Appendix C

2018 Raptor Nest Survey Report

2018 Raptor Nest Survey Report

Bitter Root Wind Energy Project

Yellow Medicine County, Minnesota

Deuel County, South Dakota

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INTRODUCTION

Flying Cow Wind, LLC (Flying Cow) is considering the development of a utility-scale wind energy project, the Bitter Root Wind Energy Project (Project), in Yellow Medicine County, Minnesota and Deuel County, South Dakota. At the request of Flying Cow, Western EcoSystems Technology, Inc. (WEST) conducted an aerial raptor nest survey to record bald eagle (*Haliaeetus leucocephalus*) and other raptor nests in the proximity of potential turbine siting areas. This survey will aid in assessing potential effects of the Project on eagles and other raptors.

The objective of the first aerial survey was to record the location and status of raptor nests within the Project area and the established buffers, with a focus on identifying bald eagle (*Haliaeetus leucocephalus*) nests. The objective of the second ground-based survey was to confirm the status of large stick nests recorded during the first round of aerial surveys and to capture additional information on nesting activity. Following confirmation of active eagle nests during the second ground-based survey, nest activity monitoring was conducted at nests nearest the project boundary to identify areas of use.

The 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 all raptor stick-nests consisted of a 2-mile (mi; 3.2-kilometer [km]) buffer of potential Project and transmission line siting areas (Figure 1) includes 9,207 hectacres (22,751 acres). This Project area encompasses approximately 8,270 hectacres (20,437 acres) in Yellow Medicine County, Minnesota and falls within the Northern Glaciated Plains Level III Ecoregion and the Prairie Coteau Level IV Ecoregion (US Environmental Protection Agency [USEPA] 2013, USEPA 2015). The Northern Glaciated Plains Ecoregion is flat to gently rolling landscape of glacial drift. The region is transitional between tallgrass and shortgrass prairie and high concentrations of temporary and seasonal wetlands offer suitable habitat for waterfowl nesting and migration. The Prairie Coteau Ecoregion is generally a higher elevation plateau with poorly defined drainage (US Environmental Protection Agency [USEPA] 2013, USEPA 2015).

METHODS

Raptor Nest Survey

Raptor surveys are conducted from a helicopter during early spring in the period before leaf out when raptors are actively tending to a nest or incubating eggs. Raptors are defined here as kites, accipiters, buteos, harriers, eagles, falcons, and owls (Buehler 2000). However, the main focus of the survey is to identify bald eagle nests. Bald eagle nest surveys focus on locating

eyries (large, stick nest structures) in suitable eagle nesting substrate (trees, transmission lines, cliff faces, etc.) within the study area (Figure 1). Pre-flight planning included the creation of field maps and mobile Geographic Information System files and review of relevant background information, such as previously recorded nest locations, topographic maps, and aerial photographs. Surveys within the study area documented all potential raptor nests, focusing on bald eagles. Efforts were made to minimize disturbance to breeding raptors; the greatest possible distance at which the species could be identified was maintained, with distances varying, depending upon nest location and wind conditions.

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). A raptor ecologist and a helicopter pilot conduct the survey.

In general, all potential raptor nest habitat was surveyed from a R-44 helicopter along transects spaced 0.25 – 1.0 mi (0.8 – 1.6 km) apart, flying at speeds of approximately 46 mi per hour (74 km per hour) when actively scanning for nests. Surveys were typically conducted between 0700 hours and 1800 hours.

The survey track was recorded using a Global Positioning System (GPS)-enabled tablet device 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 GPS enabled tablet running Locus Pro software. 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.

Nest Activity Monitoring

WEST conducted follow-up surveys of eagle and potential eagle nest in the vicinity of the Project area following the initial aerial surveys. The follow-up survey objectives were to document nest status and assess predominant use patterns of eagles around these nests (e.g. directions of flight to and from the nest).

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 unidentified 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 to populate a nest database to ensure future surveys include all potentially suitable nest sites. Unknown raptor species nests that appeared consistent in size and shape with bald eagle nests were further classified as potential alternate nest sites for bald eagles.

Nest Condition – Nest condition was categorized as good, fair, or poor. 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 were excellently maintained with very well-defined bowl, no sagging, possible to use immediately or currently in use. Nests in fair condition had a fairly well-defined bowl, minor sagging, and may require some repair or addition to use immediately. Nests in poor condition were sloughing or sagging heavily, and required effort to restore before nesting.

Substrate – Nest substrate was recorded to provide observers a visual reference to relocate the nest. Substrates may include human-created structures such as power lines, nest platforms, and dock hoists, and biological and physical structures such as 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.” Bald eagle nests and potential bald eagle nests are further classified in the nest details section as “in-use” based on updated definitions of these terms in the final eagle rule effective January 17, 2017 (50 Code of Federal Regulations Parts 13 and 22).

RESULTS

Raptor Nest Survey

Aerial surveys were conducted on May 1-2, 2018 prior to leaf-out, with ground-based follow-up surveys beginning more than 30 days later, in June 2018. A total of 103 nests representing three raptor species and one non-raptor species were detected during aerial surveys conducted May 1-2, 2018 (Table 1). Three occupied active bald eagle nests were documented, and two

unoccupied and inactive nests of unknown species which appeared consistent in size and shape with bald eagle nests were documented. Additional raptor nests documented during the survey included seven occupied active great-horned owl (*Bubo virginianus*) nests, twenty-five occupied and active red-tailed hawk (*Buteo jamaicensis*) nests, one occupied and inactive red-tailed hawk nest, and sixty-one stick nests of unidentified species (Table 1). Four occupied and active American crow (*Corvus brachyrhynchos*) nests were also documented; these stick nests may be used by raptors in future years.

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

Nest 1620 - This nest was located approximately 1.03 miles (1.66 kilometers) west of the Project boundary in a deciduous tree. The nest was in good condition. An adult bald eagle was perched on the nest with three chicks. The nest is therefore considered in-use, occupied and active in 2018 (Figure 1, Appendix A1).

Nest 1742 - This nest was located approximately 1.15 miles (1.85 kilometers) east of the Project boundary in a deciduous tree. The nest was in good condition. An adult bald eagle was perched on the nest with two chicks. The nest is therefore considered in-use, occupied and active in 2018 (Figure 1, Appendix A2).

Nest 1746 - This nest was located approximately 1.81 miles (2.91 kilometers) south of the Project boundary in a deciduous tree. The nest was in good condition. An adult bald eagle was perched on the nest with two chicks. The nest is therefore considered in-use, occupied and active in 2018 (Figure 1, Appendix A3).

Nest 3066 - This nest was located approximately 0.27 miles (0.43 kilometers) west of the Project boundary in a deciduous tree. The nest was in good condition and consistent in size and shape with a bald eagle nest. The nest was observed the nest and surrounding area for four hours from the ground on June 15, 2018 and June26, 2018. The technician saw no bald eagle activity during either visit. The nest is therefore considered inactive in 2018 (Figure 1, Appendix A4).

Nest 1561 - This nest was located approximately 1.92 miles (3.09 kilometers) east of the Project boundary in a deciduous tree. The nest was in fair condition but consistent in size and shape with a bald eagle nest. No eagles were seen on the nest or in close proximity to the nest. To confirm the nest status, a technician monitored the nest for four hours on June 16, 2018. The nest was empty and no bald eagle activity was observed. No additional monitoring was conducted. The nest is therefore considered inactive in 2018 (Figure 1, Appendix A5).

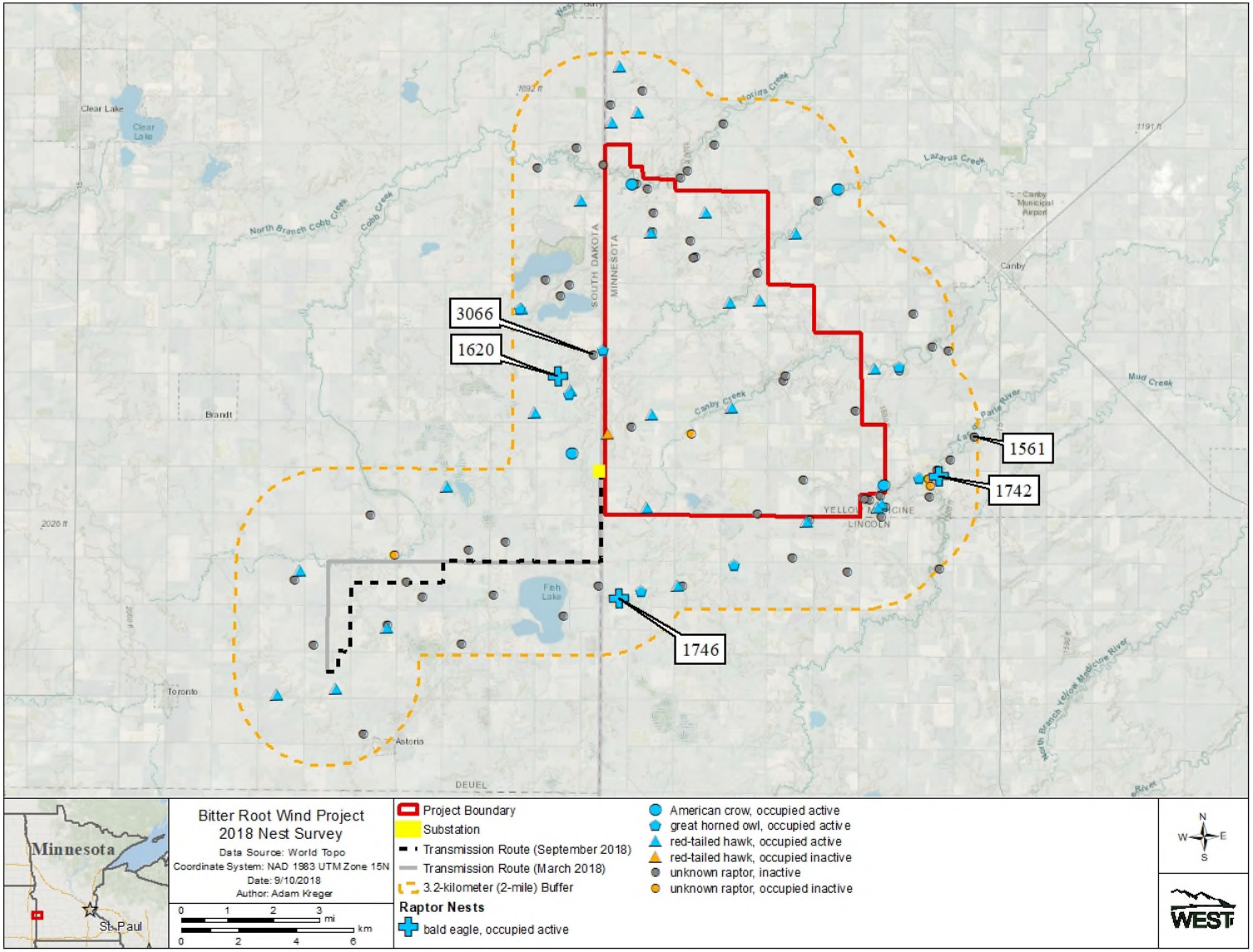

Figure 1. Raptor nests observed near the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota.

Table 1. Raptor nest identification (ID), location, species, status, substrate, and condition of nests documented May 1-2, 2018 for the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota.

Nest ID	Latitude	Longitude	Species[1]	Status at time of survey	Nest Substrate	Condition
1620	-96.4716	44.6743	BAEA	occupied active	deciduous tree	good
1742	-96.3037	44.6437	BAEA	occupied active	deciduous tree	good
1746	-96.4439	44.6048	BAEA	occupied active	deciduous tree	good
3066	-96.4562	44.6815	UNRA*	inactive	deciduous tree	good
1561	-96.2883	44.6563	UNRA*	inactive	deciduous tree	good
3022	-96.3280	44.6408	AMCR	occupied active	deciduous tree	good
3024	-96.3490	44.7336	AMCR	occupied active	deciduous tree	good
3032	-96.4653	44.6501	AMCR	occupied active	deciduous tree	good
3057	-96.4399	44.7349	AMCR	occupied active	deciduous tree	good
3007	-96.3122	44.6432	GHOW	occupied active	deciduous tree	good
2986	-96.3933	44.6154	GHOW	occupied active	deciduous tree	good
3025	-96.3213	44.6779	GHOW	occupied active	deciduous tree	good
3028	-96.4882	44.6954	GHOW	occupied active	deciduous tree	good
3033	-96.4662	44.6687	GHOW	occupied active	deciduous tree	good
3052	-96.4340	44.6072	GHOW	occupied active	deciduous tree	good
3065	-96.4513	44.6828	GHOW	occupied active	deciduous tree	good
2188	-96.5939	44.5740	RTHA	occupied active	deciduous tree	good
2978	-96.3617	44.6293	RTHA	occupied active	deciduous tree	good
2984	-96.3831	44.6987	RTHA	occupied active	deciduous tree	good
2987	-96.3947	44.6650	RTHA	occupied active	deciduous tree	good
1625	-96.3960	44.6979	RTHA	occupied active	deciduous tree	good
2991	-96.4180	44.6092	RTHA	occupied active	deciduous tree	good
2996	-96.4071	44.7263	RTHA	occupied active	deciduous tree	good
2999	-96.3671	44.7199	RTHA	occupied active	deciduous tree	good
3016	-96.3285	44.6353	RTHA	occupied active	deciduous tree	good
3019	-96.3305	44.6339	RTHA	occupied active	deciduous tree	good
3023	-96.3323	44.6776	RTHA	occupied active	deciduous tree	good
3027	-96.4817	44.6630	RTHA	occupied active	deciduous tree	good
3029	-96.4660	44.6701	RTHA	occupied active	deciduous tree	good
3034	-96.4876	44.6956	RTHA	occupied active	deciduous tree	good
3038	-96.5201	44.6395	RTHA	occupied active	deciduous tree	good
3042	-96.5460	44.5951	RTHA	occupied active	deciduous tree	good
3043	-96.5844	44.6128	RTHA	occupied active	deciduous tree	good
3046	-96.5678	44.5758	RTHA	occupied active	deciduous tree	good
3053	-96.4320	44.6334	RTHA	occupied active	deciduous tree	good
3055	-96.4300	44.6626	RTHA	occupied active	deciduous tree	good
1626	-96.4312	44.7197	RTHA	occupied active	other	good
3062	-96.4374	44.7574	RTHA	occupied active	deciduous tree	good
3067	-96.4485	44.7541	RTHA	occupied active	deciduous tree	good
3070	-96.4620	44.7297	RTHA	occupied active	deciduous tree	good
1627	-96.4451	44.7717	RTHA	occupied active	deciduous tree	good
3063	-96.4494	44.6565	RTHA	occupied inactive	deciduous tree	good
2992	-96.4130	44.6568	UNRA	occupied inactive	deciduous tree	good
3006	-96.3084	44.6432	UNRA	occupied inactive	deciduous tree	good
3008	-96.3078	44.6408	UNRA	occupied inactive	deciduous tree	good
3036	-96.5430	44.6180	UNRA	occupied inactive	deciduous tree	good
2981	-96.3724	44.6737	UNRA	inactive	deciduous tree	good
2982	-96.3718	44.6753	UNRA	inactive	deciduous tree	good
2983	-96.3845	44.7076	UNRA	inactive	deciduous tree	good
2988	-96.3998	44.7541	UNRA	inactive	deciduous tree	good

Table 1. Raptor nest identification (ID), location, species, status, substrate, and condition of nests documented May 1-2, 2018 for the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota.

Nest ID	Latitude	Longitude	Species[1]	Status at time of survey	Nest Substrate	Condition
2997	-96.4185	44.7372	UNRA	inactive	deciduous tree	good
3001	-96.4152	44.7392	UNRA	inactive	deciduous tree	good
3002	-96.3406	44.6642	UNRA	inactive	deciduous tree	good
3003	-96.3441	44.6138	UNRA	inactive	deciduous tree	good
3010	-96.3035	44.6150	UNRA	inactive	deciduous tree	good
3011	-96.3070	44.6847	UNRA	inactive	deciduous tree	good
3012	-96.3157	44.6948	UNRA	inactive	deciduous tree	good
3040	-96.5378	44.6097	UNRA	inactive	deciduous tree	good
3041	-96.5459	44.5961	UNRA	inactive	deciduous tree	good
3044	-96.5869	44.6100	UNRA	inactive	deciduous tree	good
3058	-96.4381	44.7353	UNRA	inactive	deciduous tree	good
3071	-96.5536	44.6306	UNRA	inactive	deciduous tree	good
2977	-96.3633	44.6425	UNRA	inactive	deciduous tree	fair
2979	-96.3607	44.6300	UNRA	inactive	deciduous tree	fair
2980	-96.3679	44.6179	UNRA	inactive	deciduous tree	fair
2985	-96.3836	44.6318	UNRA	inactive	deciduous tree	fair
2989	-96.4037	44.7476	UNRA	inactive	deciduous tree	fair
2990	-96.4164	44.6092	UNRA	inactive	deciduous tree	fair
2993	-96.4119	44.7123	UNRA	inactive	deciduous tree	fair
2994	-96.4124	44.7121	UNRA	inactive	deciduous tree	fair
2995	-96.4140	44.7174	UNRA	inactive	deciduous tree	fair
3000	-96.3576	44.7303	UNRA	inactive	deciduous tree	fair
3004	-96.2990	44.6490	UNRA	inactive	deciduous tree	fair
3013	-96.3002	44.6834	UNRA	inactive	deciduous tree	fair
3015	-96.3298	44.6377	UNRA	inactive	deciduous tree	fair
3018	-96.3293	44.6312	UNRA	inactive	deciduous tree	fair
3020	-96.3345	44.6363	UNRA	inactive	deciduous tree	fair
3021	-96.3368	44.6368	UNRA	inactive	deciduous tree	fair
3026	-96.4941	44.6223	UNRA	inactive	deciduous tree	fair
3030	-96.4813	44.7401	UNRA	inactive	deciduous tree	fair
3035	-96.4993	44.6056	UNRA	inactive	deciduous tree	fair
3037	-96.5105	44.6197	UNRA	inactive	deciduous tree	fair
3039	-96.5305	44.6051	UNRA	inactive	deciduous tree	fair
3045	-96.5784	44.5897	UNRA	inactive	deciduous tree	fair
3047	-96.5134	44.5903	UNRA	inactive	deciduous tree	fair
3048	-96.4710	44.6998	UNRA	inactive	deciduous tree	fair
3050	-96.4774	44.7047	UNRA	inactive	deciduous tree	fair
3051	-96.5560	44.5618	UNRA	inactive	deciduous tree	fair
3054	-96.4395	44.6589	UNRA	inactive	deciduous tree	fair
3059	-96.4331	44.7337	UNRA	inactive	deciduous tree	fair
3060	-96.4668	44.7033	UNRA	inactive	deciduous tree	fair
3061	-96.4355	44.7643	UNRA	inactive	deciduous tree	fair
3064	-96.4531	44.6089	UNRA	inactive	deciduous tree	Fair
3068	-96.4494	44.7599	UNRA	inactive	deciduous tree	Fair
3069	-96.4644	44.7461	UNRA	inactive	deciduous tree	Fair
2998	-96.4303	44.7262	UNRA	inactive	deciduous tree	Poor
3005	-96.3046	44.6461	UNRA	inactive	deciduous tree	Poor
3009	-96.3079	44.6376	UNRA	inactive	deciduous tree	Poor
3014	-96.3217	44.6770	UNRA	inactive	deciduous tree	Poor
3017	-96.3273	44.6341	UNRA	inactive	deciduous tree	Poor

Table 1. Raptor nest identification (ID), location, species, status, substrate, and condition of nests documented May 1-2, 2018 for the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota.

Nest ID	Latitude	Longitude	Species[1]	Status at time of survey	Nest Substrate	Condition
3031	-96.4688	44.5994	UNRA	inactive	deciduous tree	Poor
3049	-96.4523	44.7409	UNRA	inactive	deciduous tree	Poor
3056	-96.4305	44.7200	UNRA	inactive	deciduous tree	poor

1. BAEA = bald eagle, AMCR = American crow, GHOW = great-horned owl, RTHA = red-tailed hawk, UNRA = unknown raptor species, UNRA* = unknown species nest characteristic in shape and size of bald eagle and may be an historic nesting site.

Nest Activity Monitoring

Ground-based follow-up surveys began on June 14, 2018. Eagles using the nests further from the Project boundary are unlikely to be impacted by Project construction and operation.

Nest 1620 – The first nest monitoring session was conducted on June 14, 2018. The technician monitored the nest for four hours and observed two adult bald eagles separately, which may have been a single eagle that disappeared from view and then returned, but no eaglet. Flight paths were documented in association with the nest, west of the nest, and east of the nest (Figure 2). The following day, the technician confirmed the presence of at least one eaglet in the nest. The second four-hour session was conducted on June 26, 2018. Two eaglets were observed flapping and hopping in the nest. The third four-hour nest monitoring session was conducted on July 8, 2018; no bald eagles were observed. It is assumed, based on the advanced development of eaglets on June 26 that the eaglets fledged prior to the July 8 observation session. No additional monitoring was conducted.

Nest 1742 – The nest monitoring session was conducted on June 18, 2018. The technician monitored the nest for four hours and observed one bald eagle fly from the west to the nest tree, where it disappeared from view (Figure 2). No eaglets were observed, but the leaves were too dense to see the nest from any ground location. The fate of the nest and eaglets was unknown. No additional monitoring was conducted.

Nest 1746 – The first nest monitoring session was conducted on June 14, 2018. The technician monitored the nest for four hours; one adult bald eagle was observed flying from the nest westward (Figure 2). Surveys on June 26, 2018 were initiated but no eagles were observed, and the session was halted due to agricultural spraying in observation area. The fate of the eaglets at this nest following initial aerial survey remained unknown.

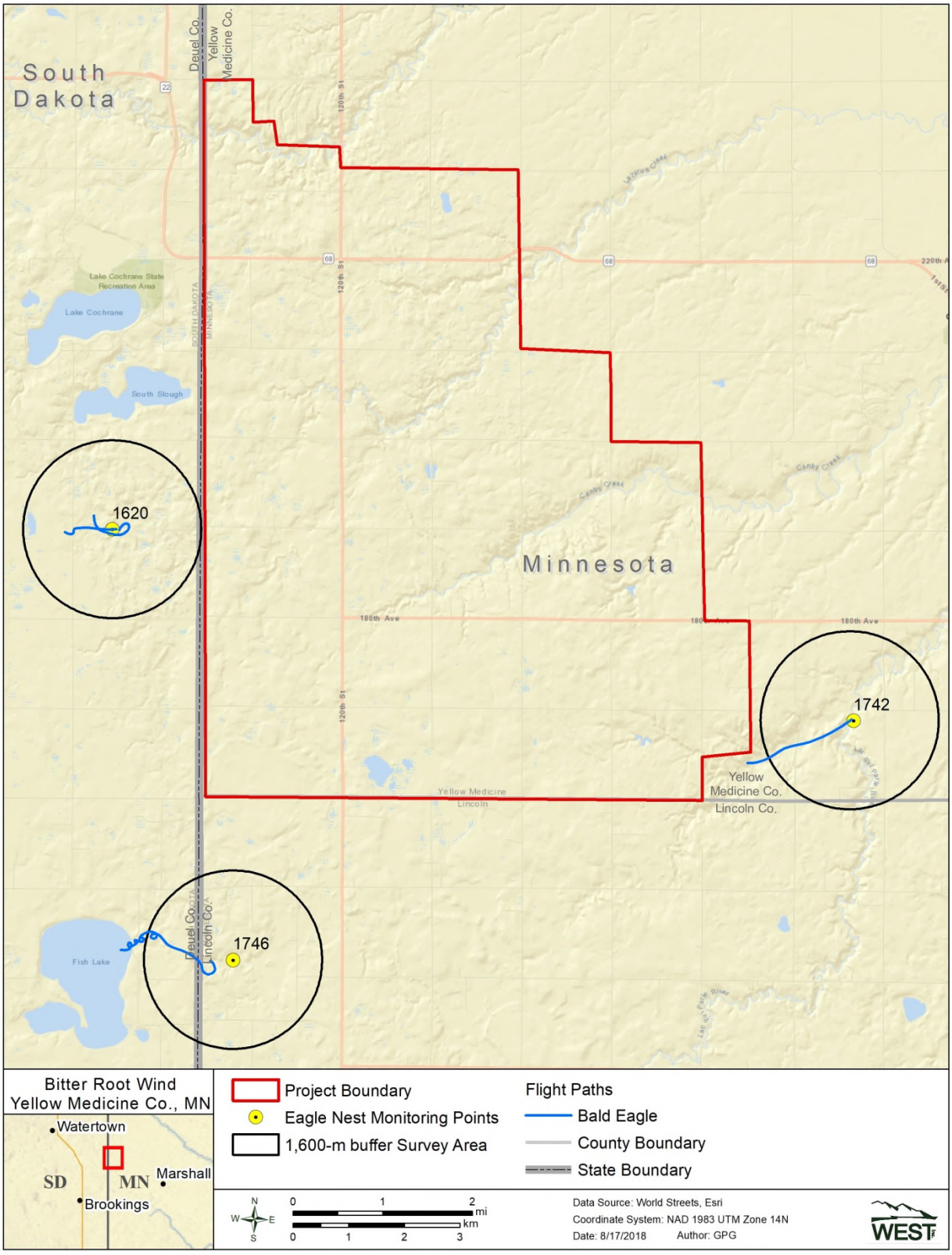

Figure 2. Flight paths associated with nest activity monitoring surveys at the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota.

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Appendix A. Images of Active and Occupied Eagle Nests and Nests Consistent in Size and Shape with Eagle Nests Found May 1-2, 2018 within the 2-mile Buffer of the Bitter Root Wind Energy Project, Yellow Medicine County, Minnesota and Deuel County, South Dakota

Appendix A1. Nest 1620 was located approximately 1.03 miles (1.66 kilometers) west of the Project boundary. The nest is considered occupied and active.

Appendix A2. Nest 1742 was located approximately 1.15 miles (1.85 kilometers) east of the Project boundary. The nest is considered occupied and active.

Appendix A3. Nest 1746 was located approximately 1.81 miles (2.91 kilometers) south of the Project boundary. The nest is considered occupied and active.

Appendix A4. Nest 3066 was located approximately 0.27 miles (0.43 kilometers) west of the Project boundary. The nest is considered inactive. (Photographed April 15, 2018; confirmed inactive May 2, 2018.)

Appendix A5. Nest 1561 was located approximately 1.92 miles (3.09 kilometers) east of the Project boundary. The nest is considered inactive.