Wildlife Conservation Strategy for the Crowned Ridge II Wind Facility, Codington, Deuel, and Grant Counties, South Dakota

APRIL 2020

PREPARED FOR

Crowned Ridge Wind II, LLC

PREPARED BY

SWCA Environmental Consultants

WILDLIFE CONSERVATION STRATEGY FOR THE CROWNED RIDGE II WIND FACILITY, CODINGTON, DEUEL, AND GRANT COUNTIES, SOUTH DAKOTA

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1 INTRODUCTION

Crowned Ridge Wind II, LLC (Crowned Ridge), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC (NextEra), is developing the Crowned Ridge II Wind Facility (Project) in Codington, Deuel, and Grant counties, South Dakota (Figure 1). Crowned Ridge has entered into a purchase and sale agreement under which it will permit and construct this Project, and, thereafter, transfer the Project, along with its Facility Permits and conditions, to Xcel Energy at the commercial operations date. Crowned Ridge is committed to environmental due diligence and contracted SWCA Environmental Consultants (SWCA) to assess potential wildlife impacts resulting from Project construction and operation. Crowned Ridge has voluntarily developed and implemented this Wildlife Conservation Strategy (WCS) in its continued efforts to demonstrate due diligence in avoiding and minimizing impacts to wildlife in association with the development, construction, and operation of the Project. This WCS describes Crowned Ridge's strategy to address wildlife conservation in all phases of Project development.

1.1 Statement of Purpose

There are potential wildlife impacts resulting from construction and operation of a wind energy facility. This WCS outlines various processes that Crowned Ridge has employed or will employ to:

1. Comply with all state and federal wildlife conservation and protection laws and regulations at the Project;
2. Ensure that impacts to wildlife resources, particularly birds and bats, are identified, quantified, and analyzed; and
3. Implement various avoidance and minimization measures to address unanticipated impacts that result from the operation of the Project.

Reducing impacts on birds, bats, and other wildlife that occur as a result of the Project is important to Crowned Ridge as both a regulatory and natural resource conservation priority.

1.2 Corporate Policy

Crowned Ridge is committed to siting, constructing, operating, and decommissioning the Project in an environmentally responsible and sustainable manner. This includes minimizing impacts to natural resources, including local wildlife and the habitats they use. As part of this commitment, Crowned Ridge has developed this WCS for the Project. The objective of this WCS is to ensure that:

- All Project-related actions comply with federal and state regulations pertaining to wildlife;
- All Project-related actions comply with conditions of existing permits with respect to wildlife;
- Avoidance and minimization measures designed for Project-specific wildlife species concerns are implemented;
- Effective documentation of bird and bat injuries and fatalities will occur to provide the basis of ongoing adaptive management and development of wildlife protection procedures; and

- Crowned Ridge staff and all relevant subcontractors will receive the appropriate training pursuant to avian, bat, and other wildlife monitoring and reporting.

1.3 Agency Coordination History

Crowned Ridge has coordinated with the South Dakota Game, Fish, and Parks (SDGFP) and South Dakota field office of the U.S. Fish and Wildlife Service (USFWS) as part of the development of the Project and the permitting process required by the South Dakota Public Utilities Commission (SDPUC) (Table 1). Copies and records of correspondence are in Appendix A.

2 REGULATORY FRAMEWORK

Native birds are protected under a variety of federal and state laws and regulations. With regard to the Project, these laws and regulations include the Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and the Bald and Golden Eagle Protection Act (BGEPA).

2.1 Migratory Bird Treaty Act

The MBTA implements the Unites States' obligations under four treaties for the protection of migratory birds. The MBTA is administered by the USFWS, which maintains a list of all species protected by the MBTA (50 Code of Federal Regulations [CFR] 10.13). This list includes over 1,000 species of migratory birds, including eagles and other raptors, waterfowl, shorebirds, seabirds, wading birds, and passerines.

The MBTA makes it unlawful "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 …" except as otherwise permitted under the regulations. (16 United States Code [USC] 703). The USFWS has interpreted the MBTA to be a strict liability statute, meaning that proof of intent, knowledge, or negligence is not an element of an MBTA violation. Actions resulting in the "take" of a protected species, in the absence of a USFWS permit or regulatory authorization, are a violation.

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" (50 CFR 10.12). The MBTA does not have a provision directly prohibiting incidental takes and the definition of "take" does not include the broader terms of "harass" or "harm" that have been found to prohibit incidental take.

2.2 Bald and Golden Eagle Protection Act

Under authority of the BGEPA (16 USC 668–668d), bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) are afforded additional legal protection. The BGEPA states that "no person shall knowingly, or with wanton disregard for the consequences of his act take, possess, sell, purchase, barter, offer for sale, purchase or barter, transport, export, or import, at any time or in any manner any bald eagle commonly known as the American eagle or any golden eagle, alive or dead, or any part, nest or egg thereof of the foregoing eagles…". The

BGEPA 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 (16 USC 668). The term "disturb" is defined as agitating or bothering an eagle to a degree that causes, or is likely to cause, injury to an eagle, or a decrease in productivity or nest abandonment by substantially interfering with normal breeding, feeding, or sheltering behavior (50 CFR 22.3).

BGEPA authorizes the Secretary of the Interior to permit the take of bald or golden eagles for several defined purposes, including when "necessary to permit the taking of such eagles for the protection of wildlife or of agricultural or other interests in any particular locality." Based on this authority, the USFWS published a final rule (Eagle Permit Rule) on September 11, 2009 (see 50 CFR Parts 13 and 22) establishing two new permit types: 1) individual permits that can be authorized in limited instances of disturbance and in certain situations where other forms of take may occur, such as human or eagle health and safety; and 2) programmatic permits that may authorize incidental take that occurs over a longer period of time or across a larger area (USFWS 2009). On December 16, 2016, the USFWS issued a revised Eagle Permit Rule that includes changes to the regulations for eagle incidental take permits and eagle nest take permits. The revisions to the Eagle Permit Rule went into effect on January 17, 2017, and include changes to permit issuance criteria, duration (including a maximum permit term of 30 years), compensatory mitigation standards, and permit application requirements.

2.3 Endangered Species Act

Certain species at risk of extinction are protected under the federal Endangered Species Act of 1973 (ESA; 16 USC §1531 et seq., as amended). The ESA defines and lists species as "endangered" or "threatened" and provides regulatory protection for the listed species. The federal ESA also provides a program for the conservation and recovery of threatened and endangered species and for the conservation of designated critical habitat. Section 9 of the federal ESA prohibits the "take" of species listed by USFWS as threatened or endangered.

"Take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 USC 1532). Significant modification or degradation of listed species' habitats where the modification actually kills or injures wildlife by significantly impairing essential behavioral patterns is considered "harm" under ESA regulations. Section 10(a) of the federal ESA includes provisions for the authorization of take that is incidental to, but not the purpose of, otherwise lawful activities. Under Section 10(a)(1)(B), an Incidental Take Permit may be issued if take is incidental and does not jeopardize the survival and recovery of the species.

2.4 State Protection

South Dakota's Endangered and Threatened Species law (SDCL Chapter 34A-8) prohibits the take, possession, and transportation of "wildlife and plants indigenous to the state determined to be endangered or threatened within the state" as determined by the SDGFP.

2.5 Non-regulatory Framework

In addition to regulatory drivers, the WCS also briefly discusses bird species included on the USFWS list of Birds of Conservation Concern (BCC). Although these species are not formally

protected under any regulatory laws, BCC species are closely monitored by USFWS due to population declines and/or rare occurrences in a specific region. As a result, BCC species that might be encountered at the Project are included in this WCS. Development of the BCC category for birds was the result of a 1988 amendment to the Fish and Wildlife Conservation Act that mandates the USFWS identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. The overall goal is to prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. The BCC categorization is intended to stimulate coordinated and collaborative proactive conservation actions among federal, state, tribal, and private partners (USFWS 2008a). The proposed Project Area is located in the Prairie Potholes Bird Conservation Region (BCR 11) and only BCC species for this region are discussed in the WCS.

3 PROJECT DESCRIPTION

3.1 Project Components

The Project will be situated within approximately 60,996 acres (the Project Area) adjacent to Crowned Ridge I wind facility that is operational (Figure 1). Crowned Ridge's July 9, 2019 SDPUC application addresses development of up to 301 MW (132 wind turbine generators). However, the current plan is for Crowned Ridge to construct only 200 MW in 2020 and to defer 100 MW, which Xcel Energy may opt to construct in the future (Figure 2). Project components will include the following.

- On-site generation tie line, which is located within the Project Area but was separately permitted from the wind facility portion of the Project under SDPUC docket EL18-019.
- Up to 132 wind turbine generators for 301 MW.
- Access roads to turbines and associated facilities.
- Underground 34.5-kilovolt (kV) electrical collection lines connecting the turbines to the collector substation.
- Underground fiber-optic cable for turbine communications co-located with the collection lines.
- The low-side of a 34.5- to 230.0-kV collector substation.
- Two permanent meteorological (MET) towers.
- An operations and maintenance (O&M) facility.
- Additional temporary construction areas, including a concrete batch plant area.

The Project will use the Crowned Ridge II 5-mile 230-kV generation tie line and the Crowned Ridge II collector substation to transmit the generation to the dead-end transmission structure adjacent to the Project's collector substation. Using a breaker position at the Project collector substation, the 301 MW from the Project will be aggregated with the 300 MW from the Crowned Ridge I Project collector substation and conjoined to the 230-kV transmission line, which is to be interconnected to the Big Stone South 230-kV Substation approximately 100 feet away that is owned by Otter Tail Power Company.

3.2 Site Description

3.2.1 Tier 1 Evaluation Area

Crowned Ridge conducted a desktop analysis consistent with Tier 1-Preliminary Site Evaluation recommendations of the USFWS Wind Energy Guidelines (WEG) (USFWS 2012) to assess the potential for adverse effects on species of concern and their habitat. The results were evaluated to further inform the location determination process for the proposed Project. As part of the initial site screening, Crowned Ridge evaluated existing, publicly available Geographic Information System (GIS) data on the proposed Project Area, including land ownership, National Land Cover Data (NLCD), US Department of Agriculture (USDA) National Agriculture Statistics Service data, U.S. Geological Survey (USGS) Ecoregions, the National Wetlands Inventory, the National Hydrography Database, Federal Emergency Management Agency floodplains, high resolution aerial imagery, data available from South Dakota State University's Public Research Access Institutional Repository and Information Exchange, known species occurrence and habitat data provided by USFWS and SDGFP, and results from field evaluations performed for previous iterations of the Project Area. The location of the proposed Project Area was selected over other evaluated areas based on the evaluation of these factors. Other factors that influenced the selection of the proposed Project Area included wind resource, interested landowners, and proximity to a transmission line for interconnection.

The Project Area lies almost equally within two ecoregions, namely the Prairie Coteau to the northeast and the Big Sioux Basin to the southwest. As described by Bryce et al. (1996), the Prairie Coteau formed from stagnant glacial ice melting beneath sediment layers, which resulted in tightly undulating, hummocky topography with no discernable drainage pattern. This region contains closely spaced semi-permanent and seasonal wetlands, with a chain of large lakes that formed where there was little ice shear and higher precipitation amounts, which support widespread burr oak woodlands near wetland margins. The Big Sioux Basin ecoregion is a trough that penetrates the core of the Prairie Coteau and is characterized by a well-developed drainage network with more tilled agriculture due to the general lack of wetlands and gentler topography than within the Prairie Coteau. Project elevations range from approximately 1,920 to 2,031 feet above mean sea level (fmsl) in the Prairie Coteau region and from approximately 1,833 fmsl to 2,023 fmsl in the Big Sioux Basin. The Project is located entirely on private land, which includes undeveloped rural areas, agricultural lands, and residential farmsteads.

The Tier 1 Preliminary Site Evaluation and coordination with USFWS and SDGFP identified species of concern with the potential to occur within the Project Area.

The following species are evaluated in detail to determine the likelihood of occurrence within the Project Area in Section 4.1:

- Bald eagle and golden eagle (federally protected; BGEPA),
- Osprey (*Pandion haliaetus*) (state threatened),
- Piping plover (*Charadrius melodus*) (federally threatened),
- Prairie grouse – greater prairie-chicken (*Tympanuchus cupido*) and sharp-tailed grouse (*Tympanuchus phasianellus*) (neither species is federally or state-listed; however, prairie grouse leks are of interest to USFWS and SDGFP),
- Red knot (*Calidris canutus*) (federally threatened),

- Whooping crane (*Grus americana*) (federally endangered),
- Northern long-eared bat (*Myotis septentrionalis*; NLEB) (federally threatened),
- Northern river otter (*Lontra canadensis*) (state threatened),
- Prairie butterflies – Dakota skipper (*Hesperia dacotae*) (federally threatened) and Poweshiek skipperling (*Oarisma poweshiek*) (federally endangered),
- Blacknose shiner (*Notropis heterolepis*) (state endangered),
- Northern redbelly dace (*Chrosomus eos*) (state threatened),
- Banded killifish (*Fundulus diaphanous*) (state endangered), and
- Topeka shiner (*Notropis topeka*) (federally endangered).

3.2.2 Tier 2 Project Area

Consistent with Tier 2-Project Area Evaluation recommendations of the WEG, field evaluations were conducted at the proposed Project Area. During ground-based surveys completed for previous iterations of the Project, biologists observed habitats and site conditions, which were then used to evaluate the initial results of the desktop study and to inform the assessment of the potential occurrence of sensitive wildlife resources. Subsequent Project re-designs modified the Project Area to avoid non-wildlife constraints, wetlands, and high-quality native prairie to the extent possible. The site visits confirmed that the existing land use in the Project Area is primarily agricultural. There are rural residences and farmsteads located within the Project Area.

There are no major rivers or lakes within the Project Area; however, the Project Area contains numerous streams and wetlands that vary from shallow vegetated depressions to man-made cattle ponds and intermittent creeks. Two named streams and multiple unnamed tributaries to these streams are located within the Project Area. Trees and forested areas are sparsely scattered throughout the Project Area and are restricted mainly to riparian areas and to windbreaks around fields and residences.

3.2.3 Baseline Habitat Management

The habitat within the Project Area is primarily agriculture and pasture vegetation typical of South Dakota. According to the USDA, the majority of the Project Area is herbaceous (67.2 percent) and grass/pasture (25.9 percent) (Table 2, Figure 3), all of which is managed by private landowners. Crop sales are primarily grains, oil seeds, dry beans, and dry peas; cattle, hogs, and sheep comprise the majority of livestock sales in the Project Area (Census of Agriculture 2012). There are no federally managed habitats within the Project Area. The Project Area contains USFWS conservation easements. These are discussed in Section 4.1.1.2.

4 PROJECT HISTORY OF BIRD, BAT, AND SPECIES OF CONCERN PRESENCE AND RISK ASSESSMENTS

4.1 Tier 1: Preliminary Site Evaluation

4.1.1 Decision to Abandon or Move Forward

4.1.1.1 ARE SPECIES OR HABITATS OF CONCERN PRESENT?

Native prairie and the following special-status wildlife species were identified as potentially present within the Project Area and were therefore evaluated in detail to determine the likelihood of occurrence within the proposed Project Area and potential risks to these species and their habitats.

4.1.1.1.1 Habitat

Native Prairie

The NLCD class “herbaceous” includes land currently not used for hay/pasture or cropland, but that may or may not have been disturbed in the past. These areas likely provide suitable habitat for grassland and some prairie species. However, Bauman et al. (2016) conducted a GIS exercise to quantify undisturbed lands in eastern South Dakota that are most likely to support native, undisturbed prairie that, in turn, are more likely to support prairie obligate and sensitive species. This exercise is described below.

Bauman et al. (2016) utilized South Dakota Farm Service Agency’s 2013 Common Land Unit data layers, and the 2012 USDA National Agriculture Imagery Program county mosaic aerial imagery, to evaluate approximately 22.6 million acres of land in the 44 counties that comprise eastern South Dakota. Land currently under crop production, or that has in the past been used for crop production, was removed from consideration for the exercise. This was followed by manual removal of other disturbed areas. The remaining land tracts were then categorized as potentially “undisturbed grassland” or “undisturbed woodland.” Water bodies larger than 40 acres as defined by the SDGFP’s Statewide Water Bodies layer were then removed to allow a more accurate interpretation of the remaining undisturbed grassland/wetland complex. The resulting dataset provides an indication of the location of likely undisturbed grasslands that may support native prairies and provide habitat for prairie species (Bauman et al. 2016). According to Bauman et al. (2016), 647 discrete tracts of land may support native prairie within the Project Area. These tracts range in size from less than 0.1 to 454.4 acres, with an average size of 17.9 acres. The total acreage of land that may contain native prairie habitat within the Project Area according to Bauman et al. (2016) is approximately 11,599.9 acres.

USFWS and SDGFP identified native prairie as a habitat of concern because it may support the Dakota skipper, Poweshiek skipperling, or grassland bird species of concern. See Section 5.1 for additional assessment results.

4.1.1.1.2 Insects

Prairie Butterflies – Dakota Skipper and Poweshiek Skipperling

The Dakota skipper is an obligate of undisturbed, native prairies, and generally inhabits wet lowlands dominated by bluestem grasses, or dry uplands that are a mix of bluestem and needle stem grasses (Vaughn 2005). Larvae have been observed feeding on several grasses, although little bluestem (Schizachyrium scoparium) is the preferred food source; the preferred nectar source for adults is purple coneflower (Echinacea angustifolia) (Vaughn 2005), in addition to other prairie flowering species. As of 2002, Dakota skippers had been recorded at 53 sites in 10 counties in South Dakota, including two sites in Codington County and five sites in Deuel County (USFWS 2002). Of the Dakota Skipper sites recorded in Codington and Deuel Counties, none are within the Project Area. The closest occurrence is approximately 0.12 miles east of the Project Area near Round Lake in Deuel County. No designated critical habitat for the Dakota skipper is within the Project Area. The nearest critical habitat is in Deuel County, approximately 5 miles east of the Project Area. Dakota skippers have not been recorded in the Project Area (USFWS 2017a).

The Poweshiek skipperling lives in high quality tallgrass prairie in both upland, dry areas and low moist areas (USFWS 2014). Nectar species for the Poweshiek skipperling include purple coneflower, black-eyed Susan (*Rudbeckia hirta*), palespike lobelia (*Lobelia spicata*), and other flowering prairie species. There is no definitive research available regarding which plant species are necessary for larvae to develop, but they appear to select fine-stemmed grasses and sedges, such as slender spike rush (*Eleocharis elliptica*), prairie dropseed (*Sporobolis heterlepis*), and little bluestem (Shepherd 2005; USFWS 2014). Skadsen (2015) suggests the Poweshiek skipperling may be extirpated from South Dakota. See Section 5.1 for additional assessment results.

4.1.1.1.3 Birds

Bald Eagle and Golden Eagle

Bald eagles typically occupy habitat near large rivers, lakes, and marshes with available food sources (USFWS 2007). They build stick nests as large as 10 ft. in diameter in trees and occasionally on human-made structures (USFWS 2007). Skadsen (2017) identifies the bald eagle as an “uncommon migrant” in northeast South Dakota. The golden eagle nests primarily west of the Missouri River in South Dakota, usually on cliffs, rocky outcrops, and in large trees (Kochert et al. 2002; Pulkrabek and O’Brien 1974). Skadsen (2017) lists the golden eagle as a “rare migrant” in northeast South Dakota. See Section 5.2 for additional assessment results.

Osprey

Ospreys inhabit areas near large water bodies that support their prey, which consists almost exclusively of fish (SDGFP 2017a). Their nest sites include large trees on or near water bodies, with preference to locations that offer separation from surrounding vegetation to avoid predators (SDGFP 2017a). The Project Area contains aquatic resources which may have the potential to support osprey prey resources, though forested areas with available nesting sites are limited throughout the Project Area. See Section 5.2 for additional assessment results.

Piping Plover

Within South Dakota, piping plovers breed and nest on open beaches, alkaline wetlands, and sandflats (Aron 2005). In the Northern Great Plains, the nesting season extends from late April through August, with peak activity in May and June (Aron 2005). Nests consist of shallow scrapes in the sand lined with rocks or small shells (Aron 2005). The SDGFP (2016) lists the piping plover as known to have occurred in Codington County but not in Deuel County or Grant County; however, the USFWS (2017b) does not list the species as a known or potential occurrence in Codington County. The Platte River Recovery Implementation Program (PRRIP) (2017) indicates that the species nests primarily on the Missouri River, downstream of the Gavins Point (approximately 135 miles south of Project Area) and Fort Randall Dams (approximately 145 miles southwest of Project Area), with some nesting on tributaries of the Missouri. The PRRIP (2017) also states that piping plovers have been observed at Horseshoe Lake in western Codington County, approximately 16 miles west of the Project Area. See Section 5.2 for additional assessment results.

Prairie Grouse

The greater prairie-chicken and sharp-tailed grouse may be present in the Project Area. These species are not federally or state-listed as threatened or endangered. Current research suggests that certain grouse species may avoid anthropogenic structures (Hagen et al. 2011; USFWS 2012); however, long-term data sets are still needed to assess wind energy impacts (Johnson et al. 2012). Regardless, state and federal wildlife agencies have regularly expressed concern about the locations of wind turbines with respect to grouse leks. Leks are breeding grounds where grouse congregate, and males engage in communal breeding displays during the spring (Connelly et al. 1998). See Section 5.2 for additional assessment results.

Red Knot

The red knot is a shoreline species that breeds in drier Arctic tundra areas that generally are sparsely vegetated. Nests are cup-shaped depressions lined with vegetation and located on the ground. Outside of the breeding season, the species primarily is found in marine habitats, especially near coastal inlets, estuaries, and bays (Harrington 2001). The species may be present in South Dakota as a migrant or accidental occurrence but breeding or wintering populations have not been observed (Harrington 2001). See Section 5.2 for additional assessment results.

Whooping Crane

South Dakota is within the whooping crane migration corridor and the species may stopover in suitable habitat including cropland and pastures, wet meadows, shallow marshes, shallow portions of large water bodies, and both freshwater and alkaline basins. The Project Area is approximately 50 miles east of the 95 percent core migration corridor (as delineated by Pearse et al. 2018a and 2018b; Figure 4) at its closest, indicating that it is relatively less likely for the species to be present within the Project Area than in areas closer to the migration corridor. According to the USFWS Whooping Crane Tracking Project Database, the closest whooping crane observation is from 1973, approximately 23.5 miles northwest of the Project Area. See Section 5.2 for additional assessment results.

4.1.1.1.4 Mammals

Northern Long-eared Bat

Summer habitat for NLEB consists of forested areas with trees greater than 3 inches in diameter at breast height (USFWS 2017b). NLEB roost in live trees and/or snags that have exfoliating bark, cracks, crevices, and/or cavities (USFWS 2017b). 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 2017b). NLEB also may roost in human-made structures such as buildings, barns, bridges, and bat houses (USFWS 2017b). The species hibernates in caves, mines, or other cave-like structures during the winter. The USFWS lists the NLEB as possibly present in Codington, Deuel, and Grant Counties, indicating that the counties are within the range of the species and may contain suitable habitat. However, there are no records of the species being present in these counties (USFWS 2017a). The nearest county records published by the USFWS indicating known presence of the NLEB are in Brookings County to the south of the Project and in Roberts County to the north (USFWS 2017b).

The USFWS cites White Nose Syndrome, a fungal pathogen specific to bats, as the primary cause for the decline of the species, rather than habitat removal (USFWS 2016a). NLEB was listed as a threatened species with a final 4(d) rule on April 2, 2016 (USFWS 2016a). The 4(d) rule prohibits purposeful take of the species range-wide. Within the “WNS Zone” (counties within 150 miles of known occurrences of the pathogen that causes white-nose syndrome) incidental take resulting from specified activities is prohibited during certain times of year. The Project Area is within the WNS Zone, therefore incidental take that results from operation of utility-scale wind-energy turbines currently is not prohibited. Additionally, incidental take that results from tree-clearing activities is not prohibited, unless it occurs within 0.25 mile of a known NLEB hibernacula or within 150 feet of a known maternity roost tree between June 1 and July 31. See Section 5.3 for additional assessment results.

Northern River Otter

Northern river otters can occupy many types of habitat; however, riparian vegetation along a wetland margin is a key habitat feature (SDGFP 2012). This species is more prevalent in areas with abundant food and limited disturbance (SDGFP 2012). Northern river otters and beavers are closely associated; the northern river otter exploits dens, downed trees, ponds, and prey that thrive in beaver ponds (SDGFP 2012). The northern river otter was reintroduced into the Minnesota River valley in 1980 and 1981 (Skadsen 2016a). Since then, Skadsen (2016a) reports that the population has expanded its range and the species now is frequently observed in Grant County along the Yellowbank River drainages, which extend to approximately 2 miles east of the Project Area, and along other tributaries and lakes within the Minnesota River valley, which lies approximately 25 miles northeast of the Project Area. However, it is unknown whether northern river otters frequently use these tributaries in Codington and Deuel Counties (SDGFP 2012). The Project Area contains streams and other open water habitat which have the potential to support northern river otters. The closest documented observation of the northern river otter was along an unnamed tributary to Hidewood Creek approximately 3.1 miles southeast of the Project Area (South Dakota Natural Heritage Database spatial data accompanying correspondence provided in Appendix A). Due to the limited habitat, it is unlikely that northern river otters would occur within the Project Area and no significant impacts to suitable habitat are anticipated from the Project; therefore, this species was eliminated from further consideration in this WCS.

4.1.1.1.5 Fish

Northern Redbelly Dace

The northern redbelly dace is a small olive to dark brown-colored fish native to eastern South Dakota that prefers quiet spring-fed areas of streams, bogs, and beaver ponds with aquatic vegetation (SDGFP 2017c). It is found within tributaries to the Missouri, Minnesota, Big Sioux, White, Niobrara, and Keya Paha River drainages. McCoy and Hales (1974) observed the northern redbelly dace in both the North and South Forks of the Yellowbank River in Grant County in 1973 (SDNHD spatial data accompanying correspondence provided in Appendix A), but the species was not observed during subsequent surveys (Burgess and Shearer 2008; Dieterman and Berry 1996). It is hypothesized that the species may be extirpated from northeast South Dakota (Skadsen 2016b). Tributaries to the North Fork of the Yellow Bank River are not present within the Project Area. There is no information available to determine whether the northern redbelly dace currently inhabits streams within the Project Area. Due to the limited habitat, it is unlikely that northern redbelly dace would occur within the Project Area and no significant impacts to suitable habitat are anticipated from the Project; therefore, this species was eliminated from further consideration in this WCS.

Blacknose Shiner

The blacknose shiner is a small minnow native to eastern South Dakota, and is found in tributaries to the Minnesota, Big Sioux, James and Keya Paha River drainages. The species prefers cool, clear streams with deep pools, abundant vegetation and sandy to gravel substrates (SDGFP 2017b). Historical records exist for the Little Minnesota River and Lake Traverse, neither of which are in Grant County (Bailey and Allum 1962). Skadsen (2016b) lists the blacknose shiner as likely extirpated from northeast South Dakota. Additional tributaries to the Big Sioux River do occur in the Project Area, and the SDGFP (2016) indicates that the species is known from Grant County. However, there is no information available to determine whether the blacknose shiner currently inhabits streams in the Project Area. Due to the limited habitat, it is unlikely that blacknose shiners would occur within the Project Area and no significant impacts to suitable habitat are anticipated from the Project; therefore, this species was eliminated from further consideration in this WCS.

Banded Killifish

The banded killifish is a small olive-colored fish with yellow sides and green-brown vertical bands, native to eastern South Dakota. The species prefers quiet, shallow lakes, ponds, and streams with abundant vegetation and sandy-gravel substrates, though it has also been detected in streams with muddy bottoms and no aquatic vegetation (SDGFP 2018). The banded killifish is found in tributaries to the James, Vermillion, and Big Sioux River basins (SDGFP 2014). Since 2000, the species only has been reported from the inlet of Bitter Lake in Day County and Little Eureka Lake in McPherson County. The SDGFP (2016b) indicates that the species is known from Deuel County and tributaries to the Big Sioux River do occur in the Project Area; however, there is no information available to determine whether the banded killifish currently inhabits streams in the Project Area or Project Construction Easement.

Topeka Shiner

The Topeka shiner is a small minnow native to eastern South Dakota, and is found within tributaries to the James, Vermillion, and Big Sioux drainages. The species prefers a variety of habitats including runs, pools, and backwater areas in cool, perennial streams. Occupied

streams typically are groundwater-fed; and have high water quality, clean gravel substrates, and vegetated banks (Shearer 2003). Shearer (2003) synthesized available occurrence data and identified 16 streams where the Topeka shiner was observed before 1997, and 38 streams where the species was observed between 1997 and 2002. While one of those streams is in Codington County, two of the streams occur within Deuel County, though they are not located within the Project Area. However, recent observations of the species from 2005 and 2009 do exist from Willow Creek and a tributary to Willow Creek, in Codington County (SDNHD spatial data accompanying correspondence provided in Appendix A). Portions of these streams are located within the northwest portion of the Project Area. Additional tributaries to the Big Sioux River do occur in the Project Area, and the USFWS (2017b) lists the species as known from Codington and Deuel Counties. There is no information available to determine whether the Topeka shiner currently inhabits streams in the Project Area or Project Construction Easement. However, Crowned Ridge elected to avoid potential impacts to aquatic habitat with the potential to support the Topeka shiner by implementing conservation measures when working near Willow Creek. Collection lines intersecting Willow Creek will be bored, avoiding direct impacts to the aquatic resource. Additionally, adjacent work areas will be reseeded and stabilized directly following construction activities to avoid indirect impacts to Willow Creek. Therefore, no impacts to Topeka shiner habitat are expected.

4.1.1.2 DOES THE LANDSCAPE CONTAIN AREAS PRECLUDED BY LAW OR AREAS THAT ARE DESIGNATED AS SENSITIVE?

USFWS, the U.S. Forest Service, and SDGFP maintain conservation areas to help preserve habitats critical to migratory birds and other sensitive species (e.g., recreation areas, National Wildlife Refuges [NWRs], state wildlife areas). Public lands within the Project Area consist of privately-owned lands that are leased by the SDGFP as Waterfowl Production Areas, Game Production Areas, and Walk-in Areas (WIAs) (Crowned Ridge 2019). Waterfowl Production Areas are managed to protect habitat for waterfowl and migratory birds. Game Production Areas are managed to provide wildlife habitat, improve production of wildlife, and provide opportunities for wildlife viewing and hunting. WIAs allow public hunting on private lands with agreements lasting one to three years. Conservation easements within the Project Area include USFWS wetland easements, grassland easements, wetland/grassland combination easements, and Farmers Home Administration (FHA) easements. There are approximately 1,692.8 acres of wetland, grassland, wetland/grassland combination, and FHA easements in the Project Area (Crowned Ridge 2019). Within wetland easements, the USFWS and private landowners agree to avoid impacts to specific wetlands. These wetlands are referred to as protected basins.

4.1.1.3 ARE THERE CRITICAL AREAS OF WILDLIFE CONGREGATION?

There are no critical areas of wildlife congregation within the Project Area.

4.1.1.4 IS THERE POTENTIAL TO FRAGMENT LARGE, INTACT HABITATS FOR SPECIES THAT ARE SENSITIVE TO HABITAT FRAGMENTATION?

To date, USFWS has not identified any specific species of habitat fragmentation concern for the Project (Appendix A). Much of the Project Area already is fragmented and in use as pasture or crop production. A network of county roads exists throughout the Project Area; although these roads are not barriers to most wildlife movement, their presence disrupts the continuity of the landscape, contributing to habitat fragmentation. There are patches of native prairie that could be sensitive to further habitat fragmentation; however, due to the existing fragmented nature of

the Project Area, impacts are unlikely. In addition, Crowned Ridge has avoided siting turbines and other associated Project facilities in areas of high-quality native prairie to the extent possible and will restore impacts to native prairie using native vegetation (weed-free) seed mixes (see Sections 5.1 and 6.1 regarding Dakota skipper).

4.2 Tier 2: Site Characterization

4.2.1 Abandon Site or Advance to Field Surveys?

4.2.1.1 ARE PLANT COMMUNITIES OR VEGETATION HABITATS OF CONSERVATION PRESENT?

Native prairie was the only plant community of conservation concern detected within the Project Area during the Tier 1 Site Evaluation or Tier 2 Site Characterization. Crowned Ridge determined that high quality native prairie would be avoided by the Project to the extent possible and any impacts to native prairie habitat will be restored using native vegetation (weed-free) seed mixes.

4.2.1.2 WHAT SPECIES OF BIRDS AND BATS ARE LIKELY TO USE THE PROPOSED SITE?

4.2.1.2.1 Birds

South Dakota has 438 documented bird species (South Dakota Ornithologists' Union [SDOU] 2018), and is situated within the Central Flyway, one of several broad bird migratory routes in North America (USFWS 2011). During fall migration, most birds that move along the Central Flyway travel from breeding grounds as far away as Alaska and northern Canada through the central states, eventually reaching wintering grounds near the Gulf of Mexico, and as far away as South America (USFWS 2011). Resident and migratory birds use the Project Area for foraging, hunting, shelter, breeding and nesting, and possibly as a stopover site during migration.

Species present within the Project Area are likely to be common grassland/agriculture species of South Dakota. Waterfowl and waterbird species are likely to use the wetlands as breeding and migratory stopover areas. Raptor species breeding in the Project Area are likely to be in low numbers, and mostly restricted to species adapted to open grassland and agricultural habitats such as great-horned owl, red-tailed hawk, and northern harrier. Grassland species have the potential to occur within the native prairie that occurs within the Project Area. To determine the species that are likely to use the Project Area, Crowned Ridge reviewed the results from the closest National Audubon Society Christmas Bird Count (CBC) count circle and USGS Breeding Bird Survey (BBS) route, summarized below.

Christmas Bird Count

One of the closest non-urban or suburban CBCs to the Project Area is the Waubay NWR (abbreviated SDWA) located approximately 28.9 miles from of the Project Area (National Audubon Society 2018). There are 70 species that have been observed during the SDWA CBC over the last 10 years, including two BCC species (2008–2017) (Table 3). There have been no federally listed threatened or endangered species observed during the SDWA CBC over the last 10 years.

Breeding Bird Survey

The nearest USGS BBS for which data was publicly available is the Wilmot Survey Route (#81017), approximately 15 miles to the north-northeast of the Crowned Ridge I wind project boundary (near the town of Wilmot) and situated along similar agriculture and grassland habitats. The Wilmot Survey Route has documented 84 species of birds that potentially breed in the area over the last five years (Table 4). Most of these species prefer grassland habitat, agricultural areas, or wetland habitat. The Project Area is approximately 67 percent agricultural, 26 percent grass/pasture, and less than 0.8 percent wetland habitat (woody wetlands, herbaceous wetlands, open water), indicating that similar species could breed in the Project Area. The exception to this involves species that prefer wetlands, which may occur in fewer numbers due to the paucity of wetlands within the Project Area. Six BCC species were observed along the survey route (Table 4).

Birds of Conservation Concern

The Project Area is in BCR 11 (USFWS 2008a). There are 27 BCC species listed within BCR 11 meaning they may also occur within the Project Area (Table 5). None of the BCC species are listed as federally endangered or threatened; however, two species were previously federally listed and have been delisted (bald eagle and peregrine falcon). Five species (solitary sandpiper, Hudsonian godwit, buff-breasted sandpiper, short-billed dowitcher, and Smith's longspur) are non-breeding migrants that may pass through the region, and possibly the Project Area, during spring and fall migration. Four BCC species for BCR 11 were observed during 2017 avian surveys (bald eagle, chestnut-collard longspur, grasshopper sparrow, and upland sandpiper).

BCC species were detected on nearby CBC and BBS surveys. Two BCC species (bald eagle, short-eared owl) have been observed within the last 10 years during the SDWA CBC. Six BCC species (American bittern, bald eagle, upland sandpiper, marbled godwit, red-headed woodpecker, and grasshopper sparrow) have been detected along the nearby BBS route over the last five years, only one of which (grasshopper sparrow) prefers grassland habitat and therefore also could be found within the Project Area. The remaining five BCC species mostly prefer wetlands and/or woodland habitat, which each comprise less than 0.8 percent of the Project Area; therefore, it is not expected that these species would occur within the Project Area.

4.2.1.2.2 Bats

Six bat species have potential to occur within the Project Area: eastern red bats, silver-haired bats, hoary bats, NLEB, little brown bats, and big-brown bats. SWCA cross-referenced these species' requirements with availability of suitable habitat in the Project Area, reviewed occurrence records, and coordinated with USFWS to determine seasonal likelihood of occurrence for each species.

The only federally listed species with potential to occur within the Project Area is NLEB. There is limited suitable habitat for NLEB within the Project Area, typically in the form of wooded riparian corridors, small woodlots, and isolated forest patches. As a forest interior species, NLEB requires contiguous forest blocks of 15 or greater acres and prefers forested blocks of greater than 114 acres (Crowned Ridge 2019: Appendix E). The Project Area contains 123 total acres of forested blocks that individually are between 15 and 114 acres, and no forested blocks that individually are 114 acres or greater (Crowned Ridge 2019: Appendix E). These acreages represent a combined 0.2 percent of the Project Area qualifying as suitable roosting and/or

foraging habitat. The habitat available within the Project Area is similar in availability and density to the surrounding landscape, indicating that there is no regionally unique habitat that would serve as an attractant for NLEBs to the Project Area. Furthermore, the USFWS has stated that there is low likelihood of NLEBs occurring within the Project Area as a summer resident (USFWS personal communication, 2018) (see Crowned Ridge 2019, Appendix E). There is potential for the NLEB to occur within the Project Area as a migrant during the spring and fall, though migration behavior of the species is poorly understood.

Based on habitat suitability and availability, the remaining species with potential to occur have varying likelihoods of occurrence throughout the year (Crowned Ridge 2019: Appendix E).

4.2.1.3 IS THERE POTENTIAL FOR SIGNIFICANT ADVERSE IMPACTS TO THOSE SPECIES?

The Tier 1 and Tier 2 evaluation results show low potential for significant adverse impacts regarding birds, bats, or other wildlife species or their habitats within the Project Area. Based on the habitat present, abundance of cultivated crops, and the distance from major waterbodies and other wildlife attractants, no significant, unavoidable adverse impacts to species or habitats of concern were identified.

4.2.1.4 IS THERE A HIGH PROBABILITY OF SIGNIFICANT ADVERSE IMPACTS THAT CANNOT BE AVOIDED OR MINIMIZED?

The site-specific characterization was consistent with the Tier 1 Site Evaluation in that there was a low probability of significant adverse impacts on wildlife or their habitats. Therefore, Crowned Ridge decided to move forward with focused field studies of the Project Area to further evaluate the presence of bird and bat species. The data resulting from those studies are used to inform this WCS.

5 TIER 3: FIELD STUDIES

Based on the results of the Tier 1 and Tier 2 analysis, Crowned Ridge conducted Tier 3 field studies in accordance with the USFWS Land-based WEG (USFWS 2012) to better understand potential risks to wildlife from development of the Project. Surveys conducted at the Project are summarized in Table 6 and described in detail in this section.

5.1 Prairie Butterflies – Dakota Skipper and Poweshiek Skipperling

5.1.1 Methods

Crowned Ridge completed a thorough desktop and field-verified habitat assessment for potentially suitable Dakota skipper and Poweshiek skipperling habitat in the Project Area (Crowned Ridge 2019: Appendix F). Based on habitat assessment results, “adult presence/absence survey areas” were identified (Crowned Ridge 2019: Appendix F). In these areas, Crowned Ridge completed three rounds of Dakota skipper and Poweshiek skipperling adult presence/absence surveys between June 28 and July 12, 2018, with 48 hours’ spacing between each survey round and in accordance with the USFWS’s 2018 Dakota Skipper

Protocol. The surveys were led by Mr. Jake Powell, SWCA (Permit Number TE64070B-1) and fell within the adult flight period of both species.

Prior to the survey, Crowned Ridge obtained USFWS concurrence with proposed survey methods. All observed butterfly species were documented, and a general count of flowering plants was conducted.

5.1.2 Results

No Dakota skippers or Poweshiek skipperlings were observed.

5.2 Birds

The following surveys were conducted to assess bird presence and use of the Project Area.

5.2.1 Methods

5.2.1.1 AVIAN USE SURVEYS

Avian use surveys for the Project Area were completed April 1, 2017 through November 30, 2017 with the objective of characterizing activity, spatial distribution, and relative abundance of avian species (Crowned Ridge 2019: Appendix H). Crowned Ridge completed large bird use surveys and small bird use surveys in accordance with recommendations set forth in the WEGs. Point count surveys were conducted at 29 locations throughout the Project Area with 800-meter and 100-meter buffers for large and small bird surveys, respectively (Figure 5). A total of 230 surveys across the 29 points were completed during the survey.

5.2.1.2 RAPTOR NEST SURVEYS

Two raptor nest aerial surveys were completed in 2017 and one was completed in 2018 to identify nesting raptors and to provide spatial and species information (Crowned Ridge 2019: Appendix G). Biologists surveyed for all raptor nests within the Project Area and a 2-mile (3.2-kilometer) buffer. Biologists surveyed specifically for eagle nests with the Project Area and a 10-mile (16-kilometer) buffer. Additionally, a raptor nest survey will be completed in April 2020 prior to construction to verify previous survey results or to update information if needed.

5.2.1.3 WHOOPING CRANE HABITAT ASSESSMENT

Crowned Ridge completed a desktop assessment to identify potentially suitable whooping crane habitat in the Project Area plus a 1-mile buffer. The assessment followed methods outlined in The Watershed Institute's (TWI's) Potentially Suitable Habitat Assessment for the Whooping Crane (TWI 2013).

5.2.2 Results

5.2.2.1 AVIAN USE SURVEYS

Crowned Ridge recorded 471 large bird observations. Flight altitudes for 275 of the 471 observations occurred at 0 to 200 meters (m) above ground level; however, 209 of the 275 observations (44.4 percent) occurred at a height below 30 m, which is outside of the typical

turbine rotor-swept area (RSA). Surveyors recorded one large bird species recognized by the USFWS as a bird of conservation concern within the Project Area: bald eagle (USFWS 2008). Ten raptor species were observed: American kestrel (*Falco sparverius*), bald eagle, Cooper's hawk (*Accipiter cooperii*), merlin (*Falco columbarius*), northern goshawk (*Accipiter gentilis*), northern harrier (*Circus cyaneus*), red-tailed hawk, rough-legged hawk (*Buteo lagopus*), sharp-shinned hawk (*Accipiter striatus*), and Swainson's hawk. No golden eagles were observed within the Project Area. Twenty-three non-raptor large bird species were recorded: American crow (*Corvus brachyrhynchos*), American white pelican (*Pelecanus erythrorhynchos*), American wigeon (*Anus americana*), blue-winged teal (*Spatula discors*), Canada goose (*Branta canadensis*), doublecrested cormorant (*Phalacrocorax auritus*), Franklin's gull (*Leucophaeus pipixcan*), gadwall (*Mareca strepera*), great blue heron (*Ardea herodias*), great egret (*A. alba*), greater prairie chicken (*Tympanuchus cupido*), greater yellowlegs (*Tringa melanoleuca*), lesser yellowlegs (*T. flavipes*), mallard (*Anas platyrhynchos*), northern shoveler (*Anas clypeata*), ring-billed gull (*Larus delawarensis*), ring-necked pheasant (*Phasianus colchicus*), sandhill crane (*Grus canadensis*), snowy egret (*Egretta thula*), snow goose (*Chen caerulescens*), turkey vulture (*Cathartes aura*), Wilson's snipe (*Gallinago delicata*), and wild turkey (*Meleagris gallopavo*). All species observed during the 8-month survey period are considered typical for the region and seasons of observation.

In total, 637 small bird observations of 54 species were made during the surveys. Flight altitudes for all of the 637 observations occurred at 0 to 200 m above ground level; however, 604 of the 637 observations (94.8 percent) occurred at a height below 30 m, which is outside the turbine rotor swept area. Biologists recorded three small bird species recognized by the USFWS as birds of conservation concern within the Project Area: the chestnut-collard longspur (*Calcarius ornatus*), grasshopper sparrow (*Ammodramus savannarum*), and upland sandpiper (*Bartramia longicauda*) (USFWS 2008). Western meadowlark (*Sturnella neglecta*), red-winged blackbird *(Agelaius phoeniceus*), and American robin (*Turdus migratorius*) accounted for 219 (34.4 percent) of all observations. A complete list of observed species is provided in the Avian Use Survey Report (Crowned Ridge 2019: Appendix H). All species observed during the 8-month survey period are considered typical for the region and seasons of observation.

5.2.2.2 RAPTOR NEST SURVEYS

5.2.2.2.1 Non-Eagle Raptors

The 2017 surveys identified 20 non-eagle raptor nest structures within the 2-mile buffer survey area. Six of these nests were considered occupied and 14 nests were considered unoccupied. Three occupied non-eagle raptor nests (two red-tailed hawk [*Buteo jamaicensis*] nests, one Swainson's hawk [*Buteo swainsoni*] nest) were observed within the Project Area. Three occupied non-eagle raptor nests (one red-tailed hawk nest, two Swainson's hawk nests) were observed outside the Project Area within the 2-mile buffer (Figure 6).

The 2018 survey identified 37 non-eagle raptor nest structures within the 2-mile buffer survey area. Eleven nests were considered occupied and 26 nests were considered unoccupied. Six occupied non-eagle raptor nests (four red-tailed hawk nests, two great-horned owl [*Bubo virginianus*] nests) were observed within the Project Area. Likewise, five occupied non-eagle raptor nests (four red-tailed hawk nests, one unknown nest) were observed outside the Project Area within the 2-mile buffer (Crowned Ridge 2019: Appendix G) (Figure 6).

5.2.2.2.2 Eagles

During the 2017 surveys, one occupied bald eagle nest and one unoccupied bald eagle nest were observed within the 2-mile buffer and outside the Project Area (3,256 feet and 5,166 feet, respectively). Two occupied bald eagle nests and two unoccupied bald eagle nests were identified within the 10-mile buffer and beyond the 2-mile buffer. No bald eagle nests were observed within the Project Area (Figure 6).

During the 2018 surveys, three occupied bald eagle nests and one unoccupied eagle nest were observed within the 2-mile buffer and outside the Project Area (4,691 feet, 5,166 feet, 9,314 feet, and 3,256 feet, respectively). Three occupied bald eagle nests and one unoccupied bald eagle nest were identified within the 10-mile buffer and beyond the 2-mile buffer. No bald eagle nests were observed within the Project Area (Crowned Ridge 2019: Appendix G) (Figure 6).

5.2.2.3 WHOOPING CRANE HABITAT ASSESSMENT

In total, 85 wetlands, totaling 2,419.6 acres, scored 12 or higher. The Watershed Institute considers a habitat score of 12 or higher as potential suitable habitat. Twenty-five of these 85 wetlands, totaling 95.0 acres, overlapped the Project Area. These wetlands comprise only 0.2 percent of the total Project Area.

5.2.3 Species of Concern

No federally listed threatened or endangered species were observed during avian use surveys, raptor nest surveys, or as incidental observations. As described in Section 4.2.1.2.1, four BCC species for BCR 11 were observed during 2017 avian surveys (bald eagle, chestnut-collard longspur, grasshopper sparrow, and upland sandpiper). Species of concern with the potential to occur within the Project Area are discussed below.

5.2.3.1 BALD EAGLE AND GOLDEN EAGLE (FEDERALLY PROTECTED UNDER BGEPA)

Several avian use and raptor nest surveys have been completed for nearby study areas, for earlier iterations of the Project Area, and for the Project Area. Surveys indicate the presence of bald eagles in and near the Project; however, no golden eagles were observed during recent surveys. In 2015, studies in a nearby study area indicated bald eagles were present; however, no golden eagles were observed (Tetra Tech 2015). A total of 453 hours of survey were conducted over all four seasons during the 2015 survey, during which four bald eagles and zero golden eagles were observed (Tetra Tech 2015). The timing of the sightings suggests that observed individuals likely were migrants and not resident breeding adults (Tetra Tech 2015). In the spring and fall of 2008, avian surveys were conducted for an earlier iteration of the Project in Grant, Codington, Deuel, and Brookings Counties (Tetra Tech 2008a, 2008b). Three golden eagles and zero bald eagles were observed (Tetra Tech 2008a, 2008b).

Most recently, large bird use surveys were completed for the current Project Area from April through November 2017 (see Section 5.2.2.1). A total of 230 surveys across 29 points were completed. Six bald eagle observations were made within the Project Area; no golden eagle observations were made. Raptor nest aerial surveys conducted in 2017 and 2018 identified no bald or golden eagle nests within the Project Area, but several bald eagle nests within 10 miles of the Project Area (Section 5.2.2.2.2). The closest occupied bald eagle nest observed was in 2017 approximately 5,174 feet from the Project Area boundary. In 2018, the closest occupied

bald eagle nest observed was approximately 3,274 feet from the Project Area boundary. No golden eagles were observed during 2017 through 2018 Project Area surveys.

Although the landscape within the Project Area does not support any large waterbodies or an abundance of smaller waterbodies that would attract bald eagles for nesting or foraging, the presence of occupied bald eagle nests in the vicinity of the Project Area suggests that the species may occasionally hunt or pass through the Project Area during the breeding season.

Golden eagles have a low likelihood of breeding within the Project Area due to a lack of suitable nesting habitat; however, the species may hunt or pass through the Project Area during any time of the year. The combination of no golden eagle sightings during 2017 avian use surveys with no habitat features that would concentrate golden eagles within the Project Area compared to the surrounding area suggests a low likelihood of golden eagle occurrence in the Project Area.

5.2.3.2 OSPREY (STATE THREATENED)

No ospreys were observed during avian use and raptor nest surveys for nearby study areas, for earlier iterations of the Project Area, or for the Project Area. Most recently, avian use surveys were completed in the Project Area from April through November 2017. A total of 230 surveys across 29 points were completed. No ospreys were observed within the Project Area. Raptor nest aerial surveys were conducted in 2017 and 2018; no osprey nests were identified within the Project Area or within 2 miles of the Project Area.

Osprey have a low likelihood of breeding within the Project Area due to a lack of suitable nesting habitat. This, combined with no osprey observations during the avian use surveys, suggests a low likelihood for osprey to occur within the Project Area.

5.2.3.3 PIPING PLOVER (FEDERALLY THREATENED)

No piping plovers were observed during avian use surveys for nearby study areas, for earlier iterations of the Project Area, or for the Project Area. Most recently, avian use surveys were completed for the current Project Area from April through November 2017. Point count surveys were conducted at 29 locations throughout the Project Area. A total of 230 surveys were completed. No piping plovers were observed.

Piping plovers have a low likelihood of breeding within the Project Area due to a lack of suitable nesting habitat. This, combined with no piping plover observations during the avian use surveys, suggests a low likelihood for piping plover to occur within the Project Area.

5.2.3.4 PRAIRIE GROUSE (NOT FEDERALLY OR STATE-LISTED)

Throughout agency coordination on the current Project Area, Crowned Ridge requested and received lek occurrence data from the SDGFP (Appendix A). These locations have been documented spatially in Crowned Ridge's Project planning databases to ensure consideration during Project siting (Figure 7). Data from SDGFP include one lek recorded in 2017 within the Project Area. During most recent avian use studies in the Project Area, two greater-prairie chickens, no sharp-tailed grouse, and no leks were observed.

5.2.3.5 RED KNOT (FEDERALLY THREATENED)

No red knots were observed during avian use surveys for nearby study areas, for earlier iterations of the Project Area, or for the Project Area. Most recently, avian use surveys were completed for the current Project Area from April through November 2017. Point count surveys were conducted at 29 locations throughout the Project Area. A total of 230 surveys were completed. No red knots were observed.

Red knots have a low likelihood of breeding within the Project Area due to a lack of suitable nesting habitat. This, combined with no species observations during the avian use surveys, suggests a low likelihood for red knot to occur within the Project Area.

5.2.3.6 WHOOPING CRANE (FEDERALLY ENDANGERED)

No whooping cranes were observed during avian use surveys for nearby study areas, for earlier iterations of the Project Area, or for the Project Area. Most recently, avian use surveys were completed for the current Project Area from April through November 2017. Point count surveys were conducted at 29 locations throughout the Project Area. A total of 230 surveys were completed. No whooping cranes were observed. Additionally, the desktop whooping crane habitat assessment found that wetlands considered potentially suitable habitat comprised only 0.2 percent of the total Project Area.

The combination of no whooping crane sightings during the avian use surveys with no habitat features that would concentrate whooping cranes within the Project Area compared to the surrounding area suggests a low likelihood of whooping crane occurrence in the Project Area. To be conservative of the species, Crowned Ridge is coordinating with the SDGFP and USFWS to develop and implement a monitoring and response plan for observations of the species (sections 7.2 and 7.3).

5.2.3.7 SPECIES OF HABITAT FRAGMENTATION CONCERN

To date, USFWS has not identified any specific bird species of habitat fragmentation concern for the Project (Appendix A).

5.3 Bats

5.3.1 Methods

5.3.1.1 HABITAT ASSESSMENT

A desktop bat habitat assessment was conducted with the purpose of assessing the availability and suitability of bat habitat within the Project Area, and to determine the potential for presence of state-listed and federally listed bat species (Crowned Ridge 2019: Appendix E).

5.3.1.2 ACOUSTIC MONITORING

A long-term, passive, acoustic bat monitoring survey was conducted within the Project Area between April 6 and December 1, 2017 in accordance with the recommendations set forth in the WEGs (Crowned Ridge 2019: Appendix D). An acoustic detector was deployed on a 3-m-high pole within the Project Area (Figure 5). Data were analyzed to determine bat passes per

detector night of recording, where a “detector night” is equal to one detector deployed for one calendar night.

A second passive, acoustic bat monitoring survey was conducted within the Project Area in or adjacent to potentially suitable NLEB habitat to be responsive of USFWS comments to determine if NLEBs were detectable in the area during the survey term. The microphones of two Anabat Swift units were affixed to the top of a 3-meter-high extendable pole. Detectors were deployed at two locations between September 10 and October 1, 2019 and were relocated to two new locations where they recorded between October 2 and November 12, 2019. Data were analyzed to determine bat passes per detector night of recording.

5.3.2 Results

5.3.2.1 HABITAT ASSESSMENT

The assessment concluded that there is limited suitable habitat for the NLEB within the Project Area, typically in the form of wooded riparian corridors, small woodlots, and isolated forest patches. As a forest interior species, the NLEB requires contiguous forest blocks of 15 or greater acres and prefers forested blocks of greater than 114 acres (Crowned Ridge 2019: Appendix E). The Project Area contains 123 total acres of forested blocks that individually are between 15 and 114 acres, and no forested blocks that individually are 114 acres or greater (Crowned Ridge 2019: Appendix E). These acreages represent a combined 0.2 percent of the Project Area qualifying as suitable roosting and/or foraging habitat. The habitat available within the Project Area is similar in availability and density to the surrounding landscape, indicating that there is no regionally unique habitat that would serve as an attractant for NLEBs to the Project Area. Furthermore, the USFWS has stated that there is low likelihood of NLEBs occurring within the Project Area as a summer resident (USFWS personal communication, 2018) (see Appendix E). There is potential for the NLEB to occur within the Project Area as a migrant during the spring and fall, though migration behavior of the species is poorly understood.

Based on habitat suitability and availability, the remaining species with potential to occur have varying likelihoods of occurrence throughout the year (see Crowned Ridge 2019: Appendix E).

5.3.2.2 ACOUSTIC MONITORING

In 2017, nearly 70 percent of calls recorded occurred in the fall migration period (Crowned Ridge 2019: Appendix D). Seasonal differences in the data collected suggest that the Project Area experiences less activity during spring migration than during fall migration. Although the dynamics of bat migration are not fully understood, one factor that could contribute to this difference is the recruitment of juveniles (which are born in the summer maternity season) into the fall migration population. Although the highest levels of activity observed correlated with fall migration, even these levels were low when compared with other fall migration events. In 2019, no NLEBs were recorded. Additionally, if 2017 data are indicative of an overall pattern, the spring bat population within the Project Area is sparse when compared to other regions of the United States.

Overall, the level of bat activity may suggest that bat use of the Project Area is relatively low. The annual mean passes per detector night recorded during the study was 3.6 in 2017. For comparison, Jain (2005) documented a mean activity level in 2003 and 2004 of 34.9 and 36.6 passes per detector-night, respectively, in Iowa. Because of the lack of suitable roosting and

foraging habitat in the project area, the number of bats is likely much lower than what might be observed in other, more ecologically diverse, parts of the country.

5.3.2.3 SPECIES OF CONCERN

The NLEB, discussed above, is the only bat species of concern with potential to occur in the Project Area. The NLEB is unlikely to occur in the Project Area, except as an occasional migrant.

5.3.2.4 SPECIES OF HABITAT FRAGMENTATION CONCERN

To date, USFWS has not identified any specific bat species of habitat fragmentation concern for the Project (Appendix A).

6 POTENTIAL PROJECT IMPACTS

This section outlines potential risks to wildlife related to the construction and operation of the Project.

6.1 Project Risk Assessment

In the following sections, the field data collected to date were analyzed to assess potential Project impacts. Impacts to the species under discussion can be short-term (one or two reproductive seasons), or long-term (affecting several generations). They can be direct (an immediate effect to an individual, population, or its habitat), or indirect (an effect that may occur over time or result from other actions). Direct impacts may include collisions with Project infrastructure such as turbine blades or transmission lines; electrocution; disturbance from construction or operations activities; displacement due to loss of suitable habitat; and habitat loss and fragmentation that creates a barrier to dispersal, regular movements, or migration. Indirect impacts may include loss or change of population vigor; attraction to modified habitats, and increased exposure to predation as a result of altered habitat use. Additionally, the Project may contribute to cumulative impacts that may affect certain species, in conjunction with impacts from other future development.

6.1.1 Prairie Butterflies – Dakota Skipper and Poweshiek Skipperling

6.1.1.1 DIRECT IMPACTS

Adult presence/absence surveys within the Project Area did not observe Dakota skippers or Poweshiek skipperlings. However, it is possible that the species could be present in the Project Area within areas of suitable habitat. If present, direct impacts on the prairie butterflies could include collision with Project vehicles or disturbance and/or displacement from preferred habitat. Crowned Ridge has avoided locating Project facilities on lands classified as potentially suitable habitat to the extent possible (Appendix B).

6.1.1.2 INDIRECT IMPACTS

Indirect impacts on prairie butterflies are generally the same as the direct impacts outlined above.

6.1.2 Birds

Birds have been identified as a group at risk because of collisions with wind turbines and power lines (Arnett et al. 2007; Drewitt and Langston 2006; Erickson et al. 2005). Specifically, migrant passerines (e.g., songbirds) are found more often in post-construction mortality monitoring compared to other groups of birds (Arnett et al. 2007). In fact, at newer generation wind energy facilities outside of California, approximately 80 percent of documented mortalities have been songbirds, of which 50 percent are often nocturnal migrants (Drewitt and Langston 2006; Erickson et al. 2001; Johnson et al. 2002; Strickland and Morrison 2008).

6.1.2.1 DIRECT IMPACTS

6.1.2.1.1 General Bird Species

The avian community detected within the Project Area during avian surveys was characterized by species typical of agricultural lands and grassland/pastures in South Dakota. Within disturbed habitats such as these, the greatest potential impact of wind facilities to avian species is risk of collisions with turbines. Nationally, reported avian fatality rates at wind energy facilities average 2.43 birds/MW/year and range from 0.15 to 11.02 birds/MW/year. Publicly available avian fatality rates at wind facilities in the mid-west of North America with similar habitat to that of the Project average 2.00 birds/MW/year (2.43 birds/turbine/year; Table 7). Recent meta-analyses relevant to the Project have estimated an average all-bird (mostly small birds) fatality rate of 1.81 birds/MW/year in the Great Plains (Loss et al. 2013) and 2.29 small birds/MW/year in the Prairie biome (Erickson et al. 2014). The meta-analysis provided by other studies and the publicly available fatality rates indicate that any Project-related bird fatalities, should the occur, may be reasonably expected to be within the range defined by these studies and the publicly available fatality rates in Table 7.

Collision

Locally breeding songbirds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine heights during the breeding season. However, some breeding songbird species have behaviors that increase the risk of collisions with turbines. For example, horned larks have been commonly found as fatalities at wind farms, and mortality may be partially attributed to the breeding flight displays within the RSA (Johnson and Erickson 2011; Pickwell 1931).

The western meadowlark (Johnson and Erickson 2011; Thelander et al. 2003) and red-winged blackbird (Kerlinger et al. 2006; Thelander et al. 2003) have been documented as fatalities at other wind energy projects according to publicly available data. The western meadowlark and red-winged blackbird were among the 25 most commonly detected collision fatalities at wind energy facilities (Erickson et al. 2014). American robin was another species observed in Project Area point counts that was among the 25 most commonly detected collision fatalities. Although risk of turbine-related fatalities at the Project exists for each of these species, should they occur, they are unlikely to have population-level impacts because South Dakota populations for each

species are large and relatively stable (7.5 million—western meadowlark, 6.7 million—red-winged blackbird, 4.1 million—American robin) (PIFSC 2019).

Although non-raptor mortality due to collision is expected to be low, collision fatalities are a cause of concern to Crowned Ridge. To monitor and minimize collision fatalities as a result of operation of wind turbines to the extent possible, Crowned Ridge will implement one year of fatality monitoring (Section 8) and adaptive management for the life of the Project (Section 9). Section 7 describes how Crowned Ridge will mark the associated generation tie-line to reduce the likelihood of avian collision with the powerline.

Electrocution

Utility lines, particularly distribution lines, can potentially result in electrocution of large raptors because their wingspan is large enough that the bird can simultaneously contact two conductors or a conductor and grounded hardware (APLIC 2006). Utility lines generally pose less of a threat to non-raptors because of their smaller wing spans. However, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. Avian electrocutions typically occur on distribution lines with voltages less than 60 kilovolts. The risk of electrocution at the Project is likely to be low due to measures Crowned Ridge will undertake to prevent electrocution. See Section 7 for details of avoidance and minimization measures.

Disturbance/Displacement

In addition to mortality associated with wind farms, concerns have been raised that some bird species may avoid areas near turbines after the wind farm is in operation (Drewitt and Langston 2006). For example, at the Buffalo Ridge wind energy facility in Minnesota, densities of male songbirds were significantly lower in CRP grasslands containing turbines than in CRP grasslands without turbines though the causal mechanism was not studied (Leddy et al. 1999). Reduced abundance of grassland songbirds was found within 50 m of turbine pads for a wind farm in Washington and Oregon, and the investigators attributed displacement to the direct loss of habitat or reduced habitat quality and not the presence of the turbines (Erickson et al. 2004). Research at three sites in North and South Dakota (Shaffer and Buhl 2016) suggests that certain grassland songbird species (seven of nine studied; one species was unaffected, one species was attracted) may avoid turbines by as much as 300 m. Displacement and attraction were observed to continue through the five-year study period. However, none of these studies addressed whether effects are temporary (i.e., the birds may habituate to the presence of turbines over time) or permanent, or what the mechanisms underlying attraction or avoidance were. Pearce-Higgins et al. (2012) found little evidence for a post-construction decline for ten species of birds at wind projects in upland habitats in the United Kingdom.

Project construction activities and the presence of turbines and other Project features may disturb or displace birds, particularly species of habitat fragmentation concern. Many of the species detected during bird surveys likely breed in the Project Area, suggesting potential for impact to breeding birds. However, the impacts to birds from disturbance or displacement from the Project are likely to be low based on the relatively low bird use in the Project. The heavy agricultural use within the Project Area suggests that the additional disturbance and habitat loss caused by construction and operation of the Project will not cause birds to avoid the Project Area, nor should it alter the current use of habitat by bird species within the Project Area. The risk of disturbance/displacement will be further reduced through avoidance and minimization measures taken during the design, construction, and operational phases of the Project (Section 7).

6.1.2.1.2 Birds of Conservation Concern

The four BCC species (bald eagle, chestnut-collard longspur, grasshopper sparrow, and upland sandpiper) observed within the Project Area are expected to occur in low numbers and therefore any risk of fatalities is also expected to be low. Direct impacts to BCC species observed within the Project Area are expected to be similar to impacts identified under general avian species and/or raptors. The risk of direct impacts will be reduced through avoidance and minimization measures implemented during the design, construction, and operational phases of the Project (Section 7).

6.1.2.1.3 Raptors (non-eagle)

Despite the observation that most bird fatalities at wind farms are songbirds, raptor mortality historically has received the most attention. Raptor mortality at newer wind projects has been low relative to older-generation wind farms, although there is substantial regional variation in raptor mortality rates (Erickson et al. 2002; Erickson et al. 2004; Jain et al. 2007; Johnson et al. 2002; Kerns and Kerlinger 2004).

Collision

While a recent meta-analysis suggests that pre-construction studies may be poor indicators of post-construction mortality (Ferrer et al. 2012), high raptor use has been associated with high raptor mortality at wind farms (Strickland et al. 2011). Conversely, raptor mortality has been low where raptor use was low.

Red-tailed hawk, followed distantly by northern harrier, was the most frequently detected raptor species during the 2017 avian use surveys (Crowned Ridge 2019: Appendix H). Both species are commonly associated with agricultural and grassland prairie habitats, which are present within the Project Area and provide opportunities for foraging, an activity associated with susceptibility to turbine collisions (Thelander et al. 2003). Northern harrier and red-tailed hawk fatalities have been recorded at operating wind facilities (Erickson et al. 2002; Erickson et al. 2004; Gritski et al. 2010, Johnson and Erickson 2011; Young et al. 2003)

In a study of raptor response to wind farms, red-tailed hawks were observed engaging in high-risk flight behaviors at operational wind facilities whereas northern harriers were identified as having a low risk flight behavior for collisions (Garvin et al. 2011). Results from post-construction mortality monitoring studies indicate that red-tailed hawks are frequently found as turbine-related fatalities (Grodsky and Drake 2011; Garvin et al. 2011; Johnson and Erickson 2011). Drewitt and Langston (2006) summarized that bird activity is typically higher near active nests than areas without active nests. As a result, red-tailed hawks may have increased potential for collision if they repeatedly fly within the Project Area during nesting activities and during the time when young begin to fledge from the nests. Red-tailed hawk nests were found within the Project Area; the presence of occupied raptor nests within and near the Project Area may increase the risk for collisions during nesting activities. However, Project-related fatalities are unlikely to have population-level impacts because red-tailed hawk populations in South Dakota are relatively large and stable (approximately 61,000 individuals) (PIFSC 2019).

Although raptor mortality due to collision is expected to be low, collision fatalities have potential to occur at Crowned Ridge. To monitor and minimize collision fatalities to the extent possible, Crowned Ridge will implement fatality monitoring for one year (Section 8) and adaptive management for the life of the Project (Section 9). Section 7 describes how Crowned Ridge will

mark the associated generation tie-line to reduce the likelihood of avian collision with the powerline.

Electrocution

Fatalities of large raptors have occurred as a result of electrocution and collisions with utility lines and structures, particularly distribution lines (APLIC 2006). Due to their large size, raptors are able to bridge conductive elements to complete a circuit (APLIC 2006). Therefore, any structures that allow for circuit completion (i.e., flesh-to-flesh contact between energized parts or an energized and grounded part) pose an electrocution risk. To protect birds from possible electrocution, APLIC recommends that lines have a horizontal separation of 60 inches and a vertical separation of 40 inches between phase conductors or between a phase conductor and grounded hardware (APLIC 2006). All collection lines will be buried. The generation tie line will be constructed following a manner consistent with APLIC guidelines for design of overhead lines (see Section 7). Therefore, the risk of electrocution for raptors from the Project is likely to be low.

Disturbance and Displacement

Raptors may be vulnerable to disturbance from many types of human activity. Human disturbance may result in direct and indirect impacts to raptor habitat, occupancy, and nesting success (USFWS 2008b). Direct impacts may include the loss of foraging or nesting habitat within the Project Area, direct mortality (e.g., due to collisions with wind turbines, electrocution by power lines), sound disturbance (e.g., construction sound), and loss of nest sites or winter roost sites (USFWS 2008b).

Disturbance or displacement of nesting raptors is possible if birds are nesting or have preferred foraging areas within line-of-sight of the Project facilities. A number of studies conducted at western wind energy facilities suggest that wind energy facilities do not have long term impacts on raptor nest densities (Erickson et al. 2004; Gritski et al. 2008; Howell and Noone 1992; Johnson et al. 2003; Young et al. 2006). For example, post-construction studies at an Oregon project found that raptor nests more than 0.5 miles from turbines were not impacted by project disturbance (Gritski et al. 2008). Studies also have found no clear relationship between nest occupancy and distance to turbines (Johnson et al. 2003; Young et al. 2006). Suitable raptor nesting habitat within the Project Area is limited. There are few trees sufficient to support raptor nests, there is no cliff nesting habitat, and there are no large waterbodies within the Project Area that would attract nesting bald or golden eagles. Given the number of known raptor nests within the Project Area and two-mile buffer, some nesting raptors may be disturbed or displaced by construction activities. However, disturbance and displacement of raptors will be minimized through the implementation of avoidance and minimization measures described in Section 7.

6.1.2.1.4 Eagles

Collision

Bald eagles currently have a low likelihood of breeding within the Project Area due to a lack of suitable nesting habitat; however, bald eagles were observed nesting in the vicinity of the Project Area (Section 5.2.2.2.2). The species currently could occur in the Project Area when foraging or migrating. Bald eagle use of the Project Area has potential to change over the operational life of the project.

Six bald eagle mortalities associated with wind energy facilities within the United States were reported from 1997 through June 2012 (Pagel et al. 2013). Bald eagles are believed to be at less risk of turbine collision than golden eagles because bald eagles tend to focus hunting efforts for fish and waterfowl in lakes and rivers (Buehler 2000). Although bald eagle-turbine collisions may be possible, the likelihood of collisions already is reduced due to the lack of nests within the Project Area. The likelihood of collision will be further minimized through the implementation of avoidance and minimization measures described in Section 7. Section 7 also describes how Crowned Ridge will mark the associated generation tie-line to reduce the likelihood of avian collision with the powerline.

No golden eagles or their nests were found within the Project Area or 10-mile buffer surrounding the Project Area during the 2017 and 2018 nest surveys (Crowned Ridge 2019: Appendix G). Golden eagles have a low likelihood of breeding within the Project Area as the Project Area is outside of the species' breeding range. Additionally, the Project Area lacks suitable nesting habitat for the species. Golden eagles could potentially occur in the Project Area when foraging or migrating.

Seventy-nine golden eagle mortalities associated with wind energy facilities within the United States were reported from 1997 through June 2012, excluding the Altamont Pass Wind Resource Area in California (Pagel et al. 2013). No golden eagle mortalities have been reported to date at wind energy facilities in South Dakota. Golden eagles are believed to be more at risk of turbine collision than bald eagles because they hunt for land-based prey along topographic contours where turbines often are located (Kochert et al. 2002). Potential collision impacts to golden eagles will be minimized through the implementation of avoidance and minimization measures described in Section 7. Section 7 also describes how Crowned Ridge will mark the associated generation tie-line to reduce the likelihood of avian collision with the powerline.

Electrocution

Potential impacts to eagles from electrocution are the same as described for raptors above.

Disturbance and Displacement

Due to the lack of foraging habitat (large bodies of water) and nests less than 1.5 miles from any turbines, it is unlikely that foraging or nesting bald eagles will be displaced or disturbed by the Project. There is some evidence that bald eagles avoid operating wind turbines (Sharp et al. 2012), but this avoidance appears to be over short distances rather than displacement from the entire wind farm.

It is unlikely that nesting golden eagles will be disturbed or displaced due to the lack of nesting habitat and absence of golden eagle nests within the Project Area. However, golden eagles, if they utilize the Project Area, may be disturbed or displaced from the Project Area if infrastructure interferes with hunting or availability of prey.

6.1.2.1.5 Whooping Cranes

Collision

Whooping cranes may be directly affected by the Project through collision with wind turbines or associated power lines. No whooping crane observations were documented in the Project Area and the Project is located approximately 50 miles east of the 95 percent isopleth of the whooping crane migration corridor (Figure 4).

To date, no whooping crane mortality has been attributed to collision with wind turbines at any facility. Whooping cranes typically fly at altitudes higher than the tallest proposed turbine height (431 feet at the tip of an upright turbine blade) during migration; however, individuals fly at lower altitudes in response to climate conditions (e.g., low cloud cover), while searching for a stopover location and while landing, taking off, and moving between roosting and foraging locations. It is during these low flight times that whooping cranes are at the highest risk for collision with turbines and power lines. Although collision with turbines or transmission lines is a risk, the species has been documented altering flight direction in response to turbines at a wind facility in South Dakota (Nagy et al. 2012), and multiple studies have documented sandhill cranes gradually climbing as they approach marked power lines (Morkill and Anderson 1991; Murphy et al. 2009).

Crowned Ridge will mark a total of approximately 8 miles along the associated generation tie line. The segments to be marked were identified using the approach recommended in The Watershed Institute's (TWI) *Potentially Suitable Habitat Assessment for the Whooping Crane*. Additional segments were identified for marking based on locations where the overhead line spanned a mapped aquatic resource or where proximate mapped aquatic resources may expand to combine in high rain events per USFWS recommendations (USFWS personal communication, 2019) (Figure 8). In segments identified for line marking, bird diverters will be installed every 50 feet.

Additionally, Crowned Ridge is coordinating with the SDGFP and USFWS to develop and implement a monitoring and response plan for observations of whooping cranes during the operational life of the Project (Section 7.3).

Electrocution

Electrocution is unlikely for whooping cranes because they are a ground-nesting bird, adapted to foraging on the ground, and are not known to perch or nest on or near the conductive elements of power lines.

Disturbance and Displacement

Land use within the Project Area consists mainly of agricultural production and grassland/pasture with a limited extent of wetlands within the Project Area. The wetland-agricultural habitat matrix preferred by whooping cranes as stopover habitat exists within the Project Area; however, it also exists in the surrounding landscape. The nearest documented whooping crane observation to the Project Area is approximately 22 miles west and was made in 1973. It is unlikely that whooping cranes will be displaced from the Project Area or that Project operations will disturb the species. To be conservative of the species, Crowned Ridge will develop, in coordination with SDGFP and USFWS, and implement a whooping crane contingency plan. The plan will describe the step-by-step response (e.g., ceasing construction activities, notifications, etc.) to whooping crane observations made within the Project area during construction.

6.1.2.2 INDIRECT IMPACTS

6.1.2.2.1 General Bird Species

Habitat Loss and Fragmentation

Birds may be indirectly affected by habitat loss and fragmentation due to Project development. Habitat fragmentation can exacerbate the problem of habitat loss for birds by decreasing patch area and increasing edge habitat. Habitat fragmentation can reduce bird productivity through increased nest predation and parasitism and reduced pairing success of males (Robinson et al. 1995). However, the increase in the amount of habitat loss and fragmentation as a result of Project construction will be minimized by the use of existing roads to the extent possible and lands already altered by agriculture, and through restoration of any native prairie impacts using native vegetation (weed-free) seed mixes. Additionally, Crowned Ridge will follow all requirements of the Project's construction stormwater authorization including the Storm Water Pollution Prevention Plan to control erosion and potential pollutants.

Population Decrease

The avian community detected within the Project Area during avian surveys was characterized by species typical of agricultural lands and pastures in South Dakota. The primary species observed during Project surveys were Western meadowlark, red-winged blackbird, and American robin. Project-related fatalities of these species, should they occur, are unlikely to have population-level impacts because South Dakota populations for each species are large (7.5, 6.7, and 4.1 million each, respectively) (PIFSC 2019). In addition, locally breeding birds may experience lower mortality rates than migrants because many of these species tend not to fly at turbine heights during the breeding season. However, some breeding bird species have behaviors that increase the risk of collisions with turbines. For example, horned larks have been commonly found as fatalities at wind farms, and mortality may be partially attributed to the breeding flight displays within the RSA (Johnson and Erickson 2011; Pickwell 1931). Most songbirds, doves, and gamebirds are short-lived and have high reproductive output, and their population growth rates are more sensitive to reproductive failure than to adult survival (Arnold and Zink 2011; Stahl and Oli 2006). A recent meta-analysis of wind-energy impacts concluded that collisions with wind turbines have negligible cumulative impacts on small bird populations such as passerine, with mortality rates due to these collisions ranging from 0.008 to 0.0043 percent of the continental population per year (Erickson et al. 2014). Therefore, collision mortality for most bird species is expected to have negligible effects on population dynamics.

Avoidance and minimization measures will be implemented during all phases of the Project to reduce the possibility of population-level impacts on all bird species (see Section 7).

6.1.2.2.2 Birds of Conservation Concern

The four BCC species (bald eagle, chestnut-collard longspur, grasshopper sparrow, and upland sandpiper) observed within the Project Area are expected to occur in low numbers and therefore any risk of fatalities is also expected to be low. Indirect impacts to BCC species observed within the Project Area are expected to be similar to impacts identified under general avian species and/or raptors.

Habitat Loss and Fragmentation

Indirect impacts to the four BCC species observed within the Project Area are similar to the impacts identified under general avian species and/or raptors. Crowned Ridge will avoid areas of high-quality grassland to the extent possible in order to minimize habitat loss for grassland dependent species and impacts to native grassland habitat will be restored with native vegetation (weed-free) seed mixes. Grassland fragmentation will be avoided and minimized through implementation of mitigation measures during the design, construction, and operation phases of the Project (Section 7).

Population Decrease

Indirect impacts to the four BCC species observed within the Project Area are similar to the impacts identified under general avian species and/or raptors. Crowned Ridge will avoid impacting these species and their habitat to the extent possible, as outlined in Section 7.

6.1.2.2.3 Raptors (Non-Eagle)

Habitat Loss and Fragmentation

Raptors that use the Project Area may be indirectly impacted by the Project. Indirect impacts may include habitat degradation and fragmentation and reduction or changes in available prey species (USFWS 2008b). The Project Area is primarily cropland and pastureland, which offers habitat for small mammals that are prey sources for raptors. The permanent habitat impacts within the Project footprint will be small, and as a result, impacts on availability of prey species are expected to be minimal. Overall, habitat degradation and fragmentation due to Project construction will be minimal due to the existing disturbed nature of the Project Area and the small permanent footprint of the Project. Impacts to native grassland will be avoided and minimized according to the mitigation measures in Section 7.

Population Decrease

Avoidance and minimization measures will be implemented during all phases of the Project to reduce the likelihood of population-level impacts on all bird species (see Section 7).

6.1.2.2.4 Eagles

Habitat Loss and Fragmentation

Indirect impacts on bald and golden eagles relating to habitat loss and fragmentation are similar to those discussed for other raptors (see Section 6.1.2.2.3). Indirect impacts on bald eagles' prey species may differ slightly as turbine operation may cause bald eagles to avoid some areas where they may have foraged for carrion in the past.

Population Decrease

Bald and golden eagle populations appear to be generally increasing or stable. However, their population sizes are relatively small when compared to other raptors and they are fairly uncommon; the USFWS estimated that there were 128 nesting pairs of bald eagles in South Dakota in 2012 (USFWS 2016c). An estimate of the golden eagle breeding population in South Dakota was not found to be available. Due to their protected status, Crowned Ridge will avoid impacting these species and their habitat to the extent possible, as outlined in Section 7.

6.1.2.2.5 Whooping Cranes

Habitat Loss and Fragmentation

Because cranes may avoid turbines by altering flight paths, the USFWS (2009) holds the opinion that such avoidance will lead to avoidance of stopover in areas with operational wind turbines. It has been assumed that whooping cranes prefer areas isolated from human disturbances when such areas are available. Studies on whooping crane migration habitat and use, and the diminution of this habitat with increasing development, point to an inverse relationship between disturbance level and habitat value (Austin and Richert 2001; USFWS 2009). As a result, potential indirect effects to the whooping crane posed by the Project include avoidance of structures (e.g., turbines, meteorological towers, and transmission lines), habitat loss and fragmentation, and disturbance caused by anthropogenic activities. Behavioral avoidance of wind farms by whooping cranes, while reducing the probability of direct impacts through collision, may amount to loss of stopover habitat. The loss of stopover habitat use through avoidance, however, may be relatively small given the large amount of suitable habitat present within the migration corridor (Western Area Power Administration [WAPA] and USFWS 2015) and the paucity of suitable habitat within the Project Area. Placing wind turbine structures in already developed areas, would likely have less impact than placement in areas where there are no existing disturbances. The Project turbines are sited close to existing section line roads and many of the turbines are sited within lands already altered by agriculture. The nearest documented whooping crane observation to the Project Area is approximately 22 miles west and was made in 1973.These factors do not exclude the possibility that whooping cranes may occur in the Project Area; however, they likely make the location less suitable or attractive to the species as compared to habitats surrounding the Project Area.

Population Decrease

The population of whooping cranes is estimated at 504 birds (95 percent Confidence Interval = 412.4-660.3) as of the 2018/2019 winter whooping crane survey conducted by USFWS at Aransas National Wildlife Refuge [USFWS 2019]). Due to the small population, any Project-related fatalities may have population-level impacts. Crowned Ridge will avoid impacting whooping cranes and their habitat to the extent possible through implementation of a whooping crane contingency plan that is described in Sections 7.2 and 7.3.

6.1.3 Bats

6.1.3.1 DIRECT IMPACTS

6.1.3.1.1 General Bat Species

Collision

Bats have been identified as a wildlife group at risk due to collisions or other interactions with wind turbines (Arnett et al. 2007; Arnett et al. 2008; Drewitt and Langston 2006; Erickson et al. 2001). Bat collision mortality at wind farms is a widespread phenomenon, commonly exceeding avian collision mortality (Kunz et al. 2007). Of 46 species of bats in North America, 11 species have been identified among fatalities at wind farms. Migratory foliage or tree-roosting bat species (hoary bat, eastern red, and silver haired bat) appear to be most susceptible to collision with wind turbines. These species have experienced the highest fatality rates at wind energy facilities in North America, particularly during the spring (March – May) and fall (August –

October) seasons when activity levels increase as these species migrate (Arnett et al. 2008; Cryan 2003; Kunz et al. 2007). Studies of wind energy facilities in the Midwest with similar agriculture/grassland habitat as that present in the Project Area have documented Brazilian free-tailed (not found in South Dakota), hoary, eastern red, silver-haired, little brown, big brown, and tricolored bats fatalities during mortality surveys (Table 8).

The relationship between activity and mortality has yet to be clearly identified, but we assume that regional fatality patterns are indicative of potential risk at the Project Area. Recent research showed that mean wind speed and mean ambient temperature have the greatest effects on bat activity patterns but may differ seasonally with bat activity generally lower at low mean nightly temperatures of approximately less than 10 degrees Celsius (°C; 50°F) in the spring and less than 16°C (61°F) in fall at wind speeds greater than 5 meters/second (Weller and Baldwin 2012). However, results of that study have not been replicated for verification. Bat fatality rates at wind energy facilities in the Midwest region average 17.25 ± 12.05 (90-percent confidence interval) bats/turbine/year or 13.4 ± 9.00 bats/MW/year (Table 8). Of the six bat species that may occur in the Project Area discussed in Section 4.2.1.2.2, hoary, eastern red, silver-haired, little brown, and big brown bats have been found during mortality searches at operating wind farms in agricultural/grassland habitat (Table 8). Of these species, the migratory tree bats are considered to be at the greatest risk from wind energy projects (Tierney 2009).

The limited roosting habitat within the Project Area is a major limiting factor for use of the Project Area by migrating bats. Therefore, bat migration through the Project Area is likely low in magnitude. To better understand Project impacts on bats, Crowned Ridge will conduct one year of post-construction fatality monitoring (Section 8).

Disturbance/Displacement

Disturbance and displacement have not been identified as risks associated with bats and operational wind farms in reviews of bat-wind turbine impacts (Kunz et al. 2007), and bats are known to habituate to anthropogenic structures (Keeley and Tuttle 1999). Given the history of agricultural activity in the Project Area, we expect that the local bat community would remain in the area at similar population levels after construction of the Project. Although activity may change the sound environment in the Project Area during daylight hours; Project-related sound levels are not anticipated to have deleterious effects on resident or migrant bats due to bats' nocturnal nature.

6.1.3.1.2 Northern Long-eared Bat

NLEB is the only listed bat species with the potential to occur within the Project Area. The 4(d) rule prohibits purposeful take of the species range-wide. Within the "WNS Zone" (counties within 150 miles of known occurrences of the pathogen that causes white-nose syndrome) incidental take resulting from specified activities is prohibited during certain times of year. The Project Area is within the WNS Zone; therefore, incidental take that results from operation of utility-scale wind-energy turbines currently is not prohibited. Additionally, incidental take that results from tree-clearing activities is not prohibited, unless it occurs within 0.25 mile of a known NLEB hibernacula or within 150 feet of a known maternity roost tree between June 1 and July 31.

No NLEBs were detected during the acoustic monitoring. If present, direct impacts could include collision with turbine blades, habitat disturbance by removal of roost trees, or disturbance to hibernacula. The Project Area only contains approximately 0.5 percent of forested habitat (based on NLCD data) that may be used for roosting and breeding NLEB. Based on the limited

quantity of forested, potentially suitable habitat and the lack of documented detections within the Project Area, the potential for direct impacts on NLEB or their habitat is expected to be low.

6.1.3.2 INDIRECT IMPACTS

6.1.3.2.1 General Bat Species

Habitat Loss and Fragmentation

Indirect impact on bats are generally the same as the direct impacts outlined above. The impacts of habitat fragmentation from wind development on bats are not well-known (Kuvlesky et al. 2007). Both roosting and foraging habitat within the Project Area are limited in availability due to lack of forested areas, presence of large amounts of open-land agriculture, and presence of only few large, permanent sources of surface water. In addition, the Project has a relatively small footprint of temporary and permanent disturbance. For these reasons, the risk of habitat loss and fragmentation is low.

6.1.3.2.2 Northern long-eared Bat

Habitat Loss and Fragmentation

Indirect impacts on NLEB are generally the same as the direct impacts outlined above. Due to the lack of known occurrences, lack of hibernacula, very limited presence of suitable habitat, and the existing fragmented nature of the Project Area, indirect impacts to the species are not expected to occur.

Population Decrease

The species is unlikely to occur in the Project Area except as an occasional migrant. Therefore, no population-level impacts are expected to occur as a result of the Project.

6.1.4 Cumulative Impacts

Activities that currently exist within the Project Area and vicinity are primarily limited to agriculture. Wind energy development removes less total land from agricultural use than other forms of development. Except for the physical locations of the turbines, access roads, and other permanent facilities, all the land surrounding the Project facilities will be available for agriculture. The Crowned Ridge I wind energy project is adjacent to the Project and is currently under construction (Figure 1). In addition, there are several other proposed wind farms in the vicinity of the proposed Project and wind energy development is expected to continue in South Dakota.

With regard to the potential cumulative impacts to wildlife resources, there is potential for the Project to affect local wildlife both directly (mortality) and indirectly (habitat loss and fragmentation). Crowned Ridge will avoid and minimize direct and indirect potential impacts to the extent possible, and therefore, the Project is not expected to contribute to cumulative impacts. Although the wind turbines would contribute to the utility/industrial component of the existing landscape, the area would remain primarily agricultural in nature. As these agricultural lands are of minimal value to wildlife compared to native vegetation, the Project is not expected to result in a cumulative loss of high quality wildlife habitat. Based on the existing land use, location of existing and planned facilities, and known impacts from similar wind facilities in the area, it is expected that the Project would have minimal cumulative impacts to wildlife.

6.2 Risk Assessment Decisions

6.2.1 Decision Criteria to Either Abandon or Advance

6.2.1.1 TIER 1/TIER 2 QUESTIONS

Results of the site characterization study indicate the majority of the Project Area is disturbed, fragmented, and managed for agriculture and pasture. Grasslands have been tilled, mowed, and/or used for livestock grazing making them low quality prairie habitats for most breeding birds. The anticipated avian community using the Project Area is composed of common species typically associated with agricultural and pasture lands of South Dakota. There are no plant communities or vegetation habitats of conservation concern designated within the Project Area other than the concerns expressed by USFWS and SDGFP regarding native prairie. Further, there are no critical areas of wildlife congregation within the Project Area. There are 15 species of concern potentially occurring within the Project Area (Section 3.2.1); these species' potential use of the Project Area and Project risks were evaluated. For many of these species, risk is likely low and can be managed through best management practices (BMPs) and avoidance and minimization measures (Section 7).

Based on the results of the Tier 1 Preliminary Site Evaluation (Section 4.1) and Tier 2 Site Characterization (Section 4.2), Crowned Ridge concluded the Project is viable for development within the Project Area.

6.2.1.2 WHAT ARE THE DISTRIBUTIONS, ABUNDANCE, BEHAVIORS, AND SITE USE OF BIRDS AND BATS, AND WHAT PROJECT ELEMENTS EXPOSE THESE SPECIES TO RISK?

Field studies (Section 5) were designed to document avian and bat use of the Project Area. The results of these studies will be used to predict the overall Project impacts to the avian and bat community, particularly during the migratory seasons when risk of impacts may be the highest. The results of the studies indicate low potential risks from Project development to the species documented or identified as potentially occurring in the Project Area (Sections 5 and 6).

Based on the results of the Tier 1 Preliminary Site Evaluation, Tier 2 Site Characterization, and Tier 3 Field Studies, Crowned Ridge concluded the Project is viable for development within the Project Area.

6.2.1.3 WHAT ARE THE POTENTIAL RISKS TO INDIVIDUALS AND LOCAL POPULATIONS OF BIRDS AND BATS AND THEIR HABITATS?

Potential Project risks include direct and indirect impacts. Direct impacts include mortality due to collision with Project structures and electrocution, disturbance, and displacement. Indirect impacts could be adverse effects due to habitat fragmentation or habitat loss. A detailed risk assessment is presented in Section 6. No significant impacts to local populations of wildlife are anticipated as a result of Project development.

Based on the results of the risk assessment, Crowned Ridge concludes that there will be no significant, unavoidable impacts on birds, bats, or other wildlife species and the Project is viable for development within the Project Area.

6.2.1.4 HOW CAN IMPACTS TO BIRDS AND BATS BE AVOIDED AND MINIMIZED?

Crowned Ridge understands that the construction and operation of a wind energy facility may pose risks to birds, bats, and other wildlife. Crowned Ridge is committed to minimizing potential impacts on these resources and will implement conservations measures throughout the construction and operations phases of the Project. Conservation measures that will be implemented by the Project are detailed in Section 7.

6.2.1.5 WHAT STUDIES SHOULD BE INITIATED AND CONTINUED POST-CONSTRUCTION TO EVALUATE PREDICTIONS OF IMPACTS TO BIRDS AND BATS?

Post-construction studies are essential to understanding whether pre-construction predictions of impacts and risks to birds, bats, and other wildlife are accurate. Therefore, Crowned Ridge will conduct formal post-construction fatality monitoring and implement an employee-based routine monitoring program. Details of post-construction monitoring are presented in Sections 8 and 9.

6.2.2 Decision of Need for Other Bird and Bat Conservation Plans

Crowned Ridge does not anticipate the need for additional bird or bat conservation plans based on the data collected to date. Crowned Ridge will coordinate with USFWS and/or SDGFP regarding ongoing surveys and assessments and will re-evaluate the need for additional plans if warranted. If additional plans are warranted, Crowned Ridge also will coordinate with the SDPUC per its authority and the Project permit conditions.

7 CONSERVATION MEASURES TO AVOID AND MINIMIZE ADVERSE IMPACTS

7.1 Siting and Design Measures to Avoid/Minimize Impacts

This section identifies impact avoidance and minimization measures that will be incorporated into the final design for the Project. These measures were derived from the voluntary WEG (USFWS 2012) and industry BMPs. All avoidance and minimization measures implemented during the planning and design phase demonstrate practical means to reduce impacts to bird and bat species, or listed species, and their habitats.

- The utility line was designed following APLIC (2006, 2012) guidelines to prevent bird collisions and electrocution. Crowned Ridge maintained a horizontal separation of 60 inches and a vertical separation of 40 inches between phases and between phases to ground to protect birds from possible electrocution from the overhead transmission line as recommended by APLIC (2006). Additionally, the principles of isolation and insulation were considered in retrofitting overhead electrical equipment, and Crowned Ridge used pad-mounted transformers. Utility poles were of monopole design instead of lattice design to minimize opportunities for perching and nesting where feasible.
- USFWS protected basins, grassland, and wetland/grassland easements will be avoided.

- Access roads and turbines will be located away from wetlands and waterbodies to the greatest extent possible to minimize impacts on aquatic species, semiaquatic species, birds, bats, and their habitat.
- Impacts to potentially jurisdictional wetland areas will be below NWP 12 thresholds. Avoiding wetland impacts will generally reduce potential impacts to migratory birds and bats and sensitive habitat.
- Crowned Ridge will bury collector lines as birds and bats can collide with electrical collection lines and redundant overhead telecommunication lines.
- All turbines will sit on a tubular tower, and not a lattice structure, to minimize perching opportunities for raptors such as eagles and other birds.
- Turbines will be sited at least 1.5 miles of known occupied bald eagle nests.
- Turbines will be sited with consideration of SDGFP-documented leks.
- During revegetation efforts in potentially suitable Dakota skipper and Poweshiek skipperling habitat, Crowned Ridge will use seed mixtures that incorporate vegetation that supports these prairie butterfly species.
- Met towers will not be located in sensitive habitats or in areas where ecological resources known to be sensitive to human activities are present.

7.2 Construction Measures to Avoid/Minimize Impacts

- Crowned Ridge will avoid activity in potentially suitable habitat for the Dakota skipper and Poweshiek skipperling where possible.
- Crowned Ridge will minimize impacts to Dakota skippers and Poweshiek skipperlings by avoiding construction in potentially suitable habitat during the adult flight period (approximately June 15–July 20) to avoid mortality of breeding adults.
- The SDGFP recommends that construction during the lekking period (March 1–June 30) avoid known leks by two miles. Crowned Ridge will follow this recommendation during construction activities, thereby minimizing potential affects to known leks as a result of construction activities.
- To reduce habitat disturbance and minimize the potential for wildlife mortality, equipment and vehicle travel will be limited to roads or specific construction pathways during construction. Construction traffic, parking, and laydown areas will be located within previously disturbed lands to the extent feasible. The construction footprint will be minimized in areas of native vegetation. Restoration of disturbed areas will include the replacement of the original pre-construction topsoil, or equivalent quality topsoil, to its original elevation, contour, and compaction. Disturbed soil, if not replanted with crops, will be reclaimed with native vegetation (weed-free) seed mixes, if approved by the landowner.
- All trash and food-related waste will be placed in self-closing containers and removed daily from the site. This prevents trash from being exposed or blown around the Project Area and reduces attraction of wildlife to the Project Area.
- To minimize vehicle collisions with wildlife, vehicular speed will be limited to 15 miles per hour on turbine or transmission line access roads; vehicular speed will be limited to 35

miles per hour on county roads within the Project Area boundary. Crowned Ridge will follow posted speed limits on county roads outside of the Project Area boundary.

- A site-specific worker environmental training program will be developed and implemented throughout the construction of the Project to inform workers of the biological resources present on-site to minimize wildlife impacts. All employees and contractors working in the field will be required to attend the environmental training session prior to working on-site. This training includes information regarding the sensitive biological resources, restrictions, protection measures, individual responsibilities associated with the Project, and the consequences of non-compliance. Written material will be provided to employees at orientation and participants sign an attendance sheet documenting their participation.
- Crowned Ridge will develop, in coordination with SDGFP and USFWS, and implement a whooping crane contingency plan. The plan will describe the step-by-step response (e.g., ceasing construction activities, notifications, etc.) to whooping crane observations made within the Project area during construction.
- To avoid habitat destruction, BMPs for fire prevention during construction will be implemented to minimize wildfire potential.
- Crowned Ridge will work closely with landowners or land management agencies to devise and implement a plan to control noxious weeds. Any use of pesticides, herbicides, fertilizers, and other chemicals will be in accordance with federal and state laws to minimize drift and other impacts on native habitat.
- Actual construction footprints and surface disturbance areas will be minimized during construction to minimize wildlife habitat disturbance. In addition, all native prairie will be avoided to the extent possible to minimize impacts on native prairie and the bird and wildlife species that rely on it. Native prairie will be reclaimed with native vegetation (weed-free) seed mixes, if approved by the landowner.
- Removal of vegetation will be avoided within the peak bird nesting season to the extent feasible to avoid removing or disturbing any nests. If not possible, pre-construction nest surveys will be implemented and any nests of ground-nesting birds (e.g., killdeer) will be flagged and a 50-foot non-disturbance buffer placed around nests while it is occupied.
- Crowned Ridge will conduct a raptor nest survey prior to construction. Disturbance to raptor nests within the Project Area will be avoided by establishing a 300-foot radius non-disturbance buffer on the center of each active nest during the nesting season.
- To avoid injury or mortality of wildlife due to poisoning, an appropriately-sized emergency spill containment kit will be available to contain and remove spilled fuels, hydraulic fluids, and other potential pollutants when working within or near streams, lakes, or ponds.
- A Storm Water Pollution Prevention Plan will be developed for the construction site to prevent contamination of natural water resources, minimize erosion, storm water runoff, and transport of sediment and other contaminants.

7.3 Operational Measures to Avoid/Minimize Impacts

- Crowned Ridge designed the transmission line to conform to APLIC suggested practices to the extent possible (APLIC 2006, 2012). These standards are intended to protect

raptors and other birds from collision and electrocution. These measures are sufficient to protect even the largest birds that may perch or roost on transmission lines or towers.

- Crowned Ridge marked the associated, overhead generation tie line to reduce the potential for whooping crane, waterfowl, or other avian collision.
- Avian and bat fatalities will be evaluated during standardized post-construction fatality monitoring for one year.
- Crowned Ridge will implement an Adaptive Management Program (Section 9) for avoidance, minimization, and mitigation of impacts to birds, bats, and other sensitive wildlife.
- A site-specific worker environmental training plan will be developed and implemented throughout the Project operating life to inform workers of the biological resources present on-site to minimize wildlife impacts. All employees and contractors working in the field will be required to attend the environmental training session prior to working on site. This training will include information regarding sensitive biological resources (with an emphasis whooping cranes and eagles), restrictions, protection measures, individual responsibilities associated with the Project, and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet to document their participation.
- Crowned Ridge will develop, in coordination with SDGFP and USFWS, and implement a whooping crane contingency plan. The plan will describe the step-by-step response (e.g., turbine curtailment, notifications, etc.) to whooping crane observations within the Project area during operation.
- “Good housekeeping” procedures will be developed to keep the site clean of debris, garbage, carrion, fugitive trash or waste, and graffiti; to prohibit scrap heaps and dumps; and to minimize storage yards. This will prevent trash from being exposed or blown around the Project Area and will avoid attracting predators as such material is a potential food source for eagles and other predators (i.e. rodents and other small mammals).
- To minimize vehicle collisions with wildlife, vehicular speed will be limited to 15 miles per hour on turbine or transmission line access roads; vehicular speed will be limited to 35 miles per hour on county roads within the Project Area boundary. Crowned Ridge will follow posted speed limits on county roads outside of the Project Area boundary.
- Crowned Ridge will contact local game managers to remove road-killed animals on state and county roadways within the Project Area. Road-killed animals or other carcasses (excluding eagles and other migratory birds) detected by personnel on actual Project service roadways will be removed promptly by Crowned Ridge personnel under guidance and/or assistance from local game managers to avoid attracting eagles or other raptors to the Project Area.
- To avoid habitat destruction, BMPs for fire prevention during operation will be implemented to minimize wildfire potential.
- Crowned Ridge workers and subcontractors will not be allowed to have firearms or pets at the Project and will be instructed to not disturb or harass wildlife.
- Lighting of the turbines will be pursuant to Federal Aviation Administration aviation hazard lighting standards. Crowned Ridge is proposing in its lighting plan to use radar activated hazard lights acceptable to the Federal Aviation Administration. Crowned Ridge may also install motion activated timed lighting on tower entrances and other

facilities that require lighting at night to avoid the potential to attract insects that may draw birds and bats toward the facility.

- Crowned Ridge has voluntarily agreed to develop and implement this WCS in its continued efforts to demonstrate due diligence in avoiding and minimizing impacts to avian and bat species in association with development and operation of the Project.

7.4 Measures to Offset and/or Compensate for Habitat Related Impacts

Approximately 76.2 acres of the total Project Area will be permanently affected due to conversion (e.g., to turbine pads, access roads) and approximately 1,940.2 acres of land will be temporarily disturbed during construction for turbine installation, road construction, collection line trenching, temporary meteorological tower installation, and temporary crane paths. Approximately 95 percent of the area that is temporarily disturbed will be reclaimed. These impacts represent a minor portion of the land area available for agricultural production. As a result, the Project would not result in significant permanent impacts to agricultural production or the habitat that it offers to birds, bats, and other wildlife.

Land where turbines will be sited primarily is undeveloped pasture/hay, cropland, and grassland. Areas of highest quality native prairie were avoided to the extent possible. Access road construction would result in the greatest effects to native vegetation, resulting in permanent loss of these habitats where they occur along selected routes. Installation of the buried collection lines would result in some temporary effects to native and non-native grasslands. Any temporary impacts to native prairie will be offset by reseeding using a native vegetation (weed-free) seed mix in accordance with landowner preferences. Other temporarily disturbed areas will be reseeded or restored to crop, depending on original conditions and landowner preference.

8 TIER 4: POST-CONSTRUCTION STUDIES TO ESTIMATE IMPACTS

8.1 Carcass Surveys

Crowned Ridge will undertake one year of independently conducted post-construction avian and bat mortality monitoring for the Project and will provide post-construction study reports to entities as described in Section 10. The objective of the fatality monitoring is to identify the bird and bat species found as fatalities at the Project and to statistically estimate fatality rates. The monitoring framework consists of standardized carcass searches conducted at a sample of the Project turbines. The number of fatalities found during searches represents a minimum number of fatalities at a project because not all fatalities that occur are found by observers. Therefore, carcass persistence trials and searcher efficiency trials will be conducted concurrently with standardized fatality monitoring to account for the bias attributable to carcass removal by scavengers and searcher efficiency. Fatality rates (e.g., birds/turbine/year and birds/operational MW/year) will then be estimated using statistical methods that adjust the number of carcasses found for detection biases. Per-turbine and per-megawatt estimates provide different ways of scaling fatality information to be comparable to other projects. Annual fatality rates will be calculated for all bird species combined, small (less than or equal to 10 inches) and large

(greater than10 inches) birds, raptors, and sensitive species (collectively). For further information on this protocol, see Appendix C: Post-construction Fatality Monitoring.

8.2 Grouse Studies

Crowned Ridge will undertake independently-conducted pre- and post-development prairie grouse (greater prairie-chicken and sharp-tailed grouse) lek studies to evaluate the effect of the Project and Crowned Ridge I on the local prairie grouse population. Study methods were designed in close coordination with the SDGFP and are described in detail in an October 29, 2019 technical memorandum from Crowned Ridge to the SDGFP. Studies will include:

- aerial lek surveys to identify leks within 6 miles of the Crowned Ridge I and II project areas,
- lek monitoring to document activity at all identified leks, and
- capture and telemetry of individuals to identify mortality events, document nest locations and success, and collect information on broods.

These studies are expected to inform the body of scientific literature on the potential impacts of wind on prairie grouse and inform mitigation efforts if an effect is detected. If results of the study indicate mitigation is necessary, Crowned Ridge will develop a stand-alone mitigation plan. The plan will describe measures to mitigate potential impacts to grouse leks as a result of operation of the Project during post-construction grouse lek monitoring, if such impacts are observed. During development of the mitigation plan, Crowned Ridge will collaborate with the SDGFP.

8.3 Avian Predator Study

Crowned Ridge will fund a federal grant match for the SDGFP State Wildlife Action Plan designed to facilitate an additional component to the grouse study related to avian predator interactions with wind projects. This particular study component will be consistent with SDGFP State Wildlife Action Plan priorities and will be designed to inform the scientific literature regarding potential mechanisms that may explain grouse and wind project interactions.

8.4 Whooping Crane Contingency Plan

Crowned Ridge is coordinating with SDGFP and USFWS to establish a formal whooping crane contingency protocol, which will be finalized prior to Project operation. The objective of contingency plan will be to minimize the likelihood of whooping crane collisions with wind turbines during the species' spring and fall migration periods. The contingency plan will include both a decision tree and communications tree for notifying project and agency personnel at designated milestones during spring and fall migration periods for the life of the project by operational staff.

9 TIER 5: OTHER POST-CONSTRUCTION STUDIES AND ADAPTIVE MANAGEMENT

The United States Department of Interior defines adaptive management as a decision-making process that promotes flexible decision making and adjustment of management decisions as

information is collected (Williams et al. 2007). Crowned Ridge has adopted an adaptive management approach to assessing and responding to the impacts of its wind energy facility on birds and bats. Crowned Ridge is committed to adaptively managing impacts to birds and bats for the life of the Project. Based on experience from the operating wind farms in the region, significant unanticipated impacts to species of concern are not expected. In the event that the Crowned Ridge detects a significant unanticipated impact, such as mortality or injury to a federally listed species or higher than expected migratory bird or bat mortality for the region, Crowned Ridge will contact the USFWS South Dakota Field Office to discuss additional potential avoidance, minimization, or mitigation measures to be considered. Crowned Ridge is committed to developing an approach that facilitates understanding any unanticipated significant issues and collaboratively working with the USFWS to develop additional avoidance, minimization, or mitigation measures that may be appropriate.

10 REPORTING FORMATS AND SCHEDULE

10.1 Pre-construction Survey Data

Pre-construction survey data have been, and will continue to be, compiled and analyzed in a report for each survey and/or survey season. Reports are in standard scientific format or in memorandum format, as appropriate based on the amount of data collected. Reports have been and will continue to be submitted to USFWS, SDGFP, and SDPUC.

10.2 Post-construction Mortality Reporting

Crowned Ridge will prepare a post-construction mortality report. The report will include a detailed description of the survey methods; results from carcass searches, carcass persistence trials, and searcher efficiency trials; an estimate of fatalities on a per-turbine and per-megawatt basis; and discussion of results in the context of adaptive management. The annual report will be provided to USFWS, SDGFP, and SDPUC.

10.3 Pre- and Post-construction Grouse Study Reporting

Reports will be prepared for the grouse study and will include a detailed description of survey methods and results. All reports will be provided to USFWS, SDGFP, and SDPUC.

10.4 Post-construction Avian Predator Study Reporting

Reports will be prepared for the post-construction raptor study and will include a detailed description of survey methods and results. All reports will be provided to USFWS, SDGFP, and SDPUC.

10.5 Other

Crowned Ridge will inform the appropriate agencies of any new critical habitat of threatened or endangered species in the Project Area, should Crowned Ridge become aware of critical habitat that was not previously reported to the SDPUC. Crowned Ridge will relay this information via telephone and email communications if needed.

11 PERSONNEL TRAINING

Crowned Ridge will develop a site-specific worker environmental training program that will be administered to all employees and contractors working in the field during construction and operation. The training will be implemented to inform workers of the biological resources present on-site to minimize wildlife impacts, and to train workers in identifying and responding to observations of whooping cranes. All employees and contractors working in the field will be required to attend the environmental training session prior to working on-site. This training includes information regarding identification of the sensitive biological resources, restrictions, protection measures, individual responsibilities associated with the Project, and the consequences of non-compliance. Written material will be provided to employees at orientation and participants will sign an attendance sheet documenting their participation. The training will be performed by qualified consultants or in-house environmental staff qualified to conduct the training. See Appendix C for more information.

12 DECOMMISSIONING

Crowned Ridge anticipates that the life of the Project will be approximately 25 years. At the end of the Project's contracted life there may be opportunities to extend the life of the Project by repowering the Project by retrofitting the turbines and power system with upgrades based on new technology, which may allow the wind farm to produce efficiently and successfully for many more years. In the event the Project's contracted life is not extended, the Project will be decommissioned in accordance with applicable state and county regulations and all Project commitments made during Project permitting intended to protect natural resources. The Decommissioning Plan for the Project is included in Appendix N of the SDPUC Application submitted for the Project (Crowned Ridge 2019).

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Table 1. Chronology of Resource Agency Contacts for the Project

Date	Agency	Event and Participants
November 26, 2007	Department of the Interior, United States Fish and Wildlife Service (USFWS) - Ecological Services	Letter – Wind Energy Project Coordination, Eastern and North Central South Dakota; from Pete Grober, Field Supervisor, South Dakota Field Office, USFWS to Erik W. Jansen, Biologist, Tetra Tech EC, Inc.
December 3, 2007	South Dakota Game, Fish, and Parks (SDGFP)	Letter – Environmental review of Eastern and North-central Wind Resource Area as potential wind power project areas; from Silka L. F. Kempema, Wildlife Biologist, SDGFP to Erik W. Jansen, Biologist, Tetra Tech EC, Inc.
February 5, 2010	USFWS	Letter – Proposed Crowned Ridge Wind Energy Center, Codington and Grant Counties, South Dakota; from Pete Grober, Field Supervisor, South Dakota Field Office, USFWS to Anne-Marie Griger, Tetra Tech EC, Inc.
February 11, 2015	SDGFP	Letter – Crowned Ridge Wind Energy Center in Codington and Grant Counties, South Dakota; from Anne-Marie Griger, Tetra Tech, Inc., to Jeff Vonk, Secretary of SDGFP.
February 11, 2015	USFWS	Letter – Crowned Ridge Wind Energy Center in Codington and Grant Counties, South Dakota; from Anne-Marie Griger, Tetra Tech, Inc., to Scott Larson, Field Supervisor, South Dakota Field Office, USFWS.
March 23, 2014 (date is incorrect and is actually March 23, 2015)	USFWS	Letter – Crowned Ridge Wind Energy Center, Codington and Grant Counties, South Dakota; From Scott Larson, Field Supervisor, South Dakota Field Office, USFWS to Anne-Marie Griger, Tetra Tech, Inc.
April 19, 2017	USFWS and SDGFP	Technical memorandum re: Crowned Ridge II Project Background. Delivered via email.
April 20, 2017	USFWS and SDGFP	Conference call to discuss Crowned Ridge II project. Participants were Natalie Gates, Biologist, USFWS South Dakota Field Office; Natoma Hansen, USFWS Refuge Manager, Madison Wetland Management District; Connie Mueller, USFWS Project Leader, Waubay National Wildlife Refuge Complex; Silka Kempema, Wildlife Biologist, SDGFP; Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra Energy Resources (NextEra); Tyler Wilhelm, Project Manager – Wind Development NextEra; Patrick Flowers, Manager of Environmental Services, Xcel Energy; Kely Mertz, Senior Project Manager, SWCA Environmental Consultants (SWCA).
May 24, 2017	Sisseton Wahpeton Oyate of the Lake Traverse Reservation (SWO)	Cultural resource survey planning meeting. Participants were: Dianne Desrosiers, SWO Tribal Historic Preservation Officer (THPO); Rick Wadleigh, Senior Environmental Analyst, SWCA; Rich Estabrook, Archaeologist, NextEra; Carolyn Stewart, Director Tribal Relations, NextEra; Michelle Phillips, Environmental Services, NextEra; Scott Phillips, Senior Cultural Anthropologist, SWCA; Norma Crumbley, Principal, SWCA; Stephen Sabatke, Archaeologist, HDR; Jenkins Cloud, CRP Ranger, SWO THPO; Vine T. Marks, Sr., SWO Cultural Preservation Board (CPB) Chair; Wayne Cloud, 106 Coordinator Assistant, SWO THPO; Jim Whitted, 106 Coordinator, SWO THPO.
June 14, 2017	South Dakota State Historical Society (SDSHS)	Technical memo – Crowned Ridge Wind Energy Facility Overview and Cultural Resources Review.
June 15, 2017	SDGFP	Project email – data request from Kely Mertz, Senior Project Manager, SWCA to Travis Runia, SDGFP.
June 19, 2017	SDSHS	Project kickoff call to discuss June 14, 2017 memo. Participants were: Paige Olson, SDSHS; Kate Nelson, SDSHS; Jenna Dietmeir, SDSHS; Scott Phillips, Senior Cultural Anthropologist, SWCA; Norma Crumbley, Principal, SWCA; Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra; Carolyn Stewart, Director Tribal Relations, NextEra; Richard Estabrook, NextEra; Stephen Sabatke, Archaeologist, HDR.
June 19, 2017	SWO, Yankton Sioux Tribe (YST), and Spirit Lake Nation (SLN)	Cultural resource survey field work kickoff meeting. Participants were: Dianne Desrosiers, SWO THPO; Amaris Makesgood, SLN; Andrew Meng, SWO; Angelique Kitto, SWO; Carolyn Stewart, Director Tribal Relations, NextEra; Chris Shelton, SWCA; CJ Jones, YST; Dylan Eigenberger, Archaeologist, HDR; Erika Eigenberger, Archaeologist, HDR; Jason Burkard, Archaeologist, SWCA; Jenkins Cloud, SWO; Jim Whitted, 106 Coordinator,

Date	Agency	Event and Participants
		SWO THPO; Keith Winckler, YST; Londel Seaboy, SWO; Rich Estabrook, Archaeologist, NextEra; Rick Wadleigh, Senior Environmental Analyst, SWCA; Scott Phillips, Senior Cultural Anthropologist, SWCA; Stephen Sabatke, Archaeologist, HDR; Steve Cummins, Archaeologist, SWCA; Vine T. Marks, Sr., SWO CPB Chair.
July 11, 2017	SDGFP	Email data response to June 15, 2017 project email; from Travis Runia, SDGFP to Kely Mertz, Senior Project Manager, SWCA.
July 12, 2017	SDGFP	Project letter – Crowned Ridge I and II Wind Energy Projects in Codington, Deuel, and Grant Counties, South Dakota; from Kely Mertz, Senior Project Manager, SWCA to Silka Kempema, Wildlife Biologist, SDGFP.
July 12, 2017	USFWS	Project letter – Crowned Ridge I and II Wind Energy Projects in Codington, Deuel, and Grant Counties, South Dakota; from Kely Mertz, Senior Project Manager, SWCA to Natalie Gates, Biologist, USFWS South Dakota Field Office.
August 1, 2017	SDGFP	Email data response to July 12, 2017 project letter; from Casey Heimerl, SDGFP to Kely Mertz, Senior Project Manager, SWCA. Spatial data were provided as an attachment to the email.
August 11, 2017	USFWS	Letter response to July 12, 2017 project letter, from Scott Larson, Field Supervisor, USFWS to Kely Mertz, Senior Project Manager, SWCA.
April 20, 2018	SDGFP	Project email – data request from Kely Mertz, Senior Project Manager, SWCA to Casey Heimerl, SDGFP.
April 24, 2018	SDGFP	Email data response to April 20, 2018 project email; from Casey Heimerl, SDGFP to Kely Mertz, Senior Project Manager, SWCA. Spatial data were provided as an attachment to the email.
April 3, 2019	USFWS	Online USFWS IPaC Official Species List generated for the Project Area by Becky Braeutigam, Natural Resources Project Manager, SWCA.
April 3, 2019	SDGFP	Project letter - Crowned Ridge II Wind Energy Project in Codington and Grant Counties, South Dakota; from Kely Mertz, Senior Project Manager, SWCA to Silka Kempema, Wildlife Biologist, SDGFP.
April 26, 2019	SDGFP	Email data response to April 3, 2019 project letter; from Casey Heimerl, SDGFP to Becky Braeutigam, Natural Resources Project Manager, SWCA. Spatial data were provided as an attachment to the email.
July 2, 2019	USFWS	Project Letter – to Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra and Darren Kearney, South Dakota Public Utilities Commission (SDPUC) from Scott Larson, Field Supervisor, North and South Dakota Field Office, USFWS.
July 8, 2019	SDPUC	Letter response to July 2, 2019 letter; from Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra to Kristen N. Edwards, Staff Attorney, SDPUC.
July 9, 2019	USFWS	Email transmittal – copy of July 8, 2019 letter from Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra to Natalie Gates, Biologist, USFWS South Dakota Field Office.
July 9, 2019	USFWS	Email transmittal – copy of July 8, 2019 letter from Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra to Scott Larson, Field Supervisor, North and South Dakota Field Office, USFWS.
July 16, 2019	USFWS and SDGFP	Conference call to discuss topics in July 2 and 8, 2019 letters. Participants were Scott Larson, Field Supervisor, North and South Dakota Field Offices, USFWS; Natalie Gates, Biologist, South Dakota Field Office, USFWS; Hilary Meyer, Environmental Review Senior Biologist, SDGFP; Kimberly Wells, Senior Manager, Environmental Services, NextEra; Tyler Wilhelm, Project Manager – Wind Development, NextEra; Michelle Philips, Environmental Specialist, NextEra; Kely Mertz, Senior Project Manager, SWCA; Sarah Sappington, Director, SWCA.
July 17, 2019	USFWS and SDGFP	Project email with attachment containing Natalie Gates' comments on July 16, 2019 conference call topics; from Natalie Gates, Biologist, South Dakota Field Office, USFWS to Kristen N. Edwards, Staff Attorney, SDPUC.
August 6, 2019	SDSHS	Project letter regarding Crowned Ridge Wind II Turbine Array – Archaeological and Traditional Cultural Property Inventory to

Date	Agency	Event and Participants
		Scott Phillips, Senior Cultural Anthropologist, SWCA from Paige Olsson, SDSHS Review and Compliance Coordinator.
August 19, 2019	SDSHS	Project letter regarding Crowned Ridge Wind II Turbine Array – Architectural Resources Assessment to Scott Phillips, Senior Cultural Anthropologist, SWCA from Kate Nelson, SDSHS Restoration Specialist.
September 12, 2019	USFWS and SDGFP	Project email with attachment containing final meeting minutes from July 16, 2019 conference call; from Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra to Natalie Gates, Biologist, South Dakota Field Office, USFWS and Hilary Meyer, Environmental Review Senior Biologist, SDGFP.
October 29, 2019	SDPUC	Grouse Study Plan filed in SDPUC docket no. EL19-003 on October 29, 2019. Plan addresses both Crowned Ridge I and Crowned Ridge II.
December 6, 2019	SDPUC	Grouse Mitigation Plan filed in SDPUC docket no. EL19-003 on December 18, 2019. Plan addresses both Crowned Ridge I and Crowned Ridge II.
February 11, 2020	SDGFP	Project email from Kim Wells, Manager – Mid Continent Region, Environmental Services, NextEra to Hilary Moore, Environmental Review Senior Biologist, SDGFP regarding 60-day notice of planned collection on Walk-in Areas.

Table 2. Land Cover Types at the Project

Land Cover	Acreage in Project Area	Percent of Project Area
Agricultural	40,996.25	67.21
Grass/Pasture	15,817.46	25.93
Developed	2,756.75	4.52
Other Hay/Non-alfalfa	535.79	0.88
Herbaceous Wetlands	431.68	0.71
Deciduous Forest	308.24	0.51
Open Water	78.97	0.13
Winter Wheat	37.58	0.06
Fallow/Idle Cropland	18.01	0.03
Barren	11.79	0.02
Shrubland	3.02	0.01
Woody Wetlands	0.22	<0.01
Total	60,955.76	100.00

Source: USDA, National Agriculture Statistics Service 2018

Table 3. Species and Average Counts for the SDWA CBC from 2008 to 2017

Species Group	Average Count/Year*
Waterfowl	
Canada Goose	416.2
Mallard	131.3
Snow Goose	3.0
Lesser Scaup	1.6

Species Group	Average Count/Year*
Common Merganser	0.7
Hooded Merganser	0.3
Ruddy Duck	0.3
Gadwall	0.2
Northern Pintail	0.2
Redhead	0.2
Wood Duck	0.1
Green-winged Teal (American)	0.1
Common Goldeneye	0.1
Gamebirds	
Ring-necked Pheasant	113.8
Wild Turkey	94.2
Sharp-tailed Grouse	46.4
Gray Partridge	3.2
Raptors	
Great Horned Owl	3.0
Bald Eagle†	2.6
Prairie Falcon	2.6
Northern Harrier	1.4
Rough-legged Hawk	1.4
Snowy Owl	1.4
Short-eared Owl†	0.5
American Kestrel	0.4
Cooper's Hawk	0.3
Red-tailed Hawk	0.2
Prairie Falcon	0.2
Merlin	0.2
Sharp-shinned Hawk	0.1
Barred Owl	0.1
Others	
American Coot	0.2
Belted Kingfisher	0.2
Pigeons/Doves	
Rock Pigeon (Feral Pigeon)	102.7
Eurasian Collared-Dove	11.6
Mourning Dove	0.4
Woodpeckers	
Downy Woodpecker	7.7
Hairy Woodpecker	3.1
Red-bellied Woodpecker	0.9

Species Group	Average Count/Year*
Northern Flicker	0.3
Northern Flicker (Yellow-shafted)	0.1
Pileated Woodpecker	0.1
Songbirds	
Lapland Longspur	1026.8
American Robin	407.0
American Crow	289.3
Common Redpoll	134.0
Cedar Waxwing	88.2
Bohemian Waxwing	40.5
Horned Lark	32.0
Snow Bunting	21.5
Blue Jay	20.8
Song Sparrow	17.3
American Tree Sparrow	11.4
Red-breasted Nuthatch	10.1
Purple Finch	8.0
Northern Shrike	6.0
Western Meadowlark	5.3
American Goldfinch	5.1
House Finch	3.9
White-throated Sparrow	2.0
Red Crossbill	1.5
European Starling	1.4
Black-capped Chickadee	1.0
Brown Creeper	1.0
White-breasted Nuthatch	0.9
Common Grackle	0.7
Brown-headed Cowbird	0.6
Brewer's Blackbird	0.5
Dark-eyed Junco	0.2
Red-winged Blackbird	0.1

Source: National Audubon Society (2018)

*Average number of individuals counted per year

†USFWS BCC, Region 11 (USFWS 2008a)

Table 4. Species Encountered and Their Abundance on the Wilmot BBS Route

Species Group	Birds/Route*	Preferred Habitat
Waterfowl		
Mallard	40.8	Wetlands

Species Group	Birds/Route*	Preferred Habitat
Canada Goose	11.6	Wetlands
Blue-winged Teal	5.0	Wetlands
Gadwall	1.4	Wetlands
Redhead	1.2	Wetlands
Wood Duck	0.6	Wetlands
Northern Pintail	0.6	Wetlands
Northern Shoveler	0.4	Wetlands
Gamebirds		
Ring-necked Pheasant	47.2	Grasslands/Agriculture
Wild Turkey	6.6	Grasslands/Agriculture
Waterbirds/Shorebirds		
Killdeer	14.2	Wetlands/Grasslands/Agriculture
Upland Sandpiper†	2.8	Wetlands/Grasslands
Wilson's Snipe	2.8	Wetlands
American White Pelican	2.6	Wetlands
American Bittern†	2.6	Wetlands
Ring-billed Gull	2.0	Wetlands
Pied-billed Grebe	1.2	Wetlands
Marbled Godwit†	0.8	Wetlands/Grasslands
Sora	0.8	Wetlands
American Coot	0.6	Wetlands
Willet	0.2	Wetlands/Grasslands
Belted Kingfisher	0.2	Wetlands
Raptors		
Red-tailed Hawk	3.4	Grasslands/Agriculture/Woodlands
Northern Harrier	0.4	Grasslands
Bald Eagle†	0.2	Wetlands/Woodlands
Great Horned Owl	0.2	Grasslands/Shrub/Woodlands
American Kestrel	0.2	Grasslands
Pigeons/Doves		
Mourning Dove	56.6	Shrub/Open Areas
Rock Pigeon	5.4	Urban Areas
Eurasian Collared-Dove	0.2	Urban Areas
Nightjars/Swifts		
Chimney Swift	1.2	Urban Areas
Common Nighthawk	1.0	Grasslands
Woodpeckers		
(Yellow-shafted Flicker) Northern Flicker	2.0	Woodlands
Downy Woodpecker	0.8	Woodlands
Red-headed Woodpecker†	0.6	Woodlands
Pileated Woodpecker	0.2	Woodlands

Species Group	Birds/Route*	Preferred Habitat
Songbirds		
Red-winged Blackbird	91.8	Grasslands/Agriculture/Wetlands
Common Grackle	66.8	Grasslands/Agriculture
Cliff Swallow	49.6	Grasslands/Agriculture
Brown-headed Cowbird	40.0	Grasslands/Agriculture/Urban
American Robin	31.2	Grasslands/Agriculture/Woodlands
Western Meadowlark	27.8	Grasslands/Agriculture
Common Yellowthroat	23.4	Grasslands/Agriculture/Wetlands
American Goldfinch	22.0	Grasslands/Agriculture/Shrub
Yellow Warbler	20.4	Grassland/Agriculture/Shrub
Song Sparrow	20.0	Grasslands/Agriculture/Shrub
Vesper Sparrow	17.2	Grasslands/Agriculture
Yellow-headed Blackbird	16.6	Grasslands/Agriculture/Wetlands
Clay-colored Sparrow	16.2	Grasslands
Barn Swallow	15.6	Grasslands/Agriculture/Urban
Horned Lark	15.4	Grasslands/Agriculture
House Wren	15.2	Grasslands/Agriculture
European Starling	13.0	Urban Areas
Bobolink	11.8	Grasslands
Marsh Wren	10.6	Wetlands
House Sparrow	9.8	Urban Areas
Warbling Vireo	9.6	Grasslands/Agriculture/Shrub
Chipping Sparrow	8.0	Grasslands/Agriculture/Shrub
Orchard Oriole	7.4	Grasslands/Shrub/Woodlands
Eastern Kingbird	7.0	Grasslands/Agriculture/Shrub
Brown Thrasher	6.0	Grasslands/Agriculture/Shrub
Tree Swallow	5.4	Grasslands/Agriculture
Savannah Sparrow	5.4	Grasslands/Agriculture
American Crow	5.0	Grasslands/Agriculture/Woodlands
Cedar Waxwing	4.2	Shrub/Woodlands
Grasshopper Sparrow†	2.8	Grasslands
Sedge Wren	2.6	Wetlands
Blue Jay	2.4	Woodlands
Baltimore Oriole	2.4	Grassland/Agriculture/Woodlands
Least Flycatcher	2.2	Woodlands
Willow Flycatcher	2.0	Grasslands/Agriculture/Shrub
Bank Swallow	2.0	Grasslands/Agriculture/Wetlands
Gray Catbird	1.2	Grasslands/Agriculture/Shrub
Rose-breasted Grosbeak	1.2	Woodlands/Shrub
Western Kingbird	1.0	Grasslands/Agriculture
Great Crested Flycatcher	0.8	Woodlands

Species Group	Birds/Route*	Preferred Habitat
Red-eyed Vireo	0.8	Grasslands/Agriculture
Brewer's Blackbird	0.8	Grasslands/Agriculture/Wetlands
Eastern Wood-Pewee	0.6	Woodlands
Eastern Bluebird	0.6	Grasslands/Agriculture/Shrub
Field Sparrow	0.4	Grasslands/Agriculture
White-breasted Nuthatch	0.2	Woodlands
Swamp Sparrow	0.2	Wetlands
Indigo Bunting	0.2	Grasslands/Agriculture/Shrub

Source: Pardiek et al. (2018)

*These numbers reflect the abundance of the species near the survey route. They are averages of the total counts along the route for the period 2010-2014. Because each survey route is 24.5 mi long and consists of fifty 3-minute counts along the length of the route, the abundance estimate represents the number of birds that a biologist would encounter in about 2.5 hours of roadside birding in the area near the BBS route.

†USFWS BCC, Region 11 (USFWS 2008a)

Table 5. USFWS BCC Species for BCR 11

Species	Residency Status Near Project Area/Notes	Detected in Vicinity of Project Area
Horned Grebe	Non-breeder – migrant	No
American Bittern	Breeder – summer resident	BBS
Least Bittern	Summer resident (rare)	No
Bald Eagle	Breeder and migrant; BGEPA	BBS/CBC/Project Avian Use Surveys
Swainson's Hawk	Breeder – summer resident	No
Peregrine Falcon	Non-breeder – migrant	No
Yellow Rail	Non-breeder – migrant	No
Mountain Plover	Project outside of its range	No
Solitary Sandpiper	Non-breeder – migrant	No
Upland Sandpiper	Breeder – summer resident	BBS/Project Avian Use Surveys
Long-billed Curlew	Project outside of its range	No
Hudsonian Godwit	Non-breeder – migrant	No
Marbled Godwit	Breeder – summer resident (rare)	BBS
Buff-breasted Sandpiper	Non-breeder – migrant	No
Short-billed Dowitcher	Non-breeder – migrant	No
Black Tern	Breeder – summer resident	No
Black-billed Cuckoo	Breeder – summer resident	No
Short-eared Owl	Breeder – year-round resident	CBC
Red-headed Woodpecker	Breeder – summer resident	BBS
Sprague's Pipit	Non-breeder – migrant	No
Grasshopper Sparrow	Breeder – summer resident	BBS/Project Avian Use Surveys
Baird's Sparrow	Project outside of its range	No
Nelson's Sharp-tailed Sparrow	Non-breeder – migrant	No
McCown's Longspur	Project outside of its range	No
Smith's Longspur	Non-breeder – migrant	No

Species	Residency Status Near Project Area/Notes	Detected in Vicinity of Project Area
Chestnut-collared Longspur	Breeder – summer resident (rare)	Project Avian Use Surveys
Dickcissel	Breeder – summer resident (rare)	No

Sources: USFWS (2008a), Cornell Lab of Ornithology (2019) (residency status)

Table 6. Summary of Survey Efforts to Date Within the Project Area and Vicinity

Date	Survey	Survey Area
Mar. 2007 – June 2008	avian use surveys (spring)	Earlier iteration of Project Area
June 2008	Dakota skipper habitat delineation	Earlier iteration of Project Area
Aug. – Nov. 2008	avian use survey (fall)	Earlier iteration of Project Area
June – July 2009	Dakota skipper habitat delineation	Earlier iteration of Project Area
Aug. – Nov. 2014	avian use surveys (fall)	Earlier iteration of Project Area
Mar. – Nov. 2014; Nov – Mar. 2015	eagle survey	Earlier iteration of Project Area
2015	Dakota Skipper habitat evaluation	Earlier iteration of Project Area
Summer 2015	bat habitat assessment	Nearby study area
Aug. – Oct. 2015; Apr. – Oct. 2016	bat acoustic survey	Earlier iteration of Project Area
Mar. – Apr. 2016	raptor nest survey	Earlier iteration of Project Area
Apr. – May 2016	lek surveys	Earlier iteration of Project Area
Apr. – Oct. 2016	bat acoustic survey	Earlier iteration of Project Area
July 2016	bat acoustic survey	Earlier iteration of Project Area
Sept. 2016	Dakota skipper and Poweshiek skipperling habitat assessment	Earlier iteration of Project Area
Apr. 2016 – Feb. 2017	avian use survey	Earlier iteration of Project Area
Apr. and May 2017	raptor nest aerial survey	Project Area
Apr. – Nov. 2017	avian point count surveys	Project Area
Apr. – Nov. 2017	bat acoustic monitoring	Project Area
Spring 2018	raptor nest aerial survey	Project Area
June – July 2018	Dakota skipper and Poweshiek skipperling adult survey	Project Area
Summer 2018	desktop whooping crane habitat assessment	Project Area
Sep. 2018	desktop bat habitat assessment	Project Area
Aug. – Nov. 2019	bat acoustic monitoring	Project Area

Table 7. Estimated Mean Bird Fatalities for All Birds per Turbine and per Megawatt at Wind Facilities in the Midwest with Similar Habitat to the Project

Wind Facility	State	Habitat	Estimated Mean Bird Fatality/ turbine/year	Estimated Mean Bird Fatality/ MW/year	Source
Blue Sky Green Field	WI	Agricultural cropland	11.83	7.17	Gruver et al. 2009
Buffalo Ridge Phase I (1996-1999)	MN	Agricultural cropland	0.98	2.86	Johnson et al. 2000

Forward Energy	WI	Agricultural cropland	3.27	2.18	Grodsky and Drake 2011
Kewaunee County	WI	Agricultural cropland	1.29	1.95	Howe et al. 2002
Ainsworth	NE	Mixed grass prairie	2.68	1.63	Derby et al. 2007
Summerview	AB, Canada	Mixed grass prairie	1.9	-	Brown and Hamilton 2006
Red Canyon	TX	Short-grass prairie	0.77	0.50	Miller 2008
Top of Iowa	IA	Agricultural cropland	0.44 (2003) 0.96 (2004)	0.49 (2003) 1.07 (2004)	Jain 2005 Jain et al. 2011
Buffalo Gap II	TX	Mixed-grass prairie	0.22	0.15	Tierney 2009
Regional Mean (90-percent Confidence Interval)			2.43 (±1.80)	2.00 (±1.17)	

Table 8. Estimated Mean Bat Fatalities per Turbine and per Megawatt at Wind Facilities in the Midwest

Wind Facility	State	Habitat	Estimated Mean Bat Fatality/ turbine/year	Estimated Mean Bat Fatality/ MW/year	Documented Bat Species Fatalities*	Source
Blue Sky Green Field	WI	Agricultural cropland	40.54	24.57	Little brown, silver-haired, big brown, hoary, eastern red, and unidentified bat	Gruver et al. 2009
Forward Energy	WI	Agricultural cropland	23.44	15.63	Hoary, silver-haired, eastern red, unknown, little brown, big brown bat	Grodsky and Drake 2011
Kewaunee County	WI	Agricultural cropland	4.26	6.45	Eastern red and hoary bat	Howe et al. 2002
Top of Iowa	IA	Agricultural cropland	4.45 (2003) 7.14 (2004)	4.94 (2003) 7.94 (2004))	Hoary, little brown, eastern red, big brown, silver-haired bat	Jain 2005 Jain et al. 2011
Ainsworth	NE	Mixed grass prairie	1.91	1.16	Hoary, unidentified species, big brown and eastern red bat	Derby et al. 2007
Summerview	AB, Canada	Mixed grass prairie	18.48	-	Hoary, silver-haired, little brown, big brown, eastern red bat	Brown and Hamilton 2006
Buffalo Ridge Phase I (1996-1999)	MN	Agricultural cropland	0.26	-	Hoary, eastern red, silver-haired, tricolored bat	Johnson et al. 2000
Regional Mean (90-percent Confidence Interval)			17.25 (±12.05)	13.4 (±9.00)		

* In order of decreasing frequency

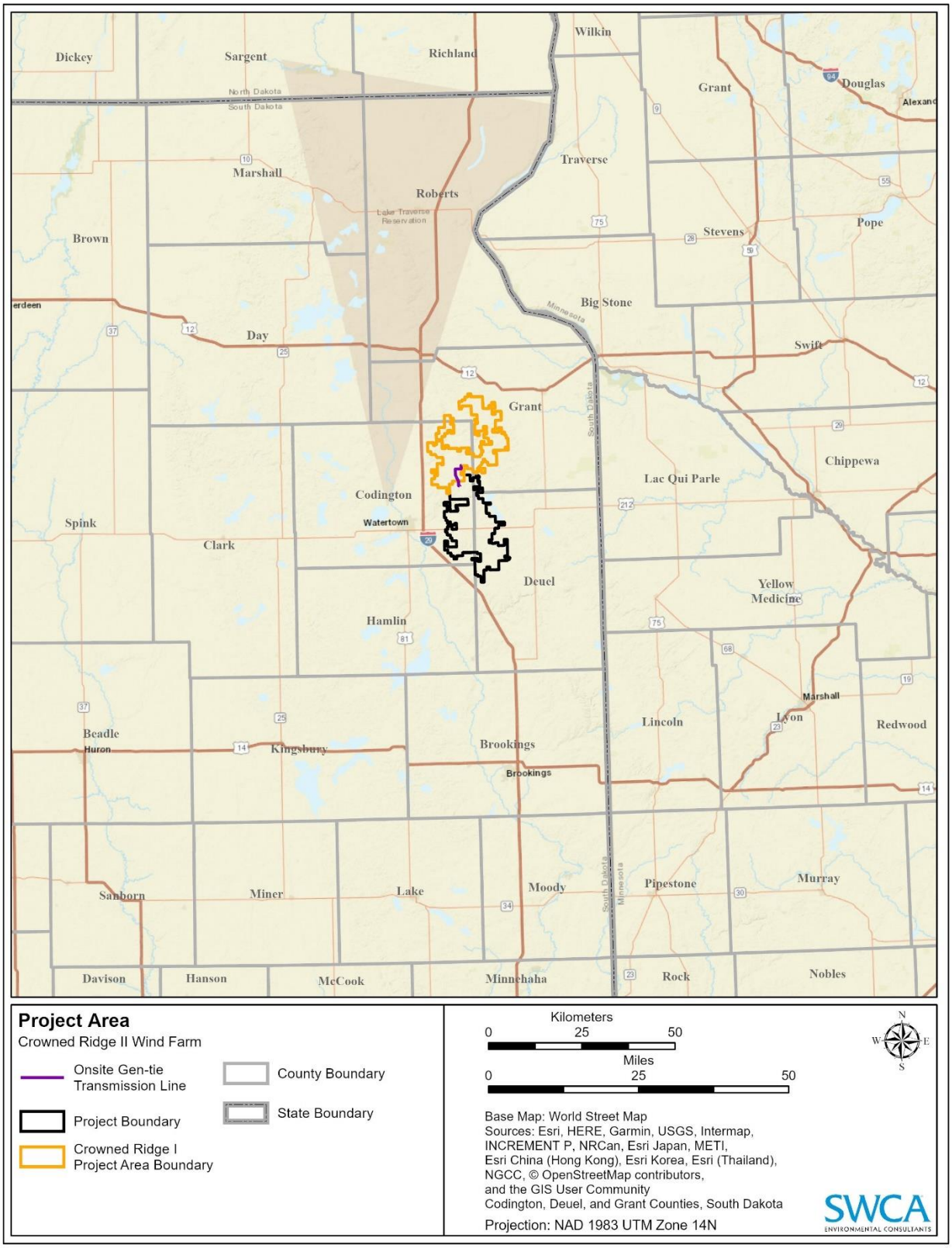

Figure 1. Project area and location.

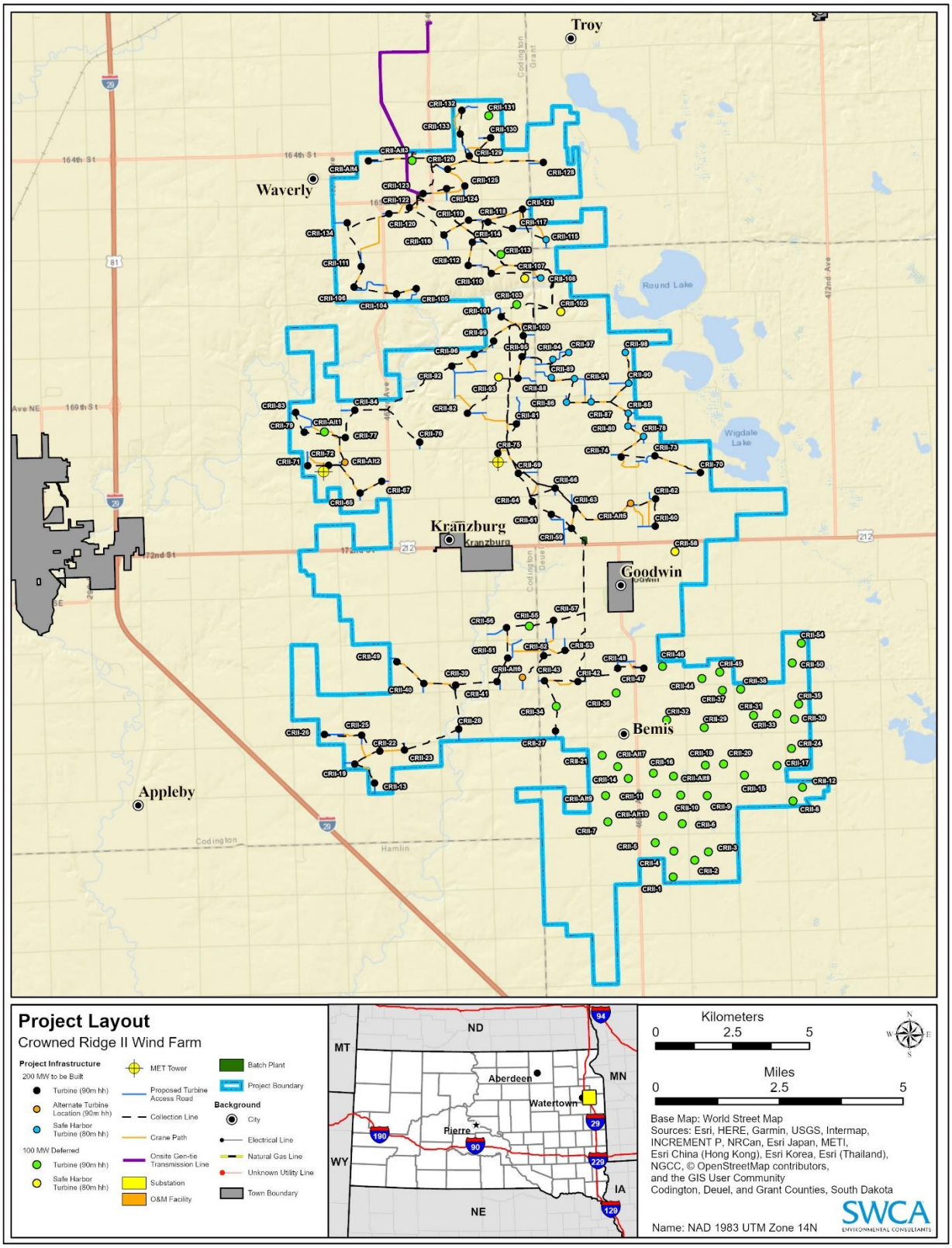

Figure 2. Project layout.

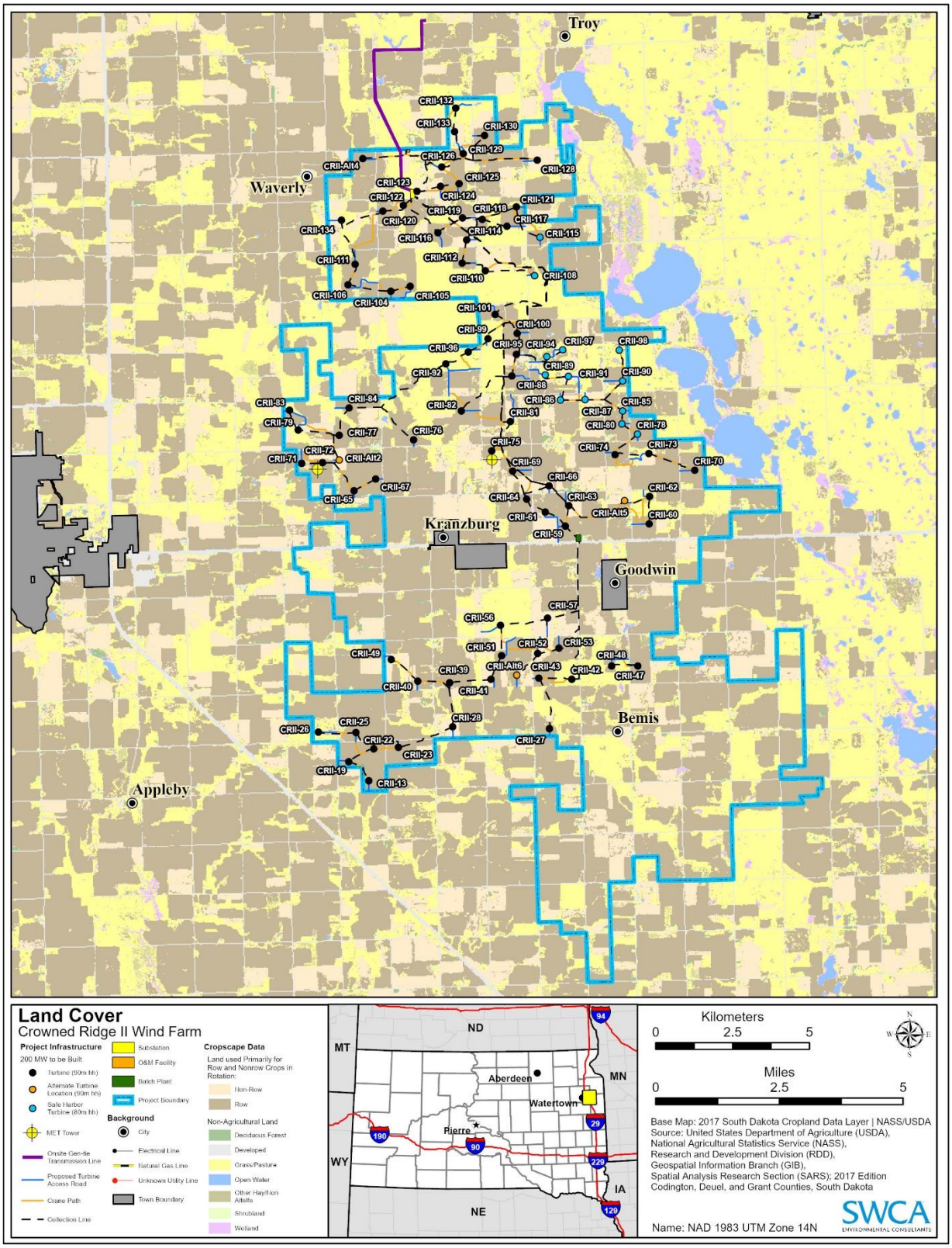

Figure 3. USDA land cover within the project area.

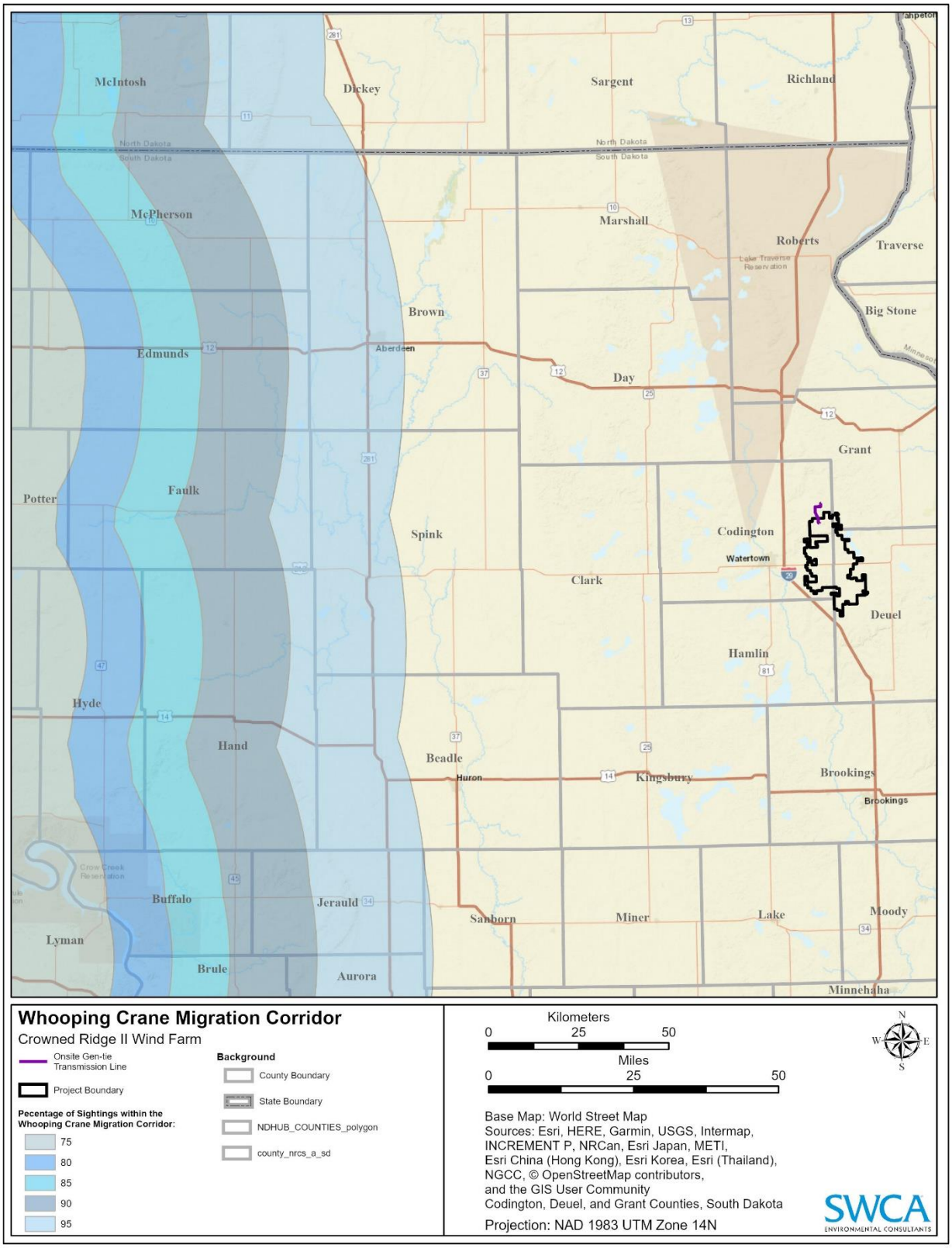

Figure 4. Project area location proximity to whooping crane migration corridor.

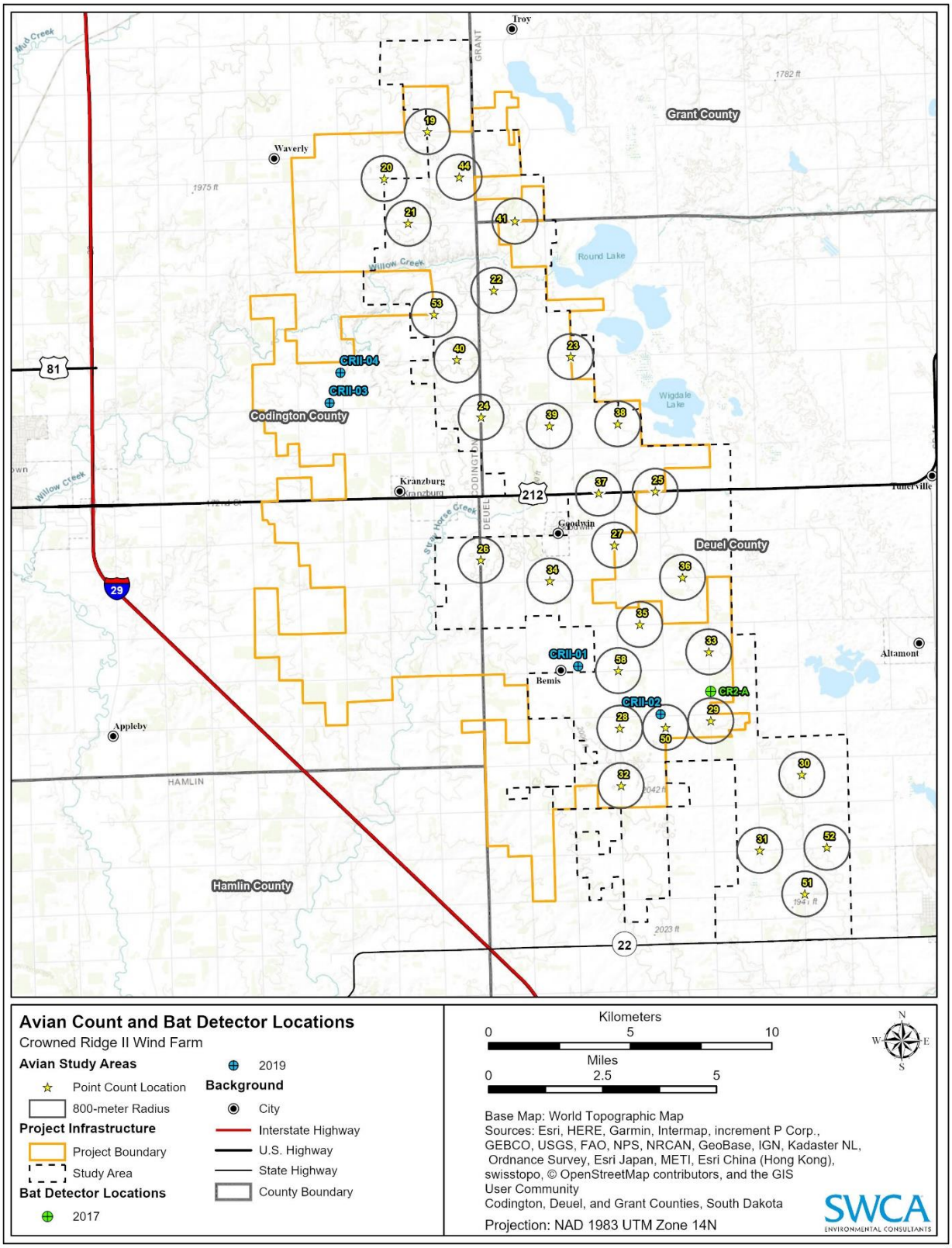

Figure 5. Avian count and bat detector locations.

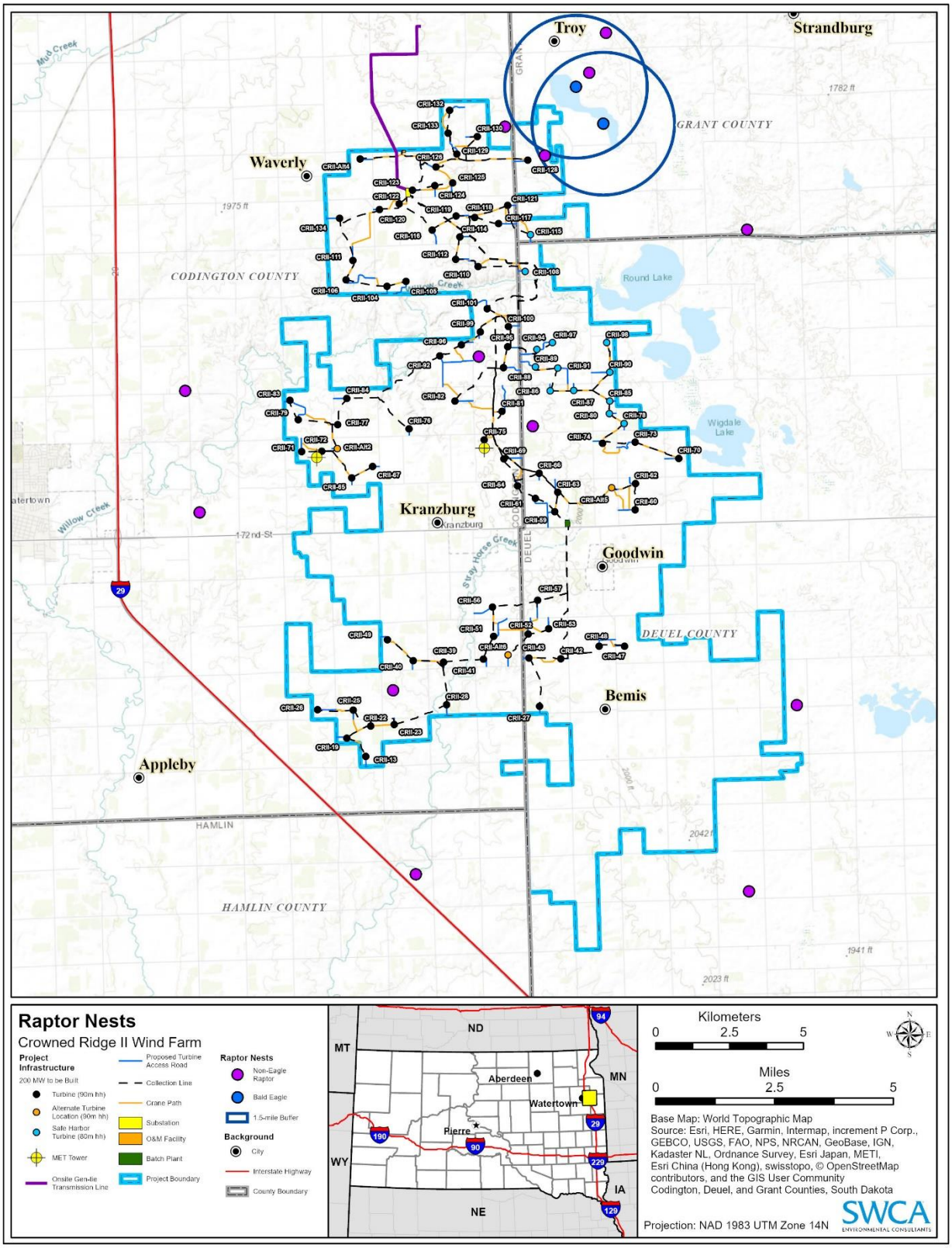

Figure 6. Raptor nest locations.

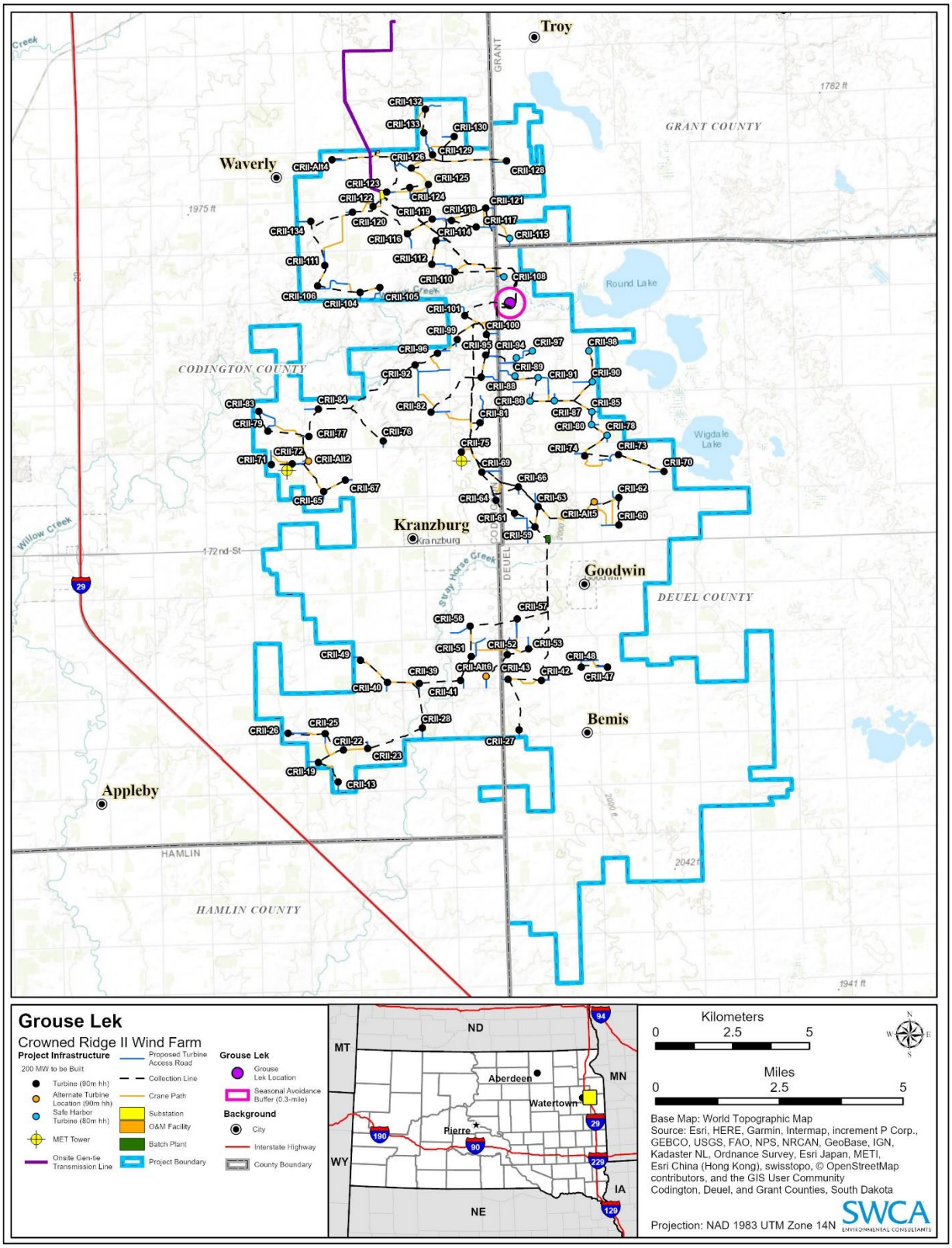

Figure 7. Grouse lek location.

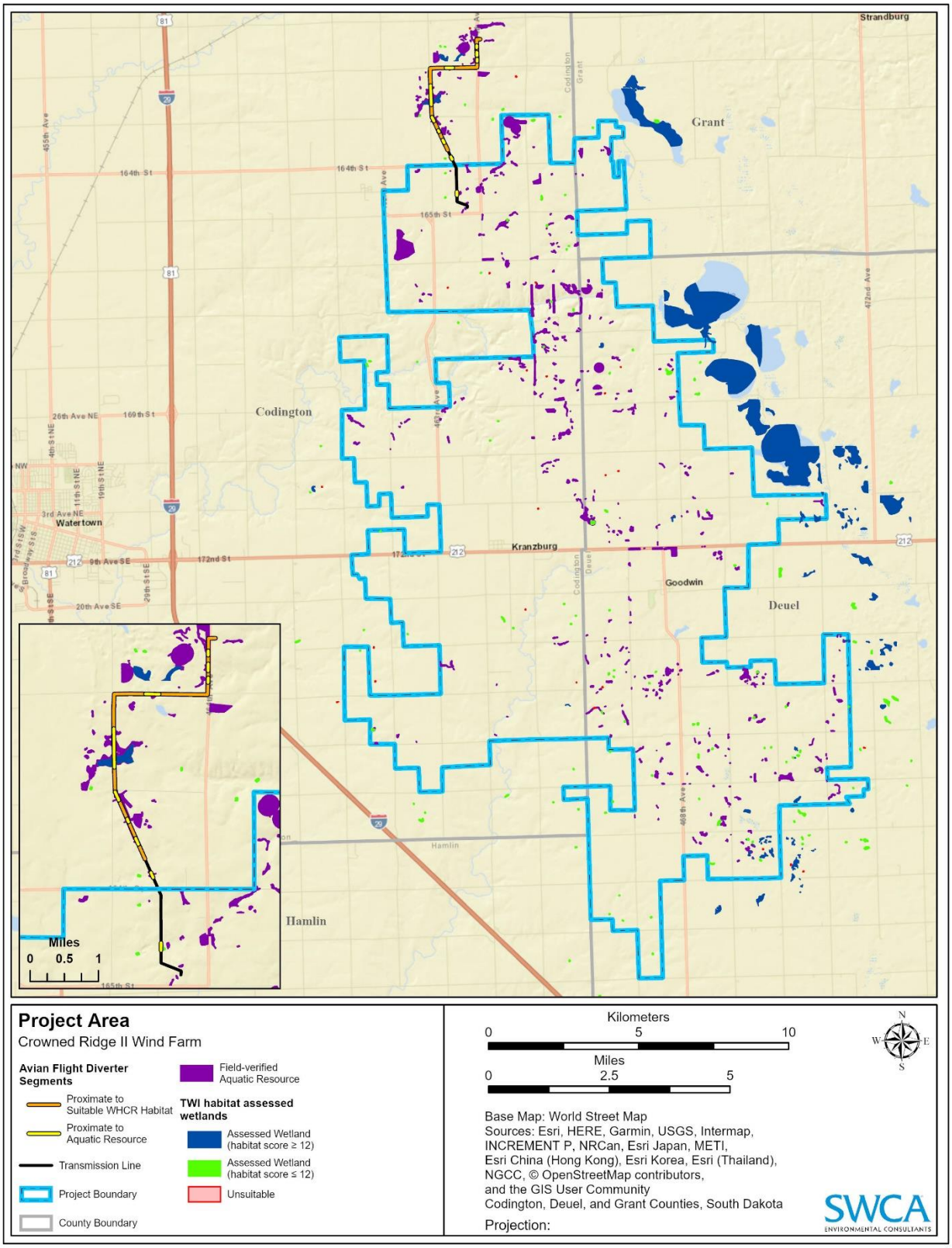

Figure 8. Overhead transmission line segments marked for avian flight diverter installation.

APPENDIX A

Agency Coordination

United States Department of the Interior

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

November 26, 2007

Mr. Erik W. Jansen, Biologist
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, Oregon 97201

Re: Wind Energy Project Consultation, Eastern and North Central South Dakota

Dear Mr. Jansen:

This letter is in response to your request dated October 19, 2007, for listed threatened or endangered species and environmental comments regarding the above referenced project. Your letter indicates a general interest in wind energy development in all or portions of five counties in eastern and north-central South Dakota: the West half (W ½) of Grant County, the Northeast quarter (NE 1/4) of Codington County, the West half (W ½) and South half (S ½) of Deuel County, the Northeast quarter (NE 1/4) of Brookings County, and all of McPherson County.

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

Species	Status	Expected Occurrence
American burying beetle (Nicrophorus americanus)	Endangered	Historic Records, No Recent Specimens, Brookings County.
Western prairie fringed orchid (Platanthera praeclara)	Threatened	Possible Habitat, No Recent Specimens, Brookings County.
Topeka shiner (Notropis topeka)	Endangered	Known Resident in Codington, Deuel, and Brookings Counties.
Whooping crane (Grus americana)	Endangered	Migration Records in Codington and McPherson Counties.
Dakota skipper (Hesperia dacotae)	Candidate	Resident in Brookings, Codington, Deuel, Grant, and McPherson Counties.

While historic records of the American burying beetle exist for Brookings County, recent documentation of the species in South Dakota has occurred only in Todd, Gregory, and Bennett Counties. The American burying beetle was formerly known to occupy a broad geographic range, and habitat was not thought to be limiting. However, recent studies have shown some preference by this species for sandy or sandy-loam grasslands with interspersed stands of low-meadow cottonwoods. If this type of habitat exists at the proposed project areas, surveys for the American burying beetle should be considered and any results reported to this office.

The Western prairie fringed orchid has not recently been documented in South Dakota. However, the life cycle of the plant often makes it difficult to detect. Additionally, populations currently exist in the neighboring states of Nebraska, Iowa, Minnesota, and North Dakota, and potential habitat may still be found in South Dakota. Although the plant is typically associated with intact native prairie, the Western prairie fringed orchid has also been found on disturbed sites. Potential habitats generally include mesic upland prairies, wet prairies, sedge meadows, subirrigated prairies, and swales in sand dune complexes. If these habitats exist within the proposed project areas, surveys for the Western prairie fringed orchid should be considered prior to construction.

Topeka shiners are known to occupy numerous small streams within eastern South Dakota within the Big Sioux, Vermillion, and James River watersheds. Activities affecting instream habitat of waterways within any of these three watersheds (e.g., road crossings, loss of riparian buffer) have the potential to adversely impact this minnow.

The single self-sustaining migratory population of whooping cranes remaining in the wild migrates through South Dakota as it travels between northern breeding grounds and southern wintering areas. The species occupies numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which they stand and rest. Line strike mortality is one of the greatest threats to this species; collisions with distribution and transmission lines are the highest known source of mortality to fledged whooping cranes. Interactions of the species with wind turbines is currently not known but, as large birds with low maneuverability, they are deemed likely to be susceptible to collision mortality with turbines as well. It is also possible that these birds may avoid wind farm areas entirely, thereby suffering a loss of potential stopover habitat in South Dakota. Additionally, should construction occur during spring or fall migration, the potential for disturbances to whooping cranes exists. Any whooping crane sightings should be reported to this office. While the species has been noted further east in South Dakota, McPherson County is included as part of the species' primary migration corridor.

The Dakota skipper may also occur on some of the proposed project areas. The Dakota skipper is a candidate species and accordingly is not, at present, provided Federal protection under the Endangered Species Act. Their candidate status defines these butterflies as a species in decline that the U.S. Fish and Wildlife Service (Service) believes needs to be listed as threatened or endangered, but listing is currently precluded by other priorities. Dakota skippers are obligate residents of high quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed grass prairie. In northeastern South Dakota, Dakota skippers inhabit dry-mesic hill prairies with abundant purple coneflower but also use mesic to wet-mesic tallgrass prairie habitats characterized by wood lily and smooth camas. If this type of habitat exists in the proposed project areas, surveys for the species should be considered and results reported to this office.

Please note that the bald eagle (Haliaeetus leucocephalus) also occurs throughout South Dakota throughout the year, and new nests are appearing annually. While Endangered Species Act protections for the bald eagle have been removed, effective August 8, 2007, the species will continue to be protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). These laws protect bald eagles from a variety of harmful actions and impacts. Our agency has developed guidance for the public regarding means to avoid take of the bald eagle under these laws. The National Bald Eagle Management Guidelines are available online at http://www.fws.gov/migratorybirds/baldeagle.htm. We recommend that you review these guidelines as they serve to advise you of circumstances where the laws may apply to your activities so that you may avoid potential violations of this law on future projects.

In addition to concerns related specifically to threatened and endangered species, primary concerns of the Service regarding wind farms are collision mortality, the loss of habitat, and habitat avoidance behaviors by wildlife. While there is still much to be learned regarding wind turbine-wildlife interactions, we do know that wind turbines can have adverse impacts on some species. Recent studies of grassland nesting birds have shown a tendency for avoidance of areas immediately surrounding turbines; thus, when considering the issues of habitat fragmentation and grassland bird avoidance, the area impacted may be larger than the final footprint of the project.

The Service has developed voluntary interim guidelines to assist energy companies in accomplishing the goal of reducing the risk posed by turbines to wildlife. You may access these guidelines on the internet at: http://www.fws.gov/habitatconservation/wind.htm. The guidelines stress the importance of proper evaluation of potential wind turbine development sites, proper location and design of turbines and related facilities, and pre- and post-construction research and monitoring.

Areas of interest identified in your letter contain grassland with relatively high density of a variety of wetland types interspersed, McPherson County in particular. Areas in northeastern South Dakota contain ridge lines and rolling topography with quality forest/shrub/grass habitats. Thus, some areas identified in your letter may exhibit relatively high value for wildlife, particularly avian species. Currently the best means of avoiding impacts to wildlife by wind farms is to avoid such high wildlife use areas. Placement of turbines within existing cropland or in/near developed areas is recommended for this reason.

If placement of wind farms and associated facilities must occur within intact native habitats, offsetting and/or mitigative measures should be considered to compensate for loss and fragmentation of wildlife habitat. Additionally, a mixture of native grasses and forbs typical of those found in this region should be planted to reclaim temporarily disturbed areas. Monitoring and contingency measures should be worked into reclamation plans to ensure that the native prairie is reestablished and that invasive weeds do not overtake disturbed sites.

Please note that the South Dakota Department of Game, Fish and Parks (SDDGFP) has coordinated with the South Dakota Public Utilities Commission (SDPUC) regarding distribution of the SDDGFP's "Siting Guidelines for Wind Power Projects in South Dakota" to wind developers intending to construct projects within the state of South Dakota. You may wish to contact the SDPUC and/or the Wildlife Diversity Division of the SDDGFP in Pierre, South Dakota, for more information. Contact information may be found on their respective web sites: http://www.state.sd.us/puc/ index.htm and http://www.sdgfp.info/Wildlife/Diversity/index.htm. The guidelines themselves may be found on the internet at: http://www.sdgfp.info/wildlife/diversity/windpower.htm.

Additionally, bats are known to suffer mortality due to collisions with wind turbines. The SDDGFP has completed a State Management Plan for bats and may be able to provide additional information and/or recommendations regarding this project. If you have not already done so, please contact Ms. Silka Kempema at the SDDGFP-Wildlife Division, Joe Foss Building, 523 East Capitol Avenue, Pierre, South Dakota 57501, Telephone No. (605) 773-2742, for more information.

The Northern Prairie Wildlife Research Center of Jamestown, North Dakota, has initiated studies of avian responses to wind turbines in both North Dakota and South Dakota. This research may be relevant to your project. We recommend that you contact Ms. Jill Shaffer of the Northern Prairie Wildlife Research Center at (701) 253-5547 for more information.

Please note that the Service owns easement rights on numerous private properties in the state in addition to fee title ownership of Waterfowl Production Areas (WPA). Concentrations of WPA's and easements are further indication of high wildlife values of certain areas in South Dakota. The Service currently has a policy regarding placement of turbines on easements. We refer you to our Wetland Management Districts for actions that may impact easements or WPA's (see table below) and anticipate being kept informed of any actions that may impact these properties.

Office	Jurisdiction	Address	Phone
Madison Wetland Management District	Deuel, Brookings	P.O. Box 48, Madison, SD 57042	(605) 256-2974
Waubay Wetland Management District	Grant, Codington	44401 134A Street Waubay, SD 57273	(605) 947-4521
Sand Lake Wetland Management District	McPherson	39650 Sand Lake Drive Columbia, SD 57433	(605) 885-6320

Although your letter did not mention meteorological towers, it is our understanding that meteorological towers are often constructed in association with wind turbines and that these structures are often similar in design to typical communications towers: tall, lighted, lattice structured, and guyed. These types of towers can be problematic for birds that may fly into the light of the towers and may become reluctant to leave the lighted area, particularly during inclement weather. Mortality results as the birds circle the structure and collide with the guy wires or the lattice of the tower itself. We presume that if meteorological tower(s) have not already been established as part of the proposed projects, they may be in the future. We recommend review of the guidance set forth in U.S. Fish and Wildlife Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning available on the internet at http://migratorybirds.fws.gov/issues/towers/comtow.html, and application of any retrofit measures possible to minimize the threat of avian mortality.

As with towers, the above ground utilities proposed in association with turbine projects (overhead transmission or distribution lines and substations) pose the risk of collision mortality and/or electrocution of birds. In addition to whooping cranes (previously mentioned), thousands of other birds are killed annually as they attempt to utilize overhead power lines or areas near power lines as nesting, hunting, resting, feeding, and sunning sites. Transmission lines are typically less problematic than distribution lines in terms of electrocutions due to their relatively

larger size and spacing between conductive components but still pose a collision mortality risk. Proposed substations may also pose a risk of electrocutions.

We recommend the installation of underground, rather than overhead, power lines whenever possible and appropriate to minimize avian mortality and environmental disturbances. For all new above ground facilities, overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent avian electrocutions and collisions. The publication entitled "Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006" has many good suggestions including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute on the internet via their website at www.eei.org or by calling 1-800-334-5453.

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

We also recommend marking overhead lines in order to make them more visible to birds. Orange or yellow aviation balls are frequently used for this purpose, but other types of marking devices are also available. For more information on bird strikes, please see "Mitigating Bird Collisions With Power Lines: The State of the Art in 1994" which may be obtained by contacting the Edison Electric Institute at the same web site and telephone number listed above.

The Service has coordinated with the Avian Power Line Interaction Committee (APLIC) to develop guidelines to assist utility companies in formulating Avian Protection Plans. These plans are utility-specific and designed to reduce avian and operational risks that result from avian interactions with electric utility facilities. We submit that these guidelines may also be adapted to wind farms, and we encourage wind energy facilities to investigate the formulation of Avian Protection Plans for their projects. These guidelines may be accessed at the APLIC's web site, http://www.aplic.org/.

The Service's guidance on bald eagles, communications towers, and wind turbines, as well as the APP guidelines and "Suggested Practices . . ." publications will provide some protection for migratory birds; however, implementation of these measures will not remove any liability should violations of the law occur. Please be apprised of the potential application of the Migratory Bird Treaty Act of 1918 (MBTA), as amended, 16 U.S.C. 703 et seq., and the Bald Eagle Protection Act of 1940 (BEPA), as amended, 16 U.S.C. 668 et seq., to the project(s). The MBTA does not require intent to be proven and does not allow for "take," except as permitted by regulations. Section 703 of the MBTA provides: "Unless and except as permitted by regulations . . . it shall be unlawful at any time, by any means, or in any manner, to . . . take, capture, kill, attempt to take, capture, or kill, possess . . . any migratory bird, any part, nest, or eggs of any such bird . . . ." The BEPA prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing activities.

Our foremost recommendation to preclude impacts to migratory birds, federally listed species, and other wildlife by wind energy development is to avoid placing wind farms in high wildlife use areas.

If the a Federal agency is involved in the proposed projects, that agency or their designated representative must determine whether adverse affects may be incurred on listed species in South Dakota and, if so, should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office. Private companies with no Federal nexus should be advised of the potential to impact listed species and note that avenues exist to obtain take permits for their actions via further consultation with this office.

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

The Service appreciates the opportunity to provide comments. If you have any questions regarding these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,

Pete Gober
Field Supervisor
South Dakota Field Office

cc: USGS; Jamestown, ND
(Attention: Jill Shaffer)
Secretary, SDDGFP; Pierre, SD
(Attention: Silka Kempema)
USFWS; Madison, SD
(Attention: Tom Tornow)
USFWS; Waubay, SD
(Attention: Larry Martin)
USFWS; Columbia, SD
(Attention: Gene Williams)

NAGate

U.S. FISH AND WILDLIFE SERVICE

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Natalie Gates 234	Scott Larson 232	Robert Klumb 228	Greg Wanner 225

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Number Of Pages (Including Cover): 7 **Date:** 11/27/07

TO Erik Jansen

AGENCY Tetra Tech **CITY** Portland **STATE** OR

FACSIMILE NO. 503 227 1287 **COMMERCIAL NO.** _____

FROM Natalie Gates

SUBJECT Wind Proposal USFWS Response

MESSAGE

Fax As requested, Enc

Natalie

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DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

December 3, 2007

Erik W. Jansen, Biologist
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97201

RE: Environmental review of Eastern and North-central Wind Resource Area as potential wind power project areas

Dear Mr. Jansen:

The following comments are in response to your letter dated 19 October 2007 requesting environmental considerations and concerns of the Eastern (W1/2 Grant Co., NE 1/4 Codington Co., W1/2, S1/2 Duel Co., and NE1/4 Brookings Co.) and North-central (McPherson County) Wind Resource Areas.

The proposed siting and operation of these wind power projects have potential to directly and indirectly impact area wildlife by killing bats and birds through wind turbine and power line strikes and altering important and declining habitats and breeding and movement behavior of wildlife. While we applaud efforts to provide alternative energy sources, we offer the following considerations for your planning efforts, encouraging responsible siting and mitigation where appropriate to avoid or lessen direct and indirect impacts. As requested, I have provided separate comments for each wind resource area in addition to final comments that apply to any other potential wind power project in South Dakota.

Eastern Wind Resource Area (EWRA)

Grasslands - The EWRA is located within the tall-grass prairie zone. Native grasslands within this zone are decreasing at an alarming rate. Less than one percent of native tall-grass prairie habitat in South Dakota remains (Samson et al. 1998). Other grassland types such as rangeland (grazed grasslands with native plant spp.), pasture (grazed grasslands with non-native plant spp.) and Conservation Reserve Program lands (tilled land planted to vegetative cover) serve as grassland wildlife habitat (Haufler 2005). Fragmentation resulting from woody encroachment, road construction, and conversion of surrounding habitat has resulted in the remaining grassland habitats existing as smaller disjunct patches. Patches often provide less suitable habitat for many native species of grassland wildlife. Some of the last remaining contiguous grasslands tracts occur along the Coteau escarpment that angles through the EWRA.

Grassland birds - Placement of turbines in this area may fragment grassland wildlife habitat reducing its suitability to serve as habitat and modify behavior of grassland bird species, a group of species which has shown the most consistent and long term declines of any other group of bird species in North America (Peterjohn and Sauer 1999). This area is known to have abundant sharp-tailed grouse populations. Greater prairie chickens also are present. The greater prairie chicken is a species known to be area-sensitive, requiring comparatively large tracts of open, contiguous grassland. The lesser prairie chicken, a similar species found more commonly in the southern Great Plains, avoids nesting within 400 m of transmission lines or improved roads (Pitman et al 2004). This highly suggests that placement of turbines and associated infrastructure (roads and transmission lines) may also negatively affect greater prairie chickens.

Birds are susceptible to direct strikes with wind turbines. Based on a study conducted in the Buffalo Ridge area of Minnesota, species with known wind turbine strike mortality and are known to occur in the EWRA include grasshopper sparrow and western meadowlark (Higgins et al 2007).

Properly timed, species-appropriate surveys for prairie grouse (greater prairie chickens and sharp-tailed grouse) and other grassland bird species should be conducted pre-construction. Prairie grouse surveys should be conducted in spring when breeding individuals are on communal display grounds (leks). Surveys for other breeding grassland birds are best conducted in June, although mid-May through early July is acceptable.

Butterflies - Four rare butterfly species are located within the EWRA. These species are classified as Species of Greatest Conservation Need, as listed in our State Wildlife Action Plan (http://www.sdgfp.info/Wildlife/Diversity/Comp_Plan.htm) and are rare species monitored by our Natural Heritage Program (NHP). They include: 1) Dakota skipper, 2) Powesheik skipperling, 3) regal fritillary, and 4) Ottoe skipper.

The range of the Dakota skipper in South Dakota is limited to eleven counties in the north eastern portion of the state. The Dakota skipper requires native mid- to tall-grass prairie and is found on rolling rangeland with abundant wetlands. Larval host plants are grasses, especially little bluestem. Flight of emerging adults occurs from June to mid-July. This species is a candidate for listing under the Federal Endangered Species Act (ESA). As such, I recommend contacting the U.S. Fish and Wildlife Ecological Services Field office in Pierre, South Dakota (605-224-8693) for further information regarding the protection of this species required under ESA. Current threats to this species include, but are not limited to, improper land management uses, agricultural cultivation, road construction, and invasive plant species. South Dakota populations are important to the existence of this species and approximately half of known populations are located on private lands.

The Powesheik skipperling distribution in South Dakota also is limited to eleven counties in the north eastern portion of the state. The Powesheik skipperling prefers native tall-grass prairie and wetlands. Larval host plants are sedges. Flight of emerging adults occurs primarily in July. Threats include excessive prescribed burning, loss of habitat due to conversion to other uses, invasive plants, population isolation, and extreme population crashes.

The regal fritillary is rapidly declining across its range in the United States. In South Dakota, its range is restricted to native prairie sites. Some of the last strongholds of this species are located in prairie states, such as South Dakota, with areas of large expanses of suitable habitat (such as the EWRA) that support larval host plants (violets). Flight periods are from June to September. Threats include loss and fragmentation of habitat to agriculture (excluding grazing or haying), conversion to cropland, woody encroachment, chemicals (e.g., pesticides and herbicides), and improper fire management.

The Ottoe skipper also requires relatively undisturbed native prairie with nectar sources (coneflowers, grayfeathers, asters, etc). It is uncommon to rare throughout the state. Peak flight for the Ottoe skipper is in mid-July. The reduction and degradation of prairie habitat is the main threat to this species.

The conservation of the four rare butterfly species documented in the EWRA requires protection of remaining undisturbed tracts of native prairie with associated nectar sources and larval host plants. There are potential disturbances to these rare butterfly species associated with the construction and maintenance of a wind power project. Road construction and turbine pad maintenance increases the chances of non-native, invasive plant species invasion. Chemical control of these species is a known threat. Pre-construction surveys for these species should be conducted during the appropriate times (flight periods). Construction in areas that are or potential butterfly habitat should be avoided.

Wetlands - The proposed project area is located within the Prairie Pothole region. This glaciated region, characterized by high densities of wetland basins of various depths and sizes, extends from Iowa into Minnesota, the Dakotas, Montana and parts of Canada. It is the major waterfowl production area in North America. Wetland losses in the Prairie Pothole Region are staggering and range from 99% in Iowa to 35% in South Dakota. Wetland basin densities (# of basins/10 mi^2) in the EWRA range from 90 to over 420 basins/10 $miles^2$. More specifically, this area is known to have some of the highest seasonal and semipermanent wetland basin densities in the state (Johnson and Higgins 1997). These remaining, high density wetlands provide critical wildlife habitat.

Wetland birds - Waterbird species such as loons, black terns, great egrets, and green backed herons are known to occur in the EWRA. Abundant waterfowl such as mallard, blue-winged teal, redhead, ruddy duck, American coot, and bufflehead also can be found in the area. Birds are susceptible to direct strikes with wind turbines. Based on a study conducted in the Buffalo Ridge area of Minnesota, species with known wind turbine strike mortality and are known to occur in the EWRA include ruddy duck, American coot, and Franklin's gull (Higgins et al 2007). Proper siting of turbines outside of daily and seasonal migration routes of waterbirds and waterfowl and the protection of remaining wetlands within the proposed project area is crucial to reduce the impact to wetland dependent species.

Bats - Bats forage and migrate along rivers, streams, and lakes. Construction of a wind power plant may affect daily and seasonal bat movements between breeding and foraging areas. Thirteen species of bats are found in South Dakota, some of which are summer residents, year-round residents, or migratory (Table 1).

Table 1. South Dakota Bats

Common Name	Scientific Name	State Residency
Big Brown Bat	*Eptesicus fuscus*	Year-round resident
Fringed Myotis	*Myotis thysanodes*	Year-round resident
Little Brown Myotis	*Myotis lucifugus*	Year-round resident
Long-eared Myotis	*Myotis evotis*	Year-round resident
Long-legged Myotis	*Myotis volans*	Year-round resident
Northern Myotis	*Myotis septentrionalis*	Year-round resident
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Year-round resident
Western Small-footed Myotis	*Myotis ciliolabrum*	Year-round resident
Hoary Bat	*Lasiurus cinereus*	Summer resident
Silver-haired Bat	*Lasionycteris noctivagans*	Summer resident
Evening Bat	*Nycticeius humeralis*	Migratory
Eastern pipistrell	*Pipistrellus subflavus*	unclassified

There has been limited research conducted on bats in South Dakota. However, Swier (2006) reported four species of bats occurring near the EWRA: 1) big brown bat, 2) Eastern red bat, 3) hoary bat, and 4) little brown myotis.

Six bat species are considered rare and monitored by the NHP: 1) long-eared myotis, 2) fringed myotis, 3) Northern myotis, 4) silver-haired bat, 5) Townsend's big-eared bat, and 6) evening bat. Although the NHP data base has no records of theses species in the proposed project area, this does not preclude the presence of any of these species in the area. Because of limited, EWRA-specific data, we would suggest pre-construction surveys of the area for potential bat habitat and species. Surveys for species should be conducted for at least one full year before construction.

Recently, South Dakota Department of Game, Fish and Parks (SDGFP) in cooperation with the South Dakota Bat Working Group (SDGWG), developed a South Dakota Bat Management Plan specific to bats and their habitats in South Dakota (http://www.sdgfp.info/Wildlife/Diversity/batmanagmentplan71304.pdf). Please review this document for pertinent information. Again, because bats reside and migrate through South Dakota, it is important to evaluate the propose project area for roosting, feeding, migration and/or stopover habitat and to survey these areas for bats.

Landscape considerations - Placement of a wind power project should take into account larger landscape-level (e.g. surrounding land uses) and cumulative impacts (e.g. existing and potential wind power projects) as well as project associated infrastructure (i.e. transmission lines and roads).

Public lands - Several Game Production Areas within the EWRA are managed by SDGFP. Placement of public lands is often done so in areas with existing and potential wildlife habitat. Management of these lands, for wildlife, is conducted in the public interest. In addition, several USFWS Waterfowl Protection Areas are also located within the EWRA. Public lands managed

for wildlife may be affected by the placement of a wind power project in the vicinity.

Migrating wildlife - The resulting mosaic of grassland and wetland basins and corridors makes it an important migration route for birds (e.g., neotropical migrants, shorebirds, and waterfowl). The Central Flyway, an important pathway for migratory ducks, geese, swans, and cranes runs through the midsection of the country, including South Dakota. Species using this flyway during migration, and particularly during inclement weather when birds alter their flight altitude, may suffer increased mortality due to direct strikes with wind turbines and associated power lines. Appropriately timed, pre-construction surveys for migratory bird species should be conducted. Spring migration can begin as early as late-March, early-April, tapering off in mid-May, depending on the species. Fall migration can begin as early as mid-July and extend through October/November depending on weather conditions and species.

Powerlines - Construction of powerlines is often associated with a proposed wind power project. Power line strikes are a known cause of mortality to birds (Erickson et al. 2005). Waterfowl (ducks, geese, swans, and cranes), raptors, and passerines are species most susceptible to powerline collisions. The Avian Protection Power line Interaction Committee (APLIC) has developed two documents that may be of use to reduce powerline strikes and mortality: 1) 'Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006' and 2) 'Mitigating Bird Collisions with Power lines'. Both of these documents are available from the Edison Institute (http://www.aplic.org/, under 'products and services'). The new and existing power lines associated with the proposed project should be buried, marked, or retrofitted to reduce strikes and electrocutions of bird species.

Non-native species - During the construction and maintenance phase of a wind power project existing roads often experience increased traffic and new roads are constructed. This increases the amount of area disturbed and allows for the introduction and establishment of non-native species. Resulting control of those species through pesticides and herbicides may also impact habitats of rare wildlife species. Non-native species are one of the major threats to rare and declining wildlife species. Improved access can also increase human activity in the area.

The matrix of grassland and wetland habitats in the proposed project area plays a crucial role in the life history of several wildlife species whether migratory or resident. Because of the potential impacts placement of the proposed wind power project would have on unique and declining habitats in the region and their associated species, we recommend the placement of turbines in areas currently disturbed (e.g. cultivated areas) and the use of existing infrastructure (roads and transmission lines) as much as possible.

North-central Wind Resource Area (McPherson County)

Grassland habitat - McPherson County is located within the mixed-grass prairie zone. In the United States, native mixed-grass prairie is disappearing at an alarming rate. In South Dakota, the area of mixed-grass prairie has decreased 70% (Samson et al. 1998). The native prairie that still remains is most often grazed (i.e. rangeland). These and other grassland types such as pasture (grazed grasslands of non-native plant spp.) and Conservation Reserve Program lands (tilled land idled and planted to vegetative cover) also serve as grassland wildlife habitat (Haufler 2005). Fragmentation resulting from woody encroachment, road construction, and conversion of surrounding habitat has resulted in the remaining grassland habitats existing as smaller disjunct patches. Patches often provide less suitable habitat for many native species of grassland wildlife. McPherson County has large tracts of contiguous grassland habitat (including rangeland) located along the ridge extending through Wacker, Weber, Hoffman, and Central McPherson townships.

Grassland birds - Placement of turbines in this area may fragment grassland wildlife habitat reducing its suitability to serve as habitat and modify behavior of grassland bird species, a group of species which has shown the most consistent and long term declines of any other group of species in North America (Peterjohn and Sauer 1999). Two grassland bird species, Baird's sparrow and Sprague's pipit, are known to occur in McPherson County. Range-wide, both of these species have exhibited significant long term negative population trends. In South Dakota, these species hold special conservation status and are classified as Species of Greatest Conservation Need, as listed in our State Wildlife Action Plan (http://www.sdgfp.info/Wildlife/Diversity/Comp_Plan.htm) and are rare species monitored by our NHP. In addition, these species are considered Grassland Species of Concern in South Dakota (Bakker 2005). Regionally they are Species of Special Concern as defined by Partner's in Flight and are considered a Species of Conservation Concern by the USFWS. The amount of emphasis placed on the conservation of these species indicates populations are declining.

Baird's sparrows breed in the north-western and north-central part of the state. Throughout most of its breeding range, it is known to prefer native mixed grass prairie interspersed with forbs (broad-leaved, herbaceous plant), moderate amounts of litter (dead layers of vegetation), and little to no shrub cover. Although the Baird's Sparrow has a strong tendency to prefer native prairie, it can be observed in non-native grasslands (e.g. crested wheatgrass) that provide appropriate habitat structure. Baird's sparrows are known to prefer large patches of grassland habitat and show avoidance of areas with extensive woody vegetation and areas near roads.

Sprague's pipits are found in the northwestern portion of the state, preferring plains and short-grass prairie with intermediate vegetation height. This species prefers native prairie, although they are known to occupy habitat consisting of non-native plant species. Sprague's pipits are most common in large contiguous grassland areas and are known to be area sensitive.

Properly timed, species-appropriate pre-construction surveys should be conducted for grassland bird species. Surveys for most breeding grassland birds are best conducted in June, although mid-May through early July is suitable. Prairie grouse surveys should be conducted in spring when breeding individuals are on communal display grounds (leks).

Wetland habitats - McPherson County is located within the Prairie Pothole Region. This glaciated region, characterized by a diversity and quantity of basin wetlands, extends from Iowa into Minnesota, the Dakotas, Montana and parts of Canada. It is the major waterfowl production area in North America. Wetland losses in the Prairie Pothole Region are staggering and ranging from 99% in Iowa to 35% in South Dakota. Throughout McPherson County, wetland basin density is high (270 - over 420 basins/10 mi^2). More specifically, the eastern quarter of the County has some of the highest concentrations of temporary and seasonal wetlands (Johnson and Higgins 1997) in the state. Remaining wetlands provide important wildlife habitat.

Wetland birds - In terms of waterfowl breeding activity, the western two-thirds of McPherson County has over 100 breeding duck pairs/mi^2. This is some of the highest breeding waterfowl densities in the Prairie Pothole region. Conservation of this habitat also is critical to waterbirds and shorebirds for breeding, feeding, and migration habitat.

Bird diversity - Reflective of the diversity and quality of native wetland and grassland habitats in the region, the northeastern portion of McPherson County has some of the highest bird species richness in the state (Peterson 1995). This is based upon data gathered from a five-year, state-wide breeding bird survey efforts.

Bats - Bats forage and migrate along rivers, streams and lakes. Construction of a wind power project may affect daily and seasonal bat movements between breeding and foraging areas. Thirteen species of bats are found in South Dakota, some of which are summer residents, year-round residents, or migratory (Table 1). There has been limited research conducted on bats in South Dakota, especially in McPherson County. The NHP database has no records of bat species considered rare in the proposed project. However, this does not preclude the presence of any of these or other bat species in the area. Because of limited information on bats in McPherson County, we would suggest pre-construction surveys of the area for potential bat habitat and species. Surveys for species should be conducted for at least one full year before construction.

Recently, SDGFP in cooperation with the SDBWG, developed a South Dakota Bat Management Plan specific to bats and their habitats in South Dakota (http://www.sdgfp.info/Wildlife/Diversity/batmanagmentplan71304.pdf). Please review this document for pertinent information. Again, because bats reside and migrate through South Dakota, it is important to evaluate the propose project area for roosting, feeding, migration and/or stopover habitat and to survey these areas for bats.

Landscape considerations - Placement of a wind power project should take into account larger landscape-level (e.g. surrounding land uses) and cumulative impacts (e.g. existing and potential wind power projects) as well as project associated infrastructure (i.e. transmission lines, roads).

Public lands - Several Game Production Areas within McPherson County are managed by SDGFP. Placement of public lands is often done so in areas with existing and potential wildlife habitat. Management of these lands, for wildlife, is conducted in the public interest. In addition, several U. S. Fish and Wildlife Service Waterfowl Protection Areas are also located within McPherson County. Public lands managed for wildlife may be affected by the placement of a

wind power project in the vicinity.

Migrating wildlife - The resulting mosaic of grassland and wetland basins and corridors in the County make it an important migration route for birds (e.g., neotropical migrants, shorebirds, waterfowl). The Central Flyway, an important pathway for migratory ducks, geese, swans, and cranes runs through the midsection of the country, including South Dakota. Species using this flyway during migration, and particularly during inclement weather when birds alter their flight altitude, may suffer increased mortality due to direct strikes with wind turbines and associated power lines. Appropriately timed, pre-construction surveys for migratory bird species should be conducted. Spring migration can begin as early as late-March, early-April, tapering off in mid-May, depending on the species. Fall migration can begin as early as mid-July and extend through October/November depending on weather conditions and species.

Powerlines - Construction of powerlines is often associated with a proposed wind power project. Power line strikes are a known cause of mortality to birds (Erickson et al. 2005). Waterfowl (ducks, geese, swans, and cranes), raptors, and passerines are species most susceptible to powerline collisions. The Avian Protection Power line Interaction Committee (APLIC) has developed two documents that may be of use to reduce powerline strikes and mortality: 1) 'Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006' and 2) 'Mitigating Bird Collisions with Power lines'. Both of these documents are available from the Edison Institute (http://www.aplic.org/, under 'products and services'). The new and existing power lines associated with the proposed project should be buried, marked, or retrofitted to reduce strikes and electrocutions of bird species.

Non-native species - During the construction and maintenance phase of a wind power projects existing roads often experience increased traffic and new roads are constructed. This increases the amount of area disturbed and allows for the introduction and establishment of non-native species. Resulting control of those species through pesticides and herbicides may also impact habitats of rare wildlife species. Non-native species are one of the major threats to rare and declining wildlife species. Improved access can also increase human activity in the area.

The matrix of grassland and wetland habitats in the proposed project area plays a crucial role in the life history of several wildlife species whether migratory or resident. Because of the potential impacts placement of the proposed wind power project would have on unique and declining habitats in the region and their associated species, we recommend the placement of turbines in areas currently disturbed (e.g. cultivated areas) and the use of existing infrastructure (roads and transmission lines) as much as possible.

Research and Monitoring

As outlined above, our agency has concerns regarding direct and indirect impacts to wildlife and habitats in association with the siting of the proposed project. Before project construction, appropriate monitoring should be conducted to determine bird and bat use of the project areas. Based upon results of these studies, project construction should be modified, continued, or cancelled. If the project is continued, monitoring should be conducted for a minimum of two years post-construction to determine if and how many bird and bat strikes are caused by this project, if habitats have been significantly altered, and if the surrounding public lands and their uses have been impacted. Any mitigation should be carefully planned, funded, and followed.

If monitoring involves live trapping or collection of wildlife species, you must first obtain a collection permit from our agency. Also, we kindly request that if you or your associates observe any of the animal (http://www.sdgfp.info/Wildlife/Diversity/RareAnimal.htm) or plant species (http://www.sdgfp.info/Wildlife/Diversity/rareplant2002.htm) monitored by the NHP, please contact myself or any of our NHP staff (http://www.sdgfp.info/Wildlife/Diversity/staff_contact.htm).

In coordination with the SDBWG, the SDGFP has developed 'Siting Guidelines for Wind Power Projects in South Dakota' This document addresses many of the concerns involved with siting wind power projects in South Dakota and may be found at on the world wide web (http://www.sdgfp.info/Wildlife/Diversity/windpower.htm). I have enclosed a copy for your convenience.

The SDGFP appreciates the opportunity to provide comments on the proposed project wind resource areas. As plans are further refined, I would be willing to conduct a site visit with you or your associates to continue to provide siting recommendations to reduce conflicts with wildlife. If you have any questions on the above comments, please feel free to contact me at 605-773-2742 or Silka.Kempema@state.sd.us.

Regards,

Silka Kempema

Silka L. F. Kempema
Terrestrial Wildlife Biologist

CC: Natalie Gates, US Fish and Wildlife Service, Pierre, SD
Will Morlock, SD Game, Fish and Parks, Watertown, SD
Mary Clawson, SD Game, Fish and Parks, Aberdeen, SD

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CR-0113

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

February 5, 2010

Ms. Anne-Marie Griger
Tetra Tech, EC Inc.
7800 Shoal Creek Boulevard, Suite 253 East
Austin, Texas 78757

Re: Proposed Crowned Ridge Wind Energy Center, Codington and Grant Counties, South Dakota

Dear Ms. Griger:

This letter is in response to your request dated December 7, 2009, for environmental comments regarding the above referenced project involving construction of a wind farm up to 150 megawatts in size and an associated 34-mile transmission line. The proposed location of the project is north and east of the city of Watertown and includes various sections within Townships 118- 121 North, Ranges 48-52 West, Codington and Grant Counties, South Dakota. Herein we provide information regarding U.S. Fish and Wildlife Service (Service) trust resources, including easement properties, federally endangered species, eagles, birds of conservation concern, and other migratory birds that may occur in the project area. We have included recommended measures to be applied to various components of a wind farm, including meteorological towers, power lines, and the turbines themselves in order to minimize impacts to Service trust resources and to assist the development company in achieving compliance with Federal laws.

Threatened/Endangered Species

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

Species	Status	Expected Occurrence
Topeka shiner (Notropis topeka)	Endangered	Known Resident.

Topeka shiners are known to occupy numerous small streams within eastern South Dakota and are concentrated within the Big Sioux, Vermillion, and James River watersheds. Willow Creek in the Big Sioux watershed of Codington County is a known occupied stream with a tributary that appears to fall within the project area. Project activities that may impact this waterway directly or indirectly have the potential to negatively affect the Topeka shiner. The Service recommends avoidance of these impacts, particularly related to instream work. Further consultation may be required to determine the possibility of adverse affects to this species.

As indicated by Appendix 1 included with your letter (Summary of Surveys Conducted to Date), you are aware that the Dakota skipper (Hesperia dacotae) is known to occur in northeastern South Dakota. The Dakota skipper is a candidate species and accordingly is not, at present, provided Federal protection under the ESA. Their candidate status defines these butterflies as a species in decline that the Service believes needs to be listed as threatened or endangered, but listing is currently precluded by other priorities. Dakota skippers are obligate residents of high quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed grass prairie. In northeastern South Dakota, Dakota skippers inhabit dry-mesic hill prairies with abundant purple coneflower but also use mesic to wet-mesic tallgrass prairie habitats characterized by wood lily and smooth camas. Per your surveys, it appears that significant percentages of good to excellent Dakota skipper grasslands exist in the project area. Surveys for this species by a qualified biologist may be useful to confirm the ranking of habitat (excellent, good, poor) described in the summary of surveys. The Service requests the results of any such surveys and recommends avoidance and minimization of impacts to Dakota skipper habitats.

If a Federal nexus exists for this project and the Federal action agency or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary; however, a copy of the determination should be forwarded to our office.

Please note that, if impacts to federally listed species may occur as a result of projects with no Federal nexus, avenues to avoid violations of section 9 of the ESA should be investigated via contact with this office.

Bald and Golden Eagles

A golden eagle was reported in Appendix 1 included with your letter (Summary of Surveys Conducted to Date). Please note also that the bald eagle (Haliaeetus leucocephalus) occurs throughout South Dakota in all seasons, and new nests are appearing each year. While ESA protections for the bald eagle have been removed, effective August 8, 2007, both bald and golden eagles will continue to be protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) (more on these laws below). These laws protect eagles from a variety of harmful actions and impacts. The Service has developed guidance for the public regarding means to avoid take of the bald eagle under these laws. The *"National Bald Eagle Management Guidelines"* are available online at: http://www.fws.gov/migratorybirds/baldeagle.htm. We recommend reviewing these guidelines as they serve to advise of circumstances where these laws may apply and to assist in avoiding potential violations on this and future projects. Additionally, permit regulations have been published for bald eagles and golden eagles. These regulations may be found in the Federal Register (Volume 74, No. 175, Friday, September 11, 2009) online at: http://www.gpoaccess.gov/fr/index.html.

Birds of Conservation Concern

Your survey efforts revealed South Dakota state-sensitive species in the project area. Please note that the Migratory Birds Division of the Service has identified bird species of conservation concern: *"Birds of Conservation Concern 2008"* may be found online at: http://www.fws.gov/migratorybirds/NewReportsPublications/SpecialTopics/BCC2008/BCC2008.pdf. This document is intended to identify species in need of coordinated and proactive

conservation efforts among State, Federal, and private entities, with the goals of precluding future evaluation of these species for ESA protections and promoting/conserving long-term avian diversity. A primary threat to many of these species is habitat loss and fragmentation.

In accordance with Executive Order 13186 regarding migratory bird protection, we recommend avoidance, minimization, and finally compensation to reduce the impacts to species protected by the MBTA. Compliance with this law may be partially addressed in an Avian and Bat Protection Plan (see below); however, a separate mitigation plan that specifically addresses direct and indirect take of birds during and after construction is also recommended. Particularly if placement must occur within intact native habitats, we strongly recommend development of mitigative/offsetting measures for this habitat and its associated wildlife.

U.S. Geological Survey (USGS) Research

The USGS's Northern Prairie Wildlife Research Center in Jamestown, North Dakota, has initiated studies of avian responses to wind turbines in both North Dakota and South Dakota. Their research may be relevant to your project, depending on habitat within the project area. We recommend that you contact Ms. Jill Shaffer of the Northern Prairie Wildlife Research Center at Telephone No. (701) 253-5547 for more information and for the possibility of participation in that research.

Service Wetland Management District

Our records indicate that the Service holds easements on some of the properties proposed for construction, and your letter indicates that you have been in contact with the Habitat and Population Evaluation Team's office to obtain the locations of these easements. If you have not already done so, please also contact Mr. Larry Martin of the Service's Waubay Wetland Management District at 44401 134A Street, Waubay, South Dakota 57273, Telephone No. (605) 947-4521, for additional information.

Bats

Bats are known to suffer mortality due to direct collisions with wind turbines, and it has been recently determined that many also die as a result of air pressure changes at the turbine blades that cause internal injuries. The South Dakota Department of Game, Fish and Parks (SDDGFP) has completed a State management plan for bats and may be able to provide additional information and/or recommendations on bats relative to this project. Your letter states that you have contacted the SDDGFP; thus, you may have already received a response from Silka Kempema of that agency. Nonetheless, her contact information is SDDGFP-Wildlife Division, Joe Foss Building, 523 East Capitol Avenue, Pierre, South Dakota 57501, Telephone No. (605) 773-2742.

Fisheries

As per the map sent with your letter, the project area contains the Whetstone River and the North Fork Yellow Bank River which have been classified by the Service as Type II, High Priority Fishery Resources. Riverine and riparian areas are among the highest resource priorities in this region of the Service. We recommend minimization of impacts to these resources and mitigation of all unavoidable habitat losses. The following methods should be implemented to minimize environmental impacts:

1. Instream work should not be undertaken during fish spawning periods. Most spawning occurs in April, May, and June.

2. Stream bottoms and wetlands impacted by construction activities should be restored to pre-project elevations.

3. Removal of vegetation and soil should be accomplished in a manner to reduce soil erosion and to disturb as little vegetation as possible.

4. Grading operations and reseeding of native species should begin immediately following construction.

5. If trees or brush will be impacted by the project, a ratio of at least 2:1 acres planted versus acres impacted should be incorporated into mitigation plans for the project.

Wetlands

According to National Wetlands Inventory maps (available online at http://wetlands.fws.gov/), numerous wetlands exist within the proposed project area. If a project may impact wetlands or other important fish and wildlife habitats, the Service, in accordance with the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) and other environmental laws and rules, recommends complete avoidance of these areas, if possible; then minimization of any adverse impacts; and finally, replacement of any lost acres; in that order. Alternatives should be examined and the least damaging practical alternative selected. If wetland impacts are unavoidable, a mitigation plan addressing the number and types of wetland acres to be impacted and the methods of replacement should be prepared and submitted to the resource agencies for review.

Wind Turbine Guidelines

Among the Service's primary concerns regarding wind turbines are avian collision mortality and the loss of habitat/habitat avoidance behaviors by wildlife, including federally listed species as indicated above. While there is still much to be learned regarding wind turbine-wildlife interactions, we do know that wind turbines can have adverse impacts on some species. Turbine location, spacing, aspect, lighting, size, and design are all potential factors related to the risk posed to resident and migratory wildlife as are the types of surrounding habitats, their use by various species of wildlife, landscape features, prey base, migration corridors, and behavioral patterns. Direct collision mortality is a concern as is loss of habitat caused by the footprint of the turbines and associated roads and structures, along with impacts that can occur with encroachment of invasive weeds as a result of these disturbances. Recent studies of grassland nesting birds have shown a tendency for avoidance of areas immediately surrounding turbines, causing indirect habitat loss as well. Currently, perhaps the best means of avoiding impacts to wildlife is to avoid placing wind farms within high wildlife use areas. Placement of turbines within existing cropland or other disturbed areas is recommended for this reason.

The Service has developed voluntary *"Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines"* to assist energy companies in accomplishing the goal of reducing the risk posed by turbines to wildlife. These guidelines may be accessed on the internet at: http://www.fws.gov/habitatconservation/Service%20Interim%20Guidelines.pdf. The guidelines stress the importance of proper evaluation of potential wind turbine development sites (via development of a Potential Impact Index score for the proposed site and a reference area), appropriate location and design of turbines and related facilities, and pre- and post-construction

research and monitoring. If the proposed project is to be constructed, we request the results of any pre-/post-construction wildlife monitoring, including any incidental mortality detected.

Please note that the SDDGFP has coordinated with the South Dakota Public Utilities Commission (SDPUC) regarding distribution of SDDGFP's *"Siting Guidelines for Wind Power Projects in South Dakota"* to wind developers intending to construct projects within the state of South Dakota. You may wish to contact the SDPUC and/or the Wildlife Diversity Division of the SDDGFP in Pierre for more information. Contact information may be found on their respective websites: http://puc.sd.gov/ and http://www.sdgfp.info/Wildlife/Diversity/index.htm. The guidelines themselves may be found online at: http://www.sdgfp.info/wildlife/diversity/windpower.htm.

Meteorological Towers

Meteorological towers constructed in association with wind turbines are often similar in design to typical communication towers: tall, lighted, lattice structured, and guyed. These types of towers can be problematic for birds, particularly during inclement weather, as they enter the lighted area, become reluctant to leave it, and suffer mortality as they circle the structure and collide with the guy wires or the lattice tower itself. We recommend following the guidance set forth in *"U.S. Fish and Wildlife Service Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning,"* found online at: http://www.fws.gov/habitatconservation/communicationtowers.html, to minimize the threat of avian mortality at these towers. Monitoring at these towers would provide insight to the effectiveness of the minimization measures. We request the results of any wildlife monitoring and any data obtained regarding wildlife mortality at towers associated with this project.

In order to obtain information on the usefulness of the communications tower guidelines in preventing birds strikes and to identify any recurring problems with their implementation which may necessitate modifications, please advise us of the final location and specifications of any towers associated with the wind turbine project and which of the measures recommended for the protection of migratory birds were implemented. If any of the recommended measures cannot be implemented, please explain why they were not feasible. A Tower Site Evaluation Form is also available via the above communication tower website (http://www.fws.gov/habitatconservation/communicationtowers.html). If meteorological towers are to be constructed, please complete this form and forward it to our office.

Power Lines

The construction of additional overhead power lines associated with wind farms creates the threat of avian electrocution, particularly for raptors, and collisions. Thousands of these birds, including endangered species, are killed annually as they attempt to utilize overhead power lines as nesting, hunting, resting, feeding, and sunning sites. The Service recommends the installation of underground, rather than overhead, power lines whenever possible/appropriate to minimize environmental disturbances. For all new overhead lines or modernization of old overhead lines, we recommend incorporating measures to prevent avian electrocutions. The publication entitled *"Suggested Practices for Avian Protection on Power Lines - The State of the Art in 2006"* has many good suggestions, including pole extensions, modified positioning of live phase conductors and ground wires, placement of perch guards and elevated perches, elimination of cross arms, use of wood (not metal) braces, and installation of various insulating covers. You may obtain this publication by contacting the Edison Electric Institute via their website at www.eei.org or by calling 1-800-334-5453.

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

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

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

In addition to electrocution, overhead power lines also present the threat of avian line strike mortality. Particularly in situations where these lines are adjacent to wetlands or where waters exist on opposite sides of the lines, we recommend marking them in order to make them more visible to birds. For more information on bird strikes, please see *"Mitigating Bird Collisions With Power Lines: The State of the Art in 1994"* which may be obtained by contacting the Edison Electric Institute at the same website and telephone number listed above. Please note that, while marking of power lines reduces line strike mortality, it does not preclude it entirely. Thus, marking of additional, existing, overhead lines is recommended to further offset the potential for avian line strike mortality.

Avian Protection Plans

As a means to address some of the above issues, the Service has coordinated with the Avian Power Line Interaction Committee (APLIC) to develop guidelines to assist companies in formulating Avian (and Bat) Protection Plans (APP). APPs are utility-specific and designed to reduce avian and operational risks that result from avian interactions with electric utility facilities, but they may be adapted to wind energy facilities as well and include consideration of bat species which are known to suffer mortality at wind farms. We encourage project developers to investigate the formulation of an Avian (and Bat) Protection Plan for specific projects and perhaps generate APPs at the company level. The APP guidelines may be accessed at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/BirdHazards.html.

The Service has developed an online reporting system for mortalities. Instructions for our "Bird Fatality/Injury Reporting Program" may be found online at: http://www.aplic.org/USFWS_BirdFatality_FilerInstructions.pdf, and the reporting site itself is located online at: https://birdreport.fws.gov/. Migratory bird mortalities or injuries located by your company, contractors, or other individuals should be recorded to this online site within 30 days of discovery. Use of this reporting program will benefit migratory birds by increasing our tracking capability of activities impacting migratory birds. This program may be used to compliment an Avian (and Bat) Protection Plan.

MBTA and BGEPA

Although adherence to the Service's recommendations will provide some protection for migratory birds, implementation of these measures alone will not remove any liability should violations of the law occur. The MBTA prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior. The BGEPA prohibits knowingly taking, or taking with wanton disregard for the consequences of an activity, any bald or golden eagles or their body parts, nests, or eggs, which includes collection, molestation, disturbance, or killing activities (again, refer to the new regulations regarding take of eagles in the September 11, 2009, publication of the Federal Register for additional information).

While the MBTA has no provision for allowing unauthorized take, the Service realizes that some birds may be killed as a result of this project even if all reasonable measures to protect them are used. The Service's Office of Law Enforcement carries out its mission to protect migratory birds through investigations and enforcement as well as by fostering relationships with individuals, companies, and industries that have taken effective steps to minimize their impacts on migratory birds and by encouraging others to enact such programs. It is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses its resources on investigating and prosecuting individuals and companies that take migratory birds without regard for their actions or without following specific agreements to avoid take.

In summary, the following items are pertinent to the proposed project, and we recommend addressing these issues if/when the project progresses:

- ✓ ESA listed species impacts: Topeka shiner
- ✓ Bald and golden eagle impacts (BGEPA and MBTA)
- ✓ Migratory bird impacts (MBTA), including Birds of Conservation Concern, with application of pre-/post-construction monitoring and mortality data and mitigative/offsetting measures to be coordinated with and reported to the Service
- ✓ USGS avian/wind studies and potential participation in their ongoing research
- ✓ Service easement impacts
- ✓ Fisheries and wetlands impacts
- ✓ SDDGFP wind siting guidelines and bat issues

✓ Existing guidelines for various project components:

a) Wind farm siting: Service's *"Interim Guidelines to Avoid and Minimize Wildlife Impacts from Wind Turbines"*

b) Meteorological Towers: Service's *"Interim Guidelines for Recommendations on Communications Tower Siting, Constructions, Operation and Decommissioning"* and the associated Tower Site Evaluation Form

c) Overhead power lines: APLIC's *"Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006"* and *"Mitigating Bird Collisions With Power Lines: The State of the Art in 1994"*

d) Overall project construction/operation: Service's *"National Bald Eagle Management Guidelines,"* APLIC's *"Avian Protection Plan Guidelines,"* and the Service's "Bird Fatality/Injury Reporting Program"

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

The Service appreciates the opportunity to provide comments. If you have any questions on these comments, please contact Natalie Gates of this office at (605) 224-8693, Extension 234.

Sincerely,

P Gober

Pete Gober
Field Supervisor
South Dakota Field Office

cc: Service/Waubay WMD; Waubay, SD
(Attention: Larry Martin)
Secretary, SDDGFP; Pierre, SD
(Attention: Silka Kempema)
USGS/NPWRC; Jamestown, ND
(Attention: Jill Shaffer)
SDPUC; Pierre, SD
(Attention: Brian Rounds)

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TETRA TECH

February 11, 2015

Mr. Jeff Vonk
Secretary
South Dakota Game Fish and Parks
523 East Capitol Avenue
Pierre, SD 57501

RE: Crowned Ridge Wind Energy Center in Codington and Grant Counties, South Dakota

Dear Mr. Vonk:

As part of our Tier 1 preliminary site evaluation and Tier 2 site characterization under the U.S. Fish and Wildlife Service (USFWS) voluntary Land-Based Wind Energy Guidelines, Tetra Tech, Inc. (Tetra Tech) is writing on behalf of NextEra Energy Resources, LLC (NextEra), to request information regarding ecologically significant areas and listed endangered, threatened or special concern species including eagles at a potential wind energy development site in Codington and Grant counties, South Dakota. We contacted your agency in 2007 regarding a much larger area for wind energy development that NextEra may develop in a later phase (see attached response letter dated December 3, 2007); however, the current project area in in Codington and Grant counties is the subject of this inquiry.

The proposed Crowned Ridge Wind Energy Center (Project) is anticipated to have a nameplate capacity of 200 megawatts and to begin commercial operation in 2016. A 40-mile, 230-kV transmission line is also proposed. We will submit an application to the South Dakota Public Utilities Commission (PUC) for a Facility Permit, as required under South Dakota Codified Law (SDCL) Chapter 49-41B and South Dakota Administrative Rules, Section 20:10:22.

The 26,038-acre Project Area is depicted on the enclosed United States Geological Survey (USGS) topographic map; a corridor for the proposed 40-mile transmission line is also shown on the map. The land sections within the Project Area and transmission line corridor are listed in the tables below. We have provided the map to facilitate your review and greatly appreciate your efforts to treat the Project and its location as confidential at this time.

Project Area:

County	Township Name	Township	Range	Sections
Grant	Mazeppa	120N	51W	7-8, 17-20, 29, 32
Codington	Germantown	119N	52W	24-26, 36
	Leola	119N	51W	4-5, 7-9, 17-19, 26-35
	Germantown	118N	52W	24
	Waverly	118N	51W	2-5, 8-11, 14-19, 22-23, 26-27

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Transmission Line Corridor:

County	Township Name	Township	Range	Sections
Codington	Leola	119N	51W	13-17, 20-30, 36
Grant	Vernon	119N	48W	6,7,19
Grant	Madison	119N	49W	1-2, 10-24, 30, 31
Grant	Stockholm	119N	50W	13-36
Grant	Alban	120N	48W	1-2, 11-14, 20-33
Grant	Grant Center	120N	49W	25, 36
Grant	Big Stone	121N	46W	18
Grant	Big Stone	121N	47W	13, 24-26, 34-36

In addition to federally protected wildlife and plant species, Tetra Tech is interested in sensitive habitats and wildlife management areas that may be located in or proximate to the proposed Project Area. In particular, we would like information on documented eagle nests within 10 miles of the Project Area and 2 miles of the transmission line corridor. Tetra Tech has also contacted the USFWS South Dakota Field Office, the USFWS Habitat and Population Evaluation Team, and the Waubay Wetland Management District.

Additionally, we have initiated Tier 3 field studies at the Project Area. We have previously conducted fall and spring avian use surveys and native prairie surveys and performed wetland delineations. In March 2014, we initiated a year of eagle use surveys. Our survey protocol for the eagle use surveys are attached as Appendix 1 for your review and comment. We also conducted fall avian point-count surveys in 2014 and will conduct spring avian point-count surveys in 2015. It is our goal to perform a thorough analysis of environmental concerns within the potential Project Area. We will use the information provided by the USFWS and South Dakota Game Fish and Parks to help guide Project development in a manner that avoids impacts to sensitive resources to the extent possible. If possible, we would appreciate a response by March 10, 2015.

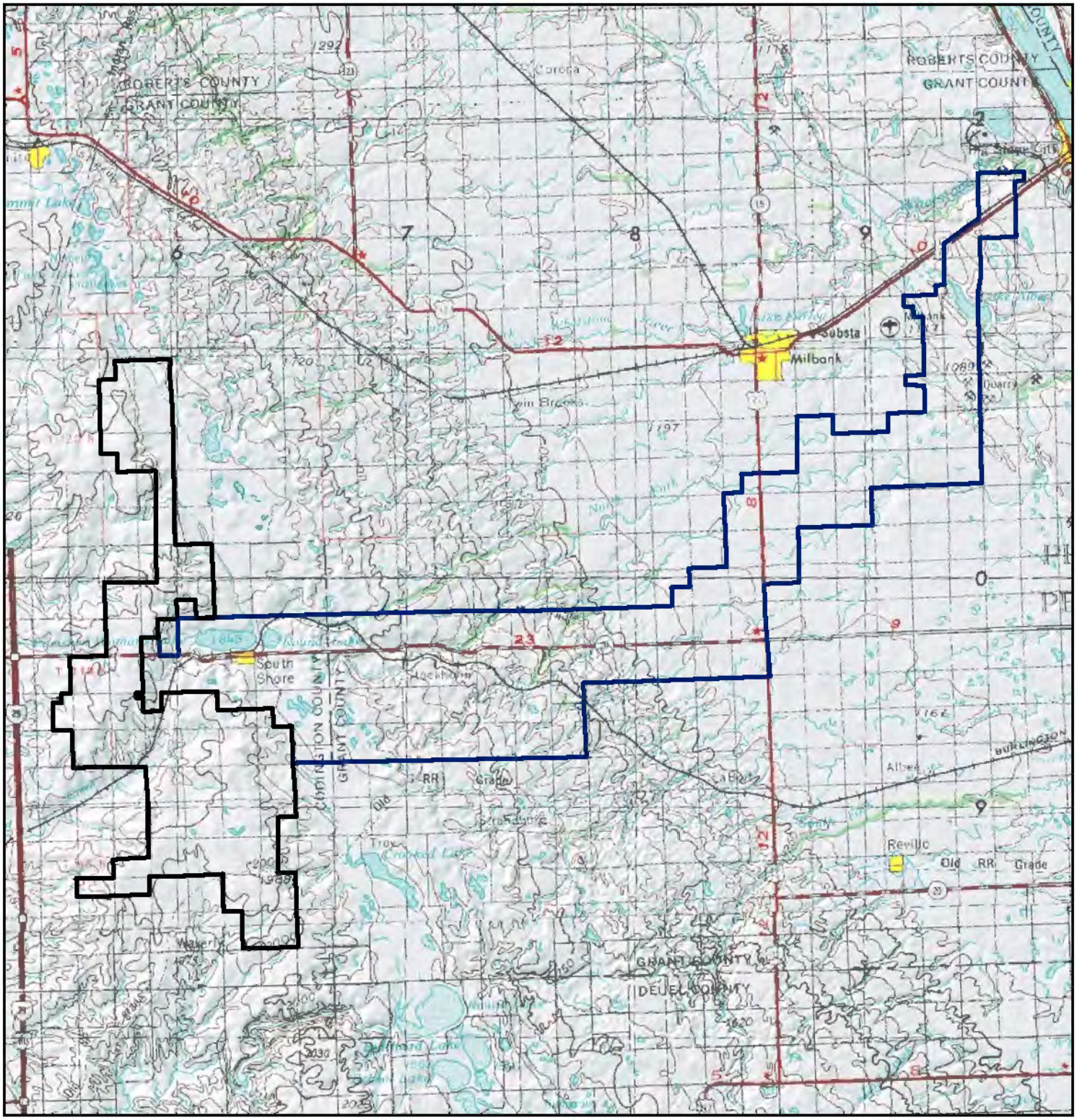
Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at 512-213-8501 or email at anne-marie.griger@tetratech.com. Thank you for your assistance.

Respectfully submitted,

Anne-Marie Griger, AICP
Tetra Tech, Inc
8911 N. Capital of Texas Hwy, Bldg 2 Suite # 2310
Austin, TX 78759

Attachments: SDGFP letter dated December 3, 2007
Map
Appendix 1

TETRA TECH



NEXTera ENERGY RESOURCES

Crowned Ridge

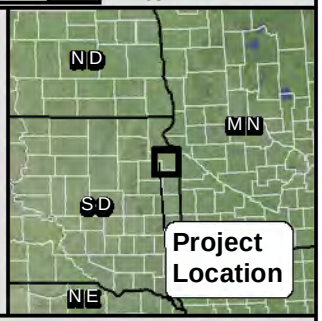
Codington and Grant Counties, SD
February 2015

1:238,000 WGS84 UTM Zone 14N

0 0.5 1 2 3 4 Miles

Project Boundary (11-24-2014)

Transmission Line Boundary (2015-02-04)



TETRA TECH

TETRA TECH

APPENDIX 1

1) Eagle Use Surveys

The objective of eagle use surveys is to document eagle movements and behavior within and adjacent to the Project Area in all four seasons in order to assess risk to eagle species. Tetra Tech will conduct eagle use surveys following the general methods outlined in the Eagle Conservation Plan Guidance. Eagle use surveys will focus exclusively on eagles, and will occur at up to 18 survey plots. This number of point-count locations is sufficient to provide spatial coverage of approximately 26 percent of a 1-km buffer around turbine locations.

Eagle use surveys will be conducted by a qualified avian biologist beginning in spring 2014 and continue for one calendar year to capture temporal variation in eagle use of the Project Area. Surveys will be conducted twice per month during the spring (March 16 – June 15), summer (June 16 – August 15), fall (August 16 – November 15), and winter (November 16 – March 15). Each survey visit will occur over 2.5 days. There will be 26 survey weeks in total. Individual surveys will consist of a 1-hour observation period at each of the 18 point-count locations during each week of surveys, for a total of 468 hours of observations.

Eagle use data will be collected in 1-minute intervals so that the data can be translated into eagle exposure minutes, as recommended in the ECP Guidance. The data recorded for each survey will include the count start and stop times, eagle species observed, numbers and age classes of eagles seen, minutes of eagle flight in two height categories based on the ECP Guidance (≤ 200 and >200 meters {m} above ground), notes on flight and other behaviors, and an individual identifier for each flight observation allowing it to be linked to a flight map. Each eagle flight observed will be drawn on a topographic map or aerial image of the Project Area and digitized using a GIS so that eagle locations and behaviors can be overlaid with Project features. Numerical data will be collected within 800-m-radius plots, but flight lines will be documented across line-of-sight and will not be limited to the 800-m-radius survey plot.

DEPARTMENT OF GAME, FISH AND PARKS
Foss Building
523 East Capitol
Pierre, South Dakota 57501-3182

December 3, 2007

Erik W. Jansen, Biologist
Tetra Tech EC, Inc.
1750 SW Harbor Way, Suite 400
Portland, OR 97201

RE: Environmental review of Eastern and North-central Wind Resource Area as potential wind power project areas

Dear Mr. Jansen:

The following comments are in response to your letter dated 19 October 2007 requesting environmental considerations and concerns of the Eastern (W1/2 Grant Co., NE 1/4 Codington Co., W1/2, S1/2 Duel Co., and NE1/4 Brookings Co.) and North-central (McPherson County) Wind Resource Areas.

The proposed siting and operation of these wind power projects have potential to directly and indirectly impact area wildlife by killing bats and birds through wind turbine and power line strikes and altering important and declining habitats and breeding and movement behavior of wildlife. While we applaud efforts to provide alternative energy sources, we offer the following considerations for your planning efforts, encouraging responsible siting and mitigation where appropriate to avoid or lessen direct and indirect impacts. As requested, I have provided separate comments for each wind resource area in addition to final comments that apply to any other potential wind power project in South Dakota.

Eastern Wind Resource Area (EWRA)

Grasslands - The EWRA is located within the tall-grass prairie zone. Native grasslands within this zone are decreasing at an alarming rate. Less than one percent of native tall-grass prairie habitat in South Dakota remains (Samson et al. 1998). Other grassland types such as rangeland (grazed grasslands with native plant spp.), pasture (grazed grasslands with non-native plant spp.) and Conservation Reserve Program lands (tilled land planted to vegetative cover) serve as grassland wildlife habitat (Haufler 2005). Fragmentation resulting from woody encroachment, road construction, and conversion of surrounding habitat has resulted in the remaining grassland habitats existing as smaller disjunct patches. Patches often provide less suitable habitat for many native species of grassland wildlife. Some of the last remaining contiguous grasslands tracts occur along the Coteau escarpment that angles through the EWRA.

Grassland birds - Placement of turbines in this area may fragment grassland wildlife habitat reducing its suitability to serve as habitat and modify behavior of grassland bird species, a group of species which has shown the most consistent and long term declines of any other group of bird species in North America (Peterjohn and Sauer 1999). This area is known to have abundant sharp-tailed grouse populations. Greater prairie chickens also are present. The greater prairie chicken is a species known to be area-sensitive, requiring comparatively large tracts of open, contiguous grassland. The lesser prairie chicken, a similar species found more commonly in the southern Great Plains, avoids nesting within 400 m of transmission lines or improved roads (Pitman et al 2004). This highly suggests that placement of turbines and associated infrastructure (roads and transmission lines) may also negatively affect greater prairie chickens.

Birds are susceptible to direct strikes with wind turbines. Based on a study conducted in the Buffalo Ridge area of Minnesota, species with known wind turbine strike mortality and are known to occur in the EWRA include grasshopper sparrow and western meadowlark (Higgins et al 2007).

Properly timed, species-appropriate surveys for prairie grouse (greater prairie chickens and sharp-tailed grouse) and other grassland bird species should be conducted pre-construction. Prairie grouse surveys should be conducted in spring when breeding individuals are on communal display grounds (leks). Surveys for other breeding grassland birds are best conducted in June, although mid-May through early July is acceptable.

Butterflies - Four rare butterfly species are located within the EWRA. These species are classified as Species of Greatest Conservation Need, as listed in our State Wildlife Action Plan (http://www.sdgfp.info/Wildlife/Diversity/Comp_Plan.htm) and are rare species monitored by our Natural Heritage Program (NHP). They include: 1) Dakota skipper, 2) Powesheik skipperling, 3) regal fritillary, and 4) Ottoe skipper.

The range of the Dakota skipper in South Dakota is limited to eleven counties in the north eastern portion of the state. The Dakota skipper requires native mid- to tall-grass prairie and is found on rolling rangeland with abundant wetlands. Larval host plants are grasses, especially little bluestem. Flight of emerging adults occurs from June to mid-July. This species is a candidate for listing under the Federal Endangered Species Act (ESA). As such, I recommend contacting the U.S. Fish and Wildlife Ecological Services Field office in Pierre, South Dakota (605-224-8693) for further information regarding the protection of this species required under ESA. Current threats to this species include, but are not limited to, improper land management uses, agricultural cultivation, road construction, and invasive plant species. South Dakota populations are important to the existence of this species and approximately half of known populations are located on private lands.

The Powesheik skipperling distribution in South Dakota also is limited to eleven counties in the north eastern portion of the state. The Powesheik skipperling prefers native tall-grass prairie and wetlands. Larval host plants are sedges. Flight of emerging adults occurs primarily in July. Threats include excessive prescribed burning, loss of habitat due to conversion to other uses, invasive plants, population isolation, and extreme population crashes.

The regal fritillary is rapidly declining across its range in the United States. In South Dakota, its range is restricted to native prairie sites. Some of the last strongholds of this species are located in prairie states, such as South Dakota, with areas of large expanses of suitable habitat (such as the EWRA) that support larval host plants (violets). Flight periods are from June to September. Threats include loss and fragmentation of habitat to agriculture (excluding grazing or haying), conversion to cropland, woody encroachment, chemicals (e.g., pesticides and herbicides), and improper fire management.

The Ottoe skipper also requires relatively undisturbed native prairie with nectar sources (coneflowers, grayfeathers, asters, etc). It is uncommon to rare throughout the state. Peak flight for the Ottoe skipper is in mid-July. The reduction and degradation of prairie habitat is the main threat to this species.

The conservation of the four rare butterfly species documented in the EWRA requires protection of remaining undisturbed tracts of native prairie with associated nectar sources and larval host plants. There are potential disturbances to these rare butterfly species associated with the construction and maintenance of a wind power project. Road construction and turbine pad maintenance increases the chances of non-native, invasive plant species invasion. Chemical control of these species is a known threat. Pre-construction surveys for these species should be conducted during the appropriate times (flight periods). Construction in areas that are or potential butterfly habitat should be avoided.

Wetlands - The proposed project area is located within the Prairie Pothole region. This glaciated region, characterized by high densities of wetland basins of various depths and sizes, extends from Iowa into Minnesota, the Dakotas, Montana and parts of Canada. It is the major waterfowl production area in North America. Wetland losses in the Prairie Pothole Region are staggering and range from 99% in Iowa to 35% in South Dakota. Wetland basin densities (# of basins/10 mi^2) in the EWRA range from 90 to over 420 basins/10 $miles^2$. More specifically, this area is known to have some of the highest seasonal and semipermanent wetland basin densities in the state (Johnson and Higgins 1997). These remaining, high density wetlands provide critical wildlife habitat.

Wetland birds - Waterbird species such as loons, black terns, great egrets, and green backed herons are known to occur in the EWRA. Abundant waterfowl such as mallard, blue-winged teal, redhead, ruddy duck, American coot, and bufflehead also can be found in the area. Birds are susceptible to direct strikes with wind turbines. Based on a study conducted in the Buffalo Ridge area of Minnesota, species with known wind turbine strike mortality and are known to occur in the EWRA include ruddy duck, American coot, and Franklin's gull (Higgins et al 2007). Proper siting of turbines outside of daily and seasonal migration routes of waterbirds and waterfowl and the protection of remaining wetlands within the proposed project area is crucial to reduce the impact to wetland dependent species.

Bats - Bats forage and migrate along rivers, streams, and lakes. Construction of a wind power plant may affect daily and seasonal bat movements between breeding and foraging areas. Thirteen species of bats are found in South Dakota, some of which are summer residents, year-round residents, or migratory (Table 1).

Table 1. South Dakota Bats

Common Name	Scientific Name	State Residency
Big Brown Bat	*Eptesicus fuscus*	Year-round resident
Fringed Myotis	*Myotis thysanodes*	Year-round resident
Little Brown Myotis	*Myotis lucifugus*	Year-round resident
Long-eared Myotis	*Myotis evotis*	Year-round resident
Long-legged Myotis	*Myotis volans*	Year-round resident
Northern Myotis	*Myotis septentrionalis*	Year-round resident
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Year-round resident
Western Small-footed Myotis	*Myotis ciliolabrum*	Year-round resident
Hoary Bat	*Lasiurus cinereus*	Summer resident
Silver-haired Bat	*Lasionycteris noctivagans*	Summer resident
Evening Bat	*Nycticeius humeralis*	Migratory
Eastern pipistrell	*Pipistrellus subflavus*	unclassified

There has been limited research conducted on bats in South Dakota. However, Swier (2006) reported four species of bats occurring near the EWRA: 1) big brown bat, 2) Eastern red bat, 3) hoary bat, and 4) little brown myotis.

Six bat species are considered rare and monitored by the NHP: 1) long-eared myotis, 2) fringed myotis, 3) Northern myotis, 4) silver-haired bat, 5) Townsend's big-eared bat, and 6) evening bat. Although the NHP data base has no records of theses species in the proposed project area, this does not preclude the presence of any of these species in the area. Because of limited, EWRA-specific data, we would suggest pre-construction surveys of the area for potential bat habitat and species. Surveys for species should be conducted for at least one full year before construction.

Recently, South Dakota Department of Game, Fish and Parks (SDGFP) in cooperation with the South Dakota Bat Working Group (SDGWG), developed a South Dakota Bat Management Plan specific to bats and their habitats in South Dakota (http://www.sdgfp.info/Wildlife/Diversity/batmanagmentplan71304.pdf). Please review this document for pertinent information. Again, because bats reside and migrate through South Dakota, it is important to evaluate the propose project area for roosting, feeding, migration and/or stopover habitat and to survey these areas for bats.

Landscape considerations - Placement of a wind power project should take into account larger landscape-level (e.g. surrounding land uses) and cumulative impacts (e.g. existing and potential wind power projects) as well as project associated infrastructure (i.e. transmission lines and roads).

Public lands - Several Game Production Areas within the EWRA are managed by SDGFP. Placement of public lands is often done so in areas with existing and potential wildlife habitat. Management of these lands, for wildlife, is conducted in the public interest. In addition, several USFWS Waterfowl Protection Areas are also located within the EWRA. Public lands managed

for wildlife may be affected by the placement of a wind power project in the vicinity.

Migrating wildlife - The resulting mosaic of grassland and wetland basins and corridors makes it an important migration route for birds (e.g., neotropical migrants, shorebirds, and waterfowl). The Central Flyway, an important pathway for migratory ducks, geese, swans, and cranes runs through the midsection of the country, including South Dakota. Species using this flyway during migration, and particularly during inclement weather when birds alter their flight altitude, may suffer increased mortality due to direct strikes with wind turbines and associated power lines. Appropriately timed, pre-construction surveys for migratory bird species should be conducted. Spring migration can begin as early as late-March, early-April, tapering off in mid-May, depending on the species. Fall migration can begin as early as mid-July and extend through October/November depending on weather conditions and species.

Powerlines - Construction of powerlines is often associated with a proposed wind power project. Power line strikes are a known cause of mortality to birds (Erickson et al. 2005). Waterfowl (ducks, geese, swans, and cranes), raptors, and passerines are species most susceptible to powerline collisions. The Avian Protection Power line Interaction Committee (APLIC) has developed two documents that may be of use to reduce powerline strikes and mortality: 1) 'Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006' and 2) 'Mitigating Bird Collisions with Power lines'. Both of these documents are available from the Edison Institute (http://www.aplic.org/, under 'products and services'). The new and existing power lines associated with the proposed project should be buried, marked, or retrofitted to reduce strikes and electrocutions of bird species.

Non-native species - During the construction and maintenance phase of a wind power project existing roads often experience increased traffic and new roads are constructed. This increases the amount of area disturbed and allows for the introduction and establishment of non-native species. Resulting control of those species through pesticides and herbicides may also impact habitats of rare wildlife species. Non-native species are one of the major threats to rare and declining wildlife species. Improved access can also increase human activity in the area.

The matrix of grassland and wetland habitats in the proposed project area plays a crucial role in the life history of several wildlife species whether migratory or resident. Because of the potential impacts placement of the proposed wind power project would have on unique and declining habitats in the region and their associated species, we recommend the placement of turbines in areas currently disturbed (e.g. cultivated areas) and the use of existing infrastructure (roads and transmission lines) as much as possible.

North-central Wind Resource Area (McPherson County)

Grassland habitat - McPherson County is located within the mixed-grass prairie zone. In the United States, native mixed-grass prairie is disappearing at an alarming rate. In South Dakota, the area of mixed-grass prairie has decreased 70% (Samson et al. 1998). The native prairie that still remains is most often grazed (i.e. rangeland). These and other grassland types such as pasture (grazed grasslands of non-native plant spp.) and Conservation Reserve Program lands (tilled land idled and planted to vegetative cover) also serve as grassland wildlife habitat (Haufler 2005). Fragmentation resulting from woody encroachment, road construction, and conversion of surrounding habitat has resulted in the remaining grassland habitats existing as smaller disjunct patches. Patches often provide less suitable habitat for many native species of grassland wildlife. McPherson County has large tracts of contiguous grassland habitat (including rangeland) located along the ridge extending through Wacker, Weber, Hoffman, and Central McPherson townships.

Grassland birds - Placement of turbines in this area may fragment grassland wildlife habitat reducing its suitability to serve as habitat and modify behavior of grassland bird species, a group of species which has shown the most consistent and long term declines of any other group of species in North America (Peterjohn and Sauer 1999). Two grassland bird species, Baird's sparrow and Sprague's pipit, are known to occur in McPherson County. Range-wide, both of these species have exhibited significant long term negative population trends. In South Dakota, these species hold special conservation status and are classified as Species of Greatest Conservation Need, as listed in our State Wildlife Action Plan (http://www.sdgfp.info/Wildlife/Diversity/Comp_Plan.htm) and are rare species monitored by our NHP. In addition, these species are considered Grassland Species of Concern in South Dakota (Bakker 2005). Regionally they are Species of Special Concern as defined by Partner's in Flight and are considered a Species of Conservation Concern by the USFWS. The amount of emphasis placed on the conservation of these species indicates populations are declining.

Baird's sparrows breed in the north-western and north-central part of the state. Throughout most of its breeding range, it is known to prefer native mixed grass prairie interspersed with forbs (broad-leaved, herbaceous plant), moderate amounts of litter (dead layers of vegetation), and little to no shrub cover. Although the Baird's Sparrow has a strong tendency to prefer native prairie, it can be observed in non-native grasslands (e.g. crested wheatgrass) that provide appropriate habitat structure. Baird's sparrows are known to prefer large patches of grassland habitat and show avoidance of areas with extensive woody vegetation and areas near roads.

Sprague's pipits are found in the northwestern portion of the state, preferring plains and short-grass prairie with intermediate vegetation height. This species prefers native prairie, although they are known to occupy habitat consisting of non-native plant species. Sprague's pipits are most common in large contiguous grassland areas and are known to be area sensitive.

Properly timed, species-appropriate pre-construction surveys should be conducted for grassland bird species. Surveys for most breeding grassland birds are best conducted in June, although mid-May through early July is suitable. Prairie grouse surveys should be conducted in spring when breeding individuals are on communal display grounds (leks).

Wetland habitats - McPherson County is located within the Prairie Pothole Region. This glaciated region, characterized by a diversity and quantity of basin wetlands, extends from Iowa into Minnesota, the Dakotas, Montana and parts of Canada. It is the major waterfowl production area in North America. Wetland losses in the Prairie Pothole Region are staggering and ranging from 99% in Iowa to 35% in South Dakota. Throughout McPherson County, wetland basin density is high (270 - over 420 basins/10 mi^2). More specifically, the eastern quarter of the County has some of the highest concentrations of temporary and seasonal wetlands (Johnson and Higgins 1997) in the state. Remaining wetlands provide important wildlife habitat.

Wetland birds - In terms of waterfowl breeding activity, the western two-thirds of McPherson County has over 100 breeding duck pairs/mi^2. This is some of the highest breeding waterfowl densities in the Prairie Pothole region. Conservation of this habitat also is critical to waterbirds and shorebirds for breeding, feeding, and migration habitat.

Bird diversity - Reflective of the diversity and quality of native wetland and grassland habitats in the region, the northeastern portion of McPherson County has some of the highest bird species richness in the state (Peterson 1995). This is based upon data gathered from a five-year, state-wide breeding bird survey efforts.

Bats - Bats forage and migrate along rivers, streams and lakes. Construction of a wind power project may affect daily and seasonal bat movements between breeding and foraging areas. Thirteen species of bats are found in South Dakota, some of which are summer residents, year-round residents, or migratory (Table 1). There has been limited research conducted on bats in South Dakota, especially in McPherson County. The NHP database has no records of bat species considered rare in the proposed project. However, this does not preclude the presence of any of these or other bat species in the area. Because of limited information on bats in McPherson County, we would suggest pre-construction surveys of the area for potential bat habitat and species. Surveys for species should be conducted for at least one full year before construction.

Recently, SDGFP in cooperation with the SDBWG, developed a South Dakota Bat Management Plan specific to bats and their habitats in South Dakota (http://www.sdgfp.info/Wildlife/Diversity/batmanagmentplan71304.pdf). Please review this document for pertinent information. Again, because bats reside and migrate through South Dakota, it is important to evaluate the propose project area for roosting, feeding, migration and/or stopover habitat and to survey these areas for bats.

Landscape considerations - Placement of a wind power project should take into account larger landscape-level (e.g. surrounding land uses) and cumulative impacts (e.g. existing and potential wind power projects) as well as project associated infrastructure (i.e. transmission lines, roads).

Public lands - Several Game Production Areas within McPherson County are managed by SDGFP. Placement of public lands is often done so in areas with existing and potential wildlife habitat. Management of these lands, for wildlife, is conducted in the public interest. In addition, several U. S. Fish and Wildlife Service Waterfowl Protection Areas are also located within McPherson County. Public lands managed for wildlife may be affected by the placement of a

wind power project in the vicinity.

Migrating wildlife - The resulting mosaic of grassland and wetland basins and corridors in the County make it an important migration route for birds (e.g., neotropical migrants, shorebirds, waterfowl). The Central Flyway, an important pathway for migratory ducks, geese, swans, and cranes runs through the midsection of the country, including South Dakota. Species using this flyway during migration, and particularly during inclement weather when birds alter their flight altitude, may suffer increased mortality due to direct strikes with wind turbines and associated power lines. Appropriately timed, pre-construction surveys for migratory bird species should be conducted. Spring migration can begin as early as late-March, early-April, tapering off in mid-May, depending on the species. Fall migration can begin as early as mid-July and extend through October/November depending on weather conditions and species.

Powerlines - Construction of powerlines is often associated with a proposed wind power project. Power line strikes are a known cause of mortality to birds (Erickson et al. 2005). Waterfowl (ducks, geese, swans, and cranes), raptors, and passerines are species most susceptible to powerline collisions. The Avian Protection Power line Interaction Committee (APLIC) has developed two documents that may be of use to reduce powerline strikes and mortality: 1) 'Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006' and 2) 'Mitigating Bird Collisions with Power lines'. Both of these documents are available from the Edison Institute (http://www.aplic.org/, under 'products and services'). The new and existing power lines associated with the proposed project should be buried, marked, or retrofitted to reduce strikes and electrocutions of bird species.

Non-native species - During the construction and maintenance phase of a wind power projects existing roads often experience increased traffic and new roads are constructed. This increases the amount of area disturbed and allows for the introduction and establishment of non-native species. Resulting control of those species through pesticides and herbicides may also impact habitats of rare wildlife species. Non-native species are one of the major threats to rare and declining wildlife species. Improved access can also increase human activity in the area.

The matrix of grassland and wetland habitats in the proposed project area plays a crucial role in the life history of several wildlife species whether migratory or resident. Because of the potential impacts placement of the proposed wind power project would have on unique and declining habitats in the region and their associated species, we recommend the placement of turbines in areas currently disturbed (e.g. cultivated areas) and the use of existing infrastructure (roads and transmission lines) as much as possible.

Research and Monitoring

As outlined above, our agency has concerns regarding direct and indirect impacts to wildlife and habitats in association with the siting of the proposed project. Before project construction, appropriate monitoring should be conducted to determine bird and bat use of the project areas. Based upon results of these studies, project construction should be modified, continued, or cancelled. If the project is continued, monitoring should be conducted for a minimum of two years post-construction to determine if and how many bird and bat strikes are caused by this project, if habitats have been significantly altered, and if the surrounding public lands and their uses have been impacted. Any mitigation should be carefully planned, funded, and followed.

If monitoring involves live trapping or collection of wildlife species, you must first obtain a collection permit from our agency. Also, we kindly request that if you or your associates observe any of the animal (http://www.sdgfp.info/Wildlife/Diversity/RareAnimal.htm) or plant species (http://www.sdgfp.info/Wildlife/Diversity/rareplant2002.htm) monitored by the NHP, please contact myself or any of our NHP staff (http://www.sdgfp.info/Wildlife/Diversity/staff_contact.htm).

In coordination with the SDBWG, the SDGFP has developed 'Siting Guidelines for Wind Power Projects in South Dakota' This document addresses many of the concerns involved with siting wind power projects in South Dakota and may be found at on the world wide web (http://www.sdgfp.info/Wildlife/Diversity/windpower.htm). I have enclosed a copy for your convenience.

The SDGFP appreciates the opportunity to provide comments on the proposed project wind resource areas. As plans are further refined, I would be willing to conduct a site visit with you or your associates to continue to provide siting recommendations to reduce conflicts with wildlife. If you have any questions on the above comments, please feel free to contact me at 605-773-2742 or Silka.Kempema@state.sd.us.

Regards,

Silka Kempema

Silka L. F. Kempema
Terrestrial Wildlife Biologist

CC: Natalie Gates, US Fish and Wildlife Service, Pierre, SD
Will Morlock, SD Game, Fish and Parks, Watertown, SD
Mary Clawson, SD Game, Fish and Parks, Aberdeen, SD

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TETRA TECH

February 11, 2015

Mr. Scott Larson
Field Supervisor
USFWS – South Dakota Field Office
420 S. Garfield Avenue, Suite 400
Pierre, SD 57501-5408

RE: Crowned Ridge Wind Energy Center in Codington and Grant Counties, South Dakota

Dear Mr. Larson:

As part of our Tier 1 preliminary site evaluation and Tier 2 site characterization under the U.S. Fish and Wildlife Service (USFWS) Land-Based Wind Energy Guidelines, Tetra Tech, Inc. (Tetra Tech) is writing on behalf of NextEra Energy Resources, LLC (NextEra), to request information regarding ecologically significant areas and listed endangered, threatened or special concern species including eagles at a potential wind energy development site in Codington and Grant counties, South Dakota. We contacted your agency in 2007 regarding a much larger area for wind energy development that NextEra may develop in a later phase (see attached response letter dated November 26, 2007); however, the current the project area in Codington and Grant counties is the subject of this inquiry.

The proposed Crowned Ridge Wind Energy Center (Project) is anticipated to have a nameplate capacity of 200 megawatts and to begin commercial operation in 2016. A 40-mile, 230-kV transmission line is also proposed. We will submit an application to the South Dakota Public Utilities Commission (PUC) for a Facility Permit, as required under South Dakota Codified Law (SDCL) Chapter 49-41B and South Dakota Administrative Rules, Section 20:10:22.

The 26,038-acre Project Area is depicted on the enclosed United States Geological Survey (USGS) topographic map; a corridor for the proposed 40-mile transmission line is also shown on the map. The land sections within the Project Area and transmission line corridor are listed in the tables below. We have provided the map to facilitate your review and greatly appreciate your efforts to treat the Project and its location as confidential at this time.

Project Area:

County	Township Name	Township	Range	Sections
Grant	Mazeppa	120N	51W	7-8, 17-20, 29, 32
Codington	Germantown	119N	52W	24-26, 36
	Leola	119N	51W	4-5, 7-9, 17-19, 26-35
	Germantown	118N	52W	24
	Waverly	118N	51W	2-5, 8-11, 14-19, 22-23, 26-27

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Transmission Line Corridor:

County	Township Name	Township	Range	Sections
Codington	Leola	119N	51W	13-17, 20-30, 36
Grant	Vernon	119N	48W	6,7,19
Grant	Madison	119N	49W	1-2, 10-24, 30, 31
Grant	Stockholm	119N	50W	13-36
Grant	Alban	120N	48W	1-2, 11-14, 20-33
Grant	Grant Center	120N	49W	25, 36
Grant	Big Stone	121N	46W	18
Grant	Big Stone	121N	47W	13, 24-26, 34-36

In addition to federally protected wildlife and plant species, Tetra Tech is interested in sensitive habitats and wildlife management areas that may be located in or proximate to the proposed Project Area. In particular, we would like information on documented eagle nests within 10 miles of the Project Area and 2 miles of the transmission line corridor. Tetra Tech has also contacted the USFWS Habitat and Population Evaluation Team, the Waubay Wetland Management District, and the South Dakota Game, Fish, and Parks Department (SDGFP).

Additionally, we have initiated Tier 3 field studies at the Project Area. We have previously conducted fall and spring avian use surveys and native prairie surveys and performed wetland delineations. In March 2014, we initiated a year of eagle use surveys. Our survey protocol for the eagle use surveys are attached as Appendix 1 for your review and comment. We also conducted fall avian point-count surveys in 2014 and will conduct spring avian point-count surveys in 2015. It is our goal to perform a thorough analysis of environmental concerns within the potential Project Area. We will use the information provided by the USFWS and SDGFP to help guide Project development in a manner that avoids impacts to sensitive resources to the extent possible. If possible, we would appreciate a response by March 10, 2015.

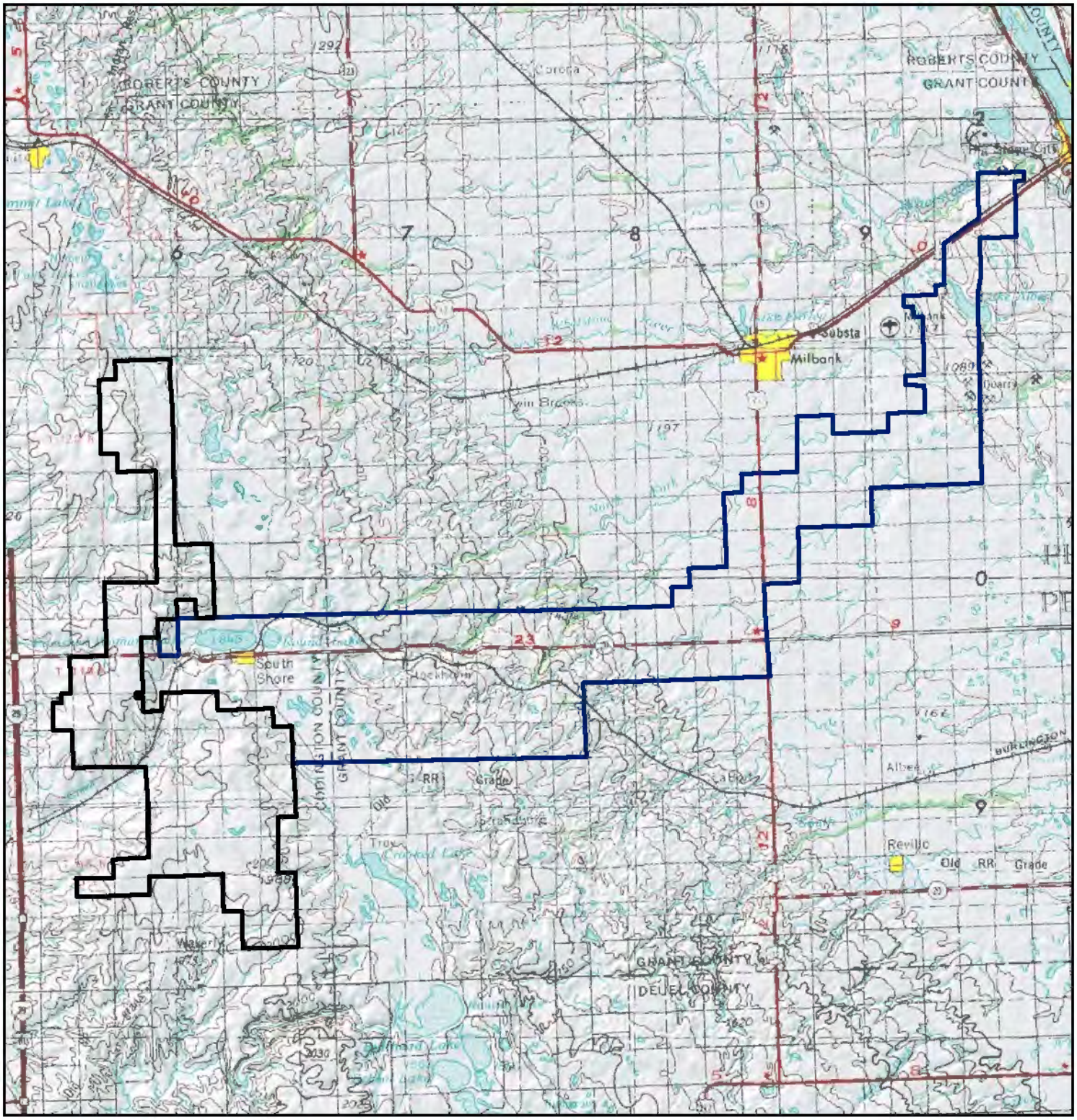
Should you have any questions or require additional information, please do not hesitate to contact me directly by phone at 512-213-8501 or email at anne-marie.griger@tetratech.com. Thank you for your assistance.

Respectfully submitted,

Anne-Marie Griger, AICP
Tetra Tech, Inc
8911 N. Capital of Texas Hwy, Bldg 2 Suite # 2310
Austin, TX 78759

Attachments: USFWS letter dated November 26, 2007
Map
Appendix 1

TETRA TECH



NEXTera ENERGY RESOURCES

Crowned Ridge

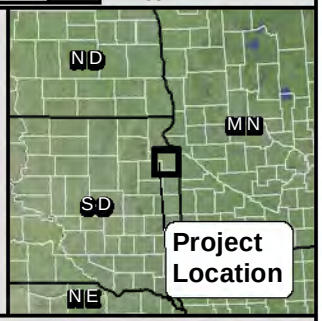
Codington and Grant Counties, SD
February 2015

1:238,000 WGS84 UTM Zone 14N

0 0.5 1 2 3 4 Miles

Project Boundary (11-24-2014)

Transmission Line Boundary (2015-02-04)



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APPENDIX 1

1) Eagle Use Surveys

The objective of eagle use surveys is to document eagle movements and behavior within and adjacent to the Project Area in all four seasons in order to assess risk to eagle species. Tetra Tech will conduct eagle use surveys following the general methods outlined in the Eagle Conservation Plan Guidance. Eagle use surveys will focus exclusively on eagles, and will occur at up to 18 survey plots. This number of point-count locations is sufficient to provide spatial coverage of approximately 26 percent of a 1-km buffer around turbine locations.

Eagle use surveys will be conducted by a qualified avian biologist beginning in spring 2014 and continue for one calendar year to capture temporal variation in eagle use of the Project Area. Surveys will be conducted twice per month during the spring (March 16 – June 15), summer (June 16 – August 15), fall (August 16 – November 15), and winter (November 16 – March 15). Each survey visit will occur over 2.5 days. There will be 26 survey weeks in total. Individual surveys will consist of a 1-hour observation period at each of the 18 point-count locations during each week of surveys, for a total of 468 hours of observations.

Eagle use data will be collected in 1-minute intervals so that the data can be translated into eagle exposure minutes, as recommended in the ECP Guidance. The data recorded for each survey will include the count start and stop times, eagle species observed, numbers and age classes of eagles seen, minutes of eagle flight in two height categories based on the ECP Guidance (≤ 200 and >200 meters {m} above ground), notes on flight and other behaviors, and an individual identifier for each flight observation allowing it to be linked to a flight map. Each eagle flight observed will be drawn on a topographic map or aerial image of the Project Area and digitized using a GIS so that eagle locations and behaviors can be overlaid with Project features. Numerical data will be collected within 800-m-radius plots, but flight lines will be documented across line-of-sight and will not be limited to the 800-m-radius survey plot.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408

March 23, 2014

Anne-Marie Griger
Tetra Tech, Inc
8911 N. Capital of Texas Hwy
Bldg 2, Suite# 2310
Austin, Texas 78759

Re: Crowned Ridge Wind Energy Center, Codington and Grant Counties, South Dakota

Dear Ms. Griger:

This letter is in response to your February 11, 2015, request for environmental comments regarding the above referenced project involving installation of the 200-MW Crowned Ridge Wind Energy Center and an associated 40- mile 230 kV transmission line. The 26,038-acre wind project area includes numerous sections in Townships 118-120 North, Ranges 51 and 52 West; the transmission line includes numerous sections in Townships 119-121 North, Ranges 46-51 West, all within Grant and Codington Counties, South Dakota.

Your current letter includes a previous (November 26, 2007) response from our office to Tetra Tech's October 19, 2007, inquiry for the Crowned Ridge facility; however, we sent an additional letter to you dated February 5, 2010 (copy enclosed) and a similar letter to Western Area Power Administration dated December 30, 2010. Herein we provide updated information.

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

Species	Status	Expected Occurrence
Topeka Shiner (*Notropis topeka*)	Endangered	Known resident
Dakota Skipper (*Hesperia dacotae*)	Threatened	Resident in native prairie, northeastern SD
Poweshiek Skipperling (*Oarisma poweshiek*)	Endangered	Possible resident in native prairie, northeastern SD

Rufa Red Knot (*Calidris canutus rufa*)	Threatened	Rare seasonal migrant
Whooping Crane (*Grus americana*)	Endangered	Migration

Additionally, the following species have been proposed for listing under the Endangered Species Act and may occur in the project area:

Species	Status	Expected Occurrence
Northern Long-eared Bat (*Myotis septentrionalis)*	Proposed Endangered	Summer resident, seasonal migrant, known winter resident in Black Hills

The Topeka shiner is an endangered minnow known to occupy numerous small streams within the Big Sioux, Vermillion and James watersheds of eastern South Dakota. Willow Creek in Codington County is a known occupied stream, tributaries of which occur within the proposed project area. We recommend avoidance of impacts to this waterway and its tributaries. If instream work in the Willow Creek watershed is proposed, specific measures may be necessary to ensure that adverse impacts to the Topeka shiner are not incurred as a result of this project.

The Dakota skipper is a small prairie butterfly listed as a threatened species under the Endangered Species Act (see: http://www.gpo.gov/fdsys/pkg/FR-2014-10-24/pdf/2014-25190.pdf). Dakota skippers are obligate residents of high quality prairie ranging from wet-mesic tallgrass prairie to dry-mesic mixed grass prairie. In northeastern South Dakota, Dakota skippers inhabit dry-mesic hill prairies with abundant purple coneflower *(Echinacea angustifolia)*, but also use mesic to wet-mesic tallgrass prairie habitats characterized by wood lily (*Lilium philadelphicum*) and mountain deathacamas (smooth camas; *Zigadenus elegans*). Their dispersal ability is very limited due in part to their short adult life span and single annual flight. Extirpation from a site may be permanent unless it occurs within about 0.6 miles of an inhabited site that generates a sufficient number of emigrants. Avoidance of impacts to native prairie habitat is recommended to reduce the risk of adverse effects to this species.

The Poweshiek skipperling is a small prairie butterfly listed as endangered under the Endangered Species Act (see: http://www.gpo.gov/fdsys/pkg/FR-2014-10-24/pdf/2014-25190.pdf). The habitat of Poweshiek skipperlings includes prairie fens, grassy lake and stream margins, moist meadows, and wet-mesic to dry tallgrass prairie. Preferred nectar plants for adult Poweshieks include smooth ox-eye (*Heliopsis helianthoides*) and purple coneflower *(Echinacea angustifolia)*, but they also use stiff tickseed (*Coreopsis palmate*), black-eyed susan (*Rudbeckia hirta*), and palespike lobelia (*Lobelia spicata*). Larval food plants are assumed to include spike-rush, sedges, prairie dropseed (*Sporobolus heterolepis*) and little bluestem (*Schizachyrium scoparium*). Poweshiek skipperlings have one flight per year from about the middle of June through the end of July (depending upon weather). They have a low dispersal capability, and may not cross areas that are not structurally similar to native prairies. Extirpation from

fragmented and isolated prairie remnants may be permanent unless it occurs within about 0.6 miles of an inhabited site that generates a sufficient number of emigrants. They are vulnerable to extreme weather conditions, dormant season fire, and other disturbances (e.g., intense cattle grazing). Avoidance of impacts to native prairie habitat is recommended to reduce the risk of adverse effects to this species.

Whooping cranes migrate through South Dakota on their way to northern breeding grounds and southern wintering areas. They occupy numerous habitats such as cropland and pastures; wet meadows; shallow marshes; shallow portions of rivers, lakes, reservoirs, and stock ponds; and both freshwater and alkaline basins for feeding and loafing. Overnight roosting sites frequently require shallow water in which to stand and rest. Line strike mortality is one of the greatest threats to this species. More information on this topic is provided below. Additionally, should construction occur during spring or fall migration, the potential for disturbances to whooping cranes exists. Disturbance (flushing the birds) stresses them at critical times of the year. We recommend remaining vigilant for these birds. There is little that can be done to reduce disturbance besides ceasing construction at sites where the birds have been observed. The birds normally do not stay in any one area for long during migration. Any whooping crane sightings should be reported to this office.

The rufa red knot is a robin-sized shorebird listed as threatened under the Endangered Species Act (see: < http://www.gpo.gov/fdsys/pkg/FR-2014-12-11/pdf/2014-28338.pdf> for more information). The red knot migrates annually between its breeding grounds in the Canadian Arctic and several wintering regions, including the Southeast United States, the Northeast Gulf of Mexico, northern Brazil, and Tierra del Fuego at the southern tip of South America. Although it is primarily a coastal species, small numbers of rufa red knots are reported annually across the interior United States (i.e., greater than 25 miles from the Gulf or Atlantic Coasts) during spring and fall migration. These reported sightings are concentrated along the Great Lakes, but multiple reports have been made from nearly every interior State, including South Dakota. Any rufa red knot sightins should be reported to this office.

The northern long-eared bat is a medium-sized brown bat that has been proposed for listing as endangered under the Endangered Species Act primarily due to impacts of White Nose Syndrome (see: <http://www.fws.gov/midwest/endangered/ mammals /nlba/pdf /FRpropListNLBA2Oct2013.pdf > for more information). Their proposed status defines these bats as a species in decline that the Service believes needs to be listed. Northern long-eared bats are known to be present in South Dakota during the summer months in forested habitat, primarily roosting singly or in colonies underneath bark, in cavities or in crevices of both live and dead trees. Some hibernacula have been documented in caves/mines in the Black Hills and the species have been documented in the Missouri River corridor during migration. White nose syndrome, a fungus affecting hibernating bats, is considered a significant threat to this species, but individuals may be harmed by other activities such as modifications to hibernacula, timber harvest, human disturbance, and collisions with wind turbines. Actions that may jeopardize the continued existence of this proposed species may require formal conference procedures in coordination with the Service. A decision regarding listing of the northern long-eared bat is anticipated to be made April 2, 2015. Interim guidance has been issued for this species that may be helpful to you (see: <http://www.fws.gov/midwest/endangered/mammals/nlba/pdf/

NLEBinterimGuidance6Jan2014.pdf>. We request any northern long-eared bat survey data you may collect.

Per earlier correspondence, it is our understanding that the Western Area Power Administration (Western) is the federal action agency for this project. If Western or their designated representative determines that the project "may adversely affect" listed species in South Dakota, it should request formal consultation from this office. If a "may affect - not likely to adversely affect" determination is made for this project, it should be submitted to this office for concurrence. If a "no effect" determination is made, further consultation may not be necessary. However, a copy of the determination should be sent to this office.

Bald Eagles

Our U.S. Fish and Wildlife Service (USFWS) *Eagle Conservation Plan Guidance* (ECPG) was issued in April 2013, and per your letter you are familiar with the guidance and will be conducting eagle surveys at the project site. We have reviewed the protocol you provided. We note that the ECPG suggests at least 2 years of preconstruction surveys for eagles, as well as coverage of at least 30% of a 1-km buffer around turbine locations, while your protocol currently includes only 1 year of study, and 26% coverage. Following the ECPG more closely will strengthen the data used to estimate the risk to eagles and determine the appropriate risk category of the proposed project. Additionally, you have requested locations of documented eagle nests within 10 miles of the project area. The South Dakota Department of Game, Fish and Parks (SDDGFP) monitors known eagle nests annually, thus you may obtain this information from SDDGFP. Consider conducting surveys for eagle nests within the 10 mile radius of the project to identify any nests not currently known to SDDGFP.

Birds of Conservation Concern

In our February 5, 2010, letter we indicated the potential for occurrence of species listed in our Birds of Conservation Concern 2008 publication. That information remains relevant to this project with exception of our recommendation to develop an Avian and Bat Protection plan for the wind facility. Although that type of plan would be appropriate for the transmission portion of this project, impacts from the wind energy facility may be better addressed via development of a Bird and Bat Conservation Strategy as outlined in our *Land-Based Wind Energy Guidelines* (see page 55 of the Guidelines: <http://www.fws.gov/windenergy/docs/ WEG_final.pdf>).

Note that some species of migratory birds, particularly grassland dependent species such as the grasshopper sparrow, may tend to avoid wind turbines. This equates to habitat loss via negative behavioral response to turbines. We recommend offsetting that loss, perhaps via establishment of grassland easements, or restoration of degraded prairie/former grasslands. If the Crowned Ridge facility will impact intact grasslands, we recommend further coordination on this issue with both this office and the USFWS Waubay Wetland Management District whom you have already contacted. We request any survey data collected at the Crowned Ridge project area.

Agency Coordination

Our February 5, 2010, letter included recommended coordination with other agencies, including the U.S. Geological Survey at the Northern Prairie Wildlife Research Center, as they were conducting wind energy/wildlife interaction studies, but it is our understanding that that work has been completed. Again, continued coordination is recommended with USFWS Waubay Wetland Management District and SDDGFP regarding their areas of expertise.

Other Guidance Updates

No changes from our February 5, 2010, recommendations and advisories are provided herein regarding fisheries, wetlands, or the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act. Your letter indicates you are familiar with our 2013 *Land-based Wind Energy Guidelines* which have been finalized since our last correspondence, and you are following the tiered steps therein, which we highly recommend. We provided information in our February 5, 2010, letter regarding meteorological towers, but note that we have updated our communication tower guidance which extends to meteorological towers; that updated guidance is enclosed. Also note that the publication *Mitigating Bird Collisions with Power Lines: The State of the Art in 1994* we had previously recommended has been updated with a 2012 version: *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* which may be obtained by contacting the Edison Electric Institute at: <http://www.eei.org/resourcesandmedia/products/Pages/ProductDetails.aspx?prod=F20558BF-A097-4289-A8BA-1674B6096523&type=P>.

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

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

Sincerely,

Scott Larson
Field Supervisor
South Dakota Field Office

Enclosures

Cc: USFWS Waubay NWR; Waubay, SD
(Attn: Connie Mueller)
Western Area Power Administration; Billings, MT
(Attn: Matt Marsh)
SDDGFP; Pierre, SD
(Attn: Silka Kempema)
USFWS HAPET; Bismarck, ND

2013 U.S. Fish and Wildlife Service (USFWS) Revised Voluntary Guidelines for Communication Tower Design, Siting, Construction, Operation, Retrofitting, and Decommissioning –

Suggestions Based on Previous USFWS Recommendations to FCC Regarding WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds" (2007), Docket No. 08-61, FCC's Antenna Structure Registration Program (2011), Service 2012 Wind Energy Guidelines, and Service 2013 Eagle Conservation Plan Guidance

Submitted by:

Albert M. Manville, II, Ph.D., C.W.B.
Senior Wildlife Biologist & Avian-Structural Lead
Division of Migratory Bird Management, U.S. Fish & Wildlife Service
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Last updated: September 27, 2013

[Comm Tower 2013 Revised Guidance-to FCC-AMM.docx]

1. Collocation of the communications equipment on an existing communication tower or other structure (e.g., billboard, water and transmission tower, distribution pole, or building mount) is strongly recommended. Depending on tower load factors and communication needs, from 6 to 10 providers should collocate on an existing tower or structure provided that frequencies do not overlap/"bleed" or where frequency length or broadcast distance requires higher towers. New towers should be designed structurally and electronically to accommodate the applicant's antenna, and antennas of at least 2 additional users – ideally 6 to 10 additional users, if possible – unless the design would require the addition of lights and/or guy wires to an otherwise unlit and/or unguyed tower. This recommendation is intended to reduce the number of towers needed in the future.

2. If collocation is not feasible and a new tower or towers are to be constructed, it is strongly recommended that the new tower(s) should be not more than 199 feet above ground level (AGL), and that construction techniques should not require guy wires. Such towers should be unlighted if Federal Aviation Administration (FAA) regulations and lighting standards (FAA 2007, Patterson 2012, FAA 2013 lighting circular anticipated update) permit. Additionally, the Federal Communications Commission (FCC) through recent rulemaking now requires that new towers $\geq$ 450 ft AGL contain no red-steady lights. FCC also recommends that new towers 350-450 ft AGL also contain no red-steady lights, and they will eventually recommend that new towers < 350 ft AGL convert non-flashing lights to flash with existing flashing lights. LED lights are being suggested as replacements for all new construction and for retrofits, with the intent of future synchronizing the flashes. Given these dynamics, the Service recommends using lattice tower or monopole structures for all towers < 200 ft AGL and for taller towers where feasible. The Service considers the less than 200 ft AGL option the "gold standard" and suggests that this

is the environmentally preferred industry standard for tower placement, construction and operation – i.e., towers that are unlit, unguyed, monopole or lattice, and less than 200 ft AGL.

3. If constructing multiple towers, the cumulative impacts of all the towers to migratory birds – especially to Birds of Conservation Concern (FWS 2008) and threatened and endangered species, as well as the impacts of each individual tower, should be considered during the development of a project.

4. The topography of the proposed tower site and surrounding habitat should be clearly noted, especially in regard to surrounding hills, mountains, mountain passes, ridge lines, rivers, lakes, wetlands, and other habitat types used by raptors, Birds of Conservation Concern, and state and federally listed species, and other birds of concern. Active raptor nests, especially those of Bald and Golden Eagles, should be noted, including known or suspected distances from proposed tower sites to nest locations. Nest site locations for Golden Eagles may vary between years, and unoccupied, inactive nests and nest sites may be re-occupied over multiple years. The Service's 2013 Eagle Conservation Plan Guidance, Module 1, Land-based Wind Energy, Version 2, available on our website, is a useful document (USFWS 2013).

5. If at all possible, new towers should be sited within existing "antenna farms" (i.e., clusters of towers), in degraded areas (e.g., strip mines or other heavily industrialized areas), in commercial agricultural lands, in Superfund sites, or other areas where bird habitat is poor or marginal. Towers should not be sited in or near wetlands, other known bird concentration areas (e.g., state of federal refuges, staging areas, rookeries, and Important Bird Areas), in known migratory, daily movement flyways, areas of breeding concentration, in habitat of threatened or endangered species, or key habitats for Birds of Conservation Concern (FWS 2008). Disturbance can result in effects to bird populations which may cumulatively affect their survival. The Service has recommended some disturbance-free buffers, e.g., 0.5 mi around raptor nests during the nesting season, and 1-mi disturbance free buffers for Ferruginous Hawks and Bald Eagles during nesting season in Wyoming (FWS WY Ecological Services Field Office, referenced in Manville 2007:23). The effects of towers on "prairie grouse," "sage grouse," and grassland and shrub-steppe bird species should also be considered since tall structures have been shown to result in abandonment of nest site areas and leks, especially for "prairie grouse" (Manville 2004). The issue of buffers is currently under review, especially for Bald and Golden Eagles. Additionally, towers should not be sited in areas with a high incidence of fog, mist, and low cloud ceilings.

6. If taller (> 199 ft AGL) towers requiring lights for aviation safety must be constructed, the minimum amount of pilot warning and obstruction avoidance lighting required by the FAA should be used. Unless otherwise required by the FAA, only white strobe or red strobe lights (red preferable since it is generally less displeasing to the human eye at night), or red flashing incandescent lights should be used at night, and these should be the minimum number, minimum intensity (< 2,000 candela), and minimum number of flashes per minute (i.e., longest duration between flashes/"dark phase") allowable by the FAA. The use of solid (non-flashing) warning lights at night should be avoided (Patterson 2012, Gehring et al. 2009) – see recommendation #2 above. Current research indicates that solid red lights attract night-migrating birds at a much higher rate than flashing lights (Gehring et al. 2009, Manville 2007, 2009). Recent research

indicates that use of white strobe, red strobe, or red flashing lights alone provides significant reductions in bird fatalities (Patterson 2012, Gehring et al. 2009).

7. Tower designs using guy wires for support, which are proposed to be located in known raptor or waterbird concentrations areas, daily movement routes, major diurnal migratory bird movement routes, staging areas, or stopover sites, should have daytime visual markers or bird deterrent devices installed on the wires to prevent collisions by these diurnally moving species. The efficacy of bird deterrents on guy wires to alert night migrating species has yet to be scientifically validated. For guidance on markers, see Avian Power Line Interaction Committee (APLIC). 2006. *Suggested Practices for Avian Protection on Power Lines -- State of the Art in 2006.* Edison Electric Institute, APLIC, and the California Energy Commission. Washington, DC, and Sacramento, CA. 207 pp, and APLIC. 2012. *Reducing Avian Collisions with Power Lines -- the State of the Art in 2012.* Edison Electric Institute and APLIC. Washington, DC. 159 pp. Also see www.aplic.org, www.energy.ca.gov, or call 202-508-5000.

8. Towers and appendant facilities should be designed, sited, and constructed so as to avoid or minimize habitat loss within and adjacent to the tower "footprint." However, a larger tower footprint is preferable to the use of guy wires in construction. Several shorter, un-guyed towers are preferable to one, tall guyed, lighted tower. Road access and fencing should be minimized to reduce or prevent habitat fragmentation, disturbance, and the creation of barriers, and to reduce above ground obstacles to birds in flight.

9. If, prior to tower design, siting and construction, if it has been determined that a significant number of breeding, feeding and roosting birds, especially of Birds of Conservation Concern (FWS 2008), state or federally-listed bird species, and eagles are known to habitually use the proposed tower construction area, relocation to an alternate site is highly recommended. If this is not an option, seasonal restrictions on construction are advised in order to avoid disturbance, site and nest abandonment, especially during breeding, rearing and other periods of high bird activity.

10. Security lighting for on-ground facilities, equipment and infrastructure should be motion- or heat-sensitive, down-shielded, and of a minimum intensity to reduce nighttime bird attraction and eliminate constant nighttime illumination, but still allow safe nighttime access to the site (USFWS 2012, Manville 2011).

11. Representatives from the USFWS or researchers from the Research Subcommittee of the Communication Tower Working Group should be allowed access to the site to evaluate bird use; conduct dead-bird searches; place above ground net catchments below the towers (Manville 2002); and to perform studies using radar, Global Position System, infrared, thermal imagery, and acoustical monitoring, as necessary. This will allow for assessment and verification of bird movements, site use, avoidance, and mortality. The goal is to acquire information on the impacts of various tower types, sizes, configurations and lighting protocols.

12. Towers no longer in use, not re-licensed by the FCC for use, or determined to be obsolete should be removed from the site within 12 months of cessation of use, preferably sooner.

13. In order to obtain information on the usefulness of these guidelines in preventing bird strikes and better understanding impacts from habitat fragmentation, please advise USFWS personnel of the final location and specifications of the proposed tower, and which measures recommended in these guidelines were implemented. If any of these recommended measures cannot be implemented, please explain why they are not feasible. This will further advise USFWS in identifying any recurring problems with the implementation of the guidelines, which may necessitate future modifications.

Reference Sources:

Federal Aviation Administration. 2007. Obstruction marking and lighting. Advisory Circular AC 70/7460-1K. U.S. Department of Transportation.

Gehring, J., P. Kerlinger, and A.M. Manville, II. 2009. Communication towers, lights and birds: successful methods of reducing the frequency of avian collisions. Ecological Applications 19(2): 505-514. Ecological Society of America.

Gehring, J., P. Kerlinger, and A.M. Manville, II. 2011. The role of tower height and guy wires on avian collisions with communication towers. Journal of Wildlife Management 75(4): 848-855. The Wildlife Society.

Manville, A.M., II. 2002. Protocol for monitoring the impact of cellular telecommunication towers on migratory birds within the Coconino, Prescott, and Kaibab National Forests, Arizona. Protocol requested by U.S. Forest Service. 9 pp.

Manville, A.M., II. 2004. Prairie grouse leks and wind turbines: U.S. Fish and Wildlife Service justification for a 5-mile buffer from leks; additional grassland songbird recommendations. Division of Migratory Bird Management, USFWS, Arlington, VA, peer-reviewed briefing paper. 17 pp.

Manville, A.M., II. 2007. Comments of the U.S. Fish and Wildlife Service Submitted Electronically to the FCC on 47 CFR Parts 1 and 17, WT Docket No. 03-187, FCC 06-164, Notice of Proposed Rulemaking, "Effects of Communication Towers on Migratory Birds." February 2, 2007. 32 pp.

Manville, A.M., II. 2009. Towers, turbines, power lines, and buildings – steps being taken by the U.S. Fish and Wildlife Service to avoid or minimize take of migratory birds at these structures. Pages 262-272 *In* T.D. Rich, C. Arizmendi, D. Demarest, and C. Thompson (eds.). Tundra to Tropics: Connecting Habitats and People. Proceedings 4th International Partners in Flight Conference, McAllen, TX.

Manville, A.M., II. 2011. Comments of the U.S. Fish and Wildlife Service's Division of Migratory Bird Management Filed Electronically on WT Docket No. 08-61 and WT Docket No. 03-187, Regarding the Environmental Effects of the Federal Communication's Antenna Structure Registration Program. January 14, 2011. 12 pp.

Patterson, J.T., Jr. 2012. Evaluation of new obstruction lighting techniques to reduce avian fatalities. DOT/FAA/TC-TN12/9, Federal Aviation Administration, U.S. Department of Transportation. 28 pp, plus appendices.

U.S. Fish and Wildlife Service. 2000. Service Guidance on the Siting, Construction, Operation, and Decommissioning of Communication Towers. September 14, 2000. http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management, Arlington, VA. 85 pp. http://www.fws.gov/migratorybirds/>

U.S. Fish and Wildlife Service. 2012. U.S. Fish and Wildlife Service Land-Based Wind Energy Guidelines. March, 82 pp.

U.S. Fish and Wildlife Service. 2013. Eagle Conservation Plan Guidance, Module 1, Land-based Wind Energy, Version 2. Division of Migratory Bird Management. April, 103 pp.

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Kely Mertz

Subject:	Information included: Crowned Ridge project discussion
Location:	Conference Line
Start:	Thu 4/20/2017 12:00 PM
End:	Thu 4/20/2017 1:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Organizer:	Kely Mertz
Required Attendees:	Kempema, Silka; Natoma Hansen; Natalie_Gates@fws.gov; Mueller, Connie; Wells, Kimberly; Tyler.Williams@nexteraenergy.com; patrick.flowers@xcelenergy.com

Good morning,

Below, please find the agenda and call-in information for the call. We are also attaching a project overview, which we will walk through during the call. We understand the late circulation and do not expect review prior to the call.

We look forward to talking tomorrow.
Thank you,
Kely

Call-in Information
305-552-3001
11855446#

Agenda

I. Introductions
II. Project overview
III. Current studies
IV. PUC process
V. USFWS easements
VI. Questions

Memorandum

Date: April 19, 2017

Re: Crowned Ridge II Project Background

PROJECT OVERVIEW

Crowned Ridge Wind, LLC, an indirect subsidiary of NextEra Energy Resources, LLC (NEER), plans to develop a 600-megawatt (MW) wind facility known as the Crowned Ridge Wind Energy Facility (the project) in Deuel, Grant, and Codington Counties. The northern 300 MW will produce energy sold to Xcel through a Power Purchase Agreement. The southern 300 MW is a build-own-transfer project, with Xcel Energy (Xcel) as the ultimate owner-operator (Figure 1). The project's point of interconnection will be Otter Tail Power's Big Stone South 230-kilovolt (kV) substation near Big Stone City, South Dakota. Construction is anticipated to commence in early 2019, and the project is scheduled to achieve commercial operation on or before the end of 2019. For purposes of discussion, the northern 300 MW can be referenced as Crowned Ridge I, and the southern 300 MW can be referenced as Crowned Ridge II.

STUDIES AND SURVEYS

NEER has completed numerous studies in the general vicinity of the project area (Table 1). NEER has coordinated with the U.S. Fish and Wildlife Service and South Dakota Game, Fish and Parks multiple times (2005, 2007, 2009, 2010, 2015, 2017) to request information regarding ecologically significant areas (e.g., easements) and endangered, threatened, or special status species (e.g., eagles) in this general area of South Dakota.

Table 1. Surveys and Studies Completed or in Progress for the Crowned Ridge Wind Energy Facility Project Area and Vicinity

Survey/Study Date	Survey/ Study Description	Description or Summary of Results	Federal or State Listed Species Observed? If Y, describe.
Fall 2007	Critical Issues Analysis (CIA) Bemis Wind Resource Area (WRA)	Recommended additional investigations; identified potential constraints.	NA
Mar 2007 – Jun 2008	Avian Surveys – Spring (Bemis WRA)	Identified 27 active raptor nests (mostly red-tailed hawks); several leks.	Y (11 South Dakota state-sensitive species)
Jun 2008	Native Prairie Surveys (Bemis WRA)	Delineated grassland, native and tame, and potential Dakota skipper habitat.	N
Aug – Nov 2008	Avian Surveys – Fall (Bemis WRA)	Documented avian species.	Y (12 South Dakota sensitive species)
Jun – Jul 2009	Native Prairie Surveys (Crowned Ridge WRA)	Delineated native and tame grassland and potential Dakota skipper habitat.	N

Table 1. Surveys and Studies Completed or in Progress for the Crowned Ridge Wind Energy Facility Project Area and Vicinity (Continued)

Survey/Study Date	Survey/ Study Description	Description or Summary of Results	Federal or State Listed Species Observed? If Y, describe.
2013	CIA (Crowned Ridge Wind Energy Center [WEC])	Recommended additional investigations and identified potential constraints or resources for consideration.	NA
Aug – Nov 2014	Avian Surveys – Fall (Crowned Ridge WEC)	Documented avian species.	N
Mar – Nov 2014; Nov – Mar 2015	Eagle Survey (Crowned Ridge WEC)	Documented eagle presence and use.	NA
2015	Dakota Skipper Habitat Evaluation (Crowned Ridge WEC)	Identified approximately five areas (ranging from 39 to 193 acres each and comprising 3% of the Project Area) of potential Dakota skipper habitat in the Project Area.	N
Summer 2015	Northern long-eared bat (NLEB) summer bat habitat assessment (Crowned Ridge Transmission Line Route)	Identified marginal potential suitable NLEB roosting habitat.	NA
Aug – Oct 2015; April – Oct 2016	Bat acoustic survey (Crowned Ridge WEC)	Documented bat activity.	NA
Apr, May 2017	Aerial Raptor Survey (Crowned Ridge Wind Energy Facility [WEF])	Identified raptor nests within project area plus 2- and 10-mile buffers. April complete.	TBD
April – Nov 2017	Avian point count surveys (Crowned Ridge WEF)	In progress. April point count complete.	TBD
Apr – Nov 2017	Bat Acoustic monitoring (Crowned Ridge WEF)	In progress.	TBD

Notes:

N = No.

NA = Not Applicable.

TBD = To Be Determined.

Y = Yes.

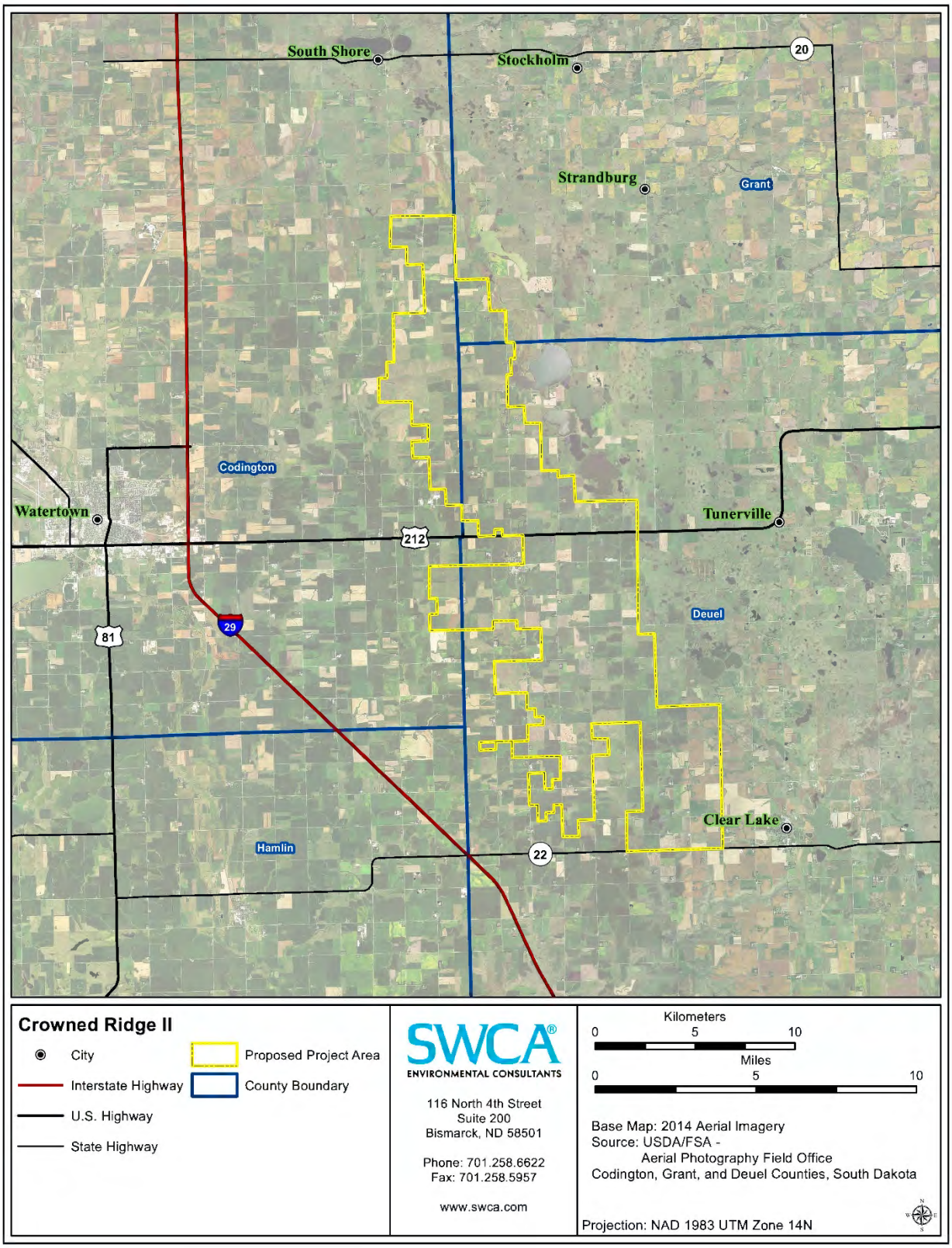

Figure 1. Crowned Ridge Wind Energy Facility, Crowned Ridge II, South Dakota.

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Scott Phillips

From: Zonna Barnes
Sent: Friday, June 16, 2017 5:02 PM
To: Paige Olson; Scott Phillips; Carolyn.Stewart@nexteraenergy.com; Richard.Estabrook@nexteraenergy.com; Tyler.Wilhelm@nexteraenergy.com; Kimberly.Wells@nexteraenergy.com
Cc: Norma Crumbley; Stephen Sabatke
Subject: RE: Crowned Ridge Project Meeting
Attachments: Cultural Resources_overview-methods_memo_swca_14Jun2017.docx

Hi all,
In preparation for the call on Monday morning, the cultural resource overview document is attached.

Thanks!
Zonnie

-----Original Appointment-----
From: Zonna Barnes
Sent: Monday, June 12, 2017 5:07 PM
To: Zonna Barnes; Paige Olson; Scott Phillips; Carolyn.Stewart@nexteraenergy.com; Richard.Estabrook@nexteraenergy.com; Tyler.Wilhelm@nexteraenergy.com; Kimberly.Wells@nexteraenergy.com
Cc: Norma Crumbley; Stephen Sabatke
Subject: Crowned Ridge Project Meeting
When: Monday, June 19, 2017 9:00 AM-10:00 AM (UTC-07:00) Mountain Time (US & Canada).
Where: 866.740.1260 Access Code: 9951661

9 am (MDT)/10 am (CDT)

Conference Call information:
1-866-740-1260
Access code: 9951661

Memorandum

Date: June 14, 2017

Re: Crowned Ridge Wind Energy Facility Overview and Cultural Resources Review

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PROJECT OVERVIEW

Crowned Ridge Wind, LLC, an indirect subsidiary of NextEra Energy Resources, LLC (NEER), plans to develop a 600-megawatt (MW) wind facility known as the Crowned Ridge Wind Energy Facility (the project) in Deuel, Grant, and Codington Counties. The northern 300 MW will produce energy sold to Xcel Energy (Xcel) through a Power Purchase Agreement. The southern 300 MW is a build-own-transfer project, with Xcel as the ultimate owner-operator (Figures 1 and 2). The project's point of interconnection will be Otter Tail Power's Big Stone South 230-kilovolt (kV) substation near Big Stone City, South Dakota. Construction is anticipated to commence in early 2019, and the project is scheduled to achieve commercial operation on or before the end of 2019. For purposes of discussion, the northern 300 MW can be referenced as Crowned Ridge I, and the southern 300 MW can be referenced as Crowned Ridge II.

CULTURAL RESOURCE REVIEW

Cultural resources review for the project is to meet the requirements of the South Dakota Public Utilities Commission (PUC) for project permitting. No federal involvement is triggered for the project that would require review under Section 106 of the National Historic Preservation Act. NEER has engaged the Sisseton-Wahpeton Oyate of the Lake Traverse Reservation (SWO), HDR, Inc. (HDR), and SWCA Incorporated (SWCA) to conduct the tribal resource, archaeological, and historic—or collectively "cultural resource"—review for the project. SWCA is leading and coordinating this combined effort.

Existing Knowledge Bases

Records searches from the South Dakota Archaeological Research Center (SARC) databases indicate 562 cultural resources previously recorded within the vicinity of the project by 103 previous surveys (Table 1). Identification of tribal resources, such as sacred sites, Traditional Cultural Properties (TCPs), sites of religious importance, and historic properties, will be identified by SWO and may overlap with sites identified by others in the SARC databases. SWO is also working with NEER to lead outreach to other concerned tribes. As a result, the Spirit Lake Tribe and the Yankton Sioux Tribe are anticipated to participate in field survey efforts.

Field Survey

A Level III intensive inventory of tribal, archaeological, and historic resources of the project area will be conducted including all turbine locations, collection lines, roads, 230-kV substations, and 230-kV transmission lines connecting the project to the Otter Tail Power 230-kV Big Stone Substation. Resource specialists from SWCA, HDR, SWO, and other engaged tribes will cover these areas with systematic pedestrian transects spaced no more than 30 meters (m) apart for an intensive survey of cultural resources.

Table 1. Previously Recorded Cultural Resources in the Project Vicinity per SARC Databases

Cultural Resource Category	Quantity Identified
Archaeological Sites	118
Historic Districts	1
Historic Bridges	49
Cemeteries	11
Historic Structures	383
Total	**562**

During the inventory, any previously recorded sites will be re-evaluated and re-recorded as necessary. Newly discovered cultural resources will be mapped to scale and recorded in accordance with South Dakota State Historic Preservation Officer (SHPO) guidelines. Global positioning system shapefiles will be created and additionally used to assist NEER in planning project design in relation to cultural resources.

Principal Investigators from this team will evaluate the significance of all identified historic and prehistoric resources in terms of eligibility for the National Register of Historic Places and in relation to tribal significance. While evaluations of significance for an archaeological resource might use information from subsurface testing of both sites and isolated finds, subsurface testing will largely be limited to historical archaeological sites and excluded from potentially tribally significant resources that may be alternately assessed through nonintrusive means.

Based upon the PUC permits required for project components, NEER anticipates that up to four phases of cultural resources reporting may be required: one each for the Off-site and On-site Gen-ties, and one each for Crowned Ridge I and II. The Off-Site Gen-tie will connect from the northern end of the project to the Big Stone South 230- kV substation and is to begin PUC permitting by August 2017. The On-site Gen-tie will connect between Crown Ridge I and II, and these project components are to begin PUC permitting by October 2017.

Reporting

The team will prepare Level III intensive inventory reports to current SHPO standards. Reporting will include a project description, environmental setting, cultural setting, background research results, research design, methods, results of investigations, recommendations, and references cited. The report will provide recommendations regarding the management of cultural resources identified in the project area, with particular recommendations for avoidance, minimization, and other mitigation, as needed, for significant (National Register of Historic Places–eligible) cultural resources. The information will assist NEER with micrositing, focusing upon the avoidance of effects to cultural resources to the extent achievable. An unanticipated discovery plan will also be drafted in consultation with NEER and the SHPO. This plan will detail specific actions to take during the construction phase of the project should any cultural resource discoveries be identified.

This memorandum was prepared for NEER by SWCA.

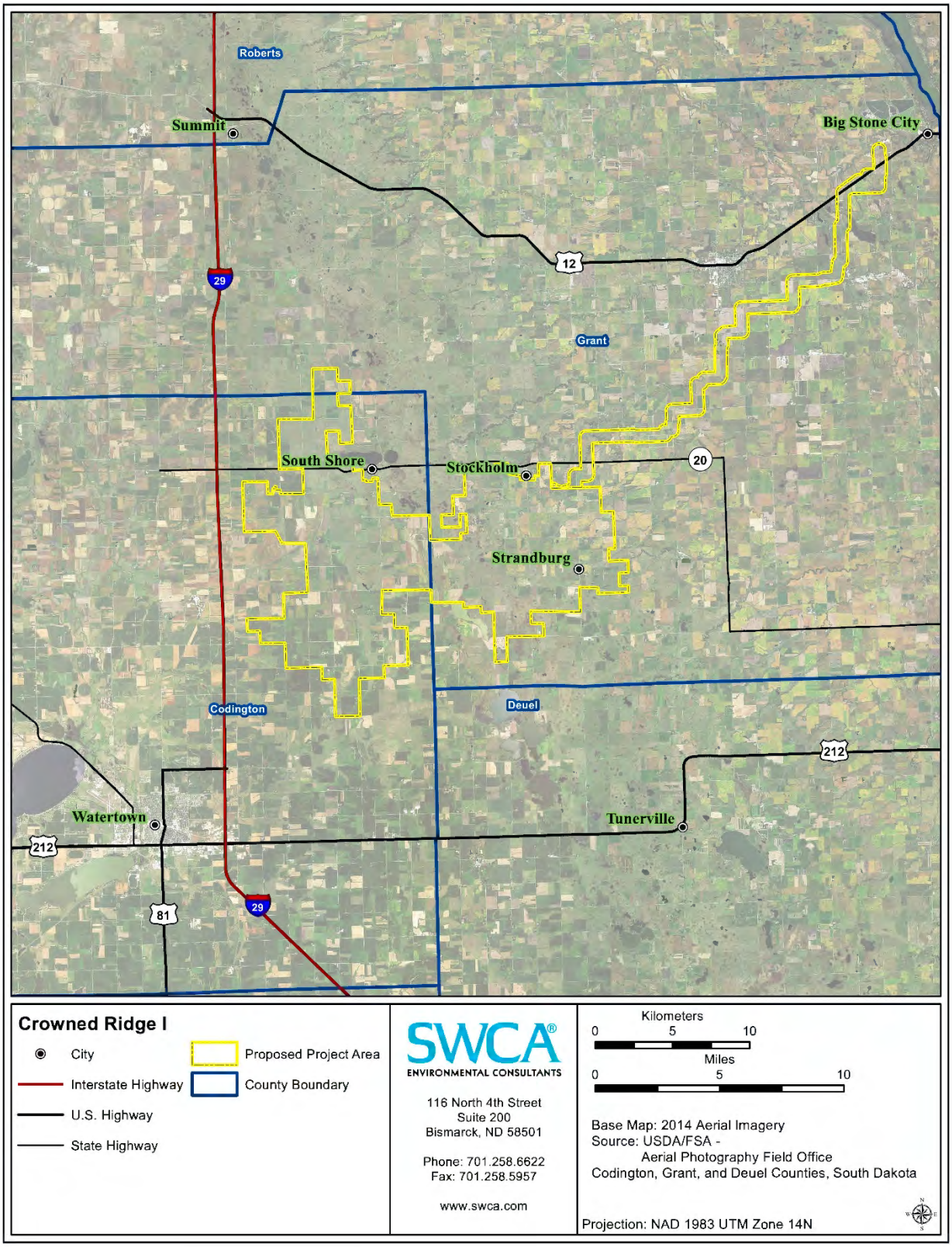

Figure 1. Crowned Ridge Wind Energy Facility, Crowned Ridge I, South Dakota.

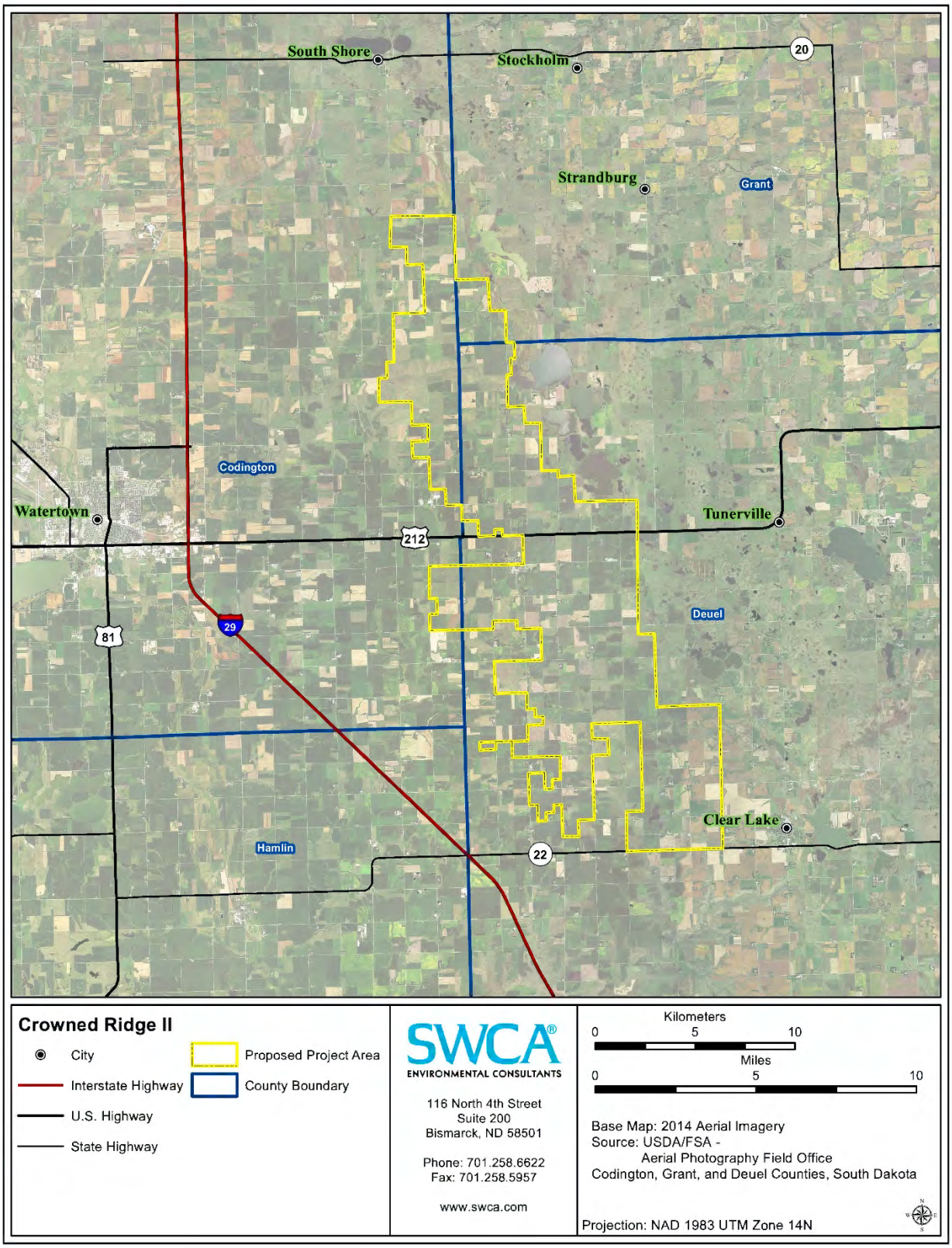

Figure 2. Crowned Ridge Wind Energy Facility, Crowned Ridge II, South Dakota.

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From: Kely Mertz
To: Runia, Travis
Subject: RE: Lek data
Date: Thursday, June 15, 2017 10:53:00 AM
Attachments: Generalized_Polygon.zip

Travis,
Attached is the general area of interest, which is confidential at this time.
Thank you!
Kely

From: Runia, Travis [mailto:Travis.Runia@state.sd.us]
Sent: Thursday, June 15, 2017 8:43 AM
To: Kely Mertz <KMertz@swca.com>
Subject: RE: Lek data

Hi Kely,

Do you have a shapefile of the area of interest? I understand you might not be able to share the exact project boundary.

We usually respond to these requests by providing any lek data we may have, but we also let the developer know what surveys have been completed in the area. Our survey foot print is quite small, so many times we do not have any known lek locations in the proposed project area, but it is because surveys have not been conducted.

Thanks,

Travis Runia | *Senior Upland Game Biologist*
South Dakota Department of Game, Fish and Parks
895 3rd St. SW | Huron, SD 57350
605.353.8477 | Travis.Runia@state.sd.us

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Thursday, June 15, 2017 7:39 AM
To: Runia, Travis
Subject: FW: [EXT] Lek data

Good morning Travis,
I was inquiring about current data regarding lek locations, and Casey indicated you might have more information. Is this data that your agency has, and can share? This is in reference to ongoing coordination with SDGFP and USFWS regarding a potential wind project in eastern South Dakota.
Thank you in advance,

Kely

Kely Mertz
Senior Project Manager

200 W. 22nd Street, Suite 220
Lombard, IL 60148
Office 630.705.1762
Cell 614.580.6715
Visit Our Website: http://www.swca.com

From: Heimerl, Casey [mailto:Casey.Heimerl@state.sd.us]
Sent: Thursday, June 15, 2017 8:36 AM
To: Kely Mertz <KMertz@swca.com>
Subject: RE: Lek data

Hi Kely,

We do not keep lek data in our Natural Heritage Database. I recommend you contact our upland gamebird biologist to see what he may be able to provide. His email is Travis.Runia@state.sd.us

~Casey

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Thursday, June 15, 2017 7:15 AM
To: Heimerl, Casey
Subject: [EXT] Lek data

Hi Casey,
We are interested in the most current information regarding lek data also. Can we make that request under the same data use agreement form, or would we need to do another request separately? I would need to provide you with a slightly updated shapefiles and buffer.
Thank you,
Kely

Kely Mertz
Senior Project Manager

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Lombard, IL 60148
Office 630.705.1762
Cell 614.580.6715
Visit Our Website: http://www.swca.com

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From: Kely Mertz
To: Runia, Travis
Cc: Heimerl, Casey
Subject: RE: Lek data
Date: Tuesday, July 11, 2017 9:44:00 AM

This is very helpful, thank you Travis!
Kely

From: Runia, Travis [mailto:Travis.Runia@state.sd.us]
Sent: Tuesday, July 11, 2017 9:43 AM
To: Kely Mertz <KMertz@swca.com>
Cc: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Subject: RE: Lek data

Hi Kely,

We have very limited survey effort for prairie grouse leks in your project area. However, see below the information for 4 recent lek locations.

2014 – STGR – 11 males - -96.877056, 44.960364
2016 – GPCH – 25 birds - -96.879337, 45.161802
2016 – Unknown Species – 6 birds - -96.912922, 45.131501
2016 – Unknown Species – 20 birds - -96.872471, 45.129682

Thanks,

Travis Runia | *Senior Upland Game Biologist*
South Dakota Department of Game, Fish and Parks
895 3rd St. SW | Huron, SD 57350
605.353.8477 | Travis.Runia@state.sd.us

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Monday, July 10, 2017 12:52 PM
To: Runia, Travis
Subject: RE: [EXT] Lek data

Good afternoon, Travis –
I was just following up to see if you had any lek data available for the area of interest I provided in June?
Thank you!
Kely

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July 12, 2017

Silka Kempema
South Dakota Game Fish and Parks
523 East Capitol Avenue
Pierre, SD 57501

Re: Crowned Ridge I and II Wind Energy Projects in Codington, Deuel, and Grant Counties, South Dakota

Dear Ms. Kempema:

SWCA Environmental (SWCA) is writing on behalf of NextEra Energy Resources, LLC (NEER), to request information regarding ecologically sensitive areas and federally and state listed endangered, threatened, or special concern species occurrences in reference to the proposed Crowned Ridge Wind, LLC and Crowned Ridge Wind II, LLC projects in Codington, Deuel, and Grant counties, South Dakota.

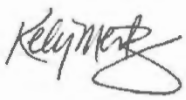
The two projects are adjacent and will total 600 megawatts (MW). The northern 300 MW and northern gen-tie are known as the Crowned Ridge I project. The southern 300 MW and southern (on-site) gen-tie is known as the Crowned Ridge II project. The projects' point of interconnection will be Otter Tail Power's Big Stone South 230-kilovolt substation near Big Stone City, South Dakota. Construction is anticipated to commence in late 2018, and the projects are scheduled to achieve commercial operation on or before the end of 2019.

We have provided Shapefiles and a figure to facilitate your review, and we greatly appreciate your ongoing efforts to treat the projects and their locations as confidential at this time. Please note that the area provided is larger than what ultimately will be needed to develop the projects. However, querying this area will allow NEER to accommodate micro-siting adjustments to avoid sensitive resources to the extent possible.

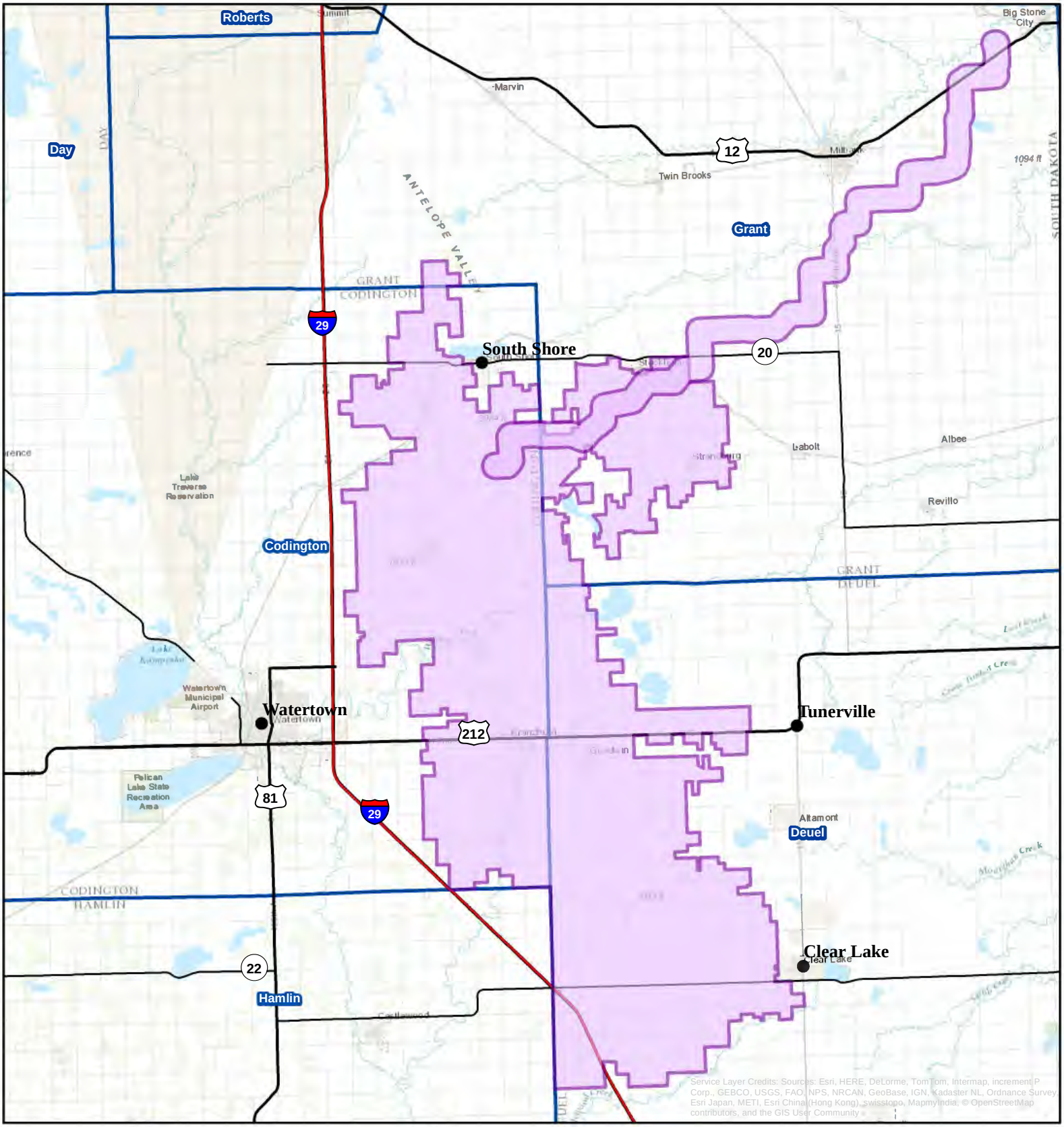
NEER has coordinated with the South Dakota Game, Fish, and Parks and US Fish and Wildlife Service (USFWS) since 2005 regarding potential wind energy development in this general region. Recent coordination includes our April 20, 2017 conference calls with you and the USFWS. As you are aware from this past and ongoing coordination, NEER's goal is to perform a thorough analysis of environmental resources using the best available information.

Should you have any questions or require additional information, please do not hesitate to contact me at 614.580.6715 or kmertz@swca.com. Thank you for your assistance.

Sincerely,



Kely Mertz
Senior Project Manager



Crowned Ridge I and II Wind Projects

- City
- County Boundary
- Interstate Highway
- U.S. Highway
- State Highway
- Area of Interest

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Bismarck, ND 58501

Phone: 701.258.6622
Fax: 701.258.5957

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Kilometers
0 5 10

Miles
0 5 10

Base Map: USGS 7.5' Topographic Map
Source: Esri ArcGIS Online service
Codington, Grant, and
Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

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Lombard, Illinois 60148
Tel 630.705.1762
www.swca.com

July 12, 2017

Natalie Gates
US Fish and Wildlife Service
420 S. Garfield Avenue, Suite 400
Pierre, SD 57501

Re: Crowned Ridge I and II Wind Energy Projects in Codington, Deuel, and Grant Counties, South Dakota

Dear Ms. Gates:

SWCA Environmental (SWCA) is writing on behalf of NextEra Energy Resources, LLC (NEER), to request information regarding ecologically sensitive areas and federally and state listed endangered, threatened, or special concern species occurrences in reference to the proposed Crowned Ridge Wind, LLC and Crowned Ridge Wind II, LLC projects in Codington, Deuel, and Grant counties, South Dakota.

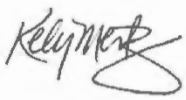
The two projects are adjacent and will total 600 megawatts (MW). The northern 300 MW and northern gen-tie are known as the Crowned Ridge I project. The southern 300 MW and southern (on-site) gen-tie is known as the Crowned Ridge II project. The projects' point of interconnection will be Otter Tail Power's Big Stone South 230-kilovolt substation near Big Stone City, South Dakota. Construction is anticipated to commence in late 2018, and the projects are scheduled to achieve commercial operation on or before the end of 2019.

We have provided Shapefiles and a figure to facilitate your review, and we greatly appreciate your ongoing efforts to treat the projects and their locations as confidential at this time. Please note that the area provided is larger than what ultimately will be needed to develop the projects. However, querying this area will allow NEER to accommodate micro-siting adjustments to avoid sensitive resources to the extent possible.

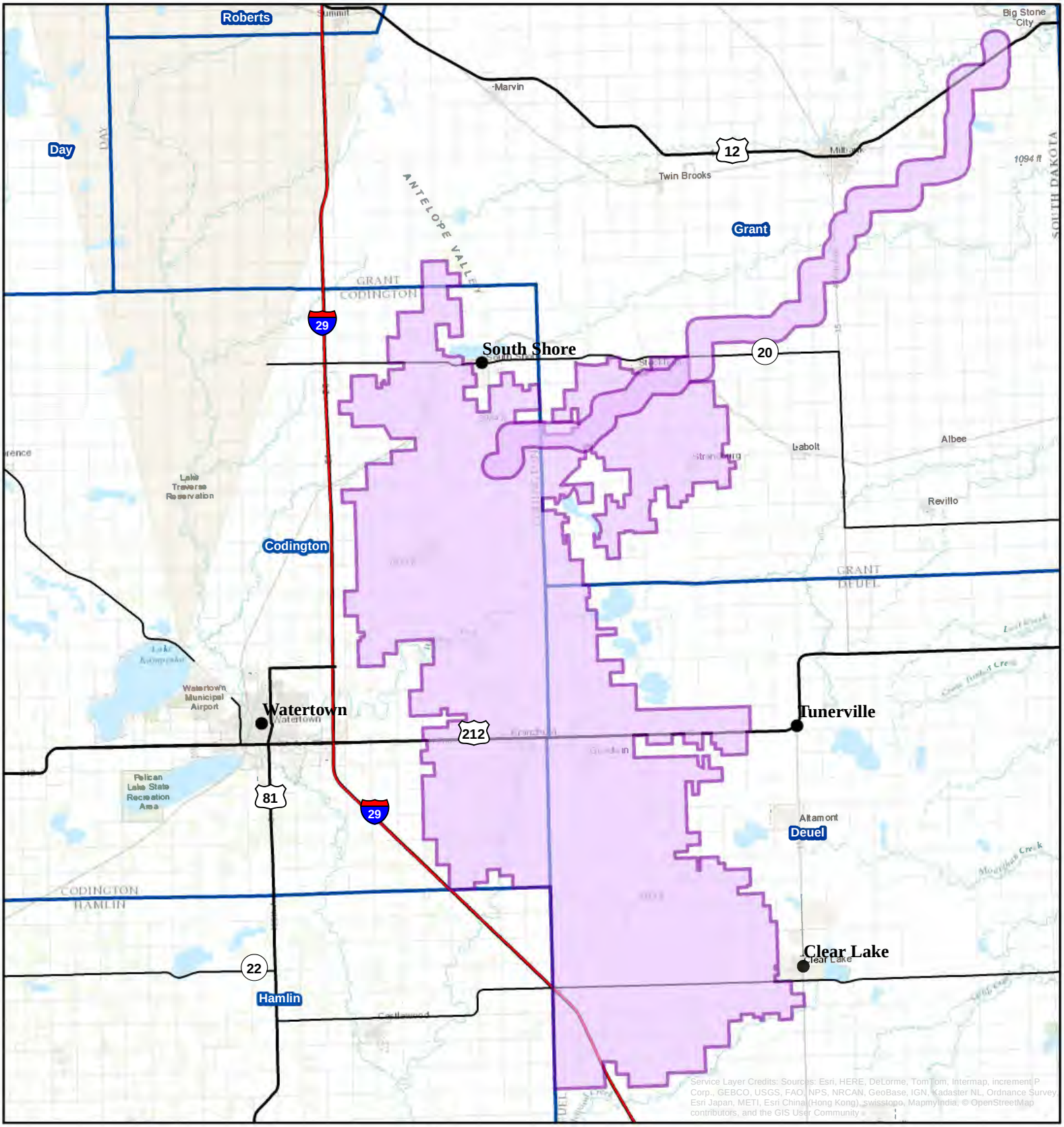
NEER has coordinated with the US Fish and Wildlife Service and South Dakota Game, Fish, and Parks (SDGFP) since 2005 regarding potential wind energy development in this general region. Recent coordination includes our April 20, 2017 conference calls with you and the SDGFP. As you are aware from this past and ongoing coordination, NEER's goal is to perform a thorough analysis of environmental resources using the best available information.

Should you have any questions or require additional information, please do not hesitate to contact me at 614.580.6715 or kmertz@swca.com. Thank you for your assistance.

Sincerely,



Kely Mertz
Senior Project Manager



Crowned Ridge I and II Wind Projects

- City
- County Boundary
- Interstate Highway
- U.S. Highway
- State Highway
- Area of Interest

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Fax: 701.258.5957

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Kilometers
0 5 10

Miles
0 5 10

Base Map: USGS 7.5' Topographic Map
Source: Esri ArcGIS Online service
Codington, Grant, and
Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

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Kely Mertz

From: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Sent: Tuesday, August 01, 2017 11:57 AM
To: Kely Mertz
Cc: Kempema, Silka
Subject: RE: Data request - Crowned Ridge projects
Attachments: SDNHD_8-1-17.zip; Invoice SDNHP-08-01-17-01.pdf; EOdatafields.pdf

Hi Kely,

Attached is a zipped shapefile of the Element Occurrence within your request area along with an invoice for your data request.

The SDNHD tracks species at risk. These species are those that are legally designated as either state or federally threatened or endangered (legally protected) or rare. Rare species are those that are declining and restricted to limited habitat, peripheral to a jurisdiction, isolated or disjunct due to geographic or climatic factors, or that are classified as such due to lack of survey data. A list of all monitored species can be found at http://gfp.sd.gov/wildlife/threatened-endangered.

I also included a description of the data fields included in the attribute table of the shapefile.

Please note that many places in South Dakota have not been surveyed for rare or protected species and the absence of any additional species from the database does not preclude its presence.

If you have any question please feel free to contact me,

~Casey

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Monday, July 31, 2017 10:03 AM
To: Heimerl, Casey
Subject: RE: [EXT] Data request - Crowned Ridge projects

Hi Casey,
Yes, we are fine with the fees.
Thank you,
Kely

From: Heimerl, Casey [mailto:Casey.Heimerl@state.sd.us]
Sent: Monday, July 31, 2017 9:32 AM
To: Kely Mertz <KMertz@swca.com>
Subject: RE: Data request - Crowned Ridge projects

Hi Kely,

Silka forwarded me your request. I can conduct a search of our Natural Heritage Database and provide you with any records of rare, threatened or endangered species within the project areas. Silka will be providing you with a review of the projects.

Before I proceed with the data search, I want to make sure you are aware of the fees associated with data requests. Fees include $30/hour of staff time required and $30 per database search. If needed, I can provide you with a cost estimate for your request.

Thanks,

~Casey

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Wednesday, July 12, 2017 10:15 AM
To: Kempema, Silka
Subject: [EXT] Data request - Crowned Ridge projects

Good morning Silka,

Attached please find a data request, and accompanying figure and shapefiles for the Crowned Ridge I and II projects.

Please let me know if you have any questions.
Thank you!
Kely

Kely Mertz
Senior Project Manager

200 W. 22nd Street, Suite 220
Lombard, IL 60148
Office 630.705.1762
Cell 614.580.6715
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EO Data Fields

FIELD	DEFINITION
EO_ID	Element Occurrence ID - Unique identifier for the EO record in the Biotics database system; used as the primary key.
EO_NUM	Element Occurrence Number - A number identifying the particular occurrence in a subnation.
SNAME	Subnational (state) recognized scientific name.
SCOMNAME	Subnational (state) recognized common name.
GNAME	Global Scientific Name - The standard global (i.e., rangewide) scientific name (genus and species) adopted for use by the NatureServe Central Databases based on selected standard taxonomic references.
GCOMNAME	Global Common Name - Species: The common name of an element adopted for use by NatureServe. Associations: A colloquial name for the association. Note: Common names have not been tracked for all plants. Names for other groups may be incomplete. Many elements have several common names, often in different languages. Spellings of common names follow no standard conventions and are not systematically edited.
NAME_CAT_1	Broad zoological, botanical or ecological category for the species to which the Scientific Name applies.
G_RANK	Global Rank - The NatureServe Conservation Status of a species from a global (i.e., rangewide) perspective, characterizing the relative rarity or imperilment of the species or community. The basic global ranks are: GX - Presumed Extinct, GH - Possibly Extinct, G1 - Critically Imperiled, G2 – Imperiled, G3 – Vulnerable, G4 - Apparently Secure, and G5 – Secure. For more detailed definitions and additional information, please see: http://www.natureserve.org/explorer/granks.htm.
S_RANK	Subnational Conservation Rank - The conservation status of a species from the subnational jurisdiction perspective, characterizing the relative rarity or imperilment of the species. Together these values provide national distribution data. The basic subnational conservation ranks are: SX - Presumed Extirpated, SH - Possibly Extirpated (Historical), S1 – Critically Imperiled, S2 – Imperiled, S3 – Vulnerable, S4 - Apparently Secure, S5 – Secure, SNR – Rank not yet assessed, SU – Unrankable, SHB – State Hybrid, SNA – Rank Not Applicable. For more detailed definitions and additional information, please see: http://www.natureserve.org/explorer/nsranks.htm.
CONFIDENCE	Confidence Extent - Indicator whether the full extent of the Element is known (i.e., has been determined through field survey) at that location and, therefore, is represented by the Element Occurrence (EO).
BASIC_EO_RANK	EO Rank Codes - Value that indicates the relative value of the Element Occurrence (EO) with respect to other occurrences of the Element, based on an assessment of estimated viability (i.e., probability of persistence) for species. In other words, EO ranks provide an assessment of the likelihood that if current conditions prevail the occurrence will persist for a defined period of time, typically 20-100 years. EO ranks may be used effectively in conjunction with NatureServe Conservation Status Ranks for the Element to guide which occurrences should be recorded and mapped, and to help prioritize EOs for purposes of conservation planning or action, both locally and rangewide. The basic EORANKs are: A – Excellent, B – Good, C – Marginal / Fair, D – Poor, E – Verified Extant, F – Failed to Find, X – Extirpated, H – Historic (possibly extirpated), U – Unrankable, NR – Not Ranked.

FIRST_OBS_DATE	First Observation Date - Date that the Element Occurrence (EO) was first reported at the site. If the EO is known from only one field report, then the date entered in this field should be the same as in the Last Observation Date field.
LAST_OBS_DATE	Last Observation Date - The date that the Element Occurrence (EO) was last observed to be extant at the site. Note that the last observation date is not necessarily the date the site was last visited (i.e., the survey date) or the date on which the occurrence was assigned an EO rank (i.e., the EO rank date). However, for E-ranked (extant) EOs, the last observation date should be the same as the date on which the occurrence was ranked.
EO_DATA	EO Data - Data collected on the biology of this EO, including the number of individuals, vigor, habitat, soils, associated species, particular characteristics, etc.
GEN_DESC	General Description - A general (capsule) description or word picture of the area where the Element Occurrence (EO) is located (i.e., the physical setting/context surrounding the EO).
DIRECTIONS	Direction to Element Occurrence
STATE_STAT	State Protection Status, i.e. ST=State Threatened, SE=State Endangered
FED_STAT	Federal Protection Status, i.e. LT=Federally Threatened, LE=Federally Endangered, C=Candidate Species

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From:	Kely Mertz
To:	"Heimerl, Casey"
Subject:	Request for nest data
Date:	Friday, April 20, 2018 9:44:00 AM
Attachments:	PROJECT_AREA_BUFFER_20180419.zip

Hi Casey,

We would like to submit an updated request (current area of interest attached) for raptor nest data. Could you please review and let me know if you have any questions?

Thank you,
Kely

From: Kely Mertz
Sent: Tuesday, April 4, 2017 10:35 AM
To: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Subject: Request for nest data (shapefiles 2 of 2)

Casey,

The attached shapefiles depict a corridor (2 of 2 project shapefiles) for which we would like to request nest data. Please let me know if you have any questions.

Thank you,
Kely

Kely Mertz
Senior Project Manager

200 W. 22nd Street, Suite 220
Lombard, IL 60148
Office 630.705.1762
Cell 614.580.6715
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From: Heimerl, Casey
To: Kely Mertz
Subject: RE: Request for nest data
Date: Tuesday, April 24, 2018 11:32:00 AM
Attachments: SDNHP-4-24-18.zip

Hi Kely,

Attached is an updated shapefile of raptor records. I will waive the fee since there are only a few additional records from last year. The data use agreement that you signed last year is also good for another year.

Please let me know if you have any questions,

~Casey

From: Kely Mertz [mailto:KMertz@swca.com]
Sent: Tuesday, April 24, 2018 9:17 AM
To: Heimerl, Casey
Subject: FW: [EXT] Request for nest data

Hi Casey,
Sorry about that, not sure what happened. Can you see if this file works?
Thank you,
Kely

From: Mike Sobiech
Sent: Tuesday, April 24, 2018 10:16 AM
To: Kely Mertz <KMertz@swca.com>
Subject: RE: Request for nest data

Interesting. This contains the shapefile.

Mike Sobiech
GIS Lead/OSR - Bismarck

From: Kely Mertz
Sent: Tuesday, April 24, 2018 9:14 AM
To: Mike Sobiech <MSobiech@swca.com>
Subject: FW: Request for nest data

Mike,
Casey says this folder is empty when she opens it?

From: Kely Mertz
Sent: Friday, April 20, 2018 9:45 AM

To: 'Heimerl, Casey' <Casey.Heimerl@state.sd.us>
Subject: Request for nest data

Hi Casey,

We would like to submit an updated request (current area of interest attached) for raptor nest data. Could you please review and let me know if you have any questions?

Thank you,
Kely

From: Kely Mertz
Sent: Tuesday, April 4, 2017 10:35 AM
To: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Subject: Request for nest data (shapefiles 2 of 2)

Casey,

The attached shapefiles depict a corridor (2 of 2 project shapefiles) for which we would like to request nest data. Please let me know if you have any questions.

Thank you,
Kely

Kely Mertz
Senior Project Manager

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April 3, 2019

Silka Kempema
South Dakota Game Fish and Parks
523 East Capitol Avenue
Pierre, SD 57501

Re: Crowned Ridge II Wind Energy Project in Codington, Deuel, and Grant Counties, South Dakota

Dear Ms. Kempema:

SWCA Environmental (SWCA) is writing on behalf of NextEra Energy Resources, LLC (NextEra), to request updated information regarding ecologically sensitive areas and federally and state listed endangered, threatened, or special concern species occurrences in reference to the proposed Crowned Ridge Wind II, LLC project in Codington, Deuel, and Grant counties, South Dakota. We have provided Shapefiles and a figure to facilitate your review.

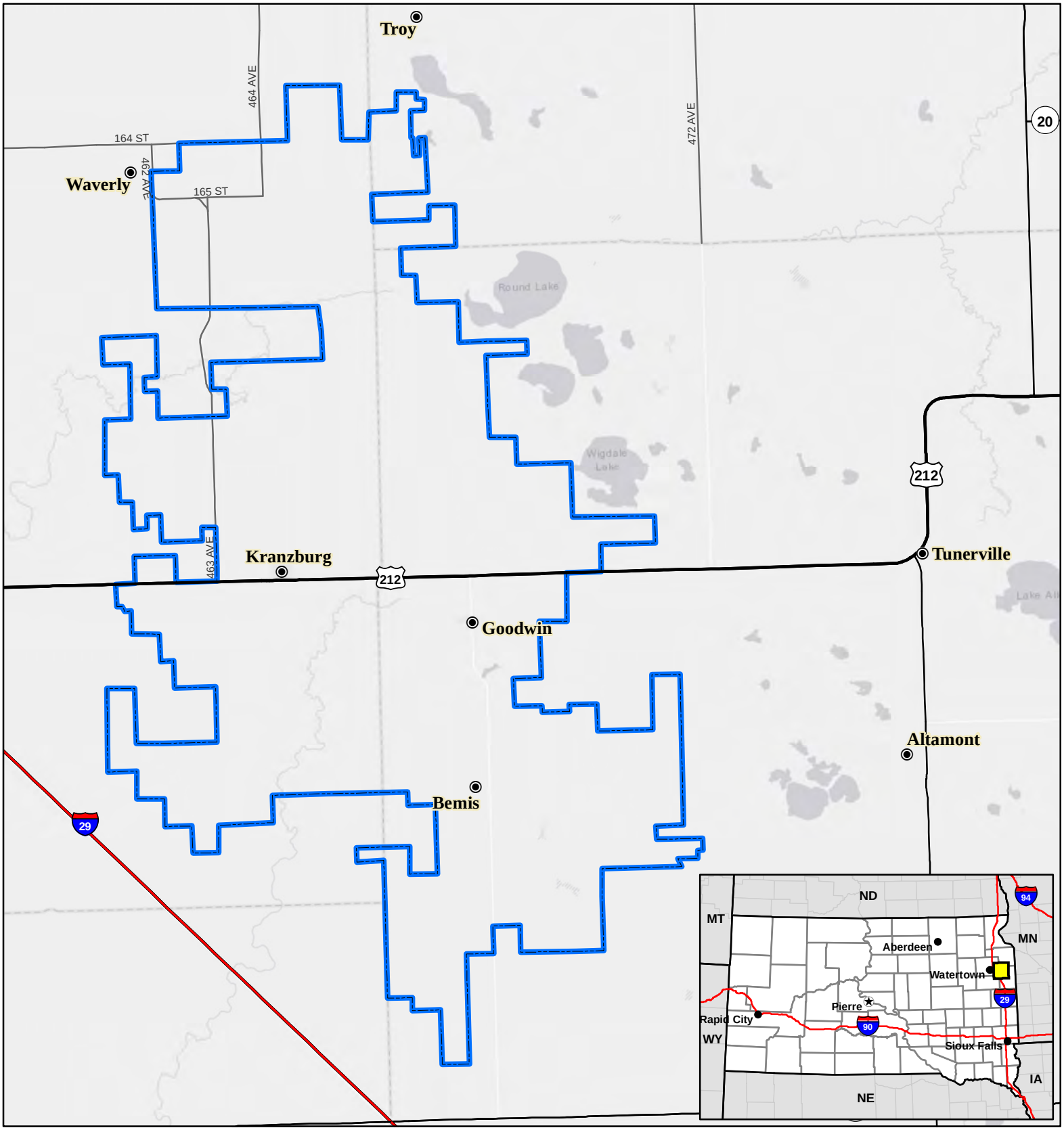
Crowned Ridge Wind II, LLC, a wholly-owned, indirect subsidiary of NextEra, plans to develop the approximately 300-megawatt project. The project includes an on-site generation tie line. Crowned Ridge Wind II, LLC, has entered into a purchase and sale agreement under which it will permit and construct the project and, thereafter, transfer the project, along with its Facility Permits, to Northern States Power at the commercial operations date.

NextEra has coordinated with the South Dakota Game, Fish, and Parks and U.S. Fish and Wildlife Service since 2005 regarding potential wind energy development in this general region. Recent coordination includes a data request letter dated July 2017, and an updated raptor nest data request dated April 2018. As you are aware from this past and ongoing coordination, NextEra's goal is to perform a thorough analysis of environmental resources using the best available information.

Should you have any questions or require additional information, please do not hesitate to contact me at 614.580.6715 or kmertz@swca.com. Thank you for your assistance.

Sincerely,

Kely Mertz
Senior Project Manager



Project Area

- City
- Project Boundary
- Interstate Highway
- U.S. Highway
- State Highway
- County Road

Kilometers
0 5 10

Miles
0 2.75 5.5

N
W E
S

Base Map: World Light Gray Canvas Base
Sources: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

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From: Heimerl, Casey
To: Becky Braeutigam
Cc: Meyer, Hilary; Kempema, Silka
Subject: RE: EXTERNAL:RE: Data request - Crowned Ridge I
Date: Friday, April 26, 2019 10:35:56 AM
Attachments: image001.png
CRI_SDNHD_4-26-19.zip
CRII_SDNHP_4-26-19.zip
CRII_AdditionalTopekaShiner_4-26-2019.zip
EOdatafields.pdf
Invoice SDNHP_4_26_19_01.pdf

Good morning Becky,

Attached are shapefiles for documented records from the SD Natural Heritage Database (SDNHD) that occurred within the Crown Ridge I and Crown Ridge II project areas. There were also additional records of Topeka Shiners (Federally Endangered) within CRII that had not yet been entered into the Heritage Database but I included these as a separate shapefile.

Also included is a description of the main fields in the attribute table and an invoice for your request.

Please note that the SDGFP does not conduct annual surveys for rare species and communities and the absence of data in your project area does not preclude its presence.

If you have any questions please feel free to contact me.

~Casey

From: Becky Braeutigam [mailto:becky.braeutigam@swca.com]
Sent: Thursday, April 25, 2019 11:00 AM
To: Heimerl, Casey
Subject: RE: [EXT] EXTERNAL:RE: Data request - Crowned Ridge I

Hi Casey-
Just within the provided shapefile would be great. Thanks for checking.
Becky

From: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Sent: Thursday, April 25, 2019 11:45 AM
To: Becky Braeutigam <becky.braeutigam@swca.com>
Subject: RE: EXTERNAL:RE: Data request - Crowned Ridge I

Thanks Becky,

Would you like me to conduct the search for record occurring within your provided shapefile, or should I extend the search any distance beyond the boundary?

~Casey

From: Becky Braeutigam [mailto:becky.braeutigam@swca.com]

Sent: Thursday, April 25, 2019 9:43 AM
To: Heimerl, Casey
Subject: RE: [EXT] EXTERNAL:RE: Data request - Crowned Ridge I

Hi Casey-
Thanks for getting back with me. The signed data use agreement is attached. We are indeed aware of the fees and the $120 estimate sounds in line with what we were anticipating. Please let me know if you need anything else to complete the request.
Thanks,
Becky

From: Heimerl, Casey <Casey.Heimerl@state.sd.us>
Sent: Thursday, April 25, 2019 9:37 AM
To: Becky Braeutigam <becky.braeutigam@swca.com>
Subject: EXTERNAL:RE: Data request - Crowned Ridge I

Good morning Becky,

My apologies for not responding sooner, somehow your email got buried in my inbox. I can conduct a search of the Natural Heritage Database for records of rare, threatened or endangered species within the project areas you provided for the Crowned Ridge I and II projects.

The SDNHD tracks species at risk. These species are those that are legally designated as either state or federally threatened or endangered (legally protected) or rare. Rare species are those that are declining and restricted to limited habitat, peripheral to a jurisdiction, isolated or disjunct due to geographic or climatic factors, or that are classified as such due to lack of survey data. A list of all monitored species can be found at https://gfp.sd.gov/natural-heritage-program/

Before I proceed, I will need you to read over and sign the attached data use agreement form. Also, I want to make sure you are aware of the fees associated with data requests. Fees include $30/hr of staff time required and $30 database search. I would estimate your cost to be around $120.00

Please let me know if you have any questions,

~Casey

Casey Heimerl | *Wildlife Biologist*
South Dakota Game, Fish and Parks
523 East Capitol Avenue | Pierre, SD 57501
605.773.4345 | Casey.Heimerl@state.sd.us

From: Kempema, Silka
Sent: Wednesday, April 03, 2019 9:59 AM
To: Kirschenmann, Tom; Meyer, Hilary; Heimerl, Casey
Subject: FW: [EXT] Data request - Crowned Ridge I

From: Becky Braeutigam [mailto:becky.braeutigam@swca.com]
Sent: Wednesday, April 03, 2019 9:03 AM
To: Kempema, Silka
Cc: Kely Mertz
Subject: [EXT] Data request - Crowned Ridge I

Good morning Silka-
Please find attached a data request and associated overview map and shapefiles for the Crowned Ridge I project in Codington and Grant counties. Please let me know if you have any questions or if you require any additional information to complete the request.
Thanks,
Becky

Becky Braeutigam
Natural Resources Project Manager

SWCA Environmental Consultants
200 W. 22nd St., Suite 220

Lombard, IL 60148
M 937.405.8256

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Dakota Ecological Services
420 South Garfield Avenue, Suite 400
Pierre, South Dakota 57501-5408
(605) 224-8693, southdakotafieldoffice@fws.gov

IN REPLY REFER TO:
CROWNED RIDGE
I AND II

July 2, 2019

Ms. Kimberly Wells
NextEra Energy Resources, LLC
601 Travis Street, Suite 1900
Houston, Texas 77002

Darren Kearney
South Dakota Public Utilities Commission
500 E. Capitol Avenue
Pierre, South Dakota 57501

Dear Ms. Wells/Mr. Kearney:

This letter is in regard to the Crowned Ridge wind energy projects (I and II); we request that the South Dakota Public Utilities Commission include this letter as part of the record of evidence for these projects. Herein we convey our primary concerns, provide associated updated recommendations, and raise additional issues related to information obtained via the South Dakota Public Utilities Commission (SDPUC) website.

We have provided several letters since at least 2007 regarding this project and participated in an April 19, 2017, conference call where we learned the Crowned Ridge project would be divided into parts I and II. Summaries of wildlife/habitat studies and results to date were conveyed over the phone during that call, but prior to that, we had relatively little information on project activities, and it was not clear how or whether environmental recommendations provided to date had been considered or applied. We accessed SDPUC's website to obtain Crowned Ridge I and II application materials, including updated project maps, and wildlife/habitat surveys and information. We request that NextEra provide any existing/future Crowned Ridge reports not already on the SDPUC website; if the projects move forward this includes information regarding post-construction studies.

Our foremost concerns with the Crowned Ridge projects are potential impacts to the Topeka shiner, the Dakota skipper, and grassland/wetland habitats and associated wildlife (direct and indirect effects).

Topeka shiner

Our concerns regarding the Topeka shiner are in relation to information within the SDPUC application materials submitted by NextEra. It appears a portion of a known occupied tributary to Willow Creek exists within the Crowned Ridge I project boundary; we are uncertain whether this waterway will be affected by the project. The Crowned Ridge II project will require four crossings of Willow Creek and Stray Horse Creek during construction; these are both known occupied Topeka shiner streams. The nature of these crossings is unknown to us. The applications for both Crowned Ridge projects state: "There is no information available to determine whether the Topeka shiner currently inhabits streams in the actual Project Area or Project Construction Easement." When actions will occur in/adjacent to waterways known to be occupied by the species, we recommend working with the assumption that Topeka shiners may be present at the sites and could be directly and/or indirectly affected by the actions. This also applies to potentially occupied waterways that are connected to the known occupied habitats (assuming water is present in both cases). We refer you to the 2018 Species Status Assessment for the Topeka shiner for maps and additional species information: https://ecos.fws.gov/ServCat/Reference/Profile/95656. Please note that instream activities in known/potential Topeka shiner occupied habitats, as well as actions conducted adjacent to these areas, have the potential to adversely affect this endangered minnow (and, depending on activities conducted, may include latent impacts when water returns to a site that was impacted when the stream was dry). Best Management Practices (BMPs) are proposed in the Crowned Ridge I and II application materials to protect water quality due to actions adjacent to the stream, but without additional information, it is not clear these BMPs are adequate to preclude the potential for adverse affects to this species. If complete avoidance is not possible, further coordination with this office may be needed to ensure the proposed action does not result in section 9 violations of the Endangered Species Act (ESA). Additionally, a permit may be required for work within these waters via the U.S. Army Corps of Engineers, and section 7 consultation with this office may then be necessary to ensure ESA compliance.

Dakota skipper/Poweshiek skipperling

Regarding the Dakota skipper/Poweshiek skipperling, BMPs were submitted with the application materials that will likely reduce the risk of impacts, but it appears potential habitats for these species may still be impacted. A single survey was conducted by consultant SWCA for Dakota skippers and Poweshiek skipperlings for each Crowned Ridge project area in 2018 following the Service's *2018 Dakota Skipper (Hesperia dacotae) North Dakota Survey Protocol*. Neither species was detected. During our review of the reports submitted for these surveys, however, we noticed several issues of concern:

- The survey reports appear to indicate that thousands of acres identified as potentially suitable habitat via desktop methods were not field verified due partly to lack of landowner access and an undefined criteria describing some areas "qualitatively assessed as occurring in small or isolated patches" among other screening factors. Note that these species are known to occur in remnant small and isolated patches. The reports lack information on the number of acres omitted from field verification due to these criteria, the specifics of the criteria (e.g. how small the omitted patches were, their distances from other suitable patches), and whether these unchecked areas will be impacted by project activities.

- Among the unknown acreages that were field verified, 1,038 acres on Crowned Ridge I and 174.5 acres on Crowned Ridge II were identified as suitable habitat for these butterflies. Of these suitable acreages, only 12% (127.5 acres) and 23% (40.4 acres) for Crowned Ridge I and II respectively were selected for flight surveys, with larger patch sizes prioritized. It is not clear how the surveyors arrived at these acreages as subsets or the adequacy of this level of effort, but it appears the majority of suitable habitat locations were not surveyed for presence of the species.

- It also appears the flight-period survey areas these butterflies at Crowned Ridge II overlapped with disturbance areas for turbine construction sites, but it is not clear whether the same is true within the Crowned Ridge I survey report. Additionally, the overlap of surveyed suitable habitat with other ground-disturbing activities (e.g. roads, underground lines, crane paths, laydown areas) is not mentioned, thus the extent to which these potential habitats will be impacted is not clear, nor quantified.

- We are not certain whether another year of surveys for these butterflies will occur at either project site (we recommend at least 2 years of surveys), but the reports describe single-year protocols (e.g. three surveys, 48 hours apart, during peak flight period), thus it appears surveys will be limited to 2018. Missing from the single-year protocols in the survey reports is whether buffers to the sites of interest were also surveyed. The protocols include surveying 250 m buffer areas to the site of interest when there are no known populations nearby and 500 m buffers when there are records within 1 km (0.6 mi). The reports do not indicate the presence/absence of observation records in/near the project areas, nor surveys of buffer areas of any size.

- There is also no mention of designated critical habitat for these species in the reports. Critical habitat unit 4 for both the Dakota skipper and Poweshiek skipperling is located approximately one mile from the Crowned Ridge I project boundary. Dakota Skipper critical habitat unit 3/Poweshiek skipperling unit 3A exists only two miles from the project boundary of Crowned Ridge II. The Crowned Ridge projects are located between these two sites. Critical habitat tracts are located close to the projects and suitable habitat is present in the project areas, thus a thorough survey effort is appropriate. Given the above-described issues it is not clear this occurred.

We encourage revision of the reports, and/or addendums to them, to address the above concerns and further explain the methods/rationale so that the risks posed to these listed butterfly species as a result of the Crowned Ridge projects may be better understood and addressed appropriately.

The application materials for these projects describe the potential for impacts to suitable habitat and the possibility these sites will be determined occupied by the species in the future. BMPs proposed for these species are likely helpful, but concerns for impacts remain if the species are present. To preclude the risk of take of these federally listed species, we recommend complete avoidance of suitable habitats which are described in the final listing rule (79 FR 63672-63748, October 24, 2014). If this is not possible, and take of these species may occur as a result of these projects, development of a Habitat Conservation Plan to achieve Endangered Species Act

compliance is available to non-federal entities. See: https://www.fws.gov/endangered/what-we-do/hcp-overview.html.

Grassland/wetland habitats and wildlife

Regarding grassland/wetland habitats at these project sites, based on our review of revised boundary maps for both Crowned Ridge projects, it appears efforts were made to avoid many of these areas by altering project boundaries; we commend efforts to focus project impacts in previously disturbed areas. However, it appears wildlife habitats are not entirely avoided and the proposed projects will still incur impacts to these sites. The Crowned Ridge I and II project areas are within the Big Sioux Basin and Prairie Coteau Ecoregions within the larger Prairie Pothole Region. The Prairie Coteau in particular, with intact grassland and wetland habitats, harbors high numbers of breeding waterfowl and other migratory birds. These habitats exist within and adjacent to the projects' boundaries. The native grasslands in this part of eastern South Dakota are composed of tallgrass prairie species. A small percentage of the original tallgrass prairie remains intact today and this habitat is considered one of North America's most endangered ecosystems. Our agency has implemented conservation programs targeting this habitat type, and have purchased easements to conserve remaining tracts, help maintain biodiversity, and slow habitat fragmentation in this area. It is a priority conservation habitat for the Service.

Our Madison and Waubay Wetland Management Districts manage the Service's grassland and wetland easements in the counties that would be impacted by the Crowned Ridge I and II projects. While we are aware that NextEra has committed to avoiding direct impacts to the Service's grassland easements, thereby avoiding the associated federal nexus, construction is still proposed on tracts of land that have Service wetland easements. On these easement tracts, the wetland basins are protected by easement restrictions, but adjacent uplands are not. While project development on these tracts will not directly impact these protected basins, indirect impacts affecting wildlife use (see below) of those wetlands will occur due to proximity of project facilities. Similarly, indirect impacts are anticipated on grassland easements if facilities are placed adjacent to these protected tracts of land. Further, facilities for both projects that will be placed on/or adjacent to wetland/grassland habitats that are not protected by easements will incur direct and indirect impacts. We continue to recommend that all project facilities be placed on previously disturbed sites (e.g. croplands) to avoid direct habitat impacts, and encourage situating facilities as far from intact wildlife habitats as possible to reduce indirect impacts.

For those direct and indirect effects that cannot be avoided, we also continue to recommend quantifying and offsetting those impacts. Proposed BMPs submitted for these projects may serve to reduce, but not preclude, impacts. As you know per our prior coordination on this and other NextEra projects, we regard several published literature sources as the best available science regarding avian avoidance of turbines. The U.S. Geological Survey research project funded by NextEra (Shaffer and Buhl 2016) revealed displacement of grassland nesting birds by turbines occurs out to at least 300 m. The Service's own research (Loesch et al. 2013) revealed displacement of breeding waterfowl pairs from wetlands within ½ mile of turbines. Additionally, an independent study of avian species in replanted grasslands (Conservation Reserve Program) (Leddy et al. 1999) also identified grassland nesting bird displacement within 180 m of turbines. Offsetting these impacts is consistent with our March 2012 U.S. Fish and

Wildlife Service Land-Based Wind Energy Guidelines (WEG), developed in coordination with wind industry.

NextEra has committed to development and implementation of habitat offset plans in relation to wind energy facilities in North Dakota; South Dakota harbors similar habitat and wildlife resources and conservation of those resources is important in this state as well. To ensure compliance with the WEG, reduce the environmental impacts of your projects, and help sustain and conserve native South Dakota wildlife species and habitats long-term, we recommend you evaluate the Crowned Ridge projects for any opportunities to further reduce impacts to habitat and wildlife. Then, quantify the remaining direct and indirect impacts to these resources and utilize the aforementioned published studies to develop/implement a plan to offset those impacts. We are willing to work with you in that regard.

Some other items of concern based on our review of NextEra's SDPUC permit application information for the Crowned Ridge projects include the following:

- Grouse Leks Although prairie grouse leks are known to exist in the vicinity of the projects, the only measure currently proposed by NextEra to reduce impacts to these leks is adjustment of the timing of construction (presumably to avoid the lekking season). While this may reduce impacts within the year of construction, it will have no bearing on operational impacts that are likely to displace grouse from leks in subsequent years. Avoiding leks by at least one mile is recommended by South Dakota Game, Fish and Parks; we submit further distance may be needed to preclude displacement.

- Line Marking A significant length (34+ miles) of overhead transmission lines will be constructed with these projects. It is not clear whether line-marking to make lines visible to birds or designs to prevent electrocutions will be applied. We refer you to our earlier letters on these topics and recommend application of the Avian Powerline Interaction Committee's (APLIC) guidelines to reduce the risk of avian mortality at these structures, including eagles (potential violations of the Bald and Golden Eagle Protection Act). Overhead lines in the vicinity of wetlands pose an increased risk to birds. We recommend marking those lines in particular, and ensuring the long-term maintenance of all marking devices and measures used to prevent electrocutions.

- Tallgrass Prairie Crowned Ridge application materials indicate use of Bauman et al. (2016), which identified areas of unbroken prairie in South Dakota. However, while the methods in that publication are described and quantity of unbroken prairie in the project areas are given, it is not clear whether these areas will be avoided – we recommend doing so. As stated above, the tallgrass prairie remaining in South Dakota is a very limited and valuable habitat.

- Bat Surveys Acoustic surveys for bats were conducted for these projects, resulting in detections of several bat species, but no northern long-eared bats. However, based on our review of the survey reports, the survey locations and level of effort appear inadequate to determine whether the northern long-eared bat may occur in the project areas. Each of the six bat species with potential to occur in the project area is associated with forested habitats, yet it appears forested habitats were not surveyed. At Crowned Ridge I, consultant SWCA identified 246 acres of suitable moderate quality habitat (based on patch size between 15-114 acres), but only two sites were surveyed, neither within the identified suitable habitat, and one was outside the project boundary. At Crowned Ridge II, 123 acres of suitable moderate quality (15-114 ac size) habitat were identified, yet only one location was surveyed, and it was not in suitable habitat. It appears all potential habitat patches were consolidated into a single acreage for each Crowned Ridge project, and the values were used to determine the number of bat survey locations. This method is not recommended to evaluate project area use by tree-roosting bat species, as it does not address the nature (small, isolated, scattered patches) of forested habitats in South Dakota and the potential occupancy of those areas by bats. As you know, the 4(d) rule for the northern long-eared bat does not prohibit mortality via collisions with wind turbines. However, if the intent of habitat evaluations and acoustic surveys is to determine the potential presence of this species, the survey methods applied for these projects appear inadequate for that purpose. We recommend targeting suitable habitats for surveys and surveying an increased number of those small, isolated, scattered patches of forest to detect a bat species that prefers trees and does not often utilize open areas.

- Eagles Raptor nest surveys revealed no eagle nests within project boundaries, but six nests were located within the 10-mile buffer surrounding these projects. One nest by the town of South Shore, while not technically within project boundaries, would ultimately be surrounded by turbines if the project area is developed as proposed. Bald eagles were observed during avian use surveys on Crowned Ridge II, but none at Crowned Ridge I. We recommend closely following the Service's *Eagle Conservation Plan Guidance* (https://www.fws.gov/migratorybirds/pdf/management/eagleconservationplanguidance.pdf) including implementation of the eagle model used to determine risk and evaluate whether an eagle take permit may be appropriate for these projects.

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

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

Sincerely,

Scott Larson
Field Supervisor
North and South Dakota Field Offices

Cc (email): Hilary Meyer, SDDGFP, Pierre, SD
Brad Johnson, USFWS, Waubay, SD
Natoma Hansen, USFWS, Madison, SD

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Crowned Ridge Wind, LLC
700 Universe Boulevard
Juno Beach, FL 33408

July 8, 2019

VIA Electronic Mail

Kristen N. Edwards
Staff Attorney
South Dakota Public Utilities Commission
500 East Capitol Avenue
Pierre, SD 57501
Phone (605)773-3201
Kristen.edwards@state.sd.us

Dear Ms. Edwards:

Thank you for forwarding the July 2, 2019 letter from the U.S. Fish and Wildlife Service (the USFWS), that was filed in Docket No. EL19-003. The purpose of this response is to elaborate on Crowned Ridge Wind, LLC's (Crowned Ridge) commitment to continued coordination with the Service, and also to address certain topics discussed by the Service in its letter.

By way of summary, this response shows the following:

- While the USFWS does not have jurisdiction over the Crowned Ridge Wind Project (Project), Crowned Ridge has voluntarily consulted with the USFWS for many years, most recently via email and telephone to discuss the issues raised in this letter on July 3, 2019;

- Crowned Ridge is committed to continue the voluntary consultation with the USFWS, including describing the commitments Crowned Ridge has made in this proceeding that address the items set forth in the letter. For example:

    - Crowned Ridge will avoid impacts to the Topeka Shiner;

    - Crowned Ridge will use seed mixes that incorporate vegetation that supports federally listed butterfly species during revegetation efforts in native prairie that occur in potentially suitable Dakota Skipper and Poweshiek Skipperling habitat;

    - Crowned Ridge will implement a Stormwater Pollution Prevention Plan (SWPPP) that addresses restoration of any disturbed areas following construction, including revegetating non-cultivated grasslands using a seed mix that is recommended by the

Natural Resource Conservation Service (NRCS), or other land management agency, unless otherwise agreed upon with the landowner in writing; and

- A 1.5 mile buffer from any known occupied bald eagle nest.

- Crowned Ridge's voluntary consultation with the Service has been interactive. For example:

  - The Service approved the biologist and the protocols used to conduct the Dakota skippers and Poweshiek Skipperling survey; and

  - The Service also indicated to Crowned Ridge that Northern Long-Eared Bat is generally located in the Black Hills region, except for periods of migration where it is unlikely to occur at the Project.

Crowned Ridge has already reached out to the USFWS, and is confident it can provide the additional information to further demonstrate Crowned Ridge's commitment to protect the environment.

By way of background, the NextEra Energy Resources, LCC ("NEER") family of companies, which includes its indirect, wholly-owned subsidiary Crowned Ridge Wind, LLC (Crowned Ridge), have a long history of coordination with USFWS on its wind projects throughout the U.S. As the record in EL19-003 demonstrates, Crowned Ridge has coordinated with the USFWS for many years on the Project. For example, Appendix B of the Application (Ex. A1-B) shows that Crowned Ridge's first coordination with the USFWS occurred in 2007 and Crowned Ridge has continued to coordinate with the USFWS throughout the development of the Project. Crowned Ridge remains committed to continuing coordination with USFWS, and reached out to discuss the letter last week, but was unable to reach USFWS personnel.

Crowned Ridge will continue, as would be the normal course of business on any NEER wind project, to voluntarily coordinate with the USFWS throughout the Project's development, construction, and operation on the Crowned Ridge Wind project. For example, in its letter the USFWS requests that Crowned Ridge provide copies of post-construction studies. Crowned Ridge commits to provide these studies to the USFWS in the spirit of voluntary coordination, as the Service has no jurisdiction over the Project. In its letter, the USFWS acknowledges that the Project has been sited to avoid federal impacts, thus there is no federal nexus and jurisdiction over the Project. Therefore, while the USFWS' citation in its letter to federal statutes and regulations may be informative for Crowned Ridge's voluntary coordination with the USFWS, these legal authorities are not controlling or applicable to the Project.

The remainder of our response addresses the specific topics discussed by the USFWS. The purpose is to provide context and demonstrate Crowned Ridge's commitment to working with the USFWS as well as state agencies on similar issues throughout the development process, and, if approved for a Facility Permit, the construction and operation of the Project.

Topeka Shiner

In its letter, the USFWS questions whether the Project will avoid impacts to the Topeka Shiner. As Crowned Ridge's Application at pages 11 and 70-71 indicate, Crowned Ridge is aware of the potential for Topeka Shiner to be found in the Project area, which includes the Willow and Stray Horse Creeks. Crowned Ridge plans to completely avoid potential impacts to the Willow and Stray Horse Creeks by boring under the streams. This avoidance measure will be included in the Wildlife Conservation Strategy that will be filed with the Commission prior to construction, and will also be communicated to the Service as a courtesy.

Dakota Skipper

In its letter, the USFWS questions whether the Project appropriately surveyed for the presence of Dakota Skipper and included an avoidance strategy. It is puzzling why the USFWS raised this concern. The Application clearly demonstrates that Crowned Ridge's surveying for the Dakota Skipper was conducted by a USFWS–approved biologist and in accordance with protocols approved by the USFWS. With respect to surveying, in Appendix C of the Application (Ex. A1-C) Crowned Ridge submitted a Dakota Skipper and Poweshiek Survey Report. The Report shows that Jake Powell of SWCA, a contractor for the Project, is a USFWS–approved biologist authorized to complete protocol-level surveys for Dakota Skippers and Poweshiek Skipperlings. Attachment A of the Dakota Skipper and Poweshiek Survey Report also describes concurrence *issued by the USFWS* that the required protocol proposed for survey use was appropriate and sufficiently based on USFWS requirements. The survey results that show no detections of either butterfly species were shared with the USFWS via email in January 2019, including a copy sent to Scott Larson of the Service. A copy of that report was also included as Appendix C of Application filed with the Commission in January 2019.

A summary of the findings regarding the absence of Dakota Skippers is set forth in Section 11.3.1.2.1 and Section 11.3.1.4.1 of the Application. These sections explain there is a small proportion of suitable habitat for Dakota Skippers within the Project area. Nonetheless, Crowned Ridge set forth an avoidance strategy to minimize any impacts to suitable habitat areas of the Dakota Skipper during the flight season in Section 11.3.2.1 and 11.3.2.5 of the Application. Further, Crowned Ridge committed to use seed mixes that incorporate vegetation that supports these prairie butterfly species during revegetation efforts in potentially suitable Dakota Skipper and Poweshiek Skipperling habitat areas. Crowned Ridge will ensure the USFWS understands we have properly surveyed and documented the lack of the presence of Dakota Skipper and our commitments to protect the Dakota Skipper, should it occur.

Tallgrass Prairie and Wetlands

In its letter, the Service asserts that not all wildlife habitats, such as grasslands and wetlands, were avoided by the Crowned Ridge Project. As the Application in Section 2.1 shows, Crowned Ridge is committed to avoiding and minimizing the impacts to grasslands and wetlands. Further, the Application sets forth an analysis of the potential presence of native prairie in Section 11.1.1 of the Application, showing approximately 47% of the Project area is grass/pasture and approximately 36% is in agriculture. The Project Construction Easement or subset of the Project area that will be potentially disturbed, is 26% in grass/pasture and 71% in agriculture that further demonstrates the Project's avoidance and

minimization efforts. Section 11.1.2 of the Application also states the permanent impact to grass/pasture is approximately 21.5 acres of the total 53,186 acre Project area or less than one tenth of one percent (< 0.004%). Further, as Crowned Ridge's Exhibit A70 shows, only 19 of the proposed 130 turbines impact native prairie as mapped by Bauman et al. 2016; and native prairie makes up approximately 17,889 acres of the Project area (Application at 50).[1] Of the 19 turbines on mapped native prairie, all 19 were sited due to minimize impacts on other environmental constraints, such as wetlands or cultural resources, or to incorporate landowner preferences not to have the turbine in land used to produce crops, or to incorporate specific turbine placement if the landowner only owned land in grasslands. Further, only 17 of the 19 turbine locations are actually located on native prairie based on field surveys that refined regional scale mapping of native prairie completed by Bauman et al. 2016 that was used in the preliminary analysis for the Project.

To minimize the impact to grasslands and native prairie, Crowned Ridge has committed to implement a Stormwater Pollution Prevention Plan that addresses restoration of any disturbed areas following construction. Crowned Ridge has also committed to address temporary impacts by revegetating non-cultivated grasslands using a seed mix that is recommended by the Natural Resource Conservation Service (NRCS), or other land management agency, unless otherwise agreed upon with the landowner in writing.

Project impacts to wetlands are described in Section 11.2.1 and avoidance and minimization measures are described in Section 11.2.2 of the Application. The Project committed to avoiding temporary and permanent impacts to wetlands and waters to the extent practical, including boring under potentially regulated features for collection lines and shifting roads for avoidance, where practical. The Project has also committed to keeping any unavoidable impacts below thresholds necessary to qualify for the conditions of the U.S. Army Corps of Engineers (USACE) Nationwide 12 permit for utility lines and associated facilities. The Project has further committed to a restoration process that will include revegetating native prairie areas with a seed mix recommended by NRCS unless otherwise agreed upon with the landowner.

USFWS Easements

The potential for Project impacts to USFWS easements are described in Section 10.2.1.1 and avoidance and minimization measures are described in Section 10.2.2 of the Application. The Project has avoided (1) all parcels with grassland or combination wetland/grassland USFWS easements on them, and (2) all protected basins within USFWS' jurisdiction. In fact, while there are turbines sited within a parcel containing a wetland easement, none of the turbines in that easement are sited on a wetland protected basin. As the USFWS specifically acknowledges in their letter, USFWS easements do not extend to the uplands on a USFWS wetland easement surrounding the protected basin and only cover the protected basin. The Project avoids all direct impacts to protected basins on USFWS wetland easements, which is documented in Section 2.1 of the Application.

[1] Bauman, P., B. Carlson, and T. Butler. 20 1 6. Quantifying Undisturbed (Native) Lands in Eastern South Dakota: 2013. Brookings: South Dakota State University Extension.

As part of its continued coordination with the USFWS, Crowned Ridge will explain the Project's impacts on native prairie and the lack of turbine impacts to protected basins, and explain the commitments Crowned Ridge made in its Application and in the stipulated conditions proposed for adoption in EL19-003.

Grouse Leks

The record in EL19-003 shows that Crowned Ridge has made more specific commitments to protect the Grouse Lek than is claimed in the USFWS letter. Crowned Ridge has made the following commitments: (1) to avoid construction activities within 2 miles of known leks during the lekking period (March 1 to June 30) (Ex. A42 at 13) and (2) to impose a 0.3 mile buffer for turbine siting from any known historic lek (Evid. Hrg. Tr. at 196). Also, Crowned Ridge used survey data of known historic leks when siting its infrastructure, and has only sited 17 of the 130 turbines on native prairie, both of which help protect grouse leks. In addition, Crowned Ridge is unaware of any empirical peer-reviewed data reviewing the effects of wind turbine development on greater prairie-chicken or sharp-tailed grouse activities at lek locations in the Upper Great Plains (including South Dakota, North Dakota, and Minnesota) supporting the hypothesis that prairie grouse exhibit avoidance or displacement behavior around turbines. The avoidance and minimization efforts of the Project were also acknowledged by Staff witness Kirschenmann of the South Dakota, Department of Game, Fish, and Parks during the evidentiary hearing. Evid. Hrg. Tr. at 500 (June 12, 2019). During Crowned Ridge's continued coordination with the USFWS, it will explain these commitments to protecting leks.

Line Marking

The USFWS letter questions whether the Project used Avian Powerline Interaction Committee's (APLIC) guidelines in the planned construction of transmission for the Project. The transmission lines were approved by Commission in EL17-050 and EL18-018, and Crowned Ridge and Crowned Ridge Wind, II, LLC, respectively agreed to design the transmission lines following APLIC suggested practices. Crowned Ridge, during its coordination with USFWS, will explain this commitment in further detail.

Northern Long-Eared Bats

In its letter, the USFWS recommends targeting suitable habitats for bat surveys and surveying an increased number of those small, isolated, scattered patches of forest to detect a bat species that prefers trees and does not often utilize open areas. Crowned Ridge's Application (in Section 11.3.2.1) acknowledges that removal and fragmentation of forested patches could impact the Northern Long-Eared Bat, if present. As explained further in Section 11.3.2.4 of the Application, Crowned Ridge minimized tree clearing to avoid impacts to potential bat habitat, if occupied. In support of appropriate implementation of avoidance and minimization measures for bats, Crowned Ridge conducted a habitat suitability assessment (Appendix F to the Application) and an acoustic survey (Appendix G to the Application).

The intent of the habitat assessment was to determine the availability and suitability of bat habitat within the study area and used that information to determine a likelihood of occurrence for listed bat

species. The definition of "suitable habitat" was specific to each species. Suitable summer habitat for northern long-eared bats, as defined by the available, peer-reviewed literature, makes up less than 1 percent of the Project area. The known distribution of Northern Long-Eared Bats in South Dakota, according to coordination with USFWS, is primarily limited to the Black Hills region in the summer and winter, though a potential migrant throughout the State. Thus, it is reasonable to conclude that the species has a low likelihood of occurrence at most within the Project area. Email correspondence from Ms. Natalie Gates of the USFWS to SWCA's biologist Drew Carson on June 6, 2018 regarding the Project is consistent with this conclusion and describes no known hibernacula of Northern Long-Eared Bats in South Dakota outside of the Black Hills, and that if the species were to occur in the Project area, it would likely be as a migrant only. Correspondence attached.

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Eagles

In Section 11.3.2.5 of its Application, Crowned Ridge committed not to site a turbine within 1.5 miles of a known occupied bald eagle nest. This buffer is comparable to the 1.6 mile buffer recommended by the USFWS in the Region 3 Midwest Wind Multi Species Habitat Conservation Plan (HCP) for Wind released in April 2016. This USFWS Plan describes expected measures for an applicant who is pursuing a voluntary HCP under Section 10 of the Endangered Species Act and although not the intention for Crowned Ridge, represents the best available science to inform turbine siting. As with all topics discussed in the July 2, 2019 Letter, Crowned Ridge will continue to coordinate with the Service on eagles.

Again, thank you for the opportunity to reiterate Crowned Ridge's strong commitments to environmental protection.

Sincerely,

/s/

Kimberly Wells, PhD
Senior Manager, Environmental Services
NextEra Energy Resources, LLC
On behalf of Crowned Ridge Wind, LLC

Attachments: Email correspondence from USFWS to SWCA

From: Gates, Natalie <natalie_gates@fws.gov>
Sent: Wednesday, June 6, 2018 3:58 PM
To: Kely Mertz <KMertz@swca.com>
Cc: Drew Carson <DCarson@swca.com>
Subject: Re: [EXTERNAL] South Dakota project area

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Natalie Gates / U.S. Fish and Wildlife Service / Ecological Services South Dakota Field Office
420 South Garfield Avenue, Suite 400 / Pierre, South Dakota 57501
Phone: 605-224-8693, Ext. 227 / Fax: 605-224-1416
http://www.fws.gov/southdakotafieldoffice/

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Hi Natalie,

Can you share whether or not either of the attached polygons are within 0.25 mile of a known northern long-eared bat hibernacula or within 150 feet of a known maternity roost tree? Please note that these polygons are not final project boundaries.

Thank you,

Kely

Kely Mertz

Senior Project Manager

SWCA Environmental Consultants

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Lombard, IL 60148

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SWCA
ENVIRONMENTAL CONSULTANTS

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From:	Wells, Kimberly
To:	Gates, Natalie
Cc:	Kely Mertz; Wells, Kimberly
Subject:	Crowned Ridge follow up
Date:	Tuesday, July 9, 2019 2:46:31 PM
Attachments:	CRI USFWS response to PUC 07082019 app.pdf

Hi Natalie,

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I will try you again today via telephone to see if we can schedule a future conversation or meeting to discuss in more detail.

Kim

Kimberly Wells, Ph.D.
Senior Manager, Environmental Services
Mid Continent Region
NEXTera Energy Resources, LLC
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713.951.5372 (office)
832.538.7935 (mobile)
Kimberly.Wells@NEE.com

** NOTE new physical mailing address

Crowned Ridge Wind, LLC
700 Universe Boulevard
Juno Beach, FL 33408

July 8, 2019

VIA Electronic Mail

Kristen N. Edwards
Staff Attorney
South Dakota Public Utilities Commission
500 East Capitol Avenue
Pierre, SD 57501
Phone (605)773-3201
Kristen.edwards@state.sd.us

Dear Ms. Edwards:

Thank you for forwarding the July 2, 2019 letter from the U.S. Fish and Wildlife Service (the USFWS), that was filed in Docket No. EL19-003. The purpose of this response is to elaborate on Crowned Ridge Wind, LLC's (Crowned Ridge) commitment to continued coordination with the Service, and also to address certain topics discussed by the Service in its letter.

By way of summary, this response shows the following:

- While the USFWS does not have jurisdiction over the Crowned Ridge Wind Project (Project), Crowned Ridge has voluntarily consulted with the USFWS for many years, most recently via email and telephone to discuss the issues raised in this letter on July 3, 2019;

- Crowned Ridge is committed to continue the voluntary consultation with the USFWS, including describing the commitments Crowned Ridge has made in this proceeding that address the items set forth in the letter. For example:

    - Crowned Ridge will avoid impacts to the Topeka Shiner;

    - Crowned Ridge will use seed mixes that incorporate vegetation that supports federally listed butterfly species during revegetation efforts in native prairie that occur in potentially suitable Dakota Skipper and Poweshiek Skipperling habitat;

    - Crowned Ridge will implement a Stormwater Pollution Prevention Plan (SWPPP) that addresses restoration of any disturbed areas following construction, including revegetating non-cultivated grasslands using a seed mix that is recommended by the

Natural Resource Conservation Service (NRCS), or other land management agency, unless otherwise agreed upon with the landowner in writing; and

- A 1.5 mile buffer from any known occupied bald eagle nest.

- Crowned Ridge's voluntary consultation with the Service has been interactive. For example:

  - The Service approved the biologist and the protocols used to conduct the Dakota skippers and Poweshiek Skipperling survey; and

  - The Service also indicated to Crowned Ridge that Northern Long-Eared Bat is generally located in the Black Hills region, except for periods of migration where it is unlikely to occur at the Project.

Crowned Ridge has already reached out to the USFWS, and is confident it can provide the additional information to further demonstrate Crowned Ridge's commitment to protect the environment.

By way of background, the NextEra Energy Resources, LCC ("NEER") family of companies, which includes its indirect, wholly-owned subsidiary Crowned Ridge Wind, LLC (Crowned Ridge), have a long history of coordination with USFWS on its wind projects throughout the U.S. As the record in EL19-003 demonstrates, Crowned Ridge has coordinated with the USFWS for many years on the Project. For example, Appendix B of the Application (Ex. A1-B) shows that Crowned Ridge's first coordination with the USFWS occurred in 2007 and Crowned Ridge has continued to coordinate with the USFWS throughout the development of the Project. Crowned Ridge remains committed to continuing coordination with USFWS, and reached out to discuss the letter last week, but was unable to reach USFWS personnel.

Crowned Ridge will continue, as would be the normal course of business on any NEER wind project, to voluntarily coordinate with the USFWS throughout the Project's development, construction, and operation on the Crowned Ridge Wind project. For example, in its letter the USFWS requests that Crowned Ridge provide copies of post-construction studies. Crowned Ridge commits to provide these studies to the USFWS in the spirit of voluntary coordination, as the Service has no jurisdiction over the Project. In its letter, the USFWS acknowledges that the Project has been sited to avoid federal impacts, thus there is no federal nexus and jurisdiction over the Project. Therefore, while the USFWS' citation in its letter to federal statutes and regulations may be informative for Crowned Ridge's voluntary coordination with the USFWS, these legal authorities are not controlling or applicable to the Project.

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Topeka Shiner

In its letter, the USFWS questions whether the Project will avoid impacts to the Topeka Shiner. As Crowned Ridge's Application at pages 11 and 70-71 indicate, Crowned Ridge is aware of the potential for Topeka Shiner to be found in the Project area, which includes the Willow and Stray Horse Creeks. Crowned Ridge plans to completely avoid potential impacts to the Willow and Stray Horse Creeks by boring under the streams. This avoidance measure will be included in the Wildlife Conservation Strategy that will be filed with the Commission prior to construction, and will also be communicated to the Service as a courtesy.

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A summary of the findings regarding the absence of Dakota Skippers is set forth in Section 11.3.1.2.1 and Section 11.3.1.4.1 of the Application. These sections explain there is a small proportion of suitable habitat for Dakota Skippers within the Project area. Nonetheless, Crowned Ridge set forth an avoidance strategy to minimize any impacts to suitable habitat areas of the Dakota Skipper during the flight season in Section 11.3.2.1 and 11.3.2.5 of the Application. Further, Crowned Ridge committed to use seed mixes that incorporate vegetation that supports these prairie butterfly species during revegetation efforts in potentially suitable Dakota Skipper and Poweshiek Skipperling habitat areas. Crowned Ridge will ensure the USFWS understands we have properly surveyed and documented the lack of the presence of Dakota Skipper and our commitments to protect the Dakota Skipper, should it occur.

Tallgrass Prairie and Wetlands

In its letter, the Service asserts that not all wildlife habitats, such as grasslands and wetlands, were avoided by the Crowned Ridge Project. As the Application in Section 2.1 shows, Crowned Ridge is committed to avoiding and minimizing the impacts to grasslands and wetlands. Further, the Application sets forth an analysis of the potential presence of native prairie in Section 11.1.1 of the Application, showing approximately 47% of the Project area is grass/pasture and approximately 36% is in agriculture. The Project Construction Easement or subset of the Project area that will be potentially disturbed, is 26% in grass/pasture and 71% in agriculture that further demonstrates the Project's avoidance and

minimization efforts. Section 11.1.2 of the Application also states the permanent impact to grass/pasture is approximately 21.5 acres of the total 53,186 acre Project area or less than one tenth of one percent (< 0.004%). Further, as Crowned Ridge's Exhibit A70 shows, only 19 of the proposed 130 turbines impact native prairie as mapped by Bauman et al. 2016; and native prairie makes up approximately 17,889 acres of the Project area (Application at 50).[1] Of the 19 turbines on mapped native prairie, all 19 were sited due to minimize impacts on other environmental constraints, such as wetlands or cultural resources, or to incorporate landowner preferences not to have the turbine in land used to produce crops, or to incorporate specific turbine placement if the landowner only owned land in grasslands. Further, only 17 of the 19 turbine locations are actually located on native prairie based on field surveys that refined regional scale mapping of native prairie completed by Bauman et al. 2016 that was used in the preliminary analysis for the Project.

To minimize the impact to grasslands and native prairie, Crowned Ridge has committed to implement a Stormwater Pollution Prevention Plan that addresses restoration of any disturbed areas following construction. Crowned Ridge has also committed to address temporary impacts by revegetating non-cultivated grasslands using a seed mix that is recommended by the Natural Resource Conservation Service (NRCS), or other land management agency, unless otherwise agreed upon with the landowner in writing.

Project impacts to wetlands are described in Section 11.2.1 and avoidance and minimization measures are described in Section 11.2.2 of the Application. The Project committed to avoiding temporary and permanent impacts to wetlands and waters to the extent practical, including boring under potentially regulated features for collection lines and shifting roads for avoidance, where practical. The Project has also committed to keeping any unavoidable impacts below thresholds necessary to qualify for the conditions of the U.S. Army Corps of Engineers (USACE) Nationwide 12 permit for utility lines and associated facilities. The Project has further committed to a restoration process that will include revegetating native prairie areas with a seed mix recommended by NRCS unless otherwise agreed upon with the landowner.

USFWS Easements

The potential for Project impacts to USFWS easements are described in Section 10.2.1.1 and avoidance and minimization measures are described in Section 10.2.2 of the Application. The Project has avoided (1) all parcels with grassland or combination wetland/grassland USFWS easements on them, and (2) all protected basins within USFWS' jurisdiction. In fact, while there are turbines sited within a parcel containing a wetland easement, none of the turbines in that easement are sited on a wetland protected basin. As the USFWS specifically acknowledges in their letter, USFWS easements do not extend to the uplands on a USFWS wetland easement surrounding the protected basin and only cover the protected basin. The Project avoids all direct impacts to protected basins on USFWS wetland easements, which is documented in Section 2.1 of the Application.

[1] Bauman, P., B. Carlson, and T. Butler. 20 1 6. Quantifying Undisturbed (Native) Lands in Eastern South Dakota: 2013. Brookings: South Dakota State University Extension.

As part of its continued coordination with the USFWS, Crowned Ridge will explain the Project's impacts on native prairie and the lack of turbine impacts to protected basins, and explain the commitments Crowned Ridge made in its Application and in the stipulated conditions proposed for adoption in EL19-003.

Grouse Leks

The record in EL19-003 shows that Crowned Ridge has made more specific commitments to protect the Grouse Lek than is claimed in the USFWS letter. Crowned Ridge has made the following commitments: (1) to avoid construction activities within 2 miles of known leks during the lekking period (March 1 to June 30) (Ex. A42 at 13) and (2) to impose a 0.3 mile buffer for turbine siting from any known historic lek (Evid. Hrg. Tr. at 196). Also, Crowned Ridge used survey data of known historic leks when siting its infrastructure, and has only sited 17 of the 130 turbines on native prairie, both of which help protect grouse leks. In addition, Crowned Ridge is unaware of any empirical peer-reviewed data reviewing the effects of wind turbine development on greater prairie-chicken or sharp-tailed grouse activities at lek locations in the Upper Great Plains (including South Dakota, North Dakota, and Minnesota) supporting the hypothesis that prairie grouse exhibit avoidance or displacement behavior around turbines. The avoidance and minimization efforts of the Project were also acknowledged by Staff witness Kirschenmann of the South Dakota, Department of Game, Fish, and Parks during the evidentiary hearing. Evid. Hrg. Tr. at 500 (June 12, 2019). During Crowned Ridge's continued coordination with the USFWS, it will explain these commitments to protecting leks.

Line Marking

The USFWS letter questions whether the Project used Avian Powerline Interaction Committee's (APLIC) guidelines in the planned construction of transmission for the Project. The transmission lines were approved by Commission in EL17-050 and EL18-018, and Crowned Ridge and Crowned Ridge Wind, II, LLC, respectively agreed to design the transmission lines following APLIC suggested practices. Crowned Ridge, during its coordination with USFWS, will explain this commitment in further detail.

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Sincerely,

/s/

Kimberly Wells, PhD
Senior Manager, Environmental Services
NextEra Energy Resources, LLC
On behalf of Crowned Ridge Wind, LLC

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Wells, Kimberly

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Sent: Wednesday, June 6, 2018 3:58 PM
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Cc: Drew Carson <DCarson@swca.com>
Subject: Re: [EXTERNAL] South Dakota project area

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> Senior Project Manager

SWCA Environmental Consultants

200 W. 22nd Street, Suite 220

Lombard, IL 60148

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From:	Wells, Kimberly
To:	Larson, Scott
Cc:	Gates, Natalie; Kely Mertz
Subject:	FW: Crowned Ridge follow up
Date:	Tuesday, July 9, 2019 3:05:27 PM
Attachments:	CRI USFWS response to PUC 07082019 app.pdf

Hi Scott,

I see Natalie is out this week, so forwarding the email below and attachment to you while she is out to make sure you receive. Should we work with you to set up our next conversation?

Kim

Kimberly Wells, Ph.D.
Senior Manager, Environmental Services
Mid Continent Region
NEXTera Energy Resources, LLC
708 Main Street, 10th Floor (mail c/o WeWork)
Houston, TX 77002
713.951.5372 (office)
832.538.7935 (mobile)
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** NOTE new physical mailing address

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Sent: Tuesday, July 09, 2019 1:46 PM
To: Gates, Natalie
Cc: Kely Mertz; Wells, Kimberly
Subject: Crowned Ridge follow up

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** NOTE new physical mailing address

Crowned Ridge Wind, LLC
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Juno Beach, FL 33408

July 8, 2019

VIA Electronic Mail

Kristen N. Edwards
Staff Attorney
South Dakota Public Utilities Commission
500 East Capitol Avenue
Pierre, SD 57501
Phone (605)773-3201
Kristen.edwards@state.sd.us

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Tallgrass Prairie and Wetlands

In its letter, the Service asserts that not all wildlife habitats, such as grasslands and wetlands, were avoided by the Crowned Ridge Project. As the Application in Section 2.1 shows, Crowned Ridge is committed to avoiding and minimizing the impacts to grasslands and wetlands. Further, the Application sets forth an analysis of the potential presence of native prairie in Section 11.1.1 of the Application, showing approximately 47% of the Project area is grass/pasture and approximately 36% is in agriculture. The Project Construction Easement or subset of the Project area that will be potentially disturbed, is 26% in grass/pasture and 71% in agriculture that further demonstrates the Project's avoidance and

minimization efforts. Section 11.1.2 of the Application also states the permanent impact to grass/pasture is approximately 21.5 acres of the total 53,186 acre Project area or less than one tenth of one percent (< 0.004%). Further, as Crowned Ridge's Exhibit A70 shows, only 19 of the proposed 130 turbines impact native prairie as mapped by Bauman et al. 2016; and native prairie makes up approximately 17,889 acres of the Project area (Application at 50).[1] Of the 19 turbines on mapped native prairie, all 19 were sited due to minimize impacts on other environmental constraints, such as wetlands or cultural resources, or to incorporate landowner preferences not to have the turbine in land used to produce crops, or to incorporate specific turbine placement if the landowner only owned land in grasslands. Further, only 17 of the 19 turbine locations are actually located on native prairie based on field surveys that refined regional scale mapping of native prairie completed by Bauman et al. 2016 that was used in the preliminary analysis for the Project.

To minimize the impact to grasslands and native prairie, Crowned Ridge has committed to implement a Stormwater Pollution Prevention Plan that addresses restoration of any disturbed areas following construction. Crowned Ridge has also committed to address temporary impacts by revegetating non-cultivated grasslands using a seed mix that is recommended by the Natural Resource Conservation Service (NRCS), or other land management agency, unless otherwise agreed upon with the landowner in writing.

Project impacts to wetlands are described in Section 11.2.1 and avoidance and minimization measures are described in Section 11.2.2 of the Application. The Project committed to avoiding temporary and permanent impacts to wetlands and waters to the extent practical, including boring under potentially regulated features for collection lines and shifting roads for avoidance, where practical. The Project has also committed to keeping any unavoidable impacts below thresholds necessary to qualify for the conditions of the U.S. Army Corps of Engineers (USACE) Nationwide 12 permit for utility lines and associated facilities. The Project has further committed to a restoration process that will include revegetating native prairie areas with a seed mix recommended by NRCS unless otherwise agreed upon with the landowner.

USFWS Easements

The potential for Project impacts to USFWS easements are described in Section 10.2.1.1 and avoidance and minimization measures are described in Section 10.2.2 of the Application. The Project has avoided (1) all parcels with grassland or combination wetland/grassland USFWS easements on them, and (2) all protected basins within USFWS' jurisdiction. In fact, while there are turbines sited within a parcel containing a wetland easement, none of the turbines in that easement are sited on a wetland protected basin. As the USFWS specifically acknowledges in their letter, USFWS easements do not extend to the uplands on a USFWS wetland easement surrounding the protected basin and only cover the protected basin. The Project avoids all direct impacts to protected basins on USFWS wetland easements, which is documented in Section 2.1 of the Application.

[1] Bauman, P., B. Carlson, and T. Butler. 20 1 6. Quantifying Undisturbed (Native) Lands in Eastern South Dakota: 2013. Brookings: South Dakota State University Extension.

As part of its continued coordination with the USFWS, Crowned Ridge will explain the Project's impacts on native prairie and the lack of turbine impacts to protected basins, and explain the commitments Crowned Ridge made in its Application and in the stipulated conditions proposed for adoption in EL19-003.

Grouse Leks

The record in EL19-003 shows that Crowned Ridge has made more specific commitments to protect the Grouse Lek than is claimed in the USFWS letter. Crowned Ridge has made the following commitments: (1) to avoid construction activities within 2 miles of known leks during the lekking period (March 1 to June 30) (Ex. A42 at 13) and (2) to impose a 0.3 mile buffer for turbine siting from any known historic lek (Evid. Hrg. Tr. at 196). Also, Crowned Ridge used survey data of known historic leks when siting its infrastructure, and has only sited 17 of the 130 turbines on native prairie, both of which help protect grouse leks. In addition, Crowned Ridge is unaware of any empirical peer-reviewed data reviewing the effects of wind turbine development on greater prairie-chicken or sharp-tailed grouse activities at lek locations in the Upper Great Plains (including South Dakota, North Dakota, and Minnesota) supporting the hypothesis that prairie grouse exhibit avoidance or displacement behavior around turbines. The avoidance and minimization efforts of the Project were also acknowledged by Staff witness Kirschenmann of the South Dakota, Department of Game, Fish, and Parks during the evidentiary hearing. Evid. Hrg. Tr. at 500 (June 12, 2019). During Crowned Ridge's continued coordination with the USFWS, it will explain these commitments to protecting leks.

Line Marking

The USFWS letter questions whether the Project used Avian Powerline Interaction Committee's (APLIC) guidelines in the planned construction of transmission for the Project. The transmission lines were approved by Commission in EL17-050 and EL18-018, and Crowned Ridge and Crowned Ridge Wind, II, LLC, respectively agreed to design the transmission lines following APLIC suggested practices. Crowned Ridge, during its coordination with USFWS, will explain this commitment in further detail.

Northern Long-Eared Bats

In its letter, the USFWS recommends targeting suitable habitats for bat surveys and surveying an increased number of those small, isolated, scattered patches of forest to detect a bat species that prefers trees and does not often utilize open areas. Crowned Ridge's Application (in Section 11.3.2.1) acknowledges that removal and fragmentation of forested patches could impact the Northern Long-Eared Bat, if present. As explained further in Section 11.3.2.4 of the Application, Crowned Ridge minimized tree clearing to avoid impacts to potential bat habitat, if occupied. In support of appropriate implementation of avoidance and minimization measures for bats, Crowned Ridge conducted a habitat suitability assessment (Appendix F to the Application) and an acoustic survey (Appendix G to the Application).

The intent of the habitat assessment was to determine the availability and suitability of bat habitat within the study area and used that information to determine a likelihood of occurrence for listed bat

species. The definition of "suitable habitat" was specific to each species. Suitable summer habitat for northern long-eared bats, as defined by the available, peer-reviewed literature, makes up less than 1 percent of the Project area. The known distribution of Northern Long-Eared Bats in South Dakota, according to coordination with USFWS, is primarily limited to the Black Hills region in the summer and winter, though a potential migrant throughout the State. Thus, it is reasonable to conclude that the species has a low likelihood of occurrence at most within the Project area. Email correspondence from Ms. Natalie Gates of the USFWS to SWCA's biologist Drew Carson on June 6, 2018 regarding the Project is consistent with this conclusion and describes no known hibernacula of Northern Long-Eared Bats in South Dakota outside of the Black Hills, and that if the species were to occur in the Project area, it would likely be as a migrant only. Correspondence attached.

The intent of the acoustic surveys was to assess relative bat activity in habitat where construction of turbines is likely (i.e., open agricultural land) and determine if the activity is similar to that at operational wind energy facilities in the same region. This survey showed that a reasonable conclusion is that relative activity in habitat where turbines are planned for construction is lower than that at operational wind energy facilities in the region. Crowned Ridge will explain the results of these surveys and its avoidance and minimization measures to address potential Northern Long-Eared Bat habitat during its continued coordination with the Service.

Eagles

In Section 11.3.2.5 of its Application, Crowned Ridge committed not to site a turbine within 1.5 miles of a known occupied bald eagle nest. This buffer is comparable to the 1.6 mile buffer recommended by the USFWS in the Region 3 Midwest Wind Multi Species Habitat Conservation Plan (HCP) for Wind released in April 2016. This USFWS Plan describes expected measures for an applicant who is pursuing a voluntary HCP under Section 10 of the Endangered Species Act and although not the intention for Crowned Ridge, represents the best available science to inform turbine siting. As with all topics discussed in the July 2, 2019 Letter, Crowned Ridge will continue to coordinate with the Service on eagles.

Again, thank you for the opportunity to reiterate Crowned Ridge's strong commitments to environmental protection.

Sincerely,

/s/

Kimberly Wells, PhD
Senior Manager, Environmental Services
NextEra Energy Resources, LLC
On behalf of Crowned Ridge Wind, LLC

Attachments: Email correspondence from USFWS to SWCA

Wells, Kimberly

From: Gates, Natalie <natalie_gates@fws.gov>
Sent: Wednesday, June 6, 2018 3:58 PM
To: Kely Mertz <KMertz@swca.com>
Cc: Drew Carson <DCarson@swca.com>
Subject: Re: [EXTERNAL] South Dakota project area

At this time, the only known NLEB hibernacula in South Dakota are in the Black Hills, and I'm not aware of any maternity roosts in the state (though there almost certainly are some in the Hills and could be others so far undetected).

So while the bat could occur in the area, its more likely to be migrant rather than breeding or hibernating.

Natalie Gates / U.S. Fish and Wildlife Service / Ecological Services South Dakota Field Office
420 South Garfield Avenue, Suite 400 / Pierre, South Dakota 57501
Phone: 605-224-8693, Ext. 227 / Fax: 605-224-1416
http://www.fws.gov/southdakotafieldoffice/

On Wed, Jun 6, 2018 at 12:54 PM, Kely Mertz <KMertz@swca.com> wrote:

> Hi Natalie,
>
> Can you share whether or not either of the attached polygons are within 0.25 mile of a known northern long-eared bat hibernacula or within 150 feet of a known maternity roost tree? Please note that these polygons are not final project boundaries.
>
> Thank you,
>
> Kely
>
> **Kely Mertz**
>
> Senior Project Manager

SWCA Environmental Consultants

200 W. 22nd Street, Suite 220

Lombard, IL 60148

M 614.580.6715 | O 630.705.1762

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south dakota
STATE HISTORICAL SOCIETY
DEPARTMENT OF EDUCATION

August 6, 2019

Mr. Scott Phillips
SWCA Environmental Consultants
295 Interlocken Blvd. Suite 300
Broomfield, CO 80021

RE: SDCL 1-19A-11.1 Consultation
Project: 150904001S – Crowned Ridge II - Archaeological and Traditional Cultural Property Inventory, Crowned Ridge II Wind Turbine Array
Location: Multiple Counties
(PUC)

Dear Mr. Phillips:

Thank you for the opportunity to comment on the above referenced project pursuant to South Dakota Codified Law (SDCL) 1-19A-11.1. The South Dakota Office of the State Historic Preservation Officer (SHPO) would like to provide the following comments concerning the effect of the proposed project on the non-renewable cultural resources of South Dakota.

On July 26, 2019, we received your letter dated July 23, 2019, and the report entitled "Level III Intensive Archaeological and Traditional Cultural Property Resources Inventory for the Crowned Ridge II Wind Turbine Array, Codington, Deuel and Grant Counties, South Dakota," prepared by the Sisseton Wahpeton Oyate Tribal Historic Preservation Office (THPO), Spirit Lake THPO, Yankton Sioux THPO, HDR, Inc. and SWCA Environmental Consultants.

Based on the information provided in the report, we agree with the following determinations of eligibility.

- Seven newly identified properties 39CD0177: 421-09, 39CD0178: 453-01, 39DE0132: II-034-S8, 39DE0133: 649-02, 39DE0135: II-127-S2, 39DE0136: AR491-01 and two sections of the Chicago, Rock Island and Pacific Railroad, (39DE3016: CRIIF-RR-01 and 39DE2016: SA152-01) should be considered **not eligible/ non-contributing** for listing to National Register of Historic Places.

- One newly recorded segment of the Chicago, Rock Island and Pacific Railroad, (39DE3016: II-116-S1, should be considered **contributing** to the overall eligibility of the railroad property.

- A total of 141 properties were identified, recorded and evaluated as Traditional Cultural Properties (TCPs) by the THPOs. The following properties should be considered **eligible** for listing in the National Register of Historic Places for Criterion A:

TCP-CD-0318: 400-03	TCP-CD-0367: 682-04	TCP-DE-0016:593-02
TCP-CD-0319: 400-07	TCP-CD-0368: 682-03	TCP-DE-0017: II-044-S3
TCP-CD-0320: 400-04	TCP-CD-0369: 682-05	TCP-DE-0018:II-048-S4
TCP-CD-0321: 400-05	TCP-CD-0370: 652-03	TCP-DE-0019:II-048-S2
TCP-CD-0322: II-ALT1-S1	TCP-CD-0371: 652-05	TCP-DE-0020:II-048-S1
TCP-CD-0318: II-ALT1-S2	TCP-CD-0372: 652-01	TCP-DE-0021:649-01
TCP-CD-0324: 427-01	TCP-CD-0373: 652-02	TCP-DE-0022:445-05
TCP-CD-0325: 427-02	TCP-CD-0374: 652-07	TCP-DE-0023:445-04
TCP-CD-0326: 427-03	TCP-CD-0375: 652-06	TCP-DE-0024:445-02
TCP-CD-0327: 529-03	TCP-CD-0376: 689-01	TCP-DE-0025:605-08
TCP-CD-0328: 529-01	TCP-CD-0377: 689-02	TCP-DE-0026:665-01
TCP-CD-0329: 529-04	TCP-CD-0378: 453-03	TCP-DE-0027:605-07
TCP-CD-0330: 529-05	TCP-CD-0379: 453-07	TCP-DE-0028:605-06
TCP-CD-0331: 529-06	TCP-CD-0380: 453-02	TCP-DE-0029:605-05
TCP-CD-0332: 424-01	TCP-CD-0381: 453-14	TCP-DE-0030:605-04
TCP-CD-0333: 424-02	TCP-CD-0382: 453-12	TCP-DE-0031:605-03
TCP-CD-0334: II-030-S1	TCP-CD-0383: 453-04	TCP-DE-0032:605-02
TCP-CD-0335: II-030-S2	TCP-CD-0384: 453-08	TCP-DE-0033:605-01
TCP-CD-0336: II-033-S5	TCP-CD-0385: 453-09	TCP-DE-0034:II-113-S13
TCP-CD-0337: II-033-S3	TCP-CD-0386: 453-05	TCP-DE-0035:571-02
TCP-CD-0338: II-033-S4	TCP-CD-0387: 453-10	TCP-DE-0036:II-113-S12
TCP-CD-0339: 685-01	TCP-CD-0388: 453-06	TCP-DE-0037:II-113-S6
TCP-CD-0340: II-033-S2	TCP-CD-0389: 450-01	TCP-DE-0038:571-01
TCP-CD-0341: II-033-S1	TCP-CD-0407: 791-01	TCP-DE-0039:II-113-S8
TCP-CD-0342: II-033-S6	TCP-CD-0408: 663-16	TCP-DE-0040:II-113-S10
TCP-CD-0343: 685-02	TCP-CD-0409: 529-02	TCP-DE-0041:II-113-S14
TCP-CD-0344: 685-03	TCP-CD-0410: 682-02	TCP-DE-0042:II-113-S3
TCP-CD-0345: 685-04	TCP-CD-0411: 650-03	TCP-DE-0043: II-113-S2
TCP-CD-0346: 685-06	TCP-CD-0412: 650-02	TCP-DE-0044: II-113-S1
TCP-CD-0347: 685-05	TCP-CD-0413: CLII265-01	TCP-DE-0045:611-02
TCP-CD-0348: 421-08	TCP-CD-0414: 453-15	TCP-DE-0046: II-117-S1
TCP-CD-0349: 421-03	TCP-DE-0001:II-034-S10	TCP-DE-0047:567-01
TCP-CD-0350: 421-07	TCP-DE-0002: II-034-S7	TCP-DE-0048:567-02
TCP-CD-0351: 421-02	TCP-DE-0003: II-034-S11	TCP-DE-0049:II-117-S2
TCP-CD-0352: 421-05	TCP-DE-0004: II-034-S9	TCP-DE-0050:II-127-S1
TCP-CD-0353: 421-04	TCP-DE-0005: II-034-S6	TCP-DE-0051:642-02
TCP-CD-0354: 421-06	TCP-DE-0006: II-034-S1	TCP-DE-0052:691-02
TCP-CD-0355: 421-01	TCP-DE-0007: II-034-S5	TCP-DE-0053:691-01
TCP-CD-0357: 643-01	TCP-DE-0008: II-034-S4	TCP-DE-0054:AR491-04
TCP-CD-0358: II-041-S3	TCP-DE-0009: 671-06	TCP-DE-0055:AR491-05
TCP-CD-0359: 643-04	TCP-DE-0010: 671-05	TCP-DE-0056:695-01
TCP-CD-0360: II-041-S1	TCP-DE-0011: 671-04	TCP-DE-00059:AR495-02
TCP-CD-0361: 643-03	TCP-DE-0012: 671-02	TCP-DE-0069:709-01
TCP-CD-0362: 643-05	TCP-CD-0370: 652-03	TCP-DE-0070:642-01

TCP-CD-0363: II-041-S4	TCP-CD-0371: 652-05	TCP-DE-0356:II-041-S2
TCP-CD-0364: II-041-S6	TCP-DE-0013: 671-03	TCP-DE-0390:II-042-S2
TCP-CD-0365: II-042-S1	TCP-DE-0014: 671-01	TCP-DE-0016:593-02
TCP-CD-0366: 682-01	TCP-DE-0015:593-01	TCP-DE-0017: II-044-S3

According to the report, the THPO's have determined that the proposed project will alter characteristics that make the TCPs eligible for listing in the National Register of Historic Places in a way that will diminish the integrity of setting and feeling. NextEra Energy Resources, LLC, working in coordination with the THPOs, including the Rosebud THPO, have developed the document entitled "Historic Property Monitoring and Discovery Plan for Crowned Ridge Wind and Crowned Ridge II Projects, Deuel, Grant and Codington Counties." The document outlines avoidance, minimization and mitigation measures. We recommend implementing these measures for all eligible and unevaluated properties located in the project area.

Given the above, we have determined that the proposed project will not encroach upon, damage or destroy any archaeological property or Traditional Cultural Property that is listed in the State or National Register of Historic Places or the environs of such property pursuant to SDCL 1-19A-11.1.

We appreciate the efforts made by all parties to consider the effects of the project on the non-renewable cultural resources of South Dakota. If you have any questions or concerns, please contact Paige Olson at Paige.Olson@state.sd.us or (605) 773-6004.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

P Olson

Paige Olson
Review and Compliance Coordinator

Cc: Jane Watts and Renee Boen, Archaeological Research Center
Dianne Desrosiers, Sisseton Wahpeton Oyate Tribal Historic Preservation Officer
Erich Longie, Spirit Lake Tribal Historic Preservation Office
Kip Spotted Eagle, Yankton Sioux Tribe - Tribal Historic Preservation Office
Ben Rhodd, Rosebud Sioux Tribal Historic Preservation Office

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STATE HISTORICAL SOCIETY
DEPARTMENT OF EDUCATION

August 19, 2019

Mr. Scott Phillips
SWCA Environmental Consultants
295 Interlocken Blvd. Suite 300
Broomfield, CO 80021

RE: SDCL 1-19A-11.1 Consultation
Project: 150904001S – Crowned Ridge Wind II Turbine Array – Architectural Resources Assessment
Location: Multiple Counties
(PUC)

Dear Mr. Phillips:

Thank you for the opportunity to comment on the above referenced project pursuant to South Dakota Codified Law (SDCL) 1-19A-11.1. The South Dakota Office of the State Historic Preservation Officer (SHPO) would like to provide the following comments concerning the effect of the proposed project on the non-renewable cultural resources of South Dakota.

On July 25, 2019, we received your letter dated July 23, 2019, and the report entitled "Historic Architectural Resources Assessment for the Crowned Ridge Wind II Turbine Array, Codington, Deuel, And Grant Counties, South Dakota," prepared by SWCA Environmental Consultants.

Based on the information provided, there are four National Register of Historic Places (NRHP)-listed or NRHP-eligible architectural properties within one mile of a proposed turbine, as noted below:

- CD00000157, Nicholas T. Ries Farmstead. This property is listed in the NRHP.
- Object ID 6107 and 6107a, Frank Hupf Farmstead, barn and stable. SWCA recommends that these two properties are NRHP-eligible. SHPO concurs with this assessment.
- DE00000098, School House District #67. This building was previously determined eligible for NRHP listing.

Given that these properties are significant for their architecture and/or their contributions to the development of the area, the proposed wind turbines will not alter the characteristics which make these properties eligible for listing in the National Register of Historic Places. Therefore, the SHPO has determined that the proposed project will not encroach upon, damage or destroy any architectural

property that is listed in the State or National Register of Historic Places or the environs of such property pursuant to SDCL 1-19A-11.1.

If you have any questions or concerns, please contact Kate Nelson at Kate.Nelson@state.sd.us or (605) 773-6005.

Sincerely,

Jay D. Vogt
State Historic Preservation Officer

Kate Nelson

Kate Nelson
Restoration Specialist

Cc: Jane Watts and Renee Boen, Archaeological Research Center
Dianne Desrosiers, Sisseton Wahpeton Oyate Tribal Historic Preservation Officer
Erich Longie, Spirit Lake Tribal Historic Preservation Office
Kip Spotted Eagle, Yankton Sioux Tribe - Tribal Historic Preservation Office
Ben Rhodd, Rosebud Sioux Tribal Historic Preservation Office

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From:	Wells, Kimberly
To:	Gates, Natalie; hilary.meyer (hilary.meyer@state.sd.us)
Cc:	Kely Mertz; Sarah Sappington; Wilhelm, Tyler; Wells, Kimberly
Subject:	Crowned Ridge I minutes and WCS link
Date:	Thursday, September 12, 2019 2:48:35 PM
Attachments:	CRI minutes 2019Sept04.pdf

Natalie/Hilary,

Here are revised discussion minutes from our last Crowned Ridge I Wind call that reflect comments we received from you both. We noted that some of the comments extended beyond the scope of what was discussed on the call, so those areas are called out with a notation to distinguish post call context.

Also, our Wildlife Conservation Strategy has been posted on the PUC web site at:

https://puc.sd.gov/commission/dockets/electric/2019/EL19-003/wildlife.pdf

Kim

Kimberly Wells, Ph.D.
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Mid Continent Region
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Crowned Ridge I and II Follow-up Conference Call

Date: July 16, 2019

Attendees: Kimberly Wells (KW), Michelle Phillips, and Tyler Wilhelm (NextEra)
Scott Larson (SL) and Natalie Gates (NG) (USFWS)
Hilary Meyer (HM) (SDGFP)
Sarah Sappington and Kely Mertz (KM) (SWCA)

Call began at approximately 11:00 am central.

All parties gave introductions, and KW provided intent of call which was to address questions USFWS raised in its July 2, 2019 letter.

Project Overview

KW: There are four separate SDPUC filings: CRI T-line, which has been approved; CRI Wind Farm, which has been approved; CRII T-line which has been approved; and CRII Wind Farm which was refiled with SDPUC last week. All applications, including most wildlife survey reports are located on the SDPUC website. The Dakota skipper (DASK) survey report also was submitted to USFWS as part of its annual permit reporting requirements.

Dakota Skipper

KM: Provided overview of the DASK survey effort. It was a phased approach beginning with desktop habitat assessment and resulting in targeted surveys in a subset of potentially suitable DASK habitat proposed to be impacted by the design at that time.

SL: Why was a subset of DASK habitat surveyed?

NG: USFWS has concern that surveys do not currently appear to support species absence in all areas of impact. Avoid the flight period is good, but in occupied habitats the species is present year-round (eggs/larvae), thus doesn't preclude risk of take.

KM: CRW prioritized conducting surveys in accessible areas (as not all areas were on participating landowner property) their permitted biologists felt optimized their opportunity to observe the species if it were present and in an area proposed for impact. It was not feasible to survey the entire project area which includes 53,186 acres for the Crowned Ridge I Wind Farm and 60,996 acres for the Crowned Ridge II Wind Farm, of which only approximately 2,220 acres (4%) and 2,016 acres (3%), respectively, are expected to be temporarily or permanently impacted. The area within which impacts may occur is described in the applications as the "Project Construction Easement." If there are specific questions on methods we can go through those.

NG: Not clear exactly which areas of suitable habitat were not surveyed. Critical Habitat was not addressed.

KM: The project's proximity to DASK Critical Habitat is discussed in the applications, Section 11. CRW has put into place seasonal restrictions regarding activities in suitable DASK habitat. CRW will be avoiding the flight period.

SL: Can you generate a map of suitable habitat areas vs. areas of disturbance?

KW: Yes.

NG: USFWS understands many areas may be degraded, contain invasive species, and provide minimal habitat for DASK within the project boundary. FWS also understands that some areas may not fit this description and the species may be present. NG requested habitat evaluations for areas that will be disturbed but were not surveyed to further evaluate the risk of take to DASK.

KW: CRW has avoided placing turbines in grasslands where feasible. CRW has attempted to minimize conflicts between grasslands, tribal, and other Endangered Species Act concerns. In several cases, landowners prefer turbines outside of the land they actively farm.

NOTE: Post-call, NG indicates the following in her review of meeting minutes: "'where feasible' is not necessarily adequate to avoid unauthorized ESA violation (take of DASK). Best way to avoid the risk is to preclude impacts in all suitable DASK habitat."

NOTE: Post-call, KW notes for clarification that turbine locations are shown in the PUC application and compliance filings, and minor movements are allowed as described in those documents.

Topeka Shiner

KW: CRW is considering a number of avoidance measures to avoid impacts to streams potentially occupied by Topeka shiner. Measures include boring, overland collection, rerouting, and total avoidance.

NG: Acknowledged CRW would pursue total avoidance for the species. Noted that avoidance measures should be implemented in the streams where Topeka shiner may occur and their tributaries.

NOTE: Post-call, NG indicates the following in her review of meeting minutes: "Just to clarify, any instream work or work adjacent to the streams that may impact instream habitat may result in unauthorized take of the endangered Topeka shiner. If work is conducted out and away from the stream, there's no problem."

KW: agreed, CRW current plan is to bore under Willow and Stray Horse creeks identified in the USFWS letter or to completely avoid.

Effects to Habitats and Wildlife

NG: Interested in discussing grassland, wetland, and effects to birds such as displacement. Is CRW considering offsets?

KW: Yes, CRW will consider voluntary offsets to address potential direct and indirect effects. What is the funneling mechanism for conservation benefits?

SL: The agency is open to non-governmental organizations and others.

KW: NextEra has worked with several non-profit groups including Ducks Unlimited and Audubon in the past. Are there restrictions for the state? In North Dakota, there are restrictions on the state agency receiving and managing funds, but there do not appear to be the same restrictions for South Dakota.

HM: Is not aware of any restrictions but is following up with her supervisor.

NOTE: After the call and in a follow-up email to KW on 7/23/19, HM indicates there are no restrictions on the state having conservation easements and there may be a specific non-profit entity available to receive offset funds from wind energy projects in general for conservation delivery.

KW: Does GFP have funding opportunities like private match foundations or other stacking opportunities? CRW is summarizing acreage for wetlands and proximity to turbines. Noted that of 130 turbines, only 19 are in grassland areas due to other concerns including landowner preference and only 17 of those are in field-verified grasslands.

SL: How many turbines are in grasslands for CRII?

KW: Not sure but can get that information to USFWS and SDGFP. CRW will treat CRI and CRII separately for offsets. NextEra is the owner and operator for CRI, but CRII will be owned and operated by Xcel. CRW will consider the acreage of wetlands and grasslands within a determined proximity to turbines in developing its voluntary offset package.

NOTE: Since the call, CRW verified that 11 of the CRII wind turbines are in mapped grasslands (i.e., per Bauman et al 2013 and as described in PUC documents) and only 2 of those are in field-verified grasslands (i.e., determined by biologists on site to be grassland habitat).

Grouse Leks

KW: The SDPUC conditioned the approval of the CRI Wind Farm with a requirement for CRW to conduct post-construction grouse lek monitoring to gather information on effects of wind energy development on leks. The plan is not yet developed. CRW will work with SDGFP and SDPUC subject matter experts to develop the protocol for post-construction monitoring.

Line Marking

KW: CRW plans to mark the CRI transmission line following the general approach outlined in Upper Great Plains HCP that is a calculation based on proximity to wetland stopover habitat for whooping cranes. CRW also generally will follow Avian Power Line Interaction Committee practices.

NG: Migratory birds are an issue. She has seen birds hit powerlines this year due to water increases associated with flooding when surrounding sides of a road merge or abut power lines.

KW: CRW and SWCA will take a look at aquatic resources proximate to transmission lines and identify any potential areas to hold additional waters in substantial rainfall years.

Bats

NG: Northern long-eared bats (NLEB): CRW is aware of the 4D rule and under the rule, CRW would not be in violation of ESA for take of a NLEB as a result of operating the wind farm. However, survey methods didn't appear to follow Indiana Bat Survey Guidelines. CRW did not look specifically at forested habitats. How many sites did CRW survey? If the goal was to find the bats, then one has to look in the habitat. CRW did not.

KM: Our objective was not to survey for presence/probably absence of NLEB. CRW did a desktop habitat assessment for the entire project area. CRW conducted the desktop assessment to derive a likelihood of occurrence for the species. Potential summer habitat is less that 1% of the project area.

NG: Did CRW use 15 acres? Information out of Michigan suggests could be lower, approximately 10 acres, in South Dakota. NG will try to obtain those data to share with SWCA.

KM: Yes, CRW used 15 acres for the assessment. Given the paucity of forested area and potentially suitable habitat, and the known distribution for the species, CRW believes it is reasonable to assume low likelihood of NLEB occurrence in the project area. CRW recognizes NLEB may occasionally migrate through the project area. From there, the objective of the acoustic survey was to assess relative bat activity in areas similar to where turbines would be constructed. Therefore, CRW assessed relative bat activity in agricultural lands because that is where the majority of turbines will be placed. Had CRW found more suitable habitat, they may have had different objectives for the acoustic survey. The lack of suitable habitat, in other words, informed the objectives for the acoustic survey.

NG: Did you not identify species? Did you use Anabat?

KM: Yes, CRW used Anabat and analyzed by frequency groups. No calls observed were consistent with those made by *Myotis* species. No Myotis species were detected.

NG: Prevailing Winds detected NLEB in the Coulee area. Bats may be less likely in the CRW project area. USFWS would like to learn more about species in state. There are some NLEB in the Black Hills and in northwestern South Dakota with proximity to hibernacula.

KM: Did Prevailing Winds survey summer habitat?

NG: Yes.

Eagles

NG: CRW should adhere to the ECPG, and run the risk model to determine appropriate risk category and whether or not an incidental take permit is appropriate. Has CRW run the model? Will CRW pursue a permit?

KW: Based on data collected at the site, CRW does not see that this area is a high risk area, and CRW does not believe a permit is warranted based on the existing data.

Other

KW: Ensured USFWS and SDGFP was aware that CRW's team coordinates regularly with USFWS to map USFWS easements, and to avoid USFWS interests.

NG: Reiterated concern about indirect impacts to birds on easement lands. CRW did make effort to avoid grassland areas. Agency's recommendation is to not site turbines on grassland.

KW: summarized action items:

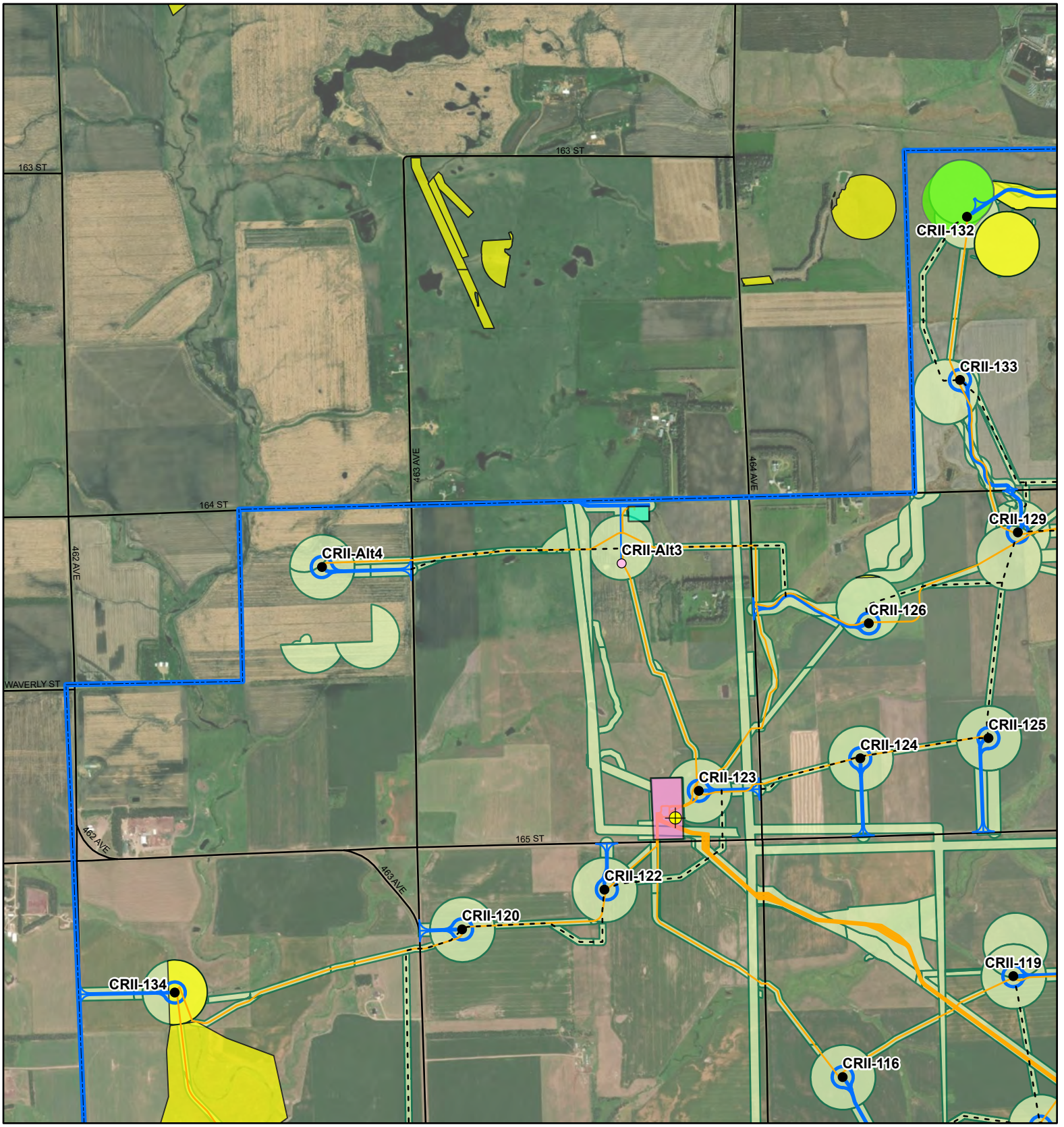
- CRW will model for offsets and indirect effects.
- CRW will provide map of suitable DASK habitat and areas of disturbance.
- CRW will compile further information regarding vegetation and quality of potentially suitable DASK habitat to share with agencies.
- CRW will look at aquatic resources proximate to transmission lines and identify any potential areas to hold additional waters in substantial rainfall years; these areas will be marked with avian flight diverters.

- HM will look at available options for offsets and conservation through the state (since completed on 7/23).
- NG will share 10-acre information re: NLEBs if she is able to obtain.

Call concluded at approximately 11:52 am central time.

APPENDIX B

Dakota Skipper Habitat and Survey Area Mapbook



Dakota Skipper

Crowned Ridge II Wind Farm

- MET Tower
- **200 MW Array**
- Turbine Location (GE 2.3 MW turbine (90m hh))
- **100 MW Array**
- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Substation
- O & M Facility
- Survey Area
- Project Boundary
- County Boundary

Kilometers
0 0.5 1

Miles
0 0.25 0.5

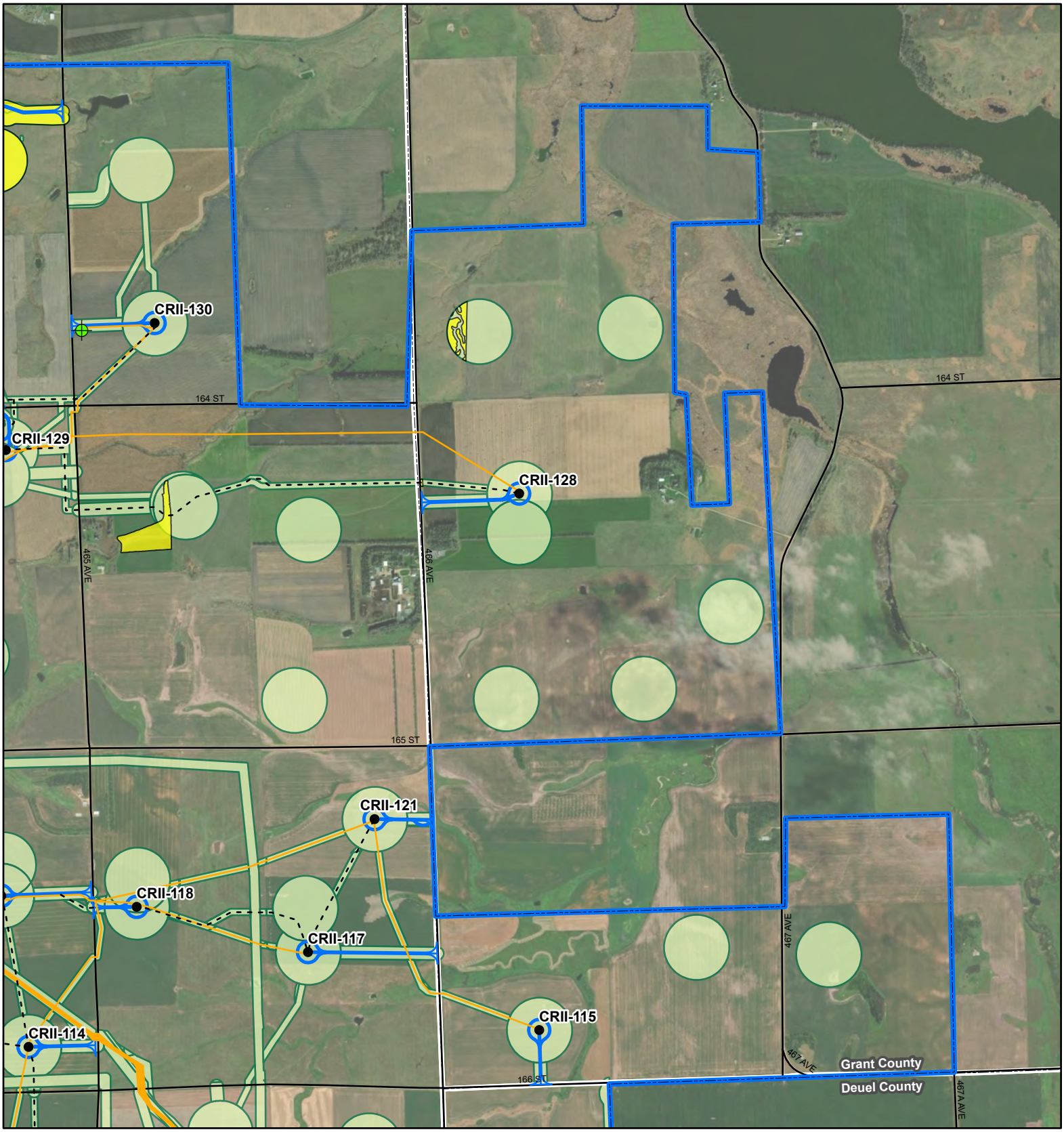
N
W E
S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T118N, R51W

Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

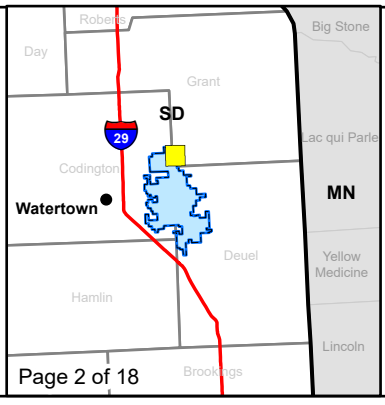
SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

Crowned Ridge II Wind Farm

- ALDS Radar Location
- **200 MW Array**
- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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Miles
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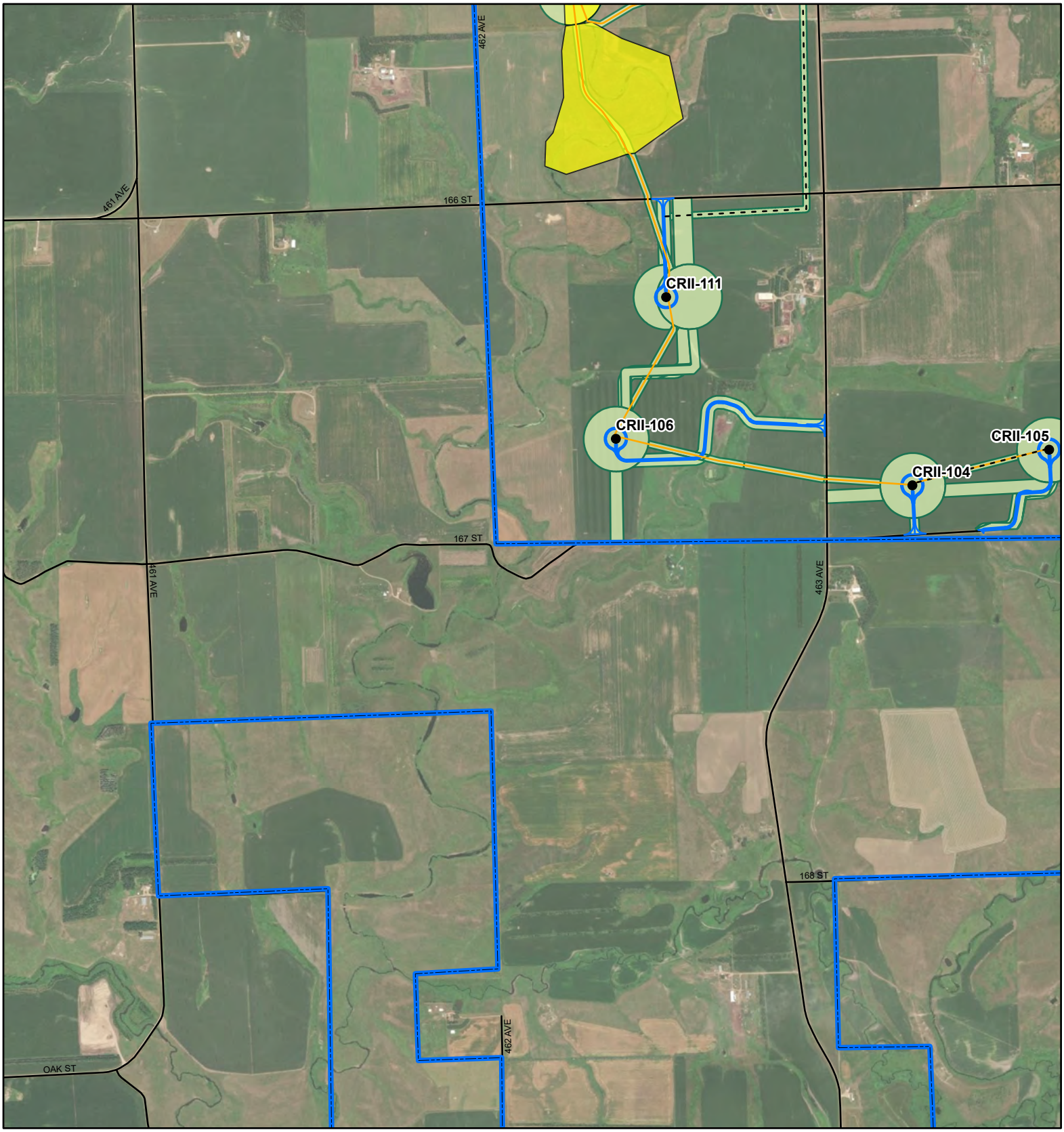
N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: South Shore (1973), Kranzburg (1970), Stockholm (1973), Goodwin (1970)
Township/Range: T118N, R51W & T118N, R51W & T117N, R51W & T117N, R50W
Codington and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary

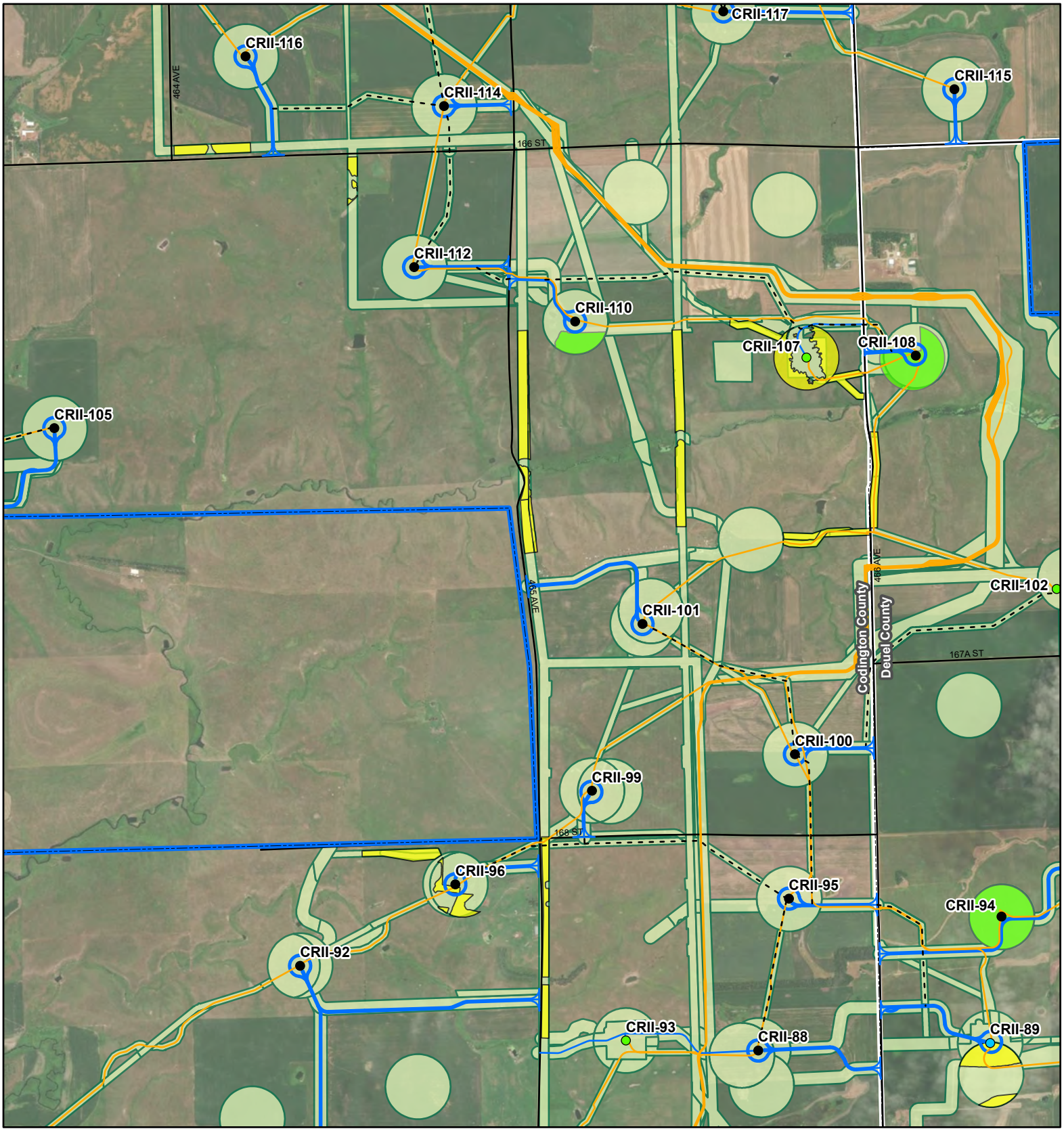
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Kranzburg (1970)
Township/Range: T118N, R51W & T117N, R51W
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

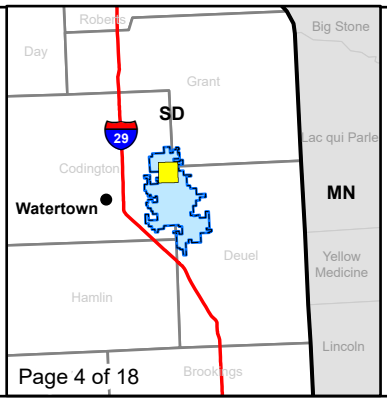
Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))

100 MW Array

- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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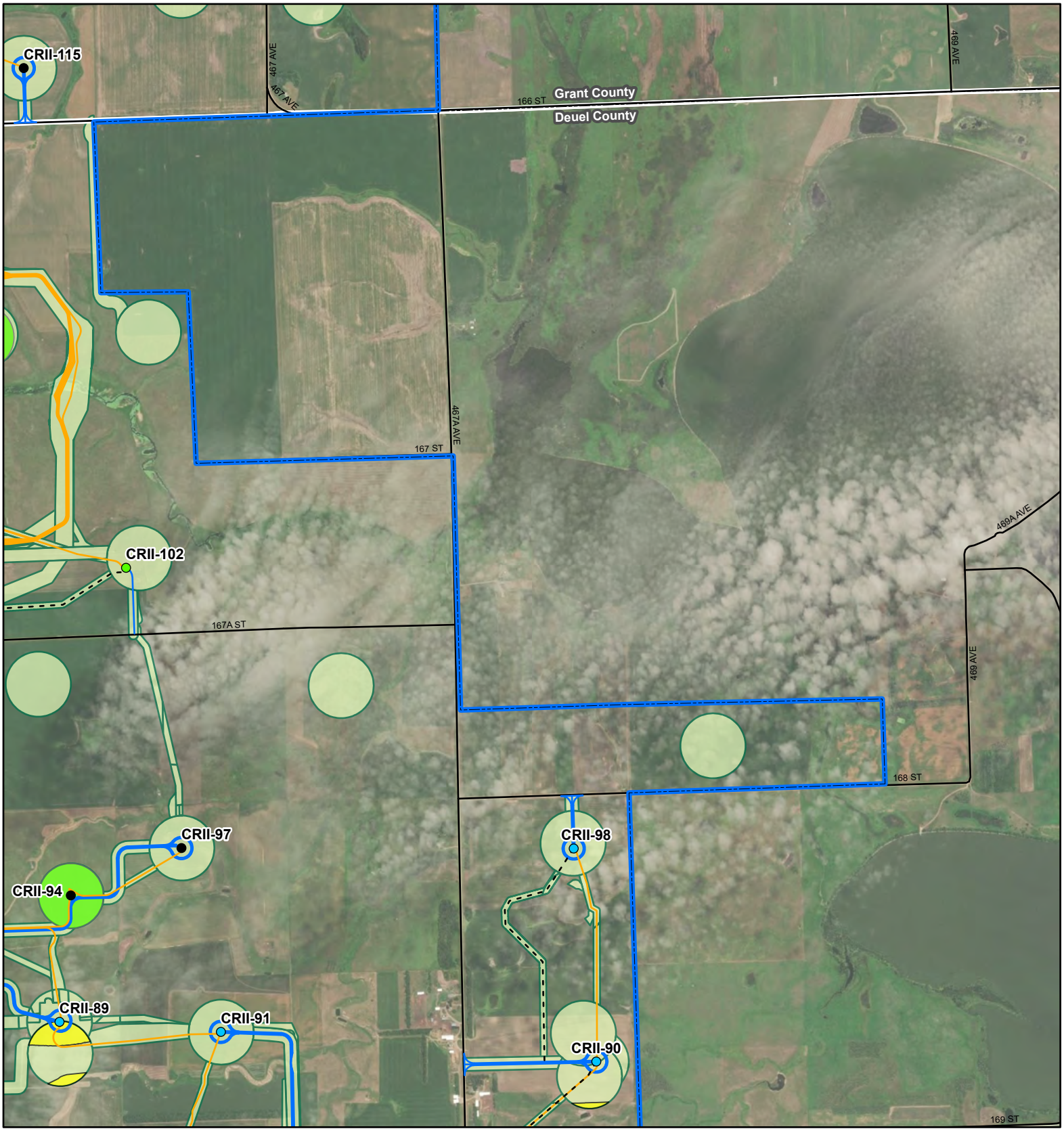
Miles
0 0.25 0.5

N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T118N, R51W & T118N, R51W & T117N, R51W & T117N, R50W
Codington, Deuel, and Grant Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

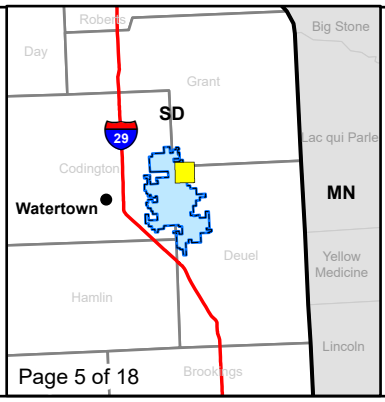
Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))

100 MW Array

- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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Miles
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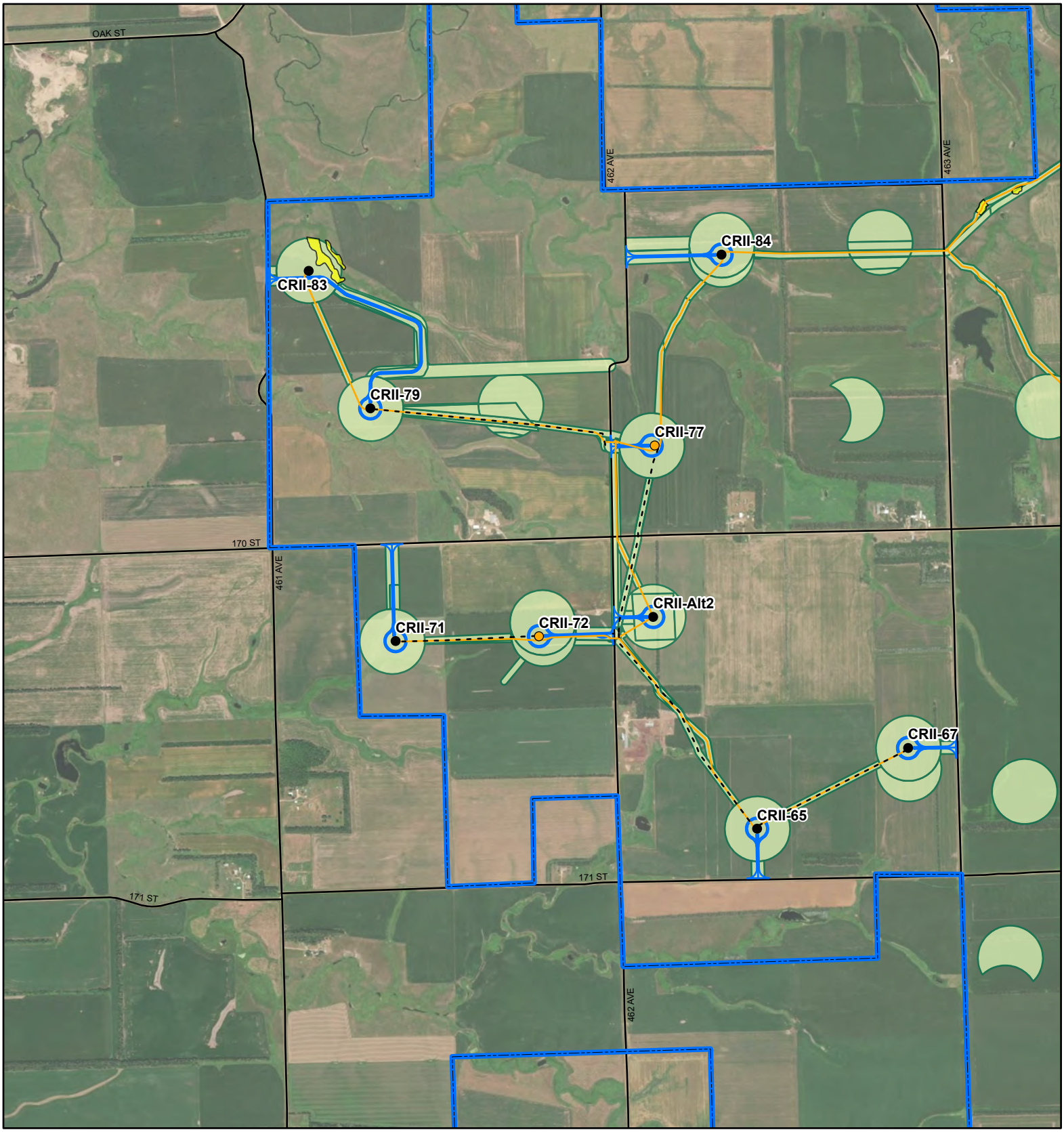
N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T118N, R50W & T117N, R50W
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

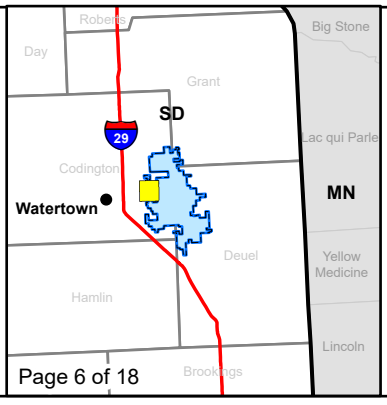


Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Alternate GE 2.3 MW Turbine Location (90m hh)
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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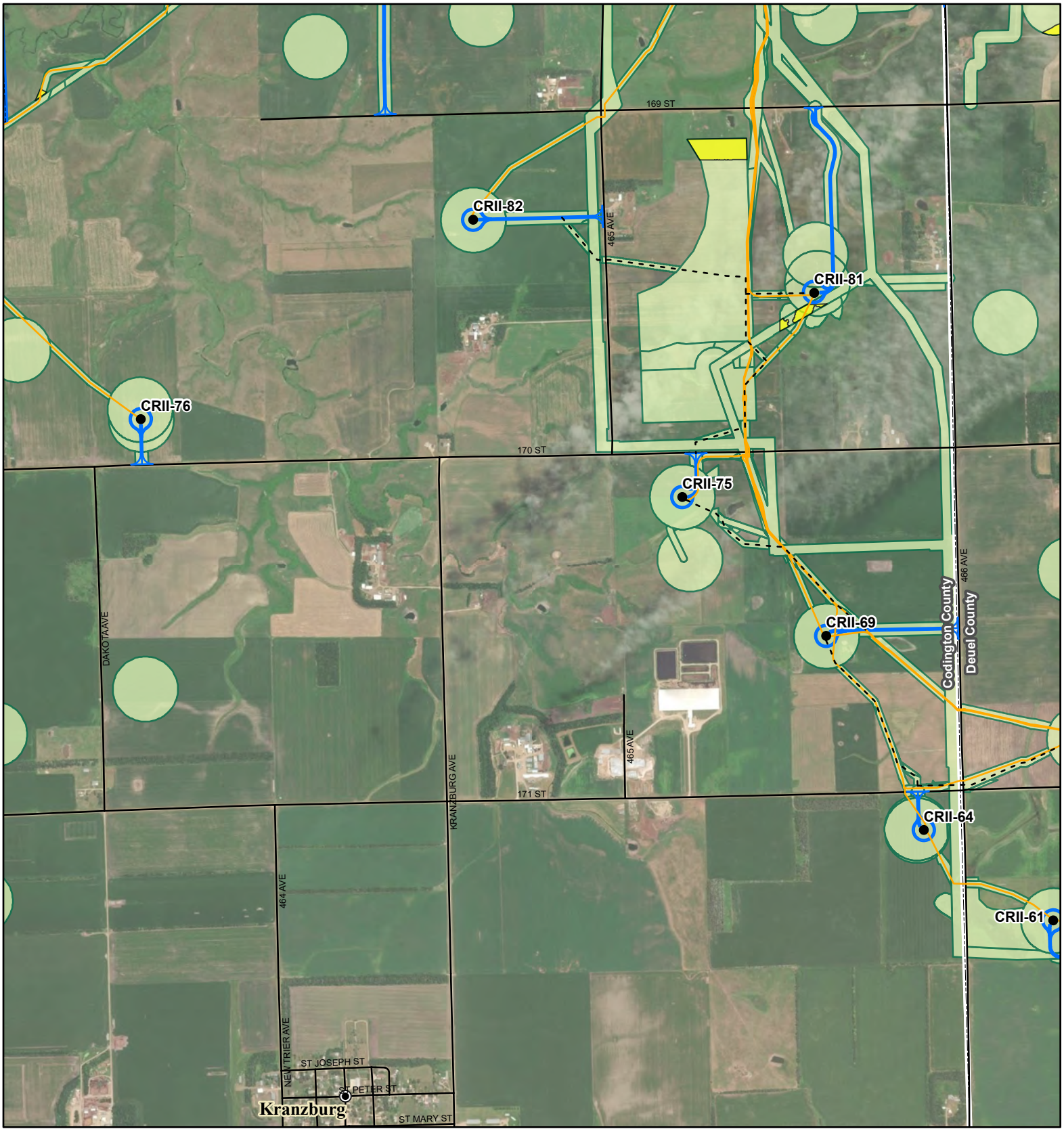
Miles
0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Kranzburg (1970)
Township/Range: T117N, R51W

Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

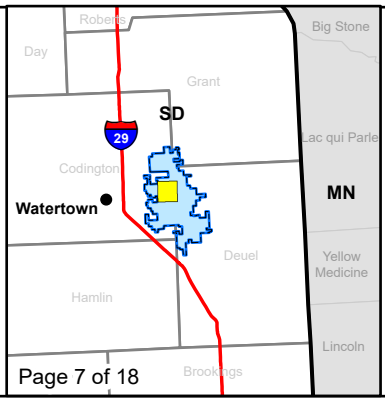


Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- City
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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Miles
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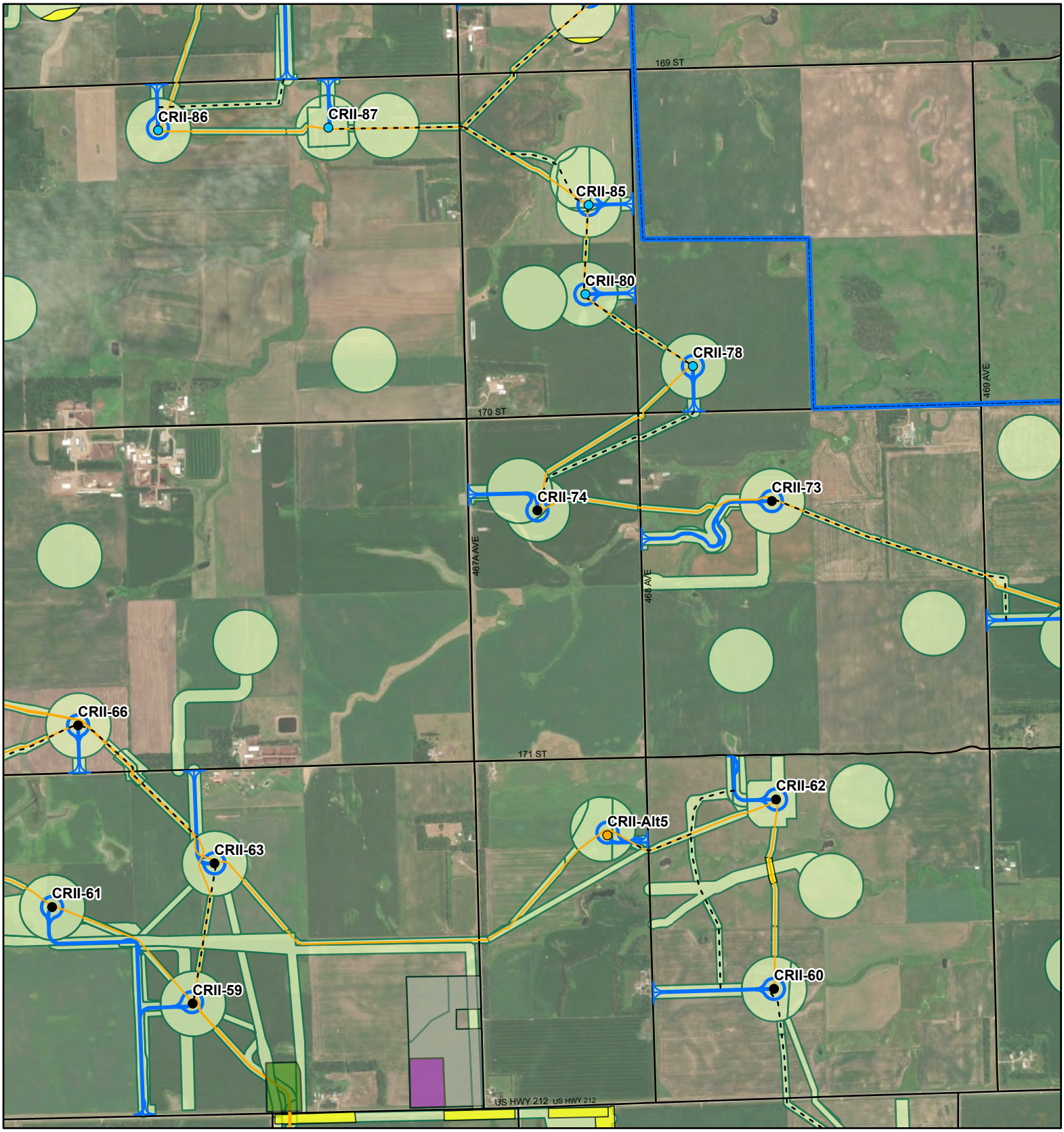
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Kranzburg (1970)
Township/Range: T117N, R51W & T117N, R50W
Codington and Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

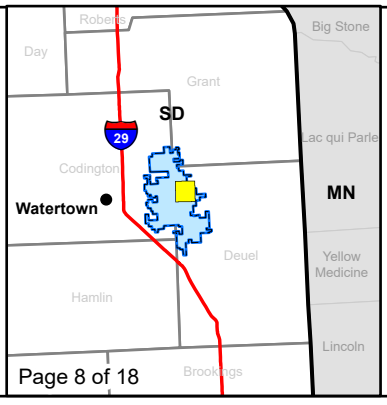


Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Alternate GE 2.3 MW Turbine Location (90m hh)
- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Alternative Batch Plant
- Batch Plant
- Laydown Yard
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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Miles
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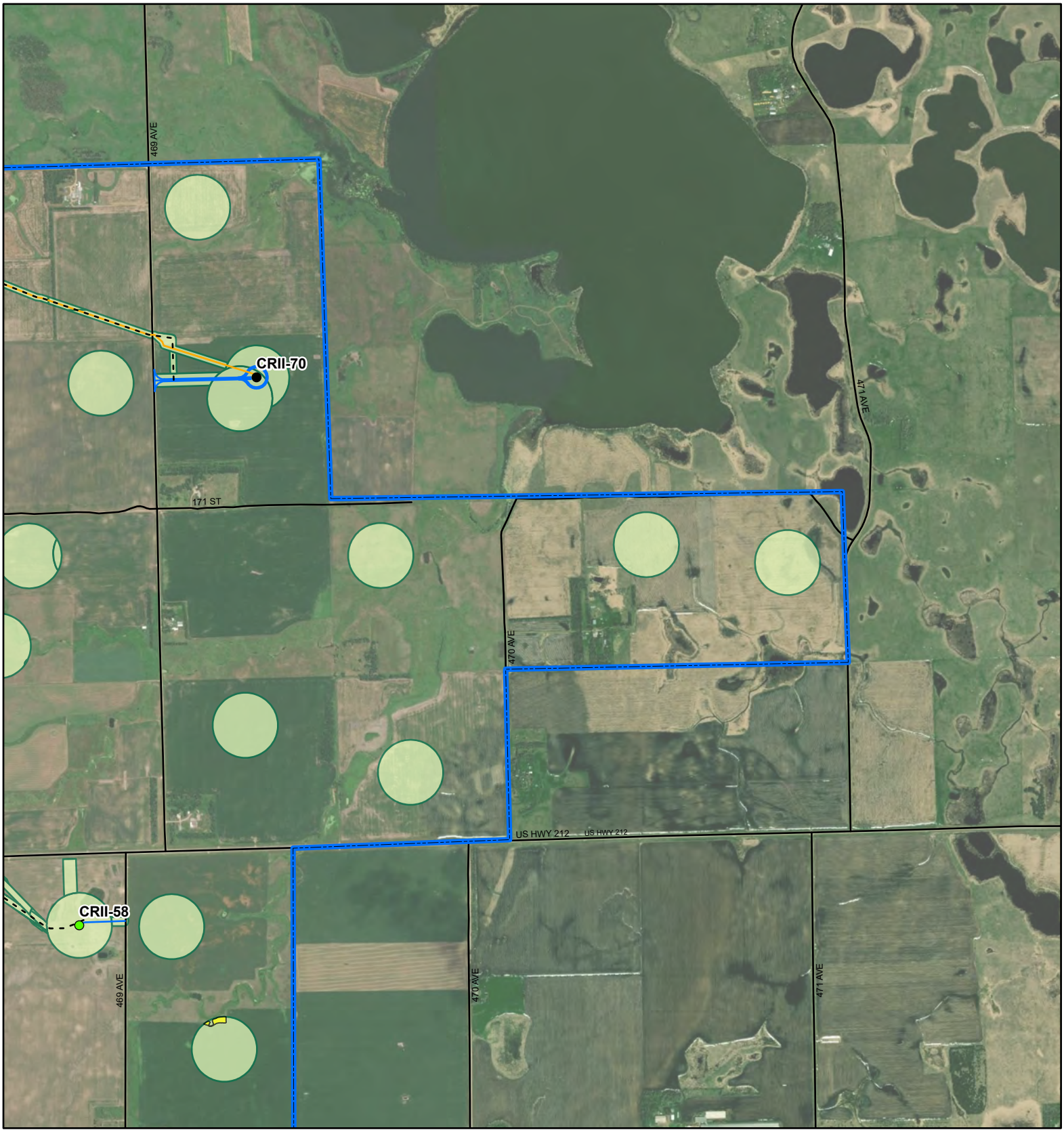
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Goodwin (1970)
Township/Range: T117N, R50W

Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

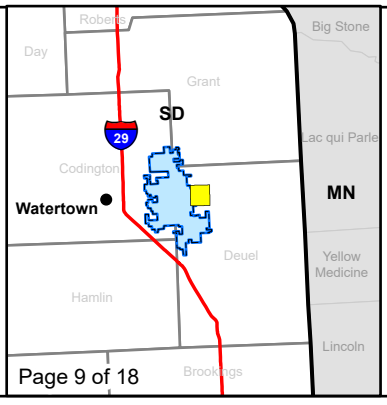
Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))

100 MW Array

- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers

0 0.5 1

Miles

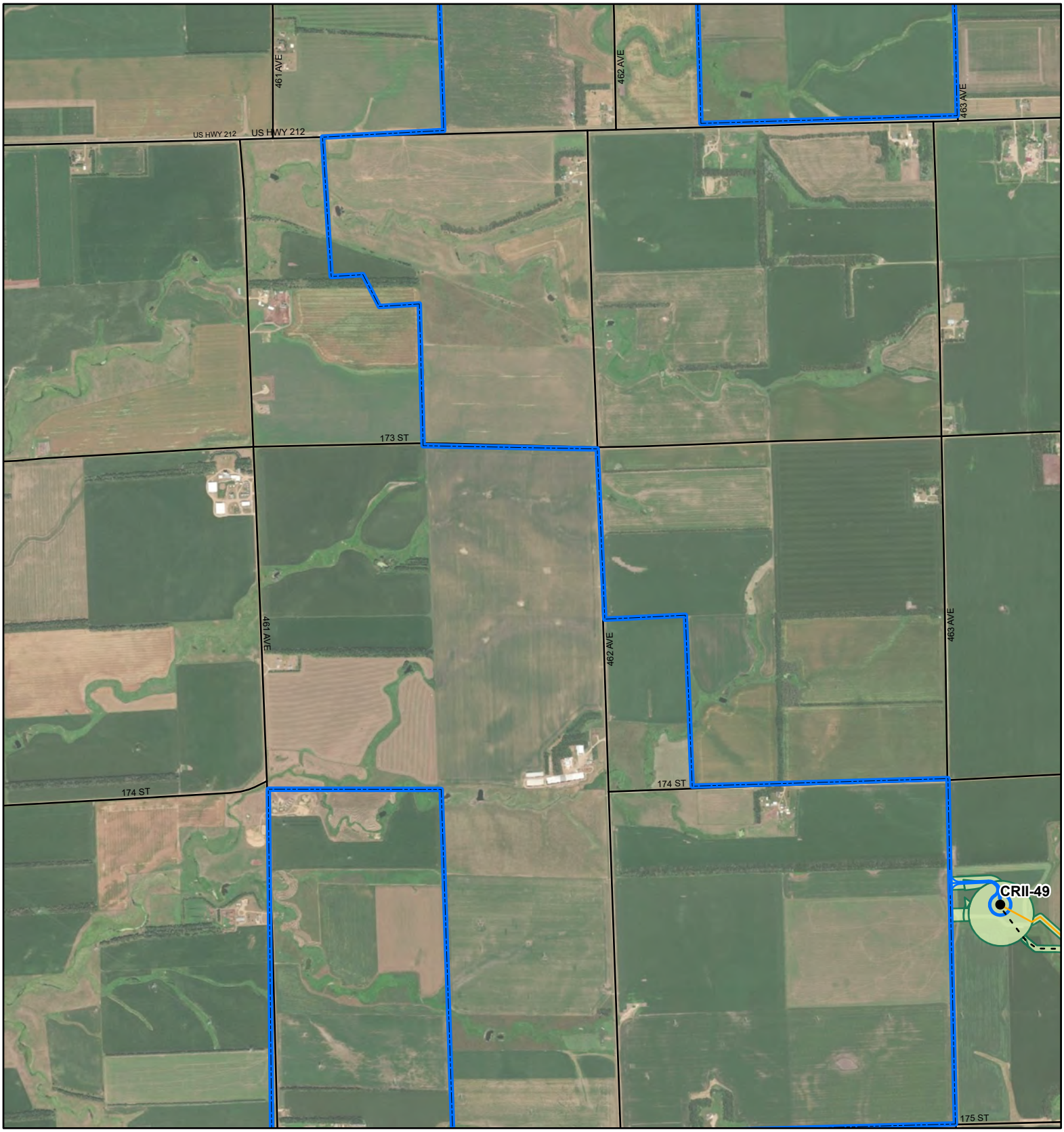
0 0.25 0.5

N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: South Shore (1973), Kranzburg (1970)
Township/Range: T117N, R50W & T116N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

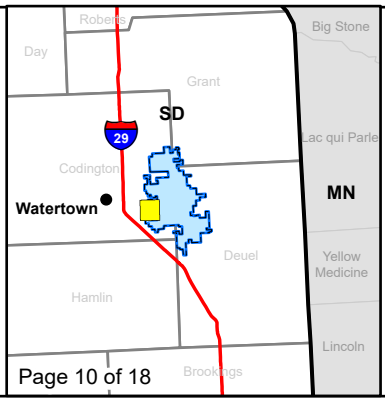


Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



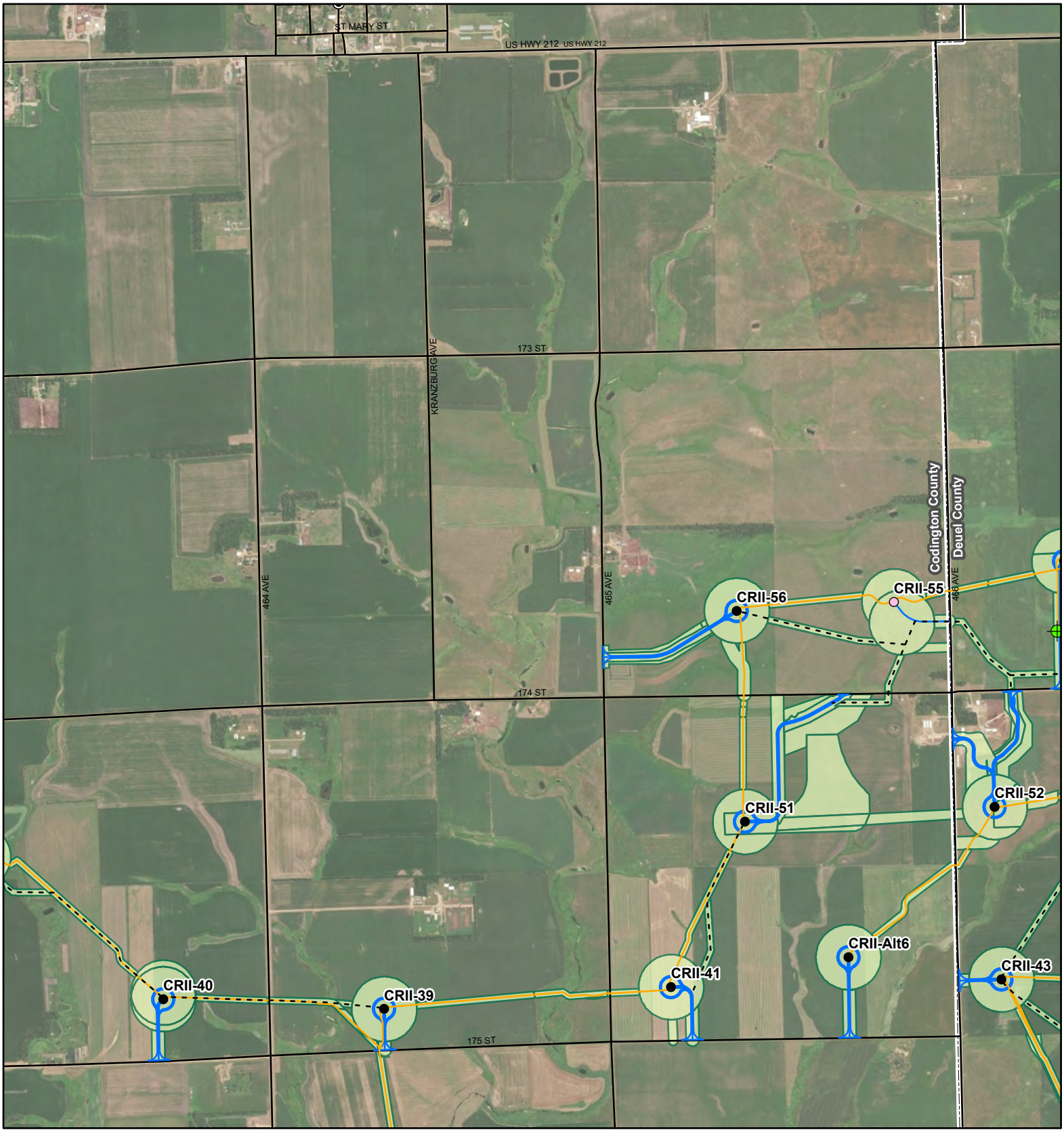
Kilometers
0 0.5 1

Miles
0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Kranzburg SW (1981)
Township/Range: T117N, R51W & T116N, R51W
Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

Crowned Ridge II Wind Farm

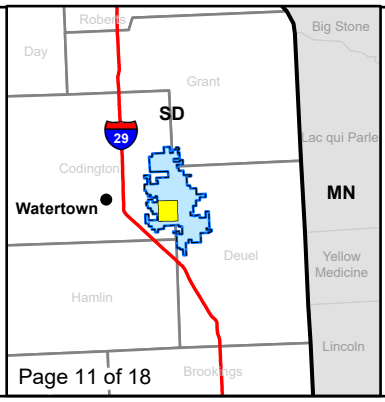
- ALDS Radar Location
- Crane Path

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers

0 0.5 1

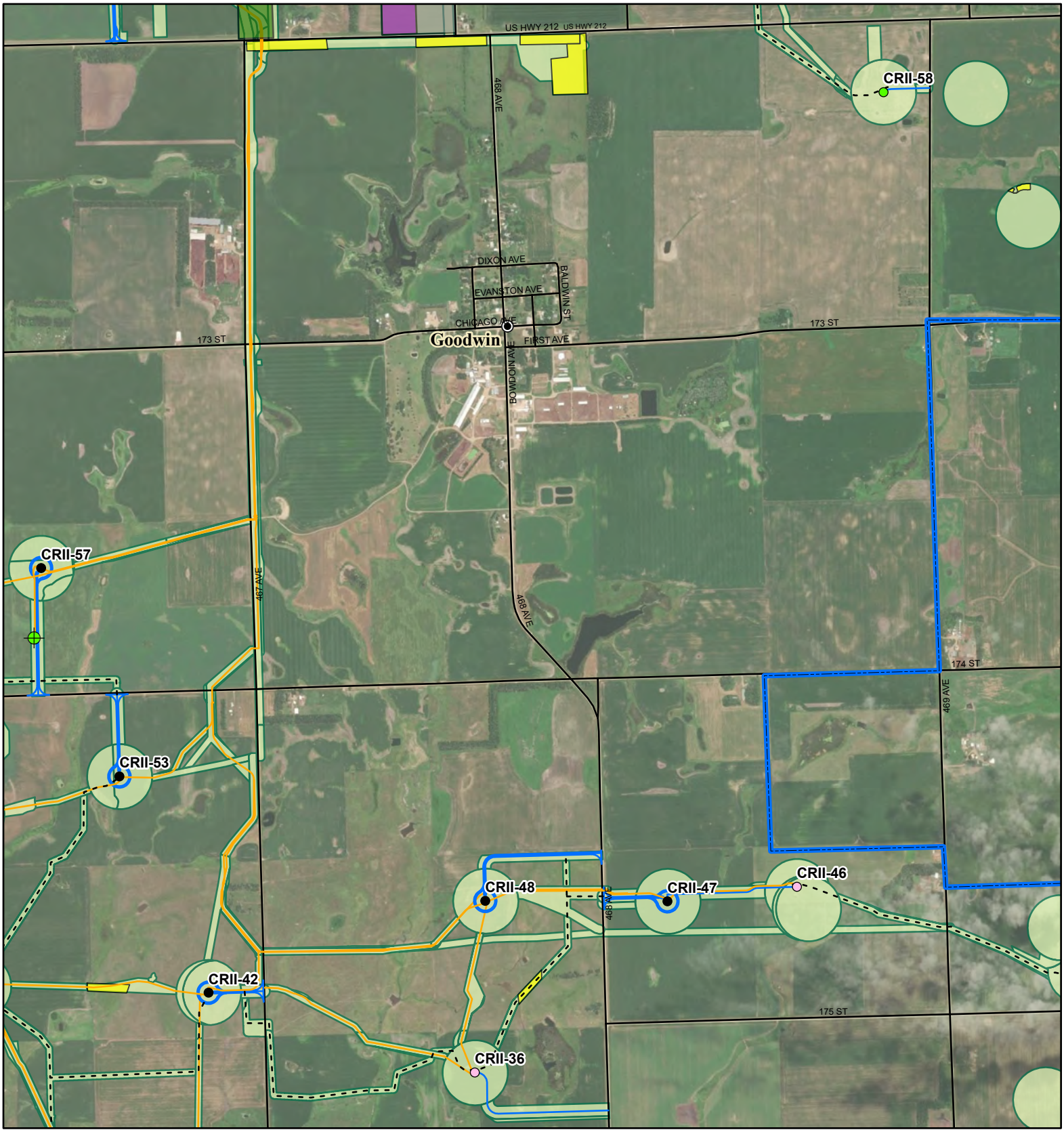
Miles

0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Kranzburg SW (1981)
Township/Range: T117N, R51W & T117N, R50W & T116N, R51W & T116N, R50W
Codington and Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

Crowned Ridge II Wind Farm

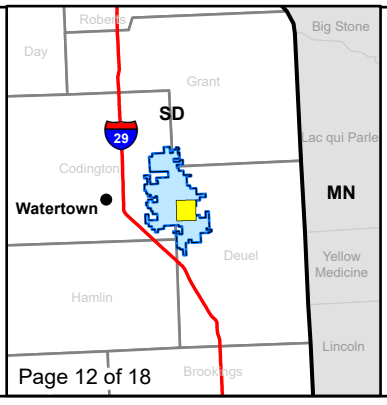
- ALDS Radar Location
- City
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Alternative Batch Plant
- Batch Plant
- Laydown Yard
- Survey Area
- Project Boundary
- County Boundary

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Safe Harbor Turbine (GE 2.1 MW turbine (80m hh))



Kilometers
0 0.5 1

Miles
0 0.25 0.5

N
W E
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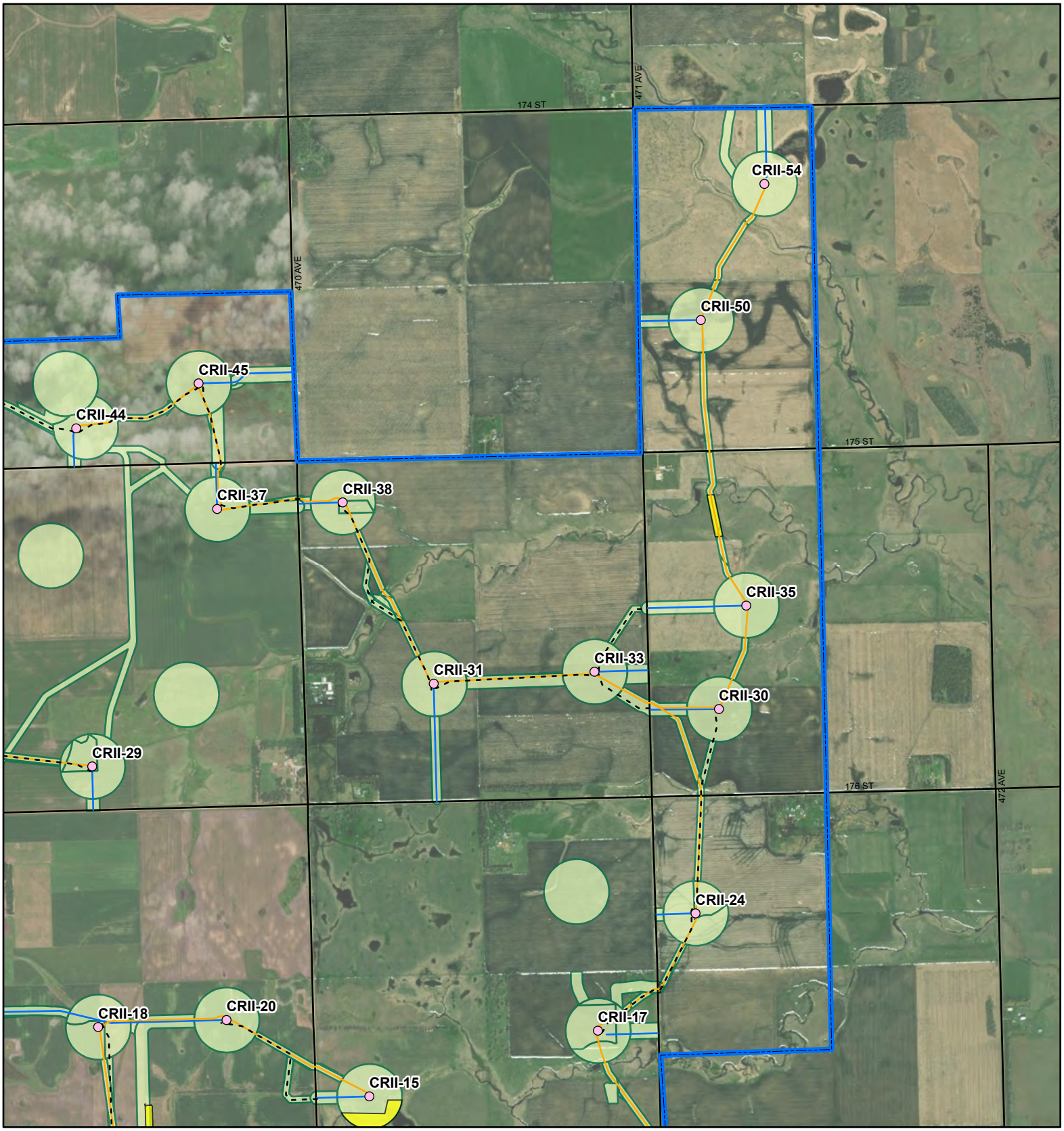
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg (1970), Goodwin (1970), Kranzburg SW (1981), Bemis (1978)
Township/Range: T117N, R50W & T116N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

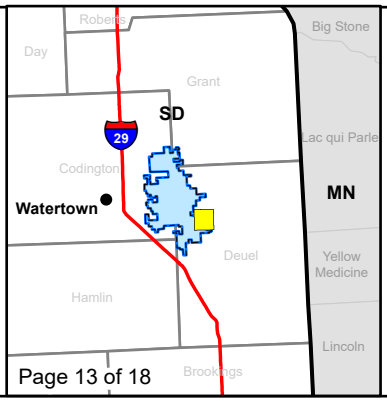


Dakota Skipper

Crowned Ridge II Wind Farm

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers

0 0.5 1

Miles

0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community

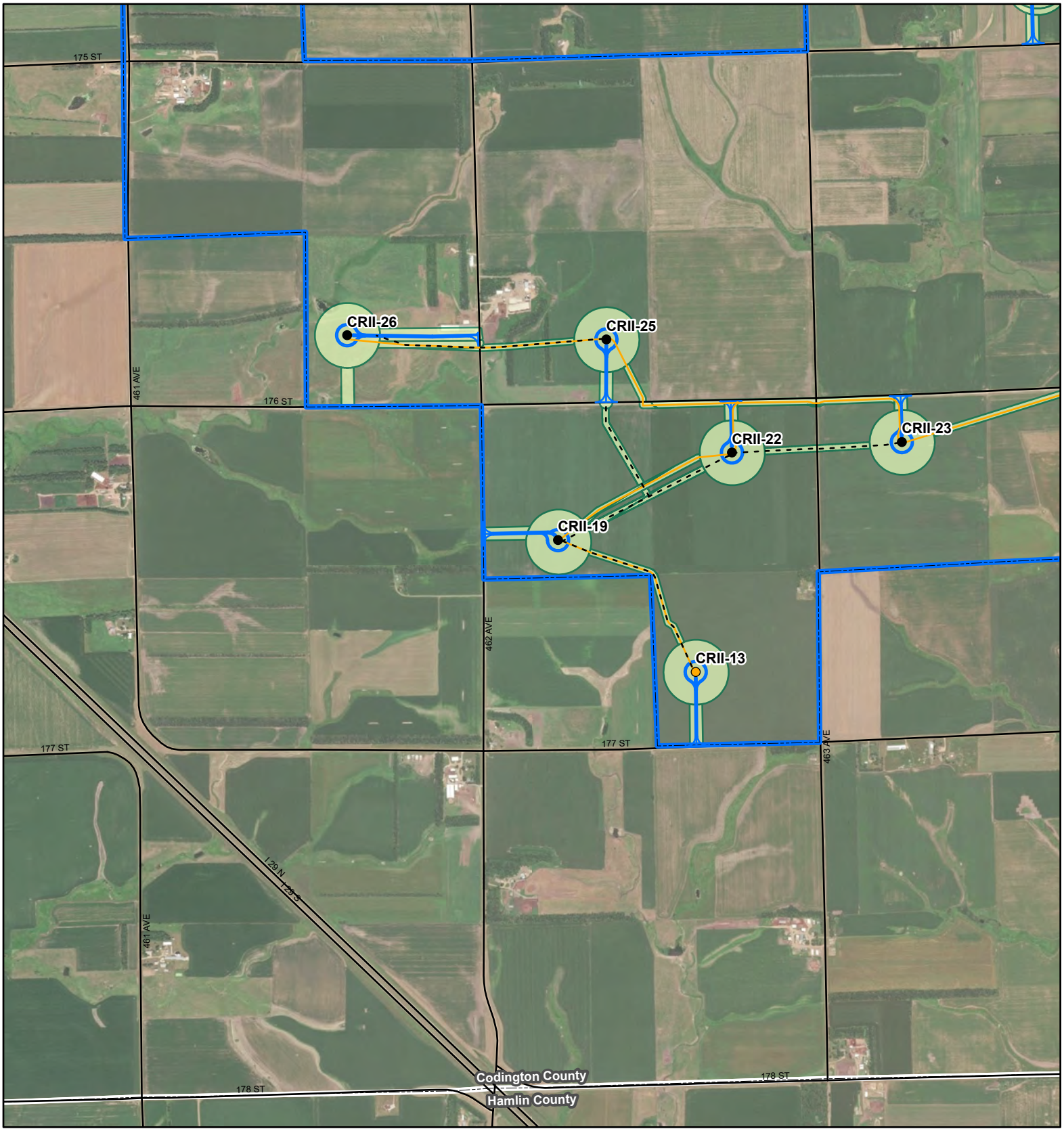
Quadrangle: Bemis (1978)

Township/Range: T118N, R51W

Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

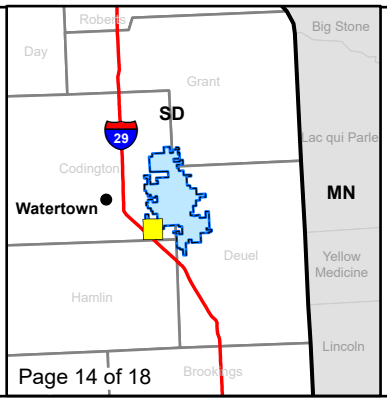


Dakota Skipper

Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Alternate GE 2.3 MW Turbine Location (90m hh)
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
0 0.5 1

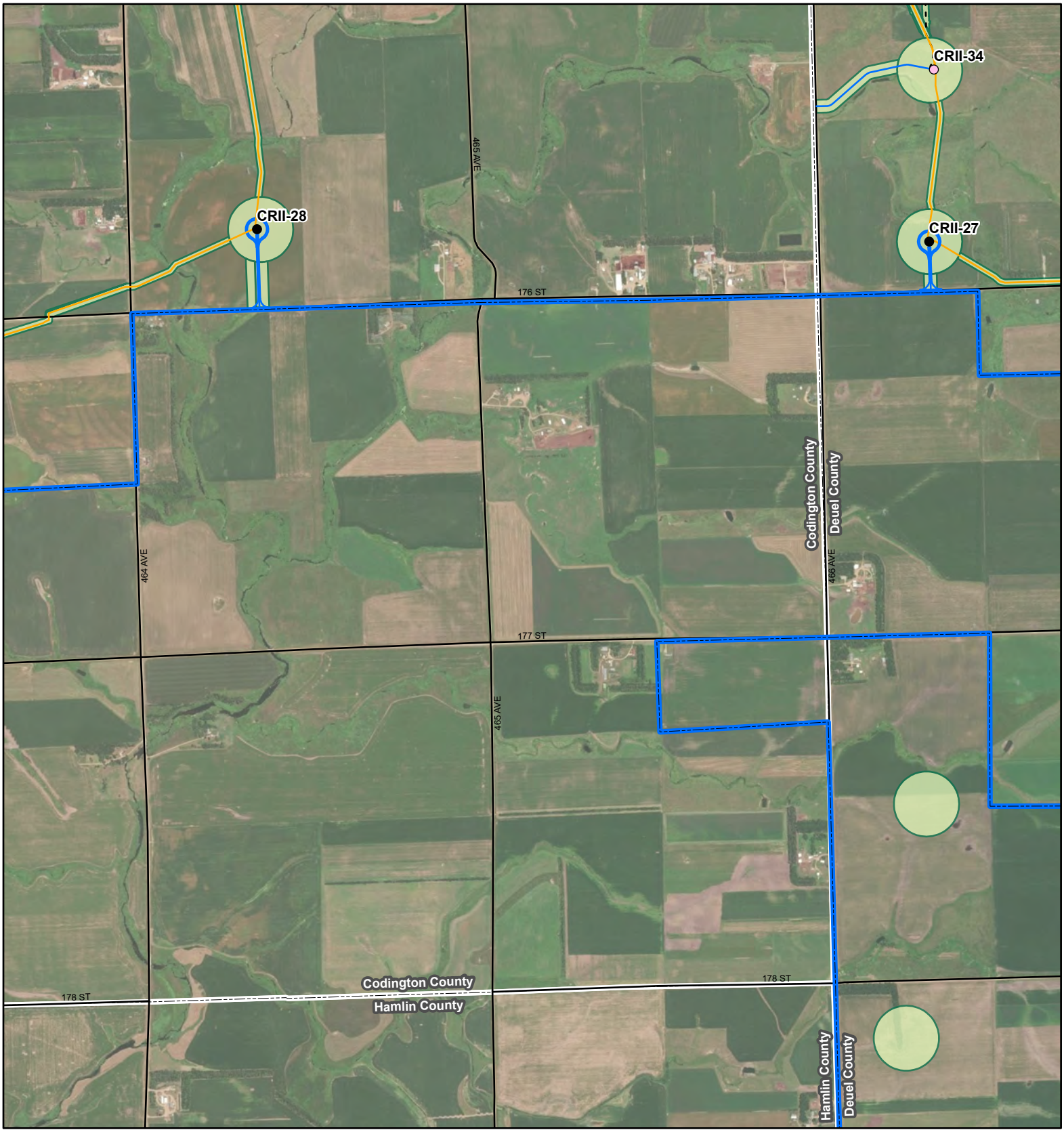
Miles
0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg SW (1981), Kranzburg (1970)
Township/Range: T116N, R51W

Codington County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

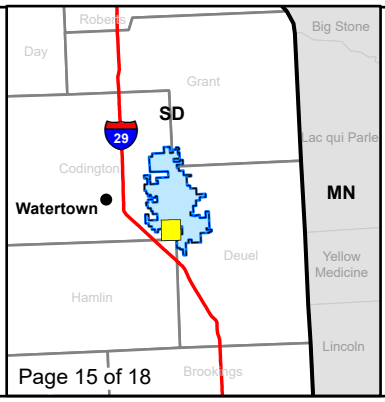
Crowned Ridge II Wind Farm

200 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers

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Miles

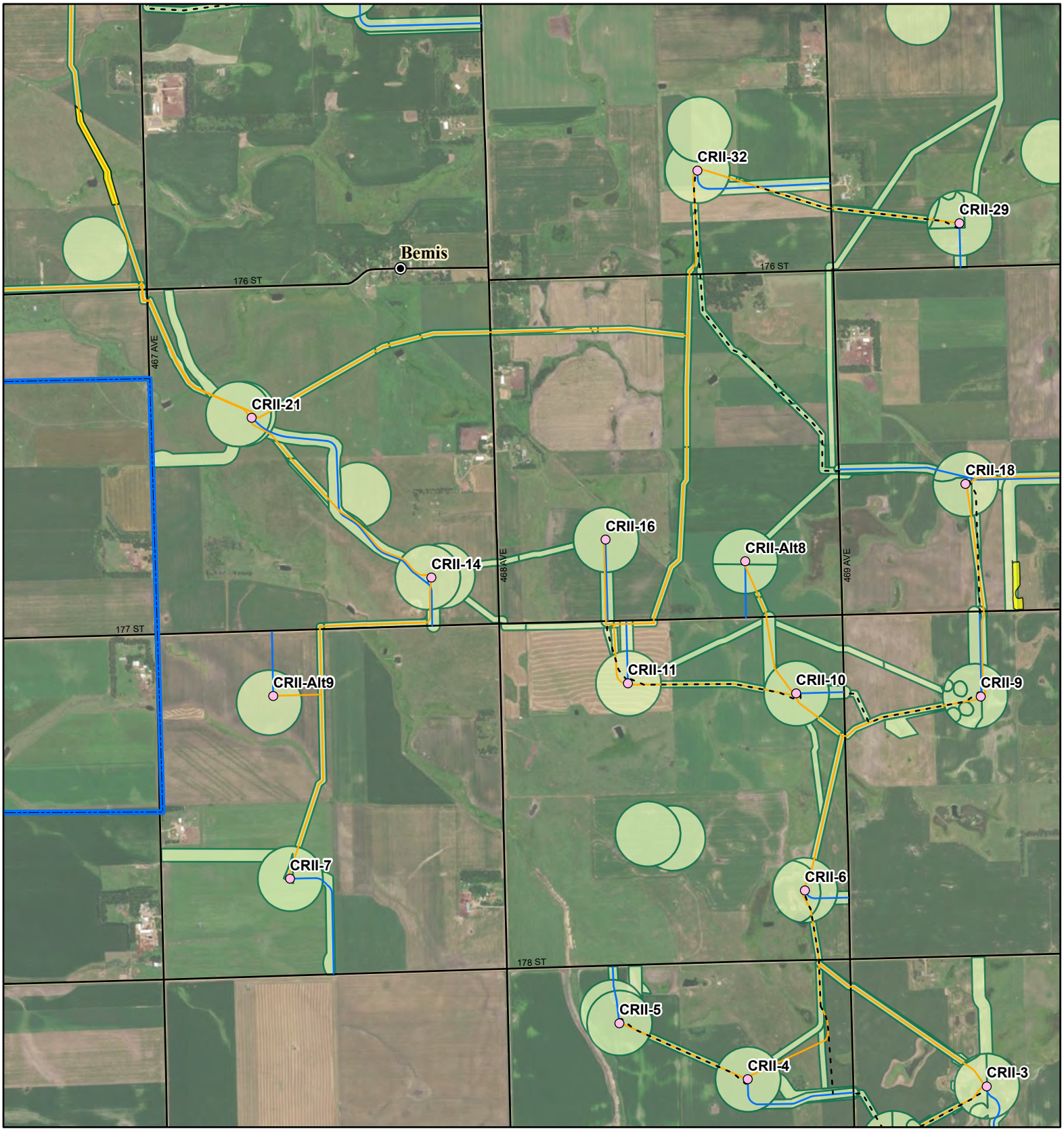
0 0.25 0.5

N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg SW (1981), Bemis (1978)
Township/Range: T116N, R51W & T116N, R50W & T115N, R50W
Codington and Deuel Counties, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

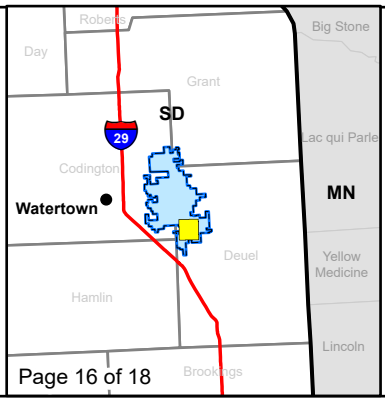


Dakota Skipper

Crowned Ridge II Wind Farm

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- City
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
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Miles
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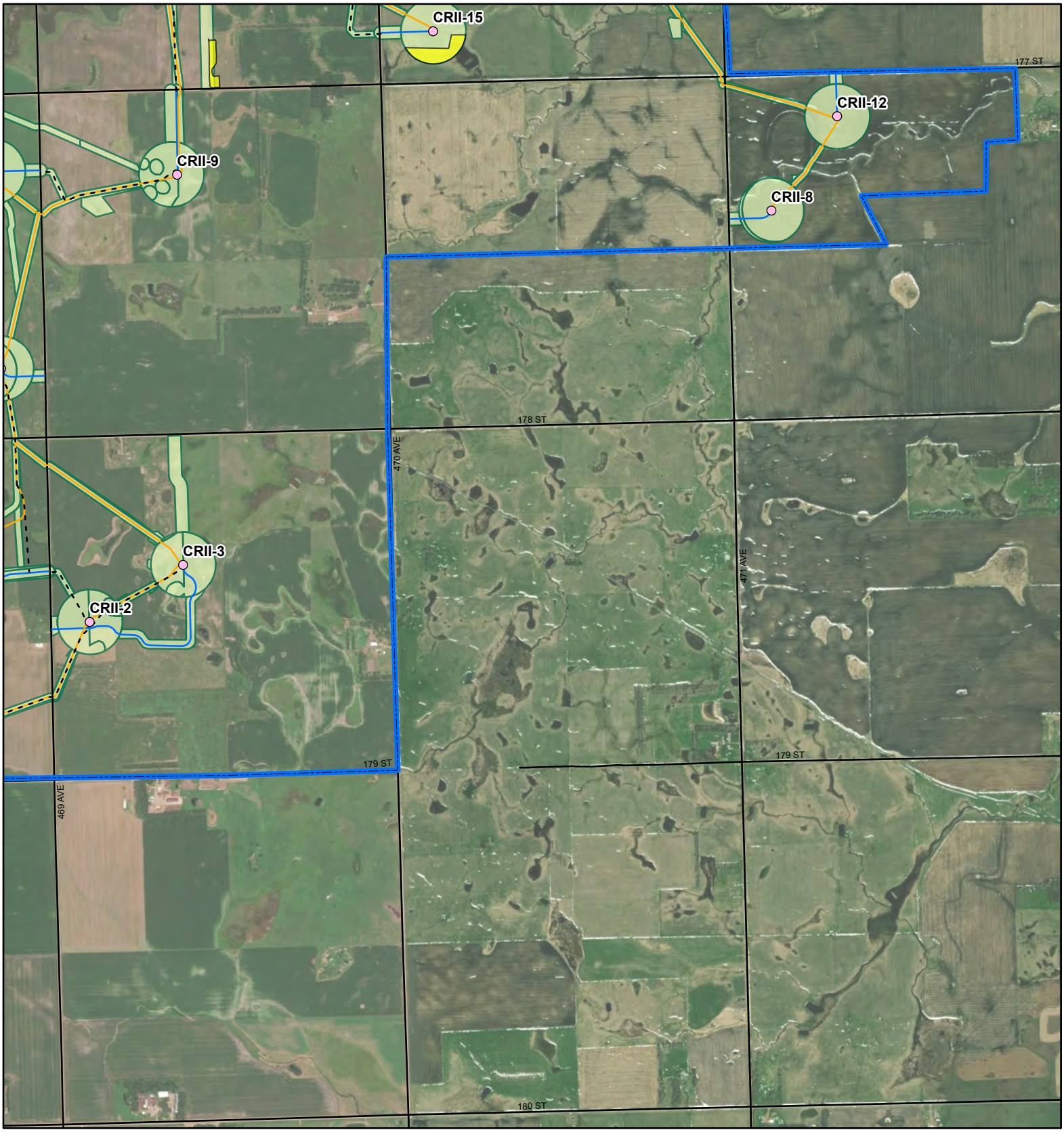
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W & T115N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

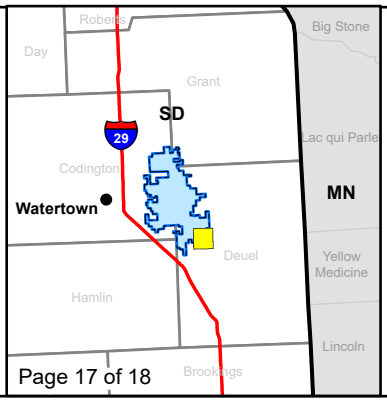


Dakota Skipper

Crowned Ridge II Wind Farm

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
- Collection Line
- Crane Path
- Existing Road
- Field-Assessed Dakota Skipper Habitat
- Field-Assessed Dakota Skipper Habitat and Presence/Absence Survey Location 2018
- Survey Area
- Project Boundary
- County Boundary



Kilometers
0 0.5 1

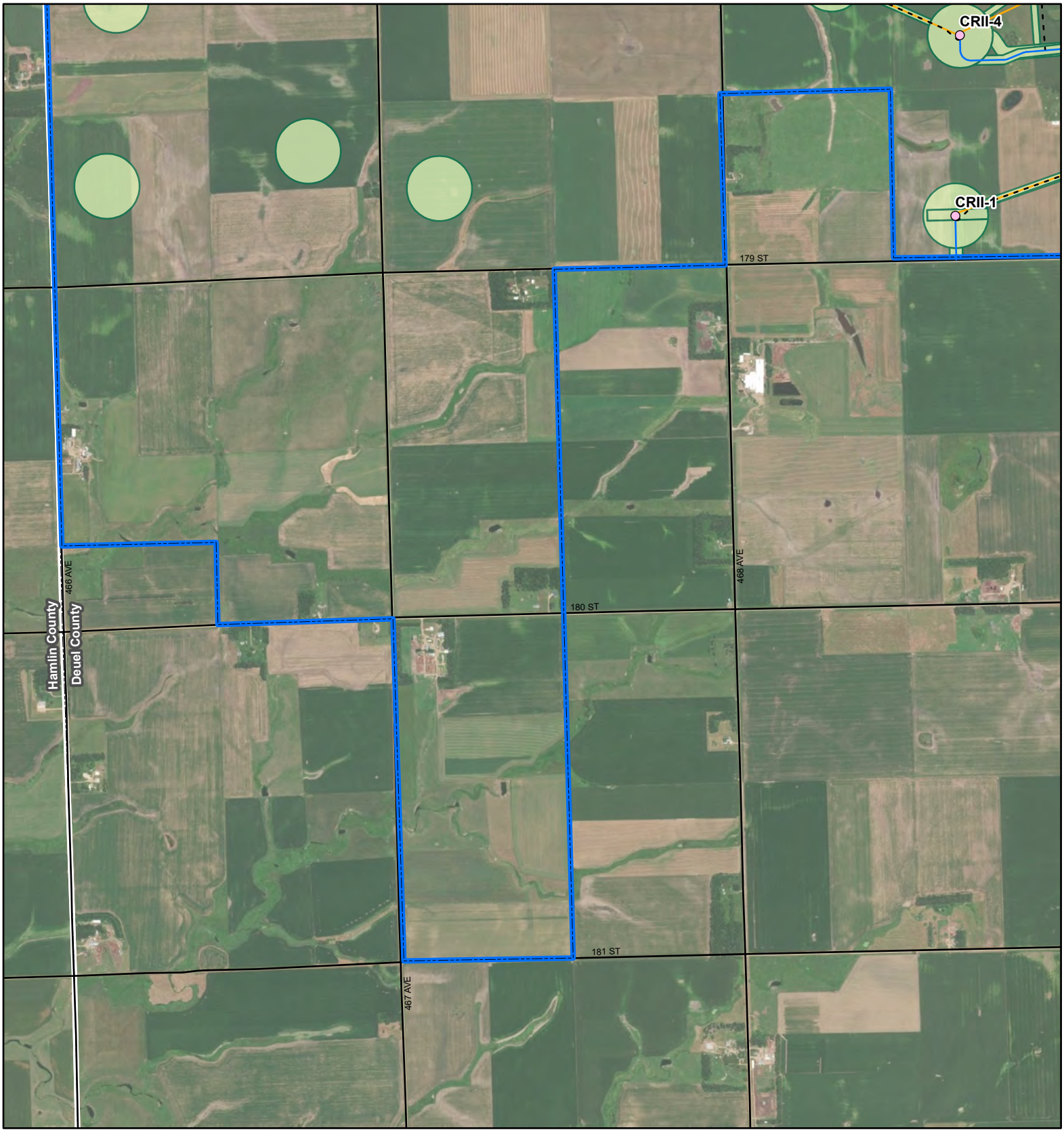
Miles
0 0.25 0.5

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Bemis (1978)

Township/Range: T116N, R50W & T115N, R50W
Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS



Dakota Skipper

Crowned Ridge II Wind Farm

100 MW Array

- Turbine Location (GE 2.3 MW turbine (90m hh))
- Access Road
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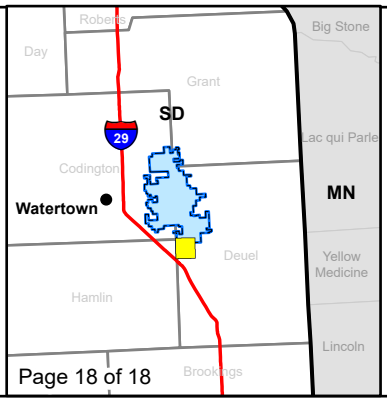

Kilometers
0 0.5 1

Miles
0 0.25 0.5

N W E S

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community
Quadrangle: Kranzburg SW (1981), Bemis (1978)
Township/Range: T115N, R50W

Deuel County, South Dakota

Projection: NAD 1983 UTM Zone 14N

SWCA ENVIRONMENTAL CONSULTANTS

APPENDIX C

Post-construction Fatality Monitoring Protocol

1 STANDARDIZED FATALITY MONITORING

The following sections describe the protocol Xcel Energy will implement for standardized fatality monitoring following transfer of the Project and Crowned Ridge to Xcel Energy. This monitoring framework consists of standardized carcass searches conducted at a sample of the Project turbines. The number of fatalities found during searches represents a minimum number of fatalities at a project because not all fatalities that occur are found by observers. Therefore, carcass persistence trials and searcher efficiency trials will be conducted concurrently with standardized fatality monitoring to account for the bias attributable to carcass removal by scavengers and searcher efficiency. Fatality rates (e.g., birds/turbine/year and birds/operational MW/year) will then be estimated using statistical methods that adjust the number of carcasses found for detection biases. Per-turbine and per-megawatt estimates provide different ways of scaling fatality information to be comparable to other projects. Annual fatality rates will be calculated for all bird species combined, small (less than or equal to 10 inches) and large (greater than10 inches) birds, raptors, and sensitive species (collectively). In some cases, the sample size for a species group of interest, such as eagles or other sensitive species, may be too small to allow for the calculation of accurate fatality estimates. In these cases, numerical counts of total fatalities detected during standardized and operational searches for each of these species or species groups will be substituted in place of rate estimates.

The field and analytical methods described below are consistent with post-construction fatality monitoring being conducted, or proposed, for other wind projects elsewhere in the United States (Johnson et al. 2003; Young et al. 2003; Jain et al. 2007; Huso 2011; Strickland et al. 2011).

Methods and timing outlined here may be modified over the course of the study as Project-specific information is gained to maximize the effectiveness and efficiency of the monitoring program (e.g., search interval, number of turbines searched, plot size).

1.1 Standardized Carcass Searches

The objective of the fatality monitoring is to identify the bird and bat species found as fatalities at the Project and to statistically estimate fatality rates. This section outlines the methods for the standardized carcass searches, which constitutes the initial step in generating the fatality estimate (i.e. finding the carcasses under the turbines). These values then will be adjusted to account for detection bias (see below). The methods for standardized carcass searches include the sampling duration and intensity, search plot size and configuration, and fatality documentation.

1.2 Sampling Duration and Intensity

Standardized post-construction fatality monitoring will consist of standardized searches of approximately 30 percent of the turbines and will be conducted for the first year of operation. To avoid bias in the fatality estimate, turbines will be selected in a stratified random manner based on habitat type and topography. To do this, habitat and topography will be determined for each turbine location and the sample turbines randomly selected from the habitat and topography categories in proportion to how often they occur in these categories. The same turbines will be searched the entire year of the baseline monitoring period to avoid confounding effects from individual turbines.

The survey year will be divided into seasons to allow for the inclusion of season-specific searcher efficiency probabilities and carcass persistence times. Searches at each of the designated turbines will initially be conducted every 2 weeks. However, search frequency may be adjusted based on the results of seasonal carcass persistence trials in order to ensure that on average, the search interval minimizes the bias associated with carcass removal by scavengers (see below).

Seasonal sampling intervals will be as follows:

- Spring: March 16–June 15
- Summer: June 16–September 14
- Fall/Winter: September 15–December 15

1.3 Search Plot Size and Configuration

It is anticipated that the turbine and roads will remain clear of vegetation. The search area will consist of a square search plot centered on the turbine. The minimum distance from the turbine to the perimeter of the square will be eighty (80) percent of the turbine height. The search plot size is based on recommendations from the USFWS (2012). Search areas will include maintained turbine pads and access roads, as well as adjacent unmaintained areas. The actual area searched will ultimately be dependent on the configuration of the maintained areas, as well as the portion of the unmaintained area that can be realistically searched as determined during the initial surveys.

Linear transects will be established within the search plots approximately 6 meters (20 feet) apart (USFWS 2012). The searchers will walk along each transect searching both sides out to 3 meters (10 feet) for fatalities. Personnel trained and tested in proper search techniques will conduct the carcass searches.

1.4 Fatality Documentation

During the set-up for carcass surveys, a sweep survey will be conducted to remove any fatalities that occurred before the study is initiated. These carcasses will be documented in the same manner as those found during the standardized carcasses searches; however, they will not be included in the statistical analysis because the statistical analysis requires a known search interval (i.e. an estimate of when fatalities occurred).

Searchers will assume that carcasses found are a result of turbine collisions unless the cause of death can be clearly attributed to a non-turbine cause. Although an unknown number of fatalities may result from natural predation, disease, or anthropogenic events (e.g., shooting), the condition of the carcasses when found rarely facilitates determining the cause of death.

Carcasses found during standardized carcass searches will be assigned a unique number, and species, sex, age, date, time found, location (global positioning system [GPS] coordinate, and distance/direction from the turbine), condition (e.g., intact, scavenged, feather spot), observer, turbine number, and any comments that may indicate cause of death will be collected. All carcasses will be photographed in situ. Once documented, carcasses will be marked in a standardized fashion (e.g., clipping of primary flight feathers) to indicate they have already been recorded.

Searchers may discover carcasses incidental to standardized carcass searches (e.g., outside of a search plot or of a scheduled survey date). For each incidentally discovered carcass, the searcher will identify, photograph, and record data for the carcass, as would be done for carcasses found during standardized scheduled searches but will code these carcasses as incidental discoveries. Incidental discoveries will not enter into the statistical calculation of fatality rate for reasons noted above for carcasses found during initial set-up.

All native birds in North America are protected under the MBTA and cannot be salvaged without a permit from the USFWS. In addition to a federal permit, a South Dakota Scientific Collectors permit is needed from SDGFP to handle native wildlife. Following ownership transfer of the Project to Xcel Energy, Xcel Energy may collect carcasses detected during post-construction monitoring to be reused, if possible, during bias correction trials described below. As a result, Xcel Energy will obtain any and all necessary permits for scientific collecting purposes. If the carcass of a federally listed species or bald eagle is found, searchers will notify Jayme Orrock (contact information in Section 5 of this appendix).

1.5 Bias Correction Trials

Carcass persistence time estimates the amount of time a carcass remains on-site prior to its disappearance from the search area due to scavenging or other means (e.g., due to forces such as wind and rain or decomposition beyond recognition). The objective of the carcass persistence trials is to document the length of time carcasses remain in the search area. Carcass persistence trials will be conducted in multiple seasons to evaluate seasonal differences in carcass persistence (i.e. due to changes in scavenger population density or type) and possible differences in the size of the animal being scavenged.

Carcasses used in the trials will be selected to represent a range of species sizes, including bats. For large birds, carcasses may include domestic waterfowl, pheasant, or similar species legally obtained from game farms. For small birds and bats, carcasses may include European starlings, house sparrows, or other non-native species not legally protected. For bats, we may also use mice.

Assuming adequate carcass availability, one carcass persistence trial will be conducted during each of the spring, summer, and fall/ winter seasons with at least 15 carcasses of each bird size class (large bird, small bird, and bat) placed per season.

Each carcass used for the carcass persistence trial will be placed randomly within the area used for the trials. Random locations will be generated and loaded into a GPS as waypoints to allow the accurate placement of the carcasses by field personnel. Carcasses will be dropped from waist height and allowed to land in a random posture. Each trial carcass will be discreetly marked (e.g., small tag or wire wrapped around one leg) prior to dropping so that it can be identified as a study carcass if it is found by other searchers or wind facility personnel. Personnel will monitor the trial carcasses on days 1, 2, 3, 4, 7, 10, 14, 21, and 30. When checking the carcass, searchers will record the condition as intact (normal stages of decomposition), scavenged (feathers pulled out, chewed on, or parts missing), feather spot (only feathers left), or gone (cannot be found). Changes in carcass condition will be cataloged with pictures and detailed notes; photographs will be taken at placement and any time major changes have occurred. At the end of the 30-day period, any evidence of carcasses that remain will be removed and properly disposed of.

Estimates of the probability that a carcass persisted between search intervals and therefore was available to be found by searchers, will be used to adjust carcass counts for bias using methods presented in Huso 2011 or similar analysis method. To date, Huso (2011) presents the most bias-free equation for determining the average probability of persistence, which takes into account the length of the search interval and the carcass persistence time:

$$\hat{r} = \frac{\hat{\bar{t}}(I - e^{-I/\hat{\bar{t}}})}{I}$$

Where t is the estimated mean persistence time and I is the length of the interval. A bootstrapped estimate and 90 percent confidence interval will be calculated based on 5,000 iterations for carcass persistence time. Bootstrapping is a statistical re-sampling procedure where the data are re-sampled with replacement to obtain an estimate and confidence interval.

1.6 Searcher Efficiency Trials

The ability of searchers to detect carcasses is influenced by a number of factors including the skill of an individual searcher in finding the carcasses, the vegetation composition within the search area, and the characteristics of individual carcasses (e.g., body size, color). The objective of searcher efficiency trials is to estimate the percentage of bird and bat fatalities that searchers are able to find. Estimates of searcher efficiency are then used to adjust carcass counts for detection bias. Searcher efficiency trials will be conducted in all seasons to account for seasonal differences in searcher efficiency. Carcass species used in the trials and marking and placement techniques will be the same as those in the carcass persistence trials.

Searcher efficiency trials will begin when standardized carcass searches start. Personnel conducting the searches will not know when trials are conducted or the location of the efficiency-trial carcasses. Trials will be conducted multiple times throughout each season and will incorporate testing of each member of the field crew. Assuming adequate carcass availability, at least 15 carcasses of each bird size class (large bird, small bird, and bat) will be placed per season for searcher efficiency trials. A minimum of 10 carcasses per size and season are needed to estimate searcher efficiency. Searcher efficiency trials will be conducted at the monitored turbines. The number of carcasses placed prior to the search (i.e. the number available for detection during each trial) will be verified immediately after the trial by the person responsible for distributing the trial carcasses. Any carcasses not found by searchers will be collected after the trial.

The probability of a carcass being observed is expressed as p, the proportion of trial carcasses that are detected by searchers in the searcher efficiency trials. The probability will be estimated by carcass size class (large bird, small bird, bat) and season. A bootstrapped estimate and 90 percent confidence interval will be calculated based on 5,000 iterations for searcher efficiency.

1.7 Fatality Rate Estimation

To calculate the Project-wide fatality rate (fatalities/turbine/year and fatalities/MW/year) and the total Project fatalities, the Huso estimator (Huso 2011) or other appropriate statistical methods will be used. The fatality rate can be calculated for subgroups, including large birds, small birds, raptors (including eagles), bats, or sensitive species (including BCC and state species of conservation priority) if at least 5 fatalities within the subgroup are found.

The estimation of fatality rates will incorporate fatalities documented during standardized carcass searches adjusted for bias. Specifically, fatality estimates will take into account:

- Search interval;
- Observed number of carcasses found during standardized searches during the monitoring year for which operation of the facility cannot be ruled out as the cause of death;
- Carcass persistence, expressed as the probability that a carcass is expected to remain in the study area (persist) and be available for detection by the searchers during carcass persistence trials; and
- Searcher efficiency, expressed as the probability of trial carcasses found by searchers during searcher efficiency trials.

The Huso estimator (2011) uses the following equation to estimate fatalities:

=

Where f^_ijk is the estimated fatality at the ith turbine during the jth search in the kth category and cijk is the observed number of carcasses at the ith turbine during the jth search in the kth category. The variable r^_jk is a function of the average carcass persistence time, which was described earlier, and the length of the search interval preceding a carcass being discovered. The variable r^_jk is calculated using the lower value of I, the actual search interval when a carcass is found or (I,)˜ ^the effective search interval, and is estimated through searcher efficiency trials previously described. v^_jk is the proportion of the effective search interval sampled where v^= min (1, Ĩ⁄). p^_jk is the estimated probability that a carcass in the kth category that is available to be found will be found during the jth search. The variables p^_(jk,) r^_(jk,) and v^_jk are assumed not to differ among turbines but can differ with carcass type, size class, and season. To obtain an estimate of the number of fatalities per turbine the following equation is used:

Where ni is the number of searches at turbine i (i = 1…u) and t is the effective number of turbines searched. A bootstrapped estimate and 90 percent confidence interval will be calculated based on 5,000 iterations for the fatality estimate. The 90 percent confidence interval represents the upper and lower bounds of the range of fatality rates that has a 90 percent probability of containing the true fatality rate. The 90 percent confidence interval is useful in a management context as a means of assessing the range of fatality rates that are probable given the number of carcasses that were detected. It should be noted that the upper 90 percent confidence limit corresponds to 95 percent probability that the true fatality rate is lower than the upper 90 percent confidence limit.

2 OPERATIONAL FATALITY MONITORING

O&M staff will conduct inspections for bird and bat fatalities each time a turbine is visited as an auxiliary effort to regular operations and maintenance activities. Any carcasses discovered by O&M staff will be recorded as incidental fatalities. Incidentally found wildlife will be documented for the life of the wind farm to identify wildlife concerns should they arise.

2.1 Training

All operations personnel will be trained to identify potential wildlife conflicts and the proper response, and training records will be maintained on-site. This training will include sensitivity to birds and other wildlife. An incidental reporting process will be developed for operations personnel ensuring they can document bird or bat casualties during routine maintenance work and at other times that they are within the Project Area. Incidentally found wildlife will be reported according to federal and state collection permits, as applicable.

Any injured wildlife observed during operations of the Project will be left in place until Crowned Ridge's primary environmental representative has been contacted (see below for contact information). The environmental representative will decide the most appropriate course of action depending on the condition and species of injured animal discovered. All injured eagles or federally-listed species will be handled in accordance with applicable federal and state collection permits, as applicable, or as directed by appropriate law enforcement personnel.

3 HABITAT STUDIES

Based on avoidance and minimization measures implemented during siting of project facilities and results of Tier 3 studies, no habitat loss, degradation, or fragmentation effects are anticipated that warrant specific post-construction monitoring studies.

4 ADAPTIVE MANAGEMENT

Post-construction monitoring will be adaptively managed to adjust search protocols and frequency as needed to optimize data inputs for the statistical estimator. Xcel Energy will coordinate any adjustments with USFWS, SDGFP, and SDPUC.

5 KEY RESOURCES

Name	Role, Organization	Contact Information
Nick Humphreys, Construction	Associate Environmental Specialist, Crowned Ridge	C: 561.339.9968; O: 561.691.7352 Nicholas.Humphreys@nee.com
Jayme Orrock, Operations	Xcel Energy	C: 612.321.3275: O: 435.590.0549
Natalie Gates	Ecological Services, South Dakota Field Office, USFWS	605.224.8693, ext: 227 natalie_gates@fws.gov
Hilary Moore	Environmental Review Senior Biologist, SDGFP	605.773.6208 Hilary.Morey@state.sd.us

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