



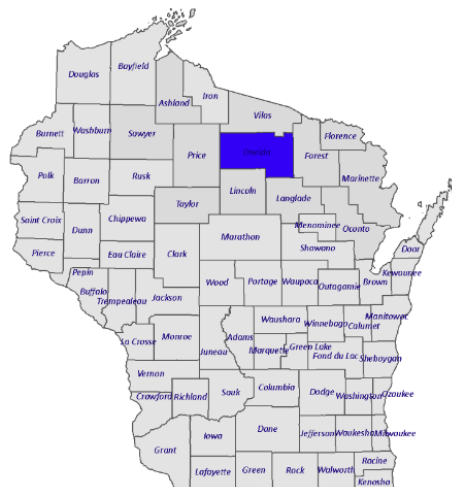
Emma Lake

Oneida County, Wisconsin

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Emma Lake AIS Monitoring and Water Clarity Report

Field Date: July 14, 2022
WBIC: 983500
Previous AIS Findings: No previous AIS findings.
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.

Emma Lake Data: Emma Lake, located in the Town of Crescent, Oneida County, is a 227-acre seepage lake with a maximum depth of 17 feet (**Figure 1.**). There is one public boat landing located in the mid-southeast bay (**Figure 2**). The substrate is 65% sand, 5% gravel, 5% rock, and 25% muck. Along with reporting the depth and substrate, the Wisconsin Department of Natural Resources (WDNR) reports that the lake has Musky, Panfish, Largemouth Bass, Smallmouth Bass and Walleye.

Field Notes (weather): The weather while conducting research on Emma Lake was sunny and fair. The air temperature was 77 degrees Fahrenheit. There was little to no wind at times.

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. Along with monitoring Emma lake, we crossed the portage between Emma Lake and Crescent Lake to monitor a section on Crescent Lake. While on Crescent Lake, we paddled the perimeter of the southeast bay, cutting across from the peninsula to Crescent Lake Bible Camp. 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**). There were no aquatic invasive species observed in Emma Lake.

Field Notes (water quality monitoring): To observe the water clarity and quality on Emma Lake, we used a depth finder and maps indicating where data had been collected in the past to locate 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 Emma Lake looked healthy. These measurements can be found in **Table 2**. The Secchi disk reading was at 7 feet out of a maximum depth of 17.2 feet.

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

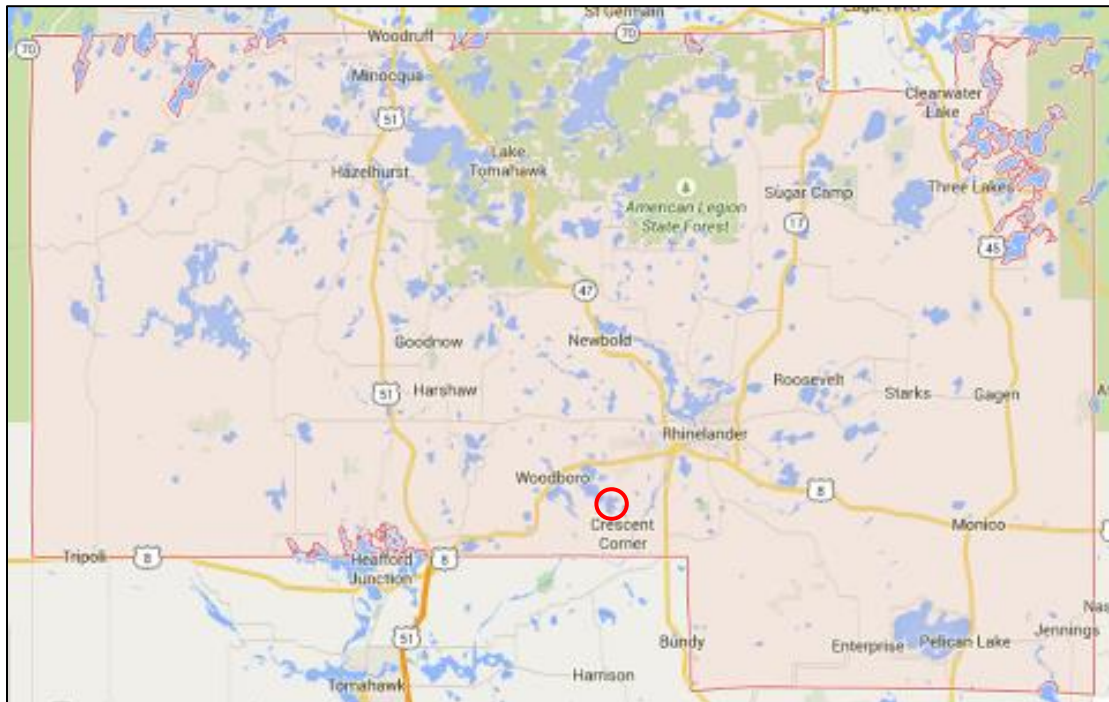
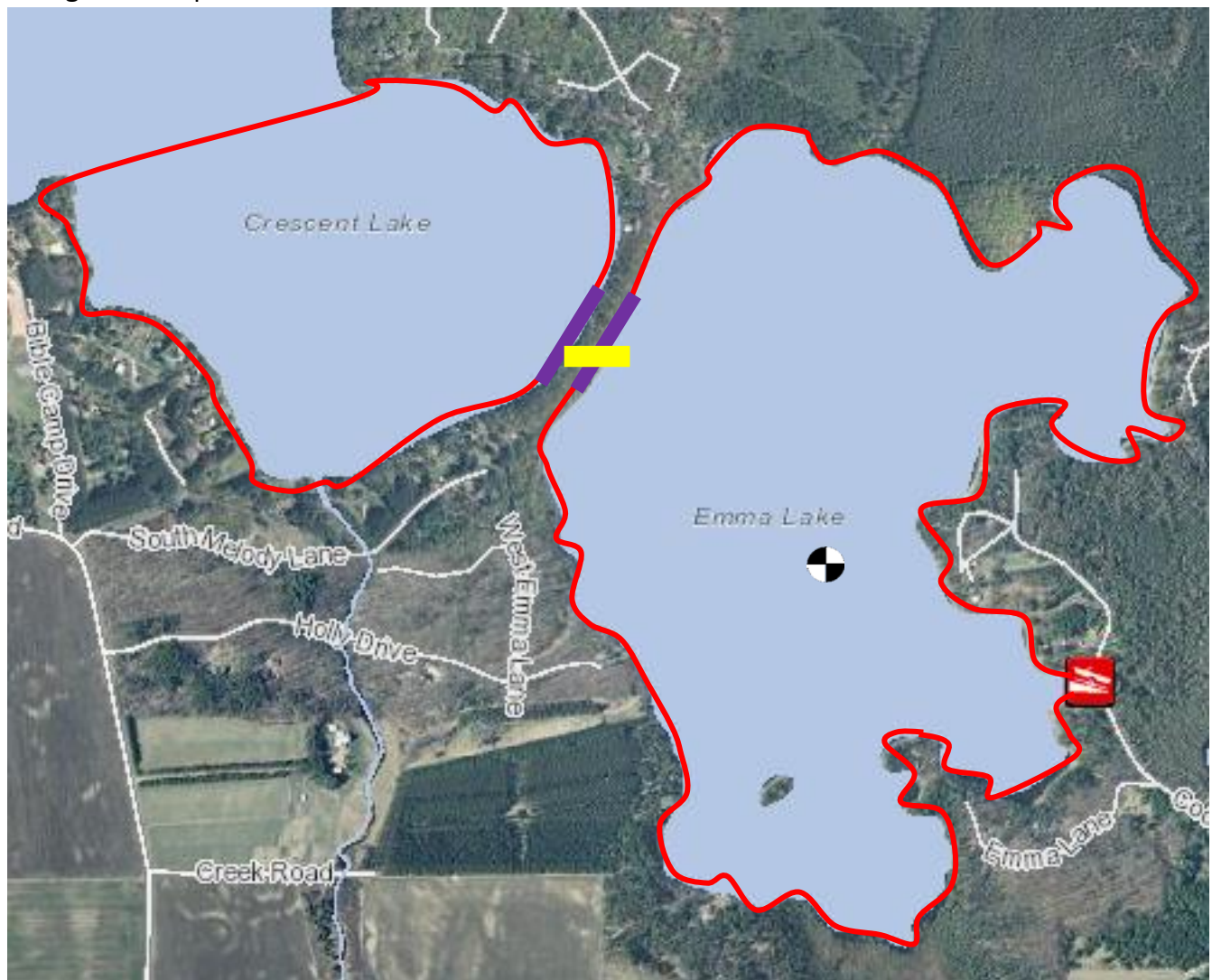


Figure 2. Map of Emma Lake.



Map Key



Boat Landing



Location of dissolved oxygen and Secchi disk reading

Latitude: 45.610464

Longitude: -89.332265



Portage



Area Monitored by Canoe



Area Monitored by Foot

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






<p>Bullhead Pond Lily (<i>Nuphar variegata</i>)</p> <p>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.</p> <p>Status: Native</p> <p><i>Photo Credit: discoverlife.org</i></p>	
<p>Pickereel Weed (<i>Pontederia cordata</i>)</p> <p>Description: An aquatic plant with thin, bright green leaves. Emergent leaves tend to be arrow shaped with 6 parted, blue flowers.</p> <p>Status: Native</p> <p><i>Photo Credit: asapaquatics.com</i></p>	
<p>Water Shield (<i>Brasenia schreberi</i>)</p> <p>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.</p> <p>Status: Native</p> <p><i>Photo Credit: Shannon Sharp</i></p>	
<p>Water Smartweed (<i>Persicaria amphibian</i>)</p> <p>Description: An aquatic, floating plant with swollen leaf nodes. Leaves tend to be smooth and rounded. Water smartweed has pink flowers that are raised a few inches above the water.</p> <p>Status: Native</p> <p><i>Photo Credit: Superior Natl. Forest</i></p>	
<p>White Water Lily (<i>Nymphaea odorata</i>)</p> <p>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.</p> <p>Status: Native</p> <p><i>Photo Credit: Stephanie Boismenue</i></p>	

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	74.1	96.9%	7.89
2	74.0	96.3%	7.84
3	73.9	94.7%	7.72
4	73.7	92.8%	7.58
5	73.4	90.0%	7.38
6	73.3	89.2%	7.32
7	73.3	89.0%	7.31
8	73.2	89.1%	7.31
9	73.2	88.2%	7.23
10	73.2	88.0%	7.23
11	73.0	77.3%	6.36
12	72.8	50.5%	4.16
13	71.9	11.0%	0.90
14	70.9	2.5%	0.21
15	69.7	1.6%	0.14
16	68.6	1.4%	0.12

Resources: <https://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=983500>



Land & Water Conservation Department

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Emma Lake AIS Monitoring and Water Clarity Report

Field Date: June 14th, 2018
WBIC: 983500
Previous AIS Findings: None
New AIS Findings: None
Field Crew: Stephanie Boismenu, AIS Coordinator, Aubrey Nycz, AIS Project Leader, Vanessa Niemczyk, AIS Project Assistant, and Jody Partin, AIS Project Assistant, Oneida County Land and Water Conservation Department
Report By: Vanessa Niemczyk

On June 14th, 2018, Stephanie, Aubrey, Jody, and I went to Emma Lake to implement AIS monitoring along with water clarity and quality assessments. Emma Lake is a 227 acre mesotrophic lake located in Oneida County and has one public boat launch. The shoreline along Emma Lake is composed of private owners and public land. A narrow strip of public land connects Emma Lake and Crescent Lake, which is part of a portage trail. The lake has a maximum depth of 17 feet, and the substrate is reported to be 65% sand, 5% gravel, 5% rock, and 25% muck. Along with reporting the depth and substrate, the Wisconsin Department of Natural Resources also reports that the lake has musky, smallmouth bass, largemouth bass, and panfish present. We observed this firsthand as panfish and spawning beds were seen in moderate quantities along the shoreline.

The weather while conducting research on Emma Lake was ideal. The outside temperature was 79 degrees Fahrenheit, the sky was sunny, there was little to no wind, and the water clarity was good. There was no adverse weather to impede our measurements in any way.

When conducting our AIS lake survey, the AIS team did a complete shoreline scan while meandering in and out between different depths. We looked on the shoreline itself and also in the water, noting the plants and animals we had observed in the process. When possible, we got in the water and used the aquascopes to have a closer look at the bottom composition.

To observe the water clarity and quality of Emma Lake, the AIS team went to the deep hole towards the center of the lake. After locating the deep hole with our sonar unit, we used a Secchi disk to measure water clarity and a dissolved oxygen meter to measure water health. 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 would be under stress. Thankfully, both of these measurements were relatively average in nature, and there should be no concern for the health of Emma Lake. The Secchi disk reading was 4 feet, and the dissolved oxygen readings can be found in table 2.

The AIS team was glad to see that no new invasive species were present at this time. The lake seems to be healthy, and many native plants were present and thriving. The three most common native plants we observed were Pickerel Weed, Bullhead Pond Lily, and Wild Calla. These plants, along with others, can be seen below in table 1.

Findings: Taken 11:00 a.m. – 4:00 p.m. on June 14th, 2018

Aquatic Invasive Species: We did not find any new invasive species along the perimeter of Emma Lake.

Secchi: The Secchi reading on this lake was 4 feet out of a 17 foot maximum depth. The water color was a brownish color, and appeared murky when glancing across the lake.

Dissolved Oxygen: These measurements can be seen in Table 2.

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



Figure 2. Map of Emma Lake with boat landing and location of Secchi disk reading labeled.



Public boat landing



Deep hole & location of Secchi disk reading

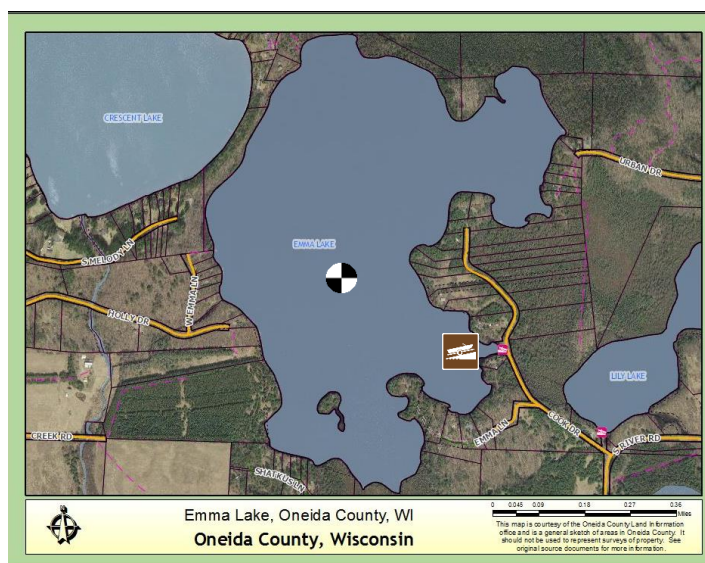





Table 1. Common plants found in Emma Lake when monitoring.

Common Plant Name Scientific Plant Name	Description	Image
<p>Pickereel Weed</p> <p><i>Pontederia cordata</i></p>	<p>An aquatic plant with thin, bright green leaves. Emergent leaves tend to be arrow shaped with 6 parted, blue flowers. This plant is native.</p>	 <p>Photo Credit: Jody Partin</p>
<p>Bullhead Pond Lily (Spatterdock)</p> <p><i>Nuphar variegata</i></p>	<p>An aquatic plant with heart-shaped leaves that can grow to be 15 inches long. This plant also has a yellow, cup-shaped flower. This plant is native.</p>	 <p>Photo Credit: Jomegat's Weblog</p>
<p>Wild Calla</p> <p><i>Calla Palustris</i></p>	<p>A native plant common in more acidic, shallow water and bogs. They typically bloom between May and June, and can be identified by having waxy smooth, heart-shaped leaves, and nearly cylindrical white flowers called the spadix.</p>	 <p>Photo Credit: Gowganda Photography</p>





<p>Blue-Flag Iris</p> <p><i>Iris versicolor & Iris virginica</i></p>	<p>A flowering plant with light green leaves and petals. This plant grows to be 2-4 feet tall. The center of the leaf is thicker than the bottom and tip. This plant is native.</p>	 <p>Photo Credit: Prairie Moon Nursery</p>
<p>Water Smartweed</p> <p><i>Persicaria amphibia</i></p>	<p>An aquatic, floating plant with swollen leaf nodes. Leaves tend to be smooth and rounded. Water smartweed has pink flowers that are raised a few inches above the water. This plant is native.</p>	 <p>Photo Credit: Superior National Forest/CCSA</p>
<p>Water Shield</p> <p><i>Brasenia schreberi</i></p>	<p>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.</p>	 <p>Photo Credit: Shannon Sharp</p>
<p>Common Bladderwort</p> <p><i>Utricularia macrohiza</i></p>	<p>An aquatic plant with leaves containing small sacks that trap small invertebrates. This plant usually has unrooted stems that easily tangle with other plants. In the water, this plant tends to look cloudy or slimy. This plant is native.</p>	 <p>Photo Credit: frenchhill.org</p>

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

Depth (Feet)	Dissolved Oxygen Levels (mg/L)	Temperature (F)	Percent Dissolved Oxygen
2	8.18	73.8°	101.2%
4	8.11	7.0°	98.4%
6	7.51	70.3°	89.5%
8	68.6	6.37°	74.5%
10	4.26	66.1°	48.5%
12	0.18	60.4	1.9

Emma Lake AIS Monitoring and Water Clarity Report

WBIC: 983500
Previous AIS Findings: None
New AIS Findings: None
Field Date: July 15, 2016
Field Crew: Stephanie Boismenu, AIS Coordinator, and Aubrey Nycz, AIS Project Assistant, Oneida County Land and Water Conservation Department
Report By: Aubrey Nycz

Stephanie and I monitored Emma Lake on July 15, 2016. Emma Lake is located South-West of Rhinelander, WI in Oneida County, and the boat launch is located on Cook Drive. It is a seepage lake of 227 acres with a maximum depth of 17 feet. The substrate on the lake is 65% sand, 5% gravel, 5% rock, and 25% muck. The lake has musky, panfish, largemouth bass, smallmouth bass, and walleye. Emma Lake's trophic state is mesotrophic, meaning it has a moderate amount of dissolved nutrients. No alga was found on this lake, but the water's surface was covered with water shield, making it difficult to navigate through parts of the lake. Despite the fact that this lake has many homes around its perimeter, the lake did not appear to have much boat traffic.

There is only one public boat landing on Emma Lake, located on Cook Drive, so Stephanie and I launched our canoe at this landing. Before we began paddling around the lake's perimeter, we used our aqua scopes to check the shoreline for any invasive species. We did find some snails, but fortunately, they were all native brown mystery snails. We visually monitored the entire perimeter of Emma Lake, and we stopped to do three AIS checks with the aqua scopes throughout the day. No invasive species were found during our aquatic invasive species checks.

The weather was fairly nice the entire day. The wind was blowing in from the north at six miles per hour, it was cloudy, and the air temperature was 64 degrees Fahrenheit. We used a contour map of Lake Emma to assist us in finding the deep hole, but we still had some difficulties finding it because the map had not been updated since January of 1940. After locating the deep hole, we took GPS coordinates, tested the water clarity using the Secchi disk, obtained the dissolved oxygen levels using the dissolved oxygen meter, and obtained the water temperature levels (Table 1). The wind did make it difficult to obtain dissolved oxygen readings, but fortunately, we were still able to get six accurate readings.

Findings: All taken starting at 12:14 p.m.

Aquatic Invasive Species:

We did not find any new invasive species along the perimeter of Emma Lake.

Secchi:

The Secchi reading on this lake was 3.5 feet out of a 17 foot max depth. The water color was a dark tea color, so I was not surprised that we could not see very far into the water.

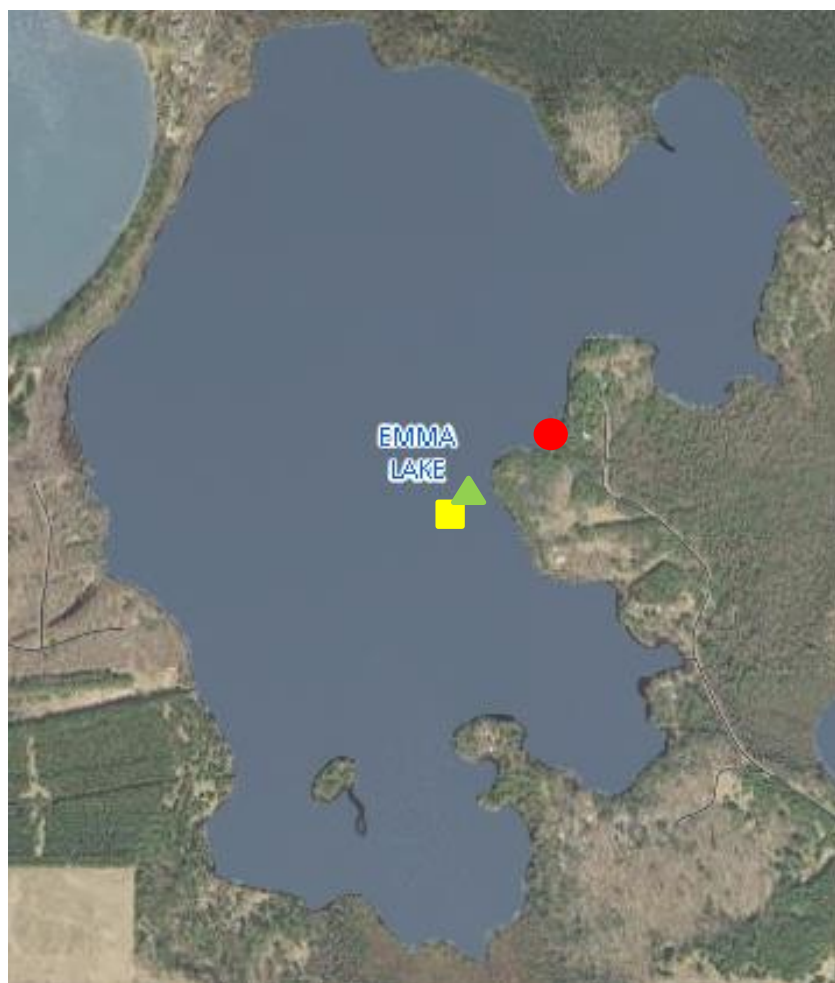
Dissolved Oxygen:

These measurements can be seen in Table 1 at two foot increments.

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



Figure 2. Map of Emma Lake; the red circle shows where we entered the lake, the yellow square shows where the deep hole can be found, the green triangle shows where we obtained our Secchi Disk coordinates.



WDNR Secchi Disk Readings: Emma Lake - Deep Hole LATITUDE 45.59 LONGITUDE -89.50

Table 1. Dissolved oxygen levels and temperatures at the deep hole.

Depth (Feet)	Dissolved Oxygen Levels (mg/L)	Temperature (F)
2	7.09	73.1°
4	6.88	73.0°
6	6.77	72.9°
8	6.42	72.5°
10	6.40	72.4°
12	6.36	72.4°

Resources:

<http://dnr.wi.gov/lakes/lakepages/LakeDetail.aspx?wbic=983500>

<https://oneida-county.maps.arcgis.com/apps/webappviewer/index.html?id=c0144697a23243d6beb981727c3e6e2b>