



Stony Lake

A Resource and Guidebook for Homeowners

Preface

In 2010, the Stony Lake Improvement Board was established in accordance with Michigan's Natural Resources and Environmental Protection Act. The Lake Board is working with the residents of Stony Lake to implement programs to improve and protect the quality of the lake.

As property owners around Stony Lake, we share a collective heritage. 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 booklet has been prepared by the Stony Lake Improvement Board as a resource for homeowners to better understand and protect the lake.

Dave Zoller, Stony Lake Property Owner

MaryLou Schuyler, Benona Township Representative

Tom Best, Claybanks Township Representative

Michelle Martin, Oceana County Deputy Drain Commissioner

Larry Byl, Oceana County Commissioner



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An Historical Perspective

The Great Lakes and the inland lakes and streams of Michigan are a product of glacial activity that ended about 10,000 years ago. The glaciers that covered Michigan plowed and sculpted the land creating the hills, valleys, soils, and water features that exist today. With the final retreat of the glaciers, Michigan was left with over 26,000 inland lakes and ponds, nearly 42,000 miles of rivers and streams, and over 4,000 miles of Great Lakes shoreline. Along the west shore of Michigan, a number of lakes were formed as a result of the fluctuating water levels in the glacial Great Lakes. As water levels fluctuated up and down, sand bars formed along many of the coastal river mouths creating natural impoundments. Stony Lake was formed in this manner as were Hamlin Lake, Pentwater Lake, and Silver Lake.

Prior to European settlement, Michigan was inhabited by native peoples; lakes and streams were used primarily for fishing and travel and the canoe was the primary mode of transportation. Michigan's vast forests provided prime habitat and fertile hunting grounds for deer, elk, fox, mink, and beaver.

Shortly before Michigan attained statehood in 1837, a survey of the region was commissioned by the Surveyor General of the United States. With the survey complete, tracts of land throughout the state could be described and geographically referenced. A basis now existed for future land divisions, claims, and sales, and land offices were established throughout the state to record and document the process—change was on the horizon.

With the onset of the logging era, Stony Lake underwent a major transformation. In the mid 1800s, a saw mill and dam were constructed downstream of the lake and the level of Stony Lake was raised several feet to facilitate the transport and cutting of lumber. Much of the lumber harvested in the area was shipped to Chicago and Milwaukee to fuel the tremendous growth underway in the Midwest. However, by the early 1900s, Michigan's forests were essentially depleted and lumber production declined rapidly. With the great forests gone, Stony Lake underwent another transformation as agriculture gained dominance in the area. The unique climate of the area afforded ideal growing conditions for a number of specialty crops.

The platting of the lands around Stony Lake in the early to mid-1900s paved the way for development of Stony Lake as a summer resort and camp community. The early lake plats typically contained lots that were quite small, but probably adequate for the times as most development consisted of modest seasonal cottages. Today, much of the shoreline of Stony Lake is developed. In many respects, the lake is undergoing another transformation as the original seasonal cottages are remodeled or replaced entirely with new dwellings. Slowly but surely, small cottages and boats are giving way to big houses and big boats. While this is a natural evolution, we need to keep our "eye on the prize" and do all we can to protect the character of Stony Lake and the quality of life it provides to all of us. History shows us that change happens quickly. Let's make sure that future change is for the better!



Historical photographs courtesy of the Stony Lake Property Owners Association



Green Point Bayou,
Stony Lake, Mich. ©

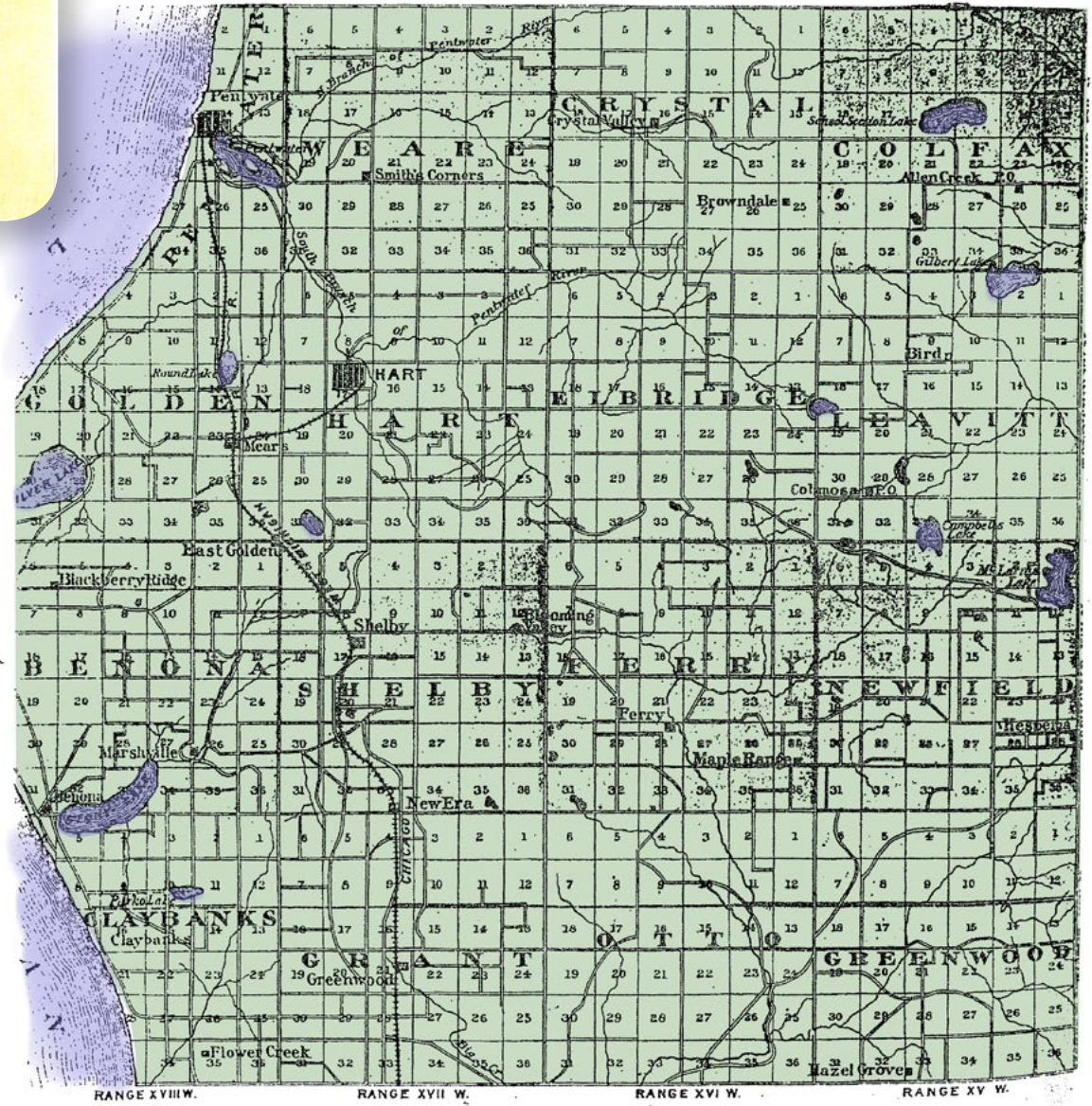


CHALET AT STONY LAKE



Sailing at Camp Knolls
Stony Lake
Shelby Michigan 126

Map of 1895
OCEANA COUNTY
MICHIGAN.



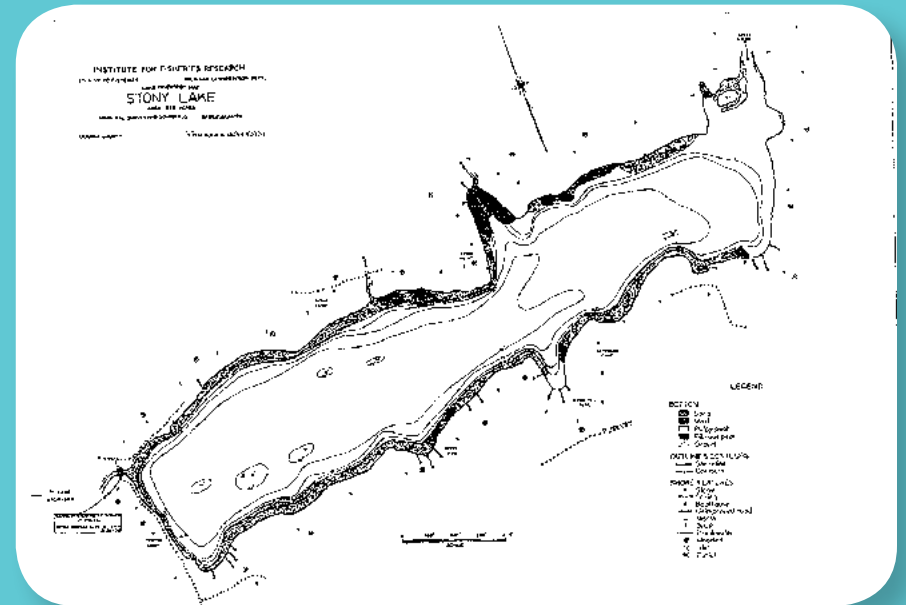
Stony Lake was much larger in the 1850's than it is today. A dam was constructed on Stony Creek approximately 1/4 mile inland from the Lake Michigan shore. The dam caused Stony Lake to inundate land that was over 1.5 miles beyond its current northeast boundary. It stretched almost all the way to an area called Marshville where there was a second dam and a grist mill.
Source: Benona Township Web Site

Lake Facts

Stony Lake was first mapped by the Michigan Department of Conservation in 1950. At that time, numerous groundwater springs were noted along the shoreline of the lake. Bottomlands of the lake were marl or sand, interspersed with fibrous peat. The original mapping of the lake was conducted during the winter months, with holes drilled through the ice and water depths measured with weighted drop lines.

With a surface area of 282 acres, Stony Lake is the 399th largest lake in Michigan. The lake has a maximum depth of 43 feet, and a mean or average depth of about 21 feet. The shoreline of Stony Lake is over 5 miles long.

Shoreline development factor is a calculation of the irregularity in the shape of the lake shoreline. A lake that is perfectly round would have a shoreline development factor of 1.0. Stony Lake has a shoreline development factor of 2.2 which indicates the shoreline of Stony Lake is over twice as long than if the lake were perfectly round. Because of its irregular shape, Stony Lake supports about twice the amount of shoreline development than a perfectly round lake of equal size. The east shore of the lake is a natural wetland area; however, much of the remaining shore has been developed. Currently, nearly 200 homes and cottages border the lake.



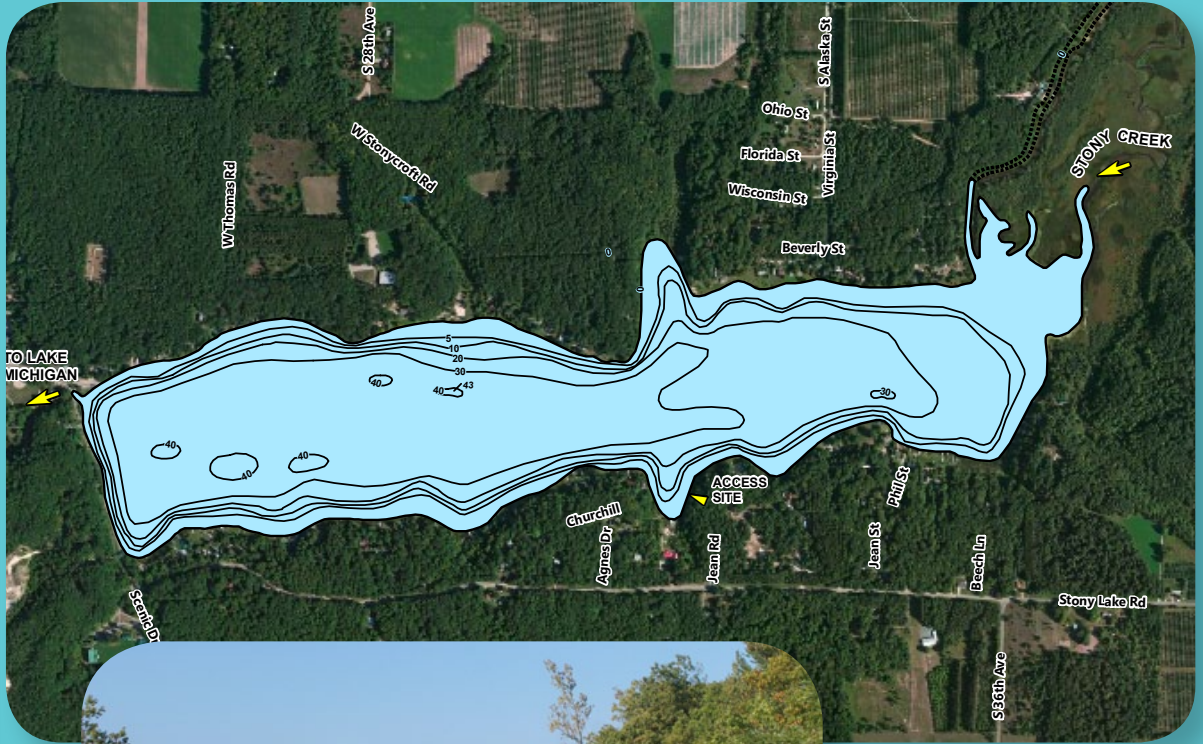
Michigan Department of Conservation (1950).

Stony Lake contains about 5,837 acre-feet of water, which equates to about 1.9 billion gallons. The main tributary to Stony Lake, Stony Creek, flows into the northeast end of the lake and exits at the northwest end to Lake Michigan. The water level of Stony Lake is controlled by a small dam located on Stony Creek immediately downstream of the lake. There is an approximate five-foot drop in elevation between Stony Lake and the average level of Lake Michigan.





Photo courtesy of J. Stivers



Stony Lake Physical Characteristics

Lake Surface Area.....	282 Acres
Maximum Depth	43 Feet
Mean Depth	20.7 Feet
Lake Volume.....	5,837 Acre-Feet
Shoreline Length	5.1 Miles
Shoreline Development Factor	2.2

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 topographical map that shows the “lay of the land” around the lake. The Stony Lake watershed is approximately 57 square miles, a land area about 129 times larger than the lake itself.

The Stony Lake watershed extends north of Buchanan Road and includes lands well to the east of US-31 and south of Stony Lake Road. Much of the watershed is drained by Stony Creek and numerous small tributary streams. There is an approximate 300-foot elevation difference between the headwaters of Stony Creek and Stony Lake.

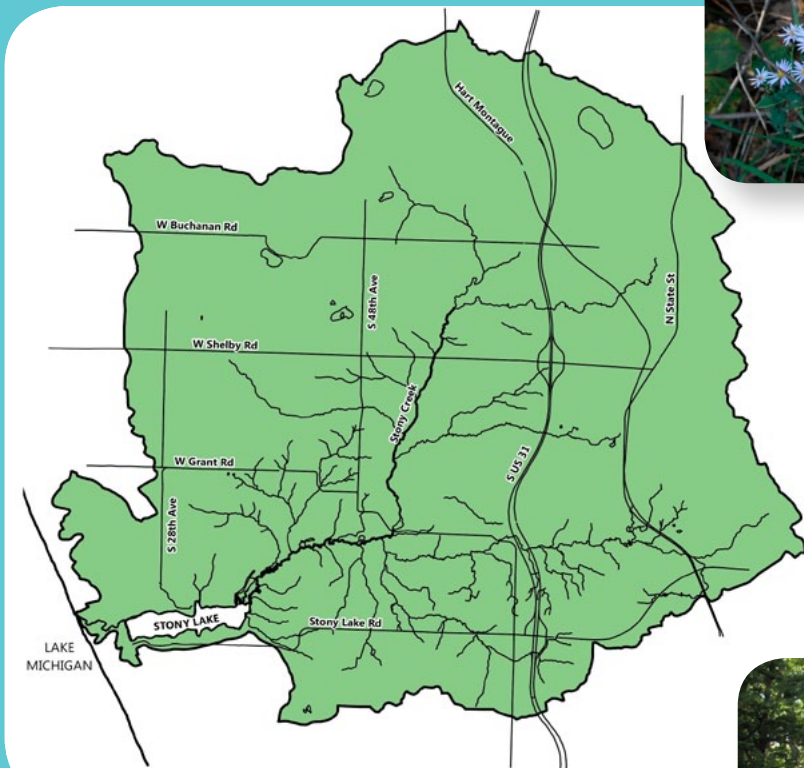
Land cover in the watershed includes a mix of agriculture, open space, forest and wetland areas. Development in the watershed is concentrated in and around the village of Shelby and in close proximity to Stony Lake. Much of the land adjacent to Stony Creek is forested or wetland. The large wetland system immediately upstream of the lake plays an important role in filtering and removing sediment and nutrients from the upper portions of the watershed. Preservation of this wetland system will be important to sustain the ecology of Stony Lake.



Photo courtesy of J. Stivers



5 Primary controllable sources of pollution in the Stony Lake watershed include lawn fertilizer and septic system seepage.



Stony Lake Watershed Map

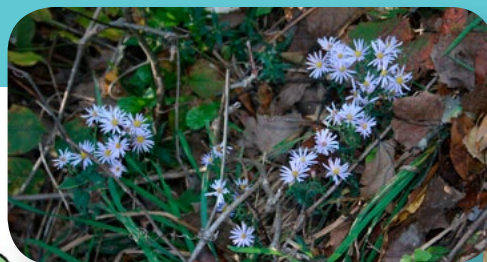
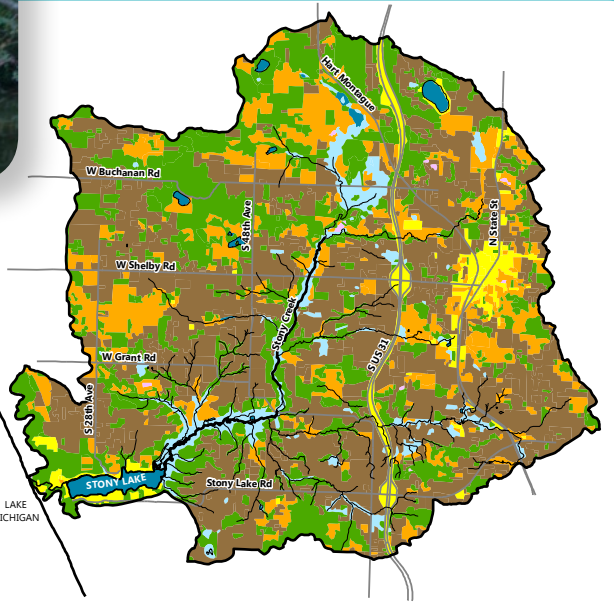
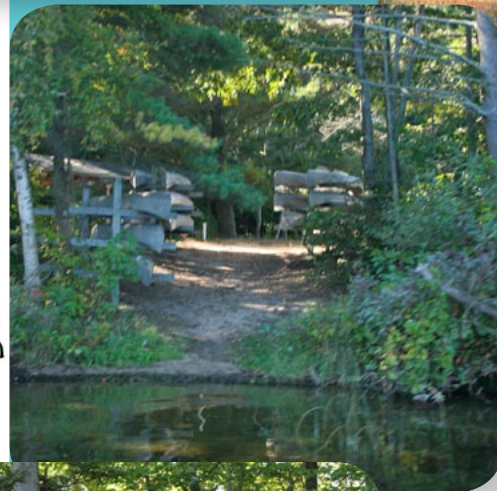


Photo courtesy of Terry Dykstra



- LAND USE**
- RESIDENTIAL
 - OPEN SPACE
 - AGRICULTURAL
 - FORESTED
 - WETLAND
 - BARREN

Stony Lake Watershed Land Use Map



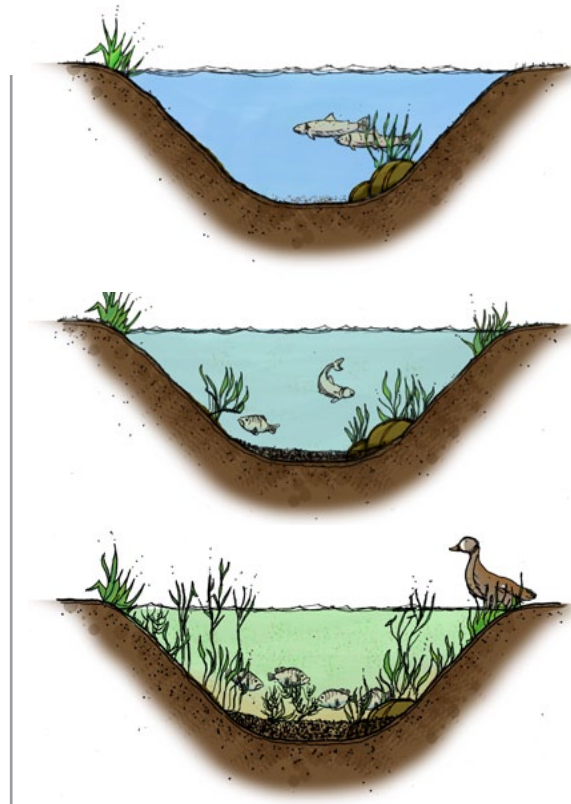
Photo courtesy of J. Stivers

The wetlands upstream of Stony Lake play an important role in filtering and removing sediment and nutrients from the upper portions of the watershed. 6

Water Quality

Samples have been collected on a periodic basis from Stony Lake to evaluate baseline water quality conditions. The discussion below provides background information on water quality and some key sampling parameters.

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.

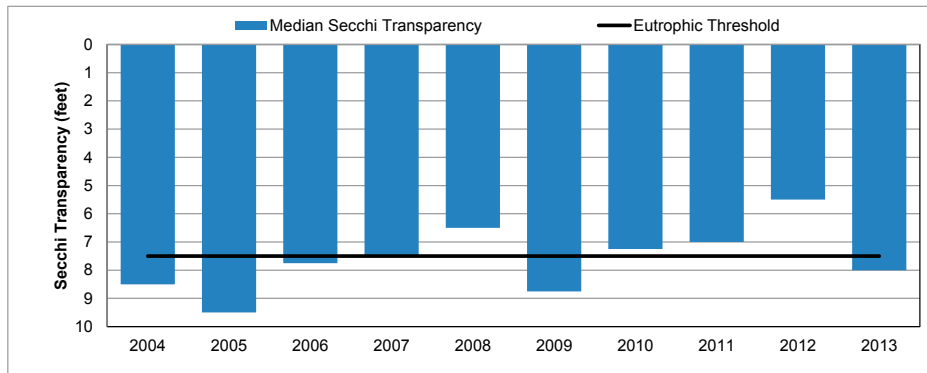
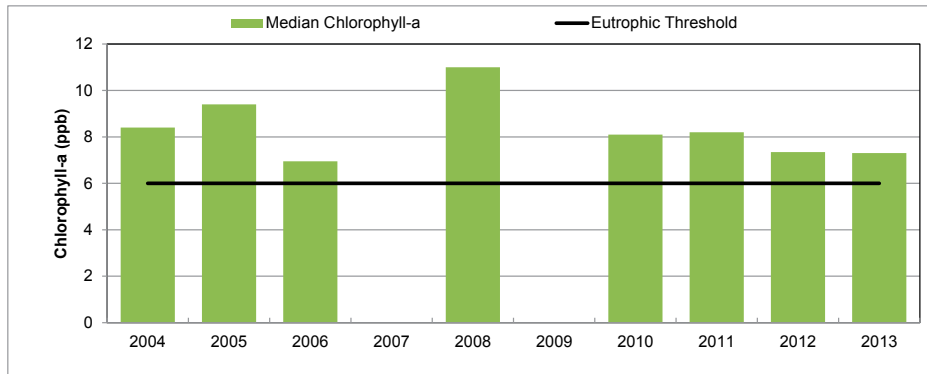
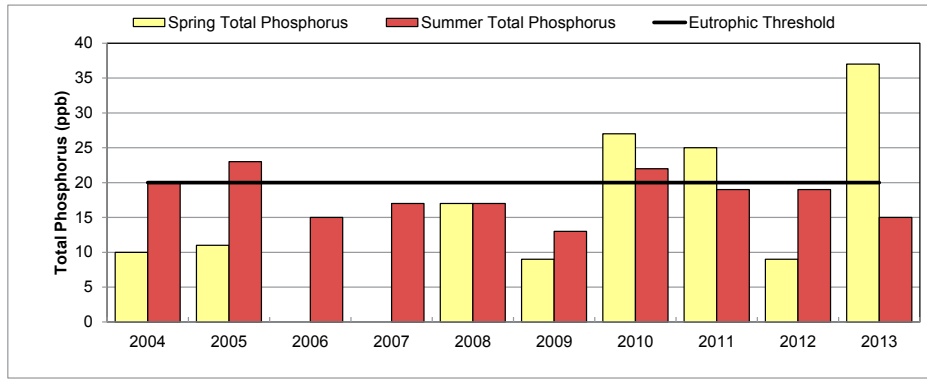


OLIGOTROPHIC lakes are generally deep and clear with little aquatic plant growth. These lakes maintain sufficient dissolved oxygen in the cool, deep bottom waters during late summer to support cold water fish such as trout and whitefish.

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.





Data collected by Progressive AE for the Stony Lake Improvement Board from 2010 to present confirm these results.

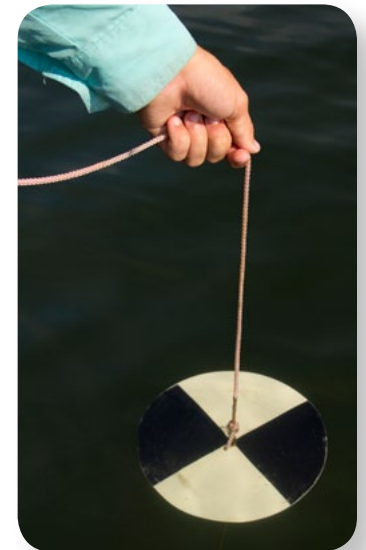
Key parameters used to classify lakes and to evaluate water quality include total phosphorus, chlorophyll-*a*, and Secchi transparency.

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 a lake. 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.

Since 2004, water samples have been collected on an annual basis from Stony Lake as part of Michigan's Cooperative Lake Monitoring Program. Sampling results indicate that Stony Lake is moderately eutrophic in that it periodically has elevated total phosphorus and chlorophyll-*a* levels, and reduced transparency.



Stony Lake is moderately eutrophic.

Aquatic Plants

Aquatic plants are part of a healthy lake. They produce oxygen, provide food and habitat for fish, and help to stabilize shoreline and bottom sediments.

Insects and other invertebrates live on or near aquatic plants, and become food for fish, birds, amphibians, and other wildlife.

Plants and algae are the base of the food chain. Lakes with a healthy fishery have a moderate density of aquatic plants.

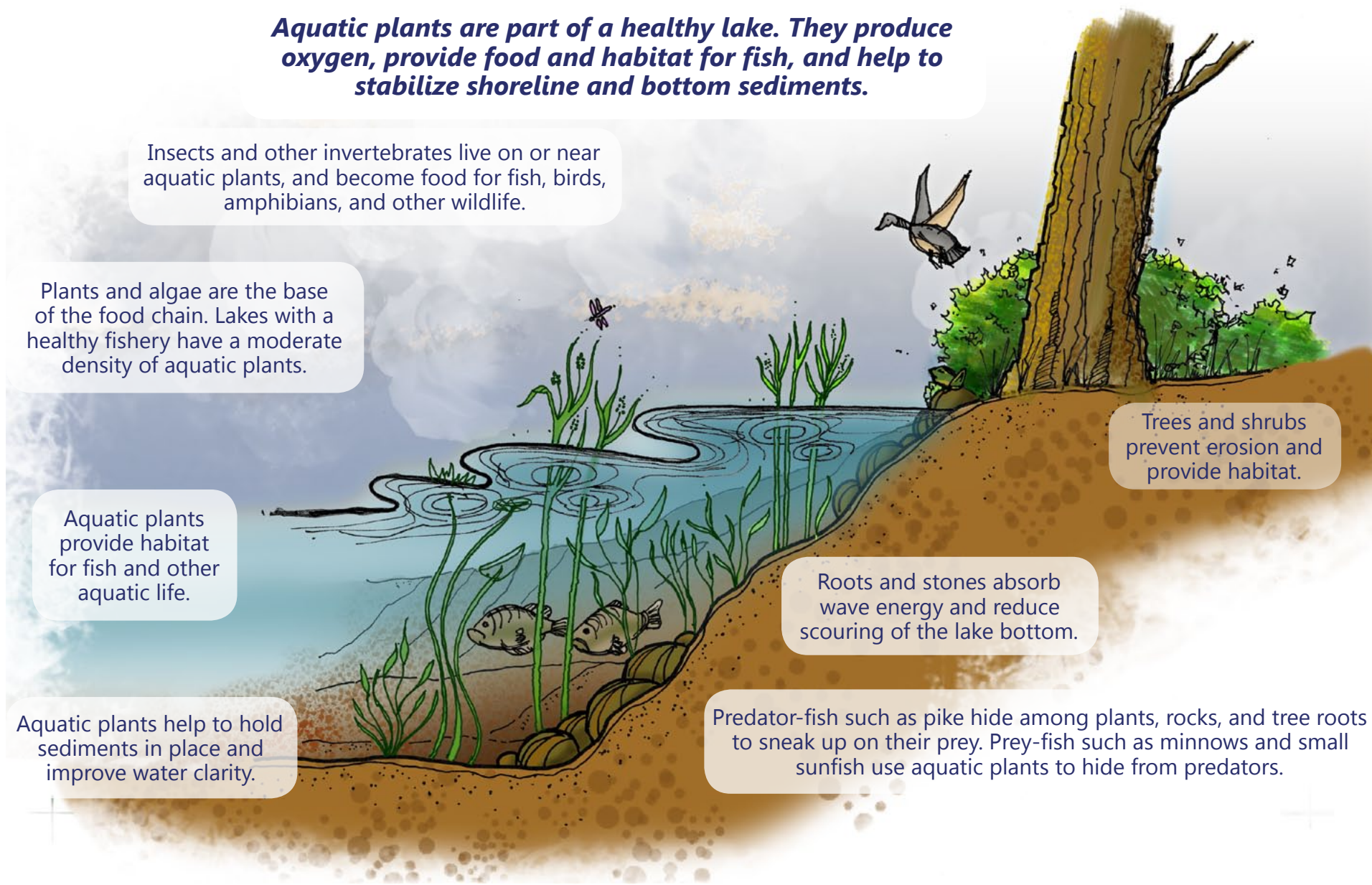
Aquatic plants provide habitat for fish and other aquatic life.

Aquatic plants help to hold sediments in place and improve water clarity.

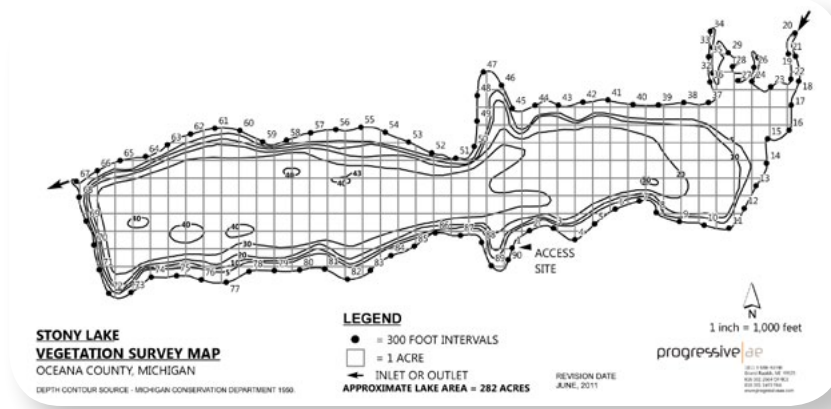
Roots and stones absorb wave energy and reduce scouring of the lake bottom.

Predator-fish such as pike hide among plants, rocks, and tree roots to sneak up on their prey. Prey-fish such as minnows and small sunfish use aquatic plants to hide from predators.

Trees and shrubs prevent erosion and provide habitat.



The plant control program in Stony Lake is designed to control nuisance plant growth while maintaining a diverse population of beneficial plant species. With the current plant control program, biologists conduct GPS-guided surveys of the lake each year to identify the location of nuisance plant growth and the presence of invasive, exotic species such as Eurasian water milfoil. Mechanical harvesting along developed shoreline areas of the lake is conducted to remove nuisance plant growth and Eurasian water milfoil is spot-treated with herbicides to prevent this plant from spreading and gaining dominance in the lake.



Aquatic plants can be categorized into four groups: the emergent, the floating-leaved, the submersed, and the free-floating. Each group provides unique habitat and conditions. Maintaining habitat diversity helps to maintain a balanced fishery.

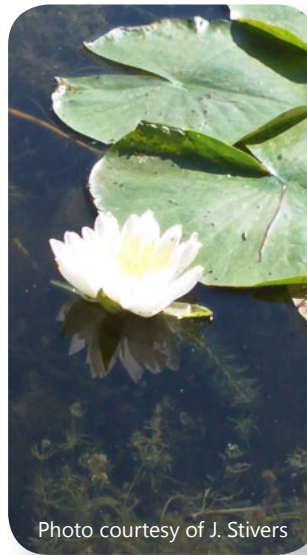
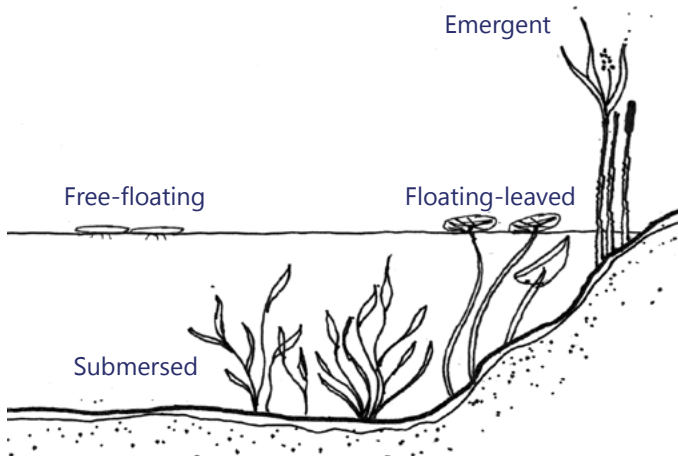
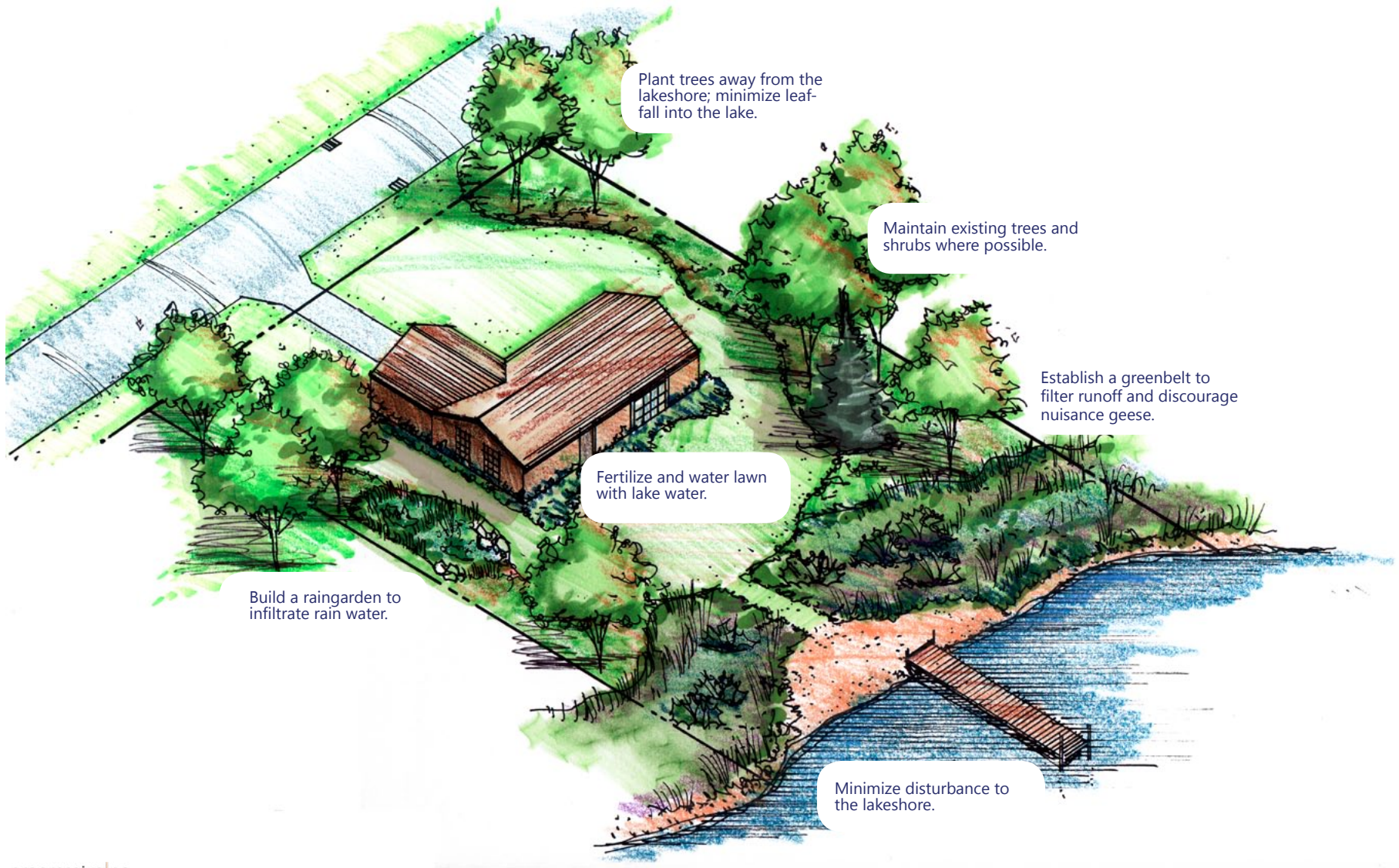


Photo courtesy of J. Stivers

Stony Lake contains an abundance of aquatic plants. Over twenty different species have been observed in the lake. Plants in Stony Lake are listed below by name and type, from the most abundant to least abundant.

Common Name	Plant Type
Wild celery	Submersed
Richardson's pondweed	Submersed
Northern water milfoil	Submersed
Flatstem pondweed	Submersed
Water stargrass	Submersed
Sago pondweed	Submersed
Whitestem pondweed	Submersed
Chara	Submersed
Najas spp.	Submersed
Coontail	Submersed
Curly leaf pondweed	Submersed
Elodea	Submersed
Thinleaf pondweed	Submersed
Eurasian water milfoil	Submersed
Illinois pondweed	Submersed
Water crowfoot	Submersed
White water lily	Floating-leaved
Yellow water lily	Floating-leaved
Bulrushes	Emergent
Cattails	Emergent
Pickerelweed	Emergent

What You Can Do



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.

In General

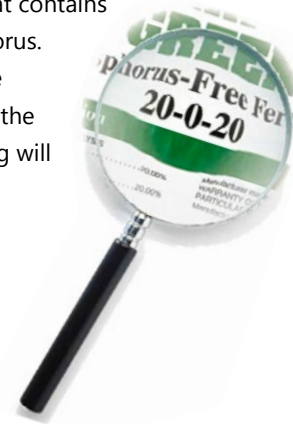
- Where possible, promote infiltration of stormwater into the ground. Build a rain garden in low areas to capture runoff from driveways and downspouts.
- To reduce runoff, maintain trees, shrubs, and ground cover.

Lawn Care

- Don't cut the grass too short! Near lakes, a mowing height of 3 to 3.5 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

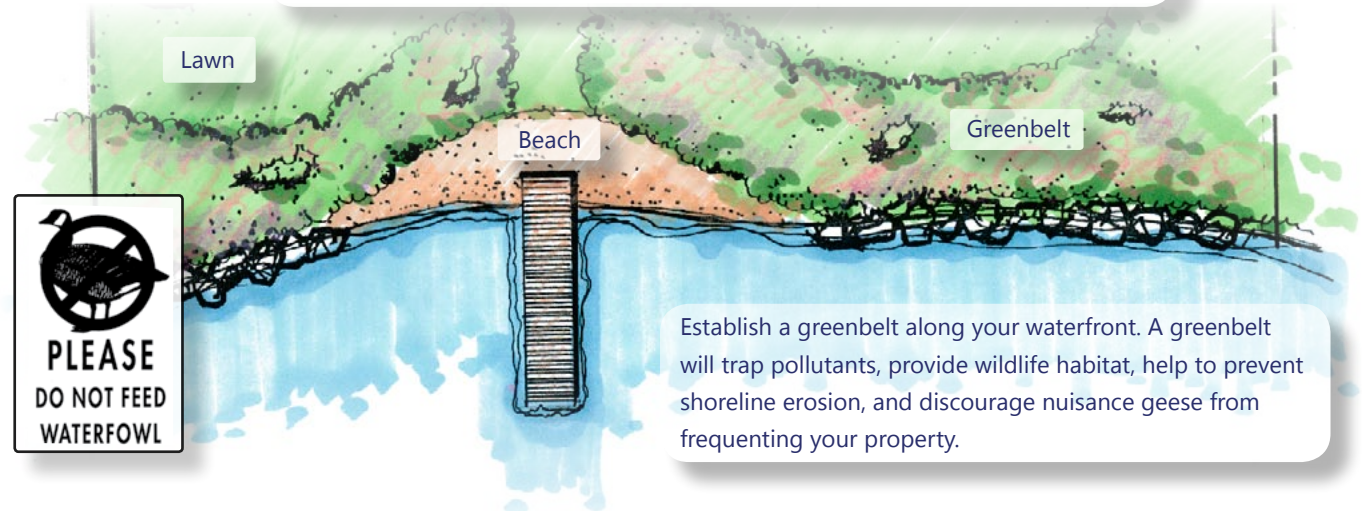
- Water lawn with lake water which contains nutrients that are good for the lawn. Water will seep through the soil back to the lake which is good for the lake.
- If you must use fertilizer, insist upon a fertilizer that contains no phosphorus. (The middle number on the fertilizer bag will be zero.)



Minimize lawn area. Less turf means less fertilizer, less pesticides—and less mowing! It's better for the lake and easier on you.

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.



10 Ways to Protect Stony Lake



1. Effective January 1, 2012, it's the law: Don't use lawn fertilizer that contains phosphorus. If you use a professional lawn care service, insist upon a fertilizer that does not contain phosphorus. (Phosphorus is the nutrient that most often stimulates excessive plant growth in lakes.)
2. Use the minimum amount of fertilizer recommended on the label — more is not necessarily better!
3. Water your 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. Where possible, promote infiltration of stormwater into the ground. Build a rain garden to capture runoff from driveways and downspouts.
8. Don't dump anything in area wetlands. Wetlands are natural purifiers.
9. Have your septic tank pumped every 2 to 3 years.
10. Everyone makes a difference! Don't be complacent.



On the Web

To find out more, visit:
www.stonylakepropertyowners.com
www.michiganlakeinfo.com
www.mishorelinepartnership.org

Establish a rain garden to capture runoff from driveways and downspouts.