Oneida COUNTY
Land & Water Conservation Department

Hodstradt Lake

Oneida County, Wisconsin

Land & Water Conservation Department

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Hodstradt Lake AIS Monitoring and Water Clarity Report

Field Date:	July 28, 2022
WBIC:	990700
Previous AIS Findings:	Chinese Mystery Snails
New AIS Findings:	Purple Loosestrife
Field Crew:	Aubrey Nycz, AIS Lead 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, including beaches and boat landings, inlets and outlets, and 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.

Hodstradt Lake Data: Hodstradt Lake, located in the Town of Lake Tomahawk, Oneida County, is a 119-acre seepage lake with a maximum depth of 36 feet (**Figure 1**.). There is one public boat landing on Hodstradt Lake located on Brush Road (**Figure 2**). The substrate is 60% sand, 10% gravel, 20% rock, and 10% muck. Along with reporting the depth and substrate, the Wisconsin Department of Natural Resources (WDNR) reports that the lake has panfish, largemouth bass, smallmouth bass, and walleye.

Field Notes (weather): The weather while conducting research on Hodstradt Lake was brisk and partly cloudy. The air temperature was 67 degrees Fahrenheit. The winds were blowing at 15 miles per hour from the northwest.

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**). During our search, we found a single Purple Loosestrife plant, which has not been identified out there before. We also observed previously identified Chinese Mystery Snails. Information on Purple Loosestrife and Chinese Mystery Snails can be found in the *AIS Quick Guide* in **Appendix A.**

Field Notes (water quality monitoring): To observe the water clarity and quality on Hodstradt Lake, we used a depth finder and maps indicating where data had been collected in the past to locate the deep hole. After locating the deep hole, 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 Hodstradt Lake looked healthy. Unfortunately, we were not able to obtain dissolved oxygen measurements past 32 feet due to an increasing amount of wind. The dissolved oxygen meter has difficulties getting readings when water is choppy. The measurements we did obtain can be found in **Table 2**. The Secchi disk reading was at 16 feet out of a maximum depth of 41 feet.

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

Figure 2. Map of Hodstradt Lake.

Map Key

Boat Landing

Location of dissolved oxygen and Secchi disk reading

Latitude: 45.809307

Longitude: -89.564523

Site of Purple Loosestrife Plant

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

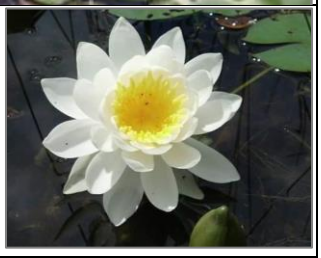
Floating Bur-reed *(Sparganium fluctuans)* **Description:** An emergent plant. Stem is usually submerged can can be up to 5 feet long. Lesves are flat, spear-like, and can grow 40 inches long. Flowers are small and are in globular clusters. **Status:** Native *Photo Credit: science.halleyhosting.com*	
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*	
Variable Leaf Pondweed *Potamogeton gramineus* **Description:** Submergent leaves with 3-7 veins and floating leaves with 11-19 veins. Can be found growing at various water depths. **Status:** Native *Photo Credit: outdooralabama.com*	
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)
2	73.8	105.8	8.54
4	74	105.9	8.53
6	74	105.8	8.53
8	74.1	105.8	8.52
10	74.1	105.8	8.53
12	74.1	106.1	8.55
14	74.1	106.2	8.56
16	74.1	106.3	8.57
18	73.4	112.5	9.08
20	69.6	143.2	12.13
22	63.7	138.8	12.53
24	59.7	130.7	12.36
26	62.0	122.1	11.53
28	59.8	119.2	11.42
30	55.8	73.0	7.24
32	53.1	7.7	0.83

Resources: https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=990700

Appendix A. *AIS Quick Guide*

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

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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Land & Water Conservation Department

Hodstradt Lake AIS Monitoring and Water Clarity Report

WBIC:	990700
Previous AIS Findings:	Chinese Mystery Snails
New AIS Findings:	None
Field Date:	July 17, 2019
Field Crew:	Isaac Benz and Lauren Radtke AIS Project Assistants, Oneida County Land and Water Conservation Department
Report by:	Aubrey Nycz, Lead Project Assistant

On July 17, 2019, Lauren Radtke and Isaac Benz went to Hodstradt Lake, located in Oneida County (Figure 1), to do Aquatic Invasive Species (AIS) monitoring along with water clarity and quality assessments. Hodstradt Lake is a 119 acre seepage lake with a maximum depth of 36 feet. The substrate is 60% sand, 10% gravel, 20% rock, 10% muck, and overall, the water clarity appears to be very clear. Along with reporting the depth and substrate, the Wisconsin Department of Natural Resources (WDNR) reports that Hodstradt Lake has largemouth bass, smallmouth bass, walleye, and panfish. While monitoring the lake, we observed panfish swimming in the shallow parts of the lake. The northern side of Hodstradt Lake is surrounded by the American Legion State Forest.

They launched their canoe from the public boat landing, located on Brush Rd (Figure 2). The weather while on Hodstradt Lake was a sunny and approximately 80^{O}F; however, there was quite a bit of wind while we were out on the water.

AIS Monitoring:

They completed a visual inspection of the Hodstradt Lake from their canoe, covering the entire perimeter of the lake and moving through a variety of depths. They also walked along both sides of the boat landing, looking in the water and along the shoreline for any possible invasive species. While they were monitoring Hodstradt Lake, they made note of the plants and animals that they observed.

Water Quality Monitoring:

To measure water clarity and quality on Hodstradt Lake effectively, they used maps provided by the DNR to help us locate the deep hole (Figure 2). Once at the deep hole, a Secchi Disk was used to measure the water clarity, and a dissolved oxygen (DO) meter was used to measure the water quality. Oxygen is need 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 would be under stress. The dissolved oxygen measurements on Hodstradt Lake appeared to be normal. Wind created a slight chop on the water which may have altered some of their DO readings; however, the readings they obtained were still in the normal range for the kind of lake that Hodstradt Lake is. The readings for the Secchi Disc showed 19 feet of visibility out of a maximum depth of 35 feet.

Overall, Hodstradt Lake appeared to be healthy, no new invasive species were detected, and many native plants were present. A detailed list of the plants that we found on the lake can be found in table 2.

Findings:
Taken between 10:00am and 11:00am.

Aquatic Invasive Species:
No new invasive species were discovered.

Secchi Disc:
The Secchi Disk reading on this lake was an estimated 19 feet out of a maximum depth of 35 feet.

Dissolved Oxygen:
These measurements can be found in Table 1.

Figure 1. Map of Oneida County, WI with Hodstradt Lake circled in red (approximate location).

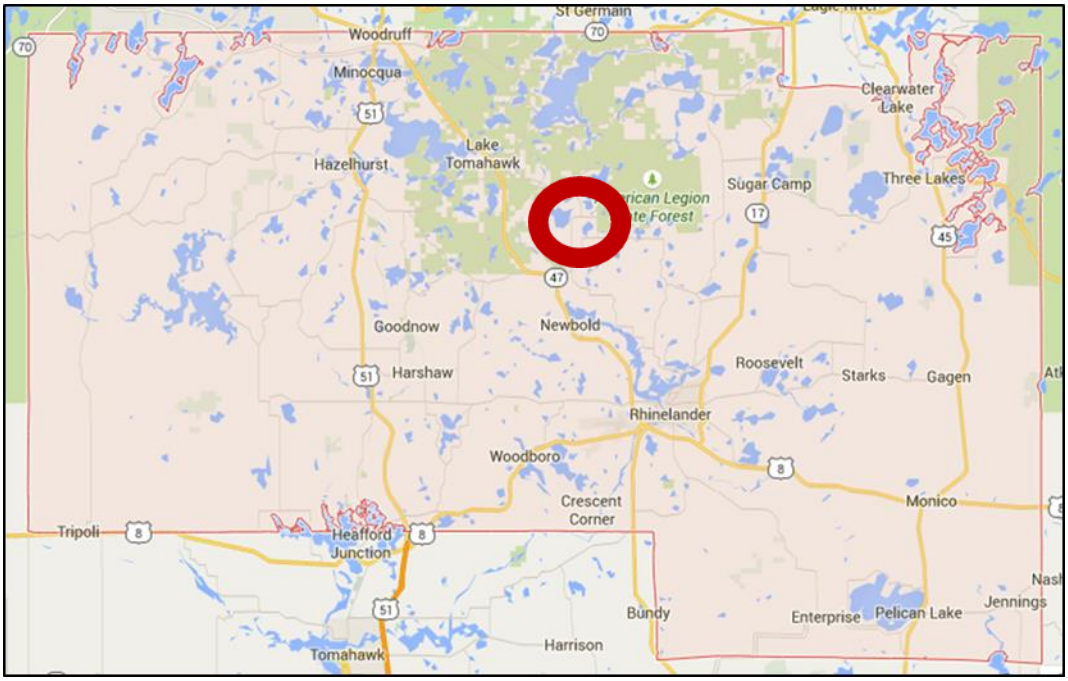

Figure 2. Map of Hodstradt Lake with the location of the boat landing and Sechi disk reading labeled.

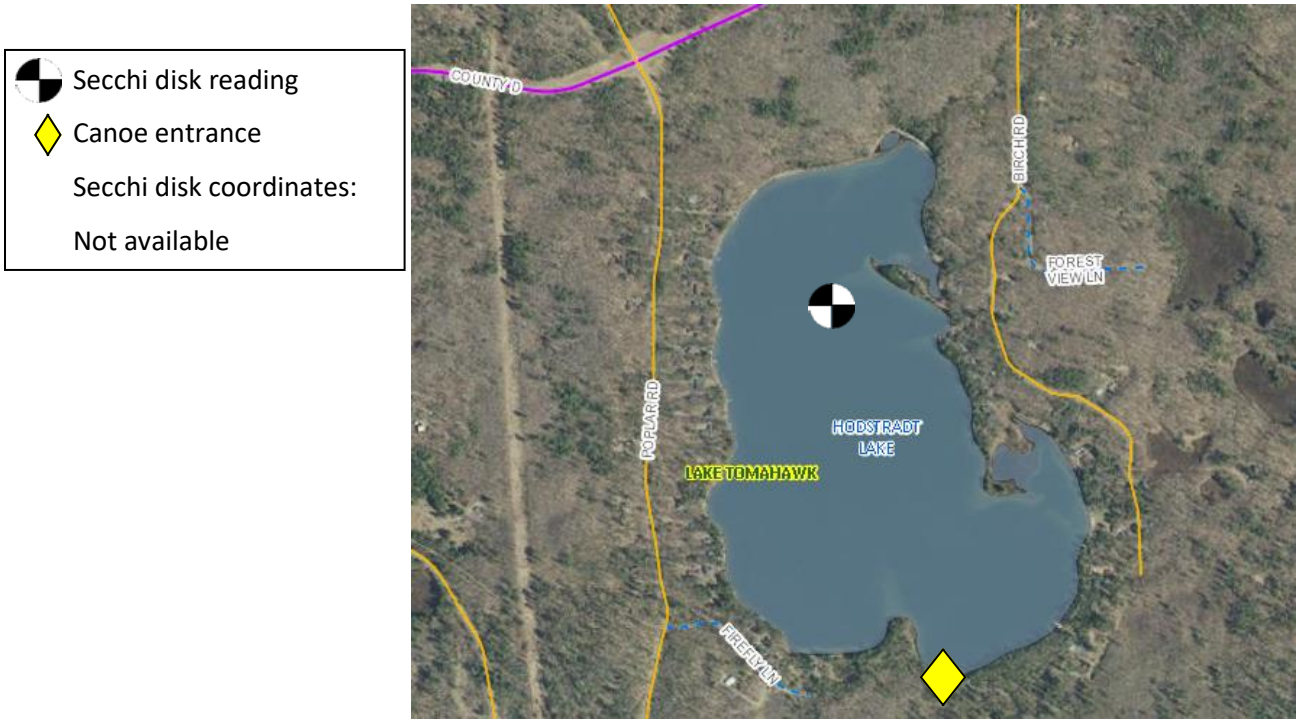

Table 1. The amount of dissolved oxygen and temperature readings in Hodstradt Lake at the deep hole site.

Depth (Feet)	Dissolved Oxygen Levels (mg/L)	Percent of Dissolved Oxygen	Temperature (°F)
3	10.32	133.5%	77.9
6	10.30	133.2%	77.8
9	10.33	133.4%	77.7
12	10.24	132.1%	77.6
15	10.83	137.1%	75.7
18	13.35	155.8%	68.0

Table 2. Plants found in Hodstradt Lake while monitoring

Bullhead Pond Lily *Nuphar variegata*

An aquatic plant with heart-shaped leaves that can grow to be 15 inches long. This plant also has a yellow, cup-shaped flower.

Status: Native.

Photo Credit: Jomegat's Weblog

Native Phragmites *Phragmites australis ssp. americanus*

A perennial grass with bright green leaves and a smooth, glossy, and reddish stem. This plant tends to have few seeds. Native phragmites will not grow taller than 8 feet.

Status: Native.

Photo Credit: mnfi.anr.msu.edu

Water Shield *Brasenia schreberi*

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. This plant is native.

Status: This plant is native.

Photo Credit: Shannon Sharp

White Water Lily *Nymphaea odorata*

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: This plant is native.

Photo Credit: Stephanie Boismenue

Northern Manna Grass *Glyceria borealis*

An aquatic plant that often lays on the water, reaching 1m long/tall. Pointed leaves have a narrow, closed sheath, a prominent midvein, and fine hairs on the upper leaf surface.

Status: This plant is native.

Photo Credit: Isaac Benz

Jean Hansen, County Conservationist
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Land & Water Conservation Department

Hodstradt Lake AIS Monitoring and Water Clarity Report

WBIC:	990700
Previous AIS Findings:	Chinese Mystery Snails
New AIS Findings:	None
Field Date:	July 30, 2014
Field Crew:	Stephanie Boismenue and Sara Mills, AIS Project Assistants, Oneida County Land and Water Conservation Department
Report by:	Sara Mills

Stephanie and I monitored Hodstradt Lake with the assistance of Shelley Lehman on 7/30/2014. We started by doing a 100 foot visual survey of the boat landing (Site 1 on Figure 1). This area was very sandy with very little amount of vegetation. We found empty shells of Chinese Mystery Snails, which we already knew that the lake had.

Next we went to the deep hole site (Figure 1) to measure with the secchi disk and the d/o meter. The Secchi disk measured the water clarity to be between 15 and 19 feet. The amount of dissolved oxygen is reported below in Table 1.

Our second visual survey for about 100 feet was along the West side of the lake (Site 2 on Figure 1) where there are a lot of private docks. This area seemed to be the same as the first site where it was very sandy with little vegetation. The legs of the docks didn't have anything attached to them and there didn't appear to be any Chinese Mystery Snails in the area.

Our third visual survey was at a beach on the North East corner of the lake (Site 3 on Figure 1) located on the American Legion State Forest. This site also had a few Chinese Mystery Snails and was very sandy. It has more vegetation than the other sites, and all of it is native vegetation.

We also retrieved the zebra mussel plate that we had attached to the dock at the boat landing 2-3 weeks prior. It came out of the water fairly clean with no indication of zebra mussels being in the lake.

Overall, the lake seemed very clean and healthy with no signs of any additional invasive species.

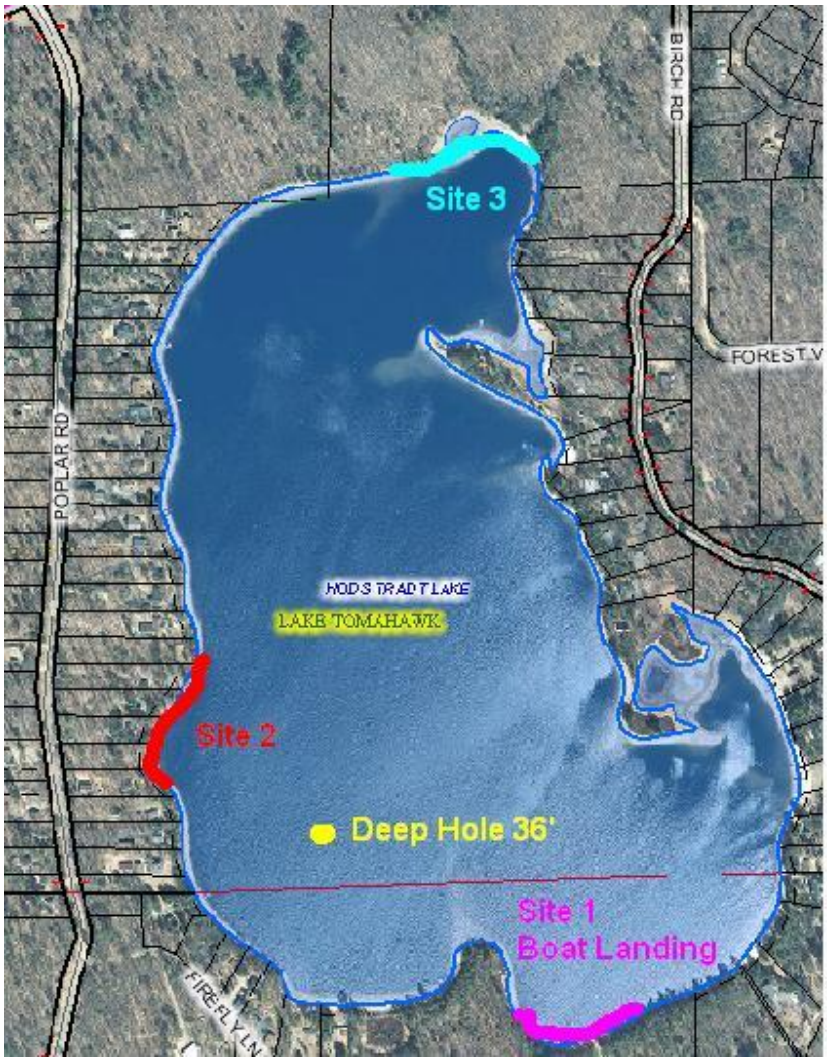

Figure 1. A map of Hodstradt Lake with lines representing the approximate locations of our visual surveys and a dot representing the deep hole site.

Table 1. The amount of dissolved oxygen and temperature readings in Hodstradt Lake at the deep hole site.

Depth	Dissolved Oxygen Level	Temperature
1’	8.71 mg/L	72.6°F
4’	8.65 mg/L	72.2°F
7’	8.64 mg/L	72.0°F
10’	8.63 mg/L	71.9°F
13’	8.60 mg/L	71.8°F
16’	8.56 mg/L	71.7°F
19’	8.52 mg/L	71.7°F
22’	8.49 mg/L	71.6°F
25’	8.42 mg/L	71.5°F