



## **Proposed Work Plan for Acoustic Bat Survey**

Saratoga Solar Project  
Wood County, Wisconsin

June 23, 2022

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## PROPOSED BAT SURVEY WORK PLAN – SARATOGA SOLAR PROJECT

Introduction

### 1.0 INTRODUCTION

Saratoga Solar Project, LLC (Saratoga Solar) has retained Stantec Consulting Services Inc. (Stantec) to conduct surveys for the federally threatened northern long-eared bat (*Myotis septentrionalis*) at the proposed Saratoga Solar Project (Project) located in the Town of Saratoga, Wood County, Wisconsin (Figure 1). Proposed surveys include performing a bat acoustic survey within suitable habitat in the Project Impact Area (i.e., lands within the Project boundary). The Project Impact Area encompasses the primary facility area and alternate facility area. The Project Impact Area includes 1,508.8 acres (ac) of forested habitat that is potentially suitable for the northern long-eared bat (approximate center point: 44.27802, -89.81040).

The U.S. Fish and Wildlife Service (USFWS) has issued guidance for acoustic bat surveys in the *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (USFWS Guidelines; USFWS 2022). The survey objective is to determine presence or probable absence of the northern long-eared bat in the Project Impact Area.

This study plan has been developed to fulfill requirements of the USFWS Guidelines. Stantec is notifying the Wisconsin Department of Natural Resources and the USFWS Minnesota-Wisconsin Ecological Services Field Office of plans to conduct an acoustic bat presence/probable absence survey for the northern long-eared bat within the proposed Project Area. In addition, Stantec must receive written concurrence from the USFWS Minnesota-Wisconsin Ecological Services Field Office accepting the level of survey effort and methods proposed in this study plan. Information from this survey will be used to inform Saratoga Solar about any northern long-eared bats using the Project Area and, if necessary, will be used during the state and federal permit process.

### 1.1 NORTHERN LONG-EARED BAT HABITAT ASSESSMENT

Northern long-eared bat summer roosting habitat is generally within forested areas containing live and dead trees that are greater than or equal to three inches in diameter at breast height with cavities, exfoliating bark, crevices, or hollows. Summer foraging habitat includes forested areas, tree-lined corridors, forest edges with adjacent agricultural or pasture fields, and water bodies (USFWS 2022). Northern long-eared bats will also utilize human-made structures for roosting such as buildings, barns, bridges, and bat houses (USFWS 2014).

A desktop review of recent aerial photography and National Land Cover Database (USGS 2016) was performed to identify locations within the Assessment Area (Project boundary and a 1-mile buffer; Figure 1), containing potentially suitable summer bat habitat. For the purposes of assessing bat summer habitat suitability (i.e., non-winter), woodlands within the Assessment Area were digitized and then categorized based on size and connectivity data from published literature on home range sizes for the northern long-eared bat (Owen et al. 2003; Carter and Feldhamer 2005; Lacki et al. 2009; USFWS 2014, 2016, 2020). The four habitat categories were as follows:

- Medium-large roost / foraging habitat (MLR/FH): Woodlands  $\geq$  50 ac in size

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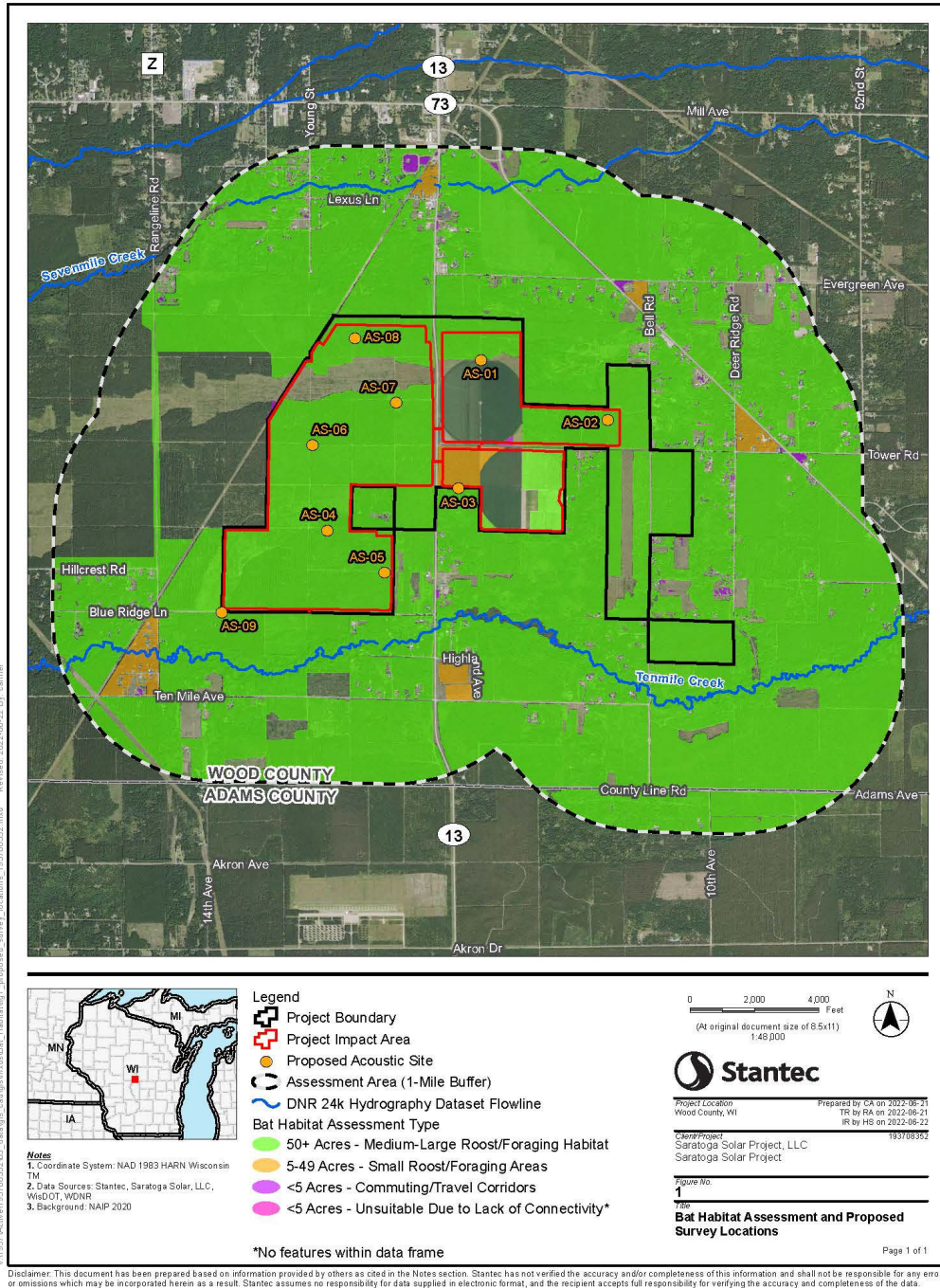
### Introduction

- Small roost / foraging habitat (SR/FH): woodlands > 5 to 49 ac in size
- Commuting / travel corridors (C/TC): woodlands < 5 ac in size, and within 1,000 feet (ft) of other suitable habitats
- Unsuitable: woodlands < 5 ac in size and not within 1,000 ft of other suitable habitats

Digitized woodlands were then reviewed, verified, and if necessary, revised by a qualified bat biologist. Based upon these results, there are approximately 1,508.8 ac of suitable summer habitat for northern long-eared bat within the Project area, approximately 8,306.4 ac within the Assessment Area, and approximately 1,018.3 ac of suitable summer habitat within the Project Impact Area (Figure 1).

# PROPOSED BAT SURVEY WORK PLAN – SARATOGA SOLAR PROJECT

## Introduction



**Figure 1. Bat Habitat Assessment and Proposed Survey Locations**

Methods

## 2.0 METHODS

### 2.1 ACOUSTIC GUIDELINES

Because suitable northern long-eared bat summer habitat is present within the Project Impact Area, acoustic presence/probable absence surveys will be conducted in accordance with the USFWS Guidelines. According to the USFWS Guidelines, 14 acoustic detector nights per 123 ac of survey area is the minimum effort required within the range of the northern long-eared bat. The amount of suitable summer northern long-eared bat habitat (1,018.3 ac) within the Project Impact Area, which would require 117 acoustic detector nights (1,018.3 ac / 123 ac x 14 detector nights = 116.2 detector nights rounded up to 117 detector nights) spread over 9 sites (1,018.3 ac / 123 ac = 8.3 acoustic sites rounded up to 9 acoustic sites) to meet the minimum requirements of the USFWS Guidelines.

Stantec's bat biologists will conduct field investigations and make the final selection of the nine (9) acoustic sites to be surveyed based on a combination of factors, including their proximity to other acoustic sites and presence of key habitat characteristics. Site selection will be based upon canopy cover, presence of non-obstructed flyways, and forest condition. The actual location and orientation of each acoustic detector will be determined in the field prior to conducting surveys.

Surveys will utilize Wildlife Acoustics SongMeter SM4BAT full-spectrum ultrasonic recorders<sup>1</sup>, which record full spectrum WAV files. A minimum of two acoustic detectors will be deployed for seven nights and a maximum of seven detectors for two nights (minimum of 14 detector nights total) at each of the 9 acoustic sites (total of 126 detector nights) and will begin recording 30 minutes prior to sunset to 30 minutes after sunrise each night of sampling.

The acoustic survey will follow the methods described in the USFWS Guidelines, as outlined below.

#### USFWS Acoustic Survey Guidelines

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1. **Acoustic Survey Season:** 15 May to 15 August, when northern long-eared bats occupy summer habitat.
2. **Equipment:**
  - ◆ Full-spectrum and/or zero-crossing detectors
  - ◆ Directional, hemispherical, and omnidirectional microphones are acceptable for acoustic surveys
3. **Acoustic Detector Placement:**
  - ◆ At least 3 meters (m; 10 ft) in any direction from vegetation or other obstructions
  - ◆ In areas without vegetation or with minimal vegetation within 10 m (33 ft) in front of microphone
  - ◆ Parallel to woodlands
  - ◆ At least 15 m (49 ft) from known or suitable roosts (e.g., trees/snags, buildings, bridges, bat houses, caves, or mine portals)
  - ◆ Forest canopy openings
  - ◆ Near water sources
  - ◆ Wooded fence lines, adjacent to large openings or connecting two larger blocks of suitable habitat
  - ◆ Blocks of recently logged forest where some potential roost trees remain
  - ◆ Road or stream corridors with open tree canopies or canopy height more than 10 m (33 ft)

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<sup>1</sup> <http://www.wildlifeacoustics.com/products/song-meter-sm4bat>

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### Methods

#### USFWS Acoustic Survey Guidelines

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- ◆ Woodland edges
- 4. **Acoustic Detector Spacing:** Acoustic sites should be a minimum of 200 m (656 ft) apart.
- 5. **Minimum Level of Effort:**
  - ◆ Non-linear projects – a minimum of 14 detector nights per 123 ac for northern long-eared bat
  - ◆ Acoustic sampling period begins at sunset and ends at sunrise
- 6. **Orientation of Acoustic Detector:** Microphones should be aimed to sample the largest volume of likely bat flight space while minimizing clutter (horizontal for omnidirectional microphones, vertical for hemispherical microphones).
- 7. **Weather Conditions:** Keep acoustic data only if the following weather conditions are met for the first 5 hours after sunset:
  - ◆ No precipitation
  - ◆ Temperature  $\geq 10^{\circ}\text{C}$  ( $50^{\circ}\text{F}$ )
  - ◆ No strong winds ( $\geq 9$  miles per hour)
  - ◆ Nightly weather observations, addressing precipitation, temperature, and wind, must be recorded from the nearest NOAA Weather Service Station, and summarized in the report
- 8. **Weatherproofing Acoustic Detector:** Acoustic detectors are rarely waterproof from the factory and will likely not function if they get wet. The decision to waterproof or not should be determined nightly based on the likelihood of precipitation. Deploying directional microphones with a 45 degree elbow is acceptable if needed.

## 2.2 DATA PROCESSING PROTOCOLS

Acoustic data collected at each site will be analyzed both quantitatively and qualitatively, following USFWS Guidelines to assess the presence of northern long-eared bats. Each data file will be processed to screen out noise files. The quantitative analysis will consist of processing recorded calls using a USFWS-approved version of Kaleidoscope Pro version (per USFWS Guidelines), a USFWS accepted auto-identification program. Default signal parameters will be used, including a minimum of 2 pulses per call and advanced signal processing. Analysis will be conducted only for species known to occur within the Project area, including:

- Big brown bat (*Eptesicus fuscus*)
- Eastern red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Little brown bat (*Myotis lucifugus*)
- Tricolored bat (*Perimyotis subflavus*)
- Northern long-eared bat

The automated program assigns a species identification to individual echolocation calls, and then uses a Maximum Likelihood Estimate (MLE) for each site and each night and assigns a p-value for presence. A low MLE value indicates that a species is likely present at a site. The USFWS Guidelines state that a MLE value  $< 0.05$  for a species recorded during a given detector night represents a probable presence for a species with a high level of certainty, though qualitative analysis will also be conducted as described below.

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### Final Report

If a detector night at a site has a MLE value of  $< 0.05$  for the northern long-eared bat, files recorded at the site will be visually analyzed in zero crossing format by a qualified bat biologist using AnalookW software (Windows version 4.2 or newer). This will involve visually analyzing each call recorded from the detector on the night the species was detected, starting with the first call on the night and continuing until the species is either confirmed present, or until all calls from that night have been visually assessed and probable absence can be assumed. The visual review will involve comparing echolocation call structures of files in question to characteristics (e.g., frequency, slope, duration) from a known call library by a qualified bat biologist with experience acoustically identifying the species within the Project area. Sites with likely presence of the northern long-eared bat will then be qualitatively analyzed by a Stantec bat biologist until the species is either confirmed present, or until all calls from that night at that detector have been analyzed and probable absence is assumed.

### 3.0 FINAL REPORT

Upon completion of the acoustic survey, a final report will be prepared, including the location of the detectors, the habitat at each survey site, weather data by survey night, number of bat passes recorded by site and the final number of passes for northern long-eared bats and what percent of the total bat activity (total number of bat passes identified by the automated programs) the species represents. In addition, for sites with northern long-eared bat activity, the results of any qualitative analysis will be reported. Tables of survey data and data sheets will be included as appendices in the report. Maps, representative photographs of site locations, and illustrations will be included as appropriate.



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### References

## 4.0 REFERENCES

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