# Innovative Responses at the Local Level

Richard Sloan: Lime Creek Watershed Improvement Association

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# Historical Case-Study for Osceola County

An attempt to hindcast erosion and water flow of the past, assess the present and model a potential future scenario at the Helmers' family farm

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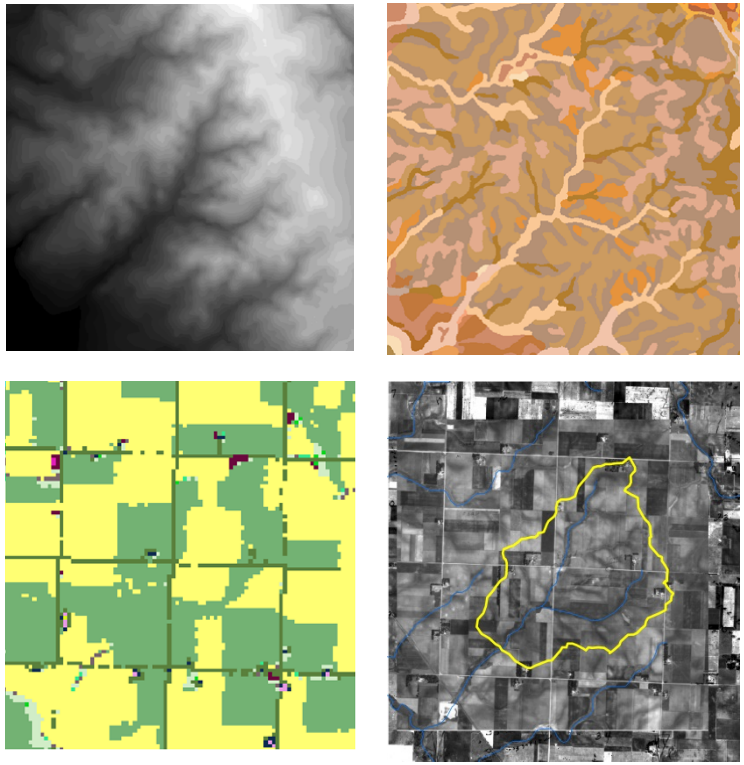
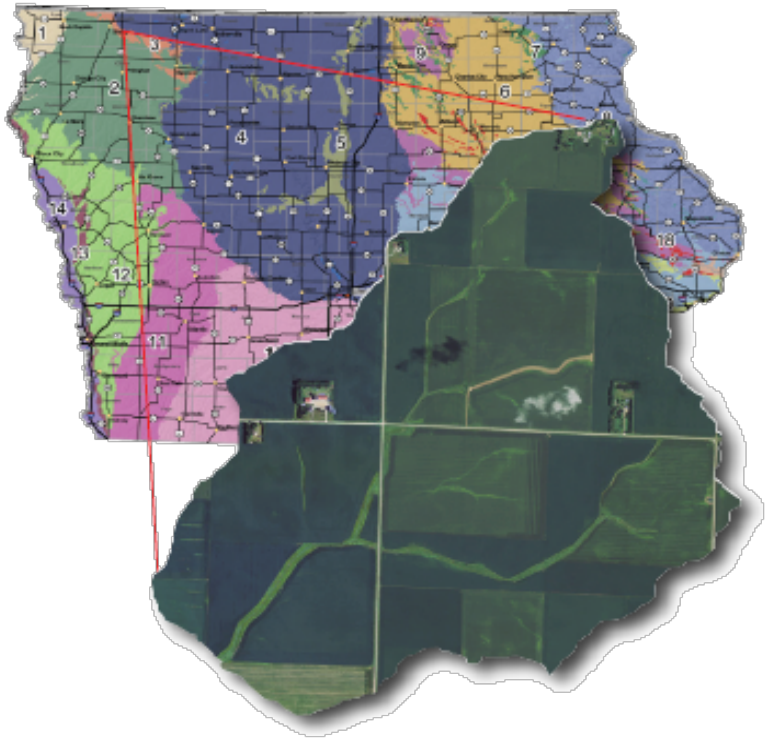
# Modeling Summary

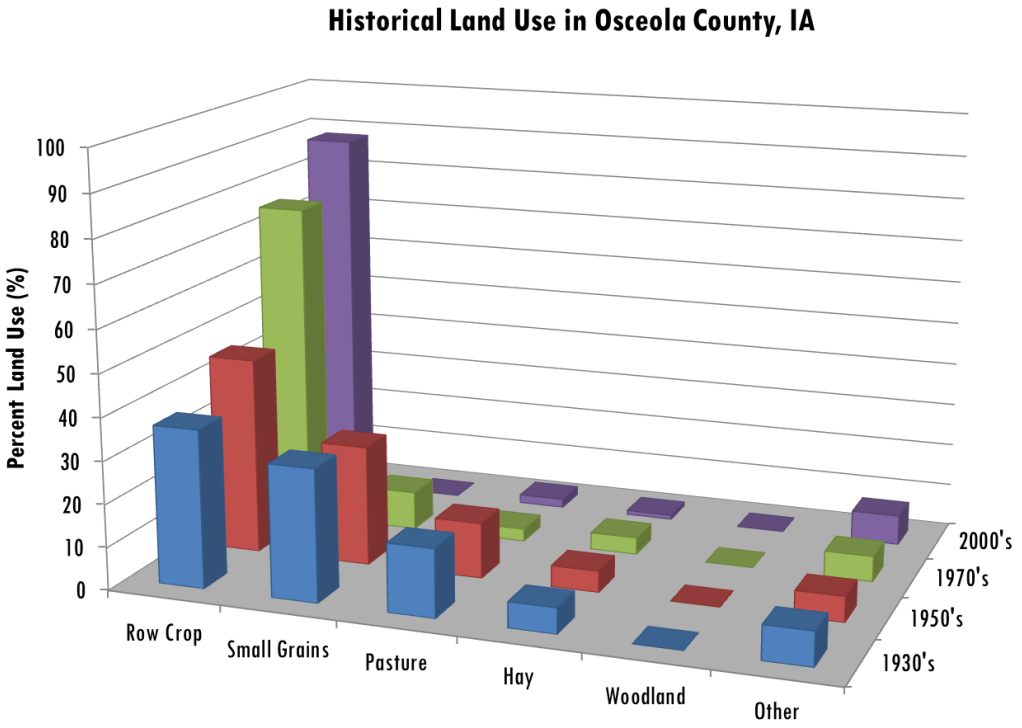
- Water Erosion Prediction Project (WEPP) is an approved model for assessing soil erosion and water flow at the hillslope and watershed scale

- Input parameters include: 100 yr average climate data, topography data, soils data, land use and management data
- Land use profiles are constructed and implemented in model:
  - Crops grown, cropping rotation, tillage implements, the number of passes used and virtually any practice applied to the land



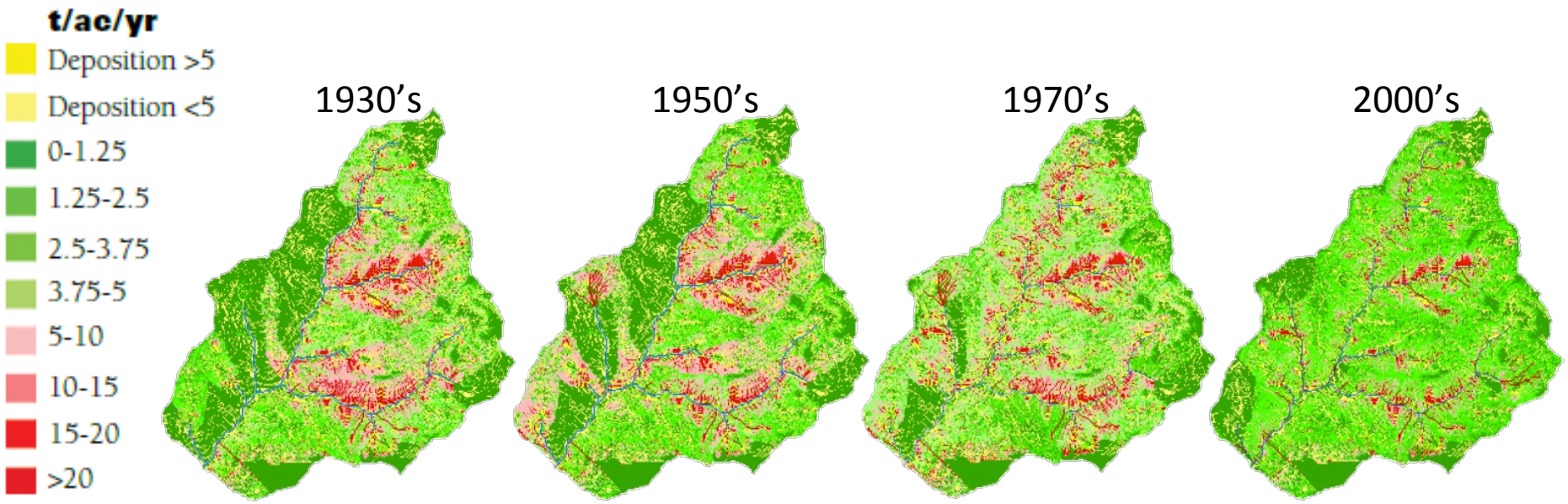
# Study Site and Land Use





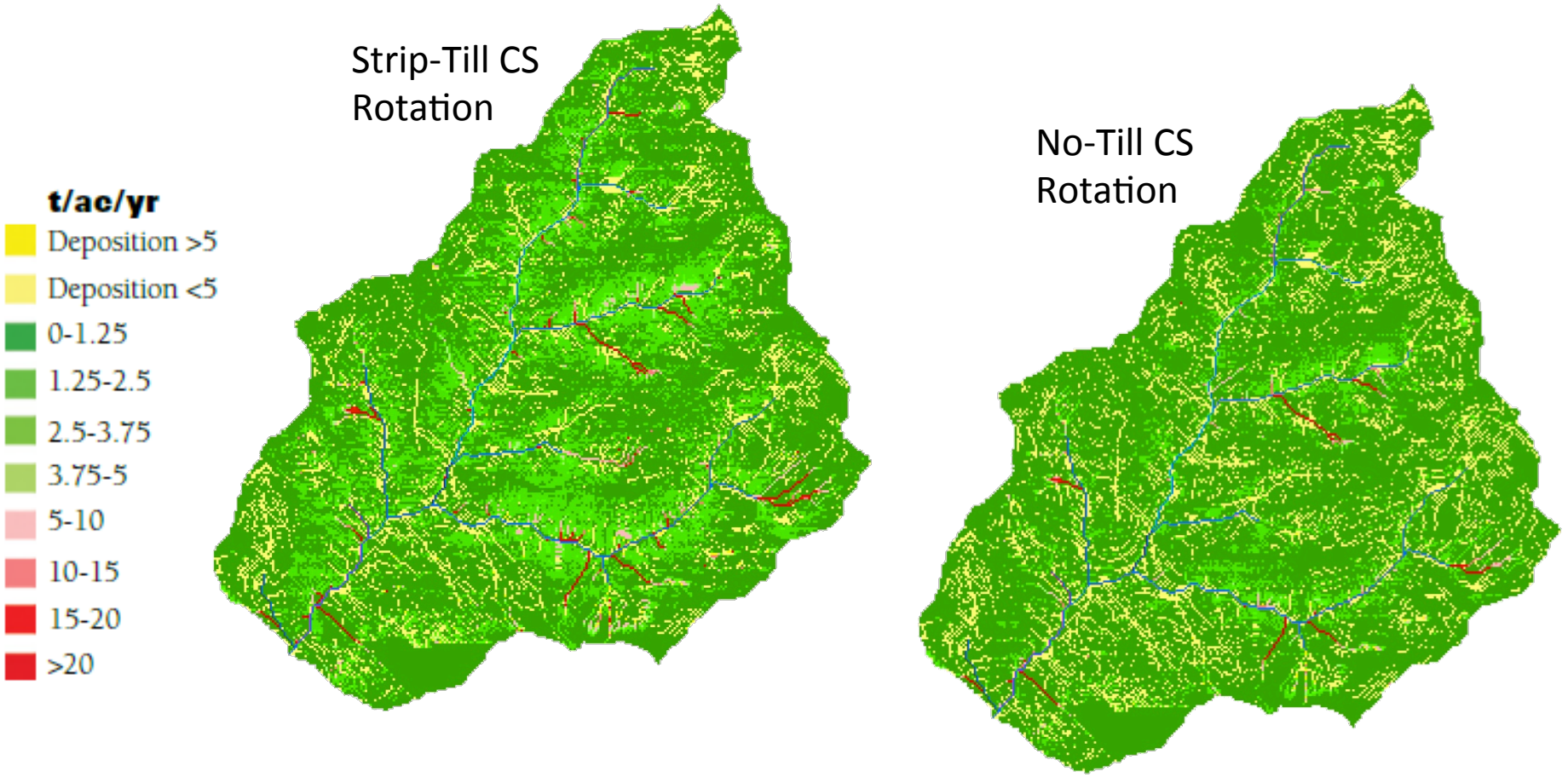

- 1200 acre watershed SE of Sibley IA

# Visual results



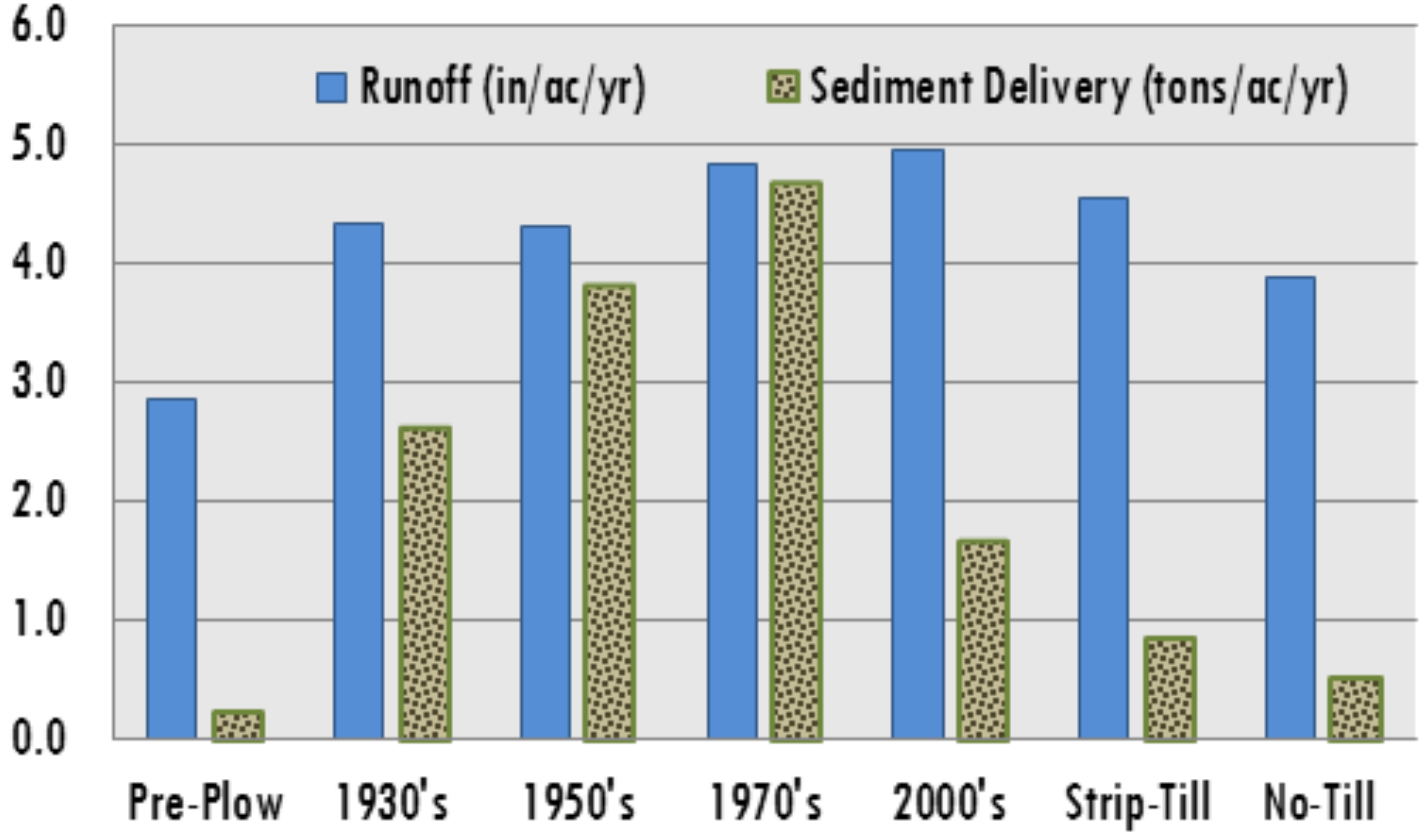

- WEPP can show us where erosion is occurring and to what extent
- Reports soil lost/deposited into channels or other areas of the landscape, as well as the amount of surface runoff occurring from a given hillslope or the watershed as a whole

# Moving to Strip-till or No-till




- Demonstrates the importance of not only reduced tillage but also grassed waterways in areas of concentrated water flow - even in no-till systems

# Runoff and Sediment Delivery to Watershed Outlet



# Whole-Farm Approach

- Performance-based management
- Manage individual fields differently
- Planned rotations, minimize tillage
- Integrate Cover Crops, Grow plants year-round
- Opportunities for 3rd crops in rotation
- In-Field conservation practices
- Edge of field conservation practices

# Contoured Prairie Filter Strips

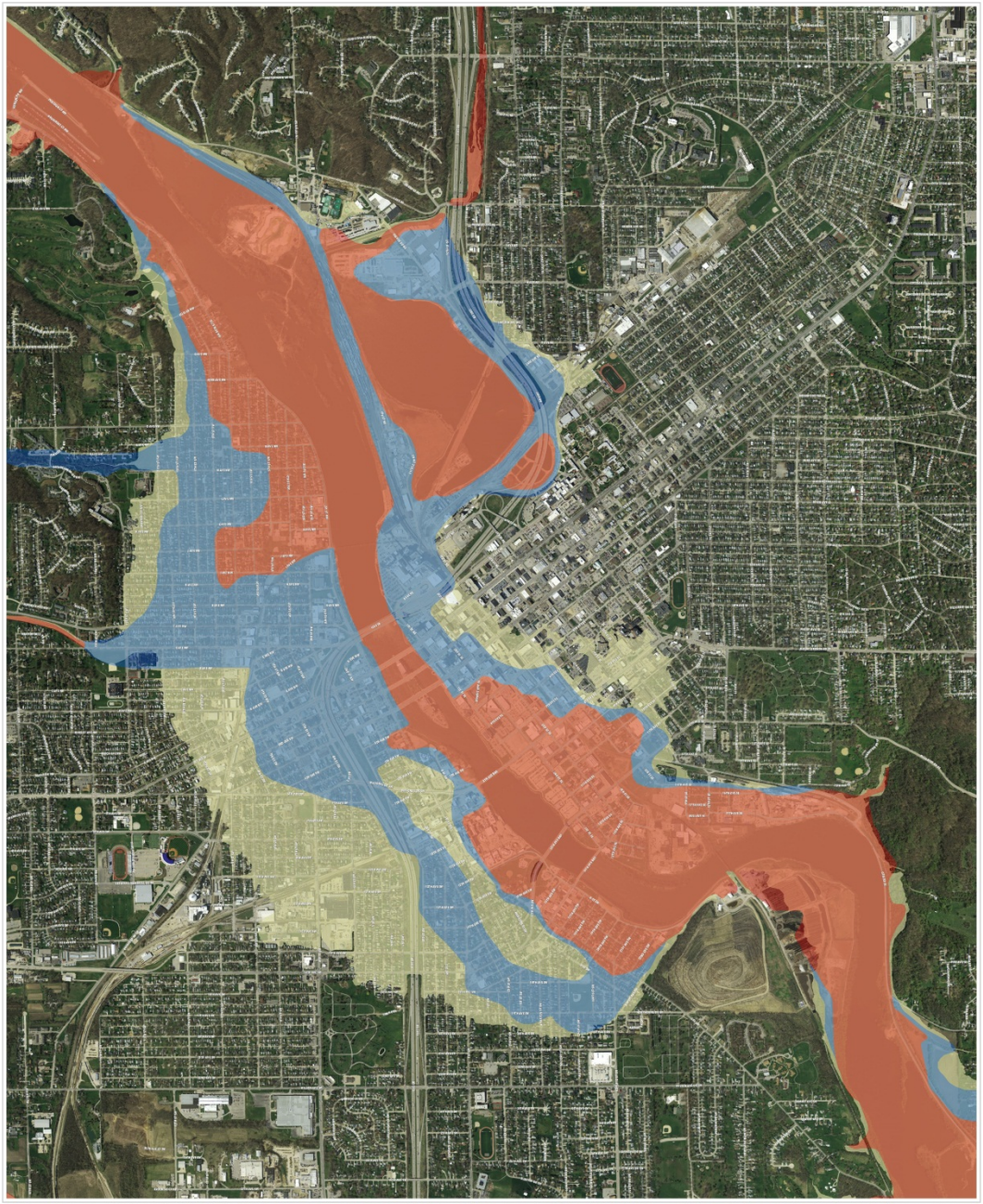
# Prairie plants 1 year after seeding

# No-till corn after corn/rye cc

# No-till corn after soybean/rye cc

# Opportunities for 3rd crops

# Wasteland?



Flood 2008 Inundation Area
& 1991 FEMA Flood Zones

Legend
2008 Flood Inundation Area
FEMA 1991 Flood Zones
100 Year
500 Year

1:6,000
1 inch = 500 feet
0 775 Feet
0 0.25 miles

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# Flood Management Strategy

E Continuous Trail System

F Restored River Edge and River Recreation

G Sports Recreation

Typical Section at Greenway

CEDAR RAPIDS
River Corridor
Redevelopment Plan
OPEN HOUSE

Jayco

# Cedar Falls' Floodplain Ordinance Effective Jan 1, 2010

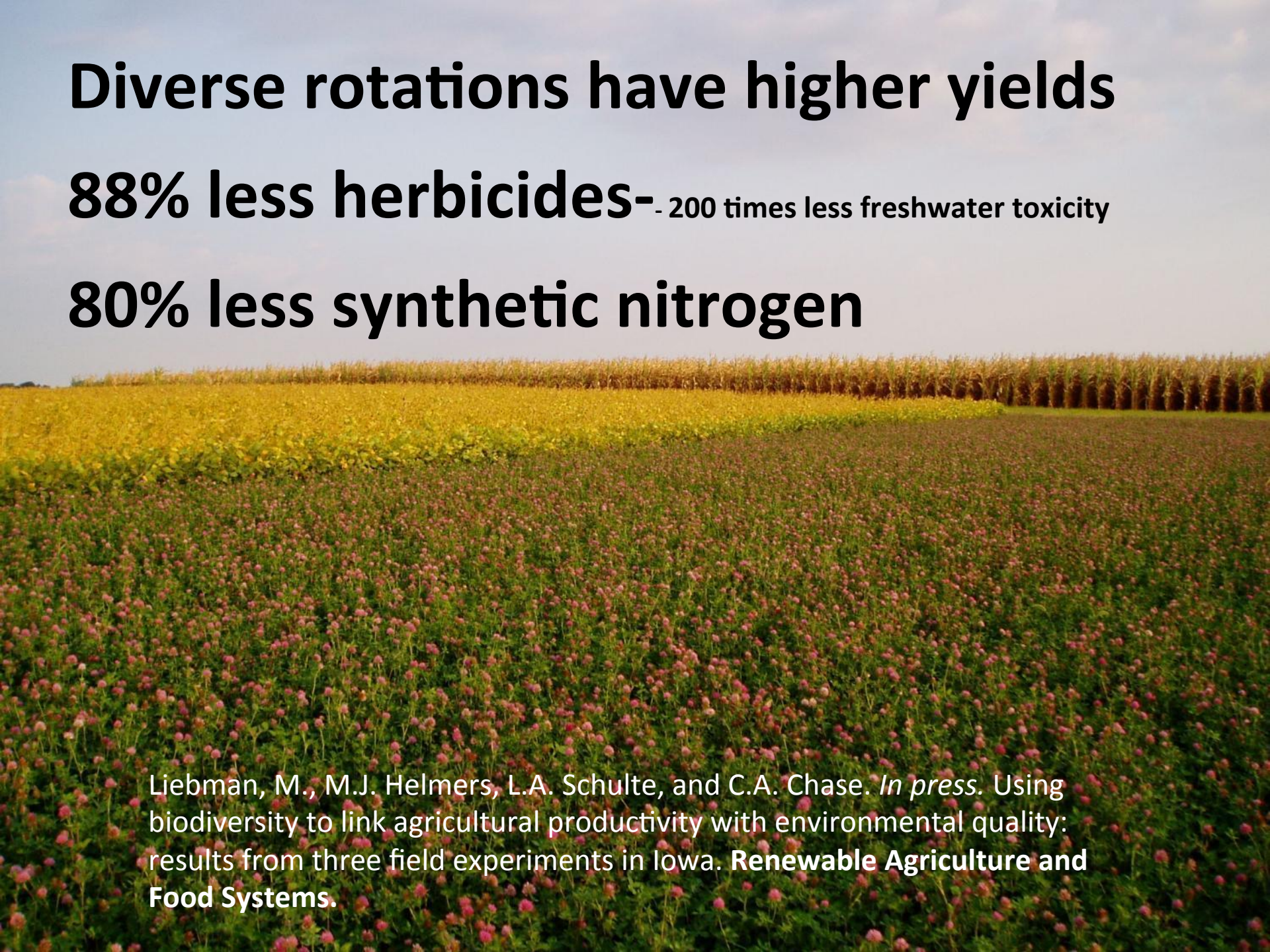
- 500-year flood event as the regulatory flood elevation
- No new subdivisions in the 500-year floodplain
- Limits amount of fill
- Floodplain Task Force to recommend fine-tuning minor changes to the ordinance

May 2004, Marshall County, Iowa Photo: Kamyar Enshayan

# Diverse rotations have higher yields

# 88% less herbicides- 200 times less freshwater toxicity

# 80% less synthetic nitrogen



Liebman, M., M.J. Helmers, L.A. Schulte, and C.A. Chase. *In press.* Using biodiversity to link agricultural productivity with environmental quality: results from three field experiments in Iowa. **Renewable Agriculture and Food Systems.**