

West Alaska Lake (94300) Monitoring Summary

West Alaska Lake, Kewaunee County, WI
2023

This report documents the results of 2023 monitoring of West Alaska Lake in Kewaunee County, WI, as part of the DNR Directed Lakes Monitoring Program. Through this program, multiple sampling techniques were completed to determine overall lake health. This included an aquatic plant survey conducted on July 13, 2023. This was complemented with three monthly water chemistry sampling events. This report details the plant survey and water chemistry results. Additional information about the lake can be found on the DNR webpage: [Wisconsin Lakes](#).

Water Chemistry

West Alaska Lake is a 27-acre seepage lake in Kewaunee County, with a maximum depth of 41 feet. The lake is considered mesotrophic. Mesotrophic lakes are characterized by moderately clear water but have an increasing chance of low dissolved oxygen in deep water during the summer. 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. An addition, the August sample included extra parameters for analysis: chloride, color, alkalinity, calcium, magnesium, hardness, total nitrogen, and NO₃+NO₂.

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	9.4	3.75	12.9
8/15/2023	7.4	8.9	16.0
9/5/2023	11.9	3.58	15.0
Mean	9.6	5.41	14.6
TSI (2023)	45.4	47	48.9
TSI (2016)	39.1	42.2	51.3
10-year average	9.5	4.3	17.0

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

Parameter		
Chloride	16.5	mg/L
Color	30	SU
Conductivity	437	uS/cm
pH	8.59	SU
Alkalinity	200	mg/L
Calcium	36.1	mg/L
Magnesium	34.8	mg/L
Hardness	233	mg/L
NO ₃ +NO ₂	Non-detect	mg/L
Total nitrogen	0.793	mg/L

Aquatic Plant Point Intercept Survey

Based on area and depth specific to West Alaska Lake, we mapped a 124-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-sided 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 surveys, 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 total 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
Curly-leaf pondweed	<i>Potamogeton crispus</i>	Submerged	7.89
Coontail	<i>Ceratophyllum demersum</i>	Submerged	26.32
Muskgrasses	<i>Chara spp.</i>	Submerged	65.79
Northern water-milfoil	<i>Myriophyllum sibiricum</i>	Submerged	2.63
Slender naid	<i>Najas flexilis</i>	Submerged	2.63
Spatterdock	<i>Nuphar variegata</i>	Floating	2.63
White water lily	<i>Nymphaea odorata</i>	Floating	28.95
Fries' pondweed	<i>Potamogeton friesii</i>	Submerged	23.68
Sago pondweed	<i>Stuckenia pectinate</i>	Submerged	7.89
Cattail	<i>Typha spp.</i>	Emergent	Visual
Softstem bulrush	<i>Schoenoplectus tabernaemontani</i>	Emergent	Visual
Water stargrass	<i>Heteranthera dubia</i>	Submerged	Visual

Table 4: Overall survey summary statistics for West Alaska Lake.

	West Alaska Lake 2016	West Alaska Lake 2023	Statewide Average	SWTP Ecoregion Average
Littoral Frequency of Occurrence (%)	89.7%	74.51%	63%	66%
Maximum Depth of Plant Growth (ft)	16.5	15.5	13.4	13.1
Species Richness	12	12	19.8	15
Floristic Quality Index (FQI)	16.3	15.9	25.7	18.5

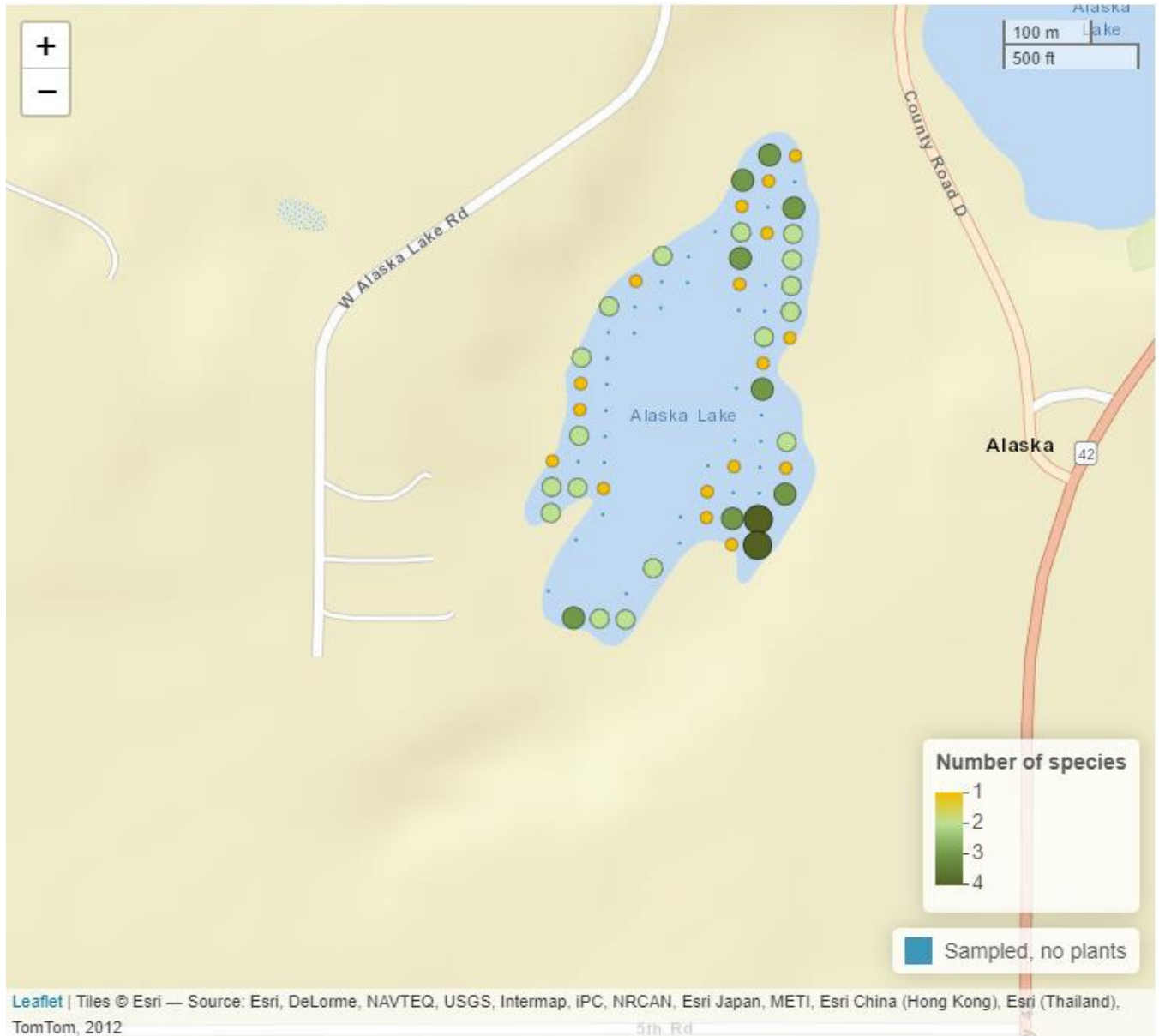


Figure 1. Species richness at survey locations in 2023.

Plant Survey Results

Based on the results of the 2023 plant survey, West Alaska Lake has similar survey statistics to the statewide and ecoregion averages, though the species richness and FQI are lower on average. With a low species richness and low FQI score, the plant community is low quality with four species dominating the overall plant community. Muskgrasses (*Chara spp.*), white water lily (*Nymphaea odorata*), coontail, (*Ceratophyllum demersum*), and Fries' pondweed (*Potamogeton friesii*) were common in West Alaska Lake. Results from the 2023 survey were very similar to the 2016 survey showing the plant community is stable, though the littoral frequency of occurrence decreasing slightly in 2023. Overall, the plant community of West Alaska Lake is considered low quality, but factors including water chemistry and clarity play a role in the overall health of the plant community. Continued monitoring at 5-10 years in the future is recommended to maintain the long-term monitoring record.