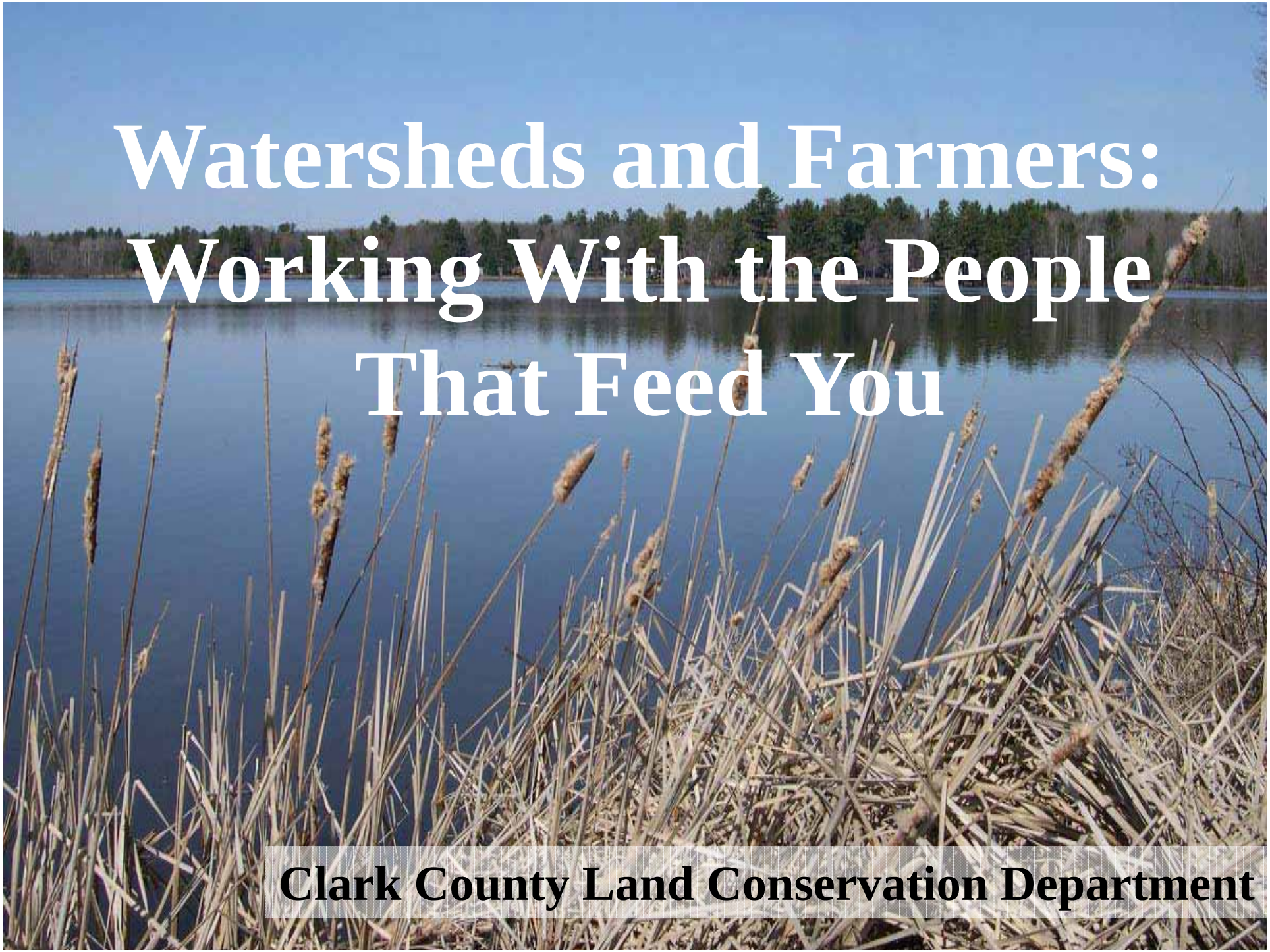
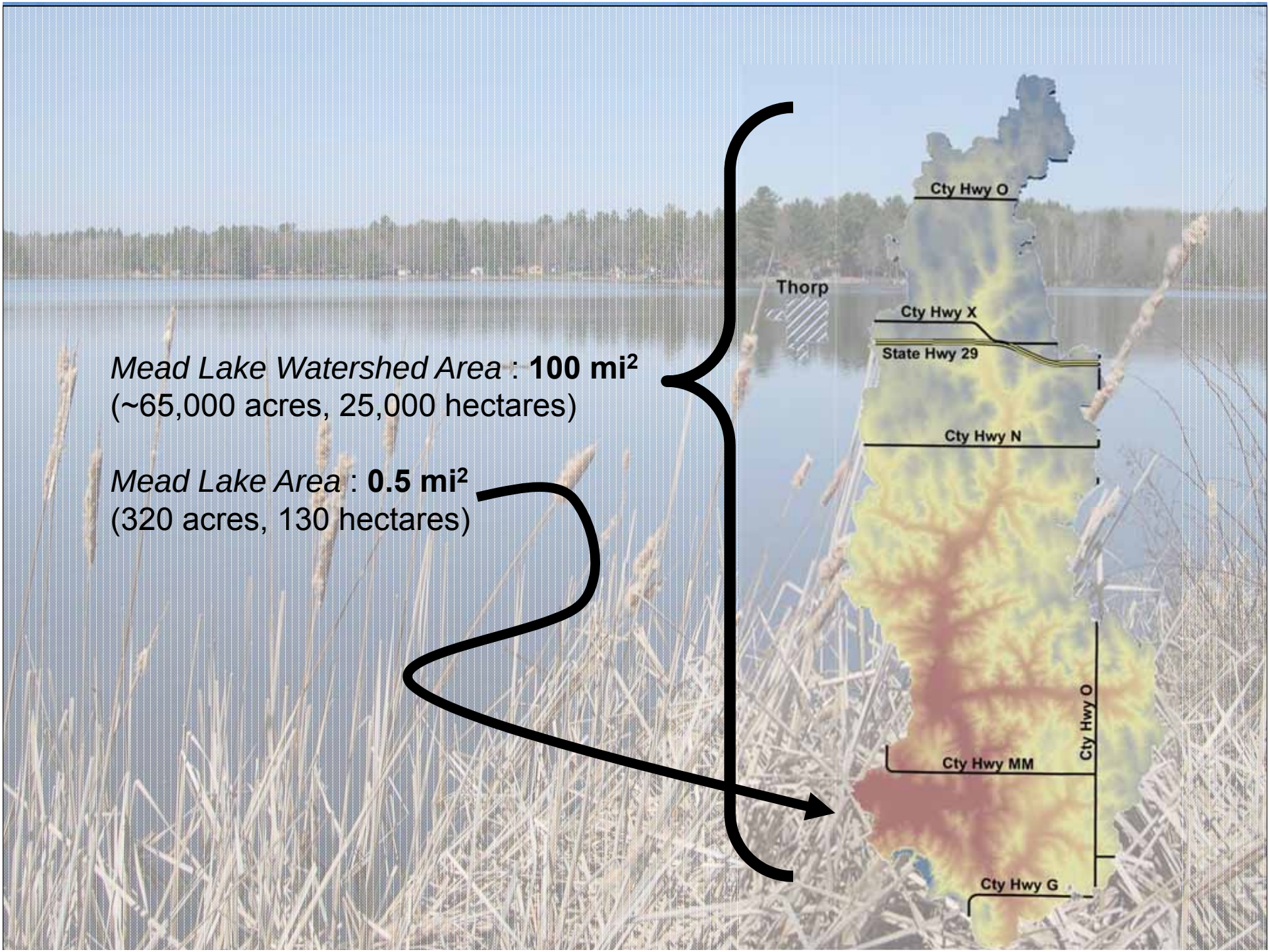


Watersheds and Farmers: Working With the People That Feed You

Clark County Land Conservation Department

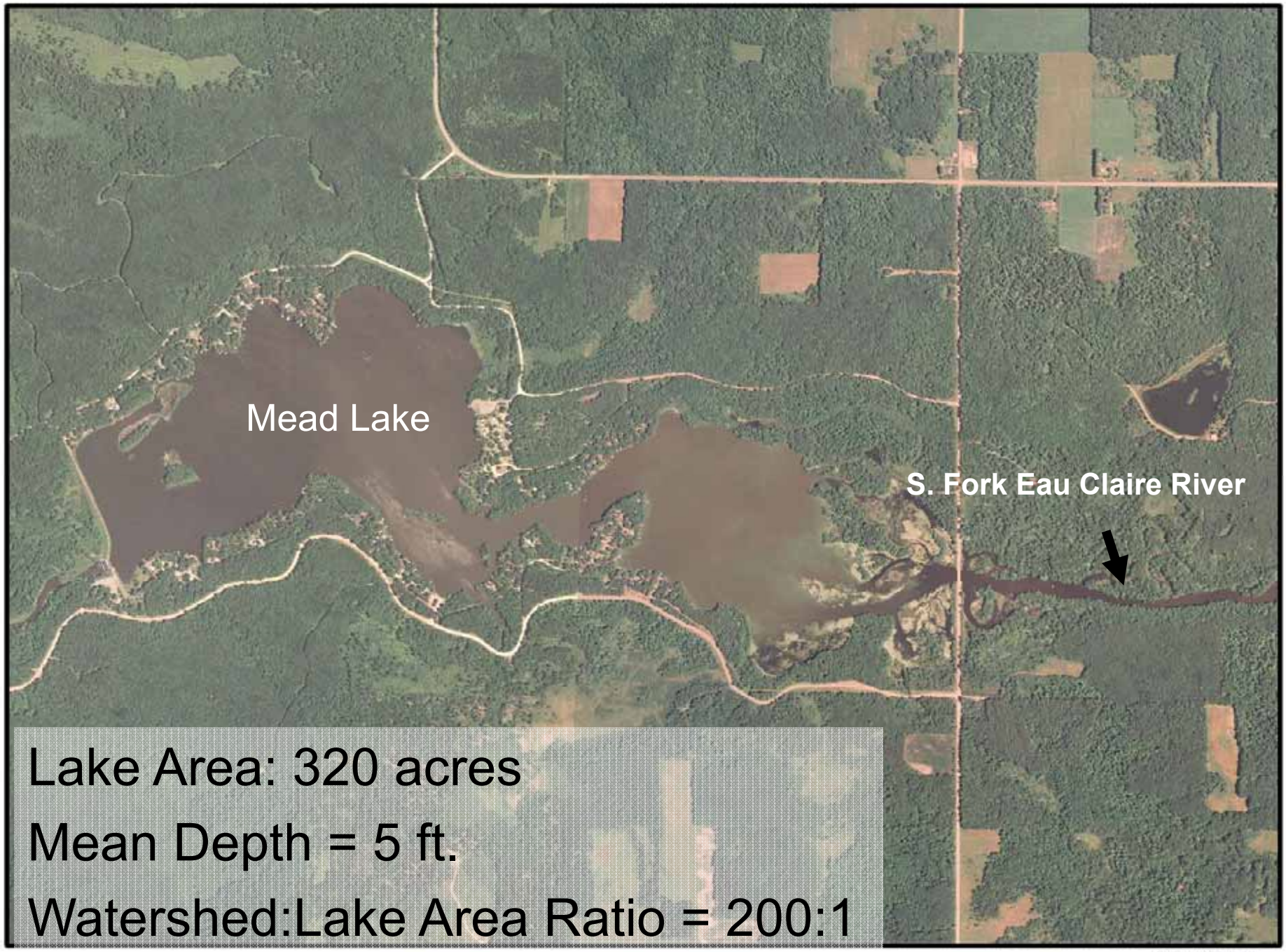
Photo Courtesy of Vic Staut- Vics Aeroplane Company


Photo Courtesy of Brad Lovelace- Mead Lake Historian

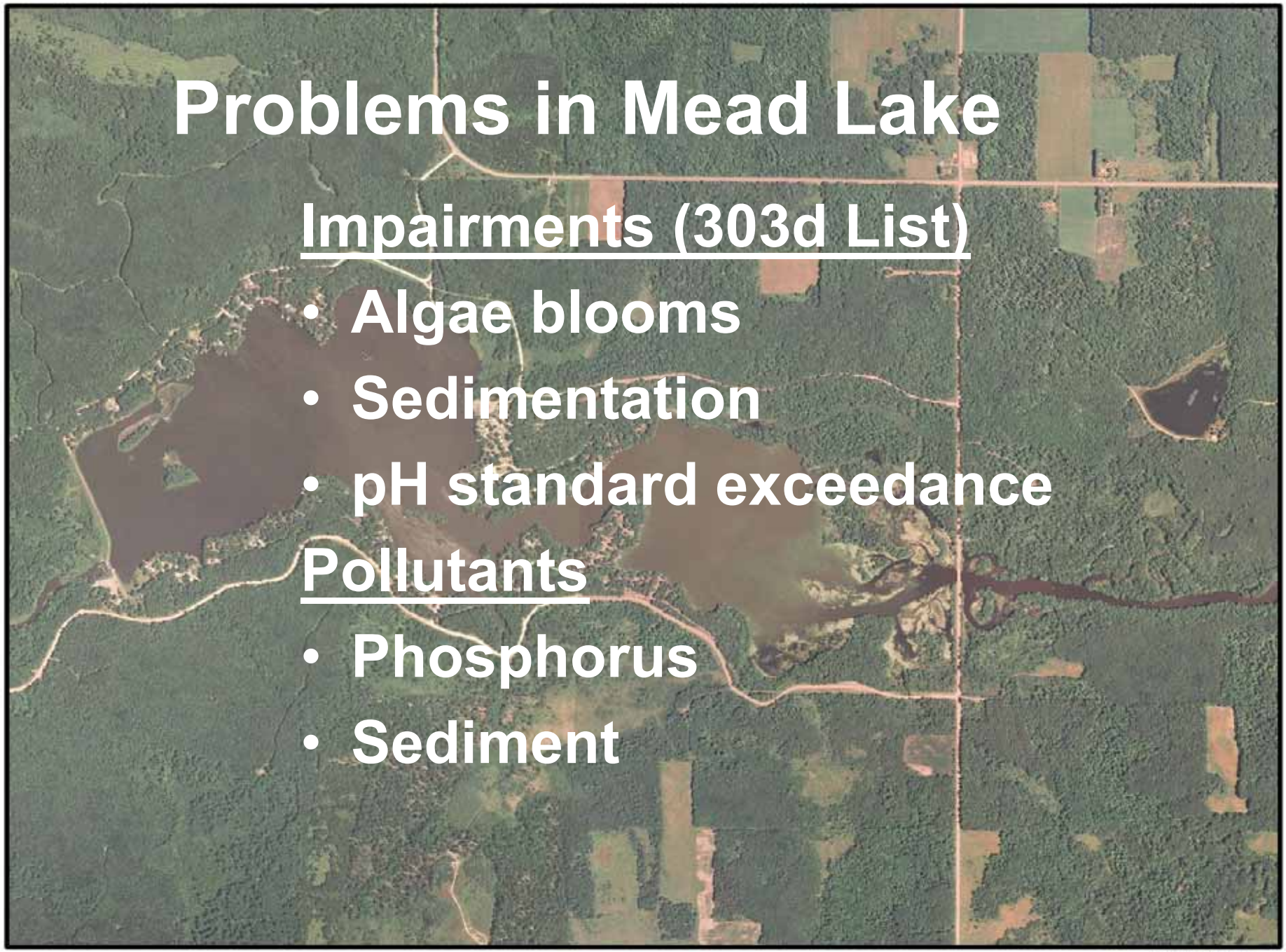


Mead Lake Watershed Area : **100 mi²**
(~65,000 acres, 25,000 hectares)

Mead Lake Area : **0.5 mi²**
(320 acres, 130 hectares)


Mead Lake
S. Fork Eau Claire River
Lake Area: 320 acres
Mean Depth = 5 ft.
Watershed:Lake Area Ratio = 200:1
2005 NAIP

Problems in Mead Lake



Impairments (303d List)

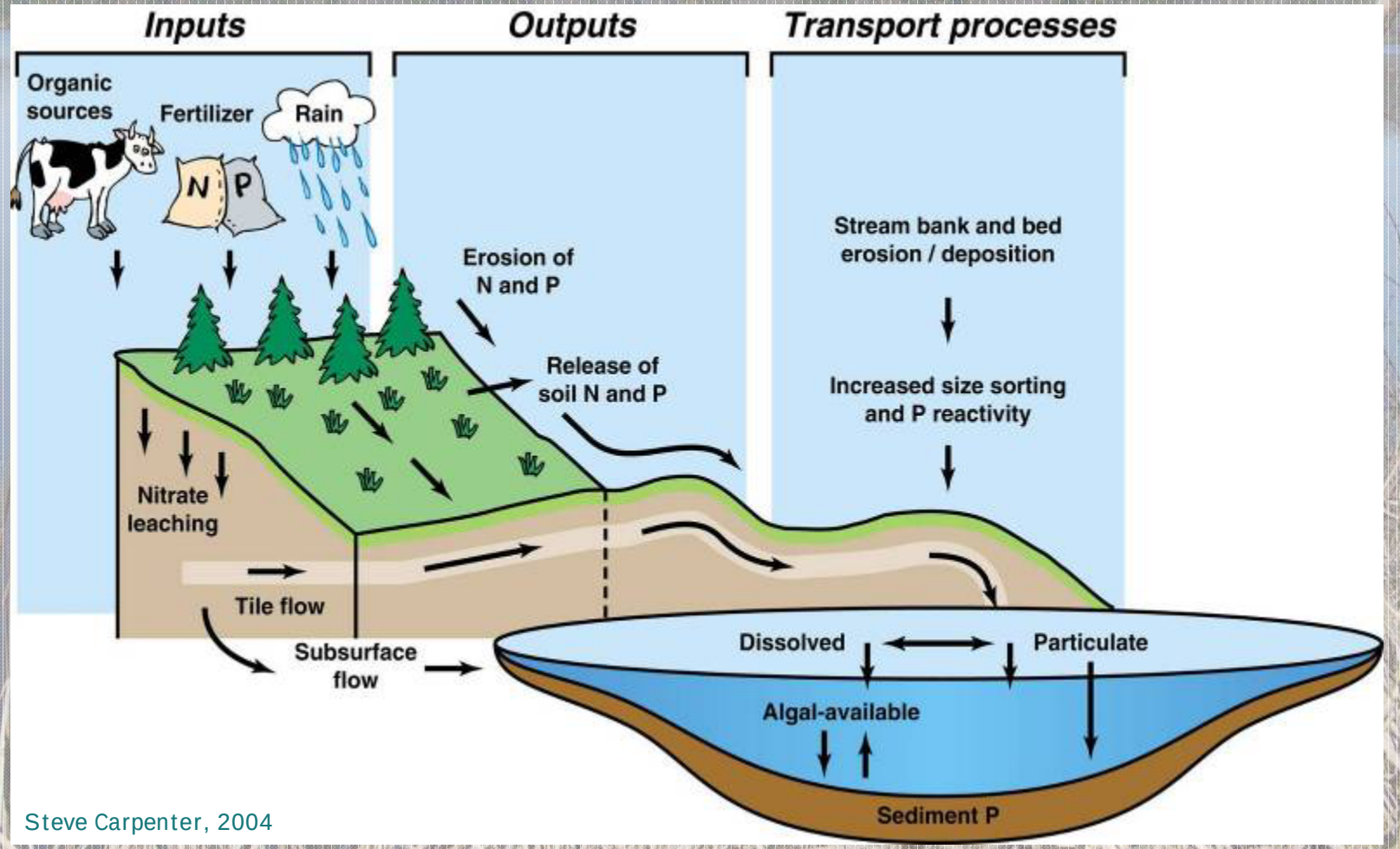
- Algae blooms
- Sedimentation
- pH standard exceedance

Pollutants

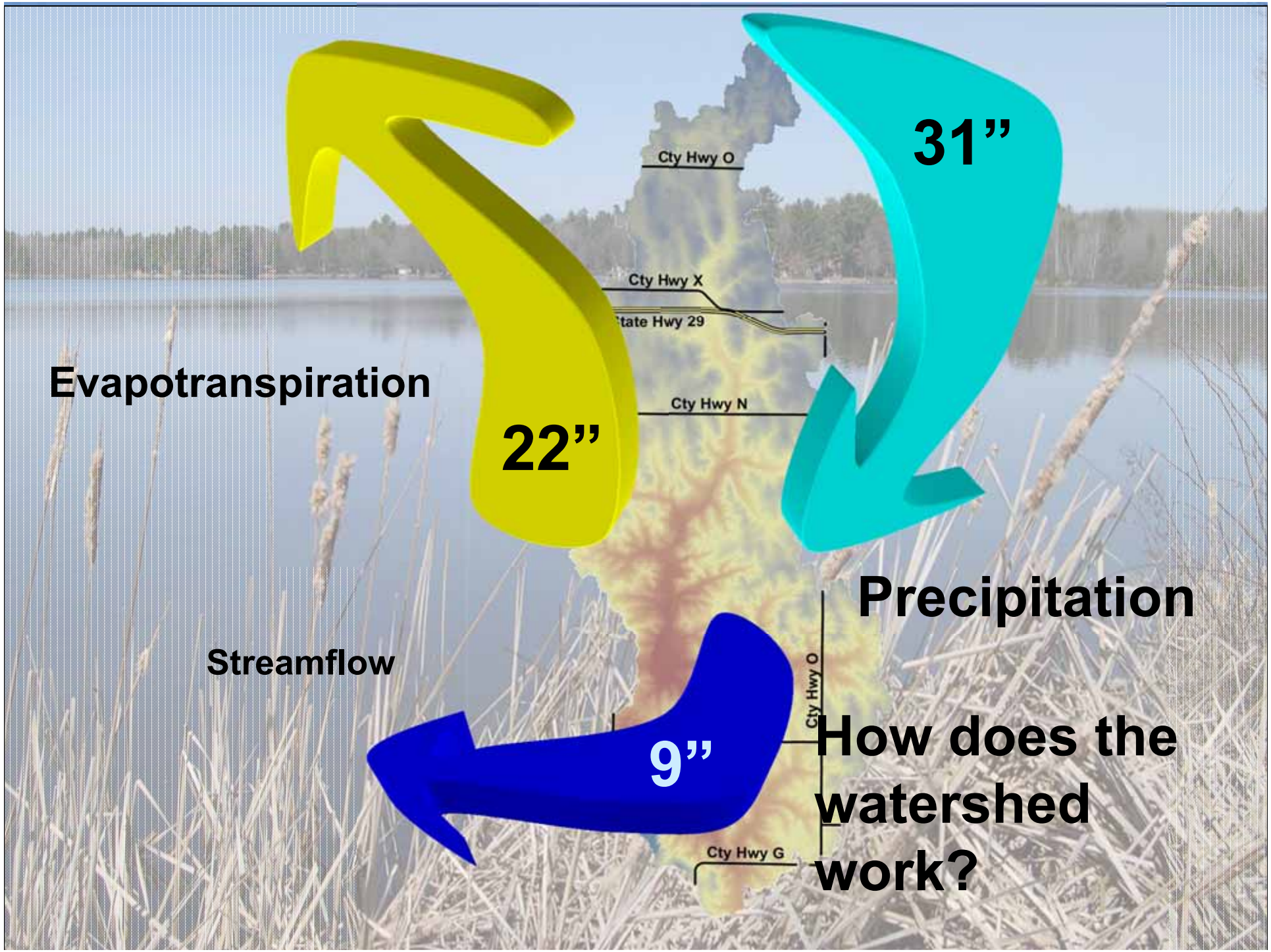
- Phosphorus
- Sediment

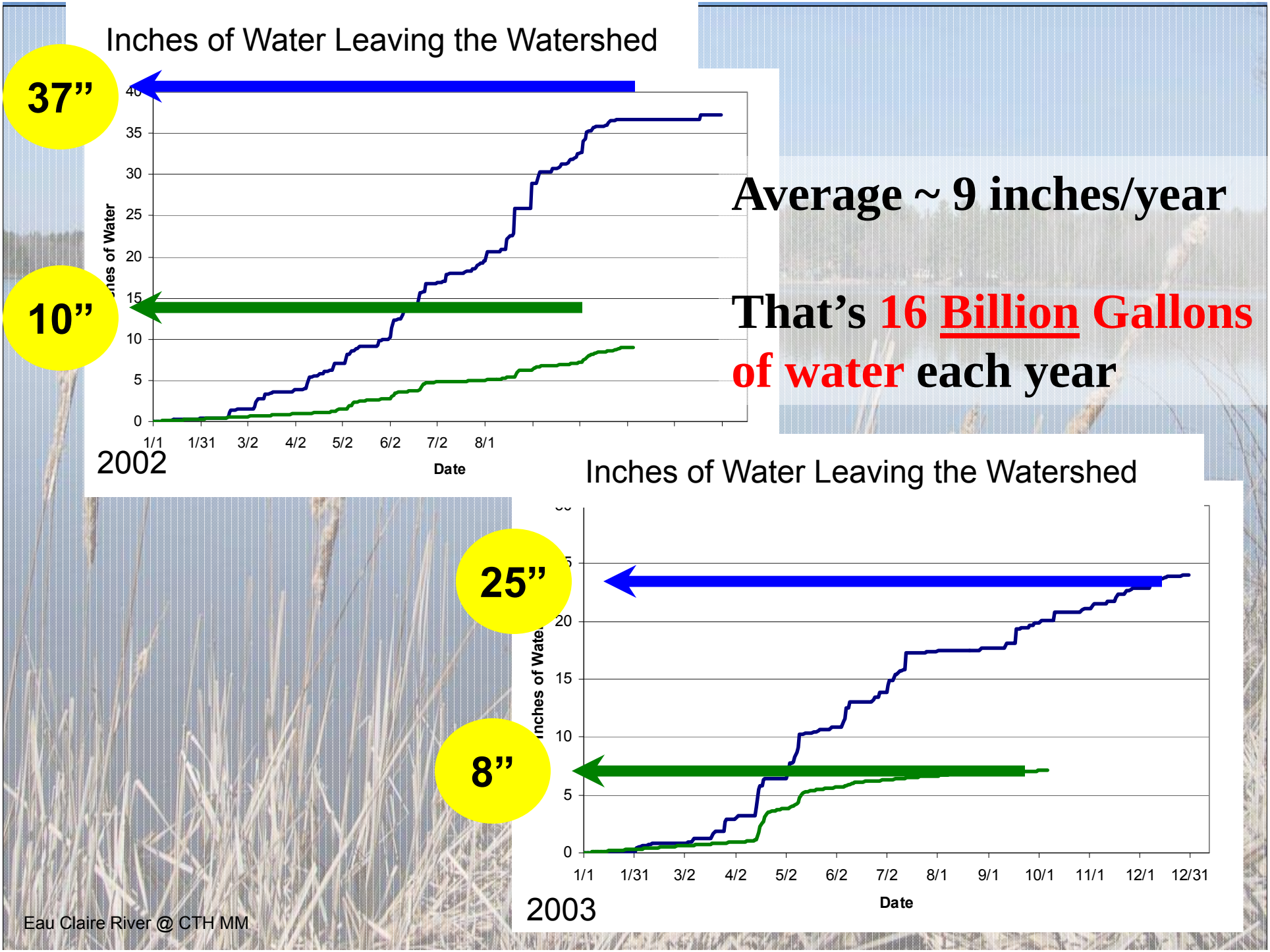
2005 NAIP

Cause of algae blooms: Runoff of phosphorus

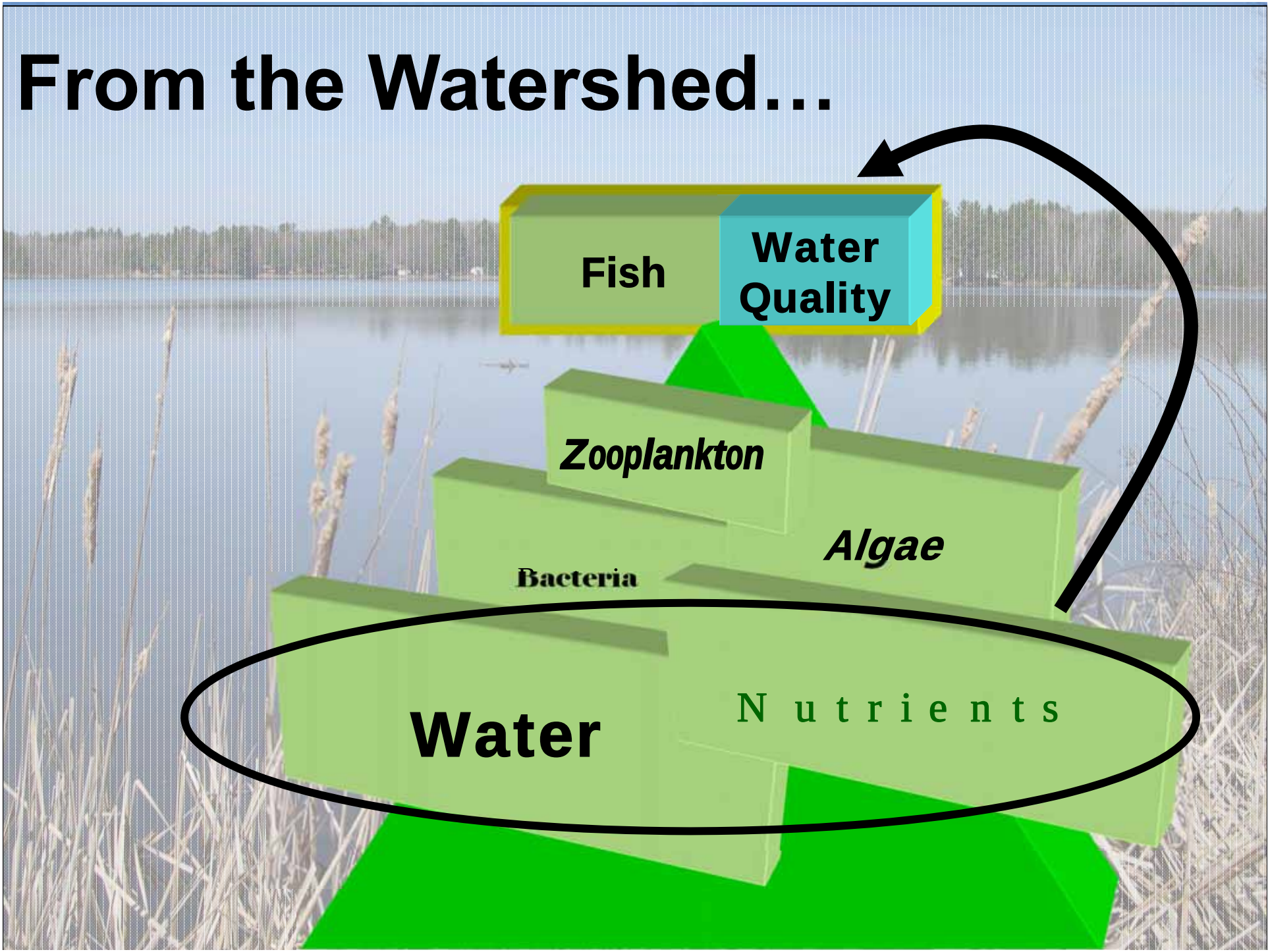


Steve Carpenter, 2004


Cty Hwy O
Cty Hwy X
tate Hwy 29
Cty Hwy N
Cty Hwy O
Cty Hwy G
31”
22”
9”
Evapotranspiration
Precipitation
Streamflow
How does the watershed work?


Inches of Water Leaving the Watershed
37”
10”
40
35
30
25
20
15
10
5
0
1/1
1/31
3/2
4/2
5/2
6/2
7/2
8/1
Date
2002
Average ~ 9 inches/year
That’s 16 Billion Gallons of water each year
Inches of Water Leaving the Watershed
25”
8”
20
15
10
5
0
1/1
1/31
3/2
4/2
5/2
6/2
7/2
8/1
9/1
10/1
11/1
12/1
12/31
Date
2003
Eau Claire River @ CTH MM

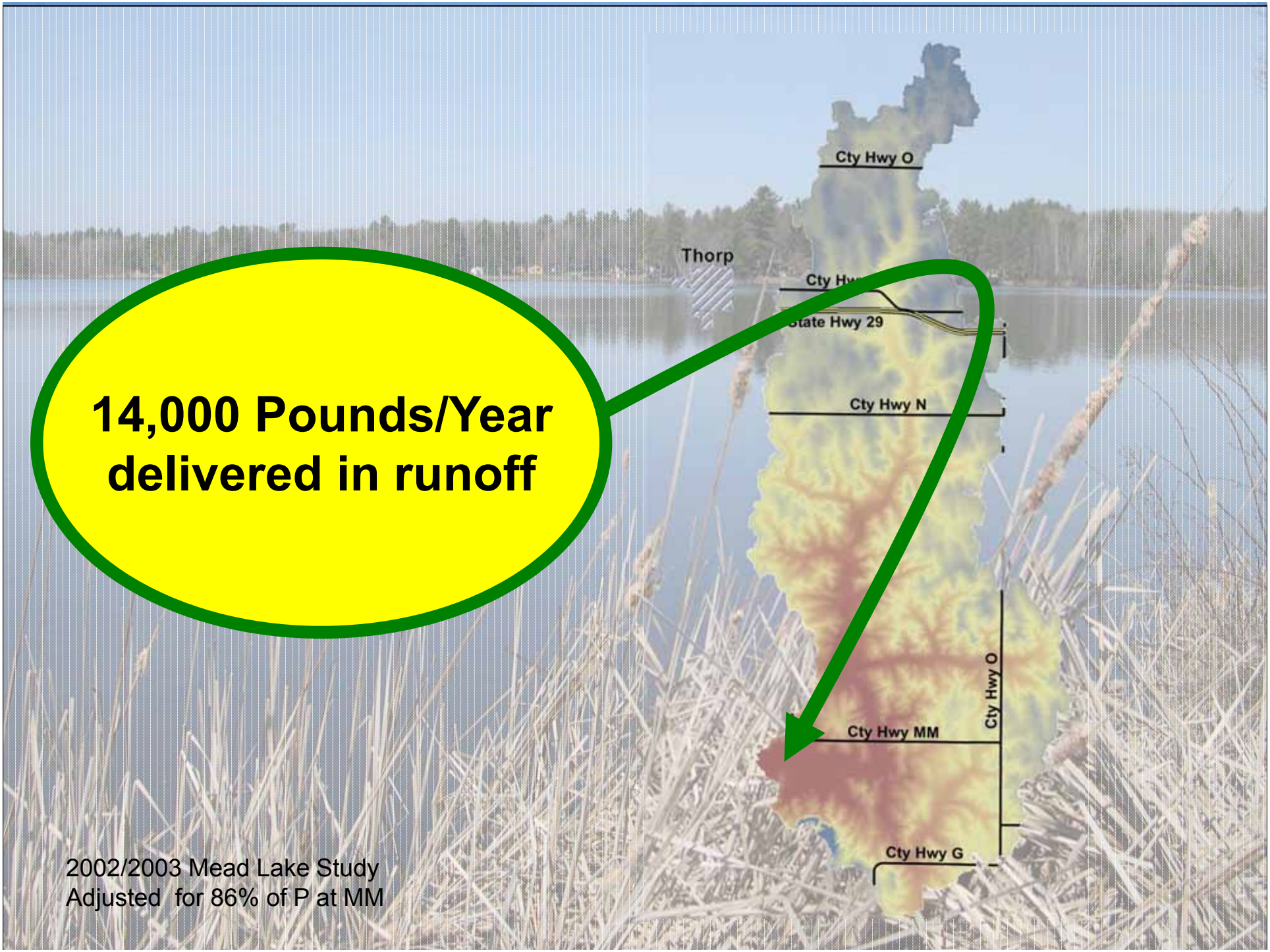
From the Watershed…



Mead Lake Watershed Phosphorus

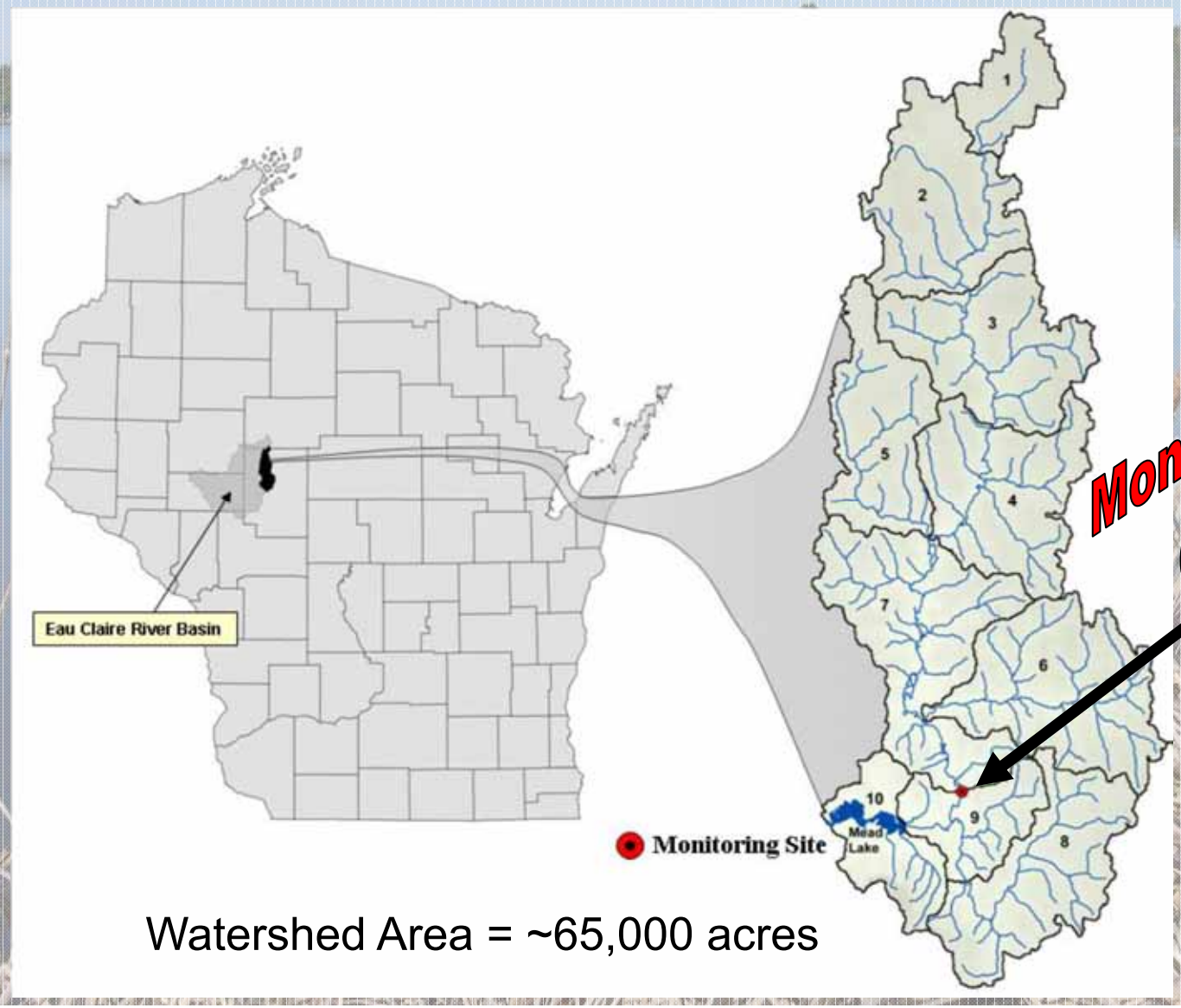
- **Increase phosphorus, increase algae growth**
  - **1lb of phosphorus can grow +500lbs algae**
- **Phosphorus is in soil, vegetation, rocks, animals, even rain…**
- **16 billion gallons of water can move a lot of phosphorus from the watershed to the lake……**

HOW MUCH???????????????


14,000 Pounds/Year
delivered in runoff
Thorp
Cty Hwy O
State Hwy 29
Cty Hwy N
Cty Hwy O
Cty Hwy MM
Cty Hwy G
2002/2003 Mead Lake Study
Adjusted for 86% of P at MM

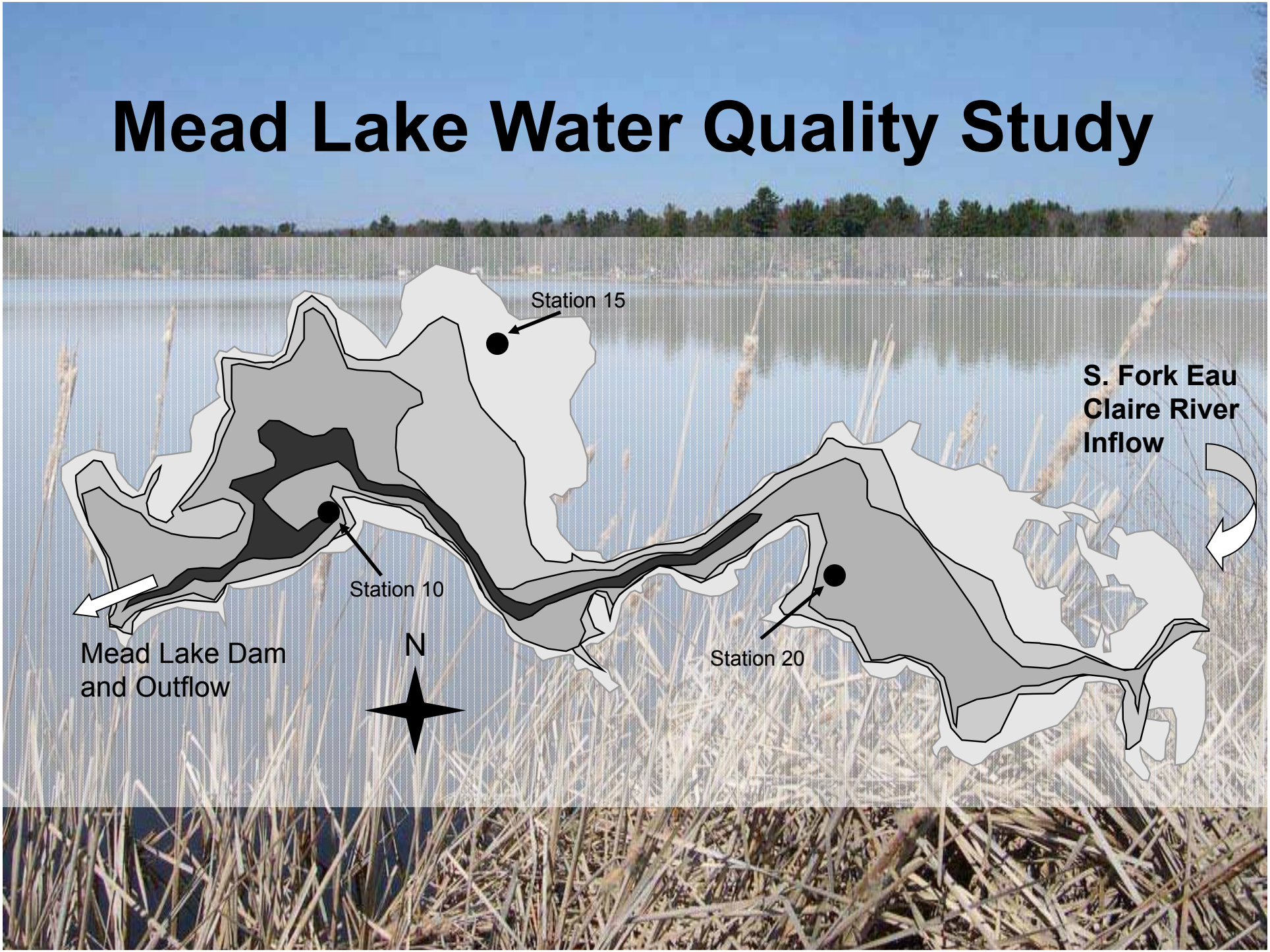

8-10-07
WARNING:
CLOSED TO
SWIMMING.
BEACH
SWIMMING
AREA IS
CONTAMINATED
AND MAY CAUSE
ILLNESS TO
HUMANS AND
ANIMALS.
County Health Department 715-743-5135

Mead Lake Watershed Water Quality Study

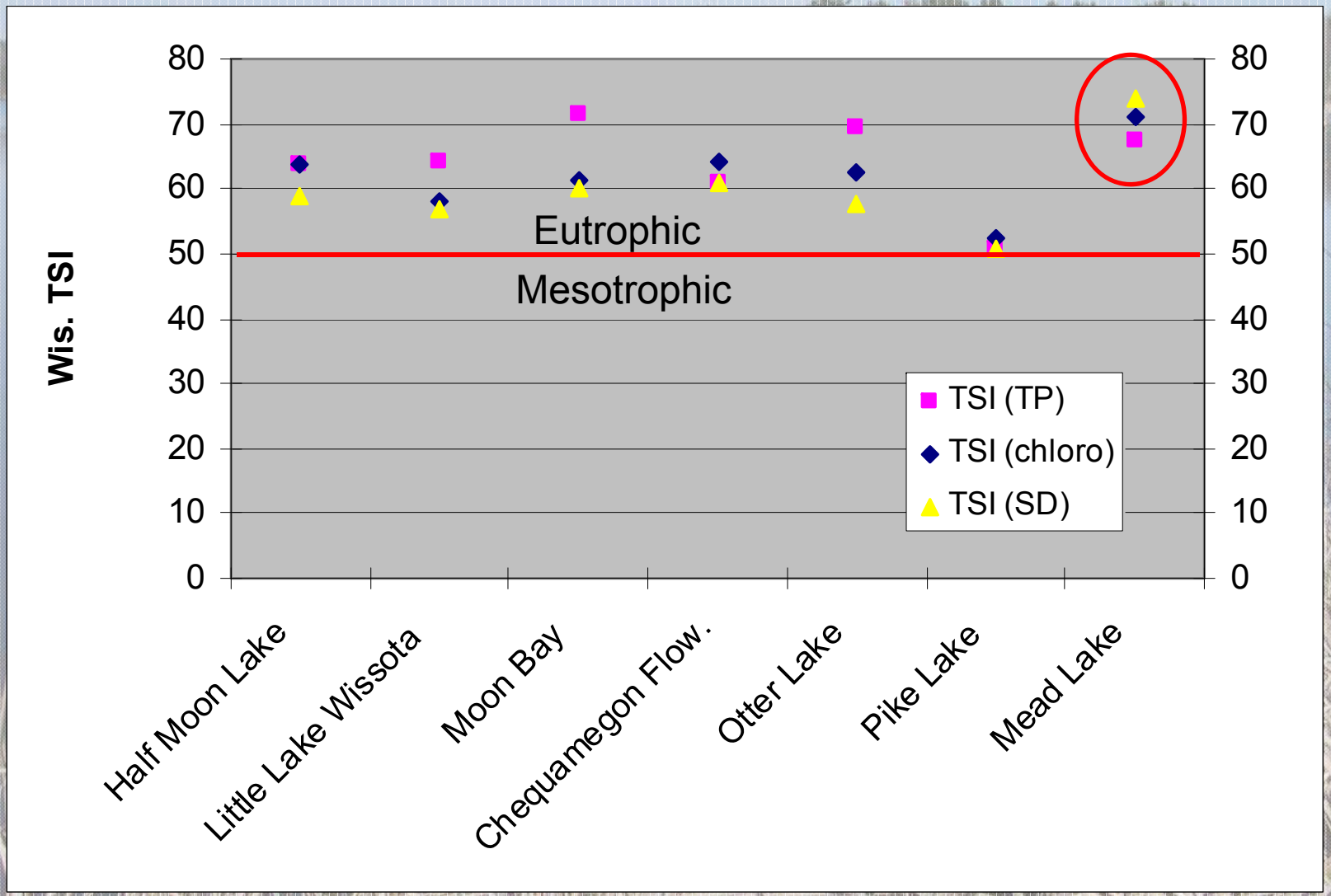


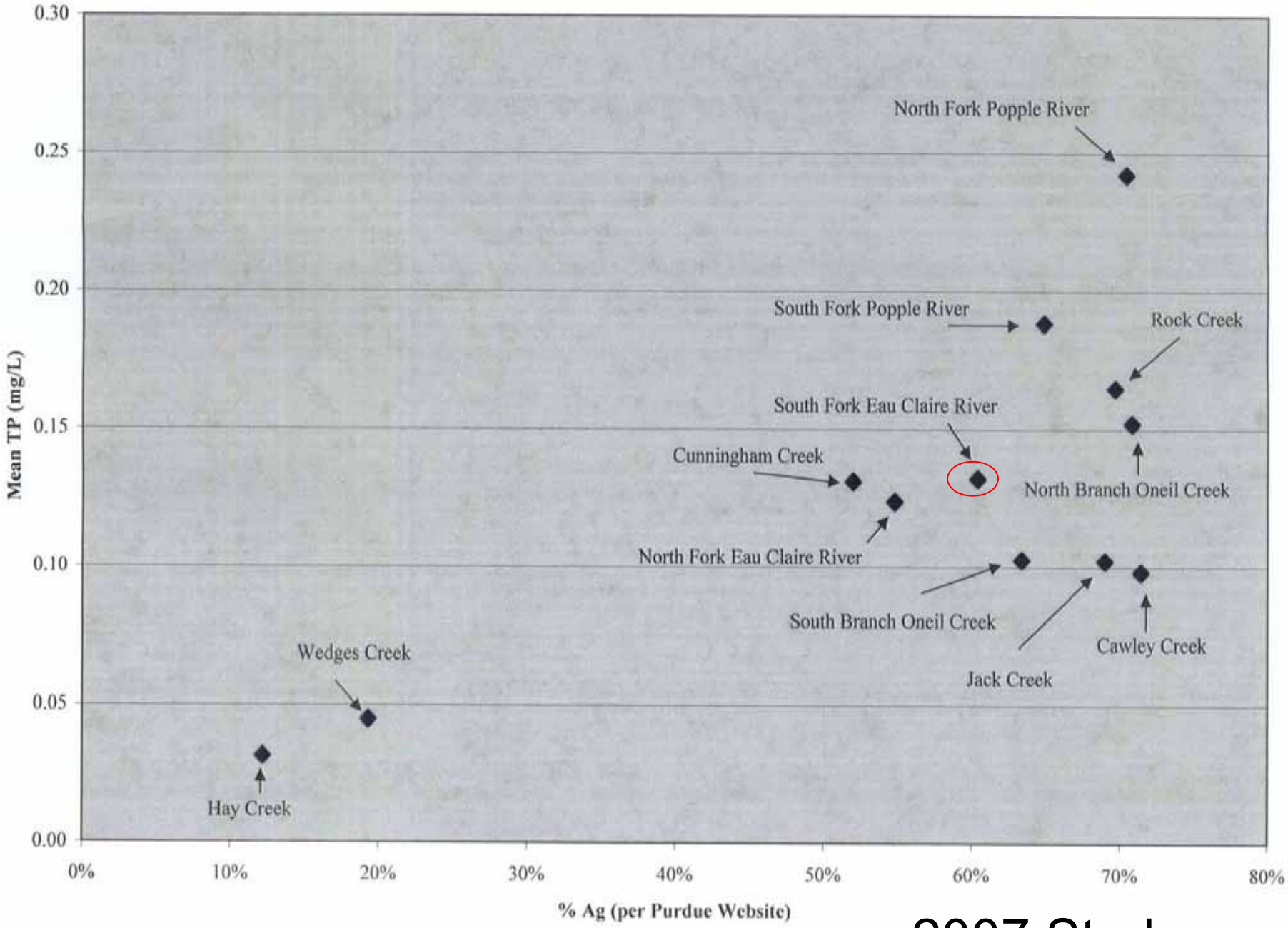
Watershed Area = ~65,000 acres

Mead Lake Water Quality Study



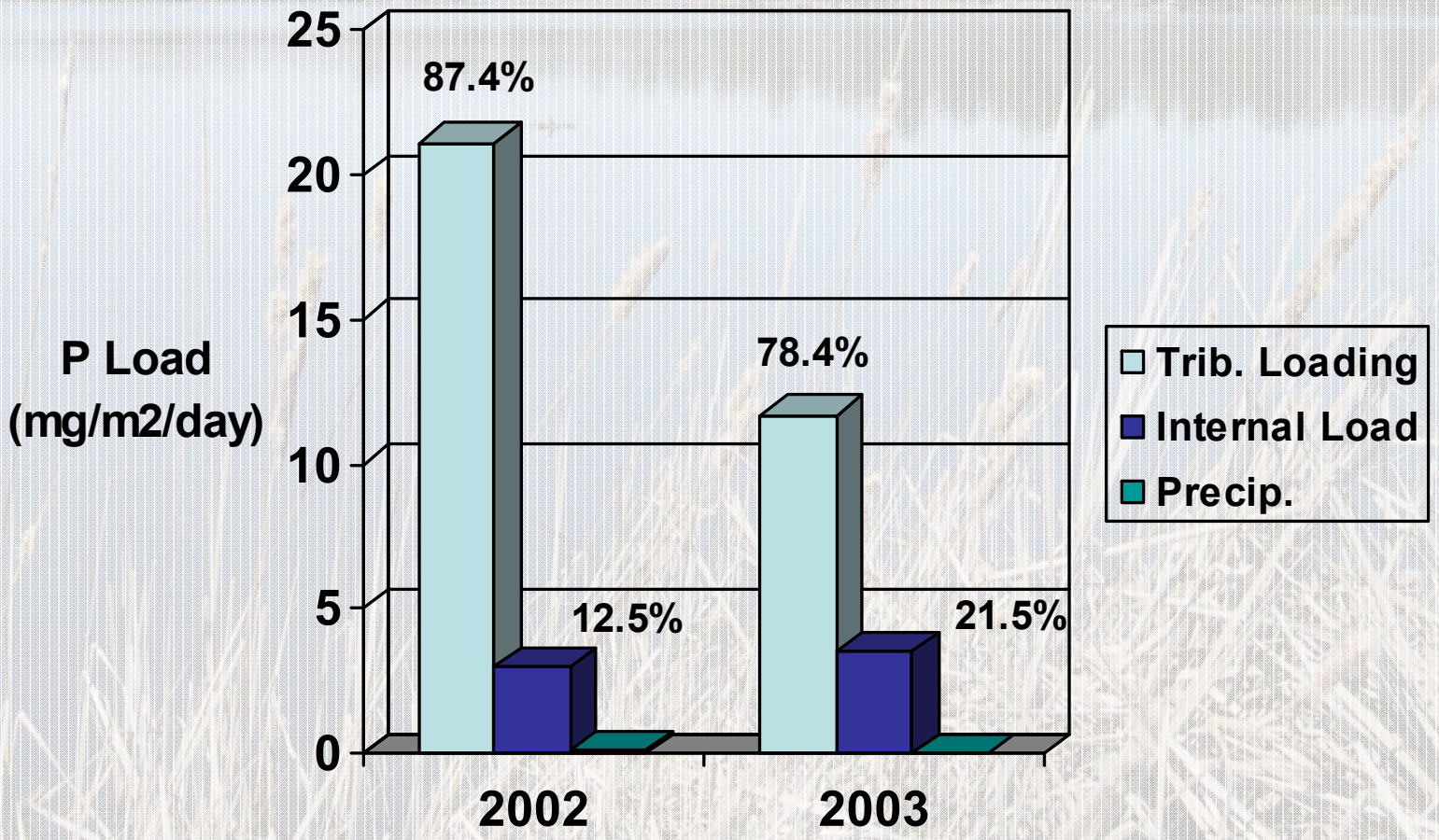
Trophic Status Index (TSI)



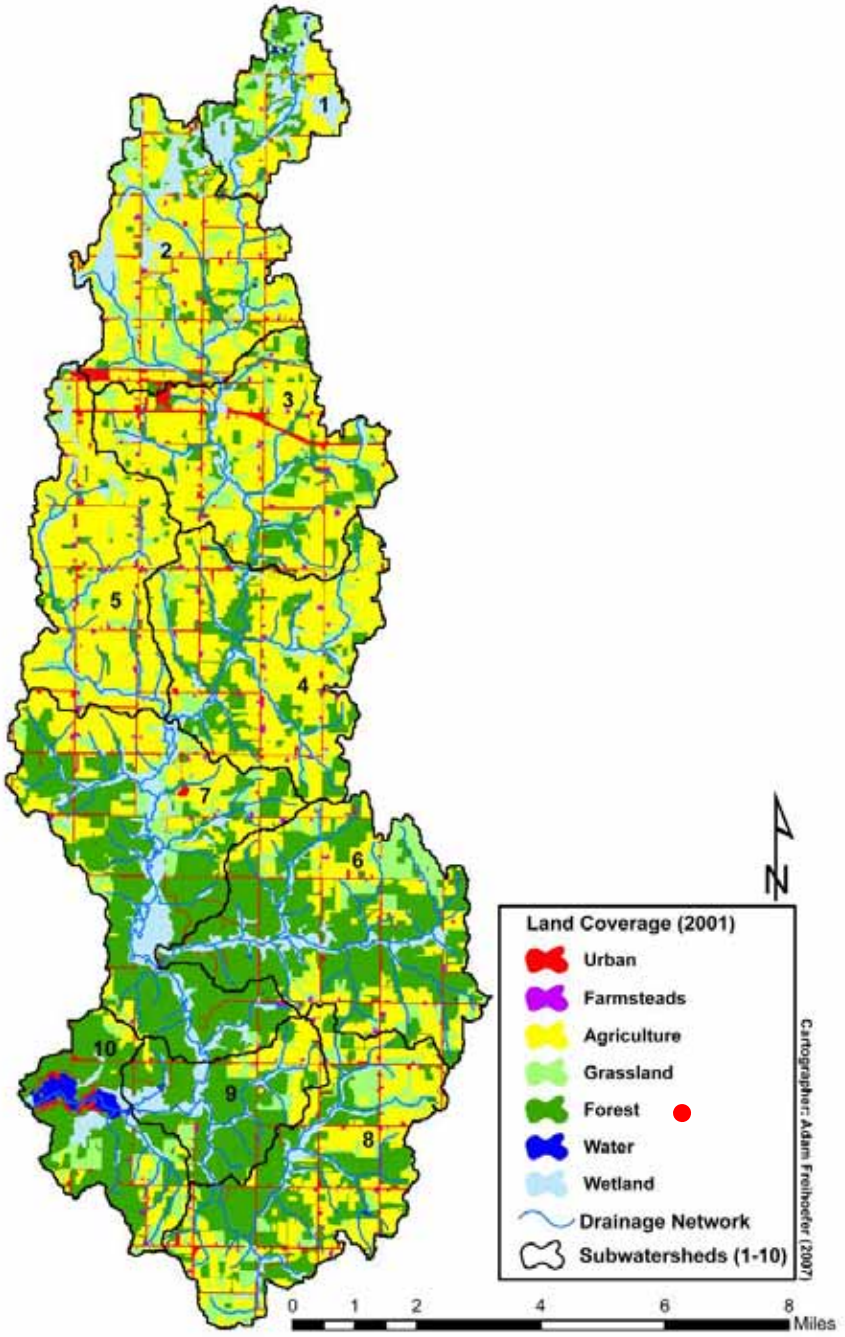

0.30
0.25
0.20
0.15
0.10
0.05
0.00
Mean TP (mg/L)
0%
10%
20%
30%
40%
50%
60%
70%
80%
% Ag (per Purdue Website)
North Fork Popple River
South Fork Popple River
Rock Creek
South Fork Eau Claire River
Cunningham Creek
North Branch Oneil Creek
North Fork Eau Claire River
South Branch Oneil Creek
Cawley Creek
Jack Creek
Wedges Creek
Hay Creek

2007 Study

Mead Lake – Summer P Loading Rates

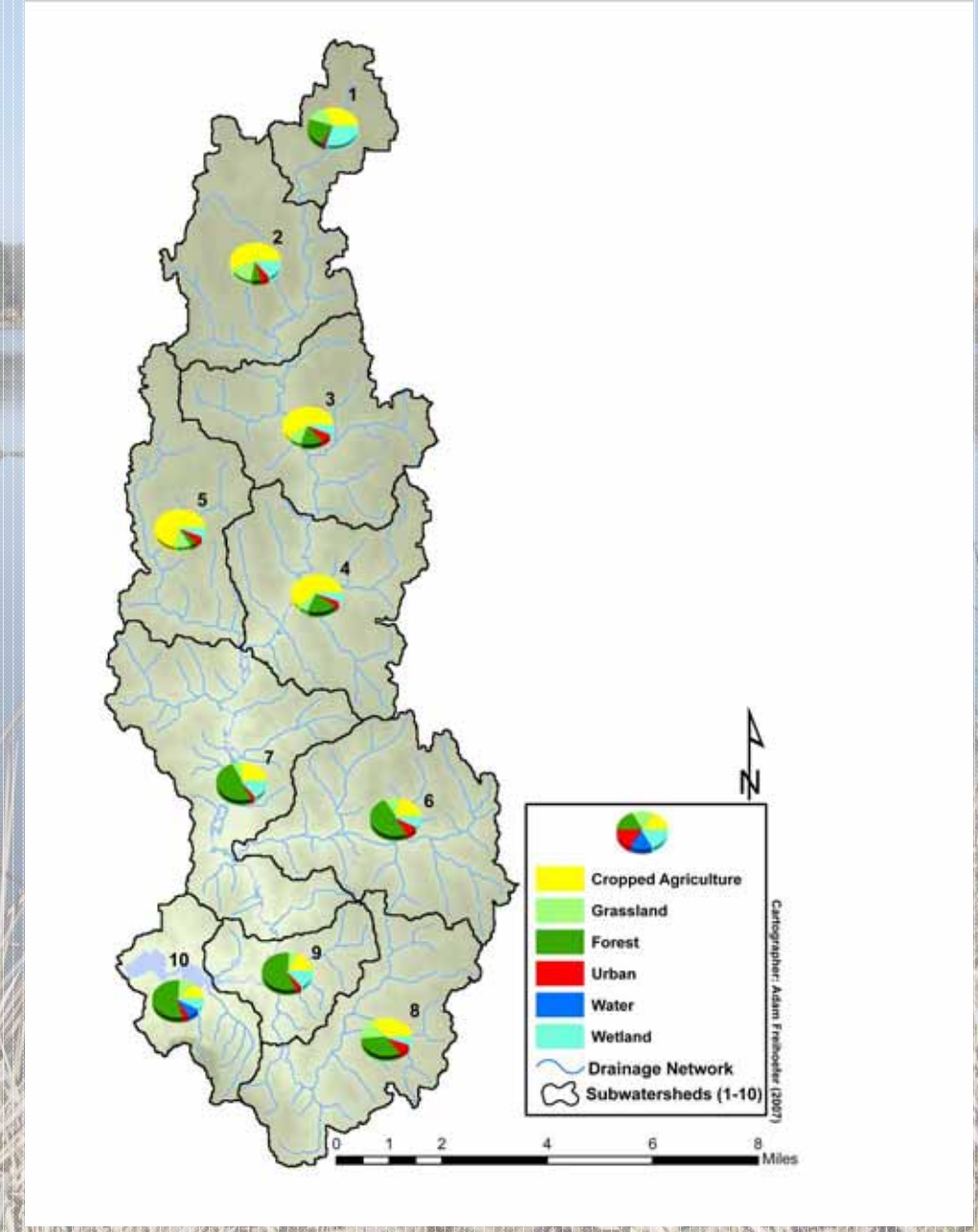


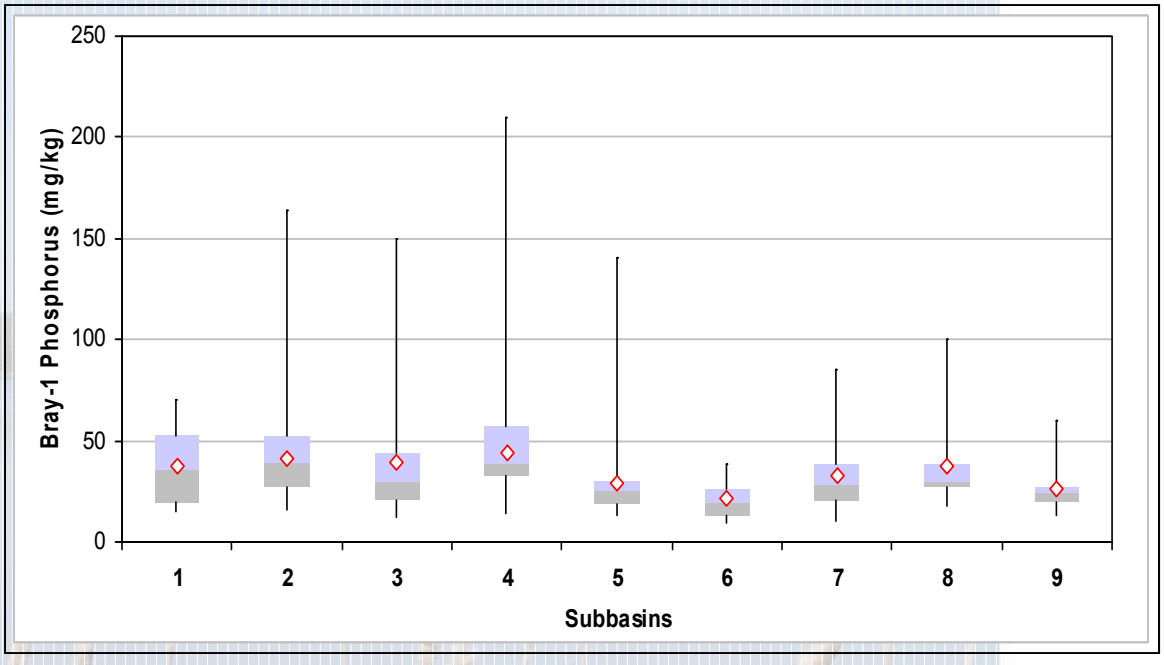
Detailed land use characterization developed
Divide into major land management classes for export analysis



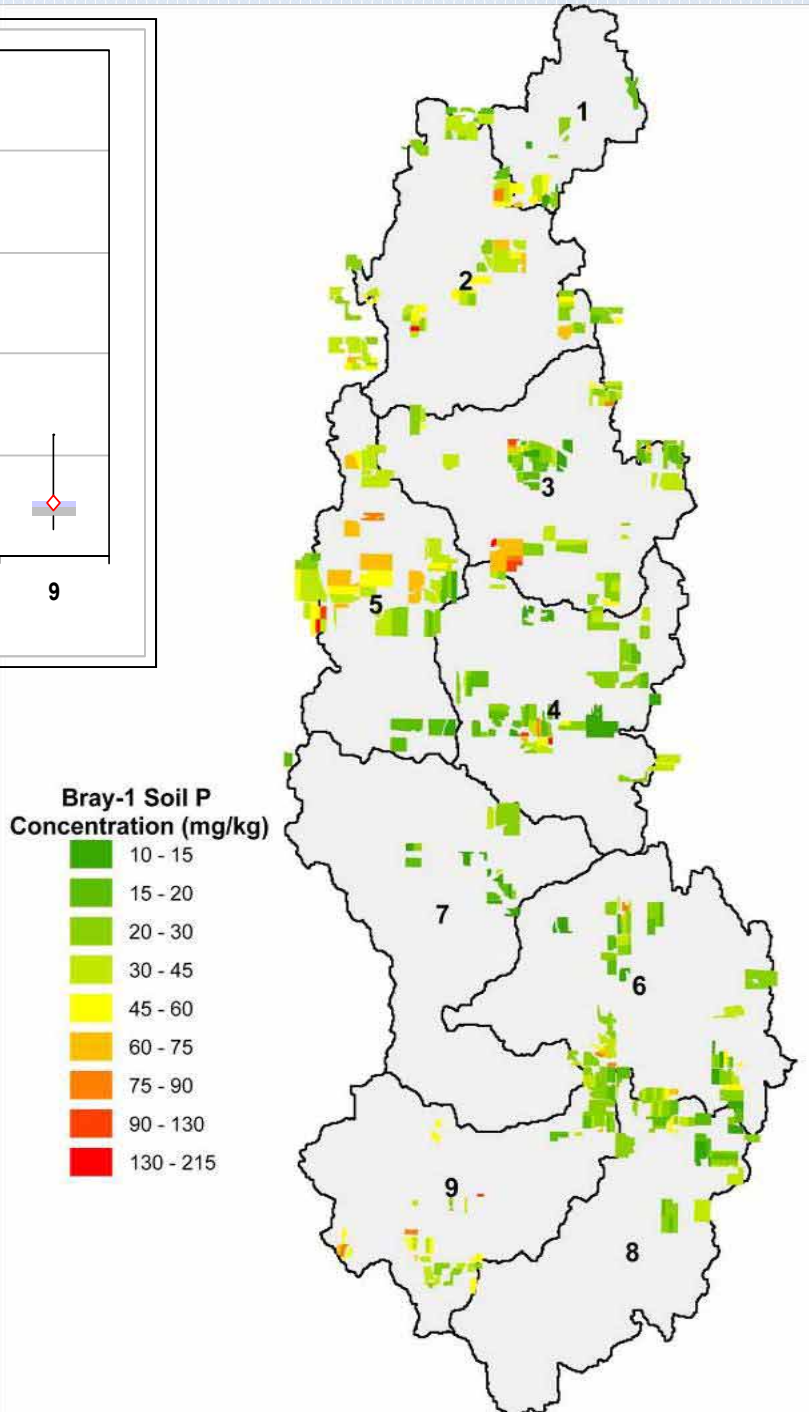
Watershed Characterization

Land management variations determined within each subwatershed

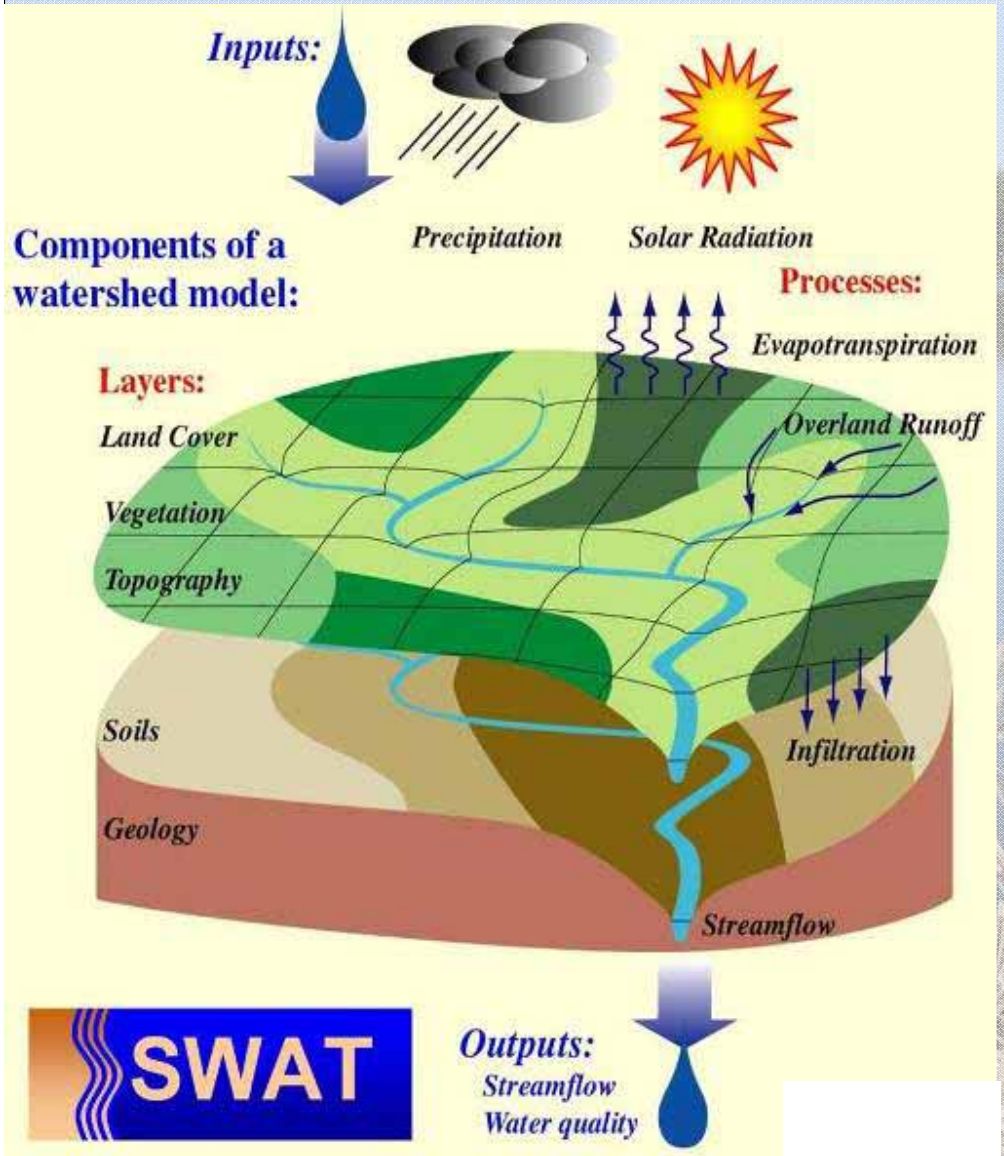




Soil Phosphorus Test Results



The SWAT Model



Soil and Water Assessment Tool (SWAT)

- **Developed by USDA**
- **Uses land use, soils, hydrology, climate, etc.**
- **Crop growth and rotations, runoff, soil erosion**
- **Water and nutrient budgets**
- **Simulate changes in crops, rotations, etc.**
- **Predict sediment and P loads**

SWAT model simulated phosphorus loads under different management scenarios in Mead Lake Watershed.

Scenario	Seasonal Total P Load (lbs.)	P Load Reduction (%)
Reducing soil P (25 ppm)	3,231	14%
Reducing Soil Erosion (50% reduction in USLE)	3,220	14%
Reduce manure P by 38% (animal dietary changes)	3,591	4%
Combination: reducing soil P, soil erosion control and manure management	**2,723**	**27%**
Winter Rye	Little change	5%
Rotational grazing	2,960	21%

TMDL = Total Maximum Daily Load

- **The amount of a pollutant a waterbody can receive without exceeding water quality standards.**

- **Targets and allocations reflect what is needed to meet water quality goals**

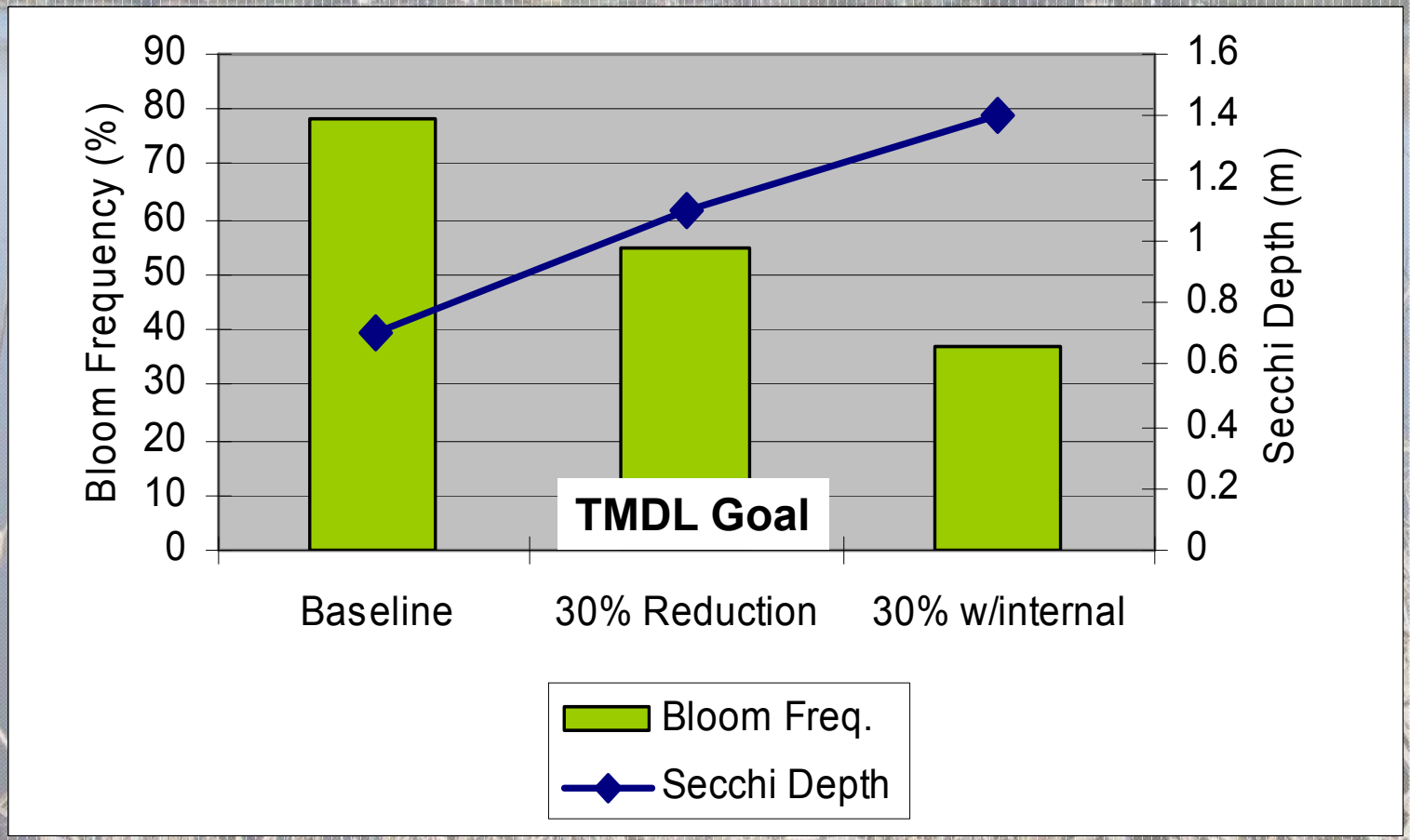
Mead Lake TMDL Goal

30% Reduction in Phosphorus and Sediment Loads

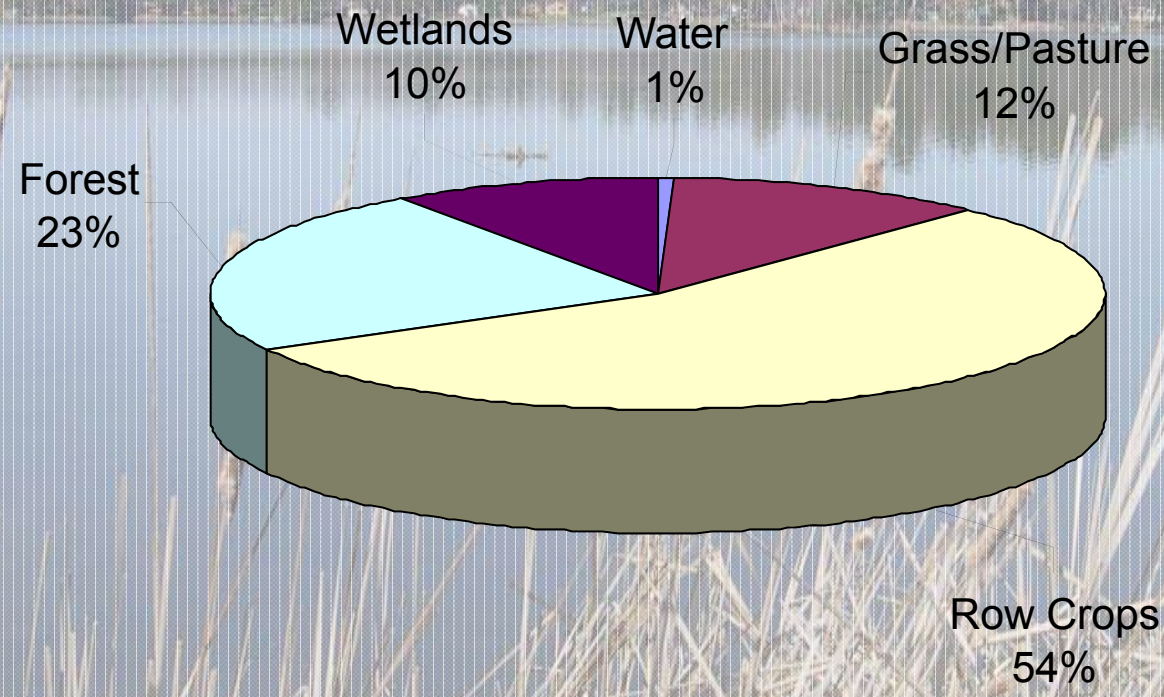
Or

>4,000lbs reduction

Mead Lake TMDL
In-Lake Water Quality Goals



Mead Lake Watershed Land Uses



Uncontrollable vs. Controllable
Keepin' it real….and rural!

“Essentially, all life depends upon the soil…There can be no life without soil and no soil without life; they have evolved together.”

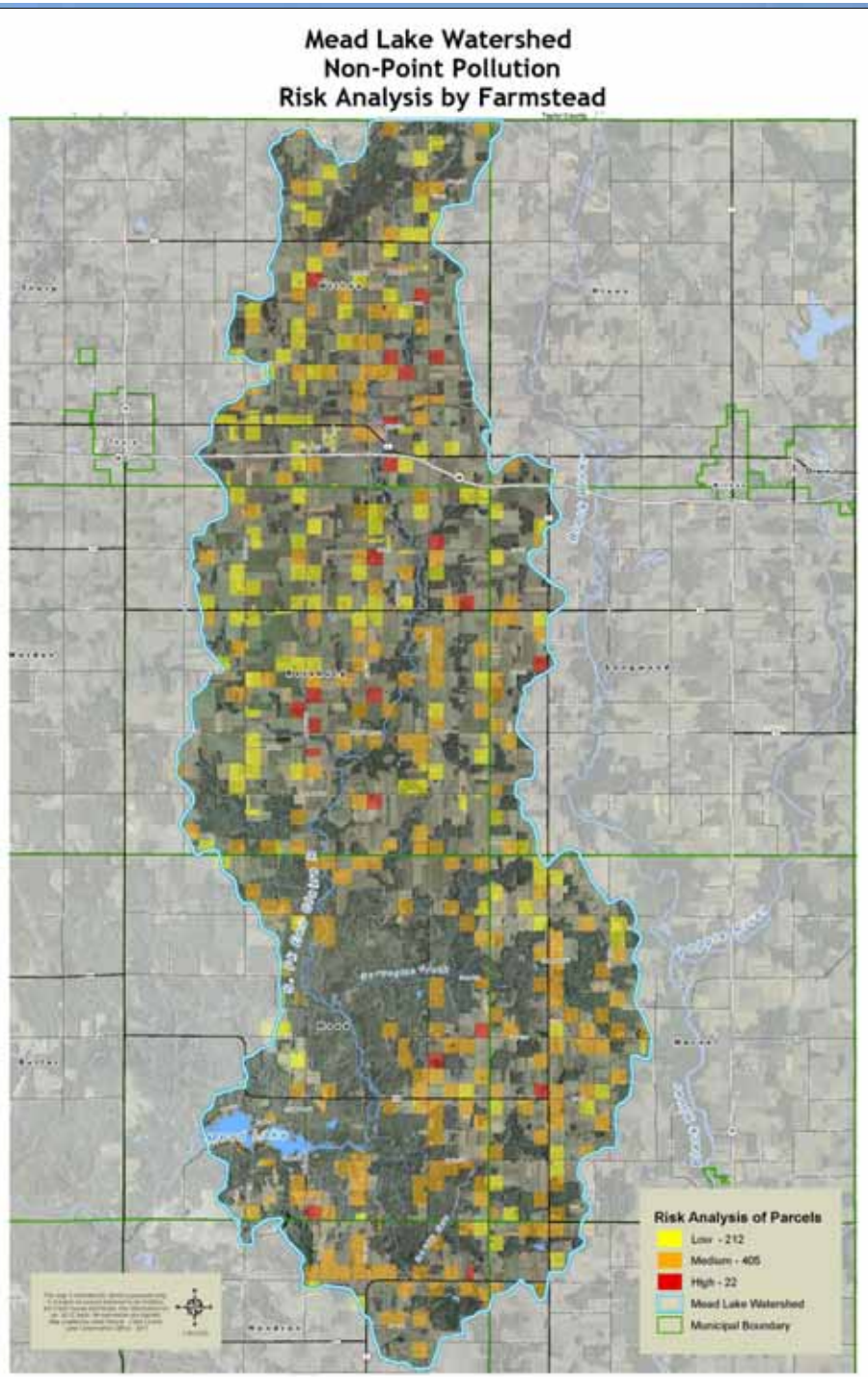
-Charles Kellogg-

Find a starting point……

- What to do with limited staff and limited funding?
  - Should we contact everyone or should we target our resources?
  - What conversation icebreaker can be used?
  - Used GIS to do a simple watershed parcel "risk analysis"- try to find a target.
  - However, risk is always "potential" and not always realized…….

Risk Potential Categories:

1. Facility
   - Manure Storage
   - Barnyard
2. Soil
   - Slope >9%
   - Leaching Soils
   - Bedrock Close
3. Water
   - SWQMAs
   - Wetland Alteration
   - Drainage Ditches



Results

- 2,659 total parcels
- 795 parcels with farmstead dwellings
  - 332 active livestock operations
  - 463 livestock infrastructure
- 212 low risk parcels
- 405 moderate risk parcels
- 22 high risk parcels
- All 639 parcels had some risk that could be managed through the implementation of nutrient management plans.

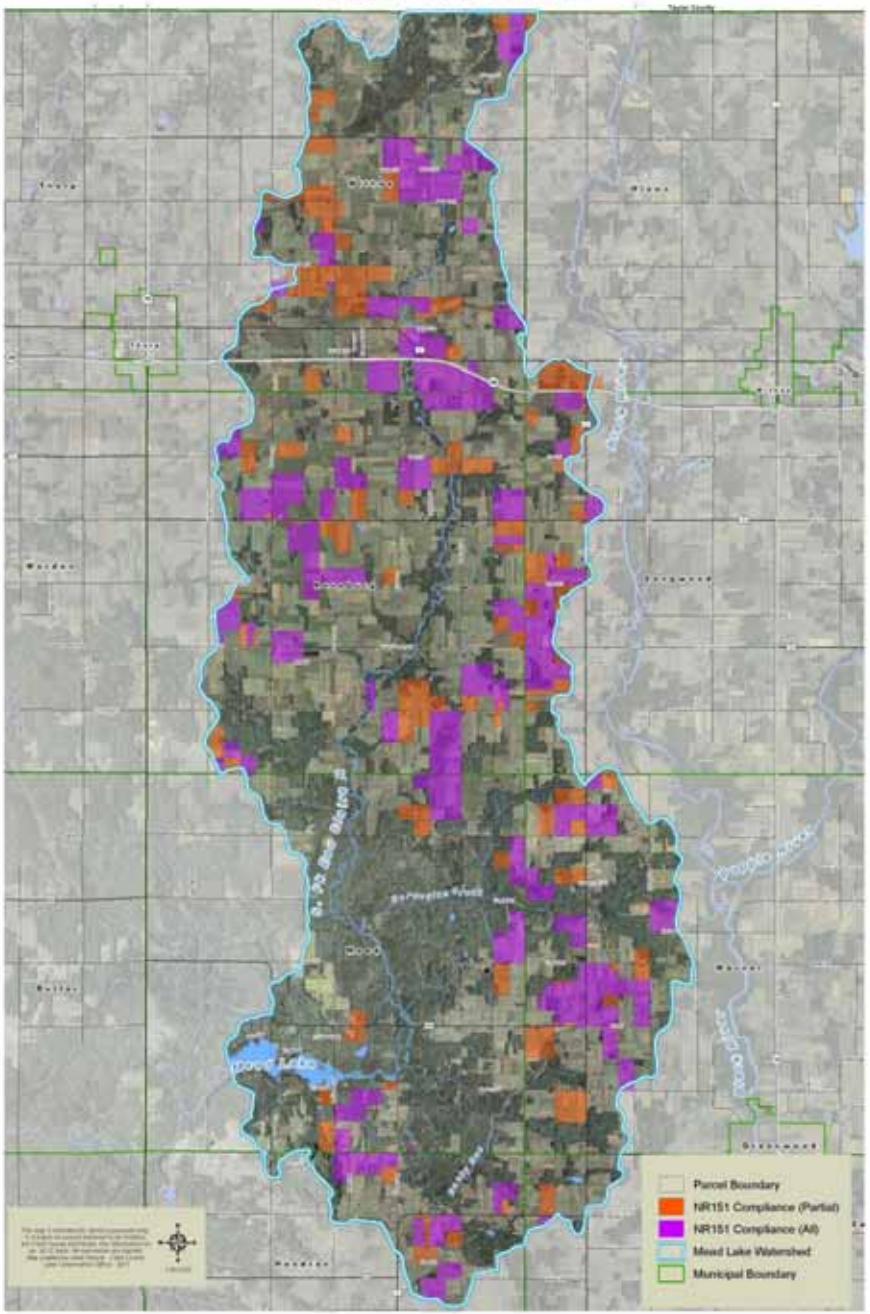
Breaking the data down further

- 89 parcels have facility risks
  - 15 parcels have barnyard risks
  - 75 parcels have manure storage risks
- 432 parcels have soils risks
  - 5 parcels have bedrock close to the surface
  - 189 parcels have slopes greater than 9% and drain to water conveyances
  - 314 parcels have soils subject to nitrate leaching
- 566 parcels have surface water risks
  - 19 parcels have man-made ditches draining to surface water
  - 289 parcels have wetland alterations
  - 465 parcels have SWQMAs

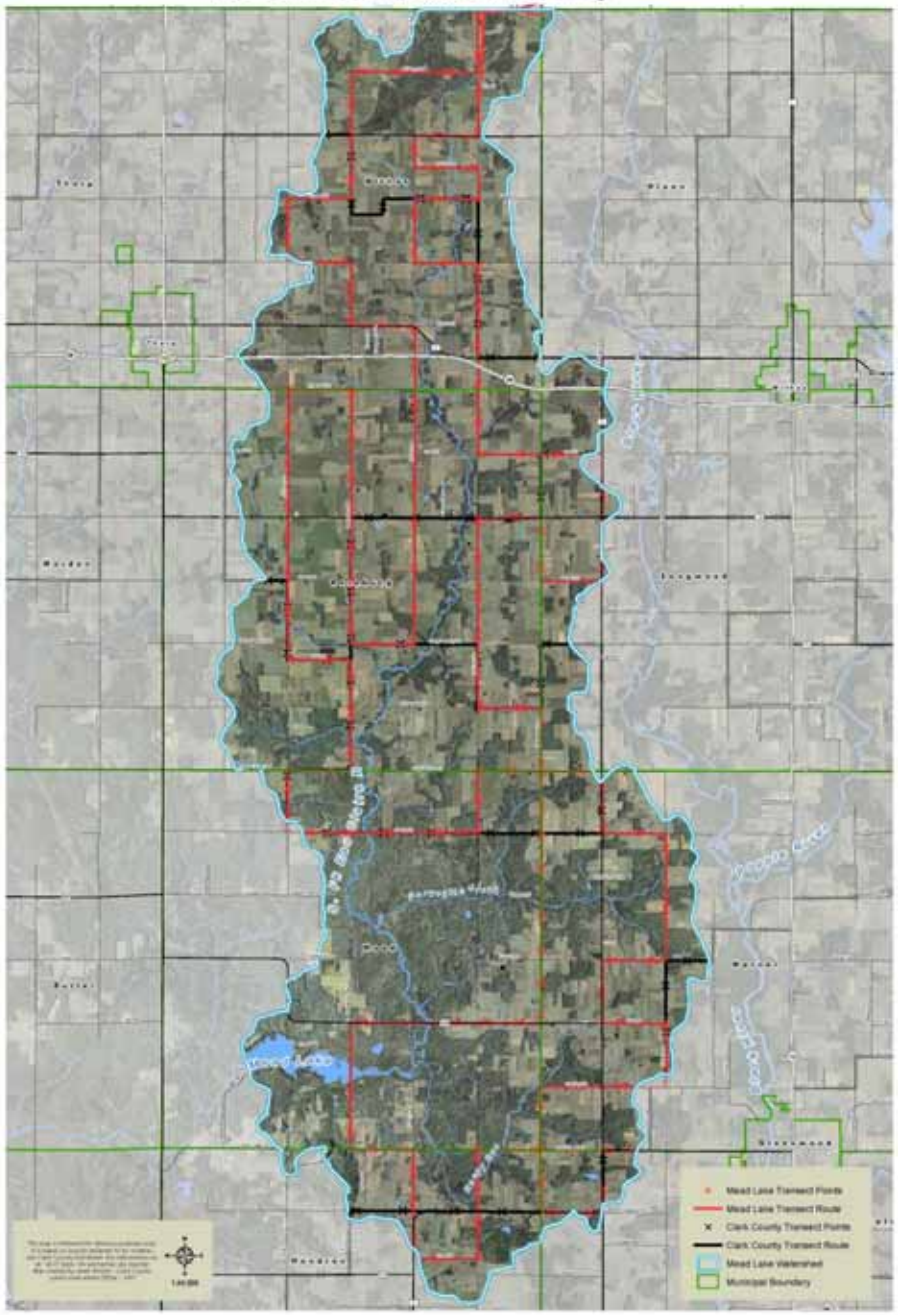
One last attempt to find a focus

- Of the 22 high risk parcels
  - Facility category
    - 6 parcels have barnyard risks
    - 20 parcels have manure storage risks
  - Soils category
    - 0 parcels had bedrock close to the surface
    - 13 parcels had soils subject to nitrate leaching
    - 15 parcels had slopes greater than 9% draining to surface water
  - Water category
    - 0 parcels had man-made ditches draining to surface water
    - 18 parcels had SWQMAs
    - 21 parcels had wetland alterations

Mead Lake Watershed
NR151 Compliance



Mead Lake Watershed
Soil Erosion Transect Survey



Transect Point Field ID _____

2012 Mead Lake Watershed Farm Practice Survey

1.) Crop Rotation (circle one rotation and please specify type of corn)

a. Corn-Soybeans
b. Corn (Grain/Silage) -Corn (Grain/Silage)-Hay-Hay-Hay
c. Corn (Grain/Silage)-Soybeans-Hay-Hay-Hay
d. Corn (Grain/Silage)-Hay-Hay-Hay
e. Continuous Corn (Grain/Silage)
f. Other_____

Please circle or fill-in the following information below for the Field ID listed above. (Upper right corner.)

2.) Corn

Tillage	Fertilizer and Rate		Manure	
No Till	None		None	
Fall Chisel, disk	Starter ___ - ___ - ___ type	lbs./acre	Liquid-Fall	Solid- Fall
Fall Chisel, no disk	Urea	lbs./acre	Gals/ac.	Tons/ac.
Fall Moldboard Plow	Ammonium Sulfate (AMS)	lbs./acre	Liquid- Spring	Solid-Spring
Spring Chisel, disk	Diammonium Phosphate (DAP)	lbs./acre	Gals/ac.	Tons/ac.
Spring Chisel, no disk	Potassium Chloride (Potash)	lbs./acre	Liquid- Winter	Solid-Winter
Spring Moldboard Plow	Other _____	lbs./acre	Gals/ac.	Tons/ac.

3.) Soybeans

Tillage	Fertilizer and Rate		Manure	
No Till	None		None	
Fall Chisel, disk	Starter ___ - ___ - ___ type	lbs./acre	Liquid-Fall	Solid- Fall
Fall Chisel, no disk	Urea	lbs./acre	Gals/ac.	Tons/ac.
Fall Moldboard Plow	Ammonium Sulfate (AMS)	lbs./acre	Liquid- Spring	Solid-Spring
Spring Chisel, disk	Diammonium Phosphate (DAP)	lbs./acre	Gals/ac.	Tons/ac.
Spring Chisel, no disk	Potassium Chloride (Potash)	lbs./acre	Liquid- Winter	Solid-Winter
Spring Moldboard Plow	Other _____	lbs./acre	Gals/ac.	Tons/ac.

4.) Small Grains _____type

Tillage	Fertilizer and Rate		Manure	
No Till	None		None	
Fall Chisel, disk	Starter ___ - ___ - ___ type	lbs./acre	Liquid-Fall	Solid- Fall
Fall Chisel, no disk	Urea	lbs./acre	Gals/ac.	Tons/ac.
Fall Moldboard Plow	Ammonium Sulfate (AMS)	lbs./acre	Liquid- Spring	Solid-Spring
Spring Chisel, disk	Diammonium Phosphate (DAP)	lbs./acre	Gals/ac.	Tons/ac.
Spring Chisel, no disk	Potassium Chloride (Potash)	lbs./acre	Liquid- Winter	Solid-Winter
Spring Moldboard Plow	Other _____	lbs./acre	Gals/ac.	Tons/ac.

5.) Hay _____type Do you use a nurse crop? _____ type grain forage

Tillage	Fertilizer and Rate		Manure	
No Till	None		None	
Fall Chisel, disk	Starter ___ - ___ - ___ type	lbs./acre	Liquid-Fall	Solid- Fall
Fall Chisel, no disk	Urea	lbs./acre	Gals/ac.	Tons/ac.
Fall Moldboard Plow	Ammonium Sulfate (AMS)	lbs./acre	Liquid- Spring	Solid-Spring
Spring Chisel, disk	Diammonium Phosphate (DAP)	lbs./acre	Gals/ac.	Tons/ac.
Spring Chisel, no disk	Potassium Chloride (Potash)	lbs./acre	Liquid- Winter	Solid-Winter
Spring Moldboard Plow	Other _____	lbs./acre	Gals/ac.	Tons/ac.
			Liquid- Summer	Solid- Summer
			Gals/ac.	Tons/ac.

6.) Do you have soil tests? YES NO
If not, can we sample? (No charge to you.) YES NO

Thank you for your time in completing this survey.

Contact Information (Optional): Name: _____ Phone: _____

Snap Plus Phosphorus Index

- 284 soil samples
  - Every 0.7 mile throughout watershed
  - Regardless of cover type
- 100+ landowners interviewed
- Conservation Management Data
  - Average Phosphorus Index value = 2.12
    - Range from 0.50 to 3.40 (mean = 1.7)
    - NR151 (ATCP 50) = not to exceed PI 6 over a crop rotation (up to 8 years) with no one year above PI 12.
  - Average soil test phosphorus value = 25.7ppm
    - Range from 6ppm to 151ppm (mean 24.8)
    - 25ppm is high end of optimum level for alfalfa and corn silage
  - Average soil loss (tons/acre) = 2.1
    - Range from 0.88 to 2.99 (mean 1.84)
    - Tolerable soil loss in tons per acre is 3 to 5 tons/acre/year

Lessons learned

- Perhaps it would be best to start at the beginning and focus on the journey and not the destination….everything takes time
- Now, the Land Conservation Department had a priority list of farmsteads to focus limited staff time and cost-sharing
  - 428 landowners with ~1,000 parcels
- We decided to start and talk to everyone, eventually!


The Mead Lake
and Watershed
PARTNERSHIP

What to Do & Where to Start: Basic Principles of Conservation

- Don’t focus on outcomes, at least not in the sense of pounds of phosphorus reduced.
- Landowners are not numbers or goals, they are people, real people, who are trying to live.
- Maybe today you’ll only have a great conversation- don’t rush it, you’ll still get paid!
- If I don’t care how long it takes, then why should you? If you don’t care, then why should they?
- Relax and enjoy…….then they can.
- Slow down: All things happen in time!

Behavior Change Principles

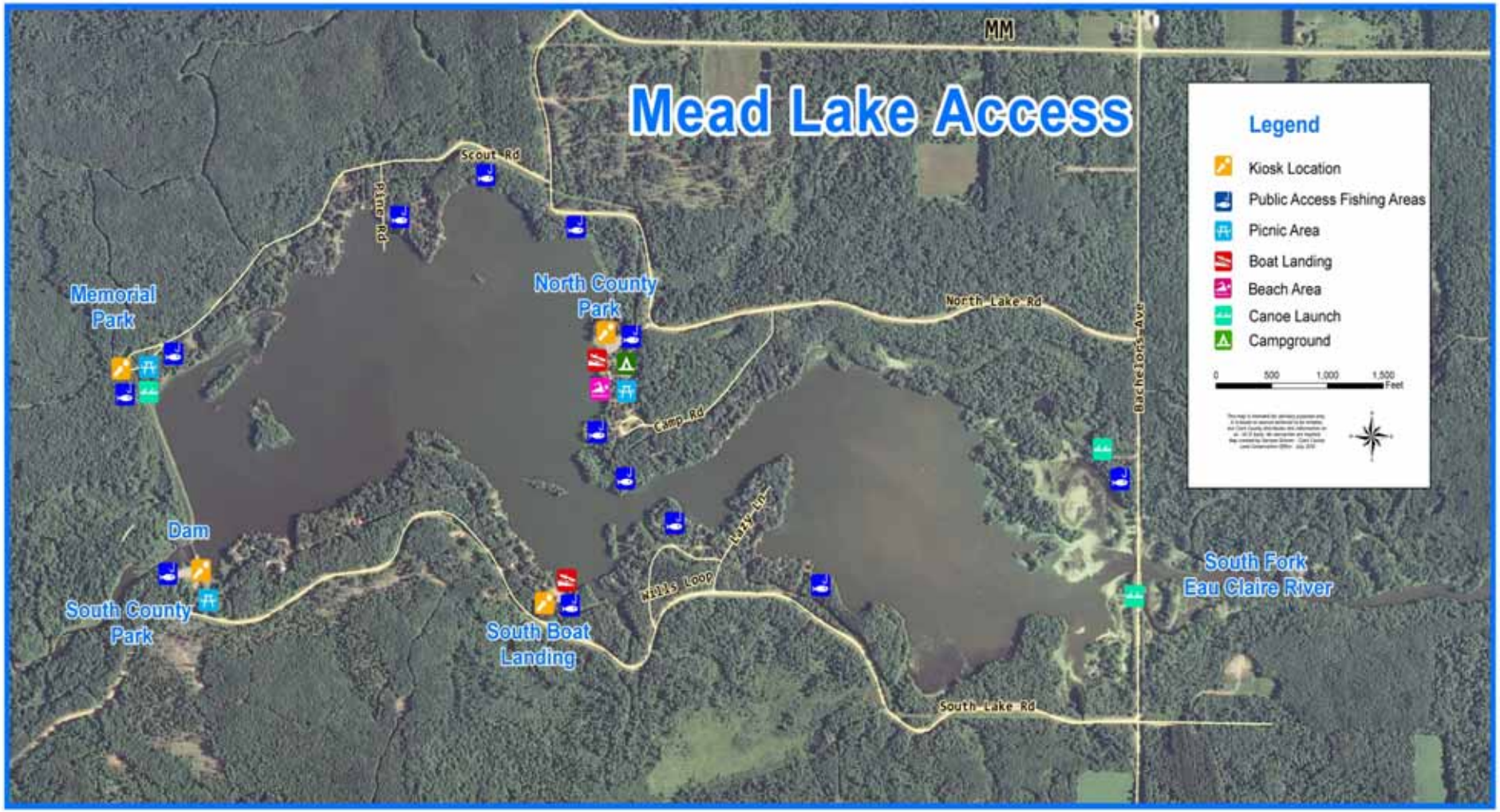
1. Recognize the differences, in order to understand the similarities
2. Understand the differences, in order to recognize the similarities

Mead Lake Watershed
Cultural Identity

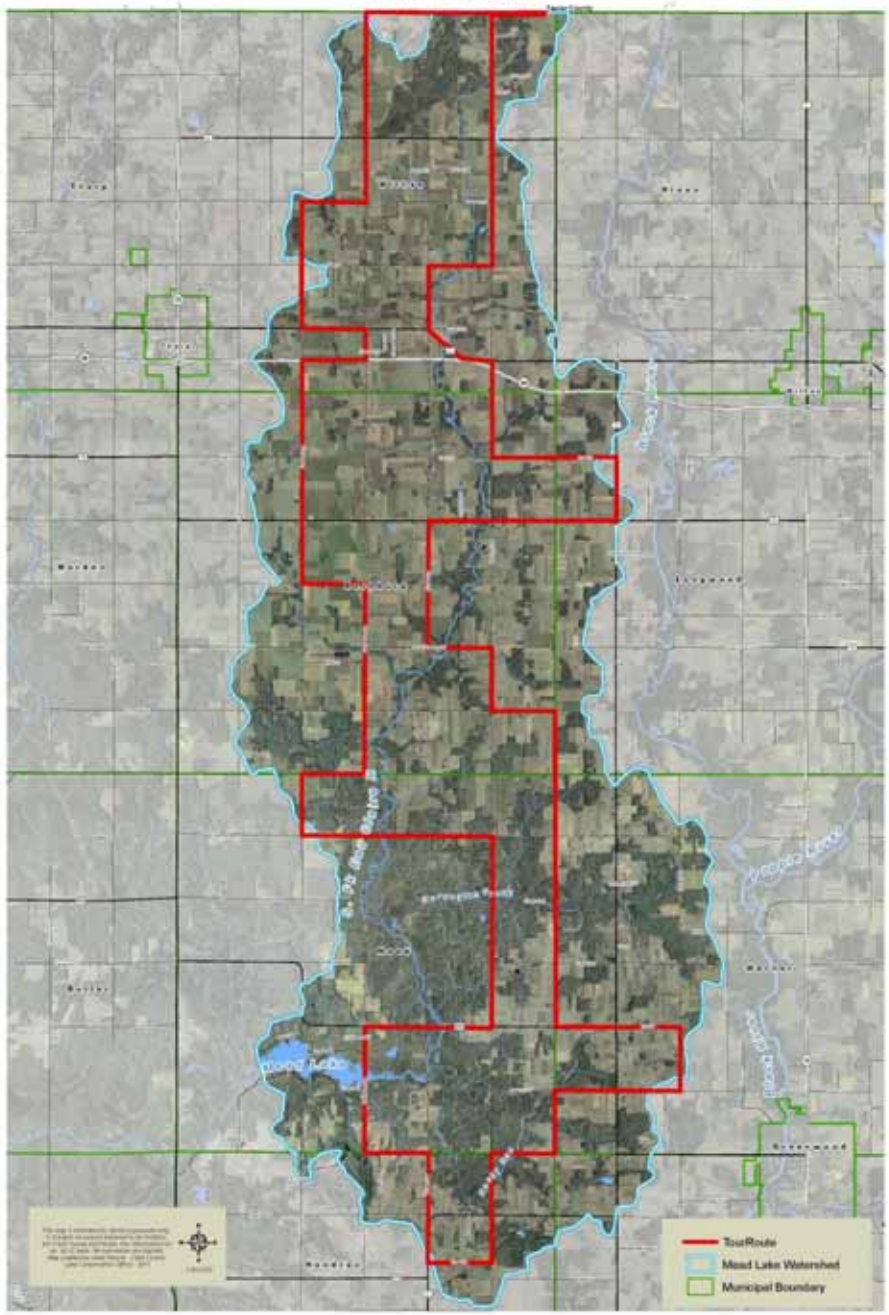
Step to Changing Behavior

1. “Me” Motivation
2. Change the Scenery
3. New Norm / Deliberate Practice
4. Peer Pressure / Bandwagon

We care about what we understand,
We understand what we experience



Mead Lake Watershed
Tour Route



Sources of Personal Influence

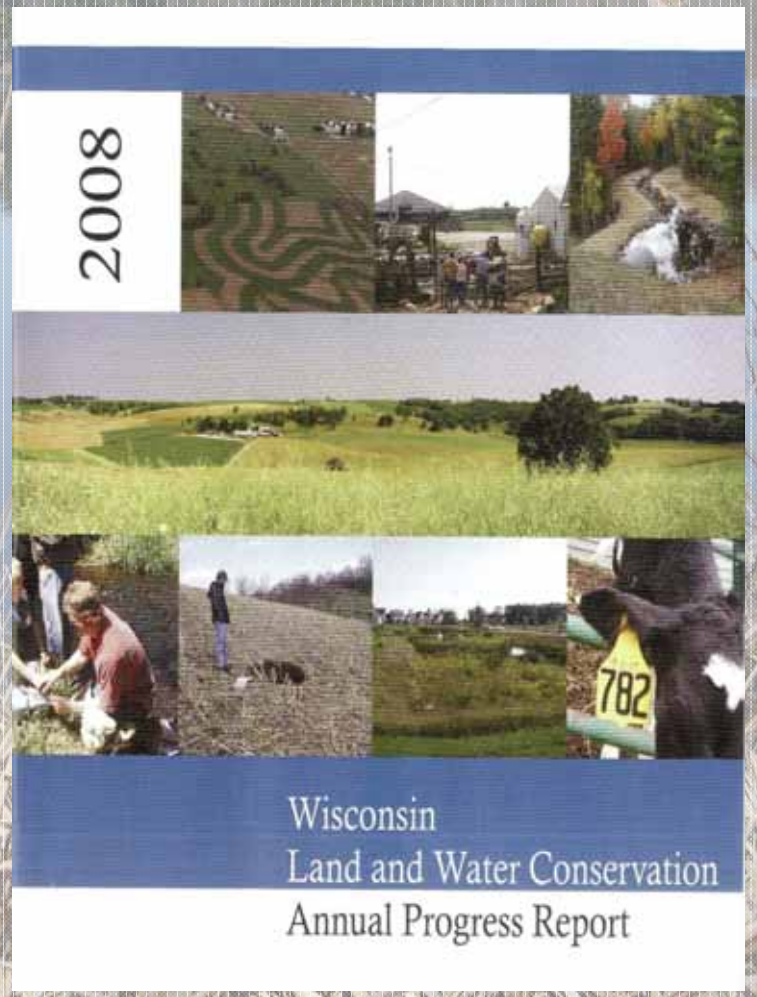
- What you say don't want, is what you want
- Push it to the edge and then redefine limits
- Everybody is doin' it, why aren't you
- United we stand, I need help
- Change for the better…or worse
- I'll meet on your terms to make you feel better
- Rewards and expectations- Pavlov Response

Farmer Education NMP Success Story

Regional Approach to Nutrient Management Implementation

NMP Farmer Training

- Quad County
  - Clark, Marathon, Lincoln, and Taylor Counties
- Technical Colleges
  - North Central, Midstate, and Chippewa Valley
- On-The-Road Show
  - Mennonite and Amish
- Multi-Agency Land & Water Education Grant Funding



DATCP SWRM/EPA 319 Grant Success Story

Mead Lake Watershed- TMDL Implementation

DNR TRM/EPA 319 Grant Success Story

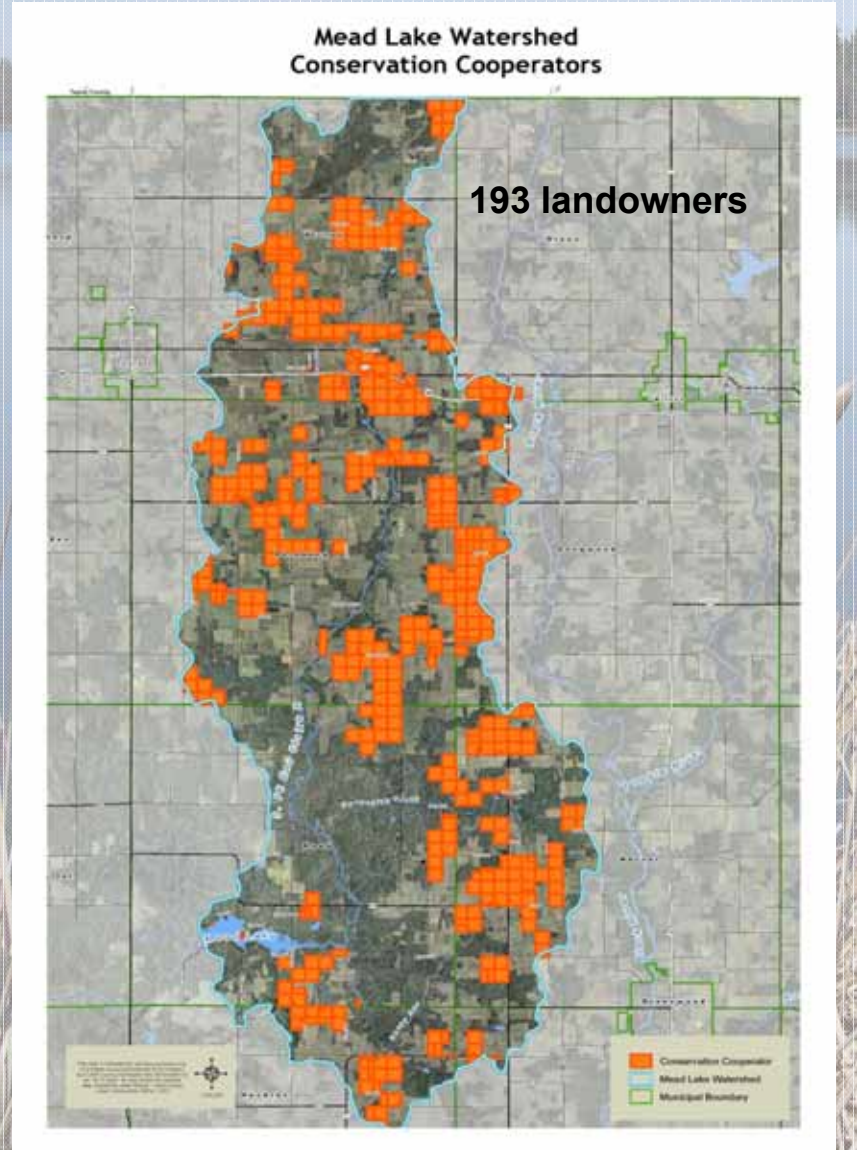
Mead Lake Watershed- TMDL Implementation

Mead Lake TMDL Implementation

- 1 farm, 7 BMPs, 3,103 lbs. of P reduced
- Bovine Asset Management
  - Manure Storage Replacement, Barnyard Runoff Control, Nutrient Management, Silage Leachate Collection, Clean Water Diversions, Grassed Waterways, Access Road
- Funded with WDNR Targeted Runoff Management Grant and EPA 319 Funding

WDNR Lake Planning Grant Success Story

Mead Lake TMDL- Educational Kiosks & Cooperator Signage



Conservation
The Mead Lake
and Watershed
PARTNERSHIP
Cooperator

Mead Lake Watershed Conservation Cooperator


RISE 'N DAIRYLAND


Conservation
Mead Lake
Watershed
PARTNERSHIP
Cooperator
ALICE IN DAIRYLAND


Conservation
Cooperator


The Mead Lake
and Watershed
PARTNERSHIP

One-On-One Personal Communication

Town Hall Meetings

Annual Town Board Meetings

Lake District Meetings

Boat Landings

Farm Visits

Bar Talk

Roadside Chats

Tell your story and listen to theirs!

Bottomline: Communication Principles

1. Respect the human-ness, the people stuff.
2. Punch me & I punch you- please don't hit.
3. Avoid conversation hand grenades!


Three “E’s”
Educate
Encourage
Enforce

Final Thoughts

A watershed is more than a community of droplets…

More importantly a watershed is a community of individuals, neighbors, working together to achieve a common goal that embraces the community of individual responsibility and therefore enhances the community of shared natural resources.

Thank You!