Citizen science's role in data monitoring of non-native herpetofauna in Florida

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Background

- Florida has a uniquely high number of non-native herpetofauna introductions due to its subtropical climate and close association with the exotic pet trade
- 1 in 3 non-native reptile and amphibian introductions become established
- Citizen science acts as a tool to supplement biodiversity data monitoring, but there is little comparison between their potential strengths, biases, and roles in species data collection
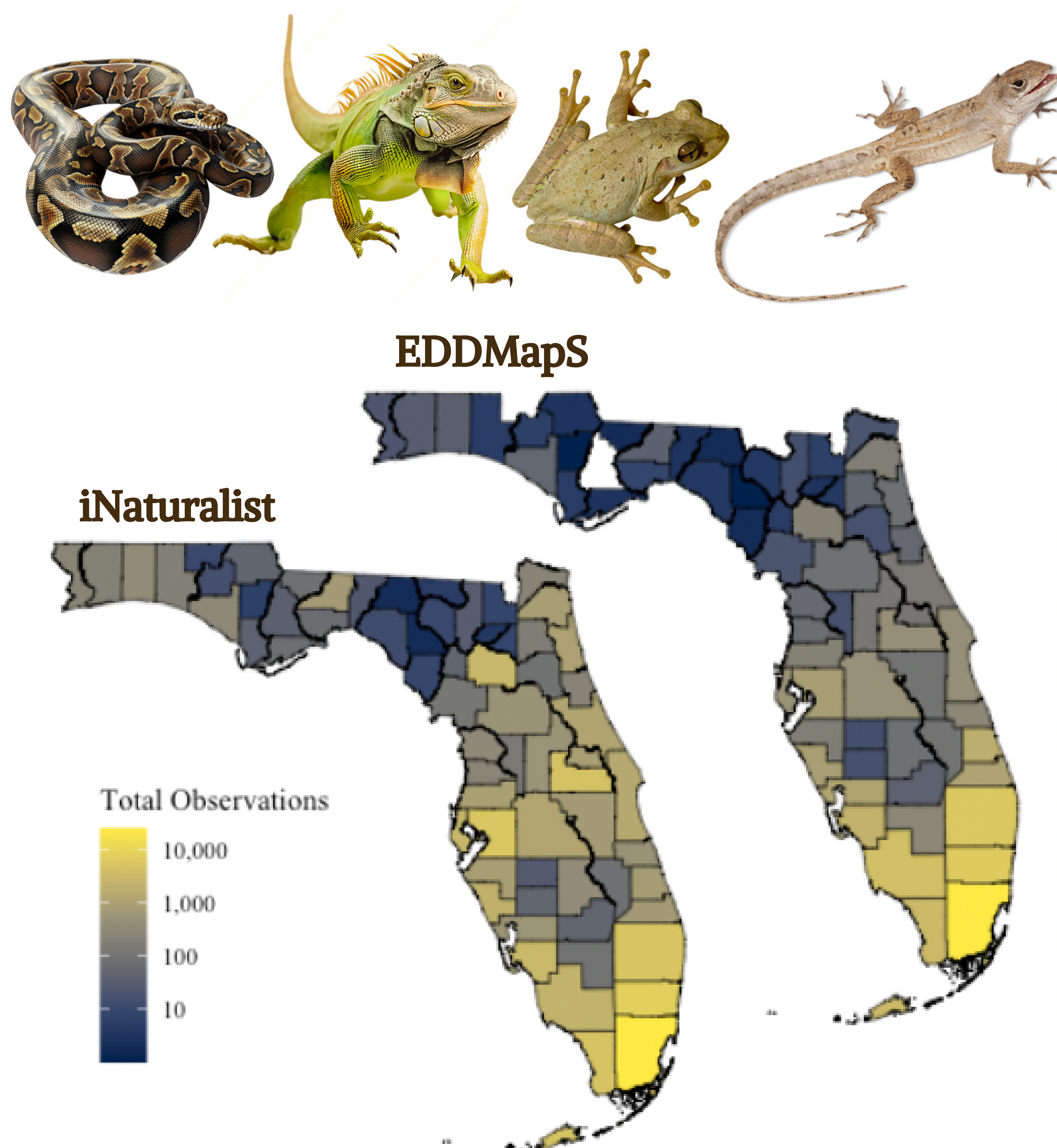
Figure 1. Non-native herpetofauna detections by Florida county from 2010 to 2024

KEY OBJECTIVE: Compare iNaturalist, a general biodiversity submission platform, and EDDMapS, a database created to collect specifically non-native species data.
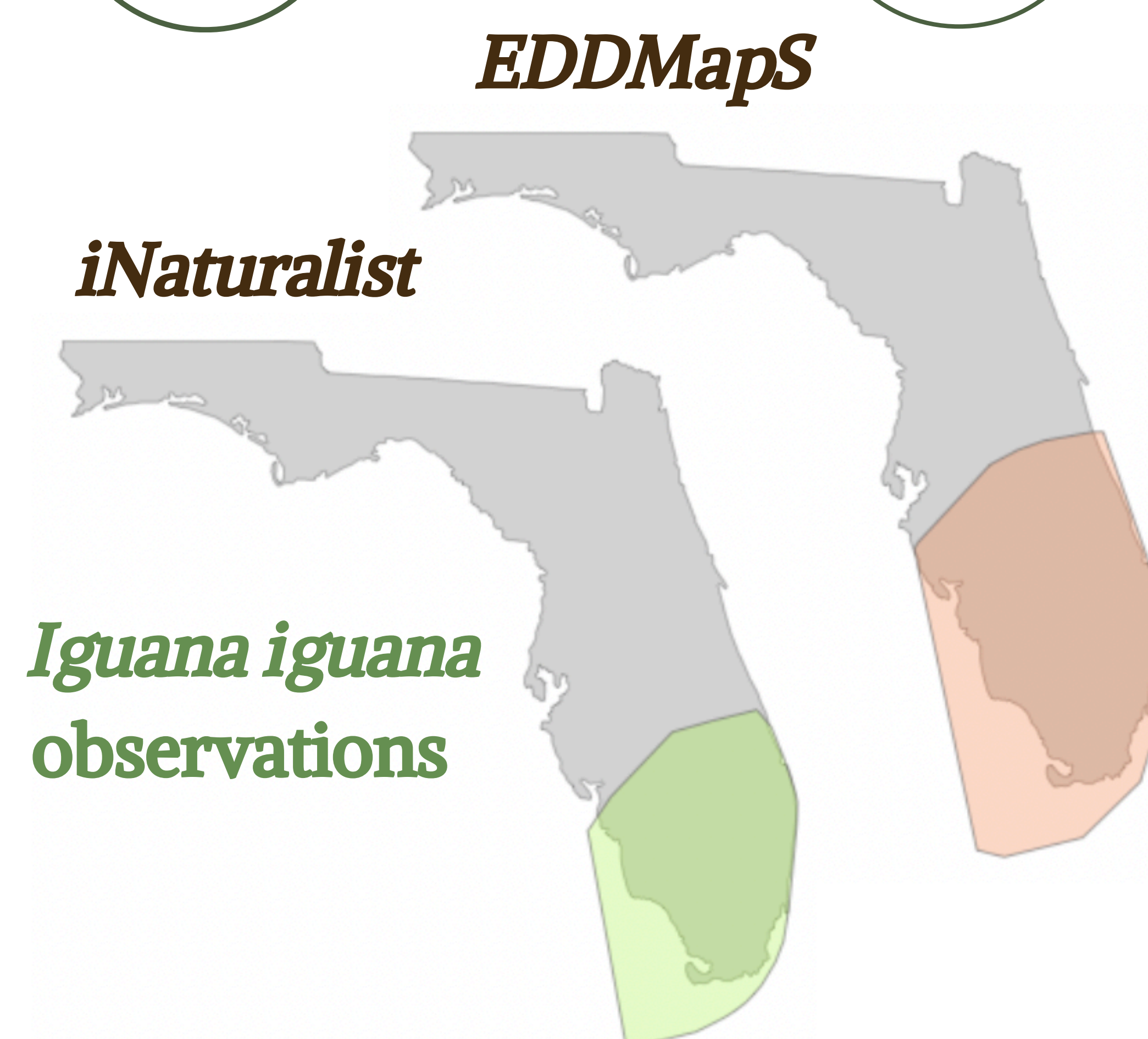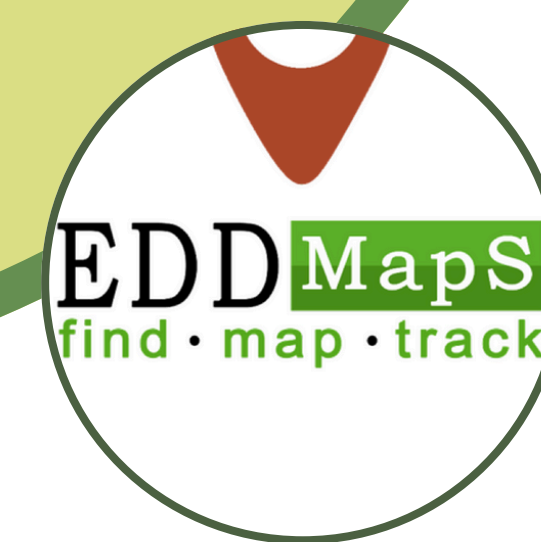
Figure 2. Minimum convex polygon (MCP) comparison of all observations by species

Methods

Contrast iNaturalist and EDDMapS from 2010 to 2024 with focus on:

- Data availability
- Urbanization bias (i.e., whether the platforms sampled the urbanization gradient to a similar degree)
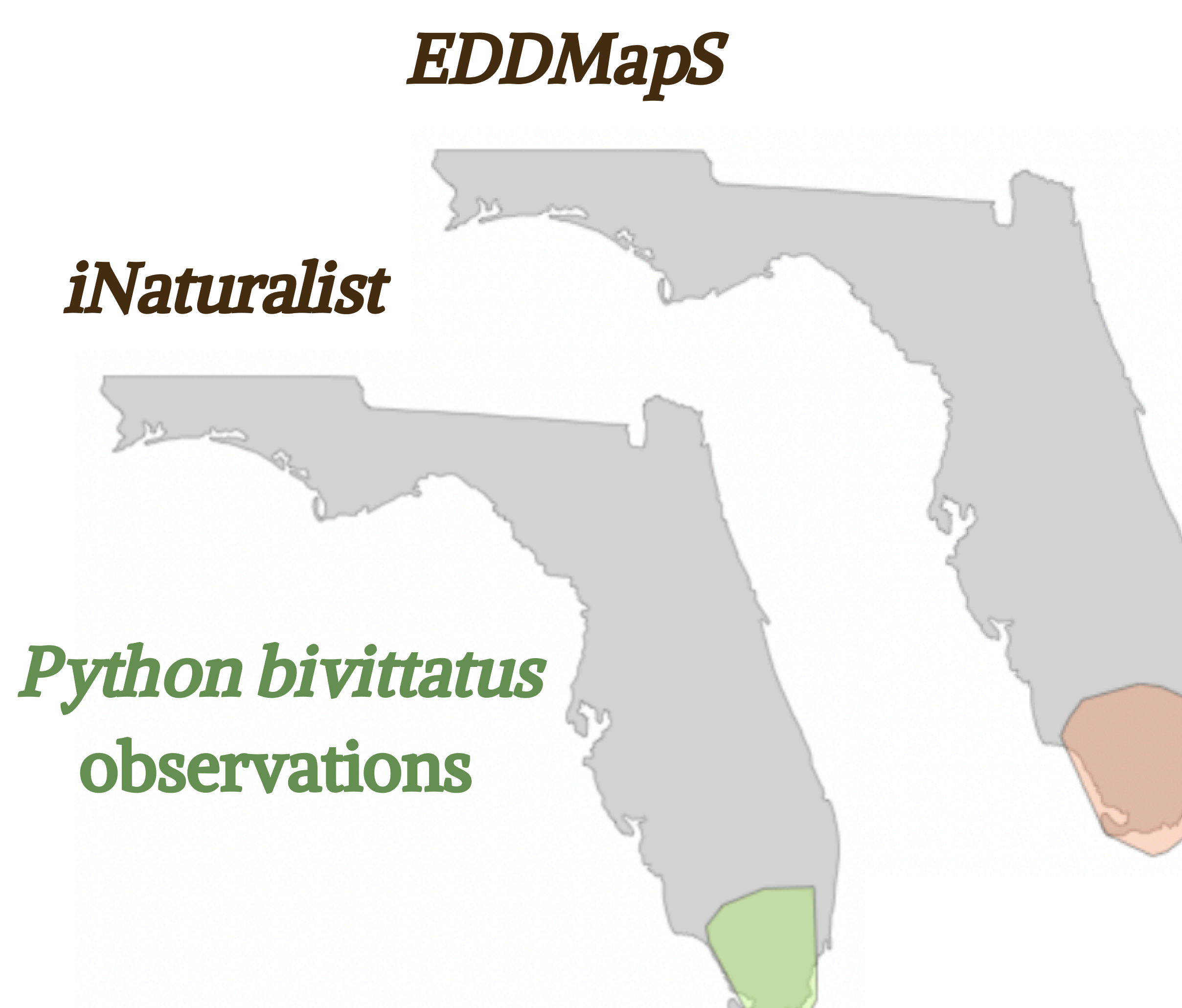- Recorded range size of species

Key Results

- Both platforms increase observations with urbanization intensity
- iNaturalist data is strongly concentrated in high density, urbanized areas, while EDDMapS has a broader spread of data across urbanization levels, with a lower average than iNaturalist
- There is no significant difference in range size between Eddmaps and iNaturalist, however there was a significant increase in the range size of herpetofauna over the 14 years, for both applications.

Discussion

These findings:

- Demonstrate the current use of citizen science in urban monitoring of non-native herpetofauna
- Emphasize the potential these applications have in mitigating urban invasions by this taxa
- Suggest that each platform serves a distinct role
  - iNaturalist → high-volume data, urban areas
  - EDDMapS → targeted data, less urban areas
- Emphasize the need to leverage both datasets to enhance early detection and mitigation strategies of urban invasions by non-native species.
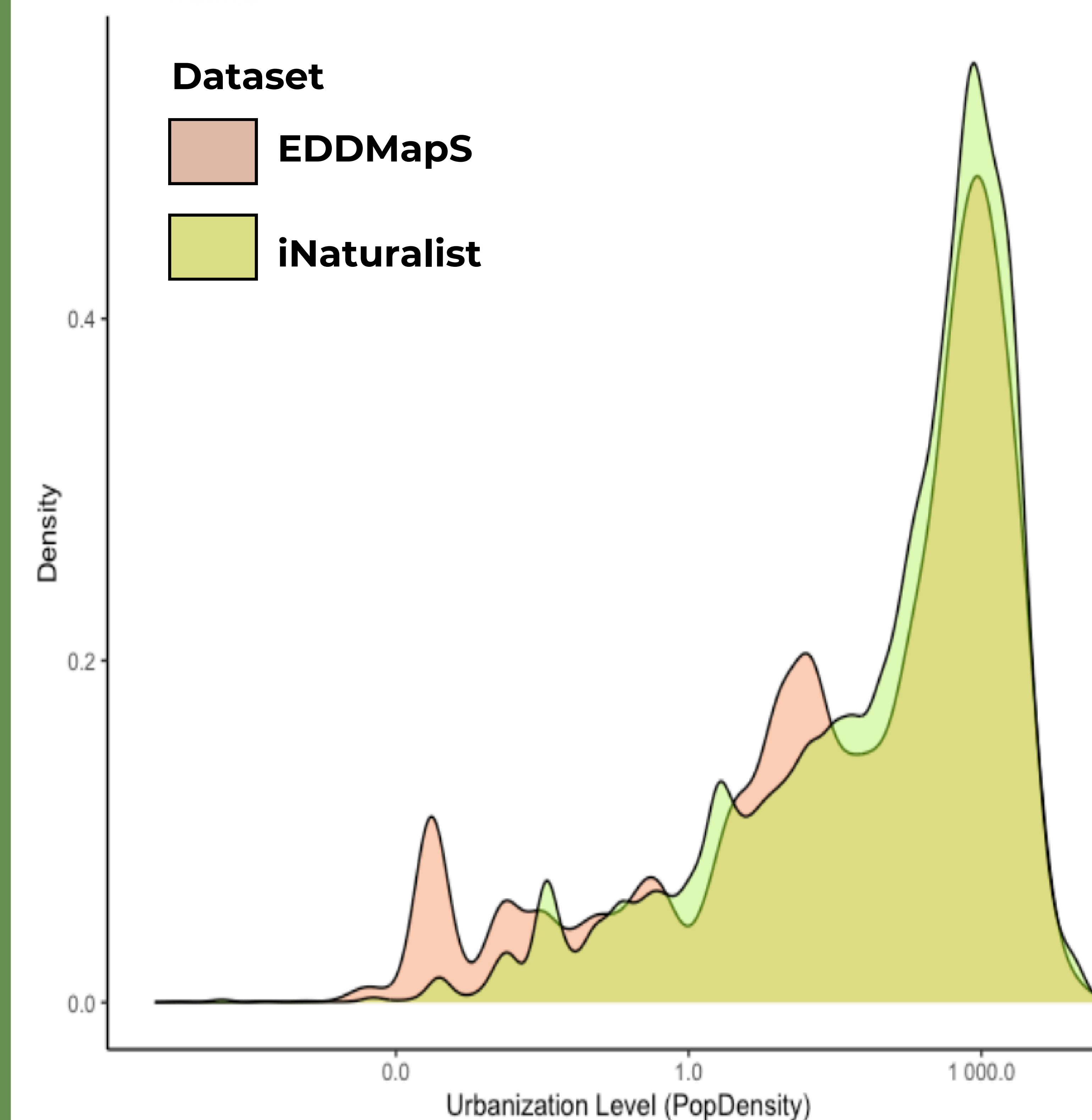
Figure 3. Density of observations as a function of urbanization intensity