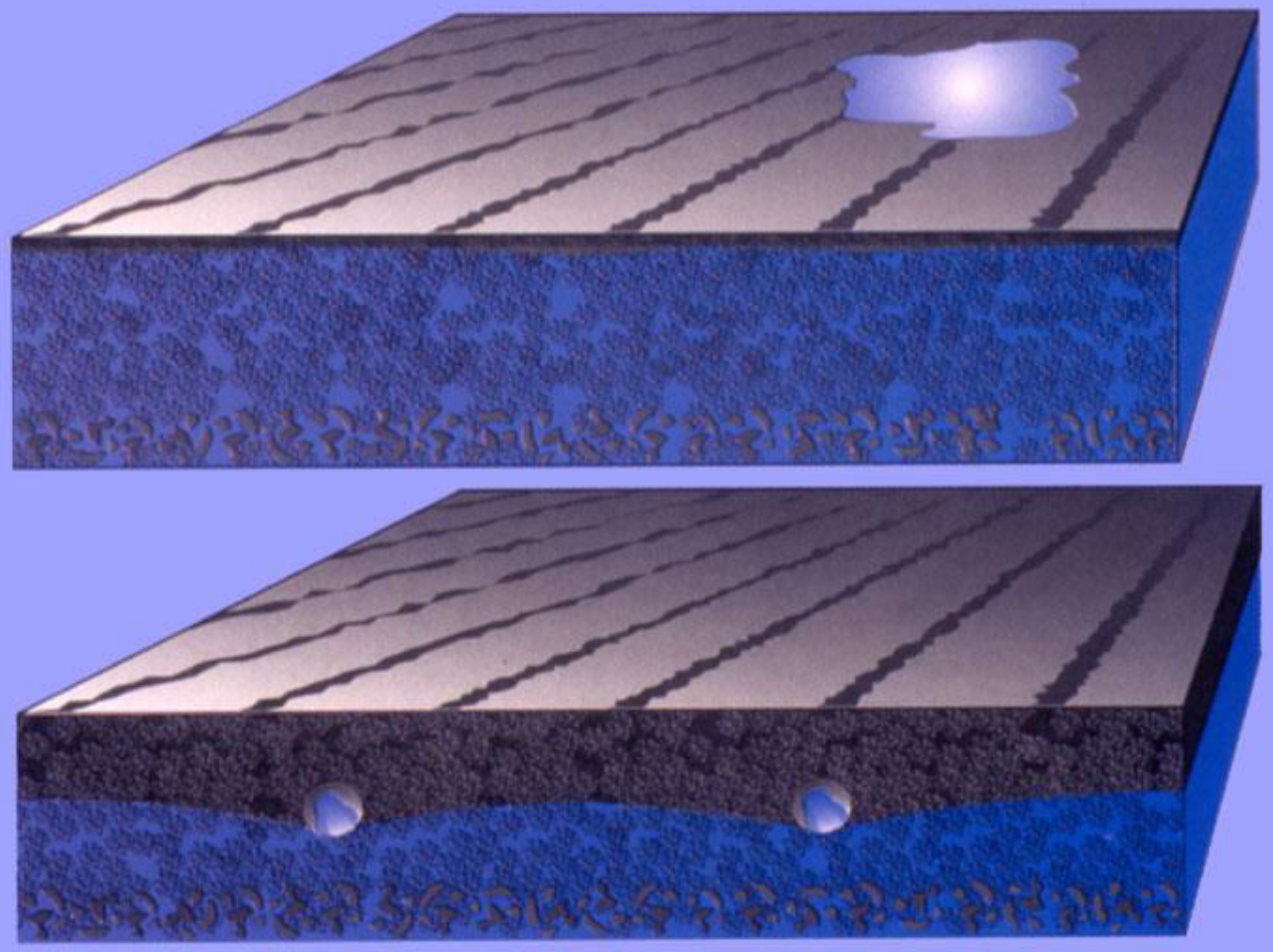
Conservation Reserve Program Acres in Iowa

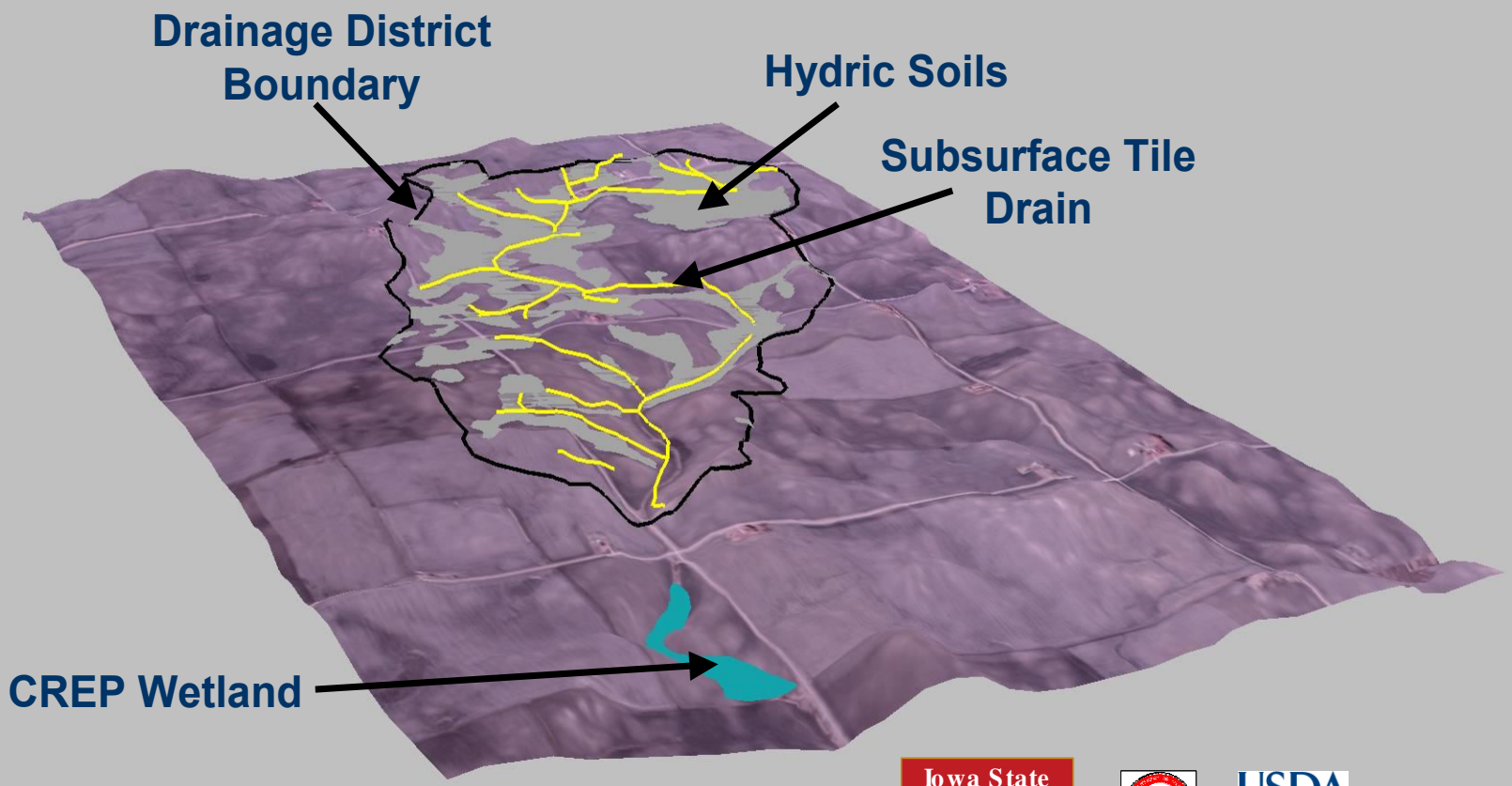
CP1	Introduced Grasses	299,889
CP2	Native Grasses	147,951
CP3	Tree Planting	17,347
CP4	Wildlife Habitat	319,523
CP5	Field Windbreaks	5,764
CP8	Grass Waterways	27,328
CP9	Shallow Water for Wildlife	16,986
CP10	Established Grass	591,059
CP11	Established Trees	7,240
CP12	Wildlife Food Plots	5,619
CP15	Contour Grass Strips	29,920
CP16	Shelter Belts	1,859
CP21	Filter Strips	232,224
CP22	Riparian Buffers	60,434
CP23	Wetland Restoration	30,797
CP25	Declining Habitat	40,801
CP27	FWP Wetland	14,902
CP28	FWP Buffer	38,233
CP29	Marginal Pastureland Wildlife Habitat	3,898
Total		1,897,239

Effects of Tile Drainage on Soil Water



Adapted from: Zucker, L.A. and L.C. Brown (eds.). 1998. Agricultural Drainage: Water Quality Impacts and Subsurface Drainage Studies in the Midwest. Ohio State University Extension Bulletin 871. The Ohio State University.

Iowa Conservation Reserve Enhancement Program



Iowa State University

USDA

Loss = concentration x carrier

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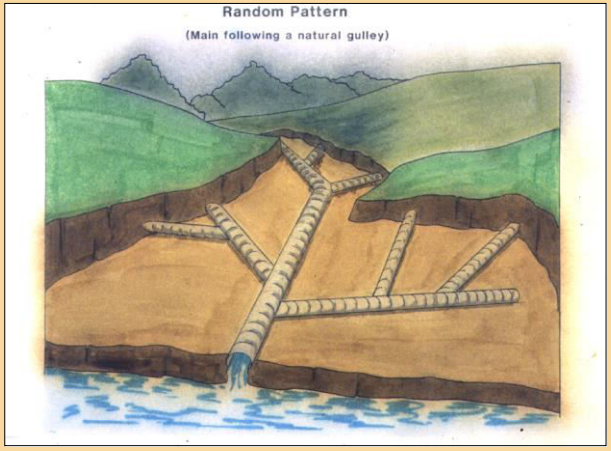

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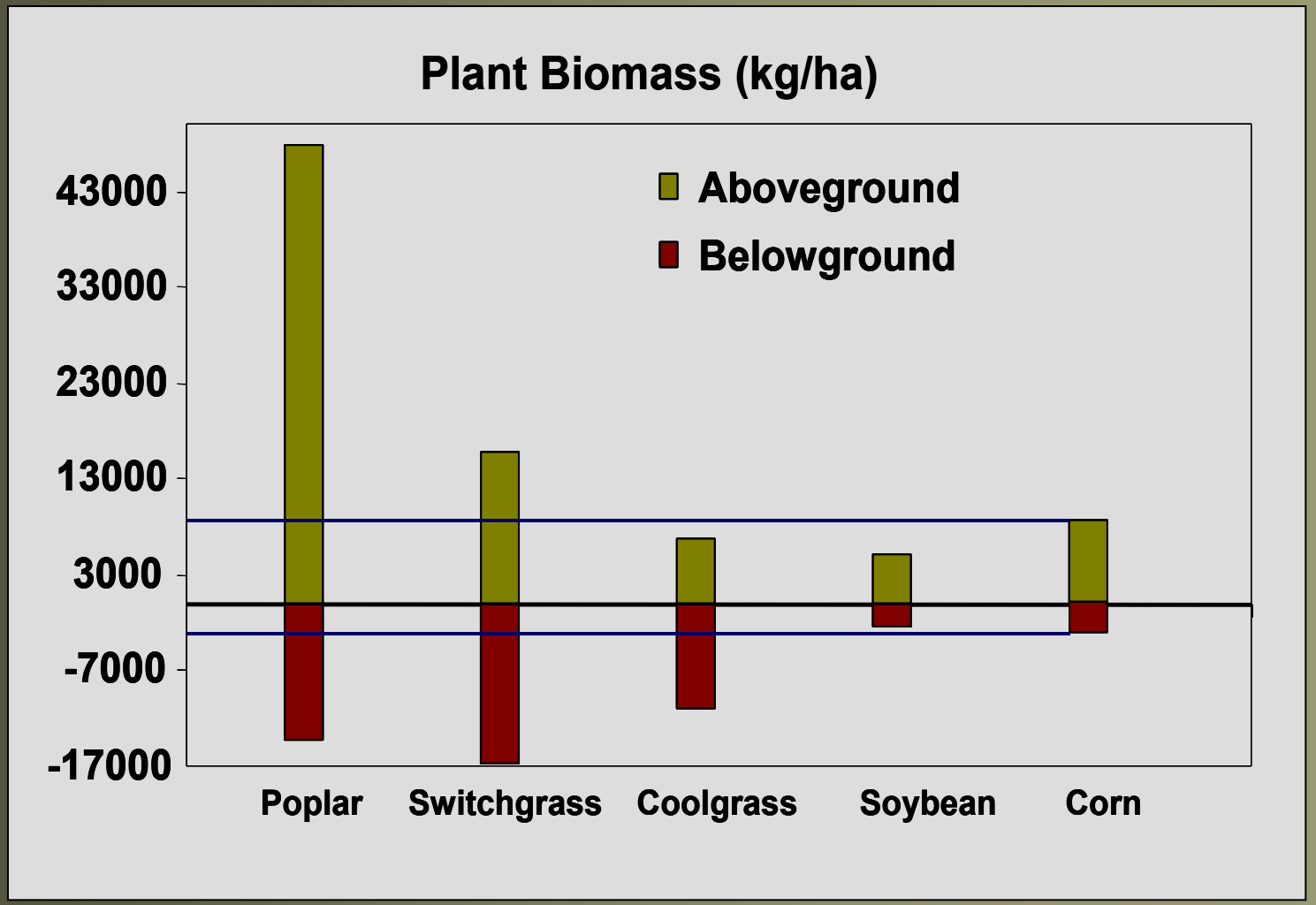
Performance Questions

- Water Budget
- Sediment & Nutrient Budget
- Soil Quality Changes
- Size/time scales
- Wildlife benefits/concerns

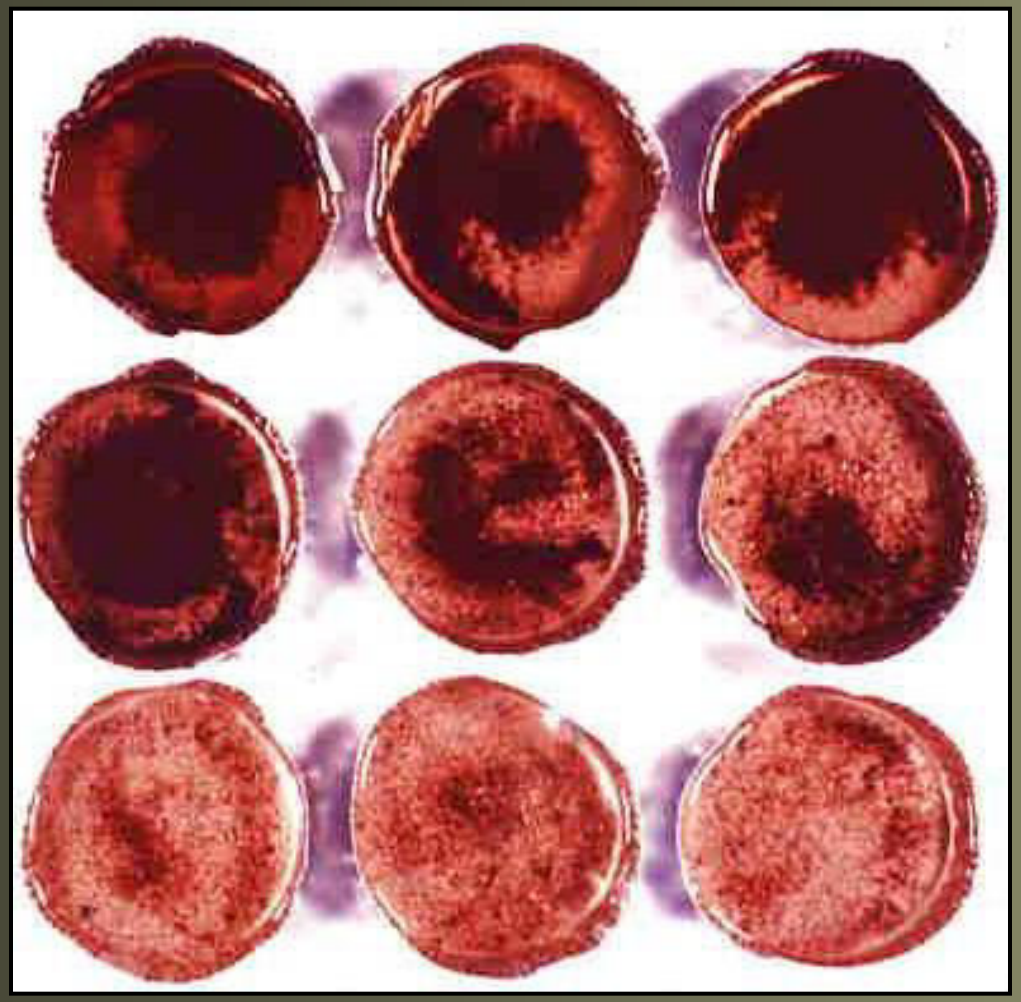
Infiltration/Surface Runoff

- Restored buffer infiltration rates 5X > crop field/pasture.
- 6 m wide grass filters remove >75% of sediment & > 40% of total N & P in surface runoff
- Adding 10 m woody buffer to switchgrass filter removal > 90% of sediment and > 80% of nutrients
- Switchgrass filters more effective than cool-season grass filters.


Plant Biomass (kg/ha)
43000
33000
23000
13000
3000
-7000
-17000
Aboveground
Belowground
Poplar
Switchgrass
Coolgrass
Soybean
Corn

Soil Organic Matter Fractions

Increase > 50% after 7 years

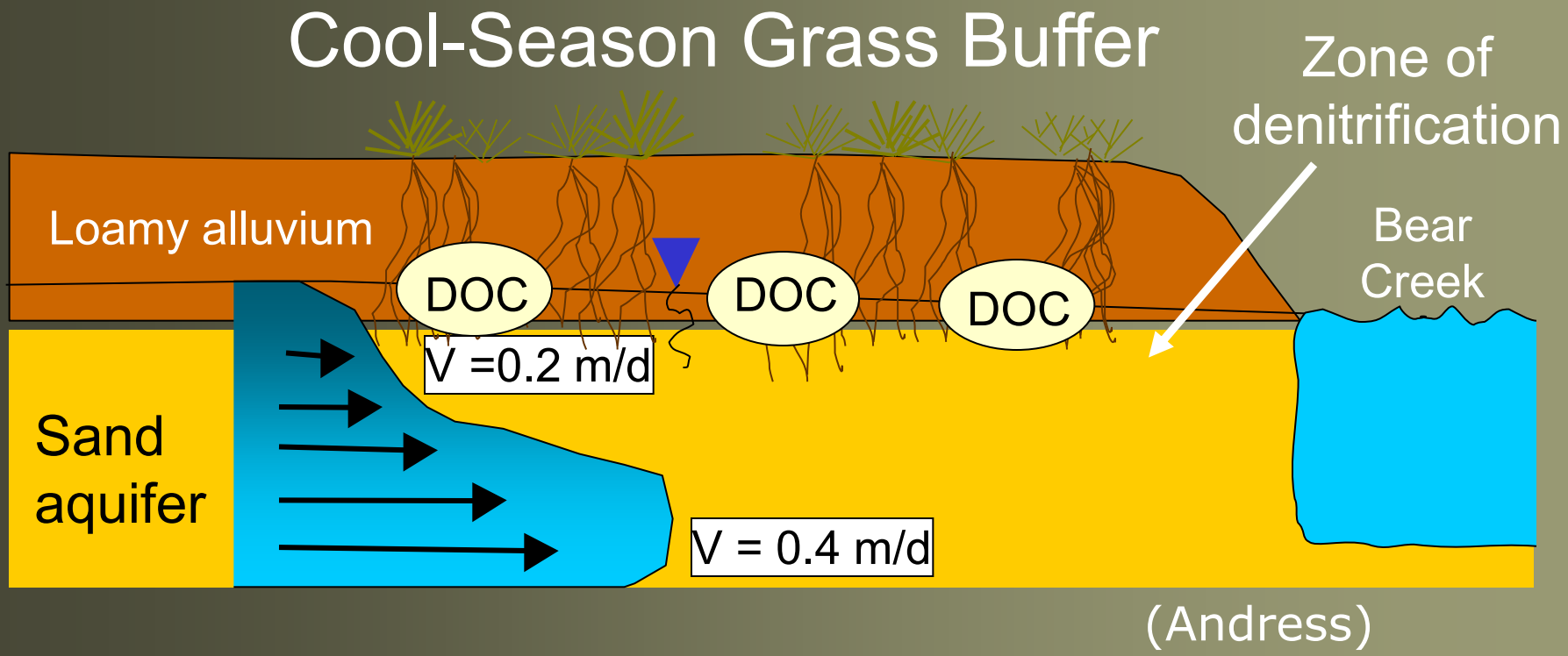


Cool season grass

Tree (Poplar)

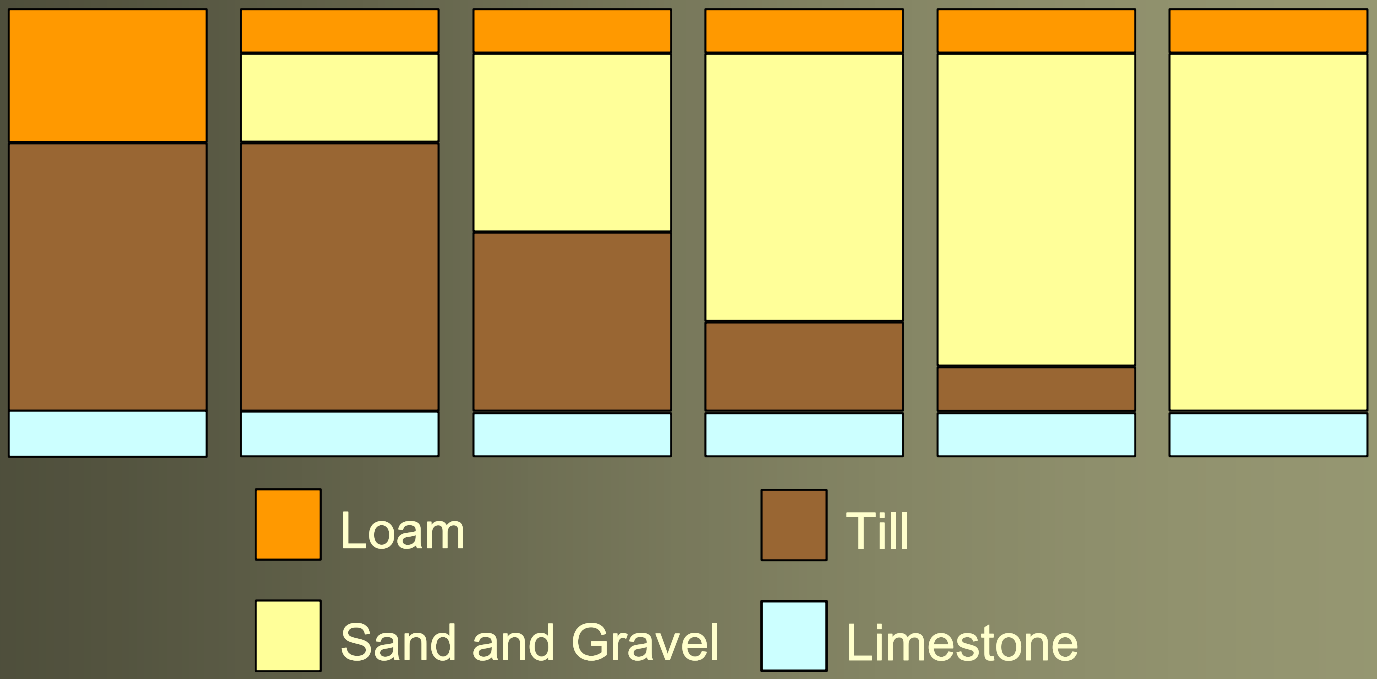
Crop (Soybean)

Conceptual Model of Groundwater Flow



- **Higher velocities at bottom of aquifer**
- **Zone of denitrification at water table**
- **Aquifer type/thickness affects NO_3 transport**

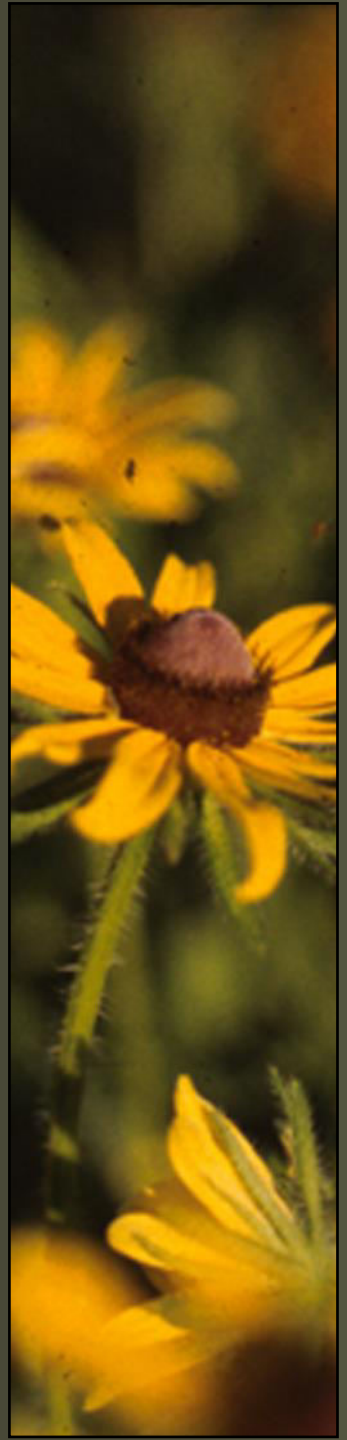
Buffer Siting Model



Maximum ← Residence Time → Minimum

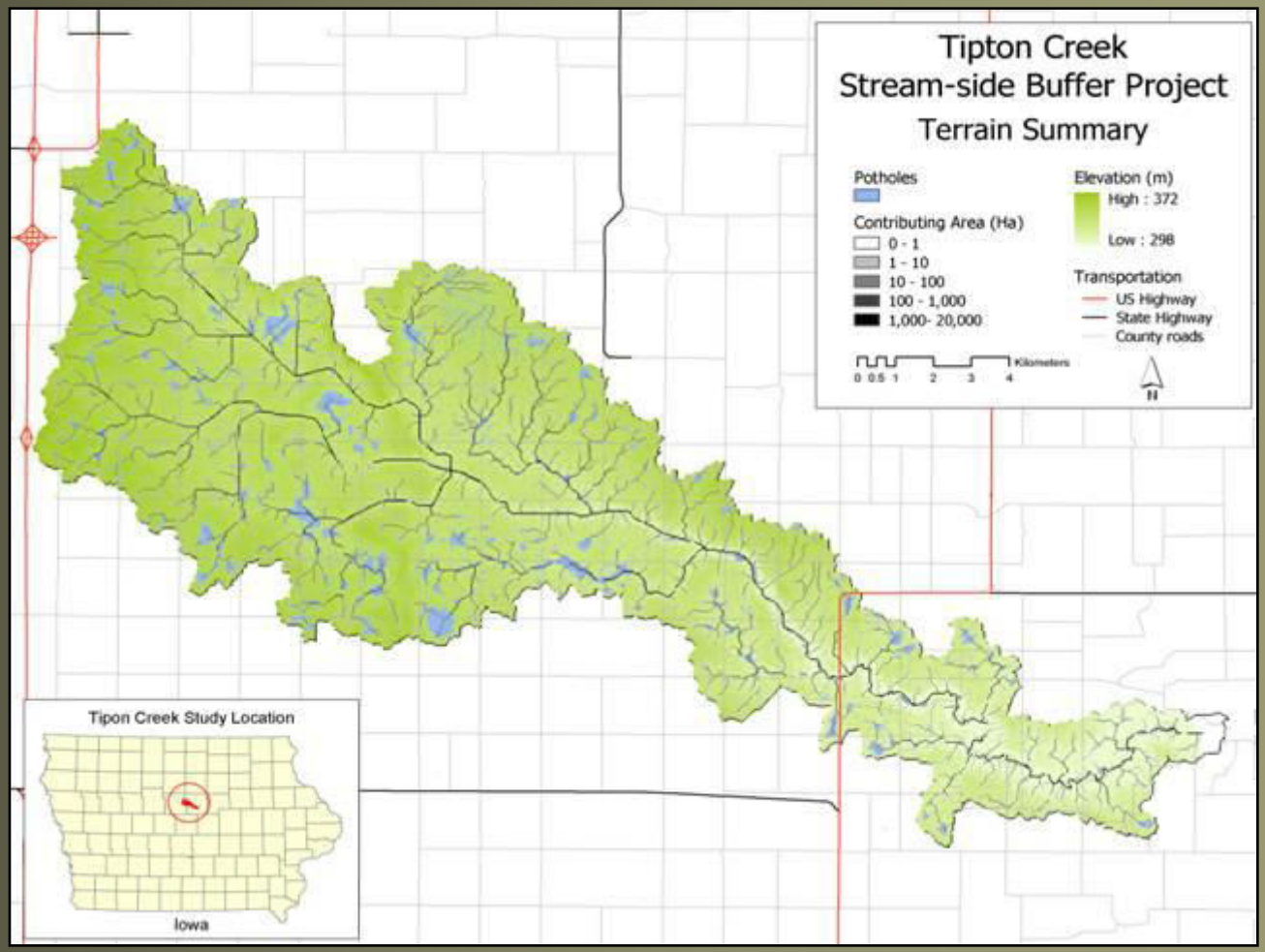
Maximum ← H_2O in contact → Minimum

GOOD ← Buffer efficiency for groundwater → NOT SO GOOD

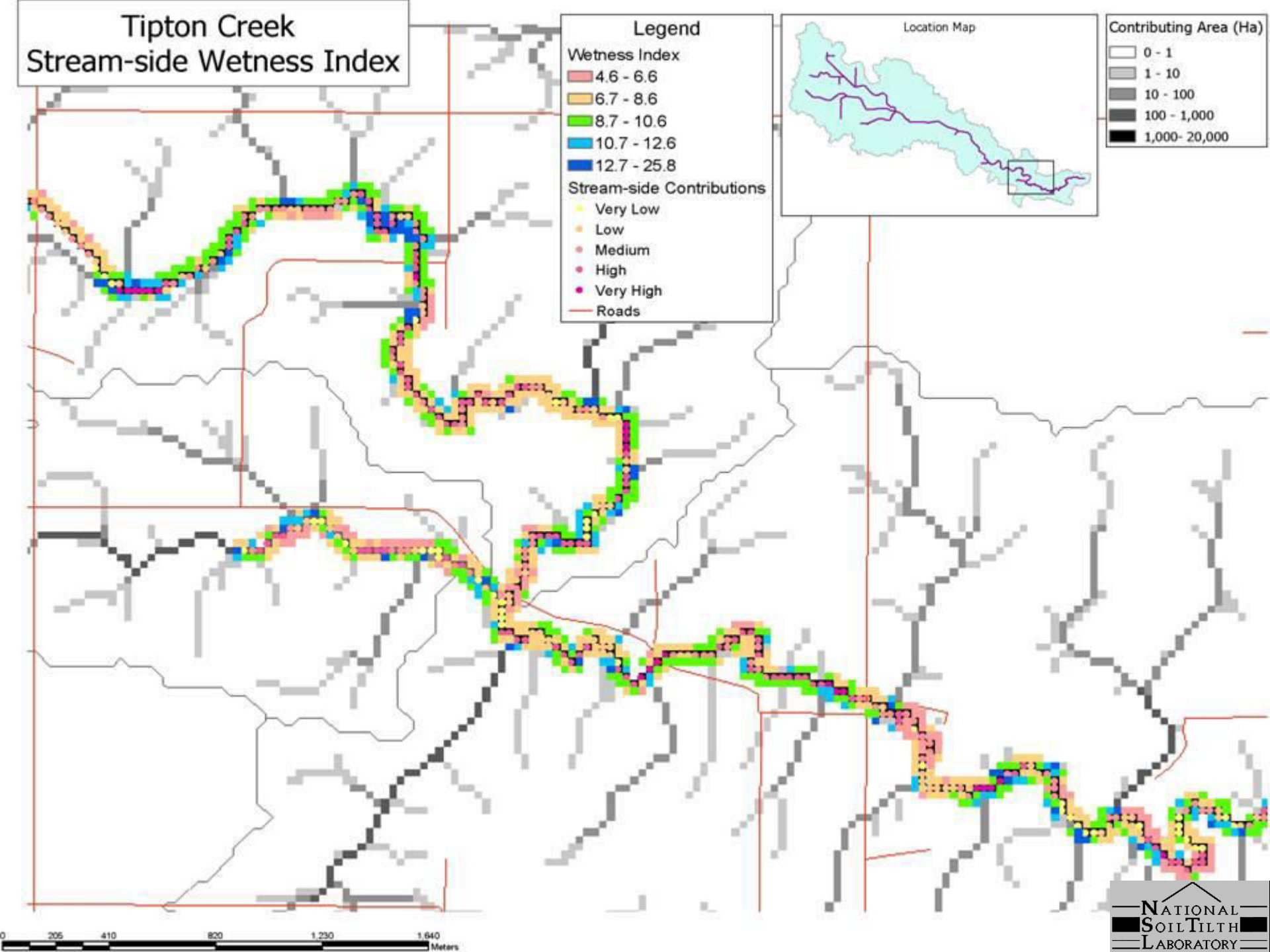


Terrain Analysis

Identify and prioritize areas where vegetated buffers and constructed wetlands (CREP) have the greatest potential to improve water quality



NATIONAL SOIL TILTH LABORATORY


Tipton Creek
Stream-side Wetness Index
Legend
Wetness Index
4.6 - 6.6
6.7 - 8.6
8.7 - 10.6
10.7 - 12.6
12.7 - 25.8
Stream-side Contributions
Very Low
Low
Medium
High
Very High
Roads
Location Map
Contributing Area (Ha)
0 - 1
1 - 10
10 - 100
100 - 1,000
1,000- 20,000
0
205
410
820
1,230
1,640
Meters
National Soil Tilth Laboratory

National
Soil Tilth
Laboratory