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Spatial Analysis of Nest Productivity and Predation in Prothonotary Warblers

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BACKGROUND

- A Prothonotary Warbler is a migratory songbird that breeds in the Eastern US and overwinters in Central and S. America.

- Prothonotaries are secondary cavity nesters, meaning they take advantage of hollows that they do not create on their own. They prefer to nest over water, as it reduces predation risk.

- In the past nest productivity and predation has been analyzed assuming that observations are independent from each other in space

- In larger ecological systems, there can be spatial autocorrelation whereby data collected in nearby areas are not independent of one another which violates the assumption of most statistical tests

OBJECTIVES

- We investigated whether Prothonotary Warbler nest productivity and nest predation are spatially autocorrelated at Deep Bottom Park along the lower James River, VA.

- We analyzed spatial autocorrelation for two main reasons:
    1. To eliminate error, accounting for a possible nuisance variable that could give false positives.
    2. To better understand the spatial structure of the nest boxes at Deep Bottom Park.

Fig. 1 Total number of young fledged At 57 nest boxes at Deep Bottom Park from 2009-2013.

Total Fledged
- 0 - 4
- 5 - 24
- 25 - 32
- 33 - 42

CONCLUSIONS

- Because neither nest success or predation is spatially autocorrelated, our observations are independent from each other in space.

- Spatial variables are not driving nest success or predation and individual bird quality is likely the main driver for these differences.

- This is most likely because of the relative similarity of habitats at the nest boxes as well as the limited size of the site.

- Future studies could compare boxes over land vs. boxes placed over water or at a larger continuous nest site.

ACKNOWLEDGEMENTS

METHODS AND RESULTS

- Nest success and predation were monitored at 57 different nest boxes at Deep Bottom Park over a period of four years (2009-2013).

- Spatial Autocorrelation (Moran's I) was run using ArcGIS version 10.2.1, and points were projected using World Geodetic System (WGS) 1984 coordinates.

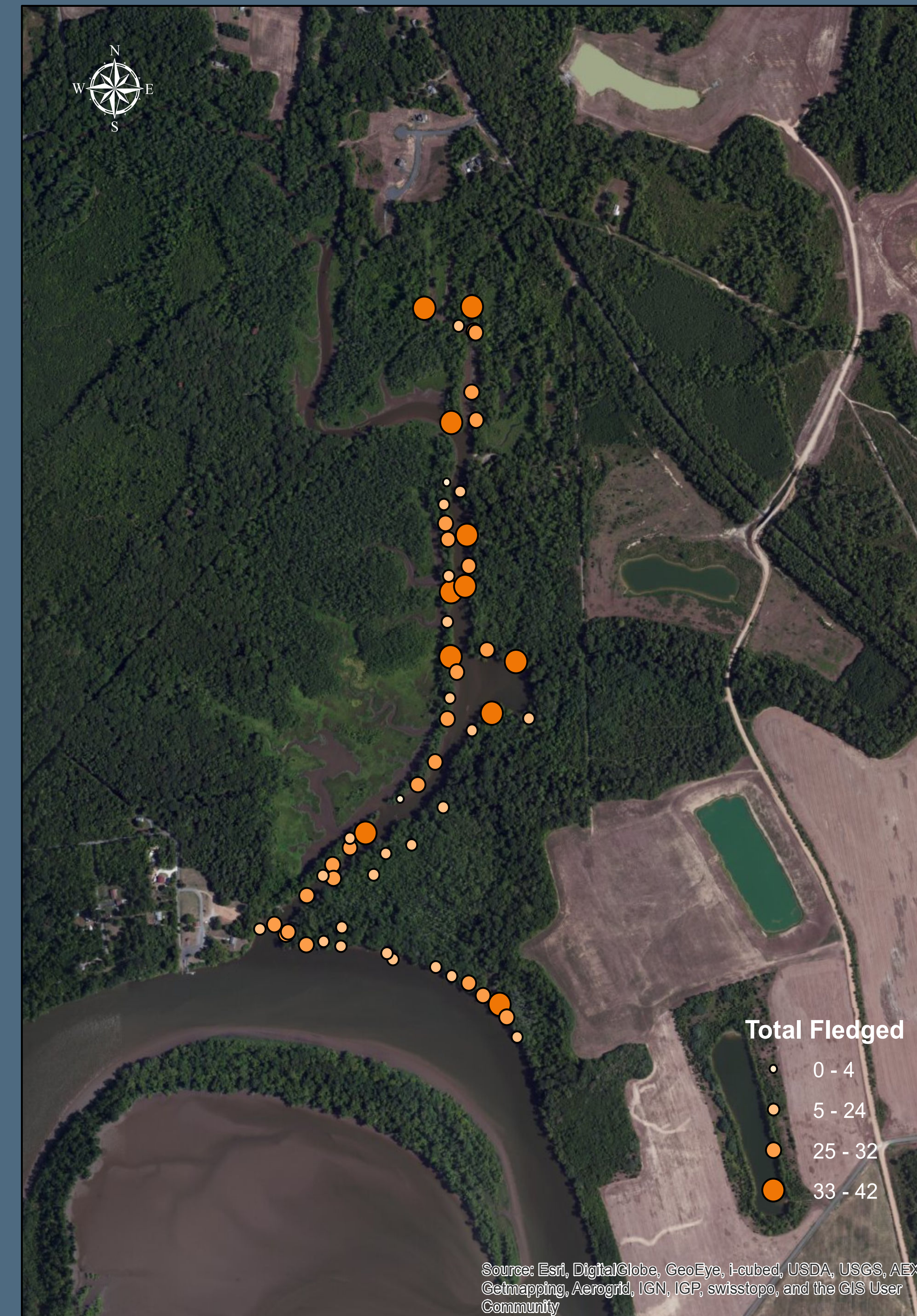- Nest success (total number of young fledged) (p value =.345) and predation (p =value.768) were found to be not spatially auto correlated.