Participatory citizen science data complements agency-collected data for species inventories of state parks

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Introduction

- The **Florida Department of Environmental Protection (FDEP)** is a state agency that oversees 175 **state parks** and trails across 6 regulatory districts in the state of Florida.
- To best manage lands, FDEP creates **Management Plans** for parks that are updated every 10 years.
- Each district has a presence-only **species list** for parks based on cumulative findings of agency-conducted species inventories.
- We examined how species lists created by FDEP for 39 parks compare to the lists of species in each park generated by citizen science observations from **iNaturalist** and **eBird**.

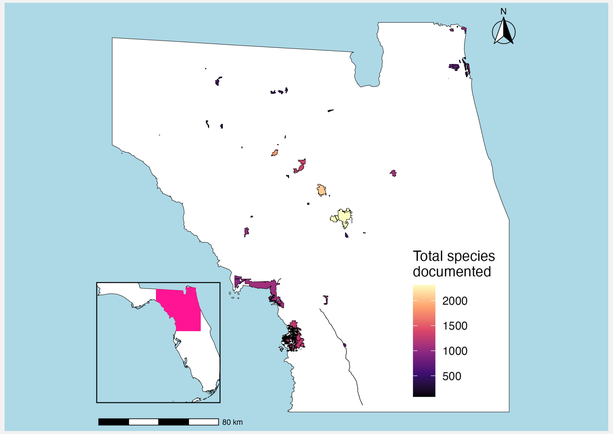

Figure 1. Map of 39 parks in Florida managed by FDEP in regulatory District 2. Parks are colored by the total number of unique species documented by citizen science and FDEP combined.

Methods

- Obtained FDEP District 2 species list with inventories of 39 parks.
- Created 'Citizen Science' species lists for each park based on 'Research Grade' iNaturalist observations and eBird observations.
- Performed taxonomic harmonization of FDEP data with iNaturalist taxonomy using the taxize package in R and manual correction.

Research Questions

1. **Can citizen science data be used in conjunction with state agency data to create more complete species inventories in state parks?**
2. **Are there any types of species/taxa that citizen science and/or state agency data favor?**
3. **What park qualities lead to differences in the contents of citizen science species inventories and state agency species inventories?**

Results

5,454 species across all 39 parks

3,948 species recorded by FDEP

3,540 species recorded by the citizen scientists

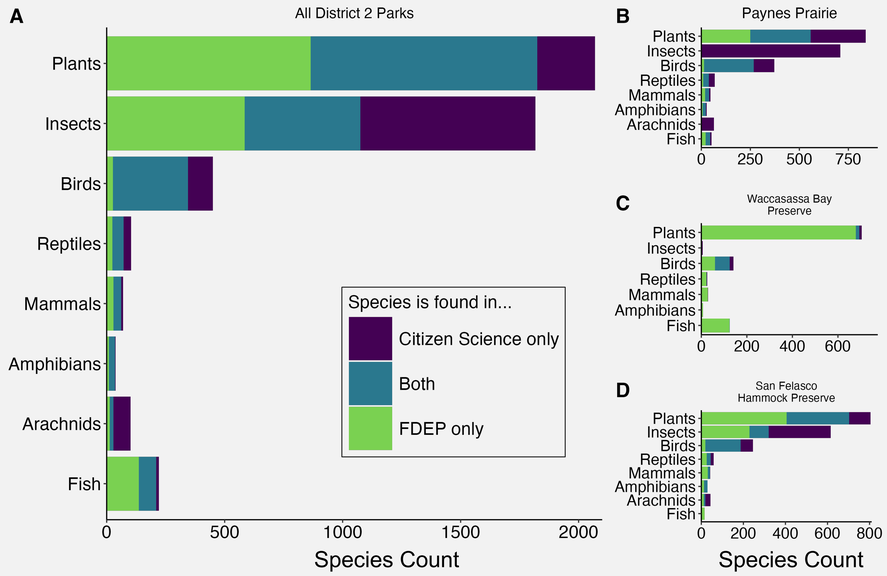

Figure 2. Across all 39 parks, citizen science data adds novel species of plants, insects, and birds to the aggregated species list (A). The proportional contributions of citizen science data and FDEP data vary among individual parks (B,C,D).

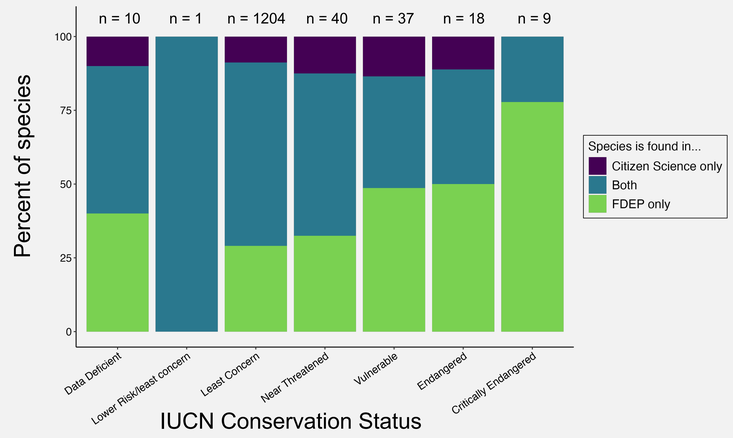

Figure 3. Across all 39 parks, 1,319 species have IUCN-reported conservation statuses, as shown in plot colored by data source. Notably, more than 4,000 species in parks have no IUCN status.

Discussion

- Citizen science data can improve the completeness of species lists in management plans without increasing the burden on state agencies.
- Citizen science data consistently provides otherwise undocumented species of insects and birds.
- We encourage the expansion of this research to include other parks/state-managed lands to further assess the value of citizen science in biodiverse species inventories.

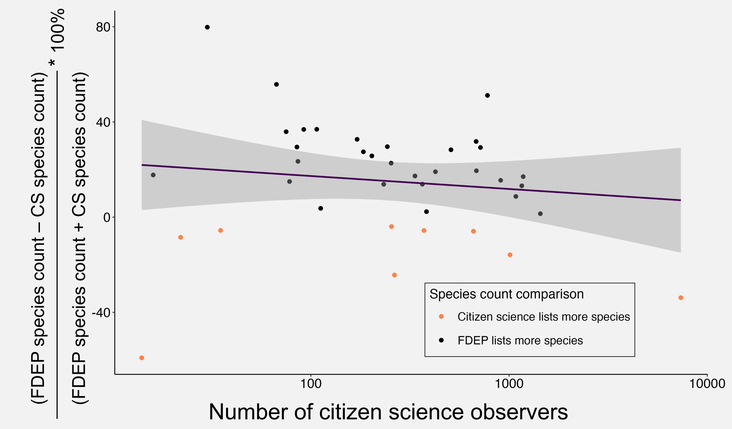

Figure 4. As the number of citizen science observers in each park increases, the proportional contribution of FDEP decreases compared to citizen science.