The Real Weasels of Ohio: Where are They Now?

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Introduction

Weasels make up a key part of small mammal communities in North America, but have overwhelmingly been overlooked in research. Historic data and targeted survey efforts have largely been nonexistent due to their difficulty, leading to a gap in knowledge for researchers. With recent reports of population declines and possible range shifts for weasels across North America, we now seek to understand the current status and trajectories of these species despite lacking historical data (1, 2).

Here, we take the first steps towards targeted monitoring for three species of weasel in Ohio: the long-tailed (*Neogale frenata)*, short-tailed (*Mustela richardsonii*), and least (*Mustela nivalis*) weasel. Using integrated species distribution models, we leverage what limited data is available to develop distribution predictions for these species that can inform future monitoring efforts.

Objectives:

- Describe and map the potential spatial distributions of three species of weasel.
- Select priority monitoring locations for the future based on identified hotspots of occurrence for all three species.

Methods

1. Collected all available occurrence records for three species of weasel between 1981 and 2025.
   - **Presence-only data:** iNaturalist, GBIF, sightings reported to the Ohio Division of Wildlife.
   - **Presence-absence data:** Wildlife Insights camera traps.
2. Developed integrated species distribution models using the *intSDM* package in R (3).
   - Forest cover, elevation, and total average temperature included as spatial covariates.
3. Designated ODNR properties as high or low priority for surveying based on the combined predicted intensity for all three species.

Figure 1. The three weasel species of Ohio as seen on iNaturalist. Image credit: @smays, @carterdorscht, @a_ma_bird.

Results

Distribution Models:

- Higher predicted intensity (relative number of individuals) in northeastern Ohio for all three species (Fig. 2).
- **Long-tailed:** intensity increases from the west to the east, with minimal influence from individual habitat covariates.
- **Short-tailed:** intensity positively influenced by forest cover and negatively by average temperature.
- **Least:** intensity positively and almost exclusively influenced by elevation.

Survey Sites:

- Eastern Ohio properties show the highest combined probability of occurrence and would be ideal survey locations in the future (Fig. 3).
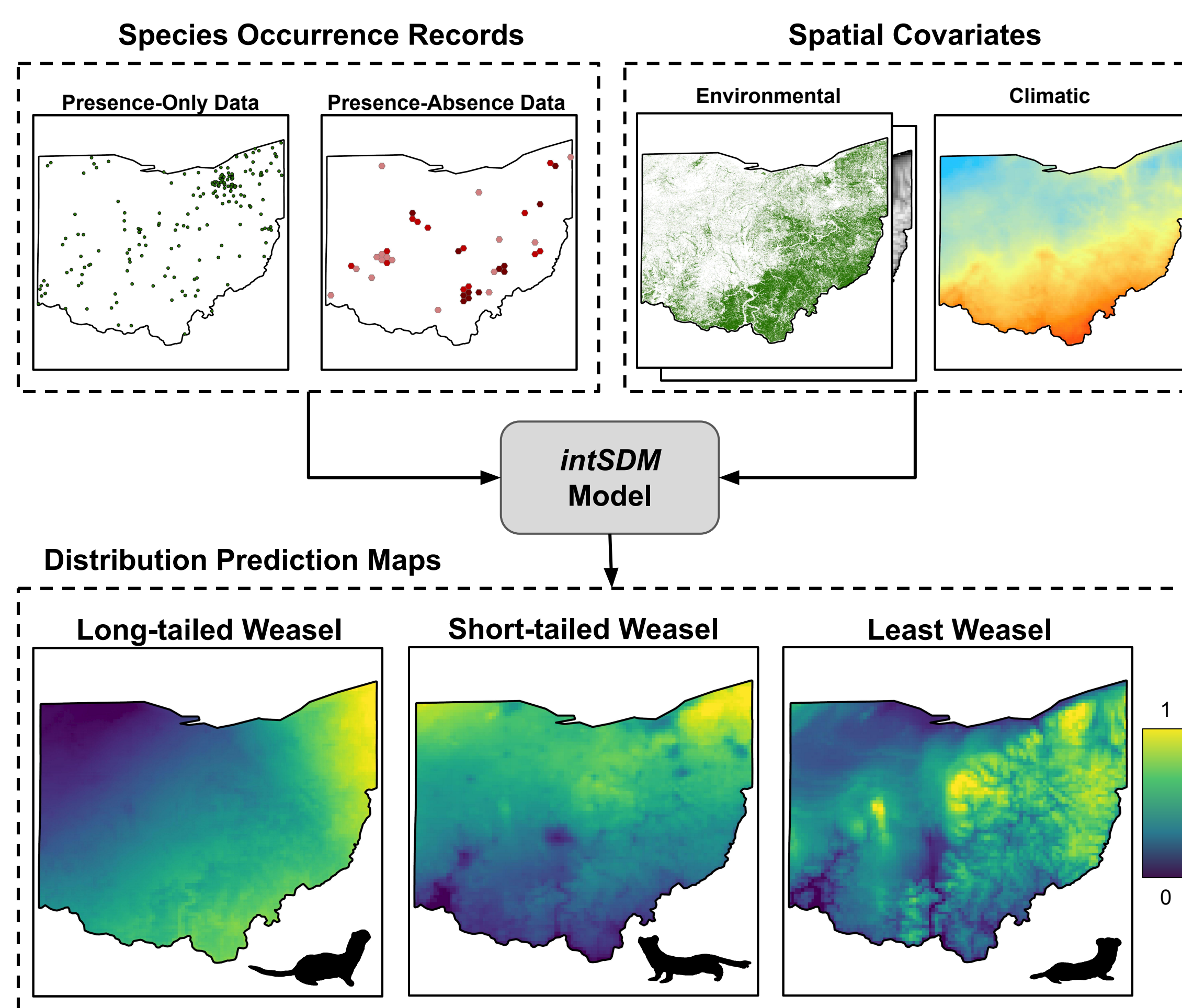

Figure 2. Species distribution model inputs (species occurrence data and covariates) and outputs (probability distribution maps). Probability distributions represented with normalized mean predicted intensity.
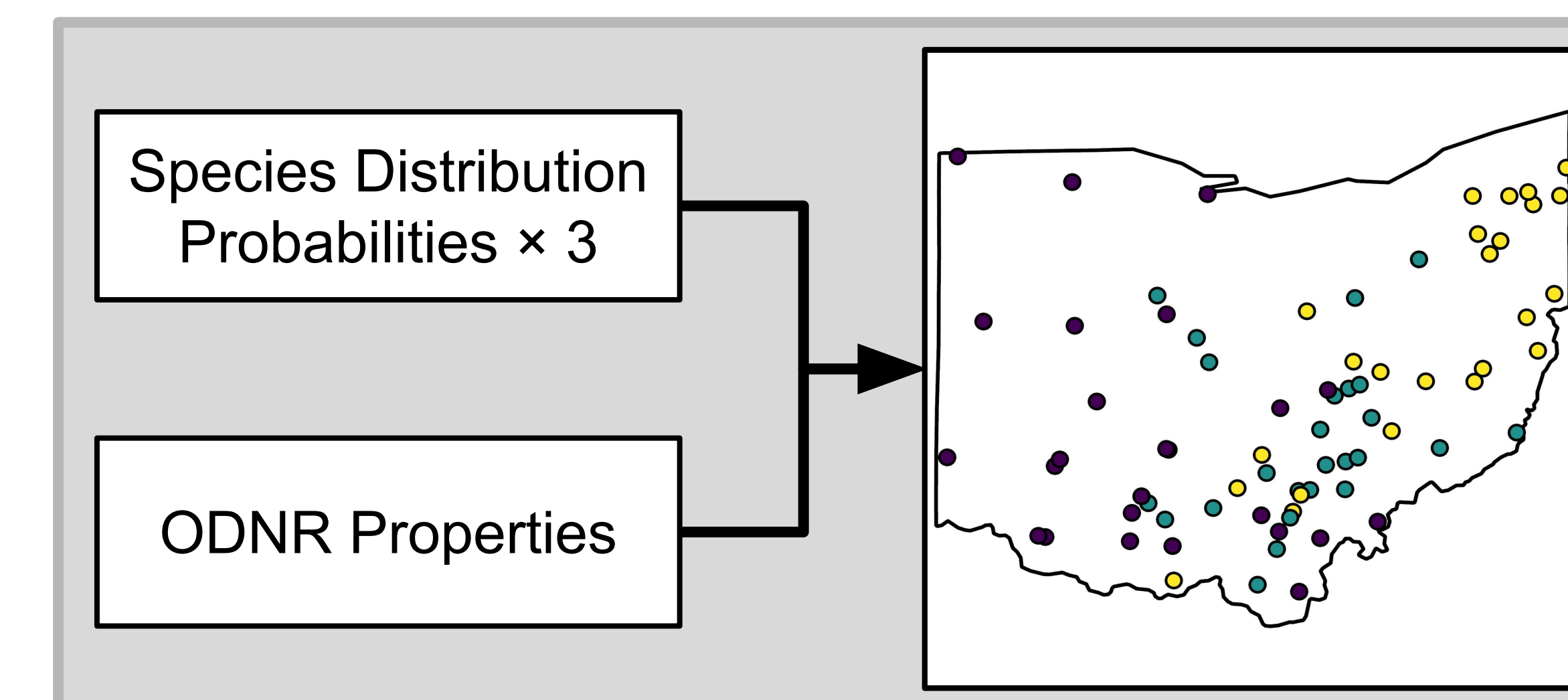

Figure 3. ODNR properties >10 km² in area with average predicted intensity across the site. Lighter colors represent higher predicted intensity.

Discussion

Our results indicate an overall higher presence of weasels in the eastern half of the state, particularly in the northeast. While this may be influenced by the large number of observations available around the Cleveland metro area, these results align well with previous efforts—which found similar distribution patterns within Ohio (1).

Historically targeted surveys have been limited by the elusive nature of weasels, which are often missed during field surveys and by typical camera traps. As such, we recommend the placement of AHDriFT (adapted-Hunt drift fence technique) cameras in sites with high combined intensity. This methodology is commonly deployed for small mammals and herpetofauna and has been found effective for capturing both weasels and their rodent prey (4).

Given the existence of a large scale AHDriFT project conducted by Cleveland Metroparks in the northeastern portion of the state, we recommend focusing additional survey efforts in southeastern Ohio, which has similar combined intensity to the northeast, but no large-scale focused efforts.

References

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