

Steps Towards Evaluating the Effectiveness of Constructed Wetlands  
and Adaptive Nitrogen Management Practices for Improving  
Water Quality in Money Creek, a Tile-drained Subwatershed  
of the Mackinaw River, Illinois





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Rick Twait

# Mackinaw River Project Sites

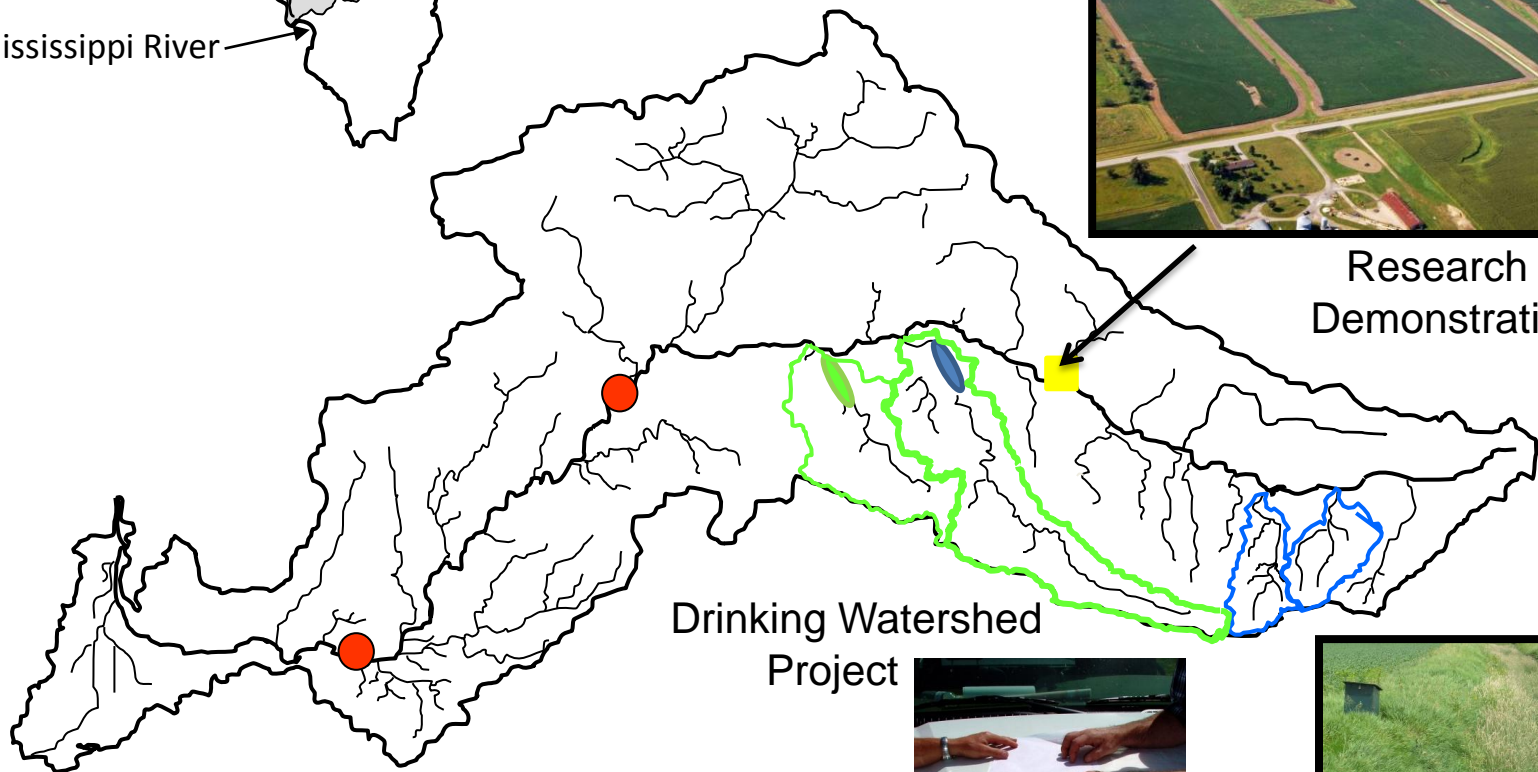


Mississippi River




Illinois River

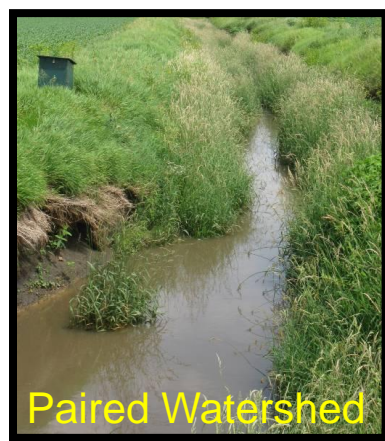
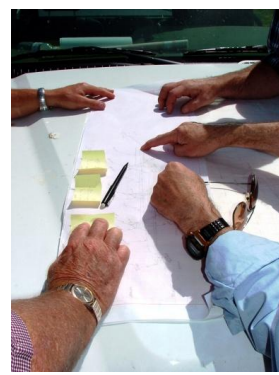


Research and Demonstration Farm



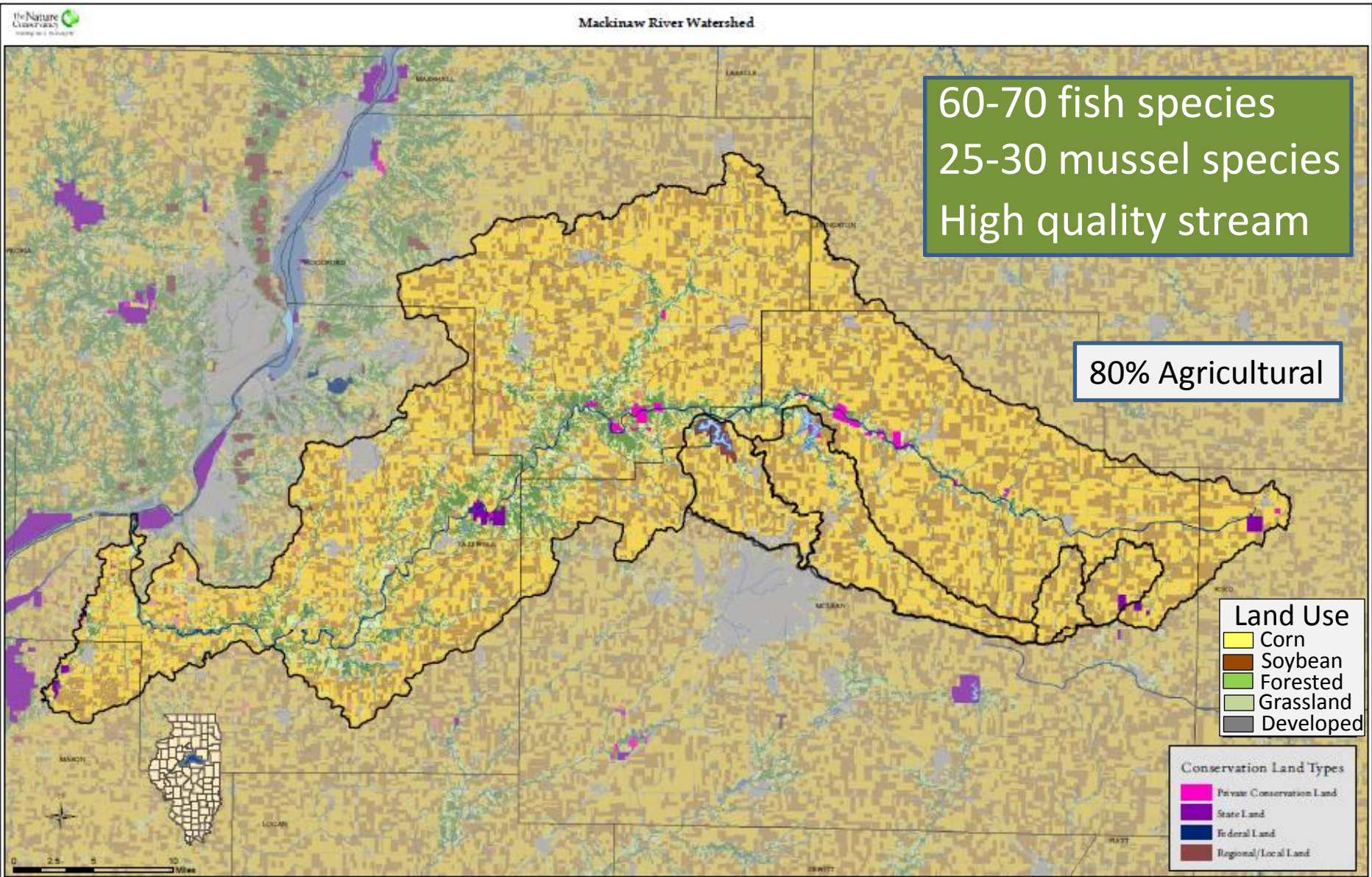
Drinking Watershed Project

-  Lake Evergreen
-  Lake Bloomington
-  USGS gaging stations

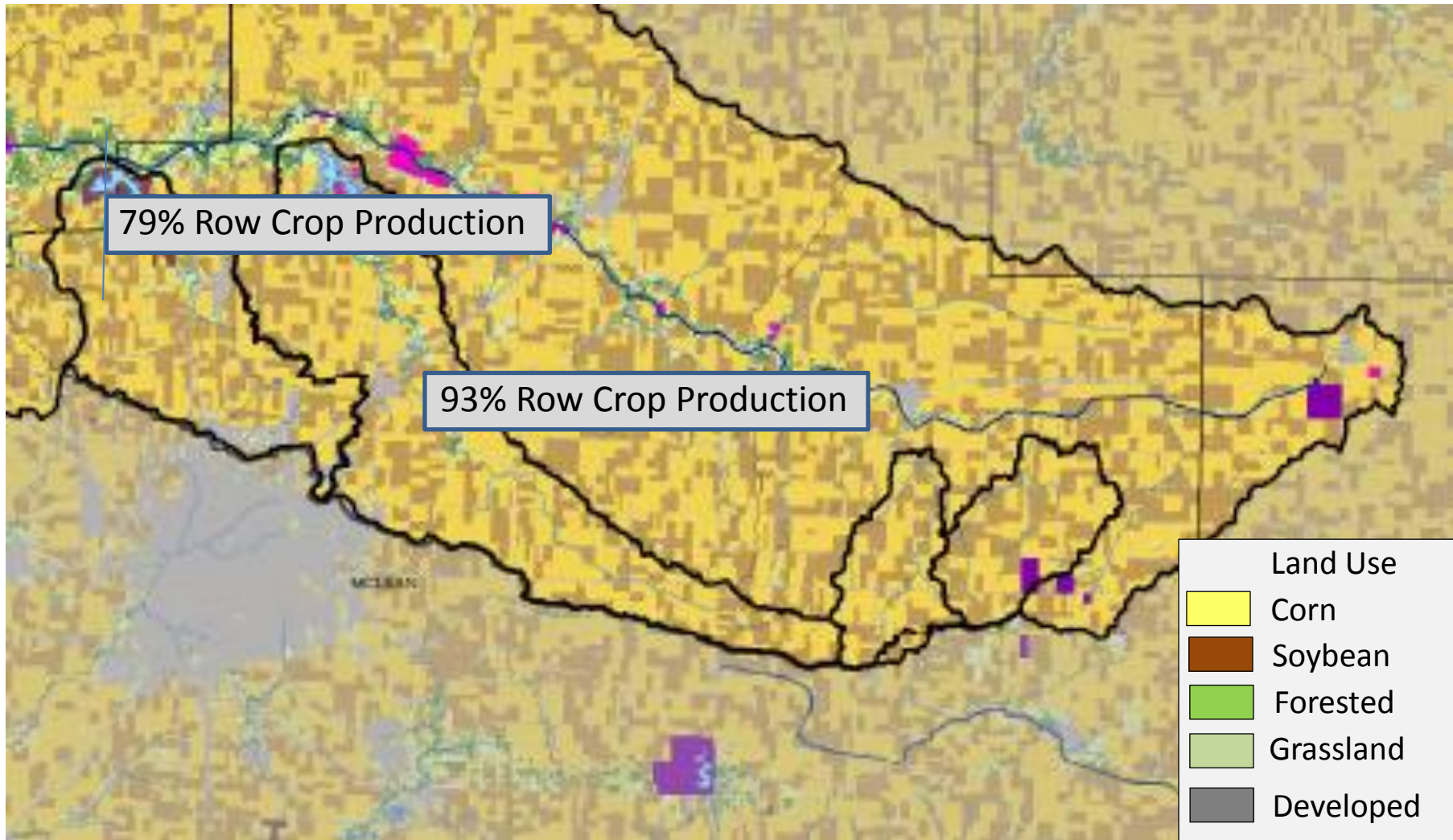


Paired Watershed

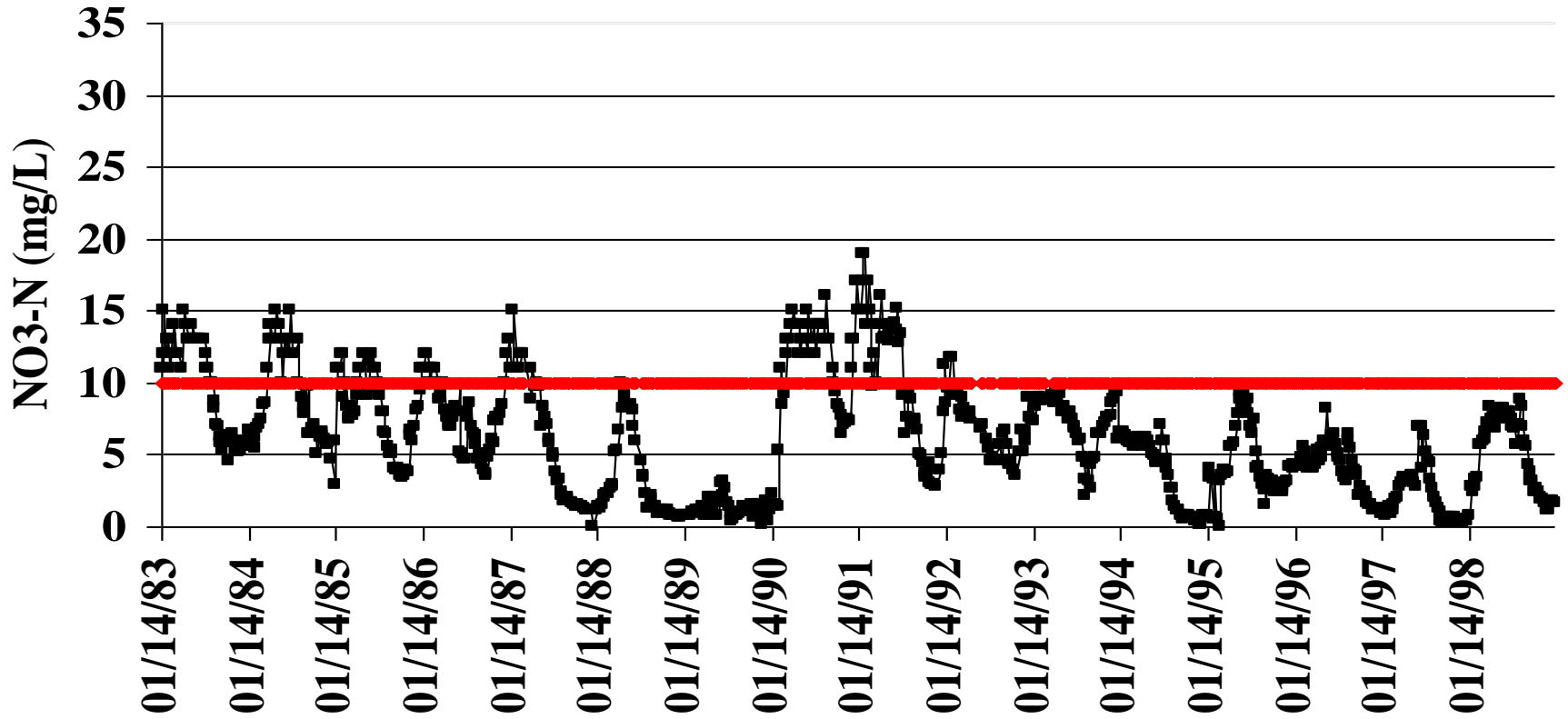
# Mackinaw River Watershed Land Use



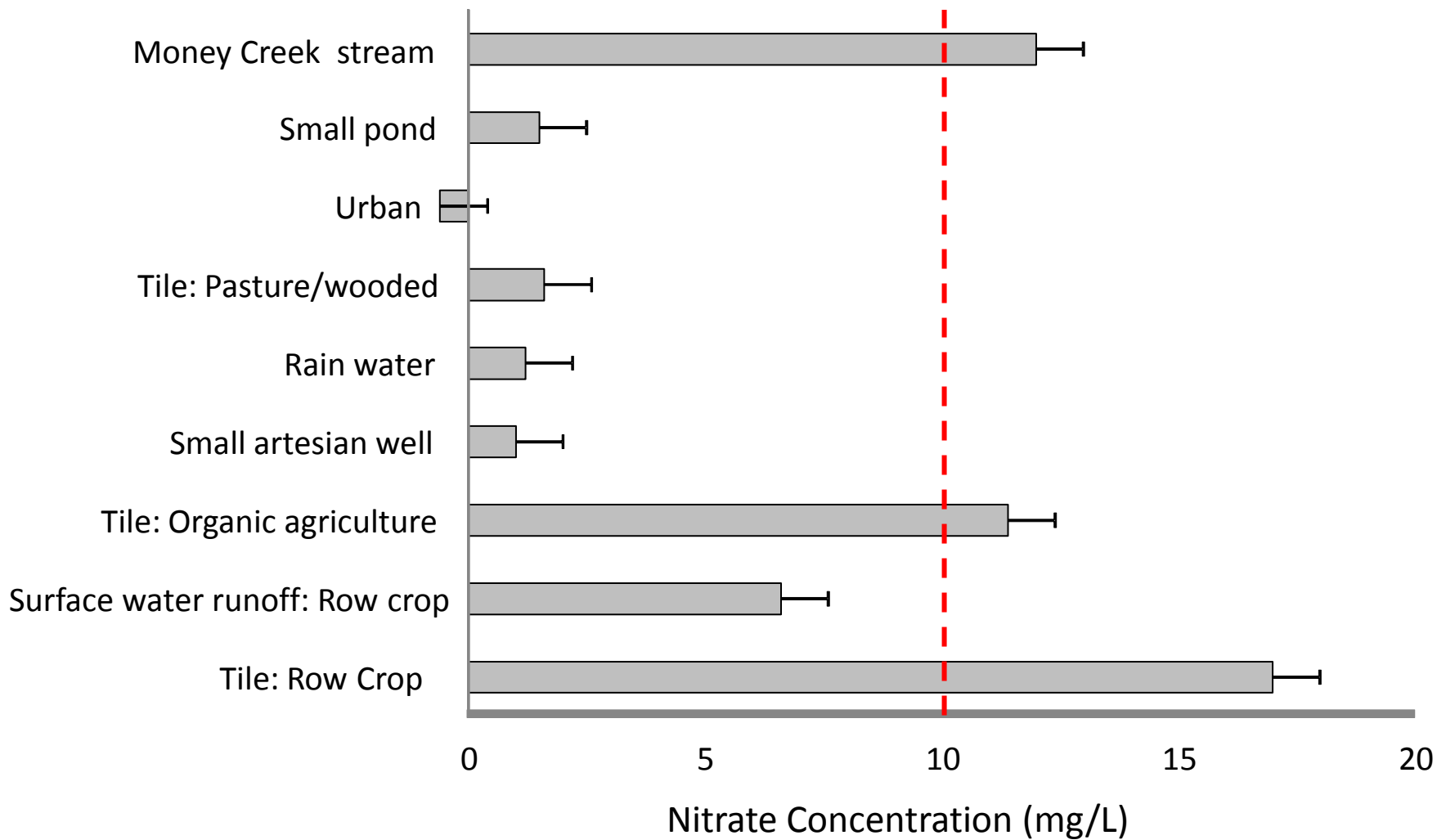
# Mackinaw River Watershed Land Use



# Bloomington, Illinois Finished Water Nitrate Levels

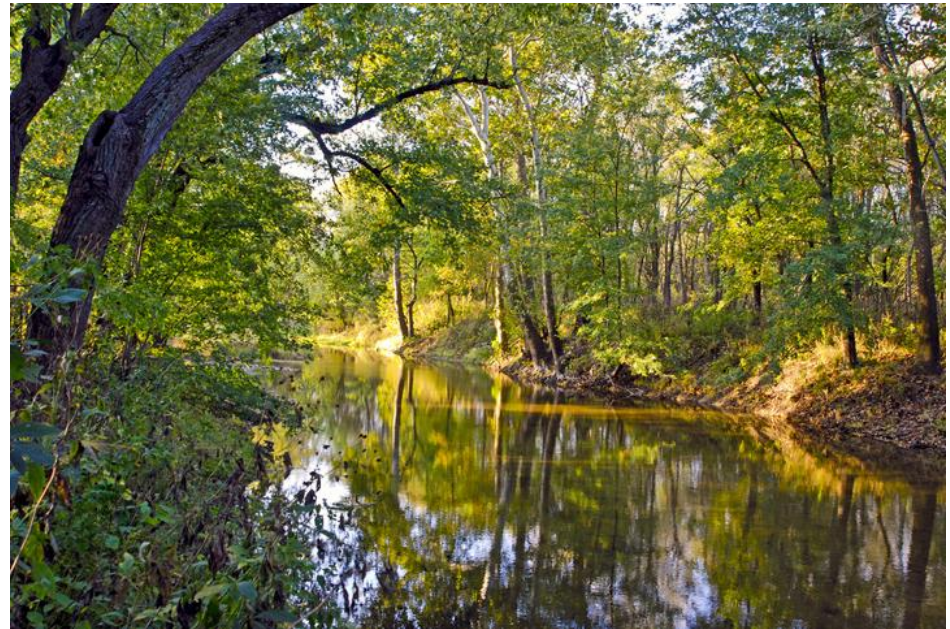


# Nitrate sources to Lake Bloomington watershed



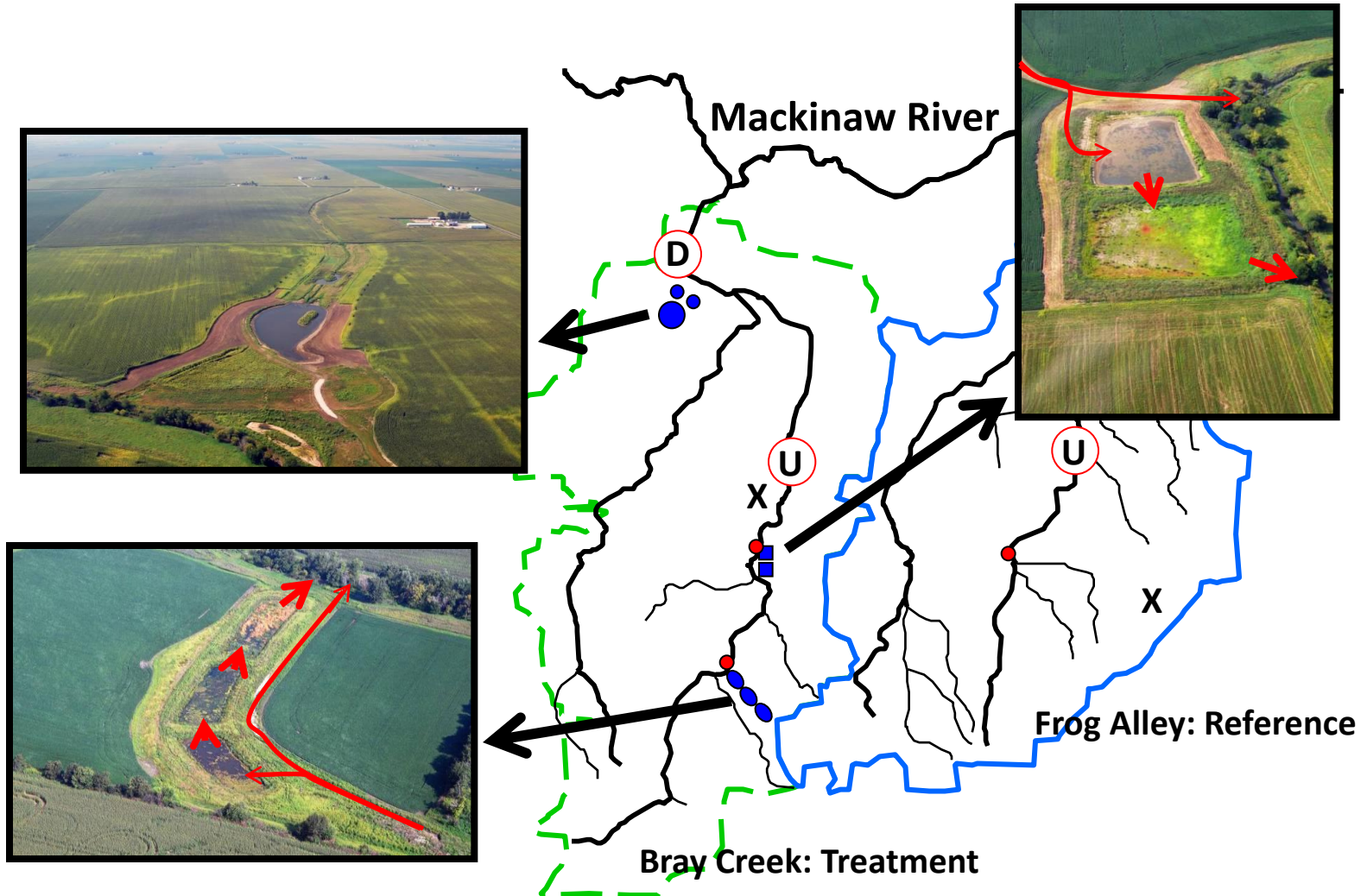
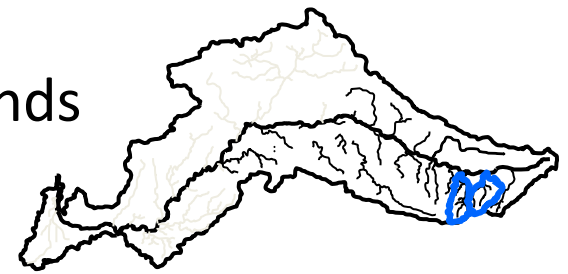
# Mackinaw River Drinking Watersheds Project

- Increase implementation: Provide additional outreach resources and assistance; simplify enrollment process through program coordination and cooperation; provide enhanced incentives
- Increase practice effectiveness: Watershed mapping techniques to identify potential wetland sites; precision outreach; monitoring effectiveness
- Innovative partnerships: Municipal government, federal, state and local agencies, universities, agricultural and conservation partners





Objective: Effectiveness of tile-retention wetlands at restoring altered hydrology and reducing nutrient export.



**Project: 10% cost share\***

- Optional participation in DNR CREP supplemental contracts or voluntary permanent easements

*\*NOTE: Subject to availability of sufficient project funding*

s (CP-39)

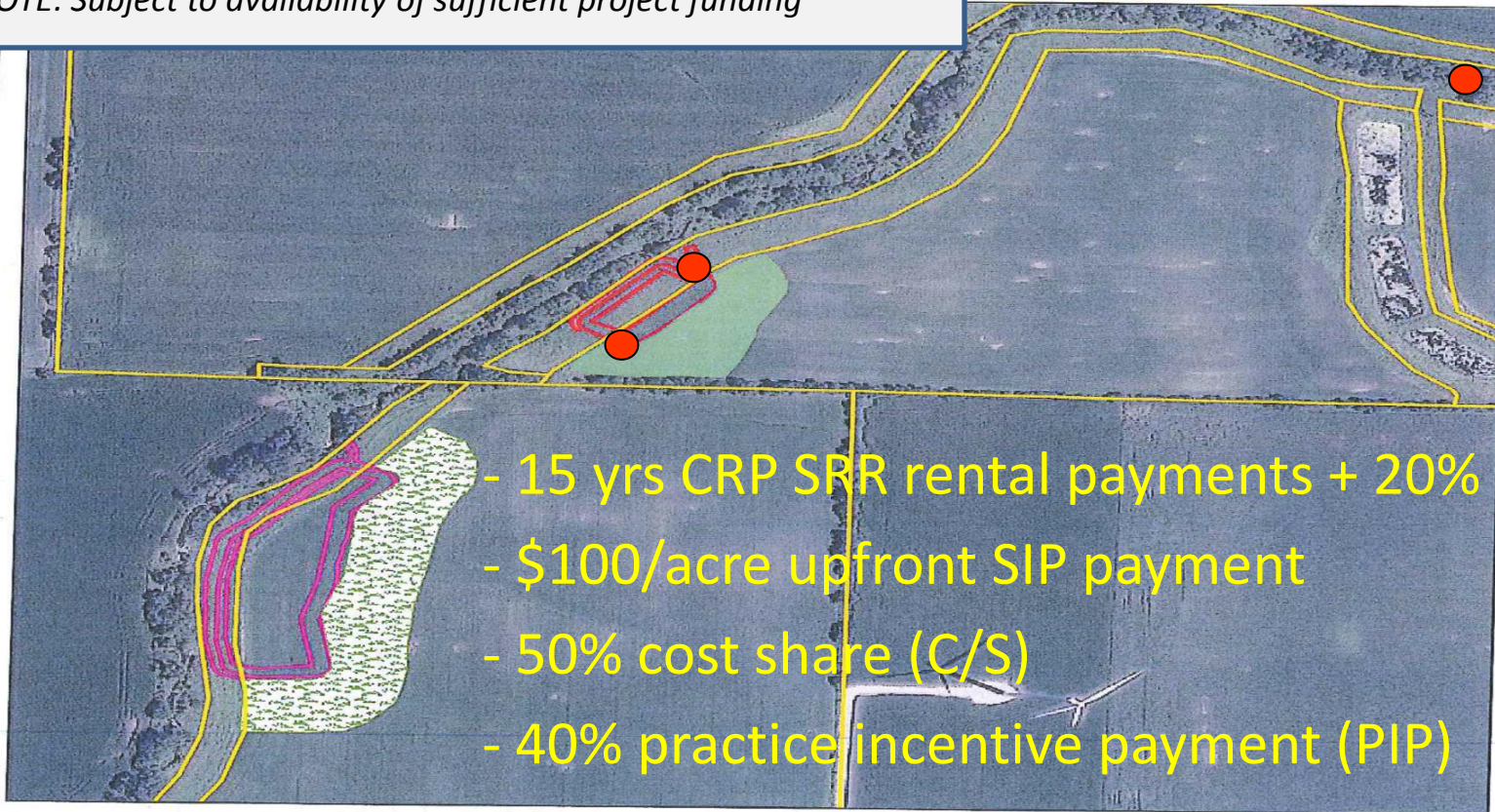
Date: 9/17/2012

Field Office: NORMAL SERVICE CENTER

Agency: NRCS

Assisted By: Matt Bell

State and County: IL, MCLEAN

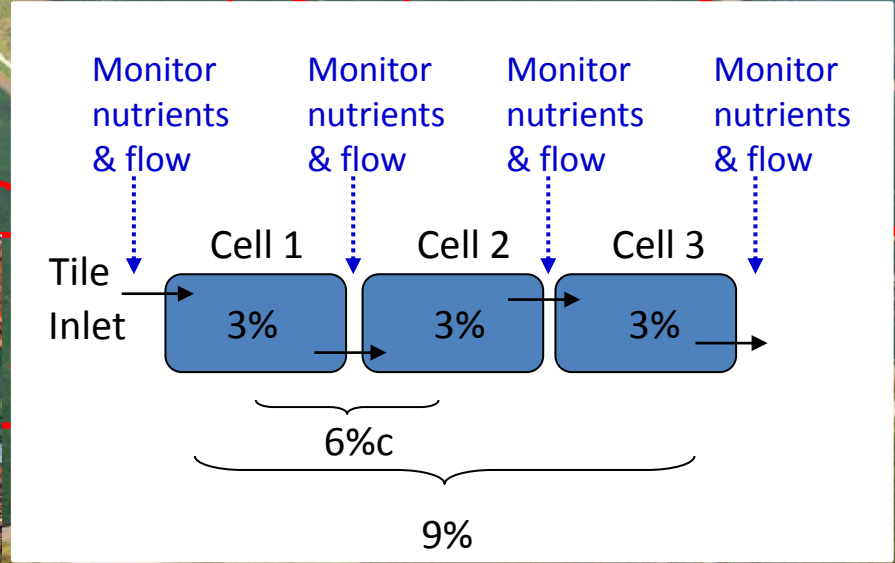
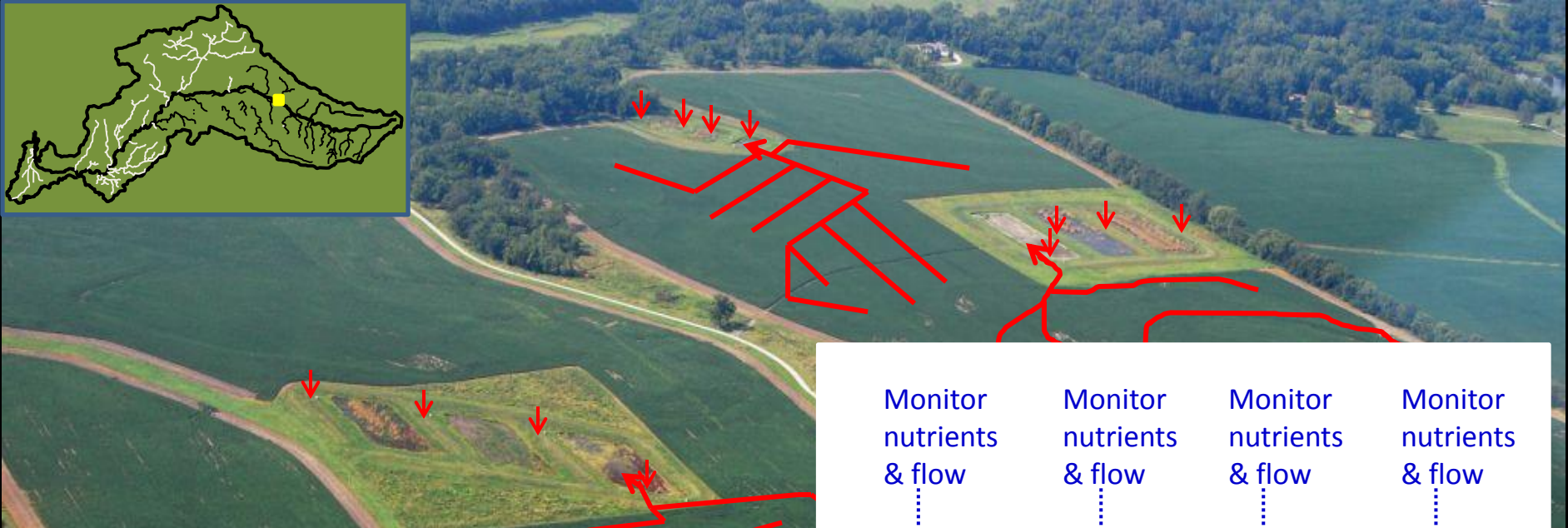
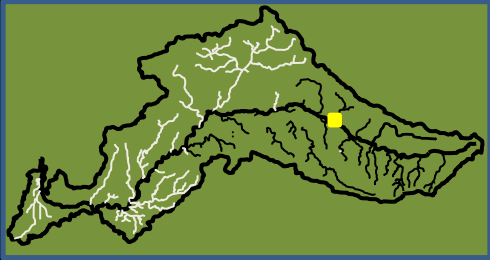


- 15 yrs CRP SRR rental payments + 20%
- \$100/acre upfront SIP payment
- 50% cost share (C/S)
- 40% practice incentive payment (PIP)

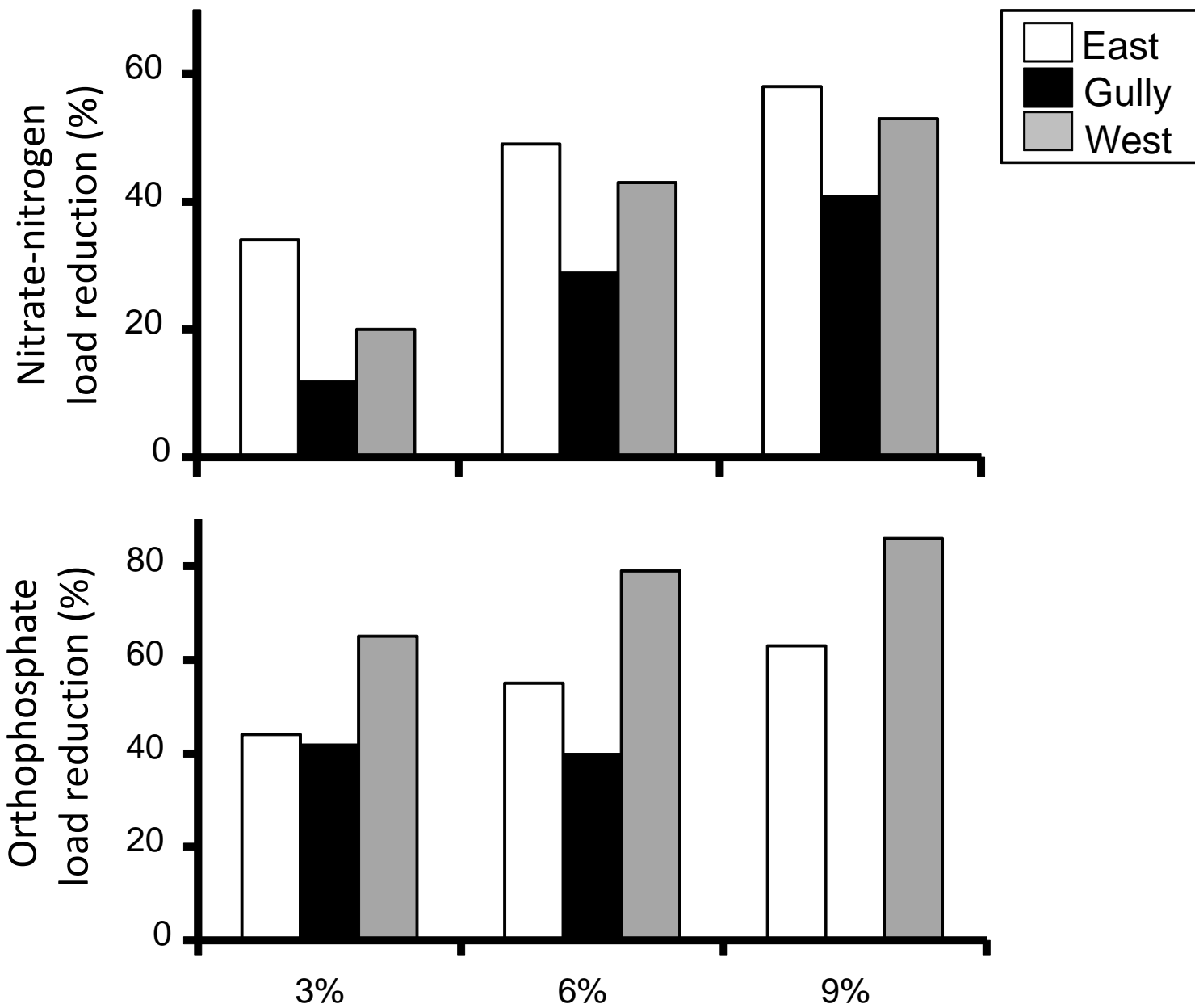
**Legend**

- Consplan\_T38038
- CP-21 Filter Strip (1.3 acres) 120' wide
- CP-21 Filter Strip (3.0 acres)- 160' wide
- Moga\_NorthWetland
- Moga\_SouthWetland

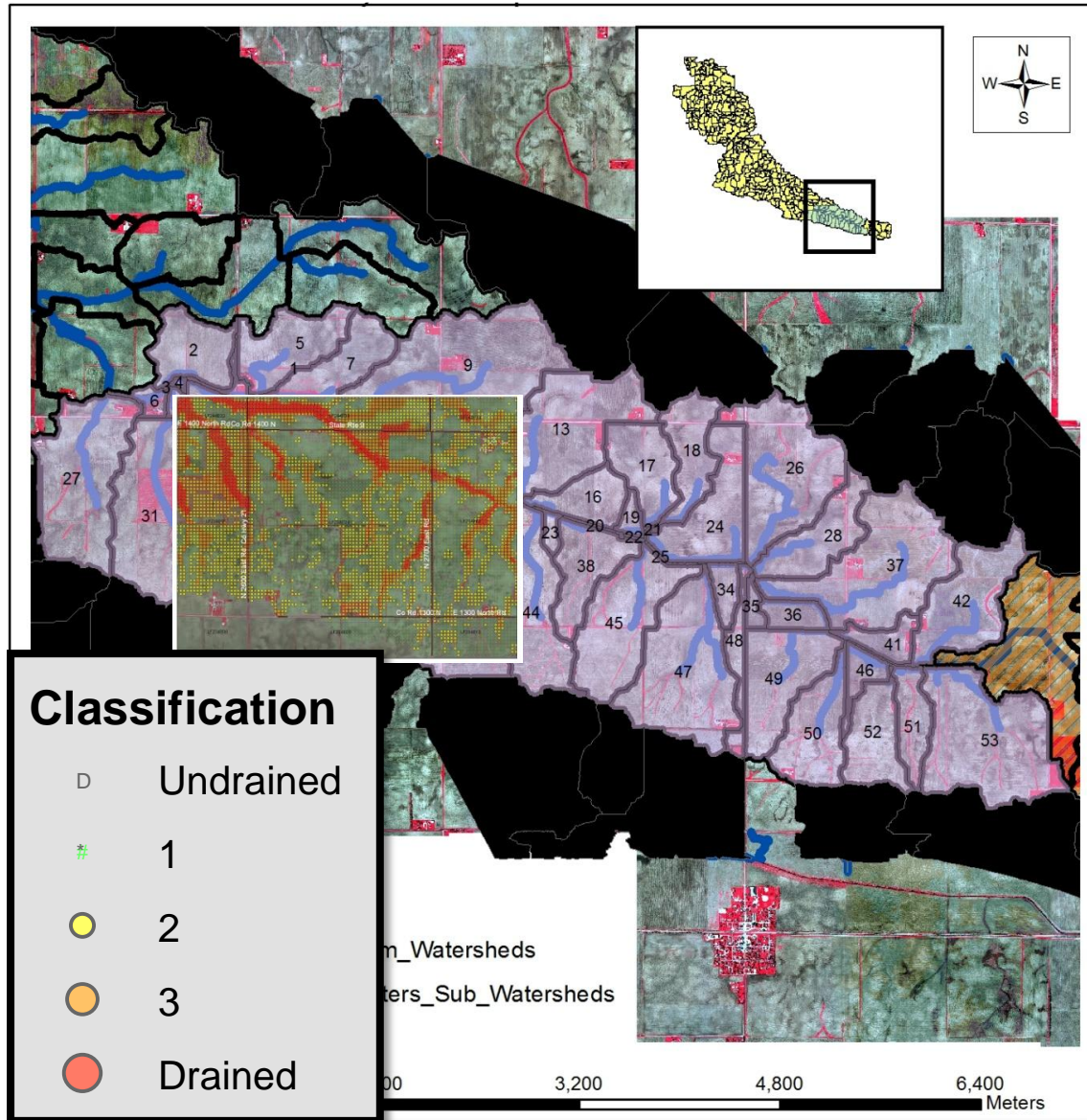




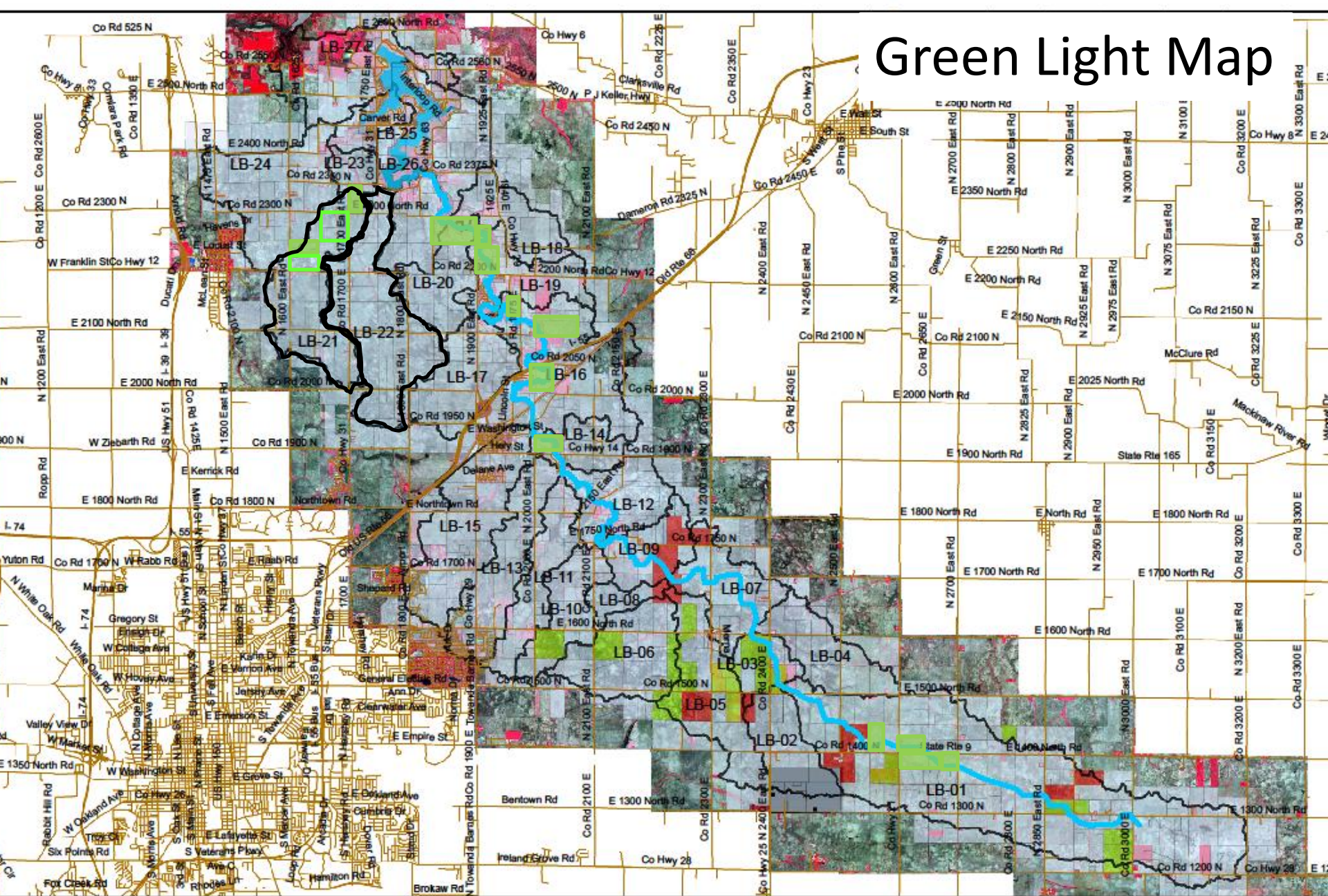
# Cumulative 5-year Monitoring Results



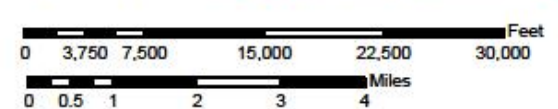
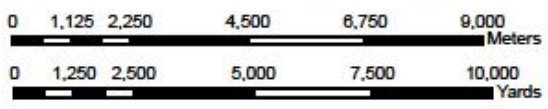
# Delineating subwatersheds



# Green Light Map



## Bloomington Watershed



# Adapt Network Nitrogen Management

## Four Basic Steps:

1. Planning of N management
2. Implementation of N Management
3. Evaluation of the results of N Management
4. Adjustments to N management planning

## Producer meetings and enrollment:

- Background and enrollment process
- Analyses of aggregate data collected during season
- Assistance interpreting individual farm data and results

## Site specific field sampling:

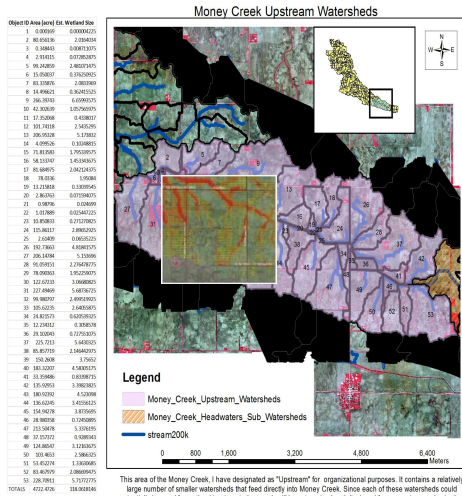
- End of season cornstalk nitrogen tests
- Soil nitrogen testing
- Replicated nitrogen-rate strip trials

## Digital aerial imagery and data coordination:

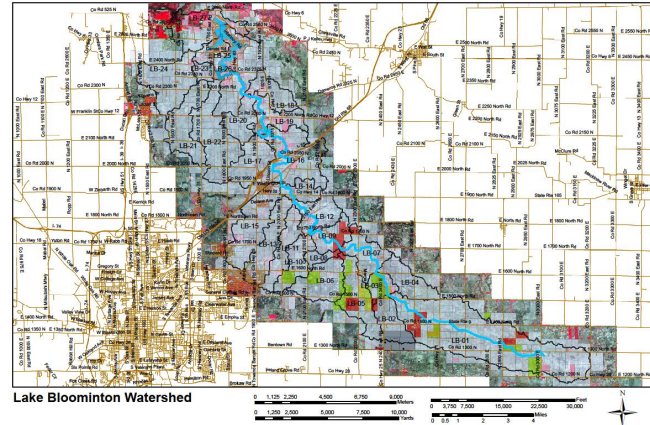
- Selection of sampling points



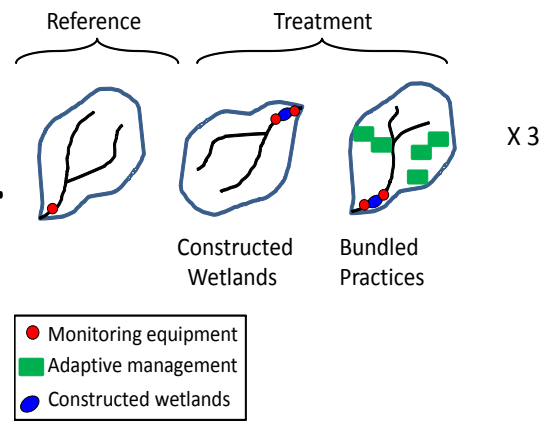
# What do we do with all of this?



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How many wetland acres are needed

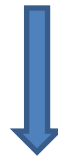
How many wetland acres are likely

What kind of watershed reductions can be expected

Economic analyses of grey versus green treatment

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Clear documentation and streamlined process



- Watershed conservation blueprint for the City of Bloomington
- Applicability beyond the Mackinaw River for sustainable conservation and agricultural production



# Application to Illinois

- Over 6 million acres of agricultural lands drain into surface drinking water sources
- These drinking waters sources serve 1.6 million people in Illinois

Subsurface Tile Drainage

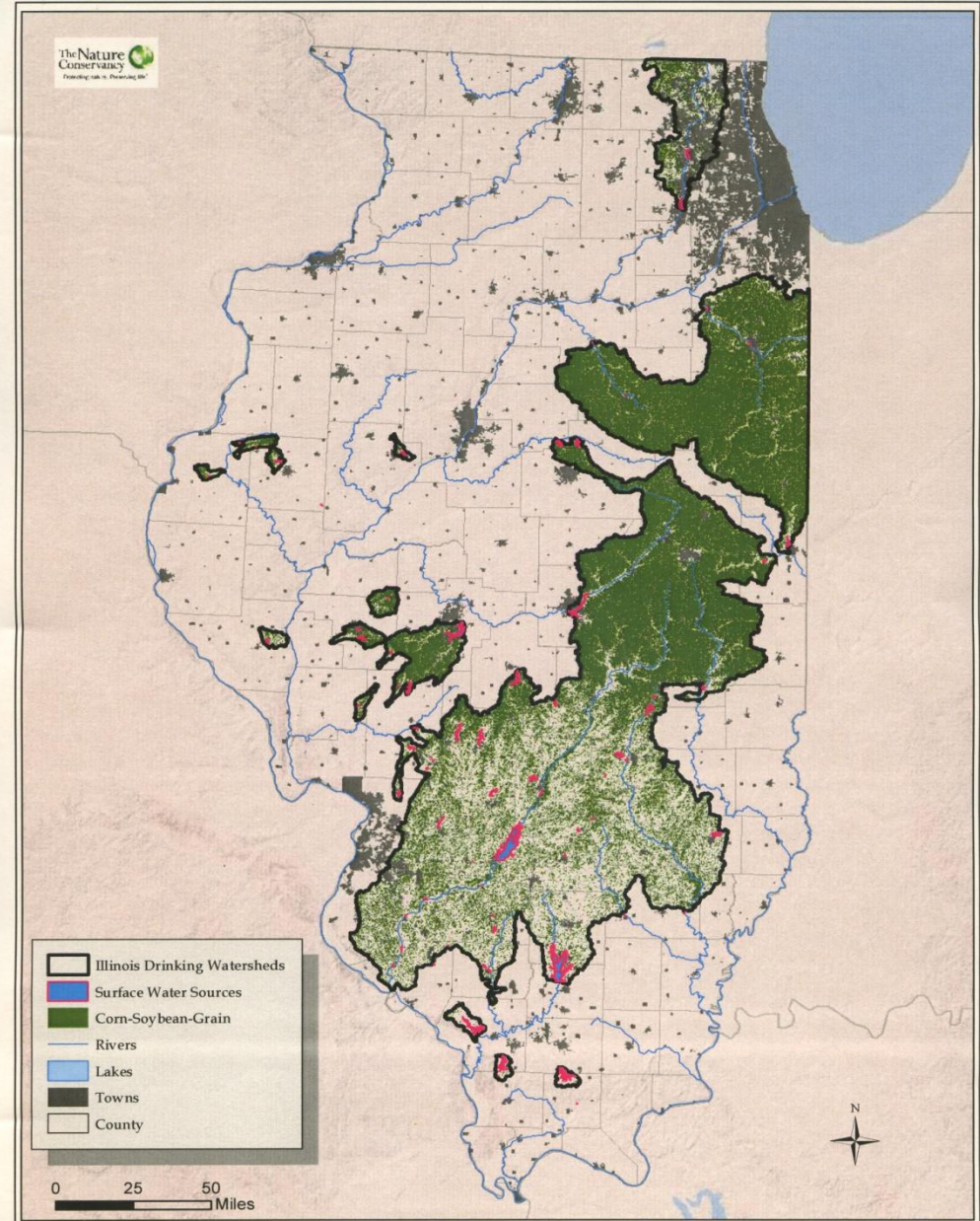
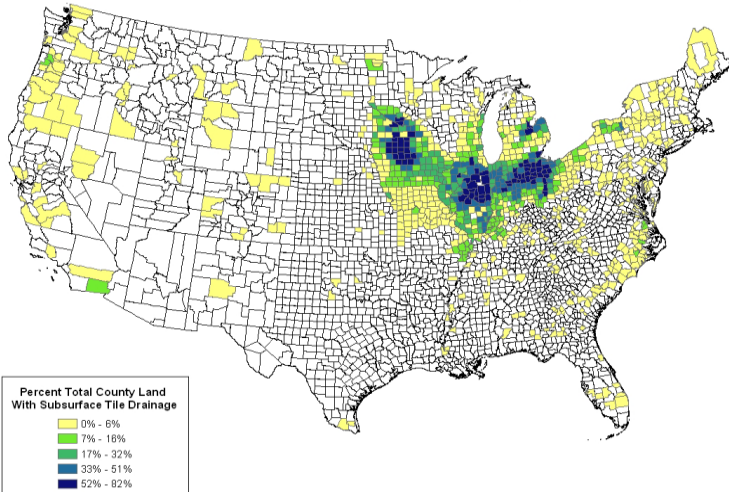


Photo credits:



**Tim Lindenbaum**

## Partners and Funding Sources

Natural Resources and Conservation Service  
Soil and Water Conservation District  
Farm Services Agency

University of Illinois at Champaign-Urbana  
Illinois State University

Environmental Defense Fund  
City of Bloomington, Illinois  
Private landowners and producers

USDA-NRCS Conservation Innovation Grant Program

U.S. Farm Services Agency

Grand Victoria Foundation

Lumpkin Family Foundation

Walton Family Foundation

World Wildlife Foundation/Coca Cola

Mosaic Company

Monsanto; DuPont -Pioneer

Kellogg Foundation

Ducks Unlimited



**Krista Kirkham**