



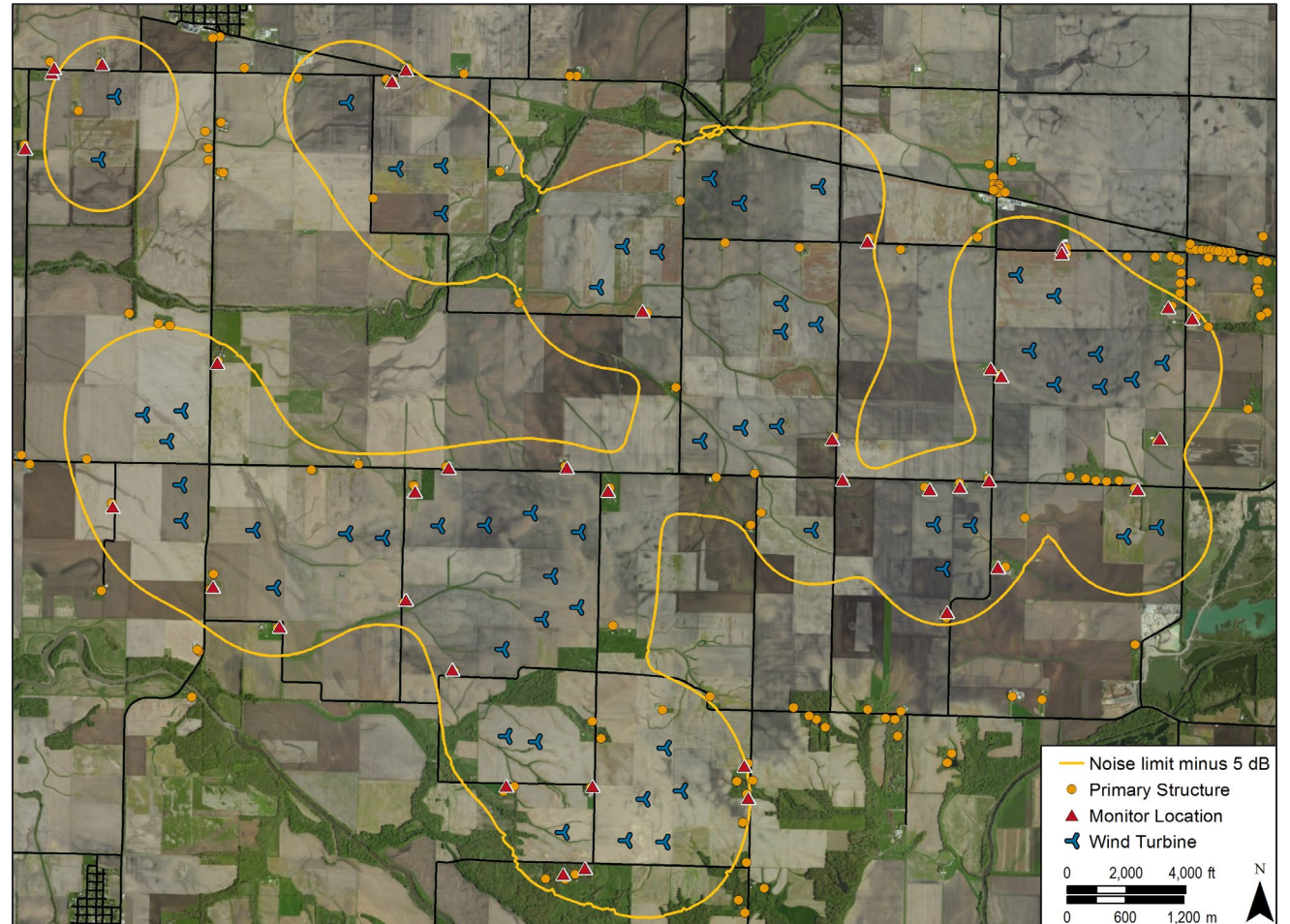
Attended Sound Monitoring of Wind Turbines

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Sugar Creek Wind Postconstruction Attended Sound Monitoring

The Sugar Creek Wind Project is a 57-turbine wind farm across 12,120 acres of private land in Logan County, Illinois, with a capacity of up to 202 megawatts.

- Construction was completed at the end of 2020
- Postconstruction sound monitoring was conducted in the fall of 2021
- 38 sites required attended monitoring



Monitoring Requirements

Project Conditional Use Permit

- The County required **attended monitoring** at **all “primary structures” within 5 dBA** of modeled nighttime sound limits at any frequency whose land-owners had given **written permission** to access their property.

Noise Standards

Logan County, Illinois

- Follow Illinois Pollution Control Board requirements

Illinois Pollution Control Board

- Daytime and Nighttime Octave Band Sound Pressure Level Limits
- Tonality



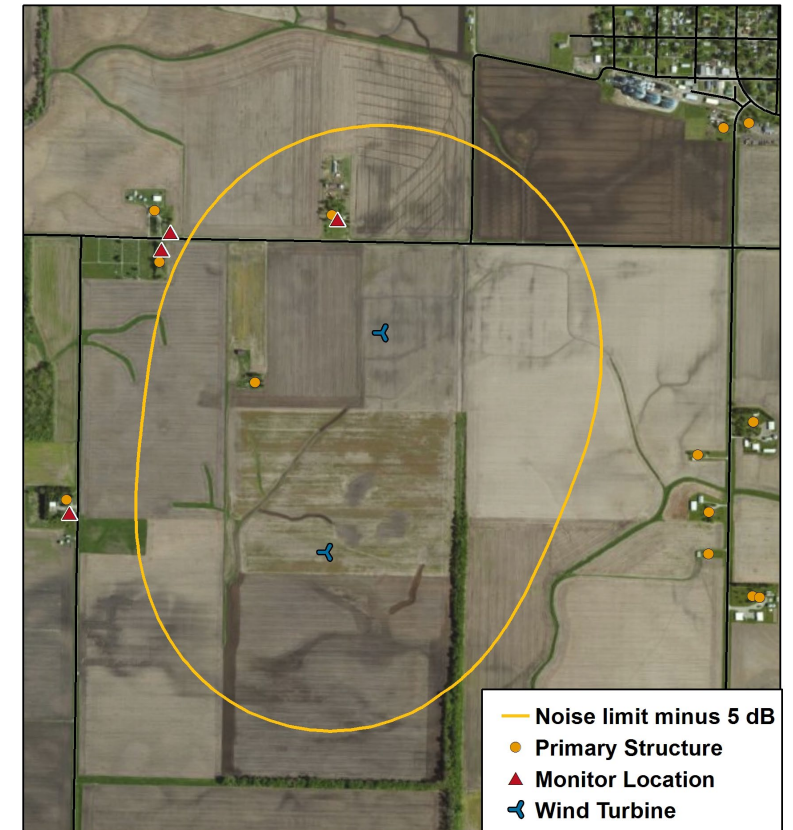
Planning: Site Selection

Factors

- Within 5 dBA of modeled nighttime sound limits
- Parcel contains primary structure
- Access granted by landowner

Micro-siting

- Highest exposure to wind turbine sounds
- Limit disturbance to residences
- Avoid additional noise sources such as farm animals, dogs, and objects that may move in the wind



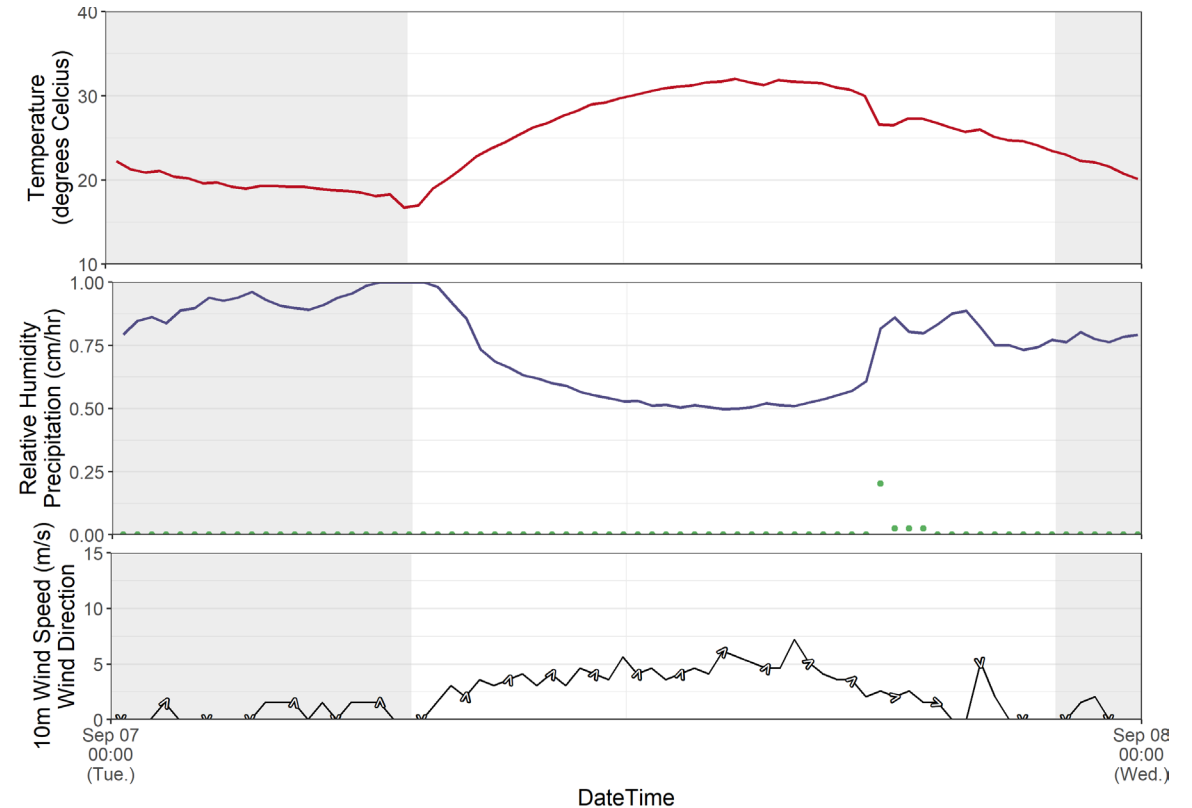
Planning: Weather and Turbine Considerations

Turbines

- Within +/- 1 dB of maximum sound power level
 - Achieved at 75% of full power or greater
 - 8-10 m/s at the turbine hub height

Ground Level

- Wind speeds less than 5 m/s
- No forecasted periods of rain or thunder
- Less than 90% humidity



Automated Surface Observation Station (“ASOS”) data compiled after the monitoring period for additional relative humidity and temperature information



Prior to Monitoring: Coordination

Personnel Involved

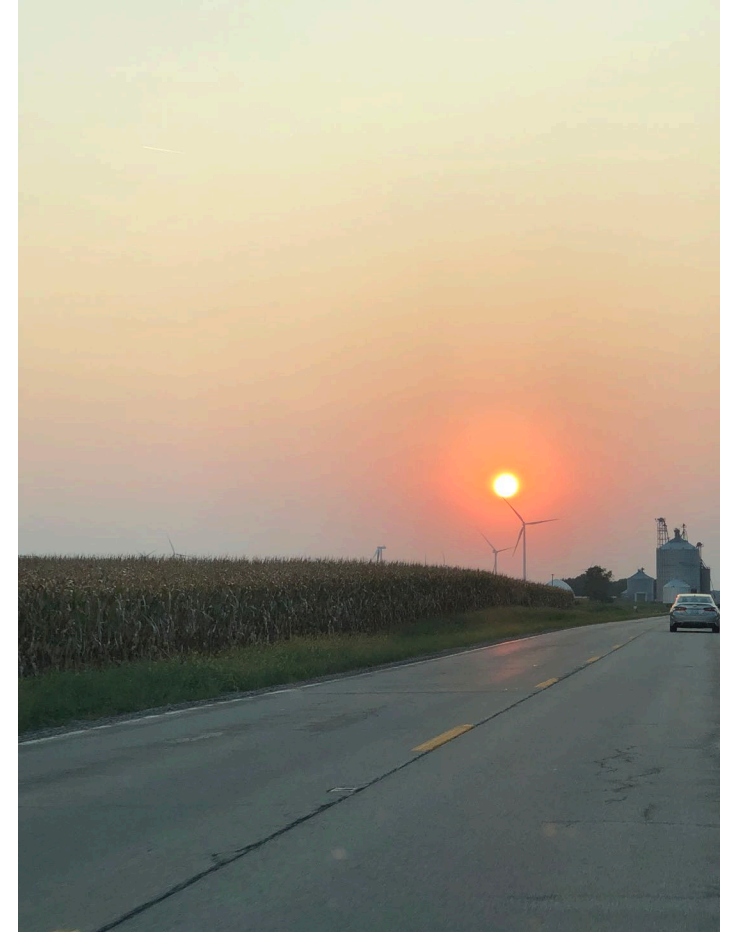
- **County and Local Police Authorities**
 - Made aware we will be on site
- **Project Community Expert**
 - Call or visit each resident one or two days prior to monitoring
 - Communicate with RSG about any concerns discovered while talking to the residents
- **Technical Dispatch**
 - Confirm site turbines are operational and staff will be available to turn on and off turbines during monitoring period



Prior to Monitoring: RSG Responsibilities

During the Daylight Before Monitoring

- Pick up and check equipment
- Scope sites and talk to residents
- Review directions and site materials
- Double-check turbine conditions with dispatch
- Address any safety or site concerns with project team



Monitoring

Equipment Used

- ANSI/IEC Type 1 Cirrus sound level meter
 - Equipped with 7-inch windscreen
 - Capable of recording audio internally
- Onset HOBO anemometer
- Handheld anemometer
- Safety equipment
 - Headlamp, safety vest, RSG car decal



Monitoring

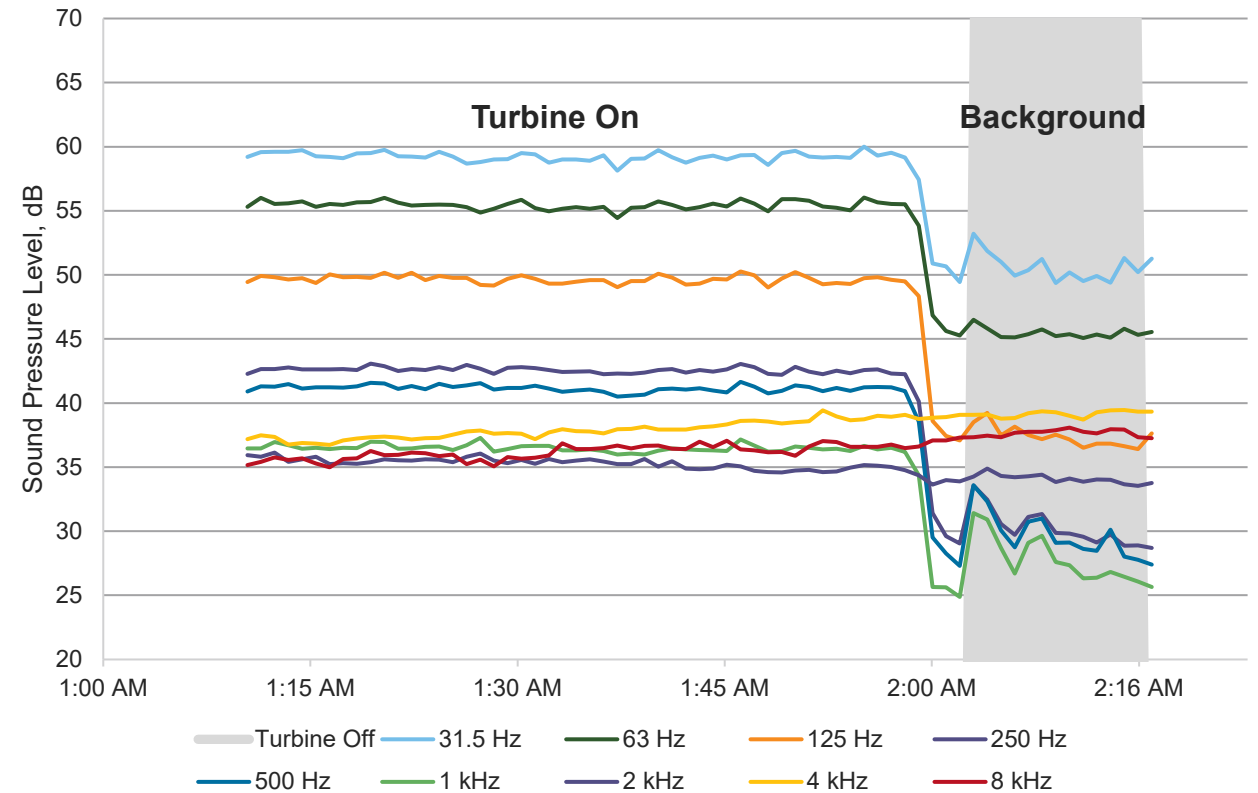
- Conducted attended monitoring between 10:00 p.m. and 5:00 a.m.
- One RSG field staff at each site
 - Staffed 2-3 people per trip
- Measured for a minimum of one hour
 - 45 minutes during turbine operations
 - Followed by 15 minutes or longer with wind turbines shut down (state requirement)
- If turbine and weather conditions were ideal, we could get 12 sites per night



Outcomes

- Repeats were required due to weather and turbine conditions
 - Total of 51 measurements for 38 sites
 - Field staff measured for 6 nights over a 3-month period
- Sound levels met the county and state noise standards at all sites
- The results and report were accepted by the county

Example Octave Band Results



Conclusions

Challenges Experienced

- Staff availability
- Weather conditions not optimal and hard to predict
- Turbines off due to repairs
- Safety concerns while nighttime monitoring
- Farm equipment running through the night
- High background sound levels

Successes

- Communication was strong
- All 38 sites were able to be monitored
- Overall satisfaction from client and county



Recommendations

- Allow for a large timeframe to get the work done
 - Having the ideal weather forecast is uncommon
 - The local weather may be different than forecasted
- Have additional safety precautions for nighttime monitoring
 - Ensure the residents know when staff will be onsite
- Advocate for a smaller number of sites
 - Focus on the loudest sites



Acknowledgments

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- RSG staff included **Ken Kaliski** (project manager), **Dana Lodico** (data analysis), **Shawn Fitzgerald** (field staff), and **Hugo Rost** (field staff)
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RSG

the science of **insight**

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