

**2017 Raptor Nest Surveys Report**  
**Emmons-Logan Wind Energy Center and 230 kV Transmission Line**  
**Emmons and Logan Counties, North Dakota**

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**Final Report**

**Prepared for:**

Emmons-Logan Wind, LLC

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4007 State Street, Suite 109  
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10 **Exhibit 31 - 2017 Raptor Nest Surveys Report**  
2017 Raptor Nest Surveys Report  
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Emmons-Logan Wind, LLC

## STUDY PARTICIPANTS

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## REPORT REFERENCE

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**TABLE OF CONTENTS**

INTRODUCTION ..... 3  
PROJECT AREA ..... 3  
METHODS..... 3  
RESULTS ..... 5  
SUMMARY ..... 5  
REFERENCES ..... 15

**LIST OF TABLES**

Table 1. Locations of eagle nests and nests of eagle size\* (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi and 10-mi buffers..... 7  
Table 2. Non-eagle nests locations (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer. .... 8

**LIST OF FIGURES**

Figure 1. Eagle nests recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 10-mi buffer. .... 12  
Figure 2. Nests of eagle size\* recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 10-mi buffer..... 13  
Figure 3. Non-eagle nests\* recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer. .... 14

## **INTRODUCTION**

Emmons-Logan Wind, LLC (Emmons-Logan Wind), a wholly-owned, indirect subsidiary of NextEra Energy Resources, LLC, is considering the development of the Emmons-Logan Wind Energy Center and 230 kV Transmission Line (Project) in south-central North Dakota. Emmons-Logan Wind tasked Western EcoSystems Technology, Inc. (WEST) to conduct diurnal raptor nest surveys within the Project and surrounding area. The principal objectives of this study were to: 1) identify the species of nesting raptors in the survey area; and 2) provide data on nest locations that could be useful in Project planning. The following report contains the results of the spring 2017 raptor nest surveys conducted for the proposed Project.

## **PROJECT AREA**

The Project, located in Emmons and Logan Counties, North Dakota, encompasses approximately 75,375 acres (ac; 30,503-hectare [ha]). The Project is located approximately eight miles (mi; 13 km) northeast of the town on Linton, North Dakota, and falls within the Northwestern Glaciated and Northwestern Great Plains Level III Ecoregions (Bryce et al. 1996), characterized by semi-arid rolling plains and moderately high concentrations of seasonal wetlands (prairie potholes). Vegetation in the region is mostly short-grass or mixed-grass prairie; rangeland and livestock grazing are common but dryland and irrigated farming also occur; topography is irregular and characterized by moraines and rolling plains (Wiken et al. 2011). Figures in this report show the Project area as it was provide by Emmons-Logan Wind in April 2017 prior to the surveys.

## **METHODS**

Two aerial raptor nest surveys were conducted from April 15 – 16, and on May 1, 2017, in accordance with the protocol described in the United States Fish and Wildlife Service (USFWS) *Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy, Version 2* (ECPG) and new eagle rule (USFWS 2013, 2016), and the USFWS Interim Golden Eagle Inventory and Monitoring Protocols (Pagel et al. 2010), to locate nests prior to construction of the Project, so they may be avoided, as well as to evaluate potential for areas of high eagle use within or near the Project.

The survey was timed to coincide with the period prior to leaf out conditions when bald eagles (*Haliaeetus leucocephalus*) were likely incubating eggs or tending young in the region (USFWS 2007), and when other raptor species were likely to be nesting as well. Raptors are defined here as kites, accipiters, buteos, harriers, eagles, falcons, and owls; however, the main focus of the survey was to identify bald eagle nests.

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 to cover all suitable bald eagle and raptor

nesting habitat within and near the Project. One experienced raptor ecologist and a helicopter pilot conducted the raptor nest survey which involved a comprehensive search of suitable nesting areas and substrates (e.g., isolated trees, open woodlands, riparian corridors, savannas, rock outcrops, and artificial nest structures such as power poles and transmission towers) within the proposed Project area and adjacent 1-mi (1.6 km) buffer for all raptor nests and a 10-mi (16.1 km) buffer for eagle nests. Additionally, information on known historic eagle nests for the study area was requested from the North Dakota Game and Fish Department.

In general, all potential raptor nesting habitat was surveyed by flying meandering transects between 0.25 and 0.5 mi (0.4 and 0.8 km) apart, flying at speeds of 60 - 75 mi per hour throughout the proposed Project and associated buffers. Surveys were typically conducted between 08:00 hours and 17:00 hours. Transect spacing was wider during the May 1, 2017 flight as only larger eagle nests were being surveyed. Efforts were made to minimize disturbance to breeding raptors; the greatest possible distance at which the species and status could be determined was maintained, with distances varying depending upon nest location and weather conditions. Additional data recorded included whether or not the nest size and location was consistent with an eagle nest (Buehler 2000, Pagel et al. 2010), and to the extent possible, photographs.

Data recorded for each observed nest site included:

*Nest Identification (ID)* - WEST assigned a unique nest identification number for each occupied/active nest documented.

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

*Nest Location* - The location of all raptor nests, including all confirmed and potential nests regardless of their activity status, was recorded using a hand-held Global Positioning System unit; coordinates were set at Universal Transverse Mercator (UTMs) North American Datum (NAD) 83 unit.

*Nest Status* - Nest status was categorized consistent with definitions in the USFWS ECPG (USFWS 2013). 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 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" or "inactive". If an adult in an incubating or brooding position, an egg or

eggs, and/or nestlings/fledglings were observed, the nest was classified as “active”; if no eggs, nestlings, fledglings, or adults in an incubating/brooding position were observed, the nest was classified as “inactive”. A nest that did not meet the above criteria for “occupied” was classified as “unoccupied”.

*Nest Condition* - Nest condition was categorized using descriptions ranging from poor to excellent. While this designation varies between observers, it gives a general sense of when a nest or nest site may have last been used. Nests in fair to poor condition are characterized by varying degrees of disrepair, sloughing, or sagging heavily, and would require some level of effort to rebuild in order to be suitable for successful nesting. Nests in good to excellent 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.

*Nest Substrate* - The substrate in which a nest was observed was recorded to provide observers a visual reference. Substrates range from manmade structures (such as power lines, nest platforms, and dock hoists) to biological and physical structures (conifer and deciduous tree species, cliff faces, and rock outcrops).

## RESULTS

A total of 108 nest structures representing four raptor species were recorded during aerial surveys conducted in the spring of 2017 for the Project and associated 1- and 10-mi (1.6- and 16.1-km) buffers (Tables 1 and 2); four additional raptor nests located just east and north of the 1-mi (1.6-km) buffer were also recorded during surveys.

Two occupied active bald eagle nests (EL-EN1 and EL-EN2) were recorded during surveys conducted in 2017 (Figure 1); three additional nests (EL-RN61 occupied by red-tailed hawk [*Buteo jamaicensis*], EL-RN62 unoccupied, and EL-RN63 occupied by ferruginous hawk [*Buteo regalis*]), were consistent in size with an eagle nest (Table 1; Figure 2). One historic nest location was provided by the North Dakota Game and Fish Department; EL-EN2 (historical nest BE372) was recorded as an occupied active nest on April 13, 2016.

Non-eagle nests recorded in 2017 were classified as follows: five occupied active ferruginous hawk nests, 17 occupied active great-horned owl (*Bubo virginianus*) nests, 40 occupied active red-tailed hawk nests, and 43 unoccupied inactive unknown raptor nests (Table 2; Figure 3). Five nests were located within the 230 kV Transmission Line corridor (Figure 3). No federally listed threatened or endangered raptor species were observed nesting during the aerial raptor nest survey conducted in 2017.

## SUMMARY

No eagle nests were located within the Project during aerial surveys conducted in 2017; however, a total of two active and three potential eagle nests were recorded within the 10-mi (16.1 km) buffer. All the occupied, unoccupied, and potential eagle nests were located outside

of the Project, likely attributed to the lack of quality nesting habitat within the Project. The majority of the land within the Project does not include rivers, lakes, or wetland systems that might provide substantial foraging opportunities for eagles.

**Table 1. Locations of eagle nests and nests of eagle size\* (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi and 10-mi buffers.**

Nest ID	Easting	Northing	Species <sup>1</sup>	Status at Time of Survey	Condition	Substrate	Comments	Date
EL-EN1	451740.65	5132969.24	BAEA	occupied, active	good	tree	two adults	2017/04/15
EL-EN2	408811.02	5113845.32	BAEA	occupied, active	good	tree	two adults	2017/04/16
EL-RN61*	450581.12	5133257.11	RTHA	occupied, active	good	tree	BAEA sized nest	2017/04/15
EL-RN62*	419977.10	5124363.81	UNKN	unoccupied, inactive	good	tree	BAEA sized nest, no bird present	2017/05/01
EL-RN63*	403267.67	5129551.11	FEHA	occupied, active	good	tree	BAEA sized nest with FEHA incubating position	2017/05/01

\* Size and location consistent with an eagle nest

<sup>1</sup> BAEA = bald eagle; RTHA = red-tailed hawk; FEHA = ferruginous hawk

Table 2. Non-eagle nests locations (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer.

Nest ID	Easting	Northing	Species <sup>1</sup>	Status at Time of Survey	Condition	Substrate	Comments	Date
EL-RN1	428931.40	5146250.19	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN2	429331.50	5146251.96	GHOW	occupied, active	good	tree	incubating	2017/04/16
EL-RN3	425541.09	5145942.22	GHOW	occupied, active	good	tree	three eggs	2017/04/15
EL-RN4	424010.49	5144943.00	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN5	421571.07	5143286.25	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN6	420697.66	5142280.06	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN7	412741.07	5142541.95	GHOW	occupied, active	good	tree	two chicks	2017/04/15
EL-RN8	410851.99	5141153.48	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN9	414808.97	5139841.11	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN10	422777.53	5139638.77	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN11	424853.29	5139935.26	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN12	425299.09	5140418.63	FEHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN13	426883.26	5141670.37	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN14	430164.66	5141576.76	RTHA	occupied, active	good	tree	incubating	2017/04/16
EL-RN15	433642.62	5142673.73	RTHA	occupied, active	good	tree	incubating	2017/04/16
EL-RN16	434618.19	5140133.78	RTHA	occupied, active	good	tree		2017/04/16
EL-RN17	429070.12	5137861.72	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN18	428855.97	5137460.82	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN19	428684.75	5137798.44	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN20	427668.21	5138215.06	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN21	427573.81	5137764.78	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN22	427163.11	5138299.43	RTHA	occupied, active	good	tree	two eggs	2017/04/15
EL-RN23	424313.62	5138054.17	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN24	408932.34	5136984.80	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN25	414039.99	5135080.00	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN26	423116.37	5134670.13	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN27	423847.97	5133660.10	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN28	424782.04	5133619.82	RTHA	occupied, active	good	tree	incubating	2017/04/15

**Table 2. Non-eagle nests locations (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer.**

Nest ID	Easting	Northing	Species <sup>1</sup>	Status at Time of Survey	Condition	Substrate	Comments	Date
EL-RN29	427130.98	5134972.49	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN30	428212.91	5133283.82	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN31	433105.50	5135680.26	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN32	436343.58	5135402.50	RTHA	occupied, active	good	tree	four eggs	2017/04/15
EL-RN33	431941.56	5131572.57	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN34	430880.41	5131125.11	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN35	425090.10	5131575.24	FEHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN36	419573.92	5131002.07	FEHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN37	419467.78	5131435.33	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN38	419193.17	5131096.79	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN39	416631.65	5132479.00	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN40	415102.41	5132273.84	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN41	410702.52	5130062.21	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN42	413538.50	5129333.20	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN43	413530.64	5129094.15	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN44	415702.61	5128607.22	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN45	415819.78	5128603.04	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN46	427079.97	5128602.88	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN47	430564.18	5128487.89	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN48	431344.30	5129355.29	GHOW	occupied, active	good	tree	two chicks	2017/04/15
EL-RN49	431303.61	5130432.45	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN50	431845.11	5129250.66	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN51	429768.56	5127953.58	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN52	429902.79	5127664.00	GHOW	occupied, active	good	tree	two eggs	2017/04/15
EL-RN53	425390.64	5126981.48	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-RN54	425348.94	5126972.33	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN55	421062.83	5126895.00	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN56	420954.86	5126981.53	GHOW	occupied, active	good	tree	two eggs	2017/04/15

**Table 2. Non-eagle nests locations (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer.**

Nest ID	Easting	Northing	Species <sup>1</sup>	Status at Time of Survey	Condition	Substrate	Comments	Date
EL-RN57	419597.24	5125530.66	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN58	418291.71	5125060.24	FEHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN59	424761.00	5124451.48	RTHA	occupied, active	good	tree	incubating	2017/04/15
EL-RN60	426115.97	5125055.26	GHOW	occupied, active	good	tree	incubating	2017/04/15
EL-UNK1	428918.44	5146271.34	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK2	429795.47	5144785.99	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK3	429762.46	5144780.71	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK4	427821.41	5144668.23	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK5	422602.15	5142811.38	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK6	418857.93	5142595.75	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK7	409873.73	5138408.35	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK8	408583.18	5137361.35	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK9	414263.64	5135128.41	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK10	418040.30	5135061.18	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK11	419000.14	5135337.83	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK12	419224.16	5135366.64	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK13	425262.98	5139826.19	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK14	425651.33	5136849.69	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK15	427756.90	5137945.96	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK16	430909.04	5135033.80	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK17	427303.15	5134191.86	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK18	425198.46	5133767.27	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK19	415271.95	5132177.79	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK20	410106.50	5132483.63	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK21	410121.95	5132409.05	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK22	409634.20	5130822.01	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK23	410849.09	5127724.66	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK24	413526.25	5128751.92	UNKN	unoccupied, inactive	good	tree		2017/04/15

Table 2. Non-eagle nests locations (UTM NAD 83, Zone 14) and features identified during aerial surveys conducted in the spring of 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer.

Nest ID	Easting	Northing	Species <sup>1</sup>	Status at Time of Survey	Condition	Substrate	Comments	Date
EL-UNK25	416355.26	5129415.06	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK26	417171.57	5130420.45	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK27	419192.45	5131402.64	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK28	420250.41	5131685.09	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK29	422351.57	5131056.64	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK30	424647.20	5130537.08	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK31	425174.39	5131092.13	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK32	430949.77	5132103.69	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK33	430680.83	5131141.38	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK34	431205.94	5130298.20	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK35	434657.49	5130653.29	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK36	430449.91	5127076.99	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK37	430493.35	5126839.91	UNKN	unoccupied, inactive	good	tree	RTHA nearby	2017/04/15
EL-UNK38	426443.65	5128574.18	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK39	424621.54	5127175.74	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK40	424411.43	5127849.78	UNKN	unoccupied, inactive	good	tree		2017/04/15
EL-UNK41	424607.69	5126097.19	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK42	419605.60	5125855.50	UNKN	unoccupied, inactive	poor-fair	tree		2017/04/15
EL-UNK43	419959.29	5124328.03	UNKN	unoccupied, inactive	good	tree		2017/04/15

<sup>1</sup> RTHA = red-tailed hawk; FEHA = ferruginous hawk; GHOW = great horned owl; UNKN = unknown raptor

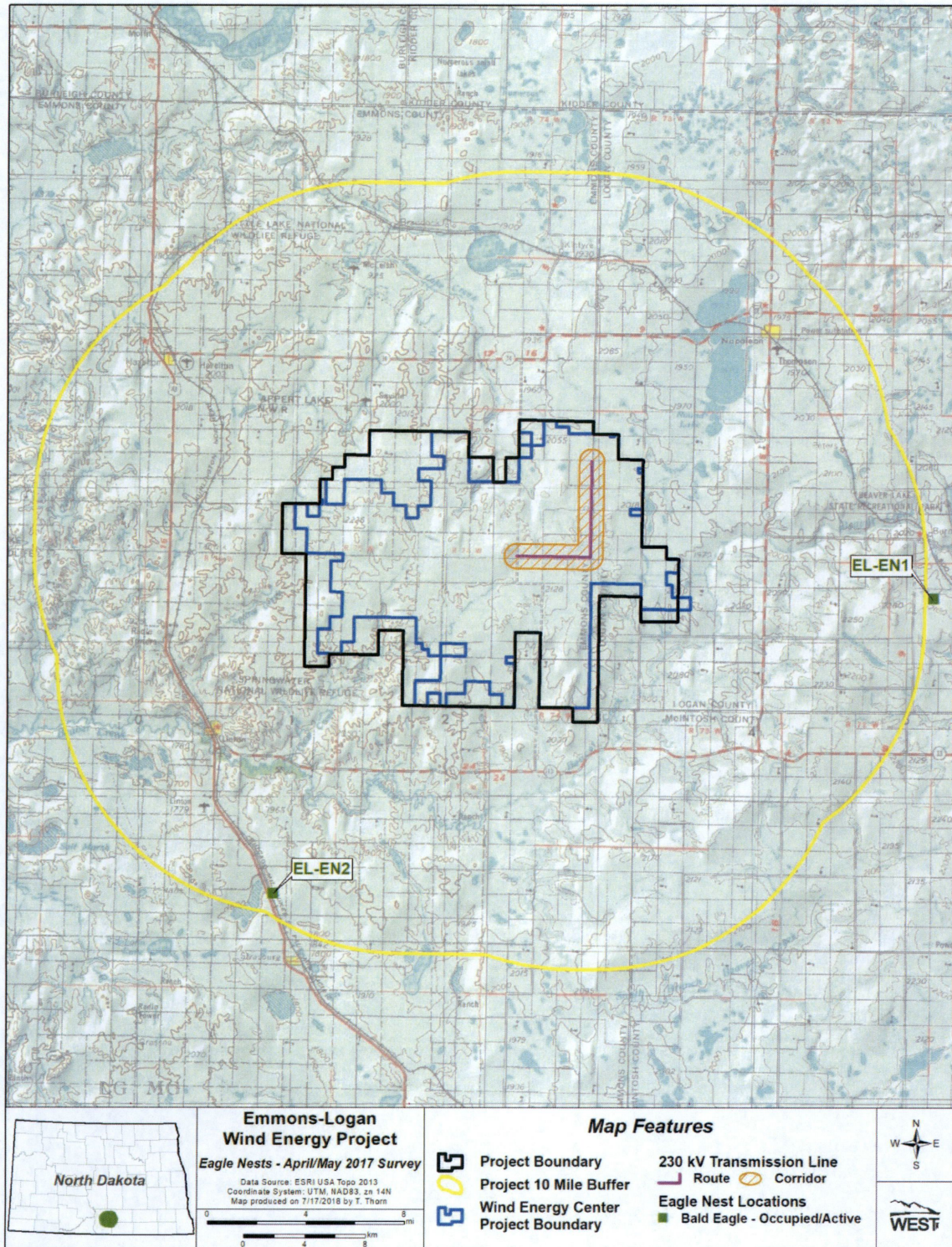


Figure 1. Eagle nests recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 10-mi buffer.

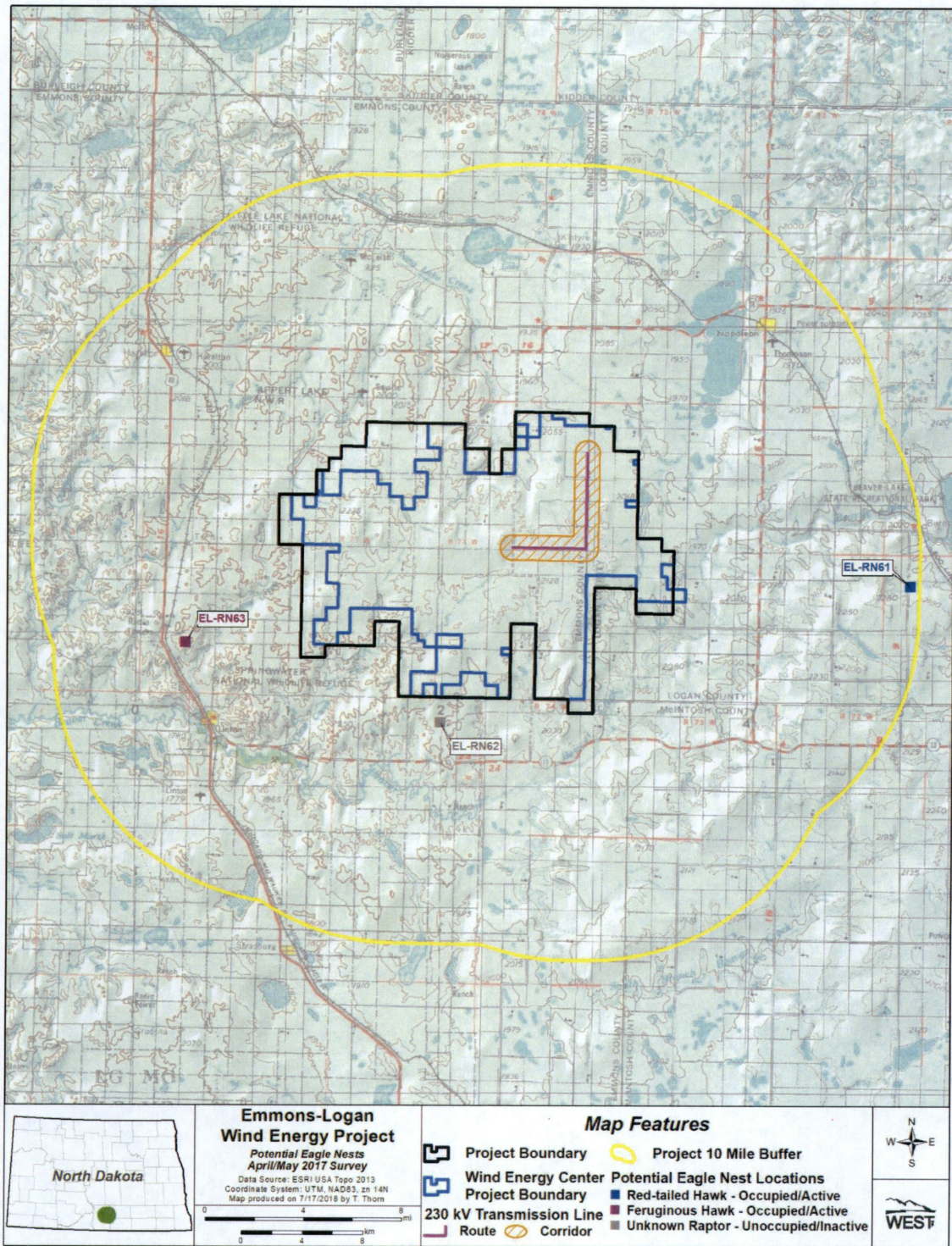


Figure 2. Nests of eagle size\* recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 10-mi buffer.

\* Size and location consistent with an eagle nest

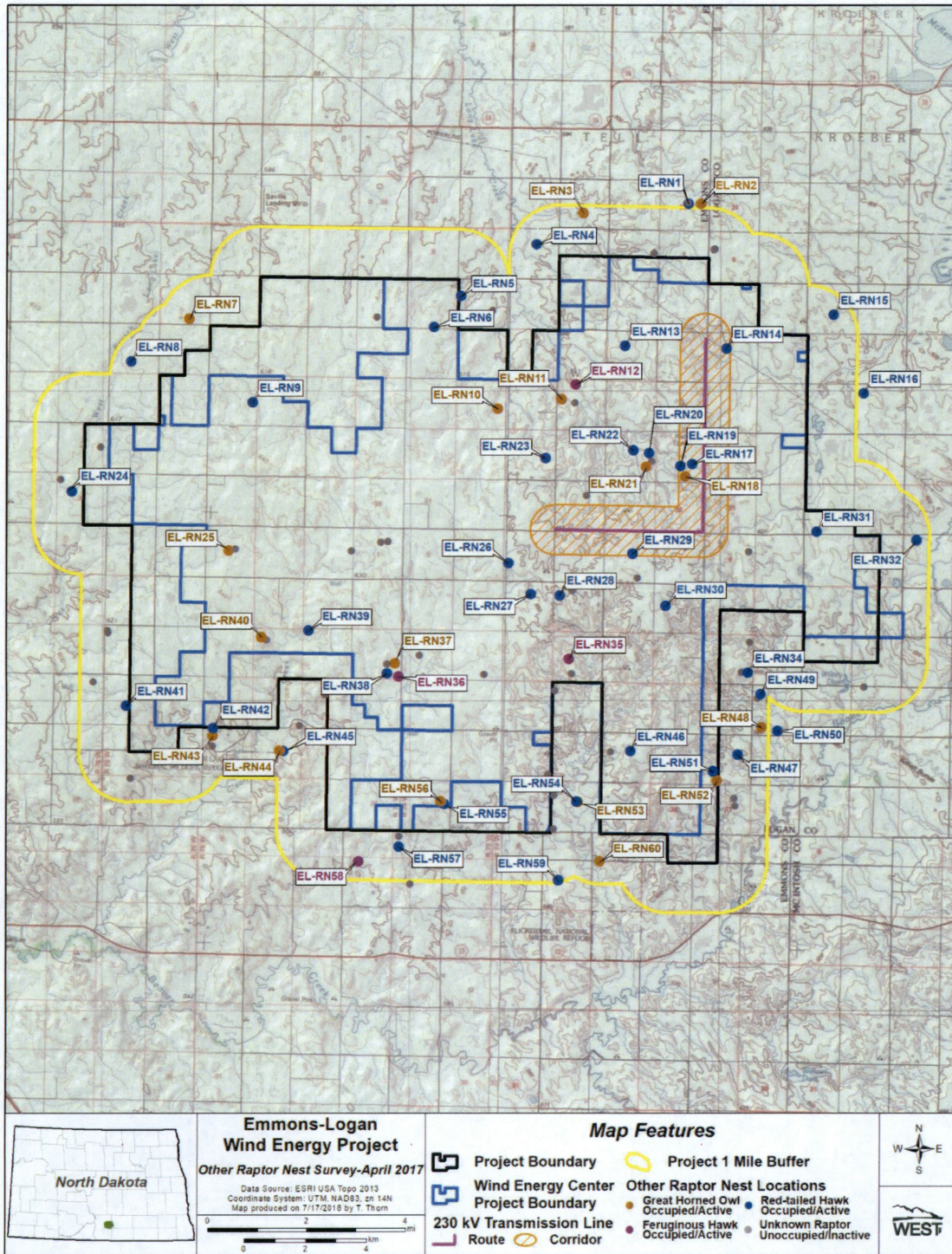


Figure 3. Non-eagle nests\* recorded during aerial raptor nest surveys conducted in spring 2017 for the Emmons-Logan Wind Energy Center and 230 kV Transmission Line, in Emmons and Logan Counties, North Dakota, and associated 1-mi buffer.

\* Nest IDs for unoccupied/inactive raptor species (grey circles) are not shown.

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