

Appendix M

Wildlife Survey Reports

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Appendix M.7
Northern Long-eared Bat Desktop Habitat
Assessment



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**Northern Long-eared Bat and Little Brown Bat Desktop Habitat
Assessment for the Homestead Wind Energy Project
Williams County, North Dakota**

Submitted To:

Homestead Wind LLC

Prepared by:

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5 February 2026

Confidential Business Information

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Appendix A: Project Mapping

INTRODUCTION

Copperhead Environmental Consulting, Inc. (Copperhead) completed a desktop habitat suitability assessment pertaining to the federally endangered northern long-eared bat (*Myotis septentrionalis*) and the little brown bat (*Myotis lucifugus*)¹ for Homestead Wind, LLC. The assessment focused on a site of approximately 24,992 acres in Williams County, North Dakota (Project Area, Figure 1). The purpose of the assessment was to identify and determine the quantity of suitable roosting habitat for these species (collectively referred to as listed bats) within the Project Area and a 0.25-mile buffer, collectively referred to as the Area of Interest (AOI). The purpose of such identification is to inform Project design.

BACKGROUND

Northern Long-Eared Bat

The U.S. Fish and Wildlife Service (USFWS) defines suitable summer northern long-eared bat roosting habitat as “a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥ 3 inches in diameter at breast height [DBH] that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors (USFWS 2024).” Linear forested features, including shelterbelts and other loose assemblages of trees with variable amounts of canopy closure, are also considered suitable roosting habitat for this species if suitable roost trees are found within the feature. Isolated individual trees may provide suitable roosting habitat if they exhibit the characteristics of a suitable roost tree and are located within 1,000 feet (304.8 meters) of additional suitable forested habitat. Additionally, USFWS considers anthropogenic structures located within 1,000 feet of suitable forested habitat, such as buildings, bridges, and bat boxes, to be potential roosting habitat for northern long-eared bats (USFWS 2024).

Isolated trees and small forest stands (less than 10 acres [4.1 hectares] in size), located farther than 1,000 feet from other suitable forested habitat, are not considered suitable for the northern long-eared bat, as per supporting research (Foster and Kurta 1999, Henderson and Broders 2008, USFWS 2008 and 2024) and previous USFWS correspondence. Additionally, USFWS (2024) does not consider trees located in developed areas (such as city centers), and forest stands in which all trees are less than 3 inches DBH, to be suitable roosting habitat.

¹This species is currently Under Review by the USFWS for potential Endangered Species Act Listing.

Little Brown Bat

The little brown bat is currently under review for listing under the Endangered Species Act and, consequently, the USFWS has not defined suitable summer habitat for the species in a guidance document. Little brown bats have been documented using human dwellings such as barns, sheds, attics, and buildings for roosting in the summers (Fenton and Barclay 1980, Davis et al. 1965, Kalcounis and Hecker 1995, Humphrey and Cope 1976), as well as artificial roost structures (Besler and Broders 2019, Waldron and Burke 2021, Webber and Willis 2018). However, they are also known to use trees, natural crevices, and rock crevices (Johnson et al. 2019). During the summer months, female little brown bats have been documented to primarily use hot, dark, and poorly ventilated buildings for maternity day roosts while adult male little brown bats roost either individually or in small groups in rock crevices, tree hollows, loose tree bark, or small openings in buildings separate from the maternity roost (Humphrey and Cope 1976). It is assumed that prior to construction of man-made structures, little brown bats used hollow trees and rock crevices as maternity roosts. However, other published documentation of natural roosts used by little brown bats is uncommon (Barclay and Cash 1985). Given the similarity in summer habitat preference between the little brown bat and the northern long-eared bat, this assessment report made no distinction between habitat for the two species.

METHODOLOGY

Desktop Analysis

A desktop review—using the U.S. Geological Survey (USGS) National Land Cover Database (NLCD), National Hydrography Dataset (NHD) waterways, Digital Elevation Model (DEM) dataset, State Historical Society of North Dakota information, North Dakota Geologic Survey information, and manual hand delineation—was conducted to determine the quantity of potential suitable summer habitat for listed bats within the AOI. For forested habitat to be considered suitable, it contained a contiguous tract of 10 acres or greater. Isolated trees and forested habitat smaller than 10 acres and farther than 1,000 feet from suitable forested habitat were not considered suitable habitat for listed bats.

Areas of forested habitat were initially identified using the NLCD in ArcGIS Pro. A Copperhead biologist then reviewed and hand-digitized any additional forested habitat that met our suitability criteria. To do so, the biologist used 2021 National Agriculture Imagery Program (NAIP) natural color (0.6-meter pixel resolution) aerial imagery at an approximate scale of 4,000-10,000 feet.

Aerial imagery, DEM dataset, and NHD waterways were reviewed to identify potential anthropogenic roost structures such as bridges, culverts, and buildings within the AOI. In accordance with USFWS guidelines, all buildings, barns, bridges, and culverts are considered to

potentially provide suitable roosting habitat for listed bats. However, any of these structures located farther than 1,000 feet from suitable forested habitat were not considered suitable habitat for listed bats.

RESULTS

Publicly Available Source Review

The Project Area consists of approximately 24,992 acres (10,113.9 hectares) while the AOI (Project Area + 0.25-mile buffer) encompasses a total of 37,648.7 acres (15,235.5 hectares) in the Missouri Plateau physiographic region (State Historical Society of North Dakota). Based on the most recent (2024) USGS NLCD dataset, the AOI is dominated by cultivated crops (30,302.0 acres, 80.5% of the AOI; Table 1, Figure 2). Land cover types that could provide suitable roosting habitat for northern long-eared bats and little brown bats account for a total of 27.36 acres (11.1 hectares), which included woody wetlands (20.24 acres; 0.05%) and deciduous forest (7.12 acres; 0.02%).

Using the NHD waterways dataset, four named streams and their unnamed tributaries were identified within the AOI (Figure 3). Little Muddy River tributaries are found in the northern portion of the AOI, also within the Little Muddy Creek watershed and the Lake Sakakawea Basin. Blacktail Creek and its tributaries are found in the eastern portion of the AOI within the Middle Little Muddy River watershed, also within the Lake Sakakawea Basin. Cow Creek and its tributaries are found in the southern portion of the AOI within the Lower Little Muddy River watershed and the Lake Sakakawea Basin. Willow Creek and its tributaries are found in the western portion of the AOI within the Medicine Lake-Lake Creek watershed and the Missouri-Poplar Basin. Very few riparian areas within the AOI were forested, and therefore, those unforested areas did not contain potential roosting habitat for bats. However, given the presence of multiple named waterways, it is likely that adequate drinking and foraging habitat for bats does exist within the AOI.

Using the DEM dataset, Copperhead found no information suggesting the presence of karst features within the AOI. “Caves in North Dakota” by Ed Murphy does not list any cave features located in Williams County, North Dakota. It appears that the closest cave (publicly known) is Medicine Hole in Dunn County, North Dakota, which is located approximately 74 miles southeast from the AOI and is not known to house bats, based on our desktop review of available information (Murphy 2002).

Table 1. National Land Cover Dataset for the Homestead Wind Project in Williams County, North Dakota.

NLCD Land Class	Project Area Acres	AOI Acres	AOI Percentage
Cultivated Crops	20,255.83	30,302.00	80.5%
Grassland/Herbaceous	3,549.81	5,502.04	14.6%
Developed, Open Space	667.29	1,060.45	2.8%
Developed, Low Intensity	246.11	380.47	1.0%
Hay/Pasture	141.22	201.51	0.54%
Emergent Herbaceous Wetlands	74.50	120.55	0.32%
Shrub/Scrub	20.01	23.17	0.06%
Open Water	15.01	23.13	0.06%
Woody Wetlands	9.08	20.24	0.05%
Developed, Medium Intensity	7.56	8.01	0.02%
Deciduous Forest	5.34	7.12	0.02%
Total	24,991.8	37,648.7	100.0%

Manual Suitable Forest Delineation

The desktop assessment identified no potentially suitable forested summer habitat (forested areas of 10 acres or greater) for northern long-eared bats or little brown bats within the AOI. The largest tract of contiguous forest found within the AOI was approximately 8.4 acres. Low-quality habitat (i.e. tree-lined fence rows, small woodlots surrounding anthropogenic structures, and small woodlots consisting of scattered trees) was present but primarily concentrated in the northern portion of the AOI. Numerous houses, barns, structures, and culverts were observed within the AOI, but these were not designated as suitable habitat as they were not located within 1,000 feet of suitable forested habitat.

REFERENCES

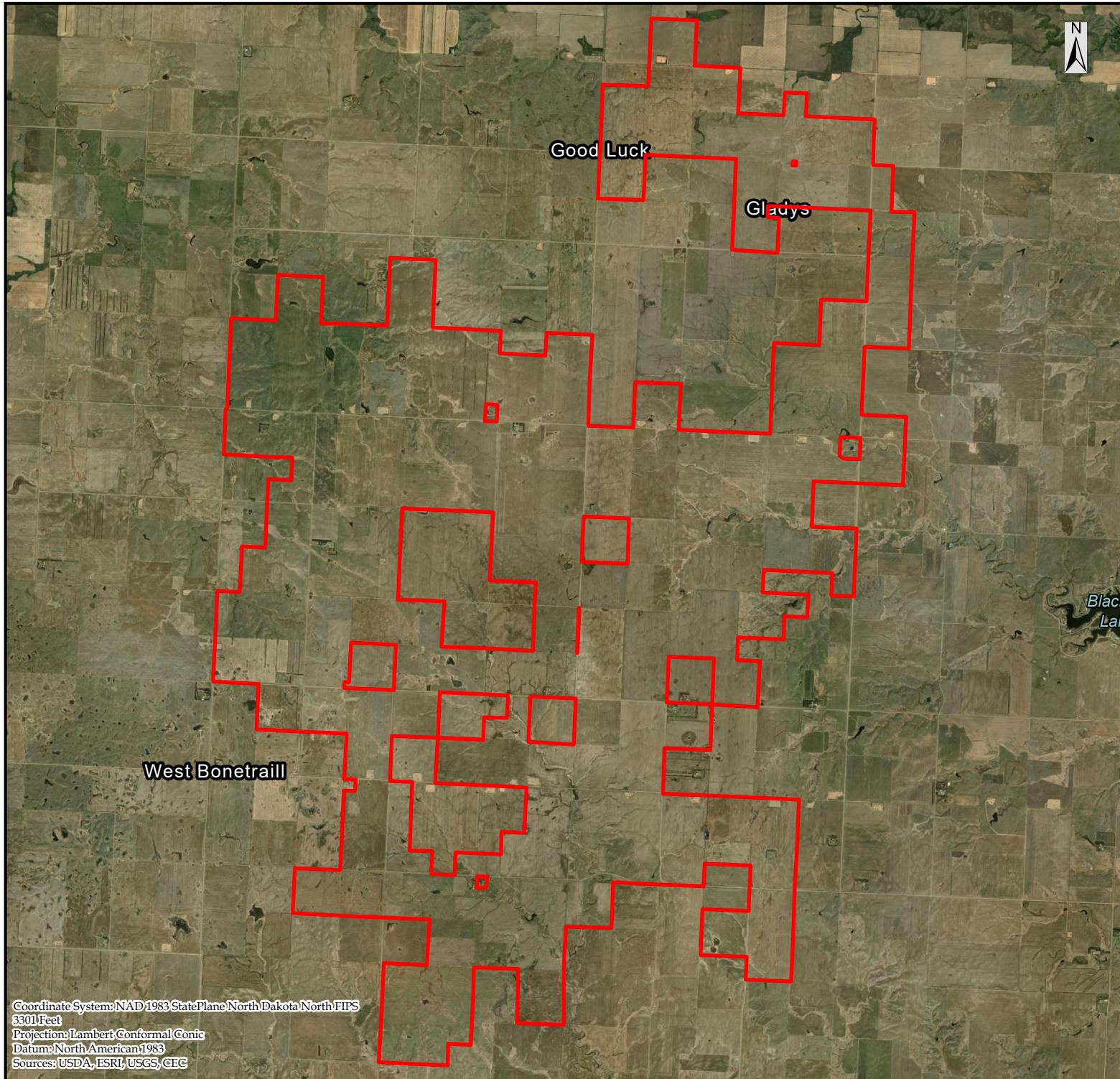
- Barclay, R.M.R and K.J. Cash. 1985. A non-commensal maternity roost of the little brown bat (*Myotis lucifugus*). *Journal of Mammalogy* 66(4):782-783.
- Besler, N.K. and H.G. Broders. 2019. Combinations of reproductive, individual, and weather effects best explain torpor patterns among female little brown bats (*Myotis lucifugus*). *Ecology and Evolution*. 2019(9): 5158-5171.
- Davis, W.H., M.D. Hassell, and M.J. Harvey. 1965. Maternity colonies of bat *Myotis I. lucifugus* in Kentucky. *American Midland Naturalist* 73(1): 161-165.
- Fenton, M.B. and R. M. R. Barclay. 1980. *Myotis lucifugus*. *Mammalian Species* 142:1-8.
- Foster, R.W. and A. Kurta. 1999. Roosting ecology of the Northern bat (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). *Journal of Mammalogy* 80(2):659- 672.
- Henderson, L.E. and H.G. Broders. 2008. Movements and Resource Selection of the Northern Long-Eared Myotis (*Myotis septentrionalis*) in a Forest - Agricultural Landscape. *Journal of Mammalogy* 89(4):952-963.
- Humphrey, S.R. and J.B. Cope. 1976. Population ecology of the little brown bat, *Myotis lucifugus*, in Indiana and North-Central Kentucky. *American Society of Mammalogists: Special Publication* 4.
- Johnson J.S., Treanor J.J., Slusher A.C., Lacki M.J. 2019. Buildings provide vital habitat for little brown myotis (*Myotis lucifugus*) in a high-elevation landscape. *Ecosphere* 10(11): e02925.
- Kalcounis, M.C. and K.R. Hecker. 1995. Intraspecific Variation in Roost-site selection by little brown bats (*Myotis lucifugus*). *Bats and Forests Symposium*.
- Murphy, E. 2002. Caves in North Dakota. North Dakota Geologic Survey.
<https://www.dmr.nd.gov/ndgs/ndnotes/Caves/>
- State Historical Society of North Dakota. (n.d.). *Part 2: Production Agriculture*. SECTION 1: GEOGRAPHY AND CLIMATE OF NORTH DAKOTA. Accessed: April 11, 2024.
- U.S. Fish and Wildlife Service (USFWS). 2008. Section 7 Technical Assistance - Summary of Indiana Bat Ecology. 1 March 2008.
https://www.fws.gov/sites/default/files/documents/Section%207%20Technical%20Assistance_IBAT.pdf. Accessed 5 January 2024.

U.S. Fish and Wildlife Service (USFWS). 2024. Range-Wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines. U.S. Fish and Wildlife Service, Region 3, Bloomington, MN. 95 pp. March 2024.

Waldron, C. and K. Burke. 2021. Occupancy of *Myotis lucifugus* among various bat house designs and habitats in the Beaverhill Natural Area. Beaverhill Bird Observatory, Beaver County, Alberta.

Webber, Q.M.R. and C.K.R. Willis. 2018. An experimental test of effects of ambient temperature and roost quality on aggregation by little brown bats (*Myotis lucifugus*). *Journal of Thermal Biology* 74(2018):174-180.

APPENDIX A: PROJECT MAPPING

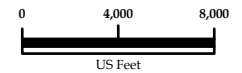


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FIGURE 1:
Overview Map for the
Homestead Wind Project,
Williams County, North Dakota

Legend

Project Boundary



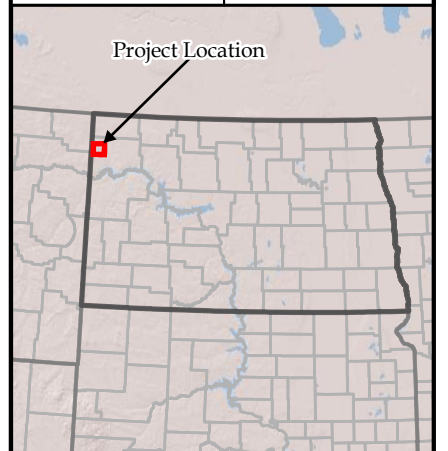
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Checked by:	STS	Revision:	01
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Coordinate System: NAD 1983 StatePlane North Dakota North FIPS
3301 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: USDA, ESRI, USGS, CEC

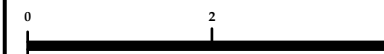


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FIGURE 2:
National Land Cover
Dataset Map for the
Homestead Wind Project,
Williams County, North Dakota

Legend

- Area of Interest (AOI)
- Project Boundary



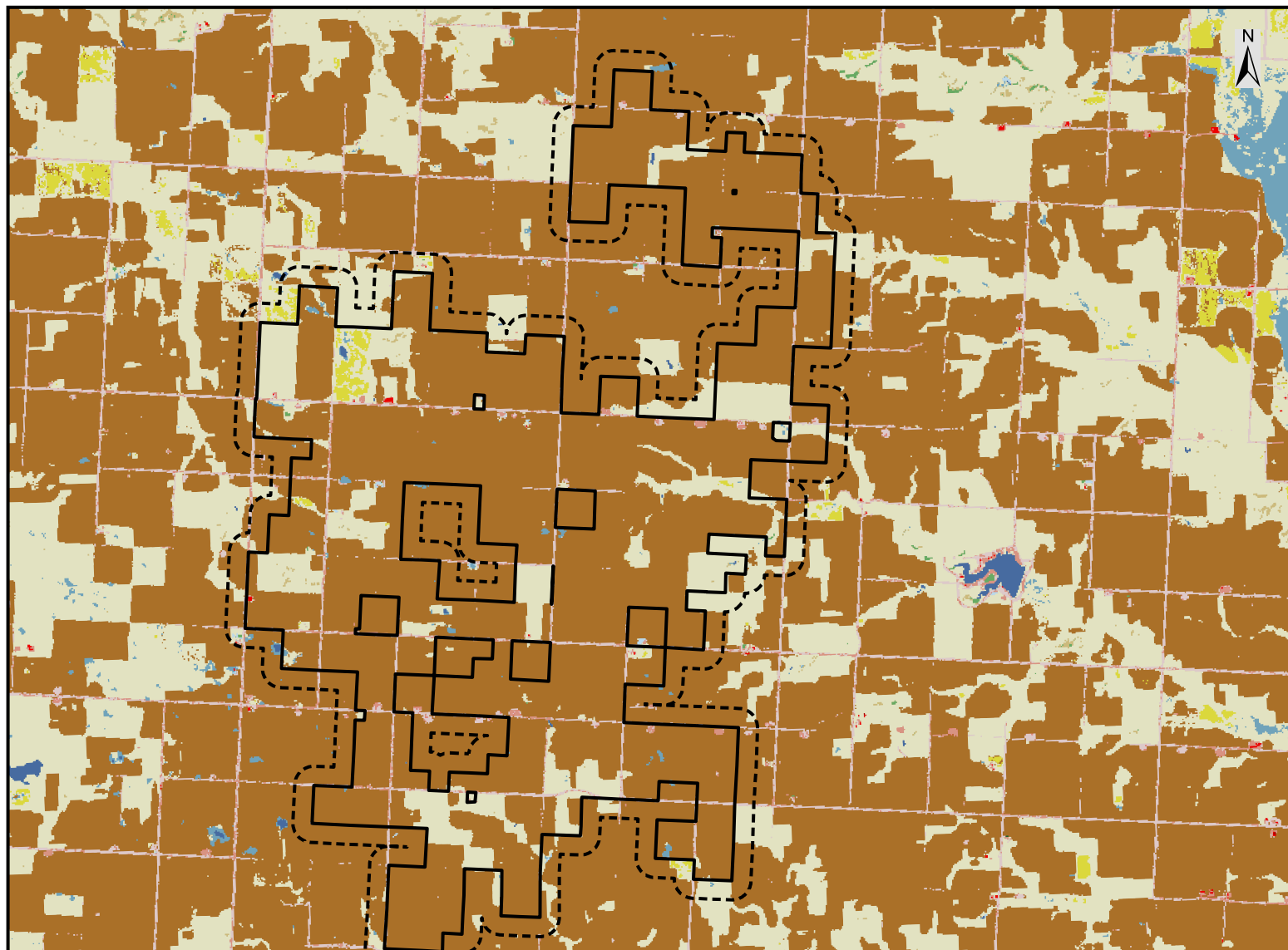
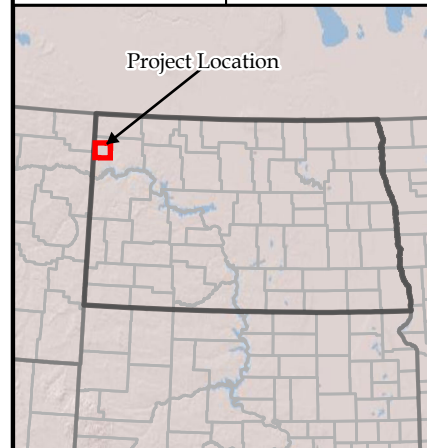
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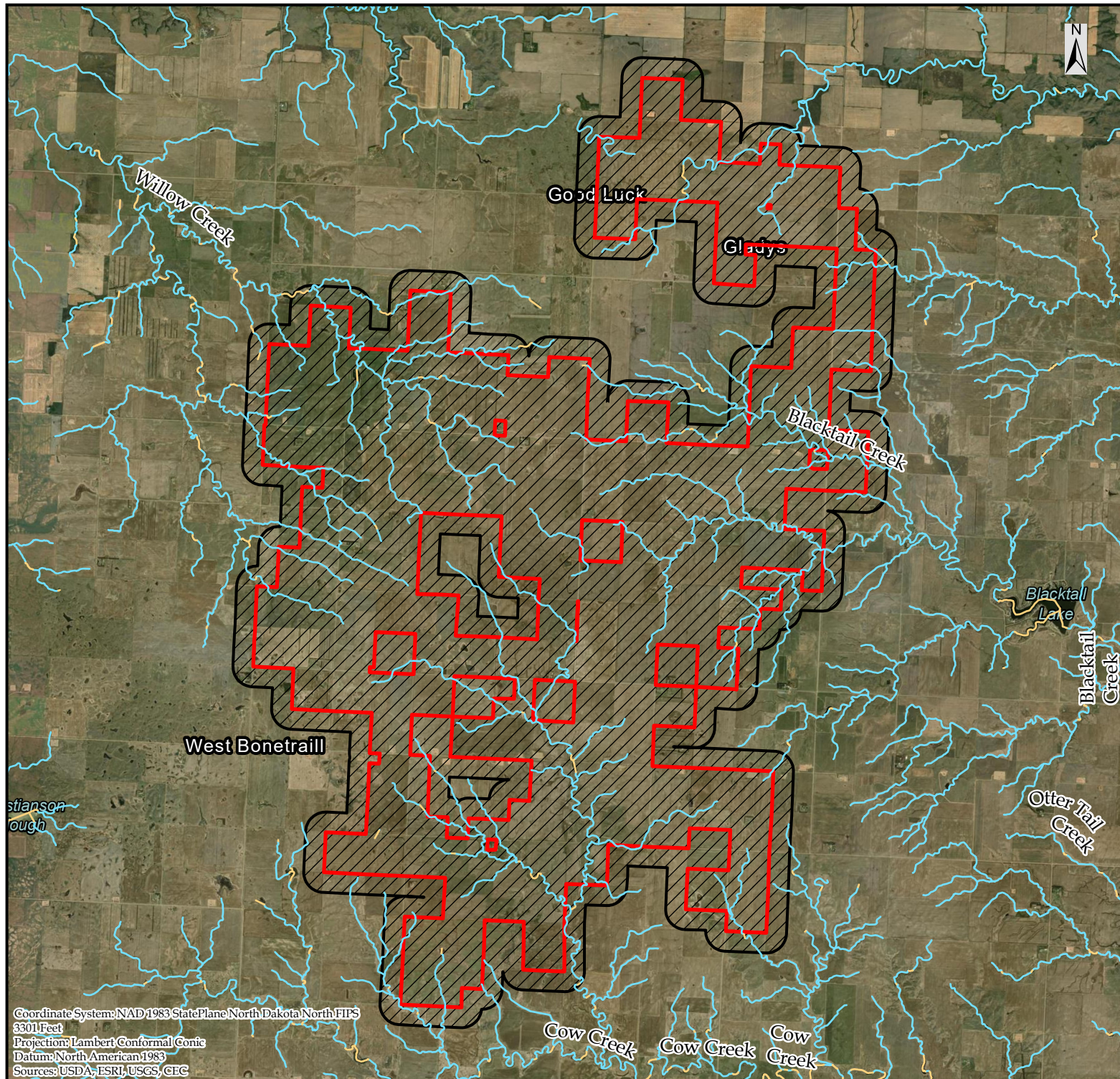
Checked by: STS Revision: 02



National Land Cover Dataset (2024)

- | | |
|------------------------------|----------------------|
| Cultivated Crops | Evergreen Forest |
| Deciduous Forest | Grassland/Herbaceous |
| Developed High Intensity | Mixed Forest |
| Developed Low Intensity | Open Water |
| Developed Medium Intensity | Pasture/Hay |
| Developed Open Space | Shrub/Scrub |
| Emergent Herbaceous Wetlands | Woody Wetlands |

Coordinate System: NAD 1983 StatePlane North Dakota North FIPS
3301 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Sources: USDA, ESRI, USGS, MRLC, CEC



Coordinate System: NAD 1983 StatePlane North Dakota North FIPS
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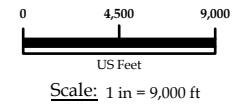


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FIGURE 3:
 National Hydrography Dataset Map
 Homestead Wind Project,
 Williams County, North Dakota

Legend

- Area of Interest (AOI)
- Project Boundary
- Stream/ River
- Artificial Path



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