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TECHNICAL MEMORANDUM

Date: July 30, 2014

To: Ingrid Schwingler, Geronimo Energy

From: Sandra Simon and Todd Mattson, WEST, Inc.

Subject: Grande Prairie Wind Farm
Northern Long-eared Bat – Phase 1 Habitat Assessment

Introduction

Grande Prairie Wind, LLC (Grande Prairie), a wholly owned subsidiary of Geronimo Wind Energy, LLC d/b/a/ Geronimo Energy, LLC (Geronimo), is considering the development of a utility scale wind energy facility in Holt County, Nebraska (Figure 1), known as the Grande Prairie Wind Farm (Project). To help understand the potential for this Project to impact the northern long-eared bat (*Myotis septentrionalis*; [NLEB]), a species proposed for listing as endangered under the federal Endangered Species Act, Stantec Consulting Services, Inc. (Stantec) completed a preliminary desk-top analysis (Stantec 2014). Given this analysis suggested that the species has the potential to occur in the area, Grande Prairie requested the Western EcoSystems Technology, Inc. (WEST) conduct a follow-up study specifically following the U.S. Fish and Wildlife Service's (USFWS) *Northern Long-Eared Bat Interim Conference and Planning Guidance* (January 2014) to confirm presence or absence of this species during the summer months. The first phase of these guidelines includes going through an initial project screening process that includes conducting a habitat assessment. This technical memorandum summarizes the results of the bat habitat assessment prepared for the Project by WEST. The objective of the NLEB habitat assessment was to provide information that can be used to evaluate the potential for NLEB to occur within the Project area during the summer months, to identify likely areas for follow-up field surveys (either using acoustics or mist-netting), and to identify likely turbine sites that could potentially be located in areas where NLEB could occur during the summer months. Below is a discussion of NLEB habitat requirements as well as an explanation of the methods WEST used to conduct the NLEB habitat analysis at the Project.

Indiana Bat/Northern Long-eared Bat Summer Habitat Requirements

The NLEB is a forest dependent species, generally relying on forest features for both foraging and roosting during the summer months (USFWS 2013; USFWS 2007). Specifically, NLEB appear to be a forest interior species that require adequate canopy closure for both roost and foraging habitat (Lausen 2009). Additionally, riparian areas are considered critical resource areas for many species of bats because they support higher concentrations of prey, provide drinking areas, and act as unobstructed commuting corridors (Grindal et al. 1999). While this species is associated with forest habitats, it also occurs in agricultural settings where forest

habitats have been highly fragmented. Wing morphology of the NLEB makes them ideally suited for the high maneuverability required for gleaning-type foraging within a cluttered forest interior (Henderson and Broders 2008). Abundance of NLEB prey items, particularly beetles and moths, are typically higher in more closed forest stands than in openings, which supports studies which have found that NLEB tend to avoid open habitats (Owen et al. 2003).

During the summer, the NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (USFWS 2007; USFWS 2013). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat seems opportunistic in selecting roosts, using tree species based on suitability to retain bark or provide cavities or crevices. NLEB have also been found, rarely, roosting in structures like barns and sheds, and so may not always be associated with tree roosts.

During the summer months, NLEB is unlikely to cross over large open lands (i.e., land lacking suitable habitat) to search for foraging and roosting habitats, but rather to use tree-lined linear features as travel corridors to and from roosting and foraging habitats (USFWS 2014). These tree-lined corridors may be important for bats as navigational aids in agricultural landscapes, as protection from predators and wind, and may act to concentrate insect prey (Verboom and Huitema 1997). The NLEB is expected to be particularly tied to intact forested habitats; for example, Henderson and Broders (2008) found that NLEB did not travel more than 255 feet (78 meters) from the edge of intact forest structure. A study of nine female NLEBs using an intensively managed forest in West Virginia found this species forages in areas with forest patch sizes between 114 and 161 acres (46 and 65 hectares; Owen et al. 2003); however, studies in landscapes dominated by agricultural activities found NLEB can use woodlots and riparian zones with as little as 15 to 49 acres (6 to 20 hectares) of forest cover (Henderson and Broders 2008; Foster and Kurta 1999).

Habitat Assessment Methods

WEST conducted a desktop assessment of potential suitable NLEB habitat by reviewing U.S. Geological Survey (USGS) land use/land cover habitat types within the Project area and a 2.5 mile buffer zone, and delineating potential suitable habitat types (i.e., woodlots, forested riparian areas, and shelterbelts) in Google Earth and Geographic Information Systems (GIS). A habitat analysis was then conducted to assess connectivity of suitable foraging (e.g., woodlots, forested riparian corridors, and natural vegetation communities adjacent to these habitats) or roosting habitats and commuting habitats (i.e., shelterbelts/tree-lines, wooded hedgerows). As NLEB have similar habitat requirements as Indiana bats, the approach used in this habitat evaluation follows recommendations for habitat assessments included in the USFWS's *Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects* (USFWS 2011). The guidance assesses the potential for bats to be present within the Project boundary based on presence of travel/commuting corridors within the Project boundary and connectivity to foraging or roosting habitat within a 2.5 mile buffer of the Project. Connectivity is defined in the guidance as commuting habitat within 1,000 feet (ft) and connected to roosting or foraging habitat within the 2.5 mile buffer of the Project boundary (USFWS 2011).

Potential roosting, foraging, and community habitat for NLEB were assessed in the Project from a desktop analysis using this guidance as a tool and measurement of suitability and determination of potential presence. For purposes of this review, we categorized habitat patches that are 14 acres of less as potential commuting/travel corridors (generally shelterbelts or small woodlots); patches 15-49 acres were considered small roost/foraging areas (larger woodlots and riparian forests); and patches greater than 50 acres were considered medium-large roost/foraging areas (larger contiguous riparian forests).

Results

The area inside the Project boundary consists of approximately 76,405 acres, with approximately 48,272 acres (63%) composed of grassland and pasture/hay, and 24,391 acres (32%) composed of agricultural land (USGS NLCD 2006). A desktop assessment for NLEB habitat showed that a moderate density of patches of forested habitats that could be used for foraging, roosting, and commuting habitat occurs within the Project boundary, with a higher concentration of these habitats within the eastern half of the Project. Desktop analysis revealed approximately 2,496 acres of woodlots, 1,441 acres of forested riparian habitat, and 305 acres of shelterbelts (approximately 5.6% of Project area). However, suitable foraging, roosting, and commuting habitats are considerably denser outside of the Project boundary, both within and beyond the 2.5 mile buffer of the Project. Larger, contiguous tracts of forested riparian habitat within the 2.5 mile buffer reach into the Project area along Spring Creek, Louse Creek, and Steel Creek on the north end of the Project (shown west to east, respectively on the attached figures) and along North Branch in the southeast portion of the Project. Smaller interior patches of habitat provide bat travel corridors and/or connectivity to the larger, contiguous tracts of foraging and roosting habitats mentioned above when assessing 1,000 ft buffers. Sparse patches of relatively isolated habitat, largely located in the central and western portions of the Project, lack connectivity to bat travel corridors and/or larger, contiguous foraging and/or roosting habitat. Therefore, these isolated patches of forest habitat ranging between 0 – 14 acres in size and isolated by greater than 1,000 feet from larger contiguous forested habitat, are not considered suitable for summer use.

Discussion/Conclusions

The habitat assessment conducted at the Project provides information on potential NLEB habitat that might be found within the Project and nearby areas. If NLEBs occur in the area during the summer months, they will likely occur within or nearby (within 1,000 feet) of these habitats. WEST anticipates that the larger and more contiguous blocks of forested areas would be more likely to be used by these species compared to the smaller and more isolated forested blocks and/or tree lines and shelterbelts. To further assess the potential for the presence/absence of NLEBs in the Project area during the summer months, the USFWS's guidelines for this species (January 2014) recommend that acoustic or mist net surveys of potential habitat be completed between May 15 and August 15. Acoustic surveys for NLEB were completed during this period and the results will be presented as part of a separate report.

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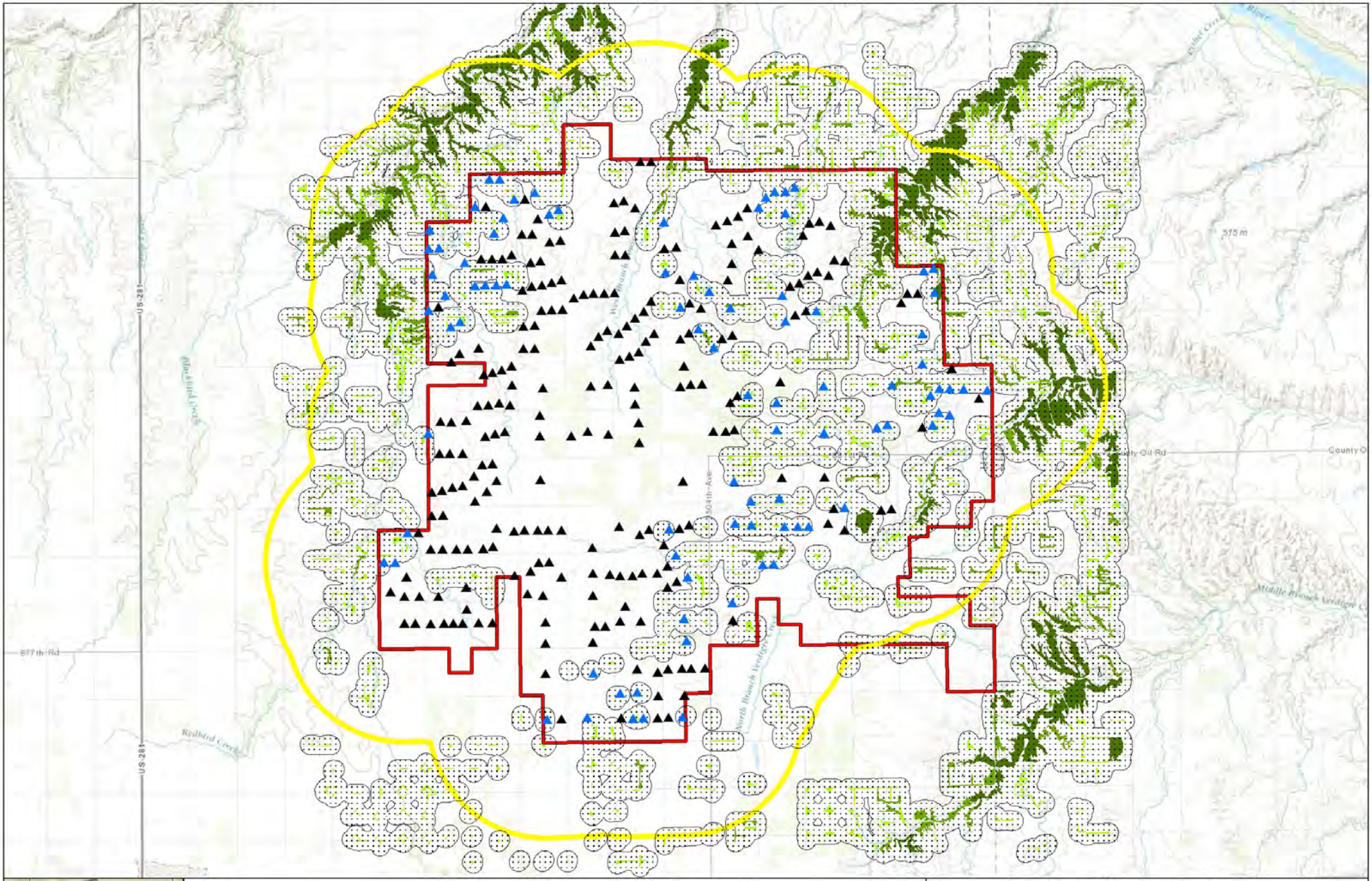
FIGURES



Project Boundary

Wind Turbine Locations 4/29/2014 (including alternates)

Wind Turbine Locations within 1,000 ft of NLEB Habitat

1,000-foot habitat buffers

2.5 mile project buffer

NLEB Forest Habitats

0-14 acres: Commuting/Travel Habitats

15-49 acres: Small Roost/Foraging Habitats

50+ acres: Medium-large Roost/Foraging Habitats

Grande Prairie Wind Farm
Holt County, Nebraska

0 1 2 3 4 5 6 Miles

N W E S

Data Source: ESRI, USDA
Projection: Universal Transverse Mercator
Datum: North American Datum 1983
Author: K. Klaphake Date: 29 Jul 2014

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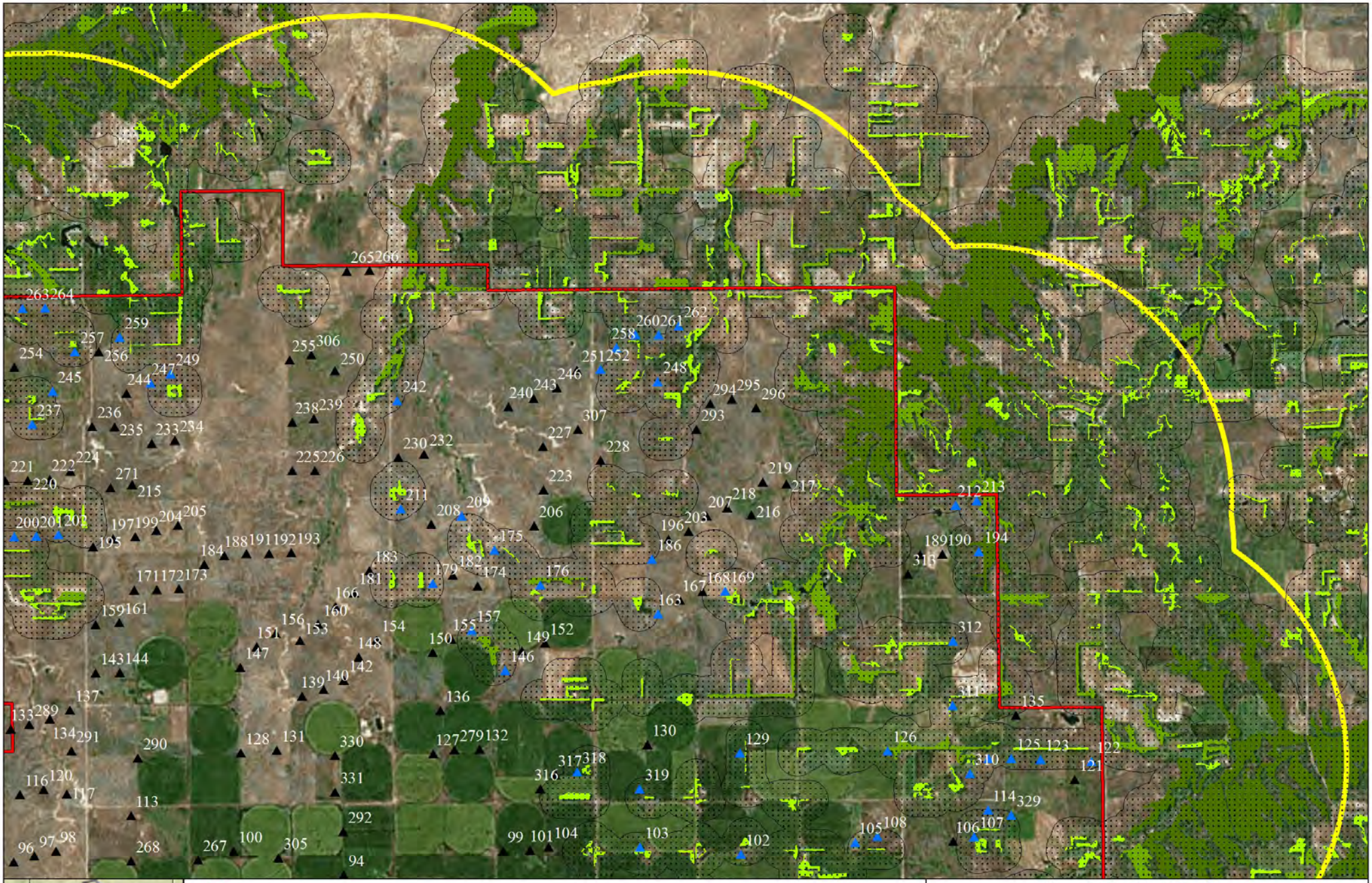

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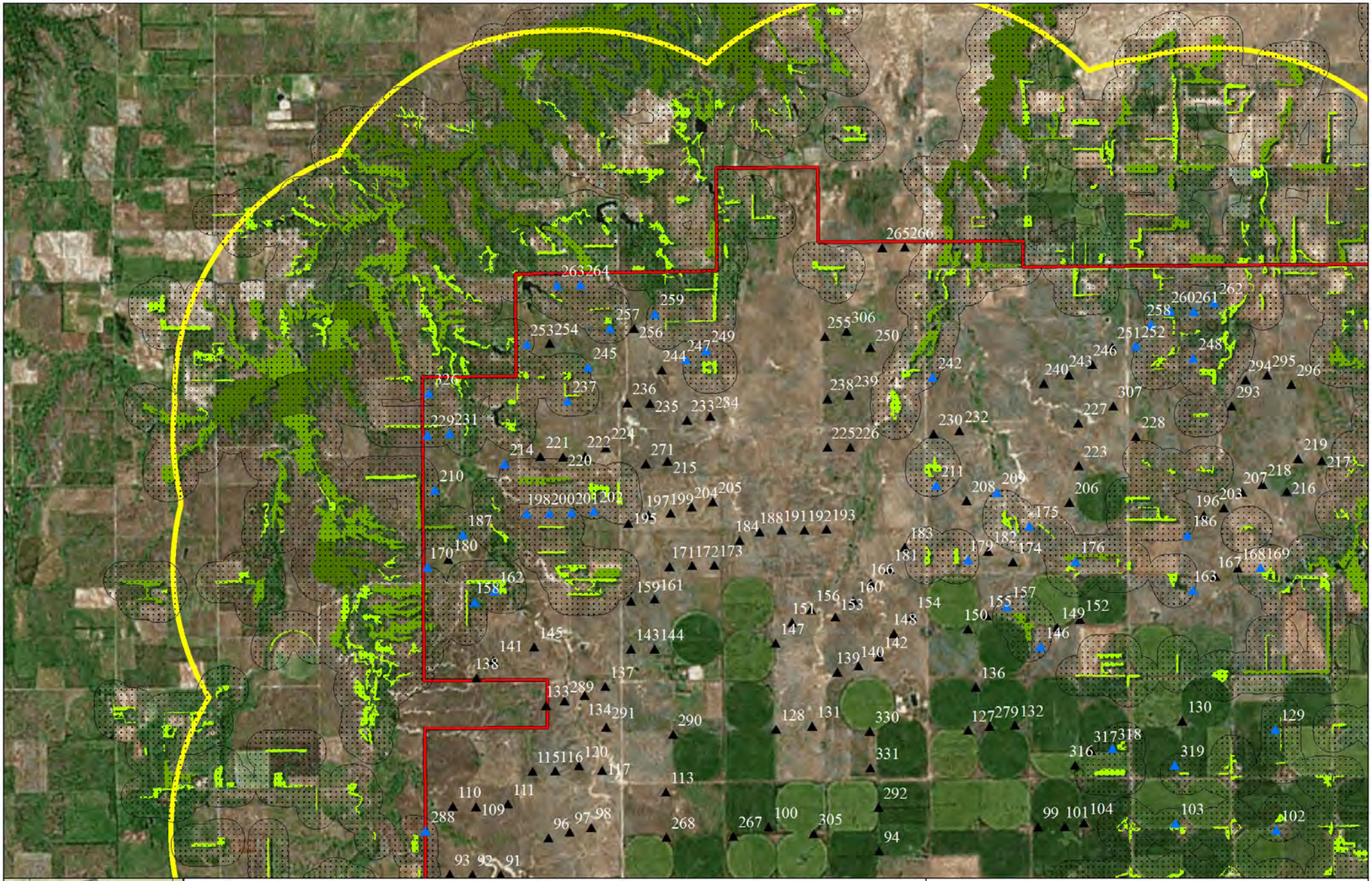

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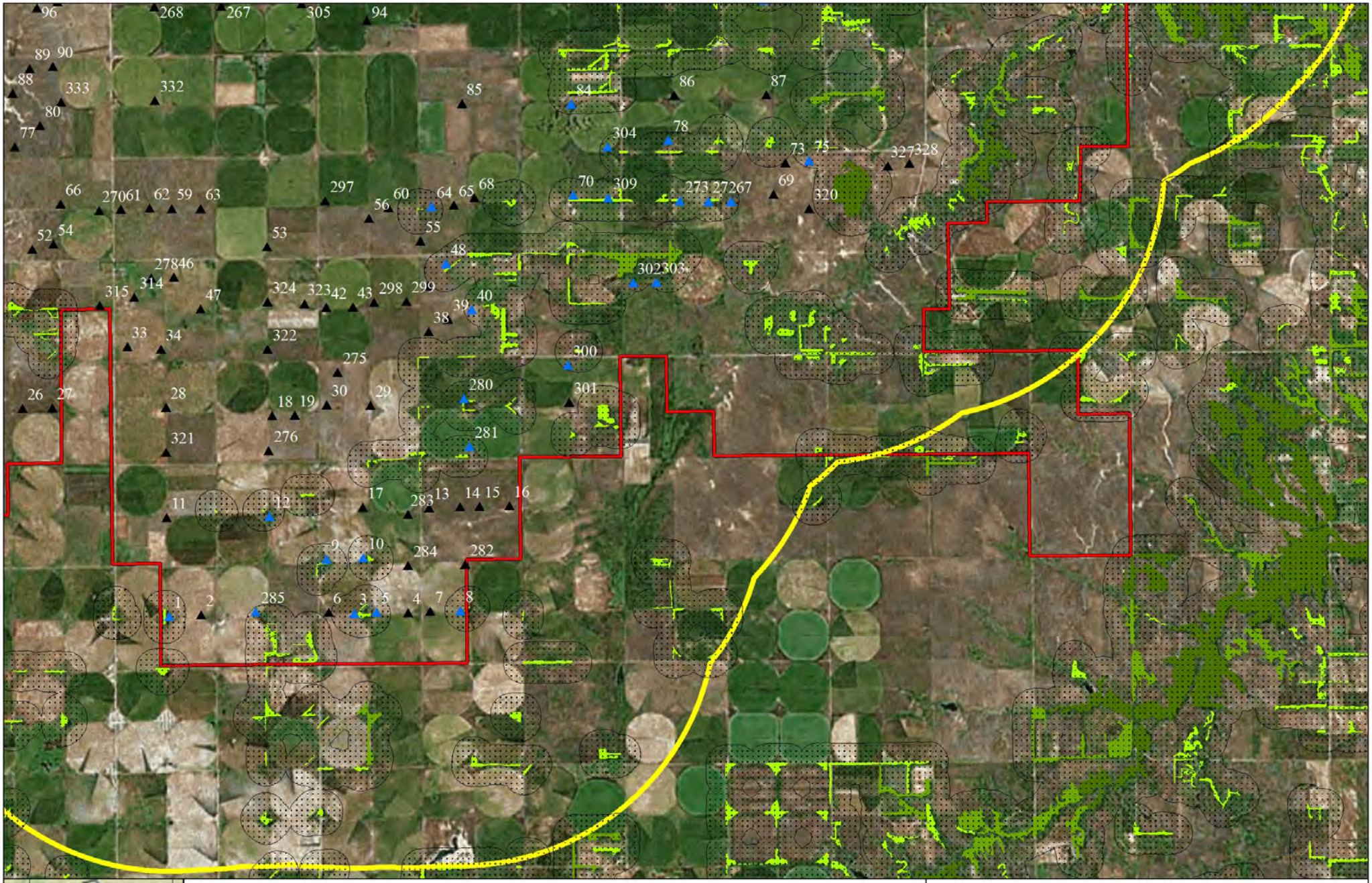

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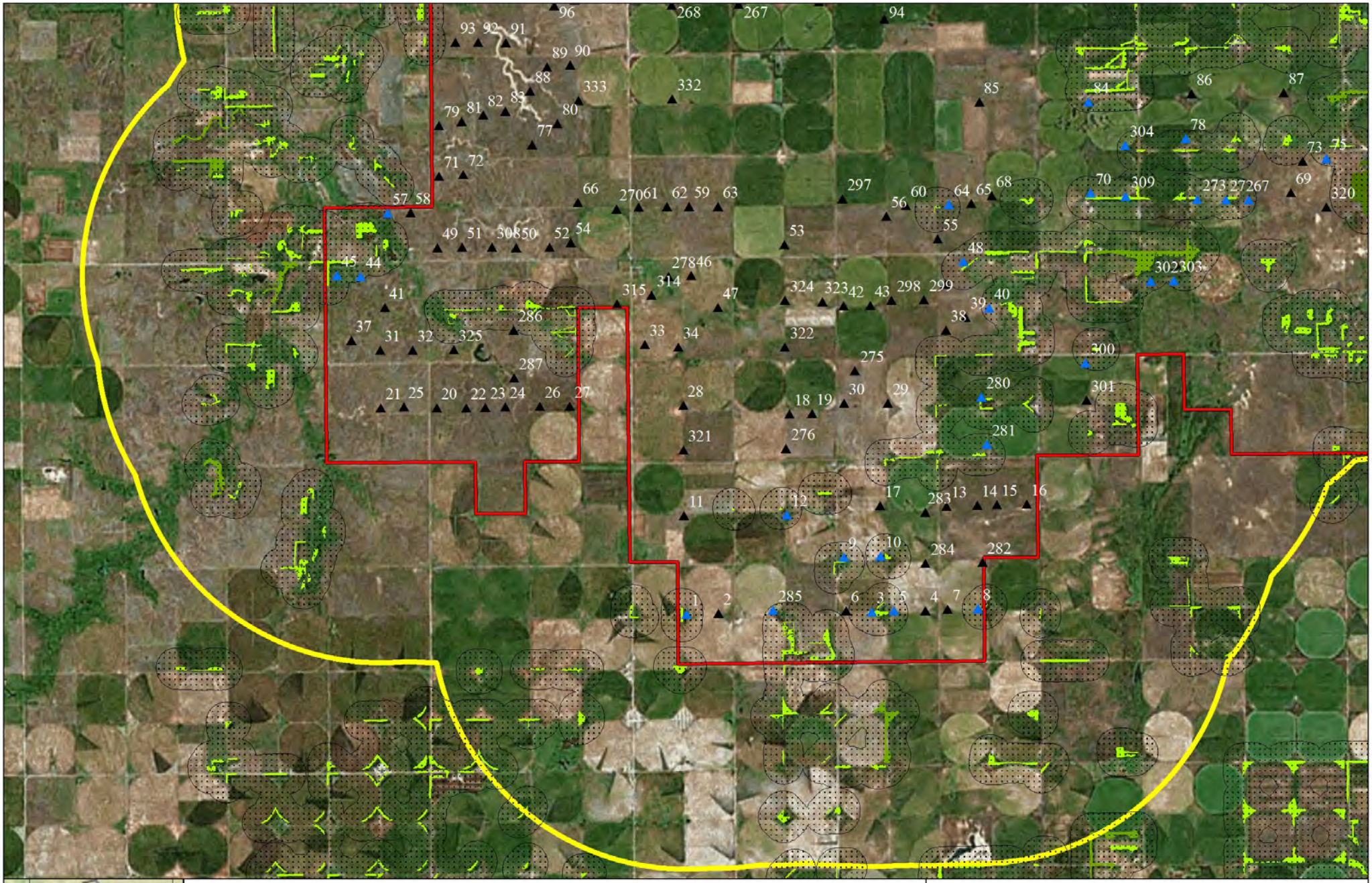

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