

Appendix H – 2023 Raptor Nest Survey

2023 Raptor Nest Survey for South Deuel Wind

DEUEL HARVEST WIND ENERGY SOUTH LLC

**South Deuel Wind
5/23/2024**

2023 Raptor Nest Survey for South Deuel Wind

prepared for

**DEUEL HARVEST WIND ENERGY SOUTH LLC
South Deuel Wind
Deuel County, South Dakota**

5/23/2024

prepared by

**Burns & McDonnell
Kansas City, Missouri**

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
ECPG	Eagle Conservation Plan Guidance: Module 1 – Land-based Wind Energy, Version 2
ESA	Endangered Species Act
ft	feet
GPS	Global Positioning System
GIS	Geographic Information System
MET	meteorological
MW	megawatt
NHD	National Hydrography Dataset
NWI	National Wetland Inventory
Project	South Deuel Wind
Project Area	Project boundary received from Deuel Harvest Wind Energy South LLC
Survey Area	Project Area plus a 2-mile buffer
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WEST	Western EcoSystems Technology, Inc.

1.0 INTRODUCTION

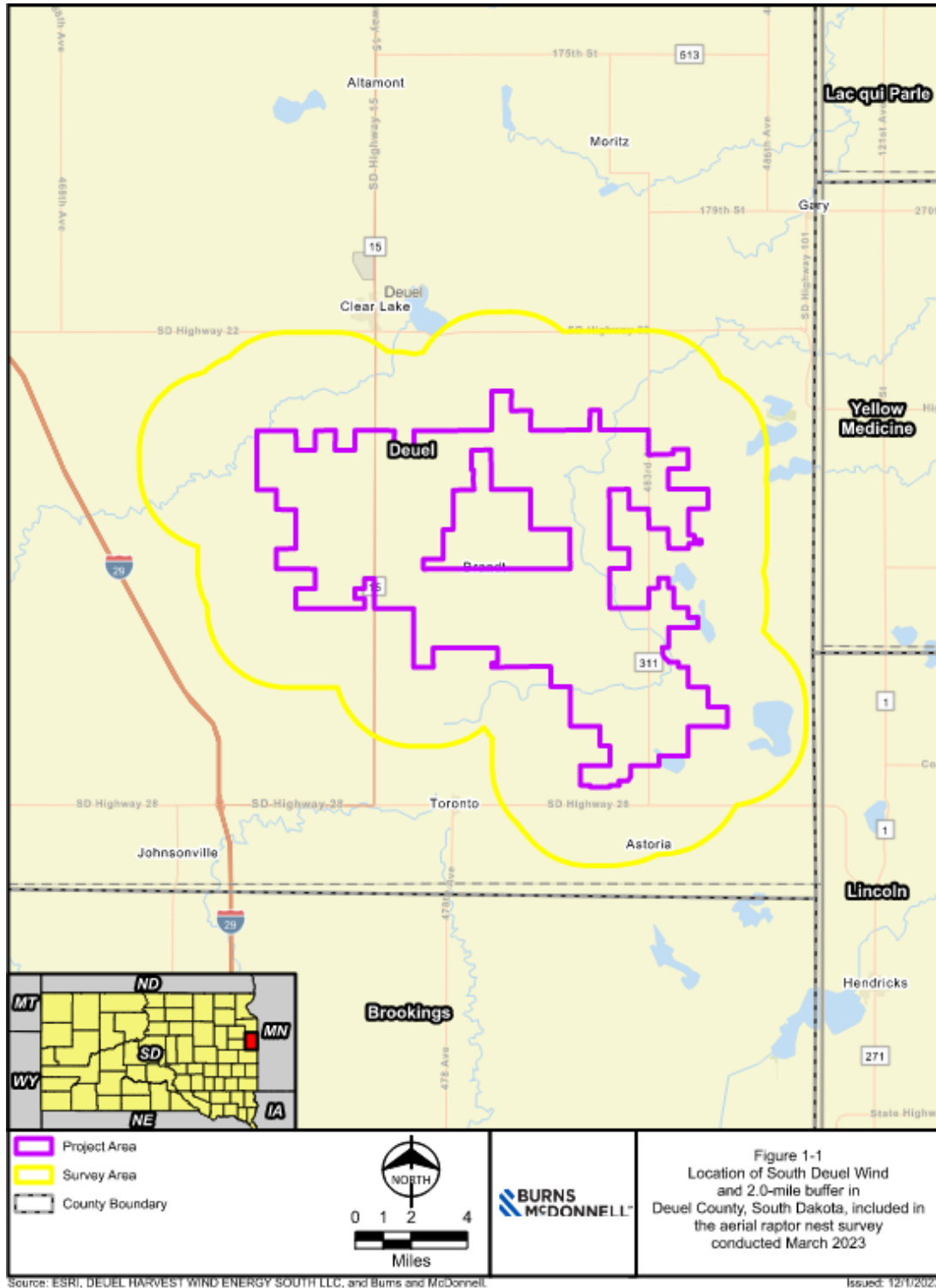
Deuel Harvest Wind Energy South LLC plans to construct South Deuel Wind (Project) in Deuel County, South Dakota. The Project is located approximately 3 miles south of Clear Lake, South Dakota (Figure 1-1).

Burns & McDonnell was contracted to conduct aerial stick nest surveys for the Project based on guidelines provided in the *U.S. Fish and Wildlife Service (USFWS) Region 6, Recommended Protocol for Conducting Pre-construction Eagle Nest Surveys at Wind Energy Projects (March 31, 2021)* (USFWS 2020) (USFWS Guidance), the *USFWS Land-Based Energy Guidelines* (USFWS 2012), the *USFWS Eagle Conservation Plan Guidance (ECPG; USFWS 2013)*, and the *USFWS Updated Eagle Nest Survey Protocol* (USFWS 2020). The purpose of the survey is to identify and inventory large stick nests within the Project Area and an applicable buffer that are constructed by eagles, non-eagle raptors (i.e., hawks, eagles, vultures, ospreys, falcons, and owls; hereafter, raptors), and colonial nesting waterbirds (i.e., great blue herons; hereafter, waterbirds). The Survey Area includes the Project Area plus a 2-mile buffer for all large stick nests.

1.1 Project Area

The Project Area at the time of the survey includes approximately 34,339 acres and is located in eastern South Dakota (Figure 1-1), which is outside of the normal breeding area of golden eagles. The Project Area was historically tall-grass and short-grass prairies within the Northern Glaciated Plains Level III Ecoregion (U.S. Environmental Protection Agency 2017). Current land uses are dominated by row-crop agriculture and hay and pasture land. The Project Area consists of rolling to flat terrain, prairie potholes, and drainages where seasonal rainfall has shaped the landscape.

Figure 1-1: Location of South Deuel Wind and 2.0-mile Buffer in Deuel County, South Dakota included in the Aerial Survey on March 29, 2023



2.0 METHODS

A desktop evaluation using data from the United States Geologic Survey (USGS), National Hydrography Dataset (NHD) and USFWS National Wetland Inventory (NWI) was performed to identify possible stick nest locations in appropriate habitat such as wooded areas, riparian corridors, anthropomorphic structures, and forested edges of waterbodies. Results of previous stick nest surveys for the Project were reviewed to identify areas where stick nests had previously been present (Burns & McDonnell 2019; Burns & McDonnell 2022). The Survey Area was incorporated into geographic information systems (GIS) software with flight path transects overlaid every 1 mile for use in the field.

One aerial stick nest survey was conducted via a Robinson R44 helicopter on March 29, 2023. The weather conditions ranged from cool and cloudy to mild and clear allowing for full range of visibility. The aerial surveys were conducted prior to total deciduous tree leaf-out and to coincide with the period when bald eagles are most likely to conduct nest maintenance, incubate eggs, or tend to their young.

The aerial survey consisted of sixteen transects at approximately 1-mile intervals within the Survey Area flying at approximately 65-85 miles per hour. When suitable habitat for raptors was identified, the helicopter would approach and begin to circle to assess the wooded area in order to identify stick nests. If a stick nest was identified the pilot would approach slowly and position such that the nest could be observed and photographed. The nest locations (Figure A-1, Appendix A) were estimated using a sub-meter accurate global positioning system (GPS) unit and recorded on a tablet computer.

Data recorded for each observed nest included:

- GPS Location
- Nest identification
- Species occupying the nest (if possible)
- Nest condition (i.e., poor, fair, good, excellent)
- Nest substrate
- Nest activity status (i.e., occupied or unoccupied, number of adults and young present)
- Any relevant information about the nest or raptor sightings and behavior nearby

Included below are descriptions of terms used during the documentation of nests (See Results; Table 3-1).

Nest Identification - A unique nest identification number was assigned for each nest documented.

Species - Species were assigned to each documented nest when possible, otherwise, it was classified as an unidentified raptor nest. Nests assigned to unidentified raptor species were defined as any stick nest that does not have an occupant associated with it at the time of the survey. Nests documented as belonging to an unidentified raptor species that appeared to be consistent in size and shape with eagle nests were classified as potential eagle nests.

Nest Condition – Poor, Fair, Good, Excellent. Nest condition was categorized using descriptions ranging from poor to excellent. The determination of nest condition can be subjective and may vary between observers based on best professional judgement. Nests in poor condition are generally dilapidated (e.g., in disrepair, sloughing, or sagging heavily) and require major repair to be suitable for successful nesting. A nest in fair condition is generally not dilapidated but needs substantial repair to be used. Nests in good condition only needing minor attention to be suitable for nesting. Nests in excellent condition are those that appear to have been well maintained, have a well-defined bowl shape, are not sagging or sloughing, and are deemed suitable for nesting.

Nest Substrate - The substrate in which a nest is observed (i.e., deciduous tree, coniferous tree, power pole) will be recorded to provide a visual reference.

Nest Activity Status - Nest status categories used were consistent with definitions from the USFWS Eagle Conservation Plan Guidance (USFWS 2013) (ECPG). Nests will be classified as occupied if any of the following are observed at the nest structure:

- An adult in an incubating or brooding position
- Eggs
- Nestlings or fledglings
- Occurrence of a pair of adults or sub-adults
- Occurrence of sub-adults
- A newly constructed or refurbished stick nest in the area where territorial behavior of a raptor had been observed early in the breeding season
- 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 will be further classified as active if one or more eggs have been laid or nestlings or fledglings are observed.
- Unoccupied nests will be further classified as inactive if no adults, eggs, nestlings, or fledglings are observed.

3.0 RESULTS

A total of three eagle nests (EN-1, EN-3, and EN-4) were identified in the Survey Area. One eagle nest (EN-3) was identified within the Project Area. The other eagle nests (EN-1 and EN-4) were not located in the Project Area but were within the 2-mile buffer around the Project Area. One nest (EN-2) in the Project Area was identified as being consistent in size and shape with eagle nests but was unoccupied and classified as a potential eagle nest.

- EN-1: Occupied by great horned owl; inactive eagle nest, outside of the Project Area, but within the 2-mile buffer area.
- EN-2: Unoccupied; inactive potential eagle nest, inside the Project Area.
- EN-3: Occupied by great horned owl; inactive eagle nest, inside the Project Area.
- EN-4: Occupied by bald eagle; active eagle nest, outside of the Project Area, but within the 2-mile buffer area.

Approximately 25 non-eagle stick nests and one heron rookery of 20 to 25 nests (Table 3-1; Figure 3-1; Figure A-1, Appendix A) were identified within the Survey Area. The species identified included three raptor species (red-tailed hawk, unidentified raptor, and great horned owl) as well as one waterbird species (great blue heron).

- 1 active red-tailed hawk (*Buteo jamaicensis*) nests:
 - 1 occupied, active nest inside the Project Area
- 6 active great horned owl (*Bubo virginianus*) nests:
 - 5 occupied, active nests outside of the Project Area, but within 2-mile buffer area
 - 1 occupied, active nest inside the Project Area
- 18 unidentified inactive raptor nests:
 - 11 unoccupied, inactive nests outside of the Project Area, but within 2-mile buffer area
 - 7 unoccupied, inactive inside the Project Area
- 1 inactive heron rookery (*Ardea herodias*)
 - 20 - 25 unoccupied, inactive nests outside the Project Area, but within 2-mile buffer area

No federally or state-threatened species were documented during the raptor nest survey.

Table 3-1: Stick Nests Documented for South Deuel Wind and 2.0-mile Buffer in Deuel County, South Dakota Included in the Aerial Survey March 29, 2023

Nest ID	Species	Occupancy Status	Nest Status	Nest Condition	Nest Substrate	Latitude, Longitude	Within Project Area?	2022 Status ¹²	Comments
EN-1	Great Horned Owl	Occupied	Inactive	Great	Deciduous Trees	44.73294553 -96.71669277	No	EN-1 Active	Close proximity to 2022 nest
EN-2	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.65284817 -96.65721152	Yes	EN-2 Inactive	Close proximity to 2022 nest
EN-3	Great Horned Owl	Occupied	Inactive	Great	Deciduous Trees	44.66679183 -96.57803984	Yes	EN-3 Active	Close proximity to 2022 nest
EN-4	Bald Eagle	Occupied	Active	Excellent	Deciduous Trees	44.71999004 -96.7558152	No	Not identified in 2022	-
HE-1	Heron Rookery	Unoccupied	Inactive	Great	Deciduous Trees	44.73368679 -96.53541134	No	-	20 – 25 nests; close proximity to 2022
SN-1	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.67878549 -96.50346685	No	-	Close proximity to 2022 nest
SN-2	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.57832173 -96.52428182	No	-	Close proximity to 2022 nest
SN-3	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.73409433 -96.52320907	No	-	-

¹ 2022 Status was determined from Survey C of the 2022 stick nest surveys.

² 2022 Status is only applied to eagle nests, which are built upon through years. Nests made by raptors or colonial nesting waterbirds cannot be accurately compared unless they are monitored year-round.

Nest ID	Species	Occupancy Status	Nest Status	Nest Condition	Nest Substrate	Latitude, Longitude	Within Project Area?	2022 Status ¹²	Comments
SN-4	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.6548012 -96.54537636	No	-	Close proximity to 2022 nest
SN-5	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.59461061 -96.54537636	Yes	-	Close proximity to 2022 nest
SN-6	Great Horned Owl	Occupied	Active	Great	Deciduous Trees	44.56277739 -96.54401609	No	-	Close proximity to 2022 nest
SN-7	Great Horned Owl	Occupied	Active	Excellent	Deciduous Trees	44.72385469 -96.57644151	No	-	Close proximity to 2022 nest
SN-8	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.72383102 -96.57549073	No	-	Close proximity to 2022 nest
SN-9	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.70482686 -96.58187439	Yes	-	Close proximity to 2022 nest
SN-10	Unidentified Raptor	Unoccupied	Inactive	Great	Deciduous Trees	44.65350708 -96.57536297	Yes	-	Close proximity to 2022 nest
SN-11	Great Horned Owl	Occupied	Active	Great	Deciduous Trees	44.64701392 -96.59872661	Yes	-	-
SN-12	Unidentified Raptor	Unoccupied	Inactive	Good	Deciduous Trees	44.61175393 -96.59872661	No	-	-
SN-13	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.61176965 -96.59894671	No	-	-

Nest ID	Species	Occupancy Status	Nest Status	Nest Condition	Nest Substrate	Latitude, Longitude	Within Project Area?	2022 Status ¹²	Comments
SN-14	Great Horned Owl	Occupied	Active	Good	Deciduous Trees	44.5801665 -96.61496765	No	-	Close proximity to 2022 nest
SN-15	Unidentified Raptor	Unoccupied	Inactive	Good	Deciduous Trees	44.62362623 -96.63529215	No	-	Close proximity to 2022 nest
SN-16	Red-tailed Hawk	Occupied	Active	Great	Deciduous Trees	44.68189315 -96.64526384	Yes	-	Close proximity to 2022 nest
SN-18	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.73748569 -96.66983935	No	-	-
SN-19	Great Horned Owl	Occupied	Active	Great	Deciduous Trees	44.63988475 -96.65925368	Yes	-	Close proximity to 2022 nest
SN-20	Unidentified Raptor	Unoccupied	Inactive	Good	Deciduous Trees	44.68108083 -96.68175546	Yes	-	Close proximity to 2022 nest
SN-21	Unidentified Raptor	Unoccupied	Inactive	Good	Deciduous Trees	44.68125777 -96.68186849	Yes	-	-
SN-22	Unidentified Raptor	Unoccupied	Inactive	Poor	Deciduous Trees	44.71421538 -96.68556836	No	-	-
SN-23	Unidentified Raptor	Unoccupied	Inactive	Good	Deciduous Trees	44.73762642 -96.68423464	No	-	-
SN-24	Great Horned Owl	Occupied	Active	Great	Deciduous Trees	44.69532865 -96.72716522	Yes	-	-
SN-25	Unidentified Raptor	Unoccupied	Inactive	Great	Deciduous Trees	44.73369864 -96.71667274	No	-	Close proximity to 2022 nest

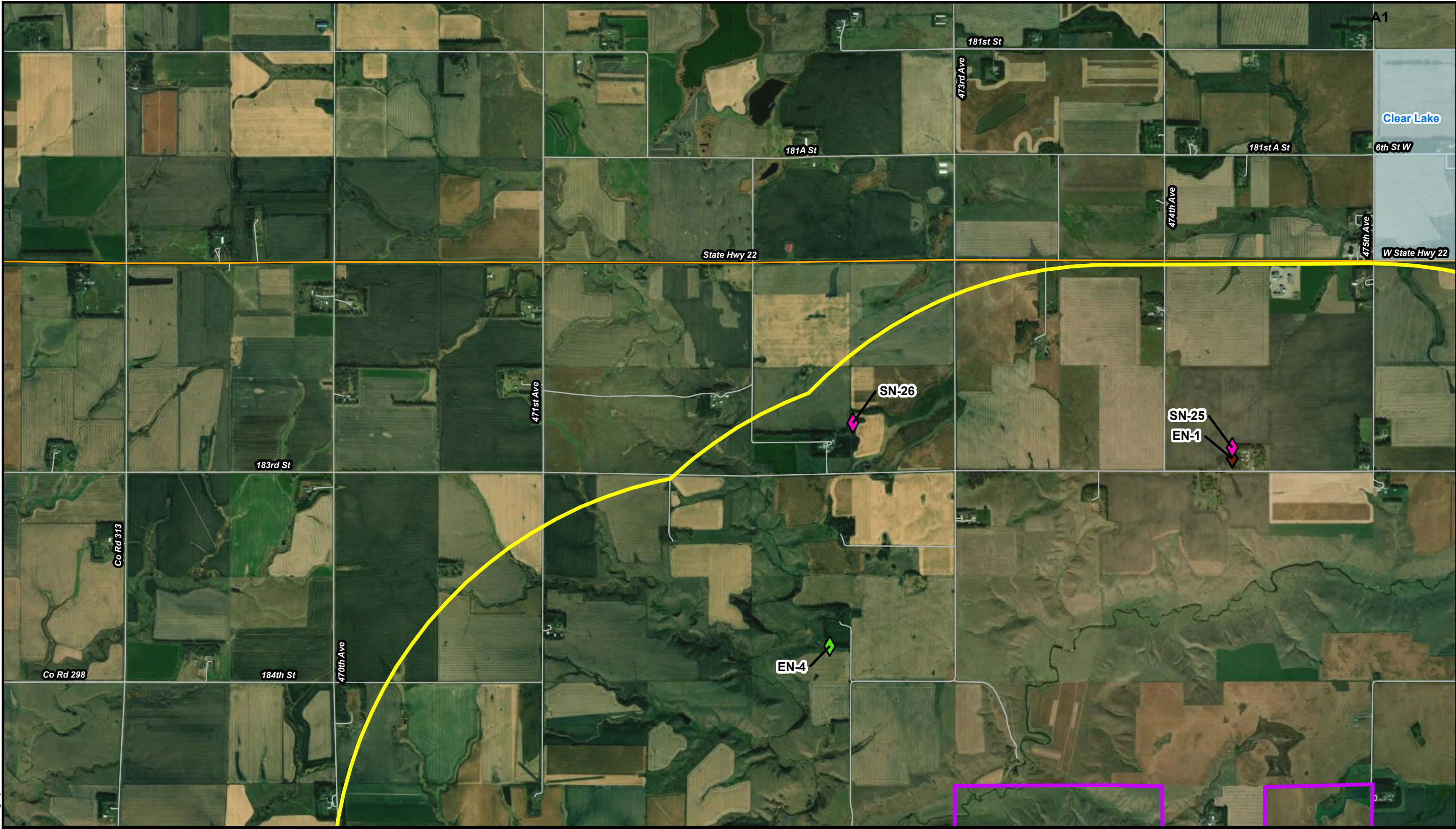
Nest ID	Species	Occupancy Status	Nest Status	Nest Condition	Nest Substrate	Latitude, Longitude	Within Project Area?	2022 Status¹²	Comments
SN-26	Unidentified Raptor	Unoccupied	Inactive	Fair	Deciduous Trees	44.73540169 -96.75357014	No	-	-

4.0 REFERENCES

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APPENDIX A- MAPBOOK

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7	8	9
10	11	

- Stick Nest Species**
- ◆ Occupied, Active Bald Eagle
 - ◆ Occupied, Inactive Eagle
 - ◆ Unoccupied, Inactive Potential Eagle

- ◆ Occupied, Active Great Blue Heron
- ◆ Occupied, Active Great Horned Owl
- ◆ Occupied, Active Red-Tailed Hawk

- ◆ Unoccupied, Inactive Unidentified Raptor
- Project Area
- Survey Area
- County Boundary
- Municipality

- Interstate
- Highway
- Road

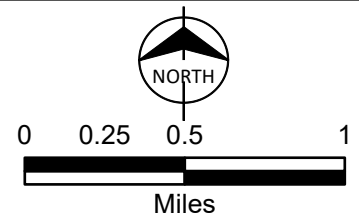
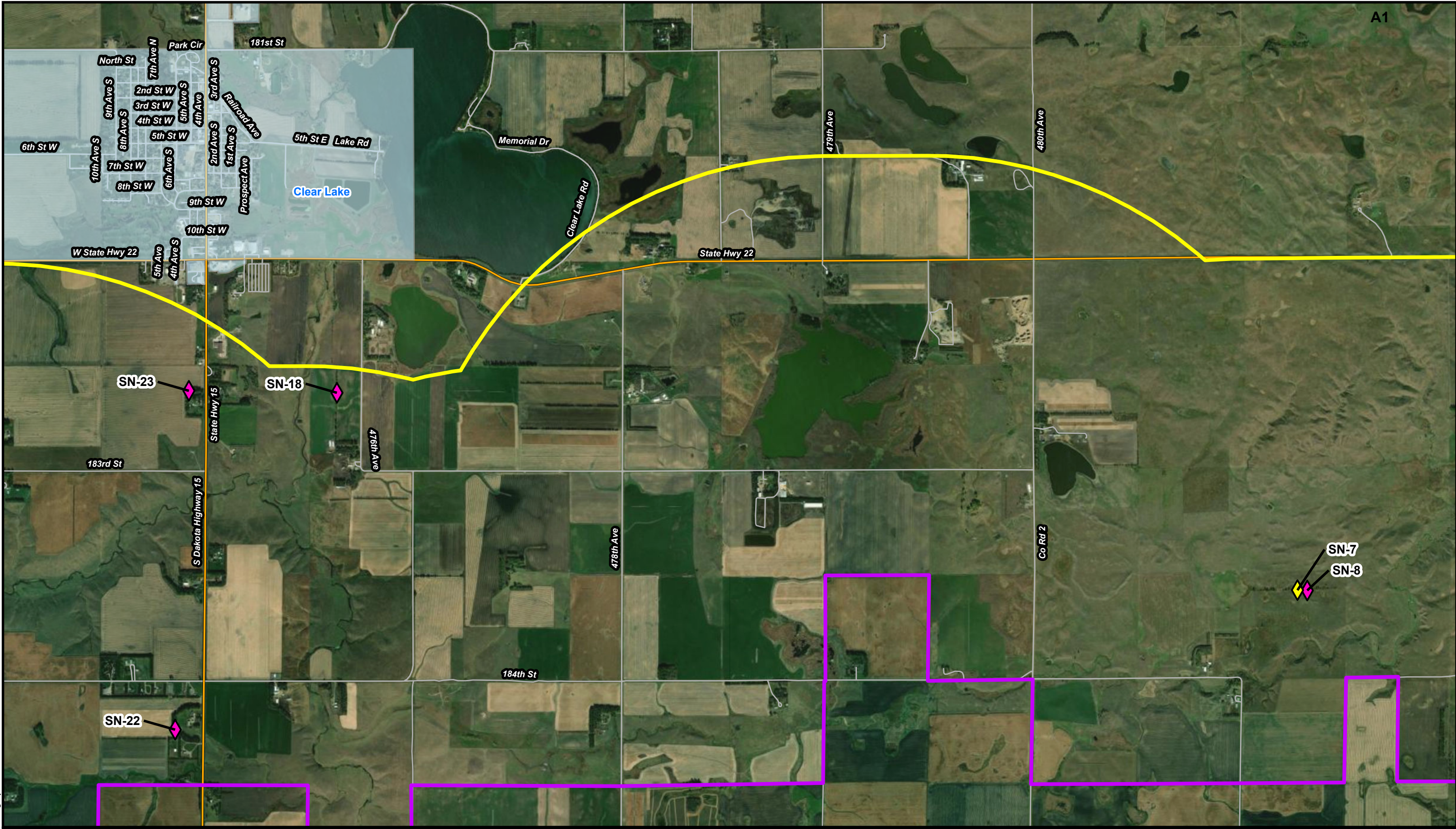


Figure A-1
 Results of the aerial raptor nest survey conducted March 2023 for South Deuel Wind in Deuel County, South Dakota
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- Stick Nest Species**
- ◆ Occupied, Active Bald Eagle
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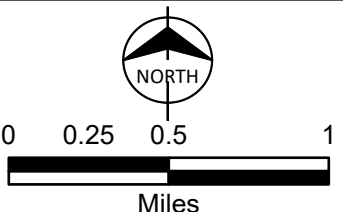
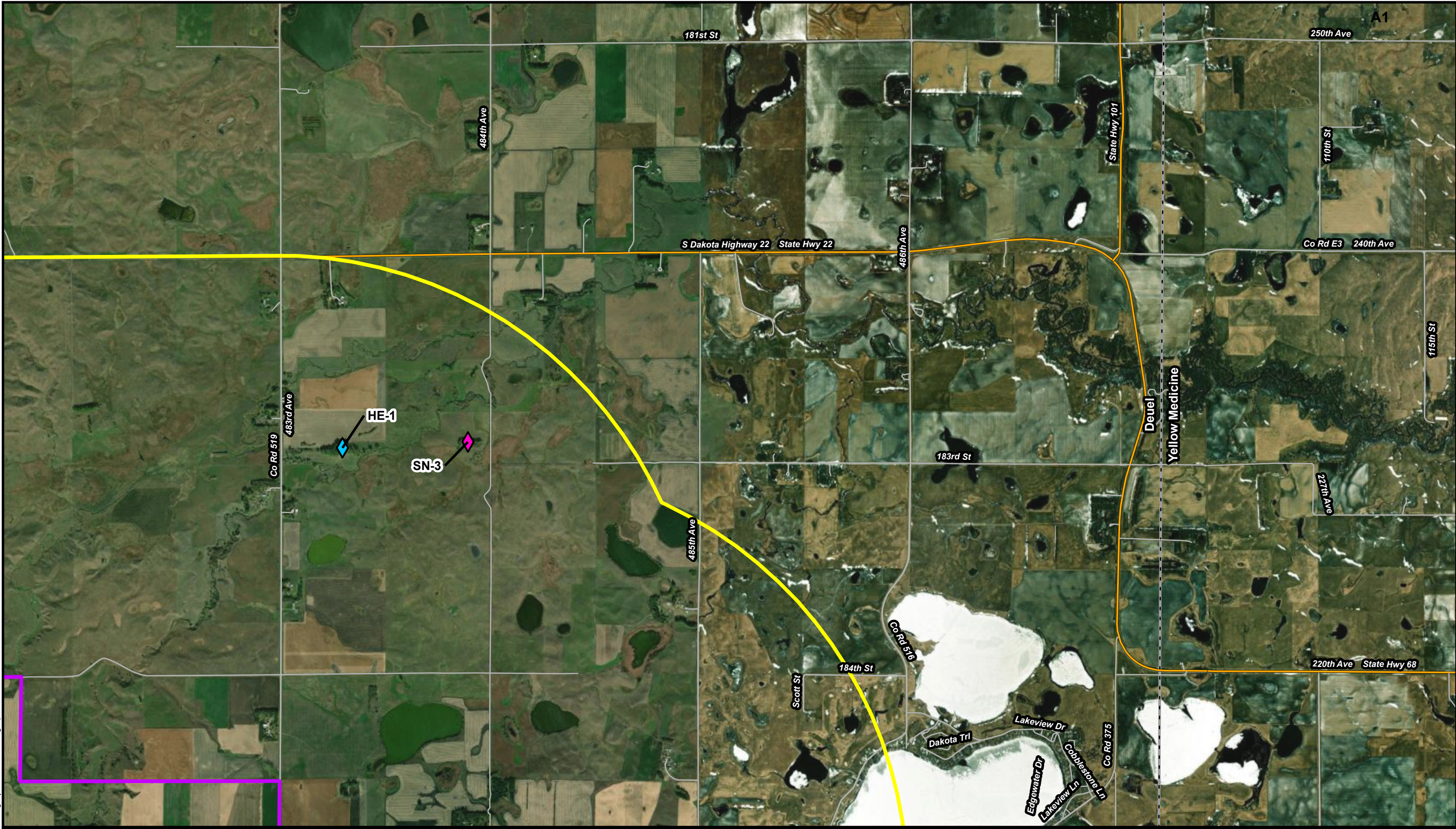


Figure A-1
Results of the aerial raptor nest survey conducted March 2023 for South Deuel Wind in Deuel County, South Dakota
Page 2 of 11

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 Service Layer Credits: World Imagery: Earthstar Geographics



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- Stick Nest Species**
- ◆ Occupied, Active Bald Eagle
 - ◆ Occupied, Inactive Eagle
 - ◆ Unoccupied, Inactive Potential Eagle

- ◆ Occupied, Active Great Blue Heron
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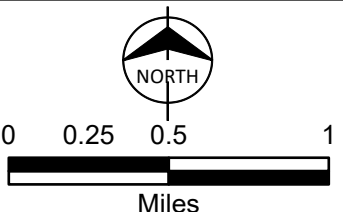
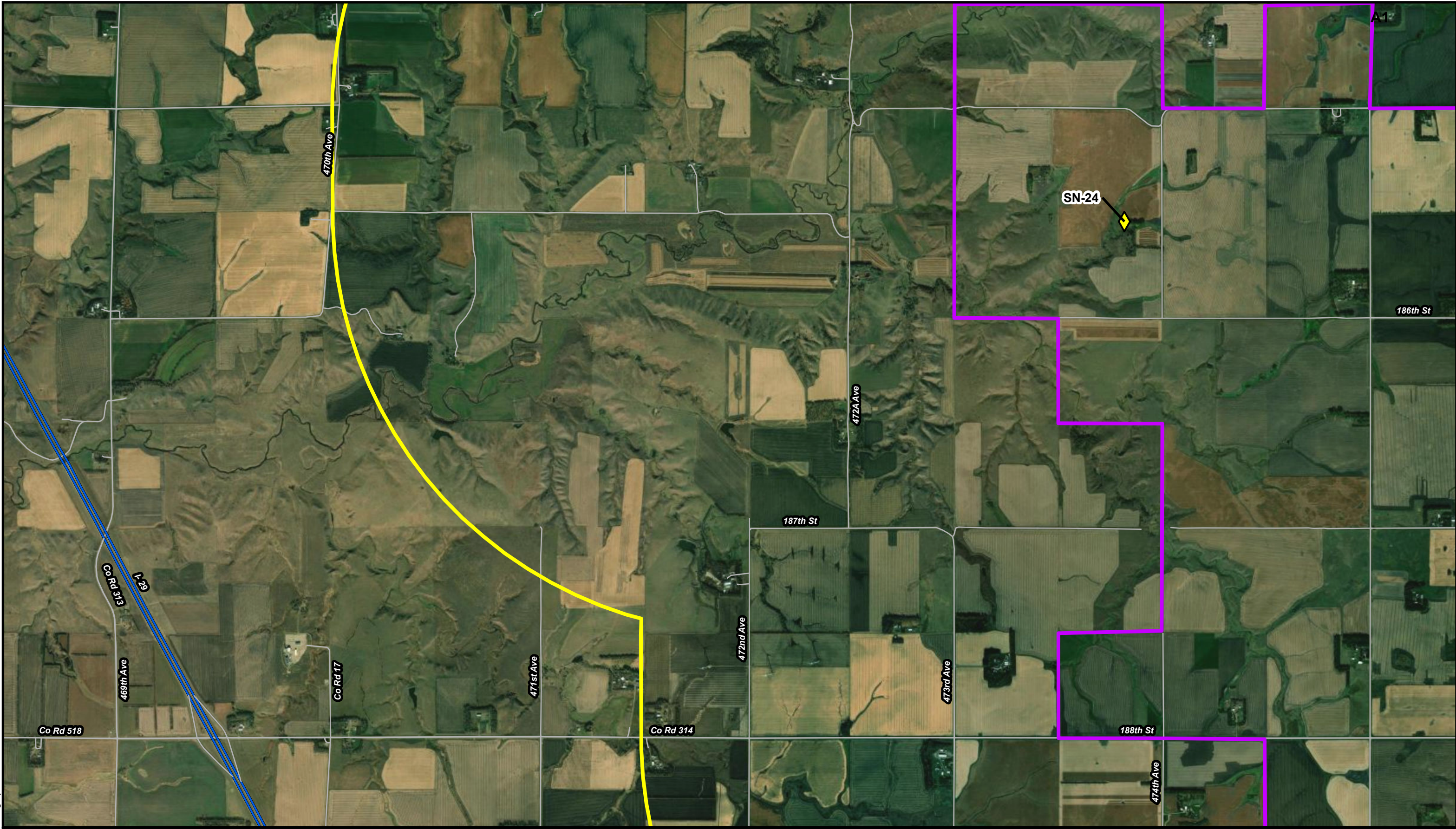


Figure A-1
 Results of the aerial raptor
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 South Deuel Wind in
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 Page 3 of 11



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- ◆ Occupied, Active Bald Eagle
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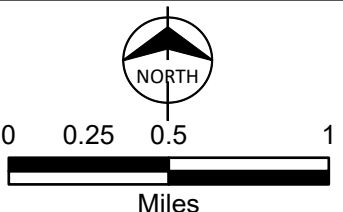
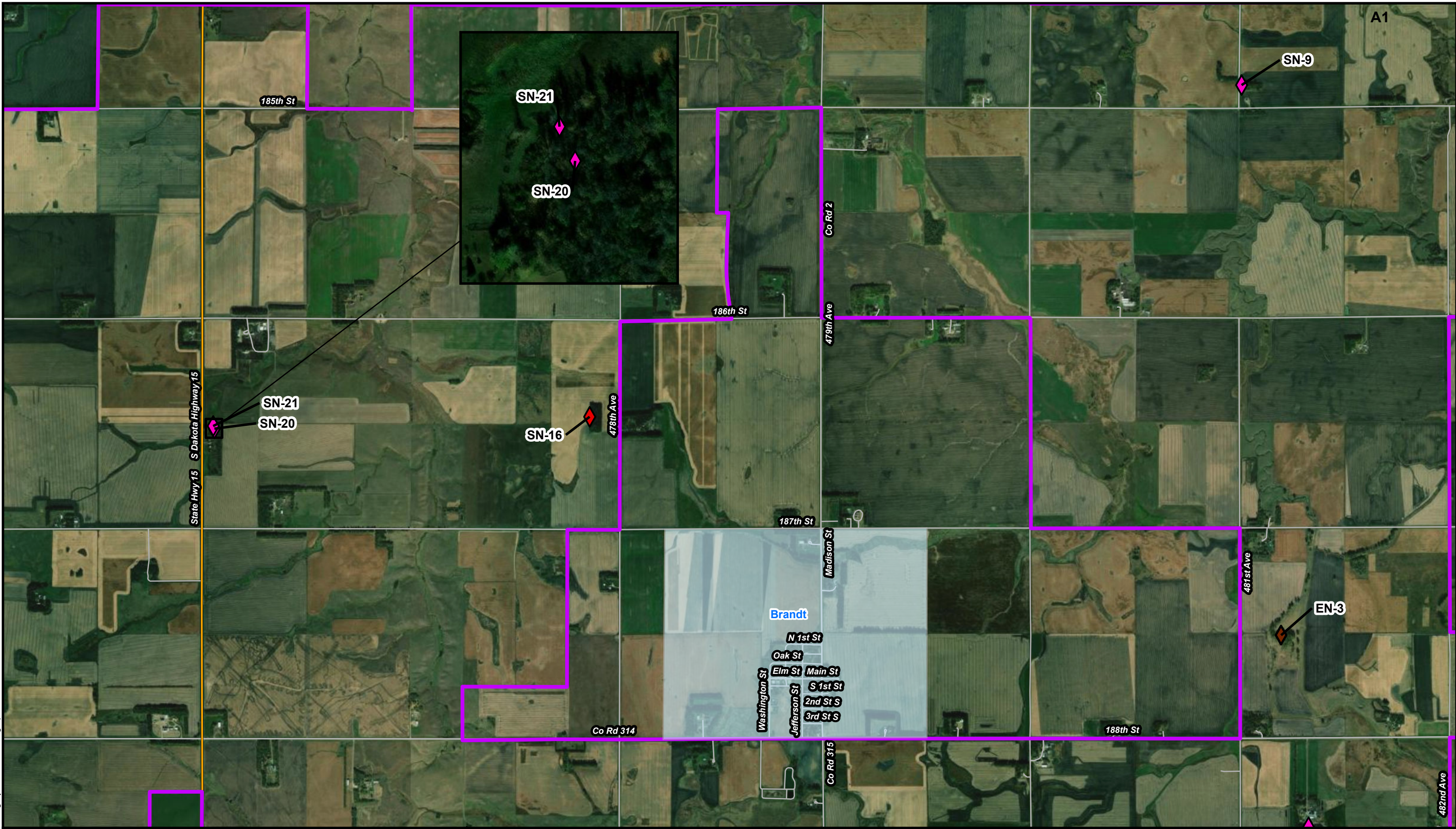


Figure A-1
 Results of the aerial raptor
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 South Deuel Wind in
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10	11	

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|--|---|---|--|
| <p>Stick Nest Species</p> <ul style="list-style-type: none"> ◆ Occupied, Active Bald Eagle ◆ Occupied, Inactive Eagle ◆ Unoccupied, Inactive Potential Eagle | <ul style="list-style-type: none"> ◆ Occupied, Active Great Blue Heron ◆ Occupied, Active Great Horned Owl ◆ Occupied, Active Red-Tailed Hawk | <ul style="list-style-type: none"> ◆ Unoccupied, Inactive Unidentified Raptor Project Area Survey Area County Boundary Municipality | <ul style="list-style-type: none"> Interstate Highway Road |
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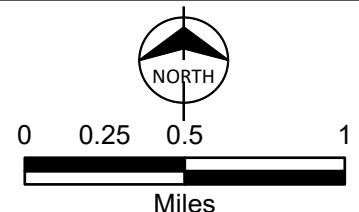
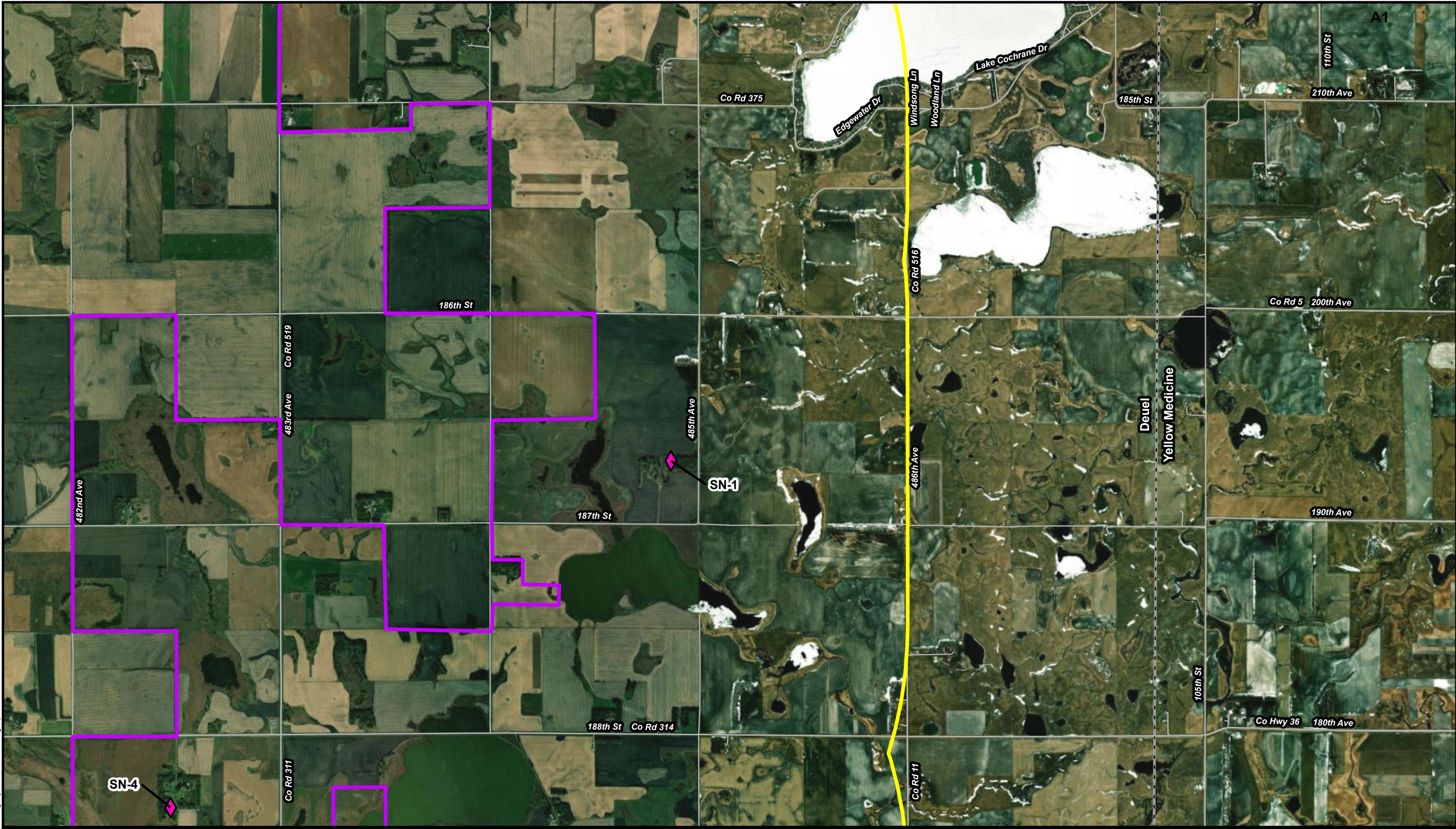


Figure A-1
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 Page 5 of 11



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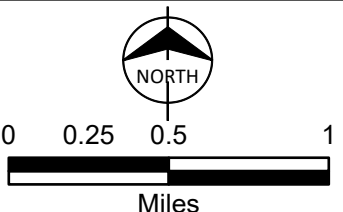


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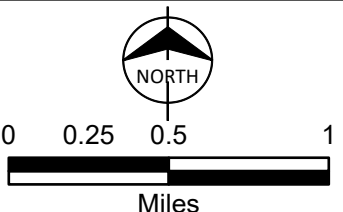
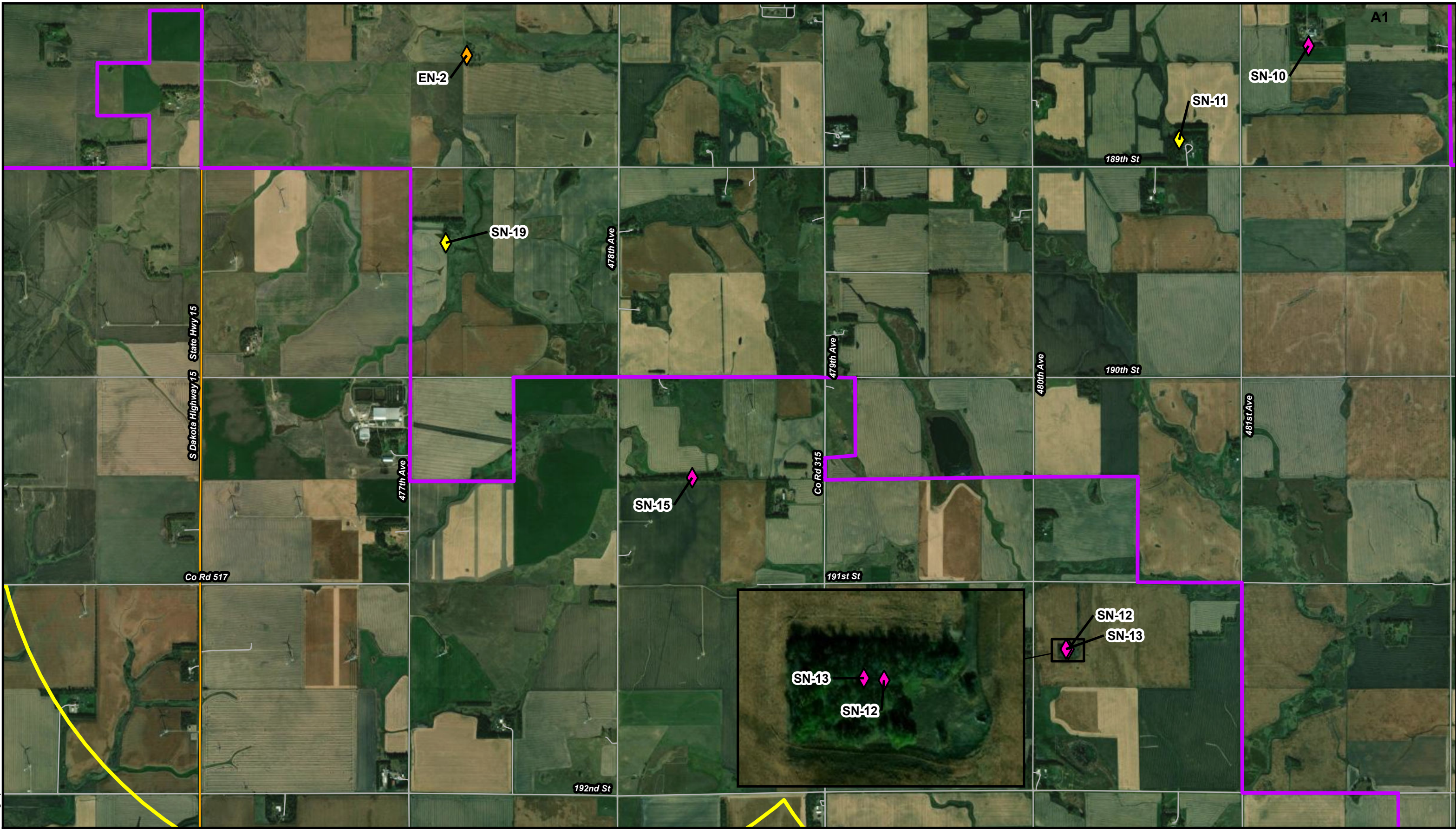


Figure A-1
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- Highway
- Road

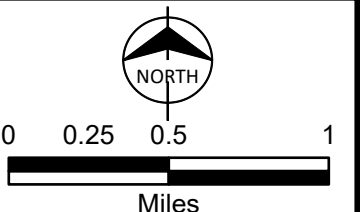
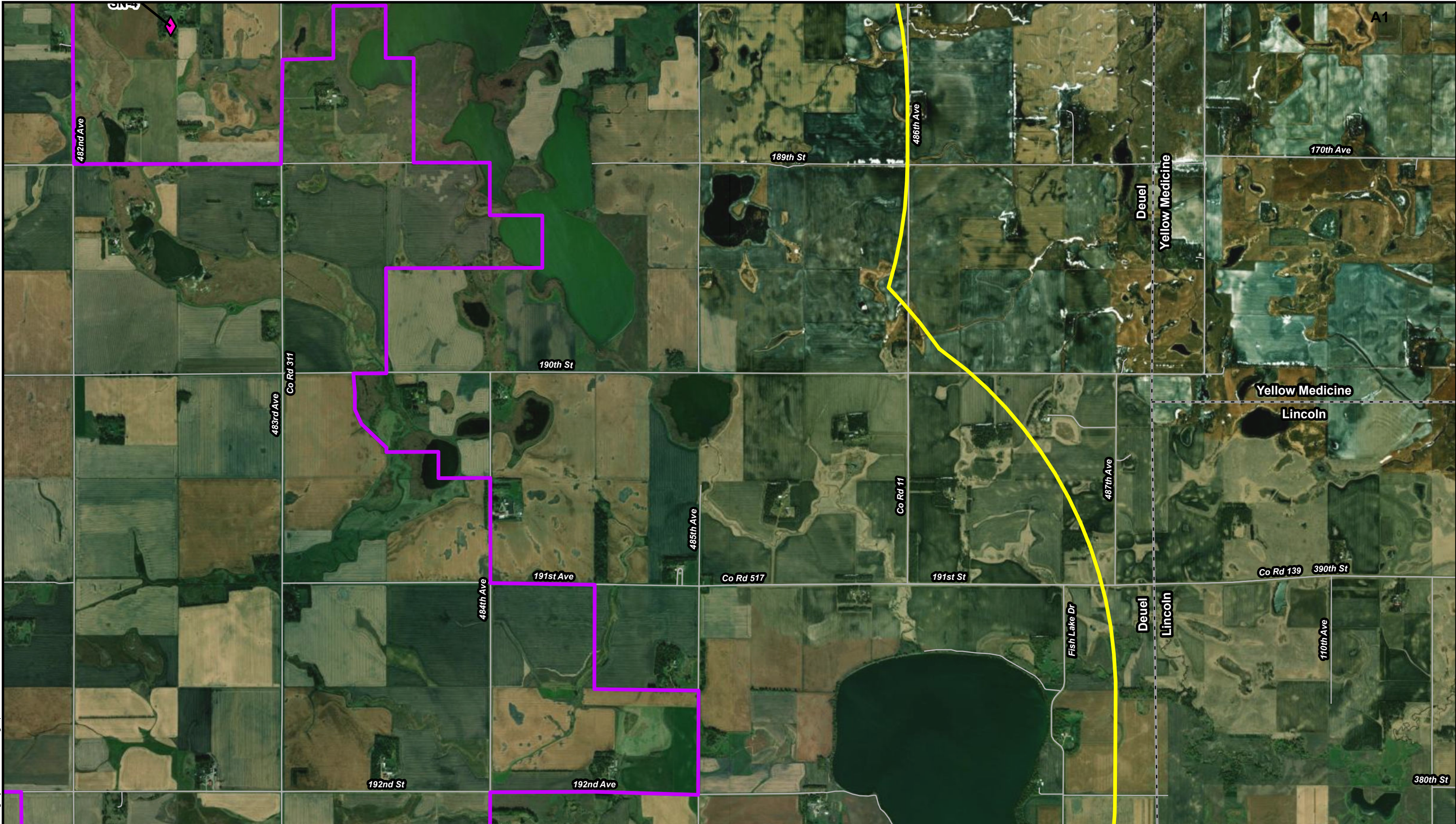


Figure A-1
 Results of the aerial raptor nest survey conducted March 2023 for South Deuel Wind in Deuel County, South Dakota
 Page 8 of 11



1	2	3
4	5	6
7	8	9
10	11	

- Stick Nest Species**
- ◆ Occupied, Active Bald Eagle
 - ◆ Occupied, Inactive Eagle
 - ◆ Unoccupied, Inactive Potential Eagle

- ◆ Occupied, Active Great Blue Heron
- ◆ Occupied, Active Great Horned Owl
- ◆ Occupied, Active Red-Tailed Hawk

- ◆ Unoccupied, Inactive Unidentified Raptor
- Project Area
- Survey Area
- County Boundary
- Municipality

- Interstate
- Highway
- Road

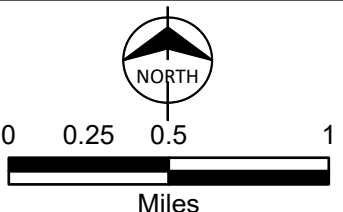
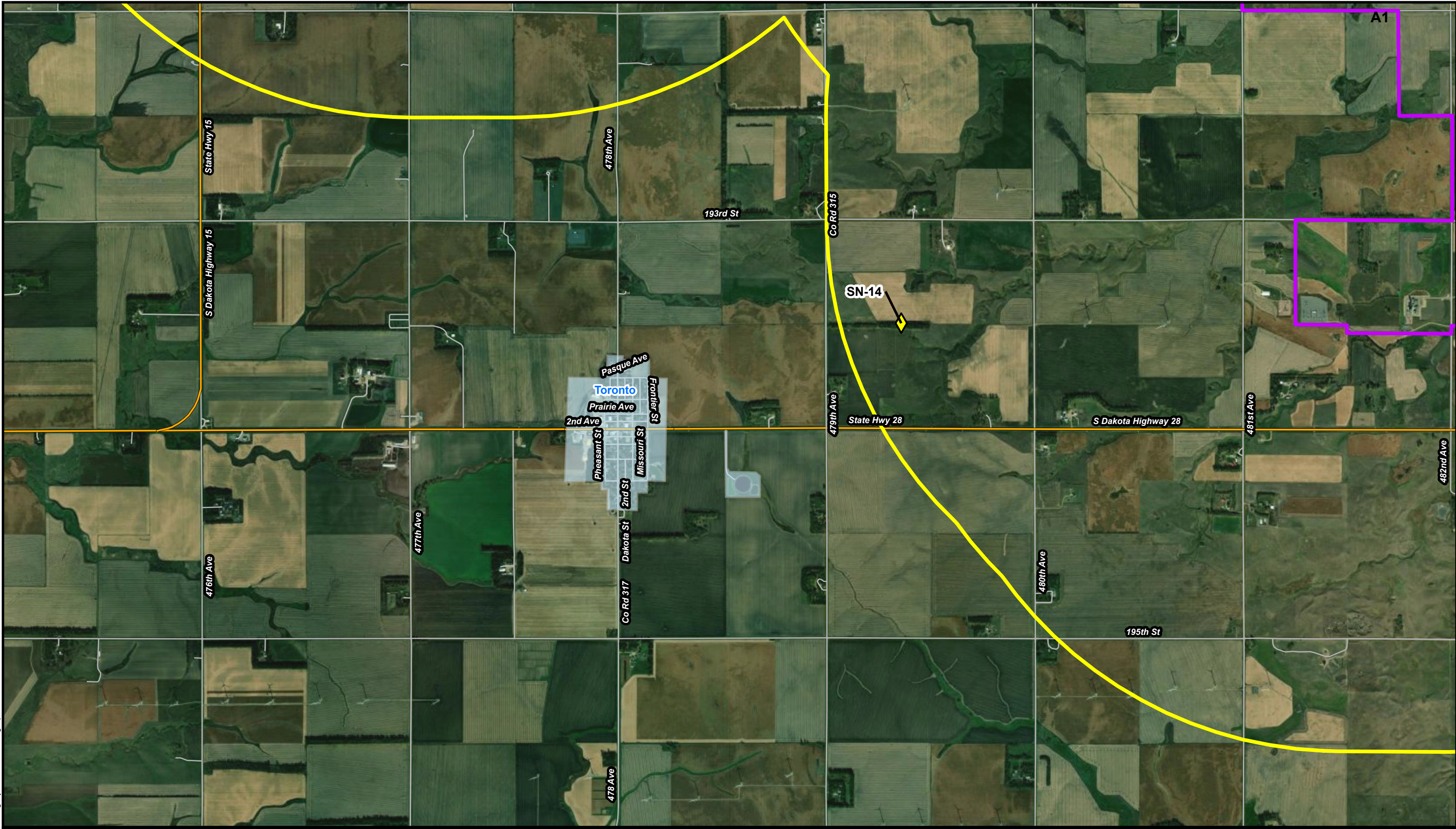


Figure A-1
 Results of the aerial raptor
 nest survey conducted March 2023 for
 South Deuel Wind in
 Deuel County, South Dakota
 Page 9 of 11



1	2	3
4	5	6
7	8	9
10	11	

- Stick Nest Species**
- Occupied, Active Bald Eagle
 - Occupied, Inactive Eagle
 - Unoccupied, Inactive Potential Eagle

- Occupied, Active Great Blue Heron
- Occupied, Active Great Horned Owl
- Occupied, Active Red-Tailed Hawk

- Unoccupied, Inactive Unidentified Raptor
- Project Area
- Survey Area
- County Boundary
- Municipality

- Interstate
- Highway
- Road

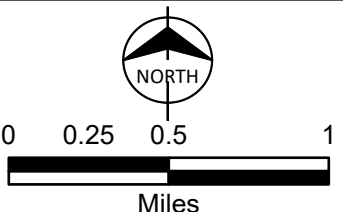
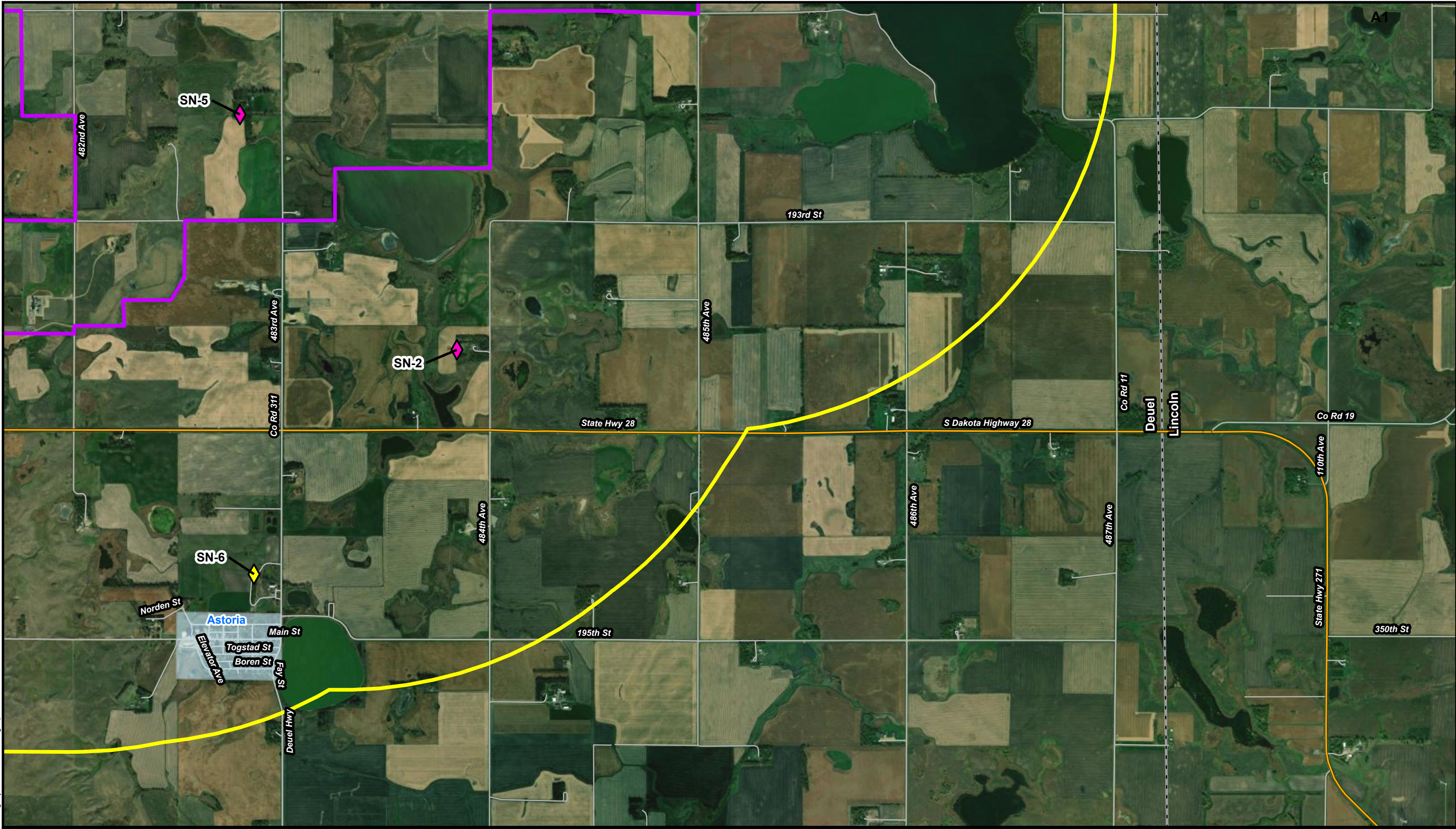


Figure A-1
 Results of the aerial raptor
 nest survey conducted March 2023 for
 South Deuel Wind in
 Deuel County, South Dakota
 Page 10 of 11

Path: \\lbmod.burnsmcd.com\dfs\Clients\ENSI\Inventory\134150_Deuel\SouthEnv\Studies\Geospatial\DataFiles\ArcDocs\2023 Stick Nest Surveys\Deuel\South_StickNestSurvey_Project_20220404\Deuel\South_StickNestSurvey_Project_20220404.aprx cjadams 9/15/2023
 Service Layer Credits: World Imagery: Earthstar Geographics



1	2	3
4	5	6
7	8	9
10	11	

- Stick Nest Species**
- ◆ Occupied, Active Bald Eagle
 - ◆ Occupied, Inactive Eagle
 - ◆ Unoccupied, Inactive Potential Eagle

- ◆ Occupied, Active Great Blue Heron
- ◆ Occupied, Active Great Horned Owl
- ◆ Occupied, Active Red-Tailed Hawk

- ◆ Unoccupied, Inactive Unidentified Raptor
- Project Area
- Survey Area
- County Boundary
- Municipality

- Interstate
- Highway
- Road

NORTH

0 0.25 0.5 1
Miles



Figure A-1
 Results of the aerial raptor
 nest survey conducted March 2023 for
 South Deuel Wind in
 Deuel County, South Dakota
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APPENDIX B- PHOTOGRAPHS



Photograph B-1: View of occupied, inactive eagle nest, occupied by a great horned owl, EN-1.



Photograph B-2: View of unoccupied, inactive potential eagle nest, EN-2.



Photograph B-3: View of occupied; inactive eagle nest, occupied by a great horned owl, EN-3.



Photograph B-4: View of occupied, active eagle nest, occupied by a bald eagle, EN-4.



Photograph B-5: View of unoccupied, inactive great blue heron rookery, HE-1.



Photograph B-6: View of unoccupied, inactive raptor nest, SN-1.



Photograph B-7: View of unoccupied, inactive unidentified raptor nest, SN-2.



Photograph B-8: View of unoccupied, inactive unidentified raptor nest, SN-3.



Photograph B-9: View of unoccupied, inactive unidentified raptor nest, SN-4.



Photograph B-10: View of unoccupied, inactive unidentified raptor nest, SN-5.



Photograph B-11: View of occupied, active great horned owl nest, SN-6.



Photograph B-12: View of occupied, active great horned owl nest, SN-7.



Photograph B-13: View of unoccupied, inactive unidentified raptor nest, SN-8.



Photograph B-14: View of unoccupied, inactive unidentified raptor nest, SN-9.



Photograph B-15: View of unoccupied, inactive unidentified raptor nest, SN-10.



Photograph B-16: View of occupied, active great horned owl nest, SN-11.



Photograph B-17: View of unoccupied, inactive unidentified raptor nest, SN-12.



Photograph B-18: View of unoccupied, inactive unidentified raptor nest, SN-13.



Photograph B-19: View of occupied, active great horned owl nest, SN-14.



Photograph B-20: View of unoccupied, inactive unidentified raptor nest, SN-15.



Photograph B-21: View of occupied, active red-tailed hawk nest, SN-16.



Photograph B-22: View of unoccupied, inactive unidentified raptor nest, SN-18.



Photograph B-23: View of occupied, active great horned owl nest, SN-19.



Photograph B-24: View of unoccupied, inactive unidentified raptor nest, SN-20.



Photograph B-25: View of unoccupied, inactive unidentified raptor nest, SN-21.



Photograph B-26: View of unoccupied, inactive unidentified raptor nest, SN-22.



Photograph B-27: View of unoccupied, inactive unidentified raptor nest, SN-23.



Photograph B-28: View of occupied, active great horned owl nest, SN-24.



Photograph B-29: View of unoccupied, inactive unidentified raptor nest, SN-25.



Photograph B-30: View of unoccupied, inactive unidentified raptor nest, SN-26.