



HITTING THE SWEET SPOT: OPTIMIZING CAMERA TRAPPING EFFORT FOR ESTIMATING AVIAN AND MAMMALIAN BIODIVERSITY IN COASTAL ENVIRONMENTS



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INTRODUCTION

- **Trail cameras** are an effective wildlife research tool allowing for long-term surveys and increase ability to detect cryptic species.
- One common question is how much sampling effort is required to accurately detect the whole range of species present.
- Saltmarshes are rapidly shrinking driven by climatic and anthropogenic stressors, and we need to better understand the role of coastal shorelines as wildlife habitat.
- 10 plots across Hampton Roads, Virginia (Fig 1) were monitored to determine the optimum sampling effort needed for answering questions of biodiversity and richness of bird and mammal saltmarsh communities.

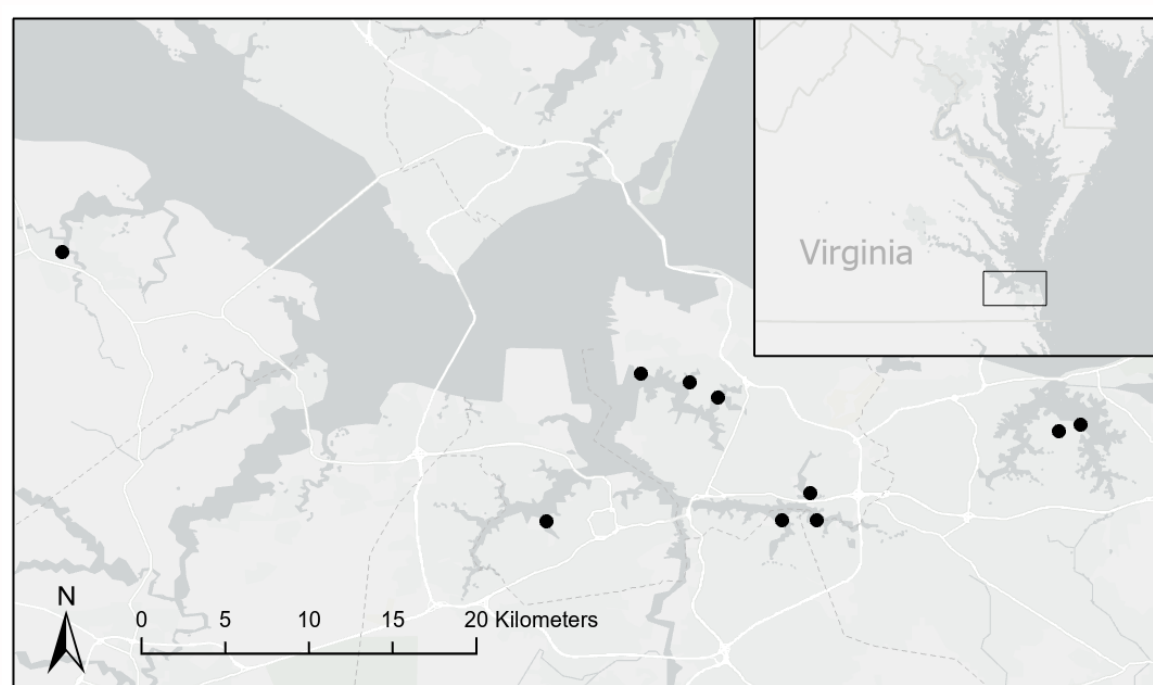


Figure 1. Location of study sites in southeastern Virginia

METHODS

- Cameras collected data along saltmarsh shorelines ~2 weeks per month from May 2022 to Jan 2023, 24 hours per day, taking one photo per minute.
- Photos were examined for all bird and mammal activity.
- All animals observed were identified to species level.

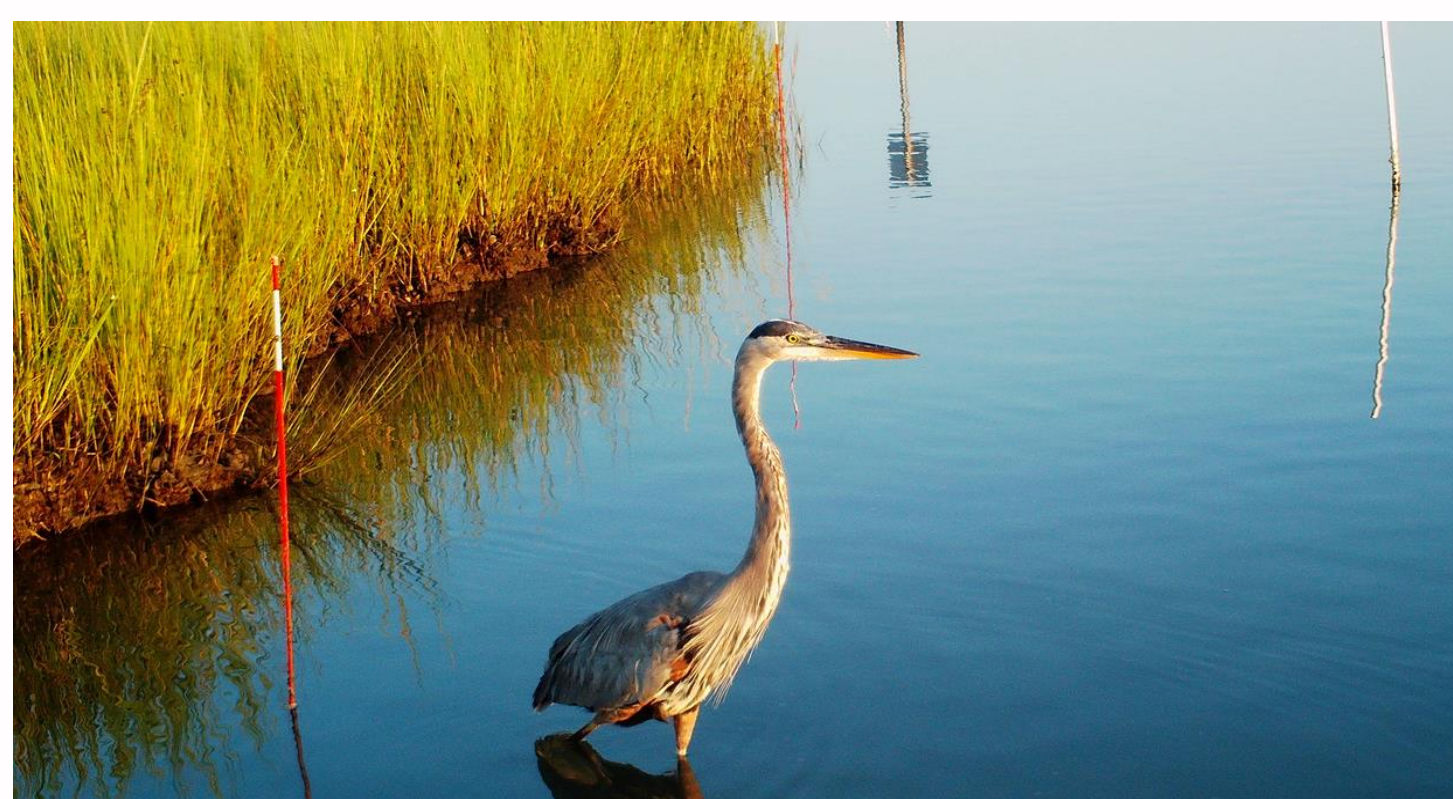


Figure 2. Great Blue Heron



Figure 3. Group of Raccoons

ANALYSIS

- We built **rarefaction curves** to show the relationship between sampling effort and observed number of species at each site.
- For each site, curve parameters were estimated permutationally to calculate a mean number of species across time (i.e., 1440 images per day; Fig 4).
- The algorithm was implemented in R version 4.2.3.

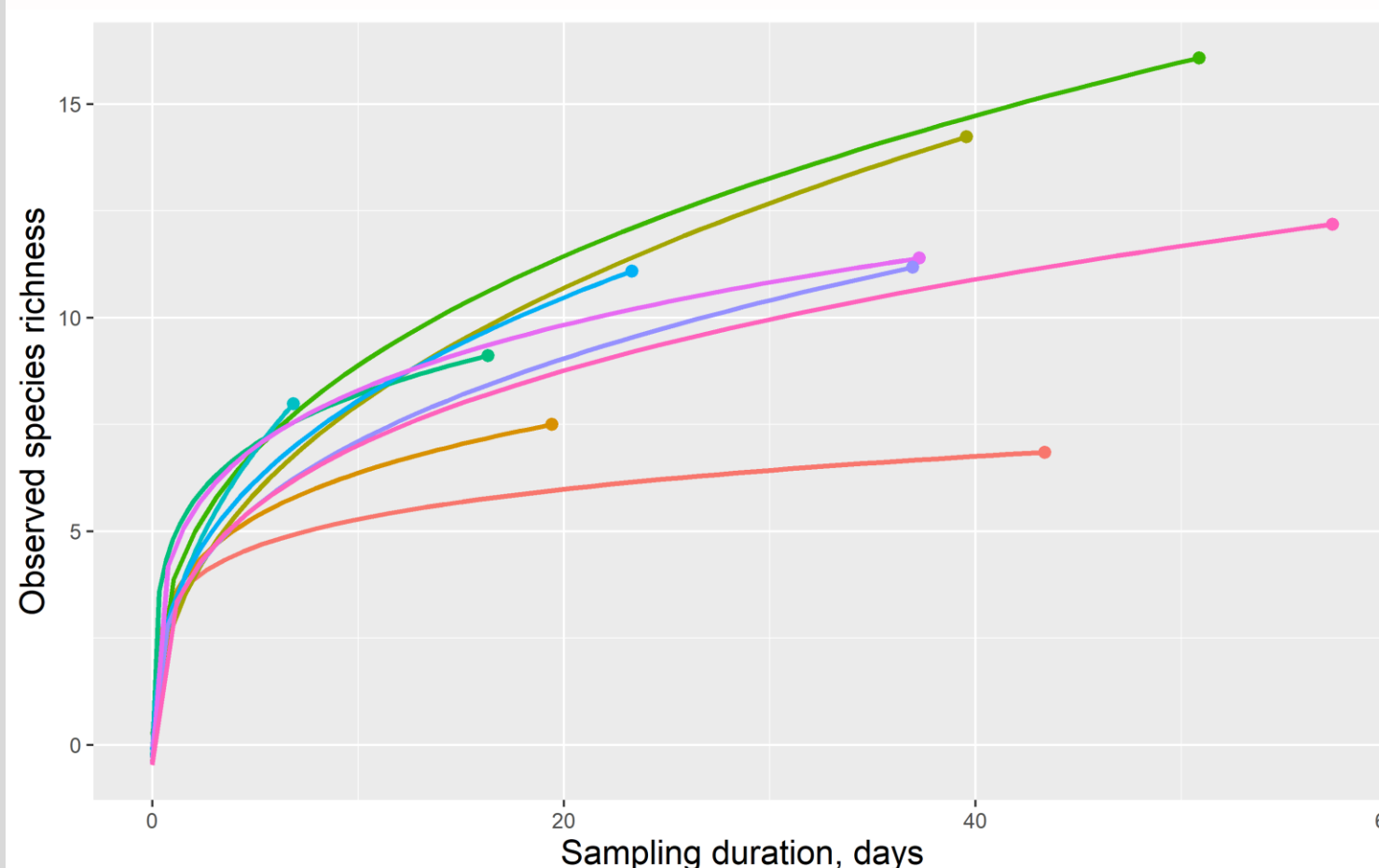


Figure 4. Site-based rarefaction curves of species richness accumulation. Note differences in sampling duration across sites because of camera failures and yet-to-be analyzed data.

RESULTS

- 25 different species found across all sites (Table 1).
- Species richness averaged **10.6** (± 2.17) across all sites
- The optimum sampling effort needed to achieve 90% detection across all sites is **39.6** (95% CI from 6 to 73) camera-days.

Common Name	Common Name
Birds	
American Crow	Mallard
American Robin	Northern Cardinal
Bald Eagle	Pied-billed Grebe
Belted Kingfisher	Red-throated Loon
Canada Goose	Spotted Sandpiper
Common Loon	Yellow-crowned Night Heron
Double-crested cormorant	Mammals
Eastern Bluebird	American Mink
Eastern Cottontail	Eastern Gray Squirrel
Great Blue Heron	Muskrat
Great Egret	Nutria
Green Heron	Raccoon
Laughing Gull	White-tailed Deer

Table 1. Full species list of the observed animals



Scan to see what we saw!

DISCUSSION

- Our findings suggest that camera traps are an effective technique in coastal environments when targeting medium to large terrestrial vertebrates like wading birds and mammals.
- Traditional visual field surveys may still be needed for small, fast-moving organisms that were not detected by cameras, including reptiles and aquatic mammals.
- These results have broader implications for coastal restoration and have the potential to inform monitoring research methodology and design.

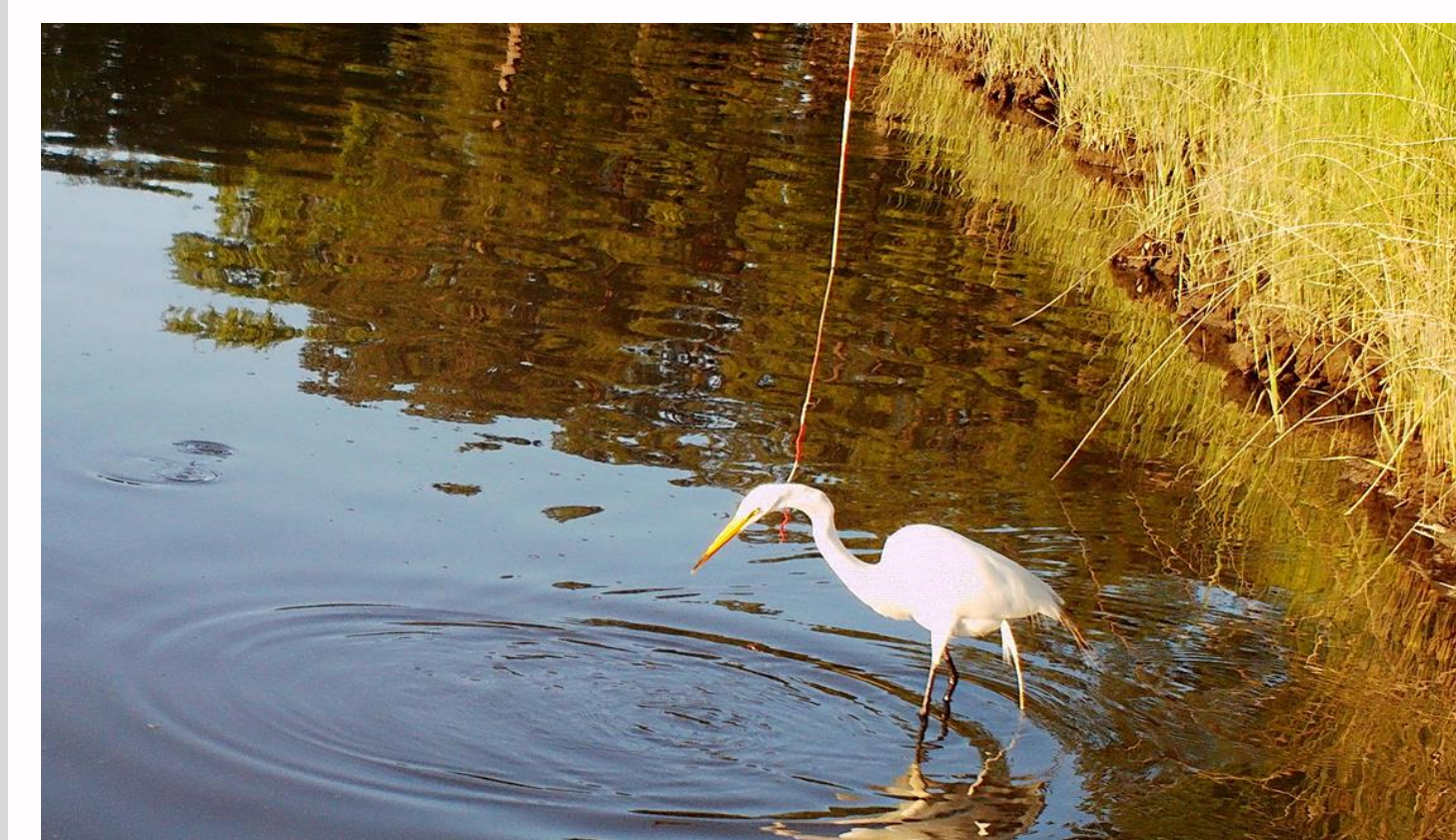


Figure 5. Great Egret



ACKNOWLEDGEMENTS

HRSD
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