

# Collins Lake

## Final Results

### Portage County Lake Study

University of Wisconsin-Stevens Point,  
Portage County Staff and Citizens

*March 31, 2005*

#### **What can you learn from this study?**

*You can learn a wealth of valuable information about:*

- *Critical habitat that fish, wildlife, and plants depend on*
- *Water quality and quantity of your lake*
- *The current diagnosis of your lake – good news and bad news*

#### **What can you DO in your community?**

*You can share this information with the other people who care about your lake and then plan together for the future.*

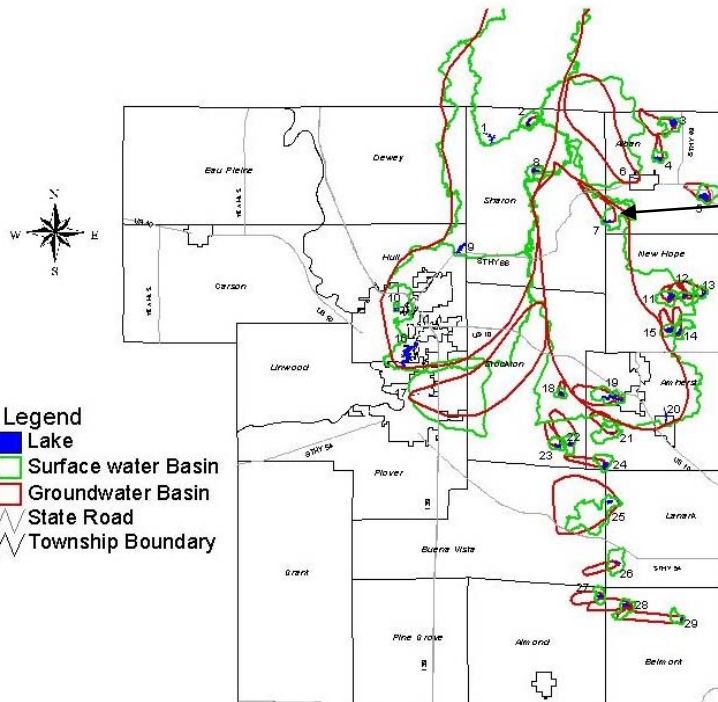
- ✓ *Develop consensus about the local goals and objectives for your lake.*
- ✓ *Identify available resources (people, expertise, time, funding).*
- ✓ *Explore and choose implementation tools to achieve your goals.*
- ✓ *Develop an action plan to achieve your lake goals.*
- ✓ *Implement your plan.*
- ✓ *Evaluate the results and then revise your goals and plans.*

**To protect**

**the lake** we must protect  
the “watershed,” the land  
that drains or  
sheds its water  
into the  
lake.



# Collins Lake ~ Location



**Collins Lake**  
 South of highway 66, just Southwest of Rosholt; Towns of Alban and Sharon

**Surface Area:** 41 acres  
**Maximum Depth:** 56 feet  
**Lake Volume:** 1036 acre-feet

## Collins Lake

### Water Flow

- Collins Lake is a drainage lake
- Water enters Collins Lake from groundwater, one inlet (agricultural channels) at the east end, runoff, and precipitation
- Water exits the lake through the wetland at the west end and to groundwater



0.5 0 0.5 Miles



# Collins Lake ~ Land Use in the Surface Watershed



**Surface Watershed:** The land area where water runs off the surface of the land and drains toward the lake. The watershed shown below also includes adjacent wetlands.

## Current Predominant Land Use

- Around the lake: forest, non-irrigated agriculture, residential, and shrub cover
- In the watershed: irrigated cropland and forest cover

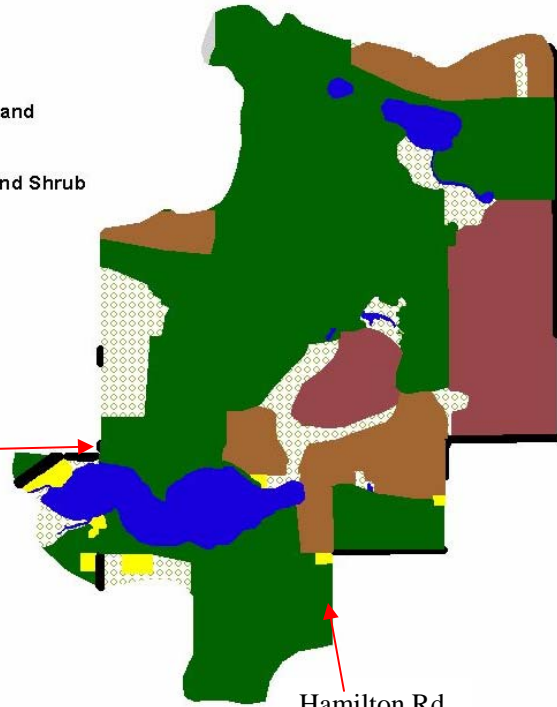
Surface Watershed:  
718 Acres

## Collins Lake Land Use

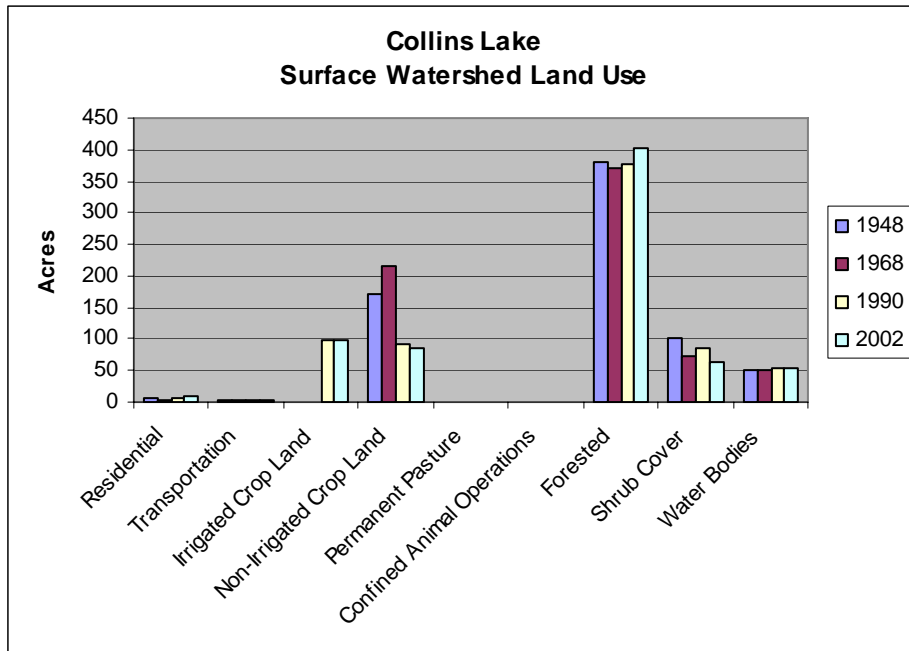
- Residential
- Transportation
- Irrigated Crop Land
- Non-Irrigated Crop Land
- Permanent Pasture
- Forested
- Herbaceous Cover and Shrub
- Water Bodies



County I



Hamilton Rd



## Surface Watershed Land Use

- Non-irrigated agriculture decreased significantly after 1968. There was then a shift to irrigated agriculture.
- Forestland continues to be the dominant land use and it appears to be slowly increasing as shrub cover decreases
- Residential use has remained a small fraction of the watershed



# Collins Lake ~ Land Use in the Groundwater Shed



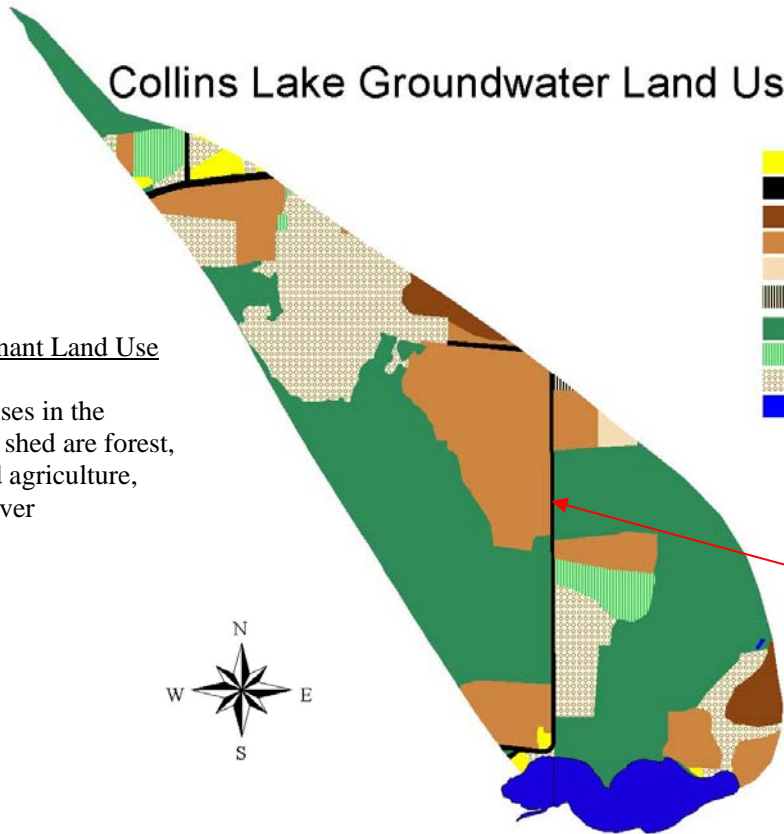
**Groundwater Shed:** The land area where water soaks into the ground and travels underground to the lake.

## Collins Lake Groundwater Land Use

- Residential
- Transportation
- Irrigated Cropland
- Non-Irrigated Cropland
- Permanent Pasture
- Confined Animal Operations
- Forested
- Conifer Plantation
- Herbaceous Cover & Shrub
- Water Bodies

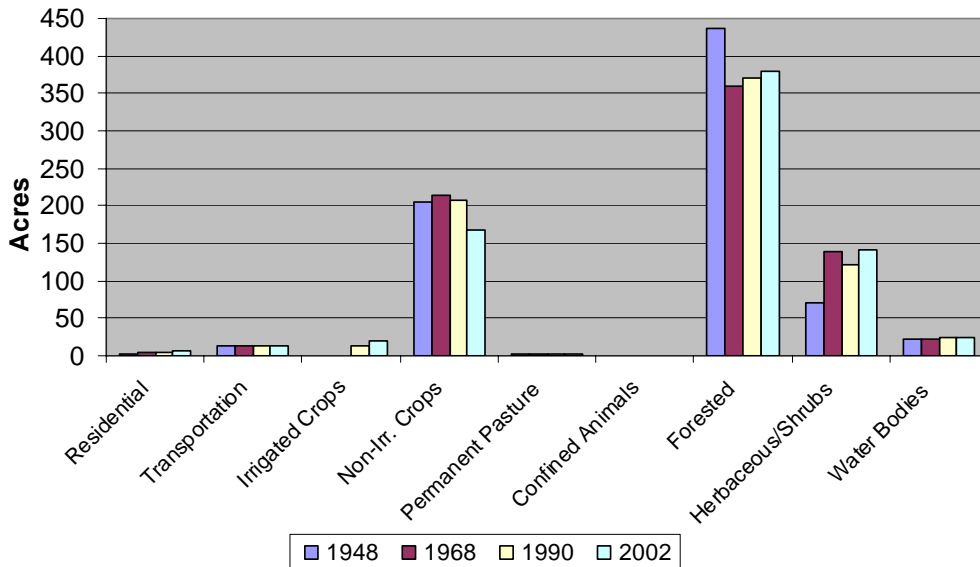
### Current Predominant Land Use

- Major land uses in the groundwater shed are forest, non-irrigated agriculture, and shrub cover



County I

### Groundwater Shed Land Use



### Groundwater Shed Land Use

- Forest and non-irrigated cropland have dominated the land use since 1948
- Irrigated agriculture and residential use have remained a small fraction of the land use
- Shrub cover has increased since 1948



# Collins Lake ~ Taking a closer look (Within 1,000 feet of the lake)



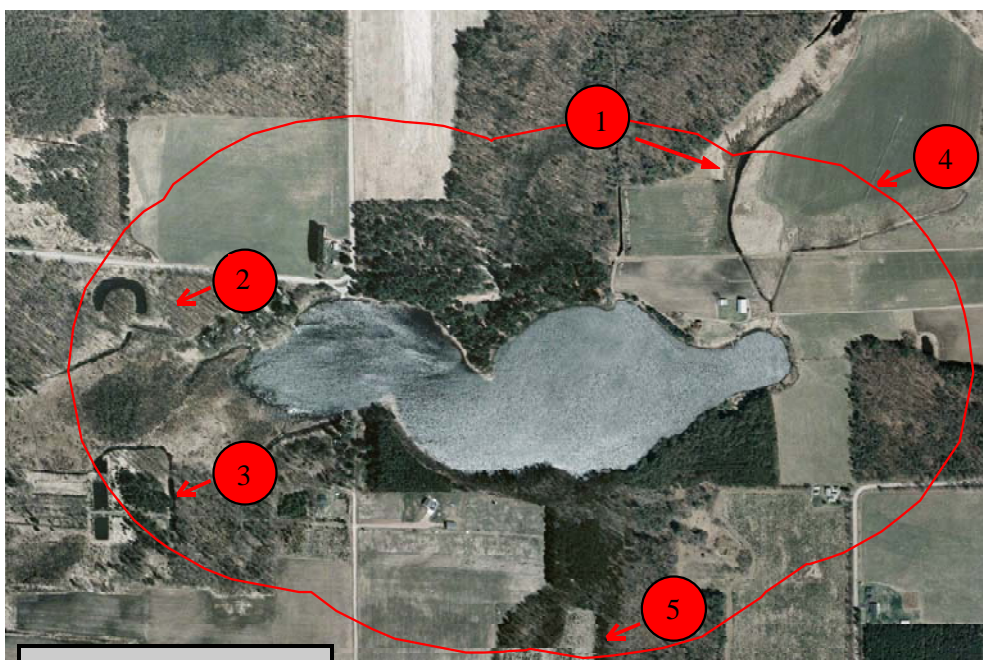
1938 Air Photo

9 - 24 - 38



1960 Air Photo

9 - 6 - 60



## Noted Features

 1000 Foot Buffer

May 2000 Orthophoto

## Points of Interest

1. This is a lengthy drainage ditch dividing the two fields.
2. This pond is approximately 30,000 square feet.
3. There are three small man-make ponds located southwest of Collins Lake.
4. This is the delineated 1000-foot buffer.
5. This field appears to be converting back to forest.



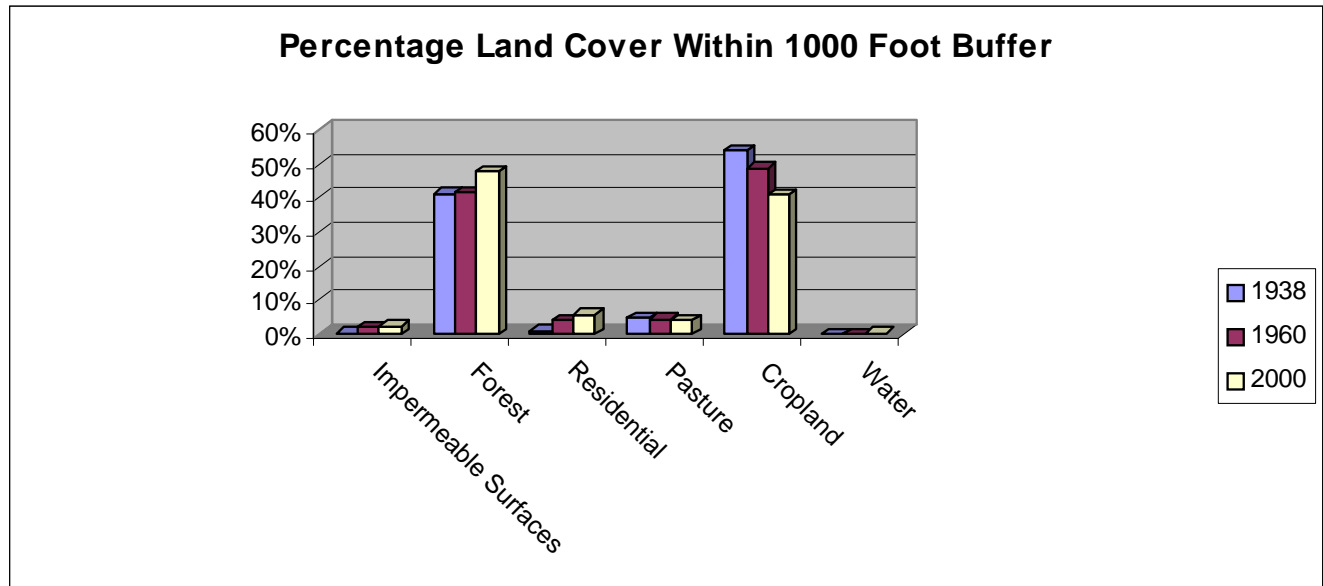
# Collins Lake ~ Taking a closer look

(Within 1,000 feet of the lake)

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## Changes from 1938 to 2000

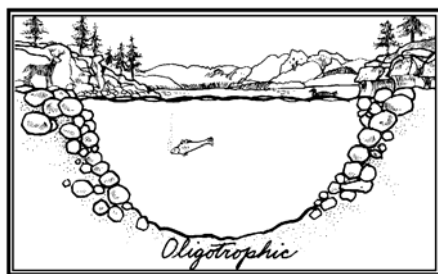
|                     | 1938 | 1960 | 2000 |
|---------------------|------|------|------|
| # of Docks          | 0    | 0    | 4    |
| Impervious Surface  | 1    | 4    | 5    |
| Residential (acres) | 2    | 9    | 13   |
| Open Land/Pasture   | 10   | 10   | 9    |
| Forest (acres)      | 92   | 93   | 106  |
| Cropland (acres)    | 119  | 109  | 91   |
| Water (acres)       | 0    | 0    | 1    |



# Collins Lake ~ Water Quality

## Total Phosphorus

In more than 80% of Wisconsin's lakes phosphorus is the key nutrient affecting aquatic plant and algae growth. Once in a lake system phosphorus levels are difficult to reduce, so limiting phosphorus input is key. Phosphorus at levels above 30 parts per billion (ppb) can lead to nuisance aquatic plant growth and accelerate a lake's change from oligotrophic to eutrophic. Sources of phosphorus include septic systems, detergents, animal waste, farmland and storm sewer runoff, soil erosion, and fertilizers for lawns, gardens, and agriculture.



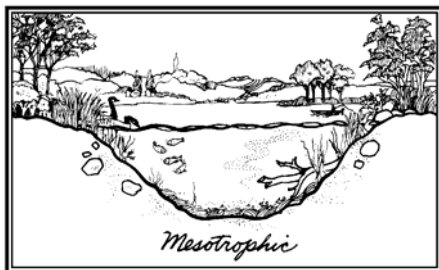
### Oligotrophic Lakes

*Common uses:*

- ✓ Swimming
- ✓ Skiing
- ✓ Boating

*Vegetation of oligotrophic lakes:*

- ✓ Very little vegetation



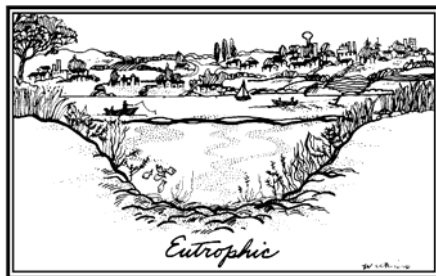
### Mesotrophic Lakes

*Common uses:*

- ✓ Boating
- ✓ Fishing

*Vegetation of mesotrophic lakes:*

- ✓ Increased vegetation
- ✓ Occasional algal blooms



### Eutrophic Lakes

*Common uses:*

- ✓ Fishing
- ✓ Wildlife watching

*Vegetation of eutrophic lakes:*

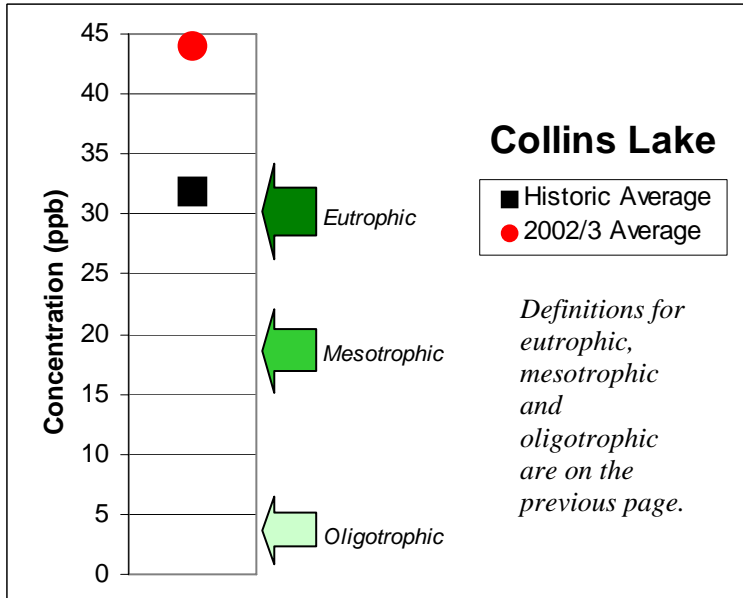
- ✓ Lots of aquatic plants
- ✓ Frequent algal blooms

*Winterkill problems can occur*



# Collins Lake ~ Water Quality

## Average Total Phosphorus Levels



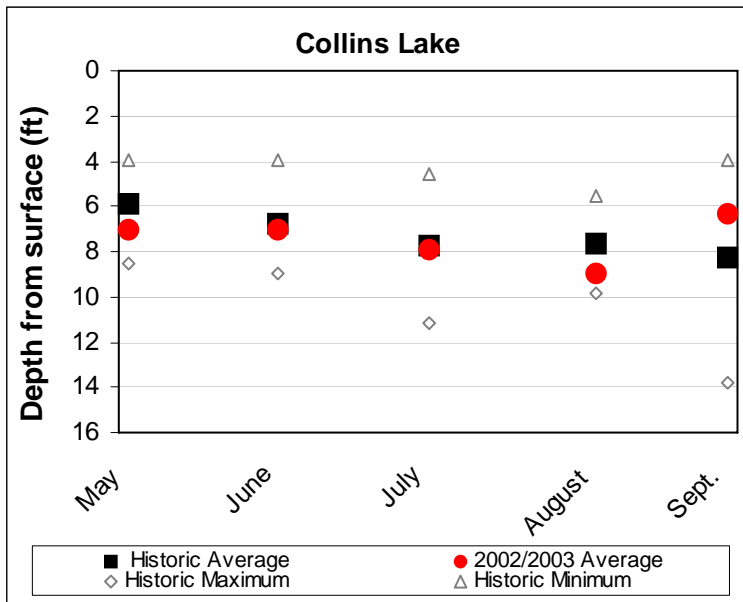
The graph to the left shows total phosphorus levels measured when the lake was well mixed (overturn). Phosphorus levels in Collins Lake in 2002-03 were much higher than average historic levels. Similar lakes in the county have an average concentration of 36ppb; the concentration in Collins Lake is higher than this. Levels of phosphorus above 30 ppb are high enough to categorize a lake as eutrophic, making it subject to nuisance algae and aquatic plant growth.



**Overturn:** uniform temperature from top to bottom in the lake

## Water Clarity

Water clarity (Secchi disc depth) is an indicator of water quality. The two main components affecting water clarity are materials dissolved in the water and materials suspended in the water. Water clarity can indicate overall water quality, especially the amount of algae and suspended sediment present.



The water clarity in Collins Lake is considered fair. The average Secchi depth reading for similar lakes in the region is 10 feet; Collins Lake appears to have worse clarity than this. The water clarity of Collins Lake during 2002-03 growing seasons was similar to the historical growing season average. The month of August shows the best water clarity and the month of September the poorest. These fluctuations throughout the summer are normal as algae populations and sedimentation increase and decrease. The higher than average phosphorous concentration, and water color from wetland vegetation account for the lower Secchi readings.



# 2002 Amphibian Distribution at Portage County Lakes

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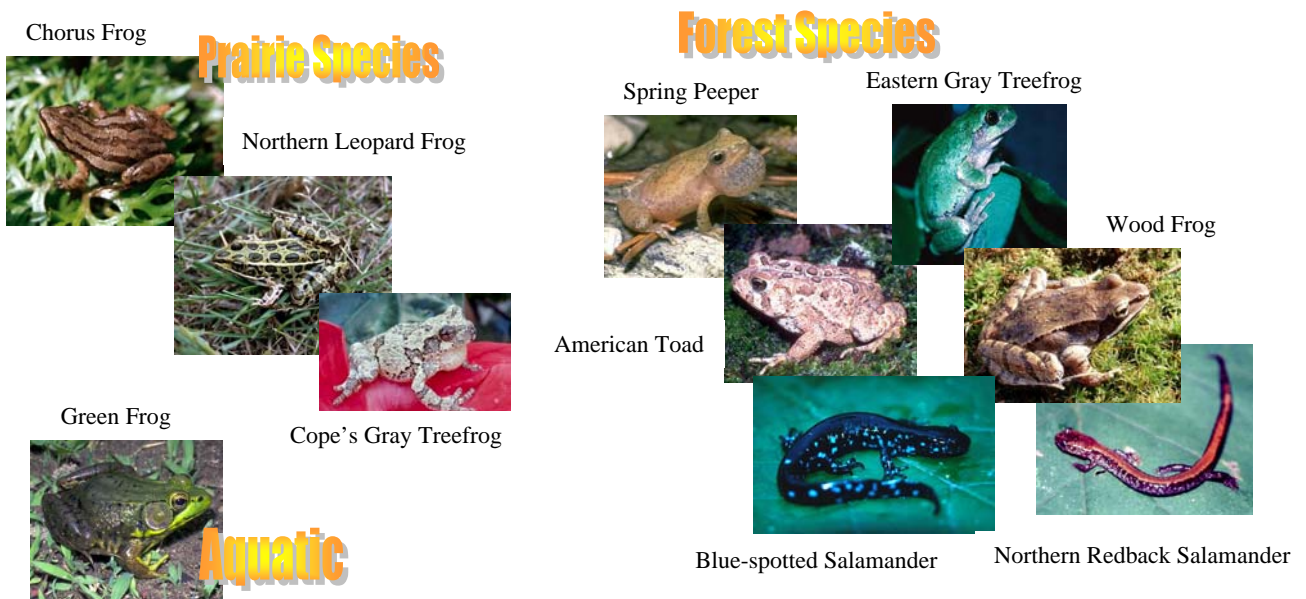
This summary provides preliminary information on the amphibian species present and their distribution at the twenty-nine Portage County lakes. Surveys were conducted from April 2002 - August 2002, the typical breeding period of the frogs and salamanders found in the county.

Twelve frog species have been documented in Wisconsin, nine of which currently inhabit Portage County: American toad, chorus frog, spring peeper, eastern gray treefrog, Cope's gray treefrog, green frog, pickerel frog, northern leopard frog, and wood frog. Historically, Blanchard's cricket frog inhabited Portage County but is believed to now exist only in southeastern Wisconsin. Of all species believed to inhabit Portage County, only the pickerel frog was not found during the spring and summer of 2002. The pickerel frog has been listed as a species of special concern in Wisconsin. No new species to Portage County were recorded in 2002.

Seven salamander species have been documented in Wisconsin, all of which currently inhabit Portage County: blue-spotted salamander, spotted salamander, tiger salamander, central newt, mudpuppy, northern redback salamander and four-toed salamander. The four-toed salamander is listed as a species of special concern in Wisconsin.

Large sections of continuous natural shoreline on lakes are ideal habitats for frog and salamander populations. Natural areas with large amounts of submergent, emergent and floating-leaf vegetation provide protection for amphibians. Many species also use the vegetation for attachment of eggs during the breeding season. Green frogs, bullfrogs, pickerel frogs and leopard frogs depend on the shoreline area throughout the year. In contrast, American toads, spring peepers, tree frogs, wood frogs and chorus frogs depend on the shoreline area in the spring for breeding and then move to other areas for the rest of the year.

Undisturbed areas of shoreline that are also connected to large natural upland areas provide ideal habitat for many amphibian species because they lessen frogs' exposure to predators. Many frog and salamander species migrate to the lakes in the spring to breed and spend the summer months foraging in the uplands. Many amphibian species will also over winter in the uplands.



# Collins Lake ~ Frogs and Reptiles



## **Collins Lake**

**Number of frog species:** 5

**Frog species observed:** wood frog, spring peeper, northern leopard frog, American toad, green frog

**Location of primary habitat:** southwest side of lake

**Key features of habitat:** areas of marsh with large amounts of submergent, emergent and floating-leaf vegetation

**Number of reptile species:** 2

**Reptile species observed:** painted turtle, snapping turtle

## **Map Key**

**Red outlined areas** = primary frog habitat

### **Good News**

Several frog species are present, large sections of undisturbed natural shoreline

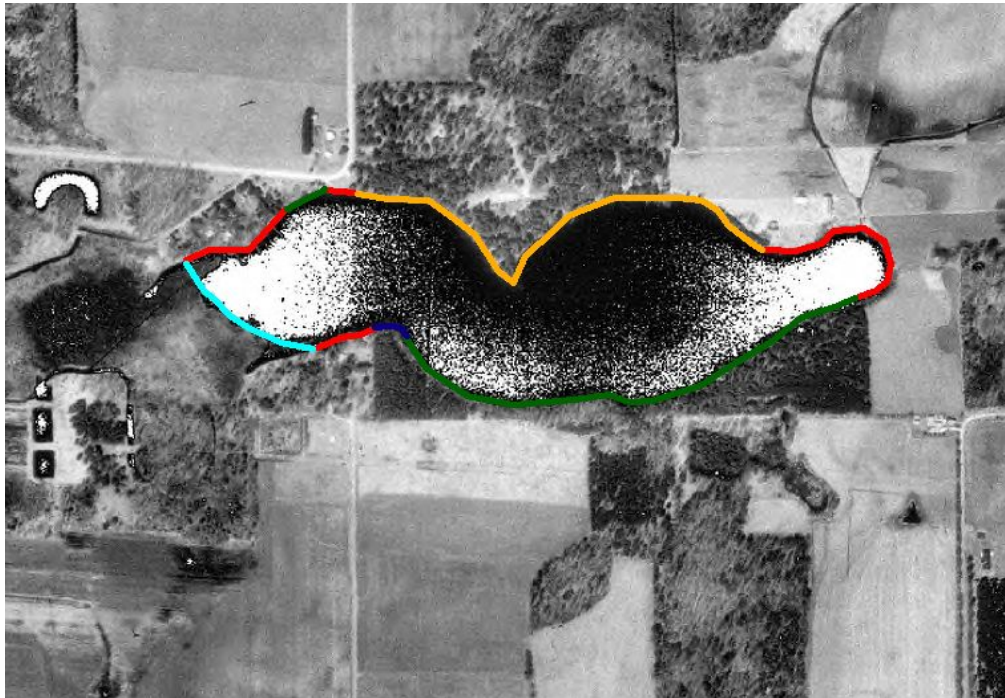
### **Bad News**

North shoreline of lake is highly altered making it poor frog habitat

The northern leopard frog is a rare species in Portage County, recorded at only five of the twenty-nine study lakes. Northern leopard frogs have experienced drastic declines throughout much of their range over the last several decades. Declines are thought to be due to a general deterioration in available habitat. Frogs require unaltered sections of shoreline with emergent vegetation, submergent vegetation, and a connection to undisturbed upland habitat. Multiple sections of the Collins Lake shoreline have already been highly altered. The remaining primary frog habitat on Collins Lake is located along the northwestern and southwestern shorelines (see attached figure).



# Collins Lake ~ Shoreline Vegetation



- ▲ 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

Frogs and toads depend on shoreline and aquatic vegetation for:

- attachment of eggs during the breeding season,
- shelter for adults throughout the spring and summer,
- food for larvae,
- habitat for prey, and
- slowing evaporation and moderating temperature fluctuations.

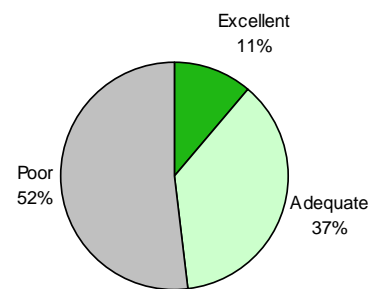
Frogs are commonly found in areas with large amounts of tree cover, aquatic plants, leaves, and downed branches, characteristics typical of natural areas. Frogs are not frequently found in sandy areas or open water, characteristics typical of altered areas. Though amphibians use drier prairies and woodlands near lakes and wetlands, this study focused on areas reaching from 16 feet into the lake to 33 feet inland.

Green frogs are used as an indicator for the health of aquatic life in Wisconsin lakes because they are abundant, live in many cover types, and remain along the edge of the lake throughout the spring and summer. While other amphibians may require more specific cover types, the green frog habitat is a useful indicator. Some cover types (as shown on map above) are better than others for green frogs. Specifically:

- Excellent green frog habitat = cover types 1 and 2
- Adequate green frog habitat = cover types 3, 4 and 6
- Poor green frog habitat = cover types 5, 7 and 8

Lakes with larger amounts of good green frog habitat will likely support more amphibians and more species of amphibians. Likewise, amphibians are more likely to be harmed or eliminated with increasing shoreland development.

Collins 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



# Collins Lake ~ Aquatic Plants

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Aquatic plant surveys were conducted in each lake. More detailed information is available in the final report.

## **Aquatic Plant Survey**

There are 93 species of aquatic macrophytes (90 species of vascular plants, 3 species of non-vascular plants) that have been found at Collins Lake. This is significantly above average for Portage County lakes.

Collins Lake holds the largest flora of aquatic and wetland species recorded for Portage County. It is one of the most thoroughly studied lakes in central Wisconsin, with herbarium records back to 1964 and notes on the aquatic flora beginning in 1968.

Although no endangered, threatened, or special concern species have been found in the lake, several plants which occur here are quite rare in this part of Wisconsin, including stiff (or spiny-spored) quillwort and creeping spearwort. However, many of the notable or relatively rare plants, such as the quillwort, are now difficult to find, and others, such as the spearwort, have not been found in recent years. Species which are more aggressive or indicative of lakes with lower floristic quality are increasing. Unlike 30 - 35 years ago, submersed plants are now covered with filamentous algae and marl; submersed plants no longer grow at the greater depths where we could find them years ago. Reed canary-grass arrived about 35 years ago and is spreading along some of the shore. The quality and diversity of the aquatic flora of Collins Lake will probably continue to decline unless nutrients, run-off, and turbidity are reduced. Furthermore, the establishment of major invasive plants, such as Eurasian milfoil, curly-leaf pondweed, and purple loosestrife, would likely result in a drastic change in the character of the lake.

## **Invasive Exotic Aquatic Plants**

Invasive species displace native species, disrupt ecosystems, and affect citizen's livelihoods and quality of life. They hamper boating, swimming, fishing, and other water recreation, and take an economic toll on commercial, agricultural and aquatic resources.

(Wisconsin DNR)

Aquatic plants surveys revealed that some of the lakes in the study have invasive aquatic plants present.

**Eurasian milfoil** (*Myriophyllum spicatum*) was present in Bear Lake, Lake Emily, Lake Joanis, Jordan Pond, McDill Pond, Springville Pond and Thomas Lake.

**Curly leaf pondweed** (*Potamogeton crispus*) was identified in Spring Lake and Amherst Millpond.

Contact the Portage County Land Conservation Department for additional information.



# Collins Lake ~ What can you do to help?

## We Can All Help Take Care Of Our Lake

A lake is a magnificent water resource. The quality of its water is a reflection of what happens on the land that surrounds it.



### Lake Users:

- ✓ Run boat engines efficiently.
- ✓ Observe no/low wake zones.
- ✓ Refuel away from water.
- ✓ Dispose of trash property
- ✓ Remove all aquatic plants from boats and trailers.



### Land Owners:

- ✓ Control soil erosion.
- ✓ Keep livestock out of lakes and streams.
- ✓ Control manure runoff.
- ✓ Carefully manage nutrients and pesticides.
- ✓ Learn to identify and look for invasive species.



### Home Owners:

- ✓ Leave natural vegetation buffers in place or replace them if they have been removed.
- ✓ Eliminate the use of fertilizer or use low/no phosphorus fertilizer.
- ✓ Eliminate or minimize use of pesticides.
- ✓ Control soil erosion.
- ✓ Clean up after pets.
- ✓ Learn to identify and look for invasive species.



### Project support provided by:

- Wisconsin DNR Lake Protection grants
- UW-Stevens Point
- Portage County
- Portage County Citizens

### Study Contacts:

Portage County: Steven Bradley at 346-1334

UW- Stevens Point: Nancy Turyk at 346-4155



# Collins Lake ~ Primary Researchers

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## **Algae**

Dr. Bob Bell

## **Aquatic Plants**

Dr. Robert Freckmann

## **Birds**

Dr. Tim Ginnett

Brad Bulin (Graduate Student)

## **Fish**

Dr. Ron Crunkilton

## **Land Use Coverages/Watersheds**

Steve Bradley (Portage County Conservationist)

## **Planning Assistance**

Lynn Markham

Mike Hansen

## **Reptiles and Amphibians/Near Shore Habitat**

Dr. Erik Wild

Rori Paloski (Graduate Student)

## **Water Quality/Watersheds**

Becky Cook

Dr. Paul McGinley

Dr. Byron Shaw

Dick Stephens

Nancy Turyk

## **Near Shore Summary**

Dr. Glenn Bowles

Special thanks to UWSP undergraduate and graduate students and local citizens  
for their assistance!

