



# Land Cover and Area Influence Bird Biodiversity in Geographically Isolated Wetlands

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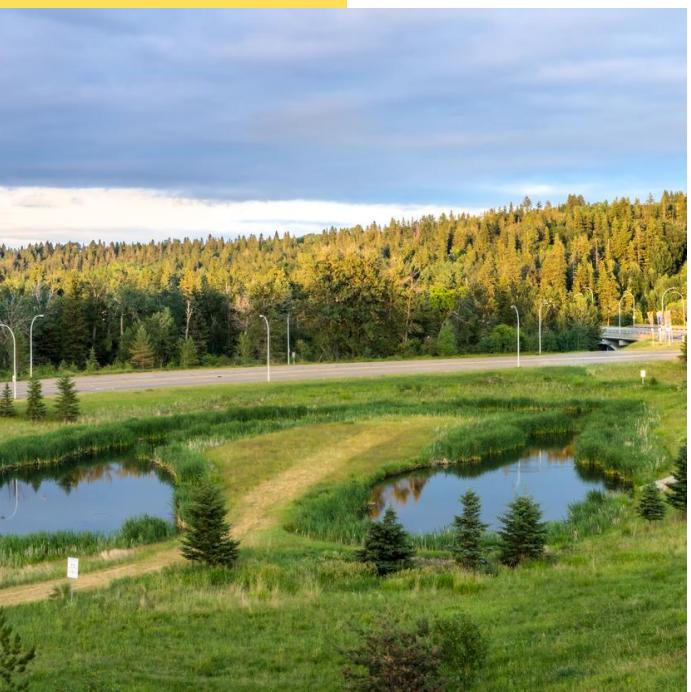
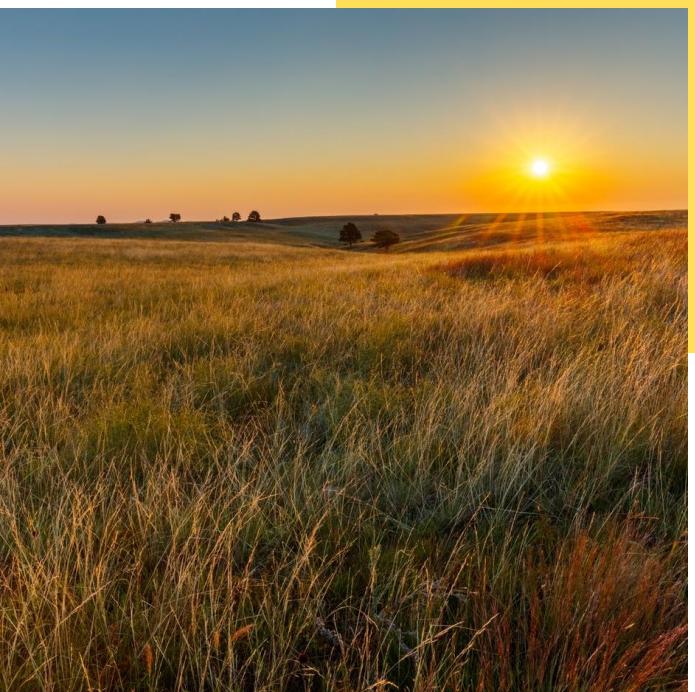
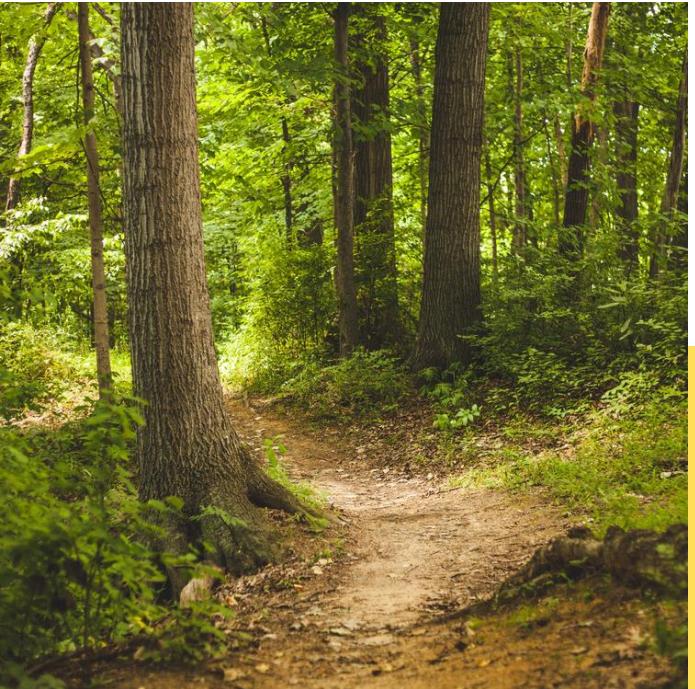


# What are Geographically Isolated Wetlands?

Wetlands with no surface water connection (at least part of the year)

- Characterized by: variable hydrology, vegetation, and area





# Where are they found?

- Hardwood forest; Prairie; Pine Savanna; and Cities
- Embedded in Habitat Mosaics, Across the U.S.
- Continental Distribution, with Variety [ie. Carolina Bays, Prairie Potholes, Vernal Pools, etc.]

# What do we know about Birds in Isolated Wetlands?

- Evidence species richness is higher in wetlands than surrounding uplands.

\*Barratt Heitmann et al. 2024, Riffel et al. 2006

- Species richness is higher in urban wetlands compared to rural ones.

(McKinney and Paton 2009)

- **But**, we don't know how these affect different functional groups of birds...





# How does land cover impact birds in these wetlands?

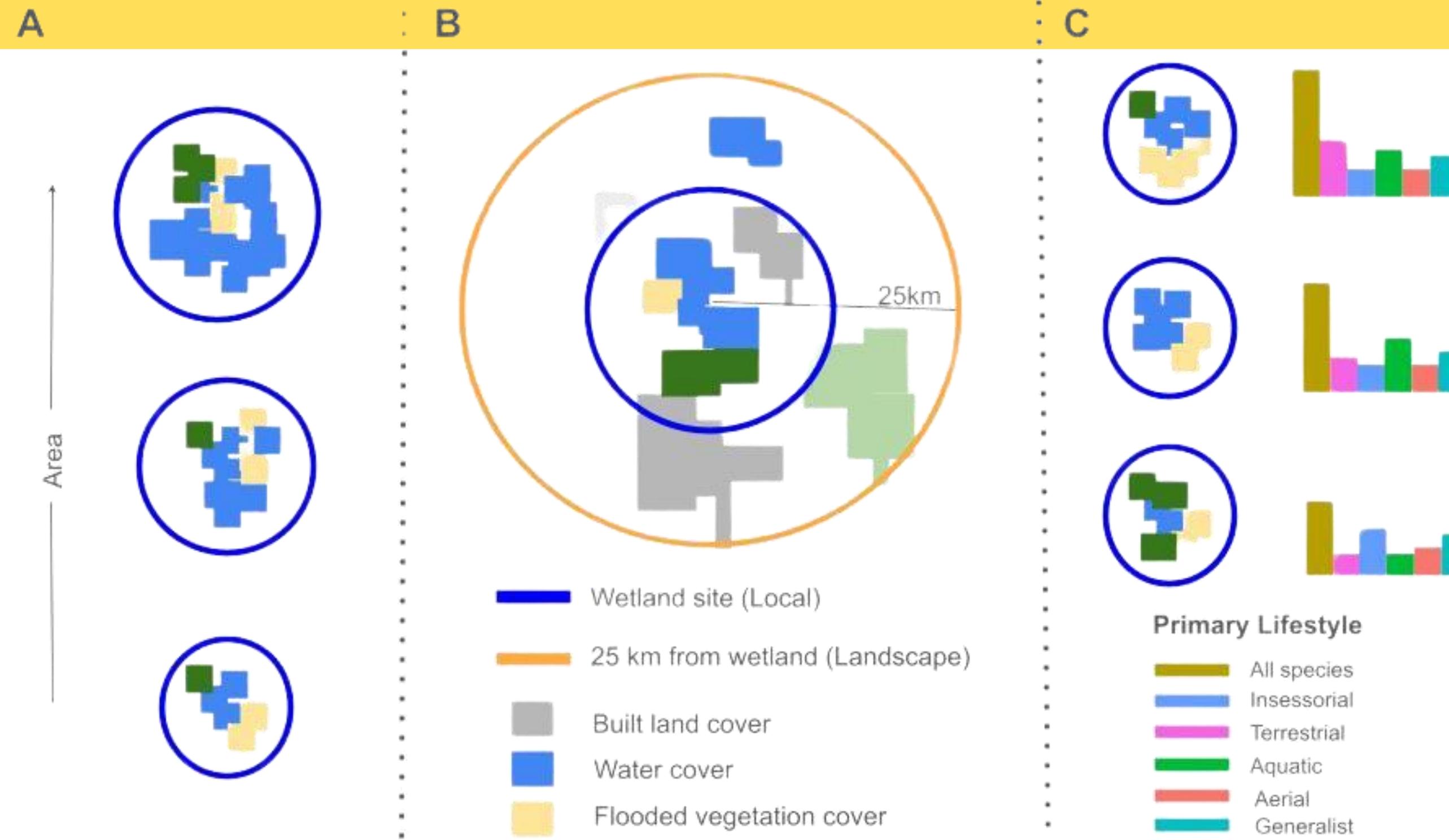
- Higher wetland area at the landscape scale (>3 km) supports higher bird biodiversity.

(Webb et al.  
2010)

- Higher flooded vegetation land cover supports higher bird biodiversity.

(Fairbairn and Dinsmore  
2001)

# The research gaps we aim to fill:

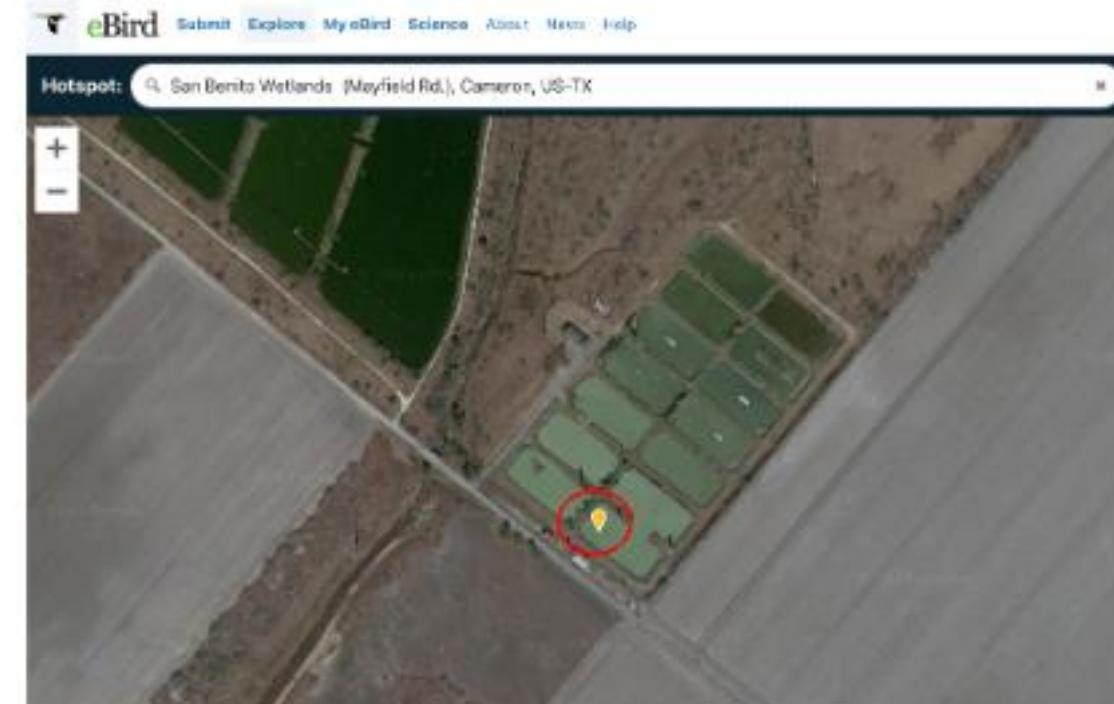


# Integrating 207 wetlands with eBird hotspots across the conterminous United States

eBird hotspot

San Benito Wetlands  
(L1673684)

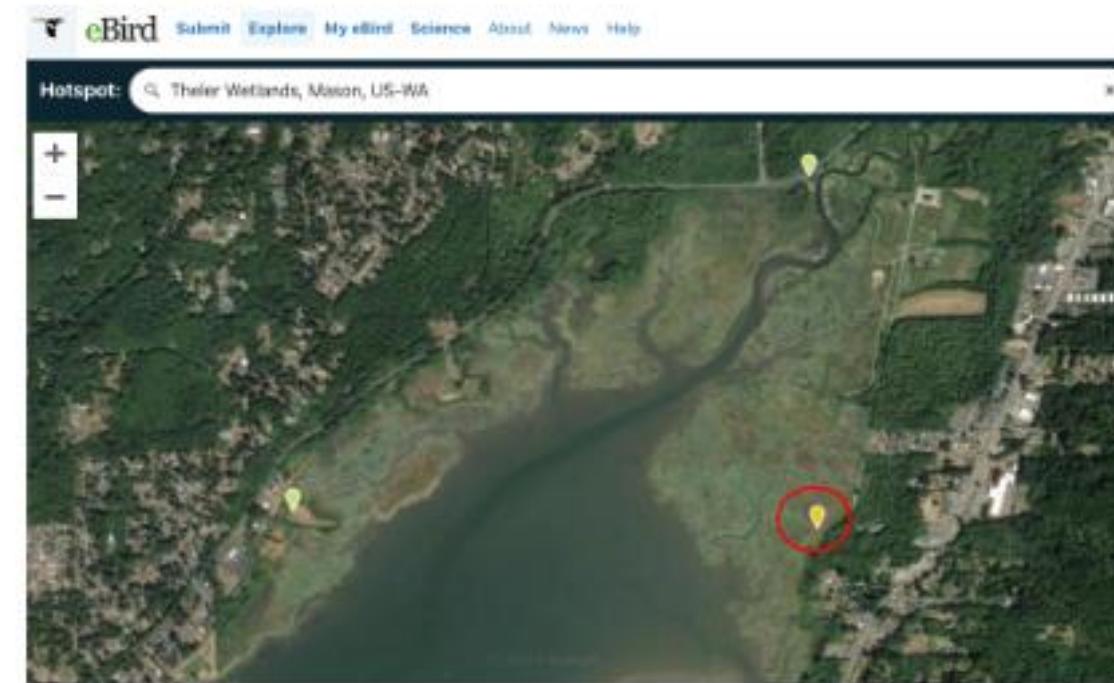
eBird hotspot screening



Wetland delineation in GeoJSON



Theeler Wetlands  
(L250091)



# Gathering land cover data from Google Earth Engine, and calculating species richness from eBird.

eBird Hotspot ID	Species Richness	Land Cover



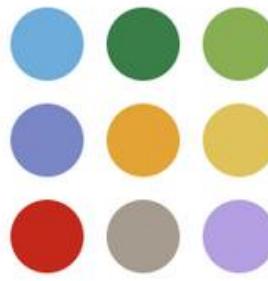
Generalized Linear Model (6 of them)

## Explore Dynamic World

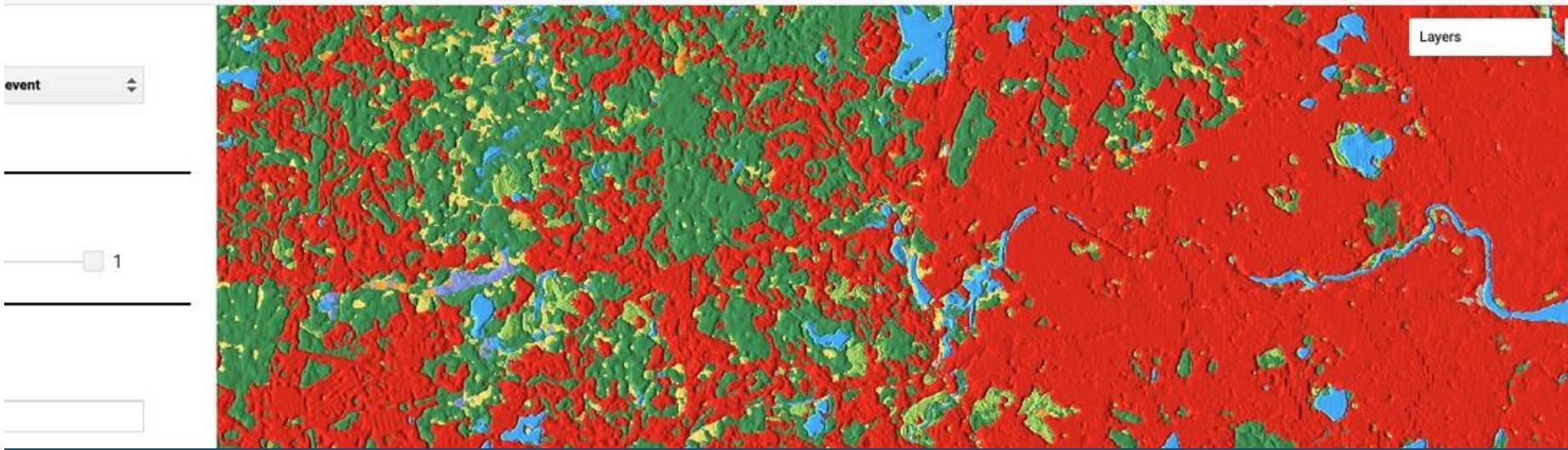
Global 10m resolution near realtime land cover dataset, producing probabilities per pixel for 9 land types, useful for change-detection products and derivative maps.

[HOW TO EXPLORE THE MAP](#)

[COLLAPSE](#)



Search places



Calculating overall species richness at each eBird hotspot, as well as species richness of 5 different functional groups (Tobias et al. 2022).



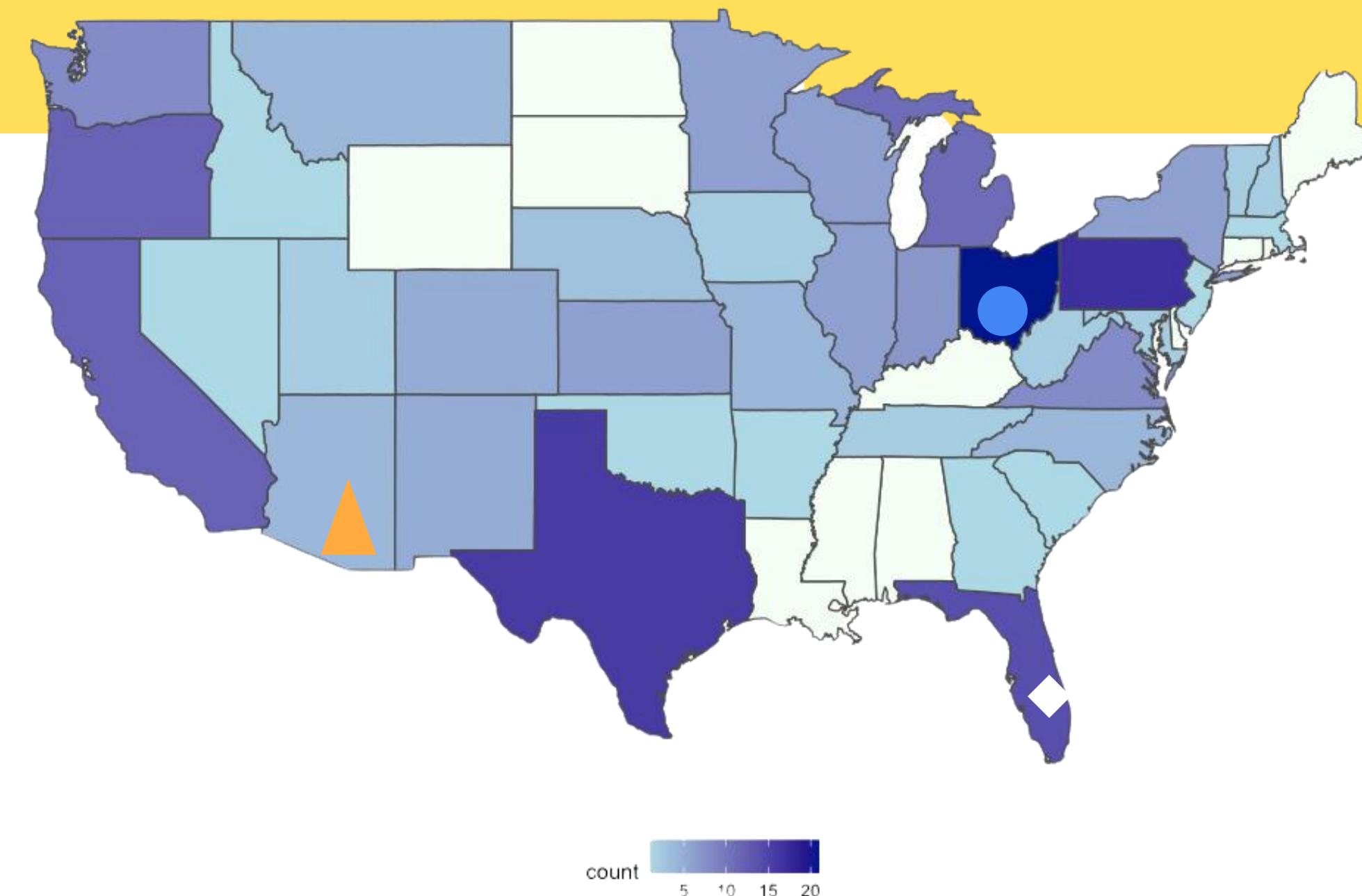
Sweetwater Wetlands Park, AZ



Ohio State University Wetlands, OH

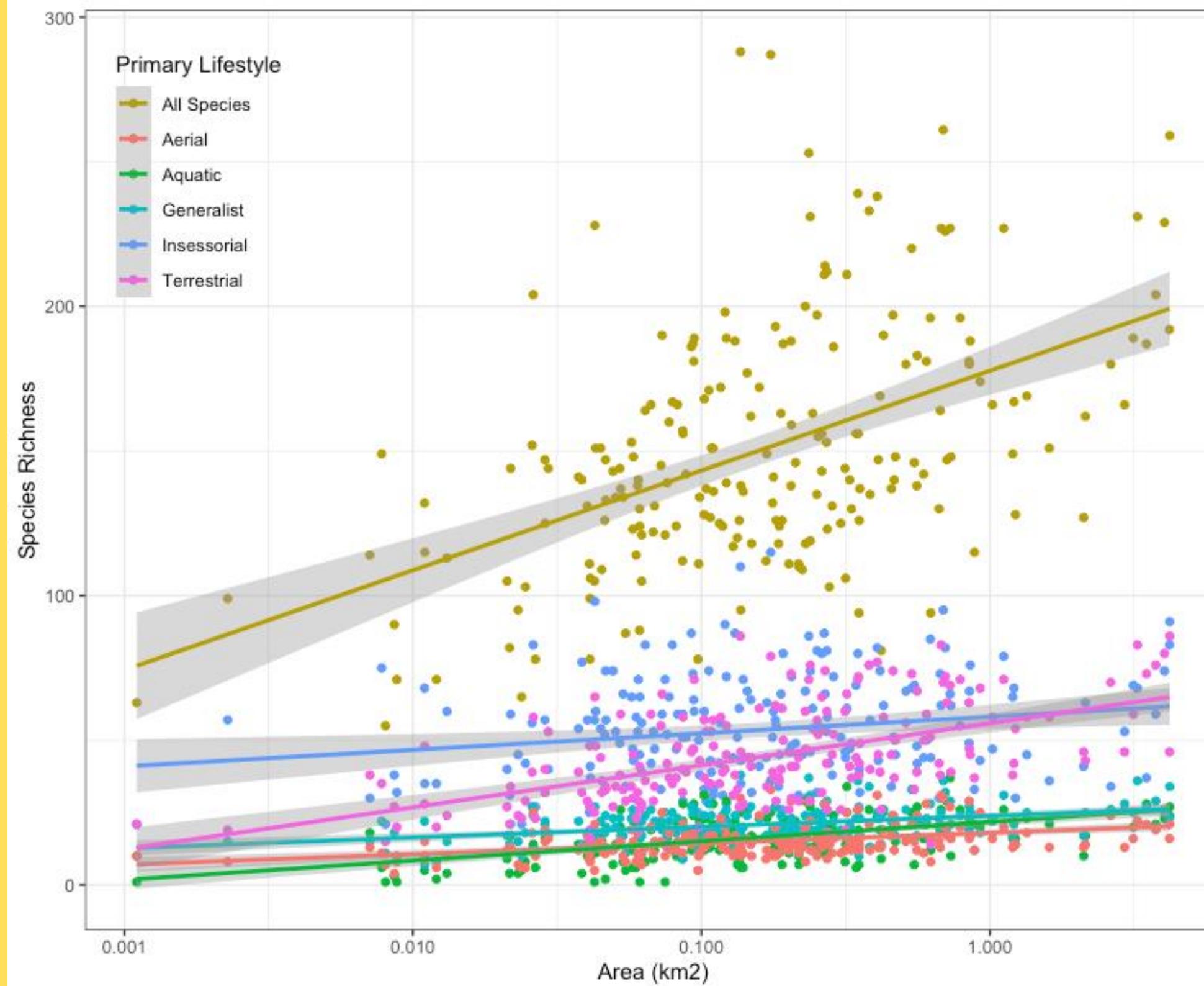


Green Cay Wetlands Center, FL

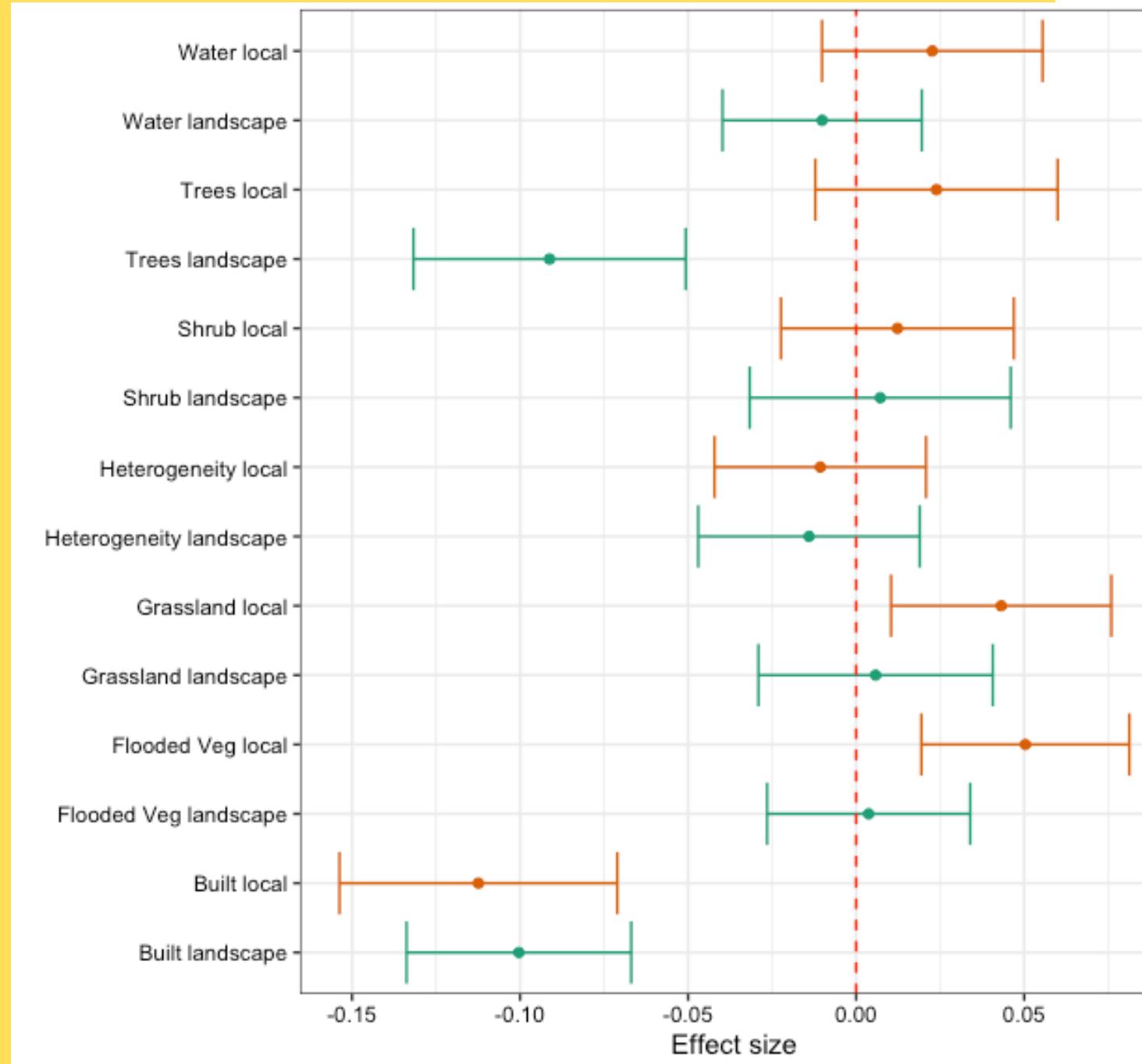


# Objective 1: Species Richness Increases with Wetland Area

- We found that species richness increases as wetland area increases.
- This was most pronounced for Terrestrial and aquatic primary lifestyles.

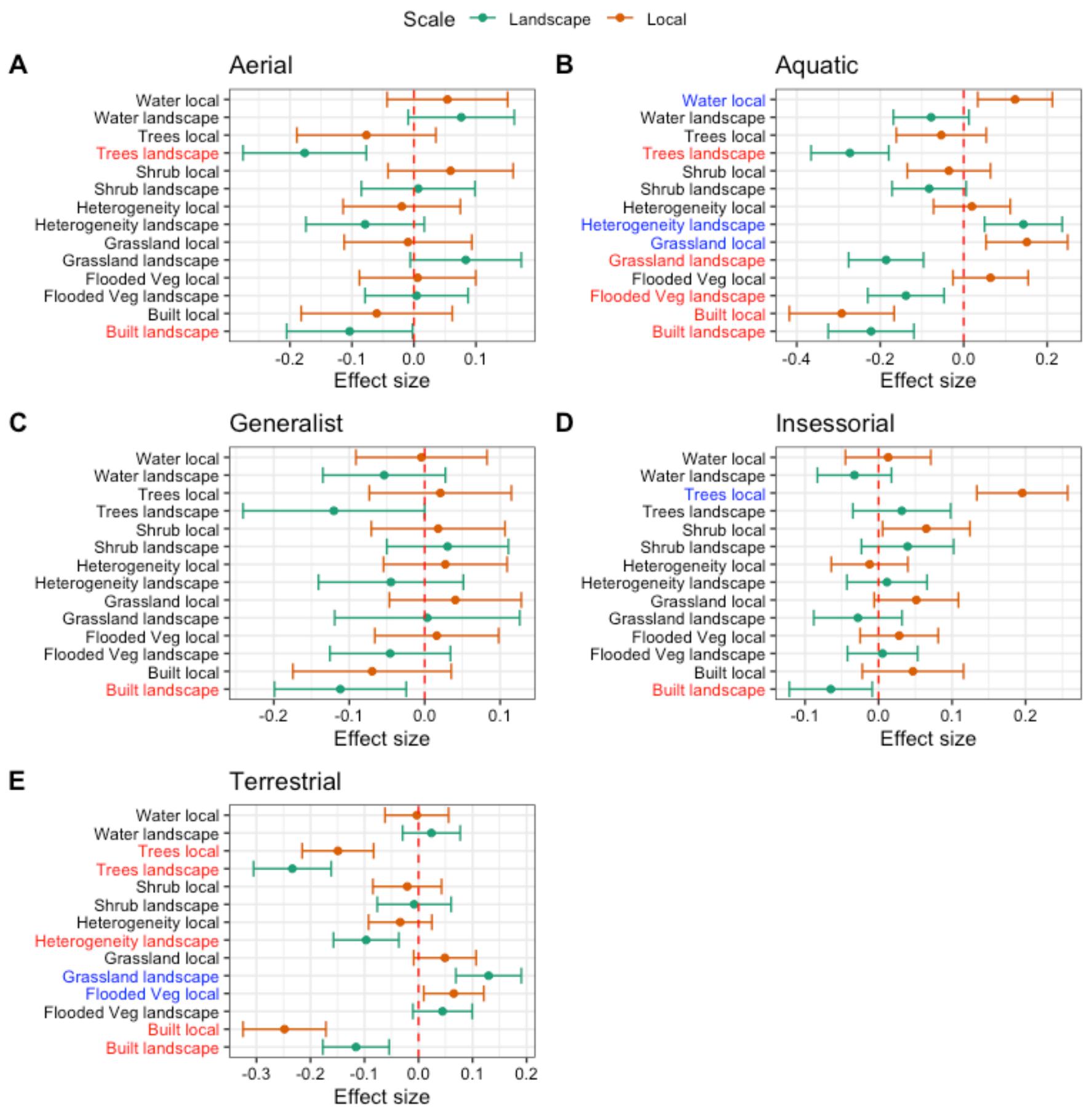


# Objective 2: Built area reduces species richness, flooded vegetation increases species richness.



- Built land area reduces richness at multiple scales.
- Trees reduced species richness, likely due to environmental filtering in the Temperate Forests of the Northeast.
- Flooded vegetation and grass cover promote richness at the local scale.

# Objective 3: Land cover impacts functional group richness differently



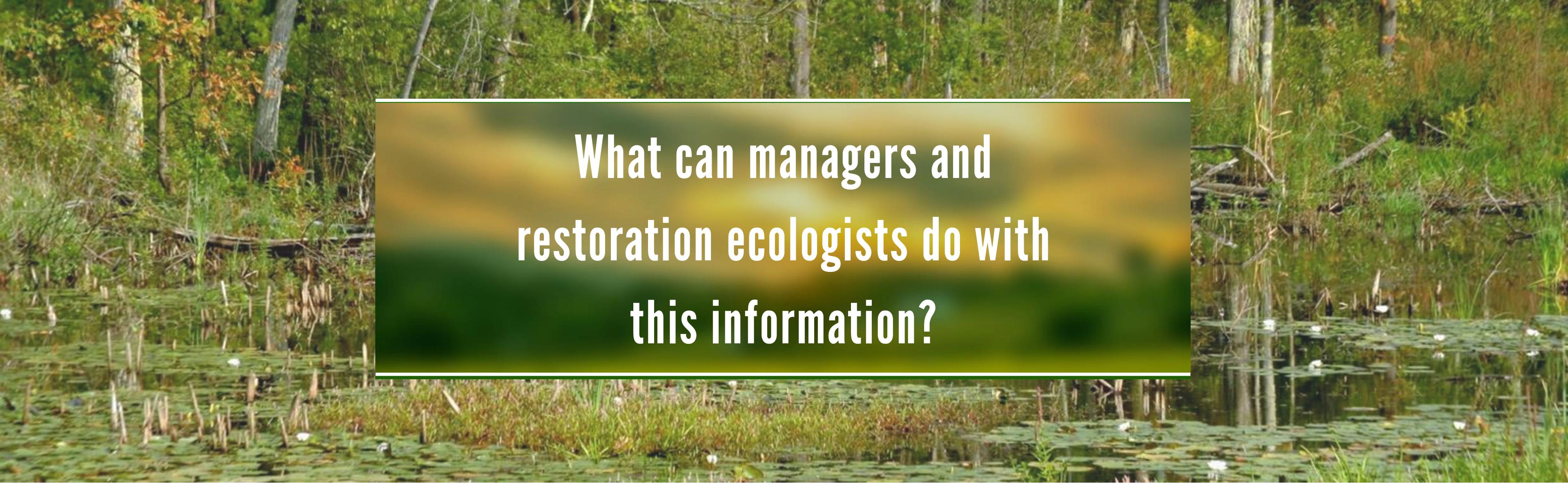
- All species respond negatively to built land area, at multiple scales.
- Aquatic species richness.



## What does this mean for birds in GIWs?

Terrestrial and aquatic species richness drive the species area relationship in GIWs, likely due to larger wetlands being visited by a greater number of larger-bodied species compared to relatively smaller insessorial and aerial species.

Landscape variables are responsible for negative trends in richness, local variables responsible for positive predictors of species richness.



# What can managers and restoration ecologists do with this information?

Prioritizing  
preservation/restoration/creation of  
larger wetlands

incorporating flooded vegetation in  
stormwater ponds, restoration of  
natural wetlands, and created  
wetlands



**Thanks to everyone who contributes to eBird.**

Don't forget to go birding at small isolated wetlands!

