



ENVIRONMENTAL & STATISTICAL CONSULTANTS

4007 State Street, Suite 109, Bismarck, ND 58503
Phone: 701-250-1756 • www.west-inc.com • Fax: 701-250-1761

TECHNICAL MEMORANDUM

Date: June 20, 2017

To: Jennie Geiger, Apex Clean Energy Management, LLC

From: Western EcoSystems Technology, Inc.

Subject: Dakota Range Wind Project – Raptor Nest Survey Memo

INTRODUCTION

Apex Clean Energy Management, LLC. (Apex) is developing of the Dakota Range Wind Project (Project), in Coddington and Grant Counties, South Dakota. At Apex's request, Western EcoSystems Technology, Inc. (WEST) conducted an aerial raptor nest survey to record bald eagle (*Haliaeetus leucocephalus*) nests in or within 10 miles and other raptor nests in or within 1 mile of the Project. The purpose of the raptor nest survey report is to characterize the raptor nesting community in the Project vicinity for use in risk analysis and siting of facilities. The aerial survey was conducted in accordance with the guidance provided in the U.S. Fish and Wildlife Service (USFWS) *Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy, Version 2* (ECPG; USFWS 2013), the USFWS *Interim Golden Eagle Inventory and Monitoring Protocols; and Other Recommendations* (Pagel et al. 2010), and by South Dakota Game, Fish and Parks Department.

PROJECT AREA

The Project, at the time of the raptor nest survey, was about 46,450 acres (18,798 hectares). The Project is located in the Northern Glaciated Plains Level III Ecoregion (U.S. Environmental Protection Agency [USEPA] 2016) with about 92% of the Project in the Big Sioux Basin Level IV Ecoregion and the remainder in the Prairie Coteau. The predominant land cover/use types within the Project include approximately 56% cultivated crops and 37% herbaceous (grassland; Figure 1). The remaining land cover/use types account for less than 5%, respectively (U.S. Geological Survey [USGS] National Land Cover Database [NLCD] 2011, Homer et al. 2015). The most common cultivated cropland in 2016 was corn (*Zea mays*) and soybeans (*Glycine max*; U.S. Department of Agriculture [USDA] National Agricultural Statistics Service [NASS] 2016). Ownership within the Project area is largely private (USGS Protected Areas Database of the United States [PADUS] 2012); however

there are five Dakota Tallgrass Prairie Wildlife Management Areas totaling about 860 acres (348 hectares) within the Project.

According to the National Wetlands Inventory (NWI; USFWS NWI 2007), about 624 acres (253 hectares) of the Project area is composed of wetlands, of which about 78% of those wetlands are classified as freshwater emergent wetlands. The next most common wetland type was freshwater pond (10% of wetlands). The Big Sioux River flows through the northwestern portion of the Project. Mahoney Creek flows through the southern portion before joining the Big Sioux River. Mud Creek is within the Project, farther south than Mahoney Creek. Soo Creek flows through the central area of the Project before joining the Big Sioux River.

METHODS

One aerial survey was conducted from an R44 helicopter between April 11-14, 2017, a period before leaf-out when raptors would be actively tending to a nest or incubating eggs. An experienced raptor ecologist and a helicopter pilot skilled in wildlife surveys conducted the survey. Raptors are defined here as kites, accipiters, buteos, harriers, eagles, falcons, and owls (Buehler 2000). Raptor nest surveys focused on locating stick nest structures in suitable raptor nesting substrate (trees, transmission lines, cliff faces, etc.) within and around the proposed Project (Figure 2). The survey within the Project boundary and 1-mile (mi; 1.6 kilometer [km]) buffer documented all potential raptor nests, including bald eagles, while the surveys out to the 10-mi (16.1 km) buffer focused only on identifying potential bald eagle nests.

In general, all potential bald eagle and raptor nest habitat was surveyed by flying meandering transects between 0.25 and 1.0 mi (0.8 and 1.6 km) apart, flying at speeds of approximately 46 miles per hour (mph; 74 km per hour). Surveys were typically conducted between 07:00 hours and 18:00 hours. The helicopter was positioned to allow thorough visual inspection of the habitat, and in particular, to provide a view of the tops of the tallest dominant trees where bald eagles generally prefer to nest (Buehler 2000). The locations of all potential raptor nests were recorded using a hand-held Global Positioning System. To determine the status of a nest, the biologist evaluated behavior of adults on or near the nest, and presence of eggs, young, whitewash, or fresh building materials. Attempts were made to identify the species of raptor associated with each active nest. Raptor species, nest type, nest status, nest condition, and nest substrate were recorded at each nest location to the extent possible. Efforts were made to minimize disturbance to breeding raptors and nestlings; the greatest possible distance at which the species could be identified was maintained, with distances varying depending upon nest location and wind conditions.

Terminology

Included below are descriptions of terms used during the documentation of nests (see Results section), in accordance with the USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013).

Nest ID - WEST assigned a unique nest identification number for each nest documented.

Species - A species was assigned to each nest when possible, otherwise, it was classified as an unknown raptor nest. Nests documented as unknown raptor species are defined as any stick nest that did not have an occupant associated with it at the time of the survey. Unknown raptor nests, including old nests or nests that could become suitable for raptors, are documented in order to populate a nest database to ensure that future surveys include all potentially suitable nest sites.

Nest Condition - Nest condition was categorized as either “good” or in “disrepair”. Although the determination of nest condition can be subjective and may vary between observers, it gives a general sense of when a nest or nest site may have last been used. Nests in disrepair were sloughing or sagging heavily, and they would require some level of effort to rebuild in order to be suitable for successful nesting. Nests in good condition are those that appear to have been well maintained, have a well-defined bowl shape, are not sagging or sloughing, and appear to be suitable for nesting.

Substrate - The substrate in which a nest was observed was recorded to provide observers a visual reference. Substrates can range from human-made structures (such as power lines, nest platforms, etc.) to biological and physical structures (conifer and deciduous tree species or cliff faces).

Nest Status - WEST categorizes basic nest use consistent with definitions from the ECPG. Nests were classified as occupied if any of the following were observed at the nest structure: (1) an adult in an incubating position, (2) eggs, (3) nestlings or fledglings, (4) occurrence of a pair of adults (or, sometimes, sub-adults), (5) a newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed early in the breeding season, or (6) a recently repaired nest with fresh sticks (clean breaks) or fresh boughs on top, and/or droppings and/or molted feathers on its rim or underneath. Occupied nests were further classified as active if there was an adult on the nest in incubating position, an egg or eggs had been laid or nestlings were observed, or inactive if no eggs or chicks were present. A nest that does not meet the above criteria for “occupied” was classified as “unoccupied”.

RESULTS

Five occupied bald eagle nests were observed in 2017 (Table 1; Figure 2). Another bald eagle nest, occupied and active in 2016, was unoccupied this year. None of the nests were located within the Project or 1-mile buffer, with the nearest occupied bald eagle nest located 1.8 miles to the west of the Project area.

Fifteen occupied and 17 unoccupied non-eagle raptor nests were located within the Project and 1-mile buffer (Table 1). The occupied nests were primarily common species (11 red-tailed hawk, three great horned owl, and one unknown non-eagle raptor).

Dakota Range Wind Project 2017 Raptor Nest Survey

Table 1. Summary details of raptor nests observed during aerial surveys at the Dakota Range Wind Project in April 2017. The projection for the Eastings and Northings is UTM, NAD83, zone 14N, units meters.

Nest ID	Date	Species	Nest Status	Nest Condition	Nest Substrate	Easting	Northing	Comments
DR-02	4/14/2017	Bald Eagle-	Unoccupied and Inactive	Good	Tree	656683	5015346	historic nest, empty nest at present
DR-04	4/11/2017	Bald Eagle	Occupied and Active	Good	Tree	664183	4998089	incubating
DR-05	4/12/2017	Bald Eagle	Occupied and Active	Good	Tree	668982	4987799	incubating
DR-06	4/14/2017	Bald Eagle	Occupied and Active	Good	Tree	657338	5026118	adult eagle incubating, recently repaired nest with fresh sticks
DR-07	4/12/2017	Bald Eagle	Occupied and Active	Good	Tree	627065	5012621	two adults, 1 sitting on nest & 1 in nearby tree, recently repaired nest w/fresh sticks
DR-08	4/12/2017	Bald Eagle	Occupied and Active	Good	Tree	645705	4997072	incubating
DR-09	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	657228	5011325	
DR-10	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	650370	5010853	incubating
DR-11	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	647920	5010051	
DR-12	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	649315	5008179	
DR-13	4/11/2017	Great Horned Owl	Occupied and Active	Good	Tree	652161	5007756	brooding
DR-14	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	660063	5005748	incubating
DR-15	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	662673	5005132	
DR-16	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	642188	5005440	
DR-17	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Disrepair	Tree	640664	5004526	
DR-18	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	646958	5004800	incubating
DR-19	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	648079	5004596	
DR-20	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	653328	5004388	
DR-21	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	656794	5004083	incubating
DR-22	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	658226	5004311	

Table 1. Summary details of raptor nests observed during aerial surveys at the Dakota Range Wind Project in April 2017. The projection for the Eastings and Northings is UTM, NAD83, zone 14N, units meters.

Nest ID	Date	Species	Nest Status	Nest Condition	Nest Substrate	Easting	Northing	Comments
DR-23	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Disrepair	Tree	646617	5003232	2 nests at this point
DR-24	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Disrepair	Tree	644743	4999907	
DR-25	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	659675	5000201	incubating
DR-26	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	651360	4999427	
DR-27	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	652970	4998674	
DR-28	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Disrepair	Tree	656956	4998512	
DR-29	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	658719	4998526	incubating
DR-30	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	650203	4996885	incubating
DR-31	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	655736	4997111	
DR-32	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	654779	4996743	
DR-33	4/11/2017	Great Horned Owl	Occupied and Active	Good	Tree	657473	4995369	brooding
DR-34	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	656486	4993632	incubating
DR-35	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Disrepair	Tree	656753	4993641	
DR-36	4/11/2017	Great Horned Owl	Occupied and Active	Good	Tree	648722	4991537	brooding
DR-37	4/11/2017	Unknown Raptor	Occupied and Inactive	Disrepair	Tree	651712	4990376	
DR-38	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	653503	4988308	
DR-39	4/11/2017	Unknown Raptor	Unoccupied and Inactive	Good	Tree	656428	4988601	
DR-40	4/11/2017	Red-tailed Hawk	Occupied and Active	Good	Tree	654616	4987289	incubating

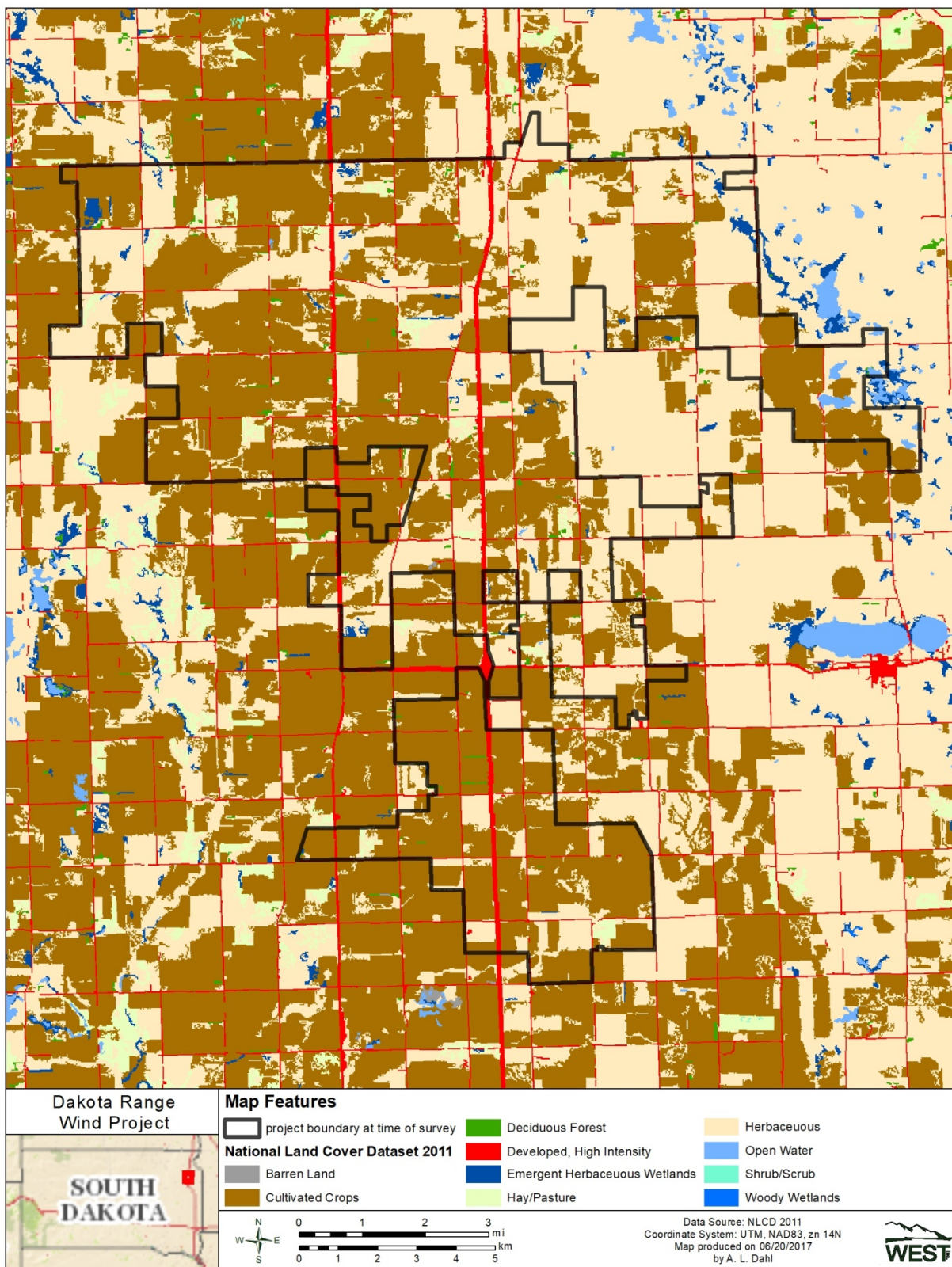


Figure 1. Land cover and use at the Dakota Range Wind Project.

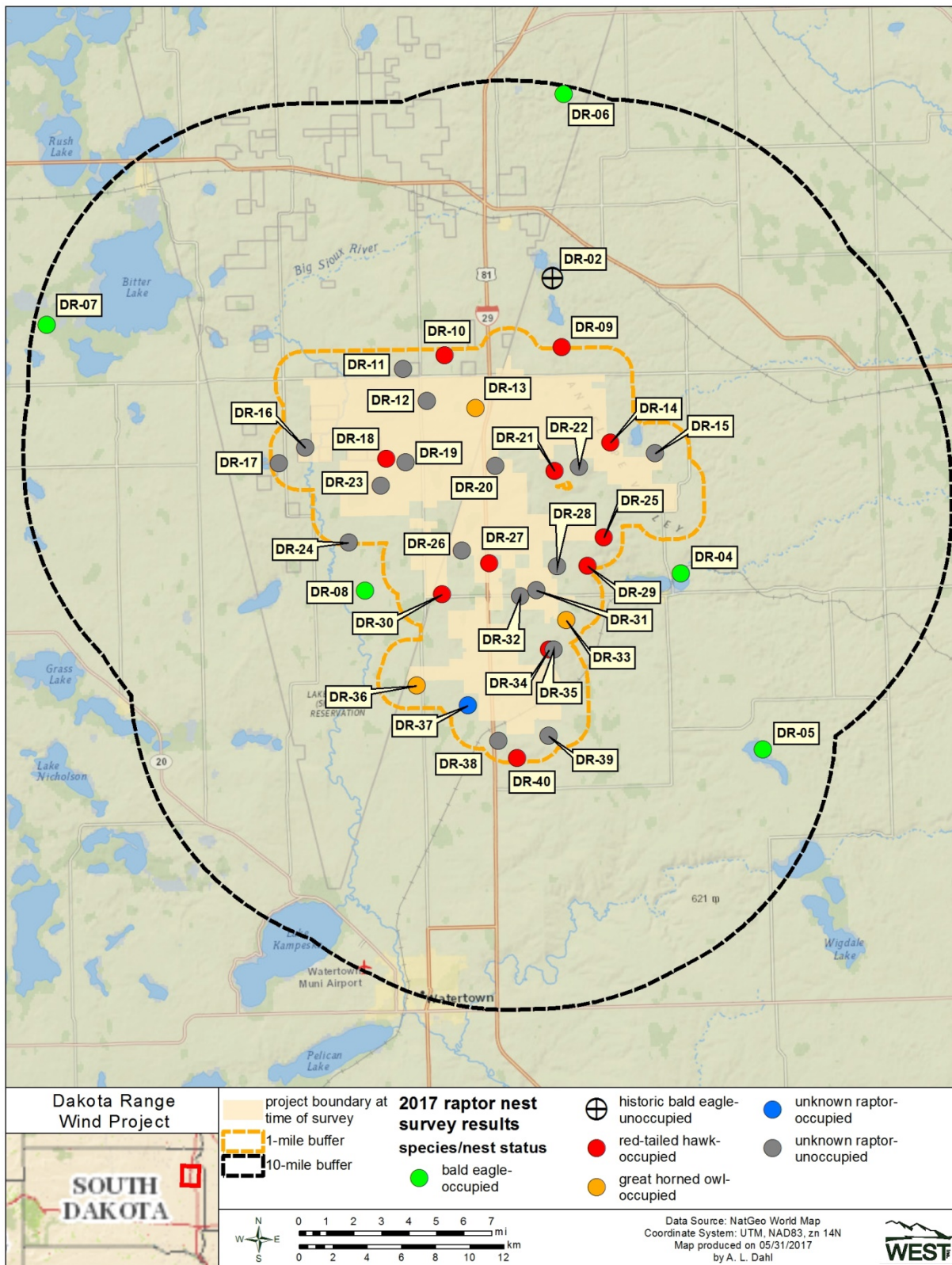


Figure 2. Raptor nests observed during aerial surveys at the Dakota Range Wind Project in April 2017.

CONCLUSIONS

Red-tailed hawks, great horned owls, and bald eagles are common raptor species that breed throughout South Dakota. Lack of bald eagle nests within the Project or within two miles of the Project minimizes potential impacts to the species.

REFERENCES

- Buehler, D. A. 2000. Bald Eagle (*Haliaeetus leucocephalus*), Number 506 in A. Poole and F. Gill, editors, *The Bird of North America*. The Birds of North America, Inc. Philadelphia, Pennsylvania
- Homer, C. G., J. A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N. D. Herold, J. D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the Conterminous United States-Representing a Decade of Land Cover Change Information. *Photogrammetric Engineering and Remote Sensing* 81(5): 345-354. Available online from: <http://www.mrlc.gov/nlcd2011.php>
- Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance. US Fish and Wildlife Service (USFWS). February 2010. Available online at: http://steinadlerschutz.lbv.de/fileadmin/www.steinadlerschutz.de/terimGoldenEagleTechnicalGuidanceProtocols25March2010_1_.pdf
- U.S. Department of Agriculture (USDA) A National Agricultural Statistics Service Cropland Data Layer. 2016. Published crop-specific data layer [Online]. Available at <https://nassgeodata.gmu.edu/CropScape/> (accessed June 5, 2017). USDA-NASS, Washington, DC.
- U.S. Environmental Protection Agency (USEPA). 2016. Ecoregion Download Files by State - Region 8: South Dakota. Ecoregions of the United States, Ecosystems Research, USEPA. Accessed June 5, 2017. Information and maps available online at: <https://www.epa.gov/eco-research/ecoregion-download-files-state-region-8#pane-39>
- US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). 2007. Region 3 NWI, Midwest Region: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin. <http://www.fws.gov/wetlands/data/index.html>, NWI data at: <http://www.fws.gov/wetlands/Data/ Mapper.html> and <http://www.fws.gov/midwest/>
- U.S. Fish and Wildlife Service (USFWS). 2013. *Eagle Conservation Plan Guidance: Module 1-Land-based Wind Energy Version 2*. Available at: https://www.fws.gov/ecological-services/es-library/pdfs/Eagle_Conservation_Guidance-Module%201.pdf
- U.S. Geological Survey (USGS). 2011. National Land Cover Database 2011 (NLCD 2011). Multi-Resolution Land Characteristics Consortium (MRLC), National Land Cover Database (NLCD). USGS Earth Resources Observation and Science (EROS) Center, Sioux Falls, South Dakota. Information available online at: <http://www.mrlc.gov/nlcd2011.php>

US Geological Survey (USGS). 2012. Protected Areas Database of the United States (PADUS), Version 1.2 Data Download. USGS Gap Analysis Program Protected Areas Viewer. Webpage last modified March 2, 2012 Download available online at: <http://gapanalysis.usgs.gov/padus/download/>