

Severson Lake

Final Results

Portage County Lake Study

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

April 7, 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*

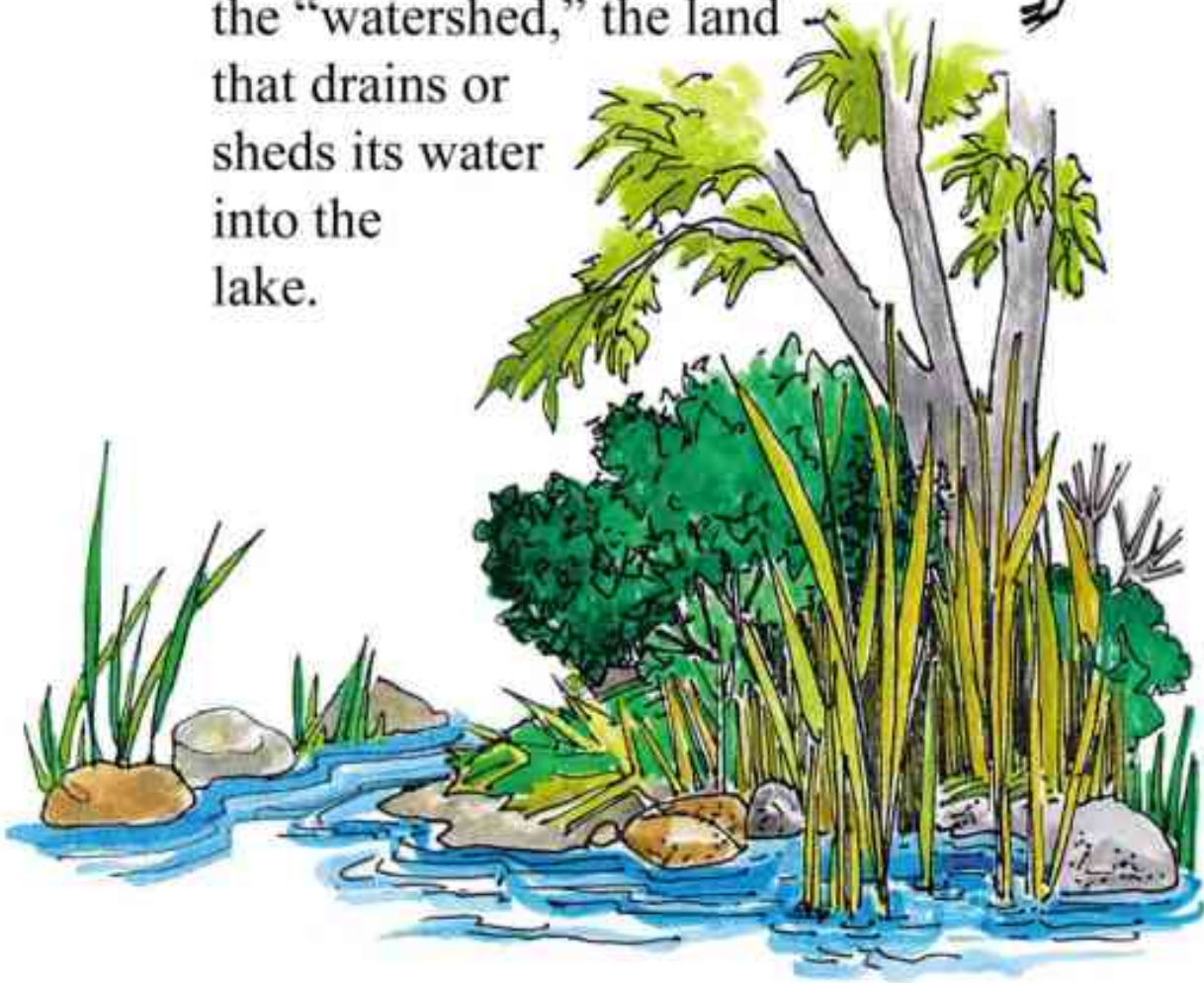
What can you DO in your community?

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

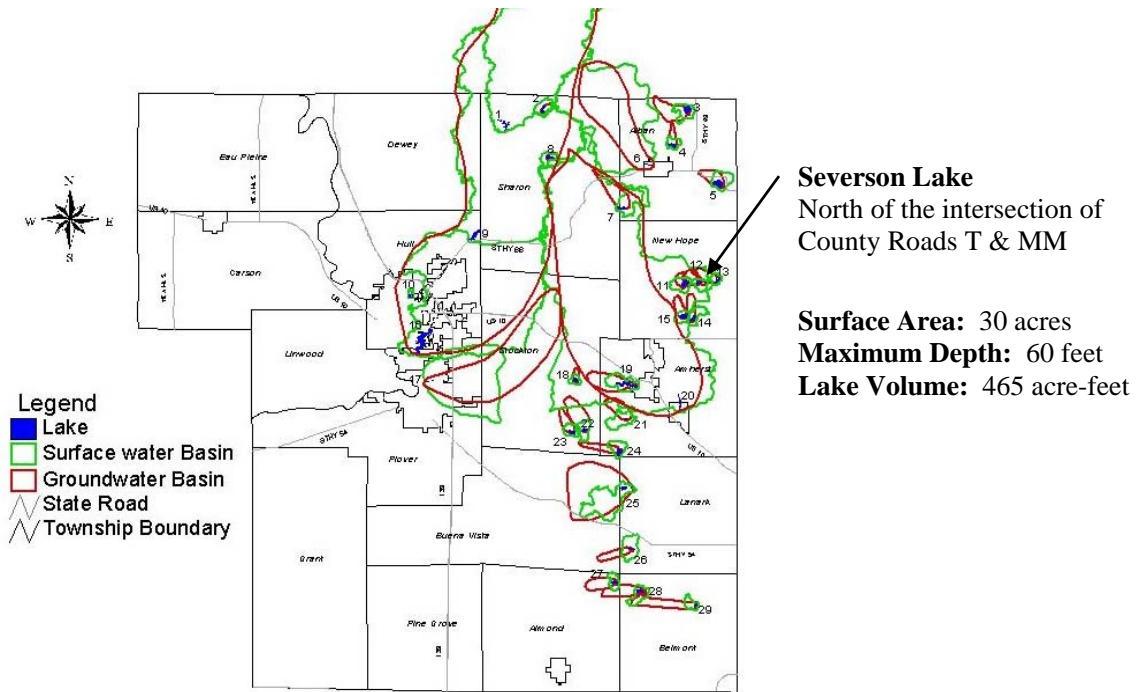
- ✓ *Develop consensus about the local goals and objectives for your lake.*
- ✓ *Identify available resources (people, expertise, time, funding).*
- ✓ *Explore and choose implementation tools to achieve your goals.*
- ✓ *Develop an action plan to achieve your lake goals.*
- ✓ *Implement your plan.*
-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



Severson Lake ~ Location



Severson Lake

Water Flow

- Severson Lake is a seepage lake
- Water enters Severson Lake from groundwater, runoff, and precipitation
- Water exits the lake through groundwater
- Water levels in Severson Lake fluctuate significantly with changes in the groundwater table



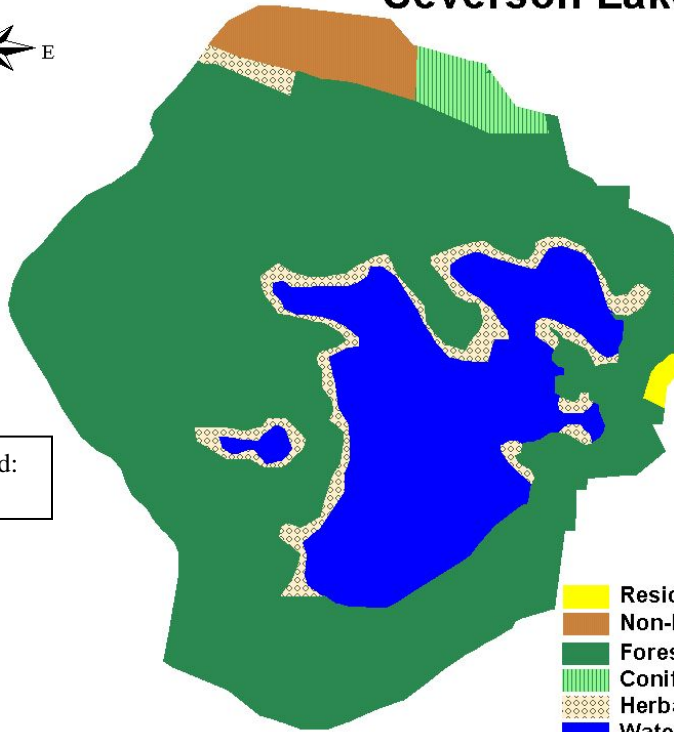
Severson Lake ~ Land Use in the Surface Watershed



Surface Watershed: The land area where water runs off the surface of the land and drains toward the lake.



Severson Lake Land Use

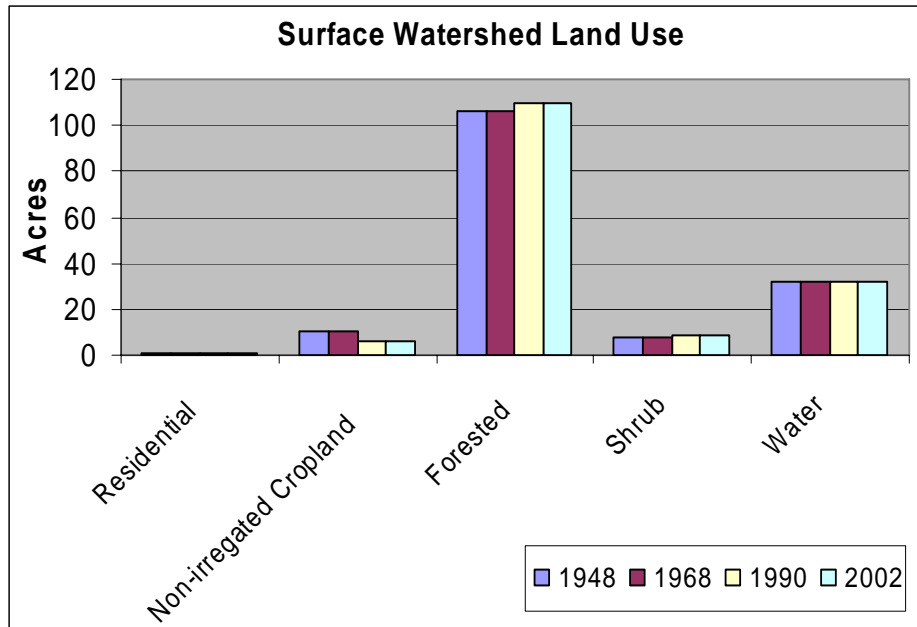


Current Predominant Land Use

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

Surface Watershed:
157 Acres

- Residential
- Non-Irrigated Cropland
- Forested
- Conifer Plantation
- Herbaceous Cover & Shrub
- Water Bodies



Surface Watershed Land Use

- Forestland is the most abundant land use in the watershed
- Residential land use is very minimal



Severson Lake ~ Land Use in the Groundwater Shed



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

Severson Lake Groundwater Land Use

Sunset Lake Rd.

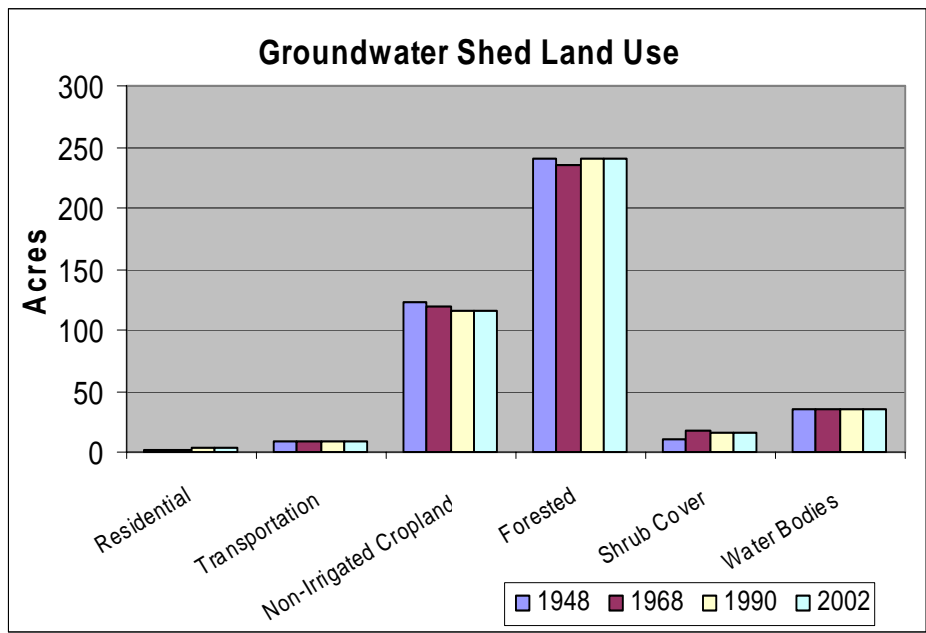
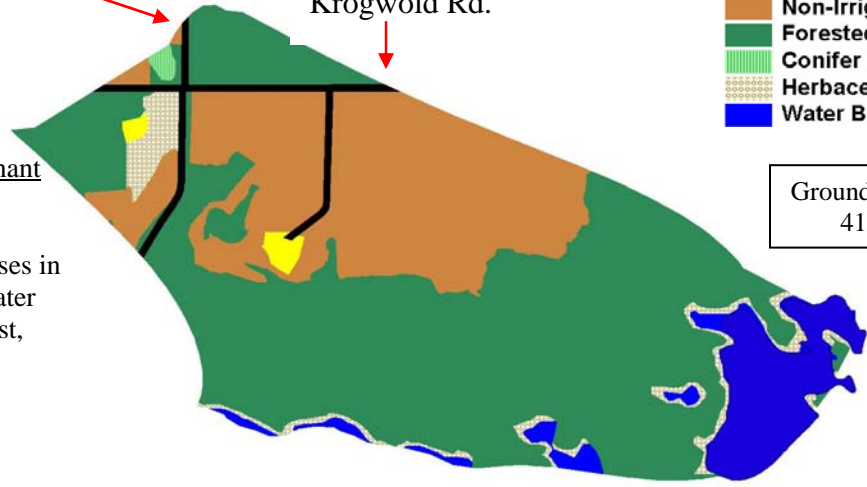
Krogwold Rd.

- Residential
- Transportation
- Non-Irrigated Cropland
- Forested
- Conifer Plantation
- Herbaceous Cover & Shrub
- Water Bodies

Current Predominant Land Use

- Major land uses in the groundwater shed are forest, non-irrigated agriculture.

Groundwater Shed:
418 Acres



Groundwater Shed Land Use

- Forest and non-irrigated cropland have dominated the land uses since 1948
- Residential use has remained a small fraction since 1948
- Herbaceous and shrub land have increased slightly since 1948

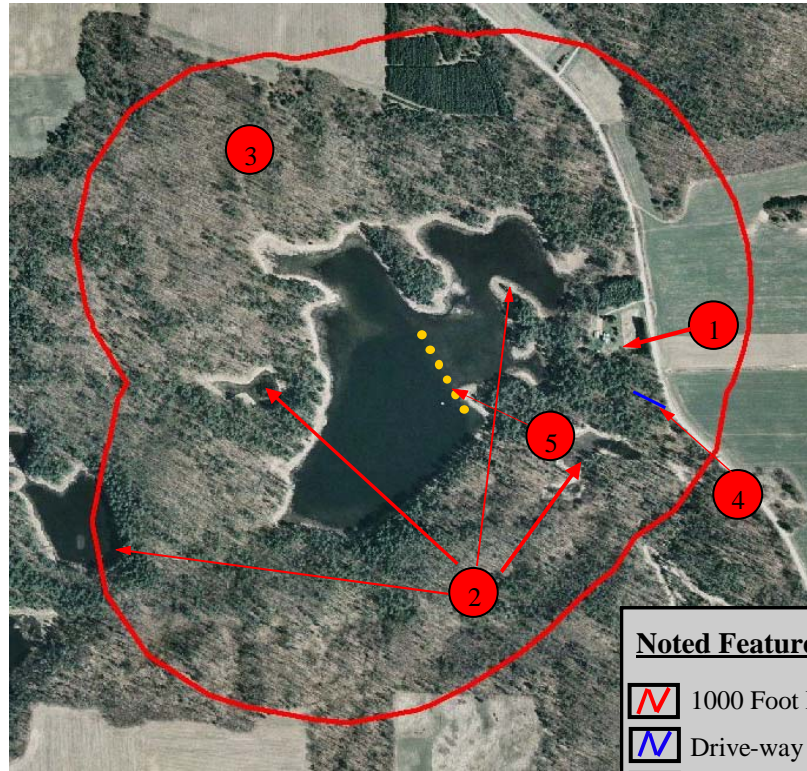





Severson Lake ~ Taking a closer look

(Within 1,000 feet of the lake)

Points of Interest

1. From 1938 to 2000 only two houses were located within 1000 feet of the lake.
2. The water level today is much higher than in 1938 and 1968. Please note that several of the little ponds around the lake were nearly dry in 1938 and 1968.
3. This area may have pasture in 1938. It has reverted back to forest by 2000.
4. Today there is private access to the lake from the east. The 1968 photo shows paths to the lake on the west side.
5. The line shows the water level in 1938. Water flooding the wetland areas may have led to the oxygen problems in the lake.



<u>Noted Features</u>	
	1000 Foot Buffer
	Drive-way
	1938 Water level

2000 Orthophoto (5-2000)



1938 Air Photo (10-10-38)



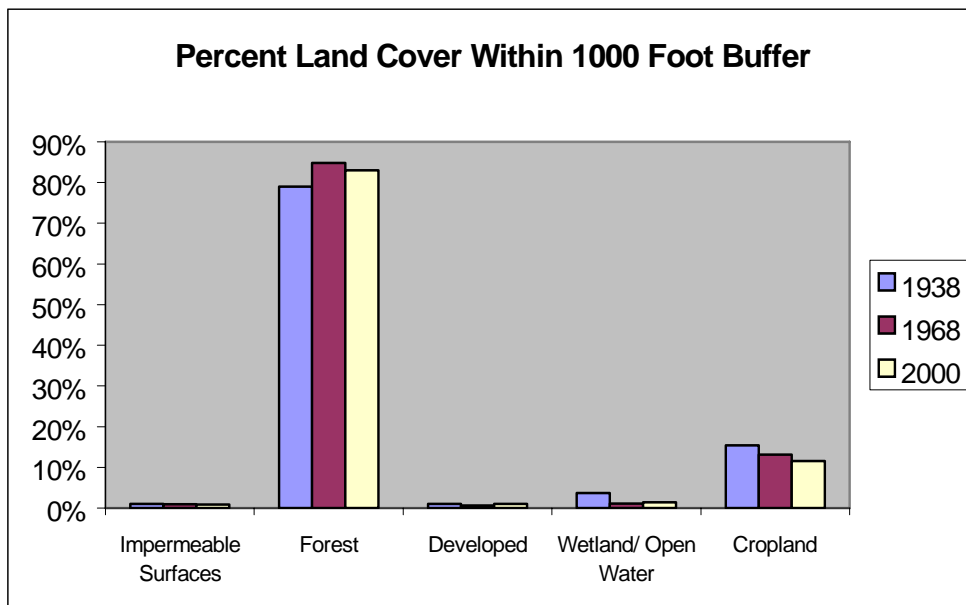
1968 Air Photo (6-4-68)



Severson Lake ~ Taking a closer look

(Within 1,000 feet of the lake)

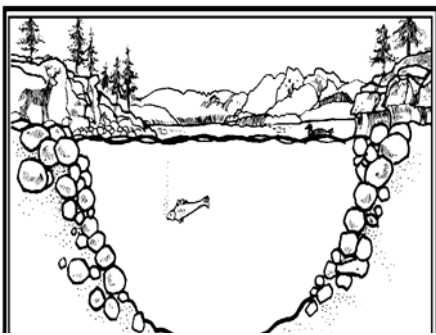
	1938	1968	2000
# of Docks	0	0	0
Impervious Surface (acres)	2	2	2
Residential (acres)	2	2	2
Cropland (acres)	30	26	23
Forest (acres)	154	165	166
Wetland (acres) (became open water)	7	2	3



Severson 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



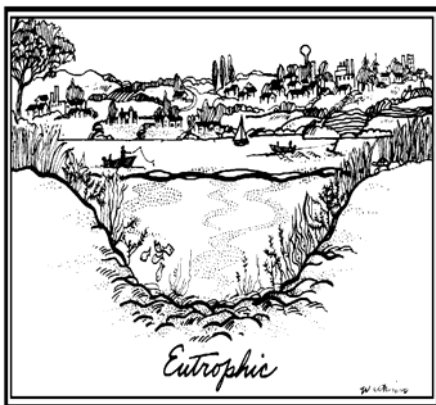
Mesotrophic Lakes

Common uses:

- ✓ Boating
- ✓ Fishing

Vegetation of mesotrophic lakes:

- ✓ Increased vegetation
- ✓ Occasional algal blooms



Eutrophic Lakes

Common uses:

- ✓ Fishing
- ✓ Wildlife watching

Vegetation of eutrophic lakes:

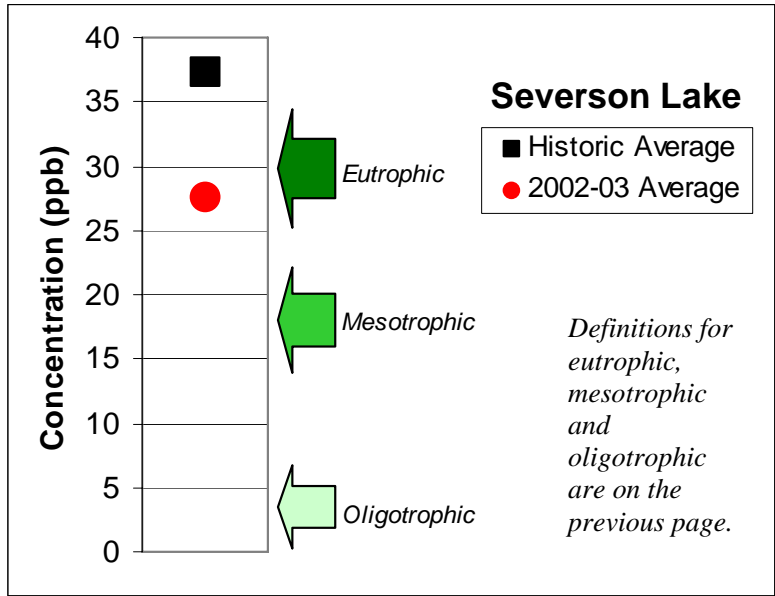
- ✓ Lots of aquatic plants
- ✓ Frequent algal blooms

Winter fish kills can occur



Severson Lake ~ Water Quality

Average Total Phosphorus Levels



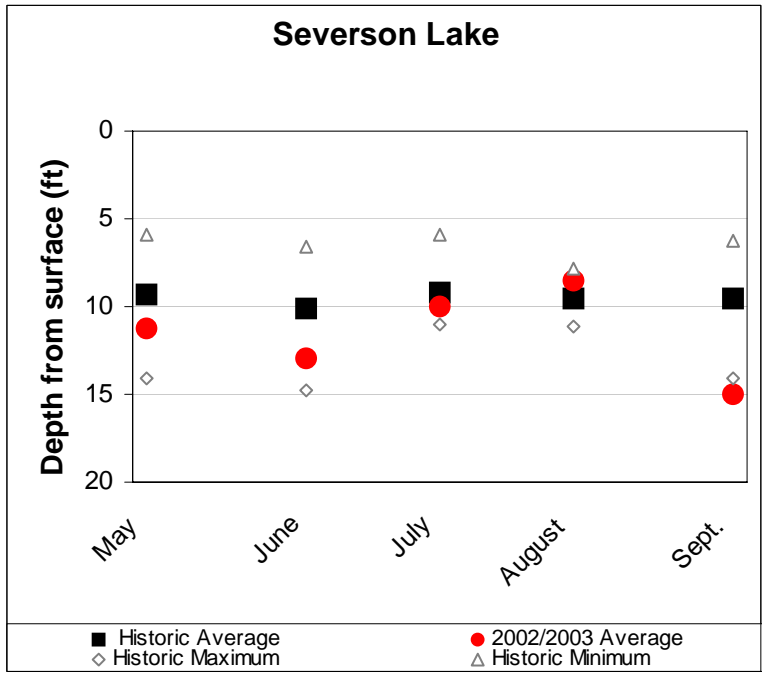
The graph to the left shows total phosphorus levels measured when the lake was well mixed (overtun). Phosphorus levels in Severson Lake in 2002-03 were lower than average historic levels, but are slightly above the 25 ppb average for similar lakes in the county. Severson Lake frequently experiences anoxic (low oxygen) conditions, due in part to the flooding of the wetland areas and the release of phosphorus from the sediment. Levels of phosphorus above 30 ppb are high enough to categorize a lake as eutrophic.



Overtun: 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 Severson Lake is considered good. The average Secchi depth reading for similar lakes in the region is about 9 feet; Severson Lake appears to have similar or better water clarity than these lakes. The water clarity of Severson Lake during 2002-03 growing seasons was better than the historical growing season average. The month of September shows the best water clarity, the month of August shows the worst. These fluctuations throughout the summer are normal as algae populations and sedimentation increase and decrease.



2002 Amphibian Distribution at Portage County Lakes

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.



Severson Lake ~ Frogs



Severson Lake

Number of species: 5

Species observed to date: spring peeper, American toad, gray treefrog, Cope's gray treefrog, green frog

Location of primary habitat: numerous areas surrounding the lake

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

Map Key

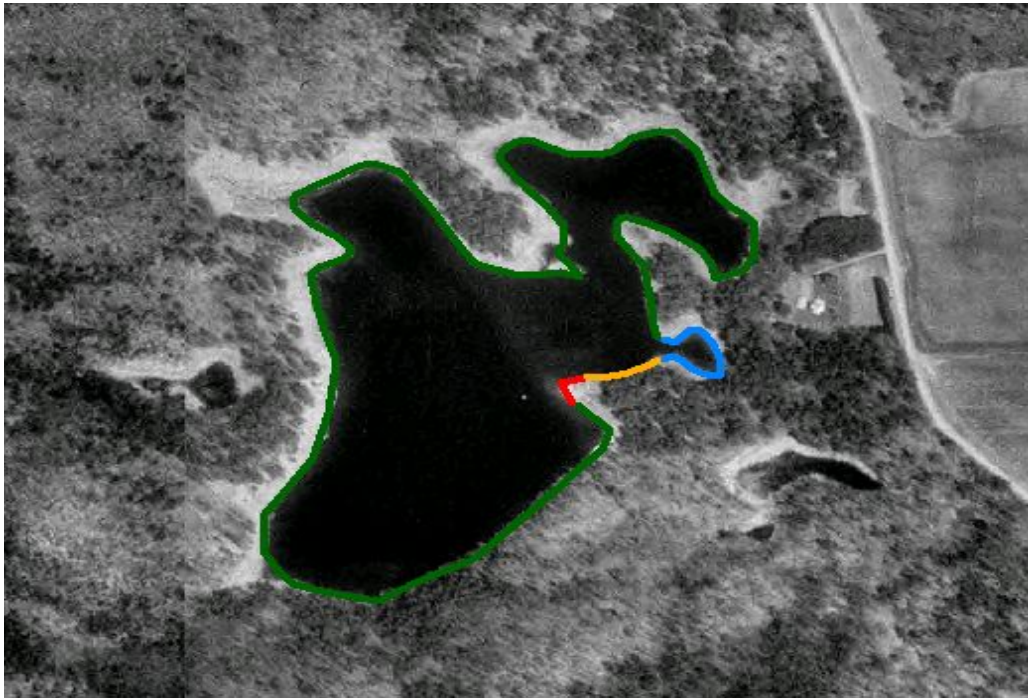
Red outlined areas = primary frog habitat









Good News

Minimal levels of development; wetland areas surrounding the lake provide ideal habitat for amphibians



Severson 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.

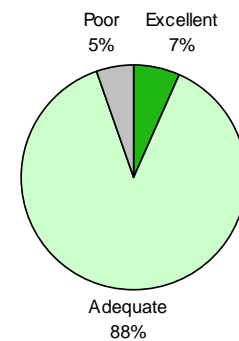
Frogs are commonly found in areas with large amounts of tree cover, aquatic plants, leaves, and downed branches, characteristics typical of natural areas. Frogs are not frequently found in sandy areas or open water, characteristics typical of altered areas. Though amphibians use drier prairies and woodlands 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.

Severson 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



Severson Lake ~ Aquatic Plants

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

Aquatic Plant Survey

There are 43 species of vascular plants that were found in the water or on wet shores of Severson Lake. This is slightly below average for Portage County lakes.

Severson Lake (Budsberg Lake on older maps) is notable for being undeveloped, except for two cabins on the east side. The shoreline includes a large boggy sedge meadow on the north. Although no rare or special concern species have been found in the lake or adjacent wetland, the flora is composed mostly of native species characteristic of intact plant communities, as indicated by the relatively high average index of conservatism. The upland is heavily wooded with large white pines, red oaks, maples, etc. and also indicates an intact native plant community.

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
- Thomas Lake

Curly leaf pondweed (*Potamogeton crispis*) was identified in

- Spring Lake
- Amherst Millpond

Contact the Portage County Land Conservation Department for additional information.



Severson 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 properly
- ✓ 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.



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

Study Contacts:

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Severson Lake ~ Primary Researchers

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Water Quality/Watersheds

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Nancy Turyk

Near Shore Summary

Dr. Glenn Bowles

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