

# East Alaska Lake (94200) Monitoring Summary

East Alaska Lake, Kewaunee County, WI  
2023

This report documents the results of 2023 monitoring of East Alaska Lake in Kewaunee County, WI, as part of the DNR Directed Lakes Monitoring Program. More information about the lake can be found on the DNR webpage for East Alaska Lake: [Wisconsin Lakes](#). Through this program, multiple sampling techniques were completed to determine overall lake health. This included an aquatic plant survey conducted on July 12, 2023. This was complemented with three monthly water chemistry sampling events. This report details the plant survey and water chemistry results.

## Water Chemistry

East Alaska Lake is a 50-acre lake in Kewaunee County, with a maximum depth of around 50 feet. It is a drainage lake and is classified as mesotrophic. The lake has a history of management activities, including a whole-lake alum treatment in 2011. The follow-up monitoring in 2023 aims to determine if the alum treatment remains successful. Three water chemistry samples were taken on the lake during summer 2023. Parameters measured include total phosphorus, chlorophyll-a, water clarity, temperature, and dissolved oxygen. In addition, the August sample included extra parameters for analysis: chloride, color, alkalinity, calcium, magnesium, hardness, total nitrogen, and NO<sub>3</sub>+NO<sub>2</sub>.

A trophic state index (TSI) is calculated for Secchi depth, total phosphorus, and chlorophyll-a. This provides a measure of the lake's trophic state or the amount of nutrients available and allows for comparison across the three parameters. As shown below in Table 1, TSI values are roughly similar for the three parameters, with TSI (TP) the highest. TSI values between 40-50 indicate a lake with moderate water clarity but with a chance of low dissolved oxygen during the summer, which is expected for a mesotrophic lake.

**Table 1.** Monthly sample results for Secchi depth, chlorophyll-a, and total phosphorus, including the 2023 mean and 10-year average for these parameters as well as the trophic state index for 2016 and 2023.

Date	Secchi depth (ft)	Chl-a (ug/L)	TP (ug/L)
7/25/2023	7.5	6.85	14.5
8/15/2023	10.0	5.87	17.6
9/5/2023	11.2	3.46	14.9
<b>Mean</b>	<b>9.57</b>	<b>5.39</b>	<b>15.7</b>
<b>TSI (2023)</b>	<b>44.4</b>	<b>47.4</b>	<b>49.5</b>
<b>10-year average</b>	<b>8.6</b>	<b>5.2</b>	<b>14.0</b>

**Table 2.** Summary of additional water chemistry parameters sampled on August 15, 2023.

Parameter		
Chloride	24.9	mg/L
Color	20	SU
Conductivity	454	uS/cm
pH	8.43	SU
Alkalinity	195	mg/L
Calcium	36.5	mg/L
Magnesium	32.3	mg/L
Hardness	224	mg/L
NO <sub>3</sub> +NO <sub>2</sub>	Non-detect	mg/L
Total nitrogen	0.701	mg/L
Dissolved organic carbon	9.04	mg/L

## Aquatic Plant Point Intercept Survey

Based on area and depth specific to East Alaska Lake, we mapped a 225-point sampling grid over the entire lake surface. Using a GPS, we navigated by boat to each of the grid points. At each point we used a two-side rake to sample approximately 1 foot along the bottom. After pulling the plants to the surface, the overall rake was assigned a fullness rating of 0, 1, 2, or 3 to estimate the density of plant growth. Each species identified on the rake is also assigned a fullness rating. Visual sightings of a species within six feet of the sample point are recorded, as well as any additional species seen in the lake during a general boat survey. For more detailed information on the point-intercept sampling method and how data were collected, please visit: <http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/PI-Protocol-2010.pdf>

Species frequencies of occurrence reflect the percentage of times a species was found out of the total number of points sampled. Littoral frequency of occurrence (reported in Table 3) indicates how often a species was found considering only areas of the lake that are capable of supporting plant growth (known as the “littoral area”). The maximum depth of plant growth is the deepest depth at which plants were found in the lake. Species richness is a count of the total number of different plant species found in a lake. The Floristic Quality Index (FQI) is a metric that evaluates the closeness of the flora in a lake to that of an undisturbed condition. The higher an FQI value, the closer that plant community is to an undisturbed ecosystem. Statewide and ecoregion averages are calculated from a subset of over 1,000 lakes across Wisconsin. For additional data on aquatic plant surveys including maps, species specific distributions, and previous survey years, visit [Aquatic Plant Explorer](#).

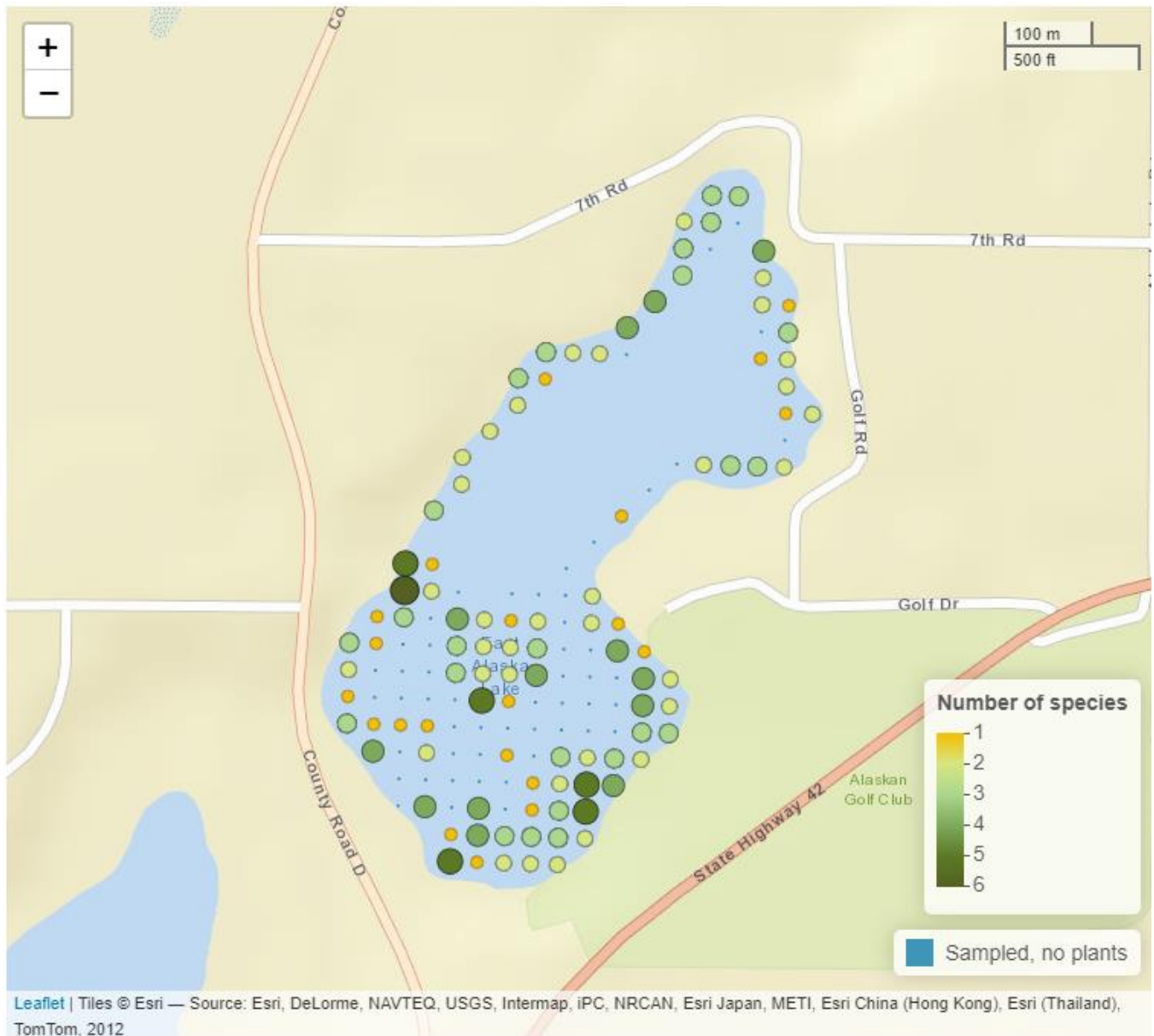
**Table 3.** Species Present

% Frequency of Occurrence (Littoral): This estimate of frequency of occurrence is calculated by taking the total number of times a species is detected in a lake divided by the number of points in a lake at which the growth of plants is possible.

Common Name	Scientific Name	Growth Form (Floating, free floating, submerged, emergent)	% Frequency of Occurrence
Eurasian water-milfoil	<i>Myriophyllum spicatum</i>	Submerged	36.26
Curly-leaf pondweed	<i>Potamogeton crispus</i>	Submerged	21.98
Coontail	<i>Ceratophyllum demersum</i>	Submerged	30.77
Muskgrasses	<i>Chara spp.</i>	Submerged	52.75
Small duckweed	<i>Lemna minor</i>	Free floating	2.20
Slender naiad	<i>Najas flexilis</i>	Submerged	4.40
White water lily	<i>Nymphaea odorata</i>	Floating	31.87
Fries' pondweed	<i>Potamogeton friesii</i>	Submerged	21.98
Illinois pondweed	<i>Potamogeton illinoensis</i>	Submerged	3.30
White-stem pondweed	<i>Potamogeton praelongus</i>	Submerged	3.30
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	Submerged	1.10
Softstem bulrush	<i>Schoenoplectus tabernaemontani</i>	Emergent	2.20
Spatterdock	<i>Nuphar variegata</i>	Floating	Visual
Cattail	<i>Typha spp.</i>	Emergent	Visual

**Table 4.** Overall survey summary statistics for East Alaska Lake.

	East Alaska Lake 2014	East Alaska Lake 2023	Statewide Average	SWTP Ecoregion Average
Littoral Frequency of Occurrence (%)	88.8%	63.2%	63%	66%
Maximum Depth of Plant Growth (ft)	13.1	20.0	13.4	13.1
Species Richness	11	15	19.8	15
Floristic Quality Index (FQI)	13.5	18.4	25.7	18.5



**Figure 1.** Species Richness at all locations surveyed in 2023.

## Plant Survey Results

Based on the results of the 2023 plant survey, the plant community of East Alaska Lake is considered low-quality. In 2023, 15 plant species were found, with six of these being most dominant. These include muskgrasses (*Chara spp.*), Eurasian watermilfoil (*Myriophyllum spicatum*), white water lily (*Nymphaea odorata*), coontail (*Ceratophyllum demersum*), curly leaf pondweed (*Potamogeton crispus*), and Fries' pondweed (*Potamogeton friesii*). Comparing the 2023 survey to the 2014 survey, the plant community appears to be variable, with an increase in maximum depth of plants but a decrease in littoral frequency of occurrence in 2023. Additionally, species richness increased in 2023 and the floristic quality index increased as well. Compared with the statewide and ecoregion averages, East Alaska Lake is above average for maximum depth of plants and about average for littoral frequency of occurrence, species richness, and FQI. Considering the alum treatment in 2011, it is to be expected that the plant community may be somewhat variable as the system experiences change. Future monitoring should be considered to determine the long-term effects of the alum treatment and how the plant community responds over time.

In 2011, a whole-lake alum treatment occurred in an aim to improve water clarity. Since an initial improvement following the treatment, water clarity trends have continued to remain stable. This has allowed for improved plant growth at deeper areas within the lake, and these plants are able to take up excess nutrients which aids water quality. The 2011 alum treatment remains successful in achieving water clarity improvements and has contributed to improved health of the lake overall. We recommend that water quality monitoring continues, using the Citizen Lake Monitoring Network volunteers, and continue aquatic plant surveys in the future to determine the long-term efficacy of the alum treatment.