

Multi-Cropping as a Flood Mitigation



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What is multi-cropping?

- Multi-cropping as a form of regenerative agriculture
- “Regenerative Agriculture is a system of farming principles and practices that increases biodiversity, enriches soils, improves watersheds, and enhances ecosystem services.”
- More than one crop harvested from the same field in the same year



Defining multi-cropping

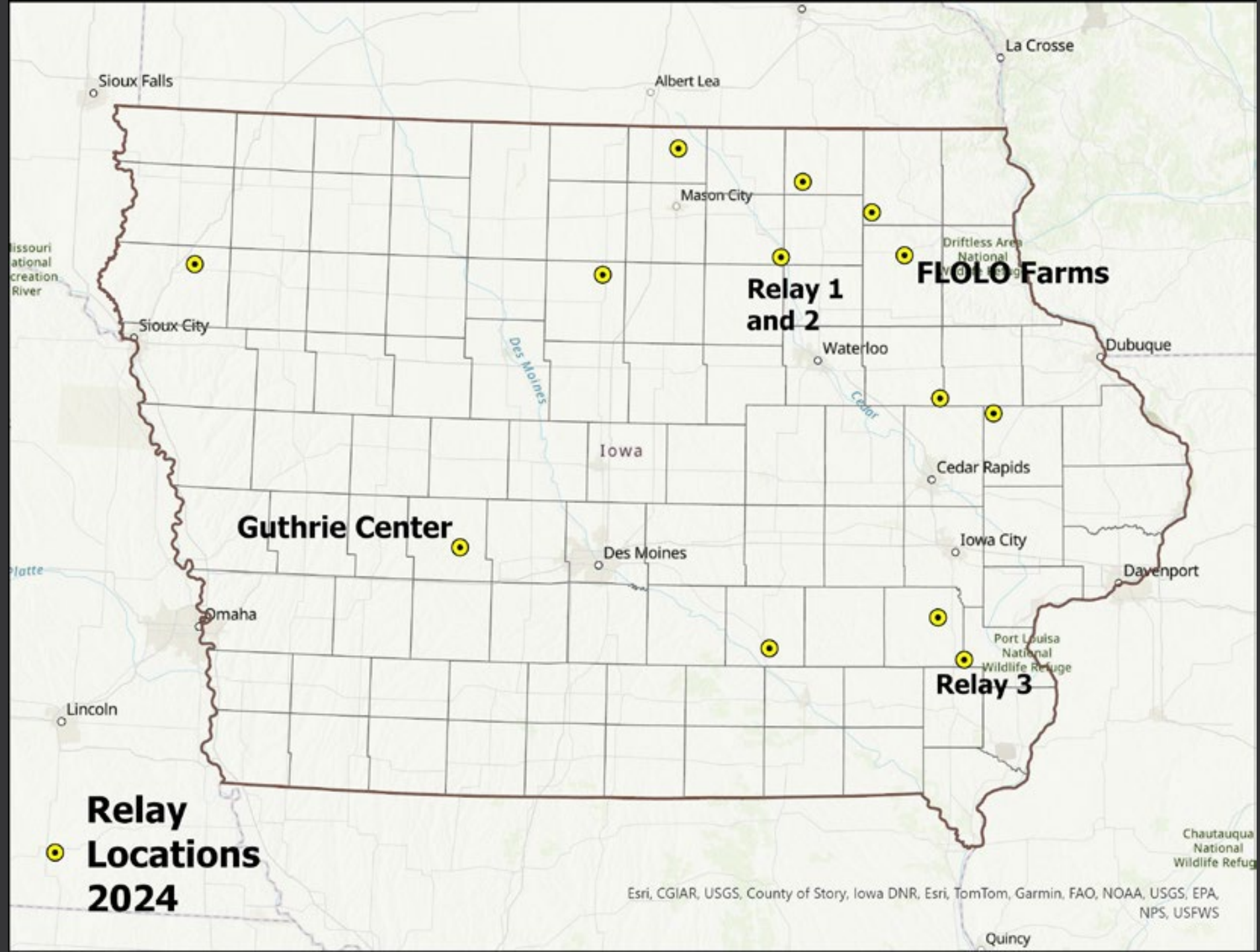


- Relay-cropping – 2 or more crops with overlapping growing seasons
- Double-cropping - 2 crops grown and harvested together OR back to back crops that don't overlap growing seasons
- Poly-cropping – 3 or more crops grown together
- Inter-cropping – 1 or more crop planted into an existing crop prior to harvest
- More than one crop harvested from the same field in the same year

Objectives

- Partnership with American Flood Coalition and Iowa Flood Center
- Field trials to determine practice viability
- Demonstrate the practice and benefits
- Measure the field level impacts of regenerative vs conventional management
- Scale the results to the HUC-8 watershed level using GHOST model





Conventional Ag

- Multiple tillage passes
- Lacks diversity and soil coverage
- Input reliant
- Poor infiltration
- Excess runoff
- Poor soil structure



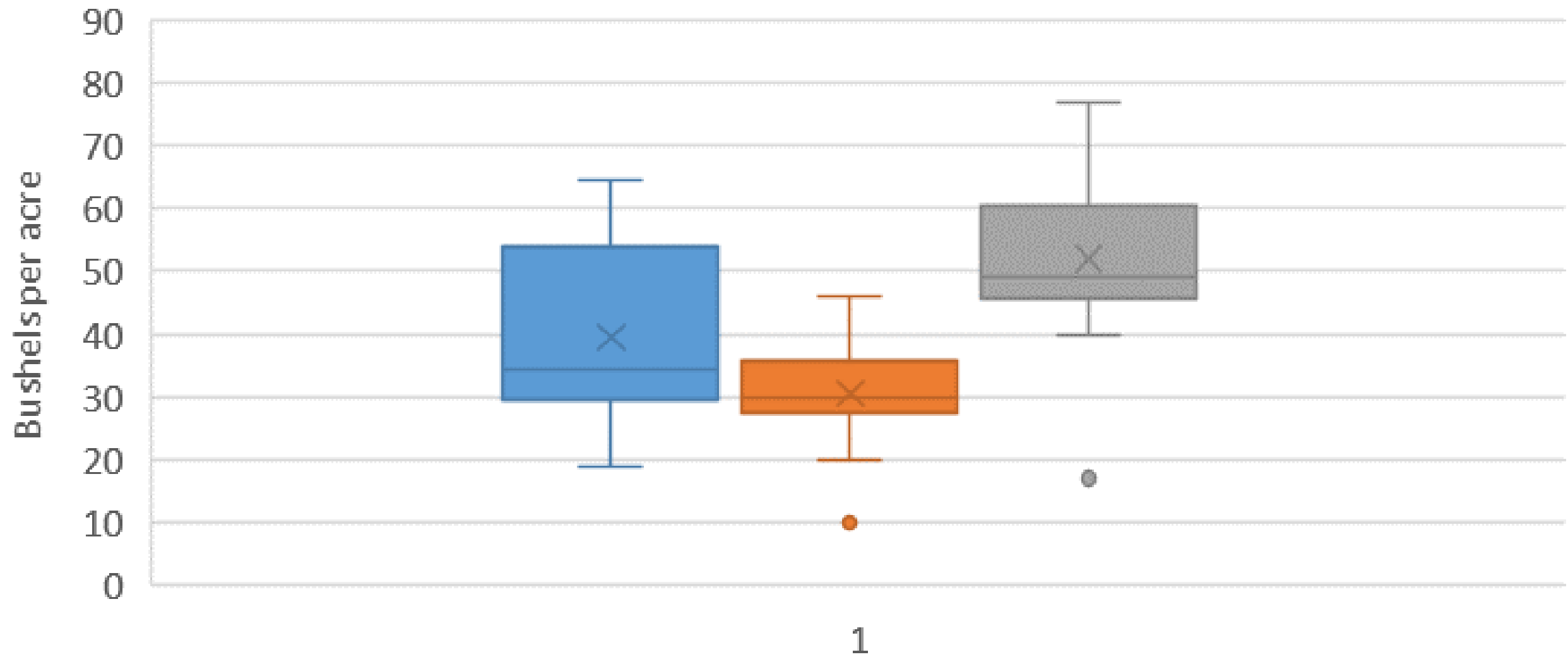
Relay Cropping

- Increases diversity
- Added biomass above and below ground
- Robust soil coverage year round
- Increased infiltration
- Higher rate of evapotranspiration
- Maximum biomass during critical periods



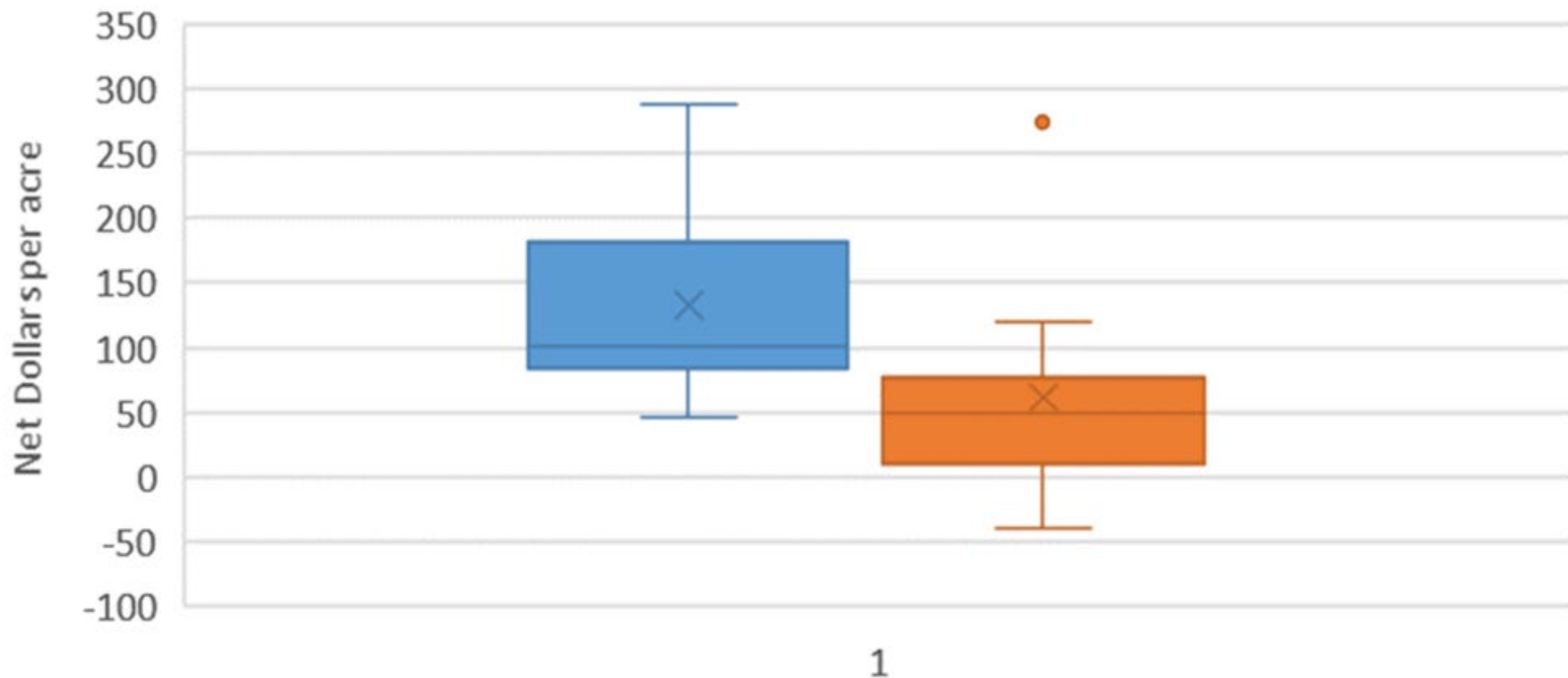
Crop Yields

Relay Soybean Yield Cereal Yield Mono Soybean Yield



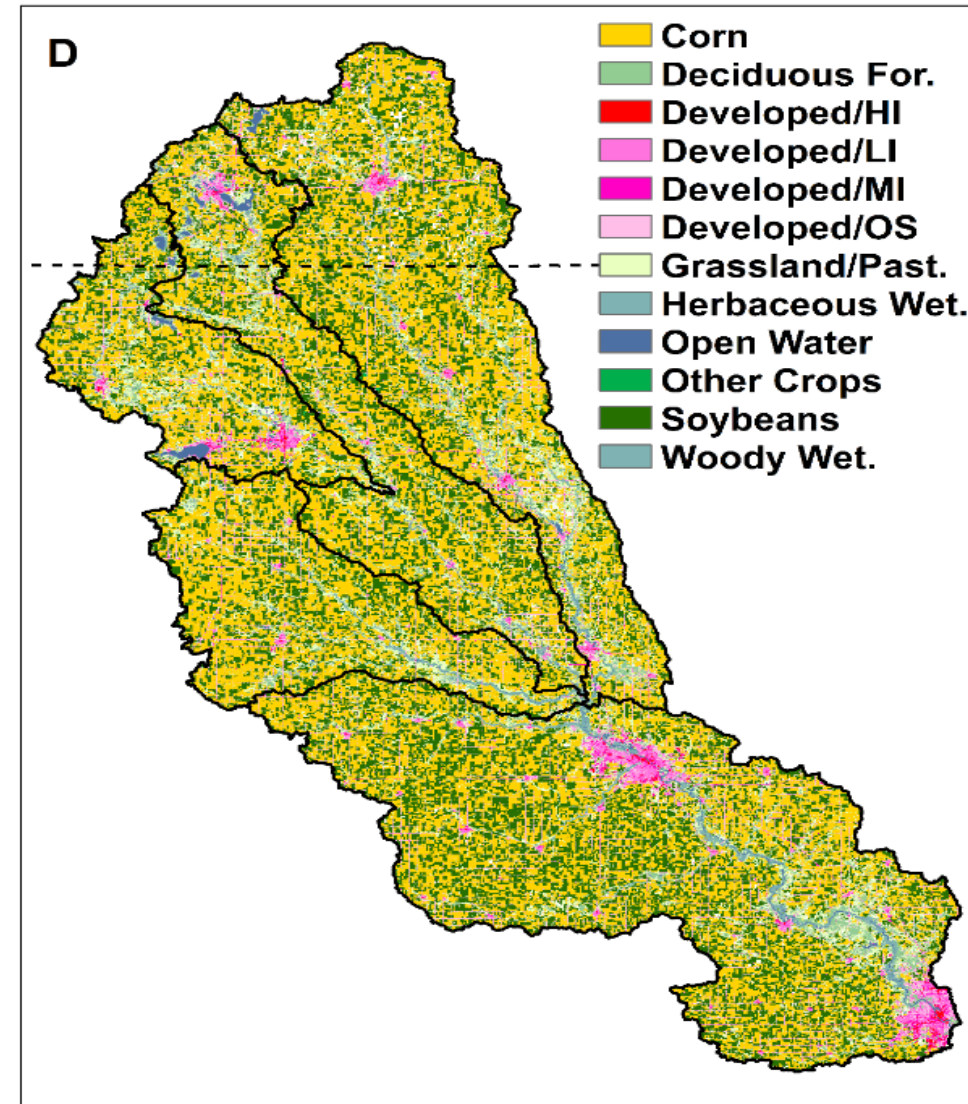
Net Field Revenue

Relay Net Revenue Mono Net Revenue



Modeling

- Cedar River Watershed – 10,800 square miles
- Modeled by Antonio Arenas and Iowa Flood Center
- Feeds to Cedar Rapids
- Event models from 2008 and 2016



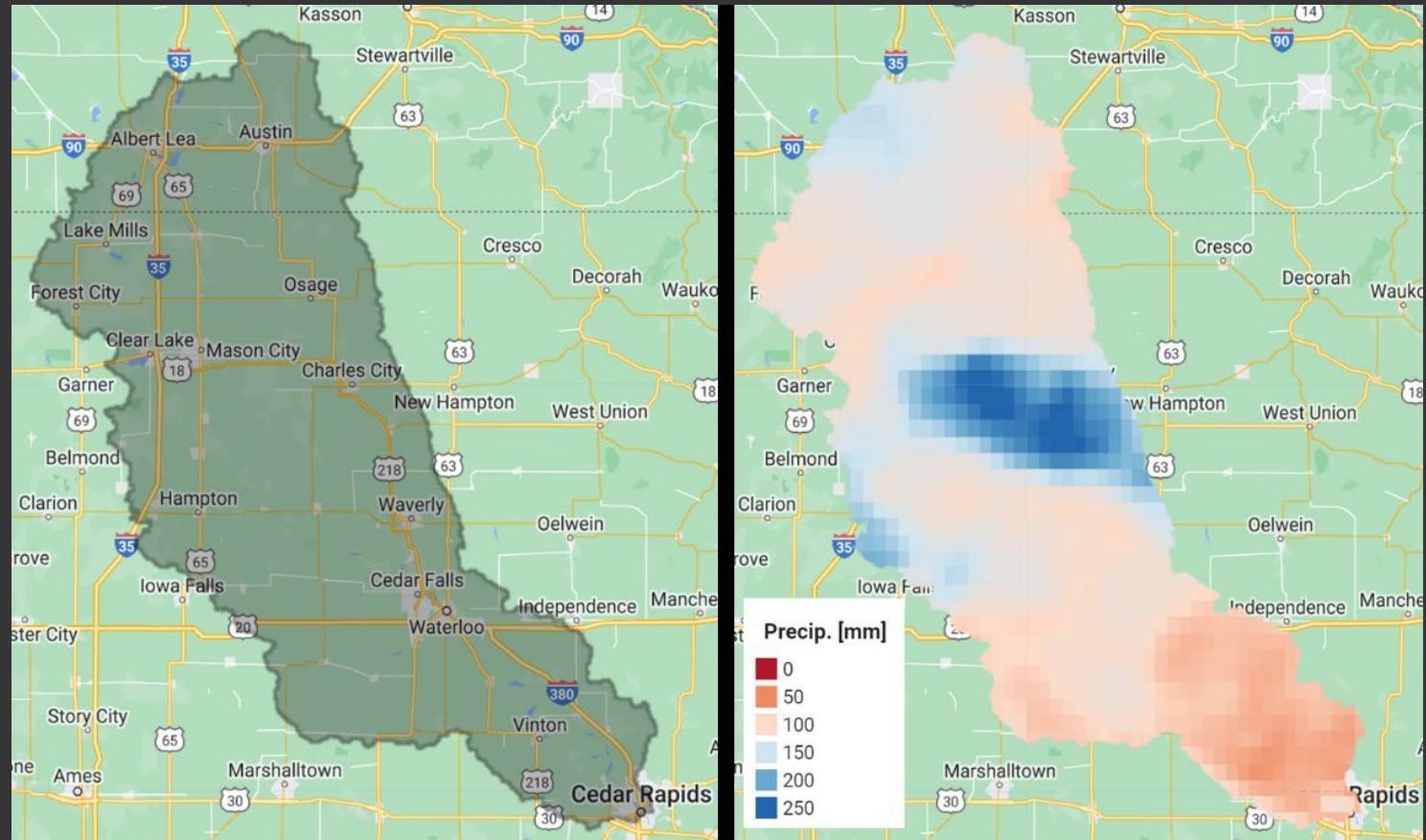
2008 Flood

- Impacted over 10 square miles of Cedar Rapids
- Over 10,000 residents were displaced
- 1,300 properties demolished
- \$848 million in damages for the state



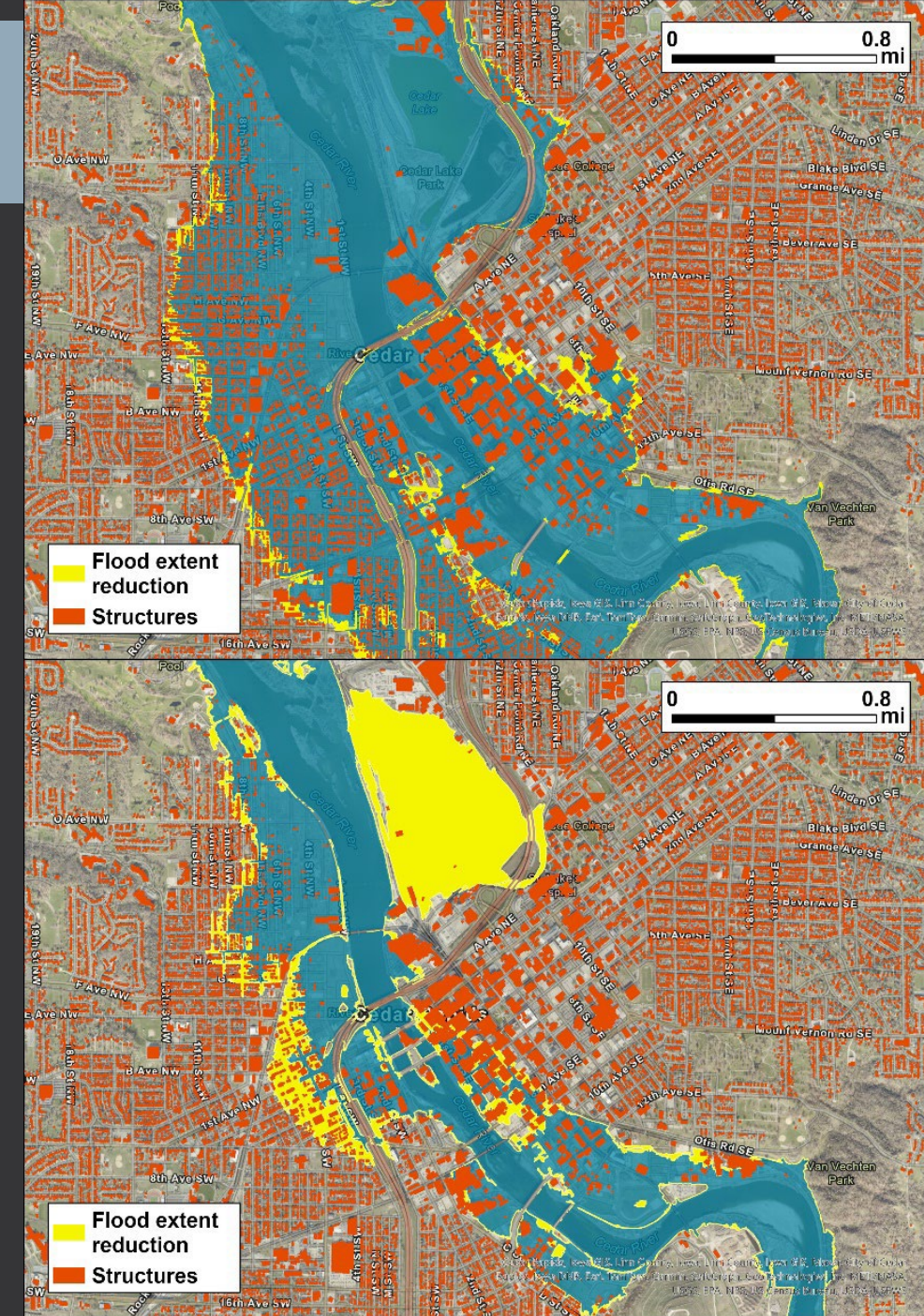
2016 Flood

- 2nd highest discharge level other than 2008
- Much more localized rainfall
- Unique timing with flooding occurring between September 21st and Oct 3rd



Impacts

- Flow reductions
- 2008 – 6.5%
- 2016 – 7.1%
- Structures saved
- 2008 – 550
- 2016 – 489
- Area inundated
- 2008 - .16 square miles less
- 2016 - .62 square miles less



Questions?



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A special thank you to our funders and partners

Funders

- Iowa NRCS
- American Flood Coalition
- McKnight Foundation
- Iowa Department of Ag & Land Stewardship – State Soil Conservation & Water Quality Committee
- Fishers and Farmers

Partners

- Iowa Soybean Association
- Iowa Flood Center
- Iowa State University
- Luther College