

# Ryerson Lake

A GUIDEBOOK FOR HOMEOWNERS



# Preface

In 1997, the Ryerson Lake Improvement Board was established in accordance with Michigan's Natural Resources and Environmental Protection Act. With input from lake residents, the lake board has implemented several programs to help improve the quality of Ryerson Lake.

As property owners around Ryerson Lake, we all have an investment in the lake. Whether we use it for swimming, boating, fishing, or simply enjoying the view, preserving the quality of the lake is important to all of us. This guidebook has been prepared by the Ryerson Lake Improvement Board to provide homeowners with information about how to protect Ryerson Lake.

Ryerson Lake Improvement Board

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# An Historical Perspective

The earliest known inhabitants of what is now Newaygo County were the Odawa Indians. However, it was logging activity in the mid-1800s that had the most profound impact on the early settlement of the area. The Muskegon River watershed, of which Ryerson Lake is a part, was transformed during this period as dams and sawmills were constructed to support the booming lumber industry. Vast stands of white pines were harvested and shipped to Chicago and other port cities. Ryerson Lake's namesake, Martin Ryerson, was one of the early millionaire lumber barons. Penoyer Creek, to which Ryerson Lake flows, was named after the Penoyer brothers who constructed the first sawmill in the area.

Camp Echo has existed on the shores of Ryerson Lake for nearly a century. The camp encompasses several hundred acres and is one of the oldest YMCA facilities in Michigan. In the 1940s and 1950s, Ryerson Lake (formerly called Long Lake) was used primarily as a resort area. At that time, summer cottages and small resorts dotted the lakeshore.

As more permanent homes became established around the lake, residents recognized the need to protect Ryerson Lake. In the early 1980s, a sanitary sewer system was constructed around the lake. Today, about 200 seasonal and year-round homes border Ryerson Lake.



Formed several thousand years ago, when the glaciers that created the Great Lakes receded, and later inhabited by the Ottawa and Potawatomi Indians, the Muskegon was used by French fur trappers in the 1600s. Rich in white pine, the area was developed during the turn-of-the-century lumber boom, and at one time Muskegon Lake boasted more than 47 sawmills. The Muskegon was

ravaged following settlement by Europeans, when rivers and streams were used to transport logs to the newly developing cities. Dams on rivers and large streams provided power for sawmills and grain milling, and later provided energy for generating electricity as technology advanced.

*From: The Muskegon: The Majesty and Tragedy of Michigan's Rarest River, by Jeff Alexander, 2006.*





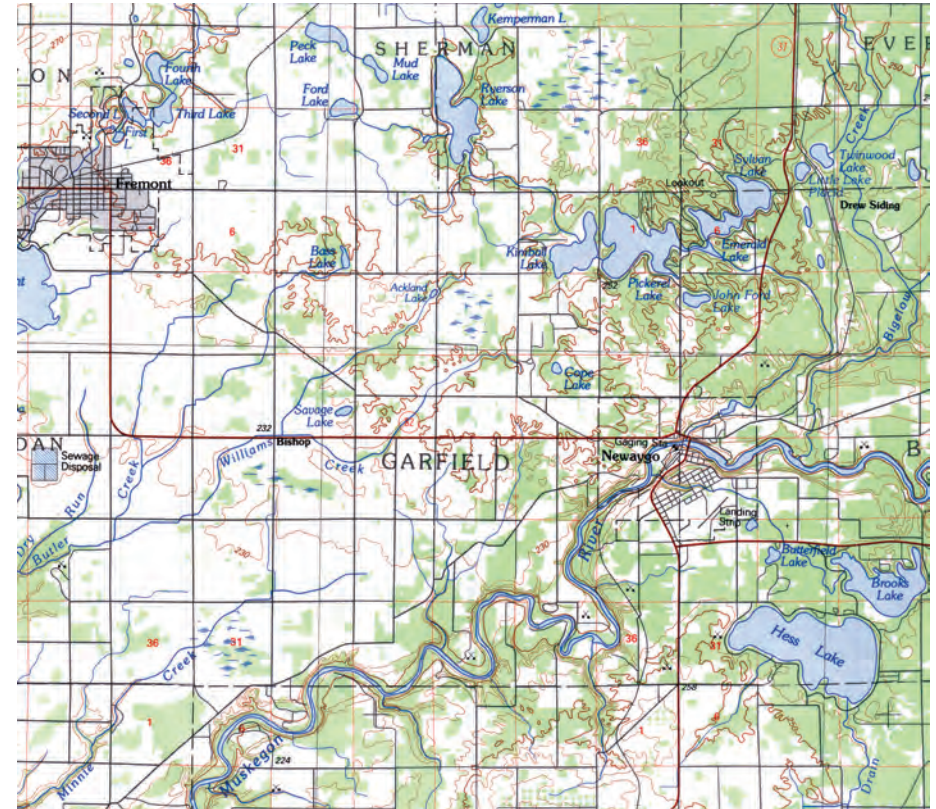
# Lake Facts

The bottom of Ryerson Lake was first mapped in the early 1940s by the Michigan Conservation Department. The lake has a surface area of 250 acres and a maximum recorded depth of 82 feet. The average, or mean, depth of Ryerson Lake is 27 feet. Despite having large areas of deep water, Ryerson Lake also contains shallow sand and marl areas. These shallow areas support aquatic plants and provide quality habitat for fish and wildlife.

The shoreline of Ryerson Lake is over four miles long. Shoreline development factor is a calculation of the irregularity in the shape of the lake shoreline. With a shoreline development factor of 2.0, the shoreline of Ryerson Lake is two times longer than if the lake were perfectly round.

Four small tributaries flow into Ryerson Lake. The water residence time of a lake is the time it takes for the entire volume of water in the lake to be replaced by incoming waters. Ryerson Lake has a water residence time of over a year.

Ryerson Lake's outlet at the south end flows to Ludke Drain, through Kimball and Pickerel Lakes, and into Penoyer Creek which, in turn, flows into the Muskegon River and Lake Michigan. In 1963, the Newaygo County Circuit Court established a legal level of 812.5 feet above sea level for Ryerson Lake. There are approximately 230 feet of fall between Ryerson Lake and Lake Michigan.



Ryerson Lake and downstream drainage. Map from U.S. Geological Survey



### Ryerson Lake Physical Characteristics

Lake Surface Area: 250 Acres

Maximum Depth: 82 Feet

Mean Depth: 27 Feet

Lake Volume: 2.17 billion gallons

Shoreline Length: 4.4 Miles

Shoreline Development Factor: 2.0

Lake Elevation: 812.5 Feet

#### DEPTH LEGEND

0 - 20
20 - 40
40 - 60
60 - 80
80+

Ryerson Lake depth contour map. Base map from Michigan Conservation Department.



Camp Echo inlet



# Watershed Facts

A watershed is the land area that drains to a lake. A watershed boundary is determined by examining a topographical map that shows the “lay of the land” around the lake. The Ryerson Lake watershed is approximately 3,800 acres — a land area about 15 times larger than the lake itself. The predominant land use in the Ryerson Lake watershed is agriculture. In addition, there are a number of small lakes, forested areas, and wetlands.

The Ryerson Lake Improvement Board has worked with the Newaygo County Natural Resources Conservation Service, the Newaygo County Soil Conservation District, the Newaygo County Road Commission, the U.S. Fish and Wildlife Service, Pheasants Forever, area landowners and others to implement a number of watershed management initiatives. These initiatives have included erosion control, drainage improvements, soil conservation plantings, and several wetland restoration and enhancement projects. Some of the projects completed to date include:

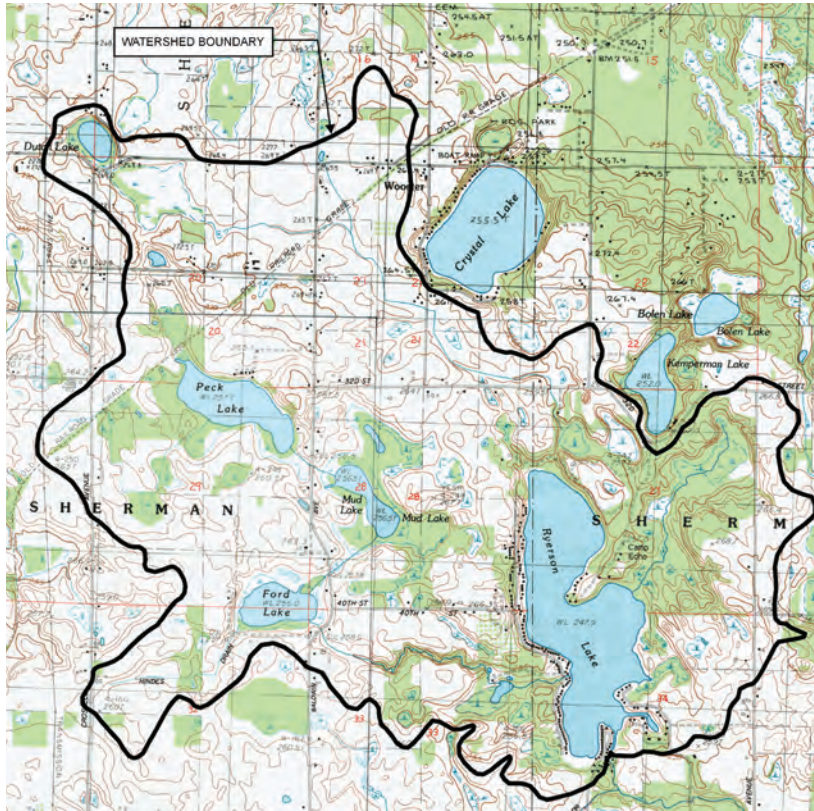
- Enhancement of three wetlands on the Camp Echo property that will help to absorb nutrients in runoff that drains to Ryerson Lake.
- Taking 26 acres of farmland northwest of Ryerson Lake and 8 acres of farmland immediately west of the lake out of production and reverting it back to wetland.
- Replacement of a 54” culvert under Wisner Avenue to minimize erosion.
- Clean out of sumps in catch basins along Sherman Road.
- Placement of a riser on the culvert under Sherman Road on the southwest tributary of the lake to enhance wetland uptake.
- Eight acres of farmland immediately west of Ryerson Lake were taken out of production and reverted back to wetland under the Wetland Reserve Program.
- Placement of rock to minimize erosion on the culvert under Baldwin Road.
- Replacement of a 12” culvert under Sherman Road to minimize erosion.
- Placement of a catch basin on the culvert under Sherman Road that currently drains directly to the lake.

Most of the development in the Ryerson Lake watershed is concentrated around the lakeshore. As a result, the shorelands around Ryerson Lake have been altered dramatically. Natural areas have been replaced by roof tops, roads, driveways, and lawns — all of which have the potential to increase pollution inputs to the lake. Shoreland runoff directly impacts localized areas near shore, often causing increased aquatic plant growth which can quickly diminish the recreational and aesthetic appeal of the lake. Reducing pollution inputs from the watershed is essential to protecting the quality of Ryerson Lake over the long term.

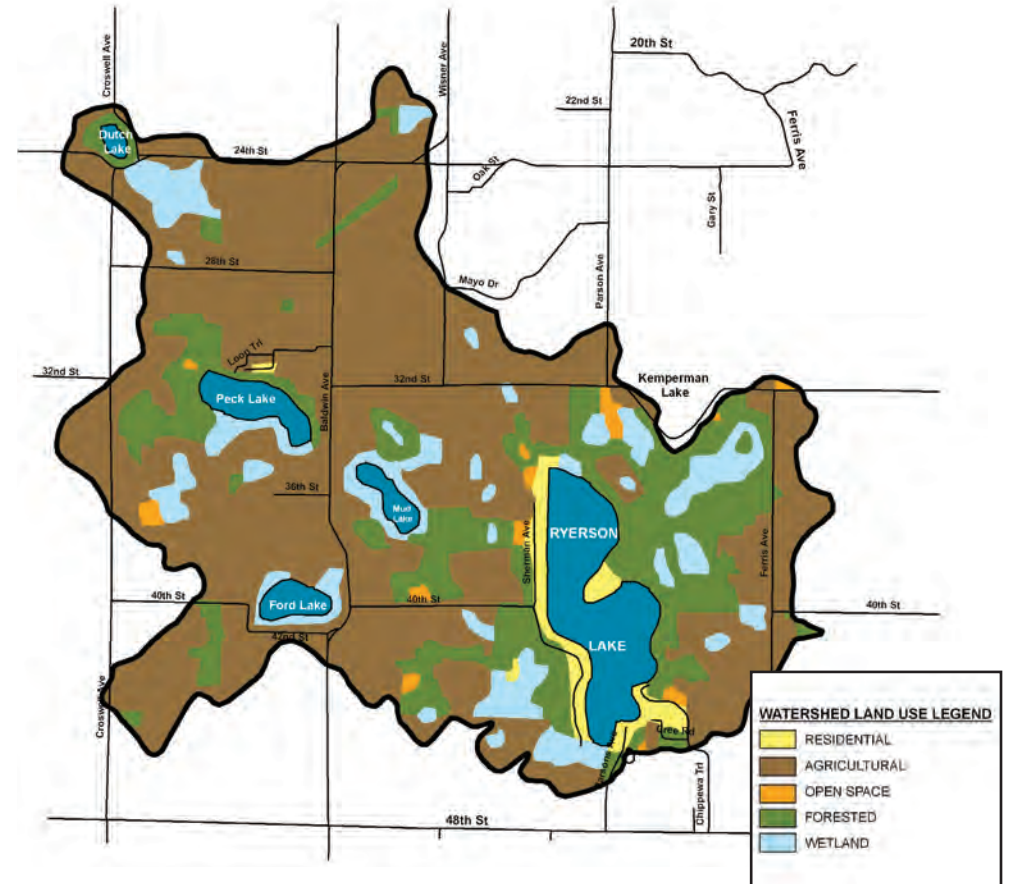


Placing riser on the southwest tributary.





Watershed Boundary. Base map from U.S. Geological Survey.



Land Use Map. Source: Michigan Resource Information System

Protection of Ryerson Lake over the long term will require that watershed pollution sources be limited as much as possible.

# Water Quality

Phosphorus is the nutrient that most often stimulates excessive growth of aquatic plants and algae, leading to a number of problems collectively known as eutrophication. By measuring phosphorus levels, it is possible to gauge the overall health of the lake. Lakes with a phosphorus concentration of 20 parts per billion or greater are considered to be eutrophic.

For the past several years, samples have been collected each spring and summer from the surface to the bottom over the deepest portion of Ryerson Lake. Phosphorus levels in Ryerson Lake consistently exceed the eutrophic threshold level.

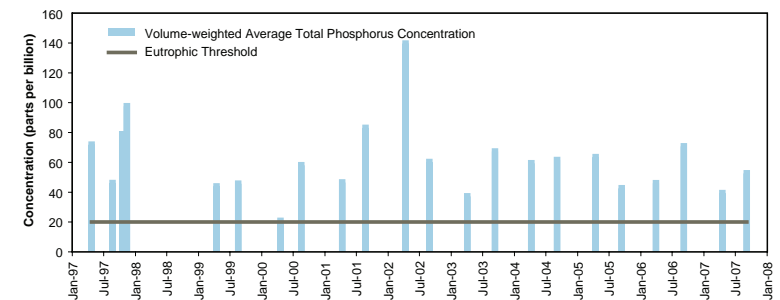


While a major source of phosphorus to Ryerson Lake was eliminated with the construction of the sewer system, runoff of phosphorus-rich fertilizers remains a concern. Another source of phosphorus is the deep-water sediments in Ryerson Lake that release phosphorus under certain conditions.

Water clarity in the lake measured with a Secchi disk is generally about eight feet. Aquatic plants can grow to a depth of about twice the Secchi transparency. Nuisance algae growth periodically occurs along the shoreline of Ryerson Lake but algae growth in the open waters of the lake is moderate.

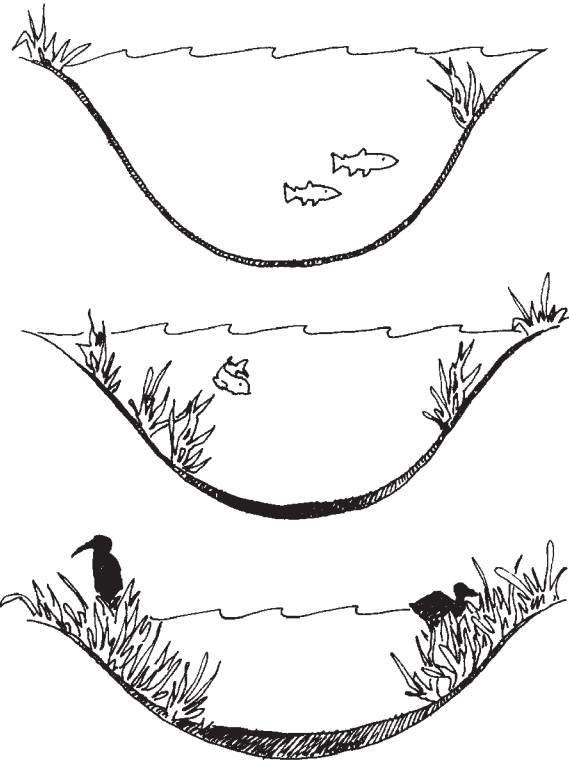


Ryerson Lake maintains a quality warm-water fishery. Bass, pike, and sunfish are caught frequently in the lake. However, the cool deep waters in the summer contain too little dissolved oxygen to support cold-water fish species like trout.



Once in a lake, a pound of phosphorus can generate several hundred pounds of aquatic plants. The primary controllable source of phosphorus in the Ryerson Lake watershed is runoff of lawn fertilizers.





**OLIGOTROPHIC** lakes are generally deep and clear with little aquatic plant growth. These lakes maintain sufficient dissolved oxygen in the cool, deep bottom waters during late summer to support cold water fish such as trout and whitefish.

Lakes that fall between the two extremes of oligotrophic and eutrophic are called **MESOTROPHIC** lakes.

**EUTROPHIC** lakes have poor clarity, and support abundant aquatic plant growth. In deep eutrophic lakes, the cool bottom waters usually contain little or no dissolved oxygen. Therefore, these lakes can only support warm water fish such as bass and pike.

Lakes can be classified based on their ability to support plant and animal life. When classifying lakes, scientists use the broad categories oligotrophic, mesotrophic, or eutrophic. Under natural conditions, most lakes will ultimately evolve to a eutrophic state as they gradually fill with sediment and organic matter transported to the lake from the surrounding watershed. As the lake becomes shallower, the process accelerates. When aquatic plants become abundant, the lake slowly begins to fill in as sediment and decaying plant matter accumulate on the lake bottom. Eventually, terrestrial plants become established and the lake is transformed to a marshland. The natural lake aging process can be greatly accelerated if excessive amounts of sediment and nutrients (which stimulate aquatic plant growth) enter the lake from the surrounding watershed. Because these added inputs are usually associated with human activity, this accelerated lake aging process is often referred to as cultural eutrophication. Ryerson Lake is beginning to show signs of cultural eutrophication.

Ryerson Lake is classified as meso-eutrophic since it is borderline between a eutrophic and mesotrophic state.

# Aquatic Plants

Aquatic plants are an essential component of the lake environment. Plants in lakes produce oxygen during photosynthesis, help stabilize shoreline and bottom sediments, and provide habitat and cover for fish and other aquatic inhabitants.

The distribution and abundance of aquatic plants are dependent on several variables including light penetration, bottom type, temperature, water levels, and the availability of plant nutrients. There are several types of aquatic plants including emergent, floating-leaved, submersed, and free-floating. Each of these plant types provides important ecological functions.

Given their importance in the lake ecosystem, control efforts should only focus on removing nuisance or exotic, non-native plant types such as Eurasian milfoil.



**Eurasian Milfoil Canopy**



**Illinois Pondweed**

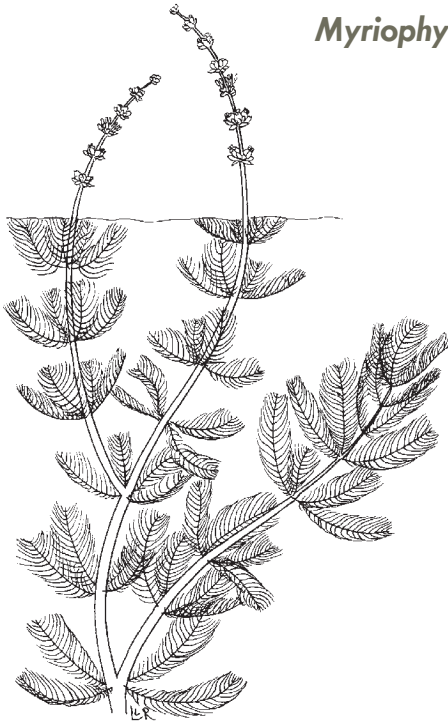
*Image copyright University of Florida Center for Aquatic Plants (Gainesville). Used with permission.*

Ryerson Lake supports a diverse population of aquatic plants. Over 20 species of aquatic plants have been identified in the lake.

<b>Common Name</b>	<b>Plant Type</b>
Coontail	Submersed
Curly-leaf pondweed	Submersed
Elodea	Submersed
Eurasian milfoil	Submersed
Flat-stem pondweed	Submersed
Illinois pondweed	Submersed
Large-leaf pondweed	Submersed
Muskgrass	Submersed
Southern naiad	Submersed
Thin-leaf pondweed	Submersed
Water stargrass	Submersed
White water-crowfoot	Submersed
Whitestem pondweed	Submersed
Wild celery	Submersed
Duckweed	Free-floating
White water lily	Floating-leaved
Yellow water lily	Floating-leaved
Arrowhead	Emergent
Bulrush	Emergent
Cattail	Emergent
Pickerelweed	Emergent
Purple loosestrife	Emergent
Swamp loosestrife	Emergent



## Eurasian Milfoil *Myriophyllum spicatum*



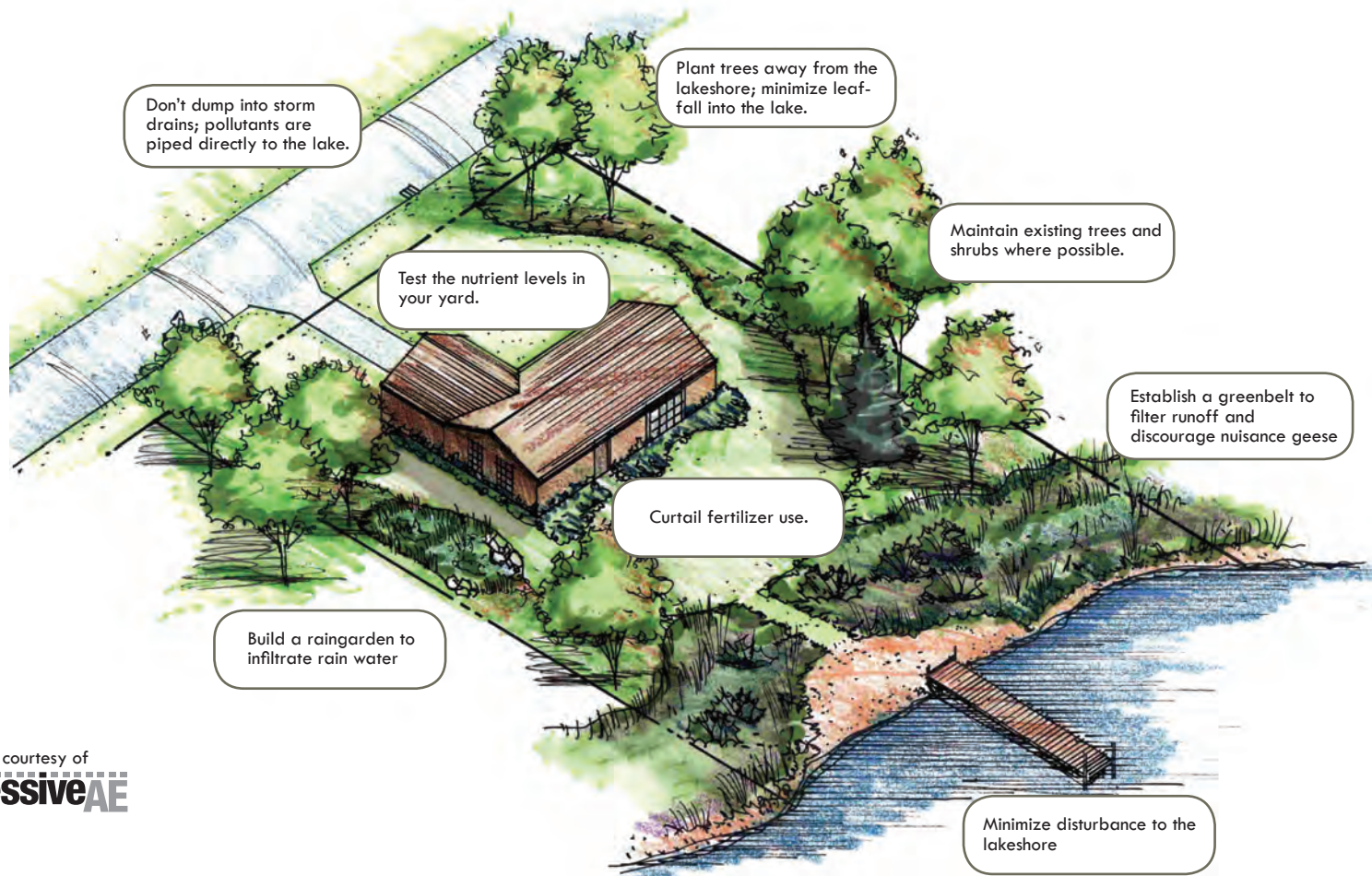
Aquatic plant line drawing is the copyright property of the University of Florida Center for Aquatic Plants (Gainesville).  
Used with permission.

Eurasian milfoil (*Myriophyllum spicatum*) is an invasive aquatic plant that was first introduced to the United States in the 1940's. Thus, it is not native to Michigan but is currently widespread in the state. Eurasian milfoil is problematic in that it becomes established early in the growing season and can grow at greater depths than most native plants. Eurasian milfoil often forms a thick canopy at the lake surface that can degrade fish habitat and seriously hinder recreational activity. Eurasian milfoil can spread rapidly by “vegetative propagation” whereby small pieces break off, take root, and grow into new plants. Once introduced into a lake system, Eurasian milfoil may out-compete and displace more desirable plants and become the dominant species. Controlling the spread of Eurasian milfoil is the primary focus of the plant control effort in Ryerson Lake.

For the past several years, biologists have conducted surveys of the lake to identify the location of Eurasian milfoil and herbicides have been applied to control the spread of the plant. The annual monitoring surveys and treatments help to ensure Eurasian milfoil and other invasive species do not gain dominance in Ryerson Lake.

Eurasian milfoil can spread rapidly by a process called “vegetative propagation” or “fragmentation” in which pieces of the plant break off, take root, and grow.

# What You Can Do



Rendering courtesy of  
**ProgressiveAE**



## IN GENERAL

- Rake and dispose of leaves away from the lake. Compost if possible. Do not burn leaves near shore. Nutrients concentrate in the ash and are easily washed into the lake.
- Avoid using pesticides near the lake, many are toxic to aquatic life
- Where possible, promote infiltration of stormwater into the ground. Build a rain garden in low areas to capture runoff from driveways and downspouts.
- To reduce runoff, maintain trees, shrubs, and ground cover.

**GUIDELINES ARE  
BASED ON MICHIGAN  
STATE UNIVERSITY  
RESEARCH.**

## FERTILIZER

- If you don't use fertilizer, don't start now. If you do...
- Don't use fertilizer that contains phosphorus unless a soil test shows a need for it.
- Fertilizers are labeled with a 3-number system that indicates the percentage of the bag that contains nitrogen (first number), phosphorus (second number) and potassium (third number). Example: a 50-pound bag of 20-0-10 fertilizer contains 20% nitrogen (or 10 pounds), 0% phosphorus, and 10% potassium (5 pounds).
- When spreading fertilizer, don't allow fertilizer to fall directly in the water.
- Lightly water after fertilizer is applied. Too much water will cause the fertilizer to leach right past the lawn and into the lake; the turf roots will never get a chance to use it.

## LAWN CARE

- Don't cut the grass too short! Near lakes, a mowing height of 3 to 3 inches or higher is recommended.
- Return grass clippings back to the lawn. You can reduce the nitrogen needs of your lawn significantly by doing so. If possible, use a mulching lawn mower to aid in this process.
- If you use a professional lawn care service, be sure to request a fertilizer that does not contain phosphorus.



## GREENBELT

- A greenbelt is a strip of land along the lakeshore that contains plants to trap pollutants that would otherwise wash into the lake.
- A greenbelt should be at least 10 feet wide, but more than 30 feet wide is best.
- Don't fertilize the greenbelt.
- For a natural look, don't mow the greenbelt. Allow natural grasses and wildflowers to grow.
- For a landscaped look, plant groundcovers, ferns, perennials, and shrubs.
- Remember: Canada geese will often avoid properties with greenbelts.

If you want to know more about lake water quality, watershed management, invasive species, and other topics, visit [www.michiganlakeinfo.com](http://www.michiganlakeinfo.com)

## 10 Ways to Protect Ryerson Lake

1. Don't use lawn fertilizer that contains phosphorus.
2. Use the minimum amount of fertilizer recommended on the label—more is not necessarily better!
3. Water the lawn sparingly to avoid washing nutrients and sediments into the lake.
4. Don't feed ducks and geese near the lake. Waterfowl droppings are high in nutrients and may cause swimmer's itch.
5. Don't burn leaves and grass clippings near the shoreline. Nutrients concentrate in the ash and can easily wash into the lake.
6. Don't mow to the water's edge. Instead, allow a strip of natural vegetation (i.e., a greenbelt) to become established along your waterfront. A greenbelt will trap pollutants and discourage nuisance geese from frequenting your property.
7. Infiltrate drainage from your downspouts rather than letting it flow overland to the lake.
8. Don't dump anything in area wetlands. Wetlands are natural purifiers.
9. If you trailer your boat from lake to lake, wash your boat and trailer before launching back into Houghton Lake.
10. Don't be complacent—our collective actions will make or break the lake!

