

Do Turbines with Lower Rotor Sweeps Have Higher Bat Mortality Rates?

Influence of Wind Turbine Minimum Rotor Sweep on Bat Fatalities

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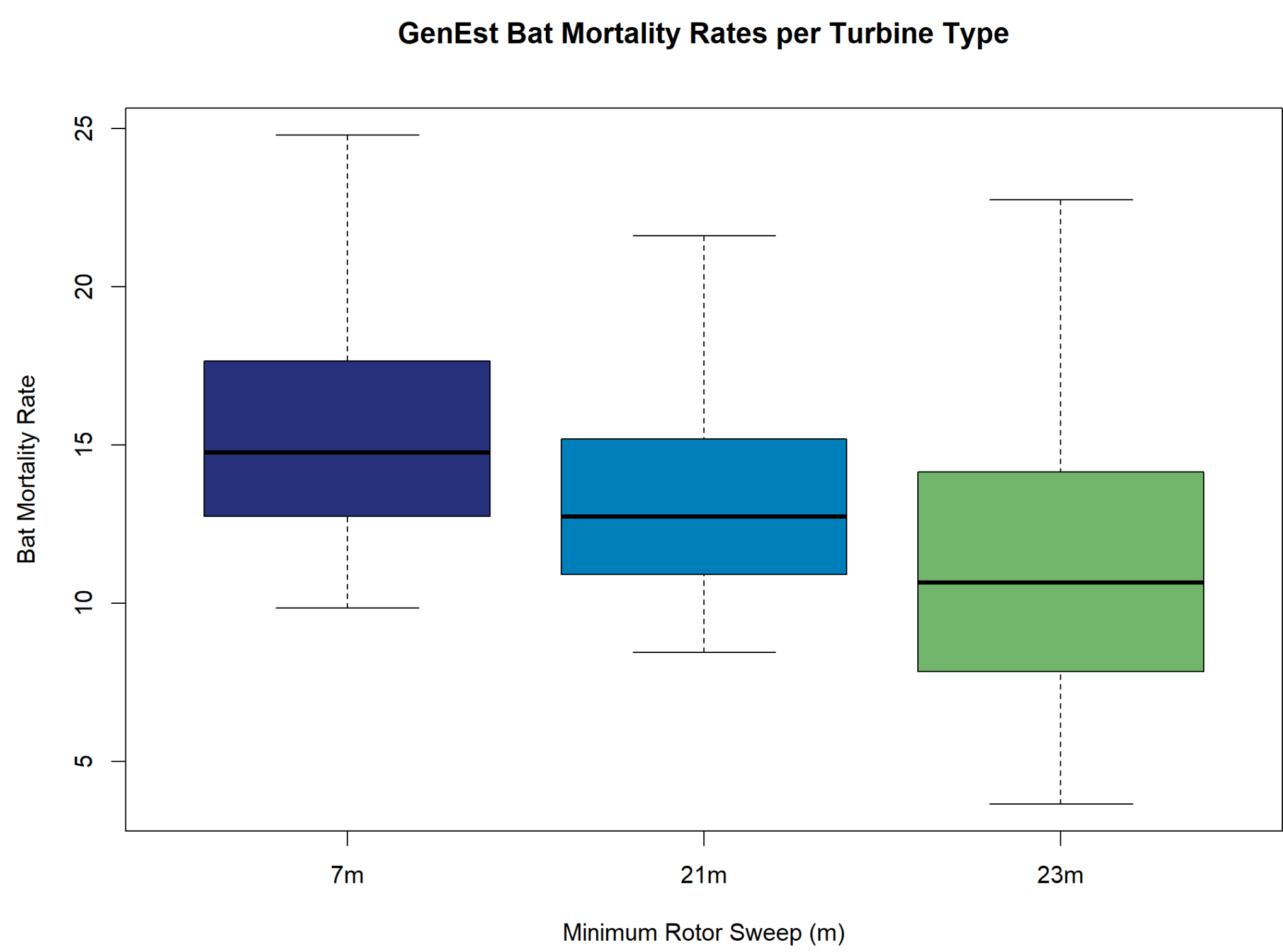


Figure 1. GenEst median (black horizontal line), interquartile range (boxes), and 95% confidence intervals (whiskers) for bat mortality rates per turbine for each model with a different minimum rotor sweep based on PCM efforts at a north Texas wind energy site from May through October 2023. Searches were conducted weekly at all operating turbines.

Intro

Bat activity might shift lower to the ground due to wind shear. Could lower rotor sweeps increase bat fatalities? Recent research supports this for hoary bats.¹

Methods

- North Texas wind energy site
- Weekly PCM monitoring May through October 2023
- 3 different turbine types with varying minimum rotor sweeps (MRS)
 - 21 Model A with 7 m, MRS
 - 27 Model B with 21 m, MRS
 - 4 Model C with 23 m, MRS
- GenEst bat mortality rates
 - Split by turbine type

Results

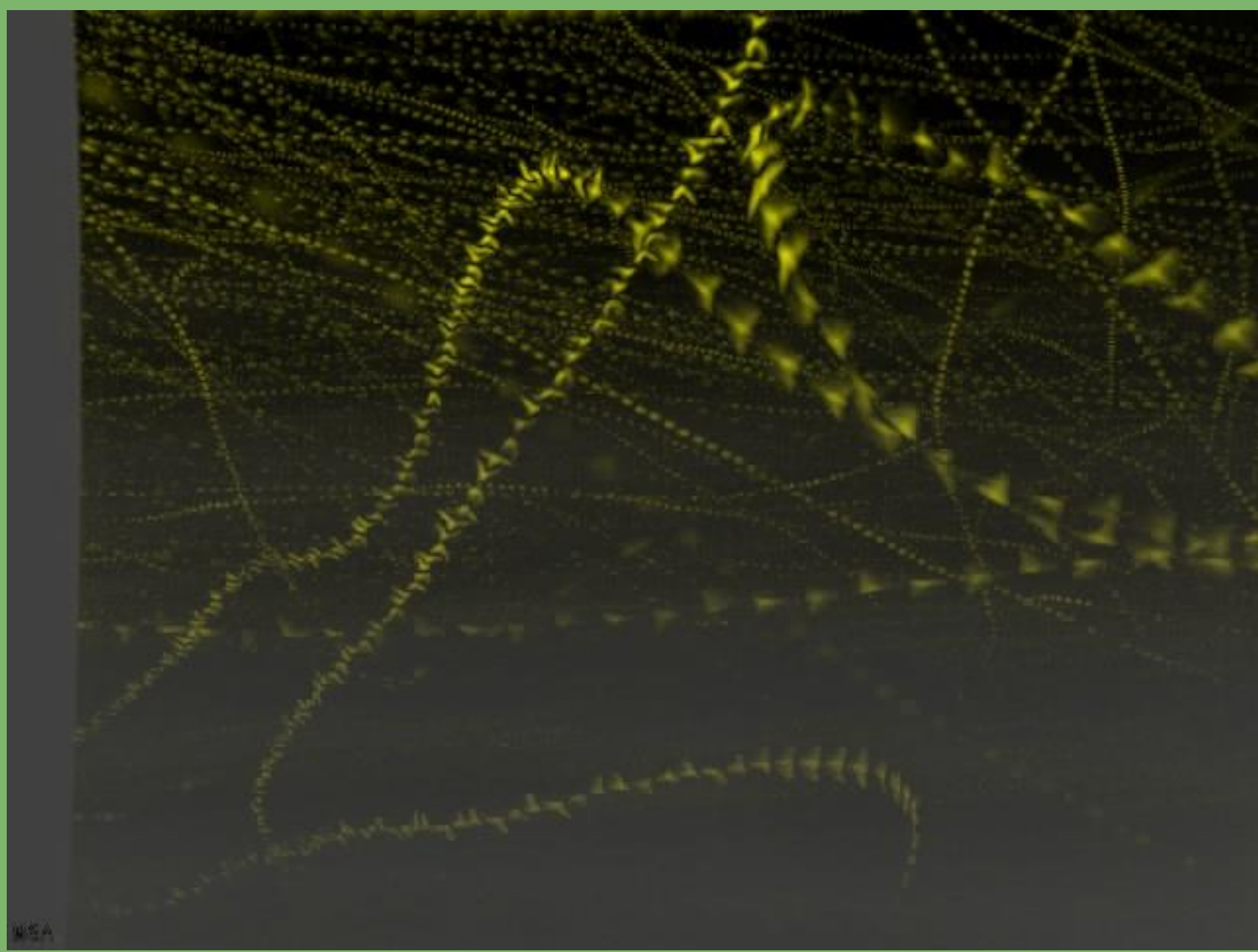
- Highest median mortality rate (14.77 bats/turbine) at turbines w/ lowest MRS (Fig 1).
- Median detection probability 0.385 (Fig 2).

Discussion

- Preliminary analysis suggests turbines with lower MSR have higher bat mortality rates.
- Increasing turbine MSR could reduce bat fatalities
- Only 4 Model C turbines means low confidence
- Expanding analysis to more facilities
- Statistical analysis to include other turbine & habitat characteristics



Image depicting the lowest minimum rotor sweep of Model A turbine at the north Texas wind energy facility. The blade tip is approximately 7 m from the ground.



Summary Image depicting 10-minutes of bat activity (yellow tracks) below the rotor sweep at a Model B wind turbine. The turbine tower can be seen on the left side of the image.

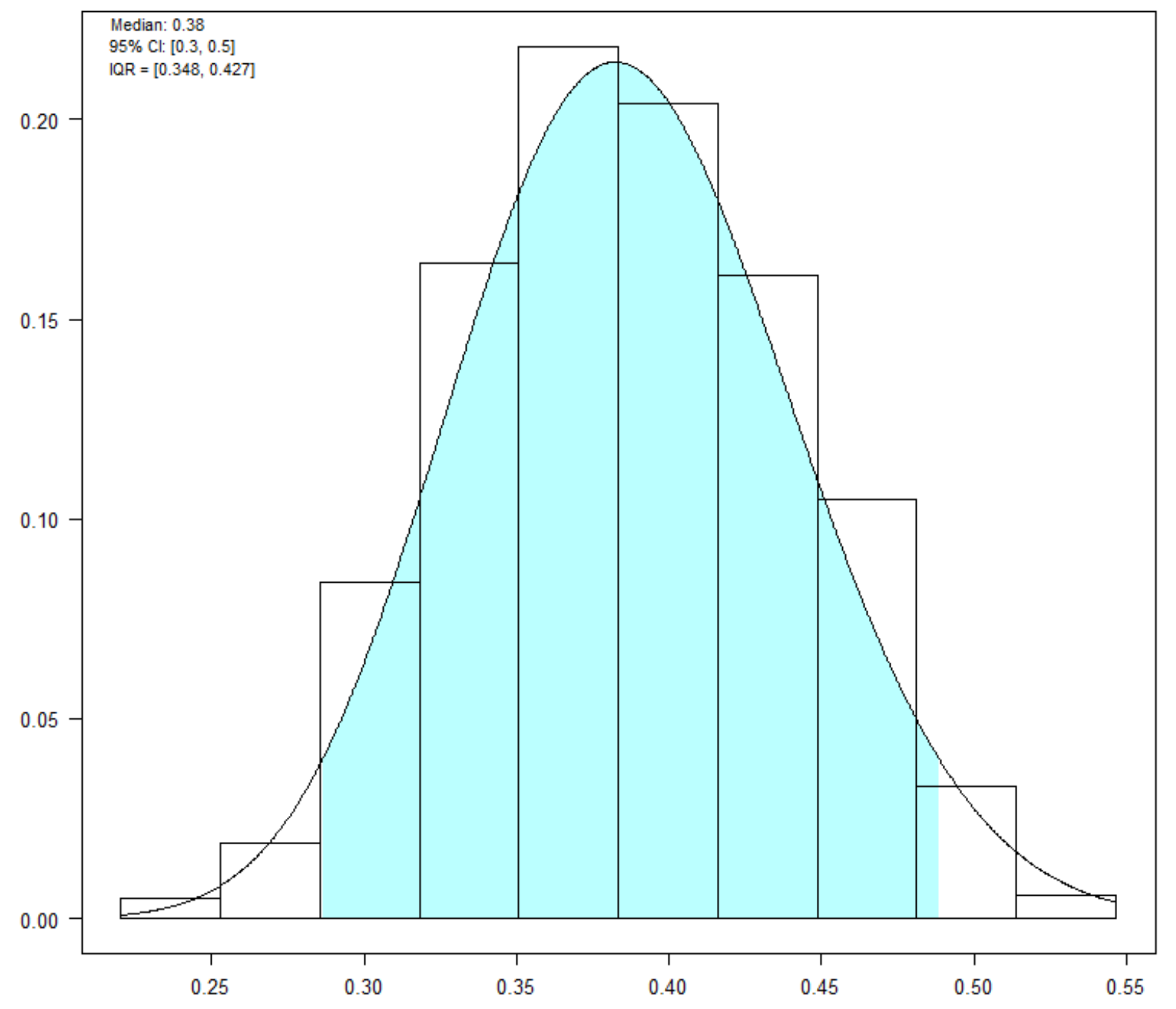


Figure 2. GenEst detection probability, 95% confidence intervals, and interquartile range for PCM efforts at a north Texas wind energy site from May through October 2023. Searches were conducted weekly at all operating turbines.

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References: 1 – J.C. Garvin, J.L. Simonis, and J. L. Taylor. 2024. Does size matter? Investigation of the effect of wind turbine size on bird and bat mortality. Biological Conservation 291:110474.
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