

Hess Lake



GUIDEBOOK

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Hess Lake Improvement Board

Richard Besser, Hess Lake Property Owner/Brooks Township Representative

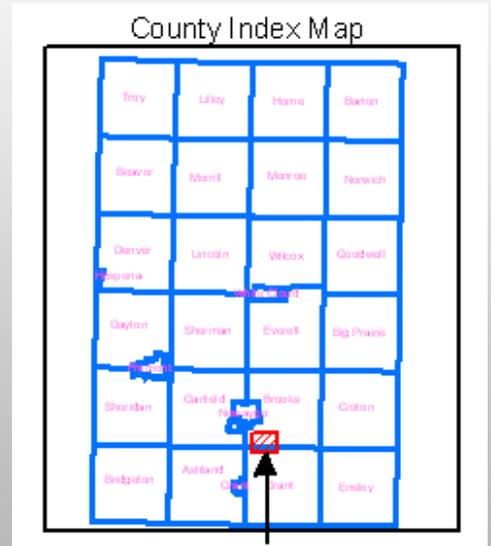
Gary Noble, Hess Lake Property Owner/Grant Township Representative

Dale Dozeman, Hess Lake Property Owner/Hess Lake Imp. Assoc. Representative

Adam Wright, Newaygo County Commissioner/By Statute

Patricia L. Baker, Newaygo County Drain Commissioner/By Statute Phone # 231-689-7213

Location Map

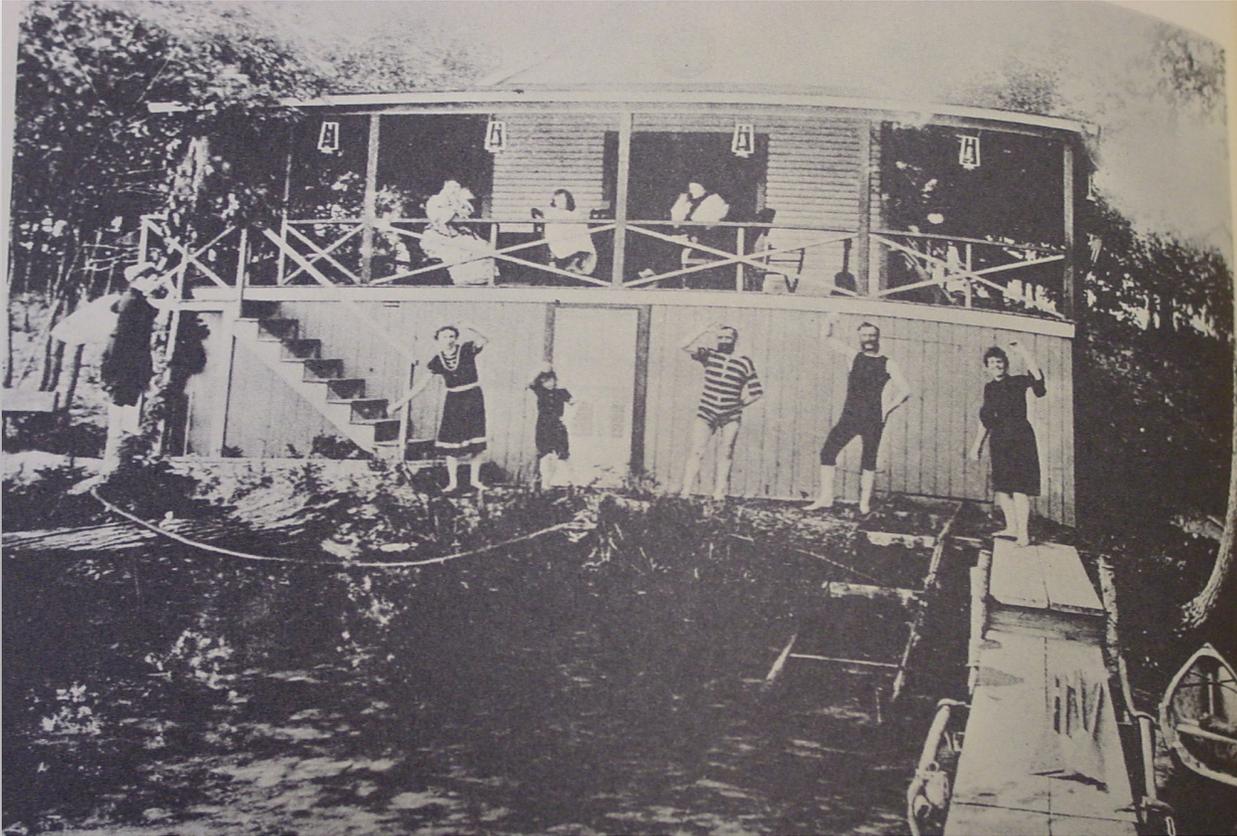


Aerial photo taken in the spring of 2010



History of Hess Lake

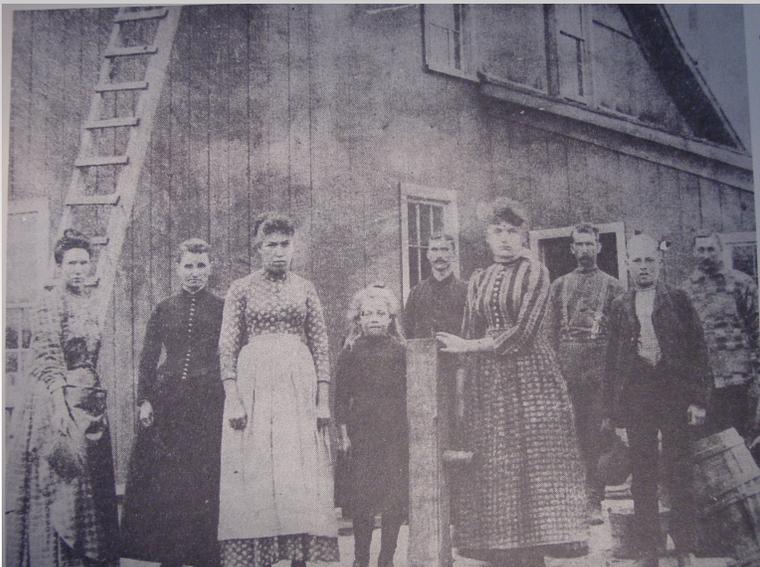
Hess lake is a 750 acre lake laying in Brooks and Grant Townships. Hess Lake is the 2nd largest lake in Newaygo County. The area around Hess lake was first developed in the late 1800's, taking advantage of the lake for logging purposes. The 1950's, 60's, and 70's brought heavy development and recreational use to the lake.



←
An early Hess Lake cottage built in 1891 by Fred Jacobi

Hess Lake used to be called Big Brooks Lake

Posing in front of the cook shack at the D.P. Clay camp - near Hess Lake.



Hess Lake Level Control Structure In 1973



History of Hess Lake

Fred Jacobi,
Frank Van Leuven,
And Fred Riblet
In 1888. →

*Jacobi
started the first
bicycle path to
Hess Lake.*



← Loggers
and their Families
near Hess Lake in
the 1890's

Time Line of Hess Lake

- 1950-1970 -The start of decline in water quality due to heavy development & recreational use,
-Fishing starts to decline and in 1970 Milfoil was introduced into the lake.
- 1965 -Hess Lake Level was established with a court ordered level of 763.3
- 1972 -Hess Lake Board was established-went inactive
-Water Quality Study done by WR Frykberg to determine effects of recreational use on the water quality of the lake, various testing done, Biochemical Oxygen, Dissolved Oxygen, Secchi Disc, Bacteriological. It was found that recreational use stirs up the silty bottom and puts it into suspension, making nutrients available to the aquatic community, limiting clarity. With 80% of residents having at least one boat w/ average hp of 35-40 their use is constantly stirring up the bottom.
-There were 384 lake front dwellings.
- 1974 -State of Michigan conducts periodic water sampling.
- 1978 -Health Department Study shows approximately 40% of septic systems are within 100' of the lake.
- 1979 -Hess Lake Board re-activated.
*Late 70's early 80's, property values followed the trend of lake quality.
- 1980 -State of Michigan conducts periodic water sampling.
- 1982 -Feasibility Study completed by Edmund's Eng, recommendations included:
Dredging 3.5 million cubic yards from the lake-Cost Prohibitive
A diversion pipe under Hess into Brooks Lk-DNR wouldn't approve & high cost
- 1983 -Weed harvesting begins, contracted out (2 machines), approximately 900 tons removed
- 1984 -Weed harvesting, contracted out , approximately 350 tons removed
-Milfoil infestation spreads and gets worse
- 1985 -State of Michigan conducts periodic water sampling.
-SCS HELP program identifies erosion problems on Wheeler
-HL Association purchases own weed harvester, removed approximately 330 tons
-Willis Timmer suggests combining chemical treatment w/ weed harvesting
-Chemical treatment of shallow areas-Drain Commissioner
- 1986 -3 acre sediment basin constructed on Wheeler Drain
-Weed harvesting, removed approximately 200 tons
-Chemical treatment 71 acres-2-4D, Aquathol K, H191 & Copper Sulfate-Lake Weed Away (LWA)
-Major milfoil infestation begins to be controlled.
- 1987 -Bank stabilization, rip rap & seeding on banks of Wheeler to prevent future erosion
-Grade control structures installed to slow water down
-Weed harvesting , removed approximately 112 tons
-Chemical treatments 125 acres-24D,Aquathol K, Hydrothal 191,&Copper Sulfate-LWA
-Apply for Clean Lakes Grant
- 1988 -Weed harvesting, removed approximately 28 tons
-Chemical treatments 125 ac-2-4D, Aquathol K, Hydrothal 191, & Copper Sulfate-LWA
- 1989 -Feasibility Study completed by Progressive Eng. on phosphorus removal system via soil filtration-found not feasible
-Weed harvesting, removed approximately 28 tons
-Chemical treatments 100 acres - 2-4D, Aquathol K, & Copper Sulfate-LWA

- 1990 -Brooks Lake Water Quality Study done by Wade Trim, recommended sewer systems on both lakes & dredge 30% of Brooks & Hess to a depth of 15'
 -Depth Study done by Expeditors to determine the amount of muck on the bottom
 -Weed harvesting, removed approximately 200 tons
 -Chemical treatments 100 acres- 2-4D, Aquathol K, & Copper Sulfate-LWA
- 1991 -Water sampling done for nutrients
 -Weed harvesting, removed approximately 175 tons
 -Chemical treatments 100 acres- 2-4D, Aquathol K, & Copper Sulfate-LWA
- 1992 -Water sampling done for nutrients
 -Weed harvesting, removed approximately 250 tons
 -Chemical treatments -125ac 2-4D, Aquathol K, & Copper Sulfate-LWA
- 1993 -Aerial reconnaissance & field surveys to identify critical areas on Wheeler Drain
 -MDNR Fisheries completed survey showing high turbidity (Secchi disk 6"), no macrophytes & low fish population
 -Diagnostic Evaluation & Feasibility Study by FTC&H, excessive phosphorus concentration, aquatic vegetation, dominate algae species during summer season Lake Management Plan concerned with low fish population
 -Weed harvesting, removed approximately 200 tons
 -Chemical treatments 100 acres- 2-4D, Aquathol K, & Copper Sulfate-LWA
- 1994 -Started petition for Wheeler Drain project-turned down
 -Aerial photos taken before and after rain event
 -Fish plantings
 -Weed harvesting, removed approximately 250 tons
 -Chemical treatments 100 acres-2-4D,Aquathol K,&Copper Sulfate-Prof. Lake Mgt (Lake Weed Away changed there name to Professional Lake Management-PLM)
- 1995 -Petition re-circulated for Wheeler Drain Project to retrofit existing sediment basin, construct 3 additional sediment basins, streambank stabilization, & wetland plantings-project found necessary
 -Sanddragon Process of filtering silt from water checked out-cost prohibitive
 -Fish plantings
 -Weed harvesting, removed approximately 200 tons
 -Chemical treatments 100 acres- 2-4D, Aquathol K, & Copper Sulfate-PLM
- 1996 -Weed Harvester put in dry dock, only chemicals used to treat-treatment successful
 -Biological control of weeds looked into-decided against
 -Project begins on Wheeler Drain
 -Fish plantings
 -383 Lake Front dwellings, still the same as 1972 only now there have been additions to the homes, are used year around by most, there are bigger boats, jet skis & more people using the lake, therefore more suspension of silt with the increased activity.
 -Chemical treatments - 2-4D, Aquathol K, & Copper Sulfate-Weed Patrol, Inc (WP)
 -Lake Board begins looking at the use of Floridone, but decide to wait until DEQ is finished with their testing for correct dosage amounts.
- 1997 -Chemical treatment for Eurasian Water Milfoil, Curly Leaf Pondweed, & Elodea.
 -Chemicals used 2,4-D, Reward, & Aquathol K-WP
 -Fish plantings
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 -Fish Plantings
 -DEQ/DNR completes fish and chemical survey and finds Hess Lake to be "pristine" regarding chemical contamination
- 2000 -Chemical treatment for Eurasian Water Milfoil, Curly Leaf Pondweed, & Elodea.
 -Chemicals used 2,4-D, Reward, & Aquathol K-WP
 -Sprayed for Gypsy Moths-600' parameter around the lake -390 acres
 -Water sampling done
 -Fish plantings

- 2001 -Chemical treatment of entire lake (750 acres)-using Fluridone (Avast) **only**-WP.
 -Survey done in September indicated resurgence of 12+ native plants in the lake
 -2nd Spray Treatment for Gypsy Moths –600’ perimeter around the lake-390 acres
 -Water sampling done
 -Fish plantings
- 2002 -Study done w/grant money on failed and failing septic systems - project promoted and on going.
 -Chemical treatment of 3 Milfoil plants-\$135.00
 -Public Hearing held July 15th - 12 in attendance
 -Water Sampling & fish plantings done
 -Failed & failing septic systems project completed-Hess Lk \$1500.00/Brooks \$1000.00.
 -Committee formed to look into sewer system around Brooks/Hess Lakes
 -Opinion poll mailed to residents late November to see if sewer project is wanted
 -Count of combined lakes survey was split- ½ voted yes ½ voted no. The count for just Hess Lake had more that voted yes than voted no. The whole thing was turned over to the committee to come up with alternatives.
- 2003 -No treatment was necessary on the lake this year.
 -A lake-wide weed survey was done in September by Weed Patrol-cost \$1000.00.
 -No Special Assessment was levied against the property owners in 2003 because the Lake Board had money in reserve and felt an assessment was not necessary.
- 2004 -Treatment of 45 acres of Milfoil with Renovate was done in June, no treatment of Curly Leaf or other pondweed as they were not a problem. The lake board is going to look into algae treatments to help with the water clarity for next season, with all the rain this year it would be a waste of money.
- 2005 -Treatment of 45 acres of Milfoil with Renovate was done in June, no treatment of Curly Leaf or other pondweed as they were not a problem. The lake board is still looking into algae treatments to help with the water clarity to make sure the expense is worth the shortness of time it will last and will probably treat with Floridone next season as the Milfoil is spreading.
- 2006 -Like wide treatment with Floridone scheduled for the end of April or 1st of May was not done until the middle of May due to problems with DEQ permit-Milfoil exploded and DEQ finally gave permit and lake was treated but it was late and it took time for the weeds to drop. Bump treatment done the end of May, 14 days after original treatment, but due to lateness of treatment, lake was a mess for Memorial Day weekend and into June. Weed Patrol came back the middle of June and treated the lake with copper sulfate and cygnet to try and make the weeds drop and clear up the algae so the lake would be decent for the 4th of July.
- 2007 -A lake wide Algae treatment was done the 2nd of July to see if it would clear up the water quality. No other treatment was needed as there were no weed problems.
- 2008 -The only treatment done this year was an algae treatment of Copper Sulfate, and a small treatment of 2.8 acres of Milfoil with 2,4-D.
- 2009 -In June there was a lake wide Algae treatment, 25 acres treated with 2,4-D, 40 acres treated with Renovate, and 10 acres treated low-dose Aquathal K.
- 2010 -In May there was a 40 acre pondweed treatment with low-dose Aquathol K, 15 acre Milfoil treatment with Renovate OTF, and a 40 acre Milfoil treatment with 2,4-d.
 In June there was a 22 acre Milfoil treatment using Renovate OTF.

Hess Lake Misc. Facts



HESS LAKE BATHYMETRY

LEGEND

x SPOT ELEVATIONS

FINAL CONTOURS

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INTERMEDIATE

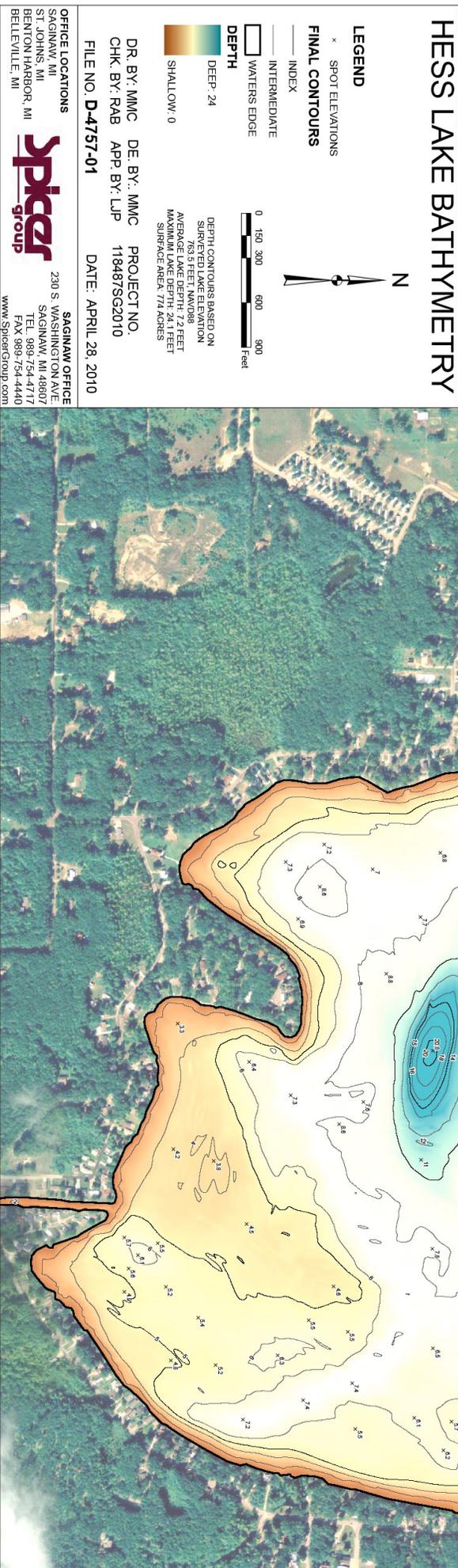
WATERS EDGE

DEPTH

DEEP: 24

SHALLOW: 0

DEPTH CONTOURS BASED ON
SURFACE ELEVATION
AVERAGE LAKE DEPTH: 7.2 FEET
MAXIMUM LAKE DEPTH: 24.1 FEET
SURFACE AREA: 774 ACRES



OFFICE LOCATIONS
SAGINAW, MI
ST. JOHNS, MI
BENTON HARBOR, MI
BELLEVILLE, MI

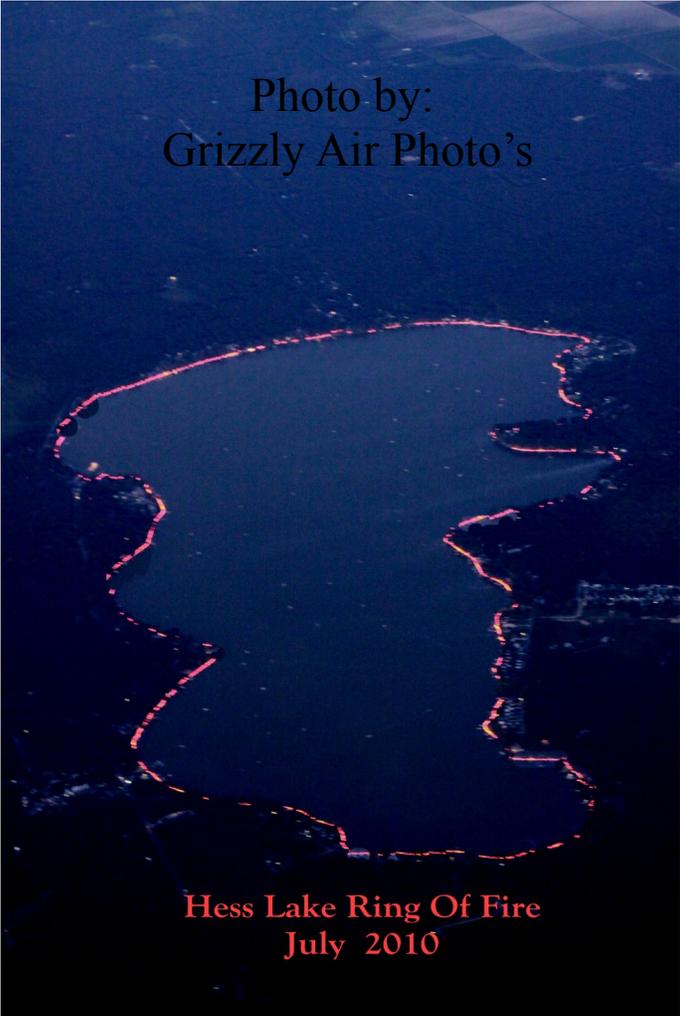


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DR. BY: MMC DE. BY: MMC PROJECT NO.
CHK. BY: RAB APP. BY: LJP 119487SG2010
FILE NO. D-4757-01 DATE: APRIL 28, 2010

Festivities



Winterfest activities on the ice



Roadside Clean-up



Fishing Tournaments



Annual Son-of-a Sailor Walk/Run



Hess Lake Yard Sales

Water Quality

Water sampling has been done for years on Hess Lake. Sampling has been done by the Association, various firms who were contracted with the Hess Lake Board, and residents around the lake. Below are some of the recent findings of a Bathymetric survey completed by Spicer Engineering during the summer months of 2010.

Temperature was fairly consistent from the surface down to about 15 feet, varying around 2.0 degrees, dropping quickly from 15 feet and deeper.

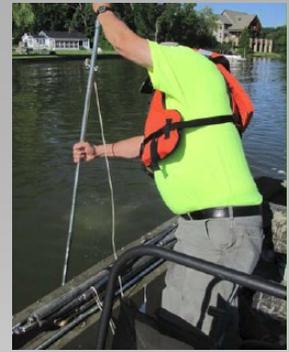
Dissolved Oxygen, which is a critical part of many biological and chemical processes, came in between 9.89 mg/L-10.33 mg/L from the surface down to 15 foot in depth. These readings were well within the acceptable levels of 8-15 mg/L.

PH levels in Michigan lakes are typically 7.5-8.4 and the acceptable range for water quality is 6.5-9.0, Hess Lake results fell between 7.3 and 9.2

Total Dissolved Solids are generally less than 1.5 g/L, Hess varied from 0.2 g/L to 0.5 g/L

Turbidity is often linked to the look of the lake, or the water clarity. Hess Lake was described as being moderately clear at the surface becoming more turbid toward the bottom.

Secchi Disk which is a way of measuring the visibility of the water, were approximately 3 feet, which mirrors results of the same test completed in 2009.

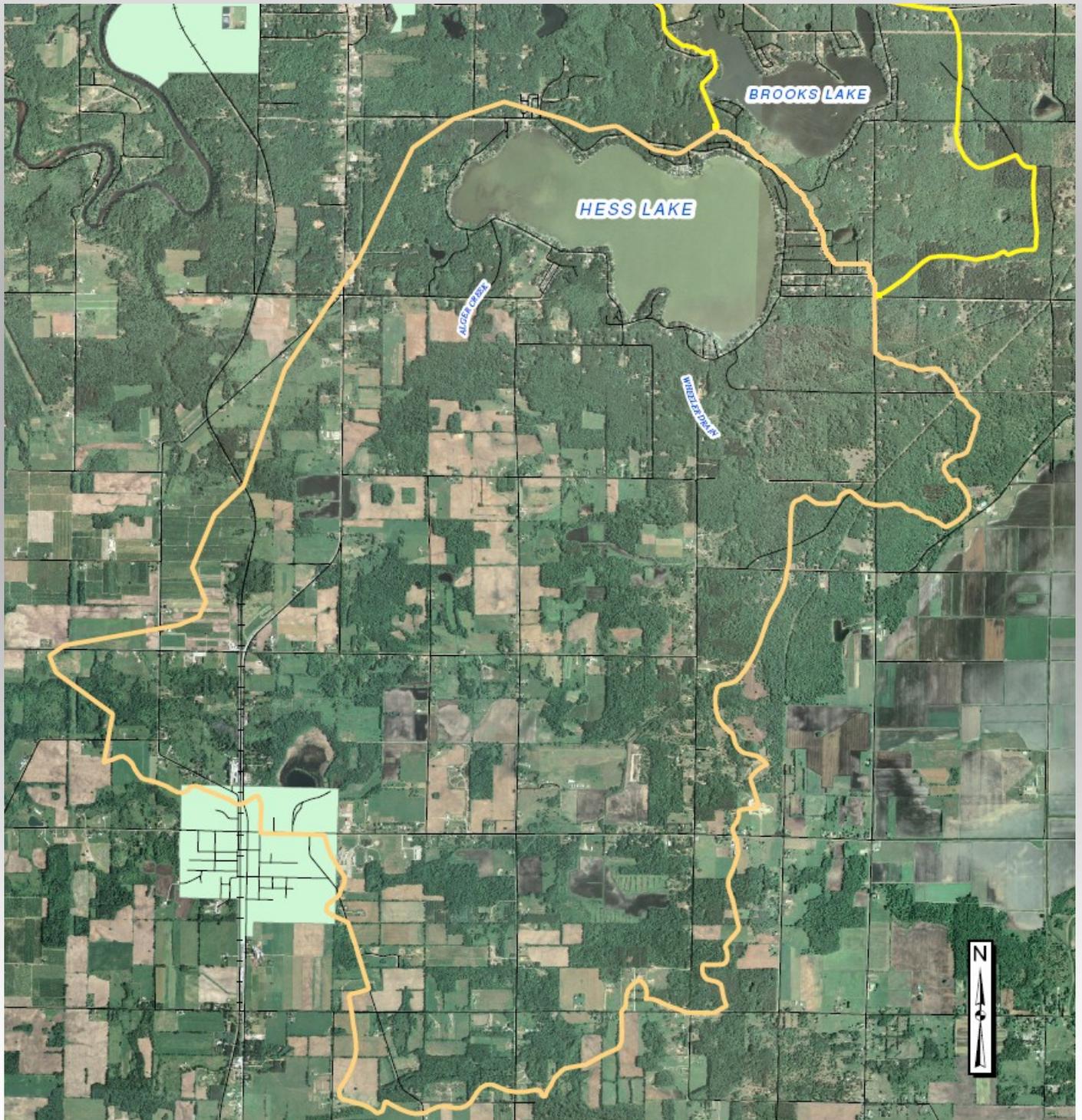


Recommendations from Spicer's Bathymetric survey:

1. Complete a map of the lake bottom with comprehensive sediment sampling to characterize the lake bed and provide a regional approach to dredging if that is a proposed task for the future.
2. Complete sediment testing in proposed areas for future dredging to determine if the dredged material meets Department Environmental Quality's disposal criteria.
3. Determine a final phosphorus strategy for Hess Lake.
4. Implement Best Management Practices (BMP's) on Wheeler and Alger Creek to decrease the amount of nutrients and sediments being transported into Hess Lake.
5. Continue implementation of the lakefront overlay zone ordinance.
6. Continue aquatic plant management on Hess Lake.
7. Continue bi-annual monitoring of phosphorus levels in the lake.

Watershed Data

The Hess Lake watershed is approximately 15 square miles. The major tributaries are Alger Creek and the Wheeler Drain, which both carry water into the lake from the south. The water from Hess Lake flows to Brooks Lake and via Brooks Creek and the Muskegon River, eventually ends up in Lake Michigan. The biggest land uses within the watershed are farming, forest , and residential.



Watershed Data

The Wheeler Drain and its tributaries are a major part of the Hess Lake watershed. The Drain Commissioner with assistance of the Hess Lake Board in previous years, has done extensive work to the Wheeler Drain to help keep the sediment from entering Hess Lake. As you can see from the pictures below there are numerous controls in place including 6 rock check dams throughout the drain from 108th Street north. The Wheeler Drain is continually being worked on including the sediment basin being cleaned out every couple of years and trying to slow down the water and erosion, as there is 22 foot of fall from 108th Street to the Lake.



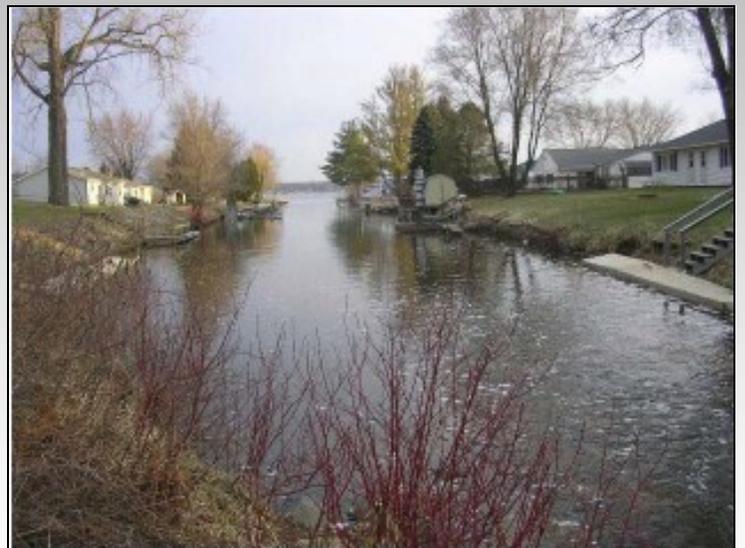
Wheeler Sediment Basin after cleanout



South weir in Wheeler Drain/S.B.



North weir in Wheeler Drain



Wheeler Channel into Hess Lake

Aquatic Plants

What are the Types of Aquatic Plants?

Emergent- Found in the shallow water and has a large portion of stems and leaves growing above (emerging from) the water surface.

→Interlocking roots anchor sediment and reduce erosion →Provide great nesting material



Floating- Have leaves that float on top of the water

→Can be rooted or free floating →Leaf shape and texture that resists tearing



Submersed- Grow underwater

→Limp out of water→Little or no cuticle facilitates gas exchange between plant and water

→Submerged leaves often dissected



What Are the Benefits of Aquatic Plants?

- * Provide habitat for fish, bird, insects
- * Stabilize sediments
- * Absorb nutrients
- * Slow down water
- * Photosynthesize, which oxygenates the water
- * Can be aesthetically pleasing

Eurasian Milfoil is an invasive aquatic plant. It was first found in the United States in the 1940's. Although it is non-native it is widespread in the state of Michigan. Eurasian Milfoil can cause many problems with the lake, it can choke out native desirable plant species, destroy fish habitat, and make water nearly impassable by boat. Eurasian Milfoil can grow in deeper water than most native plants and spread rapidly just from pieces broken or chopped off by boats or other water activities.

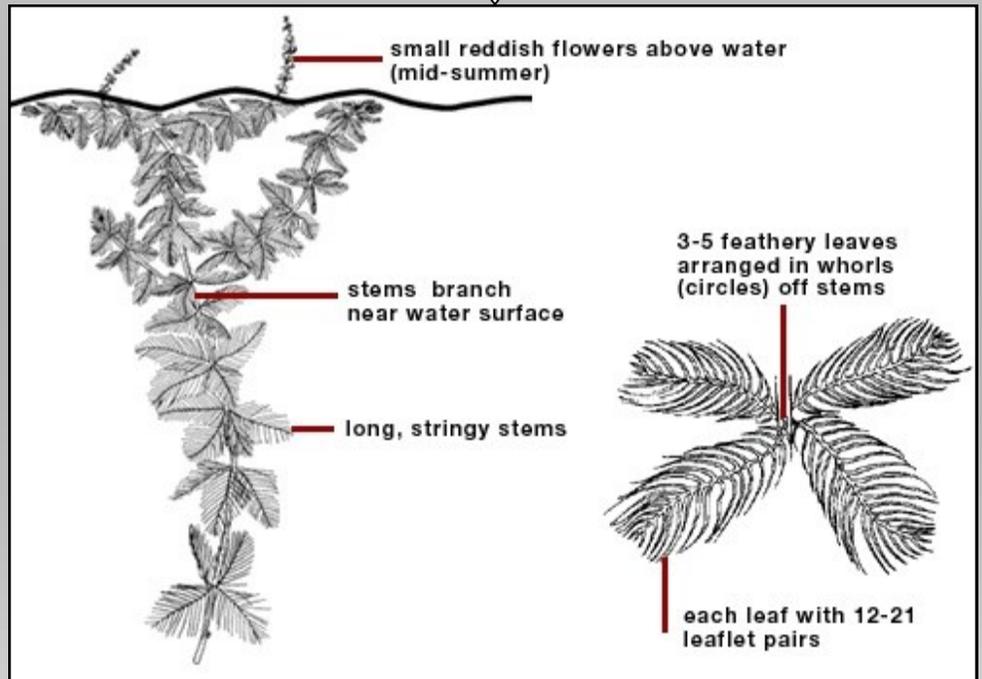
The practice to control Eurasian Milfoil in Hess Lake is to try and keep it under control before it consumes massive areas of the lake. Every so often Hess Lake receives a Floridone treatment which virtually wipes it out, but between boats, docks, etc. a couple of little untreated pieces start re-growing sooner or later and the cycle begins again.



Eurasian Milfoil

The 5 most common weeds in Hess Lake in 2010.
(per Clarke Aquatic survey)

1. Eurasian Milfoil (Invasive)
2. Nymphaea/Lily Pad (Native)
3. Arrowhead (Native)
4. Cattails (Native)
5. Spatterdock (Native)



The chemicals used to treat aquatic weeds and algae are approved by the EPA (Environmental Protection Agency) and the MDEQ (Michigan Department of Environmental Quality). Strict detailed permits are obtained from the MDEQ on an annual basis.

A treatment **NOTICE** is mailed out to all residents on the lake every spring. The **NOTICE** includes any and all restrictions for each chemical that may be used. Before a treatment begins, signs are posted along the shoreline which indicate the chemical(s) to be used along with any restrictions.

How You Can Help

Shorelands Management

What lakefront property owners should know and do

By Progressive AE

Proper shoreland management is vital to protect both water quality and fisheries. During pre-settlement days, much of the shoreland around lakes was forested, wetlands, or grassland. Natural habitat was abundant. Over time, as shorelands were developed, much changed. Shoreland vegetation was removed, and natural areas that allowed rain waters to infiltrate were replaced by rooftops, 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 lake. Problems associated with excessive shoreland development include increased aquatic plant growth, diminished fisheries, and poor water quality. How we manage our shorelands can have a direct and profound impact on the quality of our lakes. Protecting shorelands is straightforward: Maintain or restore as much natural shoreland as possible. That is not to say that you can't—or shouldn't—have an area to swim, moor boats, fish or lounge by the shore. However, manicured lawn to the water's edge and boundless seawalls are not conducive to healthy lakes, nor is large-scale removal of aquatic vegetation. In addition to protecting or restoring natural shoreland, you should also be careful about the application of lawn fertilizers, especially fertilizers containing phosphorus. Phosphorus is the nutrient that most often stimulates excessive growth of aquatic plants and causes premature lake aging. Fertilizers should only be used sparingly near lakes, if at all. If you must use fertilizer, only use a phosphorus-free fertilizer. Once in the lake, a pound of phosphorus can generate hundreds of pounds of aquatic vegetation. This vegetation is most evident in the near-shore areas of the lake where we swim and recreate. Take a look at the following illustrations. Then take a look at your shoreland and see what you can do to help preserve the natural features of your lake.

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



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.

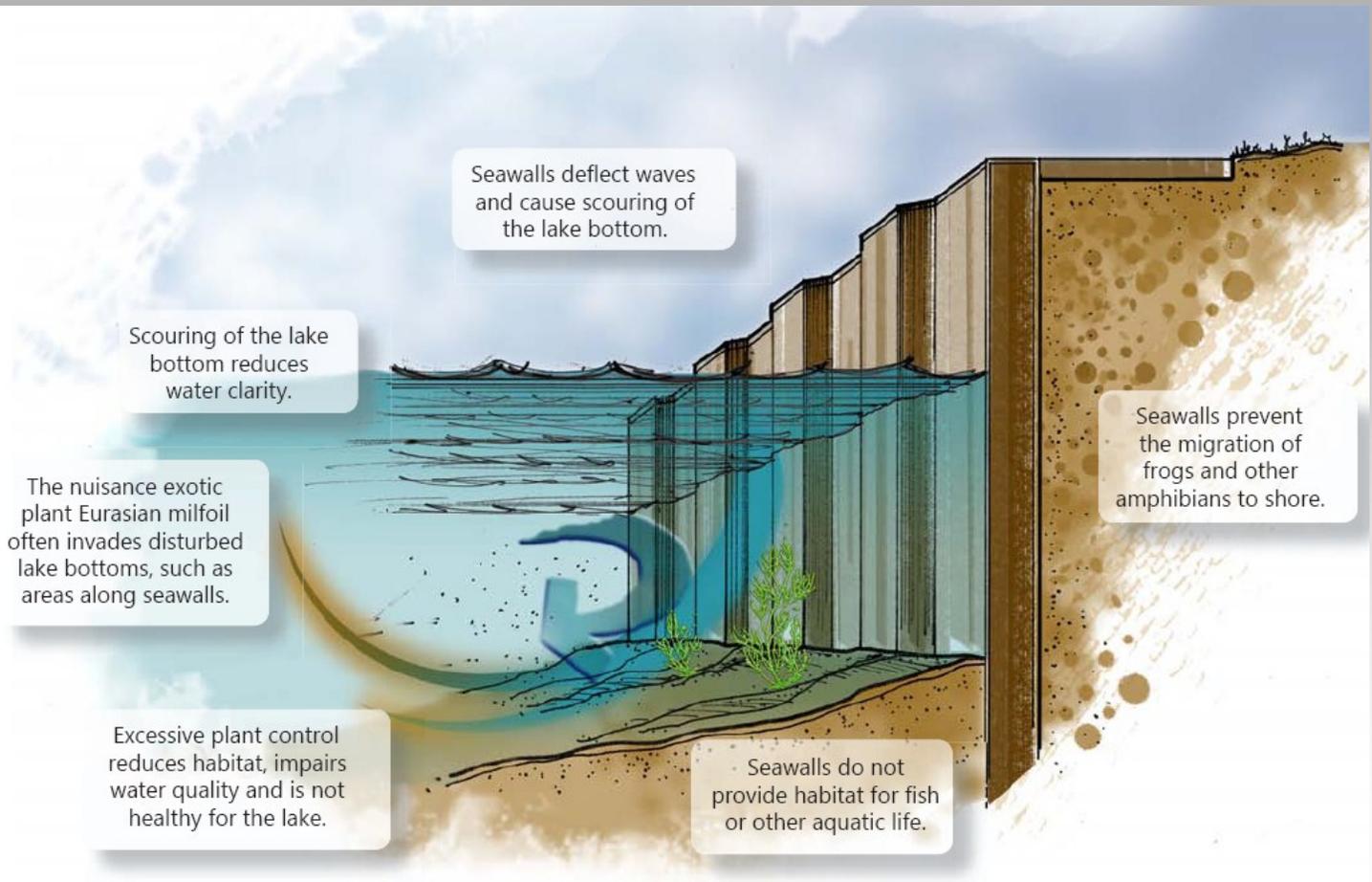
Aquatic plants provide habitat for fish and other aquatic life.

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

Trees and shrubs prevent erosion and provide habitat.

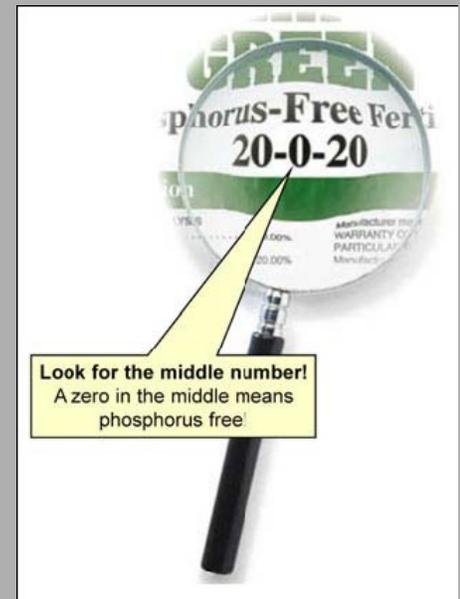
Roots and stones absorb wave energy and reduce scouring of the lake bottom.

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.



10 Ways to Protect Your Lake

1. Do not use fertilizer that contains phosphorous.
2. Use the minimum amount of fertilizer recommended on the label.
3. Water the lawn sparingly to avoid washing nutrients and sediments into the lake.



4. Do not feed ducks and geese near the lake. Waterfowl droppings are high in nutrients and may cause swimmers itch.
5. Do not burn leaves and grass clippings near the shoreline. The highly nutrient ash can easily wash into the lake.



6. Do not mow to the water's edge. Instead leave or plant a strip of natural vegetation, this will trap pollutants and sediments, and absorb nutrients.
7. Do not dump anything in wetland areas. Wetlands are natural purifiers.

8. If you have a septic system get your tank pumped every 2-3 years.
9. If you trailer your boat from lake to lake, wash your boat before launching it back into the lake.
10. Don't be complacent!
Our actions can make or break the lake!

