

# DEVELOPING COMMUNITY WIDE SCIENCE-BASED LAKE STEWARDSHIP

2010 Lake Leaders – Kemp Field Station

N. Turyk, Univ. Wisconsin-Stevens Point

S. Bradley, Portage County

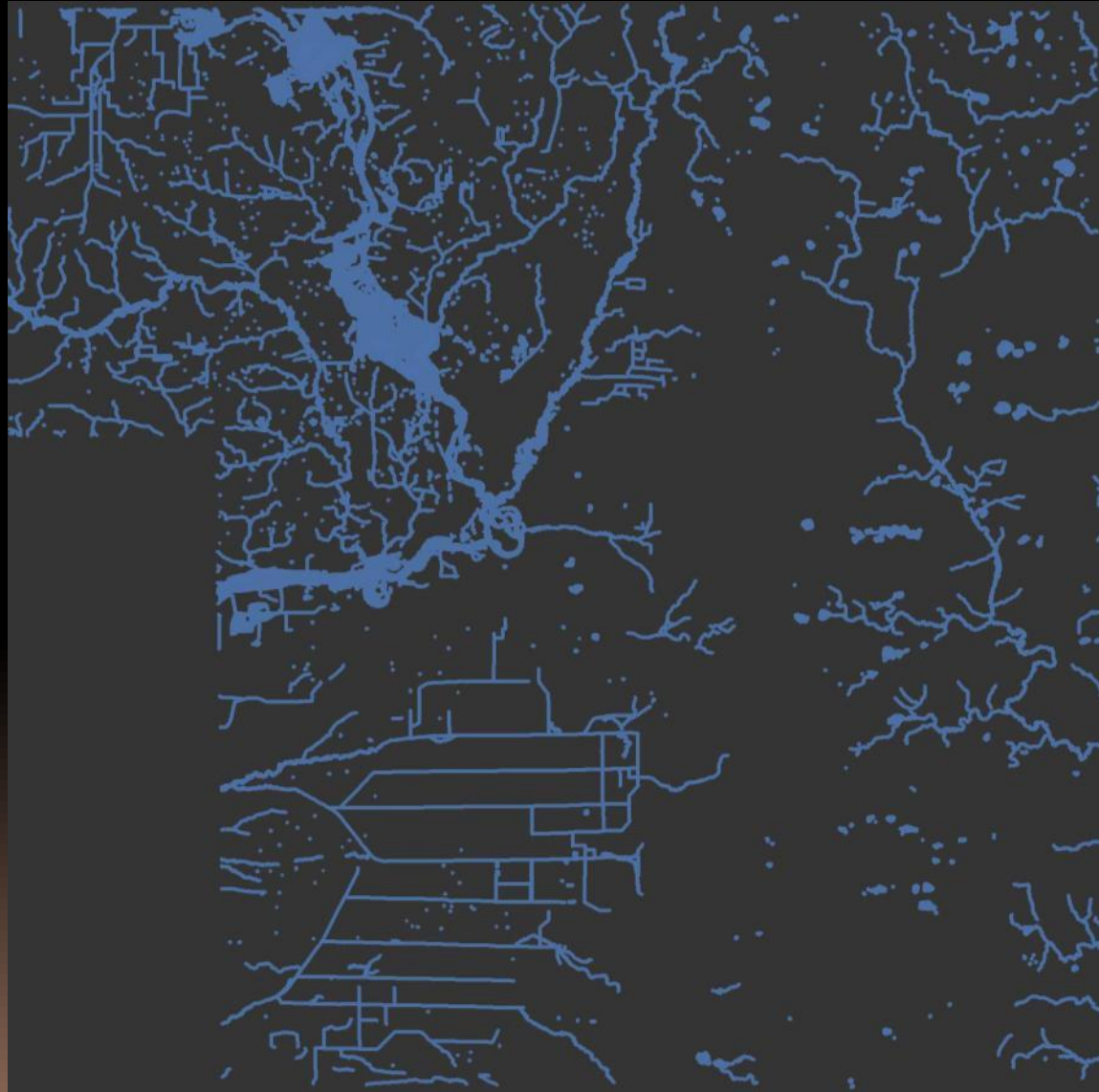
B. Sorge, Wisconsin Dept. Natural Resources

- We envision lake stewardship to become a part of the community's composition in Portage County.
  - Accomplished on a community-wide basis
  - Purposeful efforts by landowners, lake users, businesses, municipalities, and local and state agencies with goals of healthy and sustainable lake ecosystems within the county.
  - Study and planning process has been undertaken through partnership with the County, WDNR, and UWSP to provide the knowledge-based and socially-based partnership that is needed to accomplish these goals,.
  - Support for the fledgling groups and their efforts is essential to make this a sustainable part of the community.

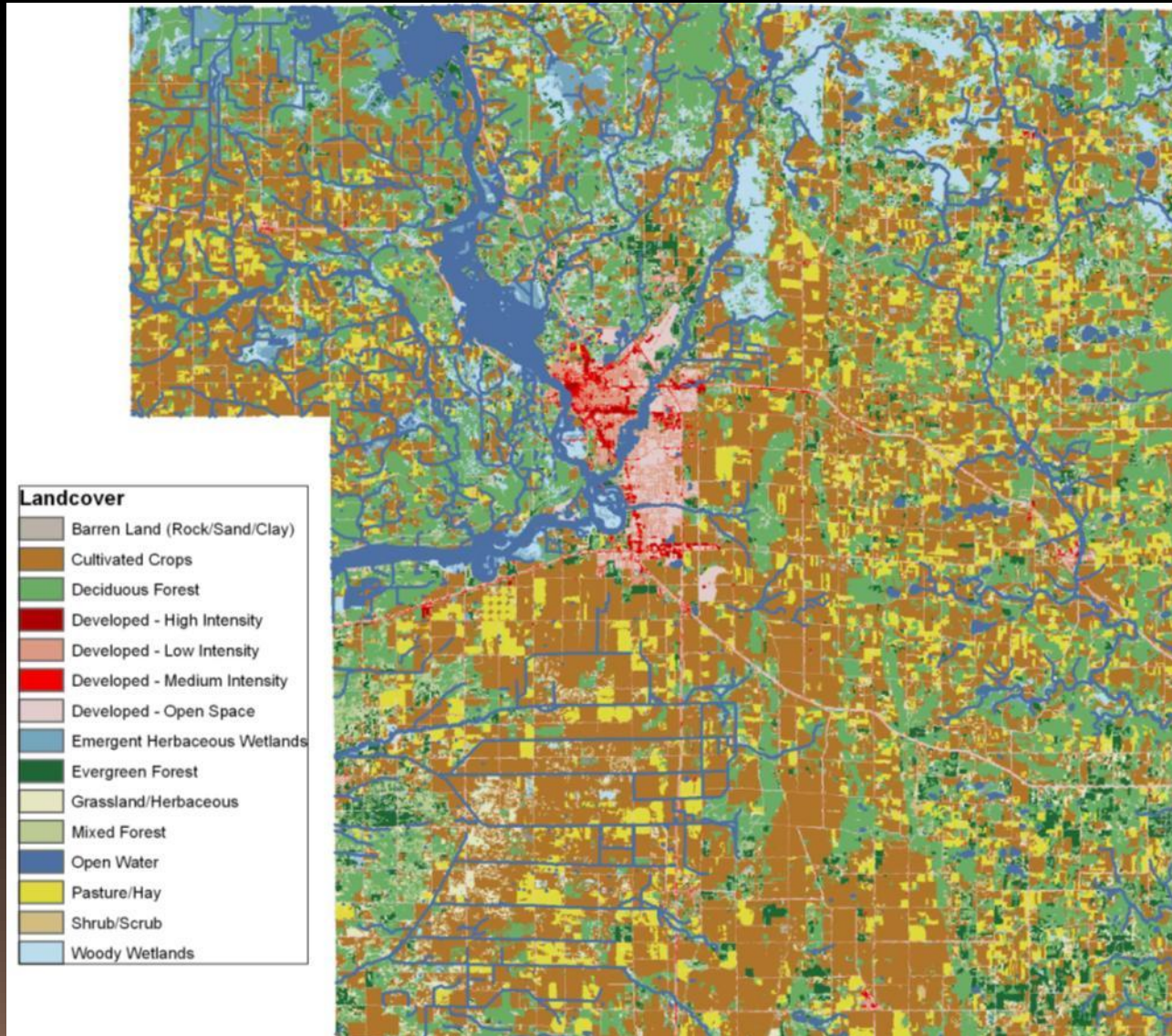
# Portage County



A fair amount of water..



# A patchwork of land cover and land uses!



A variety of agriculture and other land uses that can impact lakes.





Some lakes are developed,  
others not developed

Seepage and drainage lakes  
and impoundments







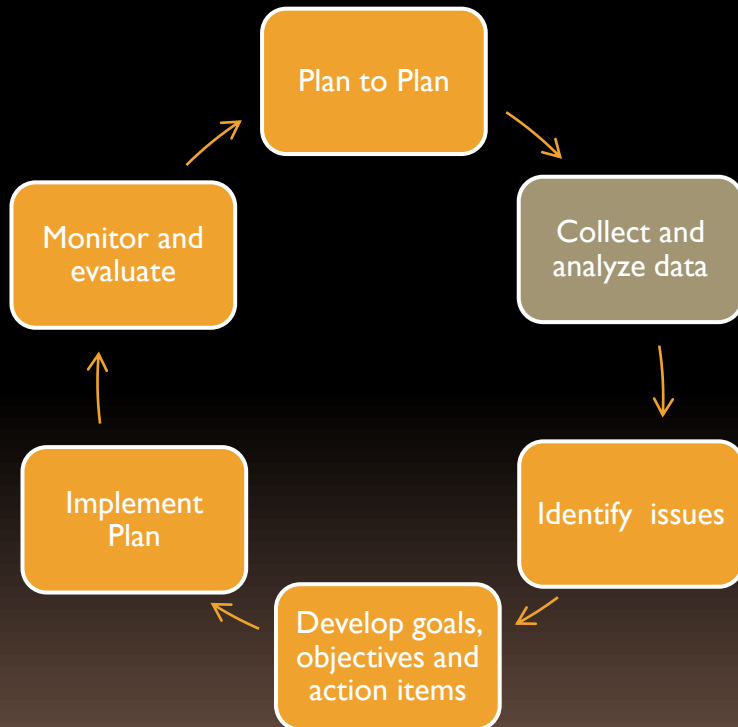
# Countywide Citizen Comprehensive Planning Survey Results

- Portage Co. should work with farmers to identify and protect productive agricultural regions
  - 86% agreed/strongly agreed
- My city/village/township should make an effort to identify and protect lakes, rivers, and streams
  - 90% agreed/strongly agreed

# Lake Stewardship and Communication?

- Water focus on groundwater problems and some rivers
- General assumption that someone was taking care of lakes...DNR or UWSP?
- 7 lake associations
- Invasive species spreading...besides the newspaper how do we reach people?

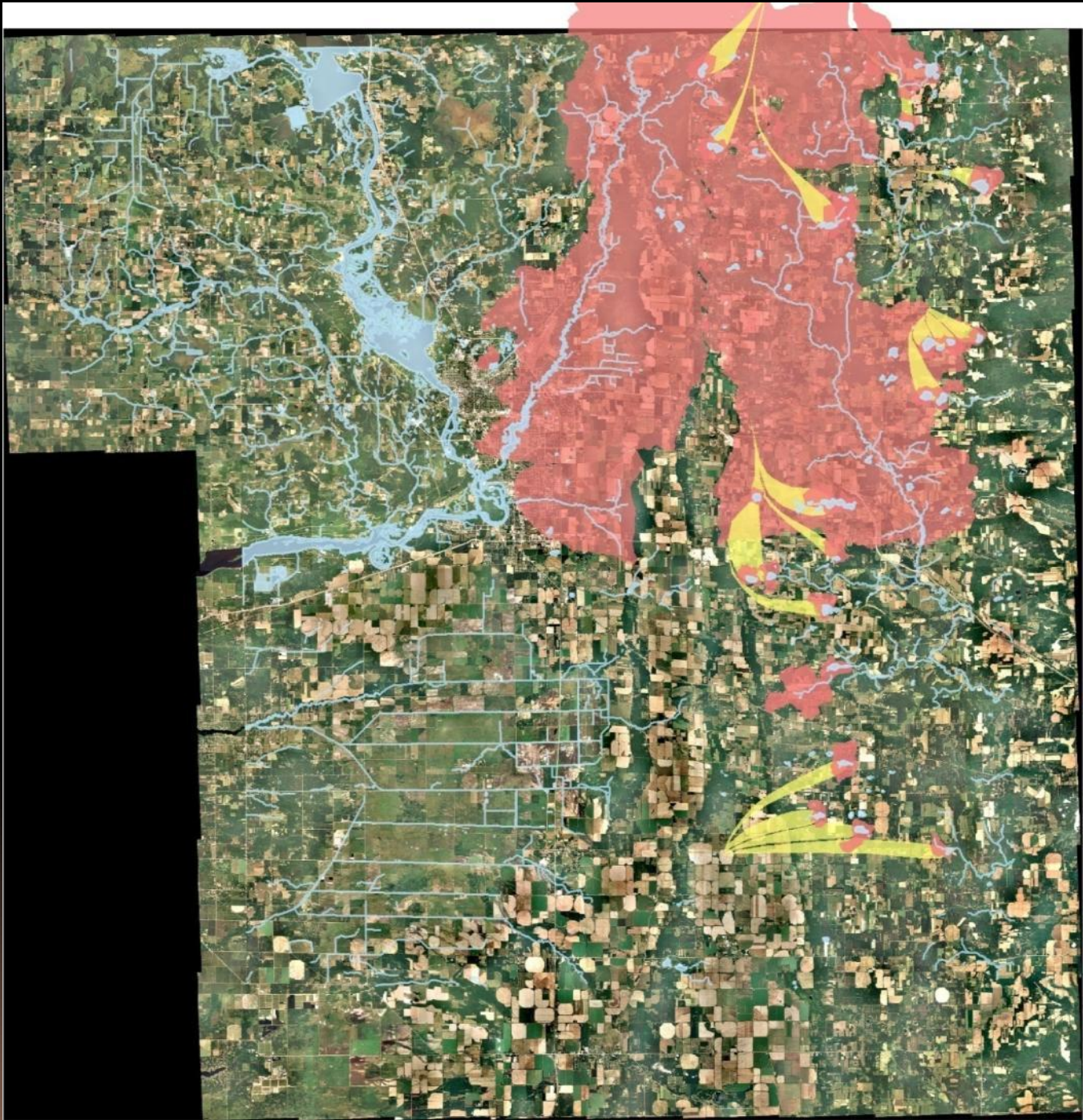
# Obtaining knowledge and putting it into action



1. What do we know about the lakes and how do we advise the municipal planning process?
2. How do we incorporate lake protection into
  - a. Municipal plans?
  - b. Zoning decisions?
  - c. Municipal and private land management decisions?
3. How do we engage citizens?

# Portage County Lake Study

- 30 Lakes
  - Seepage (14)
  - groundwater drainage (5)
  - Drainage (4)
  - Impoundments (6)
- 7 Lake Assoc/Districts
- 4 Undeveloped lakes
- Water quality
- Land use in watersheds
- Fish
- Aquatic plants
- Amphibians & reptiles
- Algae
- Birds
- Shoreland survey



# Study Results

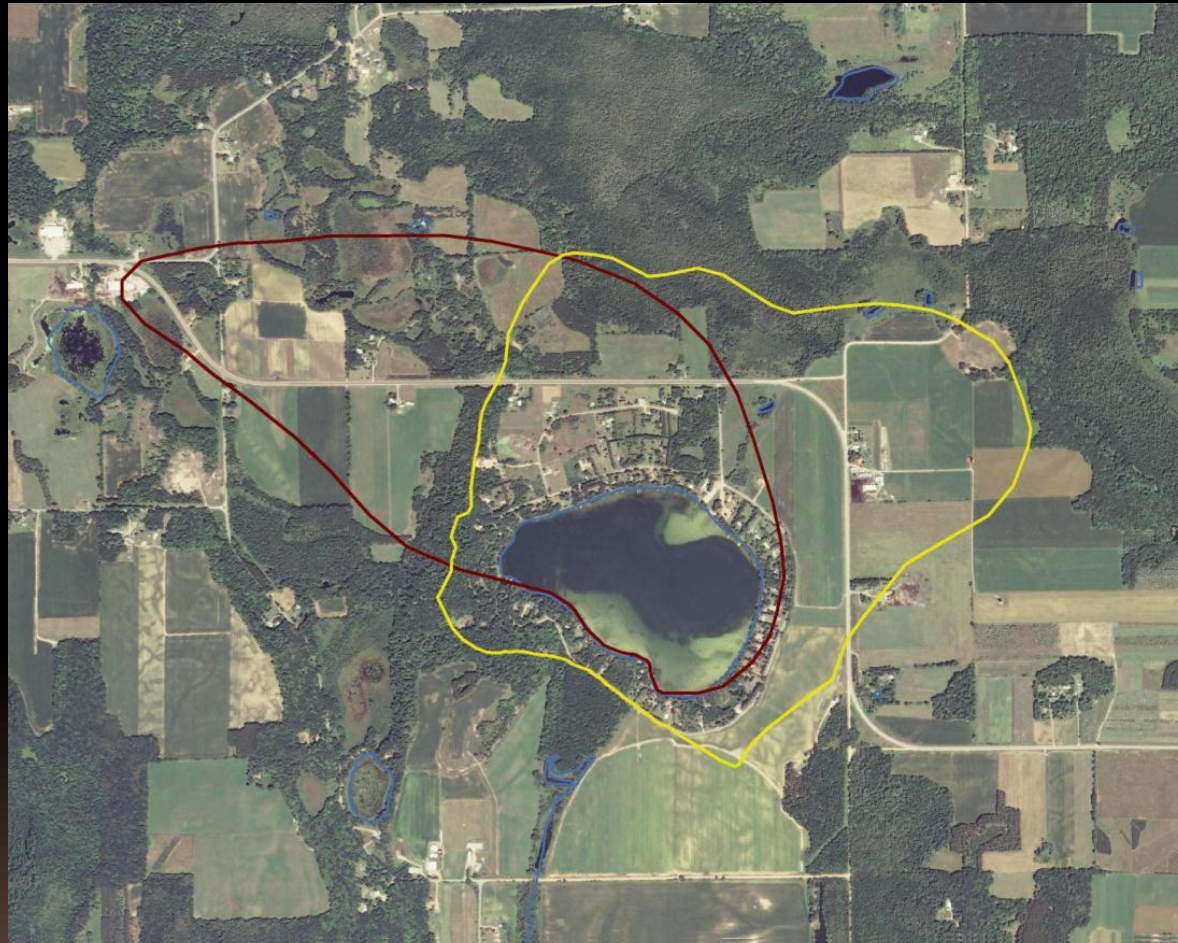
- Countywide
- Highlight Lake Helen and Spring Lake

# Lake Helen



- 87 acres
- 20 ft max depth
- Groundwater drainage lake
- Developed and altered shoreline
  - 60+ residences
- Lake District

# Lake Helen Watershed



Surface Watershed: 500 acres

Groundwater Watershed: 443 acres

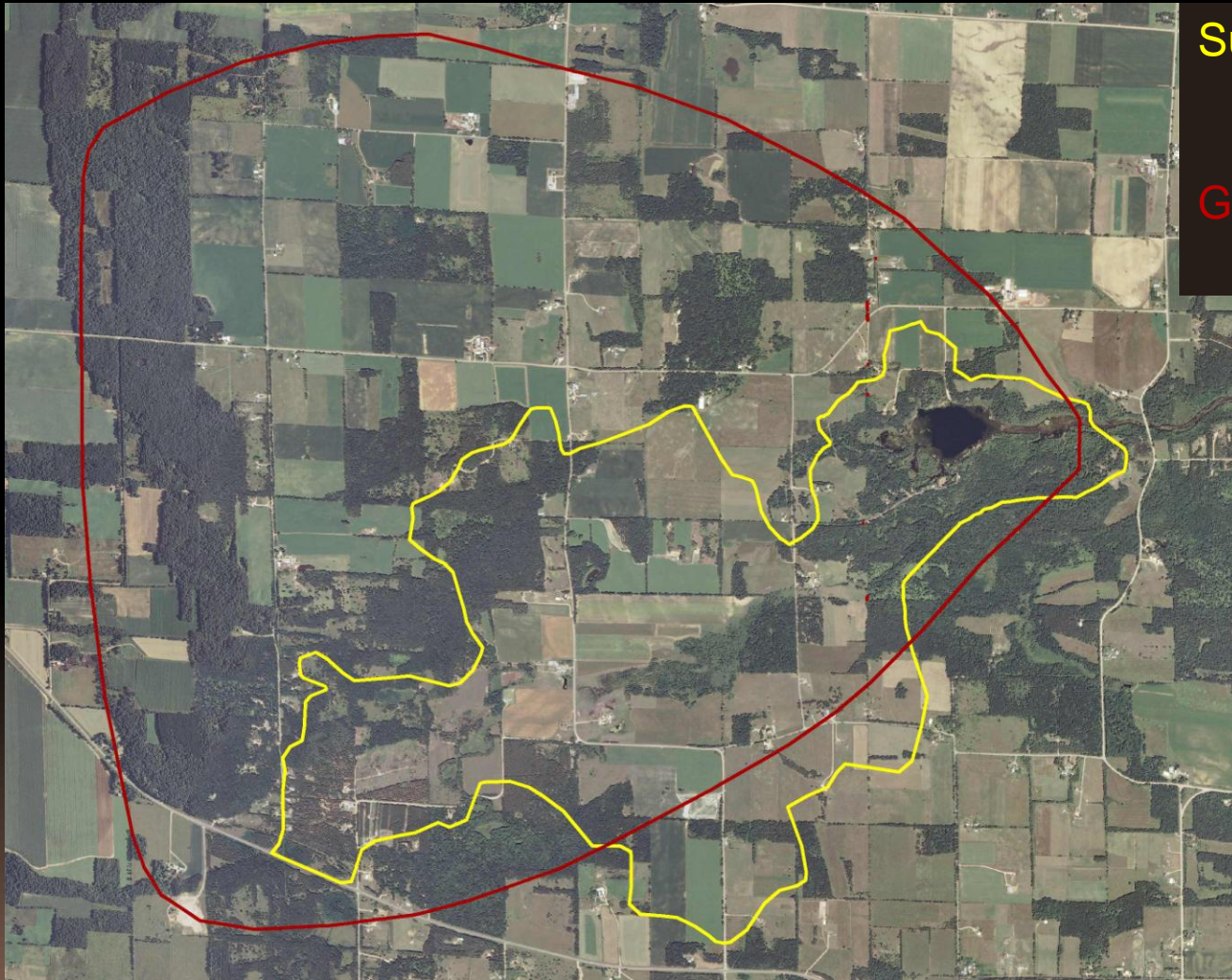


# Spring Lake



- 37.5 acre
- 42 ft max depth
- Drainage lake
- Semi developed lake intact shoreland
- No engaged lake stewards

# Spring Lake Watershed

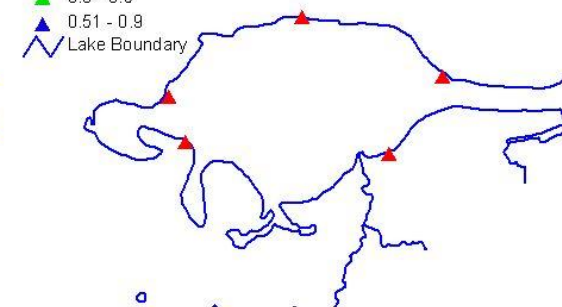
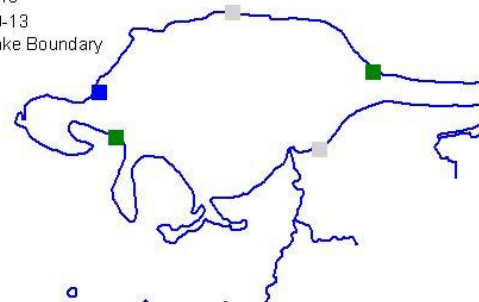
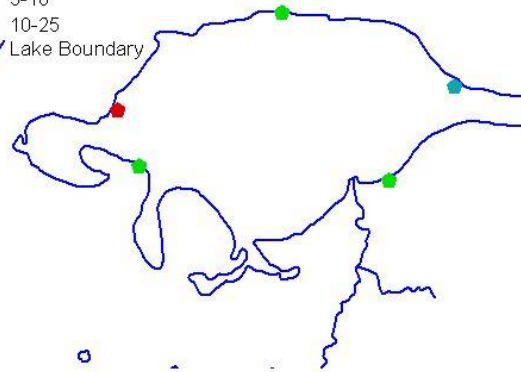
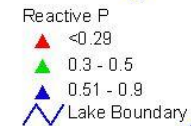
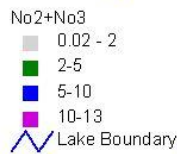
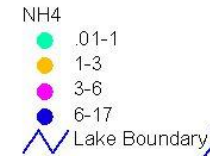
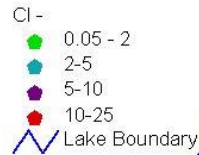
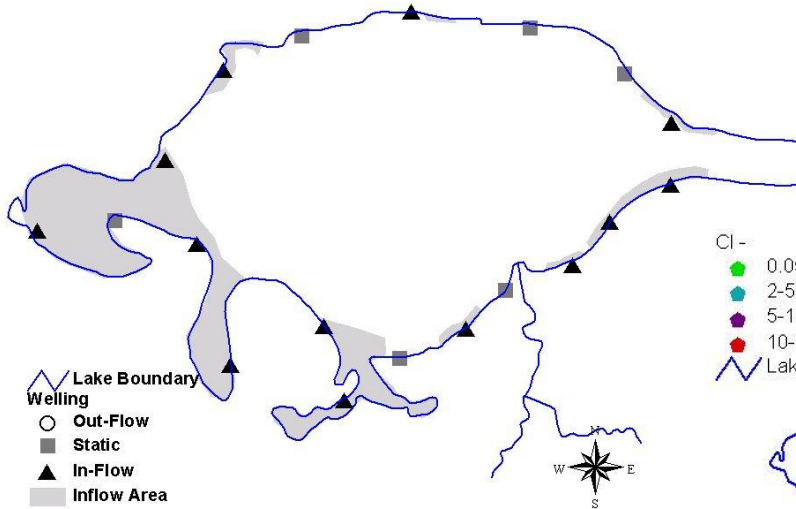


Surface Watershed:  
1,753 acres

Groundwater Watershed:  
4,739 acres

# Local Groundwater

## Spring Lake

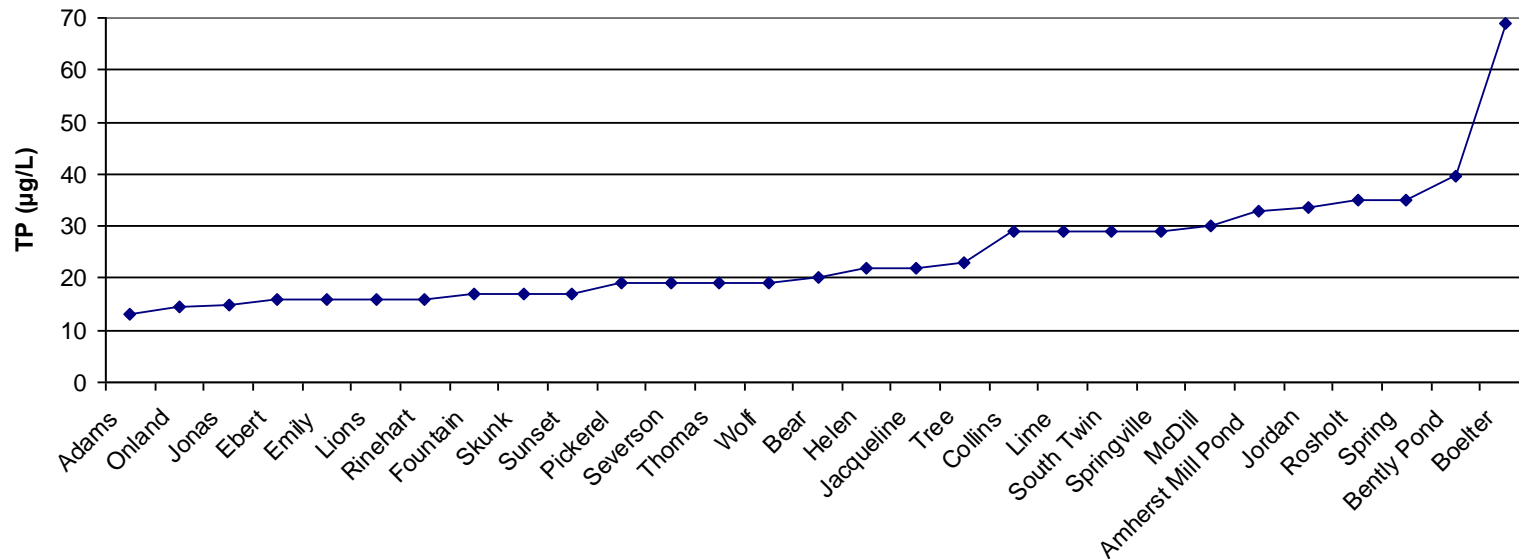


# Water Quality

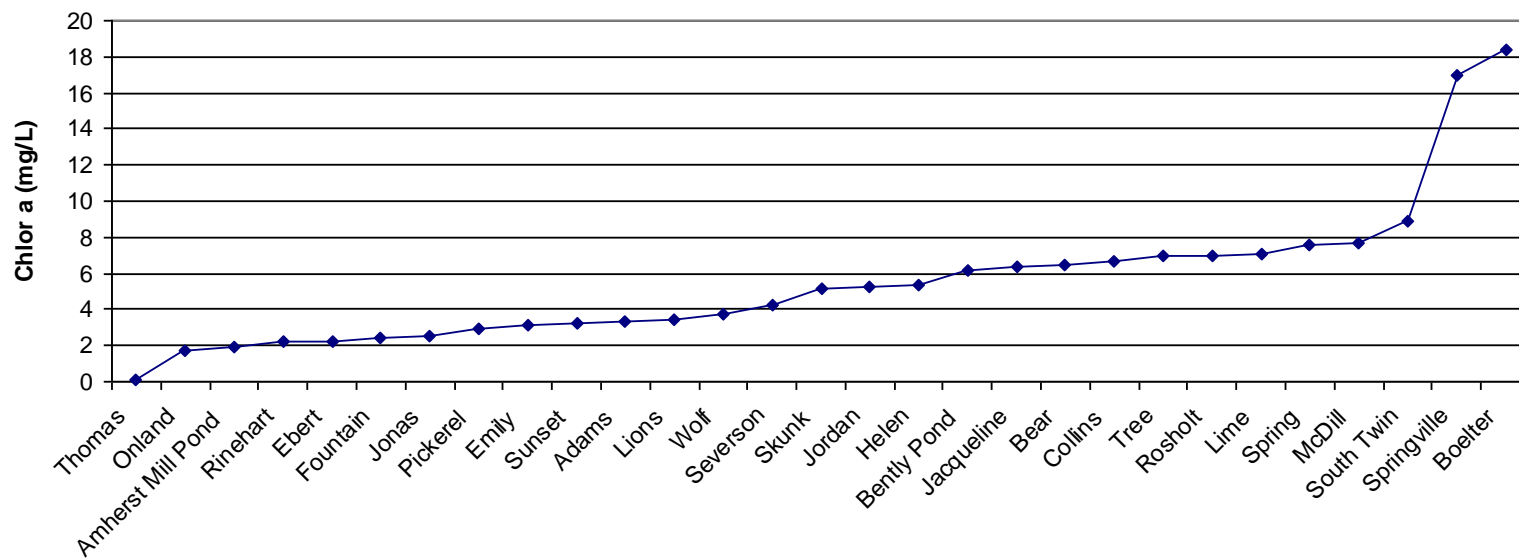
- Clarity, temperature, dissolved oxygen, nutrients, chlorophyll *a*, pesticides
- Compare current and 1970s/80s water quality and land use
- Determine areas of groundwater inflow/outflow
- Predict response to phosphorus additions



### Median Total Phosphorus



### Median Chlorophyll A



# COMPARISON TO HISTORIC TP AVERAGE

## Better

ADAMS

EBERT

HELEN

LIME

LIONS

PICKEREL

RINEHART

SEVERSON

SPRING

SPRINGVILLE

SUNSET

THOMAS

TREE

WOLF

## Same

BEAR

EMILY

MC DILL POND

ONLAND

SKUNK

## Worse

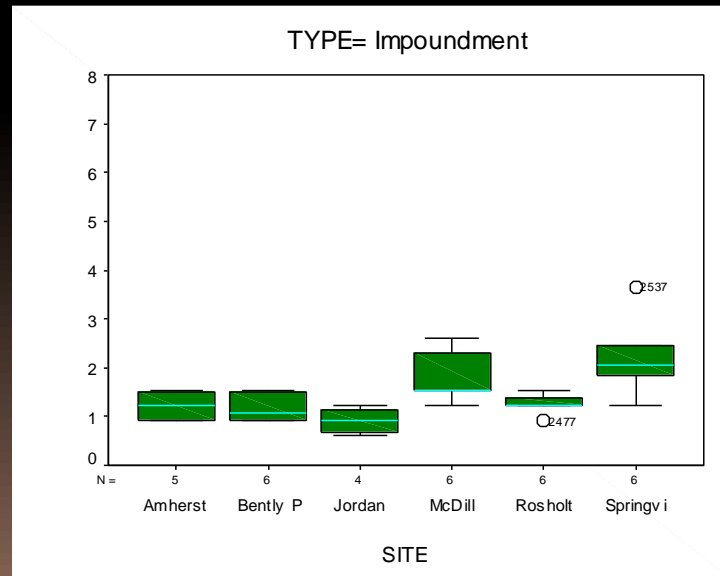
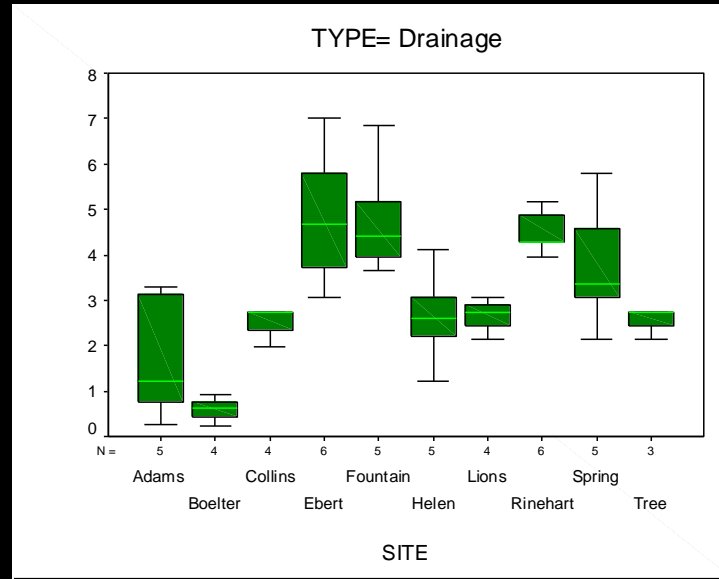
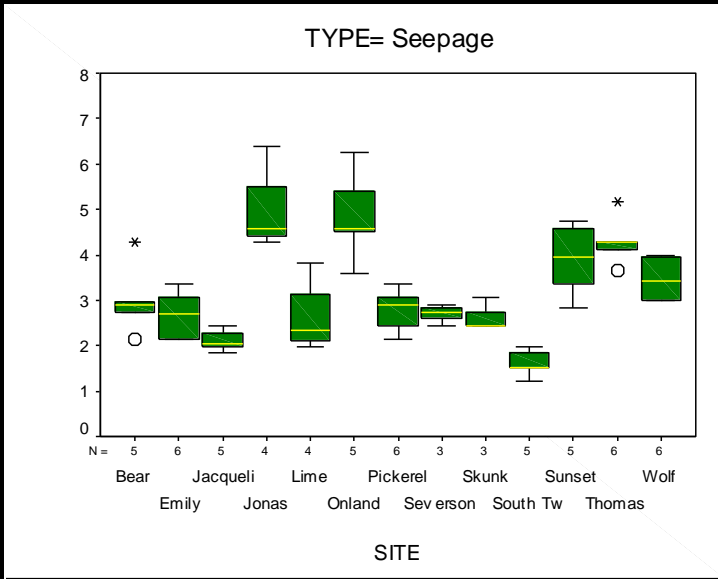
BOELTER

COLLINS

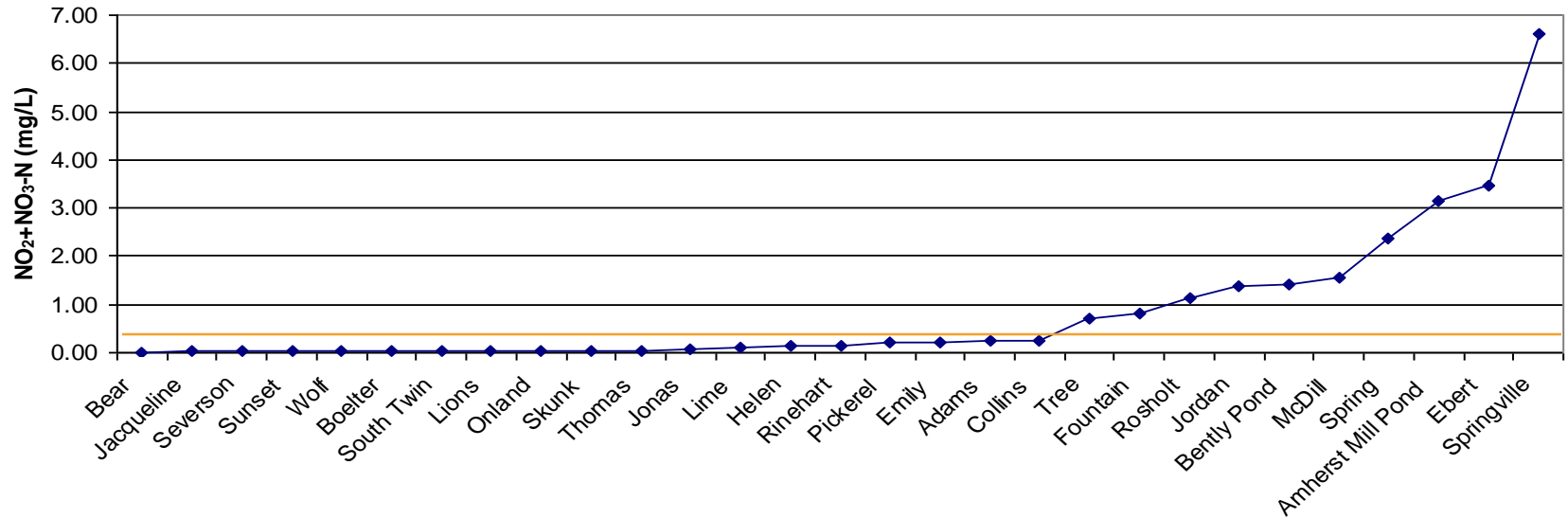
FOUNTAIN

JAQUELINE

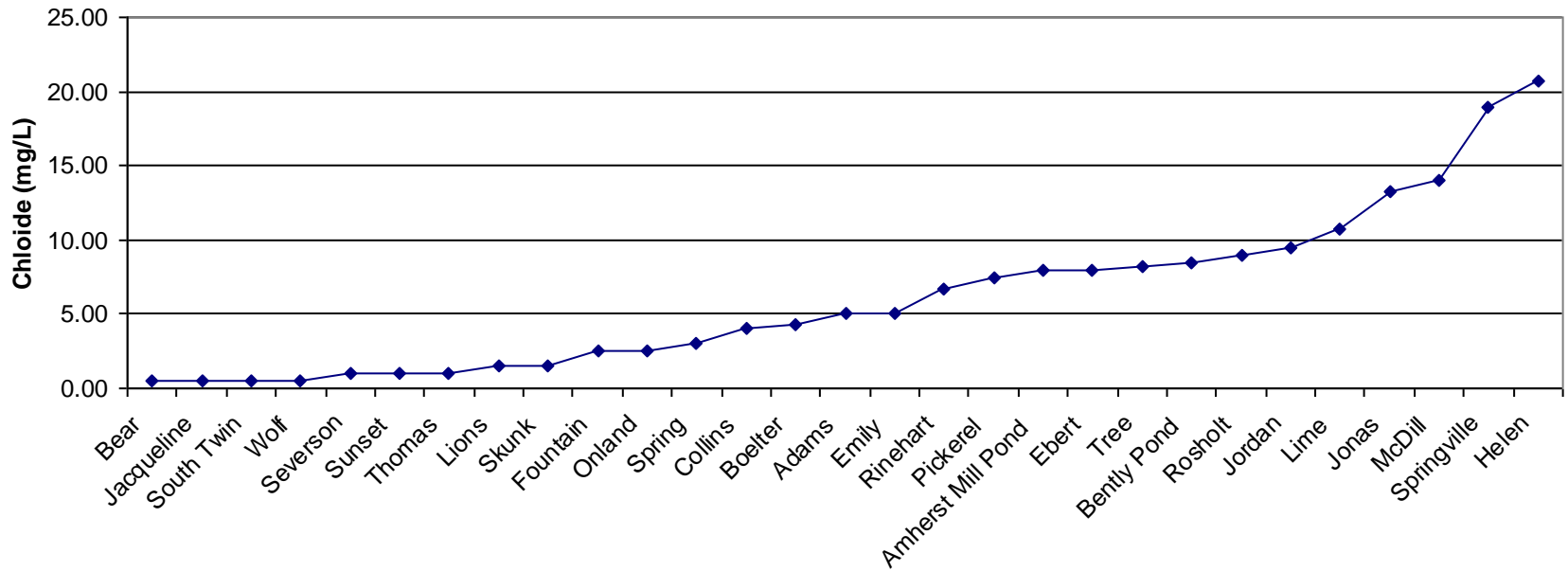
# WATER CLARITY MEASUREMENTS



### Median Nitrate

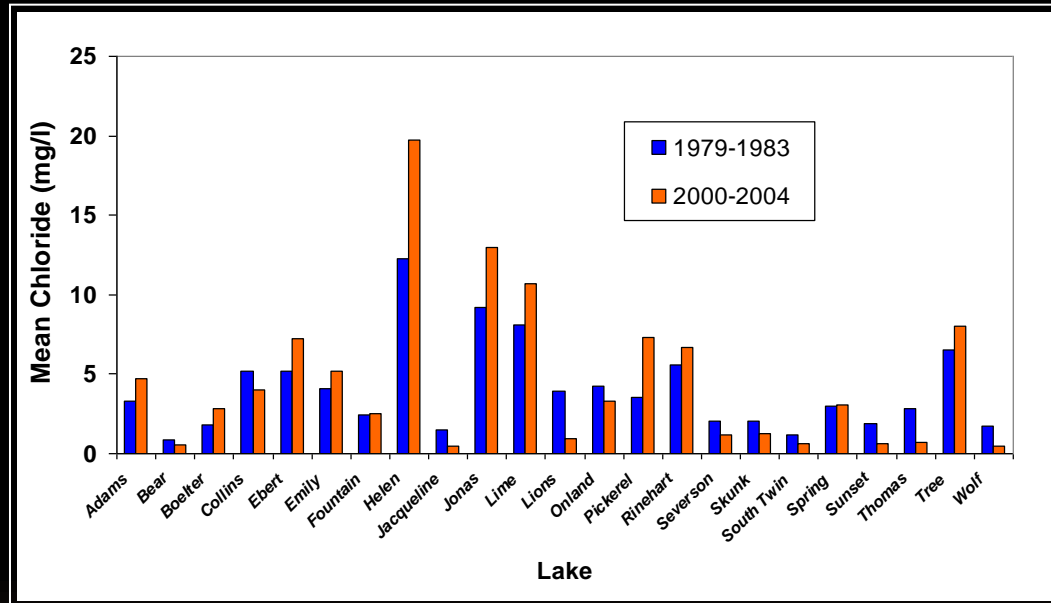


### Median Chloride





# COMPARISON TO HISTORIC – CHLORIDE AVERAGE



Sources of chloride

Road salts

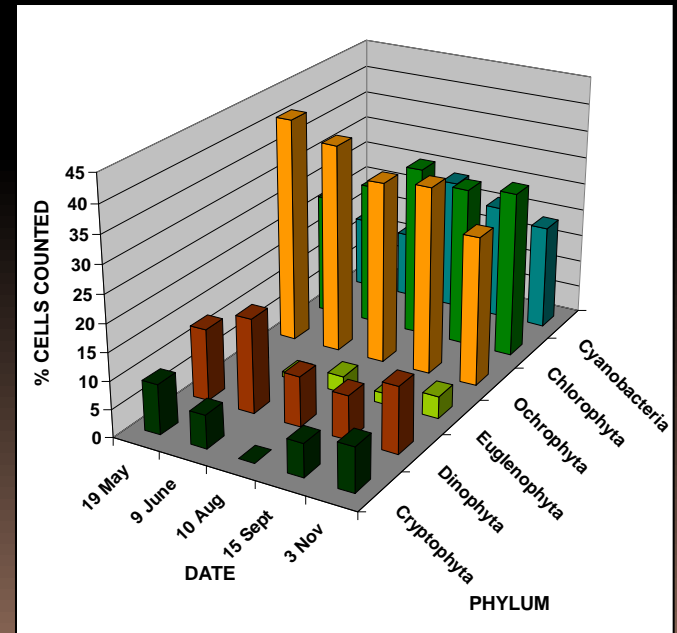
Septic systems \ waste water

Animal waste

# LAKE STUDY SCOPE

## Algae – all lakes

- List algal species & frequencies by site & what they indicate about nutrient levels



# LAKE HELEN'S "TROPHIC SCORECARD"

2002-2003

	<b>GOOD</b>	<b>FAIR</b>	<b>POOR</b>
<b>Total P</b> (Spring Overturn)	On Average <30 ppb		During July 97 & 50 ppb
<b>Inorganic N</b> (spring overturn)			>0.3 ppm
<b>Chlorophyll a</b> (Summer)	<8 ppb		During July and Aug 7.1 to 12 ppb
<b>Clarity</b>		X	During July

# OTHER PARAMETERS

	LOW	MEDIUM	HIGH
Sulfate	9.8		
Chloride			20.7
Potassium	1.5		
Sodium			6.9

Atrazine	0.10
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# LAKE STUDY SCOPE

## Fish – 10 lakes

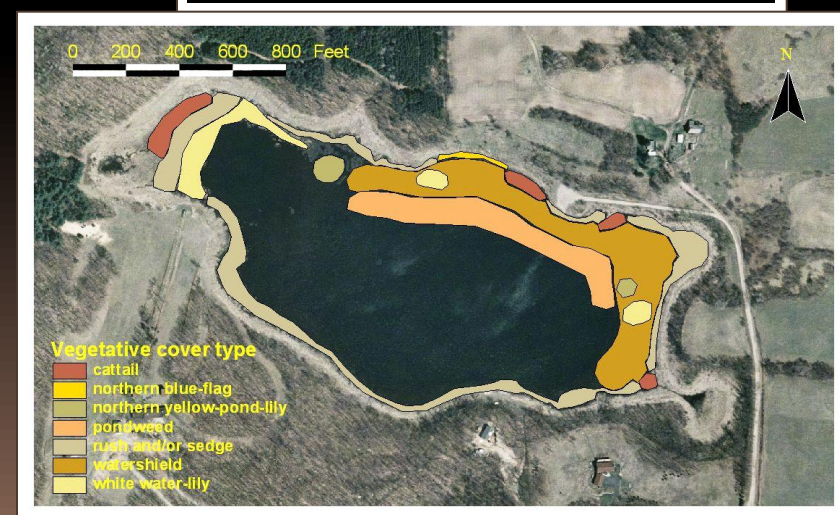
- Identify game & non-game fish species present; weigh & measure
- Identify critical habitat areas
- Not sufficient to make game fish management assessments

### Bear Lake Fish

Number of observed species: 10

Species observed to date: This chart represents all species detected, by decade, in Bear Lake since censusing began. Data before 2002 was collected by the Wisconsin DNR and 2002/2003 data was collected by UW-Stevens Point. X represents a decade when the species was detected.

	1960's	1980's	2000's
Bluegill	X	X	X
Bluegill/Pumpkinseed hybrid			X
Pumpkinseed	X	X	
Green Sunfish	X		
Warmouth		X	X
Largemouth Bass	X		X
Black Crappie	X	X	X
Yellow Perch	X	X	X
Northern Pike	X	X	X
Yellow Bullhead			X
Bullhead sp.	X		
White Sucker	X		
Blackchin Shiner			X
Central Mudminnow			X



# LAKE STUDY SCOPE

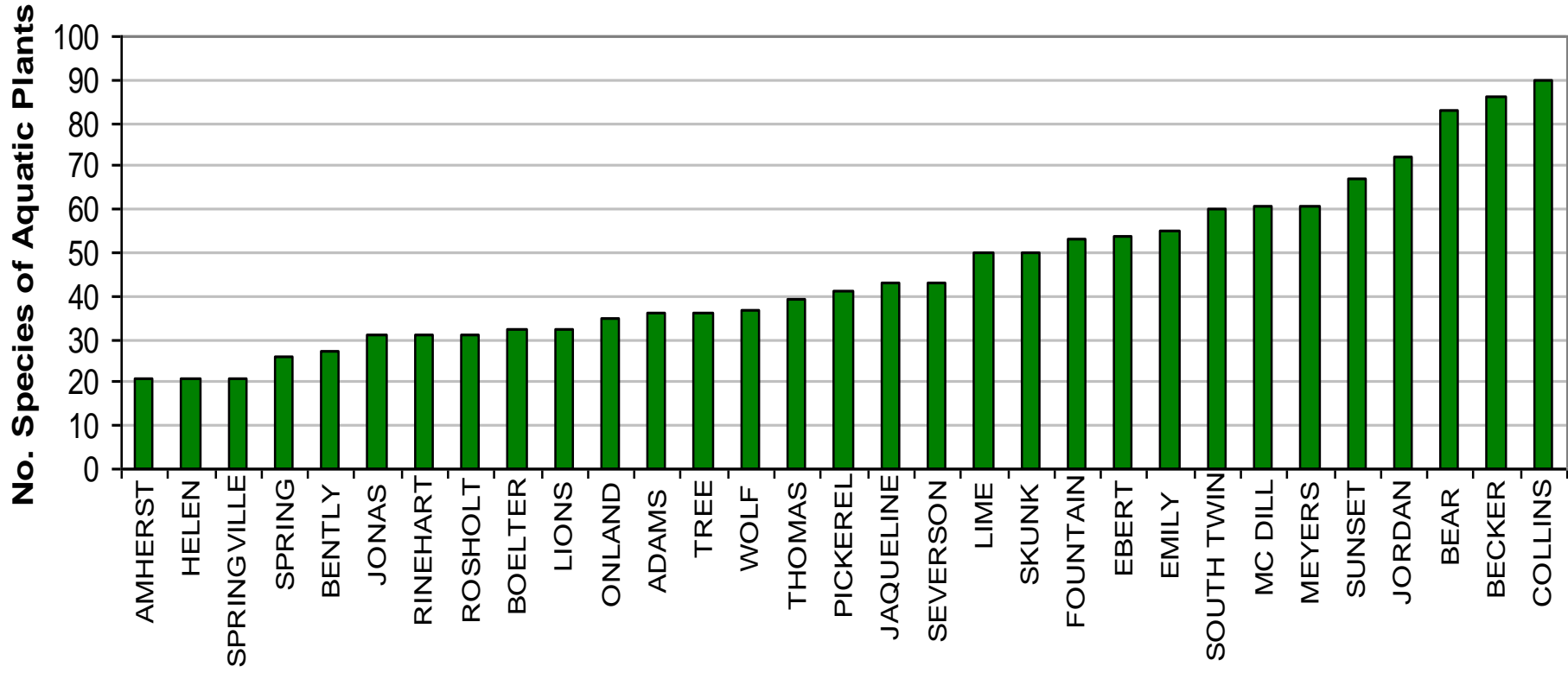
## Aquatic Plants



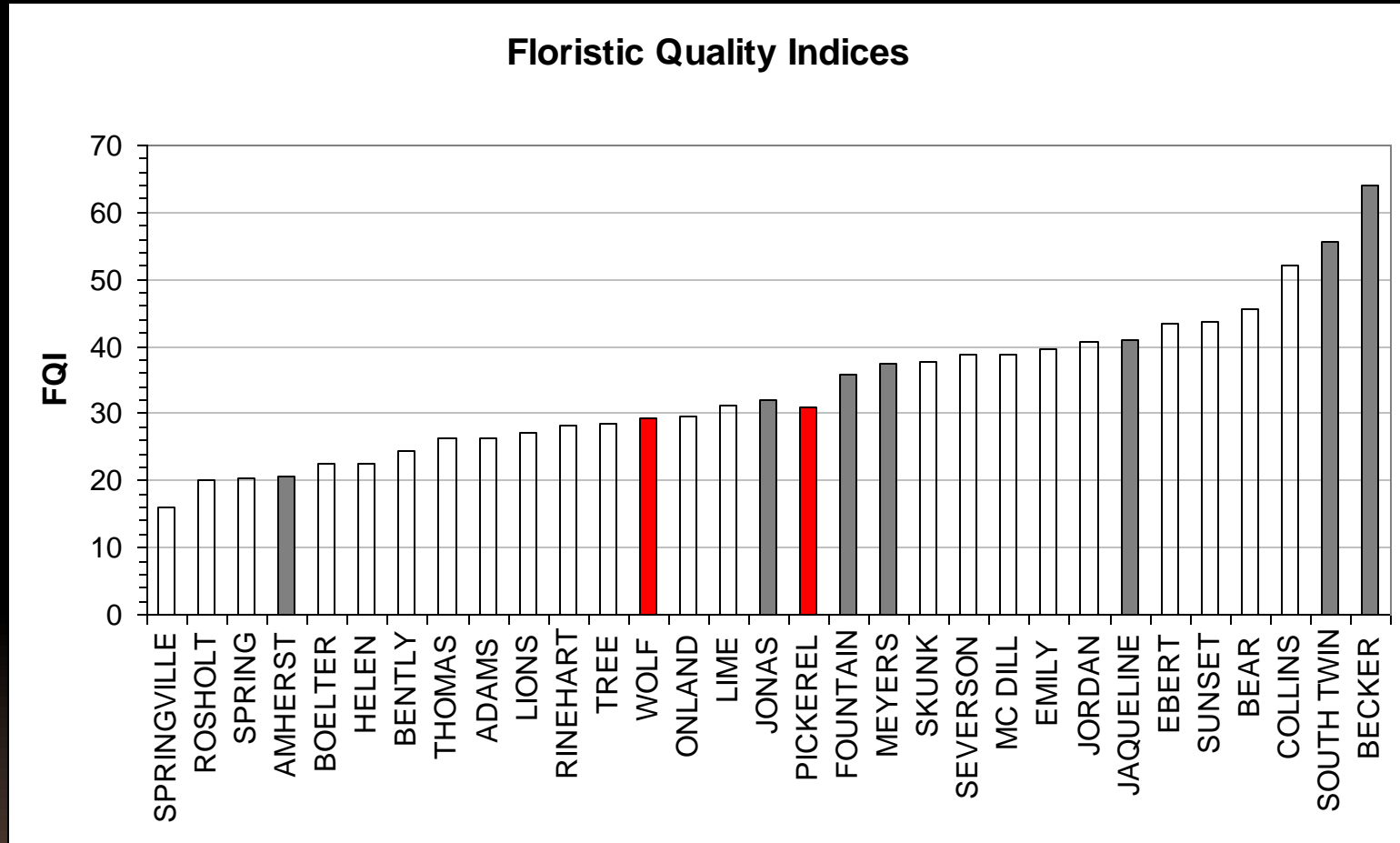
- Note changes in plant communities since 1968
- Calculate the overall aquatic plant quality for each lake
- Map areas with sensitive or exotic species



# AQUATIC PLANTS



# AQUATIC PLANTS



Species of Special Concern Endangered  
Species



# AQUATIC PLANTS

## Eurasian water-milfoil

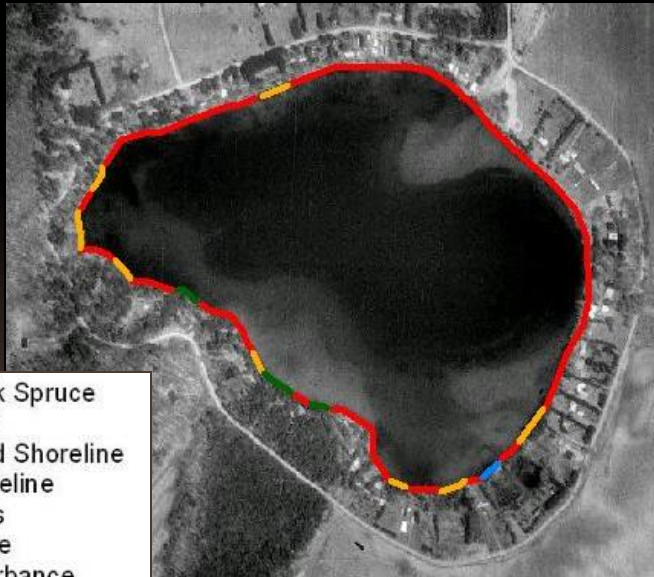
Positively Identified in

Bear Lake, Lake Emily, Jordan Pond,  
McDill Pond, Lake Pacawa,  
Springville Pond, Thomas Lake

# LAKE STUDY SCOPE

## Shoreland Survey

- Map the type of vegetation around each lake



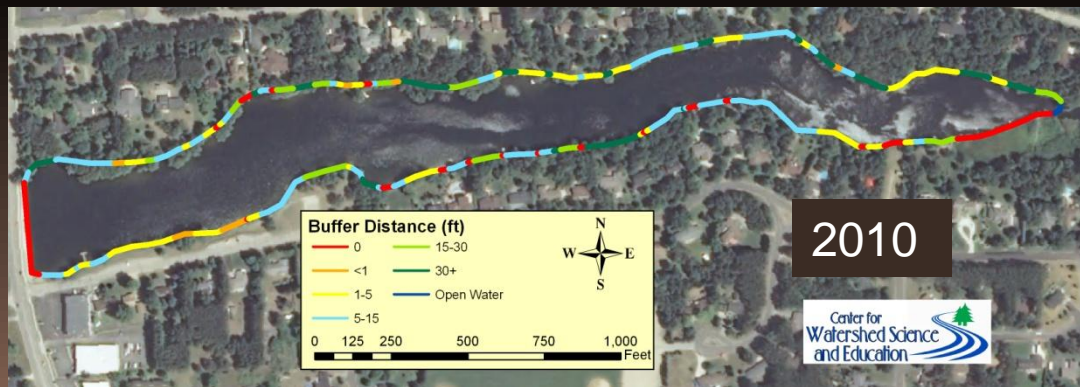
- Cover 1 - Tamarack/Black Spruce
- Cover 2 - Alder Shoreline
- Cover 3 - Narrow Wetland Shoreline
- Cover 4 - Vegetated Shoreline
- Cover 5 - Grasses/Shrubs
- Cover 6 - Low Disturbance
- Cover 7 - Moderate Disturbance
- Cover 8 - High Disturbance



# LAKE STUDY SCOPE

## Shoreland Survey II

- Map the EXTENT of vegetation around each lake



# LAKE STUDY SCOPE

## Amphibians & Reptiles

- Frog calls, salamander and turtle surveys yield lists of species, abundance and maps of key habitat areas
- Compare to historical records
- Report any malformed frogs
- Compare developed & undeveloped lakes to assess impacts on these species



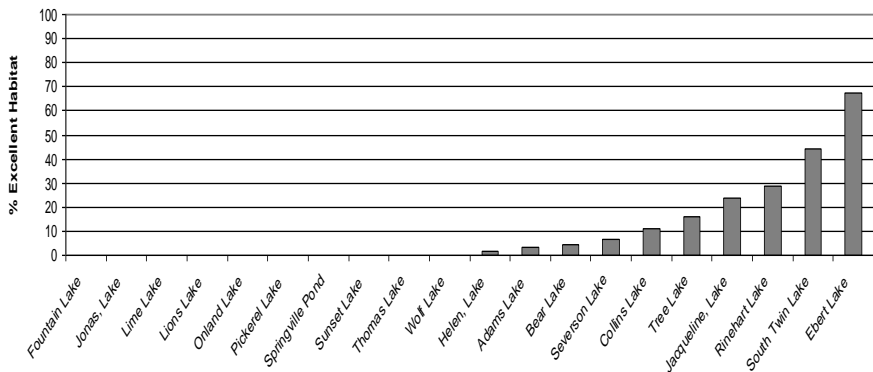
# Protected and Unique species

- Glacial remnant species
- Facette's locoweed

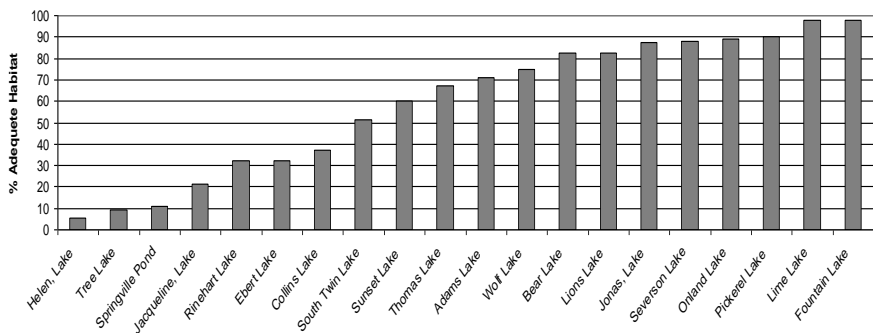


# SHORELINE HABITAT FOR FROGS

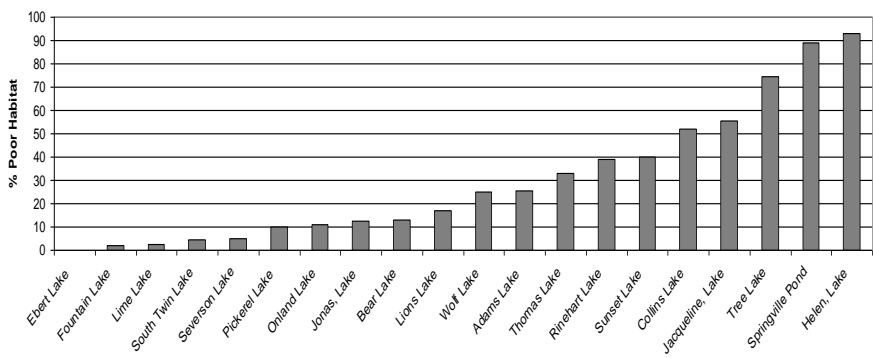
Excellent Shoreline Habitat - Green Frog



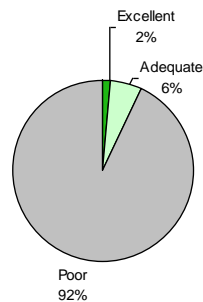
Adequate Shoreline Habitat - Green Frog



Poor Shoreline Habitat - Green Frog



Helen Lake Green Frog Habitat



**Best Green Frog Habitat: Ebert Lake**

33% excellent habitat + 67% adequate

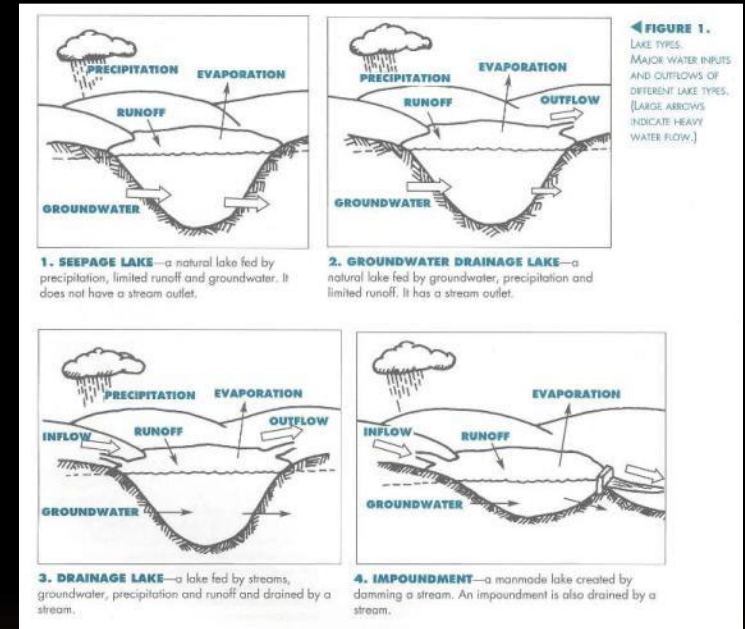
**Worst Green Frog Habitat: Helen Lake**

2% excellent habitat + 6% adequate + 92% poor

# Getting the word out...

## Community presentations to prep citizens for the results sponsored by the Friends of Portage County Lakes

- Lake types
- Limnology 101
- How land use affects water quality
- Common pollutants and effects
- Management options



# Getting the word out...

## Creation of preliminary lake summaries



Lake Emily

Preliminary Results

Portage County Lake Study

University of Wisconsin-Stevens Point

Portage County Staff and Citizens

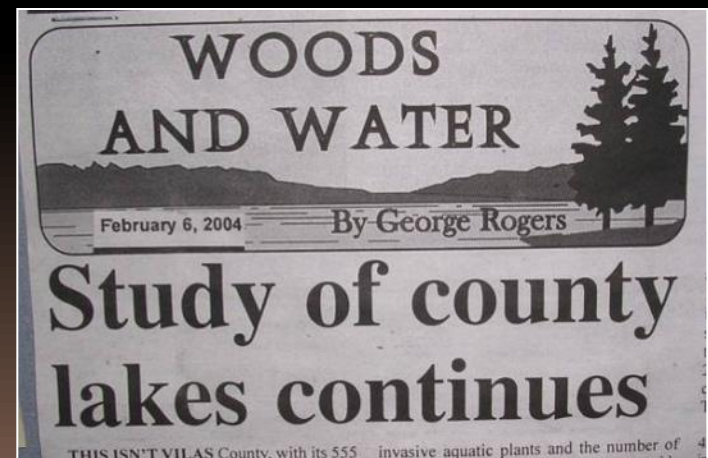
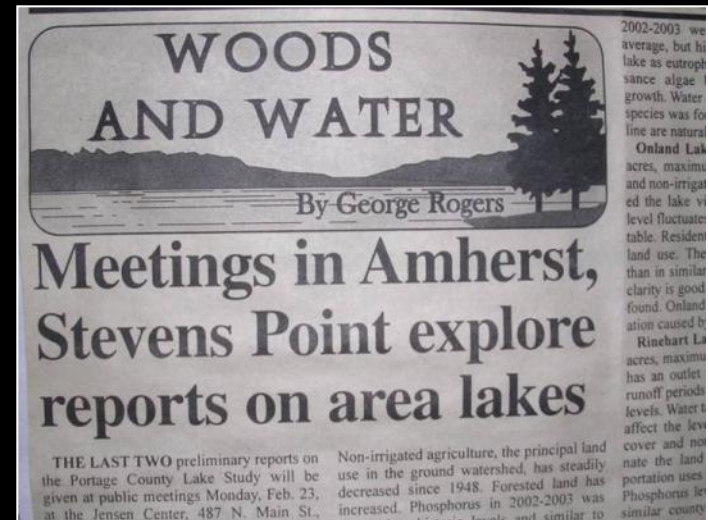
*March 31, 2005*



# Getting the word out...

## Preliminary results unveiled

- Local outdoor writers
- Presentations
  - 4 sites around the county
  - Attended by more than 200 people



# Getting the word out...

Special meetings/assistance requested by  
Towns, Villages, Lake Groups



## Jetskis and powerboats:

- Stir up bottom sediments where water is less than 10 feet deep
- Stirred sediment releases phosphorus of the past
- Noise
- Wildlife disturbance: nesting & feeding

# Getting the word out...



## Portage County Lake Fests with the Friends of Portage County Lakes



Many thanks to many others...

Portage County Citizens  
Wisconsin Department of Natural Resources  
Portage County Planning and Zoning  
Portage County Parks Department  
George Rogers, Portage County Gazette  
Stevens Point Journal  
WAOW  
UW-Extension – Portage Co. CNRD Agent  
UWSP Faculty, Staff, Students