Illuminating Firefly Ecology: Insights for Estimating Abundance

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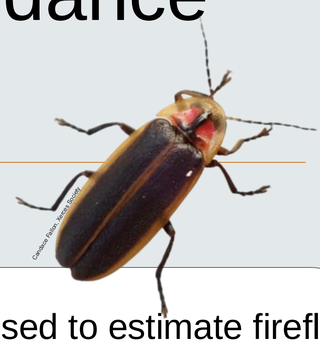


MOTIVATION

- The Southwest spring firefly(*Bicellonycha wickershamorum*) and Southwest synchronous firefly (*Photinus knulli*) are vulnerable to extinction.
- Abundance estimates are vital for assessing population status and trends.
- When surveying, counts can be an unreliable gauge of true abundance since observers don't detect all individuals that are present.
- Distance sampling, which has never before been used for fireflies, records the distance from observer to organism to correct abundance estimates for individuals present but overlooked during surveys.

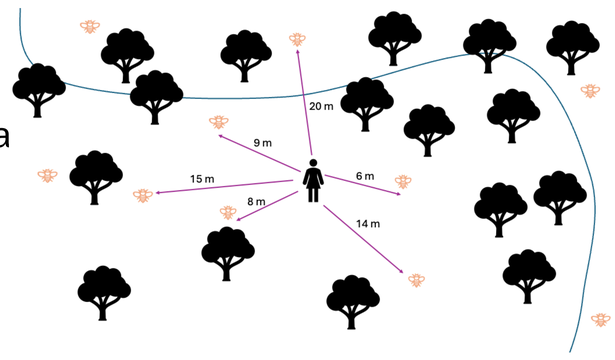
QUESTIONS

- Can distance sampling be used to estimate firefly abundance?
- Can distance sampling inform both habitat use and distribution of fireflies?
- Are both these firefly species present on the Patagonia-Sonoita Creek Preserve?

APPROACH

Study Area & Season

- Patagonia-Sonoita Creek Preserve in southern Arizona
- 10 random survey points
- June - August 2024
- Surveyed each point weekly

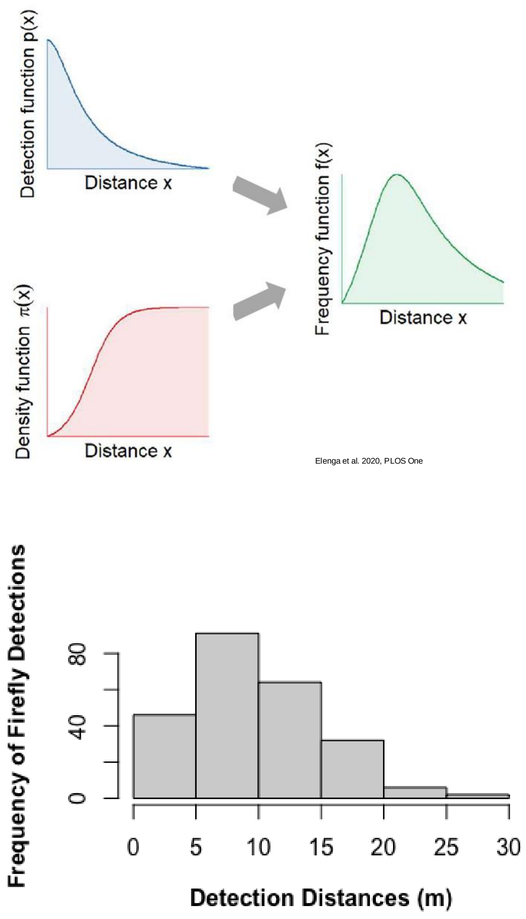


Surveys

- Single observer for all surveys
- Five, 1-min surveys during each visit
- Distance measured to firefly using night-vision rangefinder
- Recorded habitat, weather, and light conditions

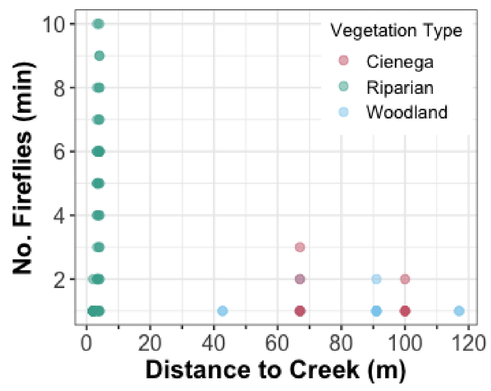
FINDINGS

Can distance sampling be used to estimate firefly abundance?

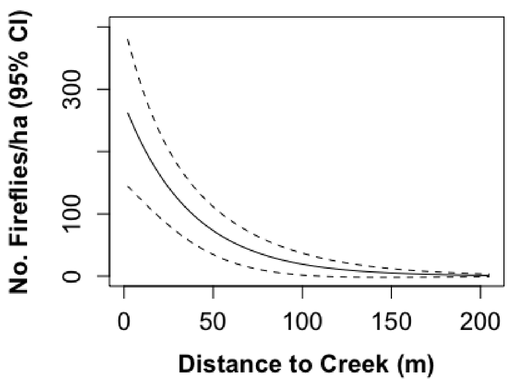


- Our results indicate that abundance estimates for the Southwest spring firefly can be corrected for imperfect detection.

Can distance sampling inform both habitat use and distribution of fireflies?

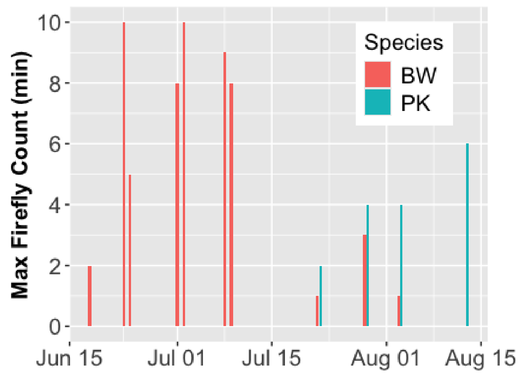


- Significantly fewer fireflies were detected in the Cienega (wetland), despite the presence of perennially moist soils.

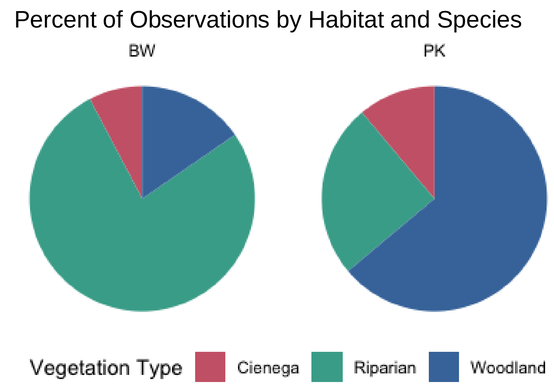


- Abundance was highest near Sonoita Creek and decreased moving from away from the creek.

Are both these firefly species present on the Patagonia-Sonoita Creek Preserve?



- Documented first co-occurrence of Southwest synchronous (PK) and Southwest spring firefly (BW).



- Species overlap in space and time.

NEXT STEPS

- Assess habitat needs by identifying key habitat features driving abundance.
- Expand data collection to more sites to generate broader-scale estimates of abundance.
- Determine the geographic range of the species with the help of volunteers.

Want to help? Reach out!

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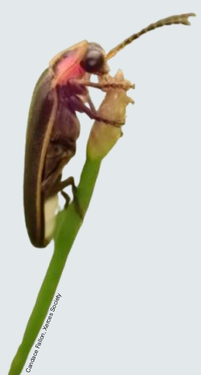

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