Oneida COUNTY
Land & Water Conservation Department

Maple Lake

Oneida County, Wisconsin

Land & Water Conservation Department

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Maple Lake AIS Monitoring and Water Clarity Report

Field Date:	July 13, 2022
WBIC:	1609900
Previous AIS Findings:	Banded Mystery Snails, Chinese Mystery Snails, Purple Loosestrife
New AIS Findings:	No new AIS found.
Field Crew:	Aubrey Nycz, Lead AIS Project Assistant, and Madeline Hetland, AIS Project Assistant, Oneida County Land and Water Conservation Department
Report By:	Madeline Hetland

Purpose: Water is Wisconsin's most precious resource. It provides an essential lifeline between wildlife, recreation, public trust resources, agriculture, industry, health and safety, and environmental, urban and rural interests throughout the state. With a growing population and a treasured supply of fresh water, the protection of water for designated and beneficial uses is of paramount importance.

Each year, the Oneida County Aquatic Invasive Species (AIS) Program staff conducts AIS early detection monitoring and baseline water quality monitoring in Oneida County waterbodies. In addition, staff conducts AIS monitoring at boat landings, rivers, streams, wetlands, roadsides, culverts, and Organisms in Trade. Monitoring takes place from June through September of each year.

AIS early detection monitoring is the most effective approach to locating pioneer populations of WI Chapter NR 40 regulated AIS, species not widely established, and newly introduced species to Wisconsin. Early detection of AIS is crucial for rapid response, containment, management, preventing their spread, and reducing management costs. Implementation of rapid response activities is vital in maintaining the stability of a waterbodies ecosystem services, habitats, fisheries, recreational opportunities, property values, economy, and human health.

Water quality monitoring provides information on the physical, chemical, and biological characteristics of water. Monitoring aims at assessing the environmental state, detecting trends, and identifying potential problems in the water or watershed. The state of water quality is the result of complex natural and manmade conditions and the consequent of those interactions over time. Evaluating trends determines whether water quality is changing relative to land use and natural conditions. Water quality data provides important and useful information to lake groups, local and regional resource managers, community stakeholders, and provides guidance

with protecting and enhancing our waters, watersheds and development to new approaches to water quality management.

Our monitoring program is in collaboration with the DNR, UW Extension's Citizens Lake Monitoring Network Program, and Great Lakes Indian Fish Wildlife Commission. All AIS staff are trained in the in the DNR's AIS monitoring, identification, collection, verification, reporting, and decontamination protocols.

Data Collected: AIS identification, live specimens, photos, population densities, distribution, locations and GPS coordinates. Other observations may include species size, characteristics, and impact to native habitat. Water quality data includes Secchi disc, dissolved oxygen, temperature, water characteristics, and GPS coordinates.

Areas Observed: Perimeter of lake's littoral zone, inlets and outlets, around culverts, under and around docks and piers, and other areas identified as most vulnerable to the introduction of AIS.

Methodology: Searching for AIS in the water and along the shoreline is achieved by slowly canoeing around the entire lake's littoral zone, meandering between shallow and maximum rooting depth or 100' from shore (whichever comes first). Additionally, targeted sites considered high risk of invasive species introductions, such as boat landings, access points, parks, beaches, and inlets receive comprehensive AIS monitoring. Several methods and tools are utilized to achieve the survey: survey from the canoe, walking along the shoreline and shallows, using aqua view scopes, snorkeling to examine underwater solid surfaces, sifting through vegetation, and analyzing plant rake samples, veliger tows, and D-net sediment samples.

Targeted Chapter NR40 Invasive Species Include: Asian clams, banded mystery snails, Chinese mystery snails, Faucet Snails, New Zealand mudsnail, quagga mussels, zebra mussels, rusty crayfish, spiny waterfleas, Eurasian watermilfoil, curly leaf pondweed, flowering rush, non-native phragmites, purple loosestrife, yellow iris, and variegated reed manna grass (Glyceria Maxima 'Variegated').

Other priority species include: red swamp crayfish, Japanese knotweed, Japanese hops, European frog-bit, yellow floating heart, water chestnut, Brazilian waterweed, Hydrilla, fanwort, parrot feather, water, hyacinth, water lettuce, and rock snot.

Maple Lake Data: Maple Lake, located in the Town of Three Lakes, Oneida County, is a 131-acre spring lake with a maximum depth of 15 feet (**Figure 1.**). There is one public boat landing located in the southwest corner (**Figure 2**). The substrate is 70% sand, 15% gravel, 5% rock, and 10% muck. Along with reporting the depth and substrate, the Wisconsin Department of Natural Resources (WDNR) reports that the lake has musky, panfish, largemouth bass, northern pike, and walleye.

Field Notes (weather): The weather while conducting research on Maple Lake was partly cloudy and slightly windy. The air temperature was 64 degrees Fahrenheit, and there was 39% humidity. The wind was blowing at 8 miles per hour from the North East.

Field Notes (AIS monitoring): We completed a visual meander survey around the entire lake's perimeter, searching both sides of the canoe, and moving in and out between various water depths. Polarized sunglasses were used to aide in looking at the bottom substrate. Throughout our monitoring, we made note of the plants and animals we observed in the process (see **Table 1**). Aquatic invasive species observed were Banded Mystery Snails, Chinese Mystery Snails, and Purple Loosestrife, which were all previously found and verified in Maple Lake. Information on these species can be found in the AIS Quick Guides in **Appendix A.**

Field Notes (water quality monitoring): To observe the water clarity and quality on Maple Lake, we used a depth finder and maps indicating where data had been collected in the past to locate the deep hole. We were not able to locate the exact deep hole, but we were in the general area according to the maps. We used a Secchi disk to measure water clarity and a dissolved oxygen meter to measure water quality. Oxygen is needed for a healthy fish population, and also for plants to respire at night. The measurements from the dissolved oxygen meter can tell us if the organisms in the lake are under stress. The dissolved oxygen measurements on Maple Lake looked healthy with high dissolved oxygen percentages all the way to the bottom. These measurements can be found in **Table 2**. The Secchi disk reading was at 12 feet out of a maximum depth of 12 feet.

Figure 1. Map of Oneida County, WI with Maple Lake circled in red.

Figure 2. Map of Maple Lake.

Map Key

Boat Landing

Location of dissolved oxygen and Secchi disk reading
Latitude: 45.803469
Longitude: -89.162496

Table 1. Common plants found in Maple Lake while monitoring.

Blue Flag Iris *(Iris versicolor)* **Description:** A semi-aquatic to emergent perennial. Flowers are deep blue to purple, 6 parted, 6-8 cm wide. Sepals may have greenish-yellow markings at the base surrounded by a white zone. Leaves are narrow, sword-like; arranged in flattened, fan-like clusters. Flowers stalks (20-80 cm high) are taller than the leaves. **Status:** Native *Photo Credit: Wisconsin Department of Natural Resources*	
Broad-leaved Cattail *(Typha latifolia)* **Description:** An emergent plant. Leaves are sword-like (10-23 mm wide, 1 – 3 m tall). The flower resembles a hotdog on a stick. The pollen that this plant contains is shed in clusters of four grains. Broadleaf cattail will often cross with narrow-leaf cattail to form the hybrid, Typha x glauca. **Status:** Native *Photo Credit: www.nwplants.com*	
Bullhead Pond Lily *(Nuphar variegata)* **Description:** Heart shaped leaves up to 40cm long, floating on surface. Has a cup-shaped yellow flower, often with dark patches at the base of each petal. Leaves originate from a thick, spongy rhizome, which can be uprooted. **Status:** Native *Photo Credit: discoverlife.org*	
Clasping-leaf pondweed *(Potamogeton richardsonii)* **Description:** A submerged aquatic plant. Leaves are wavy and smooth leaf edges and pointed tips. **Status:** Native *Photo Credit: Paul Skawinski*	
Coontail *(Ceratophyllum demersum)* **Description:** An aquatic plant that is heavily branched and light green to brown in color. This plant grows to be 2 m tall, has whorled leaves that branch once or twice, and is bushy at the tip. **Status:** Native *Photo Credit: illinoiswildflowers.info*	
Fern Pondweed *(Potamogeton robbinsii)* **Description:** Stems and leaves firm, often dark green to brown. Leaves are long, pointed, and occurring in 2 opposite directions from the stem. Leaves are usually closely spaced on the stem. **Status:** Native Photo Credit: Paul Skawinski	

Purple Loosestrife *(Lythrum salicaria)*

Description: A flowering plant with a square or 6-sided stem and smooth leaves. Flowers tend to be a pinkish purple with 6 petals.

Status: INVASIVE

Photo Credit: Dave Britton

Water Shield *(Brasenia schreberi)*

Description: An aquatic plant with stems up to 2 meters long. This plant has small floating leaves and reddish purple flowers that have 6-8 petals.

Status: Native

Photo Credit: Shannon Sharp

White Water Lily *(Nymphaea odorata)*

Description: An aquatic plant that has large, round leaves that can grow to be 12 inches in diameter. White water lilies also have large, white flowers with many petals.

Status: Native

Photo Credit: Stephanie Boismenue

Table 2. Dissolved oxygen levels and temperatures at the deep hole.

Depth (Feet)	Temperature (°F)	Percent of Dissolved Oxygen	Dissolved Oxygen Levels (mg/L)
1	74.4	103.8%	8.39
2	73.5	103.9%	8.39
3	74.5	103.9%	8.39
4	74.5	103.9%	8.39
5	74.5	103.9%	8.39
6	74.5	103.9%	8.39
7	74.5	104.0%	8.40
8	74.4	105.4%	8.50
9	74.4	106.2%	8.59
10	74.4	106.6%	8.62
11	74.4	106.1%	8.55

Resources: https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=1609900

Appendix A. AIS Quick Guides

Aquatic Invasive Species Quick Guide

Golden Sands Resource Conservation & Development Council, Inc.

Chinese Mystery Snail (*Cipangopaludina chinensis* Reeve)

Description: Chinese mystery snails are often large, up to nearly 3 inches tall. Shells are typically dark brown, and may have some dark vertical ridges near the opening. The lowermost whorl of the shell is usually much wider than the rest of the shell. At the opening of the shell, a thick, hardened plate called an operculum is able to seal the shell against predators or harmful chemicals in the water. Chinese mystery snails are capable of grazing algae from surfaces and filter-feeding on suspended algae particles.

North American Distribution: Scattered across North America, but they are most abundant in the eastern and central United States.

The Chinese mystery snail can be nearly 3 inches tall.

Chinese mystery snails have a tough plate called an operculum covering the shell opening.

Dispersal Vectors: Native to eastern Asia, Chinese mystery snails were first imported to the U.S. in the late 1800s as a food item in oriental markets. It is believed that some people may have "seeded" these snails into local waterways for later harvest. Chinese mystery snails are also introduced to water gardens for the purpose of clarifying the water and grazing algae from hard surfaces. At any time during summer and fall, each female may contain dozens of small snails at different stages of development. She occasionally gives birth to small batches of live young, complete with shells.

Ecological Impacts: Chinese mystery snails likely compete for food and resources with native snails and other grazers or filter-feeders. Some research studies suggest that impacts to native species may be insignificant. Chinese mystery snails serve as a secondary host for a trematode parasite that has been killing large numbers of waterfowl in the Midwestern U.S. Some larger animals like turtles or muskrats may occasionally feed on Chinese mystery snails.

Control Options: Manual removal of Chinese mystery snails remains the only effective method of control. Of course, the effect on the population depends on the number removed and the total population size. These snails prefer mucky, organic sediments, so manual removal is likely to be a difficult option in many areas.

Chemical control efforts tend to be unsuccessful and have unintended consequences to native snails and/or other animals. Chinese mystery snails can seal up their shells with their operculum, protecting them from unfavorable conditions like chemical pesticides. Most North American snails do not have this ability and would be harmed.

Juvenile Chinese mystery snails, just minutes old.

Additional Information:

Dillon, R. T. Jr., M. Ashton, M. Kohl, W. Reeves, T. Smith, T. Stewart & B. Watson 2013. *The freshwater gastropods of North America*. http://www.fwgna.org.

Global Invasive Species Database. *Bellamya chinensis*. http://www.issg.org/database/species/ecology.asp?si=1812&fr=1&sts=sss&lang=EN

Photo credit: Paul Skawinski

Developed by Golden Sands Resource Conservation & Development (RC&D) Council, Inc. as part of an aquatic invasive species (AIS) education program, supported by an AIS grant from the Wisconsin Department of Natural Resources. CMS-1-14

Aquatic Invasive Species Quick Guide

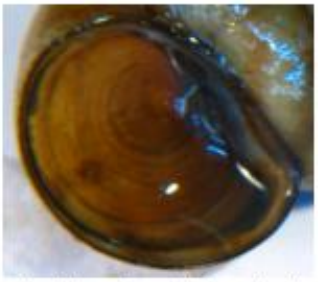
Banded Mystery Snail (*Viviparus georgianus* Lea)

Golden Sands Resource Conservation & Development Council, Inc.

Description: The banded mystery snail is a member of the family Viviparidae. Snails in this family give birth to live young, complete with shells. The shell is up to 1.5 inches tall, and 1-1.5 inches wide. Horizontal brown bands on the shell are visible from outside or inside the shell. A sturdy operculum is able to seal off the shell when the snail feels threatened. A typical life span is 3 years for males and 4 years for females. Mass die-offs of mature banded mystery snails are common in early spring after reproduction. Banded mystery snails occupy silt, marl, muck, and sand substrates.

North American Distribution: Southeastern U.S., lower Mississippi River, the Great Lakes states, northeastern U.S., and Quebec.

The banded mystery snail is usually about an inch tall and has distinct horizontal bands.



Banded mystery snails have a tough plate called an operculum covering the shell opening.

Dispersal Vectors: Banded mystery snails are native to the southeastern U.S. They were first documented in the Great Lakes basin in 1867 when 200 banded mystery snails were intentionally released by a civilian into the Hudson River drainage. Introductions have probably also occurred via the aquarium trade.

Ecological Impacts: Primarily grazes on diatoms, green algae, and fish eggs, but it is also capable of filter-feeding. First- and second-year individuals may be consumed by turtles, fish, and crayfish. Banded mystery snails have been documented at densities as high as 864 individuals per square meter. This species probably competes for food and resources with native snail species, but no serious negative impacts have been documented in its introduced range. It has been identified as an intermediate host to multiple trematode parasites, which have been involved in waterfowl die-offs in the Upper Mississippi River area.

Control Options: Manual removal of banded mystery snails is possible, but probably impractical in most situations.

Several chemical pesticides have been used to control snails in aquaculture ponds, but the banded mystery snail's thick operculum makes it less susceptible to these chemicals. Since most native snails do not have an operculum to seal off their shell, these native species are much more susceptible to pesticides.

An effective biological control agent is not known at this time.

A mass die-off of mature banded mystery snails.

Additional Information:

Eckblad, J.W. and M.H. Shealy, Jr. 1972. Predation on largemouth bass embryos by the pond snail *Viviparus georgianus*. Transactions of the American Fisheries Society. 101 (4): 734-738.

Kipp, R.M., A.J. Benson, J. Larson, and A. Fusaro. 2013. *Viviparus georgianus*. USGS Nonindigenous Aquatic Species Database, Gainesville, FL. http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=1047 Revision Date: 3/12/2013

Photo credit: Paul Skawinski

Developed by Golden Sands Resource Conservation & Development (RC&D) Council, Inc. as part of an aquatic invasive species (AIS) education program, supported by an AIS grant from the Wisconsin Department of Natural Resources. BMS-1-14

Aquatic Invasive Species Quick Guide

Purple Loosestrife (*Lythrum salicaria* L.)

Golden Sands Resource Conservation & Development Council, Inc.

Description: Purple loosestrife is a perennial wetland plant in the Lythraceae family, growing to about 8 feet tall. Stems are woody, and 4-sided (rarely 6-sided in very large plants). Leaves are opposite or occasionally in whorls of 3, with smooth margins and no leaf stalk. Each flower has six petals, and many whorls of these flowers bloom at the same time. Large plants may have many pink-purple flower spikes. Fruit capsules contain thousands of seeds each.

North American Distribution: Nearly all U.S. states and the southern Canadian provinces. Reported as far north as 65°N latitude.

Purple loosestrife flowers have six wrinkled, pink-purple petals.

Purple loosestrife produces tall flower spikes and stands up to 8 feet tall.

Dispersal Vectors: Purple loosestrife seeds probably arrived in North America from Europe, in heaps of soil used for ship ballast. It also may have been intentionally imported for ornamental use, medicinal use, or use by beekeepers. Large purple loosestrife plants can produce over two million wind-dispersed seeds per year.

Ecological Impacts: Purple loosestrife can rapidly colonize new areas, displacing native vegetative communities. In many wetlands, purple loosestrife has become the dominant species. Nesting habitat quality can decrease as the result of purple loosestrife introduction, reducing the waterfowl and shorebird communities. Some cultivars of purple loosestrife can also hybridize with our native winged loosestrife (*Lythrum alatum*), reducing the native's genetic integrity.

Control Options: Manual removal of small stands of purple loosestrife can be very effective. Plants in moist, soft substrate can often be pulled out by hand, including the roots. Very large plants may require some digging to remove the entire plant. Cutting flowerheads or seedheads can prevent seed dispersal in the short term, but plants will re-sprout from the roots and may produce new flower spikes.

Glyphosate or 2,4-D-based herbicides can be used; they should be approved for aquatic use to avoid unnecessary harm to the ecosystem. For scattered plants, herbicide is best applied with a small bottle and a wicking tip that can be used to "paint" herbicide onto the plants. Cutting the stem near the base and "painting" the cut stem is often effective. Most states require chemical use permits for any herbicide treatments in standing water or wetland situations.

Purple loosestrife stems are woody and nearly square.

Biological control of purple loosestrife is a widely used, effective method of control. *Galerucella* beetles feed on purple loosestrife without negatively affecting native wetland plants. Many states and organizations offer free assistance to volunteers looking to raise *Galerucella* beetles for local release into infested wetlands.

Additional Information:

Mai, T.K., Lovett-Doust, J., Lovett-Doust, L., and Mulligan, G. A. 1992. The biology of Canadian weeds. 100. *Lythrum salicaria*. Can. J. Plant Sci. 72: 1305-1330

Wisconsin Department of Natural Resources. Purple loosestrife biocontrol. http://dnr.wi.gov/topic/invasives/loosestrife.html

Photo credit: Paul Skawinski

Developed by Golden Sands Resource Conservation & Development (RC&D) Council, Inc. as part of an aquatic invasive species (AIS) education program, supported by an AIS grant from the Wisconsin Department of Natural Resources. PL-1-14

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Maple Lake Shoreline Only AIS Monitoring Report

Land & Water Conservation Department

Field Date:	July 21, 2017
WBIC:	1609900
Previous AIS Findings:	Banded Mystery Snail and Chinese Mystery Snail
New AIS Findings:	Purple Loosestrife
Field Crew:	Aubrey Nycz, AIS Project Leader and Thomas Boisvert, AIS Project Assistant, Oneida County Land and Water Conservation Department
Report by:	Thomas Boisvert

On July 21st, 2017, Aubrey Nycz, AIS Project Leader and Thomas Boisvert, AIS Project Assistant, headed to Maple Lake to attend to a concern about Purple Loosestrife. When on Maple Lake, Aubrey and Tom had confirmed that Purple Loosestrife was located along the northeast corner of the lake. After confirming this, a complete shoreline scan was done to look for more Purple Loosestrife and other possible invasives. After completing the full shoreline scan it was clear that the Purple Loosestrife has not spread anywhere else at the moment, and there were no other new invasives along the shoreline.

The Oneida County AIS team would recommend a beetle treatment for the affected area next year, and to clip the flowers in the meantime, before seeding starts to occur.

Findings:

Aquatic Invasive Species:

Purple Loosestrife was found on Maple Lake. This invasive has not been recorded here in the past.

Figure 1. Map of Maple Lake with the public boat landing represented by a yellow triangle, and Purple Loosestrife patch represented by a purple line.

Figure 2. Map of Oneida County, WI with the approximate location of Maple Lake circled in red.

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Land & Water Conservation Department

Maple Lake AIS Monitoring and Water Clarity Report

WBIC:	1609900
Previous AIS Findings:	Banded Mystery Snail, Chinese Mystery Snail
New AIS Findings:	None
Field Date:	August 4, 2015
Field Crew:	Stephanie Boismenue, Sara Mills, and Samantha Zommers, AIS Project Assistants, Oneida County Land and Water Conservation Department
Volunteer Crew:	June McDuffie, Maple Lake resident
Report By:	Samantha Zommers

On August 4, 2015, Stephanie, Sara, and I visited Maple Lake and June McDuffie joined our team to assist with activities and learn about the lake. We visited Maple Lake to conduct AIS monitoring as a follow-up on a report of a purple loosestrife sighting, and since we were on the lake, we decided to obtain baseline water quality monitoring as well.

Maple Lake is 131 acres and is located in the Town of Three Lakes (Figure 1). The lake has a maximum depth of 15 feet, means depth of 8 feet and the bottom substrate is composed of 70% sand, 15% gravel, 5% rock, and 10% muck. Maple Lake is a spring fed lake which means that its source of water is groundwater or it is spring-fed. The fisheries consist of musky, panfish, largemouth bass, northern pike, and walleye. According to the Water Quality and Reports data listed on the DNR's website, volunteers have monitored Maple Lake since 1991. The water quality is excellent and the trophic state index is listed as mesotrophic. Mesotrophic lakes are commonly clear waterbodies with a variety of submerged aquatic plants and support a wide variety of fish. They have an intermediate level of nutrients and productivity, more than oligotrophic lakes, but not nearly as much as eutrophic lakes.

We entered with the canoes from Junes dock, on Timbershore Drive (Figure 3). Using a bathymetric map (Figure 2), the three of us canoed to the deep hole using a depth finder. After canoeing around the area of the deep hole, we used a point with a depth of 13 feet out of a possible depth of 15 feet. At this point Stephanie anchored so that we could do our water quality measurements. I used the dissolved oxygen meter to find the dissolved oxygen readings and temperature readings (Table 1), while Sara recorded. Sara then used the Secchi disk to measure water clarity while I recorded. During this time Stephanie used the GPS to record the exact location of our deep hole water quality measurements.

The main reason we visited Maple Lake was to follow-up on June's report of a potential purple loosestrife sighting. She had suspicions that there was purple loosestrife along the northwest shoreline, which is where we searched for a presence/absence check (Figure 3). While along this shoreline we also did a presence/absence check for other invasive species.

Findings:

Aquatic Invasive Species: No new AIS were observed.

Dissolved Oxygen: See Table 1.

Secchi: The Secchi reading on this lake was 13 feet at a depth of 14 feet.

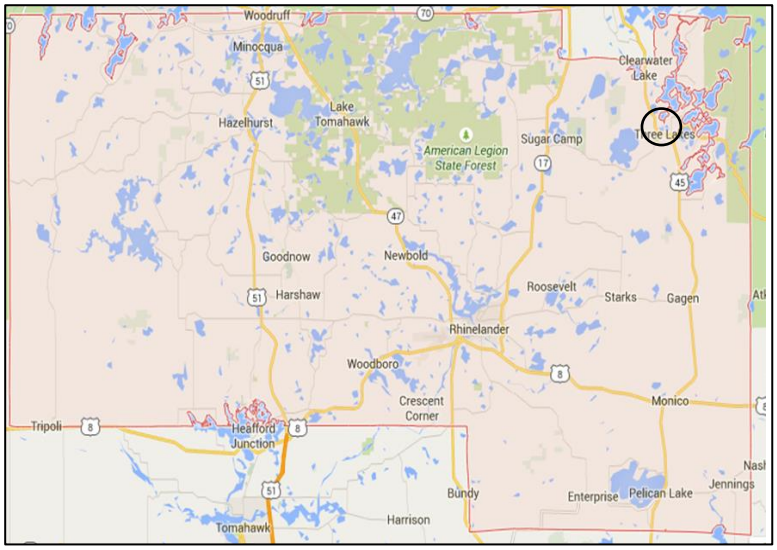

Figure 1. Map of Oneida County, WI with Maple Lake circled.

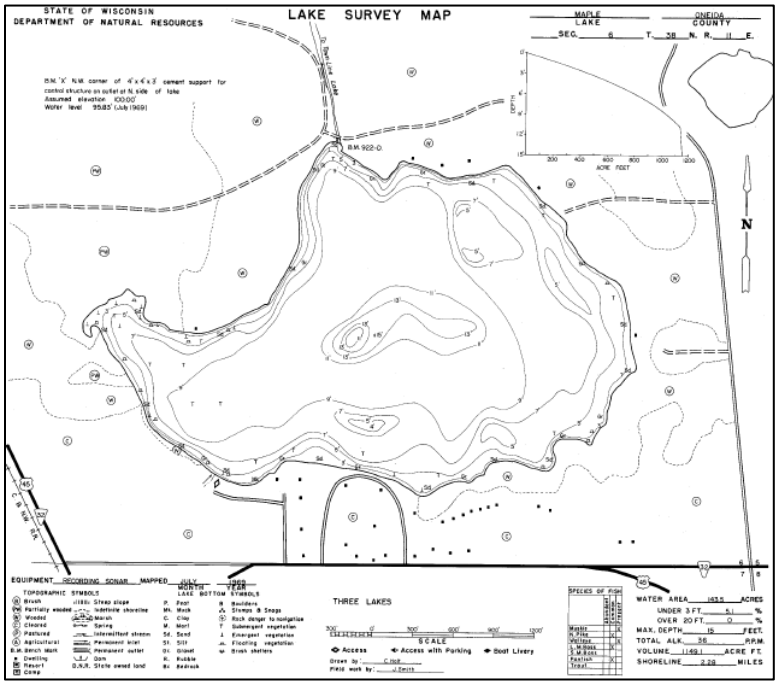

Figure 2. Bathymetric map of Maple Lake in Oneida County, WI.

Figure 3. Map of Maple Lake showing the locations of AIS presence/absence check and water quality monitoring activites. Deep Hole GPS Coordinates: 45.80285148, -89.16418484

Table 1. Dissolved oxygen levels and temperature. Data entered into SWIMS.

Depth (Feet)	Dissolved Oxygen Levels (mg/L)	Temperature (°F)
2	7.98	72.7
4	7.96	72.7
6	8.54	72.5
8	8.62	72.4
10	8.73	72.2
12	8.72	72.1

Resources: http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=1609900&page=facts
Map Source: Wisconsin Department of Natural Resources 608-266-2621, Maple Lake – Oneida County, Wisconsin – DNR Lake Map, Date –July, 1969– Historical Lake Map