2017 Eagle Nest Survey

Crocker Wind Farm

Clark County, South Dakota

Prepared for:

Crocker Wind Farm, LLC

7650 Edinborough Way, Suite 725
Edina, Minnesota 55425

Prepared by:

Western EcoSystems Technology, Inc.

7575 Golden Valley Road, Suite 350
Golden Valley, Minnesota 55427

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STUDY PARTICIPANTS

Western EcoSystems Technology, Inc.

Todd Mattson	Senior Manager
Joyce Pickle	Project Manager
Jordan Harrison	Biologist
Adam Kreger	GIS Specialist

REPORT REFERENCE

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INTRODUCTION

Crocker Wind Farm, LLC is considering the development of a utility-scale wind energy project, the Crocker Wind Farm (Project), in Clark County, South Dakota. At Crocker Wind Farm, LLC's request, Western EcoSystems Technology, Inc. (WEST) conducted an aerial raptor nest survey to record bald eagle (*Haliaeetus leucocephalus*) nests in and near the Project area. This survey will aid in assessing potential effects of the Project on eagles. The aerial survey was conducted in accordance with the guidance provided in the US Fish and Wildlife Service (USFWS) *Eagle Conservation Plan Guidance* (ECPG; USFWS 2013) and the USFWS *Interim Golden Eagle Technical Guidance* (Pagel et al. 2010).

SURVEY AREA

The survey area for bald eagle nests consisted of a 10-mile (mi; 16.1-kilometer [km]) buffer of the Project boundary (Figure 1). The Project is located in Clark County, in northeast South Dakota, approximately 33 mi (53.6 km) west of Watertown (Figure 1). The Project is located in the eastern South Dakota Prairie Coteau Level IV Ecoregion, within the Northern Glaciated Plains Level III Ecoregion, which covers much of eastern North and South Dakota. The Northern Glaciated Plains Ecoregion is characterized by a flat to gently rolling landscape composed of glacial drift. The climatic characteristics of the region foster a grassland transitional between tall and shortgrass prairie, known as the mixed-grass prairie. High concentrations of temporary and seasonal wetlands (prairie potholes) create favorable conditions for waterfowl nesting and migration. Although the till soils are very fertile, the northern mixed-grass prairie is greatly influenced by wet-dry cycles; agricultural output in the region is subject to these annual climatic variations (USEPA 2013, USEPA 2015).

METHODS

Aerial Eagle Nest Survey

One aerial survey was conducted from a helicopter April 13-14 and April 18, 2017, a period before leaf out when eagles would be actively tending to a nest or incubating eggs. Aerial surveys were conducted in accordance with the guidance provided in the ECPG (USFWS 2013) and the USFWS *Interim Golden Eagle Technical Guidance* (Pagel et al. 2010). An experienced raptor ecologist and a skilled helicopter pilot conducted the survey. The main focus of the survey was to identify bald eagle nests. Surveyors focused on locating eyries (large, stick nest structures) in suitable eagle nesting substrate (trees, transmission lines, etc.) within and around the proposed Project (Figure 1). Pre-flight planning included the creation of field maps and mobile Geographic Information System (GIS) files and review of relevant background information, such as previously recorded nest locations, topographic maps, and aerial photographs.

Surveys within the Project boundary and 10-mi (16.1-km) buffer focused only on identifying potential bald eagle nests. Efforts were made to minimize disturbance to breeding eagles; the greatest possible distance at which the species could be identified was maintained, with distances varying, depending upon nest location and wind conditions.

In general, all potential bald eagle nest habitat was surveyed by flying meandering transects between 0.25 – 1.0 mi (0.8 – 1.6 km) apart, flying at speeds of approximately 46 miles per hour (mph; 74 km per hour) when actively scanning for nests. Surveys were typically conducted between 07:00 hours and 18:00 hours.

The survey track was recorded using a handheld Global Positioning System (GPS) unit to ensure that all areas were adequately covered. 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 handheld GPS. This included all confirmed and potential nests regardless of their activity status.

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.

Terminology

Included below are descriptions of terms used during the documentation of nests (see Results section).

Nest ID –A unique nest identification number was assigned 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 were defined as any stick nest not having an occupant associated with it at the time of the survey. Many times nests become abandoned or are no longer used, and over time, may become a historic nest site. Unknown raptor nests, including old nests or nests that could become suitable for raptors, were documented in order to populate a nest database to ensure 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 was last used. Nests in good condition appeared well maintained, had a well-defined bowl shape, were not sagging or sloughing, and appeared suitable for nesting. Nests in disrepair were sloughing or sagging heavily, and required effort to restore for successful nesting.

Substrate Nest substrate was observed and recorded providing observers a visual reference. Substrates included manmade structures such as power lines, nest platforms, and dock hoists, and biological and physical structures included conifer and deciduous tree species or cliff faces.

Nest Status - Nest status was categorized using definitions consistent with the USFWS 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) a pair of adults (sometimes sub-adults), (5) a newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed earlier 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 (1) an adult was present on the nest in incubating position, (2) an egg or eggs were present, or (3) nestlings observed. Nests were classified as inactive if no eggs or chicks were present. Nests not meeting the above criteria for “occupied” were classified as “unoccupied”.

RESULTS

A total of five bald eagle nests were detected during the aerial survey on April 13-14 and April 18, 2017 (Table 1). Four occupied and active bald eagle nests and one unoccupied and inactive nest which appeared consistent in size and shape with a bald eagle nest were documented. The mean inter-nest distance for active bald eagle nests observed during the 2017 aerial survey was approximately 12.0 mi (19.4 km), with a half-mean inter-nest distance of 6.0 mi (9.7 km).

The following section provides more details on each eagle nest documented during the aerial survey:

Nest 1717 – this nest was located approximately 9.23 mi (14.85 km) southeast of the Project boundary. This nest was not observed during the 2016 raptor nest survey at the Project. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017 (Figure 1, Appendix A).

Nest 1718 – this nest was located approximately 5.28 mi (8.50 km) east of the Project boundary. This nest was not observed during the 2016 raptor nest survey at the Project; however, it is located approximately 0.25 mi (0.5 km) from Nest 1719 that was observed in 2016 but was determined to be inactive this season (more details below). The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017 (Figure 1, Appendix A).

Nest 1719 – this nest was located approximately 4.99 mi (8.03 km) east of the Project boundary. The nest was in good condition. No eagles, eggs or young were identified in the nest, and no new materials were observed. This nest was documented in the 2016 raptor nest survey at the Project, and was occupied and active in 2016. Due to the proximity to Nest 1718, it is

likely that this nest is an alternate nest site within the same territory as Nest 1718. The nest is therefore considered unoccupied and inactive in 2017 (Figure 1).

Nest 1740 – this nest was located approximately 3.18 mi (5.12 km) north of the Project boundary. This nest was observed during the 2016 raptor nest survey at the Project, and was occupied and active in 2016. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017 (Figure 1, Appendix A).

Nest 1741 – this nest was located approximately 4.06 mi (6.53 km) southwest of the Project boundary. This nest was not observed during the 2016 raptor nest survey at the Project. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017 (Figure 1, Appendix A).

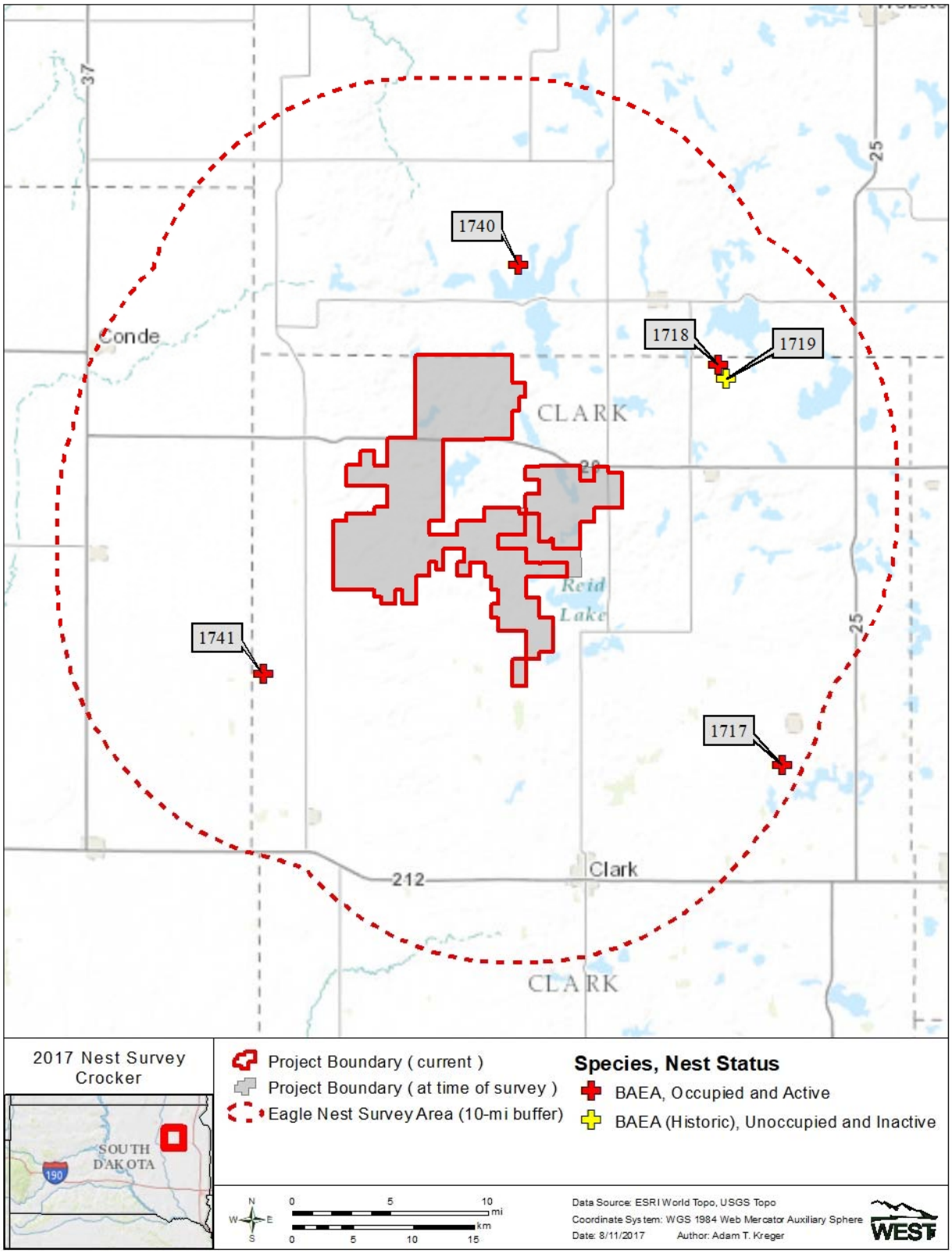

Figure 1. Locations of bald eagle nests observed near the Crocker Wind Farm, Clark County, South Dakota. (BAEA = bald eagle).

Table 1. Eagle nest ID, location, species, status, substrate, and condition of nests during the April 13-14 and April 18, 2017 survey for the Crocker Wind Farm, Clark County, South Dakota.

Nest ID	Latitude	Longitude	Species[1]	Status at time of survey	Nest Substrate	Condition
1717	44.9373	-97.5894	BAEA	Occupied and Active	Tree	Good
1718	45.1471	-97.6370	BAEA	Occupied and Active	Tree	Good
1740	45.1996	-97.7849	BAEA	Occupied and Active	Tree	Good
1741	44.9850	-97.9744	BAEA	Occupied and Active	Tree	Good
1719	45.1397	-97.6310	BAEA	Unoccupied and Inactive	Tree	Good

1. BAEA = bald eagle, UNKN = unknown species

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Appendix A. Images of Eagle Nests Found April 13-14 and April 18, 2017 within the 10-mile Buffer of the Crocker Wind Farm, Clark County, South Dakota

Appendix A1. Nest 1717 was located approximately 9.23 mi (14.85 km) southeast of the Crocker Wind Farm boundary. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017.

Appendix A2. Nest 1718 was located approximately 5.28 mi (8.50 km) east of the Crocker Wind Farm boundary. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017.

Appendix A3. Nest 1740 was located approximately 3.18 mi (5.12 km) north of the Crocker Wind Farm boundary. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017.

Appendix A4. Nest 1741 was located approximately 4.06 mi (6.53 km) southwest of the Crocker Wind Farm boundary. The nest was in good condition. One adult bald eagle was incubating on the nest. The nest is therefore considered occupied and active in 2017.