Habitat selection by waterfowl during spring migration in the Rainwater Basin region of Nebraska

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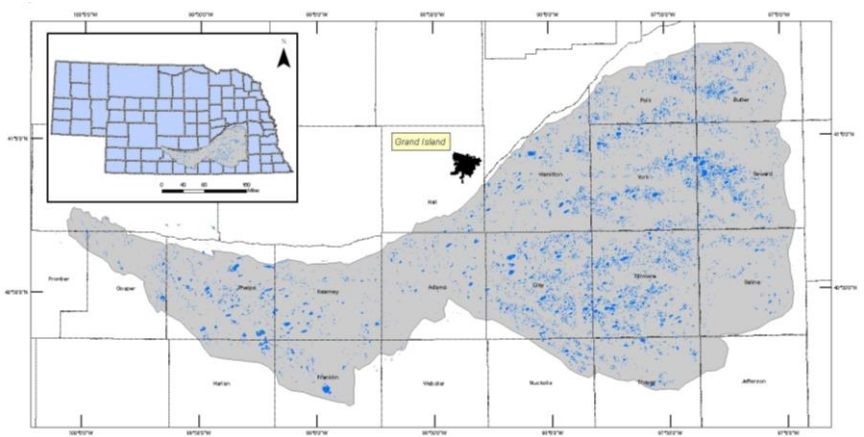
Western Ecosystems Technology, Inc.

- Provides environmental and statistical consulting services and contract research nationally and internationally for industry, government, and private organizations.
- WEST Research Initiative
  - Internal source of funding for employees of WEST to pursue reaserch interests and ideas.

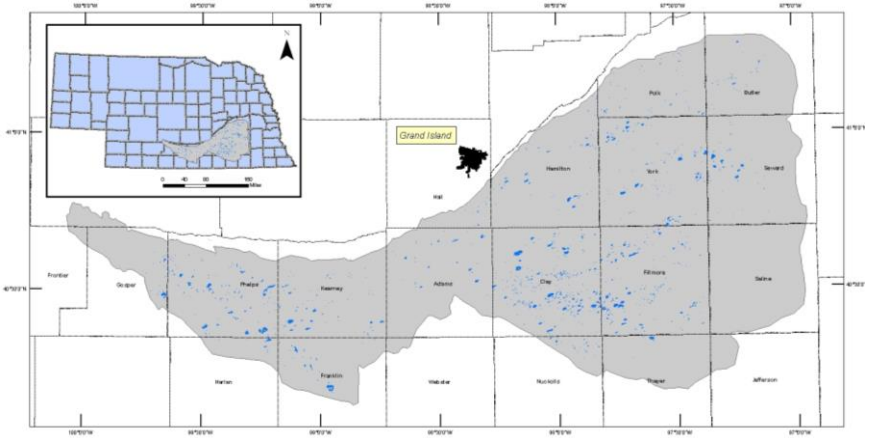
Historic

204,000 acres
5% of the landscape



Current

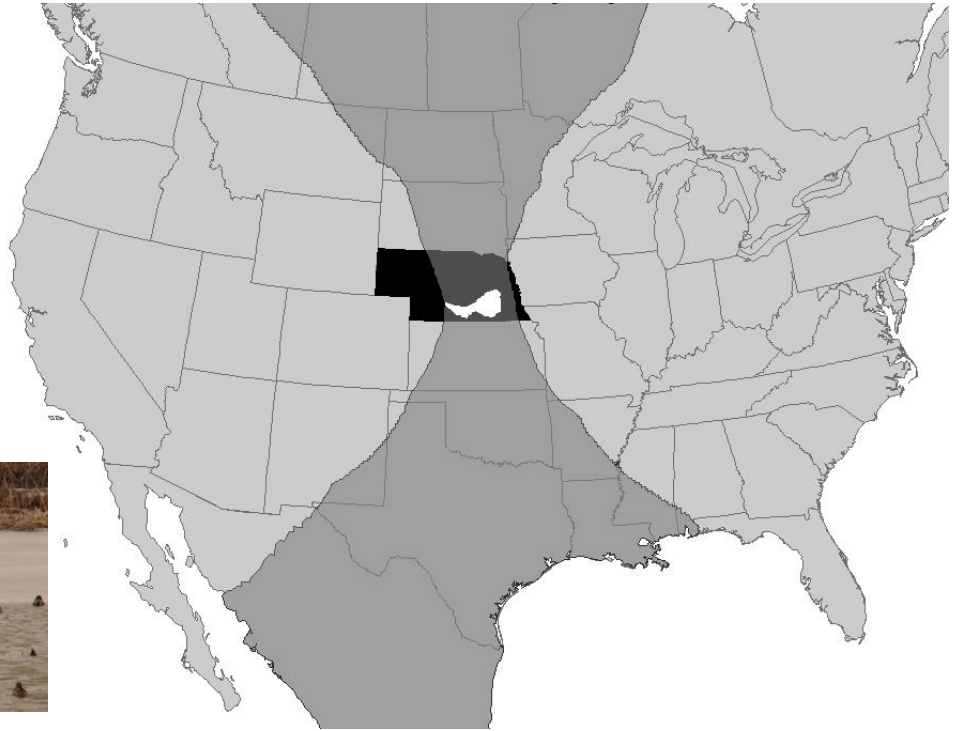
40,000 acres
1% of the landscape



Rainwater Basin Playa Modifications

Why are Rainwater Basin playas important?

- 257 bird species
- Shorebirds - 500,000
- Waterbirds - Whooping Cranes
- Waterfowl
  - 25 species
  - 7-9 million ducks
  - 2-3 million geese



Rainwater Basin Joint Venture Waterfowl Plan

A regional contribution to the

North American Waterfowl Management Plan

and the

Rainwater Basin Joint Venture Implementation Plan

By the Rainwater Basin Joint Venture

RAINWATER BASIN JOINT VENTURE

If NAWMP population goals are met, at least 8.6 million waterfowl pass through the RWB during spring migration.

How much habitat is needed to support them?

- **Estimated need = 62,500 acres**
- **Actual availability = 2,000 – 22,000 acres**

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We know how much habitat is needed… so how do we prioritize?

The current JV model primarily considers wetland characteristics

The goal of this project is to increase the impact of conservation by identifying wetland characteristics that are related to occupancy and abundance of ducks

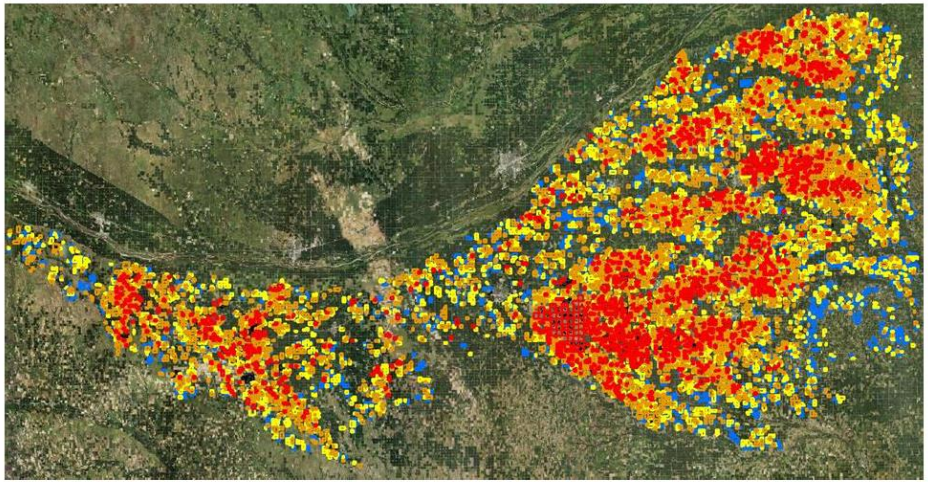
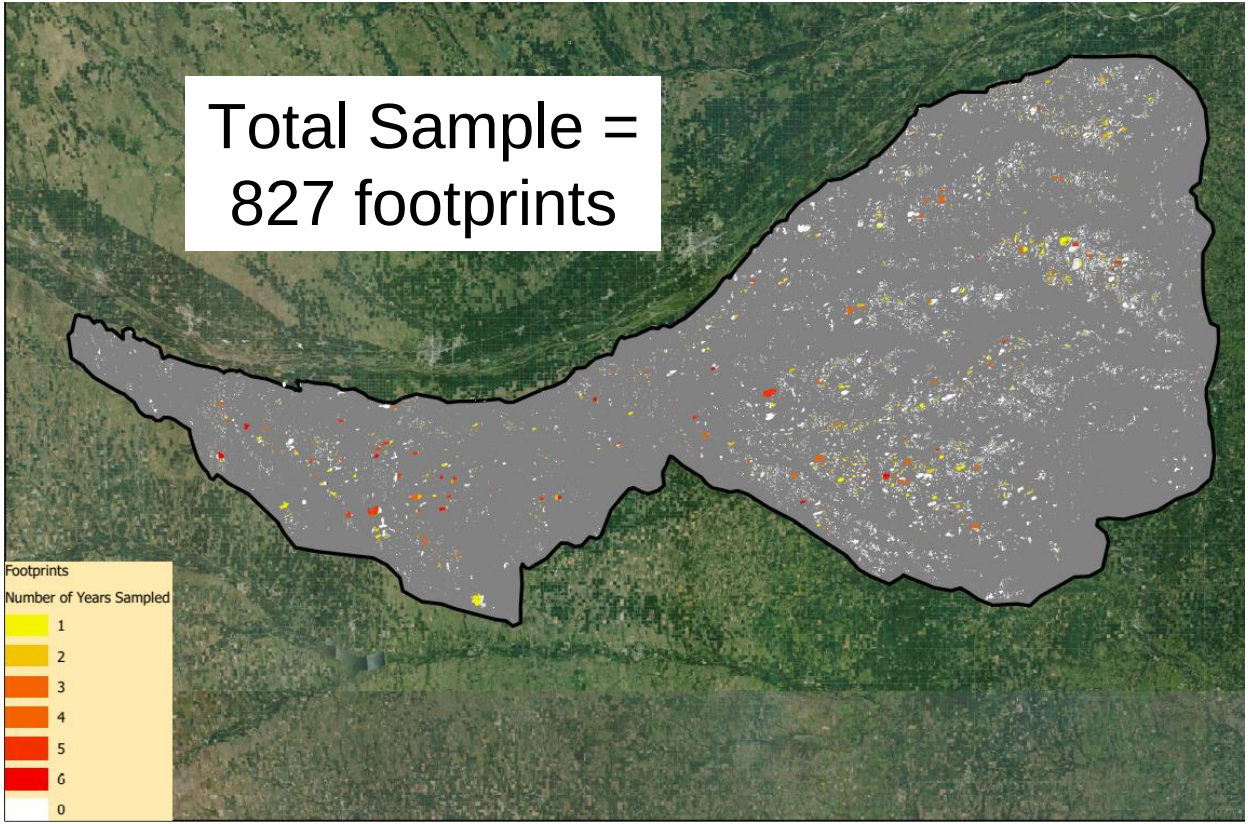
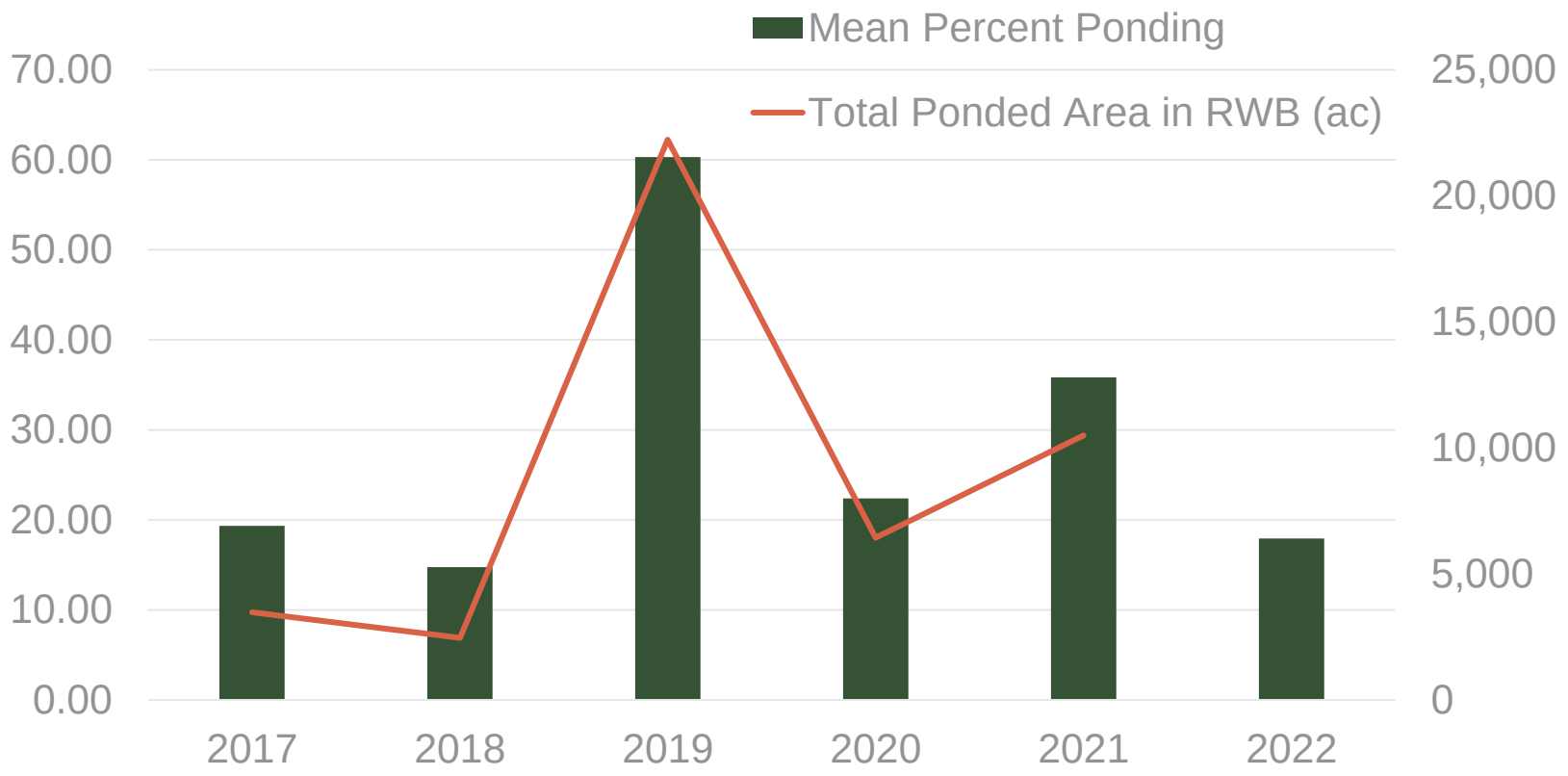


Figure I. Overview of the RWB Easement Model. Tracts are outlined in red, orange, yellow, and blue from high to low priority respectively.

Methods

- 330-340 wetland footprints surveyed each year
- Over 10,6000 road-based surveys completed
- Sunrise to sunset
- Mid-February to mid- April




Mean Percent Ponding
Total Ponded Area in RWB (ac)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
25,000
20,000
15,000
10,000
5,000
0
2017
2018
2019
2020
2021
2022

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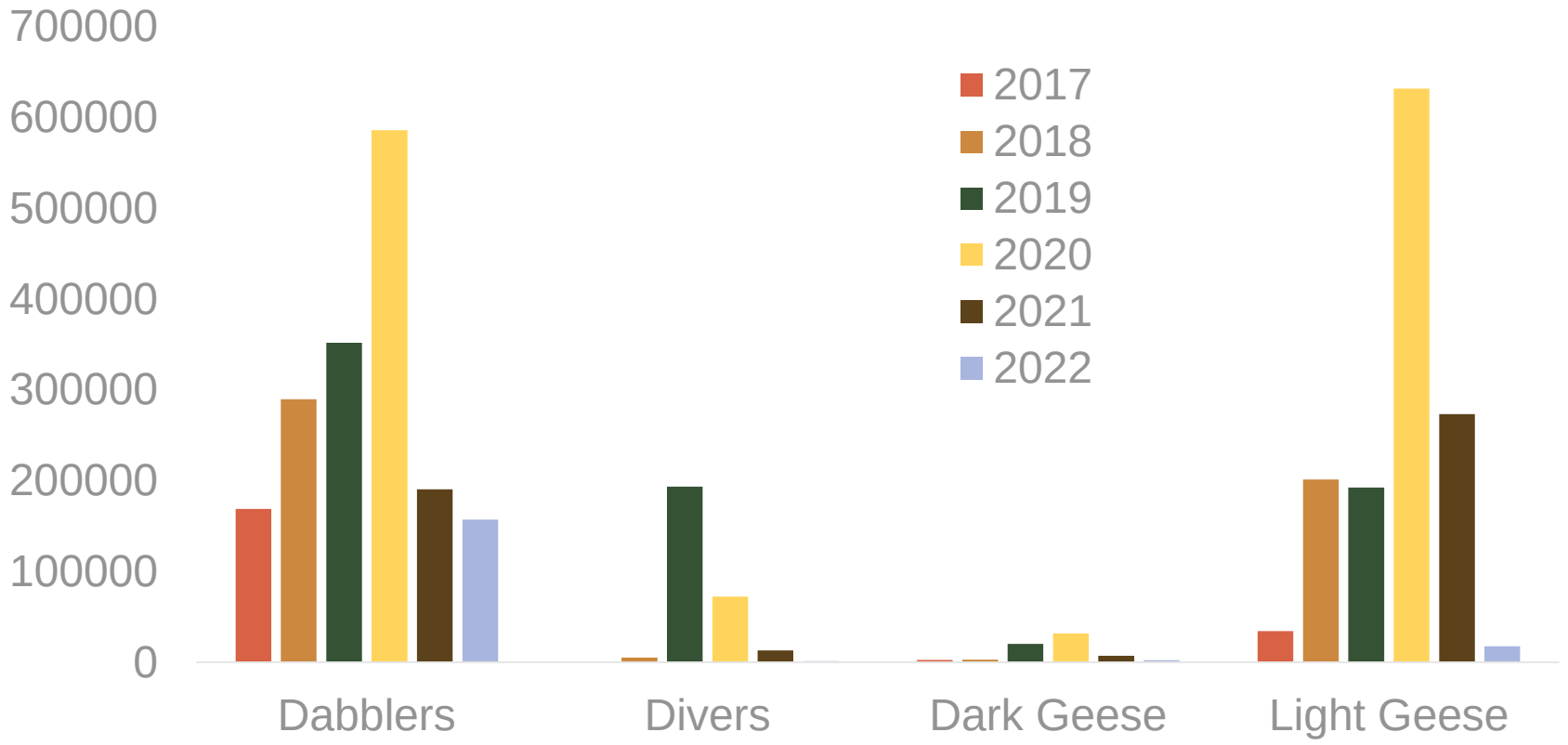

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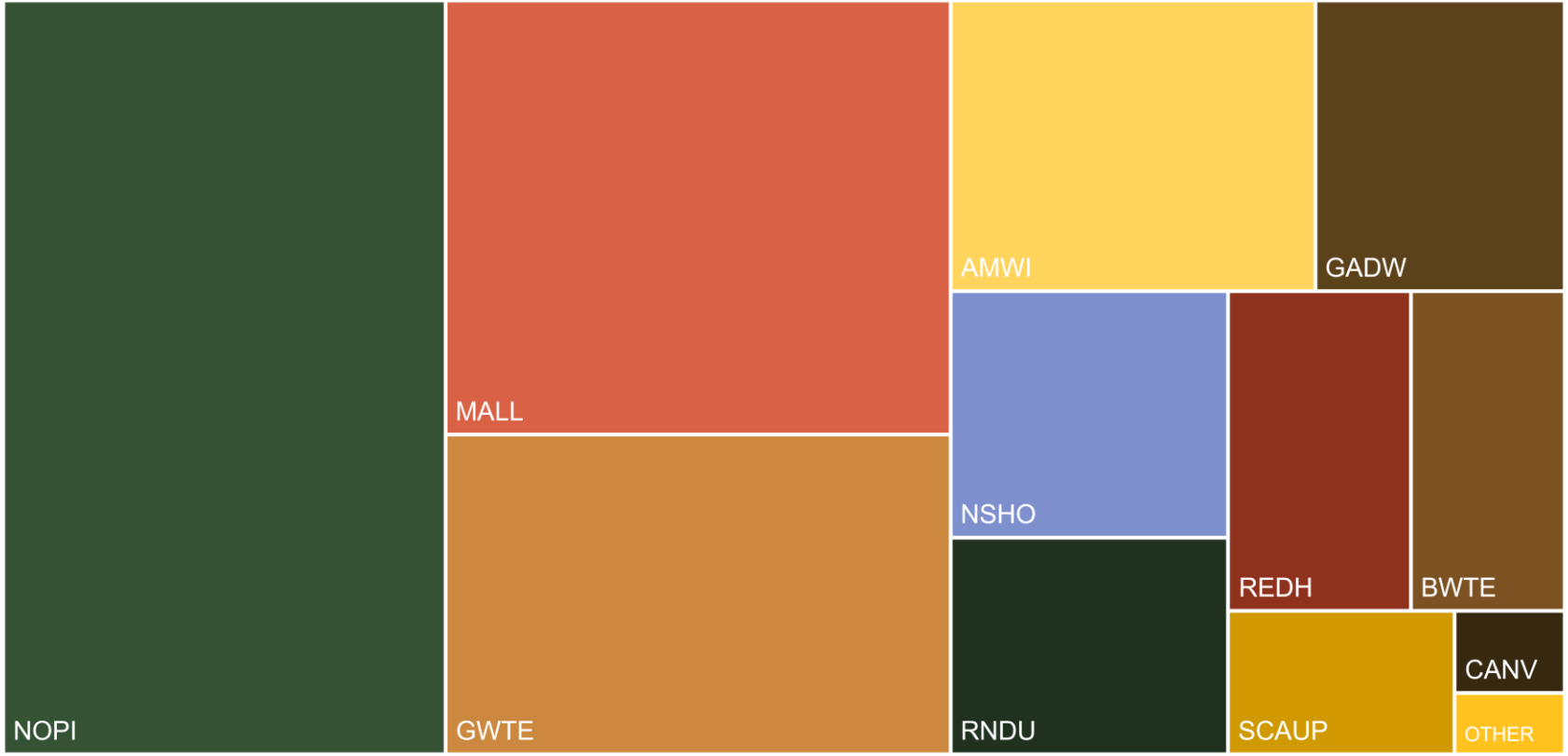

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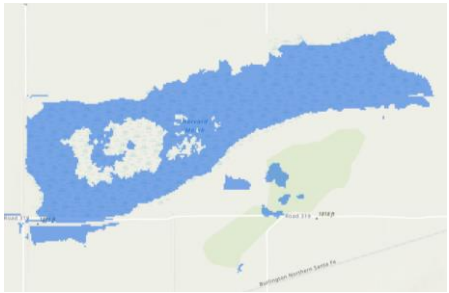
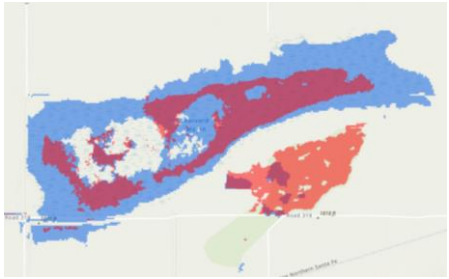
Habitat Variables

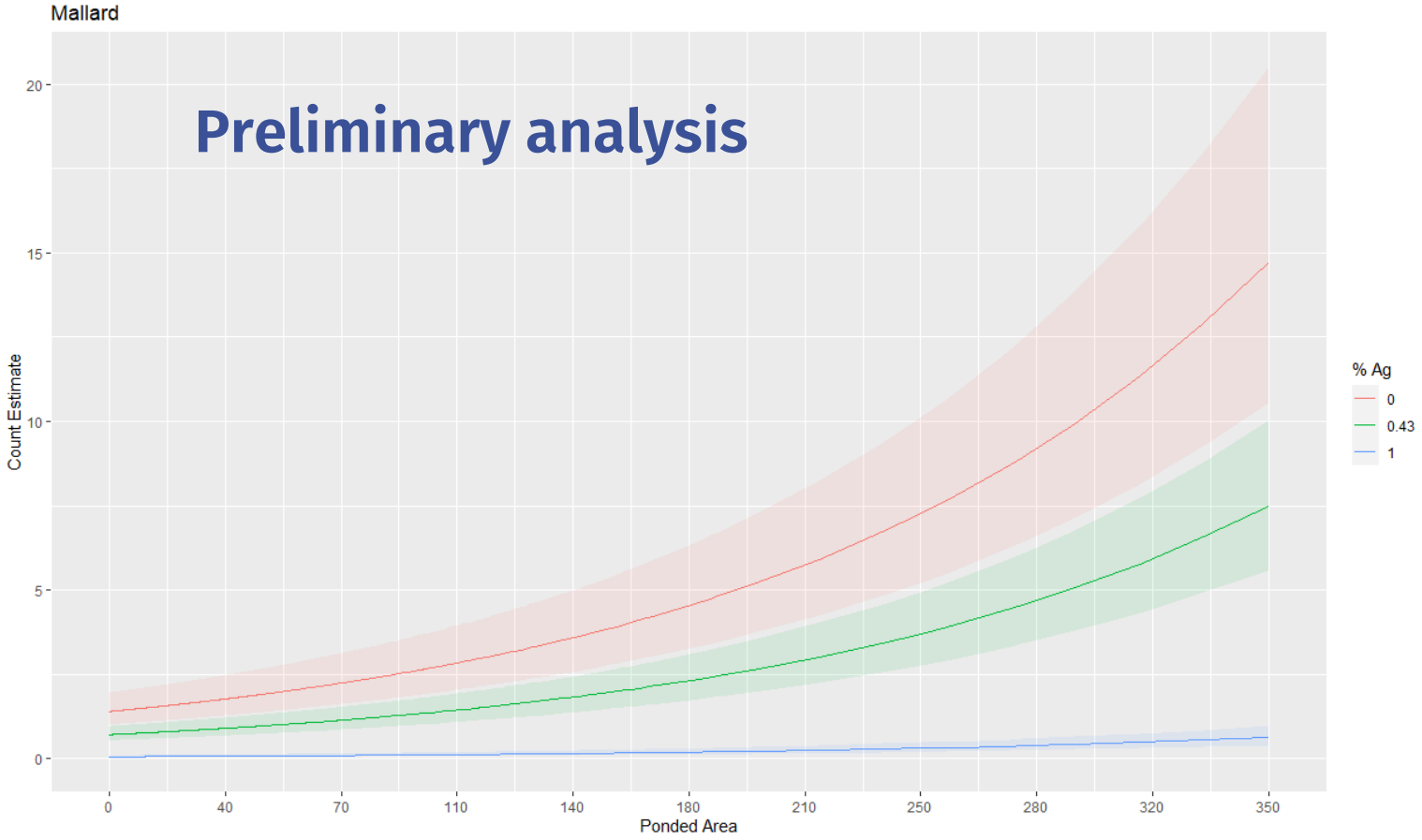
- Ponded area of footprint
- Proportion of agriculture in the footprint
- Perimeter to area ratio (ie shape)
- Location (easting and northing)
- Human disturbance
- Distance to edge of region
- Distance to permanent wetland
- Ponded area of the footprint in the prior year
- Number of ponded footprints within ### meters
- Ponded area within ### meters
- Number of functional footprints within ### meters
- Functional area within ### meters





Preliminary analysis

	DABBLER OCCURANCE	DABBLER ABUNDANCE	DIVER OCCURANCE	DIVER ABUNDANCE
Ponded Area of Footprint	+	+	+	+
Proportion of Ag	-	-	-	-
Perimeter:Area	-	-	-	-
Easting	-			-
Northing			+	+
Human Disturbance		-		
Distance to Edge of Region		+		+
Distance to Permanent Water	+	-		-
Ponded Area Last Year		+	-	-
Ponded Footprint Count		-	+	+
Ponded Area Nearby	+		+	+
Functional Footprint Count				-
Functional Area Nearby		+	-	


Mallard
Preliminary analysis
Count Estimate
20
15
10
5
0
0
40
70
110
140
180
210
250
280
320
350
Ponded Area
% Ag
0
0.43
1

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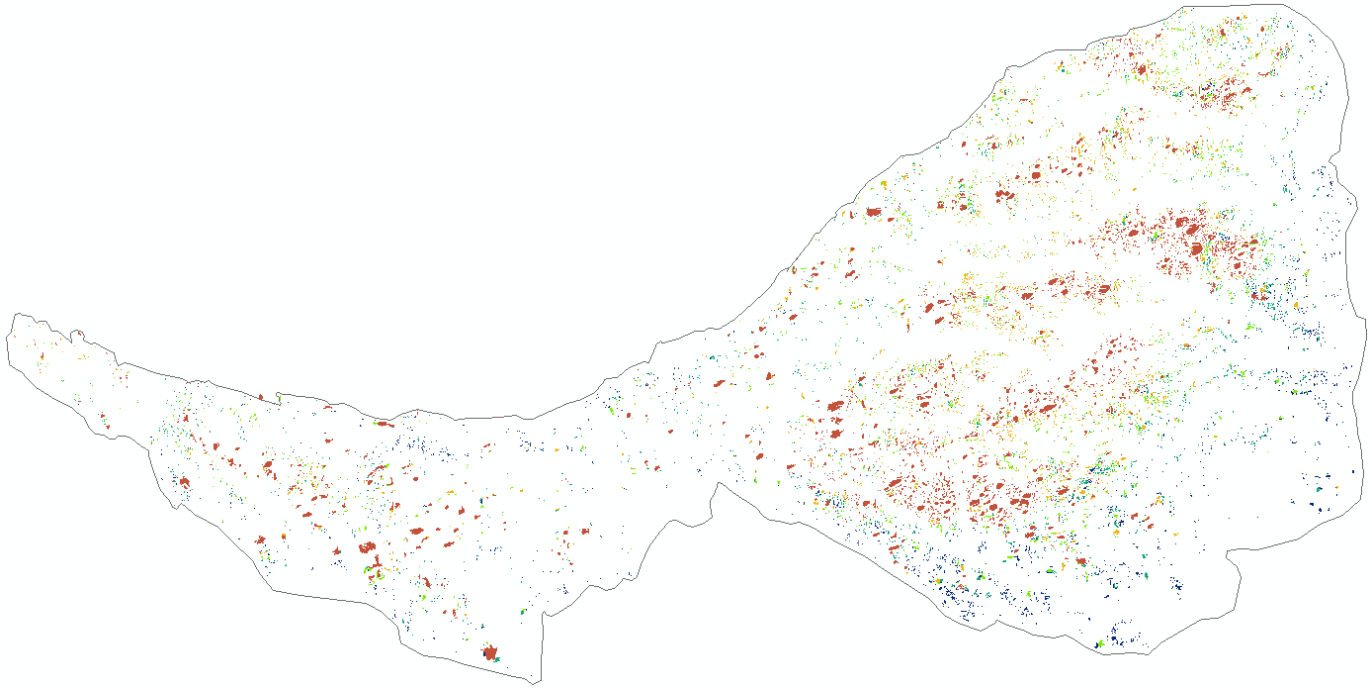
Proposed 2024 Analysis

- Evaluate relationships between landscape variables and abundance/occurrence
- Generate predictive maps of waterfowl occurrence and abundance during dry and wet years based on waterfowl surveys and landscape covariates.
  - Method: Integrated nested Laplace approximation (INLA): A Bayesian method that incorporates Gaussian Random Fields into the model to account for spatial correlation between survey sites
- Determine thresholds for variables of interest using a predictive decision tree
  - Method: Classification and regression tree (CART) model
- Evaluate patterns of occurrence and abundance among taxa groups (dabblers, divers, geese)

GOAL: A set of maps that can be used to predict occurrence and abundance of dabbling and diving ducks




DUCKS
UNLIMITED


NEBRASKA
GAME PARKS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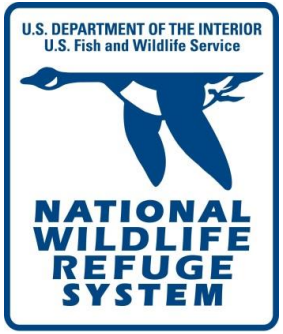
Landscape Conservation Cooperative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Thank You!

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