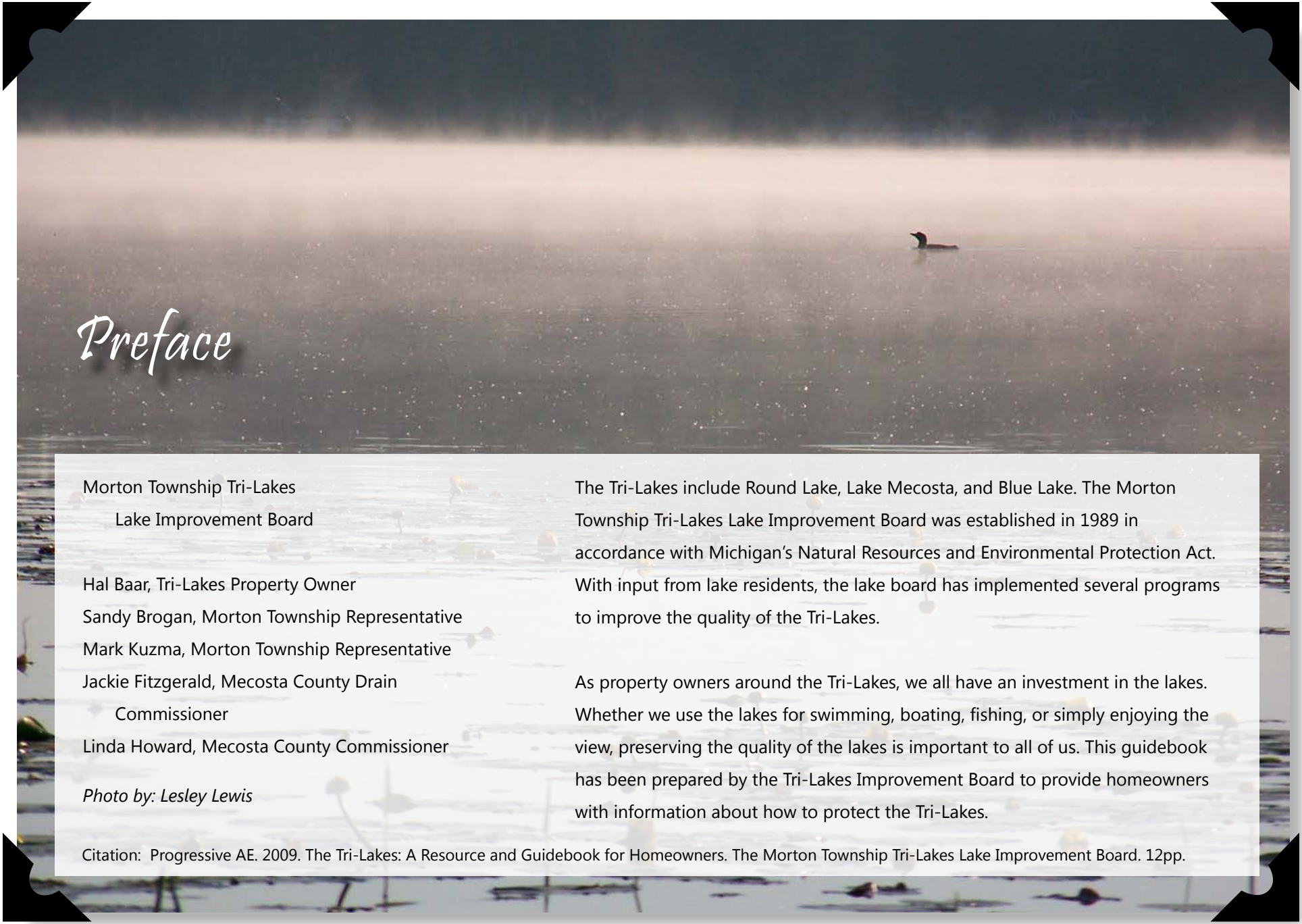
The Tri-Lakes

A Resource and Guidebook for Homeowners



Preface

Morton Township Tri-Lakes
Lake Improvement Board

Hal Baar, Tri-Lakes Property Owner
Sandy Brogan, Morton Township Representative
Mark Kuzma, Morton Township Representative
Jackie Fitzgerald, Mecosta County Drain Commissioner
Linda Howard, Mecosta County Commissioner

Photo by: Lesley Lewis

The Tri-Lakes include Round Lake, Lake Mecosta, and Blue Lake. The Morton Township Tri-Lakes Lake Improvement Board was established in 1989 in accordance with Michigan's Natural Resources and Environmental Protection Act. With input from lake residents, the lake board has implemented several programs to improve the quality of the Tri-Lakes.

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

Citation: Progressive AE. 2009. The Tri-Lakes: A Resource and Guidebook for Homeowners. The Morton Township Tri-Lakes Lake Improvement Board. 12pp.

Contents

Photo by: Lesley Lewis

An Historical Perspective

George Sapp's barns. Steam Sawmill, 1910.

Frog legs for Sunday dinner. Ed Williman, left, Barrett Sapp, right.

The earliest known inhabitants of the Tri-Lakes region were the Ojibwa Indians and French fur traders. Morton Township, in which the Tri-Lakes are located, is named after John E. Morton. In 1871, Mr. Morton settled on 160 acres of land that is now Section 36 of the township. The township was organized as a civil township in 1877. At the time of organization, the township had a population of 192 and about 300 acres of improved land.

Prior to settlement, the Tri-Lakes area was heavily forested with vast stands of white pine. However, as the logging era began in the mid 1800's, the area changed dramatically. At the onset of the logging area, lakes and rivers were the primary means of transporting logs to area saw mills, and the forests near lakes and streams were the first to be cleared. Logs were typically moved in the winter by oxen or horse-drawn sleighs. White pine was of primary interest to the lumber barons, because it was the only log that would float. Dams were often constructed on lakes and rivers to facilitate the transport of logs. In the spring, when water levels were high, the dams were removed (often by dynamite) and the logs would flow downstream to area saw mills. As noted by local historian Walter Welsh, logging activity had a profound impact on the Tri-Lakes:

Mr. Ockert cleaning fish after the drawdown of Lake Mecosta, 1919.

"This was when the dams were built on Long Lake (Lake Mecosta) and the Little Muskegon River. The Webber Dam was the static dam, which was there for the purpose of holding the water at 10 feet above the natural level. The dam at the "Cut" was the working dam. When the logs were cut and floated to the south bay of Long Lake they were held in place by logging cribs until they were ready to open the dam at the Cut and release the logs into the Little Muskegon River to float downstream to the mill at Altona. A logging crib was an underwater structure of stones anchoring an iron bar with a ring on it at the water level. A chain was connected between the bars at each crib to hold the logs in place until the dam was opened. When the dam was opened, the water in the lake reverted back to its original level. When this happened, people living locally at the south end of the lake would pick up fish that were left in the small ponds."

Horse team in logging camp with a woman at the reins, circa 1900.

Water wheel at dam, circa 1930.

As railroads came into being in the 1870's, logging was expanded to include species other than white pine. Special railroad engines were designed that could operate on small rail tracks. Track could be laid and removed quickly and areas previously inaccessible to logging were now open to harvest. The huge demand for lumber in Chicago, Milwaukee, and other port cities fueled the lumber trade. Ultimately, the forests that were originally considered to be limitless were almost completely decimated, and by the early 1900's the lumbering boom in Mecosta County was over.

Logging activity took a heavy toll on the land. Large expanses of land were left open and fires were rampant. The impact on soils was devastating, often making the land marginal for farming. In many cases, land was idled and fire-tolerant trees such as the jack pine began to gain dominance. In some areas, attempts were made at reforestation.

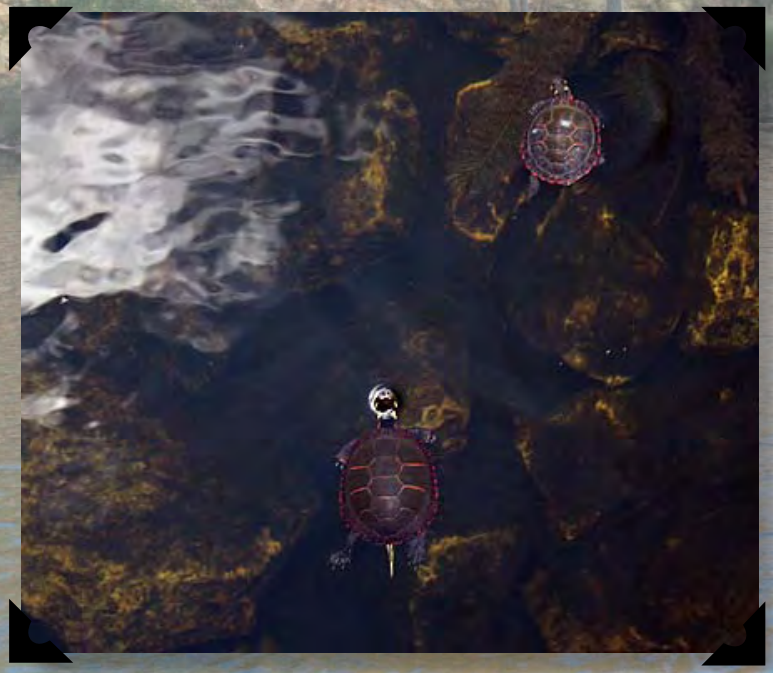
Round Lake, post-logging.

By opening large tracts of land, the lumber business hastened the early settlement of the Tri-Lakes area. With the decline of the lumbering trade, most of the small railways disappeared. Over time, as tree stumps were removed, farming operations became more prevalent. Improved roadways were constructed and the automobile quickly became the primary mode of transportation.

By the mid-1900's, much of the land around the Tri-Lakes had been platted and many summer cottages and resorts were constructed. In 1957, a legal level for the Tri-Lakes was established by the Mecosta County Circuit Court. In 1974, the Morton Township Tri-Lakes Association was established to protect the water quality of the Tri-Lakes, and has been conducting ongoing monitoring of the lakes for many years. In 1989, the Morton Township Tri-Lakes Lake Improvement Board was established to implement lake improvements.

Data compiled by the U.S. Census Bureau indicates that Morton Township had a population of 2,122 in 1990. By 2000, the population increased by nearly 70% to 3,597. Much of the development is concentrated around the lakes in the township. Without proper management, this development will have an adverse impact on the lakes. Protecting the quality of the Tri-Lakes is essential to our quality of life.

Lake Facts



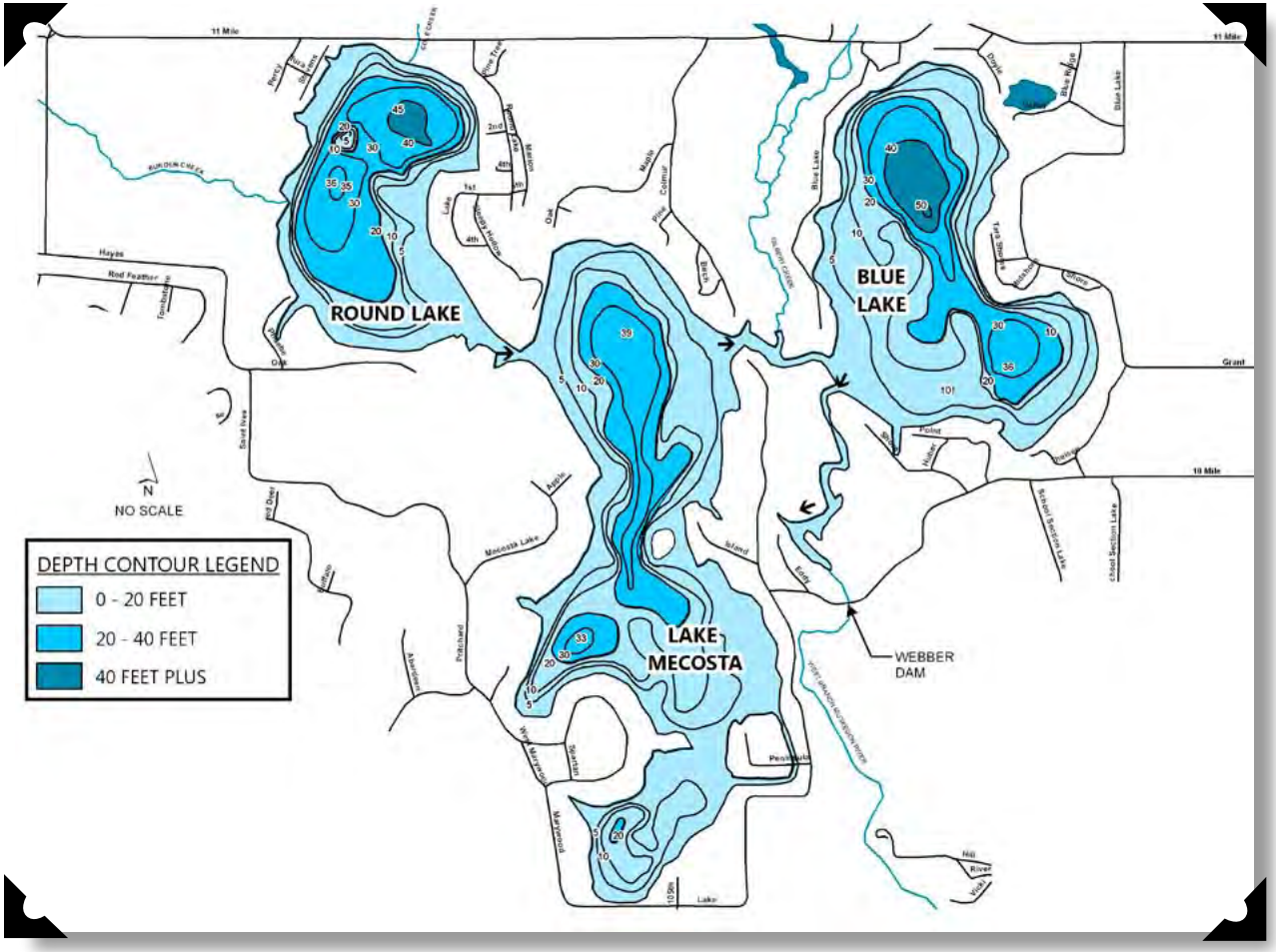
A summary of the physical characteristics of each of the Tri-Lakes is provided below.

	Round Lake	Lake Mecosta	Blue Lake
Surface Area (Acres)	156	316	221
Maximum Depth (Feet)	45	39	50
Average Depth (Feet)	15.9	10.8	15.3
Volume (Acre-Feet)	2,480	3,412	3,381
Shoreline Length (Miles)	2.7	5.6	2.9
Shoreline Development Factor	1.5	2.2	1.4

Round Lake is the smallest of the lakes but has the greatest average depth. With a surface area of 297 acres, Lake Mecosta is the largest of the Tri-Lakes. However, it is also the shallowest of the lakes. Blue Lake has a maximum depth of 50 feet and is the deepest of the Tri-Lakes. The Tri-Lakes contain 9,273 acre-feet of water, which equates to over 3 billion gallons. This volume of water would cover about 14.5 square miles to a depth of one foot.

Shoreline development factor is a calculation of the irregularity in the shape of the shoreline. A lake that is perfectly round would have a shoreline development factor of 1.0. Lake Mecosta has the longest shoreline and the most convoluted shape of the Tri-Lakes. Its shoreline development factor of 2.2 indicates the shoreline is over two times longer than if the lake were perfectly round. Because of the irregular configuration of the Tri-Lakes, the lakes support substantially more shoreline development than if the lakes were more circular in shape.

The Tri-lakes have a combined surface area of nearly 700 acres and contain over 3 billion gallons of water.



Round Lake has two tributary inflows, Cole Creek and Burden Creek. Gilbert Creek, which receives drainage from Jehnsen and Horsehead Lakes to the north, enters the channel between Mecosta and Blue Lakes. Navigation between the lakes is possible via connecting channels. Water flows from Round Lake to Lake Mecosta to Blue Lake. The outlet from Blue Lake forms the headwaters of the West Branch of the Little Muskegon River.

The Webber Dam, located on the outlet from Blue Lake, controls the level of the Tri-Lakes. Water flows over the dam in a southwest direction to the Muskegon River and on to Lake Michigan. With an elevation of 959.5 feet, the elevation of the Tri-Lakes is about 380 feet higher than Lake Michigan. Prior to the construction of the Webber Dam, the elevation of the Tri-lakes was considerably lower than today and unimpeded navigation between the lakes was not possible.

The Tri-Lakes support substantially more shoreline development than if the lakes were more circular in shape.

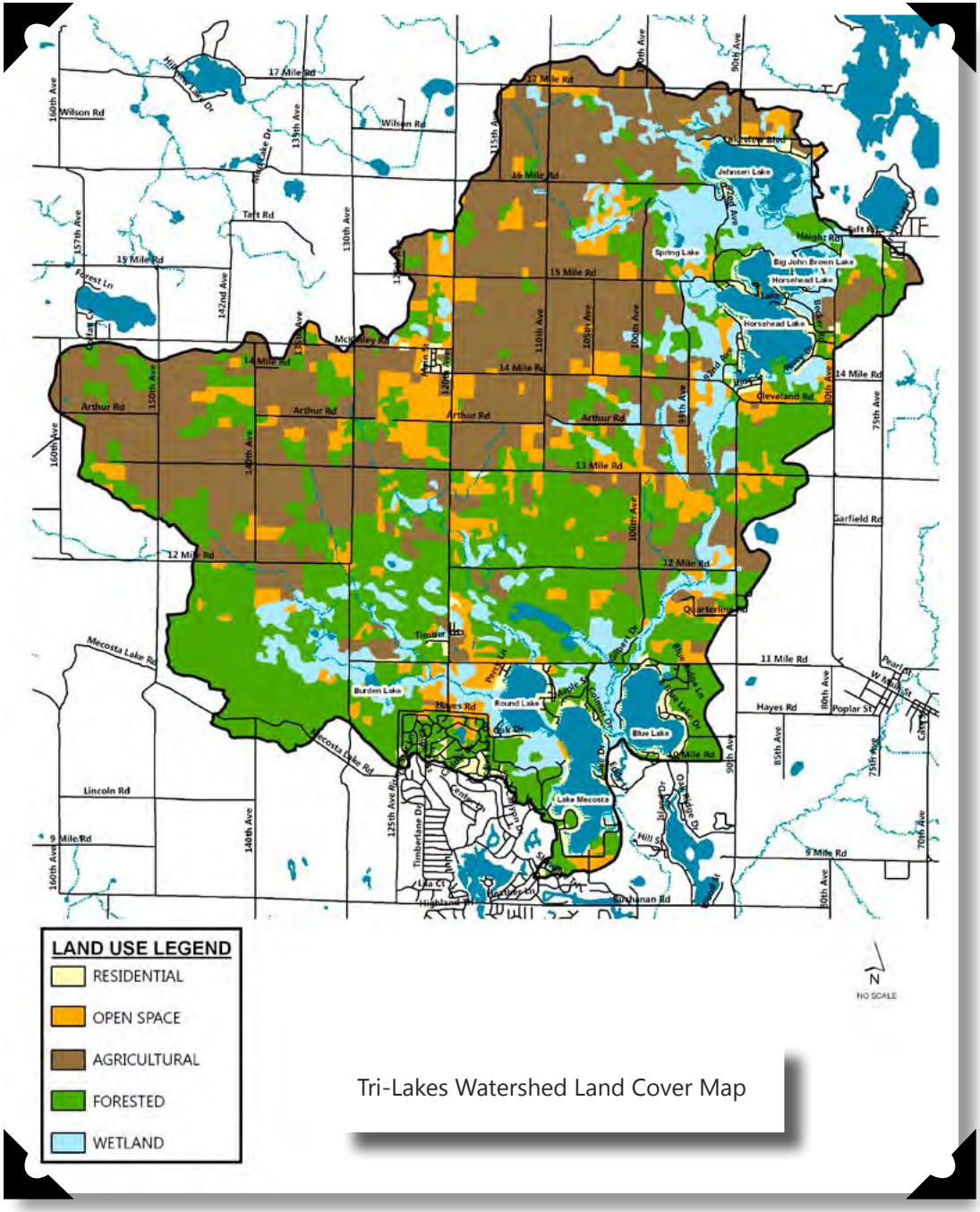
Watershed Facts

The land area surrounding a lake that drains to the lake is called a watershed or drainage basin. A watershed boundary is determined by examining a topographic map that shows the "lay of the land." The Tri-Lakes watershed is approximately 38 square miles, a land area about 35 times larger than the lakes. Much of the upper portion of the watershed is farmland, while forest and wetlands are more prevalent closer to the lakes. Most of the land immediately adjacent to the lakes has been developed for homes and cottages.

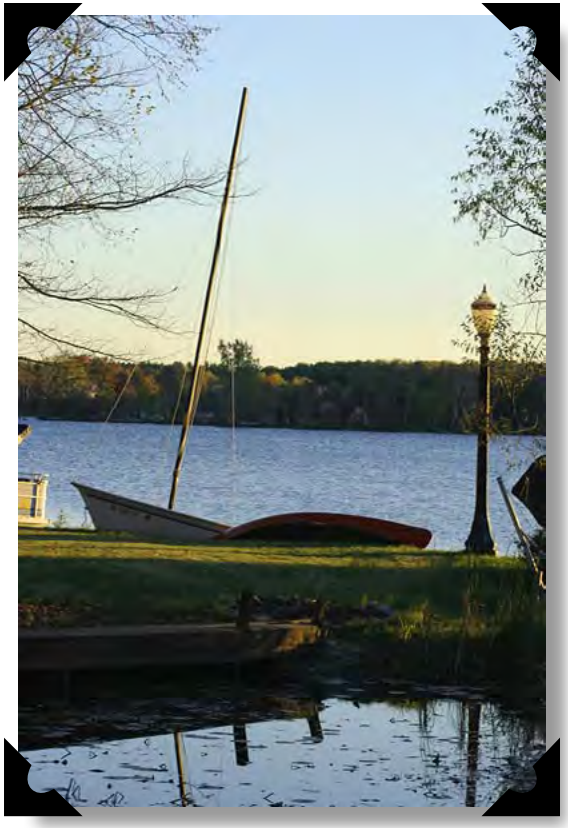
Forests and wetland in the watershed are beneficial in that they contribute very little runoff to the lakes. Wetlands in particular perform several important ecological functions. They store floodwaters, provide habitat for fish and wildlife, and help to filter storm water. Preservation of wetlands in the Tri-Lakes watershed is vital to the protection of the lakes.

Currently, the homes and cottages around the Tri-Lakes are served by on-site septic systems. Mapping conducted by the U.S. Department of Agriculture Soil Conservation Service indicates that the soils surrounding the Tri-Lakes are composed largely of Coloma and Mecosta sands. These soils have a substantial limitation for on-site septic systems due to poor filtering capabilities. Problems associated with malfunctioning septic systems can be expected to increase as more homes around the Tri-Lakes are converted from seasonal to year-round use. Eventually, the limited ability of area soils to retain pollutants will be exceeded. Until community sewer service is available, proper operation and maintenance of septic systems will be required to protect the lakes.

Primary controllable sources of pollution in the Tri-Lakes watershed include lawn fertilizer runoff and septic system seepage.



Tri-Lakes Watershed Land Cover Map



Most of the residential development in the Tri-Lakes watershed is concentrated near the lakes. As a result, the shorelands around the Tri-Lakes have changed. Natural areas that allowed rain waters to infiltrate have been replaced by roof tops, roads, driveways, and other hard surfaces. Now, rather than infiltrating, storm water runs off these hard surfaces, often carrying fertilizer, oil, and other pollutants to the lakes. Adverse impacts associated with excessive shoreland development include increased aquatic plant growth, diminished fisheries, and poor water quality. Reducing pollution inputs from the watershed is essential to protecting the quality of the Tri-Lakes over the long term.

Reducing pollution inputs from the watershed is essential to protecting the quality of the Tri-Lakes over the long term.

Water Quality

The Morton Township Tri-Lakes Association has conducted sampling of the Tri-Lakes for many years. The data collected provides valuable information regarding baseline water quality conditions in the lakes. Over time, these data may be helpful in detecting changes in water quality. In large part, the sampling program has focused on three key parameters: total phosphorus, chlorophyll-*a*, and Secchi transparency.

Phosphorus is the nutrient that most often stimulates excessive growth of aquatic plants and causes premature lake aging. By measuring phosphorus levels, it is possible to gauge the overall health of the lakes. Lakes with a phosphorus concentration of 20 parts per billion or greater are considered to be eutrophic or nutrient-enriched.

Chlorophyll-*a* is a pigment that imparts the green color to plants and algae. A rough estimate of the quantity of algae present in the water column can be made by measuring the amount of chlorophyll-a in the water column. A chlorophyll-*a* concentration greater than 6 parts per billion is considered characteristic of a eutrophic condition.

A Secchi disk is a round, black and white, 8-inch disk that is used to estimate water clarity. Eutrophic lakes have a Secchi transparency of less than 7.5 feet. Generally, it has been found that plants can grow to a depth of about twice the Secchi disk transparency.

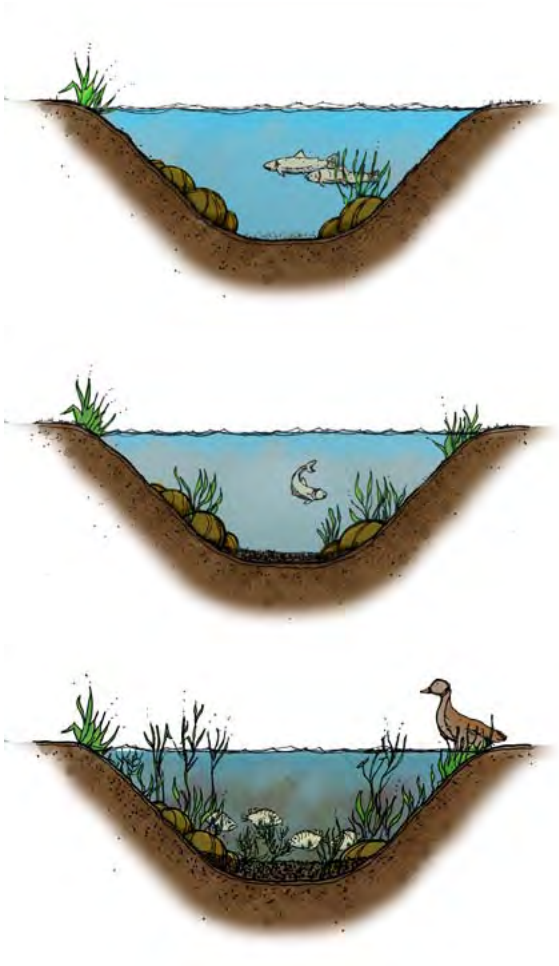
The most recent data collected from the Tri-Lakes is summarized in the chart on the right. Round Lake typically exhibits higher phosphorus and chlorophyll-*a* levels, and lower transparency readings than Lake Mecosta and Blue Lake. When compared to the other lakes, Blue Lake generally exhibits the lowest phosphorus and chlorophyll-*a* levels, and highest transparency readings, while Lake Mecosta exhibits readings intermediate between Round and Blue Lakes.

The Tri-Lakes maintain a healthy warm-water fishery including bass, pike, perch, and sunfish. However, deep water sampling conducted in the Tri-Lakes indicates that there is not sufficient dissolved oxygen in the cool, deep water of the lakes during the summer months to sustain cold-water fish such as trout.

Tri-Lakes 2008 Water Quality Data

Parameter	Round Lake	Lake Mecosta	Blue Lake
Total Phosphorus (Parts Per Billion)	20	13	6
Chlorophyll-*a* (Parts Per Billion)	6.9	2.9	2.2
Secchi Transparency (Feet)	8.2	10.5	13.1

Once in a lake, a single pound of phosphorus can generate hundreds of pounds of aquatic plants.



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. The Tri-Lakes are beginning to show signs of cultural eutrophication.

Based on historical sampling data, Lake Mecosta and Blue Lake are mesotrophic and Round Lake is more eutrophic.

Aquatic Plants

Plants are important to lakes because they 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, control efforts should only focus on removing nuisance or exotic, non-native plants such as Eurasian milfoil.

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, 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 the Tri-Lakes.

For the past several years, biologists have conducted surveys of the lakes to identify the location of Eurasian milfoil and herbicides have been applied to the lakes 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 the Tri-Lakes.

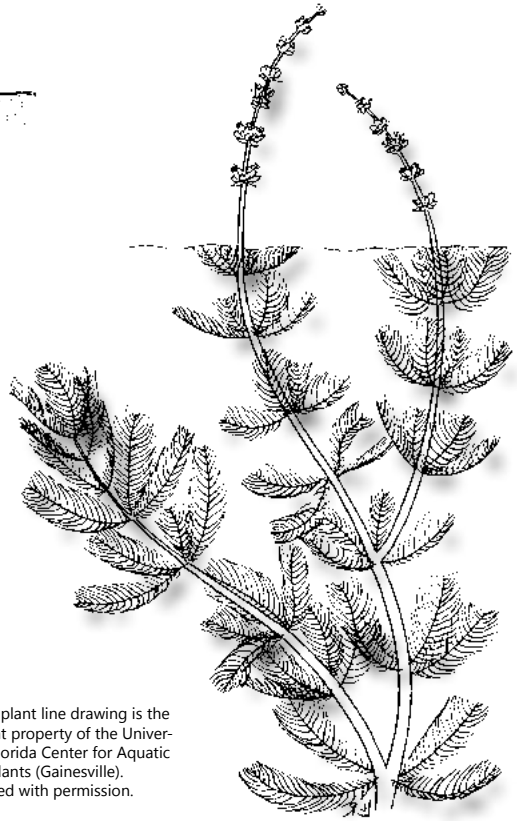
The Tri-Lakes support a diverse population of aquatic plants. Twenty-six different species of plants have been observed in the lakes.

Arrow arum	Emergent
Bulrush	Emergent
Cattail	Emergent
Pickerelweed	Emergent
Purple loosestrife	Emergent
Swamp loosestrife	Emergent
White water lily	Floating-leaved
Yellow water lily	Floating-leaved
Duckweed	Free-floating
Bladderwort	Submersed
Chara (Muskgrass)	Submersed
Coontail	Submersed
Elodea	Submersed
Eurasian milfoil	Submersed
Flat-stem pondweed	Submersed
Floating-leaf pondweed	Submersed
Illinois pondweed	Submersed
Large-leaf pondweed	Submersed
Naiad	Submersed
Northern milfoil	Submersed
Richardson's pondweed	Submersed
Sago pondweed	Submersed
Thin-leaf pondweed	Submersed
Variable pondweed	Submersed
Whorled-leaf (green) milfoil	Submersed
Wild celery	Submersed

Aquatic plants are an essential component of the lake environment.

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.

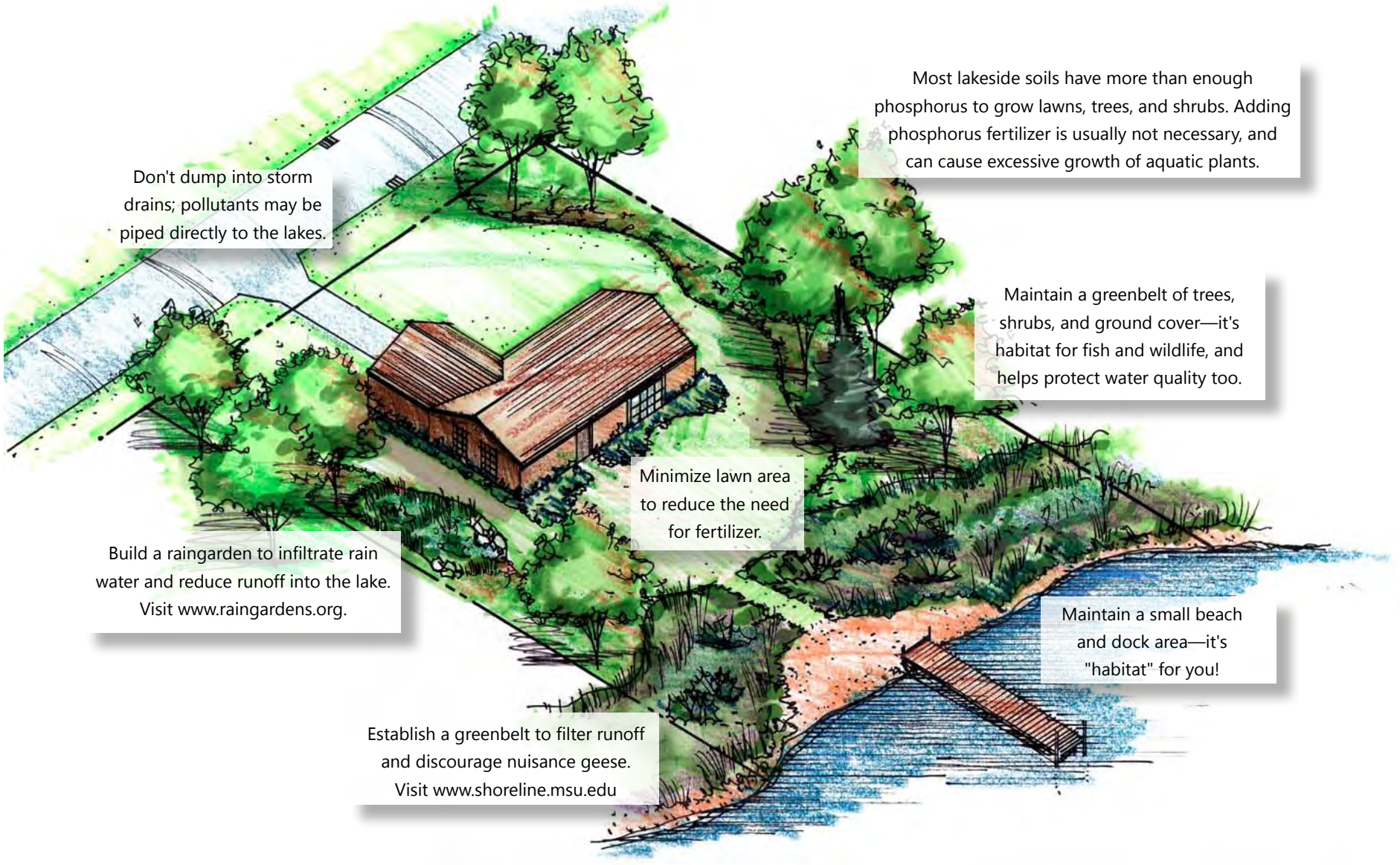
Eurasian Milfoil
Myriophyllum spicatum



Water lily, photo by Lesley Lewis

Control efforts should only focus on removing nuisance or exotic, non-native plant types such as Eurasian milfoil.

What You Can Do



progressive

In General

- Where possible, promote infiltration of stormwater into the ground. Build a rain garden in low areas to capture runoff from driveways and downspouts. For more on rain gardens visit www.raingardens.org
- To reduce runoff, maintain trees, shrubs, and ground cover.

Septic System Maintenance

- Have your septic tank pumped every two to three years.
- To avoid overburdening your septic system, do not use a kitchen garbage disposal unit.
- Do not put harmful materials such as fats, solvents, oils, paints, coffee grounds, or paper towels into your septic system.
- Know the location of your drainfield, and do not park automobiles or heavy vehicles on your drainfield.
- Do not stockpile snow or allow your downspouts to drain onto your drainfield.
- Avoid planting deep-rooted trees or shrubs over your drainfield.
- Conserve water! The less water you use, the better your septic system will function.
- Be wary of putting additives into your septic system.

Lawn Care

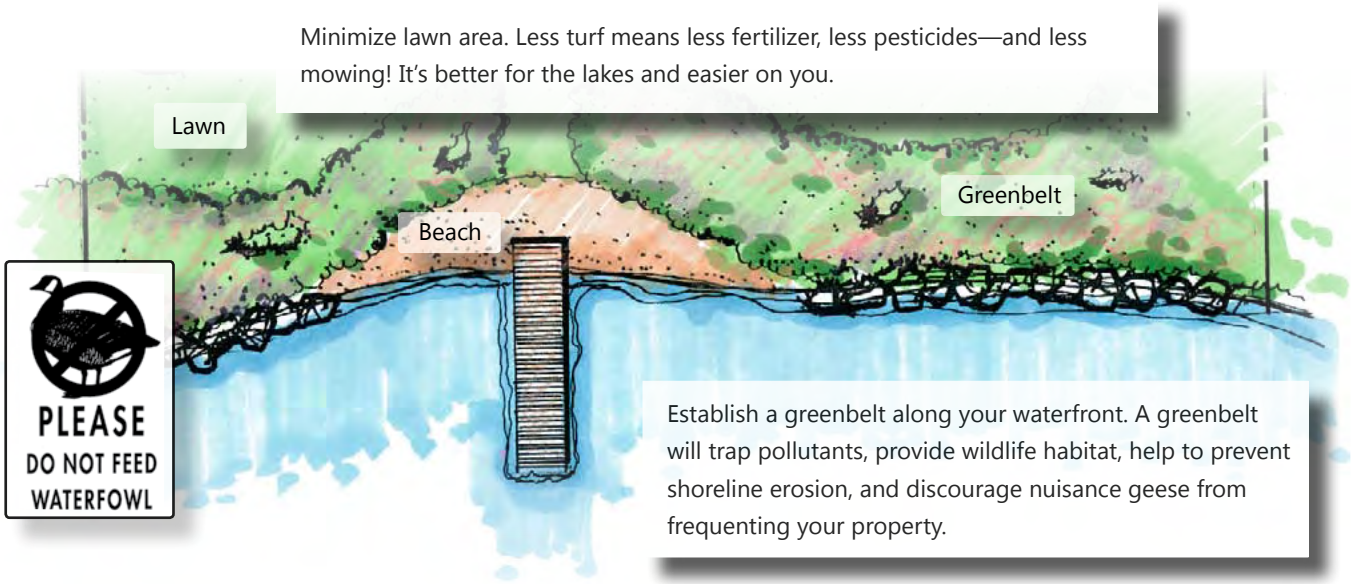
- Don't cut the grass too short! Near lakes, a mowing height of 3 to 3½ inches or higher is recommended.
- Return grass clippings back to the lawn. You can reduce the nitrogen needs of your lawn significantly by doing so. If possible, use a mulching lawn mower to aid in this process.
- Rake and dispose 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.

Fertilizer

- If you must use fertilizer, use a fertilizer that contains no phosphorus. (The middle number on the fertilizer bag will be zero.)
- If you use a professional lawn care service, insist upon 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.



10 Ways to Protect the Tri-Lakes

1. Don't use lawn fertilizer that contains phosphorus
2. Help prevent the spread of invasive species! If you trailer your boat from lake to lakes, wash your boat and trailer before launching back into the Tri-Lakes.
3. Water the lawn sparingly to avoid washing nutrients and sediments into the lakes.
4. Don't feed ducks and geese near the lakes. 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 lakes.
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 lakes.
8. Don't dump anything in area wetlands. Wetlands are natural purifiers.
9. Have your septic tank pumped every 2 to 3 years.
10. Don't be complacent—our collective actions will make or break the lakes!