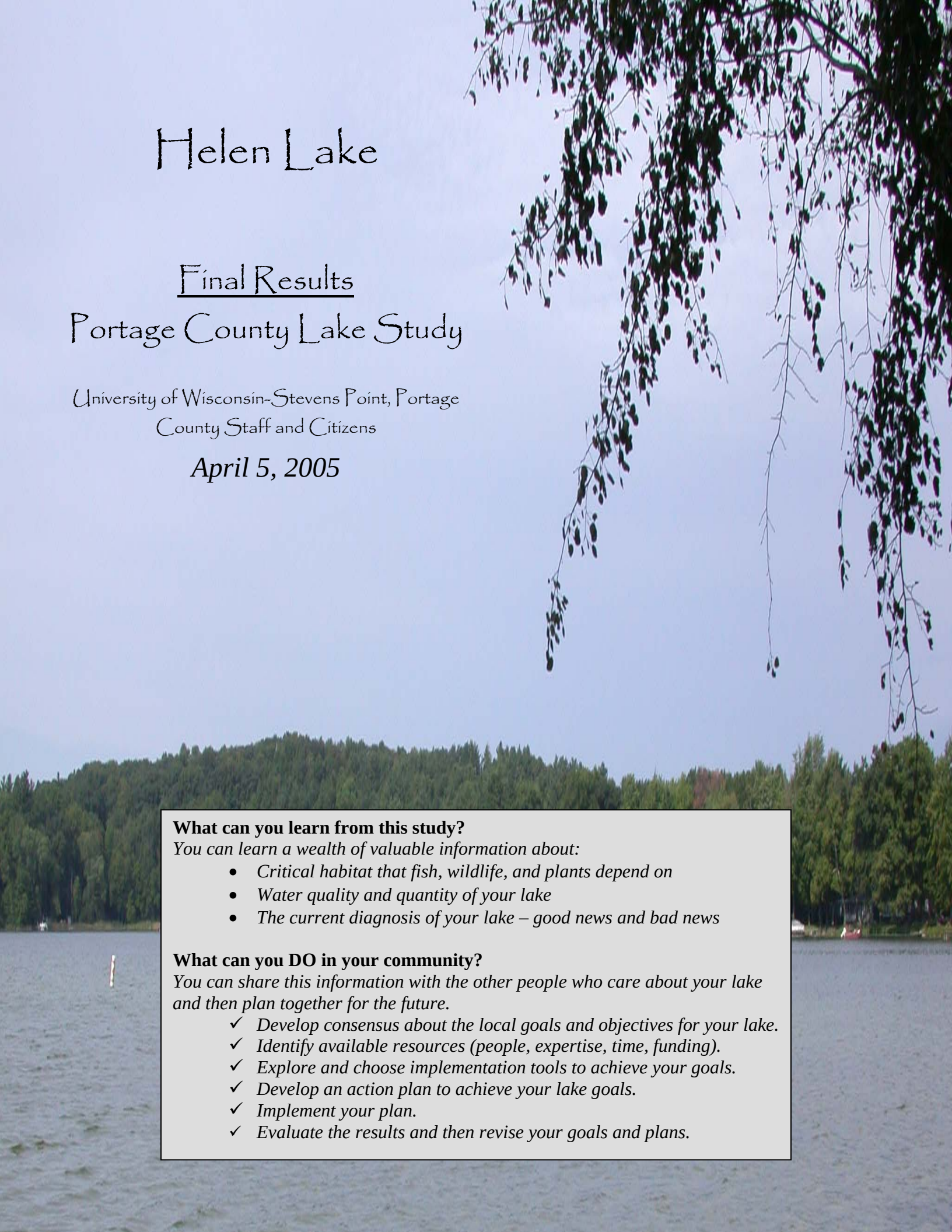


Helen Lake

Final Results
Portage County Lake Study

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

April 5, 2005

What can you learn from this study?
You can learn a wealth of valuable information about:

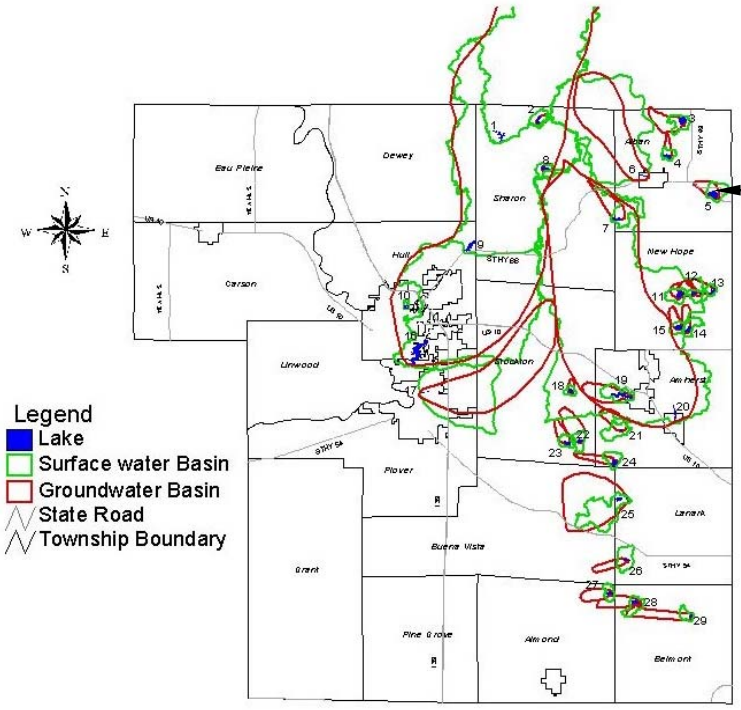
- *Critical habitat that fish, wildlife, and plants depend on*
- *Water quality and quantity of your lake*
- *The current diagnosis of your lake – good news and bad news*

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.

Helen Lake ~ Location



Helen Lake
South of Highway 49, just East of Rosholt; Town of Alban

Surface Area: 87 acres
Maximum Depth: 20 feet
Lake Volume: 599 acre-feet

Helen Lake

Water Flow

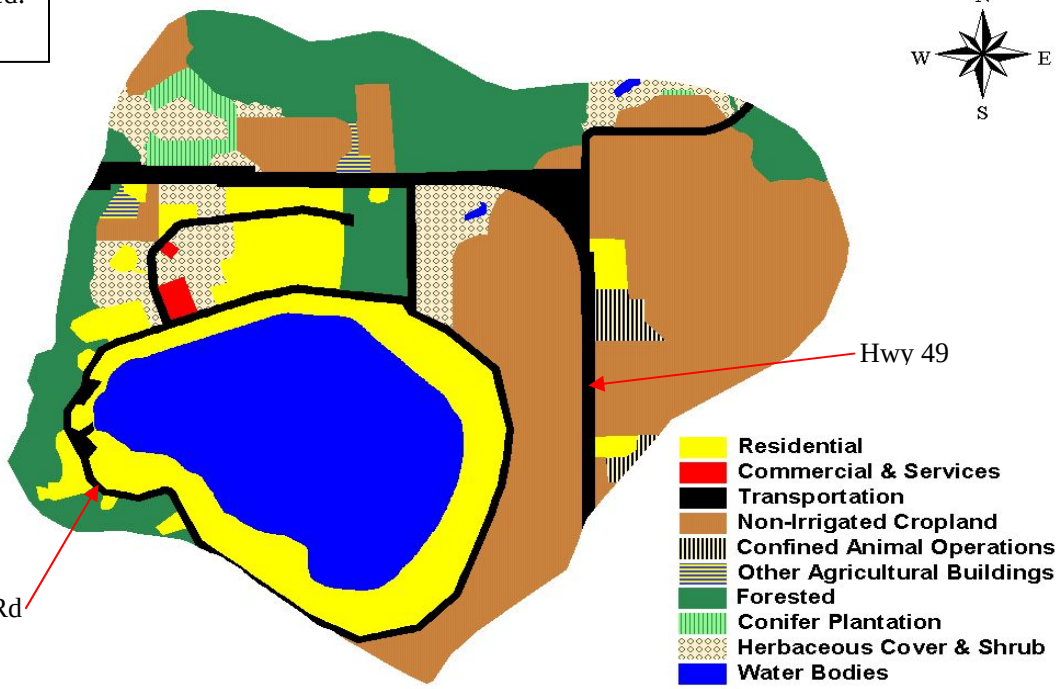
- Helen Lake is a seepage lake
- Water enters Helen Lake from groundwaterm and to a lesser degree, runoff, and precipitation
- Water exits the lake through groundwater and an intermittent outlet, which flows into Flume creek

Helen 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.

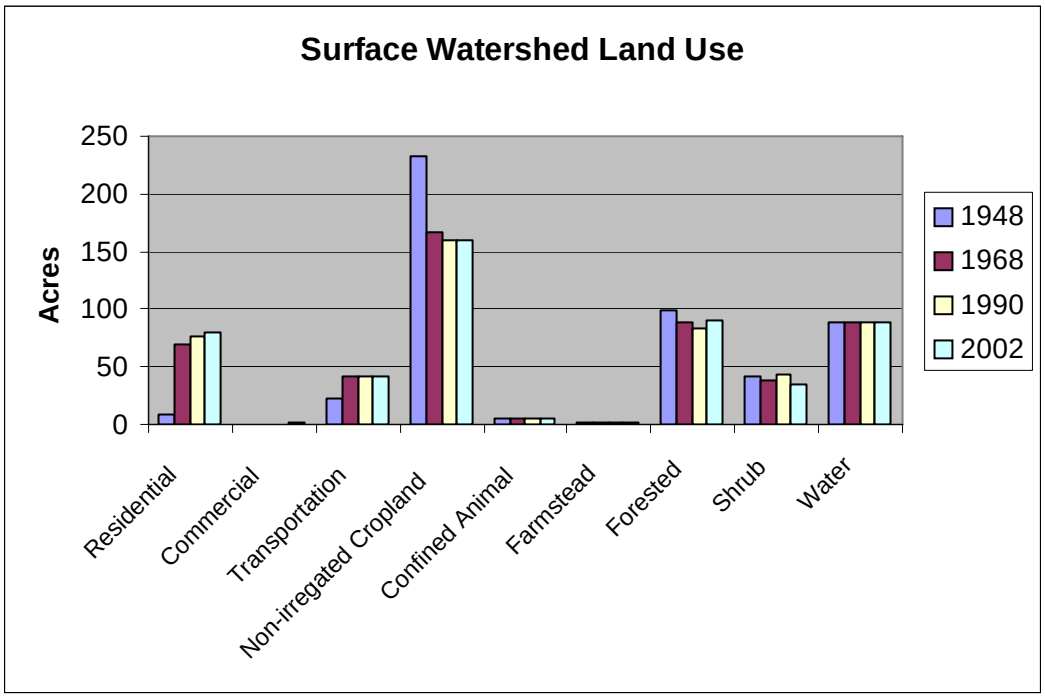
Surface Watershed: 443 acres

Helen Lake Land Use



Current Predominant Land Use

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



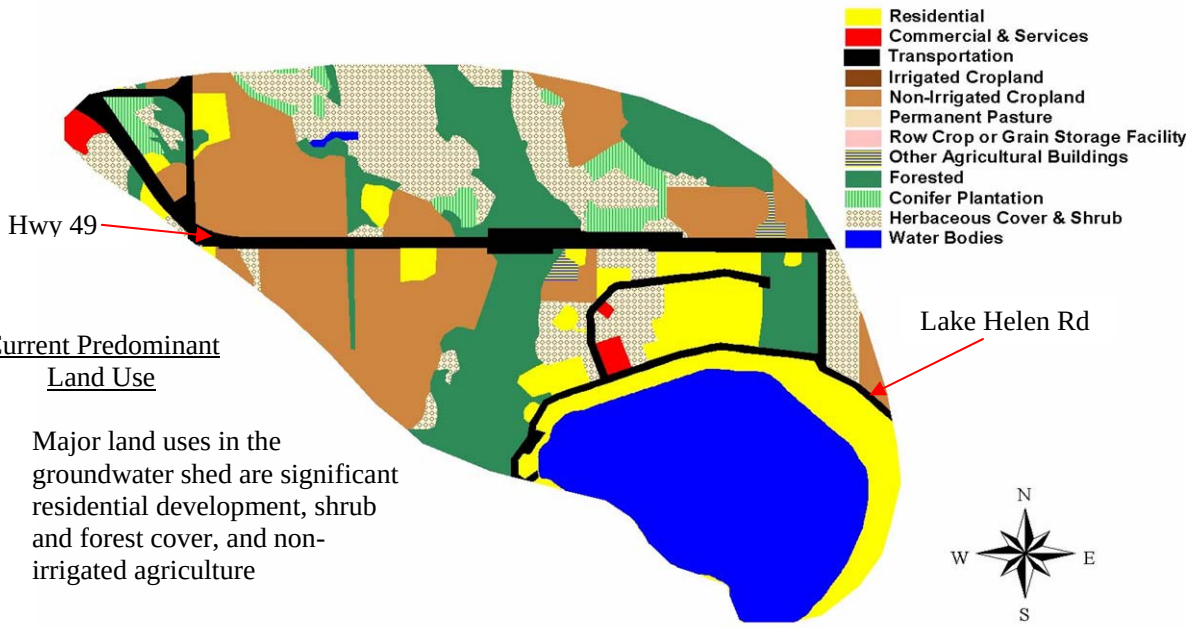
Surface Watershed Land Use

- Non-irrigated cropland and forestland has dominated the watershed since 1948
- Residential use has grown and currently is also a very predominate land use

Helen Lake ~ Land Use in the Groundwater Shed

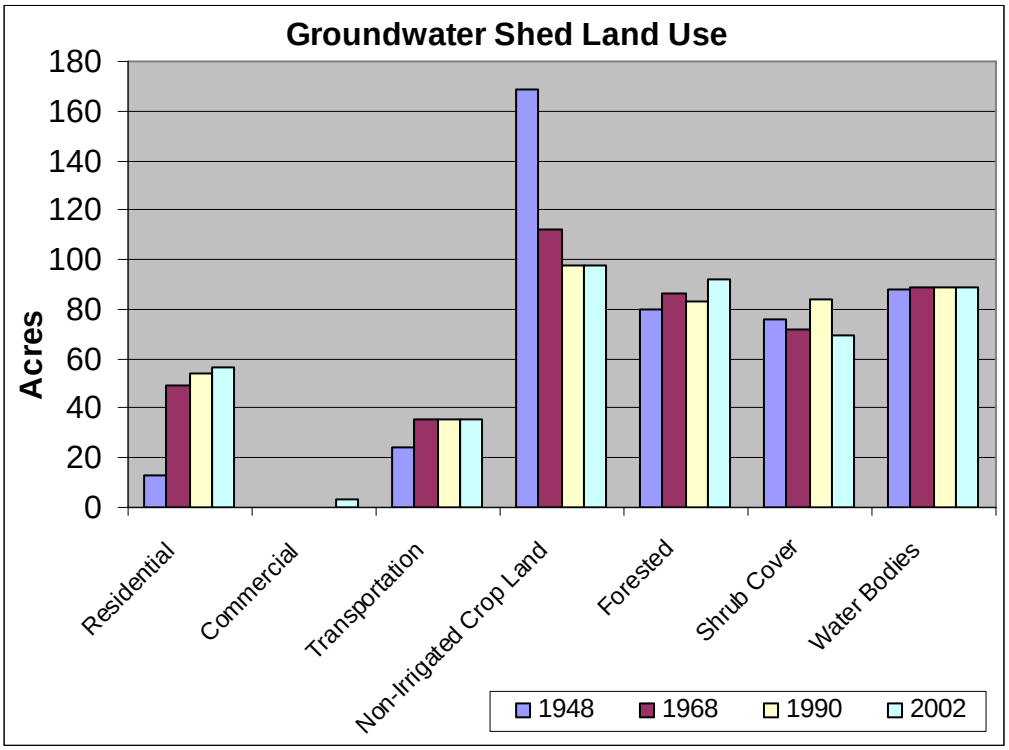
Groundwater Shed: The land area where water soaks into the ground and travels underground to the lake.

Helen Lake Groundwater Landuse



Current Predominant Land Use

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

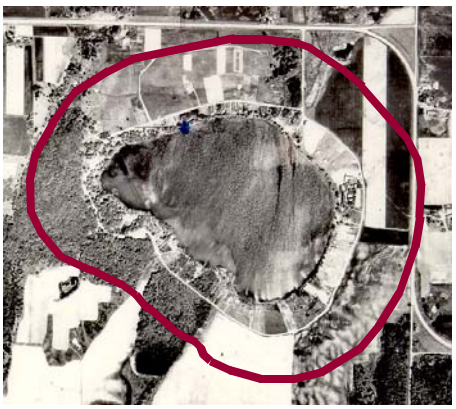


Groundwater Shed Land Use

- Non-irrigated cropland was the dominant land use in 1948, but now is about the same as forestland and shrub cover
- Forestland and shrub cover have remained relatively steady since 1948
- Residential land use almost tripled from 1948 to 1968 and now appears to be on a steady climb

Helen Lake ~ Taking a closer look
(Within 1,000 feet of lake)

1938 Air Photo Image



1968 Air Photo Image

Points of Interest

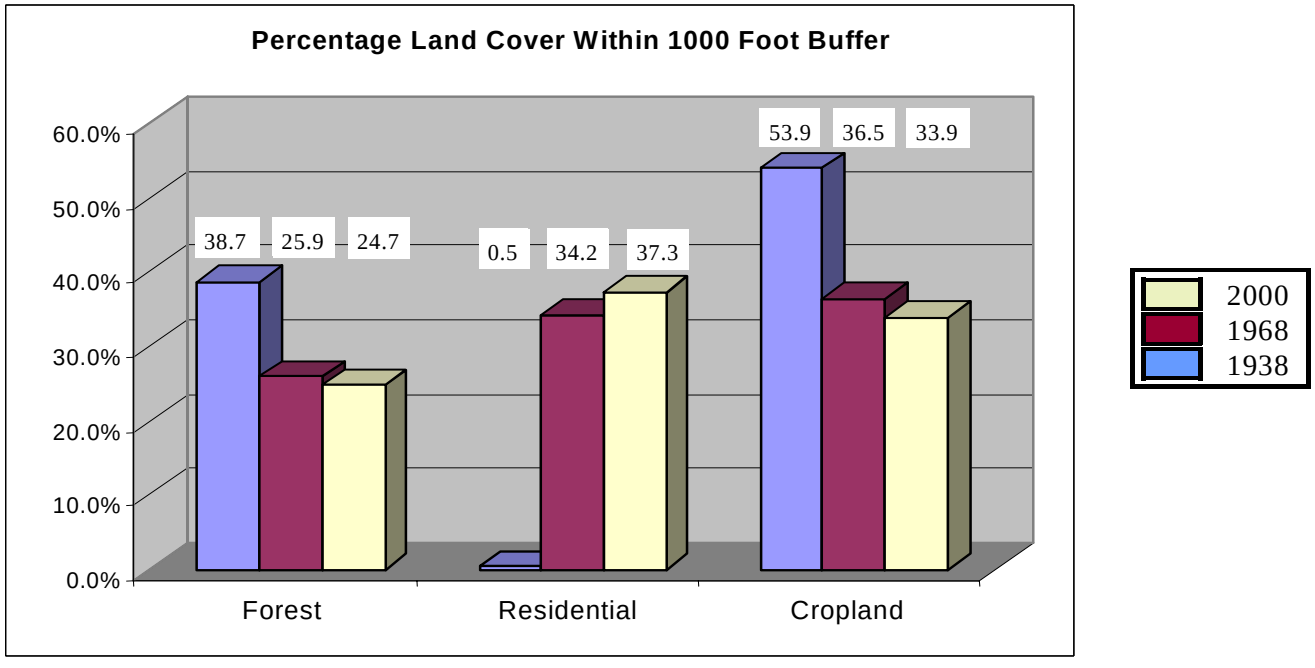
May 2000 Orthophoto

1. Dredging done in the western portion of the lake.
2. The subdivision now surrounds more than 80% of the lake. Construction began in the early 1960's.
3. Residential development has occurred since 1968.
4. Road system in place in 1938
5. A small pond appeared between the years of 1961 and 1968.
6. A single farmstead accounted for all of the residential development in 1938.
7. This is the delineated 1000-foot mark.

Helen Lake ~ Taking a closer look
(Within 1,000 feet of lake)

Changes from 1938 to 2000

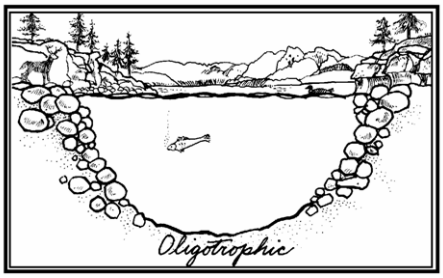
	1938	1968	2000
# of Docks	0	6	19
Impervious Surface (acres)	1.92	7.62	10.33
Residential (acres)	1.26	82.51	89.92
Cropland (acres)	129.91	87.95	81.80
Forest (acres)	93.32	62.42	59.69



Helen 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.



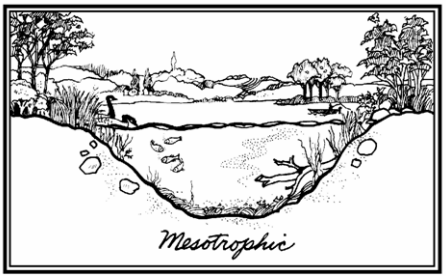
Oligotrophic Lakes

Common uses:

- ✓ Swimming
- ✓ Skiing
- ✓ Boating

Vegetation of oligotrophic lakes:

- ✓ Very little vegetation



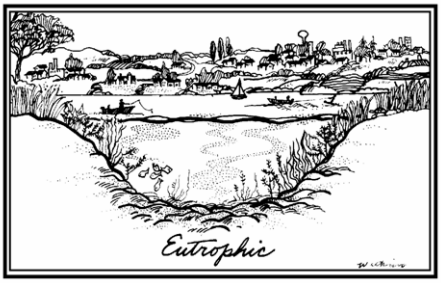
Mesotrophic Lakes

Common uses:

- ✓ Boating
- ✓ Fishing

Vegetation of mesotrophic lakes:

- ✓ Increased vegetation
- ✓ Occasional algal blooms



Eutrophic Lakes

Common uses:

- ✓ Fishing
- ✓ Wildlife watching

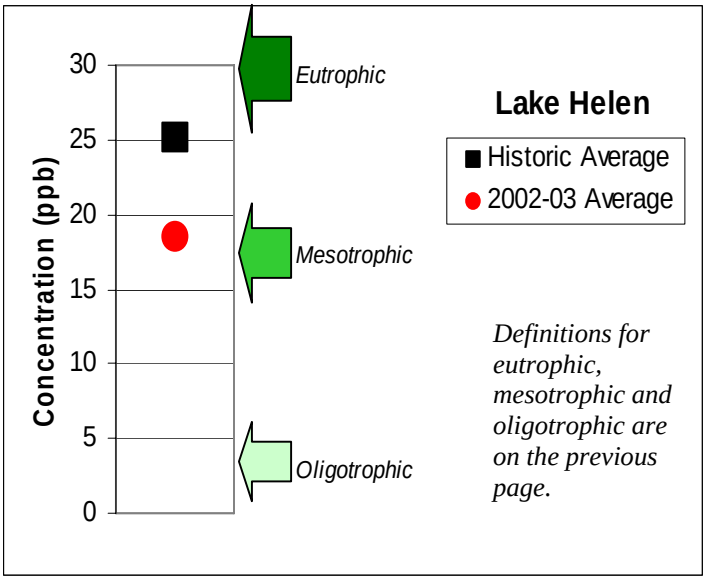
Vegetation of eutrophic lakes:

- ✓ Lots of aquatic plants
- ✓ Frequent algal blooms
- ✓

Lakes can experience winter fish kills

Helen Lake ~ Water Quality

Average Total Phosphorus Levels

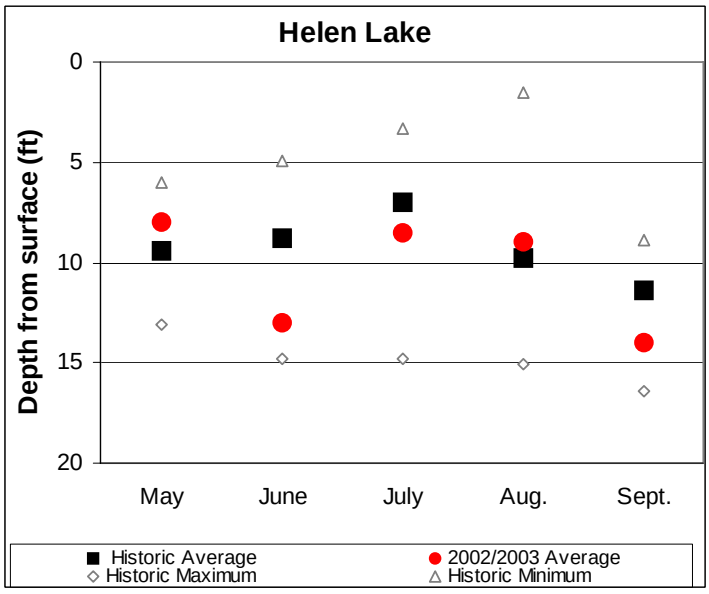


The graph to the left shows total phosphorus levels measured when the lake was well mixed (overturn). Phosphorus levels in Lake Helen in 2002-03 were less than the average historic levels. Current levels in Lake Helen are slightly higher than the average concentrations (16 ppb) of similar groundwater seepage lakes in the county.

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 Helen Lake is considered fair. The average Secchi depth reading for similar lakes in the region is 11 feet. The water clarity of Lake Helen during the 2002-03 growing seasons was similar to the historic growing season average. The months of June and September show the best water clarity and the months of May and July the poorest. These fluctuations throughout the summer are normal as algae and aquatic plant populations and sedimentation increase and decrease. Wind disturbance of sediment can also influence the water clarity in shallow lakes.

2002 Amphibian Distribution at Portage County Lakes

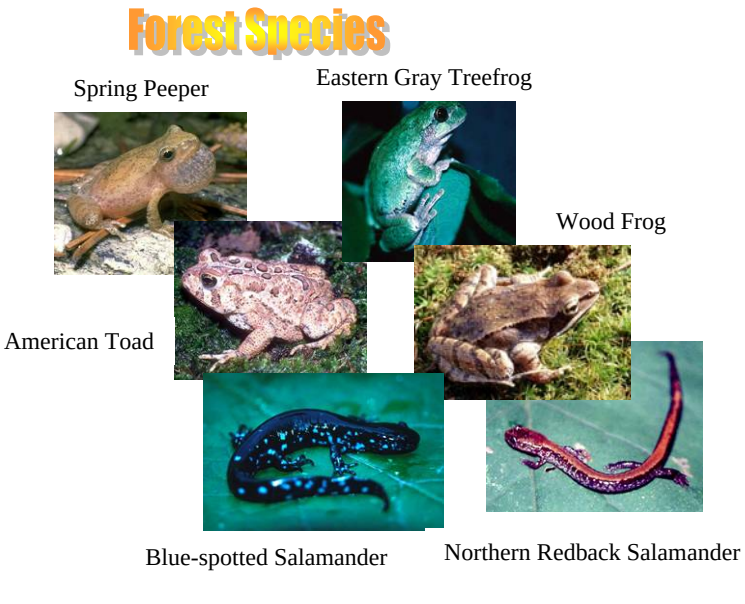
This summary provides preliminary information on the amphibian species present and their distribution at the twenty-nine Portage County lakes. Surveys were conducted from April 2002 - August 2002, the typical breeding period of the frogs and salamanders found in the county.

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.



Helen Lake ~ Frogs

Helen Lake
Number of frog species: 6

Species observed to date: wood frog, spring peeper, chorus frog, northern leopard frog, gray treefrog, green frog

Location of primary habitat: some small sections on south side of lake and in wetlands to the north of the lake

Key features of habitat: protected wetlands with submergent, emergent and floating-leaf vegetation

Map Key
Red outlined areas = primary frog habitat

Good news
several frog species present

Bad news
high level of shoreline development

Helen Lake ~ Shoreline Vegetation

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.

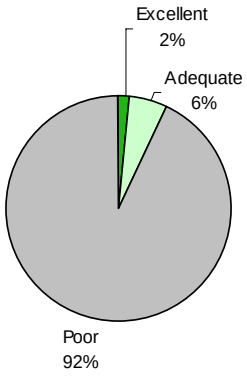
Frogs are commonly found in areas with large amounts of tree cover, aquatic plants, leaves, and downed branches, characteristics typical of natural areas. Frogs are not frequently found in sandy areas or open water, characteristics typical of altered areas. Though amphibians use drier prairies and woodlands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

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

Helen Lake ~ Aquatic Plants

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

Aquatic Plant Survey

There were 23 species of aquatic macrophytes (22 species of vascular plants plus a macrophytic alga) that have been found in Lake Helen or wet areas of the adjacent shore. This is below average compared to the other Portage County lakes.

Lake Helen is surrounded by homes and cottages, leaving very little wet shore and little native vegetation. Eurasian milfoil and curlyleaf pondweed have not been found in this study to date, but both species would likely become abundant quickly if they were to be established here in the future.

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)

Invasive aquatic plants are spreading into many of Wisconsin's lakes. They are mostly being carried lake to lake by boats, trailers, and fishing equipment. The 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 (Potomogetan crispis) was identified in

- Spring Lake
- Amherst Millpond

Even if your lake did not have exotic aquatic plants in it, we recommend that citizens attend a training session to learn to identify invasive aquatic plants and routinely look for them. It is costly to remove invasive aquatic plants once they have taken hold in a lake.

Contact the Portage County Land Conservation Department for additional information.

Helen 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.

Project support provided by:

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

Study Contacts:

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Planning Assistance
Lynn Markham
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Reptiles and Amphibians/Near Shore Habitat
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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

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