

Prairie Strips: A New Conservation Practice for Farmers and Crop Consultants

Siting Prairie Strips

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Science-based Trials of Row-crops Integrated with Prairie Strips

STRIPS is a team of scientists, educators, farmers, and extension specialists studying and offering information about prairie strips as a farmland conservation practice.



Prairie Strips Design

Why Prairie?

- Perennial
- Deep roots
- Stiff stems
- Diverse
- Native





STRIPS 1:

Research and
demonstration on small
experimental watersheds



Photo: Tim Youngquist

Experimental Watershed Treatments

Four treatments:
100% corn/soybean (no-till)
10% buffer, at toe slope
10 buffer, in contour strips
20% buffer, in contour strips



Photo: Jasper Co., Anna Golightly

100% crops

100% prairie

**90% crops:
10% prairie**



Images: Jasper Co., Jose Gutierrez

Sources: Zhou et al. 2012, Helmers et al. 2012, Hernandez-Santana et al. 2013, Iqbal et al. 2014, Mitchell et al. 2014, Zhou et al. 2014

Highlights from the 1st Decade of STRIPS Research

Strategically adding 10% prairie to no-till corn-soy fields:

- 37% reduction in water runoff
- 95% reduction in sediment loss
- 77% reduction in phosphorus runoff
- 70% reduction in nitrogen runoff
- 70% reduction in subsurface NO₃-N concentrations (not tilled)
- More than triple pollinator and double bird abundance
- Influence on crop yield proportionate to non-cropped area
- No additional weed problems
- Cheaper than installing terraces; cost comparable to cover crops

STRIPS 2: On-farm research and refinement

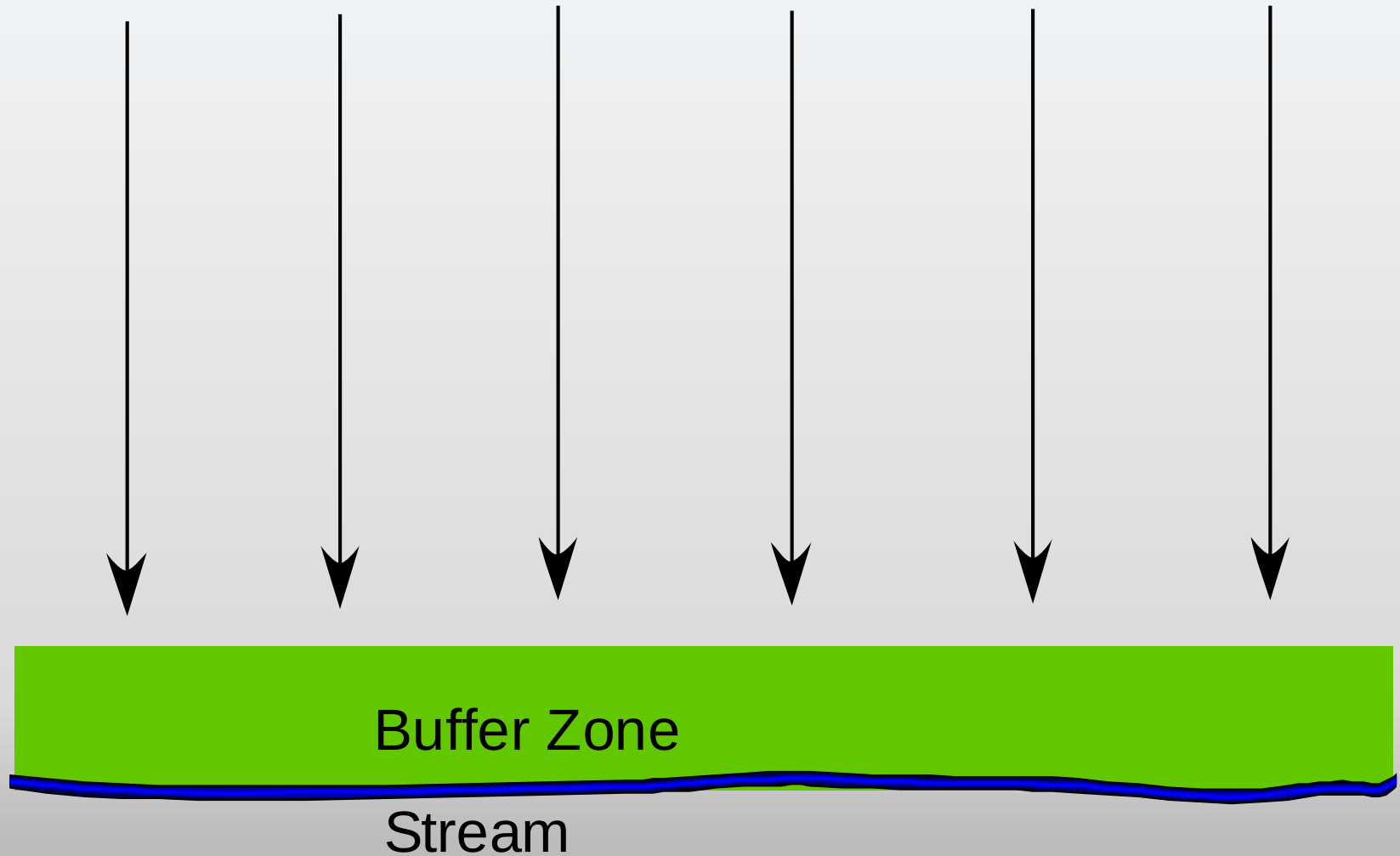


Design for water and sediment

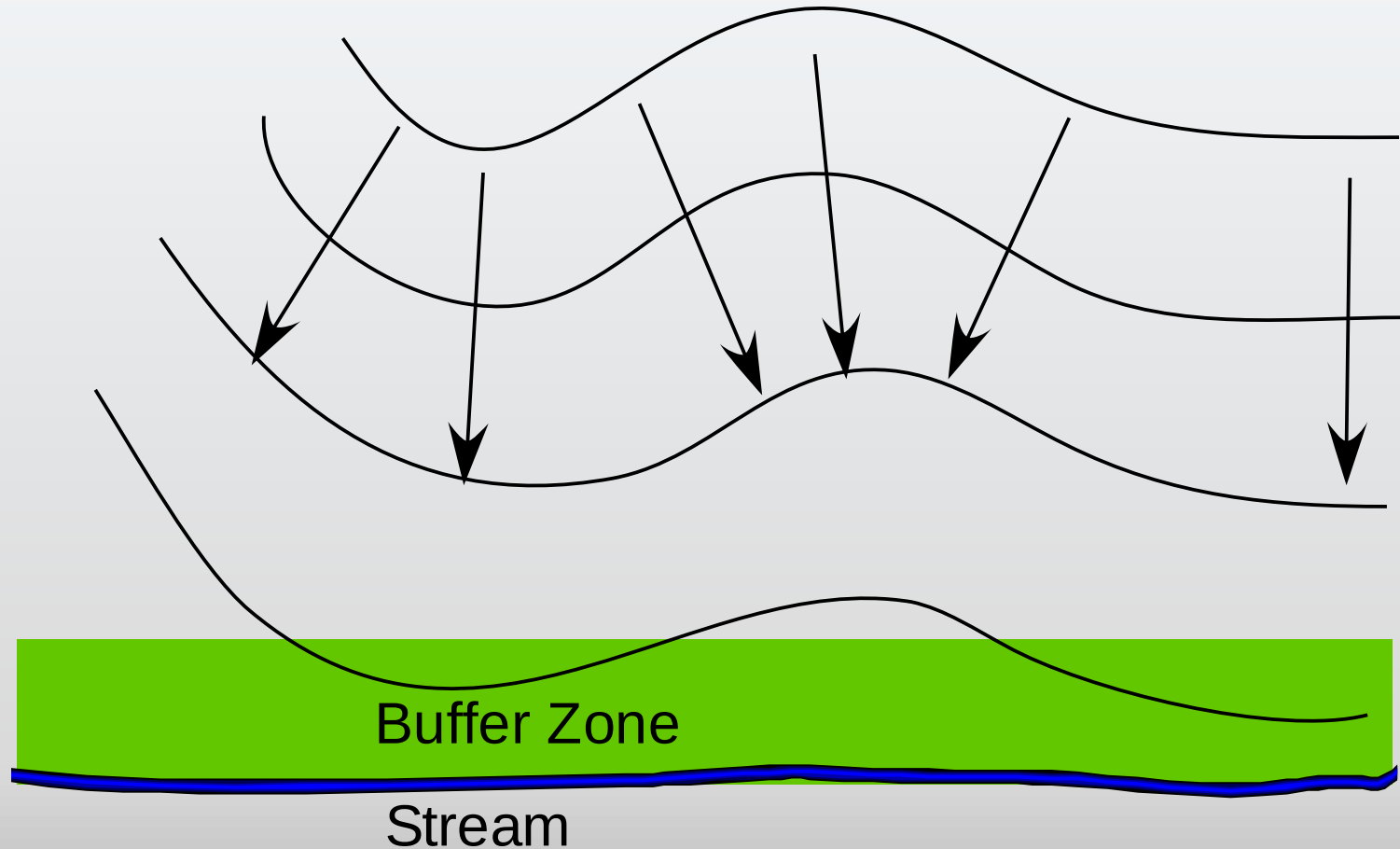
Depends on water flow

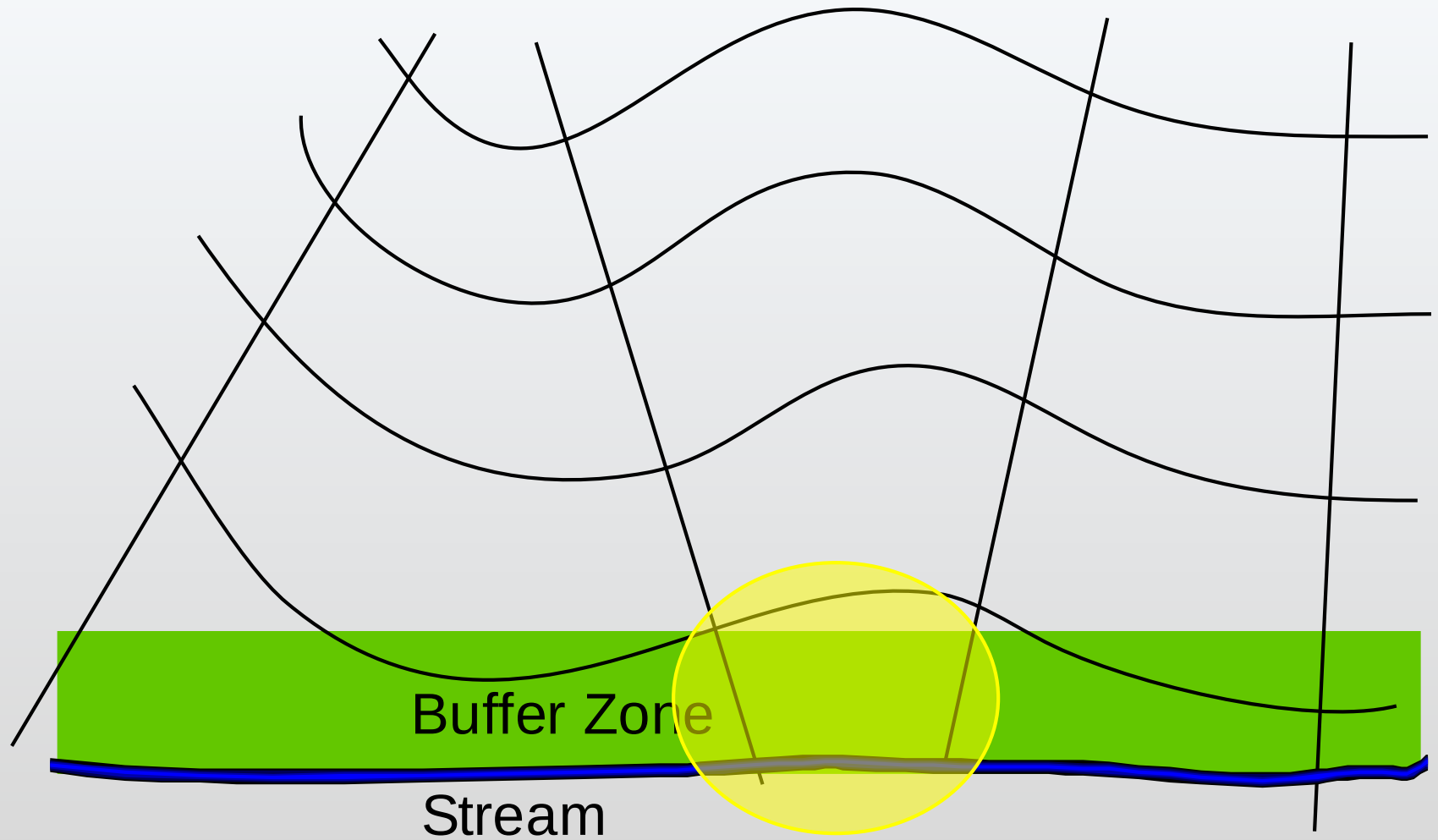


Assumed Flow to Buffer



Actual Flow to Buffer

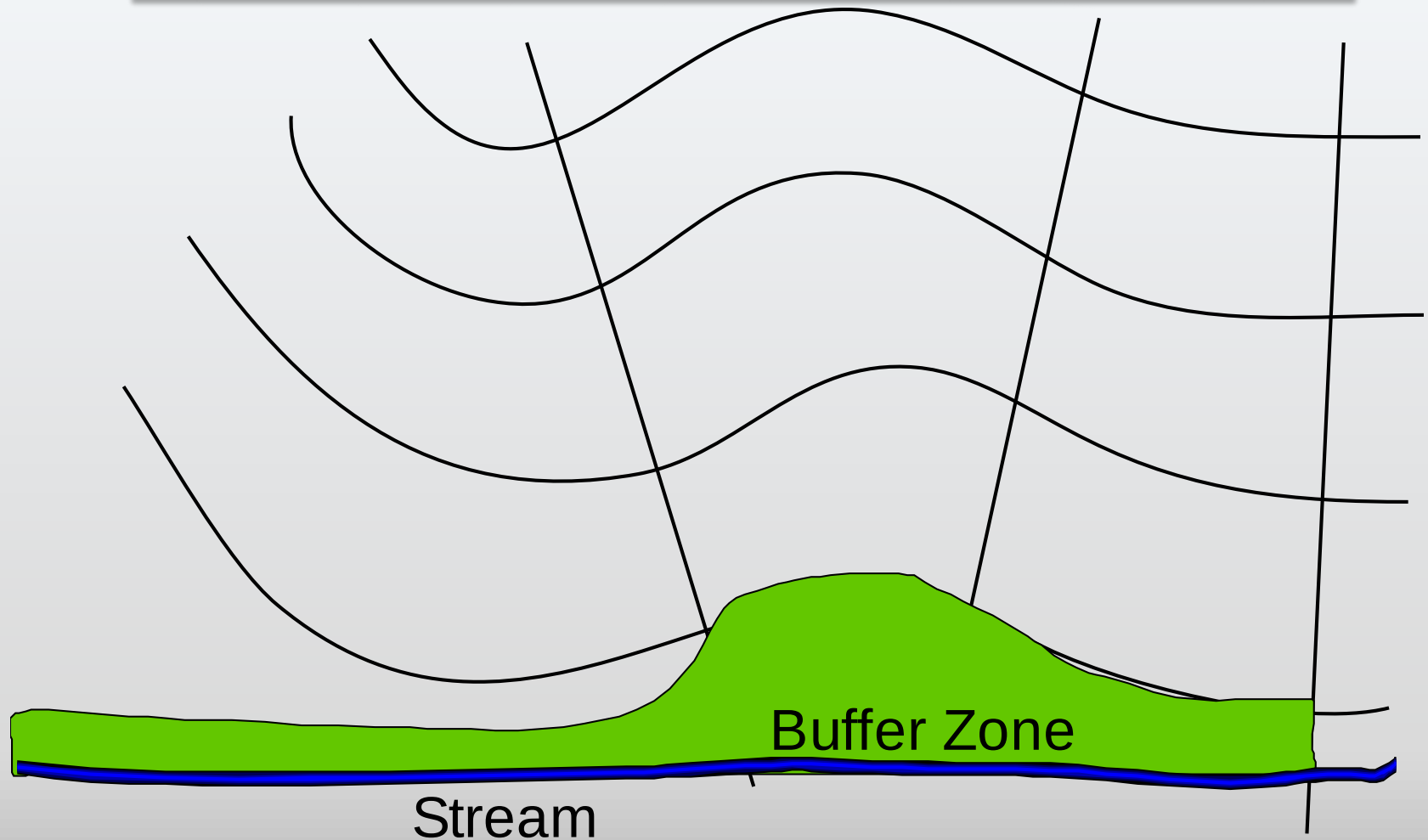




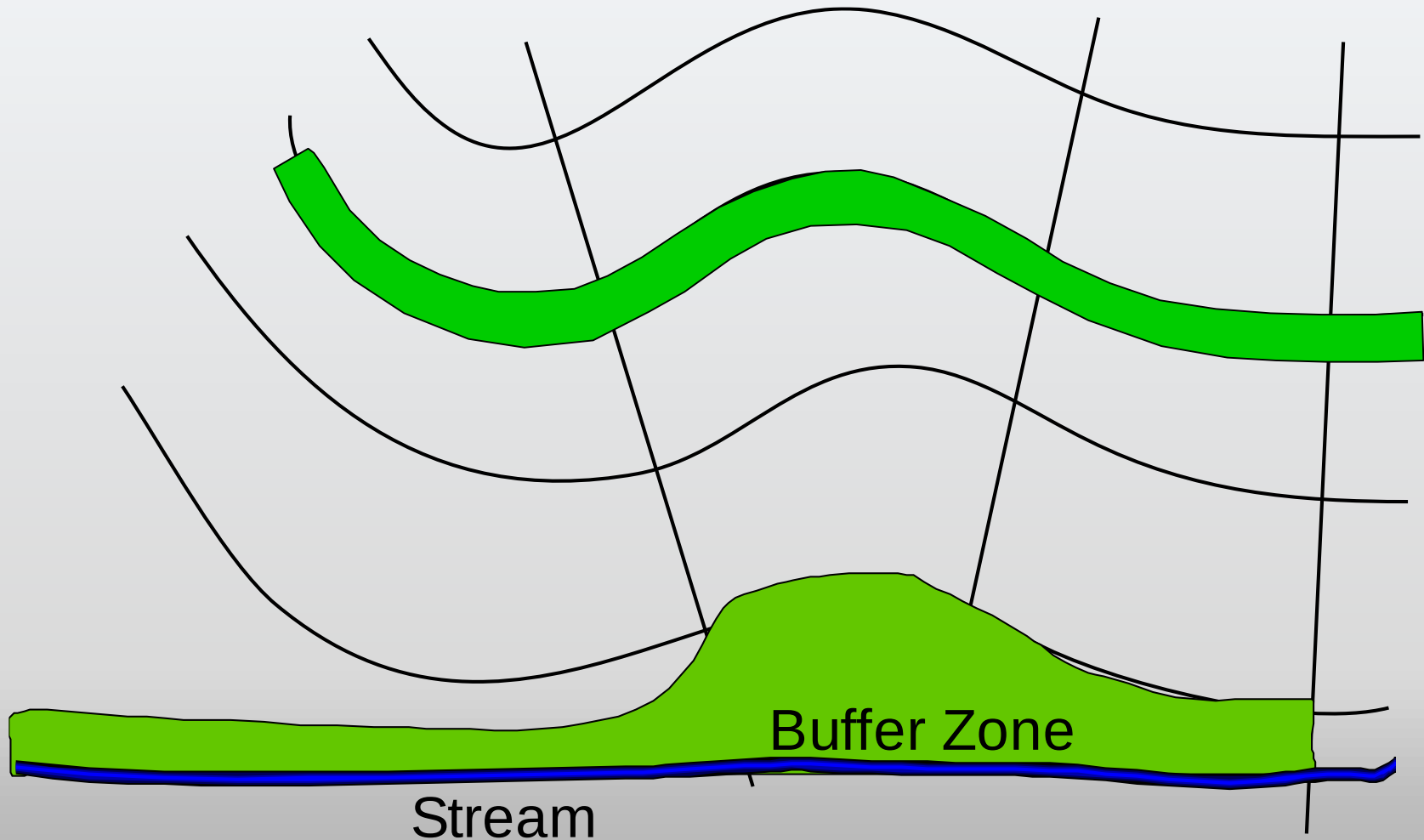
Example:
Overall BAR ~ 0.1

Actual BAR
~0.04

Potential Buffer Design



Potential Buffer Design



Prairie Strips Design



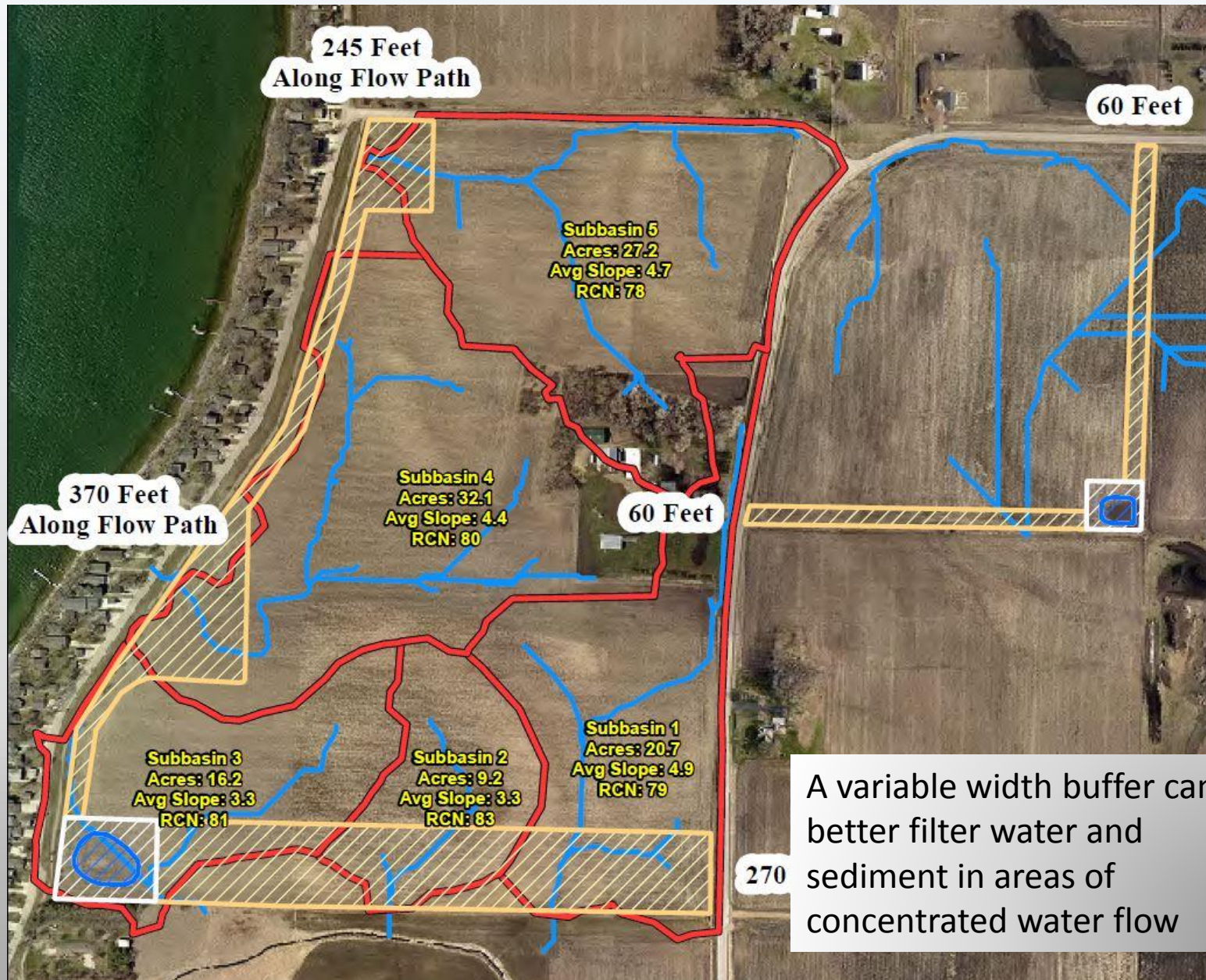
Prairie strip does not have to mean in-field contour strips

Prairie Strips Design

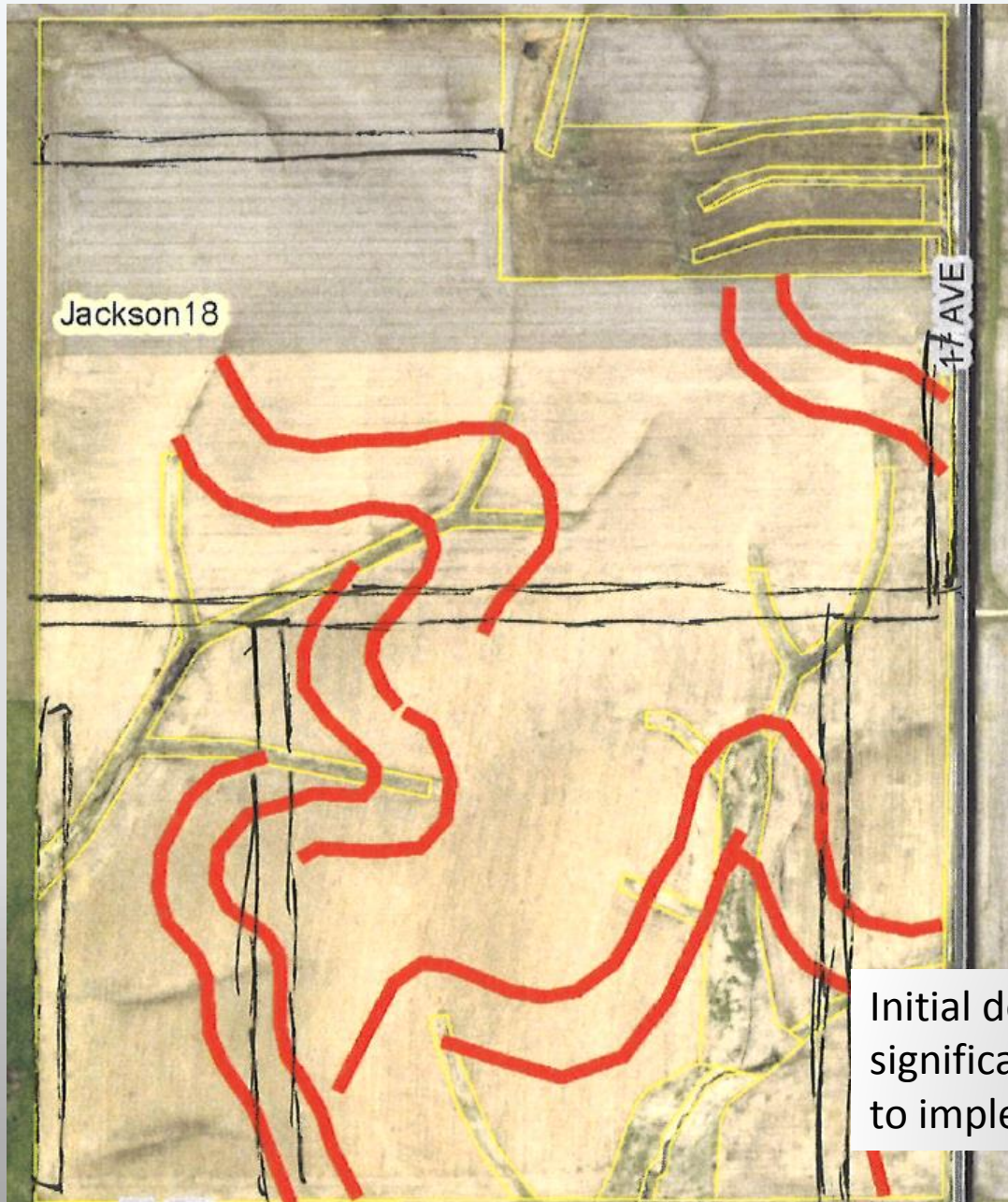


Edge of field buffers create water filter and habitat area along field border. Easier to integrate into farming operation.

Prairie Strips Design



Prairie Strips Design



Initial design may undergo significant changes prior to implementation.

Prairie Strips Design



Final design must work best for all stakeholders involved while meeting cost-share parameters.

Design for wildlife



Design for wildlife

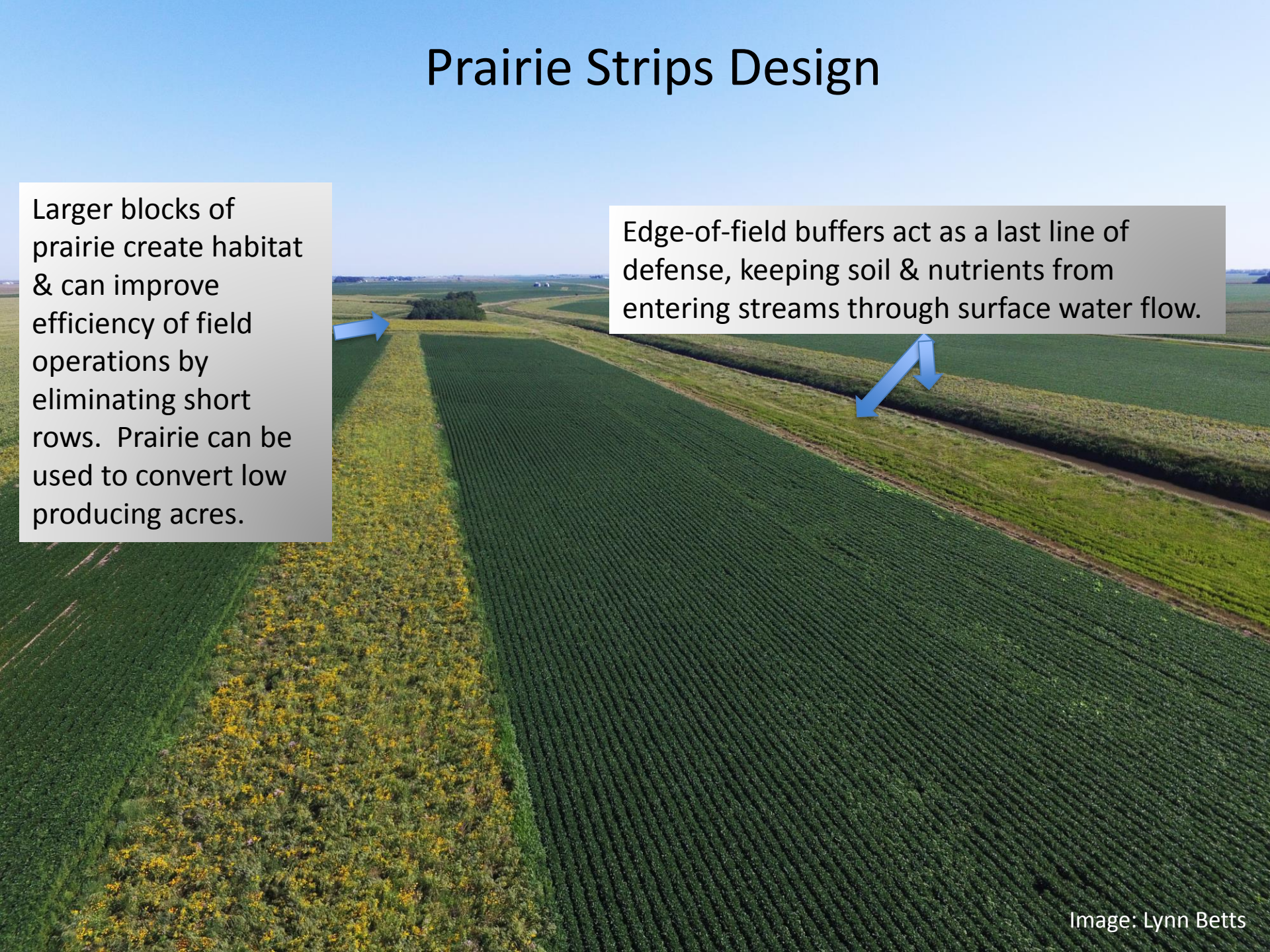


- Wider is better
- Connectivity

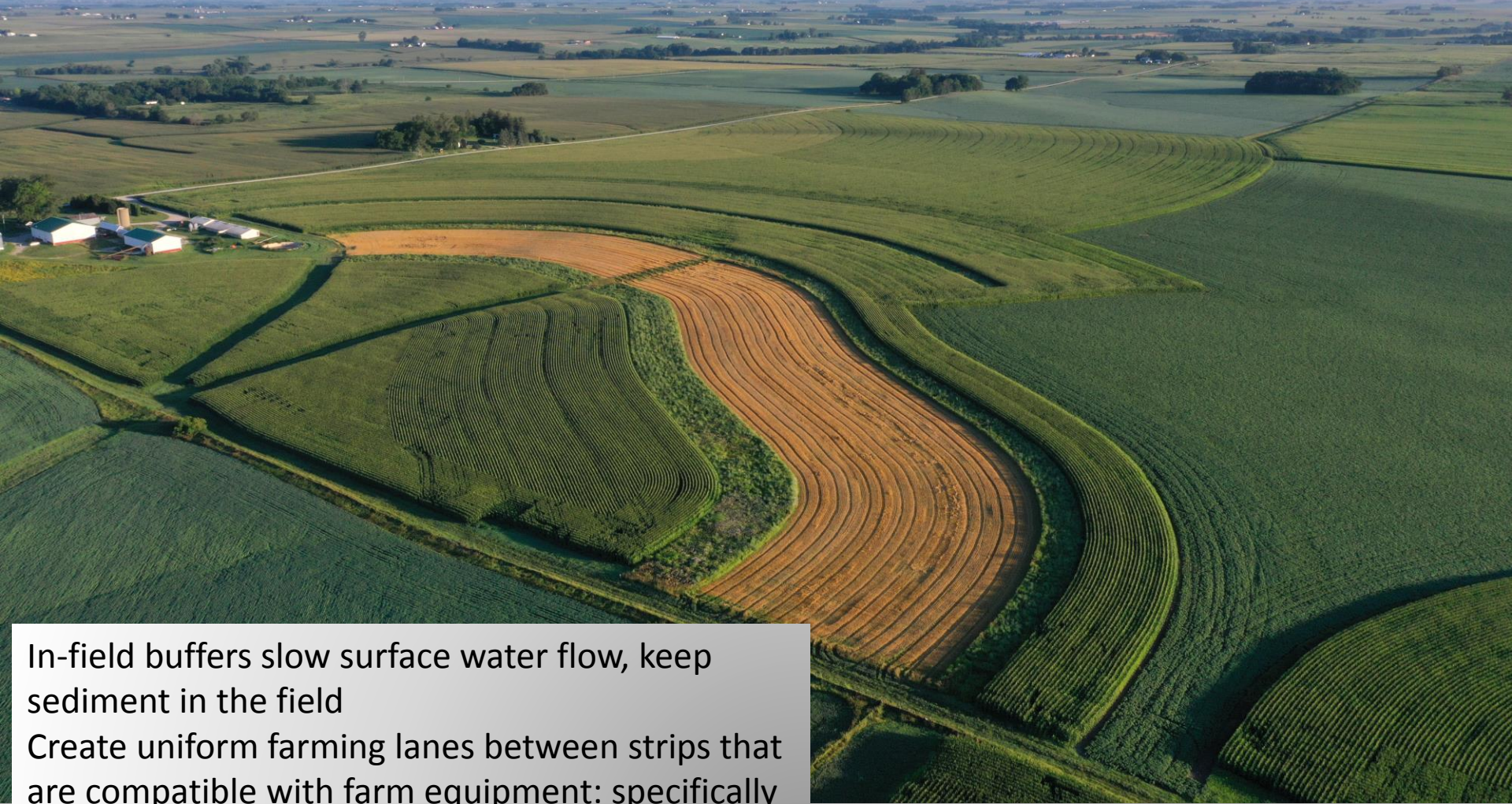
Prairie Strips Design

Larger blocks of prairie create habitat & can improve efficiency of field operations by eliminating short rows. Prairie can be used to convert low producing acres.

Edge-of-field buffers act as a last line of defense, keeping soil & nutrients from entering streams through surface water flow.



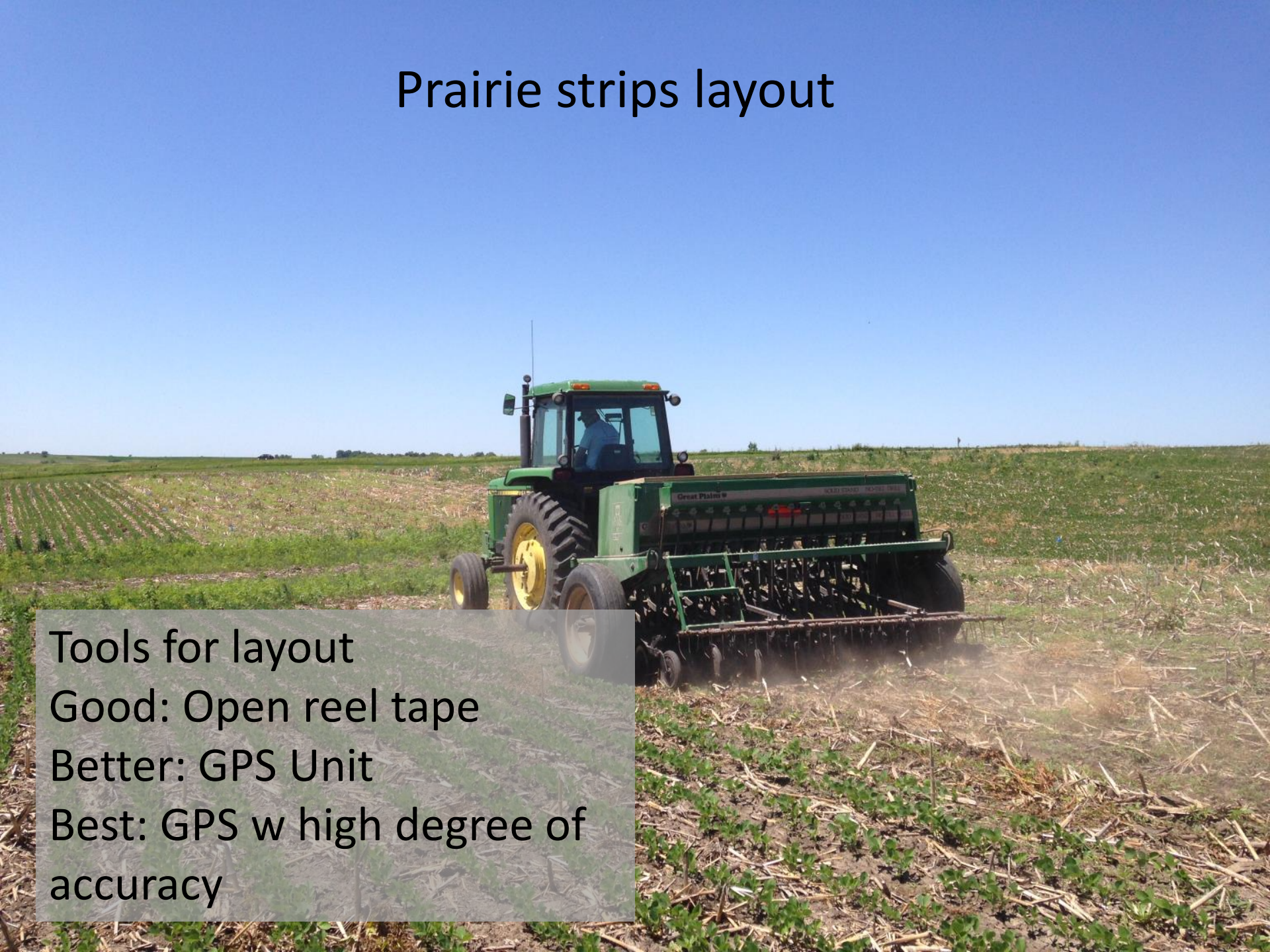
Prairie strips design for farming efficiency



In-field buffers slow surface water flow, keep sediment in the field
Create uniform farming lanes between strips that are compatible with farm equipment: specifically planter, sprayer

Image: Buchanan Co.; Omar de Kok - Mercado

Prairie strips layout



Tools for layout
Good: Open reel tape
Better: GPS Unit
Best: GPS w high degree of
accuracy

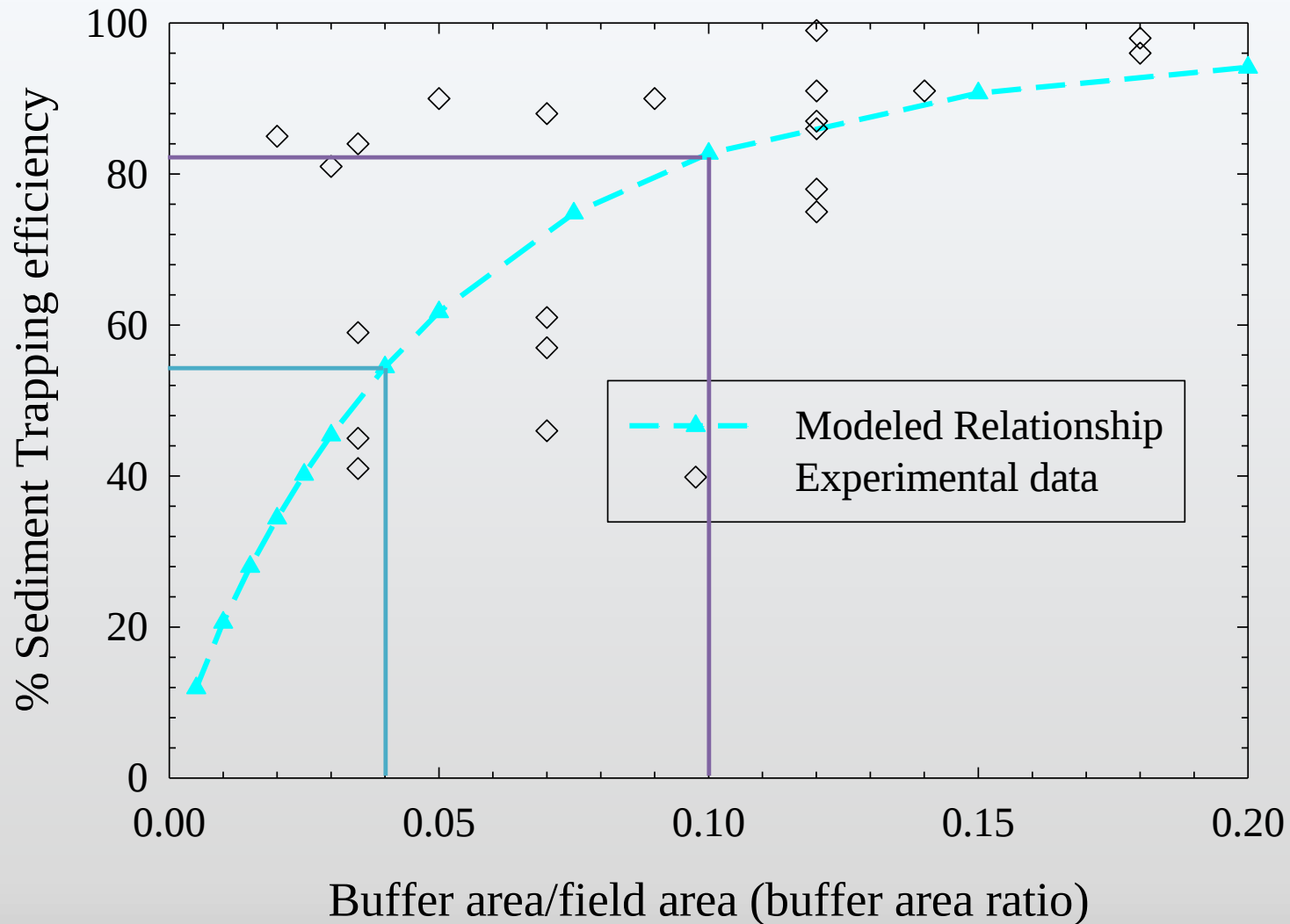
Closing Comments

- Many conservation practices, including prairie strips, are part of USDA CRP Program
- Conservation practices can be applied in a variety of ways, depending on land characteristics and landowner goals
- Multiple conservation practices protecting the same acres will produce the best results

Resources

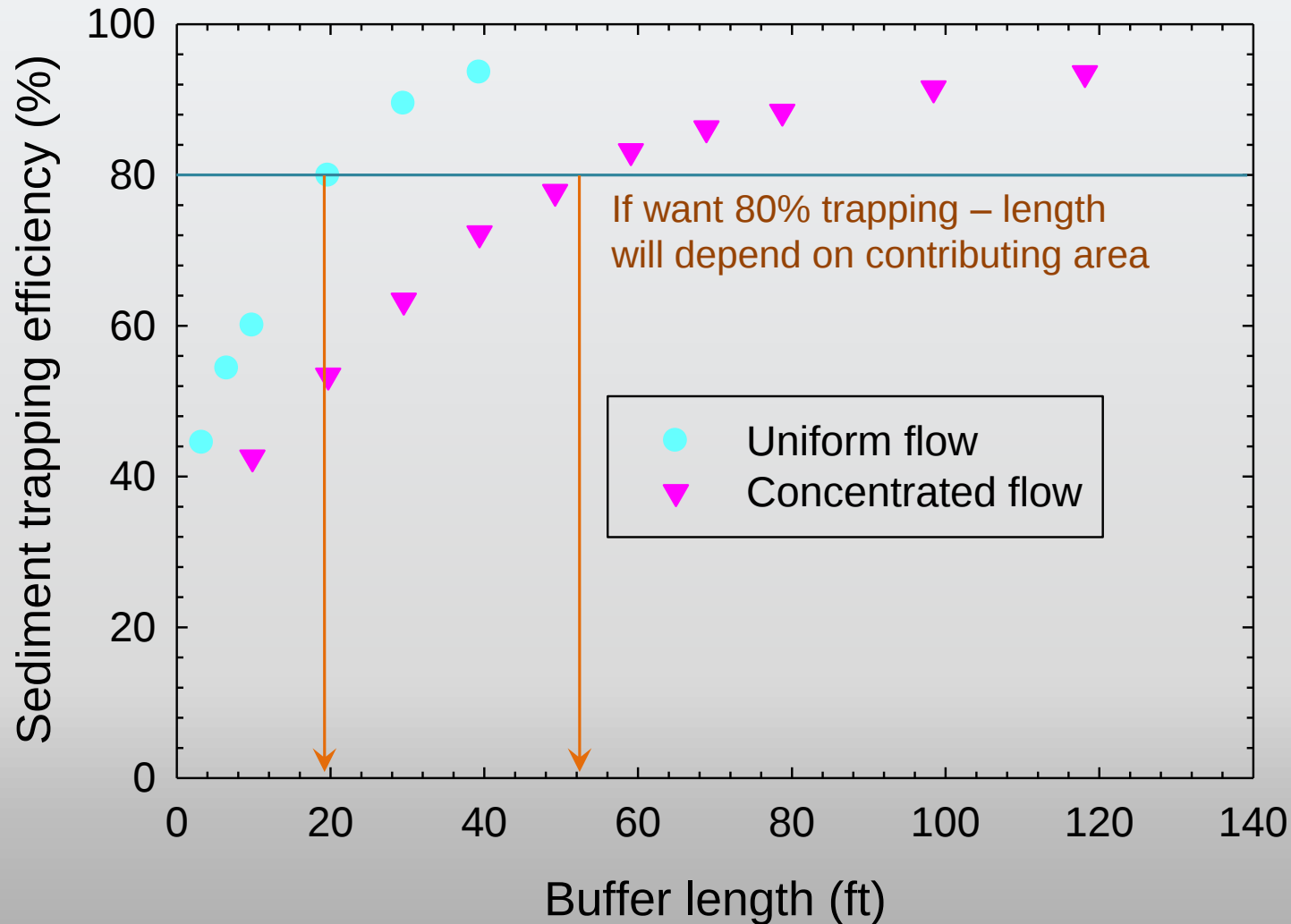
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Trapping Efficiency as a Function of Buffer Area Ratio with Experimental Data from Literature

Modeled Sediment Trapping



Seed mix design

Seed mix design

- Pollinator mix 1:3 grass:forb seeding ratio (\$909/ha)
- Diversity mix 1:1 grass:forb seeding ratio (\$719/ha)
- Economy Mix 3:1 grass:forb mix (\$321/ha)

Native stems (erosion control)

- High in economy & diversity mix, low in pollinator mix

Perennial weed resistance

- Low weed cover in economy & diversity, high weed cover in pollinator mix

Pollinator resources

- Highest in pollinator, medium in diversity, lowest in economy

Planting Time

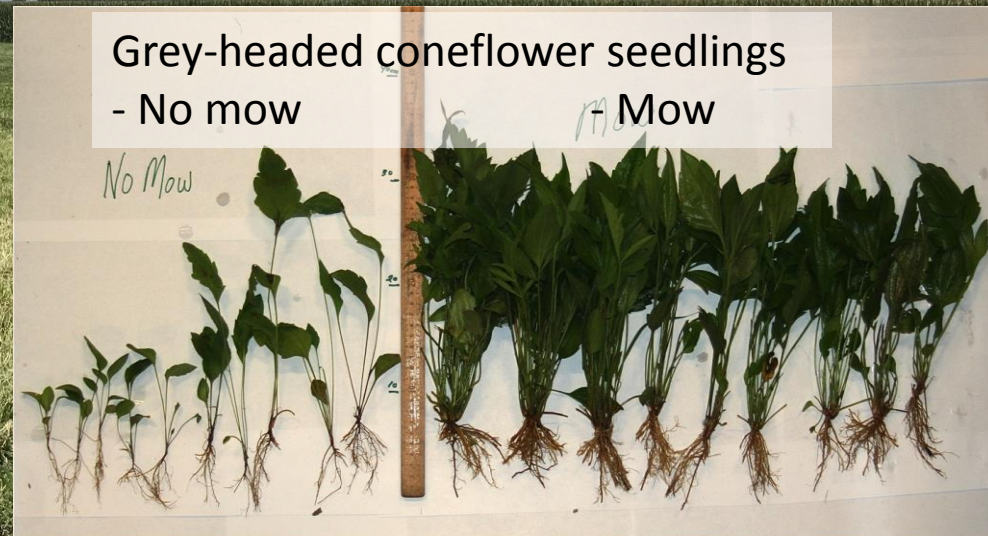
- Dormant season plantings resulted in higher cover of prairie species
- Fall plantings resulted in higher cover of forbs
- No significant difference in grass cover between planting season
- More diverse seed mix will result in more species

Establishment Maintenance



Maintained through mowing
during years 1 & 2

Importance of Mowing



Mowing gives deep-rooted perennials competitive advantage over annual weeds

Spot maintenance



Low maintenance – not NO maintenance. Invasive weeds, especially aggressive perennials like Canada thistle should be controlled during establishment.

Long term Maintenance



- Prescribed fire should be used to control invasive weeds and promote growth of native species

Root Intrusion into Tile Lines



3 years ago

Continuous Corn

3 Comments

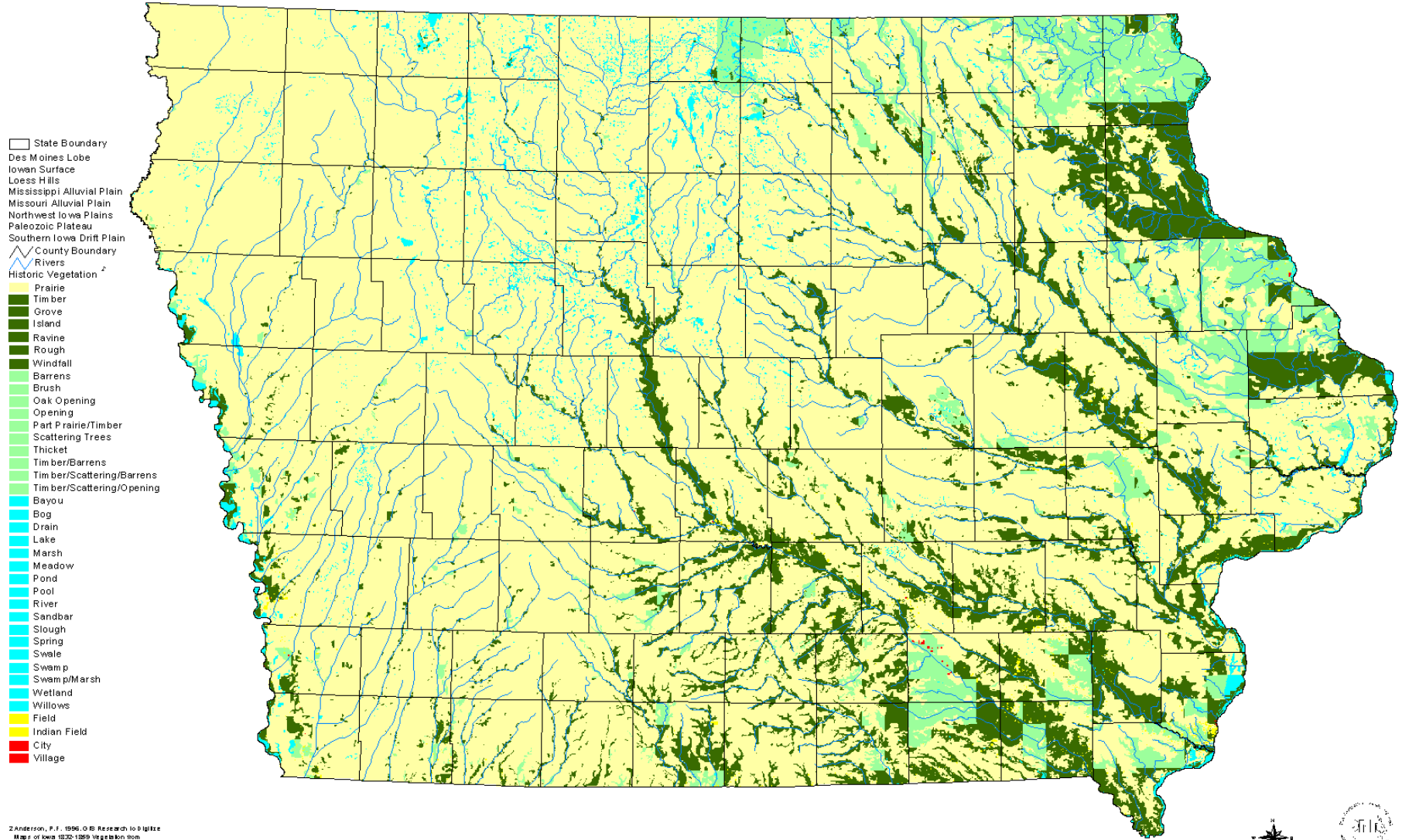


Mature Prairie



2017 ISU Graduate
ISUCALS

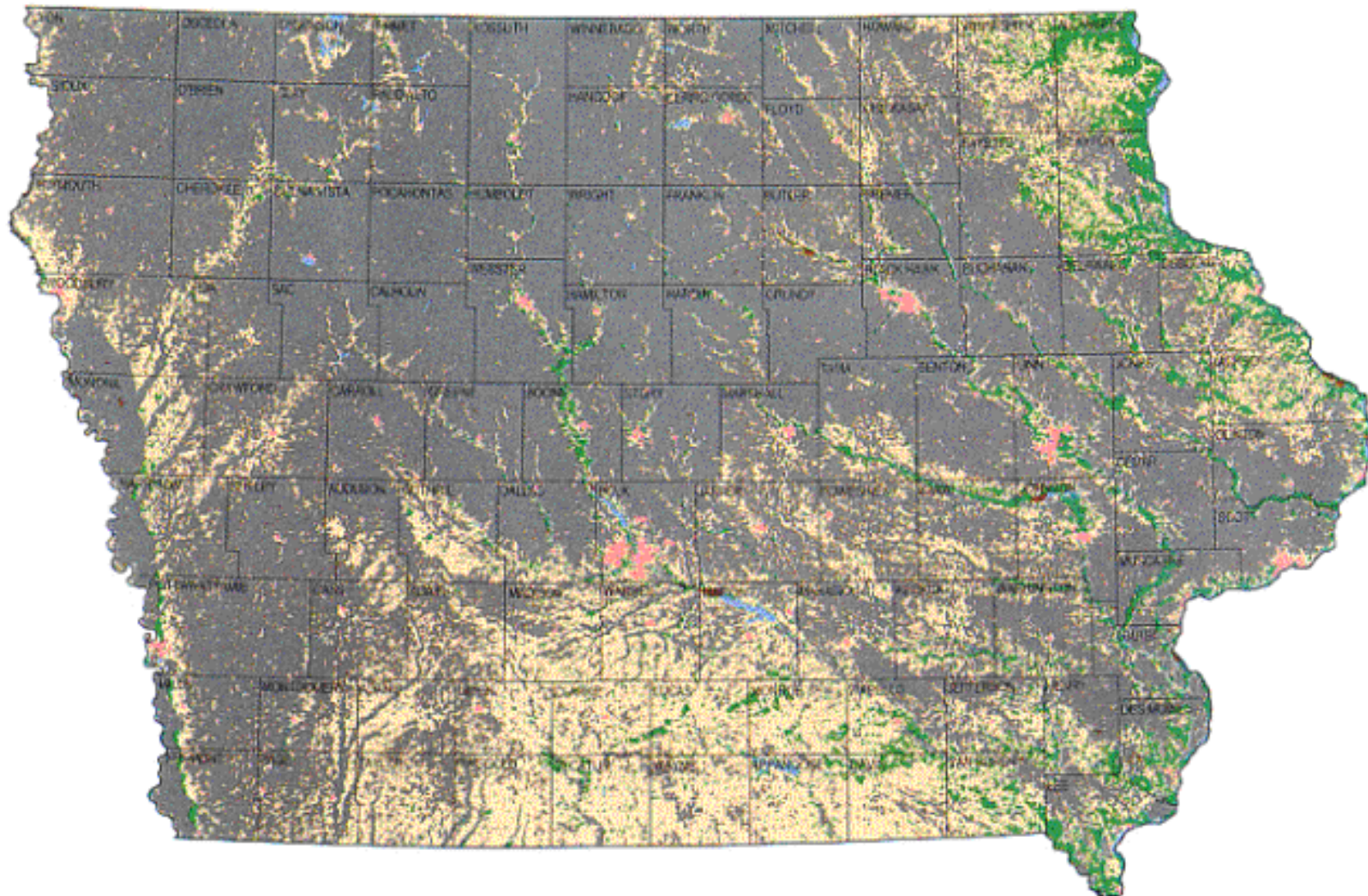
Historic Vegetation of Iowa, 1832 - 1859



Original Land Cover in Iowa

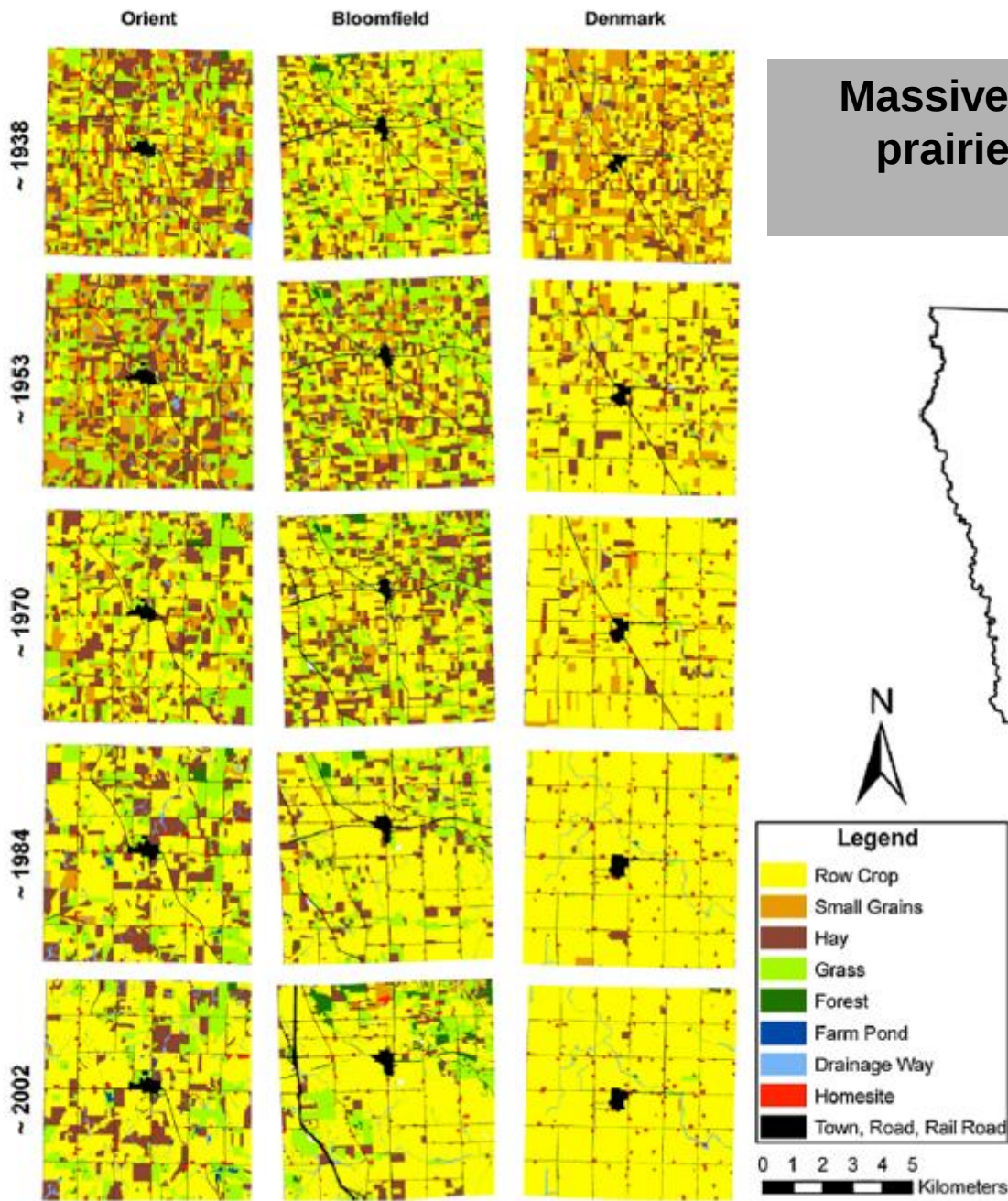


Image: Todd Ontl



Land Cover Map of Iowa





Massive conversion of perennial prairie & grassland to annual rowcrops

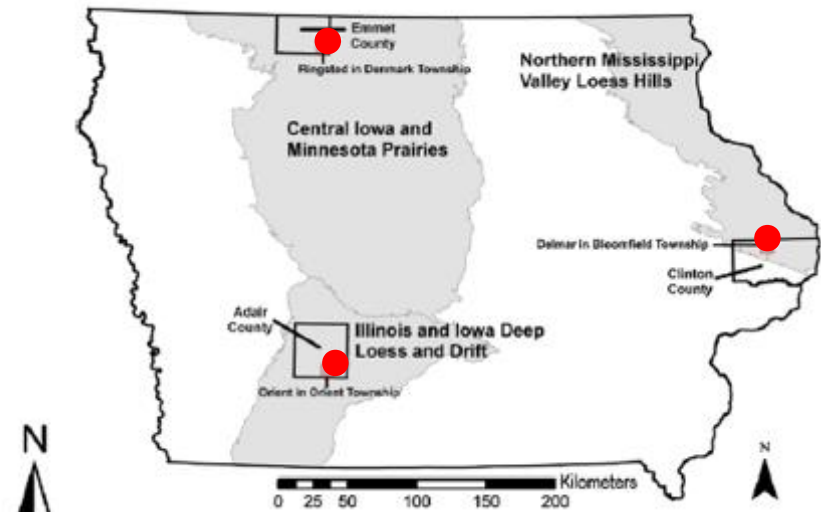


Fig. 2. Comparison of land cover change over time and among three agricultural landscapes in Iowa: Orient Township, Bloomfield Township, and Denmark Township.



Image: Tim Youngquist



Image: Mark Rasmussen