

**Northern Long-Eared Bat  
Presence/Absence Acoustic Surveys  
Crocker Wind Farm  
Clark County, South Dakota**

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**Report  
July 22 – 27, 2016**



**Prepared for:**

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## **REPORT REFERENCE**

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## BACKGROUND AND PROJECT OVERVIEW

Crocker Wind Farm, LLC, a wholly owned subsidiary of Geronimo Energy, LLC (Geronimo) is considering the development of the Crocker Wind Farm (Project) located in Clark County, South Dakota (Figure 1). Geronimo contracted Western EcoSystems Technology, Inc. (WEST) to conduct bat acoustic presence/probable absence surveys during summer 2016 to better understand the potential use of the Project during the summer months by the federally threatened northern long-eared bat (NLEB, *Myotis septentrionalis*). The primary objectives of the summer bat surveys were to: 1) collect site-specific information on bat use of the Project that will be useful in evaluating potential impacts to bats from the Project, and 2) collect site-specific information that can be used to evaluate risk to state and federally listed bat species with potential to occur in the Project to inform the need for further consultation with the South Dakota Department of Game Fish & Parks (SDGFP) and US Fish and Wildlife Service (USFWS) regarding these species. This report summarizes the results of the NLEB acoustic surveys completed for the Project during summer 2016.

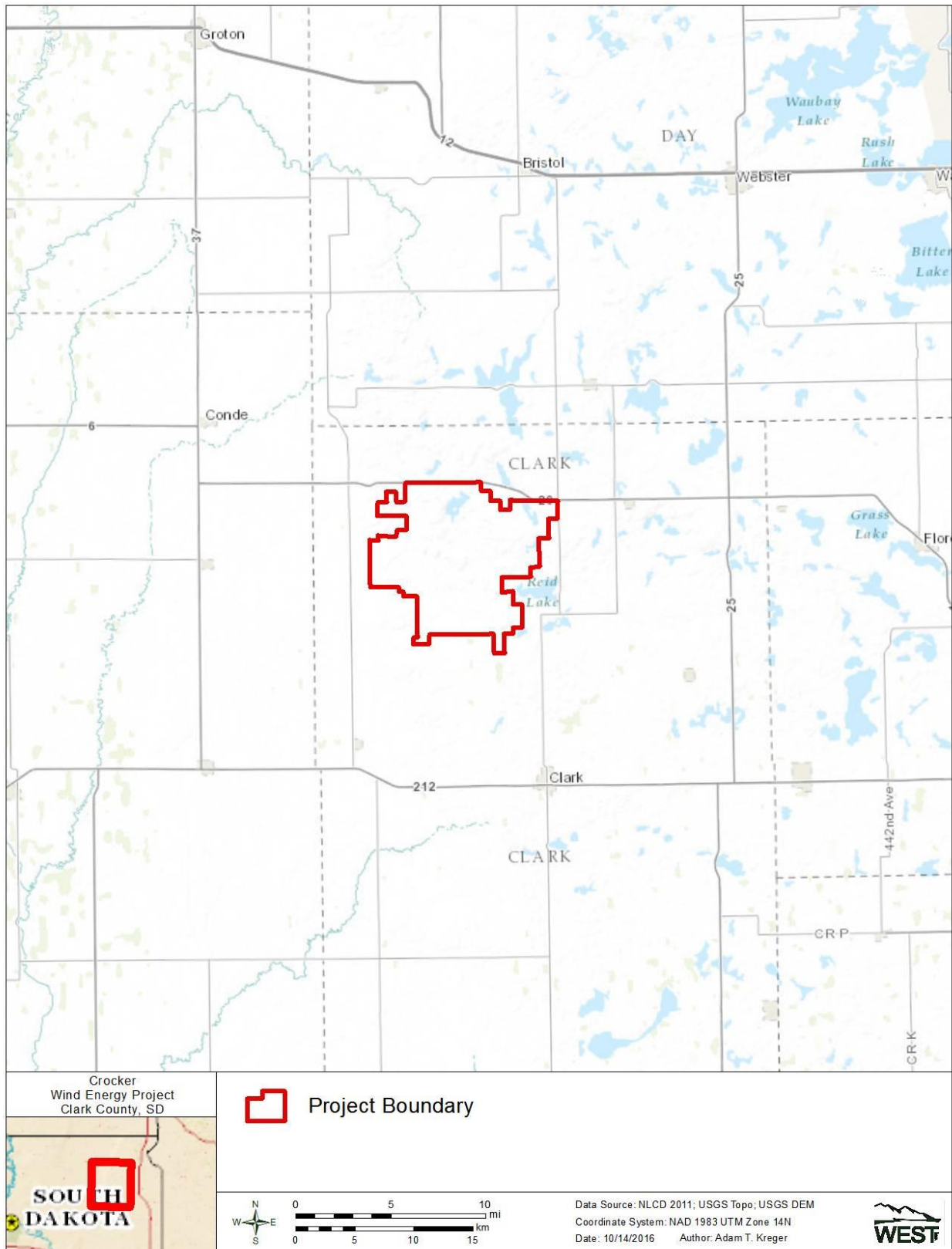


Figure 1. Location of the Crocker Wind Farm in Clark County, South Dakota.

## **METHODS**

The bat acoustic surveys followed the USFWS *2016 Range-Wide Indiana Bat Summer Survey Guidelines* (USFWS Guidelines, USFWS 2016), which are also applicable to NLEB, per the *Northern Long-Eared Bat Interim Conference and Planning Guidance* (USFWS 2014). The USFWS Guidelines recommend the following to assess the presence or probable absence of NLEB: 1) desktop habitat assessment, and 2) presence/probable absence surveys using acoustic detectors or mist-netting.

### **Desktop Habitat Assessment**

The USFWS Guidelines (USFWS 2016) define suitable habitat for NLEB as any forest (e.g., deciduous, coniferous, mixed) or forested landscape feature (e.g., woody wetlands, forested riparian areas, shelterbelts) and recommend sampling at least two detector locations for every 123 acre (ac; 0.50 square kilometers [km<sup>2</sup>]) site of suitable habitat within a non-linear project area for at least four detector nights. WEST conducted a desktop assessment of potential NLEB habitat within the Project. Overall, there are only 389 acres of wooded habitat throughout the Project, all of which are small (less than 15 acres) isolated patches associated with small wood lots or wind breaks. Connected NLEB foraging or roosting habitat within the Project is limited to the eastern margin of the Project (Figure 1), where shelterbelts and larger forested patches are separated by less than 1,000 feet (ft; 305 meters [m]). This connected habitat totals approximately 32.4 acres within the Project boundary, which are made up patches of less than 15 acres but within 1,000 ft of larger patches outside of the Project. In total, 2 acoustic survey sites with potential NLEB habitat were selected within the Project on leased lands (Figure 2).

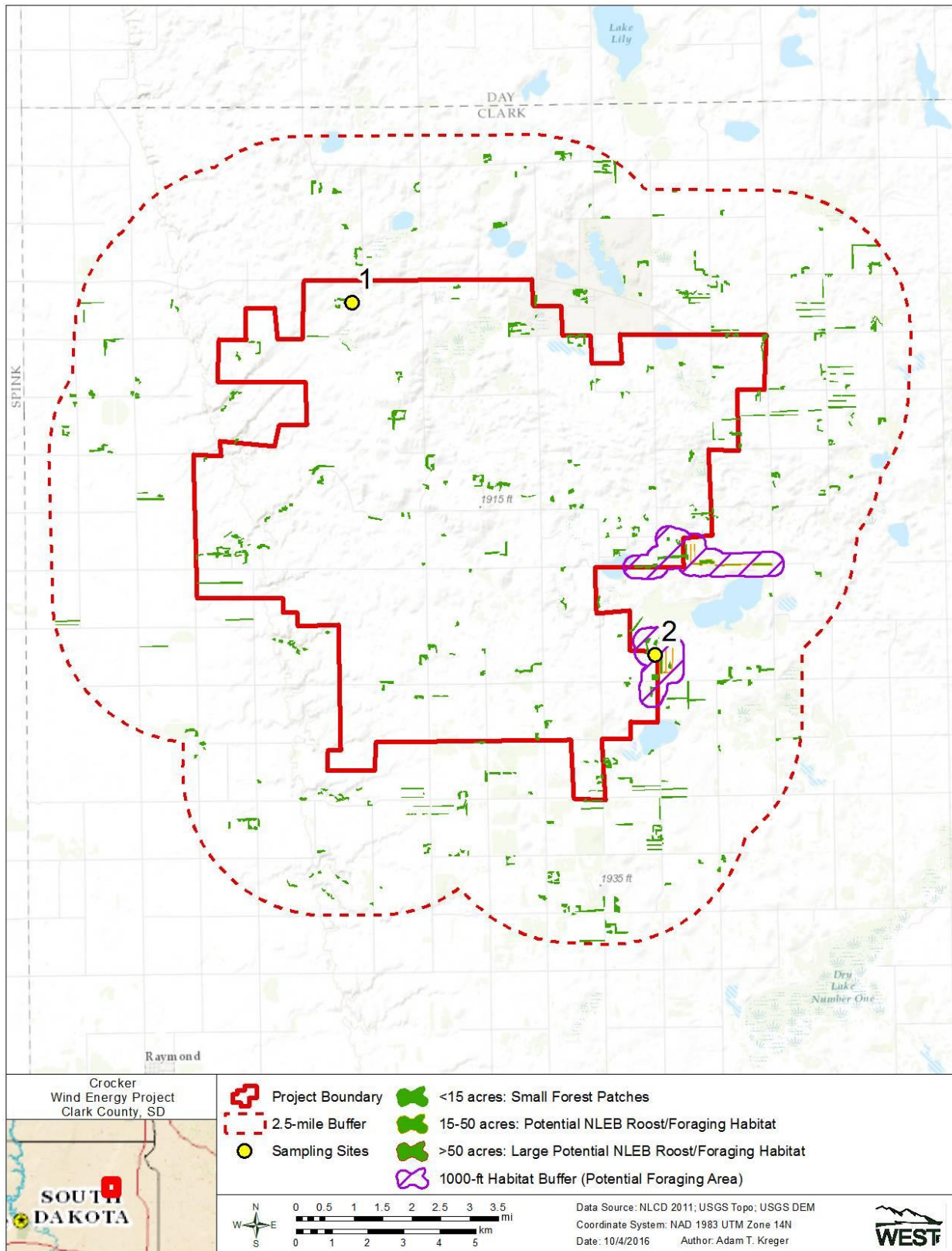


Figure 2. Crocker Wind Farm Acoustic Sampling Sites in Clark County, South Dakota.



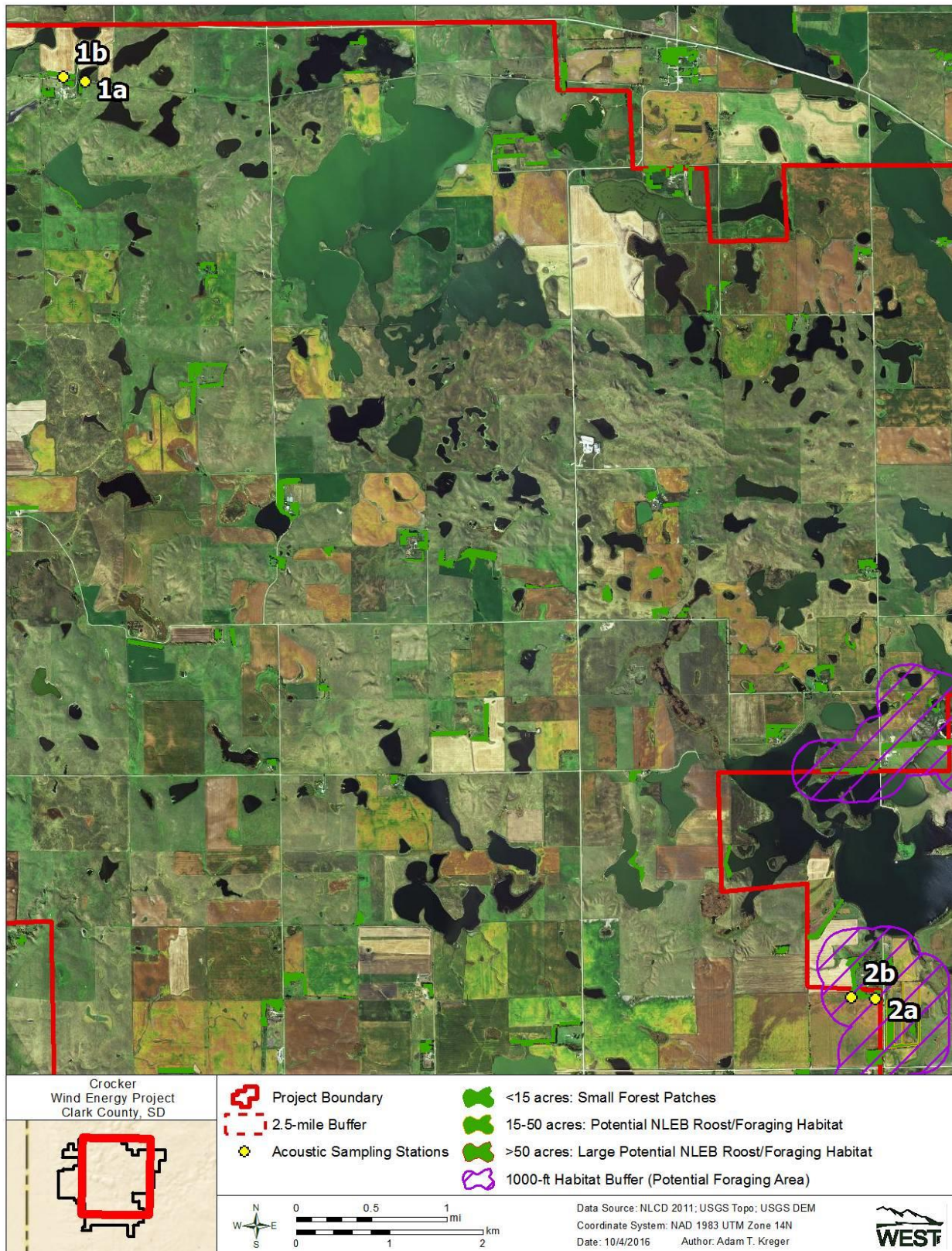


Figure 3. Location of the Crocker Wind Farm Acoustic Detector Locations in Clark County, South Dakota.



## **Acoustic Surveys**

Acoustic surveys were conducted from July 22 – 27, 2016, following USFWS Guidelines (USFWS 2016). Surveys were conducted at 2 sites with two detector locations (stations) at each site for a total of 4 acoustic survey stations. Each station was surveyed for at least two nights for a total of at 10 valid detector nights. Bats were surveyed using full spectrum Song Meter SM3 acoustic recorders (Wildlife Acoustics, Inc.). Acoustic survey sites were reviewed and approved by the USFWS prior to conducting surveys. WEST placed detectors in suitable habitat for NLEB, including forest edges, small clearings and forest-canopy openings, near water sources, and forested riparian edges. Detectors were placed in areas with open tree canopies or canopy heights greater than 33 ft (10 m) and were spaced at least 656 ft (200 m) apart. Detectors were elevated at least 9.8 ft. (3.0 m) above ground level (AGL) to minimize acoustic interference from vegetation. Detectors were programmed to record from sunset to sunrise each survey night.

Acoustic monitoring began before sunset and continued for the entire night. If weather conditions such as persistent rain (more than 30 minutes), strong sustained winds (greater than 9 miles per hour [mph] average for more than 30 minutes), or cold temperatures (below 10°C [50°F] for more than 30 minutes) occurred during the first five hours of a survey night, then that location was surveyed for an additional night unless target species were detected or bat activity was unaffected by weather conditions (USFWS 2016). For each acoustic survey location, the date, start and end time, site description, site coordinates, and weather data were recorded. Representative photographs of each acoustic survey station were taken.

Bat calls were quantitatively identified using the USFWS-approved Automated Acoustic Bat Identification Software Program (Kaleidoscope Pro, version 3.1.7, Wildlife Acoustics, Inc.). If the automated bat identification program identified calls as NLEB with a high degree of probability ( $p < 0.05$ ), then qualitative analysis was conducted to determine if NLEB were present or absent at the site. Qualitative echolocation call analysis was conducted by a biologist experienced with acoustic identification and who met required USFWS qualifications (Dr. Kevin Murray of WEST; USFWS 2016). If probable NLEB echolocation call sequences identified by Kaleidoscope were not characteristic of NLEB, contained distinct calls produced by species other than NLEB, or were of insufficient quality, they were reclassified. Per USFWS Guidelines (USFWS 2016), NLEB were considered present at sites with probable calls verified by qualitative analysis. NLEB were considered absent from sites with no probable NLEB calls or from sites with probable NLEB calls that were not verified by qualitative analysis.

## **RESULTS**

### **Acoustical Analysis**

Acoustic surveys were completed at 2 survey sites (4 survey stations) from July 22 – 27, 2016, for a total of 10 valid detector nights. UTM coordinates and site descriptions for each survey station are listed in Table 1. Photographs and datasheets with site descriptions are found in Appendix A.

**Table 1. Location and site description of acoustic survey stations at the Crocker Wind Farm.**

| Site ID | Station ID | Easting† | Northing† | Site Description   |
|---------|------------|----------|-----------|--|
| 1       | A          | 589247   | 4995068   | Open field with dirt road to the west and treed area to the south                |
| 1       | B          | 589010   | 4995109   | Grassy strip with tree-line to the north and drainage ditch to the south         |
| 2       | A          | 597763   | 4985260   | Grassy strip with corn field to south and east. Treed area to the north and west |
| 2       | B          | 597419   | 4985326   | Grassy area at edge of corn fields lined with elm trees                          |

† = NAD 1983, Zone 14

To assess study conditions for compliance with USFWS Guidelines (USFWS 2016), weather was monitored using the Kent weather station (KSDCLARK2) on Weather Underground's Wundermap (<http://www.wunderground.com/wundermap/>). Stations Cro-1a and Cro-1b were deployed on July 22 and retrieved on July 25. Weather conditions met USFWS criteria for these stations on the nights of July 22, July 23, and July 24. Stations Cro-2a and Cro-2b were deployed on July 25 and retrieved July 27. Weather conditions met USFWS criteria for these stations on the nights of July 25 and July 26. All data was included in the analysis from all deployments. Together, these 4 stations collected 10 nights of valid data, meeting the requirement of at least four detector nights per site.

Kaleidoscope identified a total of 736 bat call files and identified 722 files (98.1%) to species. Average number of bat calls per detector night was 72.2. Table 2 summarizes the number of detector nights, number of bat call files, and number of bat calls identified to species at each survey station. Table 3 provides information on species identifications for each survey station.

**Table 2. Number of bat calls recorded at each acoustic survey station determined by Kaleidoscope for the Crocker Wind Farm.**

| Acoustic Survey Site | Survey Station | ID program   | Total Bat Calls | Calls Identified | Detector Nights | Bat Calls/ Detector Night |
|----------------------|----------------|--------------|-----------------|------------------|-----------------|---------------------------|
| 1                    | A              | Kaleidoscope | 37              | 36               | 3               | 12                        |
|                      | B              | Kaleidoscope | 61              | 61               | 3               | 20.3                      |
| 2                    | A              | Kaleidoscope | 232             | 229              | 2               | 114.5                     |
|                      | B              | Kaleidoscope | 38              | 35               | 2               | 17.5                      |
| <b>Total</b>         |                |              | <b>736</b>      | <b>722</b>       | <b>10</b>       | <b>72.2</b>               |

**Table 3. Summary of Kaleidoscope echolocation call identifications for the Crocker Wind Farm.**

| Site ID      | Station ID | EPFU <sup>1</sup> | LABO       | LACI      | LANO      | MYLU      | MYSE     | UNK       | Total      |
|--------------|------------|-------------------|------------|-----------|-----------|-----------|----------|-----------|------------|
| 1            | A          | 10                | 22         | 0         | 4         | 0         | 0        | 1         | 37         |
| 1            | B          | 13                | 24         | 8         | 14        | 2         | 0        | 0         | 61         |
| 2            | A          | 12                | 200        | 4         | 10        | 3         | 0        | 3         | 232        |
| 2            | B          | 3                 | 21         | 6         | 2         | 1         | 2        | 3         | 38         |
| <b>Total</b> |            | <b>76</b>         | <b>534</b> | <b>36</b> | <b>60</b> | <b>12</b> | <b>4</b> | <b>14</b> | <b>736</b> |

<sup>1</sup> EPFU = Big Brown Bat; LABO = Eastern Red Bat; LACI = Hoary Bat; LANO = Silver-haired Bat; MYLU = Little Brown Bat; MYSE = Northern Long-eared Bat; PESU = Tri-colored bat; UNK = Unknown.

Based on the screening done by the call identification programs, station Cro-2b recorded potential NLEB calls with a p-value < 0.05 for the maximum-likelihood estimation (Table 4). Qualitative analysis did not verify the presence of NLEB at any survey stations (Tables 4 and 5).

**Table 4. Summary of NLEB call identifications by Kaleidoscope and qualitative analysis<sup>1</sup> for stations with potential northern long-eared bat calls at the Crocker Wind Farm.**

| Site ID | Station ID | Date          | Identification Method | MYSE (NLEB) |
|---------|------------|---------------|-----------------------|-------------|
| 2       | B          | July 26, 2016 | Kaleidoscope          | 2           |
|         |            |               | Qualitative           | 0           |

<sup>1</sup> Only calls with p-values < 0.05 for the maximum-likelihood estimation were included in qualitative analysis (USFWS 2016).

**Table 5. Summary of actions at each acoustic survey station for the Crocker Wind Farm.**

| Site | Station ID | NLEB Calls | Probable NLEB Calls (P < 0.05) | NLEB Qualitatively Verified | Recommended Action |
|------|------------|------------|--------------------------------|-----------------------------|--------------------|
| 1    | A          | 0          | No                             | No                          | no further action  |
| 1    | B          | 0          | No                             | No                          | no further action  |
| 2    | A          | 0          | No                             | No                          | no further action  |
| 2    | B          | 2          | Yes                            | No                          | no further action  |

## DISCUSSION

Limited information is available on NLEB migratory pathways and behaviors. While there is some information suggesting this species tends to follow forested areas and avoid open areas if possible, these bats may occasionally move through non-forested areas.

If these bats occur in the Project area during the summer months, they will likely occur within or near (within 1,000 ft [305 m]) suitable wooded habitat patches. WEST conducted acoustical surveys for NLEB at two sites in areas of suitable habitat within the Crocker Wind Farm.

NLEB was not qualitatively verified at any of the four acoustic stations at the two surveyed sites. Therefore this species is considered likely absent from the proposed Project. Surveys are

considered complete for all four survey stations at the two sites, and no further action is recommended to confirm NLEB bat absence pursuant to USFWS *Northern Long-eared Bat Interim Conference and Planning Guidance* (USFWS 2014) and *2016 Range-Wide Indiana Bat Summer Survey Guidelines* (USFWS 2016).

## **LITERATURE CITED**

- U.S. Fish and Wildlife Service (USFWS). 2014. Northern Long-eared Bat Interim Conference and Planning Guidance. January 6, 2014. USFWS Regions 2, 3, 4, 5, & 6. Available online at: <http://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf>
- U.S. Fish and Wildlife Service (USFWS). 2016. 2016 Range-Wide Indiana Bat Summer Survey Guidelines (April 2016). USFWS Endangered Species Program: Midwest Region.