

# Snow cover dynamics as a key ecological filter for species distributions

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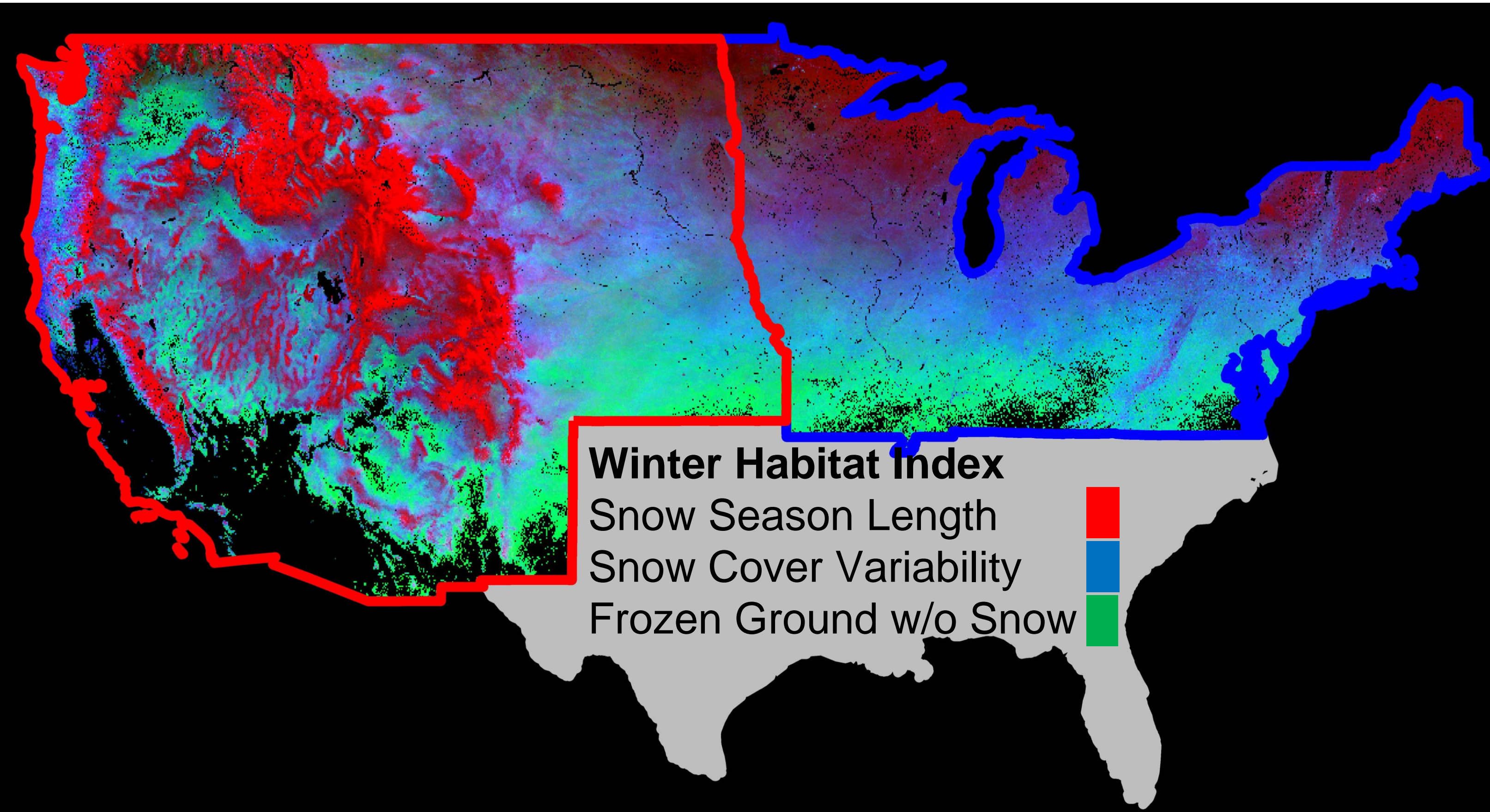
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## Background



- Snow cover is a major component of temperate ecosystems
- Snow cover dynamics have the capacity to structure species distributions through constraints on fitness
- Temperate species may respond in diverse ways to snow cover:

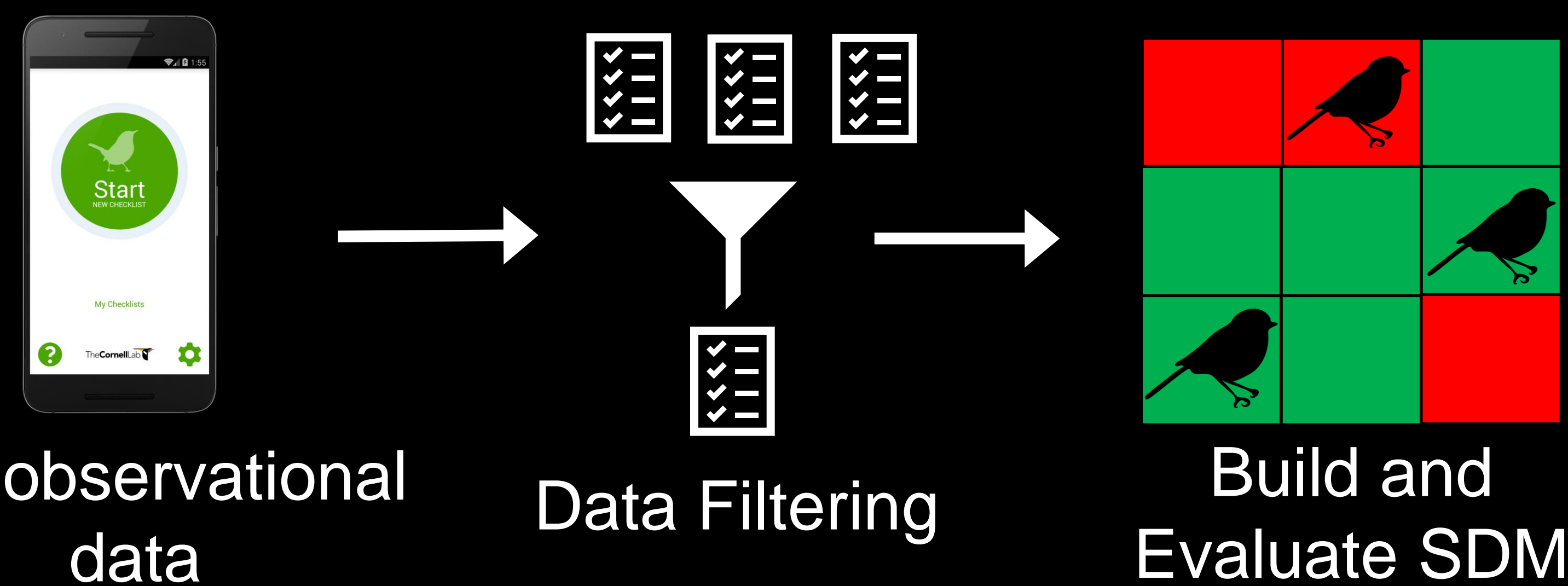


Spectrum of species responses to snow

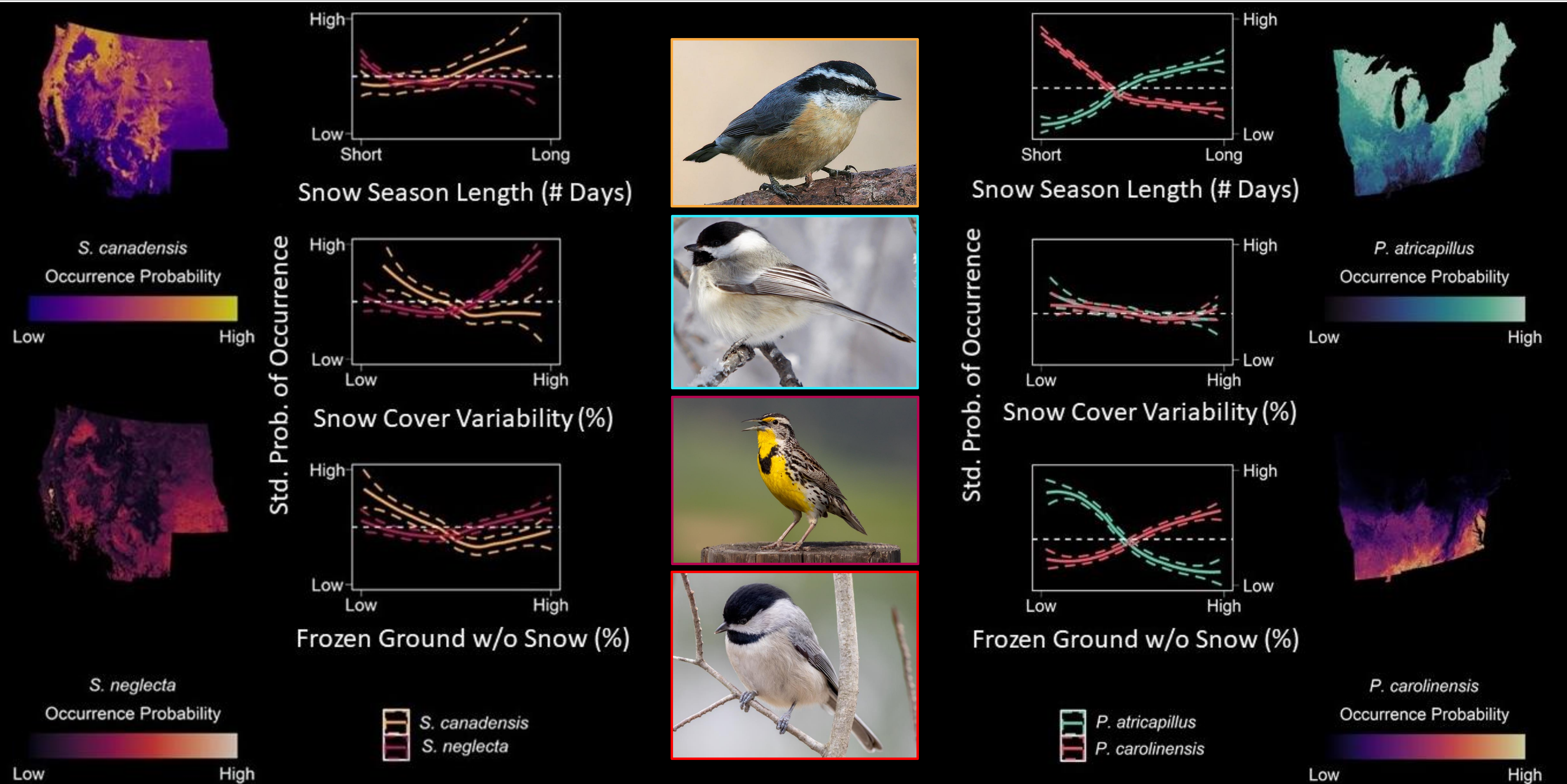
Selecting long, stable snow seasons

Selecting short, variable snow seasons

## eBird Winter SDM Workflow



## Winter-informed Species Distribution Models



Four exemplar species demonstrate unique responses to snow cover gradients with species that tolerate long, persistent snow seasons and others that avoid it. The four species depicted from top to bottom are: Red-breasted nuthatch, Black-capped chickadee, Western meadowlark, and Carolina chickadee.

## Snow Cover Drives Winter Bird Distributions



The magnitude and direction of the relationship between snow season length and species occurrence. Species shown had the strongest negative and positive responses to snow season length for the East (blue) and West (red).

- Snow cover dynamics are important for overwintering bird distributions
- Species-specific relationships capture ecologically meaningful relationships across species
- Integrating snow cover dynamics into species distributions will be critical for address SDG 15: Life on Land to effectively conserve winter biodiversity

