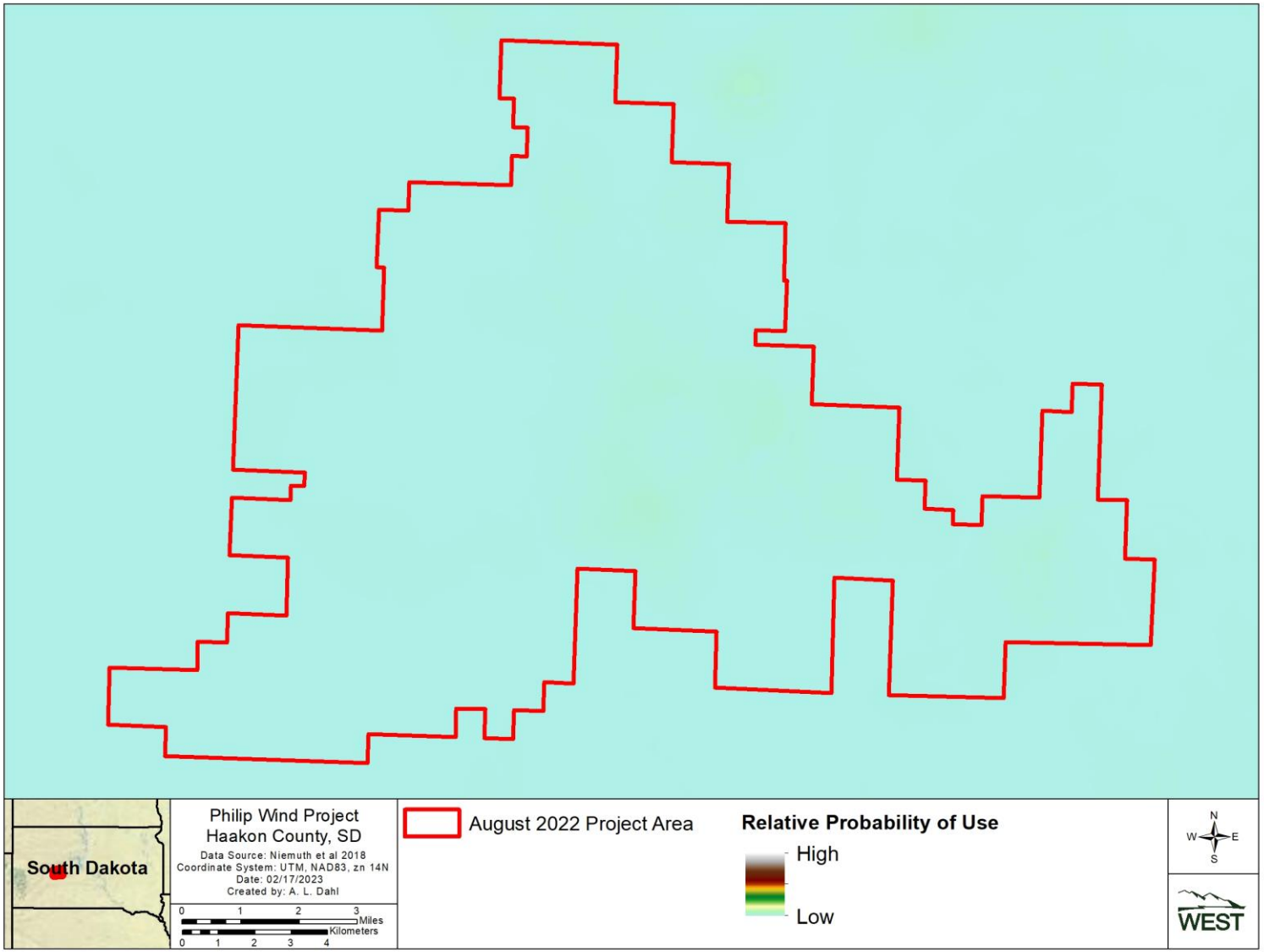

Figure 4.2. Predicted whooping crane habitat use model (Niemuth Model) output for the Philip Wind Project, Haakon County, South Dakota.

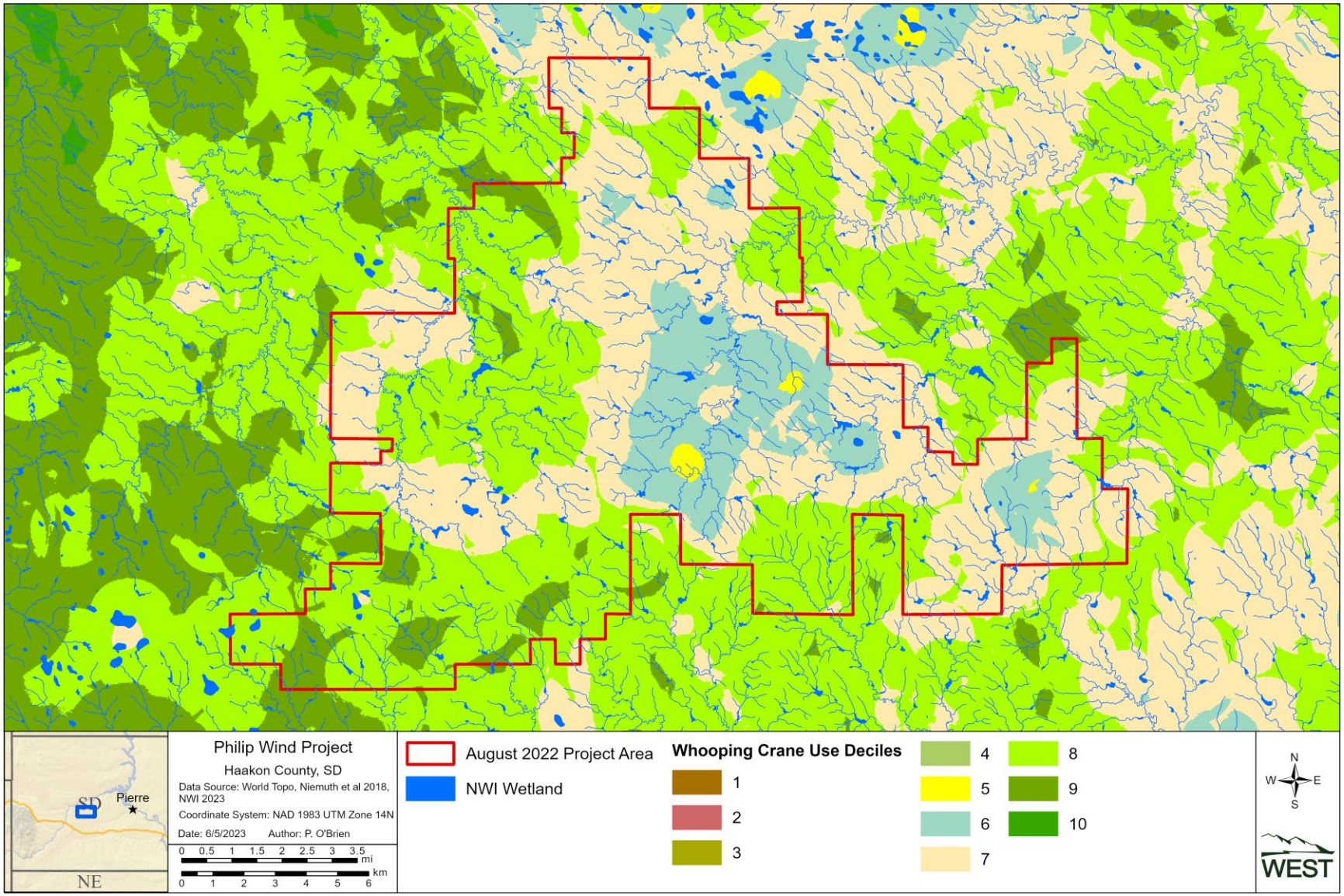

Figure 4.3. NWI wetlands and Neimuth Model whooping crane use deciles (Neimuth et al. 2018) at the Philip Wind Project Area in Haakon County, South Dakota.

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APPENDIX D

Prairie Dog Colony Status and Mapping Report

Prairie Dog Colony Status and Mapping

Philip Wind Project

Haakon County, South Dakota

Final Report

January to October 2022

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Piorkowski, M. 2023. Prairie Dog Colony Status and Mapping, Philip Wind Project, Haakon County, South Dakota. Final Report: January to October 2022. Prepared for Philip Wind Partners, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc., Bismarck, North Dakota. June 9, 2023. 7 pages + appendix.

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Appendix A. Delineation of Active Prairie Dog Colonies within the Philip Wind Project During 2022 Surveys, Haakon County, South Dakota.

1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is proposing to construct the Philip Wind Project (Project), a wind energy generation facility, in Haakon County, South Dakota (Figure 1.1). Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to conduct a black-tailed prairie dog (*Cynomys ludovicianus*) colony mapping effort. The objective was to identify and determine colony status (active versus inactive) and map active prairie dog colonies in the March 2022 Project Area (Project Area) and the Study Area, a separate 2.0-mile (mi) buffer from the Project Area (Figure 1.1). In addition, prairie dog colonies were scanned visually for burrowing owls and swift fox.

2 PROJECT AREA

The Project is located approximately 14 mi north of the city of Philip in Haakon County, South Dakota (Figure 1.1). The Project Area encompasses approximately 68,569 acres (ac) within two level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands, often referred to as prairie potholes.

Topography within the Project Area is gently rolling to flat. The primary land cover within the Project Area is grassland/herbaceous and cultivated crops. Wetlands are relatively evenly dispersed throughout the Project Area and are mainly classified as freshwater emergent and freshwater pond. Topography and land cover types in the Study Area are similar to those described for the Project Area.

Prairie dogs and their colonies are found throughout the western three-fourths of South Dakota (U.S. Fish and Wildlife Services [USFWS] 2009). They are a common prey species for many mammals and raptors including badgers, coyote, black-footed ferret, and eagles (Hoogland 1995, USFWS 2009). Prairie dog colonies and the surrounding grassland landscape are important to other species including swift fox (Sasmal et al, 2021) and burrowing owls (Desmond et al. 2000). In South Dakota, the prairie dog population is considered stable (South Dakota Game, Fish, and Parks 2023) because of the successful implementation of a black-tailed prairie dog conservation and management plan (Cooper and Gabriel 2005).

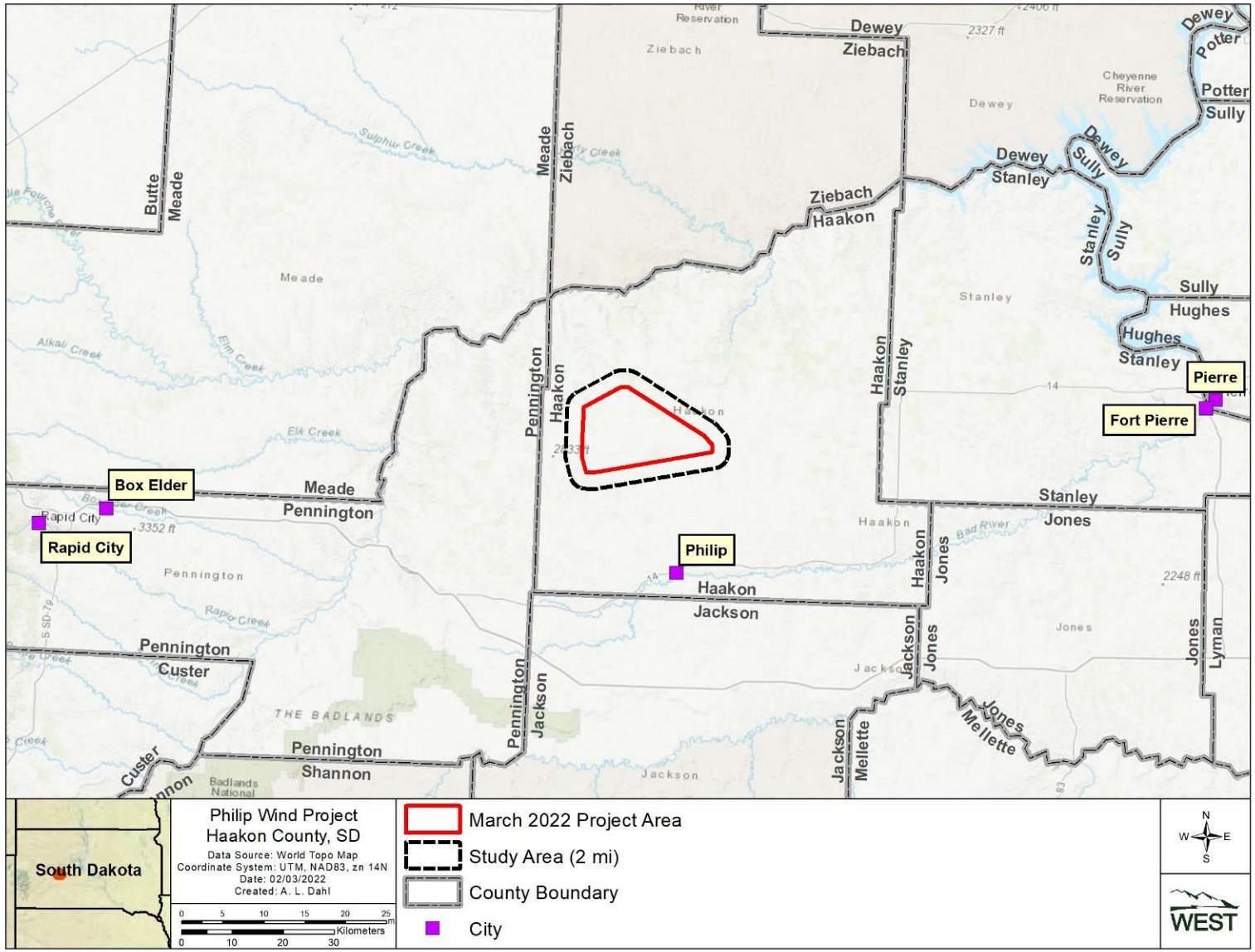

Figure 1.1 Location of the Philip Wind Project in Haakon County, South Dakota, 2022.

3 METHODS

Prairie dog colonies were identified and mapped through a desktop review and field surveys. The desktop review consisted of a data request to identify historical colonies and a review of aerial imagery to identify potential colonies. Field surveys were conducted to determine the status of identified colonies and to map active colonies. Additionally, swift fox (*Vulpes velox*) and burrowing owls (*Athene cunicularia*) were recorded incidentally, if observed during the mapping efforts within or immediately adjacent to any colony.

3.1 Desktop Review

Historical prairie dog colonies were identified and located within the Project Area and Study Area using data discussed during an agency meeting including Western Area Power Administration, U.S. Fish and Wildlife Service, and South Dakota Game Fish and Parks on August 14, 2018. No additional data on prairie dog colonies were provided in a data request for information on state or federally listed threatened and endangered species, rare species and habitats by the South Dakota Natural Heritage Database (SDNHD) on October 21, 2022. Additionally, WEST conducted a desktop review of aerial imagery using the National Agricultural Imagery Program (U.S. Department of Agriculture 2022) to identify potential prairie dog colonies within both the Project and Study areas. If a potential colony was detected, the approximate boundary was digitized using geographic information system (GIS) and the colony was given a unique ID. Maps and files showing all potential colonies, unique ID, roads, cities, and land access information were compiled for follow up field surveys.

3.2 Field Surveys and Mapping

Prairie dog colony locations were collected in conjunction with prairie grouse lek (transect surveys spaced every 400 meters; April 4-19, 20-27, 2022; Piorkowski 2022) and raptor nest surveys (combination of aerial surveys and ground verification surveys; February 24, March 19, and April 19, 2022; Piorkowski and Arellano 2023). These field-collected locations, combined with the potential prairie dog colonies from the desktop review, provided the locations to be visited for the mapping effort. All colonies were comprised of multiple locations (labelled with capital letters) – for example PD-01A, PD-01B, and PD-01C were three locations within one colony (Figure 3.1, Appendix A).

In August 2022, the Project Area was updated. Therefore, on-ground mapping was completed October 10-13, 2022 at potential colonies in areas where the August 2022 Project Area intersected the March 2022 Project Area and Study Area (Mapping Overlap; Figure 3.1). Biologist(s) visited the locations and walked the perimeter of the colony (i.e., outside edge of active burrows), recording approximate boundary using a sub-meter Global Positioning System (GPS; Trimble unit). Colony status was defined as active (presence of prairie dogs and fresh burrows, tracks and/or fecal droppings), inactive (absence of prairie dogs, old and unused

burrows), absent (no evidence remaining from a historical colony). The number of active burrows was recorded as an index to the number of prairie dogs.

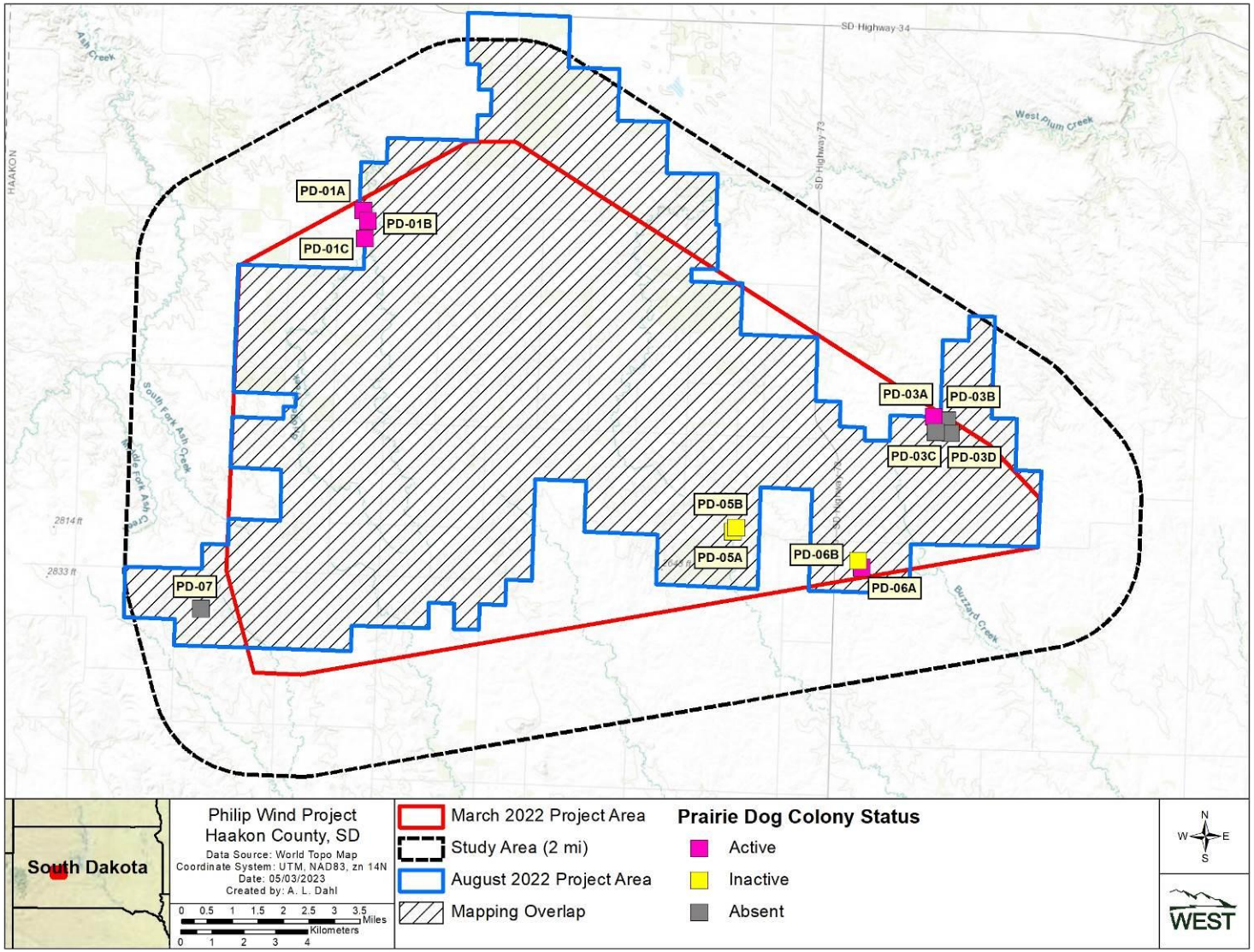

Figure 3.1. Status and location of prairie dog colonies at the Philip Wind Project in Haakon County, South Dakota, 2022.

4 RESULTS

The data discussed from the SDNHD (August 14, 2018) provided six historical prairie dog colony locations (PD-01A, 01B, 03A, 03B, 03C, and 03D) within the Project and Study areas (Table 4.1, Figure 3.1). Appendix A displays the delineated results of all active prairie dog colonies.

Twelve locations were surveyed for the presence of prairie dog colonies (Table 4.1, Figure 3.1) and include six historical and six new locations. Three active prairie dog colonies were located in the Project Area. PD-01A, PD-01B, and PD-01C are all active locations within the PD-01 colony (Appendix A). PD-03A is the only active location in the PD-03 colony, the three absent locations (PD-03B, PD-03C, and PD-03D) now experience regular agricultural practices. PD-06A is the only active location in the PD-06 colony, the one inactive location (PD-06B) also experiences regular agricultural practices.

Table 4.1. Status of historical and potential prairie dog colony locations at the Philip Wind Project in Haakon County, South Dakota, 2022.

Colony ID	Area (acres)	Colony History	2022 Status	2022 Comments
PD-01A	11.2	Historical	Active	Extends west beyond Project Area, >100 active burrows
PD-01B	10.5	Historical	Active	Extends west beyond Project Area, >100 active burrows
PD-01C	0.1	First observed in 2022	Active	Additional location near PD-01 A and B, < 10 active burrows, most of colony outside Project Area
PD-03A	4.3	Historical	Active	< 20 active burrows
PD-03B	0	Historical	Absent	Location is in crop field
PD-03C[1]	0	Historical	Absent	Location is in crop field
PD-03D[1]	0	Historical	Absent	Location is in crop field
PD-05A	0	First observed in 2022	Inactive	Old burrows present but filled in with dirt, no active burrows or prairie dog activity.
PD-05B	0	First observed in 2022	Inactive	Old burrows present but filled in with dirt, no active burrows or prairie dog activity.
PD-06A	3.3	First observed in 2022	Active	Fresh burrows present, <25 active burrows.
PD-06B	0	First observed in 2022	Inactive	Old burrows present but filled in with dirt, no active burrows or prairie dog activity.
PD-07	0	First observed in 2022 (desktop)	Absent	No colony present, no signs of old burrows or prairie dog activity

[1] Recorded as active during grassland surveys completed in 2018.

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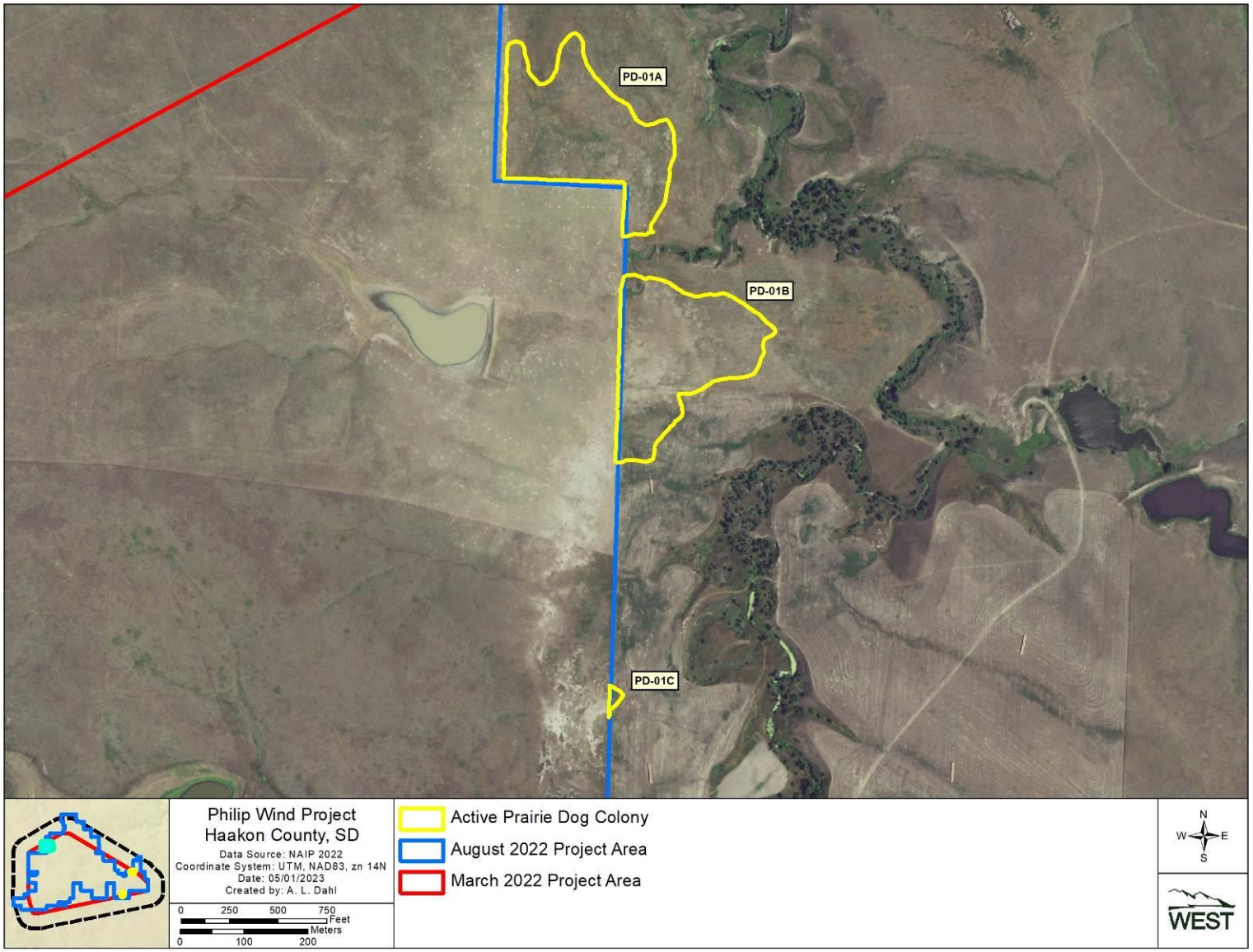
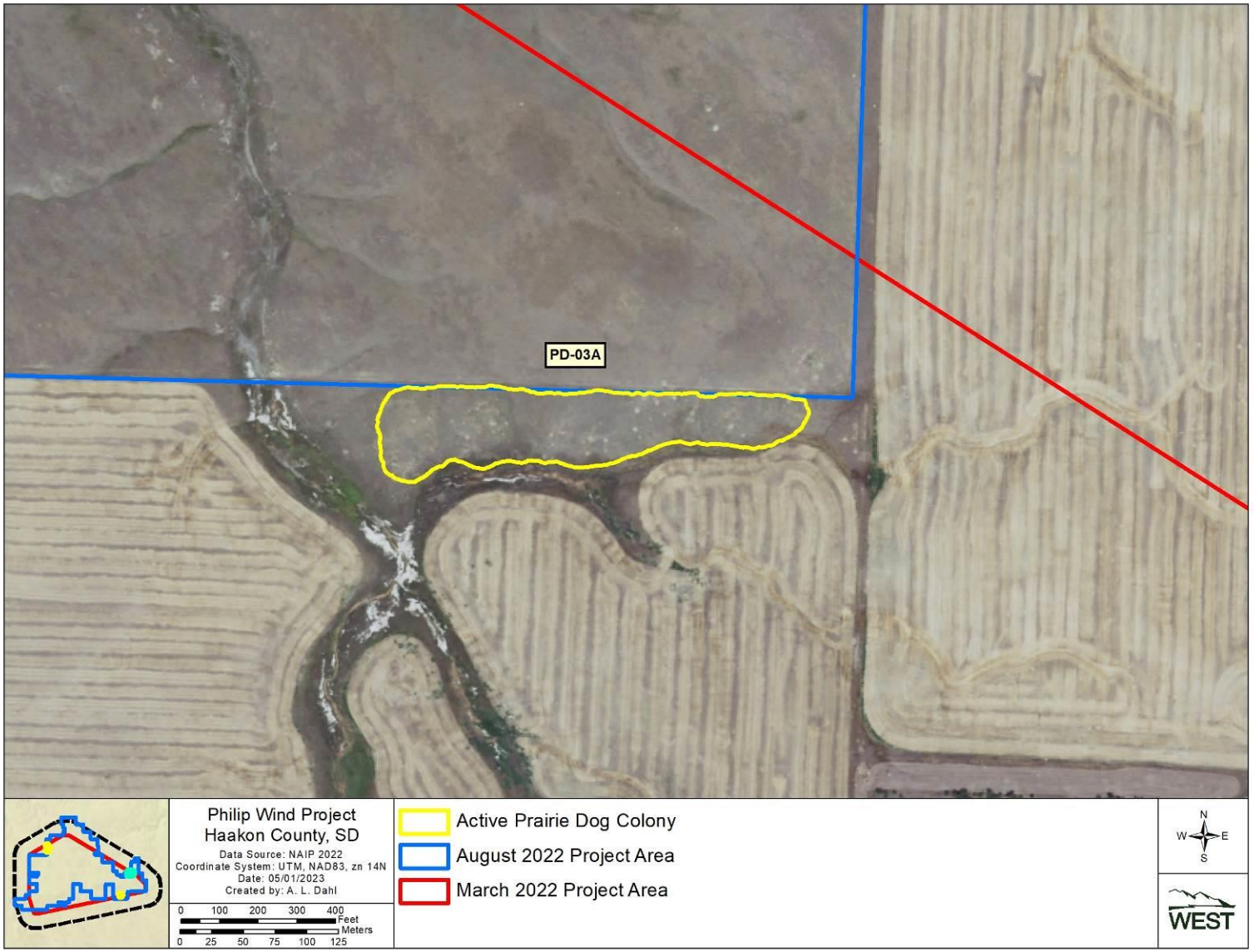
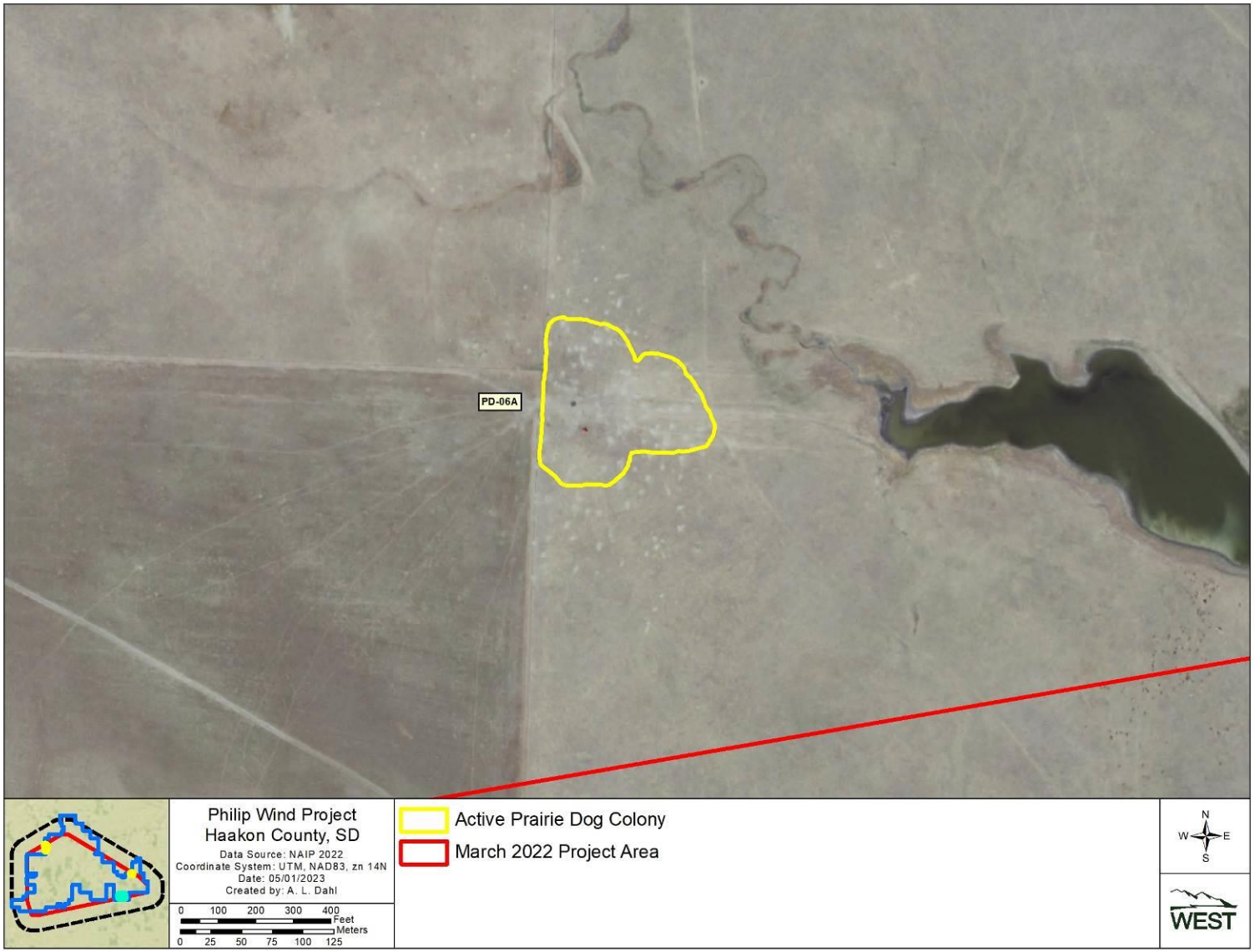
Appendix A. Delineation of Active Prairie Dog Colonies within the Philip Wind Project During 2022 Surveys, Haakon County, South Dakota.



Map A1. Active prairie dog colony PD-01 within northwestern portion of the Philip Wind Project, Haakon County, South Dakota.



Map A2. Active prairie dog colony PD-03 within eastern portion of the Philip Wind Project, Haakon County, South Dakota.



Map A3. Active prairie dog colony PD-06 within southeastern portion of the Philip Wind Project, Haakon County, South Dakota.

APPENDIX E

Northern Long-eared Bat Habitat Assessment Report

Northern Long-eared Bat Habitat Assessment

Philip Wind Project

Haakon County, South Dakota

Final Report

May – October 2022

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REPORT REFERENCE

Piorkowski, M., and T. Mabee. 2023. Northern Long-eared Bat Habitat Assessment, Philip Wind Project, Haakon County, South Dakota. Final Report. May – October 2022. Prepared for Philip Wind Partners LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc. (WEST), Bismarck, North Dakota, June 8, 2023. 8 pp + appendix.

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Appendix A. Representative Site Photographs of Potentially Suitable Summer Habitat at the Philip Wind Project, Haakon County, South Dakota

1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in Haakon County, South Dakota (Figure 1.1). Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to assess the presence of potentially suitable summer roosting and foraging habitat for northern long-eared bat (*Myotis septentrionalis*; NLEB) using the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (Guidelines; USFWS 2022b). The NLEB is listed under the Endangered Species Act (1973) as a federally endangered species throughout its range (U.S. Fish and Wildlife Service [USFWS] 2022a). The objective of this assessment was to identify potentially suitable summer roosting and foraging habitat within the March 2022 Project Area and the Study Area, a separate 2.5-mile (mi) buffer from the Project Area (Figure 1.1). This combined Project Area and Study Area encompasses the most recent Project Area (dated August 2022).

2 PROJECT AREA

The March 2022 Project Area encompasses approximately 68,569 acres (ac) in Haakon County, South Dakota (Figure 1.1). The Project is located approximately 14 mi north of the city of Philip, South Dakota. The Project is within two level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks of the Level III Northwestern Great Plains (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands.

The landscape within the Project Area is gently rolling to flat topography. The primary land cover/use within the Project Area is grassland/herbaceous and cultivated crops. There are numerous named creeks within the Project Area (U.S. Geological Survey [USGS] National Hydrography Dataset 2020).

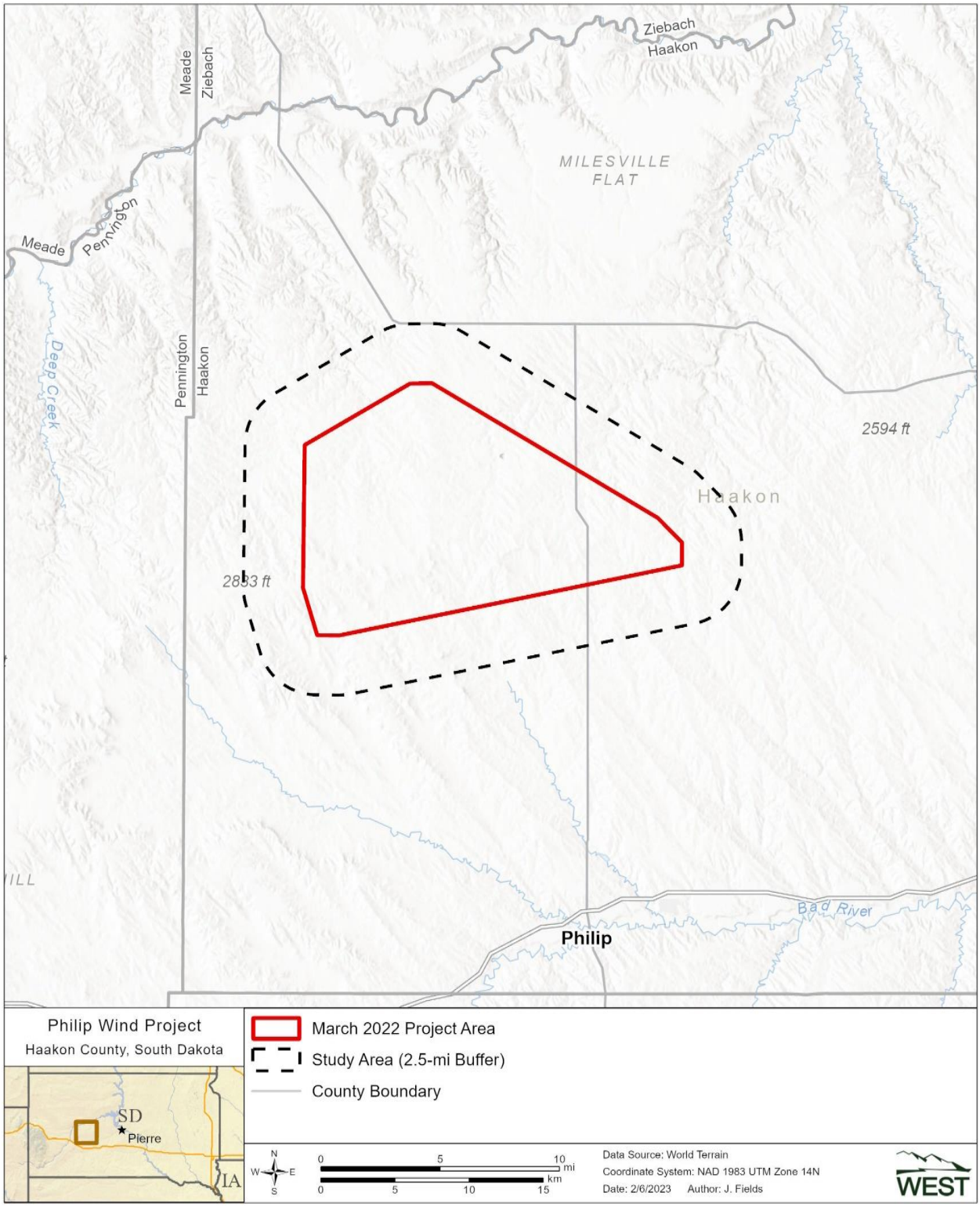

Figure 1.1 Location of the Philip Wind Project in Haakon County, South Dakota, 2022.

2.1 Northern Long-eared Bat Summer Habitat Description

NLEB favor roosting habitat located in intact, interior forests with late successional characteristics (Carter and Feldhamer 2005, Timpone et al. 2010). Although the NLEB tends to favor intact forests, this species can also use relatively small forest patches connected by shelterbelts (Henderson and Broders 2008). NLEB is a roost generalist using a much broader array of roost types than specialists such as Indiana bats (e.g., cavities, crevices, exfoliating bark, stumps, artificial structures) and smaller roost trees (as small as two inches in diameter at breast height (DBH; Lacki et al. 2009). NLEB generally use roosts with a higher percentage of canopy cover and typically greater clutter than other, similar bat species (e.g., other Myotis. spp.), usually requiring 56−84% canopy cover around roosts (Sasse and Perkins 1996, Foster and Kurta 1999, Lacki and Schwierjohann 2001, Carter and Feldhamer 2005, Timpone et al. 2010). NLEB also tend to stay relatively close to forest features while foraging (Henderson and Broders 2008), generally preferring to forage in upland, mature forest above or below the canopy, but also using forest clearings, riparian forest, forested ponds, and forested flyways (Foster and Kurta 1999, Amelon and Burhans 2006). Based on a synthesis of ecological studies, the USFWS defines suitable NLEB roost trees as trees with a DBH ≥ 3 inches, and with exfoliating bark, cracks, crevices, or cavities (USFWS 2022b). Connected habitat include “individual trees [that] may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 ft of other forested or wooded habitat” (USFWS 2022b).

3 METHODS

The NLEB summer habitat assessment was completed in accordance with the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (Guidelines; USFWS 2022b). NLEB roosting habitat was defined as deciduous forest, mixed forest, and woody wetlands 10 ac or larger in size with potential roost trees and any forested areas within 1,000 ft of these patches. Anthropogenic structures were not included in this assessment. Linear forest features, isolated trees, and isolated small forest stands (less than 10 ac in size) located more than 1,000 ft away from suitable forested habitat were considered unsuitable habitat for NLEB as per supporting research and USFWS guidelines (Foster and Kurta 1999, Henderson and Broders 2008, USFWS 2022b). The habitat assessment consisted of an initial desktop review, followed by a field reconnaissance visit to ground-truth the desktop results.

3.1 Desktop Review

3.1.1 Desktop GIS assessment to Identify Potentially Suitable Summer Habitat

WEST digitized the boundaries of forested areas greater than or equal to 10 ac within the Project and Study areas based on U.S. Department of Agriculture’s (USDA) National Agricultural Imagery Program (NAIP) imagery (USDA NAIP 2021) and considered it potentially suitable summer habitat. WEST defined “patch” as a distinct, contiguous area of trees with a DBH ≥ 3 inches separated from other distinct, contiguous areas of trees.

3.1.2 Finalize Potentially Suitable Summer Habitat

A USFWS-permitted WEST bat biologist reviewed all resulting desktop habitat assessment files. The bat biologist evaluated the suitability of each digitized patch of potentially suitable summer habitat to ensure they were biologically valid.

3.1.3 Create Connected Habitat Buffer

A connected habitat buffer (1,000-ft) was placed around forested patches (greater than or equal to 10 ac) and includes all land cover types within the 1,000 ft buffer that could be used for foraging and commuting (USFWS 2023). Forested patches within these connected habitat buffers were deemed potentially suitable summer habitat.

3.1.4 Calculate Potentially Suitable Summer Habitat

Individual trees and small tree stands (<10 ac) within or intersecting the connected habitat buffer were included in calculating the total acreage of potentially suitable summer habitat. The total calculation included forested patches greater than 10 ac and the linear forest features, individual trees within 1,000 ft of a 10 ac forest patch, and small forest stands (< 10 ac) within 1,000 ft of a 10 ac forest patch.

3.2 Site Visit

Following the desktop review, a permitted WEST bat biologist completed a reconnaissance site visit on October 13–14, 2022, to assess potential summer habitat within the Project and Study areas from publically accessible roads. During the site visit, forest characteristics were evaluated and confirmed against the desktop evaluation, when possible, using factors including vegetation type, tree size composition (≥ 3 in DBH), and snags. Areas mapped during the desktop review as potential summer habitat were visited and Global Positioning System points were recorded in the GAIA GPS mobile application to identify habitat assessment points and reference photo locations (Appendix A). If additional potential summer habitat was identified during the site visit, those forest patches were mapped and added to the dataset.

3.3 Results

The Project Area contains 1,507.7 ac of connected habitat, and the Study Area contains 8,030.8 ac of additional connected habitat (black outline; Figure 3.1; Table 3.1; area calculations may differ slightly due to rounding), both of which include the 1,000 ft connected habitat buffer. The Project Area contains 64.8 ac of potentially suitable summer habitat, and the Study Area contains 345.1 ac of potentially suitable summer habitat (green area; Figure 3.1; Table 3.1). During the site visit, it was confirmed that the desktop evaluation of potentially suitable summer habitat was accurate and that the forest patches were of at least three inches DBH interspersed with snags.

Table 3.1. Potentially suitable northern long-eared bat summer habitat at the Philip Wind Project, Haakon County, South Dakota, October 2022.

	Connected Habitat Buffer (acres)	Potentially Suitable Summer Habitat (acres)
Site 1	2906.4	103.6
Site 2	583.2	31.4
Site 3	1946.5	107.4
Site 4	1974.2	91.7
Site 5	1216.1	45.9
Site 6	912.8	30.1
Total	**9539.1**	**410.0**

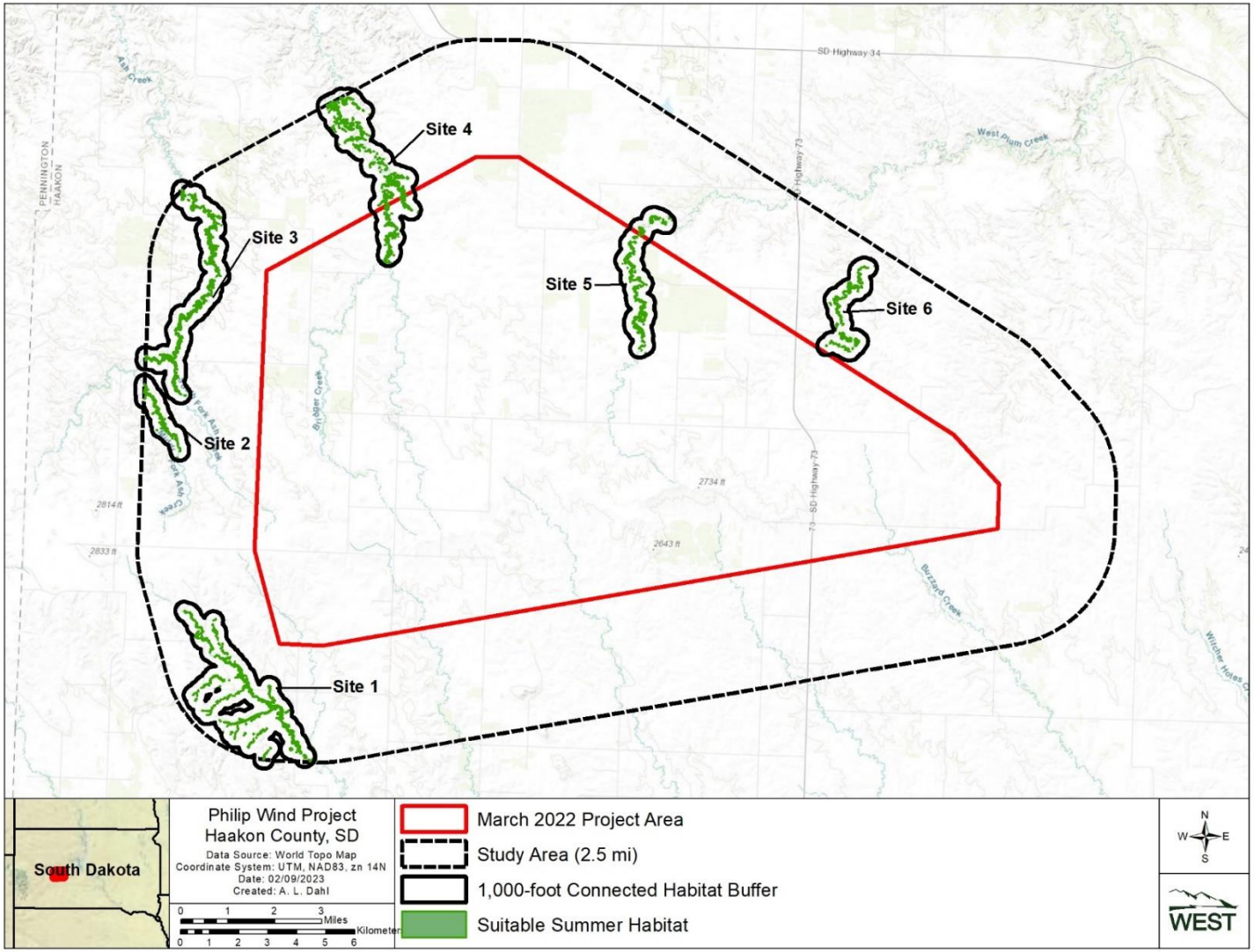

Figure 3.1. Potentially suitable summer habitat for the northern long-eared bat at the Philip Wind Project in Haakon County, South Dakota, 2022.

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Appendix A. Representative Site Photographs of Potentially Suitable Summer Habitat at the Philip Wind Project, Haakon County, South Dakota

Representative photograph of northern long-eared bat potentially suitable summer habitat at Site

Representative photograph of northern long-eared bat potentially suitable summer habitat and

Representative photograph of northern long-eared bat potentially suitable summer habitat and

Representative photograph of trees and snags with exfoliating bark at Site 3.

APPENDIX F

Raptor Nest Survey Report

(Due to sensitive information contained in this

Appendix, please contact WAPA to receive a copy.)

APPENDIX G

Prairie Grouse Lek Survey Report

(Due to sensitive information contained in this Appendix,

please contact WAPA to receive a copy.)

APPENDIX H

Grassland Habitat Assessment Report

Grassland Assessment

Philip Wind Project

Haakon County, South Dakota

Final Report

July 2018 and September 2022

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REPORT REFERENCE

Piorkowski, M. 2023. Grassland Assessment, Philip Wind Project, Haakon County, South Dakota. Final Report: July 2018 and September 2022. Prepared for Philip Wind Partners, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc., Bismarck, North Dakota. June 9, 2023. 6 pages.

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1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in central South Dakota. Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to conduct an updated grassland assessment within the August 2022 Project Area (Figure 1.1). Bauman et al. (2018) defined undisturbed land as soil that has not been mechanically manipulated or has not experienced "iron in the ground" practices and the authors refer to undisturbed grasslands as native prairie. Bauman (2021) later described undisturbed grasslands as 'unbroken' grasslands. For this report we refer to native prairie as unbroken sod and other grasslands as broken sod.

The objective of this study was to identify grassland parcels and categorize the sod type of each parcel as either unbroken or broken sod. This report presents the combined results of a previous grassland assessment conducted for the Project during July 2018 (Chodachek and Moratz 2018). This assessment, completed in September 2022 within the August 2022 Project Area only, includes unsurveyed areas from shifts in the Project area since the Chodachek and Moratz (2018) assessment.

2 PROJECT AREA

The Project is located approximately 14 mi north of the city of Philip in Haakon County, South Dakota (Figure 1.1). The Project Area encompasses approximately 68,318 acres (ac) within two level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands, often referred to as prairie potholes.

Topography within the Project Area is gently rolling to flat. The primary land cover within the Project Area is grassland/herbaceous and cultivated crops (NLCD 2019). Wetlands are relatively evenly dispersed throughout the Project Area and are mainly classified as freshwater emergent and freshwater pond (NWI 2023).

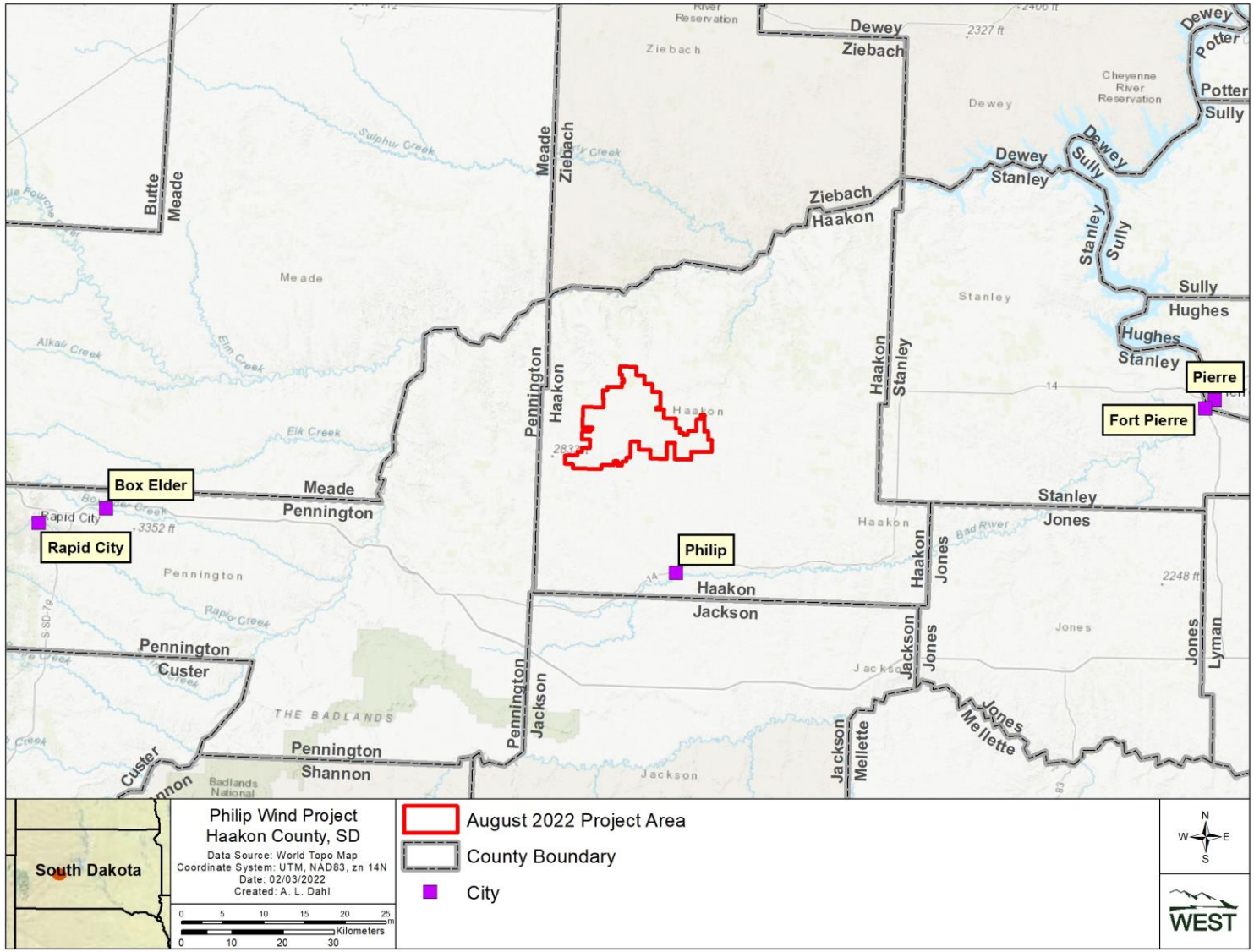

Figure 1.1 Location of the Philip Wind Project in Haakon County, South Dakota.

3 METHODS

The grassland habitat assessment was conducted using a two-stage process: a desktop analysis followed by field surveys in areas not surveyed in 2018 (Chodachek and Moratz 2018).

3.1 Desktop Analysis

The desktop analysis included a review of digital data within the Project Area to map and categorize potential grasslands by sod type (broken or unbroken grasslands; Bauman 2021). Broken sod type is defined as disturbed or mechanically manipulated ground (Bauman et al. 2018). Broken sod is characterized by the presence of features indicating mechanized cultivation, such as rock clearing, abrupt field edges, straight line features (indicating plowing, disking, harvesting, or planting), or presence of any other features indicating human disturbance to the sod. Unbroken sod is characterized by the absence of these features indicating no human-caused breaking of the sod (Bauman et al. 2018, Bauman 2021).

A desktop analysis of existing land use/land cover features within the Project Area was completed using an overlay of existing land cover data (National Land Cover Database 2019, USDA National Agricultural Statistics Service 2021) and the South Dakota native habitat digital layer "Quantifying Undisturbed (Native) Lands in Western SD: September 2020 Updated Data Files, GIS Layers, Geodatabase" (Bauman et al. 2020) to create initial grassland parcels. A land cover analysis was completed on the combined results of these data layers and manually reviewed using the current (U.S. Department of Agriculture [USDA] 2022).

The desktop analysis resulted in creation of a digital data layer of parcels classified as "grassland" or "other" (i.e., non-grass areas such as cultivated cropland, roads, barren areas, development, wetlands, forests, and shrub/scrub). Each grassland parcel was further categorized as broken or unbroken (using the previously mentioned definitions) and was given a unique identifier (Grassland ID) used on maps and datasheets. In the event that there were smaller areas within each original parcel of a different classification or category, these areas were manually digitized and reclassified as appropriate. The geographical information system specialist provided maps showing all grassland parcels, Grassland ID, roads, cities, and land access information for the field validation stage.

3.2 Field Surveys

The second stage included field validation of desktop analysis results including the identification of any new grassland areas or reclassification of sod types. A biologist conducted surveys by walking a large portion of the grassland parcel and visually assessing the grasslands. If access was not granted to a land parcel, the visual survey was conducted from public roads using binoculars and a high-powered spotting scope. For each grassland parcel the sod type (broken, unbroken), tree/shrub presence, field edge changes, rock piles, human disturbance such as buildings, and linear features such as disking, harvesting, plowing, or planting were recorded.

Representative photographs were taken to document the status and features of the grassland parcels.

3.3 Post-Field Survey Processing

The grassland digital data layer created during the desktop review was updated using results from the field survey data. The datasheets from the field survey were entered into a database and linked to the grassland features digital data layer based on the Grassland ID. Each grassland parcel categorized as unbroken was rechecked against historic 1955 aerial imagery from Historic Aerials (https://www.historicaerials.com/). If evidence of tillage was found in the aerial imagery, the status of the grassland feature was changed to broken.

4 RESULTS

Field validation surveys were completed September 11 – 14, 2022. The Project Area was composed of approximately 27,677.7 ac (40.5% of the Project Area) of grassland, of which approximately 12,191.9 ac (17.9% of the Project) were categorized as broken and 14,914.6 ac (21.9% of the Project) as unbroken (Table 4.1, Figure 4.1). Surveys were not completed at 2.1% of the grasslands due to lack of access.

Table 4.1. Summary of sod type by acres and corresponding percent of total grasslands and Project assessed during field surveys completed in 2018 and 2022 at the Philip Wind Project in Haakon County, South Dakota.

Sod Type	Acres	% of Total Grassland	% of Project
unbroken sod	14,914.6	53.9	21.9
broken sod	12,191.9	44.0	17.9
Not surveyed-no access	571.3	2.1	0.8
Total[1]	**27,677.7**	**100**	**40.5**

1. Totals may not equal values shown due to number rounding.

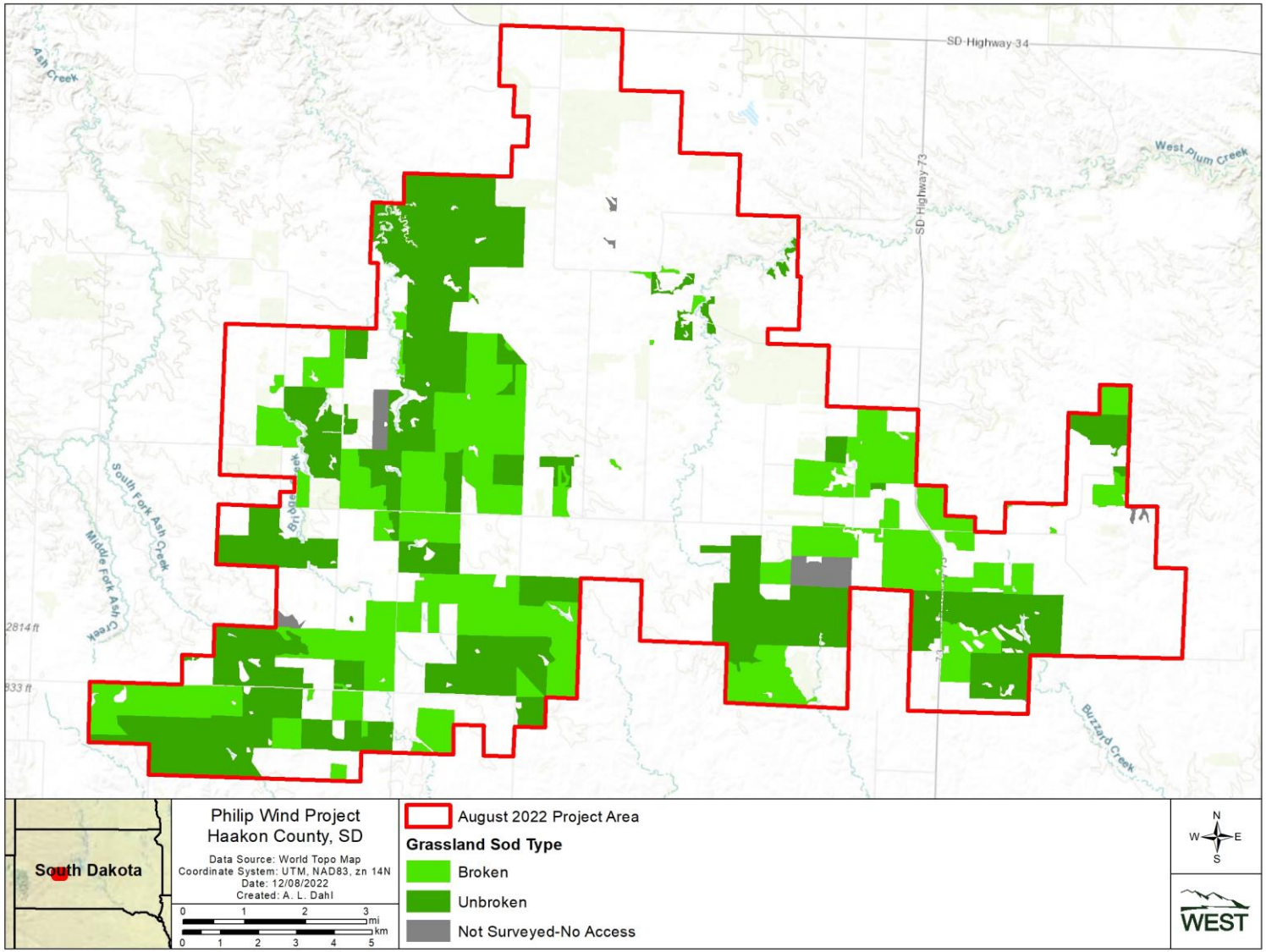

Figure 4.1. Grassland sod types for grassland parcels assessed during field surveys completed in 2018 and 2022 at the Philip Wind Project in Haakon County, South Dakota.

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APPENDIX I

Water Resource Analysis Report

Water Resource Analysis

Philip Wind Project

Haakon County, South Dakota

Final Report

October 2022

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Fields, J., T. Mabee, and M. Piorkowski. 2023. Water Resource Analysis, Philip Wind Project, Haakon County, South Dakota. Final Report: October 2022. Prepared for Philip Wind Partners, LLC, Chicago, Illinois. Prepared by Western EcoSystems Technology, Inc., Cheyenne, Wyoming. June 6, 2023. 9 pages.

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1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in central South Dakota (Figure 1.1). Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to conduct a water resource analysis. The objective of the analysis was to obtain spatial data on the location and extent of potentially jurisdictional water resource features within the August 2022 Project Area and the Study Area, a separate 2.0-mile buffer from the Project Area, and preliminarily characterize the types of wetlands and waterbodies. This desktop analysis is a detailed precursor to a more formal, complete field delineation.

2 PROJECT AREA

The Project is located approximately 14 miles north of the city of Philip in Haakon County, South Dakota (Figure 1.1). The Project Area encompasses approximately 68,318 acres (ac) within two level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands, have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands, often referred to as prairie potholes.

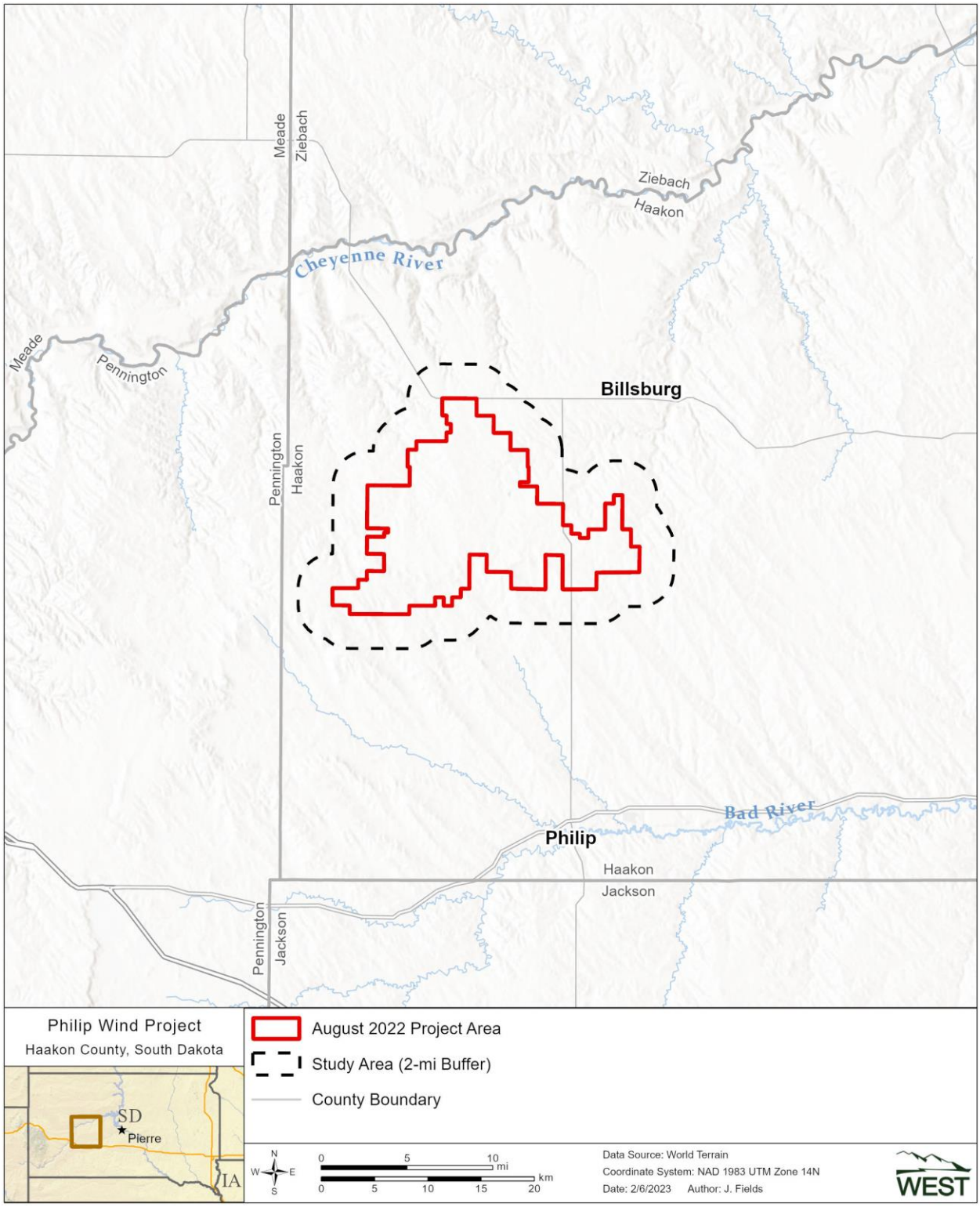

Figure 1.1. Location of the Philip Wind Project, Haakon County, South Dakota, 2022.

3 METHODS

WEST conducted a desktop review using U.S. Geological Survey (USGS) topographic maps, soil survey information from the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS 2019), U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (USFWS 2023), and National Hydrography Dataset (NHD) data (USGS 2023) for the Study Area.

These data were used to identify wetlands and waterbodies that may be regulated by the U.S. Army Corps of Engineers (USACE). The jurisdictional status of "Waters of the U.S." (WOTUS) are defined by the USACE and Environmental Protection Agency 1986 and *Rapanos* decision (USEPA 2008). WOTUS are defined as any type of waterbody or adjacent wetland that is or could flow into navigable waters within the U.S. The *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) emphasize a three-parameter approach to identify wetlands that may be federally regulated, including the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Additionally, the following guidelines have been published (Lichvar and McColley 2008) to evaluate whether drainage features have an ordinary high water mark (OHWM) and may therefore be potential WOTUS:

- presence of a defined bed and bank
- flowing water
- aerial imagery evidence
- change in vegetative communities
- evidence of periodic flow (e.g., litter, debris, natural scour line, shifted gravel, eroded banks)

In addition to the desktop analysis, a site reconnaissance was completed October 13–14, 2022, from publicly accessible roads. The purpose of the site reconnaissance was to field verify the NWI and NHD features from the desktop analysis at a high level. Features inconsistent with desktop analysis results were documented if observed while traveling publicly accessible roads.

4 RESULTS

4.1 National Wetlands Inventory

The results of the desktop NWI review are provided in Table 4.1 and Figure 4.1. NWI depicts 1,798.7 acres of potential wetlands within the Project Area and 2,535.9 acres within the Study Area. Freshwater emergent wetlands were the most common NWI category. Locations where NWI features were not present during the site reconnaissance were noted as "no feature" (Figure 4.1).

Table 4.1. National Wetland Inventory Data at the Philip Wind Project, Haakon County, South Dakota.

NWI Type	Project Area (acres)	Study Area (acres)
Freshwater Emergent Wetland	750.5	1,050.5
Riverine	681.6	990.8
Freshwater Pond	333.1	433.0
Freshwater Forested/Shrub Wetland	33.5	31.6
Lake	--	30.0
Total[1]	**1,798.7**	**2,535.9**

[1] Sums of values may not add to total value shown, due to rounding

4.2 National Hydrography Dataset

The results of the desktop NHD review are provided in Table 4.2 and Figure 4.2. NHD indicated 377.6 miles of waterways in the Project Area and 508.5 miles in the Study Area. NHD waterbodies and NWI riverine features were nearly identical, except that NHD data differentiated agricultural infrastructure (artificial path and connector) from intermittent and perennial streams/rivers. Several named drainages are present within the Project Area and Study Area. All drainages are tributaries to the Cheyenne River and the Bad River. Locations where NHD features were not present during the site reconnaissance were noted as “no feature” (Figure 4.2).

Table 4.2. National Hydrography Data at the Philip Wind Project, Haakon County, South Dakota.

NHD Type	Project Area (miles)	Study Area (miles)
Intermittent	331.2	444.7
Artificial Path	39.0	45.0
Perennial	7.4	18.7
Connector	--	0.1
Total	**377.6**	**508.5**

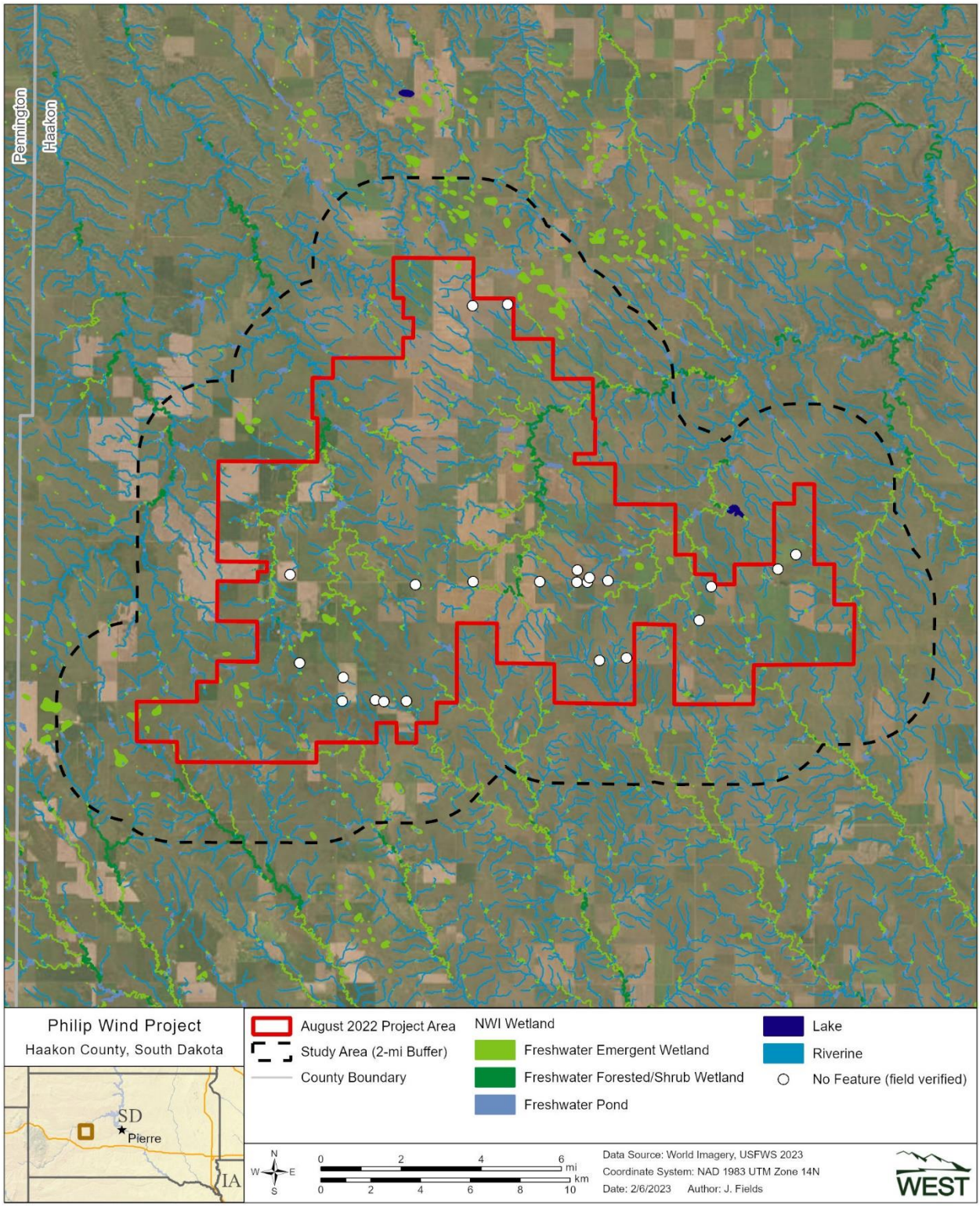

Figure 4.1. National Wetland Inventory Data at the Philip Wind Project, Haakon County, South Dakota, 2022.

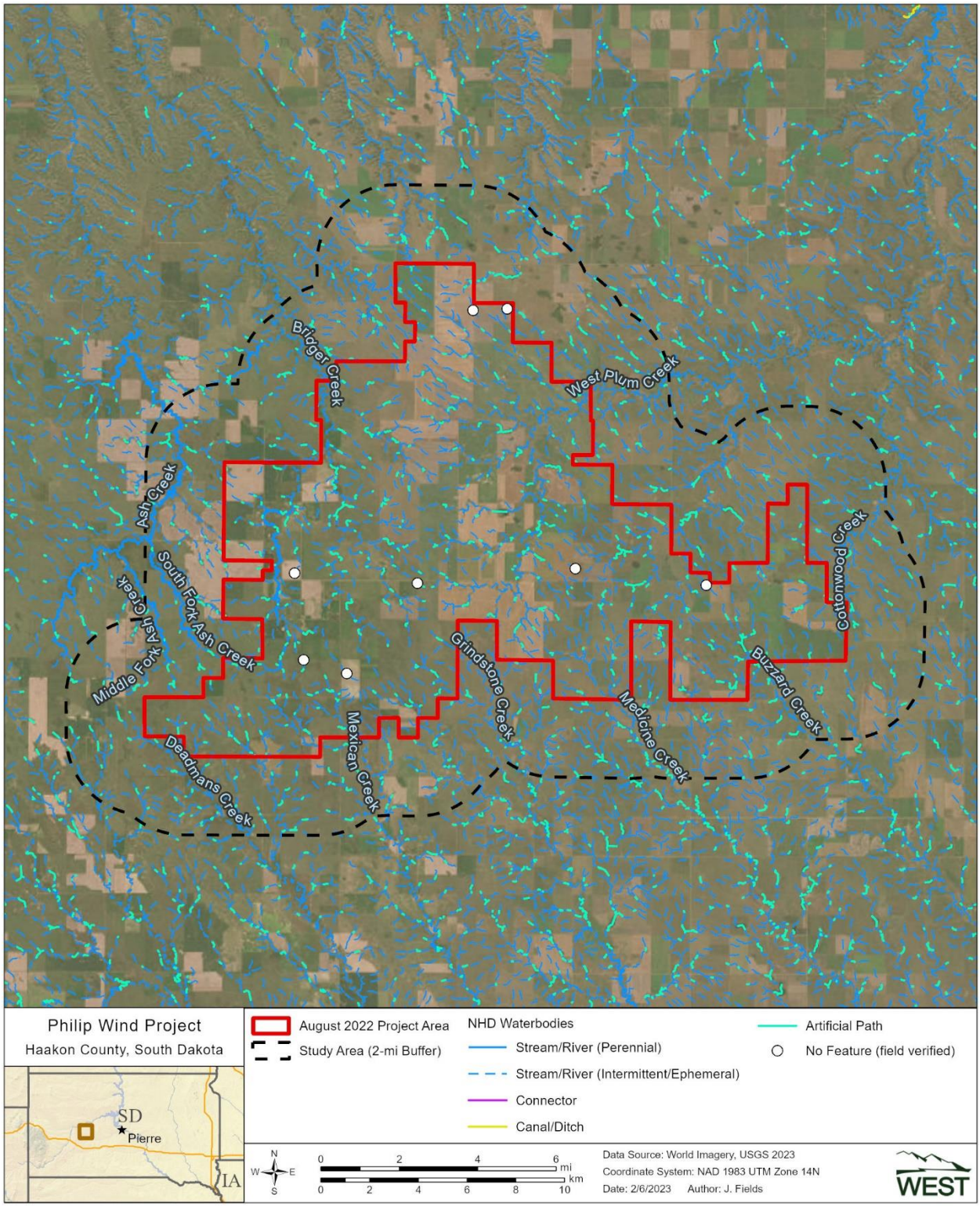

Figure 4.2. National Hydrography Data at the Philip Wind Project, Haakon County, South Dakota, 2022.

4.3 Soils

The Project Area is underlain by at least 50 soil-mapping units (USDA NRCS 2019), three of which (Egas silty clay loam, Hoven silt loam, and Kolls clay) are identified as hydric soils based on the hydric rating and comprise 0.8% (562.9 ac) of the Project Area. The Study Area is underlain by 62 soil-mapping units (USDA NRCS 2019), three of which are identified as hydric soils based on the hydric rating and comprise 1.1% (943.9 ac) of the Study Area (Figure 4.3).

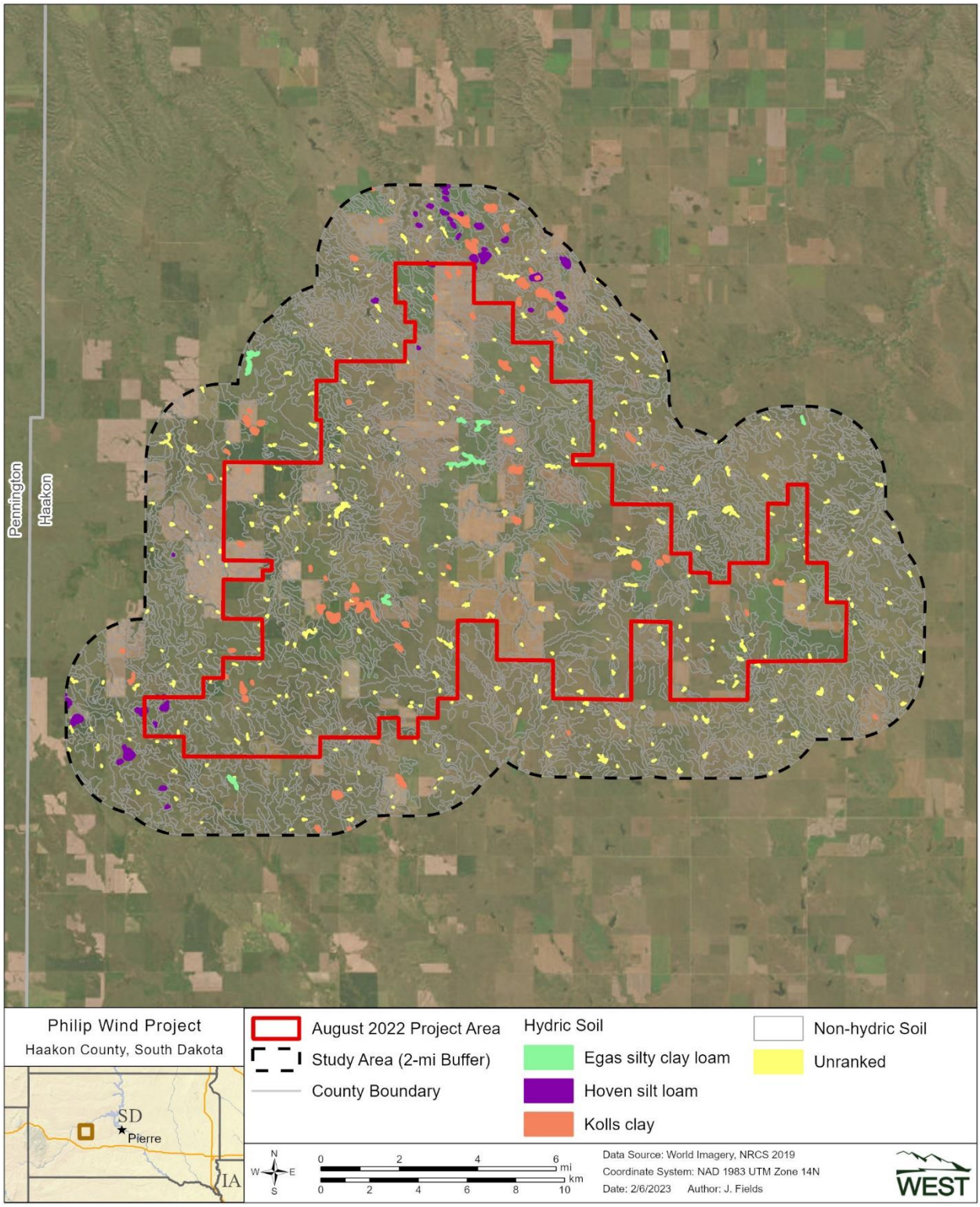

Figure 4.3. National Soil Data at the Philip Wind Project, Haakon County, South Dakota, 2022.

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APPENDIX J

Public Involvement

Department of Energy
Western Area Power Administration
Upper Great Plains Customer Service Region
P.O. Box 35800
Billings, MT 59107-5800

B0401.BL

December 21, 2022

Dear Interested Parties:

This letter is to notify you of the proposed Philip Wind Project (Project) and to request your input on the Project. Philip Wind Partners LLC's proposed Project would involve construction of a 300-megawatt (MW) wind farm generating facility that includes approximately 90 turbines (up to 6.1 MW each) and associated pads. Other Project components would include an underground power collection and communication system, a new substation, a new overhead transmission line, access roads, and a maintenance and operation center. The Project would be located on private land approximately thirteen (13) miles north of Philip, in Haakon County, South Dakota (see enclosed map).

The Project would interconnect with Western Area Power Administration's (WAPA) existing Oahe to New Underwood 230-kV transmission line. As a result, WAPA will provide federal oversight of the preparation of an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The EA will evaluate the environmental effects of the proposed Project on resources such as wetlands, vegetation and wildlife, cultural and recreation resources, as well as other social, economic, and environmental effects.

WAPA is announcing a public scoping period for the Project. The scoping period provides an opportunity for the general public, government agencies, tribal governments, and others to identify issues and alternatives that will help WAPA define the scope of the EA.

The public scoping meeting will be held virtually over Zoom Webinar on Thursday, January 19, 2023, from 5:00 to 7:00 pm MT (6:00 pm to 8:00 pm CT). The scoping meeting will be held to provide an opportunity for interested parties to learn about the Project from resource specialists and to submit written and verbal comments. During the meeting, WAPA will give a short presentation about the Project and NEPA scoping process and provide an opportunity to ask questions. To learn more about this Project and to share your ideas, join us at:

Video (preferred)
https://swca.zoom.us/j/96789099356
Meeting passcode: 354618

Call-in only:
Phone: (888) 475-4499 (Toll Free)
Webinar ID (access code): 967 8909 9356

The public meeting will be recorded and made available for the public on WAPA's website: https://www.wapa.gov/regions/UGP/Environment/Pages/PhilipWind.aspx

Comments may be submitted in the following ways:

- By mail to:
  Western Area Power Administration
  Attn: Mr. John Russell
  2900 4th Avenue North
  Billings, MT 59101
- By voicemail hotline by calling (605) 409-5116
- By email to nepa@wapa.gov with "Philip Wind EA" in the subject line
- In writing or verbally at the virtual public scoping meeting, at link provided above.

For your input to be considered during preparation of the draft EA, WAPA requests comments by **February 13, 2023**. If you have any questions, or need more information about the Project, please contact WAPA using the methods listed above. Thank you for your time and interest in the Philip Wind Project.

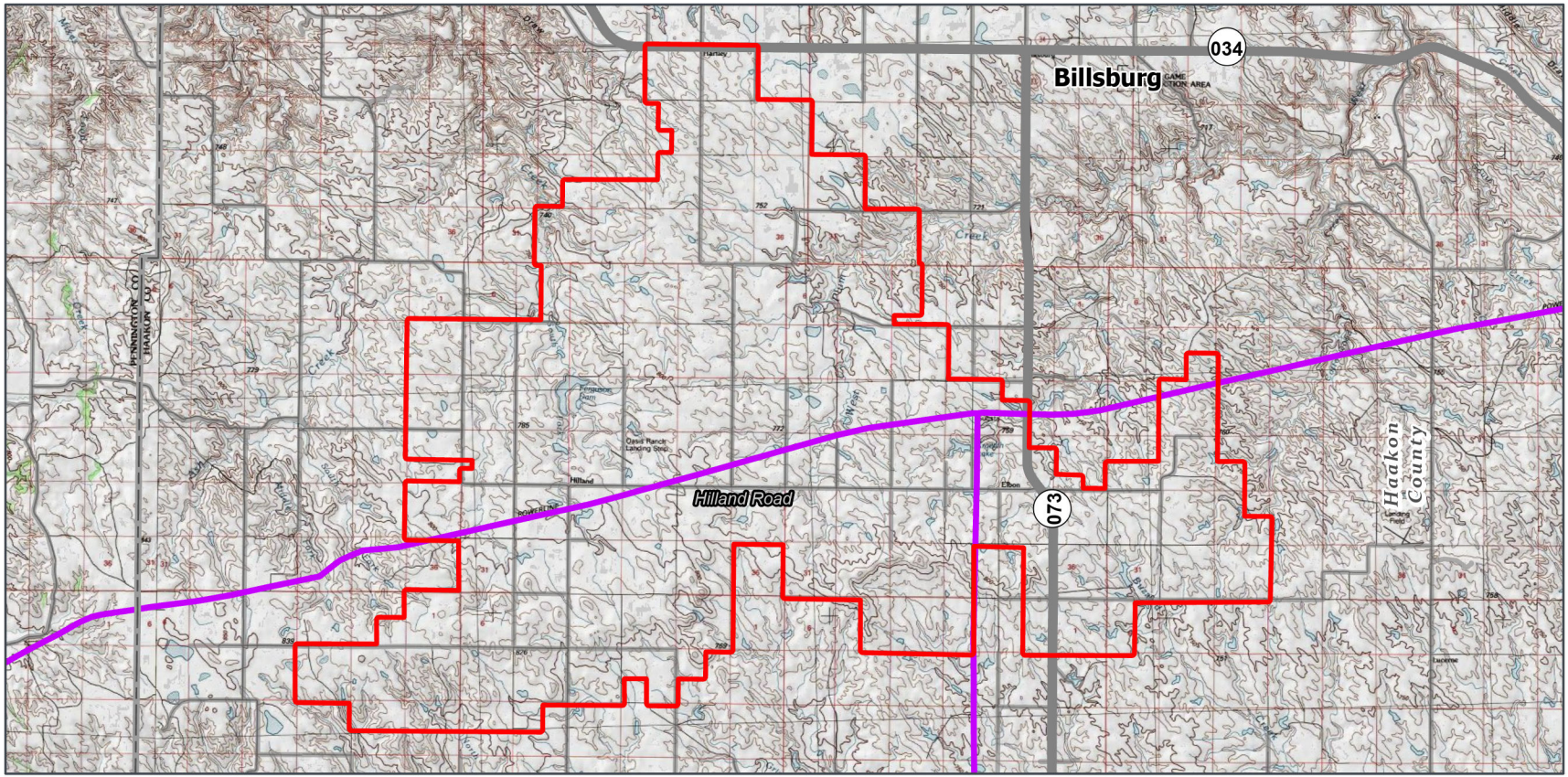
Sincerely,

JOHN RUSSELL Digitally signed by JOHN RUSSELL
Date: 2022.12.20 11:26:36 -07'00'

John Russell
Environmental Manager

Enclosure

1. Preliminary Project Map
2. Virtual Public Scoping Zoom Webinar instructions
3. Scoping comment form



PHILIP WIND PROJECT

Project Overview

- Transmission Line
- Roadway
- Project Boundary
- County Boundary

Haakon County, SD
NAD 1983 UTM Zone 14N
44.3104°N 101.7678°W

0 1.5 3 Miles
0 1.5 3 Kilometers

South Dakota

N

1:205,000

Base Map: USGS National Map, accessed December 2022
Updated: 12/22/2022
Project No. 75529
Layout: Project_Overview_Topo_NoDKParcel
Aprx: 75529_PhilipWind

SWCA ENVIRONMENTAL CONSULTANTS

Western Area Power Administration

Philip Wind Project

Virtual Public Scoping Meeting

Thursday, January 19, 2023	5:00 to 7:00 pm MT (6:00 pm to 8:00 pm CT)	via Zoom Webinar https://swca.zoom.us/j/96789099356 Meeting passcode: 354618

Thank you for your interest in the Philip Wind Project. After reviewing the Project information, please complete the appropriate sections of this form to be included on the project mailing list and/or to provide comments. Comments can be submitted:

- At the scoping meeting
- By phone to (406) 255-2810
- By voicemail hotline to (605) 409-5116
- By email to nepa@wapa.gov with Philip Wind EA in the subject line
- By mail to Mr. John Russell, WAPA Environmental Manager

Visit https://www.wapa.gov/regions/UGP/Environment/Pages/PhilipWind.aspx for Project information. Your comments are important to us and will be accepted through Monday, February 13, 2023, for formal consideration in the NEPA process.

Please Print Contact Information Below:

Name:	Organization:
E-mail Address (*optional*):	Daytime Phone No. (*optional*):
Street Address:	City / State / Zip Code:

☐ Please e-mail me the web link to the NEPA document when it becomes available (quickest and preferred method).
☐ I do not need a copy of the NEPA document.

Please Share Comments, Questions, or Concerns Below (continue on separate sheet if necessary):

Please fold in thirds and tape

Place postage here

Mr. John Russell
Environmental Manager - Upper Great Plains Region
Western Area Power Administration
2900 4th Avenue North
Billings, MT 59101

PUBLISHER'S AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA }

}SS

COUNTY OF HAAKON }

I, Selma Thorson of said County and State, being duly sworn on oath says: PIONEER REVIEW is a weekly newspaper of general circulation, published in PHILIP, in said County and State and has been such newspaper during the times thereinafter mentioned; that the said PIONEER REVIEW is a legal newspaper and has been in existence for more than one year immediately preceding the first publication herein mentioned; and has more than 200 bona fide subscribers; that I, the undersigned, am Billing Manager of said newspaper, and have personal knowledge of all facts stated in this affidavit; and that the advertisement headed:

Public Input Encouraged

Philip Wind Partner's LLC

A printed copy of which is hereto attached, was printed and published in said newspaper for 1 successive issues the first publication being on the 29th day of December, 2022, and the last publication on the 29th day of December, 2022, that $77.00 of the said newspaper; that no arrangement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any other person whomsoever

X Selma Thorson

Subscribed and sworn to me before this 31st day of December 2022.

Tamara Ravellette

Notary Public, State of South Dakota

My Commission Expires

January 24, 2026

TAMARA RAVELLETTE NOTARY SEAL PUBLIC SOUTH DAKOTA

PUBLIC INPUT ENCOURAGED

Public comments are sought to define the scope and alternatives for an Environmental Assessment of Phillip Wind Partners LLC's proposed wind energy facility in Haakon County to the north of Philip, South Dakota. The proposed project, to be called the Philip Wind Project, would involve construction of a 300-megawatt (MW) wind farm generating facility that includes approximately 90 turbines (up to 6.1 MW each) and associated pads. Support facilities for the wind energy center include an underground power collection and communication system, project substation, temporary meteorological towers, a new overhead transmission line, access roads, and a maintenance and operation center. Construction of the Philip Wind Project is proposed to begin as early as spring of 2024.

Western Area Power Administration (WAPA) will hold one virtual public scoping meeting to provide an opportunity for interested parties to learn about the Project from resource specialists and to submit written and verbal comments. The meeting will be held on Thursday, January 19, 2023, from 5:00 to 7:00 p.m. MT (6:00 pm to 8:00 pm CT), via Zoom Webinar. During the meeting, WAPA will give a short presentation about the Project and the National Environmental Policy Act scoping process. There will also be time for questions and verbal comments.

To learn more about this Project and to share your ideas, join us at:

5:00 to 7:00 pm MT (6:00 pm to 8:00 pm CT) on January 19, 2023, via Zoom Webinar.

Video (preferred): https://swca.zoom.us/j/96789099356
Meeting passcode: 354618
Call-in only: Phone: (888) 475-4499 (Toll Free)
Webinar ID (access code): 967 8909 9356.

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- By mail to:
  Western Area Power Administration
  Attn: Mr. John Russell
  2900 4th Avenue North, Billings, MT 59101
- Voicemail hotline to (605) 409-5116
- Email nepa@wapa.gov with Philip Wind EA in the subject line
- In writing or verbally at the virtual public scoping meeting

Visit the Project website to learn more at
https://www.wapa.gov/regions/UGP/Environment/Pages/PhilipWind.aspx

Comments should be postmarked no later than **February 13, 2023.**

[Published Dec. 29, 2022, at the total approximate cost of $77.00 and may be viewed free of charge at www.sdpublicnotices.com]

PUBLISHER'S AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA }

}SS

COUNTY OF HAAKON }

I, Selma Thorson of said County and State, being duly sworn on oath says: PIONEER REVIEW is a weekly newspaper of general circulation, published in PHILIP, in said County and State and has been such newspaper during the times thereinafter mentioned; that the said PIONEER REVIEW is a legal newspaper and has been in existence for more than one year immediately preceding the first publication herein mentioned; and has more than 200 bona fide subscribers; that I, the undersigned, am Billing Manager of said newspaper, and have personal knowledge of all facts stated in this affidavit; and that the advertisement headed:

SWCA Environmental Consultants

Public Input Encouraged-Philip Wind Project

A printed copy of which is hereto attached, was printed and published in said newspaper for 2 successive issues the first publication being on the 5th day of January, 2023, and the last publication on the 12th day of January, 2023, that $55.73 of the said newspaper; that no arrangement or understanding for a division thereof has been made with any person and that no part thereof has been agreed to be paid to any other person whomsoever

X Selma Thorson

Subscribed and sworn to me before this 31st day of January 2023.

Tamara Lavelett

Notary Public, State of South Dakota

My Commission Expires

January 24, 2026

PUBLIC INPUT ENCOURAGED

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- In writing or verbally at the virtual public scoping meeting

Visit the Project website to learn more at https://www.wapa.gov/regions/UGP/Environment/Pages/PhilipWind.aspx

Comments should be postmarked no later than **February 13, 2023.**

[Published Jan. 5 & 12, 2023, at the total approximate cost of $55.73 and may be viewed free of charge at www.sdpublicnotices.com]

PUBLISHER'S AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA }

}SS

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x Selma Thorson

Subscribed and sworn to me before this 31st day of January 2023.

Tamara Ravellette

Notary Public, State of South Dakota

My Commission Expires

January 24, 2026

TAMARA RAVELLETTE NOTARY SEAL PUBLIC SOUTH DAKOTA

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- Voicemail hotline to (605) 409-5116
- Email nepa@wapa.gov with Philip Wind EA in the subject line
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Comments should be postmarked no later than **February 13, 2023.**

[Published Jan. 5 & 12, 2023, at the total approximate cost of $55.73 and may be viewed free of charge at www.sdpublicnotices.com]

Submission ID	Affiliation	Comment	Comment Response
001	U.S. Department of Transportation Federal Highway Administration, South Dakota Division	At this milestone point, I would advise that if it determined that there is potential to affect the safety and/or performance of any federal-aid highway system routes in or around the Project boundaries, then please get in direct contact with the FHWA-SD Division and the South Dakota Department of Transportation (SDDOT) so that our interests can be properly considered with the scoping of this Project.	Comment noted. The proposed Project would follow WAPA's UGP Wind Energy PEIS Best Management Practices for transportation considerations. Project specific details are provided in the Philip Wind Energy Center Draft EA - Section 3.1 - Land Use and Public Facilities, including coordination with SD DOT and Haakon County for specific permits required during construction, also see Section 5.0 - Consultation and Coordination.
002	Private Citizen	Please email me the web link to the NEPA document when it becomes available (quickest and preferred method).	A public notice and meeting notice will be sent when the Draft EA is finalized.
003	Bureau of Land Management, South Dakota Office	Just to verify, there won't be any upgrades, new lines, or anything, as far as the the Oahe to New Underwood 230-kilovolt line? Nothing will happen with that, it'll be used as is and just feed new electricity into it from the wind farm, correct? The reason I bring it up is that over in the Newel area there's a wind farm that feeds the electricity into a WAPA line, but the WAPA line only had a certain amount of capacity left to accept that electricity, and if there would be any more wind turbines or anything that have to enlarge the lines or do something like that but anyway I just wanted to verify that so, thank you.	The proposed Project will not require additional upgrades of the Oahe to New Underwood 230-kilovolt line, other than the Project components discussed in the Philip Wind Energy Center Draft EA - Section 2.1.2.4 - Generation Tie Line and Basin Electric Transmission Line Extension.
004	Private Citizen	I believe I heard Staffan say that, if requested, there would be Tribal cultural surveys in addition to the archaeological and architectural surveys. And I'm just curious if at this point in time, if it's appearing that the cultural surveys will be primarily archaeological going out first and then, if needed later, having tribal surveys, or if it's anticipated that they will be essentially joint surveys with traditional cultural specialists going out with the archaeologists?	Comment noted. WAPA and Philip Wind Partners have contacted 12 Tribal governments to participate in consultation for the proposed Project. Currently, WAPA and Philip Wind Partners are working with the Tribal representatives that have shown interest in the Project and will engage them to participate in the cultural resource field surveys scheduled for fall of 2023. The results of the surveys and Tribal consultation will be updated in the Final EA. The Philip Wind Energy Center Draft EA - Section 3.10 - Cultural Resources and Section 5.3 - Native American Tribes provide the current analysis and list of Tribes consulted.
005	United States Department of the Interior - Bureau of Indian Affairs	We have no environmental objections to the actions as long as the projects comply with all applicable laws and regulations.	Comment noted.
005	United States Department of the Interior - Bureau of Indian Affairs	You should be aware, however, that Tribes or Tribal members may have lands in fee status near the sites of interest. These lands would not necessarily be in our databases, and the Tribes should be contacted directly to ensure all concerns are recognized.	Comment noted.
005	United States Department of the Interior - Bureau of Indian Affairs	We also find that the listed action will not affect cultural resources on Tribal or individual landholdings for which we are responsible. Methodologies for the treatment of cultural resources now known or yet to be discovered—particularly human remains—must nevertheless utilize the best available science in accordance with provisions of the Native American Graves Protection and Repatriation Act, the Archaeological Resources Protection Act of 1979 (as amended), and all other pertinent legislation and implementing regulations.	Comment noted.
006	Private Citizen	Where can agencies and public commenters access resource studies that have been prepared in support of the planning of this wind Project? Such information would allow commenters to provide meaningful input to WAPA's scoping request.	Project Website: https://www.wapa.gov/about-wapa/regions/ugp/environment/philipwind/
006	Private Citizen	Will vibration born (ground) noise be included as part of the noise study?	WAPA's UGP Wind Energy PEIS provides an analysis on ground-borne vibration associated with construction and operation of wind facilities in Section 4.5.2 and Section 5.5.1. Based on the conclusions from this study, the Project's noise study will not include a site-specific ground-borne vibration analysis.
006	Private Citizen	Appropriately, in accordance with the NEPA, the issuance of a Finding of No Significant Impact would be the "target" before any construction may begin.	Comment noted.
007	Private Citizen	Being a local resident in this area that's actually in the boundaries of this proposed Project and receiving the letter in the email was the first time we had heard about it, and our house is actually included in the boundary, which was very concerning.	Thank you for your comment. Not all landowners within the Project boundary will have Project components located on their property. Philip Wind Partners has contacted any landowner with Project components proposed on their property. Please see Philip Wind Energy Center Draft EA Figure 2-1 - Project Layout and Section 1.2 - Philip Wind Partners, LLC Goal and Objective.
007	Private Citizen	What is the benefit to the local community and area for this Project?	The main benefits to the community would be increased revenue for local business, creation of temporary and permanent jobs, property and sales tax increases, and participating landowners receiving benefit from Project agreements. Approximately, 200-300 jobs will be created during construction of the wind farm with those workers living and shopping in the Philip, South Dakota area. Once the Project is built, approximately 6-10 permanent full-time jobs will be created to perform operations and maintenance throughout the life of the wind farm. In addition, South Dakota has a property tax that is based off the actual energy generated at the wind farm, which is anticipated to be approximately $1-1.5 million dollars that is split between the county, school district and state of South Dakota. Finally, the landowners involved in the Project will receive payments based on the agreements executed with Philip Wind Partners.
007	Private Citizen	Can you explain or help me understand what the impact of the noise from these wind turbines would be on humans, as well as livestock?	WAPA's UGP Wind Energy PEIS provides an analysis of noise impacts from construction and operation of wind facilities in Section 5.5 and human health and safety in Section 5.13. In addition, impacts to livestock are provided in Section 4.5. The Philip Wind Energy Center Draft EA includes a site-specific noise analysis in Section 3.5 - Noise and a noise analysis report is provided as Appendix A - Pre-Construction Noise Analysis for the Philip Wind Farm.
007	Private Citizen	As we think about the location of turbines and the consturction of them, what is the plan for assisting, planning, and improving county roads to access these locations? Because, for instance, the road that I live on would not support heavy equipment to be able to support construction of these turbines, and I realized that there will be service roads into them, such as having an understanding of what Philip Wind Partners will be doing to support that for local residents as well.	Philip Wind Partners will coordinate with SD DOT and Haakon County to determine the appropriate haul routes to be used during construction in accordance with the WAPA's UGP Wind Energy PEIS transportation considerations. The Philip Wind Energy Center Draft EA Section 2.1.2.5 Access Roads and Crane Paths and Section 3.1 - Land Use describe the project-specific components.

007	Private Citizen	What impact is this Project going to potentially have on property values in the area? Because it is going to change aesthetics, it's going to create noise. You're going to have light pollution at night with the flashing lights. What is the impact of that on property value?	WAPA's UGP Wind Energy PEIS provides an analysis of property value impacts associated with wind facilities in Section 5.1. The Philip Wind Energy Center Draft EA provides site-specific analysis in Section 3.11 - Socioeconomics and Section 3.12 - Environmental Justice.
007	Private Citizen	What is the lifespan of a wind turbine? Will it last in operation?	The proposed Project would be designed to operate for 30 years. The Philip Wind Energy Center Draft EA provides specific detail on the Project's lifecycle in Section 2.1.2.8 - Project Life Cycle and Decommissioning.
007	Private Citizen	How do you dispose of/handle the materials that those are made out of? Because that's a lot of material there, and you've got 90 turbines there.	The Philip Wind Energy Center Draft EA - Section 2.1.2.8 - Project Life Cycle and Decommissioning provides detail on disposal of these materials.
007	Private Citizen	This may be a little bit pessimistic, but kind of thinking about the reality of some of these companies. But if Philip Wind Partners were to go bankrupt, who would be responsible for taking care of the turbines or decommissioning them or getting things taken care of from that respect?	The SD PUC requires decommissioning funding in advance to alleviate the risk of decommissioning the Project if Philip Wind were to go bankrupt. See Philip Wind Energy Center Draft EA - Section 2.1.2.8 - Project Life Cycle and Decommissioning for additional information.
008	Private Citizen	When will the final array (i.e., layout of turbines and their associated pads) be determined?	The Philip Wind Energy Center Draft EA - Section 2.1 - Proposed Action provides the preliminary layout of the Project. The Final EA will include the final Project layout, anticipated to be complete in the fall of 2024.
008	Private Citizen	Will that information be made available (at a minimum in a preliminary format) in the draft EA for reviewers and commenters to respond to?	The Wind Facility preliminary layout is available in the Philip Wind Energy Center Draft EA.
008	Private Citizen	What are the approximate lengths of the service roads and gen-tie line necessary for the proposed Project?	Philip Wind Energy Center Draft EA - Section 2.1.2.4 - Generation Tie Line and Basin Electric Transmission Line Extension and Section 2.1.2.5 - Access Roads provide the proposed Project transmission line and access road lengths.
008	Private Citizen	What is the approximate footprint of the proposed operations/service building? Such details are important when asking for input regarding scope of the enviornmental analysis.	The Philip Wind Energy Center Draft EA - Section 2.1.2.2 - Operations and Maintenance Facility provides the proposed footprint, and Section 3.0 Affected Environment and Environmental Consequences provides impacts analysis.
009	Private Citizen	Is this a new transmission line or an update to an old line?	The proposed Project would include the addition of a new generation tie line and the extension of the existing Basin Electric transmission line. Please see Philip Wind Energy Center Draft EA - Section 2.1.2.4 - Generation Tie Line and Basin Electric Transmission Line Extension for specific details of these Project components.
009	Private Citizen	Does WAPA have enough capacity?	WAPA works with Southwest Power Pool (SPP), an agency that manages the wholesale power market in the region of this Project, conducted an analysis of the proposed Project and if the existing transmission line has enough capacity to accept the additional electrons or electricity from the wind farm prior to the interconnection being granted. This analysis, completed by SPP, indicated there was enough capacity on the existing transmission line, and Philip Wind Partners has entered a Generator Interconnect Agreement with SPP. Please see the Philip Wind Energy Center Draft EA - Section 2.1.2.4 - Generation Tie Line and Basin Electric Transmission Line Extension for more detail on the Project.
010	Private Citizen	It would seem that an update to WAPA's existing line may be a reasonable foreseeable action to consider under the cumulative impacts considerations in the draft EA.	The proposed Project would not require additional upgrades of the Oahe to New Underwood 230-kilovolt line. The Philip Wind Energy Center Draft EA - Section 4 - Cumulative Impacts did not identify any reasonably foreseable generation projects that would add to capacity of the Oahe to New Underwood 230-kilovolt line.
011	Private Citizen	When discussing tower location selection with a project manager from other wind projects, the data used was for consideration of the efficiency of the wind turbines only with zero consideration for the efficiency of the farming operations. For example, the complete lack of symmetry of tower locations often causes massive losses of time and fuel—trying to work around the towers, including safety issues for agricultural aviation. I think it is a deal breaker that it is not factored in as part of the equation for tower locations.	Philip Wind Partners has committed to coordinating siting with landowners, please see Philip Wind Energy Center Draft EA - Table 2-3 - Applicant's Additional Voluntary Environmental Protection Measures and Section 3.1 - Land Use and Public Facilities.
012	Private Citizen	When would construction start?	If the Project is approved, construction would begin as early as summer 2025.
013	Private Citizen	On the final slide it says that the final EA would be published in 2025. And so, will that delay construction?	The Final EA is scheduled to be published in fall of 2024.
014	Private Citizen	It appears that the bat acoustic study was completed in 2019 while there is a current update for habitat underway (which is good). Would that habitat study and whether supportive vegetation exists for the bats (and where) in the Project area dictate updated accoustic studies? Given the change in existing environments in the last 4–5 years due to regional climate change effects, wouldn't that 2019 study beg an update to reflect reality now?	In 2022, Philip Wind Partners conducted additional desktop and field surveys to evaluate the NLEB habitat specifically. In order to tier the Philip Wind Energy Center EA to the UGP Wind Energy PEIS and associated PBA, Philip Wind Partners has committed to the PEIS's best management practices, PBA's NLEB minimization measures and the Applicant's proposed additional voluntary environmental protection measures to reduce potential impacts to bats. These commitments are located within the Philip Wind Energy Center Draft EA Table 2-3. In addition, a Project-specific Bird and Bat Conservation Strategy would be implemented to minimize impacts to avian and bat species.
015	Private Citizen	In addition to Adele's comment/question: Impacts related to decommissioning of wind turbines (i.e., life-cycle analysis) would seem to be appropriately within the scope of the draft EA. The company's recycling program, for example, would be important information.	The structure of the wind turbine, along with much of the equipment in the nacel (gear box, generator, main shaft, etc.), is mostly steel and other metals, which would be recycled. The blades are made of materials that are currently more difficult to recycle and will need to be evaluated at the time of decommissioning for their disposition. All materials will be recycled and/or disposed of in accordance with local, state, and federal guidelines. See Philip Wind Energy Center Draft EA - Section 2.1.2.8 - Project Life Cycle and Decommissioning for more information.
016	Private Citizen	What impact would this project have on migratory birds?	The impacts to migratory birds is discussed in the Philip Wind Energy Center Draft EA - Section 3.7 - Wildlife.
017	South Dakota Department of Agriculture and Natural Resources	Based on the information provided, it appears this Project will have minor impacts to air quality in South Dakota. This impact would be through source and fugitive emissions. In many cases, an air quality permit is required to operate equipment with point source emissions. A permit application can be obtained from the Air Quality or Minerals and Mining Program. Fugitive emissions, although not covered under State air quality regulations, are a common source of public concern and may be subject to local or county ordinances. Please contact your local officials to discuss requirements regarding fugitive emission. For further air quality information, please contact Rick Boddicker, Air Quality Program, telephone number (605)-773-3151.	Air Quality impacts from source and fugitive emissions related to the Project are discussed in the Philip Wind Energy Center Draft EA - Section 3.4 - Air Quality and Climate. An analysis of the construction equipment and associated environmental protection measures are provided to reduce potential impacts as a result of the Project.

017	South Dakota Department of Agriculture and Natural Resources	Based on the information provided, this project will not have adverse environmental effects to drinking water in this area. Should the parameters of your Project change, please reach out to Mark Mayer at (605)-773-6039 or Mark.Mayer@state.sd.us.	Comment noted.
017	South Dakota Department of Agriculture and Natural Resources	Construction can have detrimental effects to surrounding trees if no protective measures are taken. Special construction measures may have to be taken to preserve and protect tree health by avoiding damage to tree roots, stems, or branches. At a minimum, the storage of equipment, machinery, or trucks under or against a tree should be avoided. Barriers or sturdy fencing should be placed around trees that will remain on-site following construction. Barriers should be placed at a minimum of a 1-foot radius from the base of the tree's trunk for every 1 inch in diameter measured 4.5 feet above the ground. This will protect against soil compaction, alteration of the natural soil level under the live canopy, and any damage from occurring to the trunk of the tree. Eighty-five to 90% of a tree's root system lies within the top 6 to 12 inches of soil extending out one to one and a half times the height of the tree. Trenching through this critical root zone could severely destabilize a tree and adversely affect its health. Tunneling under or around the root system is much less damaging and encouraged. Trees often do not die immediately following construction damage but can decline over several months/years. A tree that sustains damage meeting or exceeding the following limits must be removed and, if conditions allow, replaced to maintain the canopy and ecosystem benefits of tree cover: a) The top or main stem of the tree is broken, b) the live crown of the tree is reduced below 30%, c) more than 1/3 of the circumference of a tree's main root system (a root 4 inches in diameter or larger) is injured such that the cambium layer (living tissue) is exposed, d) more than 1/3 of tree's total root system is severed or torn, and e) more than 1/3 of the circumference of the trunk's cambium layer is exposed. For a list of suitable replacement trees or if you have any questions, please contact Amanda Morrison at Amanda.morrison@state.sd.us or (605) 394-2279.	Comment noted. Tree clearing and removal will be evaluated as part of the vegetation clearing design for the proposed Project, which requires considerations pertaining to wildlife, visual, and vegetation resources. The UGP Wind Energy PEIS best management practices will be followed pertaining to any tree removal and are provided in the Philip Wind Energy Center Draft EA - Appendix O. In addition, the PBA NLEB best management practices have additional tree protections and are provided as Appendix K. SD DANR will be contacted for tree replacement and/or any questions.
017	South Dakota Department of Agriculture and Natural Resources	Based on the information provided, this Project is unlikely to have adverse effects on ground water quality. Should the parameters of your Project change, please reach out to Matt Hicks at (605)-773-5337 or Matt.Hicks@state.sd.us.	Comment noted. The proposed Project's impacts to water resources are provided in the Philip Wind Energy Center Draft EA - Section 3.3 - Hydrologic Setting and Water Resources. Philip Wind Partners would adhere to the UGP Wind Energy PEIS best management practices and additional voluntary environmental protection measures to reduce any impacts to water resources.
017	South Dakota Department of Agriculture and Natural Resources	Some solid waste may be generated during this Project. Any solid waste generated that will not be reused in some beneficial manner must be disposed or managed at a permitted solid waste facility. Regional landfills able to accept all solid waste generated are listed on our website: https://apps.sd.gov/NR60SolidWaste/main.html. Only regional landfills are permitted to accept all wastes generated. If you have any questions, please contact Waste Management at (605)-773-3153.	Comment noted. Waste generated due to the Project is discussed in the Philip Wind Energy Center Draft EA - Section 3.13.1.4 - Hazardous Materials and Solid Waste and Table 2-3 Additional Voluntary Environmental Protection Measures.
017	South Dakota Department of Agriculture and Natural Resources	It is not expected that any hazardous waste sites will be encountered within the vicinity of your Project area. However, if road construction is planned for areas within a city or town, the contractor should contact this Department prior to construction. Should any hazardous waste be generated during the implementation of this Project, the generator must abide by all applicable hazardous waste regulations. To determine whether your Project may generate hazardous waste, visit: https://www.epa.gov/hwgenerators/managing-your-hazardous-waste-guide-small-businesses. If you have any questions please contact Anthony Wagner at (605)-773-3153 or anthony.wagner@state.sd.us.	Comment noted. Waste generated due to the Project is discussed in the Philip Wind Energy Center Draft EA - Section 3.13.1.4 - Hazardous Materials and Solid Waste and Table 2-3 Additional Voluntary Environmental Protection Measures.
017	South Dakota Department of Agriculture and Natural Resources	Demolition or renovation of a building structure may be subject to the South Dakota asbestos requirements. If demolition or renovation is part of this construction Project, or if the scope of the project changes to include demolition or renovation, please contact Anthony Wagner at (605)-773-3153, or anthony.wagner@state.sd.us.	Comment noted.
017	South Dakota Department of Agriculture and Natural Resources	All tributaries, creeks, wetlands, and lakes within the vicinity of this Project are considered waters of the state and are protected under Administrative Rules of South Dakota (ARSD) Chapter 74:51. Special construction measures may have to be taken to ensure that water quality standards are not violated.The Project is in the vicinity of Kroetch Lake. This waterbody is classified by the South Dakota Surface Water Quality Standards and Uses Assigned to Lakes for the following beneficial uses: (4) Warmwater permanent fish life propagation waters; (7) Immersion recreation waters; (8) Limited contact recreation waters; and (9) Fish and wildlife propagation, recreation, and stock watering waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that the 30-day average total suspended solids criterion of 90 mg/L and the daily maximum total suspended solids criterion of 158 mg/L are not violated.	Comment noted. The proposed Project's impacts to water resources are provided in the Philip Wind Energy Center Draft EA - Section 3.3 - Hydrologic Setting and Water Resources. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices and additional voluntary environmental protection measures to reduce any impacts to water resources. Construction activities will receive appropriate permits prior to commencement.
017	South Dakota Department of Agriculture and Natural Resources	At a minimum, and regardless of Project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site. Any construction activity that disturbs an area of 1 or more acres of land must have authorization under the General Permit for Storm Water Discharges Associated with Construction Activities. A Surface Water Discharge permit may be required if any construction dewatering should occur because of this Project. Contact the Department of Agriculture and Natural Resources for additional information or guidance at 1-800-SDSTORM (1-800-737-8676) or https://danr.sd.gov/OfficeOfWater/SurfaceWaterQuality/default.aspx. The discharge of pollutants from any source, including indiscriminate use of fill material, may not cause destruction or impairment except where authorized under Section 404 of the Federal Water Pollution Control Act. Please contact the U.S. Army Corps of Engineers for more information (605)-224-8531.	Comment noted. The proposed Project's impacts to water resources are provided in the Philip Wind Energy Center Draft EA - Section 3.3 - Hydrologic Setting and Water Resources. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices and additional voluntary environmental protection measures to reduce any impacts to water resources. Construction activities will receive appropriate permits prior to commencement. Wind facility components have been sited to minimize impacts to wetland and water resources. An on-site wetland and water resource delineation will occur prior to construction to determine any impacts. Any necessary USACE, USEPA, state and local permits will be acquired prior to construction.
017	South Dakota Department of Agriculture and Natural Resources	The Inspection, Compliance, and Remediation Program (ICRP) maintains a database of registered storage tanks and spills/environmental events, including petroleum and chemical releases in South Dakota. Our records show eight known spills/environmental events and five registered storage tank facilities near your Project area. We have compiled this information in the attached table. We recommend reviewing our online spills and tanks database regularly as your Project progresses to determine if future spills/environmental events or new registered tanks are in or near your Project area. For more information about tanks and spills/environmental events (including PDF copies of case files), please visit: https://apps.sd.gov/nr42interactivemap.	Thank you for the records search. The Philip Wind Energy Center Draft EA - Section 3.13.1.4 - Hazardous Materials and Solid Waste and Table 2-3 Additional Voluntary Environmental Protection Measures provides the approach Philip Wind Partners would be required to adhere to for potential contaminated or hazardous materials encountered.
017	South Dakota Department of Agriculture and Natural Resources	While we do our best to maintain accurate information about spills/environmental events and registered tanks, in some cases the location information provided to us may have been inaccurate. If contamination is caused by or is encountered during on-site construction activity, that contamination must be reported to the DANR at (605)-773-3296. Contaminated soil that has been excavated should be segregated from clean soil and sampled to determine disposal requirements. Further, any piping, equipment, or other material to be placed in a location where it will be in contact with contaminated soil or groundwater, should be evaluated to determine if it is compatible with the contaminant. If you have questions, please contact Baylee Hoff at baylee.hoff@state.sd.us or (605) 773-3296.	Comment noted. The Philip Wind Energy Center Draft EA - Section 3.13.1.4 - Hazardous Materials and Solid Waste and Table 2-3 Additional Voluntary Environmental Protection Measures provides the approach Philip Wind Partners would be required to adhere to for potential contaminated or hazardous materials encountered.
017	South Dakota Department of Agriculture and Natural Resources	If water is needed during construction that is obtained from surface or ground water, a temporary permit for the use of public water will need to be obtained. If water is supplied by a municipality or rural water system for construction purposes, no additional water permitting is required. Please contact Genny McMath at genny.mcmath@state.sd.us or (605) 773-3352 if you have any questions or find form at https://danr.sd.gov/OfficeOfWater/WaterRights/docs/D2052LDV1-TempApp.pdf.	Comment noted.

018	United States Environmental Protection Agency Region 8	Existing Conditions To describe effects to aquatic resources in the Project area, we recommend the draft EA include the following analyses or descriptions: • A clear map and summary of Project area waters and downstream waters, including streams, lakes, springs, and wetlands. It would be helpful if the summary identified high resource value water bodies and their designated beneficial uses (e.g., agriculture, fisheries, drinking water, recreation). • Watershed conditions, including vegetation cover and composition, soil conditions, and areas not meeting desired future conditions. • Surface water information, including available water quality data in relation to current South Dakota Water Quality Standards, stream functional assessments, stream channel/stream bank stability conditions, sediment loads, and aquatic life. • Types, functions, conditions, and acreages of wetlands, riparian areas, and springs. • Available groundwater information. • A map and list of Clean Water Act (CWA) impaired or threatened water body segments within, or downstream of, the planning area, including the designated uses of the waterbodies and the specific pollutants of concern potentially affected by on-going activities (e.g., agricultural, including within or adjacent to the defined Project analysis area).	Comment noted. The proposed Project's water resources are provided in the Philip Wind Energy Center Draft EA - Section 3.3 Hydrologic Setting and Water Resources.
018	United States Environmental Protection Agency Region 8	Water Quality Data Water quality data for the streams and lakes located within the Project area provide important information for evaluation of the influence of the Project on downstream water quality. Such information can then guide management for the Project with the data providing a baseline for future monitoring of impacts. We recommend that the EA provide a summary of available information and monitoring data on water quality for the Project area and downstream waters that could be affected by activities in the Project area, including parameters, such as total phosphorus, total nitrogen, total dissolved solids, total suspended solids, turbidity, and temperature. It will also be important to include water quality data for parameters listed for impaired waterbodies within or downstream of the Project area. South Dakota can further assist in the identification of impaired waters and development of total maximum daily loads for impaired waters under Section 303 of the CWA, as well as in identifying any significant gaps in available data that may be useful in informing a water quality monitoring plan for the Project.	Comment noted. The UGP Wind Energy PEIS analysis of water quality impacts from wind development are predicted to be localized and short in duration and further reduced by the implementation of the best management practices provided. Please see UGP Wind Energy PEIS - Section 5.3 and associated Best Management Practices in the Philip Wind Energy Center Draft EA - Appendix O. The proposed Project's specific water resources are provided in the Philip Wind Energy Center Draft EA - Section 3.3 Hydrologic Setting and Water Resources and Additional Voluntary Environmental Protection Measures are provided in Table 2-3.
018	United States Environmental Protection Agency Region 8	Impacts of Surface Disturbance on Watershed Conditions Surface disturbance is a significant source of sediment to streams, which can smother aquatic habitat, disrupt natural food chains, increase nutrient loads, and alter stream morphology and function. Construction can cause short-term but substantial increases in sediment delivery to streams, and roads modify natural drainage patterns and can increase hillslope erosion and downstream sedimentation on a long-term basis. Evaluating the erosion hazard rating of soils in the Project area can be helpful in identifying areas where siting and construction of roads, collection lines, and turbines could result in damaging levels of soil erosion and sediment delivery to streams. According to our review of soil data presented in the Natural Resource Conservations Service's Web Soil Survey, the erosion hazard of most of the Project area's soils are characterized as a mix of those with "Moderate" and "Severe" erosion hazards. Soils with a "severe" rating are described as follows: "Significant erosion can be expected. Roads require frequent maintenance. Costly erosion control measures are needed." With consideration of this information, we recommend the EA discuss the potential effects from the Project on surface erosion, potential mass wasting on slopes, and delivery of surface sediment and debris to streams within or adjacent to the Project area. We also recommend avoiding surface disturbance in areas with "Severe" erosion hazard to the extent practicable in the final design and configuration of wind turbines and their associated pads. Road-stream crossings are one of the largest chronic inputs of eroded sediment to streams and can cause extensive acute impacts of increased sedimentation through hydrologically connected zones. Changes to the biological components of these connected zones from sedimentation can cause significant consequences to the overall function of the entire watershed ecosystem. With these considerations in mind, we recommend the draft EA include a clear map(s) of road placement in relation to water resources and evaluate the potential impacts of the roads on watershed and aquatic ecosystem structure and function.	Comment noted. The UGP Wind Energy PEIS determined that impacts to soil and water resources are mainly associated with construction and therefore short in duration. Implementation of the UGP Wind Energy PEIS best management practices further reduces the potential impacts to soils and water resources. A Project analysis of water and soil resources is provided in the Philip Wind Energy Center Draft EA - Section 3.2 - Geology, Soil Resources, and Paleontology, Section 3.3 - Hydrologic Setting and Water Resources and Appendix O - UGP Wind Energy PEIS Best Management Practices. The Philip Wind Energy Center Draft EA - Figure 2-1 contains a map with the proposed access road placement for the Project.
018	United States Environmental Protection Agency Region 8	Effects to Stream Function/Condition In addition to impacting water quality, construction of linear facilities and/or roads that cross streams or dislodge erosive soils can have disproportionate and long-term impacts on stream hydrologic, geomorphic, and biological functions, such as sediment transport, nutrient cycling, floodplain interspersion and connectivity, fish spawning, and overall aquatic habitat quality. We recommend identifying where stream crossings would occur and the stream crossing method(s) that would be used for construction of access roads and the underground power collection and communication systems. Specifically, we recommend the draft EA analyze the effects that would occur to stream condition and function based on the stream crossing construction method(s) used, and choose the option that would have the least impacts to stream functions. We also recommend avoiding stream crossings to the extent possible. Construction, increased road use, and introduction of heavy construction equipment and turbine pads can compact soil and disturb or eliminate vegetative cover, decreasing water infiltration and increasing surface runoff and erosion. These changes can have detrimental effects on stream morphology, functions, and values and are magnified on steep slopes or in erosive, unstable soils. The EPA recommends the draft EA analyze changes to runoff, erosion, sedimentation, and stream morphology and function that could occur due to the Project.	Comment noted. The UGP Wind Energy PEIS determined that impacts to soil and water resources are mainly associated with construction and, therefore, are short in duration. Implementation of the UGP Wind Energy PEIS best management practices further reduces the potential impacts to soils and water resources. A Project analysis of soil and water resources is provided in the Philip Wind Energy Center Draft EA - Section 3.2 - Geology, Soil Resources, and Paleontology, Section 3.3 - Hydrologic Setting and Water Resources, and Appendix O - UGP Wind Energy PEIS Best Management Practices. Prior to finalization of the Philip Wind Energy Center EA, a wetland and water resource delineation will be conducted to determine specific waters of the United States–resources located within the Project facility's disturbance footprint.
018	United States Environmental Protection Agency Region 8	Effects to Wetlands and Riparian Areas Wetlands and riparian areas increase landscape and species diversity, support many species of western wildlife, and are critical to the protection of water quality and designated beneficial uses of waterbodies. Installation of wind turbine generators, electric collection and transmission lines, and construction of access roads, substations, switchyards, and maintenance areas all have the potential to affect wetlands in the Project area. Specifically, the draft EA should identify and evaluate specific methods to protect wetlands, riparian areas, and floodplains, including a clear list of avoidance and mitigation requirements and BMPs applicable for construction, operation, and reclamation activities to prevent adverse impacts to these aquatic resources. This list of measures should include, as appropriate, mitigation found in the April 2015 PEIS, and could also include actions such as, use of wetland and riparian habitat buffer zones to avoid adverse effects to these critical resources; the use of stormwater control measures; marking of perennial seeps, springs, and wetlands on maps and on the ground before commencing construction to facilitate their avoidance and protection; and enhanced monitoring of resource conditions for high value wetland and riparian resources. To ensure that wetlands are protected to the greatest extent possible, it may be necessary to consider exclusion of roads or turbines in areas where wetlands or riparian area would be adversely impacted. The EPA recommends the draft EA fully evaluate potential impacts to wetlands and riparian areas that would not be avoided through Project design or siting decisions. Discharge of dredged or fill material into waters of the United States, including wetlands, is regulated under CWA Section 404. This permit program is administered jointly by the U.S. Army Corps of Engineers (USACE) and the EPA. We recommend that Philip Wind Partners, LLC and WAPA consult with USACE to make a final determination as to the applicability of CWA Section 404 permit requirements to wetlands that would be impacted by any new construction in the Project area. The EPA encourages this coordination as early as possible in the planning of the proposed Project. To the extent possible, the EA should be developed to provide sufficient information and support for decisions in compliance with the EPA's CWA Section 404(b)(1) Guidelines.	Comment noted. Prior to finalization of the Philip Wind Energy Center EA, a wetland and aquatic resource delineation will occur to determine specific Waters of the US resources located within the Project facility's disturbance footprint. Philip Wind Partners would be required to consult with USACE and USEPA on associated impacts and necessary permitting requirements prior to construction commencing. Please see Philip Wind Energy Center Draft EA - Section 3.3 - Hydrologic Setting and Water Resources and Appendix O - UGP Wind Energy PEIS Best Management Practices for preliminary analysis information.

018	United States Environmental Protection Agency Region 8	Avoidance and Minimization Measures The EPA recommends the development of design elements to avoid aquatic resource impacts wherever possible and mitigation measures to minimize unavoidable impacts to water quality, stream functions and aquatic habitats from surface disturbance, road-stream crossings, and storm water runoff. Such measures include, locating roads away from streams and riparian areas, steep slopes, landslide prone areas or erosive soils whenever possible and providing special protections, such as setbacks from water resources and non-motorized zones for areas with high quality or high value water resources. The EPA further recommends that impacts to aquatic resources determined to be "difficult to replace" under the EPA and USACE Final Rule for Mitigation for Losses of Aquatic Resources (33 Code of Federal Regulations [CFR] Parts 325 and 332; 40 CFR Part 230 [73 Federal Register 19594; April 10, 2008]) be avoided and minimized to the maximum extent practicable, particularly in areas where waterbody crossings could occur. Such resources may include fens, springs, and streams. Unless other resource concerns outweigh aquatic resource impacts, we recommend identifying corridor alignments that minimize potential impacts to these aquatic resources. If waterbody crossings are proposed, we recommend using mitigation measures to stabilize and return stream banks to preconstruction contours and grading and revegetating waterbody crossing areas immediately following construction. We also recommend that hard armoring be limited to only that which is necessary. The EPA supports an overall goal to return construction sites to natural, preconstruction conditions. Events during construction of the Project, including road building and upgrades, such as vehicular spills of hazardous or toxic materials, could result in significantly adverse habitat and water quality impacts. We recommend the draft EA evaluate the risk for such events and the resulting impacts and describe vehicle maintenance facilities (as applicable) and spill and release response capabilities. Best management practices include storing chemicals for Project activities in closed containers with secondary containment in a specific location, identifying areas and procedures for fueling, and providing a protected vehicle washout. We also recommend that a Stormwater Pollution Prevention Plan is included as an appendix to the final EA.	Comment noted. Prior to finalization of the Philip Wind Energy Center EA, a wetland and aquatic resource delineation will be condcuted to determine specific waters of the United States–resources located within the Project's disturbance footprint. Philip Wind Partners would be required to consult with the USACE and USEPA on associated impacts and necessary permitting requirements prior to construction commencing. Please see Philip Wind Energy Center Draft EA - Section 3.3 - Hydrologic Setting and Water Resources for Project specific water resource information. A stormwater pollution prevention plan (SWPPP) will be developed if the Project is approved by WAPA, prior to construction. Philip Wind Partners would be required to include applicable measures provided in the UGP Wind Energy PEIS best management practices and Philip Wind Energy Center Draft EA additional voluntary environmental protection measures in the SWPPP.
018	United States Environmental Protection Agency Region 8	Monitoring The inspection, maintenance, and adjustment of BMPs will ensure their effectiveness; therefore, we recommend the EA include a clearly defined monitoring plan for aquatic resources, including an operational plan for finding and solving runoff problems. The EPA recommends WAPA and Philip Wind Partners, LLC consider information collected as a part of monitoring efforts conducted for other existing commercial wind farms in South Dakota and elsewhere, including the existing Campbell County Wind Farm Project, to inform the design of the proposed Project, as well as considerations around avoidance, minimization, and mitigation of unavoidable impacts from the proposed Project. We recommend that the draft EA describe the mechanism by which information from monitoring efforts for existing, operational wind project(s) could be used to inform the design, construction, and operation of the proposed Project and whether there would be a mechanism for sharing monitoring results with the public for the proposed Project.	Comment noted. A stormwater pollution prevention plan (SWPPP) will be developed if the Project is approved by WAPA, prior to construction. Philip Wind Partners would be required to include inspection and monitoring requirements in the SWPPP to meet all federal, state, and local permit and regulation requirements. It is not typical that private entities share SWPPP inspection and monitoring reports since the information is typically confidential and proprietary in nature.
018	United States Environmental Protection Agency Region 8	Wildlife The EPA appreciates Philip Wind Partners, LLC's ongoing extensive studies of wildlife resources, particularly for eagles and other migratory birds, in the Project area. We recommend coordinating with the U.S. Fish and Wildlife Service and South Dakota Game, Fish and Parks officials during evaluation of all existing wildlife resources and migration corridors and impacts from micro siting decisions and avoidance measures. The EPA also recommends conducting independent and transparent postconstruction monitoring of raptor, avian, and bat deaths or injuries to help inform mitigation and calculating any compensatory mitigation amounts for the loss of ecologically important, federally protected birds. We recognize that any consultation around endangered species would be achieved in accordance with the Programmatic Biological Assessment (PBA) developed in association with the 2015 Wind PEIS. The PBA identifies avoidance and minimization measures to address potential adverse impacts on listed species in the proposed Project area. In accordance with the PBA process, the EPA encourages WAPA to fully disclose Philip Wind Partners, LLC's commitments to implement appropriate avoidance and minimization measures for protected species from effects of the proposed Project in the EA.	Comment noted. The Philip Wind Energy Center Draft EA - Section 3.7 - Wildlife and Section 3.8 - Threatened and Endangered Species provides Project-specific findings and potential impacts of the Project. Applicant-Committed Natural Resources Setbacks for Turbine Locations are provided in Table 1-1 of the Draft EA document. WAPA and Philip Wind Partners have completed multiple agency consultation meetings provided in the Draft EA - Section 5.1 - List of Federal Agencies and Section 5.2 List of State Agencies. In accordance with the UGP Wind Energy PEIS and associated PBA Consistency Evaluation Forms, Philip Wind Partners would be required to adhere to all associated minimization measures for specific species with the potential to occur on-site as provided in the Draft EA - Appendix K. USFWS has concurred with PBA CEF forms and associated findings for the Project.
018	United States Environmental Protection Agency Region 8	Noxious Weeds Management of noxious weeds is an important issue to address in the EA since these species tend to gain a foothold where there are disturbances to the landscape. We recommend the EA provide information on the current state of invasive species in the Project area and how alternatives may impact distribution and prevalence of invasive species. We further recommend that the EA disclose specific management actions that will address invasive species through prevention, early detection, rapid response, and restoration and rehabilitation. If any herbicides will be used to treat noxious weeds, we recommend disclosing any potential hazards related to the application of the chemicals and describing what actions will be taken to minimize impacts of toxic substances released into the environment.	Comment noted. The Philip Wind Energy Center Draft EA provides discussion on noxious weeds within the vicinity of the Project in Section 3.6 - Vegetation. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices and additional voluntary environmental protection measures provided in the Draft EA Table 2-3.
018	United States Environmental Protection Agency Region 8	Consistent with Executive Orders 13985, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government (86 Federal Register 7009 [January 25, 2021]) and 14008, Tackling the Climate Crisis at Home and Abroad (86 Federal Register 7619 [February 1, 2021]), the EPA recommends meaningfully engaging with rural communities and stakeholders to understand their experiences and address their concerns with respect to the potential impacts from the proposed Project to the human and natural environments. Rural communities (including subsistence households) are often more closely linked to ecosystems and their services, making it especially important that people living in such communities have opportunities for input into decision-making about local land use and utilization of natural resources, including how federal actions may affect their access to and management of natural resources and active agricultural lands, as well as resources of traditional, cultural, and religious significance to tribal communities.	Comment noted. The Philip Wind Energy Center Draft EA - Section 3.1 - Land Use, Section 3.12 - Environmental Justice, and Section 5.0 - Consultation and Coordination provide an analysis of community impacts and public engagement as a result of the proposed Project.
018	United States Environmental Protection Agency Region 8	Consultation with Tribal Governments The EPA notes WAPA's plans for consultation with Tribal governments given the proximity of the Project area to Tribal lands. It is especially important that formal government-to-government consultation take place early in the scoping and design phase of the Project to ensure that all issues are adequately addressed in the EA. Principles for interactions with tribal governments are outlined in the presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships (January 26, 2021), and Executive Order 13175, Consultation and Coordination with Indian Tribal Governments (November 6, 2000). The EPA recommends that the EA summarize the results of tribal consultation for the Project and identify the main concerns expressed by the tribes located historically in these areas about the proposed Project and how those concerns are addressed. As a resource, we recommend the document Tribal Consultation: Best Practices in Historic Preservation, published by the National Association of Tribal Historic Preservation Officers.	Comment noted. WAPA and Philip Wind Partners have contacted 12 Tribal governments to participate in consultation for the proposed Project. Currently, WAPA and Philip Wind Partners are working with the Tribal representatives that have shown interest in the Project and will engage them to participate in the cultural resource field surveys scheduled for fall of 2023. The results of the surveys and Tribal consultation will be updated in the Final EA. The Philip Wind Energy Center Draft EA - Section 3.10 - Cultural Resources and Section 5.3 - Native American Tribes provide the current analysis and list of Tribes consulted.
018	United States Environmental Protection Agency Region 8	Using Accessible Mechanisms to Address Systemic Barriers Limited broadband and media access in rural locations may warrant using various outreach strategies, such as email, letter, phone calls, and advertising of public meetings in local community venues (e.g., at markets, community centers, and community events). Meaningful engagement can also be fostered by presenting a clear Project purpose, adequate information, and associated stakes, and continuing to provide timely information and opportunities for input on an ongoing basis. Limited broadband access by members of rural communities may warrant holding public meetings about the proposed Project in rural locations, in addition to providing an option for virtual participation and at times when community members are most likely to be able to participate. In planning meetings, we recommend accounting for working hours and harvest times, driving distances, winter weather conditions, and cultural and seasonal practices and events (e.g., tribal ceremonies or local fish and game season openings).	Comment noted. The Philip Wind Energy Center Draft EA - Section 5 - Consultation and Coordination provides the public engagement and outreach conducted for the Project to date. Due to health and safety concerns, the Project agency and public scoping meetings were held virtually. WAPA will take this comment into consideration for further public and agency meetings for the project. The Philip Wind Energy Center Draft EA - Appendix J - Public Involvement provides the results of these notices and advertisements.

018	United States Environmental Protection Agency Region 8	The EPA recommends that the draft EA consider both impacts and benefits of the Project on social structures, at both the community and family-level and, therefore, meaningful engagement with rural stakeholders is necessary to fully inform such an analysis. Engaging trusted community intermediaries and tailoring engagement to distinct segments of the population can also build trust, as can walking the Project area to facilitate mutual understanding of the circumstances and concerns facing rural stakeholders. Potential disconnection of rural communities from largely urban-based political power structures and limited organization and influence over the factors that impact their well-being make such outreach and engagement strategies especially important. We recommend that the EA describe both the process and outcome of engagement with rural communities, including how their concerns were addressed in the consideration of siting alternatives. As part of this, we recommend that the EA include, as an appendix, who was contacted and how.	Comment noted. The Philip Wind Energy Center Draft EA -Section 1.2 - Philip Wind Partners' Goal and Objective provides a summary of how landowners' and stakeholders' input would be considered during design and siting. The Draft EA - Section 5 - Consultation and Coordination provides the public engagement and outreach conducted for the Project to date. The public and agency comments and WAPA responses are provided in Appendix J - Public Involvement.
018	United States Environmental Protection Agency Region 8	Cumulative Impacts and Overburdened Communities The EPA recommends the draft EA consider and disclose impacts to communities from the proposed Project considering impacts from past, present, and reasonably foreseeable planned actions. Specifically, we recommend that the draft EA consider whether local communities may already be experiencing existing pollution, social/health burdens, or economic burdens from changes in existing land use and how the proposed Project may potentially result in disproportionate impact in that context	Comment noted. The results of the proposed Project impacts on these communities is provided in the Philip Wind Energy Center Draft EA - Section 3.11 - Socioeconomics, Section 3.12 - Environmental Justice and Section 4 - Cumulative Impacts.
018	United States Environmental Protection Agency Region 8	We also recommend that the draft EA consider cumulative impacts to long-standing local livestock operations in the proposed Project area and coordinate with local residents to understand potential impacts to their operations during construction, operations and maintenance of the proposed Project.	Comment noted. Philip Wind Partners has committed to coordinating siting with landowners and would be required to adhere to the proposed practices in the Philip Wind Energy Center Draft EA - Table 2-3 - Applicant's Additional Voluntary Environmental Protection Measures and Appendix O - UGP Wind Energy PEIS Best Management Practices to minimize impacts to these operations.
018	United States Environmental Protection Agency Region 8	The EPA recommends that the draft EA describe the nature of cumulative impacts from the proposed wind farm to the rural nature of the communities in and around the Project area. Given the predominately rural character of the Project area and Phillip Wind Farm, the proposed Project would further introduce industrial components from wind energy infrastructure to the landscape. We recommend that the draft EA discuss the introduction of increased industrial effects common to operating wind generation projects, such as increased dust, sound, vibration, and flicker effects to the rural community. Full consideration of cumulative impacts from the proposed Project area would be well served by on-going, meaningful outreach with Project area residents, community representatives (such as local farmers and livestock ranchers), and tribal leaders, particularly in developing an understanding of such effects to public health, local agricultural activities, and rural ways of life.	Comment noted. A broad analysis of these impacts is provided in the UGP Wind Energy PEIS which this document tiers to. Project-specific components are discussed in the Philip Wind Energy Center Draft EA - Section 4 - Cumulative Impacts.
018	United States Environmental Protection Agency Region 8	Impacts to Local Infrastructure While we understand that construction of new roads and improvement of existing roads to access individual turbines and other ancillary facilities is a part of the proposed Project, it is not clear if the proposed Project would result in increased loads, impacts, or burdens on local infrastructure, including roads and local utilities. The EPA recommends that the draft EA examine whether the existing infrastructure can handle increased burden (temporary and permanent).	Comment noted. The proposed Project would follow WAPA's UGP Wind Energy PEIS best management practices for transportation considerations to minimize any impacts to local infrastructure. Project-specific analysis is provided in the Philip Wind Energy Center Draft EA - Section 3.1 - Land Use and Public Facilities, including coordination with SD DOT and Haakon County for specific permits required during construction, also see Section 5.0 - Consultation and Coordination. In addition, proposed Project roads and construction access is discussed in the Draft EA - Section 2.1.2.5 Access Roads and Crane Paths.
018	United States Environmental Protection Agency Region 8	We further recommend that the draft EA assess potential impacts from increased trash and disposal of solid wastes (including hazardous waste) at local collection sites due to Project construction and decommissioning, and increased use of local roads and associated damages, such as berm damage and wash-boarding of roads, leading to increased maintenance costs and blading of roads.	Comment noted. The Philip Wind Energy Center Draft EA - Section 2.1.2.8 - Project Life Cycle and Decommissioning provides details on disposal of these materials. In addition, the Draft EA includes mitigations to reduce these impacts in Section 3.13 - Health and Safety and Appendix O - UGP Wind Energy PEIS Best Management Practices.
018	United States Environmental Protection Agency Region 8	We recommend that WAPA and Philip Wind Partners, LLC consider the potential for increased monitoring and emergency response costs as a part of this analysis.	Comment noted. WAPA monitors all our facilities with a 24/7 supervisory control and data acquisition (SCADA) system. This system monitors and sends data on the position and condition of facilities to its dispatch center, which is continuously monitored. In the event of an abnormal situation, personnel are dispatched to the site to address the issue. Each WAPA site has a 911 address registered. Emergency contacts and phone numbers are maintained by the maintenance crews and posted at the site and with dispatch in case of an emergency. Whenever WAPA personnel are on-site they check-in and out with dispatch (normal procedure) for site awareness and safety.
018	United States Environmental Protection Agency Region 8	(4) Predictable Changes in the Affected Environment The EPA recommends that the EA describe how the Project would be affected by ongoing and foreseeable changes and trends in the affected environment—for instance, under a scenario of continued decreasing precipitation days, changing frequency of intense storms and related flood events, and increasing drought intensity in the Project area. Full consideration of influences from the Project setting on the proposed Project may inform necessary design modifications to enhance Project resiliency and changes to operational assumptions for determining resource supplies, system demands, system performance requirements, and operational constraints. The US Climate Resilience Toolkit (https://toolkit.climate.gov/) serves as a repository of information related to climate resilience in the United States, including steps to build resilience, case studies, expertise, and special topic areas, including renewable energy technology development. The EPA's Climate Change Indicators (https://www.epa.gov/climate-indicators) presents a key set of indicators related to the causes and effects of climate change. EPA partners with various government agencies, academic institutions, and other organizations compile these indicators that are used to understand and track the science and impacts of climate change. In addition, we suggest that this Project draft EA consider resiliency and adaptation measures based on how future precipitation and flood trends and deleterious impacts due to long-term, severe drought conditions already being experienced in the proposed Project area may impact the Project and the ability of Philip Wind Partners, LLC to effectively protect the resources in the Project area from Project-related impacts. The Fourth National Climate Assessment released by the U.S. Global Change Resource Program (https://nca2018.globalchange.gov), contains scenarios for regions and sectors. Using NCA or other peer-reviewed scenarios to inform the NEPA analysis and possible changes to the proposal can improve the ability of Philip Wind Partners, LLC to build in resilience and preparedness in their management plans for persistent alterations in the existing environmental setting.	The Philip Wind Energy Center Draft EA - Section 3.4 - Air Quality and Climate provides an analysis of the proposed Project impacts. Draft EA - Table 2-3 - Applicant Additional Voluntary Environmental Protection Measures and Appendix O - UGP Wind Energy PEIS Best Management Practices provide a comprehensive list of measures proposed to reduce emissions provided any alterations to the environmental setting due to climate change.

018	United States Environmental Protection Agency Region 8	(5) Greenhouse Gas Considerations NEPA provides federal agencies the opportunity to analyze and disclose potential negative and beneficial impacts from a proposed energy project and to build its internal base of knowledge and expertise. The EPA supports informed development of renewable energy generation facilities to meet demand for new sources of electricity. Such energy sources are consistent with decarbonization pathways that are necessary to meet science-based targets for greenhouse gas reductions as articulated in "The Long-term Strategy of the United States: Pathways to Net Zero Greenhouse Gas Emissions by 2050" (November 2021). We have reviewed and appreciate the analysis and discussion of greenhouse gas (GHG) emissions related to construction, operation, and decommissioning of land-based wind development found in Section 5.2.1 of the WAPA PEIS (DOE/EIS-0408). As this EA will be tiered to the 2015 PEIS, we recommend the EA present project-level analysis of GHG emissions for construction, operation, and decommissioning of the proposed Project. We recommend the EA analyze and discuss GHG emissions in the context of national GHG reduction and state reduction targets and how the Project would support achievement of those goals or targets. In particular, we recommend that the EA discuss potential reductions in regional GHG emissions from the proposed Project, as predicted in the WAPA's 2015 PEIS. We suggest that WAPA consider disclosing climate benefits from the Project using the estimated social cost of GHGs (SC-GHG) established by the Interagency Working Group on SC-GHG, as appropriate, to provide useful information to the public and WAPA decision makers around the GHG emissions benefits from wind energy infrastructure. The SC-GHG provides a comprehensive estimate (in dollars) of the long-term damage done by GHG emissions each year from existing or planned increases in fossil fuel-based sources of energy, and this dollar figure can be used to represent the value of damages avoided due to GHG reduction actions (e.g., the proposed wind energy Project to meet future increased demand).	Comment noted. The Philip Wind Energy Center Draft EA - Section 3.4 - Air Quality and Climate provides an analysis of the proposed Project's lifecycle emissions and impacts to greenhouse gases (GHG). The analysis provided uses the EPA's MOVE3 model to calculate total emissions based on the equipment used and provides a brief discussion of the estimating the results in terms of the social costs of GHG.
019	South Dakota Department of Game, Fish and Parks	The South Dakota Natural Heritage Program monitors species at risk. Species at risk are those that are listed as threatened or endangered at the state or federal level or those that are rare. Rare species are found at the periphery of their range, have isolated populations, or are species for which we simply do not have extensive information. A list of species monitored by the Natural Heritage Program can be found at https://gfp.sd.gov/natural-heritage-program/. We recommend Philip Wind Partners continue to request a yearly database search until the Project is constructed to ensure that developers are aware of changing patterns in wildlife use at a site. Please note many places in South Dakota have not been surveyed for rare or protected species, and the absence of a species from the database does not preclude its presence from the Project area. Species records can be requested through the Natural Heritage Program at this link: https://gfp.sd.gov/forms/heritagedata/. Alternatively, GFP has an online Environmental Review Tool available for project planning purposes: https://ert.gfp.sd.gov/. This tool is free to use and has several publicly available spatial layers, as well as the capability to generate a report of potential species that may be present. Please note that this tool will not give specific locations of sensitive species—only a list of potential species that may be found in the Project area. We have completed an initial search of the Project area and found the following records within 5 miles of the proposed Project boundary: - Three prairie dog colonies within the project boundary, and an additional four prairie dog colonies within 5 miles of the Project boundary. - A great blue heron (Ardea herodias) nesting colony within the Project boundary (last observed in 2011) - A burrowing owl (Athene cunicularia; Species of Greatest Conservation Need) nest approximately 3.6 miles south of the Project boundary (last observed in 2010). - A swift fox (Vulpes velox; state threatened) den site approximately 3.6 miles south of the Project boundary (last observed 2010). Additionally, several Bald Eagle (Haliaeetus leucocephalus) nests were identified along the Belle Fourche River north of the Project area (9–13 miles) and the Cheyenne River, west of the project area (20 miles). Although these records were more than 10 miles away, these two river drainages appear to support numerous bald eagle nests and may influence eagle activity within and near the Project area. Our purpose in sharing this information is to assist with risk assessment and the decision on whether the Project will seek an eagle take permit through the USFWS. We had previously urged Philip Wind Partners to consult with the USFWS further on this issue.	Comment noted. The Philip Wind Energy Center Draft EA provides an analysis of potential impacts to wildlife in Section 3.7 - Wildlife and Section 3.8 - Special-Status Species. The Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations and Table 2-3 - Applicant Additional Voluntary Environmental Protection Measures provide a list of additional measures proposed to protect wildlife. Philip Wind Partners have also committed to developing and implementing a Bird and Bat Conservation Strategy (BBCS). Resource survey reports are provided as appendices to the Draft EA: Appendix B. Eagle Utilization Distribution Monitoring Report, Appendix C. Whooping Crane Habitat Assessment Report, Appendix D. Prairie Dog Colony Status and Mapping Report, Appendix E. Northern Long-eared Bat Habitat Assessment Report, Appendix F. Raptor Nest Survey Report (available upon request), Appendix G. Prairie Grouse Lek Survey Report (available upon request), Appendix H. Grassland Habitat Assessment Report, and Appendix I. Water Resource Analysis Report WAPA and Philip Wind Partners will continue to consult with the USFWS/SDGFP on the proposed Project and potential impacts to wildlife during the development of the BBCS.
019	South Dakota Department of Game, Fish and Parks	Grasslands are of high conservation value in South Dakota, and many acres are converted to cropland annually. Approximately 70% of the native mixed-grass prairie has been lost in eastern South Dakota, and approximately 32% has been lost in western South Dakota (Wright and Wimberly 2013; Bauman et al. 2016; Bauman et al. 2018). Untilled grasslands, large grassland blocks, and grasslands with native plant species are of particular importance. Based on the information presented at the January 13th agency meeting, Philip Wind Partners, LLC is proposing to avoid placing Project infrastructure in untilled grasslands and large grassland blocks. Other grassland types such as native rangeland, grazed grasslands (with native plant species), pasture (grazed grasslands with non-native plant species), and Conservation Reserve Program lands (formerly tilled lands planted to vegetative cover for erosion control and wildlife habitat) also serve as wildlife habitat. Although various patches of grassland habitat can appear in "better" or "worse" condition based on vegetation height and plant species composition, GFP considers all grassland habitat as important for wildlife and continues to recommend avoiding development in these grassland types in addition to avoiding undisturbed grasslands.	Comment noted. The Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations and Section 3.6 - Vegetation provide information pertaining to avoidance of natural grasslands and Section 1.2.1 - Project History and Design Refinement provides detail on avoidance measures taken during siting.
019	South Dakota Department of Game, Fish and Parks	The prairie pothole region of South Dakota supports a wide diversity of bird species (~80 species; Johnson et al. 1997). Wetland birds (e.g., rails, ibis, herons, bitterns, ducks, whooping cranes, etc.) can be susceptible to direct strikes with wind turbines (Johnson et al. 2002). Wind turbines can also displace nesting waterfowl pairs up to 800 meters (Loesch et al. 2013). Displacement of breeding waterfowl from high quality habitats could result in increased predation or reduced reproduction in and around wind energy facilities (Loesch et al. 2013). This Project falls outside of the prairie pothole region of South Dakota. However, there may be small, isolated wetlands and streams present in the Project area. Philip Wind Partners, LLC proposed to avoid siting turbines adjacent to wetlands and streams within the Project area.	Comment noted. The Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations, Table 2-3 Applicant Additional Voluntary Environmental Protection Measures, Section 3.3 - Hydrologic Setting and Water Resources, Section 3.6 - Vegetation, Section 3.7 - Wildlife and Section 3.8 - Special-Status Species provide information pertaining to avoidance of wetlands and Section 1.2.1 - Project History and Design Refinement provides detail on avoidance measures taken during siting.
019	South Dakota Department of Game, Fish and Parks	Grassland nesting bird populations have been declining faster than any other bird group in North America (Rosenberg et al. 2019). Many grassland nesting bird species require large tracts of open, contiguous grasslands. Placement of turbines and associated infrastructure (e.g., roads) in large, in-tact grassland parcels can fragment habitat and displace certain species of grassland dependent birds, such as prairie grouse (sharp-tailed grouse and greater prairie chickens), western meadowlark (Sternella neglecta), upland sand piper (Bartramia longicauda), grasshopper sparrow (Ammodramus savannarum), and chestnut collared longspur (Pruett et al. 2009; Shaffer and Buhl 2015; Bakker 2020). Graff et al. (2016) found that direct mortality rates of turbines sited in predominately grassland (1.86 deaths/MW) vs. predominately cropland (2.55 deaths/MW) habitats in North and South Dakota were similar. Sites in grassland habitats resulted in mortalities of a greater diversity of species (30) vs. sites in cropland (9). To avoid impacts to grassland nesting birds, Philip Wind Partners, LLC is proposing to avoid siting turbines in in-tact grasslands within the Project area and siting turbines in previously disturbed areas (e.g., cropland). GFP further recommends minimizing impacts to prairie grouse by using a 1-mile setback of Project infrastructure from any documented prairie grouse leks. This 1-mile buffer recommendation is based on data collected on hen prairie grouse in the Fort Pierre National Grasslands in South Dakota (Kirschenmann 2008) and is intended to minimize disturbance from Project infrastructure to important nesting and brood-rearing habitat. Philip Wind Partners, LLC is proposing to site turbines at least 1 mile from known prairie grouse leks within the Project area to minimize disturbance to prairie grouse. Based on discussions with Philip Wind Partners, LLC on January 13th, 2023, the Project proposes to avoid untilled grasslands within the Project area. However, if changes occur and impacts to grassland habitats result from Project construction, GFP recommends mitigation in the form of voluntary habitat offsets/compensation. Shaffer et al. (2019) provides a science-based framework that calculates biological values lost by development in grassland or prairie pothole habitats. If Philip Wind Partners, LLC proposes any voluntary habitat offsets for unavoidable impacts to grasslands, GFP suggests using the Schaffer et al. (2019) framework and associated models. Additionally, Shaffer et al. (2022) also provides a tutorial on how to use the Avian-impact Off-set method that was developed in Shaffer et al. 2019.	Comment noted. The following commitments are provided in the Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations (no turbines sited on natural [unbroken] grasslands), Table 2-3 Applicant Additional Voluntary Environmental Protection Measures, Section 3.3 - Hydrologic Setting and Water Resources, Section 3.6 - Vegetation, Section 3.7 - Wildlife, and Section 3.8 - Special-Status Species provide information pertaining to avoidance of natural grasslands and Section 1.2.1 - Project History and Design Refinement provides detail on avoidance measures taken during siting. In addition, a Bird and Bat Conservation Strategy will be developed for the Project. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices.

019	South Dakota Department of Game, Fish and Parks	Bat mortality at wind energy facilities is one of the major concerns regarding wind energy impacts on wildlife (Arnett et al. 2016; O'Shea et al. 2016). Postconstruction mortality surveys from existing wind energy facilities have shown that migratory tree-roosting bats, such as the hoary bat (Lasiurus cinereus), eastern red bat (Lasiurus borealis), and silver-haired bat (Lasionycteris noctivagans), have the highest rates of mortality during their fall migration at wind energy facilities. Philip Wind Partners, LLC is proposing to minimize impacts to tree roosting bats by siting turbines at least 1,000 feet away from suitable bat habitat, such as wood draws, present on the Project area.	Comment noted. The Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations provides setbacks for siting turbines on the proposed Project. In addition, a Bird and Bat Conservation Strategy would be developed for the Project. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices.
019	South Dakota Department of Game, Fish and Parks	Prairie dog colonies may concentrate foraging raptors both during the breeding season and during migration. Many other species, such as the black-footed ferret (a federally endangered species), swift fox (a state threatened species), and burrowing owls (a species of greatest conservation need) will use abandoned prairie dog burrows. GFP reported records of three prairie dog colonies within the Project area. Philip Wind Partners, LLC proposes to avoid siting turbines within and immediately adjacent to prairie dog colonies to reduce the risk of foraging raptors colliding with wind turbines.	Comment noted. The Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-committed Natural Resources Setbacks for Turbine Locations is applicable to prairie dog colonies (no turbines sited within 500 meters) and additional setbacks for other applicable species.
019	South Dakota Department of Game, Fish and Parks	Raptors (hawks, eagles, falcons, kestrels, owls, vultures, etc.) can be adversely affected by improperly sited wind energy facilities (Watson et al. 2018). Wind turbines can directly affect raptors via mortality from turbine blade strikes. Some research also suggests displacement of nesting raptors from suitable habitat (Hunt and Hunt 2006; Higgins et al. 1996). Turbines placed near escarpments or cliffs may pose a greater threat to soaring raptors due to the use of orographic updraft. Turbines sited near roosting sites, known nest locations, known stop-over sites, forest edges, and proximity to water could also increase the risk of turbine strikes to raptors. On-going research and modeling efforts from the National Renewable Energy Lab suggest that collision risk for Golden Eagles is related to a combination of atmospheric updraft (e.g. thermal currents), as well as orographic updraft (https://www.nrel.gov/news/program/2021/novel-modeling-tool-seeks-insight-into-eagle-flight.html). The modelling efforts associated with this research are not yet available for use; however, we provide this information for the Philip Wind Project to consider when assessing risk to soaring raptors (specifically eagles) and the decision of whether the Project will pursue an eagle take permit.	Comment noted. The Philip Wind Energy Center Draft EA - Table 1-1 - Applicant-Committed Natural Resources Setbacks for Turbine Locations provides setbacks for siting turbines on the proposed Project. In addition, a Bird and Bat Conservation Strategy (BBCS) would be developed for the Project. Philip Wind Partners would be required to adhere to the UGP Wind Energy PEIS best management practices. WAPA and Philip Wind Partners will continue to consult with USFWS/SDGFP on the proposed Project and potential impacts to wildlife during the development of the BBCS.
019	South Dakota Department of Game, Fish and Parks	The whooping crane is a state and federal endangered species with only one naturally occurring population. Members of this population pass through South Dakota as they migrate to and from Aransas National Wildlife Refuge in Texas to Wood Buffalo National Park in Canada. Whooping Cranes can be spotted almost anywhere in South Dakota during migration (even as far west as Rapid City, South Dakota). However, reported sittings are most frequent near central South Dakota. Whooping cranes are large (1.5 meters) birds and can have difficulty maneuvering quickly to avoid collision with powerlines and other tall structures. Powerline strikes are the most common form of mortality for fledged whooping cranes. For any projects that occur within the migration corridor, GFP recommends that Philip Wind Partners, LLC prepare a detailed contingency plan if whooping cranes are spotted within 2 miles of the Project. We further recommend Philip Wind Partners, LLC create a detailed phone/contact tree for operations staff in the event a whooping crane is spotted. These two documents should be included in any Bird and Bat/Wildlife Conservation Strategy documents.	Comment noted. Specific whooping crane information and proposed protection measures for the proposed Project are provided in the Philip Wind Energy Center Draft EA - Section - 3.8.2.2.3 - Whooping Crane, Table 2-3 - Applicant's Additional Voluntary Environmental Protection Measures, Appendix C - Whooping Crane Habitat Assessment Draft Report, Appendix K - Programmatic Biological Assessment Project Consistency Evaluation Forms, and Appendix O - UGP Wind Energy PEIS Best Management Practices. The Draft EA - Appendix L - Whooping Crane Monitoring and Contingency Plan provides the proposed Project's contingency plan. WAPA and Philip Wind Partners will continue to consult with USFWS/SDGFP on the proposed Project and potential impacts to wildlife during the development of the BBCS.
019	South Dakota Department of Game, Fish and Parks	New power lines/transmission lines are often associated with a proposed wind energy project. Powerline strikes and electrocutions are a known cause of mortality to birds. GFP recommends implementing mitigation measures described in The Avian Power Line Interaction Committee guidelines (https://www.aplic.org/), such as marking overhead lines to help prevent collisions. Additionally, GFP recommends avoiding placement of over-head powerlines adjacent to or between bodies of water (wetlands and lakes), as this could increase the risk of bird strikes, particularly for waterfowl. We further recommend Philip Wind Partners, LLC bury collection and transmission lines when possible.	Comment noted. The Philip Wind Energy Center Draft EA - Section 2.1.2 - Wind Facility provides detail of the underground collection lines and overhead generation tie transmission line, as well as the Basin Electric Transmission Line Extension. The Draft EA - Appendix O - UGP Wind Energy PEIS Best Management Practices provides detail on the proposed Project's design standards pertaining to APLIC.
019	South Dakota Department of Game, Fish and Parks	GFP typically recommends at least 2 years of postconstruction wildlife mortality monitoring. We also recommend the developer draft a Bird and Bat Conservation Strategy/Wildlife Conservation Plan to include with Project plans after wildlife surveys and Project siting is complete (or near complete).	Comment noted. WAPA and Philip Wind Partners will continue to consult with USFWS/SDGFP on the proposed Project and potential impacts to wildlife during the development of the BBCS. The UGP Wind Energy PEIS requires a minimum of 1 year of mortality monitoring; see Philip Wind Energy Center Draft EA - Appendix O - Best Management Practices.

APPENDIX K

Programmatic Biological Assessment
Project Consistency Evaluation Forms

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:	Philip Wind Project	Developer:	Philip Wind Partners, LLC
State:	South Dakota	City:	Chicago
County:	Haakon County	State:	Illinois
Township, Range & Sections:	S1-17, 20-24, T3, R18; S1-24, T3, R19; S1-19, T3, R20 S3-10, 17, 18 T3, R21	POC:	Bristi Cure
S1-3, 9-17, 19-36, T4, R18 S1-36, T4, R19 S1-36, T4, R20 S4-9, 15-22, 27-34, T4, R21 S24, 25, 35, 36, T5, R18 S4, 8-36, T5, R19 S7, 16-23, 25-36, T5, R20 S30-32, T5, R21		Phone:	(303)557-4489

Federal Agency/Point of Contact

Fish & Wildlife Service Ecological Services Field Office		Western Area Power Administration	
City:	Pierre	City:	Huron
State:	South Dakota	State:	South Dakota
POC:	Natalie Gates	POC:	Hilary Morey
Phone:	(605)224-8693 Ext. 227	Phone:	(605)570-1377

For actions involving USFWS Land interests:

USFWS Wetland Management District: Lake Andes

City: Pickstown State: South Dakota

POC: Elizabeth Julian

Phone: (605)487-7603

	Y	N
USFWS Property Interest	☐	☒
Grassland Easement Exchange	☐	☒

Project Description Overview with Best Estimates

Construction Initiation Date:	Q3 2025 or later	Max. Turbine Ht:	664 ft	Project Area Size:	~68,200 ac
Construction Completion Date:	Q4 2026 or later	Turbine Pad Size:	0.18 ac (permanent)	Wind Reserve Area Size:	N/A
Number Turbines:	up to 91	Miles (km) of New Road:	55 mi (88.5 km)	Power Generating Initiation Date:	Q4 2026
Turbine Tower Height (ft/m):	334 ft to 394 ft	Miles (km) Improved Road:	25 mi (40.2 km)	Project Termination Date:	2057
Turbine RSA:	19,285 sq ft	Miles (km) Existing County Rd:	20 mi (32.2 km)		

Turbine Size (MW), Make & Model: V 166-4.5 on 115m hub height with operational uprate to 6.1 MW

Collector Lines from Turbine to Substation: Miles Buried: 138 mi Miles Overhead: 7 mi

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	☒	☐	6.52	0	0	6.52	5.75%	WEST field-verified data (2022)
Tame Grass	☒	☐	14.54	0	0	14.54	12.7%	WEST field-verified data (2022)
Agricultural	☒	☐	93.08	0	0	93.08	81.6%	NLCD cropland layer
Wetland	☐	☒	0	0	0	0	0	None identified; NWI data layer
Riparian	☐	☒	0	0	0	0	0	None identified; NWI data layer
Trees	☐	☒	0	0	0	0	0	None identified; NLCD
Other	☐	☒	0	0	0	0	0	Primarily NLCD development and barren lands categories
Total			114.14	0	0	114.14	100%	Most conservative estimate used incorporating largest build-out and maximum permanent disturbance areas

ESA Listed (L), Proposed (P) and Candidate (C) Species Affected (Check Boxes)

Plants

- ☐ EP Fringed Orchid (L)
- ☐ Mead's Milkweed (L)
- ☐ Prairie Bush Clover (L)
- ☐ Ute Ladies'-Tresses (L)
- ☐ WP Fringed Orchid (L)
- ☐ Whitebark Pine (C)

Invertebrates

- ☐ American Burying Beetle (L)
- ☐ Dakota Skipper (L)
- ☐ Higgins Eye (L)
- ☐ Poweshiek Skipperling (L)
- ☐ Salt Creek Tiger Beetle (L)
- ☐ Scaleshell Mussel (L)

Fish

- ☐ Bull Trout (L)
- ☐ Pallid Sturgeon (L)
- ☐ Topeka Shiner (L)

Reptiles

- ☐ Eastern Massasauga (C)

Birds

- ☐ G. Sage Grouse (C)
- ☐ Int. Least Tern (L)
- ■ Piping Plover (L)
- ■ Rufa Red Knot (L)
- ☐ Sprague's Pipit (C)
- ■ Whooping Crane (L)

Mammals

- ☐ Black-footed Ferret (L)
- ☐ Canada Lynx (L)
- ☐ Gray Wolf (L)
- ☐ Grizzly Bear (L)
- ☐ Indiana Bat (L)
- ■ N. Long-Eared Bat (L)

☒ **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:

Bristi Cure	Docusigned by: Bristi Cure 866EB31B5B28471...	12/31/2024
Project Proponent (Point of Contact)	Signature	Date

Agency Verification of Compliance with the Programmatic Wind Energy Biological Assessment:

BRIAN PAULY	Digitally signed by BRIAN PAULY Date: 2025.04.21 16:25:54 -05'00'	
Western Area Power Administration (Point of Contact)	Signature	Date
Christopher Swanson, Project Leader	CHRISTOPHER SWANSON Digitally signed by CHRISTOPHER SWANSON Date: 2025.03.19 08:12:43 -05'00'	
U.S. Fish & Wildlife Service (Point of Contact)	Signature	Date
Natalie Gates, Fish and Wildlife Biologist	NATALIE GATES Digitally signed by NATALIE GATES Date: 2025.03.18 14:42:55 -05'00'	
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

Northern long-eared bat (*Myotis septentrionalis*)

Project Name: Philip Wind Project

Company: Philip Wind Partners, LLC

Best Management Practices

☒ All general BMPs, as stated in table 2.3-2 of 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,* would be implemented as applicable, during all phases of the project (i.e., site characterization, construction, operations, and decommissioning).

Species-Specific Avoidance Measures

Species-specific avoidance and minimization measures for this form have been updated in response to the 2023 uplisting of the northern long-eared bat (NLEB; *Myotis septentrionalis*) to endangered under the Endangered Species Act (ESA) and the availability of the USFWS's October 2024 *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Northern Long-eared Bat (Myotis septentrionalis*) (the wind guidance). This form is aligned with that guidance and will be updated if/when the wind guidance is updated. The wind guidance articulates how (new or existing) land-based wind energy facilities can operate such that incidental take of NLEB under the ESA is not "reasonably certain to occur" and describes standard post-construction monitoring to validate the effectiveness of the guidance at individual wind facilities. For wind projects within the current wind range of the species, the presence of migrating NLEBs is assumed in the airspace affected by wind turbines while the bats are migrating, even if the species is not detected onsite during summer surveys. The map used by the USFWS when evaluating the impacts of wind projects to the NLEB can be found here: https://www.fws.gov/library/collections/land-based-wind-energy-voluntary-avoidance-guidance-northern-long-eared-bat.

☒ For projects within the current wind range and/or consultation range (potential summer habitat) of the NLEB, contact the local USFWS Ecological Services Field Office (Field Office) to coordinate habitat evaluations and determine if the project area contains or is within 3.0 miles (4.83 km) of recent summer confirmed NLEB summer occurrence record(s). The USFWS recommends turbines be sited > 3 miles (4.8 km) away from recent summer occurrences and > 1,000 ft (300 meters) away from suitable roosting habitat to the edge of the turbine rotor-swept area.

☒ If species summer presence is not known, summer presence may be assumed if the project falls within the consultation range of the NLEB. If a project proponent instead chooses to conduct surveys to determine summer presence/probable absence, a survey plan aligned with the most recent version of the *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (survey guidelines) shall be submitted to the USFWS for approval by the local Field Office prior to conducting preconstruction surveys within suitable foraging and roosting habitat.

☒ Within confirmed or assumed NLEB summer habitat, do not remove live or dead trees during the NLEB's active period, including the spring and fall migratory periods. Avoid tree cutting in a way that would fragment a forested connection (e.g., tree line) between two or more forest patches of at least 5 acres. For further guidance on tree removal, coordinate with the local Field Office prior to any removal activities.

☒ Identify potential NLEB hibernacula within project boundaries and surrounding 10 mile buffer as recommended in the USFWS's Potential Hibernaculum Survey Guidance (App. H of the survey guidelines). Do not site turbines ≤ 10 miles (16 km) from NLEB hibernacula.

☒ Disturbance of hibernacula is prohibited throughout the year. Do not clear woody vegetation, snags, dead/dying trees, and trees of any size ≤ 0.25 miles (400 meters) from NLEB hibernacula nor ≤ 5 miles from NLEB hibernacula during spring staging and fall swarming periods. Do not conduct drilling or blasting activities ≤ 5 miles from NLEB hibernacula during the entire active bat season.

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*)

Species-Specific Minimization Measures

☒ Implement a seasonal blanket curtailment (recommended), an algorithm-based informed curtailment (ABIC), or real-time acoustic-activated smart curtailment strategy approved by USFWS that are at least as protective as blanket curtailment. Blanket curtailment is described in the NLEB wind guidance. Algorithm-based and real-time acoustic curtailment strategies are described in *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Tricolored Bat (Perimyotis subflavus).* If using algorithm-based or real-time acoustic curtailment strategies, leave the following seasonal blanket curtailment box unchecked, and elaborate further in the explanation of conservation measures section.

Seasonal Blanket Curtailment

☒ **Spring (migration/staging):** From 1/2 hour before sunset to 1/2 hour after sunrise, feather turbine blades when wind speeds are below the manufacturer's cut-in speed and temps are > 40°F (4.44°C).

Summer (pup season):

- **If the project is outside the consultation range or probable summer absence is determined** based on completion of surveys following the USFWS NLEB survey guidelines, continue feathering below manufacturer's cut-in speeds as described above for the spring season.
- **If summer presence is either assumed or determined based on completion of surveys** following the USFWS NLEB survey guidelines, from 1/2 hour before sunset to 1/2 hour after sunrise, feather turbines and do not cut-in until wind speeds are ≥ 5.0 m/sec (11.2 mph) when temps are > 40°F (4.44°C).

Fall (migration/swarming): From 1/2 hour before sunset to 1/2 hour after sunrise, feather turbines and do not cut-in until wind speeds are ≥ 5.0 m/sec (11.2 mph) when temps are > 40°F (4.44°C).

Seasonal Dates for Blanket Curtailment in UGP Service Area States			
STATES	**SPRING**	**SUMMER**	**FALL**
IA, NE	April 1 – May 14	May 15 – July 31	Aug. 1 – Nov. 15
MN, MT, ND, SD Plains	April 15 – May 31	June 1 – Aug. 15	Aug. 16 – Oct. 31
SD Black Hills	May 1 – June 14	June 15 – Aug 31	Aug 16 – Sept. 30

☒ For projects implementing blanket or smart curtailment, conduct 1 year of standardized post-construction monitoring during the entire NLEB active season (IA, NE = Apr 1 - Nov 15; MN, MT, ND, SD Plains = Apr 15 - Oct 31; SD Black Hills = May 1 – Sept 30) that meets or exceeds PCM frequencies, g-values, and other criteria, including bat identification requirements, outlined in the wind guidance. Additional efficacy monitoring, as outlined in the NLEB wind guidance, would be based on results of previous PCMM efforts. For projects implementing ABIC curtailment, adhere to criteria in the *Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Tricolored Bat (Perimyotis subflavus).* Monitoring may be modified if no northern long-eared bats are detected as outlined in the wind guidelines.

☒ Annual operating reports (showing turbine operation statistics relative to date, time, and environmental factors), regardless of monitoring effort, shall be submitted to the USFWS local Field Office by January 31, annually.

☒ Any take of listed species shall be reported to the local USFWS Field Office and USFWS Office of Law Enforcement within 24 hours of discovery.

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

Within current consultation range of NLEB (potential summer habitat present)? ☒ Yes ☐ No

Coordinated with USFWS on NLEB record(s) in area? ☒ Yes ☐ No

Preconstruction summer and/or hibernacula habitat evaluations conducted in coordination with USFWS? ☒ Yes ☐ No Dates: September 13, 2022

Minimum distance from rotor-swept areas to suitable roosting habitat (1,000 ft recommended) 2,640 ft.

Habitat within 1000 ft of rotor-swept areas 0 acres.

Distance from closest proposed turbine location to known hibernacula (>10 mi required for turbine siting; >0.25 mi required for woody vegetation clearing): 68 miles

Survey study plans submitted to and approved by USFWS prior to summer surveys? ☒ Yes ☐ No Methods and results discussed with USFWS via consultation meetings

Summer and hibernacula habitat surveyed for NLEB presence/probable absence using the USFWS's survey guidelines? ☒ Yes ☐ No Dates of survey: April 11 - Nov 7, 2018

Survey report provided to USFWS? ☒ Yes ☐ No Methods and results discussed with USFWS via consultation meetings

Results of surveys: ☐ Occupied (spp. detected) ☒ Probable Absence (not detected)

Version of USFWS survey guidelines used: 2018 year or version Range-Wide Indiana Bat Summer Survey Guidelines April 2018

Manufacturer's turbine cut-in speed: 3.0 m/sec

Turbine cut-in speed during fall migration risk: 5.0 m/sec

Turbine cut-in speed during summer risk: 3.0 m/sec

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

Northern long-eared bat (*Myotis septentrionalis*)

Explanation of conservation measures to be implemented and effects determination of "no effect" or "not likely to adversely affect" (attach additional pages as necessary):

The U.S. Fish and Wildlife Service (Service) has been coordinating with Western Area Power Administration (WAPA) and Philip Wind Partners, LLC regarding the development of the proposed Philip Wind Project (Project), an approximately 300 MW wind energy facility in Haakon County, South Dakota. This form documents compliance with the Endangered Species Act of 1973 (as amended) for northern long-eared bats (Myotis septentrionalis, NLEB) following the Service's Land-based Wind Energy Voluntary Avoidance Guidance for the Northern Long-eared Bat (Myotis septentrionalis)(issued in October 2024) using the blanket curtailment approach, or a future method agreed upon by the Service and Philip Wind Partners, LLC.

The original PBA NLEB Consistency Evaluation Forms were completed and accepted by the USFWS in April 2023 and determined that the Proposed Action may affect but is not likely to adversely affect the NLEB. Since completion and acceptance of the PBA Consistency Evaluation Forms, the USFWS released the final Land-based Wind Energy Voluntary Operational Avoidance Guidance for the Northern Long-eared Bat in October 2024 (USFWS 2024), which includes recommended conservation measures (e.g. curtailment windows) that differ from those in the 2015 version of the PBA Consistency Evaluation Form. The PBA allows for amendments to be made when new information reveals effects on species or critical habitat (WAPA and USFWS 2015). WAPA and USFWS completed an amendment to the PBA in December of 2024, and updated the NLEB Consistency Evaluation Form to reflect the finalized NLEB avoidance guidance. Philip Wind Partners agreed to adhere to the new guidance, and updated NLEB Consistency Evaluation forms were completed by the Project, WAPA and USFWS in December of 2024. Based on the commitments concurred with, there is a negligible risk of direct or indirect impacts to NLEB, and there is no change in the significance of impacts to NLEB between the publication of Draft EA and the Final EA following the issuance of the final NLEB guidance (USFWS 2024). WAPA determined the Proposed Action may affect but is not likely to adversely affect the NLEB.

The Philip Wind Project falls outside of the current range area of influence (AOI) for NLEB as found on the Species Profile for Northern Long-Eared Bat (Myotis septentrionalis) (fws.gov). However, Philip Wind conducted two pre-construction studies to evaluate bats, specifically NLEB in the Project area. The survey methodologies were shared with and approved by the Service in a meeting on February 20, 2018. The first survey was an acoustic study using five detection stations for 892 detector nights (Tetra Tech 2019). This resulted in 14,262 bat calls for which none were classified as NLEB. The second was a summer foraging and roosting habitat evaluation (WEST 2022) completed following guidance from the 2021-2022 USFWS Range-wide Indiana Bat Survey Guidelines (USFWS 2022) and field validated on September 13, 2022, the results of which are depicted on the attached map. Suitable summer foraging and roosting habitat was defined as patches of trees 10 acres or greater and included a 1,000-foot buffer (hereafter, connected habitat buffer) as recommended by the Service's guidance. No turbines have been sited within 0.5 mile of these connected habitat buffers, which are depicted in the attached figure. NLEB migrate from summer habitat to hibernacula in the fall. NLEB have been documented to travel up to 35 miles from summer foraging habitat to hibernacula (USFWS 2022). The Project is approximately 68 miles from the nearest known hibernaculum in Black Hills, South Dakota.

In summary, pre-construction surveys of the Philip Wind Project in 2018 and 2022 showed probable absence of the NLEB in the Project Area and the Project area falls outside the current range AOI for NLEBs. In addition, based on previous consultation with the Service during the initial completion of the CEF for NLEB, there are no known northern long-eared bat maternity colonies within 3 miles of the Project area or known occurrences of NLEB within the Project boundary. Therefore, Philip Wind Partners, LLC commits to the following operating (Table 1), monitoring, and reporting procedures for the Project:

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*)

Table 1. Operational measures (cut-in speeds in miles per hour [mph] and meters per second [m/s]) by date, for NLEB by season, at the Philip Wind Project wind facility in Haakon County, South Dakota. At minimum, turbines should be feathered below the curtailment wind speeds starting 30 minutes before sunset to 30 minutes after sunrise when temperatures measured at the nacelle are above 40°F.

Season	Dates	Feathering Below Cut-in Speed	When
Spring (staging/migration)	April 15 – May 31	6.7 mph (3.0 m/s)	From ½ hour before sunset to ½ hour after sunrise
Summer (pup season)	June 1 – Aug. 15	6.7 mph (3.0 m/s)	From ½ hour before sunset to ½ hour after sunrise
Fall (migration/swarming)	Aug. 16 – Oct. 31	11.2 mph (5.0 m/s)	From ½ hour before sunset to ½ hour after sunrise

Operational measures (cut-in speeds in miles per hour [mph] and meters per second [m/s]) by date, for NLEB by season, at the Philip Wind Project in Haakon County, South Dakota. At minimum, turbines should be feathered below the curtailment wind speeds starting 30 minutes before sunset to 30 minutes after sunrise when temperatures measured at the nacelle are above 40°F.

The Project should feather turbines below these cut-in speeds. Feathering occurs when turbine blades are pitched parallel with the prevailing wind direction to slow rotation speeds (generally less than 1 rotation per minute).
In addition to implementing the operational measures specified in Table 1, Philip Wind Partners, LLC will develop and implement a detailed post-construction mortality monitoring plan (PCMM) in coordination with the Service's South Dakota Field Office that will include specifics on the numbers of turbines searched, size of plots, frequency of searches, details on bias correction trials, and statistical analyses. By January 31 of each year, Philip Wind Partners, LLC will provide an annual report to the Service's South Dakota Field Office that describes the operational measures implemented that year, along with the methods and results of any monitoring as prescribed in the detailed PCMM plan created in coordination with the Service. The framework for the monitoring program is as follows:

The Project will develop and implement a detailed monitoring plan in consultation with the Service and will use EoA to design a post-construction mortality monitoring plan or describe the alternative sampling design method to achieve a minimum cumulative detection probability of g=0.2. The plan will specify data to be collected, searcher efficiency trials, carcass persistence trials, area correction, and other appropriate measures. The Project may periodically consult with the Service regarding cost-effective and logistically feasible changes to the monitoring approach and implementation of applicable new methods or regulatory changes.

Efficacy monitoring protocol will consist of two components: (1) post-construction fatality monitoring for one year designed to achieve a minimum detection probability (g) of 0.2 or the agreed upon alternative approach during the entire active season for bats (April 15 – October 31); and (2) post- construction fatality monitoring every 7 years afterward designed to achieve a g of 0.08" or the agreed upon alternative approach during the entire active season for bats (April 15 – October 31).

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*)

If any northern long-eared bat carcasses are found during PCMM, Philip Wind Partners, LLC will report the fatality within 24 hours of discovery, which by definition will require a species identification by a qualified biologist, to the South Dakota Field Office (Natalie Gates, Fish & Wildlife Biologist, 605-220-3881) and the Service's Office of Law Enforcement (OLE) in Bismarck, North Dakota. If bat identification of a found carcass is not possible, genetic testing will occur, while waiting for results the project will continue to operate. In addition, following discovery of the species, the Project will immediately work with the Field Office to determine whether additional conservation measures, such as avoidance, are appropriate for northern long-eared bats (e.g., cut-in speeds).

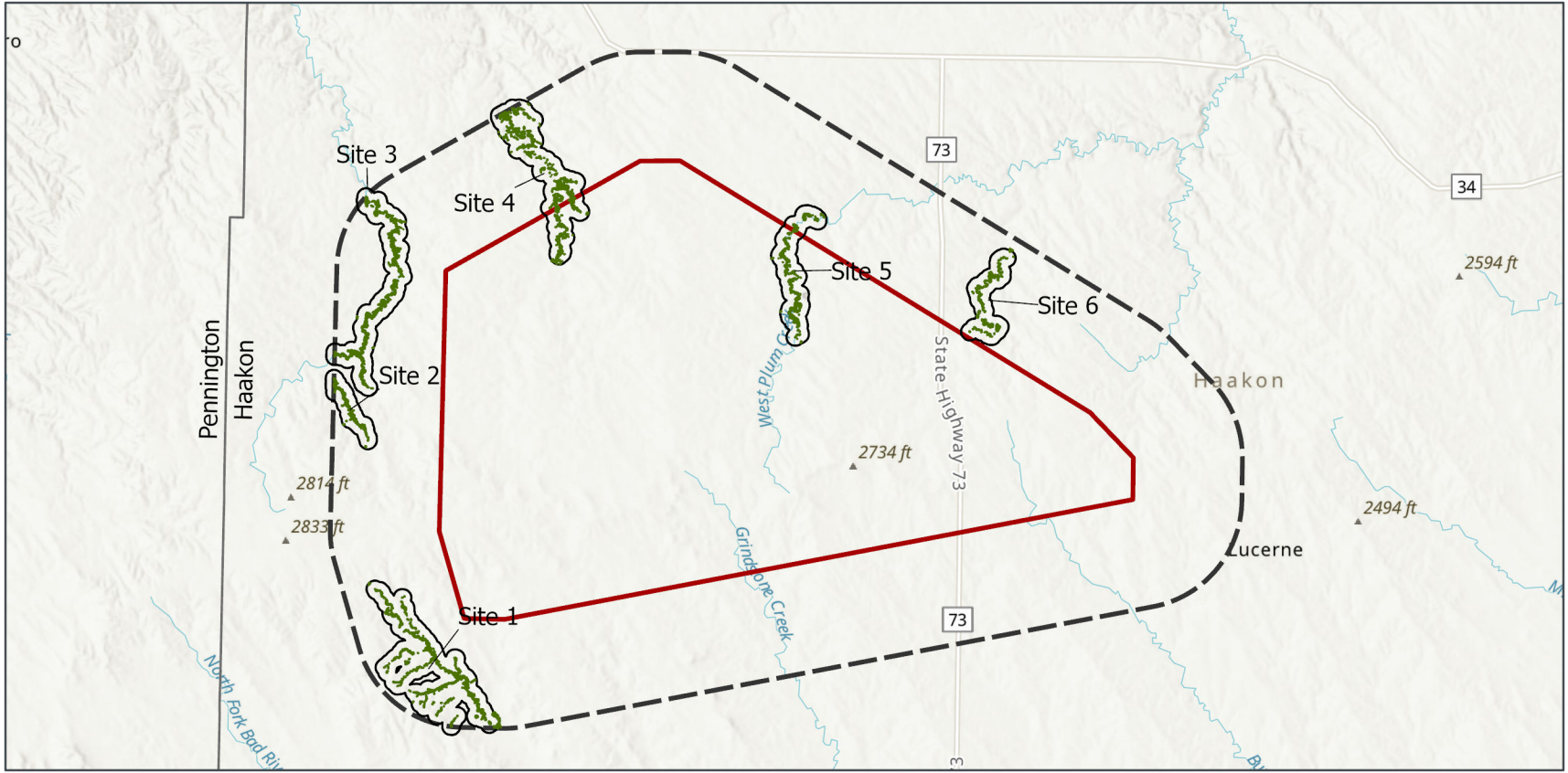
Philip Wind Partners will complete tree clearing activities outside of the NLEB active period, including the spring and fall migratory periods. The tree clearing that is anticipated by the project will be 200 feet in width through potential summer habitat so that the Project does not segment treed areas by greater than 1,000 feet.

Annual reports will be sent to the appropriate local Field Office by January 31st for the previous year. Annual reports will reaffirm that operational commitments were implemented (i.e., operating at cut-in wind speeds and if post-construction mortality monitoring was implemented as designed). Annual reports following the once every 7-year series post-construction mortality monitoring effort will include compiled bat fatality data for all bat species using this reporting form (Region 3 Wind Post-Construction Monitoring Bat Reporting Form | FWS.gov). Once the report is submitted, the Project should continue to operate under the conditions described herein and the Service will provide an email regarding continued ESA compliance within 90 days after a report is received.

As of the date of this signed form, WAPA concludes, through coordination and ongoing discussions with the Service, that the Philip Wind Project is not likely to adversely affect the NLEB. Philip Wind Partners, LLC commits in writing to WAPA and the Service via signature and inclusion of this NLEB consistency form, that the above measures will be implemented while the Service's final NLEB wind guidance is in effect. If applicable, the Project Company would coordinate these plans with the South Dakota Department Game, Fish, Parks (Mandy Pearson, mandy.pearson@state.sd.us), if the NLEB is a state-listed species or species of conservation concern.

The South Dakota Field Office is not authorized to provide guidance regarding the Service's OLE investigative priorities involving federally listed species. However, the Service, WAPA, and Philip Wind Partners, LLC understands that OLE carries out its mission to protect ESA-listed species through investigation and enforcement, as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize the likelihood of take such that it is not reasonably certain to occur for northern long-eared bats. It is not possible to absolve individuals or companies from liability for unpermitted take of listed species, even if such take occurs despite the implementation of appropriate minimization strategies to which the likelihood of take is not reasonably certain to occur, as described in this guidance. However, the OLE focuses its enforcement resources on individuals and companies that take listed species without identifying and implementing all reasonable, prudent, and effective measures to minimize the likelihood of take such that take is not reasonably certain to occur. To comply with the take prohibitions of the ESA, the facility would be willing to work with the Field Office to implement avoidance measures (e.g., not operating at night during the period of risk, etc.) and consider applying for an incidental take permit under 10(a)(1)(B) of the ESA, if needed.

If Philip Wind Partners, LLC follows the measures above, the Philip Wind Project is not likely to adversely affect the NLEB.



Suitable Summer Habitat
1,000-foot Connected Habitat Buffer
2.5 Mile Study Area
Project Area (March 2022)
County Boundary

Haakon County, SD
NAD 1983 UTM Zone 14N
44.2908°N 101.7495°W

0 1.5 3 Miles
0 2 4 Kilometers

N

1:255,000

Base Map: Esri ArcGIS Online, accessed November 2024
Updated: 11/21/2024
Project No. 75529
Layout: 75529_SummerNLEB
Aprx: 75529_PhilipWind_Reporting

SWCA ENVIRONMENTAL CONSULTANTS

Programmatic Biological Assessment Species Consistency Evaluation Form
Upper Great Plains Region Wind Energy Development Program
Impact Information and Consistency Determination

Piping plover *(Charadrius melodus)*

Project Name: Philip Wind Project

Company: Philip Wind Partners, LLC

Best Management Practices

[X] 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.

- [X] 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.
- [X] 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.
- [X] Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

Species-Specific Avoidance Measures

- [X] Conduct preconstruction evaluations and/or surveys in areas of potential occurrence to identify suitable habitat and areas of occurrence within project boundaries.
- [X] 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.
- [X] 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.
- [X] 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.
- [X] 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.
- [X] 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.
- [X] 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.

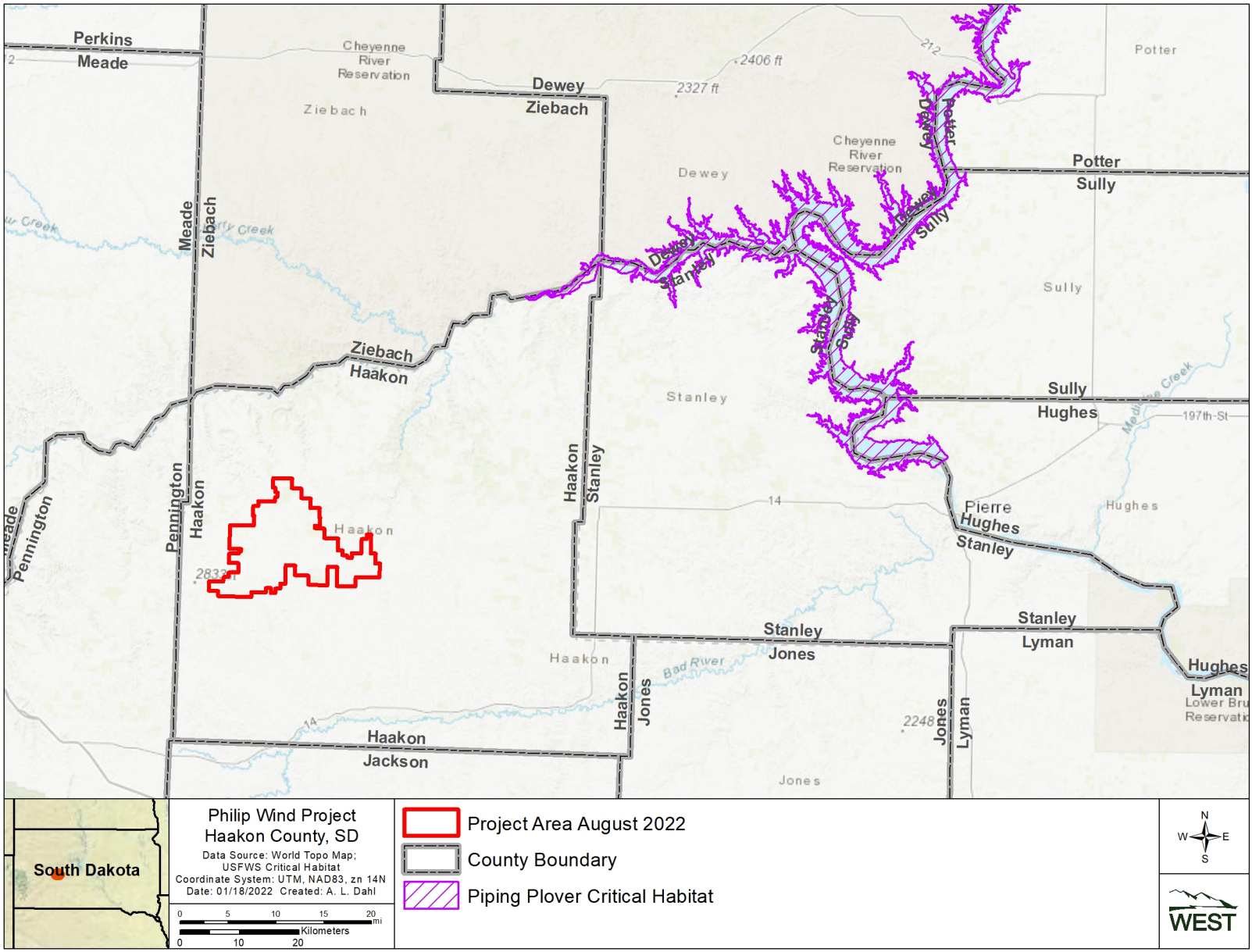
Programmatic Biological Assessment Species Consistency Evaluation Form
Upper Great Plains Region Wind Energy Development Program
Impact Information and Consistency Determination

Piping plover *(Charadrius melodus)*

Impact Information				
Project within county with recorded piping plovers?	☐ Yes	☒ No		
Preconstruction evaluations conducted with USFWS?	☒ Yes	☐ No	Dates:	Avian Use Surveys (Jan. 2022 - Mar. 2024)
Parties involved:	Philip Wind Partners, LLC; WEST, Inc.			
Suitable habitat in or near project footprint?	☐ Yes	☒ No		
Distance from suitable riverine, reservoir, or alkali lake habitat:	30 Miles			
Distance from designated critical habitat:	30 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:	~ 60 Miles	Nearest reported observation within habitat (eBird 2023)		
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":

The Philip Wind Project (Project) is tiering from the Upper Great Plains PEIS and Programmatic Biological Assessment (PBA). No piping plover observations were recorded during the 513 hours (January – December 2022) of pre-construction avian use surveys (WEST 2022). The nearest reported piping plover is a 2014 sighting approximately 20 miles southwest from the Project (eBird, accessed January 2023). Most reported observations of piping plover occur around Pierre, SD, about 60 miles east of the Project within designated critical habitat for the species approximately 30 miles to the northeast of the Project (see map). No alkali lakes were observed within the Project area; however, in dry years piping plover could occur within dried up wetlands. There is limited to no suitable habitat within the Project area. Bird flight diverters and marking devices specified in the Programmatic Biological Assessment would be installed and maintained on newly constructed overhead lines following industry standards (APLIC 2012) for the life of the Project. In summary, WAPA has considered this information and determined that there is a low likelihood of collision risk and the Project may affect, but is not likely to adversely affect the piping plover.


Perkins
Meade
Cheyenne River Reservation
Ziebach
Dewey
Ziebach
2406 ft
2327 ft
Potter
Dewey
Potter
Cheyenne River Reservation
Dewey
Potter
Sully
Meade
Ziebach
Dewey
Stanley
Dewey
Sully
Stanley
Sully
Sully
Ziebach
Haakon
Stanley
Sully
Hughes
197th-St
Pennington
Haakon
Haakon
Stanley
14
Pierre
Hughes
Hughes
Stanley
Haakon
Stanley
Jones
Stanley
Lyman
Hughes
Lyman
Haakon
Bad River
Haakon
Jones
Jones
Lyman
2248
14
Haakon
Jackson
Jones
South Dakota
Philip Wind Project
Haakon County, SD
Data Source: World Topo Map; USFWS Critical Habitat
Coordinate System: UTM, NAD83, zn 14N
Date: 01/18/2022 Created: A. L. Dahl
0 5 10 15 20 mi
0 10 20 Kilometers
Project Area August 2022
County Boundary
Piping Plover Critical Habitat
N
W E
S
WEST

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: Philip Wind Project

Company: Philip Wind Partners, LLC

Best Management Practices

[X] 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.

[X] 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.

[X] Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species.

Species-Specific Avoidance Measures

[X] 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.

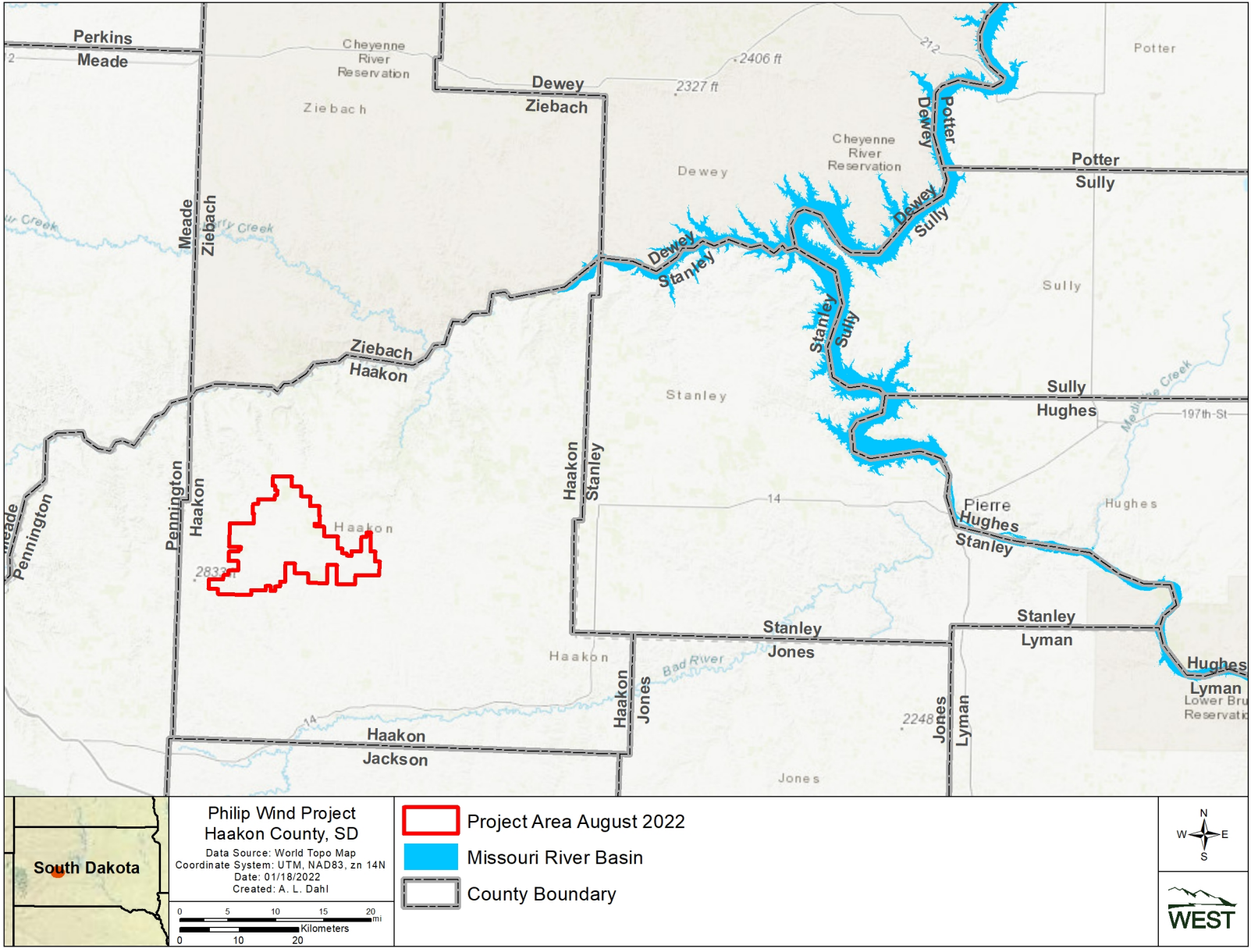
Coordinate with the local USFWS field office regarding new species information or conservation measures during planning stages.

Impact Information

Project within county with recorded rufa red knot as a transient?	[ ] Yes	[X] No	
Preconstruction evaluations conducted with USFWS?	[X] Yes	[ ] No	Dates: Avian Use Surveys (Jan. 2022 - Mar. 2024)
Parties involved:	Philip Wind Partners, LLC; WEST Inc.		
Suitable stopover habitat in or near project footprint?	[ ] Yes	[X] No	
Distance from suitable habitat:	30	Miles	
New overhead distribution/transmission lines proposed?	[X] Yes	[ ] No	
Distance from suitable stopover habitat?	~ 31	Miles	
Marking with approved bird flight diverters proposed?	[X] Yes	[ ] No	
Map of project footprint and species habitat attached?	[X] Yes	[ ] No	

Effects—Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

The Philip Wind Project (Project) is tiering from the Upper Great Plains PEIS and Programmatic Biological Assessment (PBA). Pre-construction evaluations determined the nearest potential rufa red knot habitat is approximately 31 miles from the Project's boundary along the Missouri River basin (see map). No rufa red knot observations were recorded during the 513 hours (January – December 2022) of pre-construction avian use surveys (WEST 2022). The nearest reported rufa red knot, detected in 2002, is approximately 74 miles east of the Project (eBird, accessed January 2023). A second observation was recorded approximately 76 miles to the east of the Project and included nine individuals in May of 2016 (eBird, accessed January 2023). Bird flight diverters and marking devices specified in the Programmatic Biological Assessment would be installed and maintained on newly constructed overhead lines following industry standards (APLIC 2012) for the life of the Project. In summary, WAPA has considered this information and determined that there is a low likelihood of collision risk and the Project may affect, but is not likely to adversely affect the rufa red knot.


Perkins
Meade
Cheyenne River Reservation
Ziebach
Dewey
Ziebach
2406 ft
2327 ft
Potter
Dewey
Potter
Sully
Cheyenne River Reservation
Dewey
Meade
Ziebach
Dewey
Stanley
Dewey
Sully
Stanley
Sully
Sully
Ziebach
Haakon
Stanley
Sully
Hughes
197th St
Haakon
Stanley
Pennington
Haakon
Haakon
14
Pierre
Hughes
Hughes
Stanley
Pennington
Haakon
Stanley
Jones
Stanley
Lyman
Haakon
Bad River
Hughes
Lyman
Haakon
Jones
Jones
Lyman
2248
14
Haakon
Jackson
Jones
South Dakota
Philip Wind Project
Haakon County, SD
Data Source: World Topo Map
Coordinate System: UTM, NAD83, zn 14N
Date: 01/18/2022
Created: A. L. Dahl
0 5 10 15 20 mi
0 10 20 Kilometers
Project Area August 2022
Missouri River Basin
County Boundary
N
W E
S
WEST

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: Philip Wind Project

Company: Philip Wind Partners, LLC

Best Management Practices

[X] 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.

- [X] 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:

[X] 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.

[X] 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:

[X] 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.

[X] 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.

[X] Instruct workers in the identification and reporting of sandhill and whooping cranes and to avoid disturbance of cranes present near project areas.

[X] 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)*

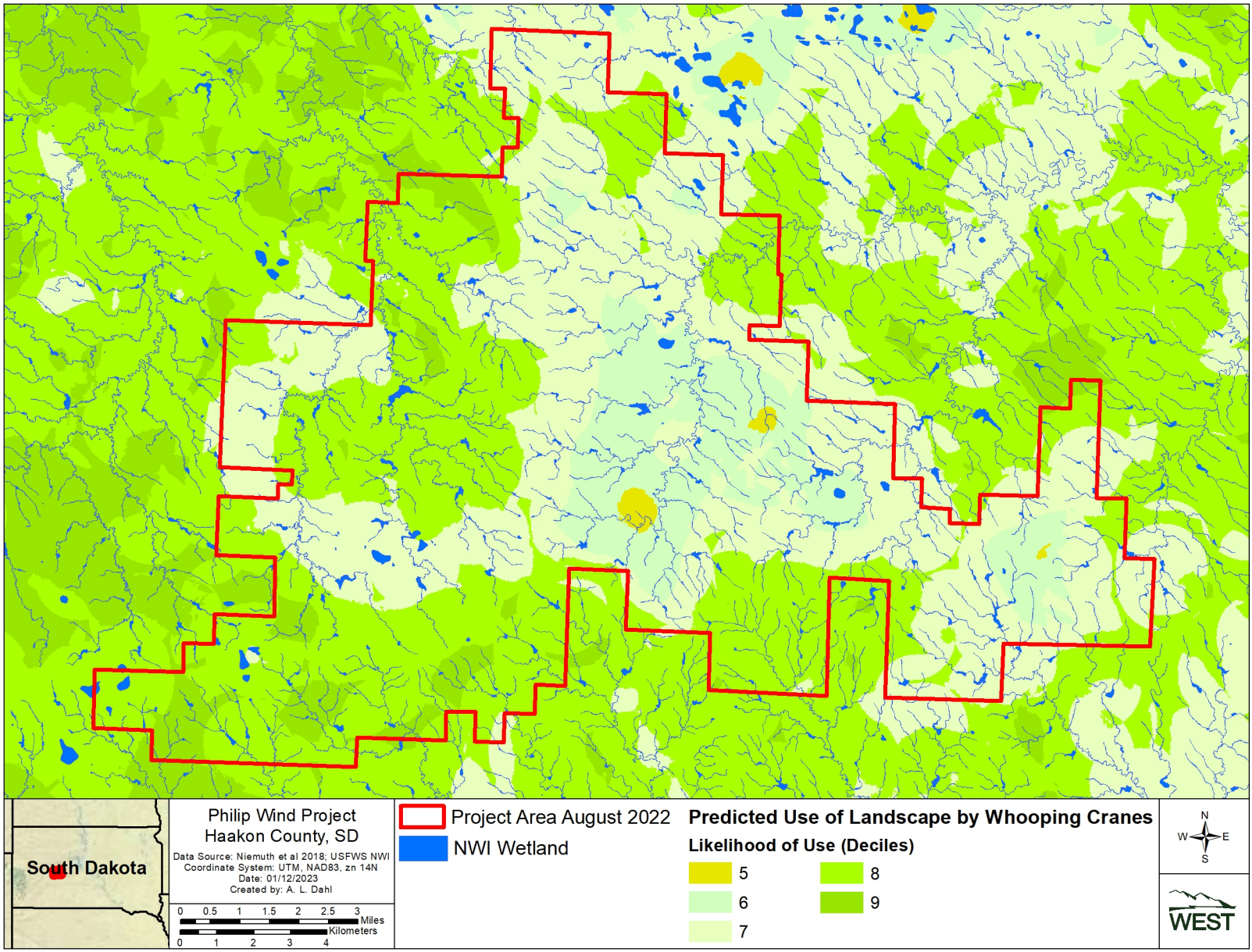
Impact Information			
Project within county with recorded whooping crane?	[X] Yes	[ ] No	
Preconstruction evaluations conducted with USFWS?	[X] Yes	[ ] No	Dates: Nov. 2022 - Jan. 2023
Parties involved:	Philip Wind Partners, LLC; WEST, Inc.		
Suitable habitat in or near project footprint?	[X] Yes	[ ] No	
Distance from suitable stopover habitat:	0	Miles	
Distance from designated critical habitat?	261	Miles	
Distance from the Platte or Niobrara River?	213 (Platte) 110 (Niobrara)	Miles	
New overhead distribution/transmission lines proposed?	[X] Yes	[ ] No	
Distance from suitable stopover habitat?	< 1.0	Miles	
Marking with approved bird flight diverters proposed?	[X] Yes	[ ] No	
Monitoring plan for spring/fall migration (copy attached)?	[X] Yes	[ ] No	
Employees trained in identification of whooping cranes?	[X] Yes	[ ] No	
Shut-down protocol for sitings within 2 mi (3.2 km) (attached)?	[X] Yes	[ ] No	
Map of project footprint and species habitat attached?	[X] Yes	[ ] No	

Effects—Explanation of consistency determination with programmatic effects determination of "may affect, not likely to adversely affect" or "no effect":

The Philip Wind Project (Project) is tiering from the Upper Great Plains PEIS and Programmatic Biological Assessment (PBA). All conditions prescribed by the Consistency Evaluation Form for whooping crane have been met with the exception of the species-specific avoidance measure stipulating that Project infrastructure not be sited within one mile of wetlands that may provide suitable stopover habitat. We provide a mitigation solution following the species-specific minimization measure in the consistency form that indicates that impacts to potentially suitable migratory stopover habitat located within a 0.5 mile (mi) radius of turbines may be mitigated based on site-specific evaluation.

Niemuth et al. (2018) developed a model that used 13 variables to identify whooping crane relative probability of use across the landscape in North and South Dakota. This probability dataset was then divided into 10 equal-area bins, or deciles, to aid in conservation planning (Niemuth et al. 2018). For this Project, suitable habitat for whooping cranes was defined as wetlands (NWI; USFWS 2021) that intersect the five highest use deciles (Niemuth et al. 2018).

To determine the total acreage of suitable whooping crane stopover habitat for mitigation, the total acres of NWI that overlapped with the five deciles of highest whooping crane use (Niemuth et al. 2018) within 0.5 mi of proposed turbine locations was calculated. This resulted in a total of 5.0 acres of wetlands for mitigation (see map) that the Project commits to fund (including third-party administrative fees) through a third-party mitigation provider that will independently acquire and manage the mitigation habitat within the South Dakota 95% whooping crane corridor and within the top five deciles of the Niemuth et al. (2018) model, or any 5.0 wetland acres within the South Dakota 50% whooping crane corridor. The third-party mitigation provider shall be responsible for protecting the wetlands in perpetuity and may include existing, restored, or created wetlands. Documentation of funding by the Project to the third-party mitigation provider shall be provided to WAPA prior to Project interconnection. Furthermore, bird flight diverters and marking devices specified in the Programmatic Biological Assessment would be installed and maintained on newly constructed overhead lines following industry standards (APLIC 2012) for the life of the Project. In summary, WAPA has considered this information and determined that the Project may affect, but is not likely to adversely affect the whooping crane.


South Dakota
Philip Wind Project
Haakon County, SD
Data Source: Niemuth et al 2018; USFWS NWI
Coordinate System: UTM, NAD83, zn 14N
Date: 01/12/2023
Created by: A. L. Dahl
0 0.5 1 1.5 2 2.5 3 Miles
0 1 2 3 4 Kilometers
Project Area August 2022
NWI Wetland
Predicted Use of Landscape by Whooping Cranes
Likelihood of Use (Deciles)
5
6
7
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N
W
E
S
WEST

APPENDIX L

Whooping Crane Monitoring and Contingency Plan

WHOOPING CRANE MONITORING AND CONTINGENCY PLAN

Philip Wind Project

Haakon County, South Dakota

Final

Prepared for:

Philip Wind Partners, LLC

One South Wacker Drive, Suite 1800
Chicago, Illinois 60606

Prepared by:

Martin Piorkowski and Todd Mabee

Western EcoSystems Technology, Inc.
4007 State Street, Suite 109
Bismarck, North Dakota 58503

February 24, 2023

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3 EMPLOYEE TRAINING AND MONITORING 2
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Figure 1.1. Location of the Philip Wind Project in Haakon County, South Dakota within the whooping crane migration corridor. 2

1 INTRODUCTION

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in Haakon County, South Dakota. Philip Wind has voluntarily prepared a Whooping Crane (*Grus americana*) Monitoring and Contingency Plan (Plan) to minimize potential impacts to whooping cranes during construction and operation of the Project. The objectives of the Plan are to 1) train construction, and operations and maintenance (O&M) personnel on the identification of whooping cranes, 2) describe monitoring for whooping cranes during spring and fall migration, and 3) describe the response to a known or suspected whooping crane sighting. To date, no whooping cranes have been recorded within the Project Area (Figure 1.1).

2 NATURAL HISTORY

The whooping crane was federally listed as threatened in the US in 1967 (32 FR 4001 [March 11, 1967]) and endangered in 1970, and is considered a species of greatest conservation need in South Dakota (South Dakota Game, Fish, and Parks [SDGFP] 2022). There are currently four non-captive whooping crane populations, but only the Aransas/Wood Buffalo whooping crane population (AWBP) is naturally occurring, self-sustaining, and protected under the ESA (Urbanek and Lewis 2020). The AWBP was estimated at 543 individuals in the most recent (2021–2022) available winter census data (Butler et al. 2022) and the population has remained fairly stable since 2017 (Harrell and Bidwell 2020).

The AWBP breeds in Wood Buffalo National Park in Canada and winters along the Texas coast, including in the Aransas National Wildlife Refuge (NWR; Urbanek and Lewis 2020). The breeding grounds are characterized by numerous potholes (Canadian Wildlife Service and U.S. Fish and Wildlife Service [USFWS] 2007) that form shallow wetlands of various shapes and sizes (Urbanek and Lewis 2020). Wintering grounds at Aransas NWR and adjacent areas of the central Texas coast consist of estuarine marshes, shallow bays, tidal flats (Urbanek and Lewis 2020) and occasionally rangelands or farmlands.

Spring migration ranges between March 25 and mid-May and fall migration ranges between mid-September and mid-November (USFWS 2007). Whooping cranes are daytime migrants and are known to travel individually, in family groups, or in small flocks (up to five individuals), however, larger flocks (six or more individuals) have been observed more frequently in recent decades (Caven et al. 2020). Whooping cranes occasionally join flocks of sandhill cranes (*Antigone canadensis*) for part of their migration (Urbanek and Lewis 2020). Ninety-five percent of whooping crane sightings occur within a 183-mi wide corridor (Pearse et al. 2018) and the Project occurs within the 95% whooping crane migration corridor (Figure 1.1). Migration flights generally occur between 1,000 and 6,000 feet (ft) above the ground, but whooping cranes fly at lower altitudes when starting or ending a migratory flight, especially when thermal currents are minimal or when making brief mid-day stopovers to forage (USFWS 2009).

Whooping cranes are known to choose stopover sites during migration that sandhill cranes are already utilizing (USFWS 2009). On average, migrating whooping cranes make 11 to 12 overnight stopovers and four multi-day stopovers during each migration season (Pearse et al. 2020). Individuals do not appear to exhibit site fidelity to overnight stopover sites (Pearse et al. 2020), but some areas on the landscape have a higher intensity of stopover use than others (Pearse et al. 2015). Stopover sites provide roosting and foraging areas, typically within 0.6 mi of each other (Urbanek and Lewis 2020) and can include palustrine or lacustrine wetlands, prairie and wet meadows, rivers, and agricultural fields (USFWS 2007).

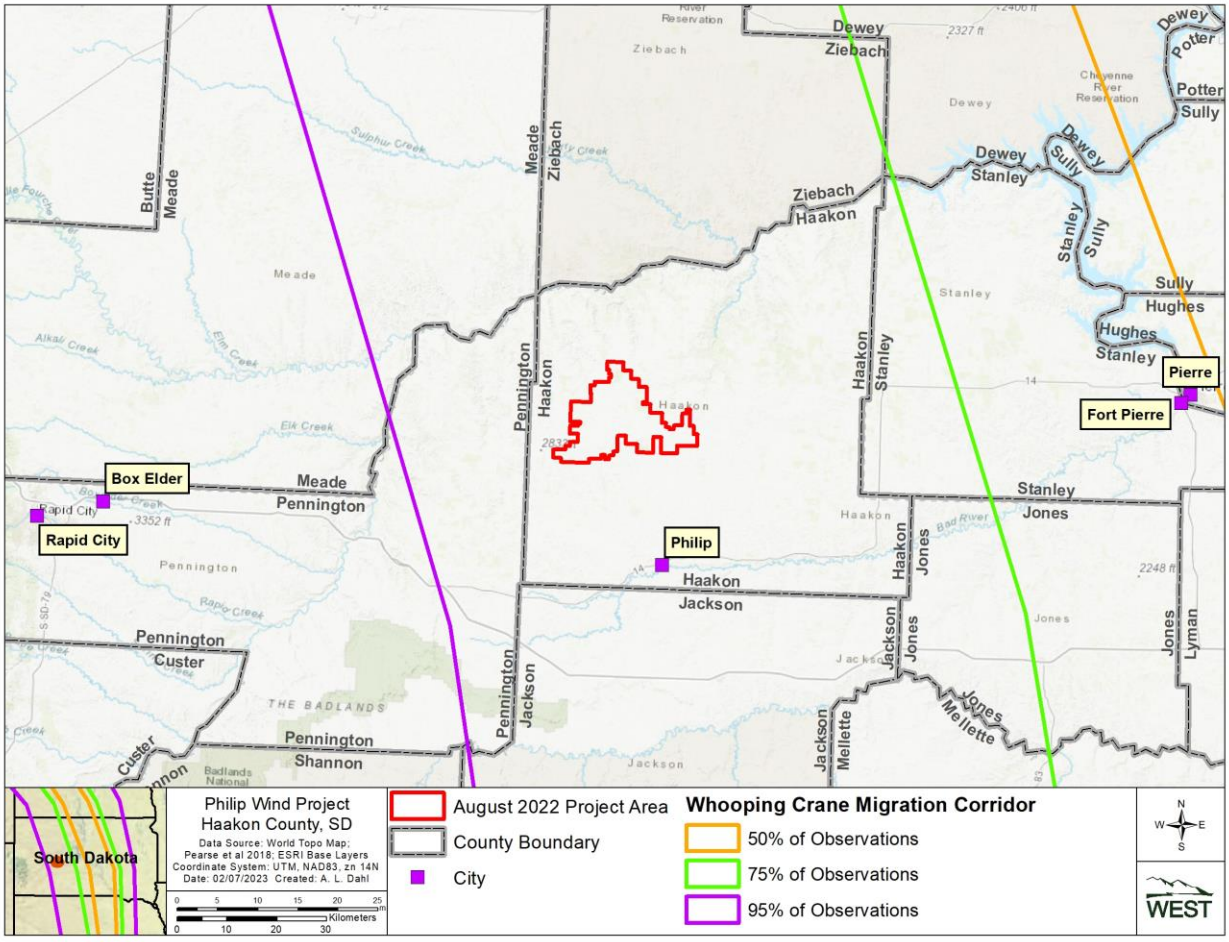

Figure 1.1. Location of the Philip Wind Project in Haakon County, South Dakota within the whooping crane migration corridor.

3 EMPLOYEE TRAINING AND MONITORING

All construction and O&M personnel at the Project will be trained to identify whooping cranes and to implement the Plan. Training will be conducted on an annual basis for the life of the Project. A poster of whooping crane identification will be displayed year-round in a common area of the main office building (e.g., kitchen) to aid in the education and identification of the species. Plan training

will be documented and kept on file at the O&M building. The following are the minimum topics to be covered during the initial and annual training:

- Natural history and behavior of the whooping crane.
- Identification of whooping crane adults and juveniles (e.g., photographs) and differentiating among similar species (i.e., sandhill crane [*Grus canadensis*], American white pelican [*Pelecanus erythrorhynchos*], great egret [*Ardea alba*], swan [*Cygnus* spp.], and snow goose [*Anser caerulescens*]).
- Avoiding harassing whooping cranes on the ground.
- Reporting and response procedures if a whooping crane is sighted.

Following training, construction and O&M personnel will look for whooping cranes during the course of their regular activities in the spring (March 25 – May 15) and fall (September 16 – November 15) migration seasons during construction and operations of the Project. If any whooping cranes are observed, the number of cranes, location coordinates (decimal degrees or UTM), and behavior (i.e., flying, foraging, roosting) will be recorded. Flocks of sandhill cranes will also be examined closely because whooping cranes sometimes travel with sandhill cranes.

4 CONTINGENCY PLAN

If construction or O&M personnel observe a whooping crane within two miles of a turbine at the Project, the Construction Manager or Site Manager (or their designee) will halt construction or turbine operations within two miles of the observed whooping crane until it is greater than two miles away from the nearest turbine. Philip Wind will inform the USFWS of any whooping crane observations.

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APPENDIX M

Shadow Flicker Report

Shadow Flicker Study
Philip Wind Project
Haakon County, South Dakota

17 April 2023

Prepared for:

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Prepared by:

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1165 Scheuring Road
De Pere, Wisconsin 54115

Project No: 193709483

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3.1 SHADOW FLICKER ANALYSIS METHODS 3.3
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APPENDIX B RECEPTOR COORDINATES AND EXPECTED ANNUAL SHADOW HOURS

1.0 INTRODUCTION

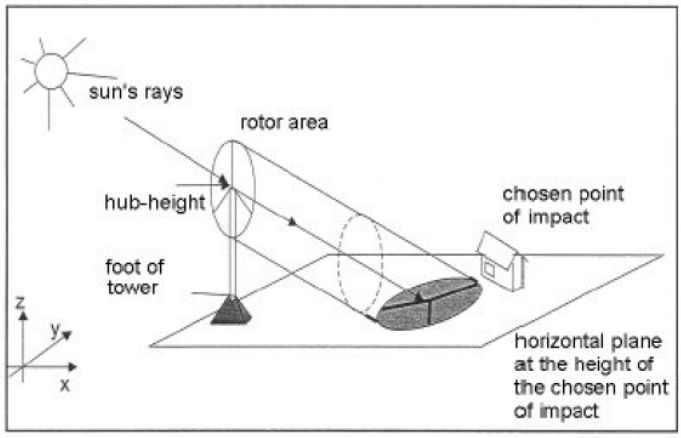
Philip Wind Partners LLC ("Philip Wind") is proposing to develop an approximately 300-Megawatt (MW) wind power generation facility in Haakon County, South Dakota. The proposed Philip Wind Project (the "Project") application proposes 95 possible wind turbine generator ("WTG" or "turbine") locations. The Project is located north of the city of Philip, South Dakota. Philip Wind retained Stantec Consulting Services Inc. (Stantec) to conduct an analysis of potential shadow flicker from the proposed Project wind turbines. The analysis considers the primary Project layout of 95 Vestas V163-4.5 MW wind turbines. Potential shadow flicker on inhabited dwellings within approximately 1.25 miles of proposed Project turbine sites was assessed and the results are summarized herein.

2.0 SHADOW FLICKER AND REGULATIONS

2.1 DESCRIPTION OF SHADOW FLICKER

Shadow flicker is a term used to describe the intermittent change in the intensity of light cast on an area resulting from the rotation of an operating wind turbine's blades between the sun and a stationary object. The presence and intensity of shadow flicker are dependent on many factors, including but not limited to the position of the sun in relation to the turbine and receptor, distance of receptor from turbine, physical characteristics of the turbine and blades, time of day, season of year, and topography of the Project area. Shadow flicker will only occur during daylight hours, when skies are not overcast or cloudy. Turbines must be operational, as the flicker effect is caused by rotation of the blades as they intercept the sunlight cast on a receptor. When a turbine is not operating it may cast a stationary shadow, similar to other objects such as trees or utility poles.

The amount of shadow flicker received in an area is dependent on the alignment of the rotor blades in relation to the sun and receptor. Maximum shadow flicker is received when the sun is aligned with the turbine and receptor, and the turbine's rotor plane is perpendicular to the receptor. This alignment occurs when the wind is blowing directly from a source turbine towards a receptor. At times when the wind is blowing from other directions, the shadow cast on the target receptor is diminished and the shadow flicker effect passes more quickly.



Shadow flicker also diminishes as the distance between the source turbine and receptor increases. It is generally accepted that flicker becomes imperceptible beyond approximately 1,500 meters (4,921 feet). For turbines with a rotor diameter less than 150 meters the flicker effect is less pronounced due to dissipation and the relative ratio of the turbine blade to the sun disk area at distances between approximately 10 times the rotor diameter and 1,500 meters.

2.2 REGULATIONS WITHIN THE PROJECT AREA

No regulations regarding shadow flicker have been identified for Haakon County or the state of South Dakota. However, Philip Wind has designed the Project to limit the amount of shadow flicker that is expected to fall on inhabited dwellings or other community structures considered sensitive (e.g., churches, schools) to 30 hours or less per year. Structures such as barns, agricultural buildings and commercial businesses were not included in the study.

Philip Wind has conducted this study to better understand the shadow flicker that may affect area receptors due to the normal operation of the proposed Project. They have considered shadow flicker in designing the current layout and seek to minimize flicker on sensitive receptors to the extent practicable.

3.0 SHADOW FLICKER ANALYSIS

The potential amount of shadow flicker on inhabited dwellings (also referred to as receptors) within the Project area was modeled using the Shadow module of EMD's WindPRO Version 3.6 software. WindPRO is an industry-accepted modeling program that calculates the number of hours per year that any given receptor may receive shadow flicker from the source turbines. The application considers the attributes and positions of the wind turbines in relation to receptors within the area. Shadow flicker models also consider the sun's position as it passes through the Project area each day in addition to regional climatological information.

Philip Wind requested a shadow flicker analysis on their current Project layout consisting of 95 potential locations of Vestas V163-4.5 MW turbines. The turbines have a 163 meter rotor diameter and a 98-meter hub height. The results of total shadow flicker for the analysis include expected shadow flicker due to the operation of turbines at the 95 proposed sites.

3.1 SHADOW FLICKER ANALYSIS METHODS

A modeling analysis was completed to assess the expected shadow levels at receptors based on a series of assumptions. The WindPRO model calculates both a "potential" and "expected" scenario. The "potential" scenario provides the periods when shadow flicker *may* occur on a receptor; however, it is not representative of the shadow flicker that is expected to occur. The "potential" scenario assumes no cloud cover, the sun is always shining during daylight hours, and turbines are always operating and rotated to cast maximum shadow on a receptor. The "expected" amount of annual shadow flicker considers the percentage of sunshine based on local regional sunshine statistics; the alignment of the blades in relation to the receptor due to wind direction; and the amount of time that the blades would not be rotating due to wind speeds outside of the turbine's operating parameters. The "potential" scenario, as described, could not realistically occur; however, is useful as an indicator of the potential times within which shadow flicker may occur. The shadow flicker analysis uses a conservative 90% operational time for purposes of calculating the annual hours of expected shadow flicker.

The results provided in this report include the expected amount of shadow flicker annually on each receptor, given the climatological conditions of the area as previously described. Climatological information was acquired from the National Climatic Data Center (NCDC) and regional meteorological stations. The percentage of sunshine probability was estimated from an analysis of average sunshine statistics for the Project region.

The climatologically based expected hours of sunshine for the Project area are presented in Table 1. The frequency of wind (hours per year) expected in 16 compass directions is summarized in Table 2. The total number of hours that turbines are able to cause shadow flicker takes into account non-operational time due to low or high wind speeds. The turbine types that Philip Wind proposes to use will generally operate when hub-height wind speeds are between 3 meters per second (m/s) and 30 m/s.

Table 1 Sunshine Probability (sun hours/possible sun hours)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.57	0.62	0.63	0.60	0.63	0.69	0.74	0.73	0.68	0.60	0.54	0.55

Table 2 Turbine Operation Time per Sector (hours per year)

0	22.5	45.0	95.5	90.0	112.5	135.0	157.5	180.0	202.5	225.0	247.5	270.0	292.5	315.0	337.5
473	237	158	158	237	394	552	473	355	355	315	315	473	1,104	1,418	895
TOTAL		7,884													

The effect of shadow flicker is also dependent on the physical characteristics of the turbine model and the distance between the source turbine and shadow receptor. The proposed Vestas V163-4.5MW turbines will have a rotor diameter of 163 meters (534.7 feet) and hub heights of 98.0 meters (321.5 feet). The individual locations of the wind turbines are based on the current layout of the Project. Elevations for turbines and receptors located within approximately 1.25 miles (2,012 meters) of the turbines were calculated using the National Elevation Dataset digitally acquired from the U.S. Geological Survey.

A total of 16 potential receptors (inhabited residences, schools, hospitals, churches, and cemeteries) within 1.25 miles of the proposed turbine locations were identified by Philip Wind and Stantec utilizing aerial imagery and on-site reconnaissance. Ten (10) of the 16 receptors are owned by participants in the Project. The coordinates (UTM Zone 14) of turbine and receptor locations are included in Appendix A and Appendix B, respectively.

The model utilizes a “greenhouse” approach which defines each receptor as a one-meter glass cube, representing a window able to receive shadow from all directions. Vegetation surrounding receptors may block or diminish the effect of shadow flicker.

Shadow flicker is widely considered imperceptible at a distance greater than 1,500 meters; however, Stantec conservatively analyzed the impact at all distances when more than 20 percent of the sun would be covered by a turbine blade. Shadow flicker does not occur when the sun-angle is less than three degrees above the horizon, due to atmospheric diffusion.

3.2 SHADOW FLICKER ANALYSIS RESULTS

The amount of shadow flicker on receptors within the Project area was calculated based on the climatological history of wind speed, wind direction and percentage of sunshine for the turbine models described in Section 3.1. Potential blocking of shadow flicker due to vegetation adjacent to a dwelling was not considered in this analysis.

Results of the analysis indicate that the majority of the 16 potential receptors analyzed within approximately 1.25 miles of turbines are expected to receive 10 hours or less of shadow flicker each year. Approximately 11 receptors are expected to receive between 0 and 10 total hours of annual shadow (Table 3). Three (3)

receptors are expected to receive between 10 and 20 hours of shadow flicker per year with two (2) expected between 20 and 30 annual hours.

A detailed table of receptor locations and expected annual shadow flicker results is included in Appendix B. Figure 1 presents a map of the Project area along with the expected shadow flicker hours per year if turbines were constructed and operational at all 95 primary proposed turbine locations.

Table 3 Shadow Flicker Analysis Summary (95 Turbine Locations)

Expected Annual Shadow Flicker Hours	Number of Receptors
Less than 10	11
10 – 20	3
20 – 30	2
Greater than 30	0

Detailed tabular shadow flicker results of both the shadow flicker analysis are provided in Appendix B and include the following information.

- Receptor identification number
- Coordinates of receptor location (UTM-Zone 14)
- Participation status in the Project
- The expected annual hours of shadow flicker at receptor

4.0 CONCLUSION

Potential shadow flicker from the Philip Wind Energy Project on inhabited residences and other sensitive receptors within approximately 1.25 miles of potential turbine locations was assessed using WindPRO's Version 3.6 Shadow Module software. Analyses were completed for a total of 95 turbines on 16 sensitive receptors.

Results of the shadow flicker analysis demonstrate that the Project can be operated in compliance with Invenergy's standards regarding the shadow flicker on sensitive receptors identified in relation to the Project.

FIGURES

Figure No.
1

DRAFT

Title
Shadow Modeling Results
Annual Hours - Expected Shadow Flicker

Client/Project
Invenergy, LLC
Philip Wind Project
Shadow Analysis

193709483

Project Location
Haakon Co., SD

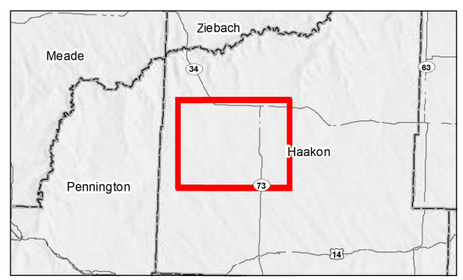
Prepared by JM on 2023-04-13
TR by AS on 2023-04-13
IR by XX on 2023-XX-XX

N

0 4,000 8,000 Feet
(At original document size of 11x17)
1:96,000

Legend
- Wind Turbine Location
- Sensitive Receptor

Shadow Results
Expected Annual Hours
- 10
- 15
- 20
- 25
- 30
- 35
- 40
- 45



Notes
1. Coordinate System: NAD 1983 UTM Zone 14N
2. Data Sources: Stantec, Invenergy, USGS, NADS
3. Background: 2021 NAIP

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

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APPENDICES

Appendix A Philip Wind Energy Center - Potential Turbine Locations

Turbine Identification	X (UTM 17)	Y (UTM 17)
T-001	278,953	4,916,432
T-002	279,062	4,916,934
T-003	279,806	4,917,015
T-004	277,421	4,919,621
T-005	277,290	4,919,088
T-006	279,071	4,914,793
T-007	278,716	4,914,301
T-008	278,328	4,912,592
T-009	278,247	4,913,554
T-010	278,034	4,913,192
T-011	279,307	4,912,428
T-012	277,361	4,911,512
T-013	277,997	4,911,819
T-014	279,202	4,911,601
T-015	277,134	4,910,804
T-016	278,760	4,910,602
T-017	279,250	4,910,861
T-018	278,115	4,909,768
T-019	277,975	4,909,232
T-020	279,042	4,908,888
T-021	276,094	4,908,511
T-022	277,918	4,908,477
T-023	276,260	4,907,923
T-024	277,845	4,907,428
T-025	278,299	4,907,713
T-026	279,021	4,907,925
T-028	284,382	4,909,786
T-029	283,041	4,910,336
T-030	283,755	4,910,384
T-031	283,131	4,909,606
T-032	284,151	4,909,433
T-033	282,670	4,909,298
T-034	281,138	4,907,456
T-035	281,644	4,907,959
T-036	282,072	4,908,388
T-037	283,512	4,907,241
T-038	278,366	4,918,774
T-039	277,238	4,918,508
T-040	278,351	4,918,093
T-041	277,653	4,917,679
T-042	277,246	4,917,311
T-044	269,753	4,905,319
T-045	270,225	4,905,590

Turbine Identification	X (UTM 17)	Y (UTM 17)
T-046	270,368	4,902,963
T-047	270,808	4,903,283
T-048	293,257	4,904,508
T-049	272,066	4,902,258
T-050	273,166	4,902,059
T-051	273,707	4,902,284
T-052	273,283	4,902,971
T-053	273,665	4,903,461
T-054	274,060	4,903,900
T-055	274,131	4,904,440
T-056	275,245	4,904,217
T-057	275,737	4,904,481
T-058	276,241	4,904,722
T-059	275,510	4,907,004
T-060	276,536	4,905,894
T-062	276,739	4,907,005
T-067	282,606	4,906,387
T-068	282,523	4,905,775
T-069	282,501	4,905,134
T-073	285,104	4,905,551
T-074	285,208	4,905,962
T-075	287,753	4,906,292
T-076	287,612	4,905,696
T-077	288,335	4,906,565
T-078	289,234	4,906,552
T-079	290,127	4,906,526
T-080	289,977	4,905,534
T-081	290,625	4,905,716
T-082	290,437	4,904,735
T-083	291,392	4,904,824
T-084	291,830	4,905,341
T-085	290,655	4,904,053
T-086	291,462	4,904,025
T-087	292,436	4,903,762
T-088	292,871	4,904,139
T-089	276,513	4,910,637
T-090	276,550	4,910,031
T-091	276,301	4,909,051
T-092	265,824	4,902,186
T-093	266,313	4,902,468
T-094	267,202	4,902,485
T-095	269,697	4,900,613
T-096	277,228	4,903,846

APPENDIX A

TURBINE COORDINATES

Appendix A Philip Wind Energy Center - Potential Turbine Locations

Turbine Identification	X (UTM 17)	Y (UTM 17)
T-097	277,160	4,903,324
T-098	277,182	4,902,817
T-101	274,566	4,906,230
T-102	279,743	4,918,305
T-103	279,765	4,917,586
T-104	281,602	4,906,780
T-105	285,176	4,906,595
T-106	286,440	4,903,180
T-108	276,288	4,909,618

APPENDIX B

RECEPTOR COORDINATES AND EXPECTED ANNUAL SHADOW HOURS

Appendix B - Philip Wind Energy Center
Receptor Coordinates and Expected Annual Shadow Flicker

Rec ID[1]	X (UTM 17)	Y (UTM 17)	Expected Shadow (Annual Hours)
R-002-P	286,785	4,902,305	0:00
R-003-P	287,012	4,903,919	0:00
R-008	285,818	4,910,305	3:54
R-009-P	284,768	4,908,594	3:12
R-010-P	282,281	4,906,984	28:15
R-011	280,731	4,908,411	18:16
R-012	280,170	4,907,197	26:03
R-013-P	280,766	4,912,369	5:27
R-015-P	274,435	4,907,683	13:33
R-016-P	271,187	4,905,980	6:34
R-026-P	271,208	4,905,926	6:55
R-027	271,850	4,900,914	0:00
R-033	280,512	4,920,071	0:00
R-070-P	284,706	4,908,341	0:00
R-149-P	271,023	4,905,998	9:32
R-248	276,690	4,920,342	12:29

[1] "-P" denotes participation in the Project

APPENDIX N

Cultural Resources

(Confidential)

APPENDIX O

Upper Great Plains Programmatic Environmental Impact Statement
Best Management Practices

Appendix O. Upper Great Plains Programmatic Environmental Impact Statement Best Management Practices

Generalized Topic	UGP PEIS BMPs*
Land use and public facilities	**General:** Plan and site the wind energy development to minimize impacts on other land uses. Consult with federal, state, and county agencies; Tribes; property owners; and other stakeholders as early as possible in the planning process to identify potentially significant land use conflicts and issues and state and local rules that govern wind energy development. • Avoid locating wind energy developments in areas of unique or important recreation, wildlife, or visual resources. When feasible, a wind energy development should be sited on already altered landscapes. • Consolidate infrastructure wherever possible to maximize efficient use of the land and minimize impacts. Existing transmission and market access should be evaluated, and use of existing facilities should be maximized. • Develop restoration plans to ensure that all temporary use areas are restored. **Agricultural and Grazing Lands:** Construction activities should be coordinated with landowners to minimize interference with farming or livestock operations. Issues that would need to be addressed could include installation of gates and cattle guards where access roads cross existing fence lines, access control, signing of open range areas, traffic management (e.g., vehicle speed management), and location of livestock water sources. • Construction debris should be removed from the site. • Excess concrete (excluding belowground portions of decommissioned turbine foundations intentionally left in place) should not be buried or left in active agricultural areas. • Vehicles should be washed outside of active agricultural areas to minimize the possibility of the spread of noxious weeds. • Topsoil should be stripped from any agricultural area used for traffic or vehicle parking—segregating topsoil from excavated rock and subsoil—and replaced during restoration activities. • Drainage problems caused by construction should be corrected to prevent damage to agricultural fields. • Following completion of construction and during decommissioning, subsoil should be decompacted (Brower 2005). **Recreation:** Ensure that adequate safety measures (e.g., access control and traffic management) are established for recreational visitors to adjacent properties. **Wetland and Grassland Easements:** Coordinate closely with the USFWS or U.S. Department of Agriculture during initial project planning to ensure that wetland and grassland easements are avoided to the extent practicable. **Military Operations:** Consult with the Department of Defense (DoD) during initial project planning to evaluate the potential impact of a proposed development on military airspace in order to identify and address any DoD concerns. **Aviation Operations:** Prepare the FAA-required notice of proposed construction during initial project planning in order to identify any air safety issues and required mitigation measures. Radar Interference. Mitigation measures pertaining to radar interference are provided in Section 3.8.2.4 of the UGP PEIS. The only way to completely avoid any adverse impacts on radar involves methods that avoid locating turbines in the radar line of sight (e.g., achieved by distance, terrain masking, or terrain relief) (DoD 2006). An additional solution could be to replace aging radar equipment with modern and flexible equipment that can better distinguish wind farm clutter from aircraft or weather (Brenner 2008). Turbine operations could also be curtailed during significant weather events. WAPA generally advises developers submitting interconnection requests to avoid areas that would potentially conflict with radar facilities. **Transportation:** Existing roads should be used to the extent possible, but only in safe and environmentally sound locations. If new access roads are necessary, they should be designed and constructed to the appropriate standard necessary to accommodate their intended function (e.g., traffic volume and weight of vehicles) and minimize erosion. Access roads that are no longer needed should be recontoured and revegetated. A transportation plan should be prepared that identifies measures the developer will implement to comply with state or federal requirements and to obtain the necessary permits. This will typically address the transport of turbine components, main assembly crane, and other large pieces of equipment. The plan should consider specific object size, weight, origin, destination, and unique handling requirements and should evaluate alternative means of transportation (e.g., rail or barge). A traffic management plan should be prepared for the site access roads to ensure that no hazards would result from increased truck traffic and that traffic flow would not be adversely impacted. This plan should identify measures that will be implemented to comply with any state or federal department of

Generalized Topic	UGP PEIS BMPs*
	transportation requirements, such as informational signs, flaggers when equipment may result in blocked throughways, and traffic cones to identify any necessary changes in temporary lane configurations. Signs should be placed along roads to identify speed limits, travel restrictions, and other standard traffic control information. To minimize impacts on local communities, consideration should be given to limiting construction vehicles on public roadways during the morning and late afternoon commute times. Project personnel and contractors should be instructed and required to adhere to speed limits commensurate with road types, traffic volumes, vehicle types, and site-specific conditions to ensure safe and efficient traffic flow. During construction, O&M, and decommissioning phases, traffic should be restricted to designated project roads. Use of other unimproved roads should be restricted to emergency situations.
Soil resources	• Avoid placement of wind energy facilities in areas with unsuitable seismic, liquefaction, slope, subsidence, settling, and flooding conditions. • Minimize the extent of the project footprint, including improved roads and construction staging areas. • Minimize ground-disturbing activities, especially during the rainy season. • Use existing roads and disturbed areas to the extent possible. • Site new roads to follow natural land contours; excessive slopes should be avoided. • Site new roads to avoid stream crossings and wetlands and minimize the need to cross drainage bottoms. • Surface new roads with aggregate materials, wherever appropriate. • Restrict heavy vehicles and equipment to improved roads to the extent practicable. • Control vehicle and equipment speed on unpaved surfaces. • Conduct construction and maintenance activities when the ground is frozen or when soils are dry and native vegetation is dormant. • Stabilize disturbed areas that are not actively under construction using methods such as erosion matting or soil aggregation, as site conditions warrant. • Salvage topsoil from all excavation and construction activities to reapply to disturbed areas once construction is completed. • Dispose of excess excavation materials in approved areas to control erosion. • Isolate excavation areas (and soil piles) from surface water bodies using silt fencing, bales, or other accepted appropriate methods to prevent sediment transport by surface runoff. • Use earth dikes, swales, and lined ditches to divert local runoff around the work site. • Reestablish the original grade and drainage pattern to the extent practicable. • Reseed disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction.
Water resources	• Minimize the extent of land disturbance to the extent possible. • Use existing roads and disturbed areas to the extent possible. • Site new roads to avoid crossing streams and wetlands and minimize the number of drainage bottom crossings. • 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. • Apply erosion controls relative to possible soil erosion from vehicular traffic. • Identify and avoid unstable slopes and local factors that can cause slope instability (groundwater conditions, precipitation, seismic activity, high slope angles, and certain geological landforms). • Identify areas of groundwater recharge and discharge and evaluate their potential relationship with surface water bodies and groundwater quality. • Avoid creating hydrologic conduits between two aquifers (e.g., upper and lower). • Construct drainage ditches only where necessary; use appropriate structures at culvert outlets to prevent erosion. • Avoid altering existing drainage systems, especially in sensitive areas such as erodible soils or steep slopes. • Clean and maintain catch basins, drainage ditches, and culverts regularly.

Generalized Topic	UGP PEIS BMPs*
	• Limit herbicide and pesticide use to nonpersistent, immobile compounds and apply them using a properly licensed applicator in accordance with label requirements. • Dispose of excess excavation materials in approved areas to control erosion and minimize leaching of hazardous materials. • Reestablish the original grade and drainage pattern to the extent practicable. • Reseed (non-cropland) disturbed areas with a native seed mix and revegetate disturbed areas immediately following construction. • When decommissioning sites, ensure that any wells are properly filled and capped.
Air quality	**General:** General mitigation measures applicable to multiple phases of project development include the following: • Use surface access roads, on-site roads, and parking lots with aggregates or that maintain compacted soil conditions to reduce dust generation. • Post and enforce lower speed limits on dirt and gravel access roads to minimize airborne fugitive dust. • Minimize potential environmental impacts from the use of dust palliatives by taking the necessary measures to keep the chemicals out of sensitive terrestrial habitats and streams. The application of dust palliatives must comply with federal, state, and local laws and regulations. • Ensure that all pieces of heavy equipment meet emission standards specified in the state code of regulations, and conduct routine preventive maintenance, including tune-ups to manufacturer specification to ensure efficient combustion and minimum emissions. If possible, equipment with more stringent emission controls should be leased or purchased. • Employ fuel diesel engines in facility construction and maintenance that use ultra-low sulfur diesel, with a maximum 15 ppm sulfur content. • Limit idling of diesel equipment to no more than 10 minutes unless necessary for proper operation. **Construction:** Mitigation measures applicable during construction activities include the following: • Stage construction activities to limit the area of disturbed soils exposed at any particular time. • Water unpaved roads, disturbed areas (e.g., scraping, excavation, backfilling, grading, and compacting), and loose materials generated during project activities as necessary to minimize fugitive dust generation. • Install wind fences around disturbed areas if windborne dust is likely to impact sensitive areas beyond the site boundaries (e.g., nearby residences). • Spray stockpiles of soils with water, cover with tarpaulins, and/or treat with appropriate dust suppressants, especially when high wind or storm conditions are likely. Vegetative plantings may also be used to limit dust generation for stockpiles that will be inactive for relatively long periods. • Train workers to comply with speed limits, use good engineering practices, minimize the drop height of excavated materials, and minimize disturbed areas. • Cover vehicles transporting loose materials when traveling on public roads and keep loads sufficiently wet and below the freeboard of the truck to minimize wind dispersal. • Inspect and clean tires of construction-related vehicles, as necessary, so they are free of dirt prior to entering paved public roadways. • Clean (e.g., through street vacuum sweeping) visible trackout or runoff dirt from the construction site off public roadways.
Noise impacts	**General:** BMPs and mitigation measures applicable throughout multiple phases of a wind energy development project include the following: • Take advantage of topography and the distance to nearby sensitive receptors when positioning potential sources of noise. • Establish sufficient setback distances from sensitive receptors wherever feasible. Based on previous experience, noise complaints seldom exist for people living more than 1 to 1.5 miles (1.6–2.4 kilometers [km]) from a wind farm (Stewart 2006). • Select equipment with the lowest noise levels available and no prominent discrete tones, when possible. • Maintain all equipment in good working order in accordance with manufacturer specifications. Suitable mufflers and/or air-inlet silencers should be installed on all internal combustion engines and certain compressor components. • All vehicles traveling within and around the project area should operate in accordance with posted speed limits. • Establish a process for documenting, investigating, evaluating, and resolving project-related noise complaints.

Generalized Topic	UGP PEIS BMPs*
	Construction: • When possible, limit noisy construction activities to times when nearby sensitive receptors are least likely to be disturbed. • Schedule noisy activities to occur at the same time whenever feasible, since additional sources of noise generally do not greatly increase noise levels at the site boundary. Less-frequent but noisy activities would generally be less annoying than lower-level noises occurring more frequently. • Locate stationary construction equipment (e.g., compressors or generators) as far as practical from nearby sensitive receptors. • In the unlikely event that blasting or pile driving would be needed during the construction period, notify nearby residents in advance. **O&M:** • If a transformer becomes a noise issue, a new transformer with reduced flux density generating noise levels as much as 10 to 20 decibels lower than National Electrical Manufacturers Association 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
Ecological impacts	**Project Planning and Design:** Proper siting of the project area and of specific project components is the best means for minimizing impacts on wildlife from wind energy projects. To reduce the potential for unacceptable impacts on ecological resources, the following measures should be incorporated into the project planning and siting activities: • Follow the recommendations provided in the USFWS's *Land-Based Wind Energy Guidelines* (WEG) (USFWS 2012) and, as appropriate, the Eagle Conservation Plan Guidance (USFWS 2013). In addition, follow guidelines or recommendations developed by individual states (e.g., IDNR 2011; Nebraska Wind and Wildlife Working Group 2011; SDGFP n.d. [2012]) to address potential effects of wind energy development on ecological resources. **Prepare a Bird and Bat Conservation Strategy (BBCS):** The overall goal of such a plan is to reduce or eliminate avian and bat mortality; implementation of a BBCS builds support for a finding of no significant impact when projects tier to the UGP PEIS. 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 year of postconstruction monitoring is needed to validate the preconstruction risk assessment and allow the facility owner to adjust operations based on identified problems. Based on project location in proximity to occupancy, habitat, and other attributes that may increase the risk to birds and bats, multiyear postconstruction monitoring may be necessary at some project sites. It is of paramount importance that postconstruction surveys are accurate estimates of fatality at wind power facilities. Simple carcass counts at wind energy facilities are inaccurate and underestimate the total number of fatalities because not all carcasses are found due to factors such as unsearchable terrain, carcass removal by scavengers, and less than perfect searcher efficiency. Postconstruction surveys for mortality must be robust and standardized to provide reliable results upon which to base adaptive management decisions. For these reasons, using a fatality estimator model is critical. The USFWS recommends a model like the Evidence of Absence model developed by Huso et al. (2015). The user's guide and software developed to estimate bird and bat fatalities at wind-power facilities (Dalthorp et al. 2014) can be found at http://pubs.usgs.gov/ds/0881. The Evidence of Absence software provides for comparison of various combinations of search coverage, search interval, and searcher efficiency that all produce the same overall level of carcass detection probability. Results of monitoring activities shall be reported to the appropriate state or federal agencies in a timely manner. If bat monitoring is appropriate for the site, installation of bat acoustic monitors should be considered at the time MET towers are installed to reduce costs and minimize delays by collecting data early during the site review process. • Review existing information on species and habitats in the project area. Identify important, sensitive, or unique habitat (including large contiguous tracts of grassland habitat) and biota in the project site and vicinity, and design the project to avoid, minimize, or mitigate potential impacts on these resources. Avoidance is the typically the most effective, and therefore preferred, choice for minimizing impacts. The design and siting of the facility should follow appropriate guidance and requirements from Western and the USFWS (as specified for each species in the selected alternative in the UGP PEIS) as well as those required by state permitting agencies, and other resource agencies, as available and applicable. For birds specifically, attention should be given to project placement that may be within or near Important Bird Areas (IBAs) (http://netapp.audubon.org/iba) or Hemispheric or Regional Western Hemisphere Shorebird Reserve Network sites (http://www.whsrn.org/whsrn-sites), or where bird species or habitats of conservation concern are known to occur. The IBA Program has identified the most essential areas for birds, and conservation of these areas will provide for long-term protection of biodiversity. Sources of information on these important habitats can be found at http://ecos.fws.gov/ipac, http://www.avianknowledge.net, and http://web4.audubon.org/bird/iba.

Generalized Topic	UGP PEIS BMPs*

- Tier to the UGP PEIS. The responsible federal agency will use a tiered NEPA evaluation to document avoidance, minimization, or mitigation of impacts to important bird habitat (e.g., established private, state, or federal special management areas for birds, IBAs, Regional Western Hemisphere Shorebird Reserve Network, [http://www.whsrn.org/whsrn-sites], etc.) to achieve no significant impact to avian resources. On a project-by-project basis, developers should contact local USFWS offices early in the planning process to identify areas of conflict with specific avian species or important bird habitat. Developers shall work with USFWS and WAPA to develop avoidance, minimization, or mitigation measures to adequately demonstrate their project will have no significant impact on avian resources. In these cases, individual projects determined to be consistent with the selected alternative in the UGP PEIS will require a finding of no significant impact to document consistency.
- If significant impacts on IBAs or similar ecologically important avian areas are not avoided, minimized, or mitigated, then this UGP PEIS would not apply, and a separate project specific NEPA evaluation must be developed and approved by the appropriate responsible federal agency prior to project construction.
- Contact appropriate federal and state agencies (including state entities responsible for permitting energy development projects) early in the planning process to identify potentially sensitive ecological resources known to be present or likely to be present in the vicinity of the wind energy development.
- If appropriate, conduct surveys for presence of federal- and state-protected species and other species of concern and the habitats for such species that have a reasonable potential to occur within the project area based on habitat characteristics. Consult with the USFWS and/or appropriate state agency to identify species likely to be present and appropriate survey techniques, determine permit needs, and identify/apply species-specific avoidance and minimization measures.
- Evaluate potential avian and bat use (including the locations of active nest sites, colonies, roosts, and migration corridors) of the project and use data to plan turbine (and other structure/infrastructure) locations to minimize impacts.
- The transmission lines should be designed and constructed with regard to the recommendations in Avian Protection Plan Guidelines (APLIC and USFWS 2005), in conjunction with *Suggested Practices for Avian Protection on Power Lines* (APLIC 2006) and *Reducing Avian Collisions with Power Lines* (APLIC 2012), to reduce the operational and avian risks that result from avian interactions with electric utility facilities. For example, transmission line support structures and other facility structures should be designed to reduce the likelihood of electrocution with proper spacing of components and by the use of line marking devices, where warranted and appropriate, to reduce the likelihood of collision.
- Evaluate the potential for the wind energy project to adversely affect bald and golden eagles in a manner consistent with the *Eagle Conservation Plan Guidance* (USFWS 2013). Early in the planning of transmission interconnection and wind farm location, coordination with USFWS Field Offices regarding the guidance is highly recommended. Documented occurrence of eagles can be acquired from the local USFWS Ecological Services office, state wildlife agencies, or state natural heritage databases in some cases, although on-site surveys may be needed. In accordance with the USFWS's WEG (USFWS 2012), surveys during early project development should identify all important eagle use areas (nesting, foraging, and winter roost areas) within the project's footprint. If recent data are available on the spacing of occupied eagle nests for the project-area nesting population, these data can be used to delineate an appropriate boundary for the project area. If appropriate survey data are unavailable, the USFWS suggests that the project area, for the purpose of evaluating potential effects on eagles, be defined as the project footprint together with areas within 10 miles (16 km) of the footprint boundary. As described in the USFWS's WEG (USFWS 2012), project developers should evaluate the need to develop an eagle conservation plan.

Characterization: Site characterization activities would generally result in only minimal impacts on ecological resources because of the small areas within which activities would take place and because of the low levels of impacts generally associated with those activities. The following BMPs and mitigation measures are applicable to this phase of development to limit the potential for effects to occur to ecological resources:

- Use existing roads to the maximum extent feasible to access the proposed project area. Install MET towers and conduct other characterization activities (e.g., geotechnical testing) as close as practicable to existing access roads.
- Minimize the area disturbed during the installation of MET towers (i.e., the footprint needed for MET towers and associated laydown areas).
- Do not locate individual MET towers in or adjacent to sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.
- Schedule the installation of MET towers and other characterization activities to avoid disruption of wildlife reproductive activities or other important behaviors (e.g., do not install towers during periods of sage-grouse nesting).

Generalized Topic	UGP PEIS BMPs*
	• Avoid or minimize the use of guy wires on MET towers. Equip any needed guy wires with line marking devices. **Construction:** A variety of measures may be applicable to minimize the potential for construction activities to affect ecological resources. In addition to BMPs and mitigation measures identified for other resource areas such as soils, water, air quality, and noise, the following measures would be applicable during construction activities for wind energy projects: • Minimize the size of areas in which soil would be disturbed or vegetation would be removed. • Minimize the number of road miles of new road construction needed for the project. • Reduce habitat disturbance by keeping vehicles on access roads and minimizing foot and vehicle traffic through undisturbed areas. • Consult with the appropriate natural resource agencies to avoid scheduling construction activities during important periods for wildlife courtship, breeding, nesting, lambing, or calving that are applicable to sensitive species within the project area. • 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. • Establish buffer zones around known raptor nests, bat roosts, and biota and habitats of concern if site evaluations show that proposed construction activities would pose a significant risk to avian or bat species of concern. • Avoid constructing turbines in areas of concentrated prey base for raptors (e.g., prairie dog towns). • If needed during construction, only use explosives within specified times and at specified distances from sensitive wildlife or surface waters as established by the appropriate federal and state agencies. • Minimize the use of guy wires on permanent MET towers or use designs for towers that do not require guy wires. If guy wires are necessary, they should be equipped with line marking devices. • 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. • Minimize the amount of lighting installed on project turbines; all outdoor lighting on project buildings should be downshielded. • Develop a plan for control of noxious weeds and invasive plants 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. • Establish a controlled inspection and cleaning area for trucks and construction equipment are arriving from locations with known invasive vegetation problems. Visually inspect construction equipment arriving at the project area and remove and contain seeds that may be adhering to tires and other equipment surfaces. • Regularly monitor access roads and newly established utility and transmission line corridors for the establishment of invasive species. Initiate weed control measures immediately upon evidence of the introduction or establishment of invasive species. • Place marking devices on any newly constructed or upgraded transmission lines, where appropriate, within suitable habitats for sensitive bird species. • Promptly dispose of all garbage or human waste generated on site in order to avoid attracting nuisance wildlife. • Do not use fill materials that originate from areas with known invasive vegetation problems. **O&M:** A variety of measures may be implemented to minimize the potential for impact to ecological resources during the operations phase of a wind energy project, including the following: • 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. • Regularly inspect access roads, utility and transmission line corridors, and tower site areas for damage from erosion, washouts, and rutting. Initiate corrective measures immediately upon evidence of damage.

Generalized Topic	UGP PEIS BMPs*
	• Turn off unnecessary lighting at night to limit attraction of migratory birds. Follow lighting guidelines, where applicable, from the WEG (USFWS 2012:50, items 10 and 11). This includes using lights with timed shutoff, downward-directed lighting to minimize horizontal or skyward illumination, and avoidance of steady-burning, high-intensity lights. • Increasing turbine cut-in speeds (i.e., prevent turbine rotation at lower wind velocity) in areas of bat conservation concern during times when active bats may be at particular risk from turbines (Arnett et al. 2011). • 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. • In the absence of long-term mortality studies, monitor regularly for potential wildlife problems, including wildlife mortality. Report observations of potential wildlife problems, including wildlife mortality, to the appropriate state or federal agency in a timely manner, and work with the agencies to use this information to avoid/minimize/offset impacts. The Ecological Services Division of the USFWS shall be contacted. Development of additional mitigation measures may be necessary. **Decommissioning:** Many BMPs and mitigation measures applicable to construction activities are also applicable to decommissioning activities. One goal of decommissioning should be implementation of appropriate habitat restoration activities to return disturbed areas to pre-project conditions. Additional BMPs and mitigation measures specifically applicable to addressing potential impacts of decommissioning activities on ecological resources include the following: • All turbines and ancillary structures should be removed from the site. • Salvage and reapply topsoil excavated during decommissioning activities to disturbed areas during final restoration activities. • Reclaim areas of disturbed soil using weed-free native shrubs, grasses, and forbs. Restore the vegetation cover, composition, and diversity to values commensurate with the ecological setting. • Facilities constructed on federal lands should follow the decommissioning recommendations provided in the USFWS's WEG (USFWS 2012).
Visual	**Mitigation Measures Related to Project Siting:** The greatest potential for visual impacts associated with wind energy facilities and associated electricity transmission systems would occur as a result of decisions made during the siting and design of the projects. In many cases, visual impacts associated with these facilities could be avoided or substantially reduced by careful project siting. Assessment of visual resources needs to be part of the project's early pre-planning phases and must continue throughout the life of the project. A professional landscape architect should be a part of the planning team evaluating visual resource issues as project siting options are considered. The professional landscape architect and the planning team as a whole should use procedures for conducting detailed visual resource analyses that identify and map landscape characteristics, key observation points (KOPs), and key viewsheds; prominent scenic and cultural landmarks; and other visually sensitive areas near the project location. The appropriate land management agencies, planning entities, and local public should be consulted to provide input on the identification of important visual resources in the project area and on the siting and design process. The public should be involved and informed about the visual site design elements of the proposed wind energy projects. Possible approaches include conducting public forums for disseminating information regarding facets of wind energy development, such as design, operations, and productivity; offering organized tours of operating wind energy development projects; using computer simulation and visualization techniques in public presentations; and conducting surveys regarding public perceptions and attitudes about wind energy development. Geographic information system (GIS) tools and visual impact simulations are valuable for conducting visual analyses (including mapping), analyzing the visual characteristics of landscapes, visualizing the potential impacts of project siting and design, and fostering the type of communication among stakeholders that informs decision making. The visual analyses provide data that would be critical for identifying constraints and opportunities for siting projects to minimize visual impacts. All the above are typical components of both developer project planning and agency environmental documentation. The following specific project-siting measures could help reduce visual impacts of wind energy development, and should be employed where appropriate and feasible: • Because the landscape setting observed from national historic sites, national trails, and tribal cultural resources may be a part of the historic context contributing to the historic significance of the site or trail, project siting should avoid locating facilities that would alter the visual setting such as would reduce the historic significance or function.

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	• Where possible, projects should be sited outside the viewsheds of KOPs, highly sensitive viewing locations, and/or areas with limited visual absorption capability and/or high scenic integrity. When wind energy developments and associated facilities must be sited within view of KOPs, they should be sited as far away as possible, since visual impacts generally diminish as viewing distance increases. • Where possible, developments should be sited in already industrialized and developed landscapes, with due consideration for visual absorption capacity and possible cumulative effects. • Siting should take advantage of both topography and vegetation (where possible) as screening devices to restrict views of projects from visually sensitive areas. • The eye is naturally drawn to prominent landscape features (e.g., knobs and waterfalls); thus, projects and their elements should not be sited next to such features, where possible. • The eye naturally follows strong natural lines in the landscape, and these lines and associated landforms can "focus" views on particular landscape features. For this reason, linear facilities associated with a wind energy project, such as transmission lines and roads, generally should not be sited so that they bisect ridge tops or run down the center of valley bottoms. • Although wind turbines may sometimes be located on ridgelines, skylining of substations, transmission structures, communication towers, and other structures associated with wind energy developments should be avoided; that is, they should not be placed on ridgelines, summits, or other locations where they will be silhouetted against the sky from important viewing locations. Siting should avoid skylining by taking advantage of opportunities to use topography as a backdrop for views of facilities and structures. The presence of these structures should be concealed or made less conspicuous by siting and designing them to harmonize with desirable or acceptable characteristics of the surrounding environment. • Wind turbines should be sited properly to eliminate shadow flicker effects on nearby residences or other highly sensitive viewing locations, or reduce them to the lowest achievable levels, as calculated using appropriate siting software and procedures. Accurately determined shadow flicker estimates should be made available to stakeholders in advance of project approval. If turbine locations are changed during the siting process, shadow flicker effects should be recalculated and made available to potentially affected stakeholders. • Spatially accurate and realistic photo simulations of wind turbines in the proposed location should be prepared as part of the siting process. Simulations should show views from sensitive visual resource areas; highly sensitive viewing locations, such as residences; and more representative typical viewing locations. Stakeholders should be involved in selecting KOPs for simulations. Where feasible, simulations should portray a range of lighting conditions and sun angles. Simulations should be based on accurate spatial information, particularly elevation data, and must account for screening vegetation and structures. Simulations should show enough of the surrounding landscape to show the project in the appropriate spatial context and should be reproduced at a large enough size to be comfortably viewed from the appropriate specified distance to accurately depict the apparent size of the facility in a real setting. • As feasible, siting of linear features (rights-of-way [ROWs] and roads) associated with wind energy developments should follow natural land contours rather than straight lines, particularly up slopes. Fall-line cuts should be avoided. Where it can be accomplished without introducing unacceptable impacts on other resources, following natural contours echoes the lines found in the landscape and often reduces cut-and-fill requirements; straight lines can introduce conspicuous linear contrasts that appear unnatural. • Siting of facilities, especially linear facilities, should take advantage of natural topographic breaks (i.e., pronounced changes in slope), and siting of facilities on steep side slopes should be avoided. Facilities sited on steep slopes are often more visible (particularly if either the project or viewer is elevated); in addition, they may be more susceptible to soil erosion, which could contribute to negative visual impacts. • In forested areas or shrublands, where possible, linear facilities should follow the edges of clearings (where they would be less conspicuous) rather than pass through their center. • Because visual impacts are usually lessened when vegetation and ground disturbances are minimized, where possible, in forested areas or shrublands, siting should take advantage of existing clearings to reduce vegetation clearing and ground disturbance. • Locations for transmission line and ROW road crossings of other roads, streams, and other linear features within a corridor should be chosen to avoid KOP viewsheds and other visually sensitive areas and to minimize disturbance to vegetation and landforms. The ROWs should cross linear features (e.g., trails, roads, and rivers) at right angles whenever possible to minimize the viewing area and duration.

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	• To the extent possible, transmission lines and roads associated with wind energy facilities should be collocated within a corridor to use existing/shared ROWs, existing/shared access and maintenance roads, and other infrastructure in order to reduce visual impacts associated with new construction. **Mitigation Measures Related to Project Design:** Most visual impact mitigation measures that apply to siting wind energy facilities as a whole would also apply to the siting and design of individual facilities, structures, roads, and other components of the projects. A number of additional mitigation measures are directed at minimizing vegetation and ground disturbance to lessen associated visual impacts: • Wind turbine siting should be sensitive to and respond to the surrounding landscape in a visually pleasing way. For example, in rolling landscapes, a less rectilinear and rigid configuration of turbines that follows local topography may be appropriate. In flatter agricultural landscapes with rectilinear patterns of road and fields, a more geometric or linear wind turbine configuration may be preferred. • To the extent possible, given the terrain of a site, wind turbines should be clustered or grouped when placed in large numbers, but a cluttering effect should be avoided by separating otherwise overly long lines of turbines or large arrays, and breaks or open zones should be inserted to create distinct visual units or groups of turbines. • Project design should provide visual order and unity among clusters of turbines (visual units) to avoid visual disruptions and perceived "disorder, disarray, or clutter." • Wind turbines should exhibit visual uniformity in the shape, color, and size of rotor blades, nacelles, and towers. • Power collection cables or lines on the site should be buried in a manner that minimizes additional surface disturbance (e.g., collocating them with access roads). • For ancillary buildings and other structures, low-profile structures should be chosen whenever possible to reduce their visibility. • Where screening topography and vegetation are absent, natural-looking earthwork berms and vegetative or architectural screening should be used to minimize visual impacts associated with ancillary facilities. Vegetative screening can be particularly effective along roadways. • The siting and design of facilities, structures, roads, and other project elements should match and repeat the form, line, color, and texture of the existing landscape. • In forested areas and shrublands, openings in vegetation for facilities, structures, roads, etc., should mimic the size, shape, and characteristics of naturally occurring openings to the extent possible. • Through site design, the number of structures required should be minimized. Activities should be combined and carried out in one structure, or structures should be collocated to share pads, fences, access roads, lighting, etc. • Structures and roads should be designed and located to minimize and balance cuts and fills. Reducing cut and fill has numerous visual benefits, including fewer fill piles, landforms and vegetation that appear more natural, fewer or reduced color contrasts with disturbed soils, and reduced visual disturbance from erosion and the establishment of invasive species. • Facilities, structures, and roads should be located in stable fertile soils to reduce visual contrasts from erosion and to better support rapid and complete regrowth of affected vegetation. Site hydrology should also be carefully considered in siting operations to avoid visual contrasts from erosion. Strip, stockpile, and stabilize topsoil from the site before excavating earth for facility construction. • The vegetation-clearing design in forested areas should include the feathering of cleared area edges (i.e., the progressive and selective thinning of trees from the edge of the clearing inward) combined with the mixing of tree heights from the edge to create an irregular vegetation outline. These actions would result in a more natural-appearing edge, thereby avoiding the very high linear contrasts associated with straight-edged, clear-cut areas. • Structures, roads, and other project elements should be set as far back from road, trail, and river crossings as possible, and vegetation should be used to screen views from crossings, where feasible. **Mitigation Measures Related to Building and Structural Materials:** Visual impacts associated with wind energy facilities and associated electricity transmission could be partially mitigated by choosing appropriate building and structural materials and surface treatments (i.e., paints or coatings designed to reduce contrast and reflectivity). A careful study of the site should be performed to identify appropriate colors and textures for materials; both summer and winter appearance should be considered, as well as seasons of peak visitor use. The choice of colors should be based on the appearance at typical viewing

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distances and consider the entire landscape around the proposed development. Appropriate colors for smooth surfaces often need to be two to three shades darker than the background color to compensate for shadows that darken most textured natural surfaces.

Specific mitigation measures that could be found appropriate and feasible include the following:

- The use of monopole structures is recommended. Truss or lattice-style wind turbine structures with lacework or pyramidal or prismatic shapes should be avoided. Monopole structures present a simpler profile, and less complex surface characteristics and reflective/shading properties.
- Color selections for turbines should be made to reduce visual impact and should be applied uniformly to tower, nacelle, and rotor, unless gradient or other patterned color schemes are used.
- Grouped structures should all be painted the same color to reduce visual complexity and color contrast.
- For ancillary structures, materials and surface treatments should repeat and/or blend with the existing form, line, color, and texture of the landscape. If the project will be viewed against an earthen or other non-sky background, appropriately colored materials should be selected for structures, or appropriate stains/coatings should be applied to blend with the project's backdrop.
- The operator should use nonreflective paints and coatings on wind turbines, visible ancillary structures, and other equipment to reduce reflection and glare.
- Turbines, visible ancillary structures, and other equipment should be painted before or immediately after installation.
- For ancillary facilities, multiple-color camouflage technology applications should be considered for projects within sensitive viewsheds and with a visibility distance between 0.25 to 2 miles (0.4–3.2 km).
- Electricity transmission projects associated with wind energy facilities should use nonspecular conductors and nonreflective coatings on insulators.
- For transmission structures, monopoles may reduce visual impacts more effectively than lattice structures in foreground and middle-ground views, while lattice structures may be more appropriate for more distant views, where the latticework would "disappear," allowing background textures to show through.
- Lighting for facilities should not exceed the minimum required for safety and security, and full-cutoff designs that minimize upward light scattering (light pollution) should be selected. If possible, site design should be accomplished to make security lights nonessential. Such lights increase the contrast between a wind energy project and the night sky, especially in rural/remote environments common to UGP region. Where they are necessary, security lights should be extinguished except when activated by motion detectors (e.g., only around the substation).
- Commercial messages and symbols (such as logos, trademarks) on wind turbines should be avoided and should not appear on sites or ancillary structures of wind energy projects. Similarly, billboards and advertising messages should also be discouraged.

Mitigation Measures Related to Construction: Visual impacts associated with construction activities can be partially mitigated by implementing the following measures, where appropriate and feasible:

- Where possible, staging and laydown areas should be sited outside the viewsheds of KOPs and not in visually sensitive areas; they should be sited in swales, around bends, and behind ridges and vegetative screens, where these screening opportunities exist.
- A site restoration plan should be in place prior to construction. Restoration of the construction areas should begin immediately after construction to reduce the likelihood of visual contrasts associated with erosion and invasive weed infestation and to reduce the visibility of affected areas as quickly as possible.
- Disturbed surfaces should be restored to their original contours as closely as possible and revegetated immediately after, or contemporaneously with, construction. Prompt action should be taken to limit erosion and to accelerate restoring the preconstruction color and texture of the landscape.
- Visual impact mitigation objectives and activities should be discussed with equipment operators before construction activities begin.
- Penalty clauses should be used to protect trees and other sensitive visual resources.
- Existing rocks, vegetation, and drainage patterns should be preserved to the maximum extent possible.
- Valuable trees and other scenic elements can be protected by clearing only to the edge of the designed grade manipulation and not beyond through the use of retaining walls, and by protecting tree roots and stems from construction activities. Brush-beating or mowing rather than vegetation removal should be done, where feasible.

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- Slash from vegetation removal should be mulched and spread to cover fresh soil disturbances (preferred) or should be buried. Slash piles should not be left in sensitive viewing areas.
- Installation of gravel and pavement should be avoided where possible to reduce color and texture contrasts with the existing landscape.
- For road construction, excess fill should be used to fill uphill-side swales to reduce slope interruption that would appear unnatural and to reduce fill piles.
- The geometry of road ditch design should consider visual objectives; rounded slopes are preferred to V-shaped and U-shaped ditches.
- Road-cut slopes should be rounded, and the cut/fill pitch should be varied to reduce contrasts in form and line; the slope should be varied to preserve specimen trees and nonhazardous rock outcroppings.
- Planting pockets should be left on slopes, where feasible.
- Benches should be provided in rock cuts to accent natural strata.
- Topsoil from cut/fill activities should be segregated and spread on freshly disturbed areas to reduce color contrast and aid rapid revegetation. Topsoil piles should not be left in sensitive viewing areas.
- Excess fill material should not be disposed of downslope in order to avoid creating color contrast with existing vegetation/soils.
- Excess cut/fill materials should be hauled in or out to minimize ground disturbance and impacts from fill piles.
- Soil disturbance should be minimized in areas with highly contrasting subsoil color.
- Natural or previously excavated bedrock landforms should be sculpted and shaped when excavation of these landforms is required. A percentage of backslope, benches, and vertical variations should be integrated into a final landform that repeats the natural shapes, forms, textures, and lines of the surrounding landscape. The earthen landform should be integrated and transitioned into the excavated bedrock landform. Sculpted rock face angles, bench formations, and backslope need to adhere to the natural bedding planes of the natural bedrock geology. Half-case drill traces from pre-split blasting should not remain evident in the final rock face. Where feasible, the color contrast should be removed from the excavated rock faces by color- treating with a rock stain.
- Where feasible, construction on wet soils should be avoided to reduce erosion.
- Communication and other local utility cables should be buried, where feasible.
- Culvert ends should be painted or coated to reduce color contrasts with existing landscape.
- Signage should be minimized; reverse sides of signs and mounts should be painted or coated to reduce color contrasts with the existing landscape.
- The burning of trash should be prohibited during construction; trash should be stored in containers and/or hauled off-site.
- Litter must be controlled and removed regularly during construction.
- Dust abatement measures should be implemented in arid environments to minimize the impacts of vehicular and pedestrian traffic, construction, and wind on exposed surface soils.

Mitigation Measures Related to O&M: Visual impacts associated with O&M activities could be partially mitigated by implementing the following measures, where appropriate and feasible:

- Wind facilities and sites should be actively and carefully maintained during operation. Wind energy projects should evidence environmental care, which would also reinforce the expectation and impression of good management for benign or clean power.
- Inoperative or incomplete turbines cause the misperception in viewers that “wind power does not work” or that it is unreliable. Inoperative turbines should be repaired, replaced, or removed quickly. Nacelle covers and rotor nose cones should always be in place and undamaged.
- Nacelles and towers should be cleaned regularly (yearly, at minimum) to remove spilled or leaking fluids and the dirt and dust that accumulates, especially in seeping lubricants.
- Facilities and off-site surrounding areas should be kept clean of debris, “fugitive” trash or waste, and graffiti. Scrap heaps and materials dumps should be prohibited and prevented. Materials storage yards, even if thought to be orderly, should be kept to an absolute minimum. Surplus, broken, disused materials and equipment of any size should not be allowed to accumulate.

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	• Maintenance activities should include dust abatement (in arid environments), litter cleanup, and noxious weed control. • Road maintenance activities should avoid blading of existing forbs and grasses in ditches and adjacent to roads; however, any invasive or noxious weeds should be controlled as needed. • Interim restoration should be undertaken during the operating life of the project as soon as possible after disturbances. **Mitigation Measures Related to Decommissioning:** As noted above, a reclamation plan that includes visual impact mitigation measures should be in place prior to construction, and reclamation activities should be undertaken as soon as possible after disturbances occur and be maintained throughout the life of the project. The following reclamation activities/practices can partially mitigate visual impacts associated with electricity transmission/distribution lines and pipelines, where appropriate and feasible: • All aboveground and near-ground structures should be removed. • Soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas should be contoured to approximate naturally occurring slopes, thereby avoiding form and line contrasts with the existing landscapes. Contouring to rough texture would trap seed and discourage off-road travel, thereby reducing associated visual impacts. • Cut slopes should be randomly scarified and roughened to reduce texture contrasts with existing landscapes and to aid in revegetation. • Combining seeding, planting of nursery stock, transplanting of local vegetation within the proposed disturbance areas, and staging of construction should be considered, enabling direct transplanting. Generally, native vegetation should be used for revegetation, establishing a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape. Seed mixes should be coordinated with local authorities, such as country extension services, weed boards, or land management agencies. • Gravel and other surface treatments should be removed or buried. • Rocks, brush, and forest debris should be restored, whenever possible, to approximate preexisting visual conditions. **Other Mitigation Methods:** In addition to mitigation measures that directly reduce the visual resource impacts of wind energy and associated facilities, aesthetic offsets present a mitigation option in some situations. Aesthetic offsets should be considered in situations where visual impacts are unavoidable or where alternative mitigation options are only partially effective or uneconomical. An aesthetic offset is a correction or remediation of an existing condition located in the same viewshed of the proposed development that has been determined to have a negative visual or aesthetic impact. For example, aesthetic offsets could include reclamation of unnecessary roads in the area, removal of abandoned buildings, cleanup of illegal dumps or trash, or the rehabilitation of existing erosion or disturbed areas.
Paleontological resources	To mitigate or minimize potential paleontological resource impacts, the following mitigation measures could be adopted: • Whether paleontological resources exist in a project area should be determined on the basis of the sedimentary context and soil surveys of the area, a records search of federal, state, and local inventories for past paleontological finds in the area, review of past paleontological surveys, and/or a paleontological survey. • Placement of wind energy structures in fossil-rich areas, such as outcrops, should be avoided. • A paleontological resources management plan should be developed for areas where there is a high potential for paleontological material to be present. Management options may include avoidance, removal of the fossils, or monitoring. If the fossils are to be removed, a mitigation plan should be drafted identifying the strategy for collection of the fossils in the project area. Often it is unrealistic to remove all of the fossils, in which case a sampling strategy can be developed. If an area exhibits a high potential, but no fossils were observed during surveying, monitoring could be required. A qualified paleontologist should monitor all excavation and earthmoving in the sensitive area. Whether the strategy chosen is excavation or monitoring, a report detailing the results of the efforts should be produced. • If an area has a strong potential for containing fossil remains and those remains are exposed on the surface for potential collection, steps should be taken to educate workers and the public on the consequences of unauthorized collection.

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Cultural resources	The following mitigation measures could be implemented to address potential impacts to cultural resources: • The appropriate federal agency should consult with federally recognized Native American governments early in the planning process for a wind energy development to identify issues and areas of concern. Consultation is required under the National Historic Preservation Act. Consultation is necessary to establish whether the project is likely to disturb traditional cultural properties, affect access rights to particular locations, disrupt traditional cultural practices, affect trust resources such as eagles, and/or visually impact areas important to the Tribe(s). • The presence of archaeological sites and historic properties in the area of potential effect should be determined on the basis of a records search of recorded sites and properties in the area and/or an archaeological survey. The State Historic Preservation Office (SHPO) is the primary repository for cultural resource information. The National Register of Historic Places (NRHP) could also be consulted at http://www.nps.gov/nr/research/index.htm. • Archaeological sites and historic properties present in locations that would be affected by project activities should be reviewed to determine whether they meet the criteria of eligibility for listing on the NRHP. Cultural resources listed on or eligible for listing on the NRHP are considered "significant" resources. • If a development is within the viewshed of a national historic trail eligible for listing on the NRHP, the Applicant should evaluate the potential visual impacts on the trail associated with the proposed project. If impacts were to occur, mitigation measures such as vegetation or landscape screening could be employed. Other mitigation options are identified in Section 5.7.1.3. • If cultural resources are known to be present at the site, or if areas with a high potential to contain cultural material have been identified, consultation with the SHPO should be undertaken by the appropriate federal agency (e.g., WAPA, USFWS, U.S. Forest Service, or Bureau of Land Management). In instances where federal oversight is not appropriate, developers can interact directly with the SHPO. Avoidance of these resources is always the preferred mitigation option. Other mitigation options include archaeological survey, excavation, data recovery, and monitoring (as warranted). If an area exhibits a high potential but no artifacts are observed during an archaeological survey, monitoring by a qualified archaeologist could be required during all excavation and earthmoving in the high-potential area. A report should be prepared documenting these activities. Other steps include the identification and implementation of measures to prevent potential looting/vandalism or erosion impacts, as well as educating workers and the public to make them aware of the consequences of unauthorized collection of artifacts. • Periodic monitoring of significant cultural resources in the vicinity of development projects may help curtail potential looting/vandalism and erosion impacts. If impacts are recognized early, additional actions can be taken before the resource is destroyed. Monitoring activities do not require federal involvement. • Cultural resources discovered during construction should immediately be brought to the attention of the responsible federal agency. Work should be immediately halted in the vicinity of the find to avoid further disturbance to the resources while they are being evaluated and appropriate mitigation plans are being developed. • If human remains are found on a development site, work should cease immediately in the vicinity of the find. The appropriate law enforcement officials and the appropriate federal agency should be contacted. No material should be removed from the find location. Once it is determined that the remains belong to an archaeological site, the appropriate SHPO should be contacted to determine how the remains should be addressed. • Significant cultural resources can be affected by soil erosion. See the mitigation measures discussed in Section 5.2.1.7 for methods that could control soil erosion during a development project. Minimization of soil erosion would protect important resources from damage.
Hazardous materials	Means to eliminate or reduce adverse impacts from hazardous materials and wastes include compliance with applicable laws, ordinances, and regulations and conformance with relevant industry standards (including those issued by nonregulatory bodies such as the National Fire Protection Association). Wind energy facility projects issued ROWs by federal agencies, including the USFWS, and interconnection access to transmission facilities operated by Western or other transmission system operators will be required to incorporate elements of relevant construction standards and interconnection requirements as well as the reliability requirements of Federal Energy Regulatory Commission orders. Developers of wind energy facilities should prepare several plans addressing various aspects of hazardous materials and waste, including a hazardous materials and waste management plan, a construction and operation waste management plan, a fire management and protection plan, an integrated pest and vegetation management plan (if the facility will use pesticides/herbicides), and a spill prevention and emergency response plan. Such plans should include the following items:

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	• Prepare a hazardous materials and waste management plan that addresses the selection, transport, storage, and use of all hazardous materials needed for construction, operation, and decommissioning of the facility for local emergency response and public safety authorities and for the regulating agency, and that addresses the characterization, on-site storage, recycling, and disposal of all resulting wastes. The plan should include a comprehensive hazardous materials inventory; Material Safety Data Sheets for each type of hazardous material; emergency contacts and mutual aid agreements, if any; site map showing all hazardous materials and waste storage and use locations; copies of spill and emergency response plans (see below), and hazardous materials-related elements of a decommissioning/closure plan. The waste management plan should identify the waste streams that are expected to be generated at the site during construction and operation and address hazardous waste determination procedures, waste storage locations, waste-specific management and disposal requirements (e.g., selecting appropriate waste storage containers, appropriate off-site treatment, storage, and disposal facilities), inspection procedures, and waste minimization procedures. The plan should address solid and liquid wastes that may be generated at the site in compliance with Clean Water Act requirements if a National Pollutant Discharge Elimination System permit is needed. • Develop a fire management and protection plan to implement measures to minimize the potential for fires associated with substances used and stored at the site. The flammability of the specific chemicals used at the facility should be considered. • If pesticides/herbicides are to be used on the site, develop an integrated pest and vegetation management plan to ensure that applications will be conducted within the framework of managing agencies and will entail the use of only U.S. Environmental Protection Agency–registered pesticides/herbicides that are 1) nonpersistent and immobile and 2) applied by licensed applicators in accordance with label and application permit directions, following stipulations regarding suitability for terrestrial and aquatic applications. Potentially applicable mitigation measures for hazardous materials and wastes at wind energy facilities include the following: • All site characterization, construction, operation, and decommissioning activities should be conducted in compliance with applicable federal and state laws and regulations, including the Toxic Substances Control Act of 1976, as amended (15 United States Code 2601, et seq.). In addition, any release of toxic substances (leaks, spills, and the like) in excess of the reportable quantity established by 40 CFR Part 117 should be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, Section 102b. A copy of any report required or requested by any federal agency or state government as a result of a reportable release or spill of any toxic substances should be furnished to the authorized officer concurrent with the filing of the reports to the involved federal agency or state government. • Spills should be immediately addressed per the appropriate spill management plan, and cleanup and removal initiated, if needed. O&M personnel should be trained in spill prevention and containment, and spill containment supplies should be located on site and be readily available. • All vehicles and equipment should be in proper working condition to ensure that there is no potential for leaks of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. • Hazardous materials and waste storage areas or facilities should be formally designated and access to them restricted to authorized personnel. Construction debris, especially treated wood, should not be disposed of or stored in areas where it could come in contact with aquatic habitats. • Design requirements should be established for hazardous materials and waste storage areas that are consistent with accepted industry practices as well as applicable federal, state, and local regulations and that include, at a minimum, containers constructed of compatible materials, properly labeled, and in good condition; secondary containment features for liquid hazardous materials and wastes; physical separation of incompatible chemicals; and fire-fighting capabilities when warranted. • Written procedures should be established for inspecting hazardous materials and waste storage areas and for plant systems containing hazardous materials; identified deficiencies and their resolution should be documented. • Schedules should be established for the regular removal of wastes (including sanitary wastewater generated in temporary, portable sanitary facilities) for delivery by licensed haulers to appropriate off-site treatment or disposal facilities. • During facility decommissioning, the following should occur: emergency response capabilities should be maintained throughout the decommissioning period as long as hazardous materials and wastes remain on-site, and emergency response planning should be extended to any temporary material and equipment storage areas that may have been established; temporary waste storage areas should be properly designated, designed, and equipped; hazardous materials removed from systems should be properly containerized and characterized, and recycling options should be identified and pursued; off-site transportation of recovered hazardous materials and wastes resulting from decommissioning activities

Generalized Topic	UGP PEIS BMPs*
	should be conducted by authorized carriers; hazardous materials and waste should be removed from on-site storage and management areas, and the areas should be surveyed for contamination and remediated as necessary.
Health and safety	**Occupational Health and Safety:** The following mitigation measures to protect wind energy facility and transmission line workers are applicable during all phases associated with a project. • All site characterization, construction, operation, and decommissioning activities must be conducted in compliance with applicable federal and state occupational safety and health standards (e.g., the Occupational Safety and Health Administration's [OSHA's] Occupational Safety and Health Standards, 29 CFR 1910 and 1926). • Conduct a safety assessment to describe potential safety issues and the means that would be taken to mitigate them, covering issues such as site access, construction, safe work practices, security, heavy equipment transportation, traffic management, emergency procedures, and fire control. • Develop a health and safety program to protect workers during site characterization, construction, operation, and decommissioning of a wind energy project. The program should identify all applicable federal and state occupational safety standards and establish safe work practices addressing all hazards, including requirements for developing the following plans: general injury prevention; PPE requirements and training; respiratory protection; hearing conservation; electrical safety; hazardous materials safety and communication; housekeeping and material handling; confined space entry; hand and portable power tool use; gas-filled equipment use; and rescue response and emergency medical support, including on-site first-aid capability. • As needed, the health and safety program must address OSHA standard practices for the safe use of explosives and blasting agents (if needed for site development); measures for reducing occupational electric and magnetic field (EMF) exposures; the establishment of fire safety evacuation procedures; and required safety performance standards (e.g., electrical system standards and lighting protection standards). The program should include training requirements for applicable tasks for workers and establish procedures for providing required training to all workers. Documentation of training and a mechanism for reporting serious accidents to appropriate agencies should be established. • Design all electrical systems to meet all applicable safety standards (e.g., the National Electrical Safety Code) and comply with the interconnection requirements of the transmission system operator. • In the event of an accidental release of hazardous substances to the environment, document the event, including a root cause analysis, a description of appropriate corrective actions taken, and a characterization of the resulting environmental or health and safety impacts. Documentation of the event should be provided to permitting agencies and other appropriate federal and state agencies within 30 days, as required. **Public Health and Safety:** The following mitigation measures for the protection of public health and safety are applicable during all phases associated with a wind energy project: • Develop a project health and safety program that addresses protection of public health and safety during site characterization, construction, O&M, and decommissioning activities for a wind energy project. The program should establish a safety zone or setback for wind energy facilities and associated transmission lines from residences and occupied buildings, roads, ROWs, and other public access areas that is sufficient to prevent accidents resulting from various hazards during all phases of development. It should identify requirements for temporary fencing around staging areas, storage yards, and excavations during construction or decommissioning activities. It should also identify measures to be taken during the operations phase to limit public access to facilities (e.g., equipment with access doors should be locked to limit public access, and permanent fencing with slats should be installed around electrical substations). • Develop a traffic management plan for the site access roads to control hazards that could result from increased truck traffic (most likely during construction or decommissioning), ensuring that traffic flow would not be adversely affected and that specific issues of concern (e.g., the locations of school bus routes and stops) are identified and addressed. This plan should incorporate measures such as informational signs, flaggers (when equipment may result in blocked throughways), and traffic cones to identify any necessary changes in temporary lane configurations. The plan should be developed in coordination with local planning authorities. • Site and design wind energy facilities to eliminate glint and glare effects on roadway users, nearby residences, commercial areas, or other highly sensitive viewing locations, or reduce it to the lowest achievable levels.

Generalized Topic	UGP PEIS BMPs*
	• Use proper signage and/or engineered barriers (e.g., fencing) to limit access to electrically energized equipment and conductors in order to prevent access to electrical hazards by unauthorized individuals or wildlife. • If operation of the wind energy facility and associated transmission lines and substations could cause potential adverse impacts on nearby residences and occupied buildings as a result of noise, sun reflection, or EMF, incorporate recommendations for addressing these concerns into the project design (e.g., establishing a sufficient setback from transmission lines). • Site and design the project to comply with FAA regulations, including lighting requirements, and to avoid potential safety issues associated with proximity to airports, military bases or training areas, or landing strips. • Develop a fire management and protection plan to implement measures to minimize the potential for a human-caused fire and to respond to human- caused or natural-caused fires. • Project developers shall work with appropriate agencies (e.g., U.S. Department of Energy and Transportation Security Administration) to address critical infrastructure and key resource vulnerabilities at wind energy facilities, and to minimize and plan for potential risks from natural events, sabotage, and terrorism.

Source: WAPA and USFWS (2015).

* "project," "developers," "project site," "site boundary," "footprint," and "footprint boundary," etc., are terms used throughout this table (which has been adapted from the UGP PEIS) to refer to general requirements for the development of wind projects. Although these terms may not match the rest of this EA, it should be assumed that they apply to this Project and Philip Wind Partners (Applicant).

Bird and Bat Conservation Strategy

Philip Wind Project

Haakon County, South Dakota

Prepared by:

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October 15, 2024

Confidential Business Information

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1 INTRODUCTION

1.1 Background

Philip Wind Partners, LLC (Philip Wind) is considering development of the Philip Wind Project (Project) in central South Dakota. Philip Wind contracted Western EcoSystems Technology, Inc. (WEST) to develop this site-specific Conservation Strategy (BBCS) for the Project.

When Invenergy Wind Development LLC (Invenergy) acquired Philip Wind Partners, LLC from the previous developer in September 2019, the land area encompassed approximately 71,000 acres and was designed with a layout focused on maximizing energy production. Since acquisition, Philip Wind has modified the Project Area to avoid, minimize, and mitigate potential adverse impacts to environmental resources based on collected field data and to address comments from regulatory agencies and the public (Figure 1.1). For the purposes of this BBCS, the current Project Area defined in August 2022 is referred to as the Project Area in all figures, tables, and references unless otherwise stated. This BBCS includes a summary of the results of relevant environmental studies conducted near or within the current Project Area.

1.2 Purpose and Objectives

This BBCS was developed to provide a written record of the Project's efforts to characterize avian and bat resources within the Project Area, assess potential impacts to these resources, and to document conservation measures that have been or will be taken to avoid, minimize, and/or mitigate for those potential impacts. The studies followed a tiered approach consistent with the 2012 *Land-Based Wind Energy Guidelines* (WEG; USFWS 2012) to inform these efforts. Table 1.1 explains links between the BBCS and WEG tiers.

Table 1.1 Relationship between Philip Wind Project Bird and Bat Conservation Strategy (BBCS) sections and U.S. Fish and Wildlife Service (USFWS) *Land-based Wind Energy Guidelines* sections.

BBCS	USFWS Wind Energy Guidelines
Section 2: Tier 1 and 2 Site Characterization	Tier 1: Preliminary Site Evaluation/Tier 2: Site Characterization
Section 3: Field Studies Section 4: Potential Impacts to Birds and Bats	Tier 3: Field Studies to Document Site Wildlife and Habitat and Predict Project Impacts
Section 5: Avoidance and Minimization Measures	Best Management Practices
Section 6: Post-construction Avian and Bat Monitoring	Tier 4: Post-construction Studies to Estimate Impacts

Source: USFWS 2012

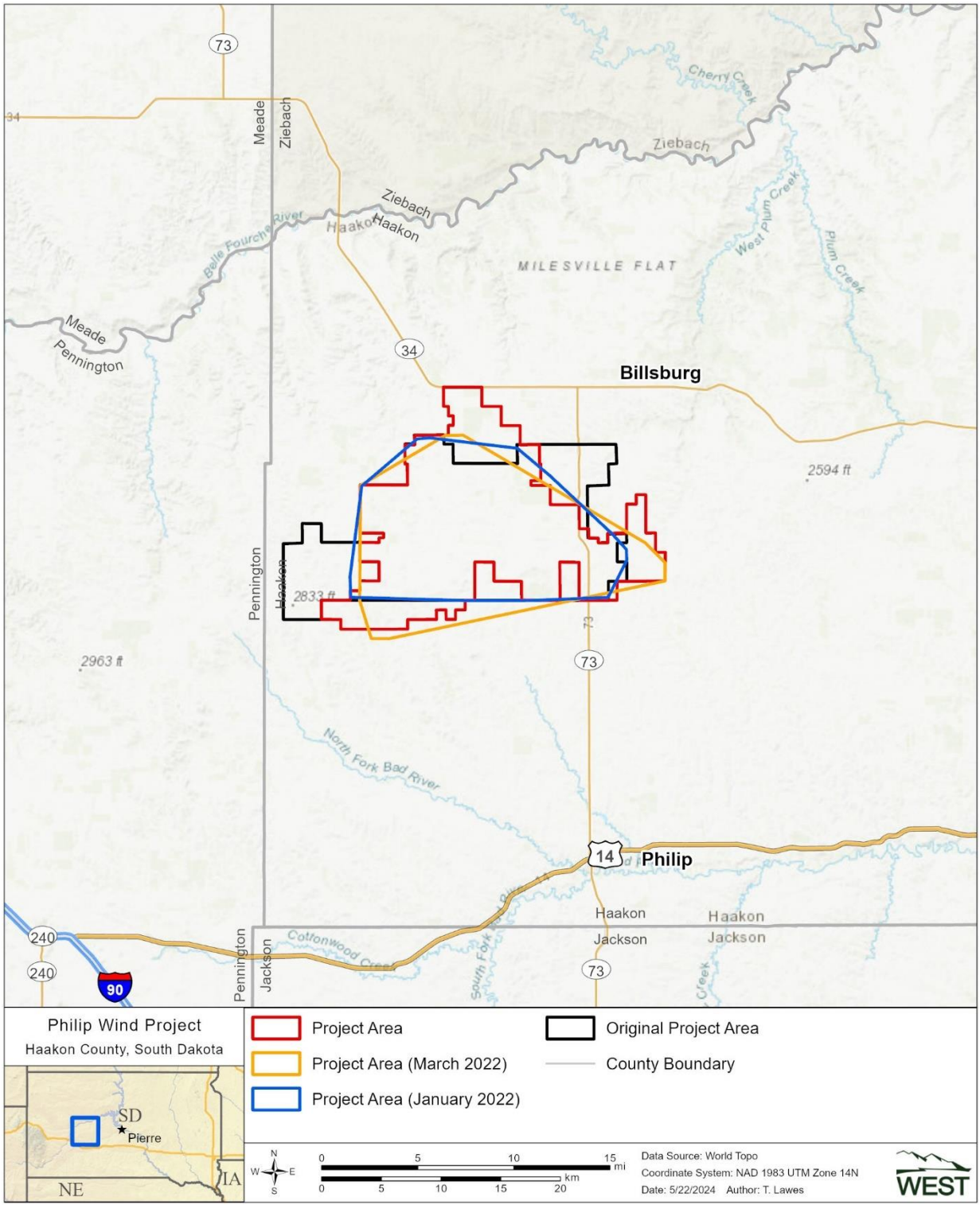

Figure 1.1 Project Area location and changes of the Philip Wind Project in Haakon County, South Dakota, in 2022.

The objectives of the BBCS are as follows:

1) Summarize the results of the Project's habitat evaluation and bird and bat surveys and its progression through the WEG, data collection following the *Eagle Conservation Plan Guidance* (ECPG), and agency coordination.
2) Assess potential impacts to birds and bats from the Project.
3) Identify measures that, when implemented during construction, operation, maintenance, and decommissioning at the Project, will avoid and minimize potential impacts to birds and bats.
4) Describe post-construction monitoring and adaptive management procedures to evaluate and then avoid or minimize potential impacts to species of special concern as defined in Section 2.1.3.

This BBCS is a living document that will evolve throughout the life of the Project, as needed, in response to changing conditions. Additional information from avian and bat survey results, changes in our understanding of how birds and bats interact with wind turbines, or new minimization measures could be included in updated versions. Thus, the BBCS is current at the time of writing, and modifications will be noted in the Document Version Tracking table presented earlier. This BBCS will cover the anticipated 30-year functional life of the Project and potential extended operations and/or decommissioning period. Should the Project be re-powered, the BBCS will remain in effect until decommissioning occurs.

1.3 Project Description

The Project is located approximately 14 miles (mi) north of the city of Philip in Haakon County, South Dakota (Figure 1.1). The current Project Area encompasses approximately 68,300 acres (ac) within two Level IV ecoregions: the Sub-humid Pierre Shale Plains and the Rivers Breaks (U.S. Environmental Protection Agency [USEPA] 2012). These ecoregions, historically dominated by grasslands, have been extensively converted for agricultural use (e.g., row crops and livestock grazing; USEPA 2012), and contain semi-permanent and seasonal wetlands.

Topography within the Project Area is gently rolling to flat (U.S. Geological Survey [USGS] 2020). The primary land cover within the Project Area is grassland/herbaceous and cultivated crops (National Land Cover Database [NLCD] 2019). Wetlands are relatively evenly dispersed throughout the Project Area (USFWS National Wetlands Inventory [NWI] 2023) and are primarily classified as freshwater emergent and freshwater pond (USFWS NWI 2023).

The Project will consist of up to 91 turbines being installed, representing an overestimation of build-out with a planned commercial operation date of 2026 (Figure 1.2). Three turbine models are being considered, with each turbine rated up to a maximum of 6.1 megawatts (MW), though the number and model of turbines selected will not exceed a total nameplate generation capacity of 300 MW (Table 1.2). Infrastructure at the Project will include up to 91 wind turbines, 44 mi of new access roads, 109 mi of underground electrical collector lines and cables, a facility substation, an interconnection substation, an approximately 7-mi generation tie (gen-tie)

transmission line, three permanent meteorological (met) towers, three ADLS towers, one operations and maintenance facility, and additional associated facilities. Construction of the Project is scheduled to begin in 2025, and commercial operation is anticipated to begin in 2026.

Table 1.2. Wind turbine specifications for the Philip Wind Project Area in Haakon County, South Dakota.

Manufacturer	Hub Height (m)	Rotor Diameter (m)	Tip Height (m)	Megawatt Rating
General Electric 140	102	140	172	3.4
Vestas 166	113	166	196	6.1
Vestas 163	113	163	194	4.5

m = meter

1.4 Regulatory Context

1.4.1 Endangered Species Act

The federal Endangered Species Act of 1973 (ESA; 16 U.S. Code [USC] §§ 1531 et seq. [1973]) provides for the listing, conservation, and recovery of endangered and threatened species. The USFWS implements the ESA to conserve terrestrial species and resident fish species. Section 9 of the ESA prohibits the unauthorized take of listed species. Under the ESA, "take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" a listed species (ESA § 3(19), 16 USC 1532 [1973]). The term "harm" has been further defined in agency regulations to mean habitat modification that kills or injures a federally listed species.

1.4.2 Migratory Bird Treaty Act

The federal regulatory framework for protecting birds includes the Migratory Bird Treaty Act of 1918 (MBTA; 16 USC §§ 703-712 [1918]). In the U.S., the MBTA is the cornerstone of migratory bird conservation and protection. The MBTA implements four treaties that provide international protection of migratory birds. The take prohibition for MBTA states:

> "Unless and except as permitted by regulations…[1] it shall be unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, kill… possess, offer for sale, sell …purchase … ship, export, import …transport or cause to be transported… any migratory bird, any part, nest, or eggs of any such bird ….[The Act] prohibits the taking, killing, possession, transportation, import and export of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior."

[1] 16 U.S. Code 703.

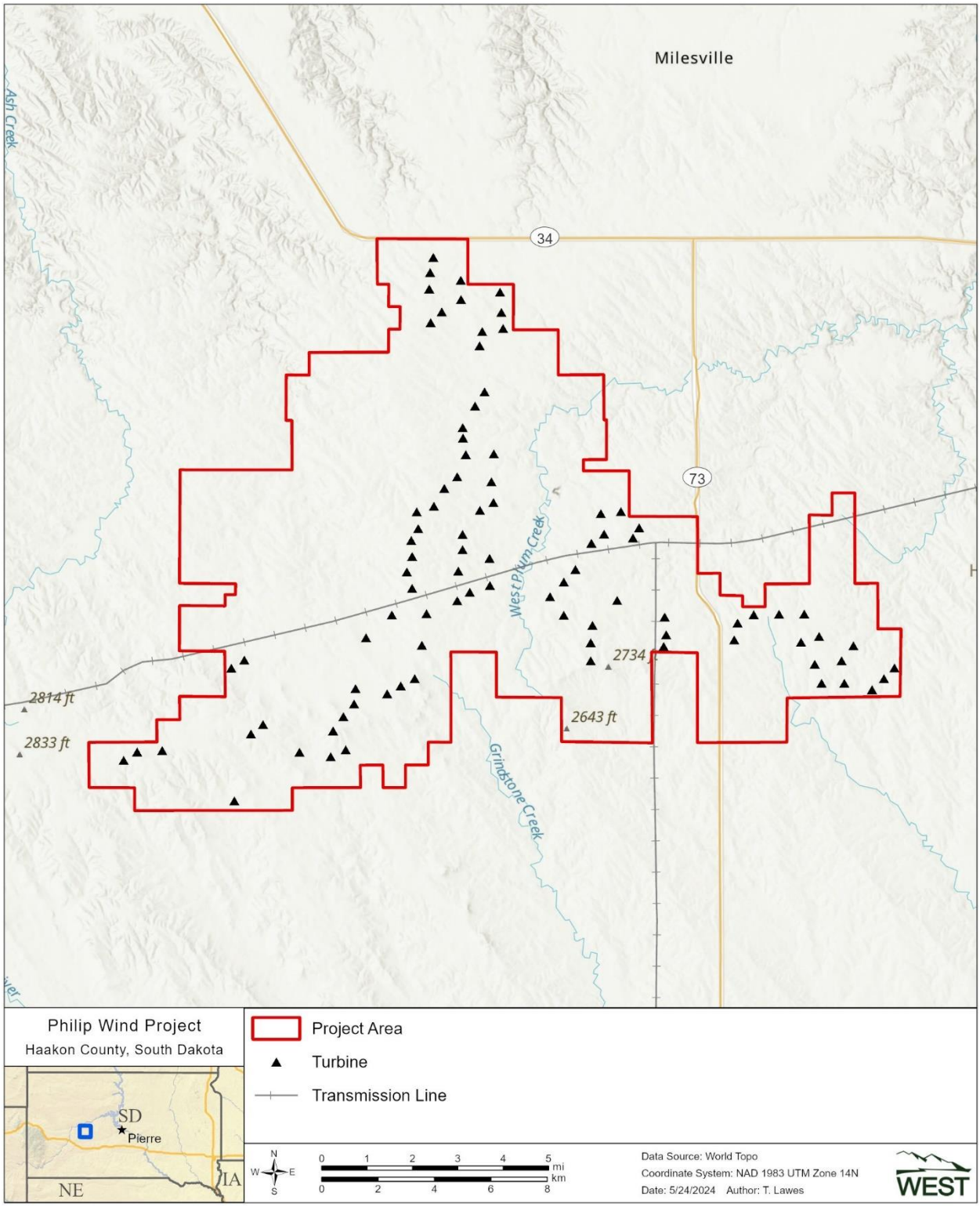

Figure 1.2. Proposed turbine layout for the Philip Wind Project Area in Haakon County, South Dakota.

The word “take” is defined by regulation as “to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect.”[2] The USFWS maintains a list of all species protected by the MBTA.[3] This list includes more than one thousand species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines. Bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are protected under the MBTA.

1.4.3 Bald and Golden Eagle Protection Act

Under authority of the Bald and Golden Eagle Protection Act (BGEPA), 16 USC 668–668d, bald eagles and golden eagles are afforded additional legal protection. The BGEPA prohibits the take, sale, purchase, barter, offer of sale, transport, export or import, at any time or in any manner of any bald or golden eagle, alive or dead, or any part, nest, or egg thereof. The BGEPA also defines take to include “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb,” 16 USC 668c, and includes criminal and civil penalties for violating the statute (see 16 USC 668). The USFWS further defined the term “disturb” as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury, or either a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior.

In 2024, the USFWS revised the permit regulations for incidental take of eagles under 50 CFR 22. The Permits for Incidental Take of Eagles and Eagle Nests (2024 Eagle Rule; USFWS 2024b) included the creation of a general permit option (50 CFR 22 Subpart E § 22.250) for authorizing incidental take at a wind facility “that occur frequently enough for the Service to have developed a standardized approach to permitting and ensure permitting is consistent with the preservation standard.” To be eligible for a general permit, a wind facility must 1) be in an area with relative abundance below the seasonal thresholds identified by the USFWS for both eagle species, and 2) not have a golden eagle nest within 2 miles or a bald eagle nest within 660 feet of turbine blades or other turbine infrastructure (USFWS 2024b). Project proponents who desire to obtain incidental take authorization but are ineligible for a general permit may apply for a “specific permit” (50 CFR § 22.200) in much the same way as permits were issued under the 2016 Eagle Rule. However, the 2024 Eagle Rule also created a tiered process for specific permit applications (and associated permit fees) based on the level of complexity and anticipated processing times associated with an application. For all eagle incidental take permits, the USFWS continues to require implementation of all practicable avoidance and minimization measures to reduce the likelihood of take.

1.4.4 National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 (NEPA; 42 USC 4321 et seq. [1970]) establishes national environmental policies and goals for the protection, maintenance, and enhancement of the environment, and provides a process for implementing these goals within federal agencies. The act ensures potential environmental impacts of federal actions and appropriate mitigation for those impacts are fully considered through a systematic interdisciplinary

[2] 50 Code of Federal Regulations (CFR) 10.12.

[3] 50 CFR 10.13.

approach. All federal agencies are required to prepare detailed statements assessing the environmental impact of, and alternatives to, major federal actions potentially affecting the environment. The USFWS considers the issuance of an incidental take permit to constitute a federal action and, thus, requires an assessment of the potential environmental impacts associated with the action and alternatives under the NEPA.

For this Project, Philip Wind is proposing to connect the Project to a Western Area Power Administration (WAPA) interconnection. This interconnection is a federal action and will require NEPA to be carried out. WAPA will evaluate environmental impacts tiering off the Upper Great Plains Programmatic Environmental Impact Statement (PEIS) with the project-specific development of an Environmental Assessment (EA). WAPA will coordinate with USFWS through Section 7 of ESA to evaluate potential impacts to endangered or threatened species with the potential to occur at the Project.

1.4.5 South Dakota State Threatened and Endangered Species

South Dakota's Endangered Species Statute (South Dakota Statutes, Title 34A Chapter 8) requires the South Dakota Game Fish and Parks (SDGFP) and the S.D. Department of Agriculture and Natural Resources (DANR) to perform those acts necessary for the conservation, management, protection, restoration, and propagation of endangered, threatened, and nongame species of wildlife. In accordance with this mandate, the SDGFP has drafted a Wildlife Action Plan, which includes a list of Species of Greatest Conservation Need (SGCN; SDGFP 2023a). In addition to endangered and threatened species, the SGCN list includes species that are regionally or globally imperiled (or secure) and for which South Dakota represents an important portion of their remaining range and species with characteristics that make them vulnerable. The resulting List of Endangered and Threatened is promulgated by the SDGFP Commission and reviewed biennially. The Endangered Species Statute also authorizes the Secretary of Agriculture and the Secretary of Game, Fish and Parks to enter cooperative agreements with federal or state agencies or private persons for management of nongame, endangered, or threatened species. The South Dakota Endangered Species Statute defines endangered, nongame, threatened as follows:

- *Endangered (E)* – any species of wildlife or plants which is in danger of extinction throughout all or a significant part of its range other than a species of insects determined by the South Dakota Game, Fish and Parks Commission or the secretary of the U.S. Department of Interior to constitute a pest whose protection under this chapter would present an overwhelming and overriding risk to humans
- *Nongame species (NG)* – any wildlife species not legally classified a game species, fur-bearer, threatened species, or as endangered by statute or regulations of this state
- *Threatened (T)* – any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range

1.5 Agency Consultation

Invenergy maintains a commitment to work cooperatively to minimize adverse impacts to protected bird and bat species. Through the planning stages of the Project, Invenergy and its consultants worked in coordination with federal and state agency personnel regarding necessary wildlife studies and siting considerations to ensure that all parties understand the scope of the Project and potential issues identified and addressed early in the planning process. Invenergy will continue to work with the agencies to implement conservation measures intended to avoid, minimize, and/or mitigate potential impacts to bird and bat species, including those measures identified in this BBCS.

Meetings with USFWS and SDGFP were conducted from 2022 through 2024. Regular, monthly coordination with Western Area Power Administration's (WAPA) biological lead began in September 2022 and will continue through the completion of the Final Environmental Assessment (EA) and signing of the anticipated finding of no significant impacts (FONSI) as part of the NEPA process. Below is a summary of the key communications with USFWS and SDGFP, which specifically oversee bird and bat resources, which included study protocols, study results, and avoidance and minimization measures.

On May 12, 2022, Philip Wind provided an overview of the Project since acquired from a previous developer to USFWS, SDGFP, and WAPA. After reviewing previously collected data, Philip Wind was committed to re-designing the Project to address previously identified bird, bat, and habitat concerns. To begin to address these concerns, the Project was shifted to the south and east, and new studies were proposed to evaluate the updated Project Area. Philip Wind presented the studies that were ongoing or proposed and solicited feedback from SDGFP and USFWS on survey methodologies. SDGFP noted there were anticipated updates to their *Prairie Grouse Management Plan for South Dakota 2017-2021* which was published in July 2017. USFWS provided additional feedback related to the May 12, 2022, meeting on July 1, 2022. This feedback focused primarily on eagle, grassland birds, and bird species of concern. On September 27, 2022, SDGFP provided siting recommendations based on the general location of the Project. After receiving these responses, WEST submitted a data request to the SDGFP Natural Heritage Database on October 7, 2022, and received a reply on October 21, 2022, that there were no records of rare, threatened or endangered species and additionally no records of grouse leks within the Project Area.

On November 7, 2022, Philip Wind submitted a request to the Lake Andes Wetland Management District to review all parcels within the Project Area for any existing USFWS easements. A response from USFWS on November 17, 2022, confirmed no USFWS wetland or grassland easements within the Project and the only easement was a Farm Service Agency easement in both Townships 7 and 8.

On January 13, 2023, Philip Wind provided an overview of completed studies to date and a spatial demonstration of how these data were being incorporated into Project design to USFWS, SDGFP, and WAPA. The objective of this spatial demonstration was to demonstrate how preliminary data was being incorporated into the Project's design and to review the Project's proposed approach

to address the Upper Great Plains PEIS species-specific Consistency Evaluation Forms (CEFs). These CEF provide a description of avoidance and minimization measures that, if followed, will result in a determination of either no affect or may affect not likely to adversely affect with existing concurrence from the USFWS through Section 7. Through this demonstration, Philip Wind showed generally low-quality prairie grouse habitat within the Project Area as compared to outside the Project Area using the SDGFP Tiered habitat model. Similarly, whooping crane stopover habitat was limited within the Project Area and was outside of the top four deciles of the Niemuth Model (Niemuth et al. 2018) with limited area within the top fifth decile. There were no recorded whooping crane observations within the Project Area. Philip Wind reviewed prioritization of turbine setbacks with the agencies for active leks, wetlands, eagle nests, and northern long-eared bat habitat. USFWS and Philip Wind discussed ongoing avian and eagle use surveys.

As part of the NEPA process, an agency consultation and coordination scoping meeting was conducted on January 19, 2023. Details of this scoping meeting are provided in the Philip Wind Energy Center Draft EA (SWCA Environmental Consultants [SWCA] 2023). Following this meeting numerous informal discussions occurred between WAPA, USFWS, and Philip Wind to develop a set of species-specific CEF including the piping plover, rufa red knot, whooping crane, and north long-eared bat. Specifically for whooping crane Philip Wind developed a Project-specific monitoring and contingency plan to complete the CEF in addition to compensatory mitigation for 5.0 acres of suitable whooping crane stopover habitat. These CEFs were reviewed and signed by Philip Wind, USFWS, and WAPA on April 4, 2023, closing out the Project's Section 7 consultation under the ESA.

SDGFP provided a support letter to Philip Wind on March 13, 2023, acknowledging the informal discussions with Philip Wind and WEST to modify lek survey protocols provided in the *Management of prairie grouse in South Dakota* and published in September 2022. Due to minimal roads in sections of the Project Area, Philip Wind proposed a hybrid survey approach that included both aerial surveys and ground survey efforts. The modification included three rounds of ground surveys along publicly accessible roads, and one aerial survey conducted during the first two weeks of April focused on large roadless tracts.

On July 25, 2023, Philip Wind provided an overview of the proposed 300 MW Project to the agencies including an update on the ongoing development of the Draft EA and addressing comments from the initial review by WAPA. Philip Wind updated the agencies that it was the second year of Tier 3 surveys being conducted. Philip Wind provided an active review of completed surveys since the last agency meeting through an interactive geospatial platform. A new eagle nest was observed approximately 800 ft to the east of an existing eagle nest and how Philip Wind responded with adjustments to the turbine layout. Philip Wind displayed the results of the 2023 prairie grouse lek surveys and the increase in number and locations of prairie grouse leks. SDGFP noted that the Project is near the edge of the range for GRPC and may account for greater variation. Philip Wind provided a review of removed and adjusted turbine locations based on bird, bat, and habitat surveys including avoiding unbroken grasslands and Tier 1 and 2 priority grouse habitats for either grouse species. The remaining discussion focused on the Draft EA. WAPA stated that the Draft EA needed to include the results of the bird, bat, and habitat surveys

in addition to the avoidance and minimization strategies applied to the Project and any remaining impacts. WAPA and Philip Wind also discussed appropriate locations within the Draft EA to include general minimization strategies and bird and bat specific minimization strategies. There was a follow-up discussion on the proposed listing of the tricolored bat (TCB) under the ESA. Philip Wind acknowledged that they have already committed to the conservation measures for northern long-eared bat, and USFWS stated that many of the same measures would apply to tricolored bats as well if they are listed. USFWS recommended following the guidance for northern long-eared bats and provided the web link.

On August 30, 2023, SDGFP provided an explanation for prioritizing turbine siting based on the preliminary prairie grouse leks survey results discussed during the July 25, 2023, agency meeting. SDGFP identified three turbines that they suggested removed due to proximity to large blocks of unbroken grasslands and potential for fragmentation concerns by connecting infrastructure.

On October 11, 2023, Philip Wind provided a brief review of the completed prairie grouse lek surveys from 2022 and 2023. Philip Wind reviewed the original 2022 turbine layout and provided the updated 2023 turbine layout in addition to connecting infrastructure as previously discussed with SDGFP on August 30, 2023. Philip Wind discussed the Project's siting updates based on the feedback from SDGFP. Philip Wind demonstrated adherence to minimization recommendations for associated infrastructure such as collection lines and access roads to follow existing disturbance. Philip Wind responded that they would still remove four turbines and re-site five other turbines based on proximity to sensitive resources such as an eagle nest, prairie grouse leks, and high-quality modeled grouse habitat. All agencies present agreed to the avoidance and minimization efforts by Philip Wind and stated this was a good balance between agency recommendations and energy production.

USFWS recommended that Philip Wind obtain an eagle take permit for the Project noting a bald eagle nest within the Project Area, the Project's proximity to the Missouri River, and fatalities of eagles at other wind facilities. Philip Wind acknowledged the recommendation but noted that surveys were still ongoing along with a focus on developing a BBCS, uncertainty around the Project operator (and therefore permit holder) and awaiting the proposed finalization of the expected 2024 eagle rule. Philip Wind would continue to coordinate with USFWS as the Project continued development.

On May 1, 2024, Philip Wind provided the USFWS with a NEPA update and anticipated schedule to submit the Final EA for WAPA's review in mid-June and FONSI issued early October. The Project is currently operating under the assumption that the TCB will be listed, and that the final guidance will likely be issued by USFWS before the FONSI is issued. Philip Wind reviewed previous efforts employed for NLEB avoidance and minimization measures following the CEFs in addition to an assessment of NLEB summer habitat to inform setbacks from suitable summer habitat. Philip Wind discussed previous conversations with the agencies and intended to use the same avoidance and minimization measures for NLEB and apply those to TCB for risk minimization. This would include increasing cut-in speeds to 5.0 m/s during fall (August 15 – October 15) each year in addition to one year of post-construction monitoring. USFWS suggested

Philip Wind review the new draft guidance for NLEB and TCB dated April 2024 and see if the draft guidance could be applied to the Project. Additionally, USFWS noted that post-construction acoustic monitoring could also inform curtailment options. USFWS noted that finalized guidance would be available later in 2024.

2 TIER 1 AND 2 – DESKTOP ANALYSES

Characterization of biological resource issues early in the development phase of a wind energy project helps identify, avoid, and minimize potential bird and bat impacts associated with project development. The list of Tier 1 and 2 studies in Table 2.1 are relevant to the Project Area because of their spatial overlap or similarities in habitats with the Project Area.

Table 2.1 List of Tier 1 and 2 reports relevant to the BBCS for the Philip Wind Project in Haakon County, South Dakota.

Date	Report	Citation
May 22, 2017	Critical Issues Analysis	Westwood 2017a
May 31, 2017	Site Characterization Study	Westwood 2017b
June 6, 2023	Whooping Crane Habitat Assessment	Piorkowski 2023d
June 6, 2023	Water Resources Analysis	Fields et al. 2023a
June 8, 2023	Northern Long-eared Bat Habitat Assessment	Piorkowski and Mabee 2023b
June 9, 2023	Site Characterization Study	Piorkowski et al. 2023a

2.1 Site Characterization Study

Biological resources in and near the Project Area were evaluated through desktop reviews of existing data. Available data used in this review included spatial datasets for topography, elevation, land ownership, land use/land cover, wetlands, and wildlife distributions in South Dakota as well as information from the USFWS, South Dakota Natural Heritage Program (SDNHP), USGS Breeding Bird Surveys (BBS), National Audubon Society (Audubon) Christmas Bird Count (CBC), eBird, and Bat Conservation International. In addition to the desktop analyses, a site reconnaissance was conducted on September 13, 2022 and October 13 – 14, 2022, to perform a coarse-scale ground-truth of the National Land Cover Database (NLCD) cover types, NWI potential wetland locations, National Hydrography Dataset (NHD) features, grassland condition (i.e., broken or unbroken sod), document areas where land cover types provide potential habitat for species of concern, search for suitable substrates for and map nests of eagles or other raptor species of concern, and record incidental wildlife observations.

2.1.1 Land Cover

Land cover was assessed for the Project Area and the landscape within a separate 2-mi buffer of the Project Area (i.e., Study Area). The desktop review of the NLCD (2019) for the Project Area identified herbaceous vegetation (52%) as the major land cover type within the Project Area, intermixed with patches of cultivated crops (42%). All other land cover types together accounted for approximately 6% of the Project Area. The NLCD cover types in the Study Area were also identified as predominately herbaceous vegetation (82%), but with a lower percentage of the

Study Area in cultivated crops (13%) as compared to the Project Area. All remaining cover types made up approximately 5% of the Study Area.

The site reconnaissance revealed that for areas accessible by public roads, land cover types present at the Project and Study areas were consistent with those identified during the desktop review and included dominant plant species such as: wheatgrass (*Agropyron* spp.), brome grasses (*Bromus* spp.), bluegrass (*Poa* spp.), and lucerne (alfalfa; *Medicago sativa*). Additionally, the site visit confirmed that the herbaceous land cover in the western third of the Project Area included large areas of intact grasslands and that much of the herbaceous land cover within the Study Area was contiguous unbroken grasslands.

2.1.2 Protected Areas

Protected areas within proximity to the Project Area included Bureau of Land Management (BLM) lands, Cheyenne River Reservation, South Dakota Schools and Public (SDSP) lands, and SDGFP Billsburg Game Production Area. There are no federal wilderness areas, wildlife refuges, USFWS conservation easements, designated critical habitats, or additional special status lands designated within 10-mi of the Project Area. Special status lands included lands classified by the National Audubon Society as Important Bird Areas, eBird hotspots, USDA Natural Resources Conservation Service (NRCS) conservation easements, or lands managed as mitigation parcels by a non-governmental organization because of previous development projects. Land ownership and management practices are summarized in the following sections.

2.1.2.1 Bureau of Land Management

There are approximately 1,439 ac of BLM lands within the Project Area and an additional 3,471 ac of BLM lands within a 10-mi buffer of the Project Area. No infrastructure will be constructed on BLM lands. The BLM manages their parcels for multiple uses including recreation and wildlife conservation. These are currently managed for a variety of resources including wildlife, water conservation, livestock grazing, recreation, and minerals production. Within the Project Area, the primary land use of BLM lands is for grazing purposes.

2.1.2.2 U.S. Fish and Wildlife

The Project is located entirely in the USFWS Lacreek Wetland Management District. The USFWS manages waterfowl production areas such as small wetlands and grasslands that provide migratory and breeding habitat for various bird species. The wetland management districts are composed predominantly of patches of waterfowl production areas across several counties. No waterfowl production areas are within the Project Area or within 10-mi of the Project. USFWS confirmed no wetland or grassland easements on November 17, 2022.

2.1.2.3 Native American Lands

The southern border of the Cheyenne River Reservation is located approximately eight mi north of the Project Area.

2.1.2.4 State Managed Lands

There are approximately 7.5 ac of SDSP lands bordering the outside edges of the Project Area, and there are an additional 17,274 ac of SDSP lands within a 10-mi buffer of the Project Area. State lands are typically leased for minerals and/or livestock grazing. Funds generated from leasing are used to support the state's schools, universities, and other endowed institutions. These lands are also used for public recreation, including hunting and fishing.

The Billsburg Game Production Area is located approximately five mi northeast of the Project Area. This Game Production Area is approximately 80 ac in size and is managed by SDGFP for wildlife production and public hunting.

2.1.3 Species of Concern

Species of concern in this report are defined per the WEG as any species that 1) is either a) listed as an endangered, threatened or candidate species under the ESA, subject to the MBTA or BGEPA; b) is designated by law, regulation, or other formal process for protection and/or management by the relevant agency or other authority; or c) has been shown to be significantly adversely affected by wind energy development; and 2) is determined to be possibly affected by the Project (USFWS 2012).

Table 2.2 summarizes federal- and state-protected or candidate bird and bat species and their likelihood to occur within the Project and Study areas. The likelihood of occurrence in the Project and/or Study areas was determined by considering the species' range, habitat suitability, species' mobility, population size, and records of occurrence in that area. Based on these factors, the likelihood of occurrence was defined for each species, using the following categories:

- None – outside the species' known range; no suitable habitat, restricted mobility, or small population size.
- Unlikely – outside the species' known range and suitable habitat appears absent; may have restricted mobility or population size; however, species may occur in the area during dispersal, migration, or annual movements.
- Possible – in the species' known range but contains marginal suitable habitat; or the species is highly mobile and may occur year-round.
- Likely – in the species' known range and contains suitable habitat, no records from the area.
- Occurs – records of species' occurrence in the area based on USFWS, SDGFP or other survey data.

SDGFP maintains a list of bird and bat SGCN in the state (SDGFP 2014). These SGCN species are not afforded additional protections but warrant special attention and management to keep them from becoming federally or state listed in the future. SGCN species were reviewed to determine their potential to occur in the Project and Study areas (Piorkowski et al. 2023a). There is no USFWS-designated Critical Habitat within the Project or Study areas.

Five federally protected species of birds range from occur to unlikely to occur at the Project in Haakon County, South Dakota (Table 2.2; USFWS 2022a, 2023a). One federally protected species of bat has the potential to occur in addition to one proposed endangered bat species (Table 2.2; USFWS 2022a, 2023a). Five state-listed endangered or threatened bird species were known to occur or possibly occur in Haakon County, South Dakota (USFWS 2022a, 2023a; Table 2.2). Five state-listed endangered or threatened bird species range from unlikely to possibly occur at the Project in Haakon County, South Dakota (USFWS 2022a, 2023a; Table 2.2).

Two species of prairie grouse reside within South Dakota, the sharp-tailed grouse (*Tympanuchus phasianellus*) and greater prairie-chicken (*Tympanuchus cupido*; SDGFP 2023b). Both are valued bird species because of their status as game birds, charismatic lekking behavior, and habitat use (SDGFP 2023b). According to the South Dakota Breeding Bird Atlas II (SDGFP 2023a) prairie grouse are known to occur within the Project Area.

Table 2.2. Federal and state-protected bird and bat species and their likelihood of occurrence within the Philip Wind Project Area in Haakon County, South Dakota.

Bird or Bat/ Common Name	Scientific Name	Status (Federal; State)[1]	Habitat by Season	NLCD Land Cover Types	Seasons of Potential Occurrence and Likelihood of Occurrence[2] in the Project and Study Areas				
					Location	Spring	Summer	Fall	Winter
Birds									
Bald eagle	*Haliaeetus leucocephalus*	BGEPA, BCC; SGCN	Nests in large trees during spring and summer; forages near water in steppe and shrub-steppe habitats in spring, summer, fall, and winter.	Deciduous forest, evergreen forest, mixed forest, shrub/scrub, herbaceous.	*Project/ Study Areas*	Occurs	Occurs	Likely	Occurs
Golden eagle	*Aquila chrysaetos*	BGEPA; --	Nests in trees and cliffs during spring and summer; forages in shrub-steppe habitats spring, summer, fall, and winter.	Herbaceous, shrub/scrub	*Project/ Study Areas*	Occurs	Occurs	Likely	Occurs
Interior least tern	*Sterna antillarum athalassos*	--; SE, SGCN	Interior population nests colonially on mudflats, sand spits, or gravel along rivers in summer. Migrates along major river drainages in spring and fall. Winters outside of U.S.	Barren land, open water.	*Project/ Study Areas*	Unlikely	Unlikely	Unlikely	Unlikely
Osprey	*Pandion haliaetus*	--, ST, SGCN	Migrates in the spring and fall. Breeds and forages near rivers, lakes, ponds. Nests in large open-top trees during the summer. Winters primarily outside the U.S.	Open water.	*Project/ Study Areas*	Unlikely	Unlikely	Unlikely	Unlikely
Peregrine falcon	*Falco peregrinus*	--; ST, SGCN	Migrates in the spring and fall. Nests along cliffs and rock outcroppings and forages in open grasslands. Typically, winters outside the U.S.	Herbaceous, shrub/scrub.	*Project/ Study Areas*	Possible	Unlikely	Possible	Unlikely

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Table 2.2. Federal and state-protected bird and bat species and their likelihood of occurrence within the Philip Wind Project Area in Haakon County, South Dakota.

Bird or Bat/ Common Name	Scientific Name	Status (Federal; State)[1]	Habitat by Season	NLCD Land Cover Types	Seasons of Potential Occurrence and Likelihood of Occurrence[2] in the Project and Study Areas				
					Location	**Spring**	**Summer**	**Fall**	**Winter**
Piping plover	*Charadrius melodus*	FT; SE, SGCN	Migrates in spring and fall to/from wintering ground along the southern Atlantic and Gulf of Mexico coasts. Breeds along small alkaline lakes, large reservoirs, or river islands and sandbars during the summer.	Barren land, open water.	*Project/ Study Areas*	Unlikely	Unlikely	Unlikely	Unlikely
Rufa red knot	*Calidris canutus rufa*	FT; --	Migrates in spring and fall primarily to/from South America to breeding grounds in central Canadian Arctic and stopover habitat includes coastal habitats, beaches, and mudflats. Does not breed in the U.S.	Barren land, open water.	*Project/ Study Areas*	Unlikely	Unlikely	Unlikely	Unlikely
Whooping crane	*Grus americana*	FE; SE, SGCN	Migrates from wintering grounds along the Texas coast to breeding grounds in central Canada in the spring and fall with stopovers primarily occurring in wetlands through the central states of the U.S. Occupies a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, agricultural fields, and wetlands during migration.	Cultivated crops, emergent herbaceous wetlands, open water.	*Project/ Study Areas*	Possible	None	Possible	None

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Table 2.2. Federal and state-protected bird and bat species and their likelihood of occurrence within the Philip Wind Project Area in Haakon County, South Dakota.

Bird or Bat/ Common Name	Scientific Name	Status (Federal; State)[1]	Habitat by Season	NLCD Land Cover Types	Seasons of Potential Occurrence and Likelihood of Occurrence[2] in the Project and Study Areas				
					Location	Spring	Summer	Fall	Winter
Bats									
Northern long-eared bat	*Myotis septentrionalis*	FE; SGCN	Summer roosts underneath bark, in cavities, or crevices of live trees and snags. Migrates between summer roosts and wintering caves and mines.	Woody wetlands, evergreen forest, mixed forest, and deciduous forest.	*Project/ Study Areas*	Possible	Possible	Possible	None
Tricolored Bat	*Perimyotis subflavus*	PE; --	Primarily roosts among live and dead leaf clusters. Migrates between summer roosts and wintering caves and mines.	Forest, dense forest with underbrush.	*Project/ Study Areas*	Possible	Possible	Possible	None

[1] BGEPA = Federal Bald and Golden Eagle Protection Act of 1940, FE = Federal endangered species, FT = Federal threatened species, PE = Proposed Endangered = USFWS considering listing on the Endangered Species Act (ESA), SE = State endangered species, ST = State threatened species, SC = State candidate species; SGCN – South Dakota Game, Fish and Parks (SDGFP) Species of Greatest Conservation Need, -- = Not federal- or state-listed as endangered or threatened species.

[2] Likelihood of species to occur for breeding, nesting, spawning, migration, flowing, etc., based on the species' range, habitat suitability, species' mobility, population size, and records of occurrence in the appropriate area (Section 3.1). Seasonal likelihood of occurrence applies to the Project area, Study Area, or neither (--) as shown under "Suitable Habitat".

Sources: SDGFP South Dakota Wildlife Action Plan 2014; Tetra Tech 2018; NatureServe 2021; U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern 2021a; USFWS Information for Planning and Consultation report (2022a, 2024a); eBird 2023; USFWS Environmental Conservation Online System 2023a

NLCD = National Land Cover Database (2019)

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2.1.4 Prairie Grouse

Sharp-tailed grouse have a wide distribution from the Great Plains to Alaska and in South Dakota, they are a fairly common resident west of the Missouri River and on the Missouri and Prairie coteaus east of the Missouri River (Runia et al. 2021). In contrast, greater prairie-chicken now only occurs in isolated populations, with the largest population extending from central South Dakota south to central Kansas. In South Dakota, greater prairie-chickens occur in the northeast, but the densest and most stable populations are in the center of the state south to Nebraska (Runia et al. 2021).

Based on models presented in Runia et al. (2021), SDGFP developed Modelled Priority Habitat Areas categorized primarily in four tiers with Tier 1 as the highest quality habitat, followed by Tier 2 and Tier 3. Areas not categorized as Tier 1, 2, or 3 are considered Low-Quality habitat (Runia et al. 2021, SDGFP 2022).

The Project Area lacks large areas of Tiers 1 and 2 for both sharp-tailed grouse and greater prairie-chickens (Figures 2.1 and 2.2). Limited Tier 3 habitat exists with the Project Area, otherwise the majority of the landscape is considered low-quality habitat for both species.

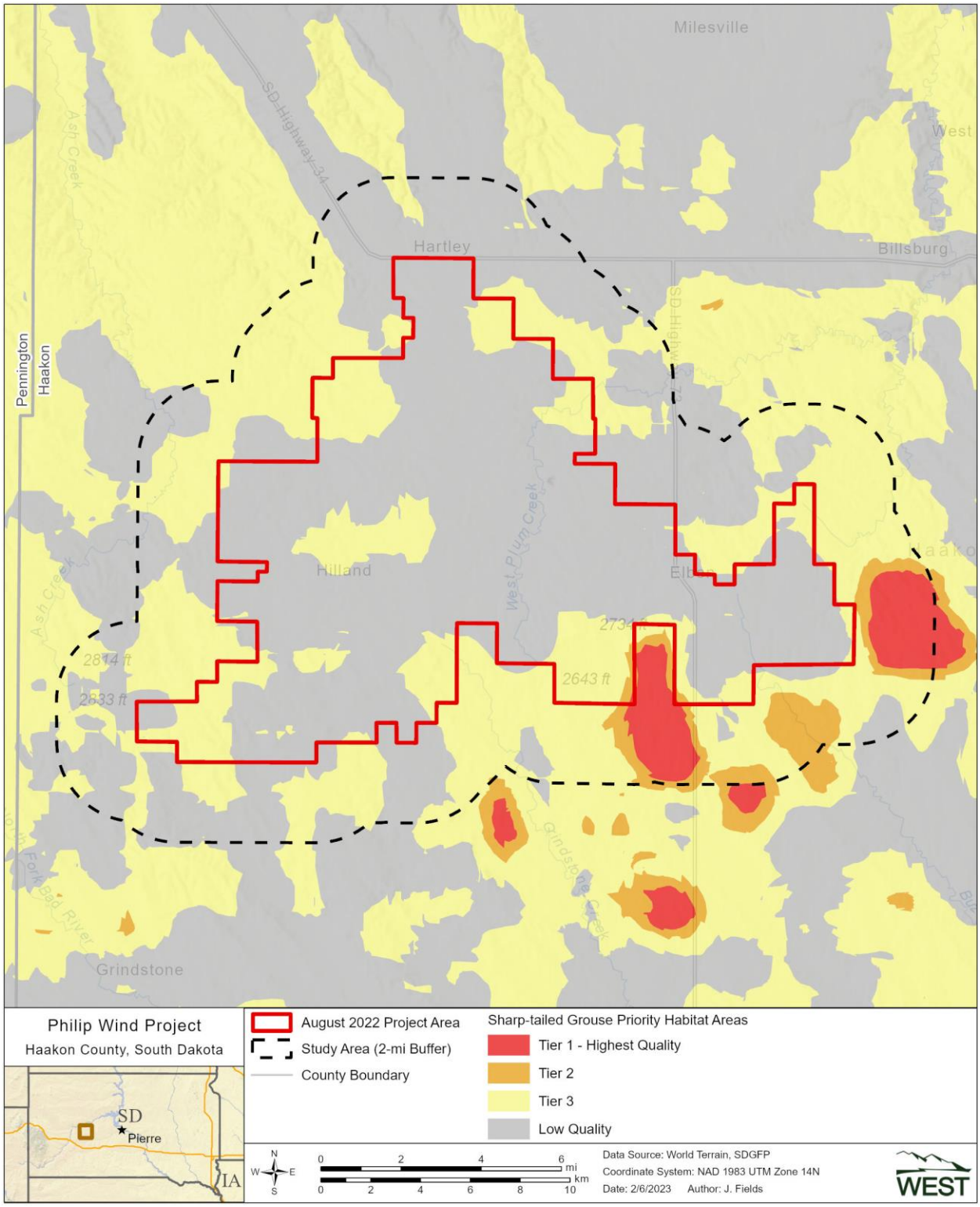

Figure 2.1. Sharp-tailed grouse modelled priority habitat areas within the Philip Wind Project, Haakon County, South Dakota.

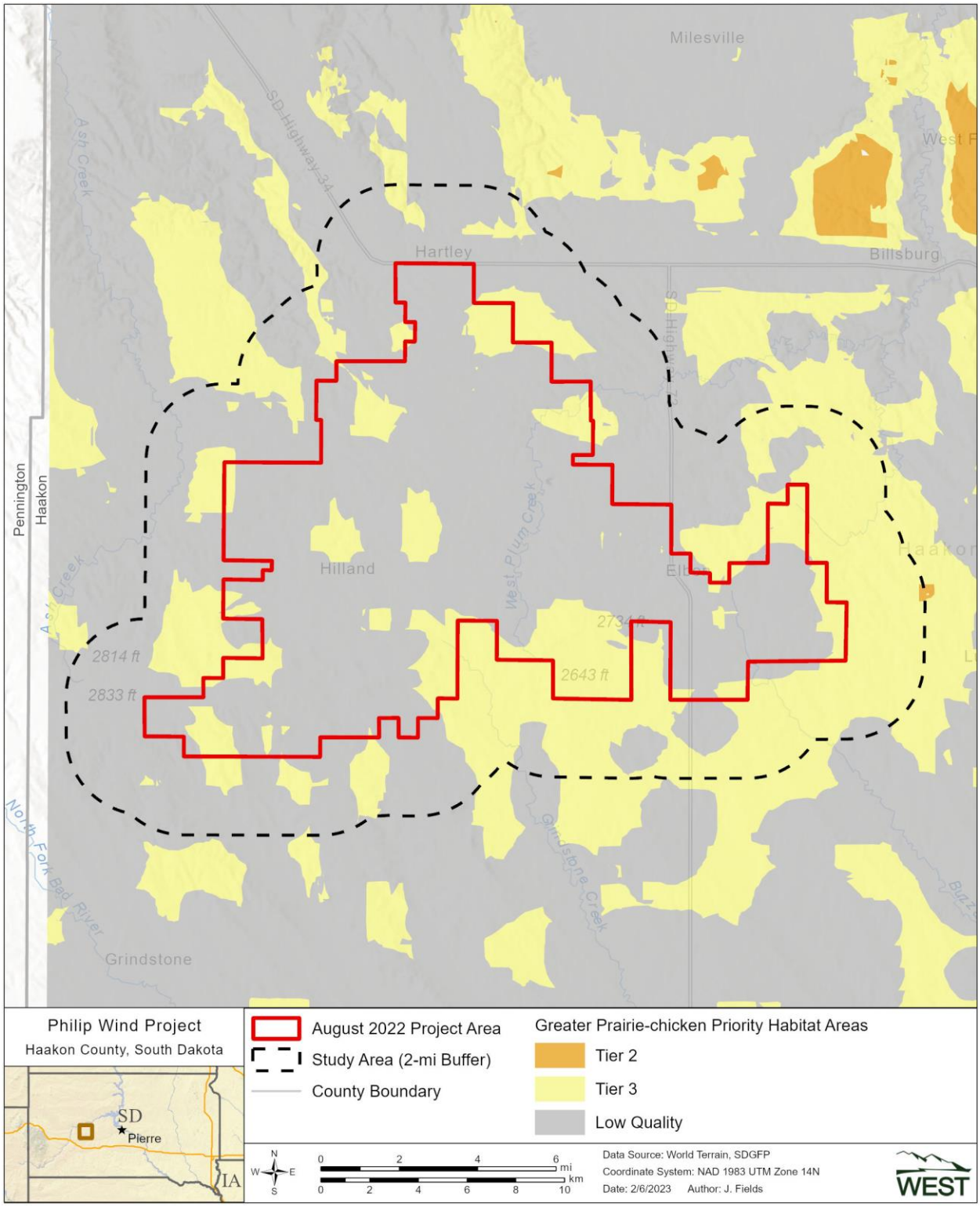

Figure 2.2. Greater prairie-chicken modelled priority habitat areas within the Philip Wind Project, Haakon County, South Dakota.

2.2 Water Resources Analysis

The objective of the desktop water resources analysis was to obtain spatial data on the location and extent of water resource features within the Project Area and the Study Area, a separate 2.0-mile buffer from the Project Area, and preliminarily characterize the types of wetlands and waterbodies. The desktop review was conducted using USGS topographic maps, soil survey information from the USDA NRCS (2019), NWI maps (USFWS NWI 2023), and National Hydrography Dataset (NHD) data (USGS 2023) for the Study Area. Desktop analysis is a detailed precursor to a more formal, complete field delineation.

Results of the desktop analysis of NWI data indicated that there are 1,799 acres of potential wetlands within the Project Area and 2,536 acres within the Study Area. Freshwater emergent wetlands were the most common NWI category identified in the Project and Study areas. Results of the desktop analysis of NHD data indicated that there are 378 mi of waterways in the Project Area and 509 mi in the Study Area. Several named drainages are present within the Project Area and Study Area, and all drainages are tributaries to the Cheyenne River and the Bad River.

2.3 Northern Long-eared Bat Habitat Assessment

The objective of the northern long-eared bat (*Myotis septentrionalis)* habitat assessment was to identify potentially suitable summer roosting and foraging habitat within the March 2022 Project Area and the Study Area, a separate 2.5-mi buffer from the Project Area. This combined Project Area and Study Area encompasses the most recent Project Area (dated August 2022).

The assessment of summer habitat for northern long-eared bat was completed in accordance with the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines (Guidelines; USFWS 2022b). Northern long-eared bat roosting habitat was defined as deciduous forest, mixed forest, and woody wetlands 10 ac or larger in size with potential roost trees and any forested areas within 1,000 feet (ft) of these patches. Anthropogenic structures were not included in this assessment. Linear forest features, isolated trees, and isolated small forest stands (less than 10 ac in size) located more than 1,000 ft away from suitable forested habitat were considered unsuitable habitat for northern long-eared bat as per supporting research and USFWS guidelines (Foster and Kurta 1999, Henderson and Broders 2008, USFWS 2022b). The habitat assessment consisted of an initial desktop review, followed by a field reconnaissance visit to ground-truth the desktop results.

The Project Area contains 65 ac of potentially suitable summer habitat, and the Study Area contains 345 ac of potentially suitable summer habitat (green area; Figure 2.3; Table 2.3). The Project Area contains 1,508 ac of connected habitat (inclusive of suitable summer habitat), and the Study Area contains 8,031.8 ac of additional connected habitat (black outline; Figure 2.3; Table 2.3; area calculations may differ slightly due to rounding), which includes a 1,000 ft connected habitat buffer. During the site visit, it was confirmed that the desktop evaluation of potentially suitable summer habitat was accurate and that the tree composition within the forest patches were of at least three inches diameter at breast height interspersed with snags.

Table 2.3. Potentially suitable northern long-eared bat summer habitat at the Philip Wind Project, Haakon County, South Dakota, October 2022.

	Potentially Suitable Summer Habitat (acres)		Connected Habitat Buffer (acres)[1]	
Site	**Study Area**	**Project Area**	**Study Area**	**Project Area**
Site 1	104	–	2,906	–
Site 2	44	–	583	–
Site 3	95	–	1,946	–
Site 4	66	25	1,421	552
Site 5	6	40	269	947
Site 6	30	–	905	8
Total	**345**	**65**	**8,031**	**1,508**

[1] Connected Habitat Buffer includes Potential Suitable Summer Habitat.

Sums may not equal total values shown due to rounding.

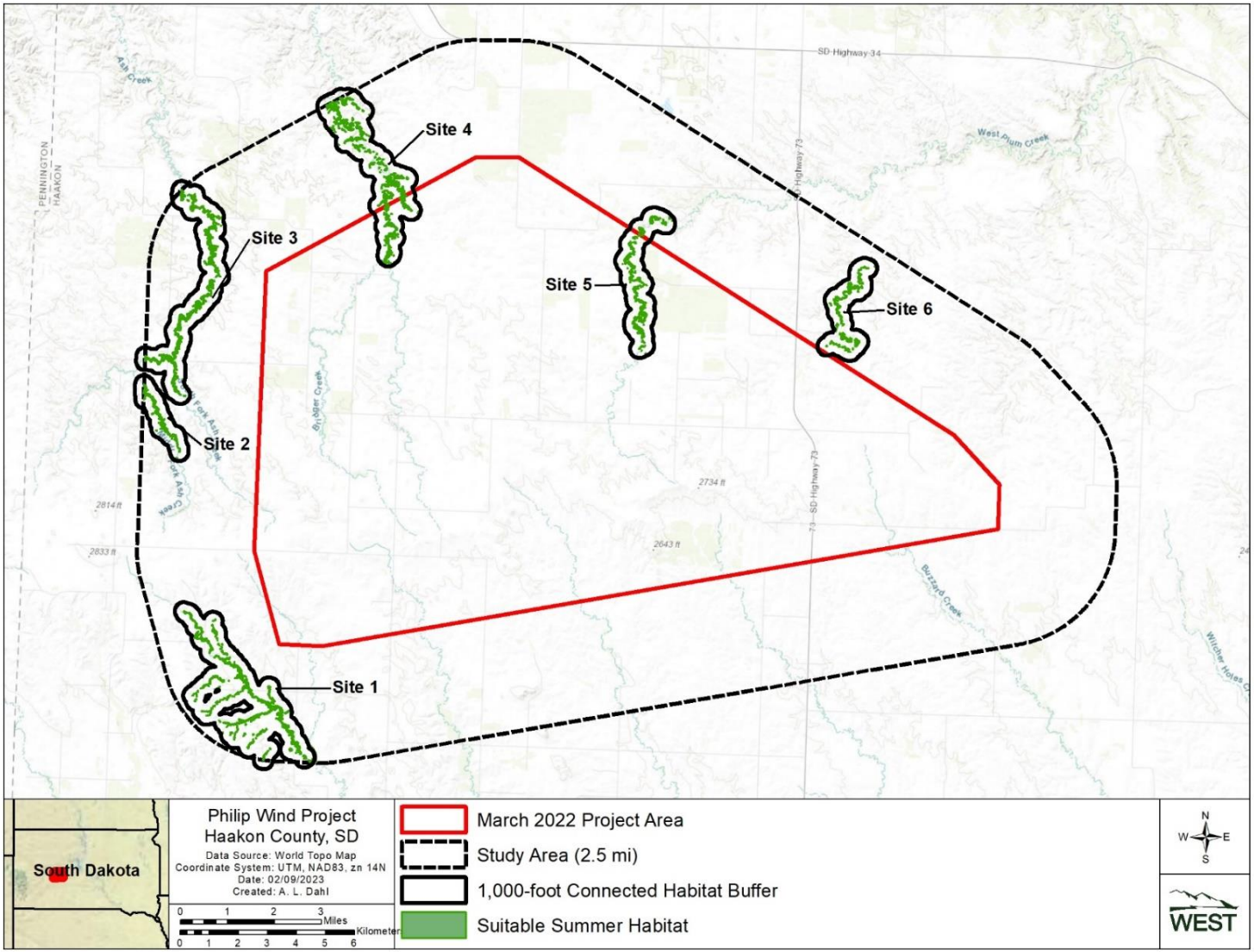

Figure 2.3. Potentially suitable summer habitat for the northern long-eared bat at the Philip Wind Project in Haakon County, South Dakota, 2022.

2.4 Whooping Crane Habitat Assessment

The objective of the whooping crane habitat assessment was to evaluate potentially suitable whooping crane stopover habitat within the Project Area. Three methods for assessing potentially suitable whooping crane stopover habitat within the Project Area have been recommended by federal agencies including Western Area Power Administration (WAPA; B. Pauly, pers comm. January 13, 2023) and USFWS (N. Gates, pers comm. January 13, 2023) as consistent with the Upper Great Plains Programmatic Environmental Impact Statement (WAPA and USFWS 2015). These three models were used independently to analyze wetland habitat suitability:

1. The Watershed Institute (TWI) Wetland Suitability Model (TWI 2012),
2. Predicted Habitat Use Model (Niemuth et al. 2018), and
3. Decile Model (Niemuth et al. 2018).

The most recently available data (Pearse et al. 2020, USFWS 2023b), indicate no observations or telemetry locations of whooping cranes have been documented within the Project Area. Two observations of whooping cranes have been observed 5.5 mi west and 8.8 mi east of the Project Area (USFWS 2023b) along with two individuals less than 0.5 mi south and 5.5 mi southeast of the Project Area confirmed by telemetry locations (Pearse et al. 2020). Results for each of three habitat suitability models assessed for the Project Area are presented below.

The Watershed Institute Wetland Suitability Model (TWI Model; TWI 2012) – TWI published a standardized approach to formalize and identify potentially suitable habitat for migrating whooping cranes. The TWI Model is feature-specific, and potentially suitable habitat was compared to habitat at Quivira National Wildlife Refuge in Kansas, which is designated Critical Habitat for the species (USFWS 1978). Based on a desktop analysis, the Project Area contains 1,799 ac of NWI wetlands. Based on the definition wetland inclusion (TWI 2012), 872 ac of NWI wetlands were evaluated using this model to assess whooping crane habitat within the Project Area. The wetland scores range from 3–18 with 18 as the highest quality of wetland stopover habitat. Of the scored acres of wetlands within the Project Area, 415 ac of NWI wetlands were considered potentially suitable habitat (scores of 12 or more; TWI 2012) for whooping cranes.

Predicted Habitat Use Model (Niemuth Model; Niemuth et al. 2018) – The Niemuth Model was developed explicitly for North and South Dakota and provides a numerically continuous (0.0–1.0) prediction of the relative probability of habitat use by whooping cranes. The model considered 12 predictor variables that were analyzed and validated using GPS location data from whooping cranes equipped with radio-telemetry transmitters (Niemuth et al. 2018). Predicted whooping crane habitat use within the Project Area ranged from less than 0.0001 to 0.0038 on a scale of 0 to 1.0. Therefore, it is expected that habitat within the Project Area would have a maximum of a 0.38% chance of use by whooping cranes during migration.

Decile Model (Niemuth et al. 2018) – To aid in conservation planning, the Decile Model approach divides the Niemuth Model into 10 equal areas which are referred to as deciles with the first decile (Decile 1) as the highest likelihood of use decile and the 10th decile (Decile 10) as the lowest likelihood of use. Like the Niemuth Model, the Decile Model was developed specifically for North and South Dakota. For this habitat assessment, suitable wetland stopover habitat for whooping crane was defined as any NWI wetland within the five highest use deciles (deciles 1–5) within the Project Area. Results of this modelling indicated that there were five deciles (5–9) represented within the Project Area. Of which, only one (Decile 5), representing 348 ac, was considered a whooping crane high use decile. Five acres of NWI wetlands occurred within Decile 5 (Figure 2.4).

3 TIER 3 – FIELD STUDIES

Numerous Tier 3 studies were conducted to evaluate and characterize wildlife resources within or near the Project Area to assess potential impacts from development of the Project between 2017 and 2024 (Table 3.1). For the purposes of this BBCS, a summary of the methods and results from both unique survey efforts and repeated studies completed within the past five years are provided for the most updated information for the Project.

Table 3.1. List of Tier 3 pre-construction surveys relevant to the BBCS at or near the Philip Wind Project Area in Haakon County, South Dakota.

Survey Dates	Survey Report	Citation
August 27 to November 8, 2017	Fall Avian Use Study (2017)	Tetra Tech 2017
August 27, 2017 to July 26, 2018	Eagle Use Study (2017-2018)	Tetra Tech 2018a
March 25 to August 7, 2018	Spring/Summer Avian Use Study (2018)	Tetra Tech 2018b
April 11 to November 7, 2018	Bat Acoustic Study (2018)	Tetra Tech 2019a
April 20 to April 24, 2018	Eagle Nest Aerial Survey (2018)	Tetra Tech 2018c
April 22 to May 9, 2018	Prairie Grouse Lek Surveys (2018)	Tetra Tech 2018d
June 19 to June 28, 2018	Eagle Nest Ground Surveys (2018)	Tetra Tech 2018e
July 11 to July 22, 2018	Grassland Assessment (2018)	Chodachek and Moratz 2018
August 2018	Whooping Crane Habitat Assessment (2018)	Chodachek 2018
August 27, 2018 to July 11, 2019	Eagle Use Study (2018-2019)	Tetra Tech 2019b
January 13 to June 15, 2022	Raptor Nest Survey (2022)	Piorkowski and Arellano 2023
February 24 to October 13, 2022	Prairie Dog Colony Mapping (2022)	Piorkowski 2023b
April 4 to May 11, 2022	Prairie Grouse Lek Survey (2022)	Piorkowski 2023c
May 14 to June 22, 2022	Bald Eagle Utilization Distribution Monitoring (2022)	Piorkowski and Mabee 2023a
July 2018 to September 14, 2022	Grassland Assessment (2022)	Piorkowski 2023a
January 25, 2022 to March 30, 2023	Avian Use Study (2022-2023)	Fields et al. 2023b
February 2 to June 1, 2023	Raptor Nest Survey (2023)	Piorkowski and Wilson 2023
March 29 to May 5, 2023	Prairie Grouse Lek Survey (2023)	Piorkowski et al. 2023b
April 3, 2023 to August 30,2024	Avian Use Study (2023-2024)	TBD

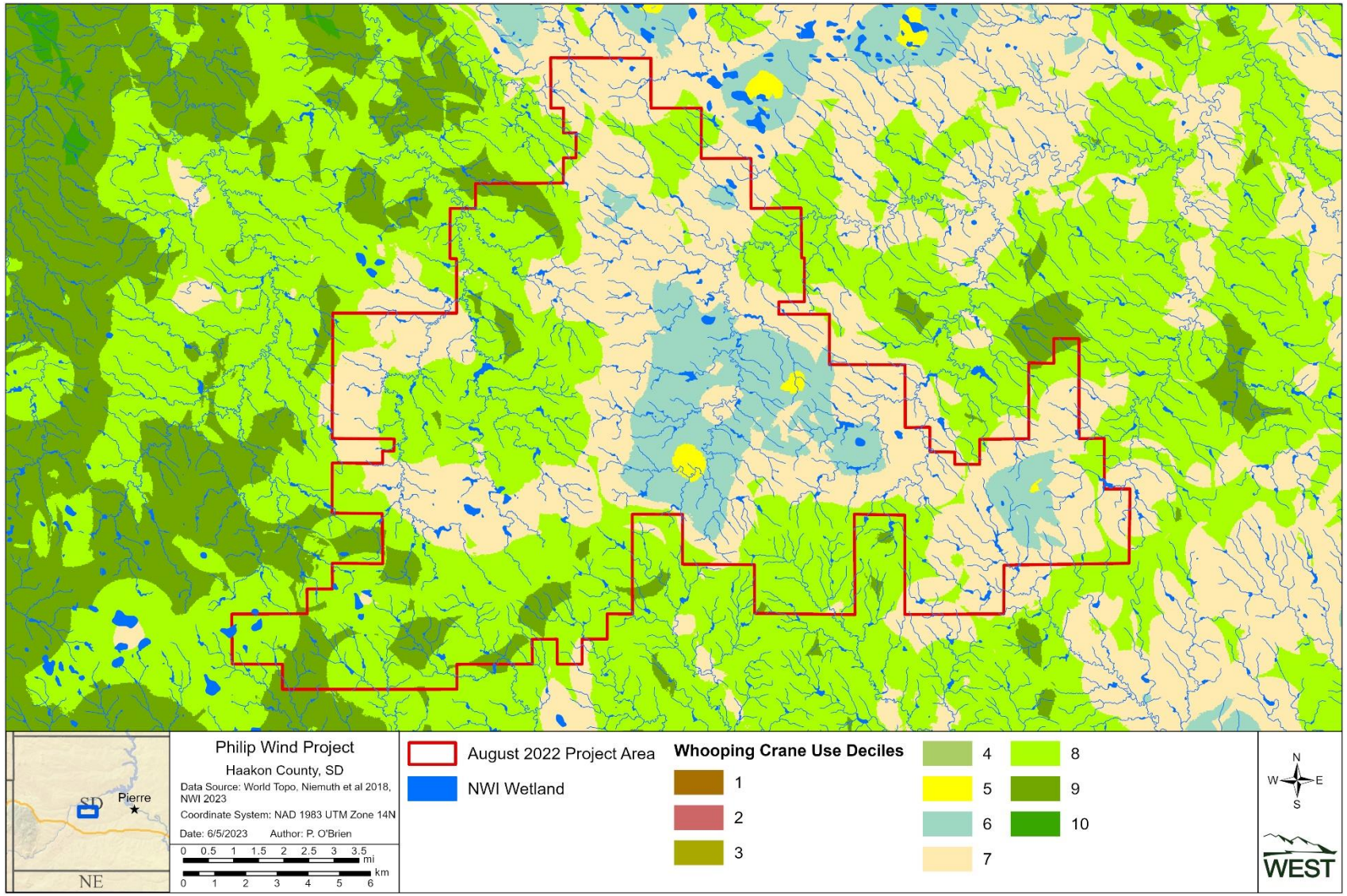

Figure 2.4. National Wetlands Inventory (NWI) wetlands and Neimuth Model whooping crane use deciles at the Philip Wind Project Area in Haakon County, South Dakota.

3.1 Birds

3.1.1 Avian Use Studies

Tetra Tech Inc. (Tetra Tech) conducted avian use studies at the Project in 2017-2018 (Tetra Tech 2017, 2018b; Table 3.1). The combined objective of these surveys were to estimate bird use for the fall migration period and the combined spring and summer seasons within the Project Area.

WEST conducted fixed-point bird use surveys in 2022-2023 within the Project (Fields et al. 2023b; Table 3.1). The second year of data collection began in April 2023 and is ongoing within the Project Area and this section will be following the completion of survey efforts in August 2024. Survey objectives were to 1) assess spatial and temporal use of the Project Area by large birds, including eagles and species of concern (USFWS 2012).

3.1.1.1 Methods (2017–2018)

Tetra Tech conducted 20-minute (min) surveys for all diurnal birds within 800-m survey plots at each of 13 survey locations. Survey points were selected to obtain representative coverage of habitat types present within the proposed turbine locations (Tetra tech 2017, 2018b). In 2017, surveys were conducted bi-weekly between August 27 to November 8, 2017. In 2018, surveys were conducted between March 25-June 28, 2018, and July 23-August 7, 2018. Surveys were conducted by continuously scanning the 800-m survey buffer and recording any visual or auditory observations. Data collection included bird species (or lowest taxonomic level), number of individuals, behavior, distance form observer, flight height, flight direction, and weather (temperature, wind speed, wind direction, precipitation visibility, and cloud cover).

3.1.1.2 Methods (2022–2023)

Avian use studies primarily followed guidance in the WEG, ECPG, and the 2016 *Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests* (Revisions; USFWS 2016), and the South Dakota Game Fish and Parks (SDGFP) *Siting Guidelines for Wind Power Projects in South Dakota* (SDGFP 2012). Methods described below were used for both survey years and were common for all birds (i.e., large birds, eagles, and other species of concern) except as noted.

Large birds were defined as waterbirds, waterfowl, shorebirds, diurnal raptors (i.e., kites, accipiters, buteos, eagles, falcons, northern harrier [*Circus hudsonius*], and osprey [*Pandion haliaetus*]), owls, vultures, upland game birds, doves and pigeons, nightjar, and large corvids (e.g., magpies, crow, and ravens).

If an eagle was observed biologists recorded behavior (i.e., flight height, distance from observer, activity) at the top of each minute an eagle was in view. Biologists also recorded an eagle minute, defined as an eagle flying below 220 m above ground level and within the 800-m survey plot at any time during the minute. Total bald and golden eagle minutes were the sum of eagle minutes defined above, separated by species. Flight paths and perch locations of eagles were also recorded.

Fifty survey points were selected randomly in the Project Area, providing 33% coverage of the Project Area; exceeding the ECPG recommendation (USFWS 2013; Figure 3.1). Each survey plot was an 800-meter (m) radius circle centered on the survey point (Reynolds et al. 1980, USFWS 2013, 2016).

Surveys at each point were conducted for a period of 60 min. Surveys were conducted once per month during all seasons from January 25, 2022 – March 30, 2023. Seasons were defined as spring (March 1 – May 30), summer (May 31 – August 31), fall (September 1 – November 30), and winter (December 1 – February 28). Surveys were conducted during daylight hours and survey times at survey points were randomized to cover all daylight hours during a season. Flight paths and perch locations of eagles were mapped during large bird use surveys to qualitatively look for potential areas of concentration and consistent flight patterns within the Project Area.

3.1.1.3 Avian Use Study (2023–2024)

The completion of a second full year of avian use surveys at the Project are ongoing. WEST is conducting an avian use study at the Project from April 3, 2023, to August 2024 to collect two complete years of data at all survey points. Field surveys are expected to be completed in August 2024 with a complete analysis available in late 2024.

3.1.1.4 Results

3.1.1.4.1 Avian Use Studies (2017–2018)

During fall surveys (Tetra Tech 2017), each survey point was surveyed six times each resulting in the documentation of 761 birds representing 27 species. Overall avian mean use was 9.76 bird/20 minutes. Passerines composed the majority of use (63.5%) with raptors composing 4.9% of use. No federal or state protected threatened or endangered species were recorded during surveys. One bald eagle and one golden eagle were recorded during the fall surveys.

During spring and summer surveys (Tetra Tech 2018b), each survey point was surveyed 10 times resulting in the documentation of 2,645 birds representing 59 species. Overall avian mean use was 20.35 birds/20 minutes. Passerines composed the majority of use (75.6%) with raptors composing 1.3% of use. No federal or state protected threatened or endangered species were recorded during surveys. One bald eagle and two golden eagles were recorded during the spring and summer surveys.

3.1.1.4.2 Avian Use Study (2022–2023)

WEST conducted an avian use study at the Project for 15 months from January 25, 2022 – March 30, 2023. Six hundred thirty-four avian use surveys were conducted at 50 survey points over 15 visits within the Project Area. Fifty-two large bird species were observed during the study. Large bird species richness was highest during spring (40 species) and summer (39 species), followed by fall (25 species) and winter (16 species).

Large Birds (Non-eagle)

Large bird mean use (observations/60-min survey/800-m radius survey plot) ranged from 2.29 to 18.20 among seasons and was highest during spring (18.20) followed by fall (8.11), summer (6.68), and winter (2.29). Overall large bird mean use was 8.59 observations/60-min survey/800-m radius survey plot for the 15-month study. The species group with the highest mean use was waterfowl (3.69) followed by doves/pigeons (1.46), upland game birds (1.20), waterbirds (0.99), and diurnal raptors (0.45). Waterfowl use was largely influenced by migrating Canada geese.

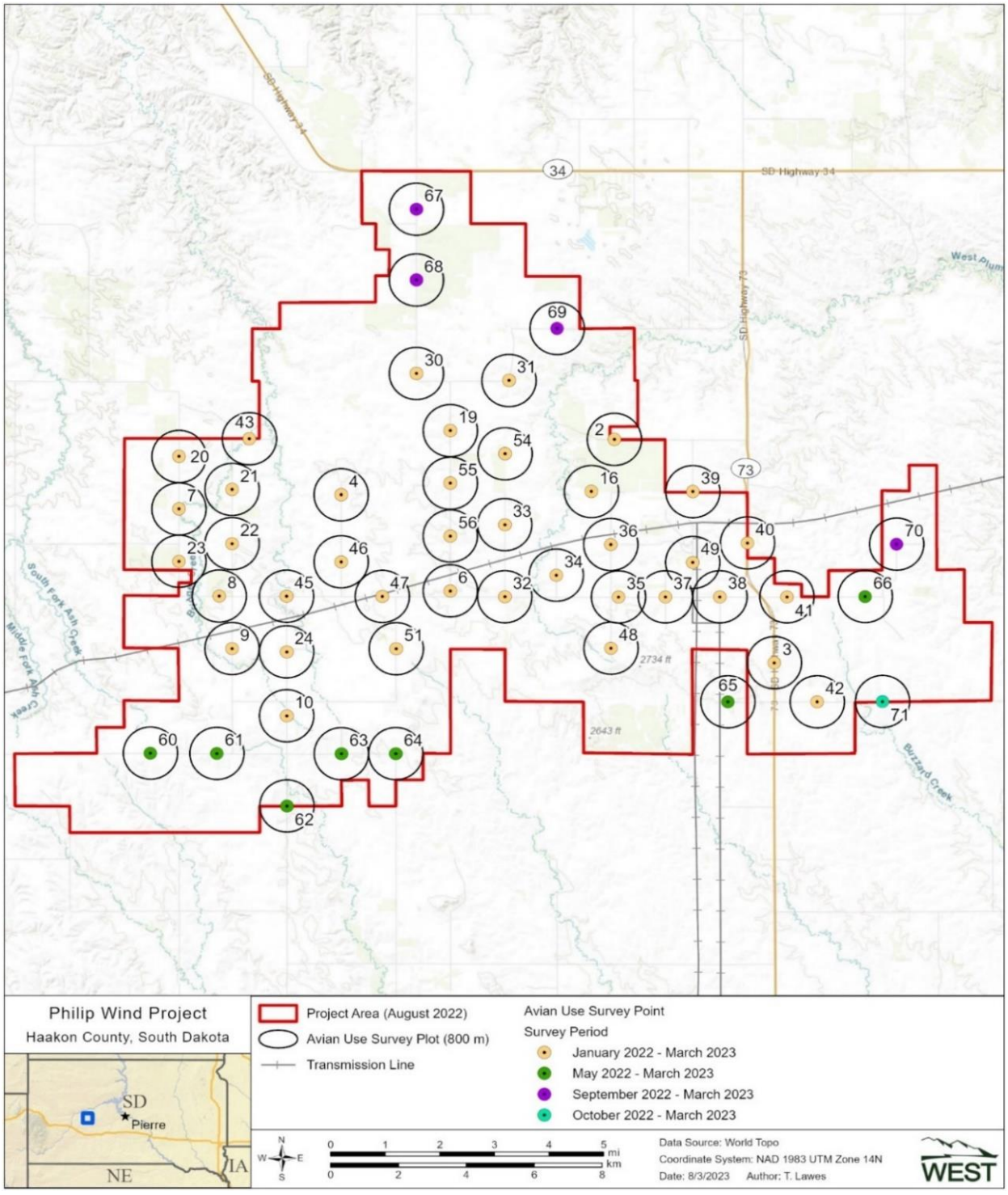

Figure 3.1. Avian use survey points and plots at the Philip Wind Project, Haakon County, South Dakota, from January 25, 2022 – March 30, 2023.

Mean large bird flight heights ranged from approximately 4 to 299 m across all large bird types. Large birds were mainly observed below the rotor swept area (RSA; 58%), although there was variation by bird type. Owls, upland game birds, and nightjars (all 100%), along with large corvids (93%), shorebirds (86%), doves/pigeons (78%), diurnal raptors (66%), and waterbirds (60%) were mainly observed below the RSA. Gulls/terns (67%) were most frequently recorded within the RSA and vultures (60%) were most frequently recorded above the RSA.

Large bird use ranged from 1.33 observations/60-min survey/800-m radius survey plot to 64.92 across points. The highest use values were from waterfowl at Point 31 (58.69) followed by waterbirds at Point 32 (20.00), and upland game birds at Point 71 (13.67; Figure 3.1).

Eagles

Twenty-three bald eagles and 46 golden eagles were recorded during 634 survey hours. Bald eagle mean use ranged from 0.01 observations/60-min survey/800-m radius survey plot to 0.08 among seasons and was highest during winter (0.08) followed by spring (0.04), summer (0.01), and fall (0.01). Overall bald eagle mean use was 0.10 observations/60-min survey/800-m radius survey plot. Bald eagle flight heights were recorded most frequently (60.0%) within the RSH (30–195 m) with fewer flights below (35.0%) and above (5.0%) the RSH. Golden eagle mean use ranged from 0.03 observations/60-min survey/800-m radius survey plot to 0.11 among seasons and was highest during winter (0.11) followed by spring (0.10), fall (0.07), and summer (0.03). Overall golden eagle mean use was 0.27 observations/60-min survey/800-m radius survey plot. Golden eagle flight heights were recorded more frequently (43.6%) within the RSH (30–195 m) with fewer flights below (38.5%) and above (17.9%).

Species of Concern

No federal- or state-protected threatened or endangered species were recorded within the Project Area. Species of concern observed during the study included five species designated as BCC (USFWS 2021), three species designated as SGCN (SDGFP 2014), one species designated as both BCC and SGCN, and two species protected under the BGEPA (1940; Table 3.2).

Table 3.2. Groups and observations of large bird species of concern observed during surveys in the Philip Wind Project, Haakon County, South Dakota, from January 25, 2022 – March 30, 2023.

Species	Scientific Name	Status[1]	Surveys	
			# grps	# obs
bald eagle	*Haliaeetus leucocephalus*	BGEPA	24	24
black-billed magpie	*Pica hudsonia*	SGCN	4	8
Clark's grebe	*Aechmophorus clarkii*	SGCN	1	1
ferruginous hawk	*Buteo regalis*	BCC	10	10
golden eagle	*Aquila chrysaetos*	BGEPA	50	50
lesser yellowlegs	*Tringa flavipes*	BCC	1	1
marbled godwit	*Limosa fedoa*	BCC	7	10
merlin	*Falco columbarius*	SGCN	9	9
northern harrier	*Circus hudsonius*	BCC	10	10

Table 3.2. Groups and observations of large bird species of concern observed during surveys in the Philip Wind Project, Haakon County, South Dakota, from January 25, 2022 – March 30, 2023.

Species	Scientific Name	Status[1]	Surveys	
			# grps	# obs
prairie falcon	*Falco mexicanus*	BCC	3	3
short-eared owl	*Asio flammeus*	BCC; SGCN	1	1
Total	**11 species**		**120**	**127**

[1] SGCN = South Dakota Species of Greatest Conservation Need; BCC = USFWS Birds of Conservation Concern (Bird Conservation Region 17); BGEPA = Bald and Golden Eagle Protection Act.

grps = groups; obs = observations

3.1.2 Raptor Nest Surveys

WEST conducted aerial raptor nest surveys during 2022 (Piorkowski and Arellano 2023) and 2023 (Piorkowski and Wilson 2023). The objective of the raptor nest surveys was to identify and record the location and status of all raptor nests within the Project and Study Areas. Surveys were conducted throughout the March 2022 Project Area and the Study Area, a separate 2.0-mi buffer from the Project Area (Figure 3.2). The methods described below were used for both survey years and results for eagles are presented separately from other raptors.

3.1.2.1 Methods

3.1.2.1.1 Aerial Surveys (All Raptors)

Raptor nest surveys were conducted in accordance with guidance provided in the WEG, the ECPG the Revisions, the USFWS *Updated Eagle Nest Survey Protocol* (USFWS 2020) and the USFWS *Region 6 Recommended Protocol for Conducting Pre-construction Eagle Nest Surveys at Wind Energy Projects* (Protocol; USFWS 2021b).

Two experienced WEST biologists conducted the first round of a double observer (i.e., a primary and a secondary observer) aerial raptor nest survey from a Robinson R-44 Raven II helicopter with bubble windows that provided good visibility (Pagel et al. 2010, USFWS 2013). The survey was conducted early in the season prior to deciduous tree leaf-out to ensure easier detection of nests and before fledging of nestlings. One experienced WEST biologist conducted a second aerial survey to confirm nest status and to check each nest observed during the first round.

In general, the helicopter was flown at approximately 150–200 ft above ground level at an air speed of approximately 60–70 mi per hour surveying all potential habitat by flying meandering transects spaced approximately 0.5 mi apart. (Pagel et al. 2010, USFWS 2013). To determine the status of a nest, the biologist evaluated behavior of adults on or near the nest, and the presence of eggs, young, whitewash, or fresh building materials. Species, nest type, nest status, nest condition, and nest substrate were recorded at each nest location to the extent possible.

3.1.2.1.2 Ground-based Surveys (Eagles)

Ground-based surveys to check the status of known eagle nest locations for occupancy or productivity at any new eagle nest location observed during the aerial surveys were conducted

by an experienced biologist. The biologist focused on locating giant and large stick nest structures in suitable nesting habitats within the Project and Study areas by driving along all public roads allowing for a thorough visual inspection of the habitat and providing views of trees from several different angles. The ground survey was conducted during the hours after sunrise and before sunset. To determine the status of a nest, the biologist used the same criteria as that of aerial surveys with the exception that inactive nest (consistent with an eagle nest) was monitored for four hours per survey or until occupancy was confirmed.

3.1.2.2 Results

3.1.2.2.1 2022 (Eagles)

Aerial nest surveys were conducted on February 24 and March 19, 2022, and April 19, 2022, while ground-based surveys were completed on January 13, 2022, April 8, 2022, and June 15, 2022 (Piorkowski and Arellano 2023). One bald eagle nest (BAEA-1) and one golden eagle nest (GOEA-1) were documented during the surveys at the Project; both nests were classified as occupied active in 2022 (Figure 3.2). The golden eagle nest, however, was initially found active and occupied by a ferruginous hawk during the first aerial survey but was later observed to be occupied inactive by a golden eagle during the subsequent ground-based and aerial surveys.

3.1.2.2.2 2022 (Non-eagle Raptors)

Aerial nest surveys were conducted on February 24 and March 19, 2022, and April 19, 2022 (Piorkowski and Arellano 2023). Six non-eagle raptor nests were documented within the Project and Study areas (Figure 3.3). All three active red-tailed hawk (*B. jamaicensis*) nests were within the Study Area, whereas all three inactive unidentified raptor nests were within the Project Area. Two active great blue heron (*Ardea herodias*) rookeries were documented within the Study Area (Figure 3.2).

3.1.2.2.3 2023 (Eagles)

Aerial nest surveys were conducted on March 1, and May 3, 2023, while ground-based surveys were completed on February 2, 2023, and June 1, 2023 (Piorkowski and Wilson 2023). Surveys found two bald eagle nests and one golden eagle nest in the Project Area (Figure 3.2). Of these, one of the bald eagle nests (BAEA-1) and the golden eagle nest (GOEA-1) were previously documented in 2022 (Piorkowski and Arellano 2023). In 2023, nest BAEA-1 was first determined to be occupied inactive by a bald eagle, then was found occupied active later in the season with a great horned owl (*Bubo virginianus*). Similarly, nest GOEA-1 was first determined to be occupied inactive by a golden eagle, then occupied inactive later in the season by a red-tailed hawk during the 2023 surveys. The second bald eagle nest identified during surveys in 2023 (BAEA-2) was approximately 816 ft east of the other bald eagle nest; this nest had not been observed during previous surveys (i.e., Tetra Tech 2018 or Piorkowski and Arellano 2023) and was determined to be occupied inactive in 2023.

3.1.2.2.4 2023 (Non-eagle Raptors)

Aerial nest surveys were conducted on March 1, and May 3, 2023 (Piorkowski and Wilson 2023). Twelve non-eagle raptor nests were documented within the Project and Study Areas (Figure 3.2). Two active great horned owl nests and two active red-tailed hawk nests were within the Study Area. Two active great horned owl nests, three active red-tailed hawk nests, and three inactive unidentified raptor nests were within the Project Area. The western great blue heron rookery only was documented as active in 2023. The eastern rookery did not appear active in 2023.

3.1.3 Prairie Grouse Lek Surveys

In 2022 (Piorkowski 2023c) and 2023 (Piorkowski et al. 2023b), WEST conducted lek surveys for prairie grouse (sharp-tailed grouse [*Tympanuchus phasianellus*] and greater prairie-chicken [*T. cupido*]) at the Project Area and a separate 2-mi buffer around the Project Area (i.e., Study Area; Figure 3.3). Surveys were conducted following guidance from the SDGFP *Prairie Grouse Management Plan for South Dakota 2017-2021* (SDGFP 2017) in 2022 and *Management of prairie grouse in South Dakota* (SDGFP 2022) with approved modifications from SDGFP agency discussion in March 2023.

The objective of the survey was to locate prairie grouse leks within the Project and Study areas and, to the extent possible, record the species and number of birds observed at a lek. Methods and results of these surveys are presented below.

3.1.3.1 Methods

3.1.3.1.1 Aerial Surveys

To search for prairie grouse leks within the Project Area and Study Area in 2022 and 2023, two experienced WEST biologists and a pilot flew aerial transects spaced 400 m apart, at approximately 50–100 m above ground level using a fixed-wing aircraft (Cessna 172). In both years, aerial surveys were conducted between late March and early May, the typical lekking timeframe for prairie grouse (SDGFP 2022). The flight route was developed using transects oriented in a north-south direction to increase visibility due to sun positions in the early morning hours. Transects were spaced throughout the Project and Survey areas to provide complete visual coverage of these areas. Survey flights occurred during calm weather (wind speeds less than 20 mi per hour) with no or very light rain and were conducted approximately 30 min before sunrise until two hours after sunrise.

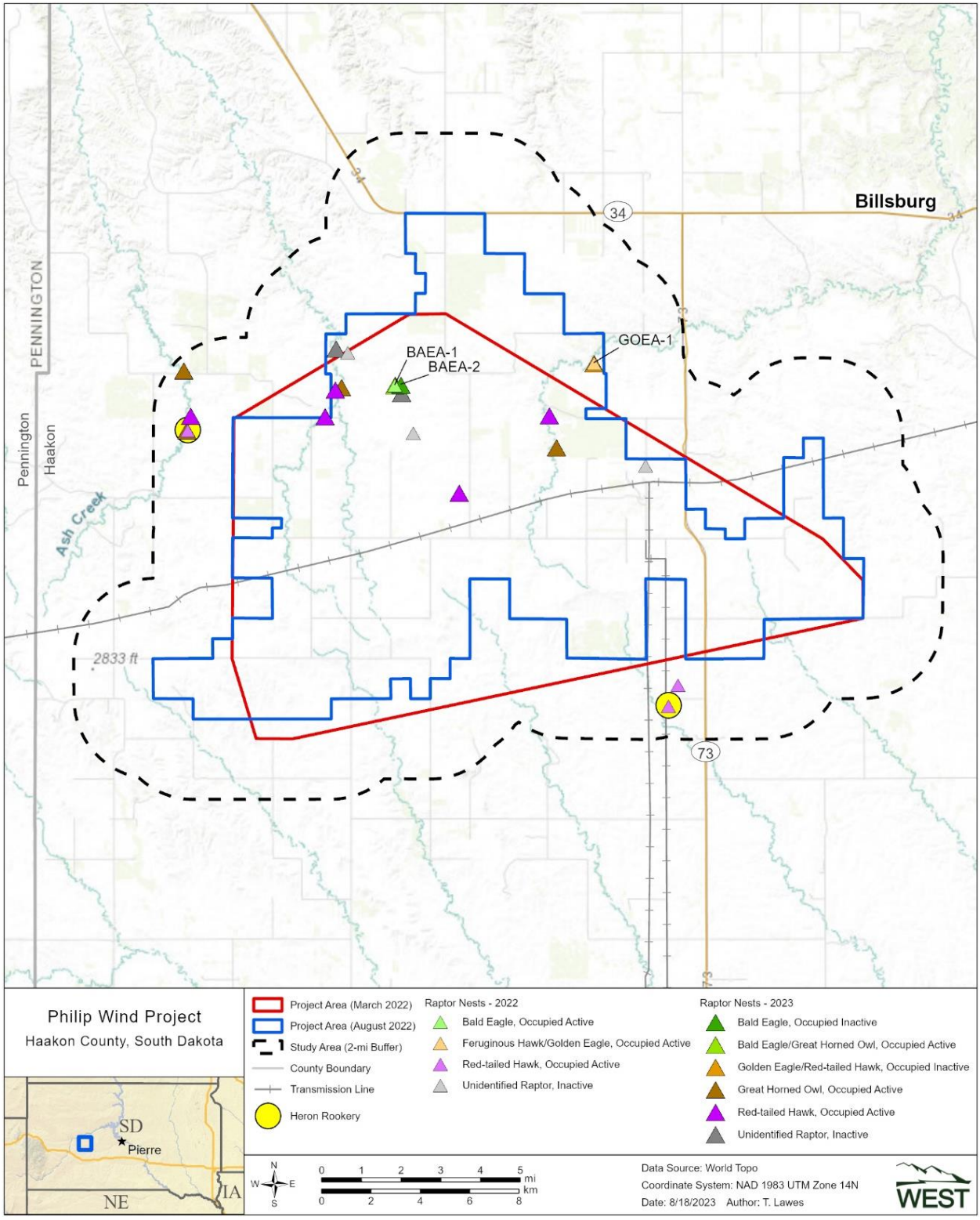

Figure 3.2. Location of raptor nests within the Project and Study areas at the Philip Wind Project Area, Haakon County, South Dakota, 2022-2023.

WEST conducted three aerial surveys in 2022 and one aerial survey in 2023. In 2022, the aerial survey covered the entire Project and Study areas but focused on locations that could not be covered during the ground surveys.

3.1.3.1.2 Ground Surveys

In 2023, WEST conducted three surveys for prairie grouse and their leks at locations that were spaced approximately 0.5 mi apart along publicly accessible roads using ground-based surveys. Ground and aerial surveys overlapped temporally in 2023, but not spatially. At each location, WEST biologists visually scanned and listened for prairie grouse for up to 5 min. Three ground surveys were conducted during the season. If an active lek was detected, a count was conducted to quantify the number of grouse, their sex, and species if possible.

3.1.3.2 Results

3.1.3.2.1 2022 Prairie Grouse Lek Surveys

Three aerial surveys were conducted between April 4 and May 11, 2022, at the Project and Study areas. Survey 1 was conducted from April 4 – 19. Survey 2 was conducted from April 20 – 28, and Survey 3 was conducted from April 29 – May 11, 2022. Twenty-seven active lek locations were documented within the August 2022 Project and Study areas in 2022 (Table 3.3, Figure 3.3). Twenty of these lek locations were new and five were historical locations (Tetra Tech 2018d). Lek attendance ranged from 4-40 individuals for sharp-tailed grouse.

Table 3.3. Number of active prairie grouse leks in the August 2022 Project and Study areas, in relation to proposed turbine locations for the Philip Wind Project, Haakon County, South Dakota. Based on surveys from April 4 – May 11, 2022.

Lek Location	Sharp-tailed Grouse	Greater Prairie-chicken	Total
Project Area	8	0	8
Study Area (only)	17	0	17
Sub-total	**25**	**0**	**25**

3.1.3.2.2 2023 Prairie Grouse Lek Surveys

One aerial and three ground surveys were conducted between March 29 and May 5, 2023. Throughout the Project and Study areas, 274 points were surveyed during three survey efforts from the ground and one complete survey was conducted from the air. Ground surveys occurred between March 29 – April 13, April 15 – April 26, and April 17 – May 5; the one aerial survey occurred between April 10 – May 2.

During the surveys, 69 active prairie grouse leks were located in the Project and Study areas (Table 3.4, Figure 3.3). Leks appeared to be generally located in the western and eastern areas of the Project and Study areas, with fewer leks in the central area (Figure 3.3). Greater prairie-chicken lek attendance ranged from 2–20 birds and sharp-tailed grouse lek attendance ranged from 3–30 birds.

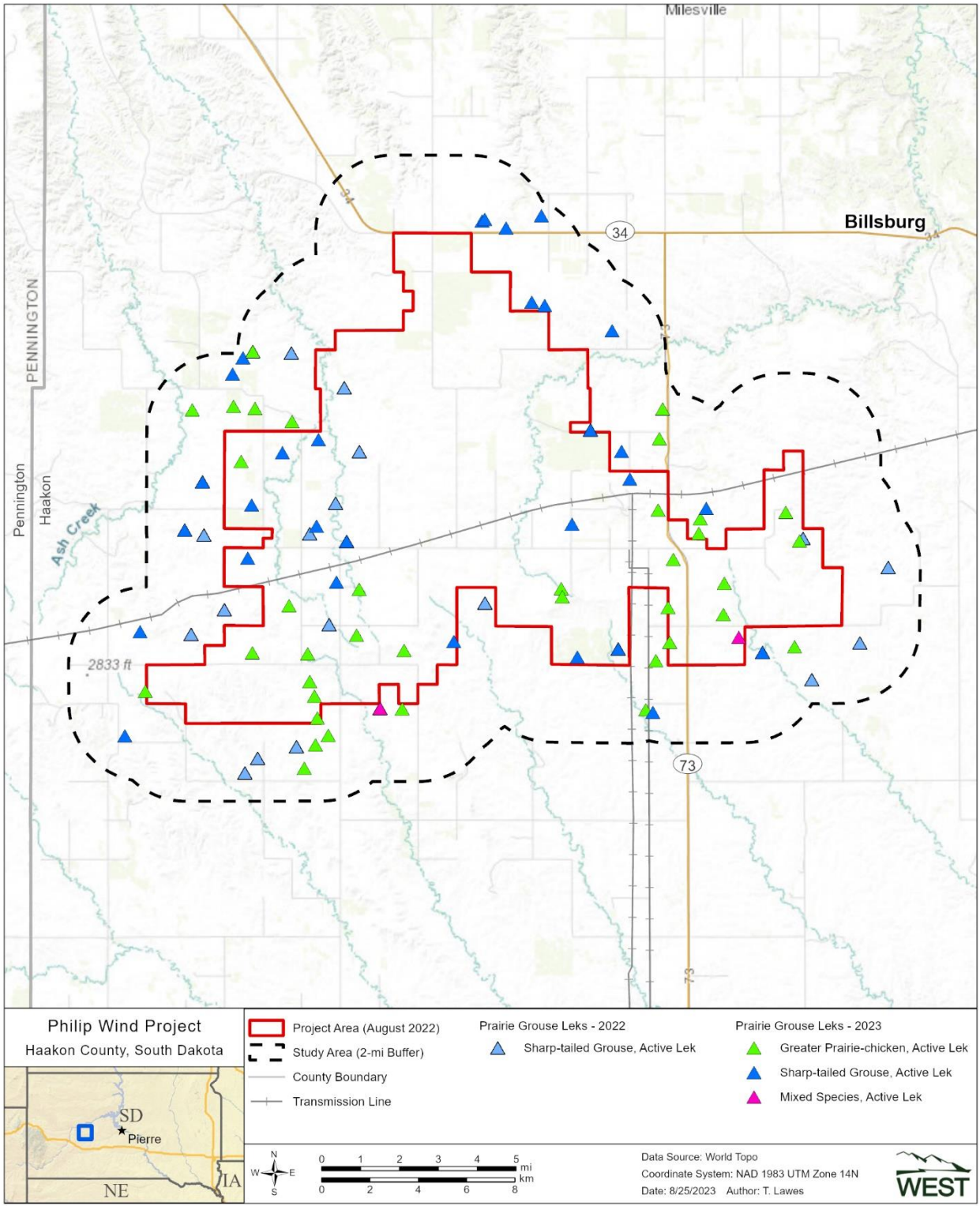

Figure 3.3. Location of active prairie grouse leks within the August 2022 Project and Study areas at the Philip Wind Project in Haakon County, South Dakota, from April 4 – May 11, 2022, and March 29 – May 05, 2023.

Table 3.4. Number of active prairie grouse leks in Project and Study Areas, in relation to proposed turbine locations for the Philip Wind Project, Haakon County, South Dakota. Based on surveys from March 29 – May 05, 2023.

Lek Location	Sharp-tailed Grouse	Greater Prairie-chicken	Both Species	Total
Project Area	12	19	1	32
Study Area (only)	18	18	1	37
Sub-total	**30**	**37**	**2**	**69**

3.2 Bald Eagle Utilization Distribution Monitoring

In 2022, WEST conducted bald eagle Utilization Distribution (UD) surveys at the Project (Piorkowski and Mabee 2023a; Table 3.1). The objective of bald eagle UD surveys was to gain information on how bald eagles use the area around the active nest spatially by mapping flight paths to and from the nest. Eagle nest flight path mapping was carried out in accordance with the WEG and ECPG, and in compliance with the Revisions

3.2.1 Methods

Bald eagle UD surveys were conducted at nest BAEA-1, the one known occupied active bald eagle nest (i.e., nest had eggs, nestlings, and/or an adult in incubating/brooding position at the time of the survey; Piorkowski and Arellano 2023; Figure 3.2) within the Project Area during the 2022 breeding season. Surveys were conducted from observation points that maximized the observers' ability to note activity at the nest and surrounding landscape. Survey points were generally located within 1,200 m of the nests. The nest was observed during weekly, 4-hour observation periods beginning in the second week of May 2022 and continuing until the nest was confirmed to have either succeeded (at least one young fledged [able to fly] or reached an age of 67 days within the nest; Steenhof and Newton 2007, USFWS 2013) or failed (no documented use by adults for at least two consecutive surveys). Survey timing alternated between early morning and late afternoon.

3.2.2 Results

The bald eagle nest was surveyed between May 14 and June 22, 2022. One bald eagle observation was recorded over 28 hours (seven, 4-hour surveys) of nest monitoring. The observation on June 8, 2022, was of an adult soaring and approaching from the north then circling towards the nest tree. The eagle did not perch on the nest. The eagle was recorded in the air for two minutes before landing in the nest tree where it remained perched until the conclusion of the survey (121 minutes). The eagle's flight height ranged from 800 m to 25 m prior to perching on the tree above the nest (nest height approximately 20 m off the ground). No spatial or temporal patterns could be made with a single observation. Nest failure was confirmed on June 22, 2022, because no eagle observations were made during two consecutive surveys (June 15, 2022, and June 22, 2022).

3.3 Bats

In 2018, Tetra Tech conducted acoustic monitoring surveys for the Project (Tetra Tech 2019a; Table 3.1). Twelve bat species are known to occur in South Dakota (Tetra Tech 2019a; Table 3.5) with the recent addition of tricolored bat (*Perimyotis subflavus*; USFWS 2023c). Of these 13 species, available information about species-specific suitable habitat, known distribution ranges, and documented occurrences indicated that eight species, big brown bat (*Eptesicus fuscus*), little brown bat (*Myotis lucifugus*), fringed bat (*Myotis thysanodes*), long-legged bat *(Macrophyllum macrophyllum*), western small-footed bat (*Myotis ciliolabrum*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*) are expected to have a moderate potential to occur within the vicinity of the Project Area (Tetra Tech 2019a). The remaining five species, western long-eared bat (*Myotis evotis*), Townsend's big-eared bat (*Corynorhinus townsendii*), evening bat (*Nycticeius humeralis*), northern long-eared bat, and tricolored bat are expected to have a low potential of occurrence (Tetra Tech 2019a, USFWS 2023c). The objective of the acoustic monitoring was to assess the use of the Project Area by resident and migratory bat species, as recommended in the WEG.

3.3.1 Methods

Tetra Tech designed the acoustic monitoring surveys for the Project using standardized passive acoustic survey protocols to evaluate bat species' risk from wind projects, and in accordance with the recommendations outlined within the WEG. Tetra Tech conducted acoustic bat monitoring in the Project Area from April 11 through November 7, 2018, using four bat detectors: three were ground-based with a single microphone, and one detector was outfitted with a high and a low microphone mounted on a meteorological tower). Tetra Tech used Wildlife Acoustics Song Meter SM3BAT Monitoring Systems (acoustic detector) to record bat activity in full spectrum format for the duration of the acoustic monitoring survey at all four survey locations. For a map of the Project Area at the time of the acoustic bat study and the location of the acoustic detectors see Tetra Tech (2019).

3.3.2 Results

During the 2018 surveys, 892 detector-nights (cumulative number of nights surveyed by all microphones) were sampled over the course of 211 calendar nights. A total of 14,262 bat passes were recorded and identified to the species level or frequency group, resulting in an overall activity rate of 16.0 bat passes/detector-night. Mean activity rates across all detectors ranged from 0.6 bat passes/detector-night to 54.4 bat passes/detector-night.

Bat passes identified at the species level included seven species and three groups (Table 3.5). The recorded bat species, ordered by frequency of detection included: big brown bats (32% of total passes recorded), hoary bats (18%), little brown bats (17%), silver-haired bats (12%), western small-footed bats (12%), eastern red bats (4%), long-legged bats (4%), and unidentified high frequency bats, unidentified low frequency bats, and unidentified myotis species (accounting for less than one percent each, respectively).

Table 3.5. Bat species with potential to be present at the Philip Wind Project, Haakon County, South Dakota (adapted from Tetra Tech 2019a).

Common Name	Species Name	Migratory Status[1,2]	Habitat Associations	Status[3,4]
big brown bat[5]	*Eptesicus fuscus*	Non-migratory	Most abundant in deciduous forests, although found in most habitats including agricultural croplands.	-
eastern red bat[5]	*Lasiurus borealis*	Long-distance migrant	Found in hardwood deciduous forests. Generally found in close association with riparian areas. Roosts in foliage of trees.	SGCN
evening bat	*Nycticeius humeralis*	Long-distance migrant	Associated with forested areas along waterways. Hollow trees are utilized for nursing sites and day roosts.	-
fringed myotis	*Myotis thysanodes*	Regional migrant	Found in a wide variety of habitats including roosts in trees, snags, buildings, cave, rocks, cliffs, and bridges.	SGCN
hoary bat[5]	*Lasiurus cinereus*	Long-distance migrant	Found in forested upland habitats, including junipers. Roosts in tree foliage.	SGCN
little brown bat[5]	*Myotis lucifugus*	Regional migrant	Found in a wide variety of forested habitats.	SGCN
long-eared myotis	*Myotis evotis*	Regional migrant	Typically found in coniferous forests but can occur in shrub-steppe regions. Forages mainly in forests or adjacent to creeks.	-
long-legged myotis[5]	*Myotis volans*	Regional migrant	Typically found in coniferous forests but can occur in desert and riparian habitats.	-
northern long-eared bat	*Myotis septentrionalis*	Regional migrant	Forages along forested hillsides and ridges. Roosts in cavities, caves and mines, underneath bark, or in crevices of trees and snags; rarely roosting in barns. Hibernate in caves and mines.	E
silver-haired bat[5]	*Lasionycteris noctivagans*	Long-distance migrant	Found in northern temperate conifer and mixed conifer-hardwood forest. Generally found in association with riparian areas.	SGCN
Townsend's big-eared bat	*Corynorhinus townsendii*	Regional migrant	Found in natural caves, mines, and buildings in the summer. Hibernates October to April in caves and mines.	SGCN
tricolored bat[6]	*Perimyotis subflavus*	Regional migrant	Found in forested habitats primarily within deciduous hardwoods. Hibernates in caves, abandoned mines, and occasionally road-associated culverts.	PE
western small-footed myotis	*Myotis ciliolabrum*	Regional migrant	Found in dry climates, particularly near cliffs and rock outcroppings. Forages near cliff faces and hibernates in caves and mines.	-

[1] Western Bat Working Group (2019)

[2] Bat Conservation International (2018)

[3] E = Endangered (USFWS 2024a); PE = Proposed Endangered (USFWS 2024a)

[4] Listed as a Species of Greatest Conservation Concern (SDGFP 2023a)

[5] Documented during acoustic surveys (Tetra Tech 2019a)

[6] Proposed Endangered (USFWS 2024a)

Acoustic detectors recorded bat activity for nearly the entire survey period, with the highest activity rates detected during early June and early August. Migratory tree bats accounted for over 34% of all bat activity and demonstrated spikes of activity in early June and early August. Myotis species and big brown bats (33% and 32%, respectively) accounted for the remaining activity and demonstrated consistent activity throughout the survey period with the highest levels in mid-summer.

3.4 Prairie Dog Colony Status and Mapping

Prairie dog colonies can be a source of prey for raptors. In 2022, WEST identified and mapped prairie dog colonies through a desktop review and field surveys (Piorkowski 2023b; Table 3.1). The objective was to identify and determine colony status (active versus inactive) and map active prairie dog colonies in the March 2022 Project Area (Project Area) and the Study Area, a separate 2.0-mi buffer from the Project Area (Figure 3.4). In addition, prairie dog colonies were scanned visually for burrowing owls and swift foxes (*Vulpes velox)*.

3.4.1 Methods

Prairie dog colonies were identified and mapped through a desktop review and field surveys. The desktop review consisted of a data request to identify historical colonies and a review of aerial imagery to identify potential colonies. Historical prairie dog colonies were identified and located within the Project and Study areas using data discussed during an agency meeting including Western Area Power Administration, USFWS, and SDFGP on August 14, 2018. Additionally, WEST conducted a desktop review of aerial imagery using the National Agricultural Imagery Program (NAIP; USDA NRCS 2022) to identify potential prairie dog colonies within both the Project and Study areas. Field surveys were conducted to determine the status of identified colonies and to map active colonies. Prairie dog colony locations were collected in conjunction with prairie grouse lek (transect surveys spaced every 400 m; April 4-19, 20-27, 2022; Piorkowski 2023c) and raptor nest surveys (combination of aerial surveys and ground verification surveys; February 24, March 19, and April 19, 2022; Piorkowski and Arellano 2023). Observations of swift fox and burrowing owls (*Athene cunicularia*) recorded incidentally, if observed during the mapping efforts within or immediately adjacent to any colony.

3.4.2 Results

Twelve locations were surveyed for the presence of prairie dog colonies (Figure 3.4), which included six historical locations identified from data discussed from the South Dakota Natural Heritage Database and six new locations identified from the NAIP aerial imagery review. Three active prairie dog colonies were located in the Project Area (Figure 3.4). The absent and inactive colony locations all experience regular agricultural practices.

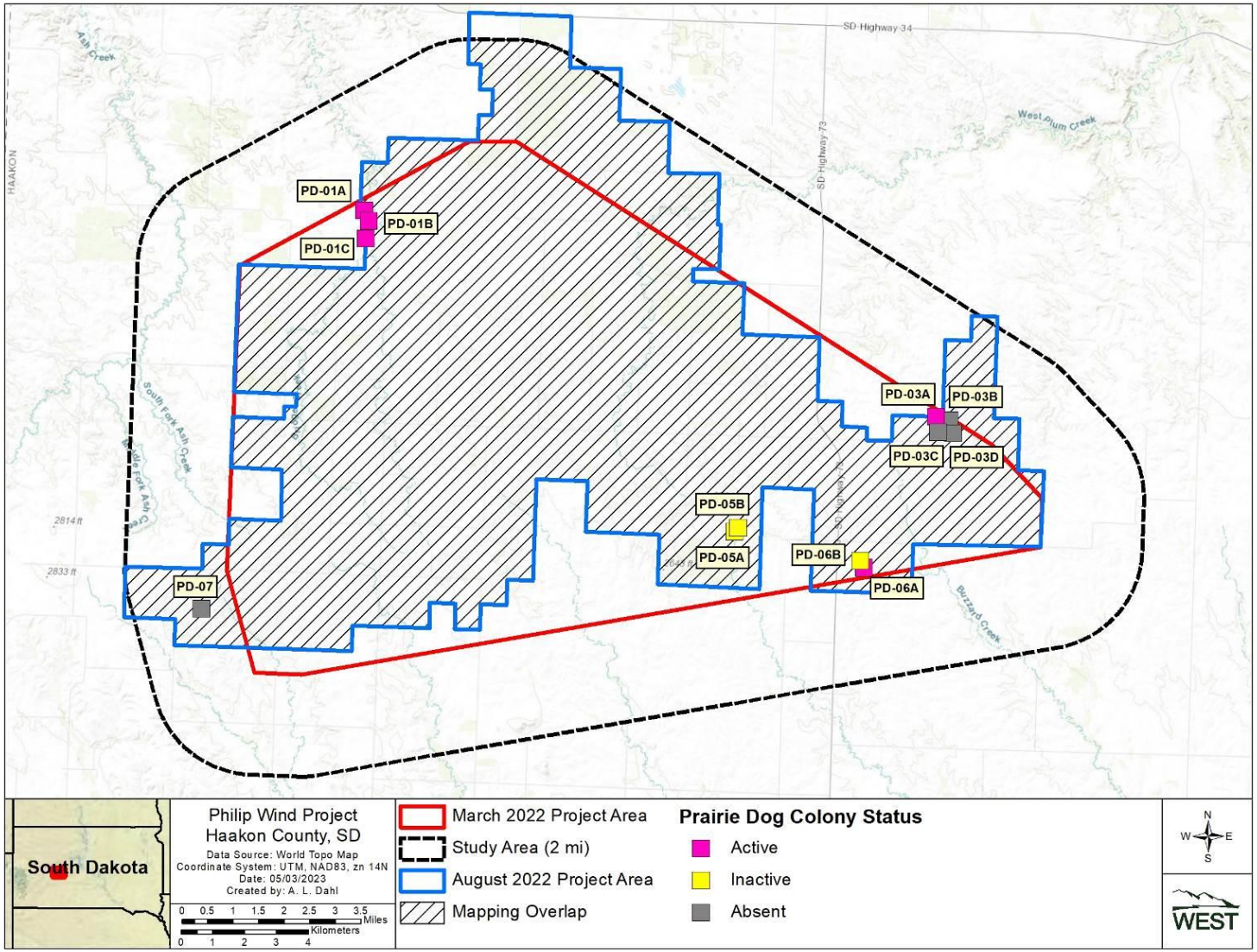

Figure 3.4. Status and location of prairie dog colonies at the Philip Wind Project in Haakon County, South Dakota, 2022.

3.5 Grassland Assessment

Grasslands, including native prairie, are important habitats for grassland birds which have shown declines in avian populations (Rosenberg et al. 2019). The objective of the grassland assessment was to identify grassland parcels and categorize the sod type of each parcel as either unbroken or broken sod within the Project Area. Bauman et al. (2018) defined undisturbed land as soil that has not been mechanically manipulated or has not experienced “iron in the ground” practices and the authors refer to undisturbed grasslands as native prairie. Bauman (2021) later described undisturbed grasslands as ‘unbroken’ grasslands. The grassland habitat assessment was conducted using a two-stage process: a desktop analysis followed by field surveys in areas not surveyed in 2018 (Chodachek and Moratz 2018). This report presents the combined results of the 2018 and current assessment.

The desktop analysis included a review of digital data within the Project Area to map and categorize potential grasslands by sod type (broken or unbroken grasslands; Bauman 2021). Based on the desktop analysis of NLCD (2019), USDA National Agricultural Statistics Service (2021) and the South Dakota native habitat digital layer “Quantifying Undisturbed (Native) Lands in Western South Dakota (2020)” and field verification, the Project Area is composed of approximately 27,678 ac (40.5% of the Project Area) of grassland. Of this area, approximately 12,192 ac (17.9% of the Project) was categorized as having broken sod and 14,915 ac (21.9% of the Project) as having unbroken sod (Figure 3.5). Field verification surveys were not completed at 0.8% of the grasslands due to lack of access.

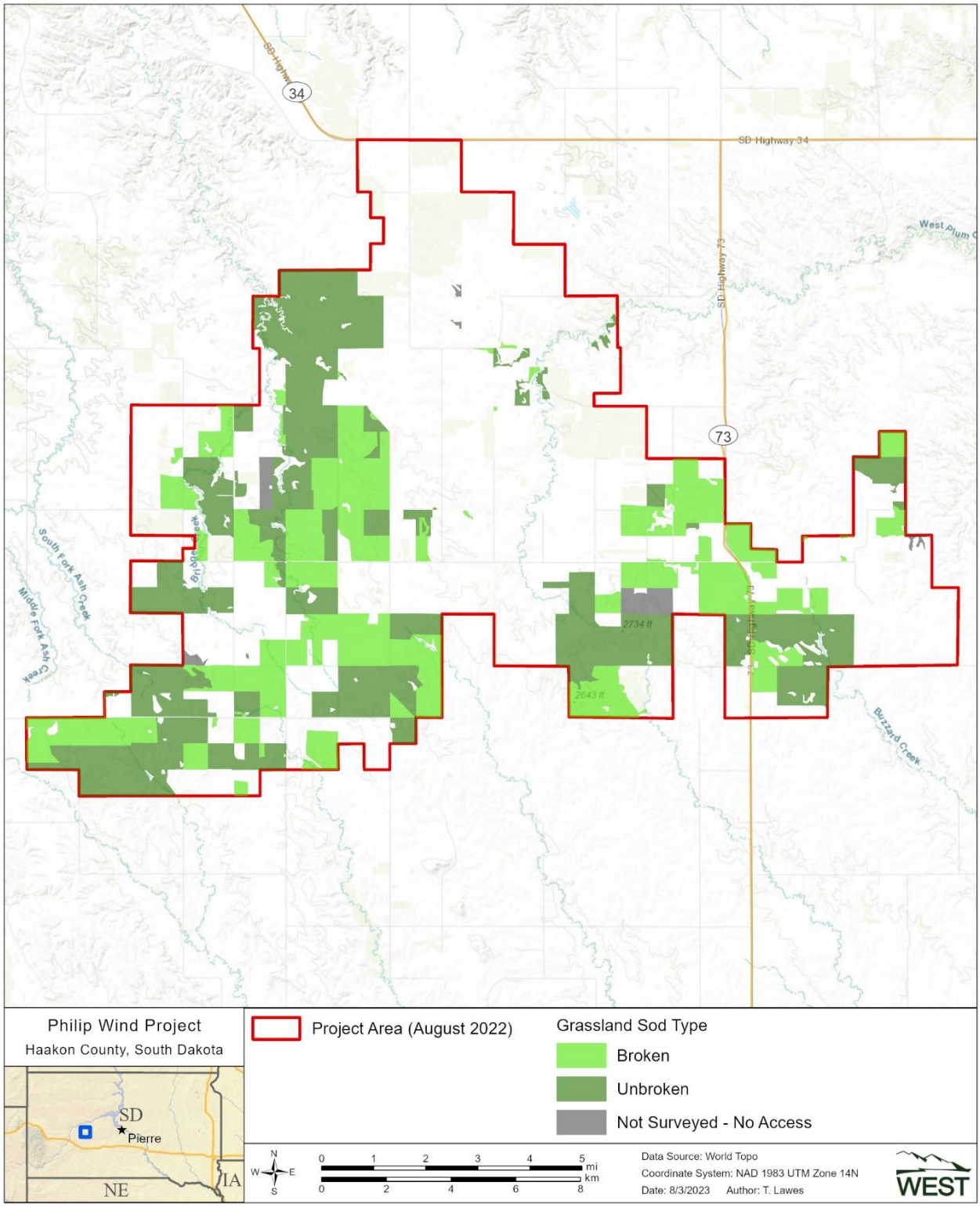

Figure 3.5. Grassland sod types for grassland parcels assessed during field surveys completed in 2018 and 2022 at the Philip Wind Project in Haakon County, South Dakota.

3.6 Wetlands

Impacts to wetlands can cause both direct and indirect impacts to waterfowl (Loesch et al. 2013) Wetland delineations were conducted for the Project between June 13 to 16, 2023, and June 19 to 22, 2023. Field wetland delineations focused on a survey corridor, rather than the Project Area. The survey corridor does not encompass the whole of the Project Area, but it is based on the Project design and associated buffers. The Survey Corridor encompassed approximately 2,068 acres.

4 POTENTIAL IMPACTS TO BIRDS AND BATS

Impacts to birds and bats from construction and operation of a wind energy facility (WEF) can be *direct* or *indirect*. *Direct* impacts result from interactions with facility infrastructure during operations, such as collisions with turbines or buildings or interactions with power lines. *Indirect* impacts can occur during construction, operation, and decommissioning of a facility and can be difficult to predict, especially at locations where they have not been studied. Displacement is the main potential indirect impact from wind energy development on birds and bats; barrier effects are another potential indirect impact. Habitat loss, fragmentation, or alteration are all examples of potential direct or indirect impacts from wind energy development that could occur during construction and/or operations.

This section focuses on impacts that are possible to occur at the Project, particularly collisions with turbines, avian power line interactions, and displacement, which were determined from results of Tier 1 (preliminary site evaluation), 2 (site characterization), and 3 (field studies) studies (USFWS 2012), and WEST's experience with WEF in the Project's region and the U.S. These impacts will be described for all birds, diurnal raptors, and bats along with avian and bat species of concern observed at the Project. These potential impacts may be reduced through avoidance and minimization measures (Section 5).

4.1 Methods

Assessment of potential impacts to avian and bat species at the Project was informed by Tier 1–3 studies conducted for the Project along with the most up-to-date publicly available information on impacts to wildlife from wind energy. Tier 1–3 studies provided information on 1) the likelihood of species of concern occurring at the Project, 2) actual occurrence of species of concern observed across all studies relevant to the Project, and 3) spatial and temporal patterns of species occurrences at the Project. Project-specific information was contextualized by including publicly available information at multiple spatial scales on 1) avian and bat fatality estimates due to turbine collisions, 2) species composition of turbine-related fatalities of avian and bat species of concern, and 3) temporal patterns of avian and bat fatalities. In addition, factors influencing potential avian power line interactions and potential indirect impacts for birds and bats were discussed in the context of the Project.

Analysis of direct impacts to birds and bats resulting from collision with wind turbines for this BBCS relies on WEST's Renew database that contains results of post-construction fatality

monitoring studies for birds and bats from across the U.S. Fatality estimates for birds (all birds, diurnal raptors) and bats were summarized at multiple spatial scales (e.g., state, bird conservation region [BCR], USFWS region, EPA ecoregions, and U.S.) to provide a landscape-scale context. For this Project, landscape scales corresponded to South Dakota, Badlands and Prairies BCR (BCR 17), USFWS Mountain-Prairie region (Region 6 – North and South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Utah), EPA Level I ecoregion (9, Great Plains), and the lower 48 states of the U.S. (Figure 4.1). Fatality studies were screened to provide "comparable" information across WEFs by including annual fatality estimates that 1) were calculated from turbines greater than 0.5 MW; 2) were calculated from the Huso, Shoenfeld, or GenEst estimators; 3) covered adequate sampling time for taxa of interest when most fatalities have been observed (i.e., two seasons for bats, three seasons for birds); and 4) were averaged for each WEF when multiple fatality studies were conducted at a facility.

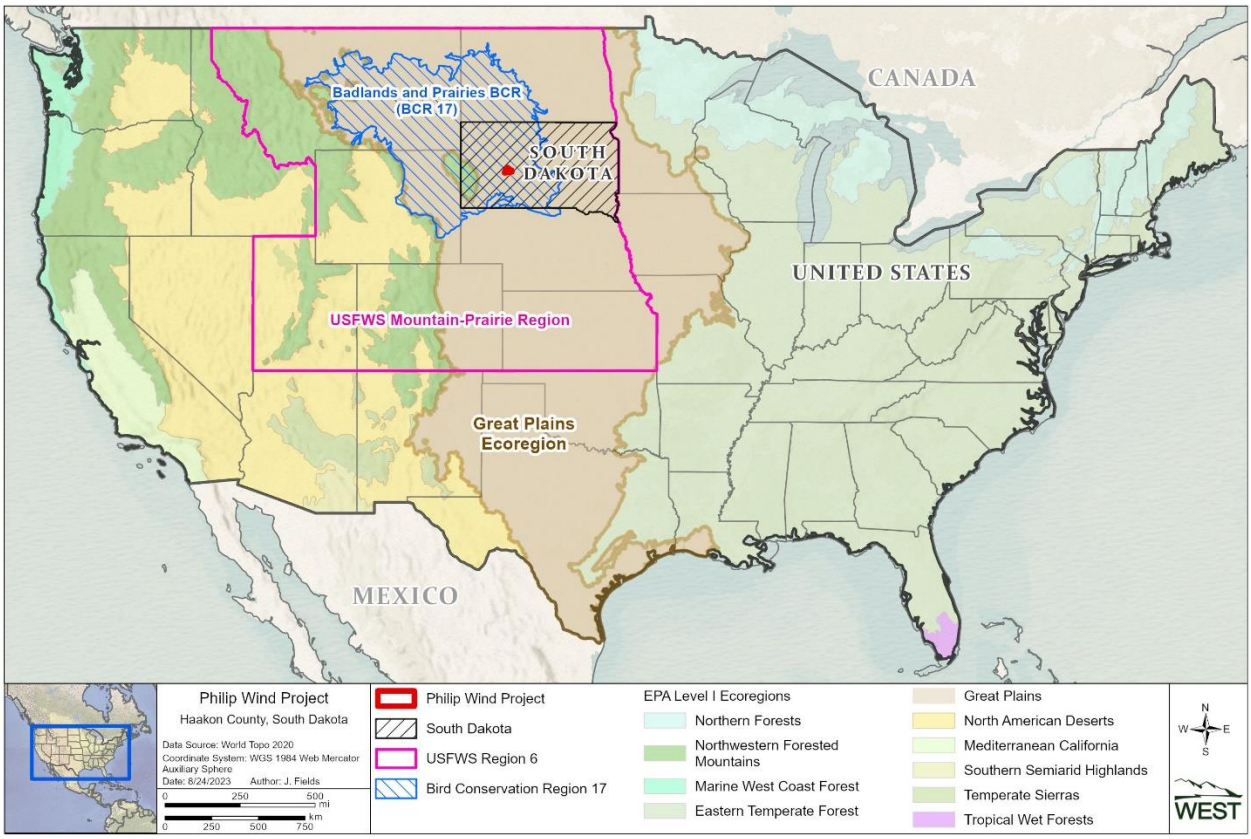

Figure 4.1. Spatial scales (Bird Conservation Region 17, U.S. Fish and Wildlife Service Mountain-Prairie Region, Environmental Protection Agency Level I Ecoregion [Great Plains]) examined for avian and bat impacts relative to the Philip Wind Project in Haakon County, South Dakota.

4.2 Birds

Impacts to birds include both direct (collisions) and indirect (avoidance or displacement). Direct impacts to birds from land based WEFs have been documented in the U.S. since the late 1980s (Orloff and Flannery 1992) and 363 species of birds have been recorded as fatalities at WEFs in

the U.S. (WEST 2023). Given continued concern over bird species' vulnerability to collision fatalities at WEFs (Thaxter et al. 2017, AWWI 2019), understanding the magnitude of these impacts at multiple spatial scales is critical for management of species of concern. Indirect impacts have been measured in terms of avoidance or displacement of different bird species and bird groups (Leddy et al. 1999, Loesch et al. 2013, Shaffer and Buhl 2016, Pearse et al. 2021).

4.2.1 Fatality Estimates

4.2.1.1 All Birds

WEST compiled data from 617 studies across 372 WEF in the U.S. that have reported 363 species of birds as fatalities (WEST 2023). Across all spatial scales examined in this report, fatality estimates ranged from zero to 8.45 fatalities/MW/year; median and mean estimates ranged from 1.04 to 2.96 (median) to 1.04 to 3.19 (mean) across all spatial scales (Table 4.1). Fatality estimates from scales with low sample sizes should be interpreted with caution.

Table 4.1. Summary of fatality estimates for all birds from multiple spatial scales in the U.S.[1]

Spatial Scale	Fatality estimates (birds/megawatt/year)				Facilities[2]	Studies[3]
	Min	Max	Median	Mean		
South Dakota	1.69	1.69	1.69	1.69	1	3
Badlands and Prairies BCR	0.59	1.49	1.04	1.04	2	4
USFWS Mountain-Prairie Region	0.56	5.95	1.49	2.32	9	15
Great Plains	0.08	8.44	2.96	3.19	37	48
U.S.	0	8.45	2.63	2.87	83	125

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2023).

2. Facilities are individual wind projects.

3. Multiple studies may occur at a given facility in different years.

BCR = Bird Conservation Region; USFWS = U.S. Fish and Wildlife Service.

4.2.1.2 Diurnal Raptors

WEST reviewed fatality estimates for raptors at multiple spatial scales, similar to all birds (above). Overall fatality estimates ranged from zero to 0.77 fatalities/MW/year; median and mean estimates ranged from 0.04 to 0.11 (median) to 0.08 to 0.11 (mean) across all spatial scales (Table 4.2). Fatality estimates from scales with low sample sizes should be interpreted with caution.

Table 4.2. Summary of fatality estimates for diurnal raptors from multiple spatial scales in the U.S.[1]

Spatial Scale	Fatality estimates (birds/megawatt/year)				Facilities[2]	Studies[3]
	Min	Max	Median	Mean		
South Dakota	0.10	0.10	0.10	0.10	1	2
Badlands and Prairies BCR	0.04	0.18	0.11	0.11	2	3
USFWS Mountain-Prairie Region	0.04	0.18	0.09	0.10	4	6
Great Plains	0	0.40	0.04	0.08	26	30
U.S.	0	0.77	0.07	0.10	58	76

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2023).

2. Facilities are individual wind projects.

3. Multiple studies may occur at a given facility in different years.

BCR = Bird Conservation Region; USFWS = U.S. Fish and Wildlife Service.

4.2.2 Species Composition

4.2.2.1 All Birds

One hundred forty of the approximately 450 avian species from the USFWS Mountain-prairie region were recorded as fatalities with the top five species including horned lark, (*Eremophila alpestris*) ring-necked pheasant (*Phasianus colchicus*), mallard (*Anas platyrhynchos*), mourning dove (*Zenaida macroura*), and western meadowlark (*Sturnella neglecta*; WEST 2023).

4.2.2.2 Diurnal Raptors

The top five raptor species found as fatalities in the USFWS Mountain-prairie region were golden eagle, red-tailed hawk, American kestrel (*Falco sparverius*), Swainson's hawk (*B. swainsoni*), and ferruginous hawk (WEST 2023). Two of these species (golden eagle, ferruginous hawk) are species of concern that have been observed at the Project (see 4.2.1.2.4).

4.2.2.3 Temporal Patterns of Fatalities

Temporal patterns at multiple spatial scales show peak bird fatalities during spring and/or fall migration seasons, particularly for passerines (Figure 4.2) and are particularly evident at spatial scales with larger sample sizes (i.e., Great Plains, U.S.). Fatality patterns from scales with low sample sizes should be interpreted with caution.

4.2.2.4 Species of Concern

Nineteen avian species of concern were recorded during studies conducted for the Project and of these, seventeen species were recorded as fatalities at WEFs at one of the spatial scales of interest in the U.S. (Table 4.3). Two species of concern (marbled godwit [*Limosa fedoa*], Sprague's pipit [*Anthus spragueii*]) were not recorded as fatalities in the U.S. (Table 4.3). Two raptor species of concern (golden eagle, ferruginous hawk) observed at the Project are in the top five species of raptor fatalities in the USFWS Mountain-Prairie region (WEST 2023). Both species of prairie grouse have been documented at facilities within South Dakota (Table 4.3).

Note the raw fatality counts shown in Table 4.3 do not account for differences in detectability (e.g., large birds are more easily detected than small birds) nor differences in study design (e.g., many post-construction fatality monitoring studies are designed to find eagles). The information in Table 4.3, therefore, should be interpreted with caution. The intent of this table is to determine if species of concern have been recorded as fatalities at multiple spatial scales and to provide a basis for predicting if they may also be expected as fatalities at a project.

Table 4.3. Avian species of concern observed at the Philip Wind Project in Haakon County, South Dakota, and total number of fatalities recorded at multiple spatial scales in the U.S.[1]

Species	Scientific name	Bird Type	South Dakota	BCR 17	USFWS Mt-Prairie Region	Great Plains	US
American white pelican	*Pelecanus erythrorhynchos*	waterbird	0	0	0	33	41

Table 4.3. Avian species of concern observed at the Philip Wind Project in Haakon County, South Dakota, and total number of fatalities recorded at multiple spatial scales in the U.S.[1]

Species	Scientific name	Bird Type	South Dakota	BCR 17	USFWS Mt-Prairie Region	Great Plains	US
bald eagle	*Haliaeetus leucocephalus*	raptor	0	1	12	9	58
black-billed magpie	*Pica hudsonia*	passerine	0	0	0	0	9
bobolink	*Dolichonyx oryzivorus*	passerine	0	0	0	3	21
chestnut-collared longspur	*Calcarius ornatus*	passerine	0	4	7	3	7
Clark's grebe	*Aechmophorus clarkii*	waterbird	0	0	0	0	2
ferruginous hawk	*Buteo regalis*	raptor	0	4	7	15	38
golden eagle	*Aquila chrysaetos*	raptor	0	22	50	22	157
grasshopper sparrow	*Ammodramus savannarum*	passerine	3	1	9	27	32
greater prairie-chicken	*Tympanuchus cupido*	upland game bird	1	1	3	3	3
lark bunting	*Calamospiza melanocorys*	passerine	0	4	5	5	6
lesser yellowlegs	*Tringa flavipes*	shorebird	0	0	0	0	1
marbled godwit	*Limosa fedoa*	shorebird	0	0	0	0	0
merlin	*Falco columbarius*	raptor	0	1	3	3	9
northern harrier	*Circus hudsonius*	raptor	0	3	3	5	28
prairie falcon	*Falco mexicanus*	raptor	0	3	4	2	14
sharp-tailed grouse	*Tympanuchus phasianellus*	upland game bird	3	7	10	11	12
short-eared owl	*Asio flammeus*	raptor	0	6	7	14	32
Sprague's pipit	*Anthus spragueii*	passerine	0	0	0	0	0

[1.] Data represent unadjusted fatality counts and inform the potential species composition of fatalities that may occur at the Project. Data from the Renew database (Western EcoSystems Technology, Inc. 2023).

BCR = Bird Conservation Region; USFWS = U.S. Fish and Wildlife Service.

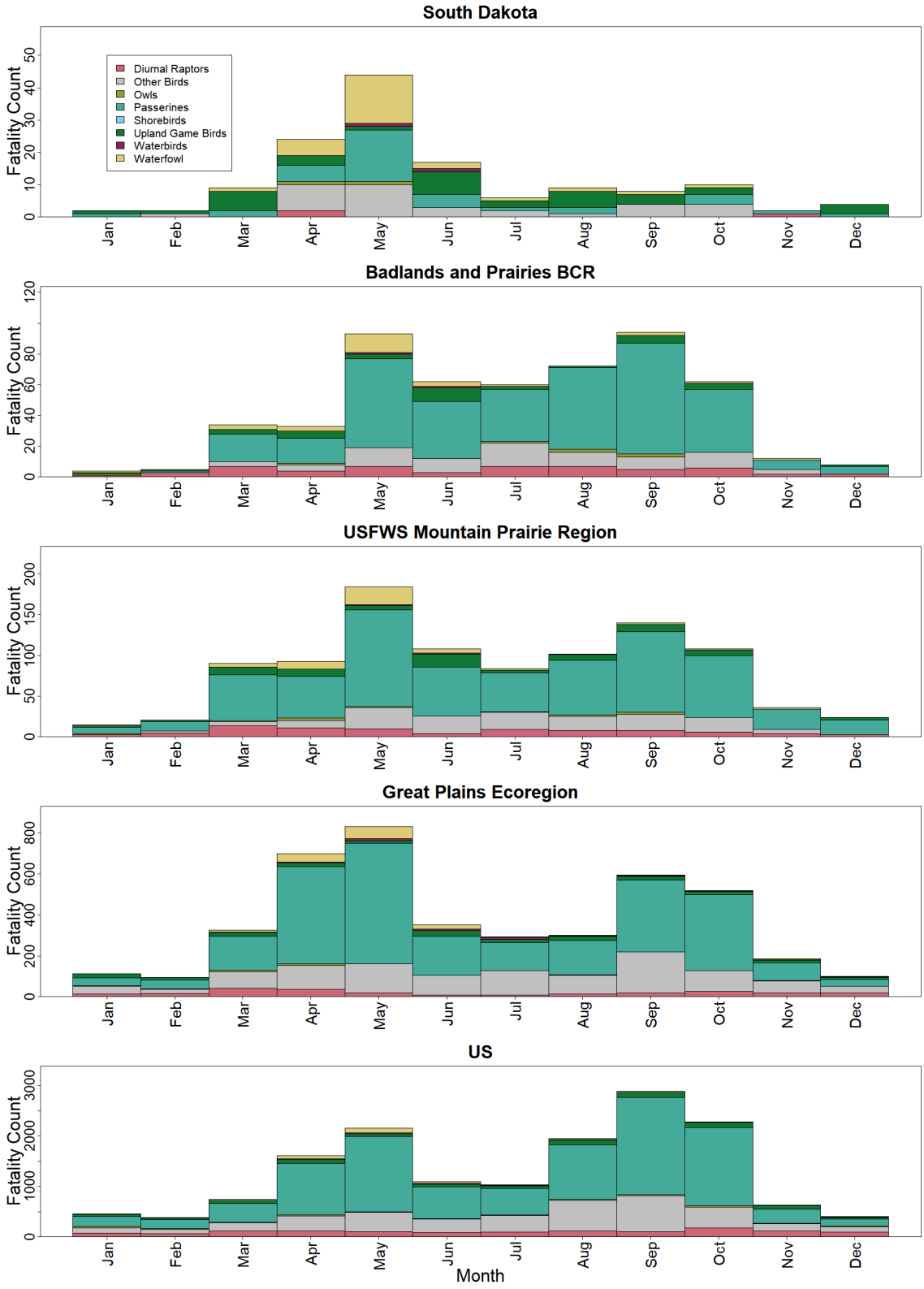

Figure 4.2. Fatalities of bird species types at multiple spatial scales in the U.S. (Western EcoSystems Technology, Inc. 2023).

4.2.3 Direct Impacts: Avian Power Line Interactions

Potential impacts to birds from power line operation include electrocution and collision risks, which depend on line location, voltage, and configurations relative to area habitats and bird presence/use. For the Project, the 34.5 kilovolt (kV) collector lines from the wind turbines to the Project's substation will be buried. Additionally, up to 7.0 mi of transmission line will be designed and constructed for the Project. These above ground lines will meet all Avian Power Line Interaction Committee (APLIC) suggested practices (APLIC 2006 and 2012, respectively).

4.2.4 Indirect Impacts

Construction of the Project will result in habitat impacts that could lead to avoidance or displacement of local avian species. Displacement effects, defined as "the displacement of birds from areas within and surrounding wind farms due to visual intrusion and disturbance that can amount effectively to habitat loss," are a primary indirect impact at WEFs (Drewitt and Langston 2006). Displacement may occur during both construction and operation of a wind project and may be caused by the presence of turbines and/or ongoing site activities such as vehicle and personnel movements or site maintenance.

The scale and degree of displacement effects varies according to site and species-specific factors. The scale of disturbance caused by WEFs varies greatly and is likely to depend on multiple factors including seasonal and daily patterns of use by birds, location to important habitats, availability of alternative habitats, and turbine and wind project specifications (Drewitt and Langston 2006, Lange et al. 2018). Similarly, the degree of behavioral responses will vary among species and individuals and may depend on factors such as life cycle stage (e.g., wintering, molting, breeding), flock size, and degree of habituation. Research indicated that indirect impacts of wind turbines on grassland nesting birds from displacement vary across years, species, sites, and distance from turbines (Erickson et al. 2004, Young et al. 2006, Shaffer and Johnson 2009, Hale et al. 2014, Johnson 2016, Shaffer and Buhl 2016).

AWWI (2017) concluded that indirect impacts on birds from operating wind turbines due to displacement result in some species showing consistent decreases in abundance while other species show no effect. Other bird groups have also indicated potential displacement from habitat in proximity to wind turbines such as waterfowl (Loesch et al. 2013) and synthesized in Marques et al. (2021).

Studies in the Great Plains on the effects of wind energy development on grassland breeding birds found immediate displacement effects (first year) for three species, attraction for two species, and no effect on four species (Shaffer and Buhl 2016). Over time, however, delayed effects (2 to 5 years post-construction) were observed for seven species that showed some displacement up to 300 meters from wind turbines, whereas no effects were observed for two species (killdeer, vesper sparrow; Shaffer and Buhl 2016). Of the seven grassland-breeding birds showing displacement in the Shaffer and Buhl (2016) study, bobolink, chestnut collared longspur, clay-colored sparrow, grasshopper sparrow, upland sandpiper, and western meadowlark were detected at the Project, whereas savannah sparrow was not detected at the Project.

Impacts to grassland breeding birds at the Project have been minimized through Project siting, including the avoidance of unbroken grasslands for turbine placement and reduced fragmentation through the use of existing right of ways for access roads and collection lines, to the extent practicable. Using data from two years of lek survey data, turbines have been sited to avoid known lek locations to the extent practicable. Additional measures have been implemented to avoid turbine placement within Tiers 1 and 2 of SDGFP Modelled Priority Habitat Areas for both sharp-tailed grouse and greater prairie-chicken per SDGFP prairie grouse recommendations (SDGFP 2022).

4.2.5 Summary

Multi-scale summaries of bird fatality information from South Dakota, Badlands and Prairies BCR, USFWS Mountain–Prairie region, Great Plains, and the U.S. provide insight into the number, species composition, and timing of fatalities that could be expected at the Project. Attempts were made to standardize comparisons in this report (see Section 4.1) but many factors including study design, study implementation, data analysis, and availability of public information all influence the quality of these summaries. Information from Tier 1–3 studies conducted at the Project also provide information on factors that may influence the likelihood of avian fatalities at the Project including species composition and spatial and temporal movement patterns (Watson et al. 2018, AWWI 2019), which can be applied to project planning to minimize fatalities.

Taking into account information from Tier 1–3 studies and publicly available information on bird fatalities at WEFs, the range of bird fatality estimates observed in the USFWS Mountain–Prairie region and Great Plains may be expected to encompass the impacts anticipated at the Project. Similarly, the species composition observed in the USFWS Mountain–Prairie region may resemble that anticipated at the Project, including 12 avian species of concern known as fatalities from the Mountain-Prairie region. Lastly, the timing of fatalities for birds in the USFWS Mountain–Prairie region may be expected to encompass the timing of fatalities at the Project. Indirect impacts may influence avian species at varying degrees based on the synthesis of previous research (Marques et al. 2021), although grassland breeding birds such as bobolink, chestnut collared longspur, clay-colored sparrow, grasshopper sparrow, upland sandpiper, and western meadowlark may show displacement to turbines based on research in the Great Plains (Schaffer and Buhl 2016). In all these predictions, however, there is some uncertainty because of the limited number of studies and facilities with publicly available data in South Dakota.

Impacts to birds at the Project have been minimized through Project siting, including the avoidance of unbroken grasslands for turbine placement and minimization of grassland fragmentation by use of existing right of ways for access roads and collection lines. Additional measures have been implemented to avoid known leks to the extent practicable and to avoid high quality habitat for prairie grouse species. Philip Wind is committed to avoiding and/or minimizing impacts to birds through Project design, construction, and operation by implementing Conservation Measures found in Section 5.

4.3 Bats

Impacts to bats from the construction and operation of the Project could include both direct and indirect impacts. Potential direct impacts to bats (i.e., all bats, bat species of concern) are described below.

4.3.1 Direct Impacts

4.3.1.1 Fatality Estimates

Twenty-eight species of bats were recorded as fatalities at WEFs in the U.S. (WEST 2023). Across all spatial scales examined in this report, fatality estimates for all bats ranged from zero to 40.20 fatalities/MW/year, while median and mean estimates ranged from 0.94 to 8.73 (median) to 0.94 to 9.83 (mean) across all spatial scales (Table 4.4). Fatality estimates from scales with low sample sizes should be interpreted with caution.

Table 4.4. Summary of fatality estimates for all bats from multiple spatial scales in the U.S.[1]

Spatial Scale	Fatality estimates (bats/megawatt/year)				Facilities[2]	Studies[3]
	Min	Max	Median	Mean		
South Dakota	0.93	0.94	0.94	0.94	2	5
USFWS Mountain-Prairie Region	0.42	12.72	1.53	2.91	12	19
Great Plains	0.11	36.42	8.73	9.83	56	70
U.S.	0	40.20	3.66	7.18	132	196

1. Data on fatality rates from the Renew database (Western EcoSystems Technology, Inc. 2023).
2. Facilities are individual wind projects.
3. Multiple studies may occur at a given facility in different years.

USFWS = U.S. Fish and Wildlife Service.

4.3.1.2 Species Composition

Eight of 26 species of bats in the USFWS Mountain–Prairie Region have been recorded as fatalities at WEFs with the top five species including hoary bat (54%), silver-haired bat (17%), eastern red bat (14%), Mexican free-tailed bat (*Tadarida brasiliensis*; 7%), and little brown bat (3%; WEST 2023). Four species of concern are known to occur at the Project including: eastern red bat, hoary bat, little brown bat, and silver-haired bat (Table 4.5).

4.3.1.3 Temporal Patterns of Fatalities

Temporal patterns at multiple spatial scales show peak bat fatalities for migratory tree bats (i.e., hoary bat, silver-haired bat, eastern red bat) and all bats during late summer and fall migration seasons (Figure 4.3). This pattern is consistent with other studies that found the majority of bat fatalities occur during the fall migration season (July through October) and most fatalities occur on nights with relatively low wind speeds (e.g., less than 6.0 m per second; Arnett et al. 2008, 2013; Arnett and Baerwald 2013; WEST 2023).

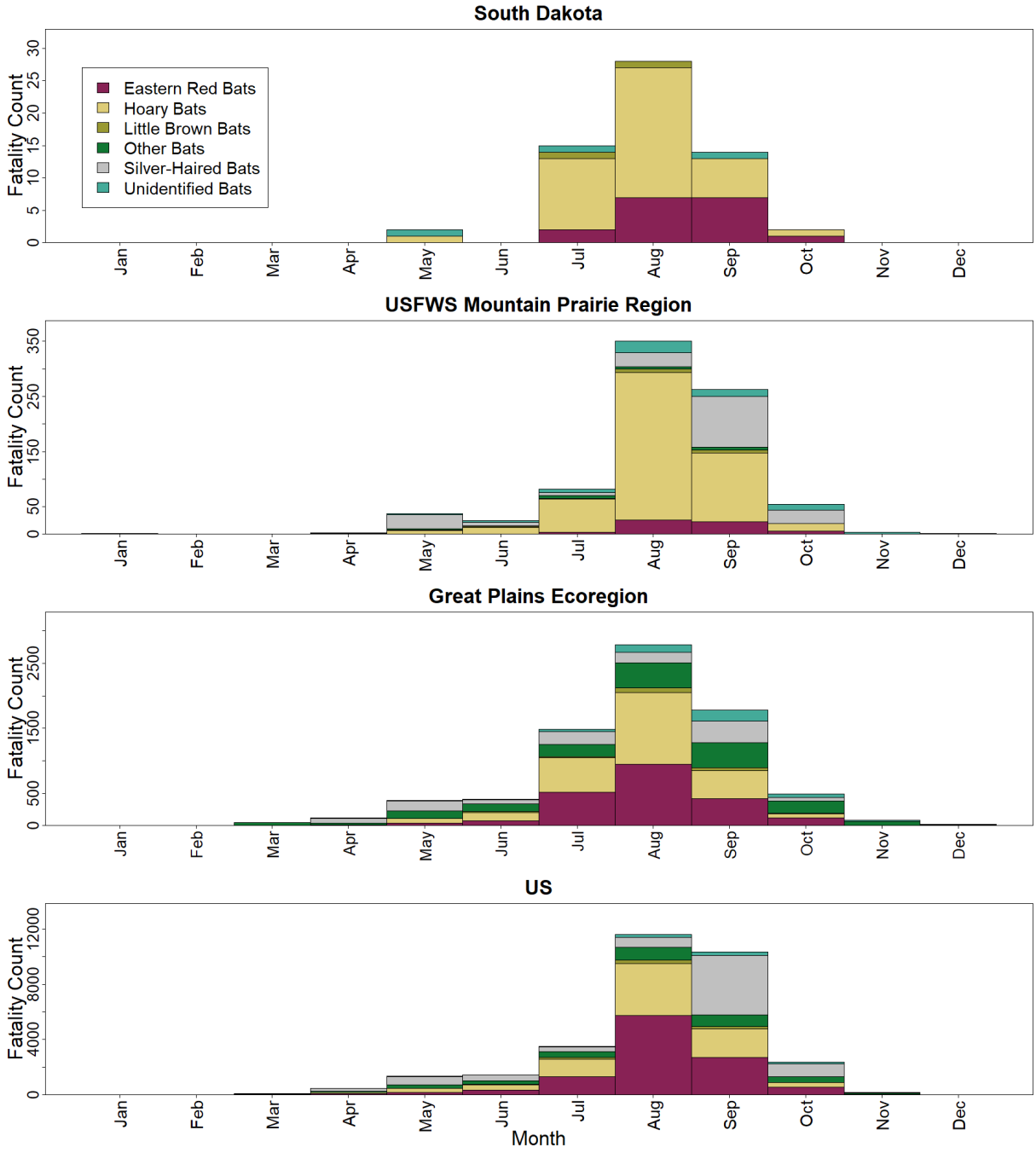

Figure 4.3. Bat fatality counts from multiple spatial scales in the U.S.

4.3.1.4 Species of Concern

Eight bat species of concern have the potential to occur at the Project and six of these species were recorded as fatalities at WEFs at one of the spatial scales of interest in the U.S. (Table 4.5). Four bat species of concern are known to occur at the Project and were recorded as fatalities at WEFs at one of the spatial scales of interest in the U.S. (Table 4.5).

Table 4.5. Bat species of concern that occur or potentially occur at the Philip Wind Project in Haakon County, South Dakota, and total number of fatalities recorded at multiple spatial scales in the U.S.

Species	Scientific name	South Dakota	USFWS Mt-Prairie Region	Great Plains	US
eastern red bat[1]	*Lasiurus borealis*	20	167	2,561	14,906
fringe-tailed myotis	*Myotis thysanodes pahasapensis*	0	0	0	0
hoary bat[1]	*Lasiurus cinereus*	43	616	2,773	11,560
little brown myotis[1]	*Myotis lucifugus*	4	33	292	1,238
northern long-eared bat	*Myotis septentrionalis*	0	0	2	36
silver-haired bat[1]	*Lasionycteris noctivagans*	0	201	1,185	9,613
tricolored bat	*Perimyotis subflavus*	0	3	53	752
Townsend's big-eared bat	*Corynorhinus townsendii*	0	0	0	0

[1] Bat species detected at the Philip Wind Project (Tetra Tech 2019a).

4.3.2 Indirect Impacts

Understanding how wind energy development could affect bats through indirect effects such as disturbance or displacement is limited by the lack of knowledge on this topic (Kunz et al. 2007; AWWI 2018). Based on a northern long-eared bat habitat assessment, there was limited northern long-eared bat roosting habitat within the Project Area. These identified areas were avoided by at least 0.5 mi from turbines, minimizing potential impacts. Additionally, minimal tree clearing is expected; however, any tree clearing conducted would occur outside of the bat active season (April 15 – October 31) as described in Section 5 thus minimizing disturbance to all tree roosting bat species. It is not anticipated that operation of the Project would permanently displace bats based on pre- and post-construction studies of bat activity conducted at WEFs that show increased activity following construction (Solick et al. 2020). Furthermore, some studies documented increased activity following construction due to attraction to turbines (Cryan et al. 2014, Richardson et al. 2021).

4.3.3 Summary

Summaries of bat fatalities that occurred in South Dakota, the USFWS Mountain-Prairie region, Great Plains, and the U.S. provide insight into the number, species composition, and timing of fatalities that may be expected at the Project. Information from Tier 1–3 studies also provide information on factors that may influence the likelihood of fatalities at the Project.

Acoustic monitoring studies were conducted in 2018 at the Project from April 11 through November 7 and identified seven bat species in the vicinity of the Project, four of which are species of concern including, eastern red bat, hoary bat, little brown bat, and silver-haired bat. Hoary bat was the most frequently recorded species of concern. No federally protected bats species were identified. SDGFP does not have any state-protected bat species (SDGFP 2024). Bat activity was lowest during spring and highest in summer and fall. Although acoustic monitoring provides valuable information on the species composition and timing of activity, it does not provide the ability to predict the level of bat fatalities at WEFs (Hein et al. 2013, Solick et al. 2020).

Taking into account information from Tier 1–3 studies and publicly available information on bat fatalities at WEFs, the range of bat fatality estimates observed in the USFWS Mountain–Prairie

region and Great Plains ecoregion may be expected to encompass the impacts anticipated at the Project. Similarly, the species composition observed in the USFWS Mountain–Prairie region may resemble that anticipated at the Project and hoary bat, silver-haired bat, and eastern red bat are expected to comprise the majority of fatalities. Lastly, the timing of fatalities for migratory tree bats in the USFWS Mountain–Prairie region may be expected to encompass the timing of fatalities at the Project. In all these predictions, however, there is some uncertainty because of the limited number of studies and facilities with publicly available data in South Dakota.

Impacts to bats at the Project have been minimized through Project design, construction and operations. Project design has included avoidance of NLEB summer habitat by 0.5 mi exceeding current USFWS draft guidance (USFWS 2024c) and no known hibernacula within the Project. Project construction included no tree removal within NLEB summer habitat and minimal tree removal outside of NLEB summer habitat, and Project operations includes various curtailment strategies throughout the bat active season (April 15 to October 31). These conservation measures benefit all bat species with a focus on tree roosting bats.

5 AVOIDANCE AND MINIMIZATION MEASURES

Information gathered during Tier 1, 2, and 3 studies will be used during the Project design and turbine and infrastructure siting process to reduce potential impacts to birds and bats and their habitats. As part of the NEPA process and Section 7 Consultation with USFWS for approval of the WAPA interconnection, the Project will implement the applicable best management practices (BMPs) and mitigation measures specified in the Upper Great Plains (UGP) Programmatic Environmental Impact Statement (PEIS) developed jointly by WAPA and USFWS (WAPA and USFWS 2015). This PEIS included species-specific avoidance and minimization measures provided in CEF that were completed by Philip Wind. Philip Wind is committed to avoiding and/or minimizing impacts to birds and bats through Project design, construction, and operation by implementing the following Conservation Measures.

5.1 Conservation Measures Implemented During Site Selection and Project Design

Philip Wind will make efforts during initial site selection and during Project design to locate and select wind turbines, met towers, and other infrastructure such that bird and bat collisions are minimized. Project design and siting measures to avoid or minimize risk to avian and bat species will include the following:

- To the extent commercially reasonable, maximize power generation per turbine to reduce the number of turbines needed to achieve maximum energy production.
- Locate transmission lines in areas where Philip Wind has site control and to the extent possible in areas where previous disturbance has occurred, thereby minimizing impacts to trees and associated birds and bats.

- Where applicable, the Project's aboveground power lines shall be designed and constructed to minimize avian electrocution and collision risks, referencing guidelines outlined in the APLIC *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006* and *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*.
- To the extent commercially reasonable, use un-guyed met towers for permanent monitoring. Schedule the installation of met towers and other characterization activities (i.e., field surveys and to avoid disruption of bird and bat reproductive activities or other important behaviors (e.g., do not install towers during periods of prairie-grouse nesting).
- Use the existing road network where feasible and reasonable to reduce the need for new road construction.
- Avoid siting project components in wetlands and waterbodies.
- Avoid siting turbines within 1,000 ft of wetlands with TWI score of 4-11 and within 0.5 mile of wetlands scores with a TWI score of 12-14.
- Minimize disturbance to broken grasslands.
- Avoid siting turbines on native (unbroken) sod grasslands.
- Avoid all SDGFP modelled Tier 1 and Tier 2 sharp-tailed grouse and greater prairie-chicken habitat for siting turbines.
- Avoid siting turbines on unbroken grasslands within one mile of known active sharp-tailed grouse and greater prairie-chicken leks.
- Avoid siting turbines within 0.5 mile of NLEB summer roosting and foraging habitats.
- Avoid siting turbines within 500 m of known active prairie dog colonies.
- Site turbines and other above-ground wind facility infrastructure away from prairie grouse leks to the extent feasible.
- Avoid siting turbine within two miles of currently known bald eagle nests.
- Follow USFWS Region 6 raptor nest (non-eagle) setback buffers from pre-construction data as follows: 800 m for red-tailed hawk and 400 m for great horned owl.
- Turn off unnecessary lighting at night to limit the attraction of migratory birds. Follow lighting guidelines, where applicable, from the WEG. This includes using lights with timed shutoff, downward-directed lighting to minimize horizontal or skyward illumination, and avoidance of steady-burning, high-intensity lights. Extinguish all internal turbine nacelle and tower lighting when unoccupied.
- Light the wind turbines and met towers in accordance with the Federal Aviation Administration requirements.
- Prepare a BBCS in accordance with the WEG that will be implemented to minimize impacts to avian and bat species during construction and operation of the Project.

5.2 Conservation Measures to be Implemented during Construction

Construction of the Project is expected to begin in 2025. The following Conservation Measures will be implemented to avoid or minimize risk to avian and bat species during construction:

- Minimize tree clearing as much as feasible to minimize potential impacts to bat roosting habitat. The Project has been sited to avoid tree clearing to the extent feasible and reasonable.
- Clear trees outside of the bat active season from November 1 – April 14 (USFWS 2024c)
- Establish wind turbine buffer zones around occupied raptor nests and occupied bat roosts.
- Conduct construction monitoring and contingencies during whooping crane migration seasons and stop construction activities within 2 mi of observed whooping cranes until the crane leaves following the whooping crane monitoring and contingency plan.
- Construction activities within 0.5-mile of known active leks in unbroken grasslands during displaying and nesting season (March 15 – May 15) will be avoided from 3 hours after sunrise to 1 hour before sunset.
- Install avian flight diverters on any new or upgraded overhead collector, distribution, and transmission lines within 1-mi (1.6-km) of suitable stopover habitat to minimize potential collision impacts to whooping cranes and other avian species. Devices will be installed on the overhead top statis wire (as appropriate) to increase wire visibility (APLIC 2012).
- To the extent feasible, the area required for Project construction and operation will be minimized. Philip Wind will restore all areas of temporary disturbance to their previous condition, including the use of applicable seed mixes.
- Following Project construction, roads not needed for site operations will be restored to preexisting conditions.
- Limit vehicle speeds to 25 mi per hour (mph) to avoid wildlife collisions and construction vehicles will be restricted to pre-designated access routes.
- Cover all trash in containers, and work sites will be cleared regularly of any garbage and debris related to food.
- Pets shall not be allowed in the Project Area near Project facilities.

5.3 Conservation Measures to be Implemented during Operations

- Vehicle speeds will be limited to 25 mph to avoid wildlife collisions.
- Fire hazards from vehicles and human activities will be reduced (e.g., use of spark arrestors on power equipment, avoiding driving vehicles off roads, allowing smoking in designated areas only).
- Pest and weed control measures will be implemented as specified by county, state, and federal requirements.
- Turbines will be feathered below the manufacturer's cut-in speed during the bat active season (April 14-October 31) when temperatures are >40 °F.
- Curtailment of turbines from 30 minutes before sunset to 30 minutes after sunrise from August 16-October 31 will increase to 5.0 m/s.

- A mitigation offset for potentially impacted whooping crane stopover habitat (5 ac) will be implemented by a third party in accordance with direction from the WAPA and USFWS prior to an interconnect.
- Conduct operational monitoring during whooping crane migration seasons following Project's monitoring and contingency plan; operations staff will be trained to identify whooping cranes, and if any are noted in the Project Area, turbines will be shut down within 2 mi of the crane until it leaves.
- All of Philip Wind's employees and contractors working on site will receive worker awareness training for identifying and responding to encounters with sensitive biological resources, including avian and bat species. The training will:
    - Be conducted by Philip Wind or their designee.
    - Instruct employees, contractors, and site visitors to avoid harassment and disturbance of birds and bats, especially during reproductive (e.g., courtship and nesting) seasons.
    - Provide information to contractors and employees on the Project detailing information on potential state and federal special-status animal and plant species that might be discovered on the Project site.
    - Include an overview of the distribution, general behavior, and ecology of golden and bald eagles. Employees will be informed that they are not authorized to approach, handle, or otherwise move any eagles that might be encountered during construction or operation, whether alive, injured, or deceased. Operations personnel will be instructed to report any finding of an injured or deceased eagle to the Philip Wind environmental lead within 24 hours of observation, which will then be reported within two business days to USFWS.

6 TIER 4 – POST-CONSTRUCTION AVIAN AND BAT MONITORING

6.1 Monitoring Goals

The goals of post-construction monitoring are to estimate bird and bat fatality rates for the Project, evaluate the circumstances under which fatalities occur, and provide a survey protocol for detecting large-bird (i.e., large raptor, vulture, eagle) carcasses that may occur over the life of the Project. Post-construction monitoring results could also provide the triggers for adaptive management, described in Section 7. In accordance with the WEG and the EA (SWCA 2023), the Project will analyze bird and bat carcass monitoring data to accomplish the following:

- Estimate bird and bat fatality rates for the Project
- Estimate fatality rates for species of concern
- Evaluate bird and bat carcasses within the Project in relation to site characteristics
- Compare estimated fatality rates at the Project to fatality rates at existing Projects in similar landscapes with similar species composition and use

- Determine the composition of carcasses in relation to migrating and resident birds and bats at the site
- The Project would conduct one year of post-construction monitoring following the first year of commercial operation and would subsequently conduct post-construction monitoring during the bat active season every seven years.
- The Project would report any found NLEB carcass within 24 hours of discovery and would submit annual reports by January 31st following finalized NLEB wind avoidance guidance (USFWS 2024c)
- Assess whether carcass data suggests the need for measures to reduce impacts

Details of the proposed post-construction monitoring will be developed and the BBCS will be updated prior to operations at the Project.

6.2 Incidental Monitoring

An incidental reporting process will be developed for operations personnel to ensure they can document bird or bat carcasses during routine maintenance work and at other times they are within the Project. Philip Wind will provide operations personnel with training describing the incidental reporting process and reporting resources.

6.3 Permits and Bird and Bat Handling Procedures

6.3.1 Permits

Philip Wind may elect to obtain federal and state collection permits. In general, carcasses will be left in place and not handled. If a permit is obtained, carcasses will be handled in accordance with the permit.

6.3.2 Bird and Bat Handling Procedures

All bird and bat carcasses found will be left in place (i.e., not handled), documented, and buried in place, or handled in accordance with federal and state permits, if applicable. If a carcass of a federal- or state-listed species or eagle is found, Philip Wind or their designee will cover the carcass with a container or other appropriate method and contact the Philip Wind environmental lead within 24 hours of observation, which will then be reported within two business days to appropriate authorities. If an injured bird or bat is found, Philip Wind may contact a wildlife rehabilitator, if appropriate.

7 ADAPTIVE MANAGEMENT

In the WEG, the USFWS defines adaptive management as “an iterative decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Comprehensively applying the tiered approach embodies the adaptive management process” (USFWS 2012). The goals of the adaptive management approach are to enable the incorporation of results from the post-construction fatality monitoring, operations and management incidental reporting, industry

research, and new regulatory developments into the Project's bird and bat avoidance and minimization strategy. If the avoidance and minimization measures are not producing the desired results, adjustments will be made, as necessary, to reduce impacts to birds and bats. Philip Wind will report and coordinate with the USFWS and SDGFP as necessary and appropriate to address any unanticipated issues. If appropriate, Philip Wind will conduct additional specific, targeted monitoring to determine if adaptive management measures are necessary and/or effective.

Project siting, influenced by adaptively responding to pre-construction survey results and following bird and bat agency guidance and recommendations to the extent feasible, has attempted to avoid or minimize impacts to birds and bats within the surveyed Project Area (Sections 2.0 and 3.0). Based on these avoidance and minimization measures (Section 5.) and conditions described in the draft EA (SWCA 2023), no significant adverse impacts are anticipated at this time from the Project and avian and bat fatalities are expected to fall within the range of other similar projects in similar regions (Section 4.0). However, situations for considering an adaptive management response may include fatality of an eagle or a species listed as state or federally endangered/threatened. In this situation, an assessment of why this occurred will be conducted to aid in developing an appropriate response.

7.1 Adaptive Management Goals

The goals of the adaptive management plan are to enable the incorporation of results from the post-construction monitoring, O&M incidental reporting, industry research, and new regulatory developments into the Project's bird and bat avoidance and minimization strategy. Certain trigger events and potential subsequent changes to the avoidance and minimization strategy have been defined as a part of the adaptive management plan to guide the adaptive management process. If the avoidance and minimization measures are not producing the desired results, adjustments will be made, as necessary, to reduce impacts to birds and bats.

7.2 Adaptive Management Triggers and Response

Adaptive management measures for the Project will be triggered by the following events, which are further defined below:

- Mass casualty event (ten or more carcasses documented at a single turbine in a five-day period)
- Discovery of the carcass of a federally listed species or eagle
- Discovery of a new and/or active eagle nest

Philip Wind understands that unanticipated events beyond these adaptive management triggers may arise, and Philip Wind will report and coordinate with the USFWS and SDGFP as necessary and appropriate to address any unanticipated issues. If appropriate, Philip Wind will conduct additional specific, targeted monitoring to determine if adaptive management measures are necessary and/or effective.

7.2.1 Mass Casualty Event

If a mass casualty event is documented, Philip Wind will meet and confer with the USFWS and SDGFP as appropriate. If a particular cause can be identified, Philip Wind will develop specific mitigation measures in coordination with appropriate agencies to address the occurrence. Examples of potential adaptive management responses may include:

- Remove/modify the source of bird attraction
- Implement turbine operational protocols designed to reduce bat carcasses and target the particular issue identified during monitoring
- Implement technological solutions if new techniques or technology become available that are cost-effective and feasible to implement

7.2.2 Discovery of a Federally or State Listed Species' Carcass or Eagle Carcass

If a federally or state-listed species' carcass or eagle carcass is found at the Project, Philip Wind will take the following actions:

- Identify and secure the carcass at the place of its discovery in the field until USFWS or SDGFP can be reached and provide further instruction for carcass storage or pickup
- Notify the USFWS or SDGFP within two business days of the discovery and positive species identification confirmation of any federally or state listed species, respectively
- Notify the SDGFP in accordance with any state collection permits obtained
- Work with the USFWS to evaluate available data related to the carcass discovery and, as appropriate, identify and implement avoidance or minimization measures to avoid the risk of future fatalities; such measures may include adjusting the operational protocol at specific turbines during specific weather conditions or seasonal periods, followed by carcass monitoring to assess whether the avoidance or minimization measures are effective
- Assess the need to obtain take authorization under the ESA or BGEPA considering the new information

7.2.3 Discovery of a New and/or Active Eagle Nest

Philip Wind will notify the USFWS if a new and/or active bald eagle nest is identified within 800 m (2,625ft) of an operating turbine. If appropriate, Philip Wind may elect to monitor eagle activity in and around the eagle nest. Additionally, after the nesting season, Philip Wind will consider seeking a permit to remove the eagle nest in coordination with the USFWS and SDGFP.

8 KEY RESOURCES

Resource	Phone Number
U.S. Fish and Wildlife Service, Region 6 Migratory Bird Office, Denver, Colorado	303-236-8171
U.S. Fish and Wildlife Service, Ecological Services	605-224-8693
South Dakota Game, Fish, and Parks Pierre, South Dakota	605-223-7660
Operations and Maintenance Philip Wind Partners, LLC	TBD

9 REFERENCES

9.1 Acts, Laws, Regulations

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16 United States Code (USC) §§ 703-712. 1918. Title 16 - Conservation; Chapter 7- Protection of Migratory Game and Insectivorous Birds; Subchapter II - Migratory Bird Treaty; Sections (§§) 703-712. 16 USC 703-712. [July 3, 1918, Chapter (Ch.) 128, §2, 40 Statute (Stat.). 755; June 20, 1936, Ch. 634, §3, 49 Stat. 1556; Public Law (PL) 93-300, §1, June 1, 1974, 88 Stat. 190; PL 101-233, §15, December 13, 1989, 103 Stat. 1977; PL 108-447, Division E, Title I, §143(b), December 8, 2004, 118 Stat. 3071.]. Available online: https://www.gpo.gov/fdsys/pkg/USCODE-2010-title16/pdf/USCODE-2010-title16-chap7-subchapII.pdf

16 United States Code (USC) § 1531. 1973. Title 16 - Conservation; Chapter 35 - Endangered Species; Section (§) 1531 - Congressional Findings and Declaration of Purposes and Policy. 16 USC 1531. December 28, 1973. [Public Law (PL) 93-205, Section (§) 2, December 28, 1973, 87 Statute [Stat.] 884; PL 96-159, § 1, December 28, 1979, 93 Stat. 1225; PL 97-304, § 9(a), October 13, 1982, 96 Stat. 1426; PL 100-478, Title I, § 1013(a), October 7, 1988, 102 Stat. 2315.]. Available online: https://www.gpo.gov/fdsys/pkg/USCODE-2011-title16/pdf/USCODE-2011-title16-chap35-sec1531.pdf

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42 United States Code (USC) §§ 4321-4370h. 1970. Title 42 - the Public Health and Welfare; Chapter 55 - National Environmental Policy; Subchapters I (Policies and Goals) and II (Council on Environmental Quality); Sections (§§) 4321-4370h. Known as the National Environmental Policy Act of 1969. 42 USC 4321-4370h. January 1, 1970. [Public Law 91-190, § 2, January 1, 1970, 83 Statute 852.]. Available online: https://www.gpo.gov/fdsys/pkg/USCODE-2016-title42/pdf/USCODE-2016-title42-chap55.pdf

50 Code of Federal Regulations (CFR) § 10.12. 1973. Title 50 - Wildlife and Fisheries; Chapter I -United States Fish and Wildlife Service, Department of the Interior; Subchapter B Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 10 - General Provisions; Subpart B - Definitions; Section (§) 10.12. Definitions. 50 CFR 10.12. [38 Federal Register (FR) 22015, August 15, 1973, as amended at 42 FR 32377, June 24, 1977; 42 FR 59358, November 16, 1977; 45 FR 56673, August 25, 1980; 50 FR 52889, December 26, 1985; 72 FR 48445, August 23, 2007.].

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50 Code of Federal Regulations (CFR) § 22.200. 2024. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart E - Section (§) 22.200 -Specific Permits. 50 CFR 22.200. [89 Federal Register 29: 9920-9965, February 12, 2024.].

50 Code of Federal Regulations (CFR) § 22.250. 2024. Title 50 - Wildlife and Fisheries; Chapter I - United States Fish and Wildlife Service, Department of the Interior; Subchapter B - Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife and Plants; Part 22 - Eagle Permits; Subpart E - Section (§) 22.250 - Wind Energy Project Incidental Take. 50 CFR 22.250. [89 Federal Register 29: 9920-9965, February 12, 2024.].

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