

**2018 Raptor Nest Survey Report  
Aurora Wind Energy Project  
Williams County, North Dakota**

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**Final Report  
April 22, 2018**

**Prepared for:**  
**Aurora Wind Project, LLC**  
16105 West 113<sup>th</sup> Street  
Lenexa, Kansas 66219

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**Prepared by:**  
**Sofia Agudelo, Terri Thorn, and Clayton Derby**  
Western EcoSystems Technology, Inc.  
4007 State Street, Suite 109  
Bismarck, North Dakota 58503

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## **STUDY PARTICIPANTS**

|               |                                      |                                |
|---------------|--------------------------------------|--------------------------------|
| Clayton Derby | <b>Western EcoSystems Technology</b> | Senior Project Manager         |
| Terri Thorn   |                                      | GIS Specialist                 |
| Sofia Agudelo |                                      | Report Writer/Technical Editor |
| Wyatt Mack    |                                      | Field Technician               |

## **REPORT REFERENCE**

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## **INTRODUCTION**

Aurora Wind Project, LLC (Aurora), is considering the development of the Aurora Wind Energy Project (Project) in northwest North Dakota. Aurora contracted Western EcoSystems Technology, Inc. (WEST) to conduct diurnal raptor nest surveys within the Project area and surroundings to estimate the impacts of construction on nesting raptors.

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 raptor nest surveys conducted for the proposed Project in the spring of 2018.

## **STUDY AREA**

The proposed Project, located approximately 5 miles (mi; 8.0 kilometers [km]) northwest of the city of Tioga in Williams County, North Dakota (Figure 1), falls within the Glaciated Dark Brown Prairie Level IV Ecoregion (US Environmental Protection Agency 2016), in an area of nearly flat to gently rolling topography (US Geological Survey 2013). This ecoregion, previously dominated by short- and mixed- grass prairies, has extensively been converted to agricultural and livestock production lands, with oil and gas extraction constituting additional important activities (Bryce et al. 1996, US Environmental Protection Agency 2017). As defined in April of 2018 for nest surveys the Project encompassed an area of 55,549.8 acres (22,480.2 hectares).

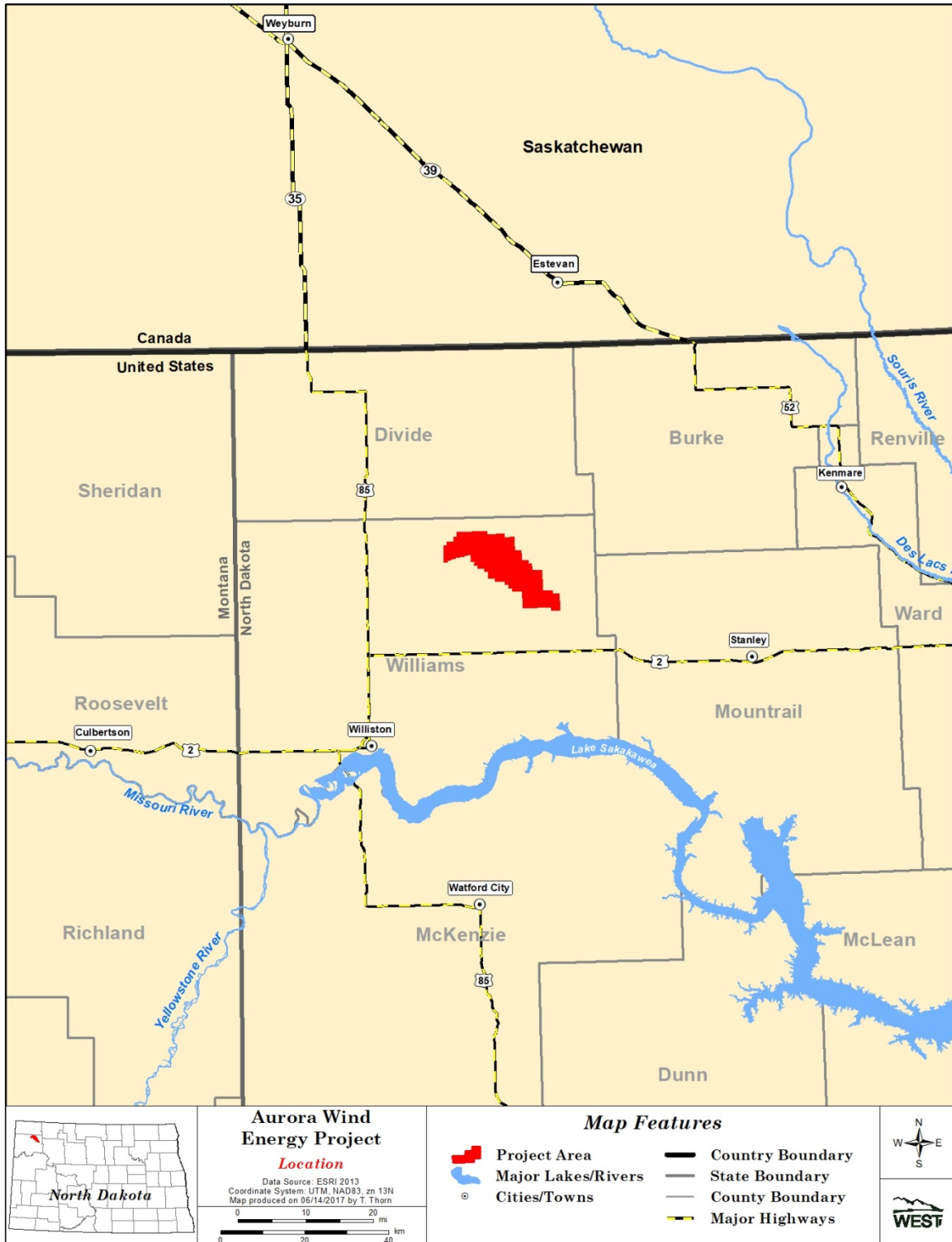


Figure 1. Location of the Aurora Wind Energy Project in Williams County, North Dakota.

## METHODS

One aerial raptor nest survey was conducted for the Project area, as defined in April of 2018, 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).

The survey, conducted on April 22, 2018, was timed to coincide with the period prior to leaf out conditions when bald eagles (*Haliaeetus leucocephalus*) are likely incubating eggs or tending young in the region (USFWS 2007), and when other raptor species are 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 eagle nests, focusing on locating eyries (i.e., large, stick nest structures) in suitable eagle nesting substrates (e.g., trees, transmission lines, cliff faces) within the proposed Project and associated buffers.

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 to cover all suitable bald eagle and raptor nesting habitat within 10.0 miles (mi; 16.1 kilometers [km]) of the Project. In addition, a shapefile of known eagle nest locations within the Project and 10-mile buffer was requested from the North Dakota Game and Fish Department in January 2018. One experienced raptor ecologists and a skilled 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, cliffs, and artificial nest structures such as power poles and transmission towers) within the proposed Project and buffers. The aerial survey efforts included surveys for all raptor nests within the Project area and 1.0-mi (1.6 km) buffer, and only eagle nests within the 10-mi buffer.

In general, all potential raptor nesting habitat was surveyed by flying meandering transects located 0.25–0.5 mi (0.4–0.8 km) apart, flying at speeds of 60–75 mi per hour throughout the proposed Project and associated buffers. Surveys were conducted daylight hours. Data recorded for each observed nest site are described below.

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

*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 (commonly, GPS); coordinates were set at Universal Transverse Mercator (commonly, UTM) North American Datum (NAD) 1983 unit.

*Bird Species:* To the extent possible, a species was assigned to each observed nest; otherwise, the nest 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 nesting raptors, were documented in order to create a nest database for use during future surveys to identify all potentially suitable nest sites.

*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 is qualitative, it gives a general sense of when a nest or nest site may have last been used. Nests in fair to poor condition were characterized by varying degrees of disrepair, sloughing, or heavy sagging, and would require some level of effort to rebuild in order to be suitable for successful nesting. Nests in good to excellent condition were those that appeared to have been well maintained, have a well-defined bowl shape, were not sagging or sloughing, and appeared to be suitable for nesting.

*Nest Substrate:* Substrates ranged from man-made structures such as power lines, nest platforms, and dock hoists, to biological and physical structures such as conifer and deciduous tree species, cliff faces, and rock outcrops.

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.

## **RESULTS**

A total of 63 nest structures representing three raptor species were recorded during the aerial survey conducted for the Project in the spring of 2018 (Table 1). No eagle nests or potential eagles nests were observed within the Project area or associated buffers and no eagle nests

were identified in the North Dakota Game and Fish data request. All raptor nests recorded during this survey were located within the Project area and 1.0-mi buffer (Figure 1).

The raptor nests recorded in 2018 were classified as follows: one occupied active ferruginous hawk (*Buteo regalis*) nest, seven occupied active great-horned owl (*Bubo virginianus*) nests, seven occupied active red-tailed hawk (*Buteo jamaicensis*) nests, one occupied active unknown raptor nest, and 47 unoccupied inactive unknown raptor nests (Table 1). No federally listed threatened or endangered raptor species with potential to occur in the Project area were observed nesting during the aerial raptor nest survey conducted in 2018. All species observed were to be expected for this geographic region and time of year.

The state of North Dakota does not designate species as endangered or threatened but uses a three level system to categorize species of conservation priority based on their conservation need (Dyke et al. 2015). The ferruginous hawk, a Level I Species of Conservation Priority in the State, was recorded nesting within the Project area (Figure 1). Level I species have a high conservation priority due to declining populations across North Dakota and/or their range (Dyke et al. 2015).

**Table 1. Raptor nest locations (UTM NAD 83, Zone 13 N) and features identified during aerial surveys conducted on April 22, 2018 for the Aurora Wind Energy Project, in Williams County, North Dakota, and associated buffers<sup>1</sup>.**

| <b>Nest ID</b> | <b>Easting</b> | <b>Northing</b> | <b>Raptor Species</b> | <b>Status</b>       | <b>Condition</b> | <b>Substrate</b> | <b>Comments</b>               |
|----------------|----------------|-----------------|-----------------------|---------------------|------------------|------------------|-------------------------------|
| R1             | 626110         | 5386457         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R2             | 626958         | 5386343         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R3             | 629608         | 5385909         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R4             | 629790         | 5385905         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R5             | 627015         | 5384827         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; perched              |
| R6             | 627034         | 5384699         | Unknown               | Occupied/Active     | Good             | Deciduous Tree   | 2 eggs; no adults in vicinity |
| R7             | 641659         | 5379584         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; perched              |
| R8             | 634736         | 5378291         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R9             | 628944         | 5374418         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R10            | 647664         | 5369739         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R11            | 641069         | 5368223         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R12            | 638977         | 5367698         | Ferruginous Hawk      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; perched              |
| R13            | 637572         | 5367957         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R14            | 649027         | 5366849         | Great horned owl      | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; 2 nestlings          |
| R15            | 652570         | 5366855         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 1 adult; incubating           |
| R16            | 652184         | 5364689         | Red-tailed Hawk       | Occupied/Active     | Good             | Deciduous Tree   | 2 adults; perched             |
| R17            | 630014         | 5386029         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R18            | 629866         | 5385764         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R19            | 629136         | 5383142         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R20            | 625452         | 5381339         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R21            | 625442         | 5381348         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R22            | 625269         | 5381350         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R23            | 626238         | 5380088         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R24            | 627033         | 5376904         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R25            | 633341         | 5375889         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R26            | 643484         | 5376637         | Unknown               | Unoccupied/Inactive | Excellent        | Deciduous Tree   | ---                           |
| R27            | 637229         | 5373493         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R28            | 637229         | 5373493         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R29            | 637232         | 5373307         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R30            | 637220         | 5373288         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R31            | 635427         | 5374020         | Unknown               | Unoccupied/Inactive | Fair             | Deciduous Tree   | ---                           |
| R32            | 632052         | 5373939         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R33            | 628938         | 5375136         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R34            | 628960         | 5374925         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R35            | 628939         | 5374841         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R36            | 629821         | 5372488         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |
| R37            | 629807         | 5372446         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---                           |

**Table 1. Raptor nest locations (UTM NAD 83, Zone 13 N) and features identified during aerial surveys conducted on April 22, 2018 for the Aurora Wind Energy Project, in Williams County, North Dakota, and associated buffers<sup>1</sup>.**

| <b>Nest ID</b> | <b>Easting</b> | <b>Northing</b> | <b>Raptor Species</b> | <b>Status</b>       | <b>Condition</b> | <b>Substrate</b> | <b>Comments</b> |
|----------------|----------------|-----------------|-----------------------|---------------------|------------------|------------------|-----------------|
| R38            | 631303         | 5373024         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R39            | 632017         | 5372892         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R40            | 635693         | 5371559         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R41            | 635783         | 5371760         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R42            | 636113         | 5371789         | Unknown               | Unoccupied/Inactive | Fair             | Deciduous Tree   | ---             |
| R43            | 636265         | 5371597         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R44            | 641857         | 5371663         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R45            | 644598         | 5371525         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R46            | 648041         | 5370627         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R47            | 643968         | 5369108         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R48            | 641191         | 5367059         | Unknown               | Unoccupied/Inactive | Fair             | Deciduous Tree   | ---             |
| R49            | 641405         | 5366940         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R50            | 640630         | 5366618         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R51            | 640627         | 5366385         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R52            | 640638         | 5366120         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R53            | 638327         | 5365251         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R54            | 638347         | 5365249         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R55            | 640770         | 5364880         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R56            | 643022         | 5365183         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R57            | 644164         | 5365704         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R58            | 647948         | 5366752         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R59            | 652566         | 5366855         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R60            | 660094         | 5364484         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R61            | 660781         | 5364286         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R62            | 661176         | 5363297         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |
| R63            | 658192         | 5362496         | Unknown               | Unoccupied/Inactive | Good             | Deciduous Tree   | ---             |

<sup>1</sup>. 1.0-mile (mi; 1.6-kilometer [km]) buffer for all raptor nests; 10.0-mi (16.1-km) buffer for eagle nests only.

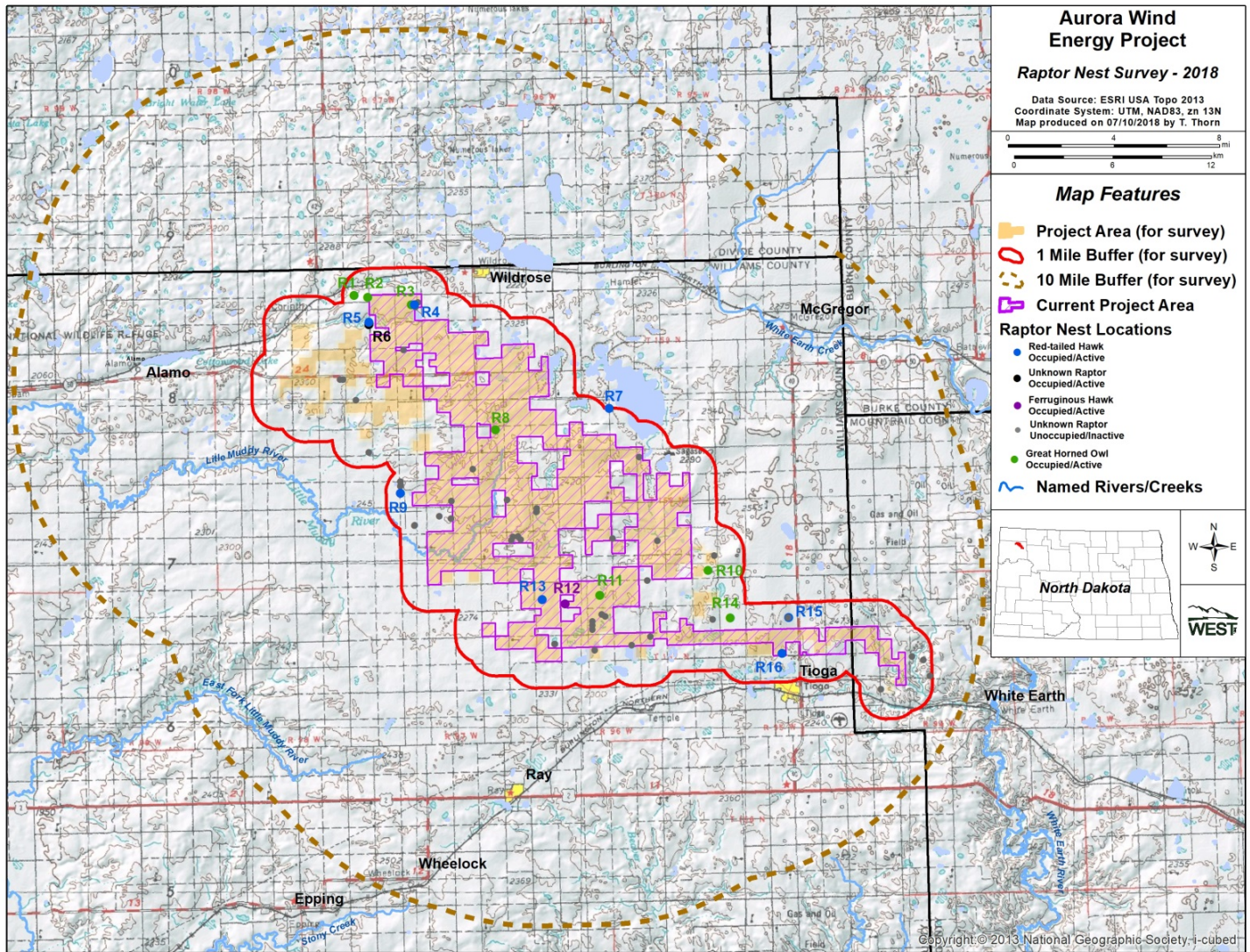


Figure 1. Raptor nests\* recorded during aerial raptor nest surveys conducted on April 22, 2018 for the Aurora Wind Energy Project in Williams County, North Dakota, and associated buffers.

\* Nest IDs for unknown raptor species (grey and black circles) are not shown.

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