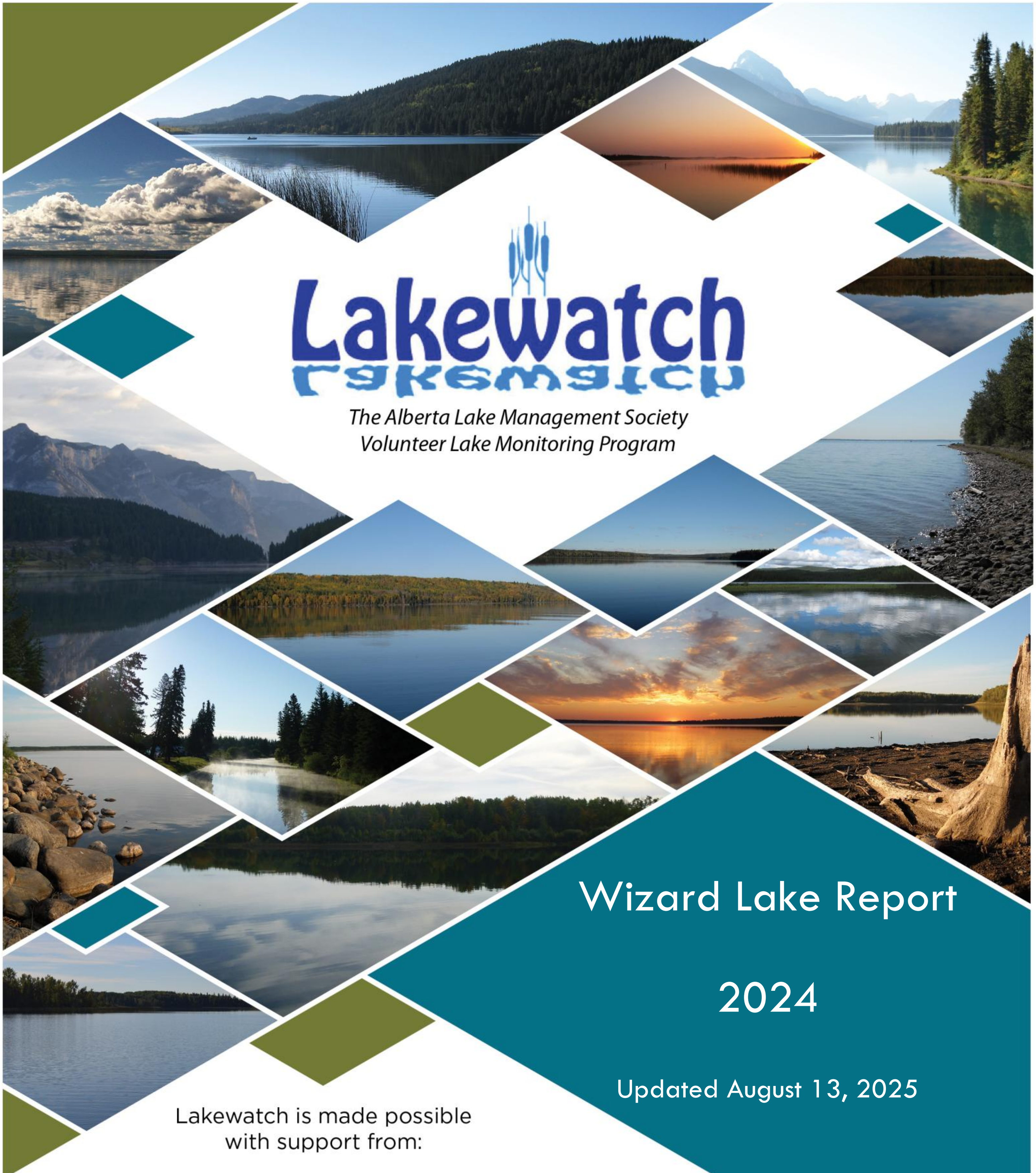


Lakewatch

The Alberta Lake Management Society
Volunteer Lake Monitoring Program

Wizard Lake Report

2024

Updated August 13, 2025

Lakewatch is made possible with support from:

Alberta Environment and Parks

LICA Environmental Stewards

Pigeon Lake Watershed Association

ALBERTA LAKE MANAGEMENT SOCIETY'S LAKEWATCH PROGRAM

LakeWatch has several important objectives, one of which is to collect and interpret water quality data from Alberta's Lakes. Equally important is educating lake users about aquatic environments, encouraging public involvement in lake management, and facilitating cooperation and partnerships between government, industry, the scientific community and lake users. LakeWatch reports are designed to summarize basic lake data in understandable terms for the widest audience, and are not meant to be a complete synopsis of information about specific lakes. Additional information is available for many lakes that have been included in LakeWatch, and readers requiring more information are encouraged to seek those sources.

ALMS would like to thank all who express interest in Alberta's aquatic environments, and particularly those who have participated in the LakeWatch program. These leaders in stewardship give us hope that our water resources will not be the limiting factor in the health of our environment.

If you require data from this report, please contact ALMS for the raw data files.

ACKNOWLEDGEMENTS

The LakeWatch program is made possible through the dedication of its volunteers. A special thanks to Corey and Kathie Drynan for their commitment to collecting data at Wizard Lake. We would also like to thank Katherine Cundict and Jordyn Lajeunesse, who were summer technicians in 2024. Executive Director Bradley Peter and Program Manager Brittany Onysyk were instrumental in planning and organizing the field program. This report was prepared by Brittany Onysyk and Bradley Peter.

BEFORE READING THIS REPORT, CHECK OUT **A BRIEF INTRODUCTION TO LIMNOLOGY**

WIZARD LAKE

Wizard Lake July 2, 2024.

Wizard Lake is a long serpentine lake lying in a heavily forested, deep glacial meltwater channel 60 km southwest of the City of Edmonton. The lake lies within a valley providing excellent shelter from winds, making this lake very popular for water skiing. The northern shore of the lake is in the County of Leduc and the southern shore of the lake is in the County of Wetaskiwin.

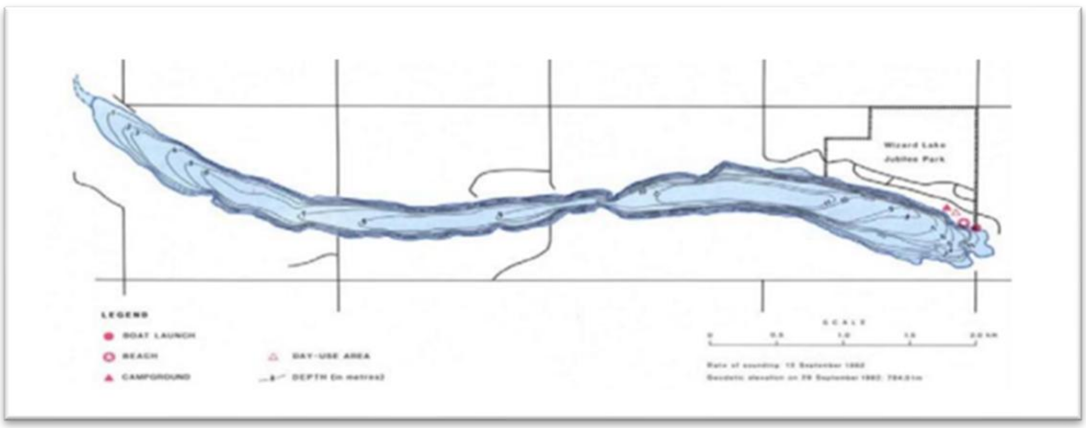
Wizard Lake lies within the boundaries of Treaty 6 territory, which is the ancestral home of the Cree, Assiniboin, Salteaux, and Chipewyan[1], as well as within the Métis District Region 8.[2] The Nêhiyawak (Cree) name for the lake is Seksyawas Sakigan, which translates to "Lizard Lake", and until the late 1960's the popular name for the lake was Conjuring Lake.[3] Cree legends said strange noises in the lake came from 'conjuring creatures'; the creek draining the lake, which enters the North Saskatchewan River ~5 km west of Devon, is still called Conjuring Creek.[3]

The year 1904 saw both the first settlers and the opening of a sawmill in the lake area. The sawmill was short-lived, closing in 1905 when the railway was not built across the area as expected. The sawmill was succeeded by the building of an underground coalmine, in operation until the 1940's. Today, the area surrounding the lake includes Wizard Lake Jubilee Park and 110 cottages on the north shore, 61 cottages on the south, and a subdivision.[3]

Wizard Lake is a popular recreation area for water skiing, SCUBA diving, and fishing. Intensive use of the lake, especially on summer weekends, led to conflict between water skiers, high-speed boat operators, canoers, and anglers. A lake management plan was prepared in 1979, which recommended dividing the lake into two zones. As a result, the boat speed in the west half of the lake was to be limited to 12 km/hr to facilitate access to anglers, while the boat speed in the east half was to be limited to 65 km/hr to allow water skiing.[3] Yellow perch and northern pike are the most commonly fished species in the lake.

Wizard Lake occupies an area of 2.67 km^2, with a maximum depth of 11 m and a mean depth of 6.2 m.[3] The length of the lake stretches 11.5 km and has a maximum width of 0.55 km. Wizard Lake lies in the Strawberry Creek sub-basin of the North Saskatchewan River Watershed.[4] The watershed area is approximately 37 km^2, resulting in a watershed to lake ratio of 13:1.

Wizard Lake is considered a productive (eutrophic) lake that can experience dense blue-green algae blooms during the summer months. For more detailed information on Wizard Lake and its watershed, view the State of the Watershed Report available at www.wizardlake.ca.



Bathymetric map of Wizard Lake obtained
from the Atlas of Alberta Lakes.

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[1] The Alberta Teachers' Association. 2017. Treaty map (https://www.albertaschoolcouncils.ca/public/download/documents/57314).
[2] Otipemisiwak Métis Government. 2025. Districts.
[3] Mitchell, P. and E. Prepas. 1990. Atlas of Alberta Lakes.
[4] Aquality Environmental Consulting. 2013. Wizard Lake State of the Watershed Report 2012.

WATER CHEMISTRY

ALMS measures a suite of water chemistry parameters. Phosphorus, nitrogen, and chlorophyll-a are important because they are indicators of eutrophication, or excess nutrients, which can lead to harmful algal/cyanobacteria blooms. One direct measure of harmful cyanobacteria blooms are Microcystins, a common group of toxins produced by cyanobacteria. See Table 2 for a complete list of parameters.

The average total phosphorus (TP) concentration for Wizard Lake was 43 µg/L (Table 2), falling into the eutrophic or highly productive trophic classification. TP ranged from a minimum of 28 µg/L on June 9 to a maximum of 56 µg/L on September 22 (Figure 1).

The average chlorophyll-*a* concentration in 2024 was 40.3 µg/L (Table 2), falling into the hypereutrophic, or very highly productive trophic classification. Chlorophyll-*a* was lowest at 19.4 mg/L on June 9 and peaked at 57.8 µg/L on September 2 (Figure 1).

The average Total Kjeldahl Nitrogen (TKN) concentration in 2024 was 1.2 mg/L (Table 2). TKN displayed little variation over the season (Figure 1).

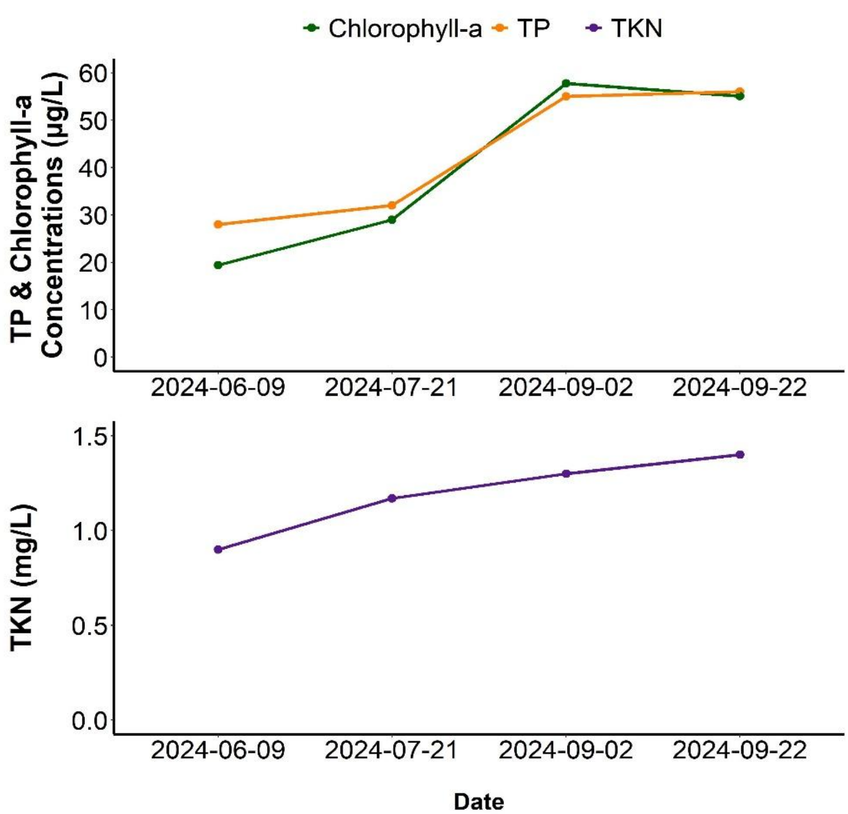

Figure 1. Total Phosphorus, Chlorophyll-*a*, and Total Kjeldahl Nitrogen concentrations measured over the course of the summer at Wizard in 2024.

Average pH was measured as 8.17 in 2024, buffered by moderate alkalinity (182 mg/L CaCO3) and bicarbonate (218 mg/L HCO3). Aside from bicarbonate, sodium and calcium were higher than all other major ions and contributed to a low conductivity of 370 µS/cm (Figure 2, top; Table 2). Wizard Lake is in the moderate range of ion levels compared to other LakeWatch lakes sampled in 2024 (Figure 2, bottom).

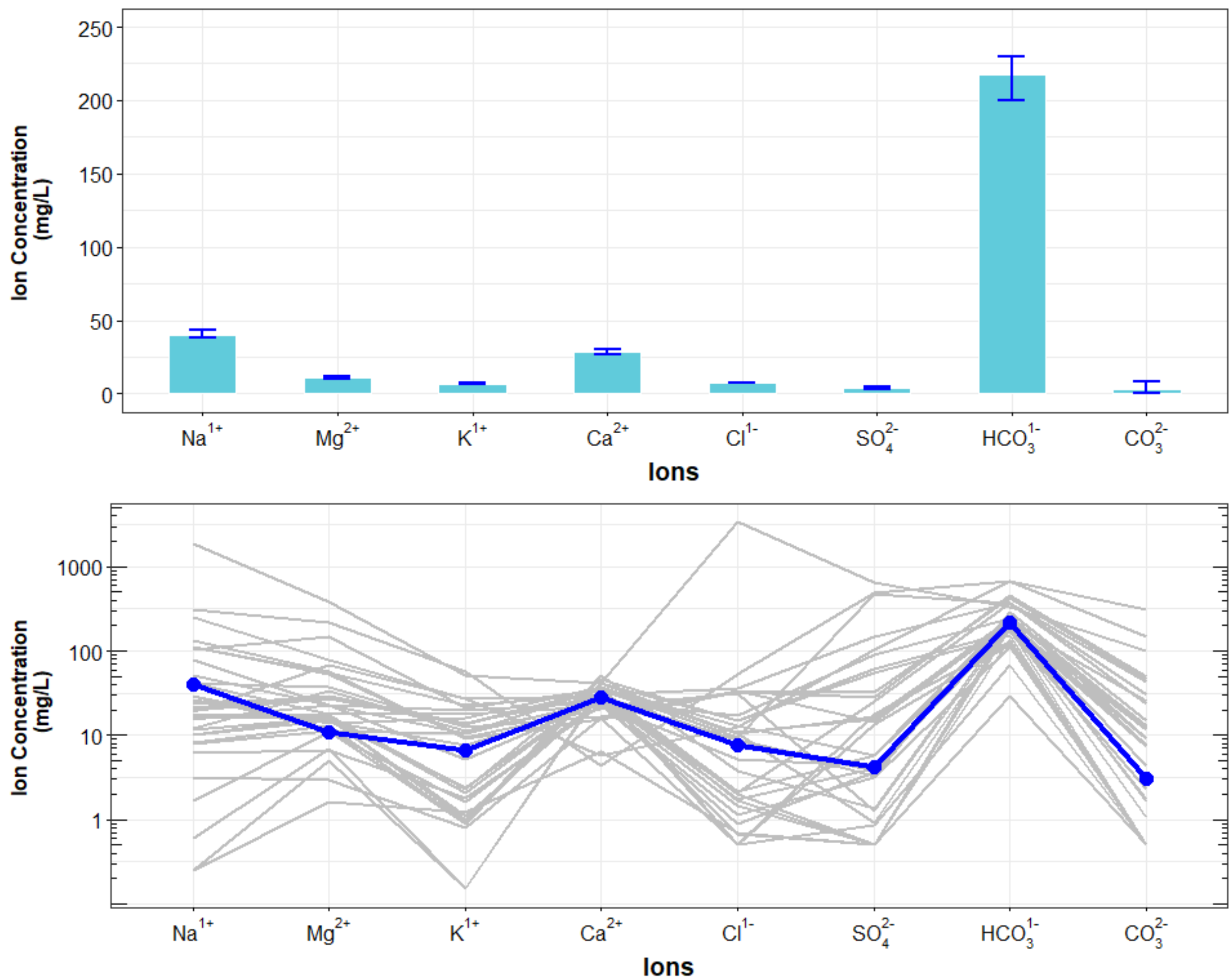

Figure 2. Average levels of cations (sodium = Na^{1+}, magnesium = Mg^{2+}, potassium = K^{1+}, calcium = Ca^{2+}) and anions (chloride = Cl^{1-}, sulphate = SO_4^{2-}, bicarbonate = HCO_3^{1-}, carbonate = CO_3^{2-}) sampled over the course of the summer at Wizard Lake. Top) bars indicate range of values measured, and bottom) Schoeller diagram of average ion levels at Wizard Lake (blue line) compared to 26 lake basins (gray lines) sampled through the LakeWatch program in 2024 (note log10 scale on y-axis of bottom figure).

Metals

Metals will naturally be present in aquatic environments due to in-lake processes or the erosion of rocks, or introduced to the environment from human activities such as urban, agricultural, or industrial developments. Many metals have a unique guideline as they may become toxic at higher concentrations. Where current metal data are not available, historical concentrations for 27 metals have been provided (Table 3).

Metals were not collected at Wizard Lake in 2024. Historical levels can be found in Table 3.

WATER CLARITY AND EUPHOTIC DEPTH

Water clarity is influenced by suspended materials, both living and dead, as well as dissolved colored compounds in the water column. During the melting of snow and ice in spring, lake water can become turbid (cloudy) from silt transported into the lake. Lake water usually clears in late spring, but then becomes more turbid with increased algal growth as the summer progresses. The easiest and most widely used measure of lake water clarity is the Secchi depth. Two times the Secchi depth equals the euphotic depth – the depth to which there is enough light for photosynthesis.

The average euphotic depth of Wizard Lake in 2024 was 2.8 m, corresponding to an average Secchi depth of 1.4 m (Table 2). Euphotic depth varied over the season, ranging from as deep as 5 m on June 9 to as shallow as 2 m on July 21 (Figure 3).

The decrease in euphotic depth over the summer correlates with the increasing concentrations of TP and chlorophyll-*a* (Figure 1), indicating that algal communities grew substantially throughout the summer.

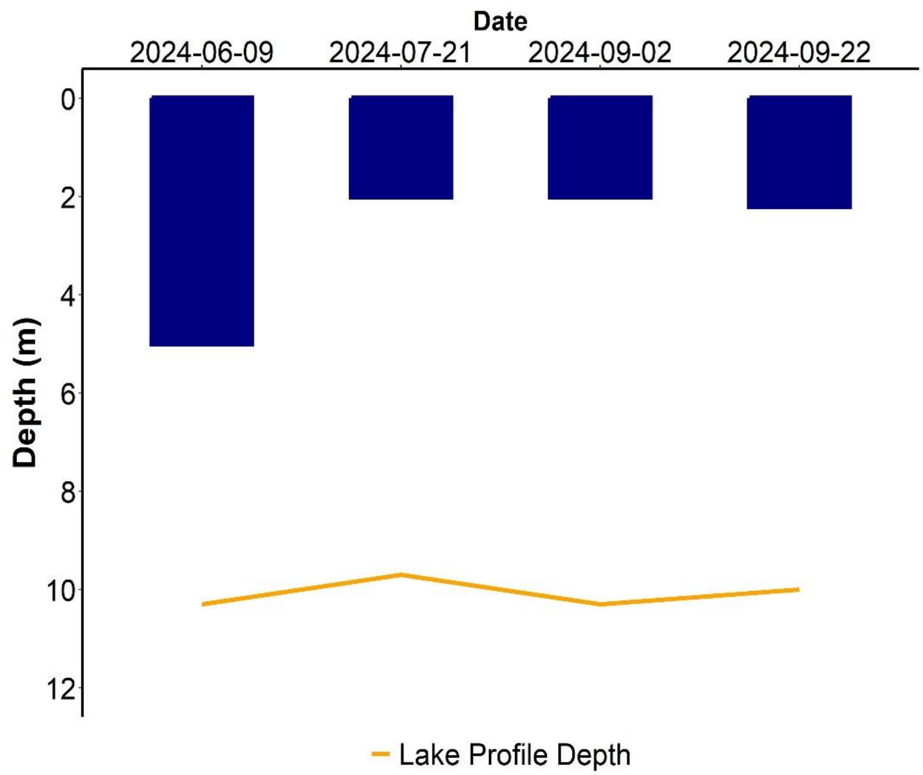

Figure 4. Euphotic depth values measured over the course of the summer at Wizard Lake in 2024.

WATER TEMPERATURE AND DISSOLVED OXYGEN

Water temperature and dissolved oxygen (DO) profiles in the water column can provide information on water quality and fish habitat. The depth of the thermocline is important in determining the depth to which dissolved oxygen from the surface can be mixed. Please refer to the end of this report for descriptions of technical terms.

Surface temperatures of Wizard varied throughout the summer, with the July 21 sampling having the warmest temperatures at 24.83 °C (Figure 4). During this sampling trip, the lake showed stratification starting at about 4 m.

Wizard Lake was well oxygenated in the surface waters on all sampling dates, measuring above the CCME guidelines of 6.5 mg/L dissolved oxygen[5] (Figure 4). On July 21, oxygen levels decrease sharply below the thermocline (4 m), with oxygen levels quickly reaching anoxia (<1 mg/L). A weaker depletion of oxygen was also observed during the August 2 sampling trip, where oxygen levels decreased gradually to the lake bottom.

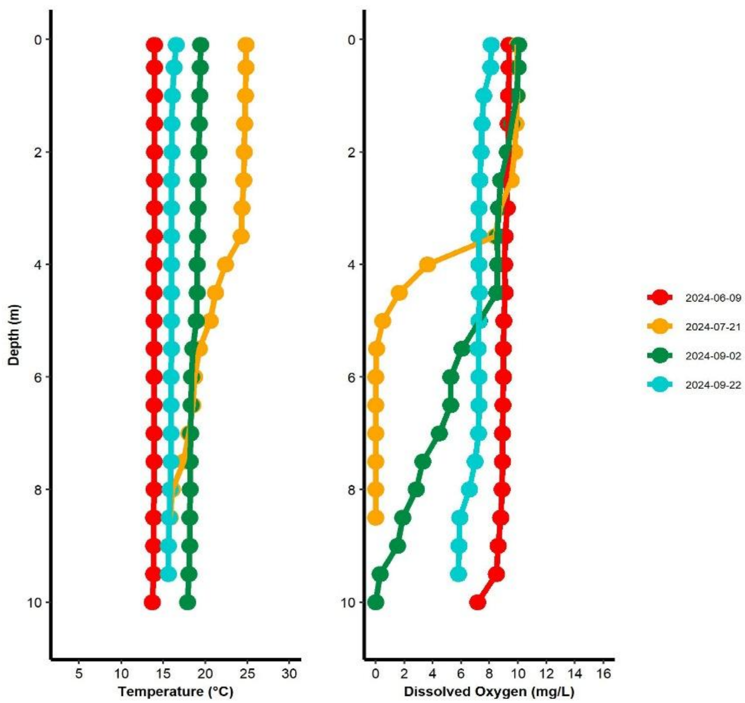

Figure 4. Temperature (°C) and b) dissolved oxygen (mg/L) profiles for Wizard Lake measured four times over the course of the summer of 2024.

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[5] Canadian Council of Ministers of the Environment. 1999. Canadian water quality guidelines for the protection of aquatic life: Dissolved oxygen (freshwater).

MICROCYSTIN

Microcystins are toxins produced by cyanobacteria (blue-green algae) which, when ingested, can cause severe liver damage. Microcystins are produced by many species of cyanobacteria which are common to Alberta's Lakes, and are thought to be one of the most common cyanobacteria toxins. In Alberta, recreational guidelines for microcystin are set at 10 μg/L. Blue-green algae advisories are managed by Alberta Health Services. Recreating in algal blooms, even if microcystin concentrations are not above guidelines, is not recommended.

Microcystin levels in Wizard Lake fell below the recreational guideline of 10 μg/L[6] during every sampling event in 2024. Despite low levels of microcystin detected during the sampling events, caution should be observed in areas of the lake where significant cyanobacteria accumulation occurs.

Table 1. Microcystin concentrations measured four times at Wizard Lake in 2024.

Date	Microcystin Concentration (μg/L)
06/09/2024	0.12
07/21/2024	0.59
09/02/2024	0.94
09/22/2024	0.82
Average	**0.62**

[6] Health Canada. 2022. Guidelines for Canadian Recreational Water Quality.

INVASIVE SPECIES

Dreissenid mussels pose a significant concern for Alberta because they impair the function of water conveyance infrastructure and adversely impact the aquatic environment. These invasive mussels can change lake conditions which can then lead to toxic cyanobacteria blooms, decrease the amount of nutrients needed for fish and other native species, and cause millions of dollars in annual costs for repair and maintenance of water-operated infrastructure and facilities. Spiny water flea pose a concern for Alberta because they alter the abundance and diversity of native zooplankton, as they are aggressive zooplankton predators. Through over-predation, they will impact higher trophic levels such as fish. They also disrupt fishing equipment by attaching in large numbers to fishing lines.

Monitoring for aquatic invasive species involved sampling with a 63 µm plankton net. This monitoring is designed to detect juvenile Dreissenid mussel veligers and spiny water flea. No mussels or spiny water flea were detected at Wizard in 2024.

Eurasian watermilfoil is a non-native aquatic plant that poses a threat to aquatic habitats in Alberta because it grows in dense mats preventing light penetration through the water column, reduces oxygen levels when the dense mats decompose, and outcompetes native aquatic plants. Eurasian watermilfoil can look similar to the native Northern watermilfoil, thus genetic analysis is ideal for suspect watermilfoil species identification.

Watermilfoil was collected from Wizard Lake on June 9, 2024. The specimen was confirmed to be Northern Watermilfoil (*Myriophyllum sibiricum*).

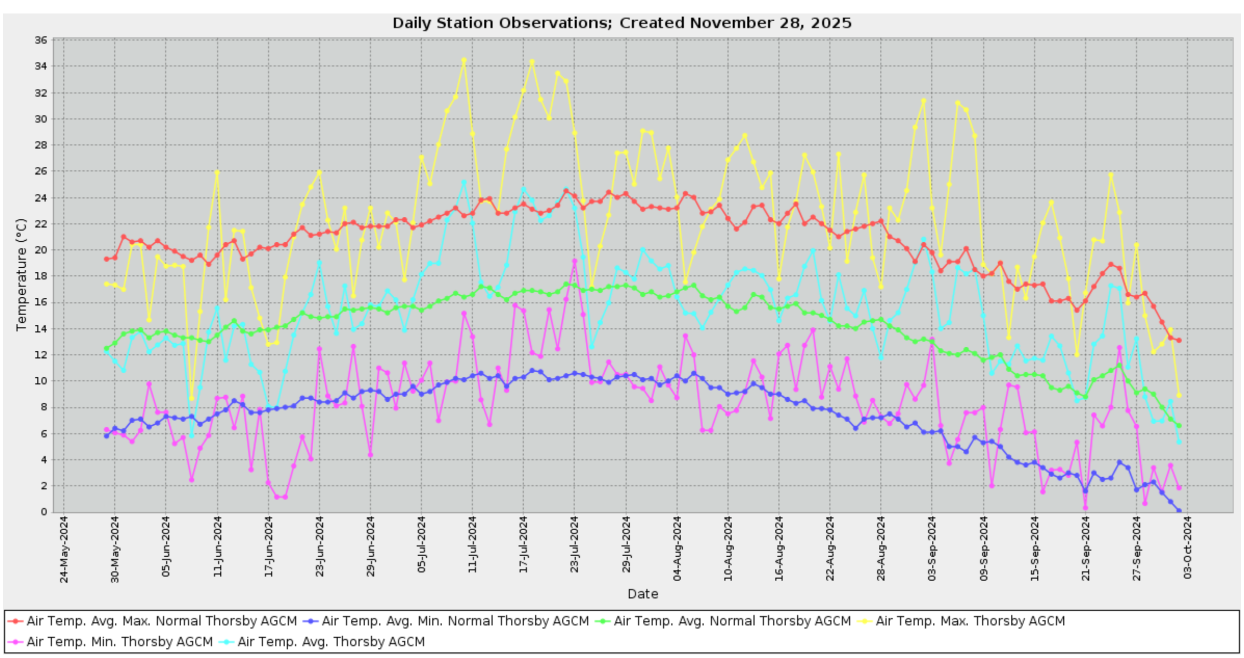
WEATHER AND LAKE STRATIFICATION

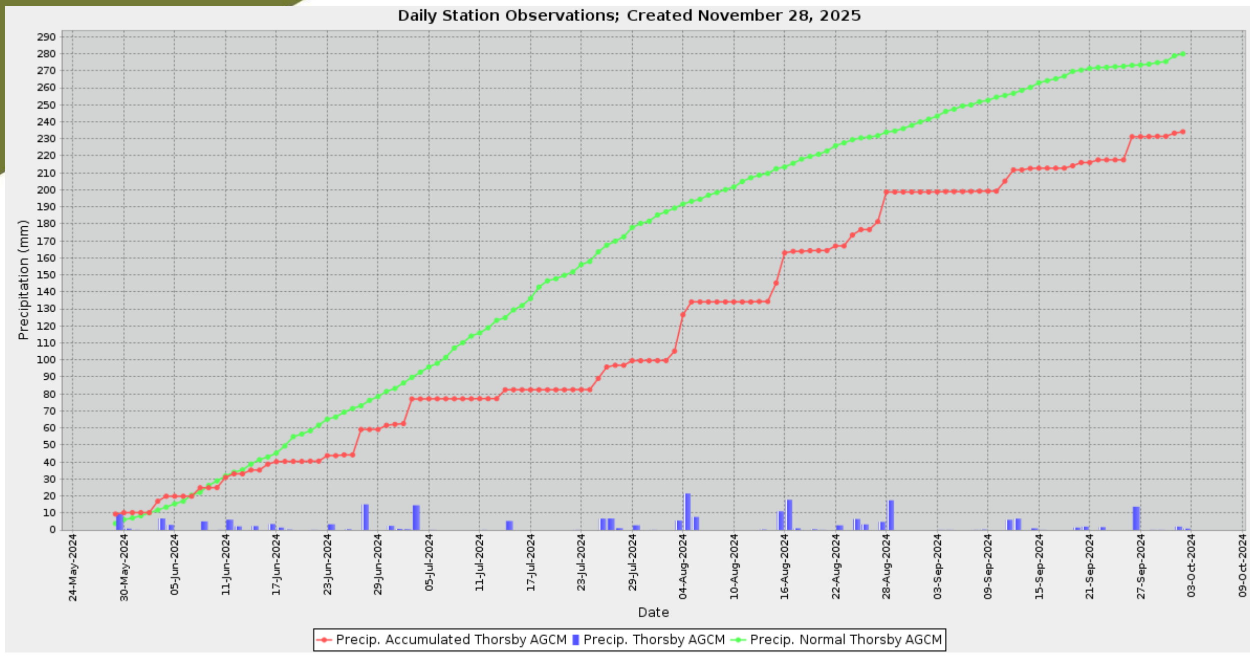
Air temperature will directly impact lake temperatures, and result in different temperature layers (stratification) throughout the lake, depending on its depth. Wind will also impact the degree to which a lake mixes, and how it will stratify. The amount of precipitation that falls within a lake's watershed will have important implications, depending on the context of the watershed and the amount of precipitation that has fallen. Solar radiation represents the amount of energy that reaches the earth's surface, and has implications for lake temperature & productivity.

In 2024, Wizard Lake experienced a warmer and windier summer compared to normal, with less than normal accumulated precipitation (Figure 5). Although it was warmer overall, the beginning of the sampling season was unseasonably cool, with the month of June falling below average temperatures and breaking the lowest temperature record on June 18 and 19 with a low of 1.2°C. July was the warmest month, with the average temperature being 19.6°C. 2024 also broke heat records on numerous days in July and September, including the hottest day recorded on July 10 at 34.5°C. September was also a warmer than average month, with the average temperature being 13.3°C.

Wizard Lake received less than normal precipitation in the summer of 2024 (280 mm total). Precipitation was sporadic over the summer months, and generally fell a bit at a time (Figure 5).

Strong winds were also observed throughout the sampling season.





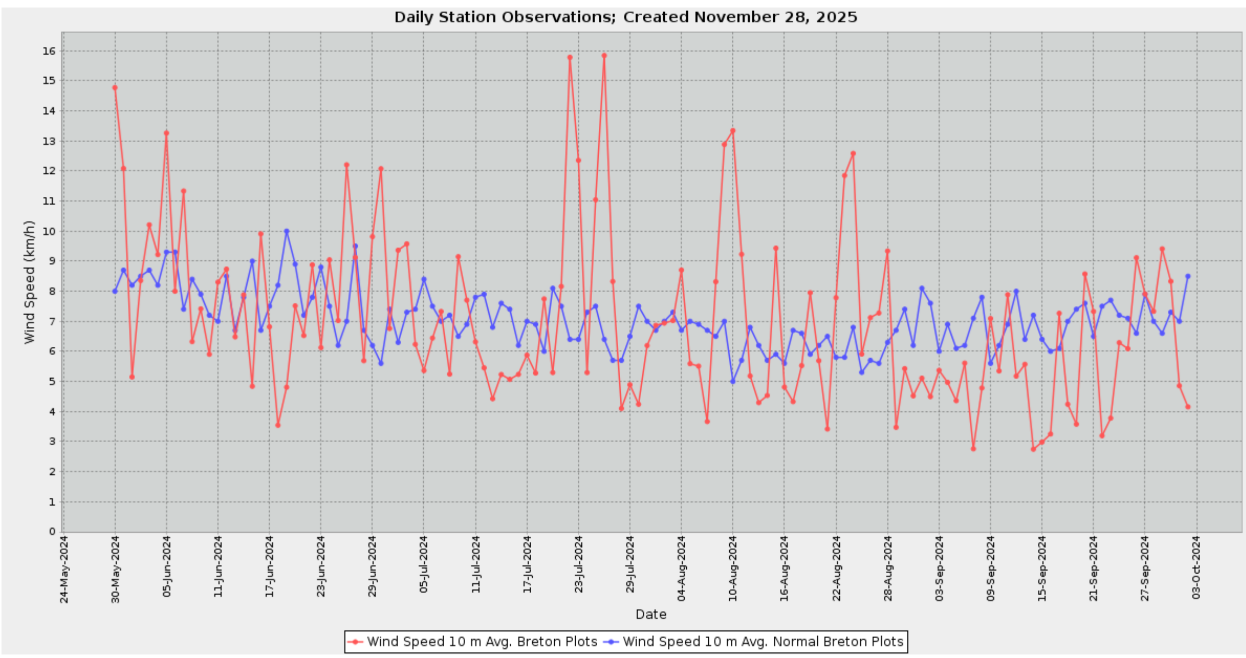


Figure 5. Air temperature (°C) and precipitation (mm) measured from Thorsby weather station north of Wizard Lake, and wind speed (km/h) measured from Breton Plots weather station west of Wizard Lake. Weather data provided by Agriculture, Forestry and Rural Economic Development, Alberta Climate Information Service (ACIS) https://acis.alberta.ca.

WATER LEVELS

There are many factors influencing water quantity. Some of these factors include the size of the lake's drainage basin, precipitation, evaporation, water consumption, ground water influences, and the efficiency of the outlet channel structure at removing water from the lake. Requests for water quantity monitoring should go through Alberta Environment and Parks Monitoring and Science division.

In 2024, water levels at Wizard Lake started off slightly above the historical average (783.9 masl, Figure 6) during the beginning of the year and then decreased through the summer to 783.6 masl (Figure 7). Levels have been relatively stable since measurements began in 1968 (Figure 6).

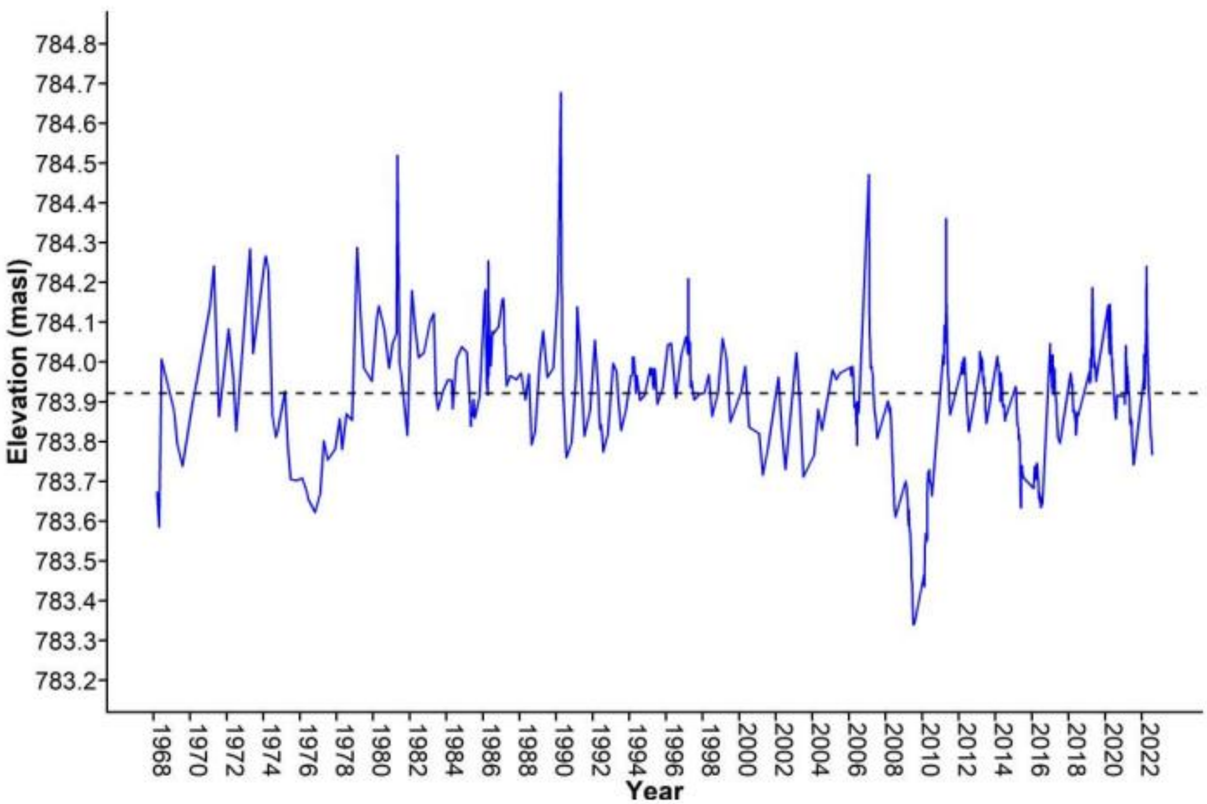


Figure 6. Historical water levels measured at Wizard Lake in metres above sea level (masl) from 1968-2022. Obtained from Environment and Climate Change Canada

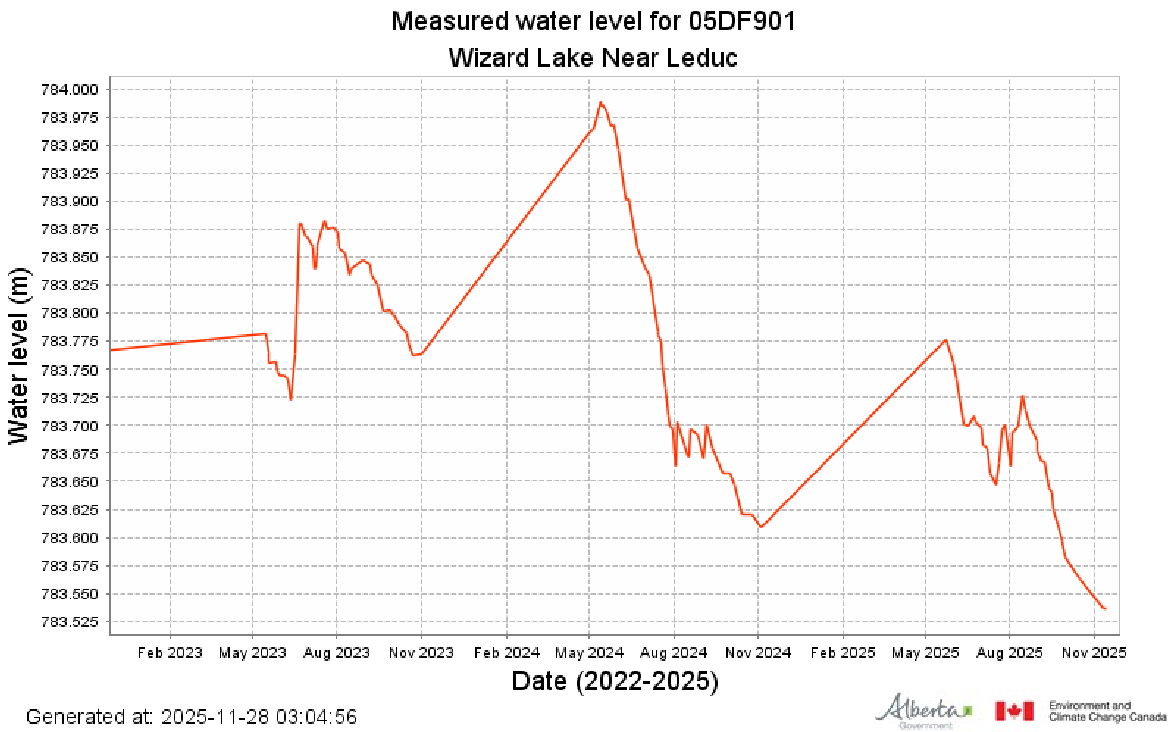


Figure 7. Water levels measured at Wizard Lake in metres above sea level (masl) from 2022-2025. Obtained from Alberta Environment and Parks.

Table 2. Average Secchi depth and water chemistry values for Wizard Lake.

Parameter	1983	1988	2006	2008	2009	2010	2011
TP (μg/L)	33	42	48	50	52	48	76
TDP (μg/L)	14	-	14	12	18	20	14
Chlorophyll-a (μg/L)	23.1	20.0	32.6	24.0	26.8	17.1	39.2
Secchi depth (m)	1.70	3.62	1.33	1.43	1.81	2.71	1.15
TKN (mg/L)	0.9	-	1.3	1.2	1.3	1.3	1.6
NO_2-N and NO_3-N (μg/L)	14	10	4	3	44	20	2
NH_3-N (μg/L)	1	-	31	21	-	-	19
DOC (mg/L)	-	-	13	14	14	12	15
Ca^{2+} (mg/L)	36	30	-	-	-	-	-
Mg^{2+}(mg/L)	10	9	-	-	-	-	-
Na^{+} (mg/L)	27	32	36	35	38	38	32
K^{+} (mg/L)	5	5	6	6	6	6	6
SO_4^{2-} (mg/L)	10	5	3	4	4	4	3
Cl^{-} (mg/L)	3	4	5	4	5	6	5
$CO\sim_3^{2-}$ (mg/L)	-	-	6	10	5.2	-	3.6
HCO_3^{2-} (mg/L)	-	-	201.67	206.33	207.33	215.5	199.8
pH	8.40	8.35	8.30	8.31	8.44	8.29	8.47
Conductivity (μS/cm)	327	332	335	337	341	346	337
Hardness (mg/L)	131	113	-	-	-	-	-
TDS (mg/L)	189	187	186	191	196	193	185
Microcystin (μg/L)	-	-	0.13	0.13	0.16	0.09	0.25
Total Alkalinity (mg/L CaCO3)	164	169	172	175	176	176	170

Parameter	2013	2016	2018	2020	2022	2024
TP (µg/L)	53	43	46	41	37	43
TDP (µg/L)	19	6	6	7	5	6
Chlorophyll-a (µg/L)	23.8	44.0	35.3	33.4	31.3	40.3
Secchi depth (m)	1.36	1.52	1.16	1.53	1.95	1.40
TKN (mg/L)	1.2	1.2	1.3	1.4	1.3	1.2
NO_2-N and NO_3-N (µg/L)	6	2	2	4	6	9
NH_3-N (µg/L)	28	25	25	38	19	14
DOC (mg/L)	13	12	12	14	16	13
Ca^{2+} (mg/L)	-	26	25	31	29	28
Mg^{2+}(mg/L)	-	11	10	10	10	11
Na^{+} (mg/L)	37	39	41	36	34	40
K^{+} (mg/L)	6	7	7	6	6	7
SO_4^{2-} (mg/L)	6	3	2	14	4	4
Cl^{-} (mg/L)	5	6	7	7	7	8
$CO\sim_3^{2-}$ (mg/L)	5.1	3.9	4	3.4	1.4	3
HCO_3^{2-} (mg/L)	202.4	210	207.5	200	207.5	217.5
pH	8.47	8.50	8.48	8.25	8.31	8.17
Conductivity (µS/cm)	354	350	350	360	355	370
Hardness (mg/L)	-	105	102	118	115	115
TDS (mg/L)	197	202	200	212	195	210
Microcystin (µg/L)	0.25	1.41	0.38	0.27	0.55	0.62
Total Alkalinity (mg/L CaCO3)	174	176	172	170	172	182

Table 3. Concentrations of metals measured in Wizard Lake. The CCME heavy metal Guidelines for the Protection of Freshwater Aquatic Life (unless otherwise indicated) are presented for reference. Note that metal sample collection method changed in 2016 from composite to single surface grab at the profile location.

Metals	**2013**	**2016**	**Guidelines**
Aluminum (µg/L)	18	7.7	100[a]
Antimony (µg/L)	0.066	0.074	/
Arsenic (µg/L)	1.21	1.17	5
Barium (µg/L)	60.3	52.8	/
Beryllium (µg/L)	0.0015	0.029	100[c,d]
Bismuth (µg/L)	0.0026	0.004	/
Boron (µg/L)	43.8	39.3	1500
Cadmium (µg/L)	0.002	0.029	0.36[b]
Chromium (µg/L)	0.3215	0.08	/
Cobalt (µg/L)	0.0312	0.06	500, 1000[c,d]
Copper (µg/L)	0.764	0.51	4[b]
Iron (µg/L)	52.15	56.3	300
Lead (µg/L)	0.028	0.053	7[b]
Lithium (µg/L)	15.5	12.4	2500[d]
Manganese (µg/L)	74.6	88.1	130[e]
Molybdenum (µg/L)	0.38	0.376	73
Nickel (µg/L)	0.214	0.095	150[b]
Selenium (µg/L)	0.095	0.23	1
Silver (µg/L)	0.0115	0.028	0.25
Strontium (µg/L)	230.5	211	/
Thallium (µg/L)	0.0012	0.0358	0.8
Thorium (µg/L)	0	0.015	/
Tin (µg/L)	0.01	0.03	/
Titanium (µg/L)	0.782	0.9	/
Uranium (µg/L)	0.328	0.342	15
Vanadium (µg/L)	0.192	0.23	100[c,d]
Zinc (µg/L)	1.91	0.5	30[f]

Values represent means of total recoverable metal concentrations.
[a] Based on pH ≥ 6.5
[b] Based on 2016 avg. water hardness (as CaCO3) with CCME equation
[c] Based on CCME Guidelines for Agricultural use (Livestock).
[d] Based on CCME Guidelines for Agricultural Use (Irrigation).
[e] Based on CCME Manganese variable calculation (https://ccme.ca/en/chemical/129#_aql_fresh_concentration) using 2016 avg. water hardness (as CaCO3) and avg. pH
[f] Based on 2016 avg. water hardness (as CaCO3), avg. pH, and avg. DOC with CCME equation
A forward slash (/) indicates an absence of data or guidelines.

LONG TERM TRENDS

Trend analysis was conducted on the parameters total phosphorus (TP), chlorophyll-*a*, total dissolved solids (TDS), and Secchi depth to look for changes over time in Wizard Lake. In sum, a significant decreasing trend was detected in TP, a significant increasing trend was detected in TDS, and no significant trend was detected in chlorophyll-*a* and Secchi depth. Data is presented below as both line and box-and-whisker plots. Detailed methods are available in the ALMS Guide to Trend Analysis on Alberta Lakes.

Table 4. Summary table of trend analysis on Wizard Lake data from 2006 to 2024.

Parameter	Date Range	Direction of Significant Change
Total Phosphorus	2006-2024	Decreasing
Chlorophyll-*a*	2006-2024	No Change
Total Dissolved Solids	2006-2024	Increasing
Secchi Depth	2006-2024	No Change

Definitions

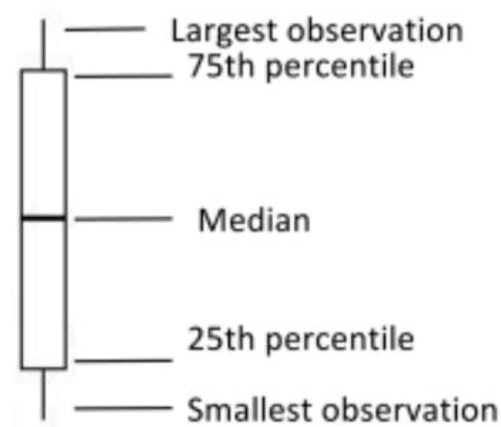
Median: the value in a range of ordered numbers that falls in the middle.

Trend: a general direction in which something is changing.

Monotonic trend: a gradual change in a single direction.

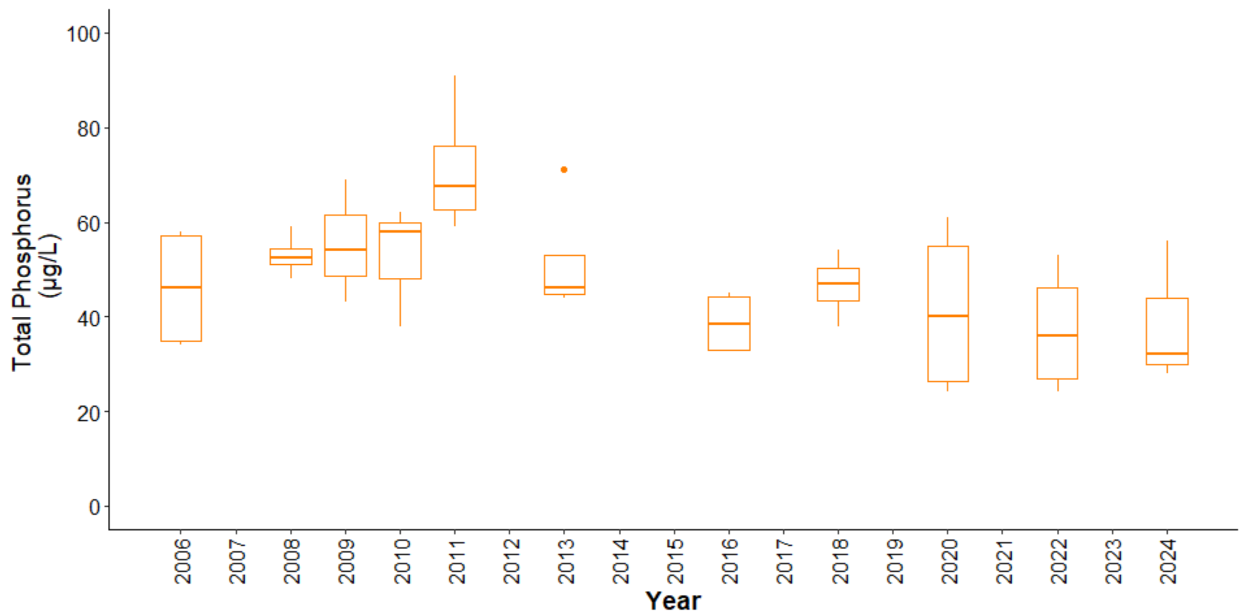
Statistically significant: The likelihood that a relationship between variables is caused by something other than random chance. This is indicated by a p-value of <0.05. Variability: the extent by which data is inconsistent or scattered.

Box and Whisker Plot: a box-and-whisker plot, or boxplot, is a way of displaying all of our annual data. The median splits the data in half. The 75th percentile is the upper quartile of the data, and the 25th percentile is the lower quartile of the data. The top and bottom points are the largest and smallest observations.



Total Phosphorus (TP)

Trend analysis of TP over time suggests TP has significantly decreased in Wizard since 2006 (Tau = -0.3734, p = 0.0022).



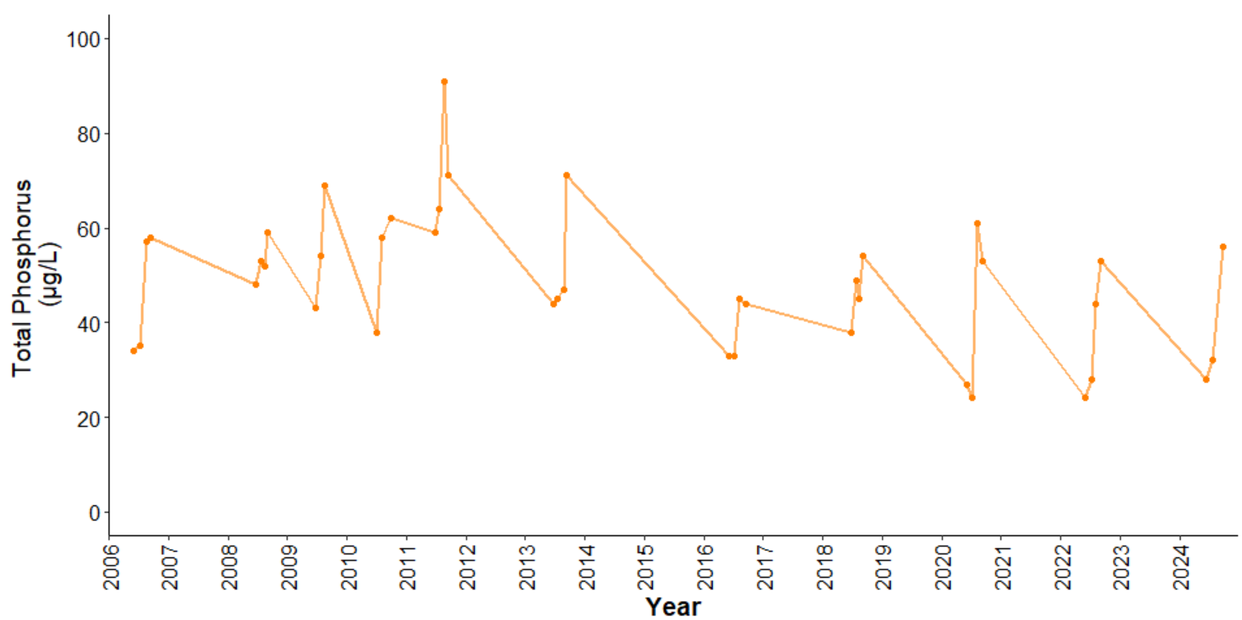
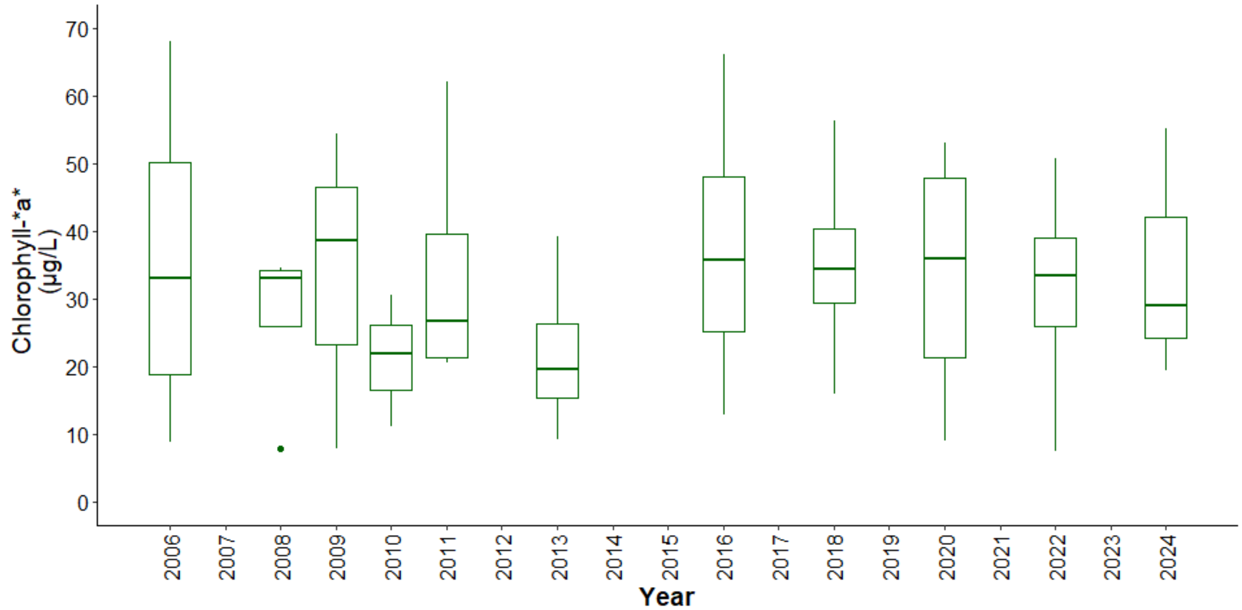


Figure 8. Monthly total phosphorus (TP) concentrations measured between June and September over the long term sampling dates between 2006 and 2024 (n = 41). The value closest to the 15th day of the month was chosen to represent the monthly value in cases with multiple monthly samples.

Chlorophyll-*a*

Trend analysis of chlorophyll-*a* suggests it has no significant upwards or downwards trend at Wizard Lake from 2006-2024 (Tau = 0.1285, p = 0.3017).



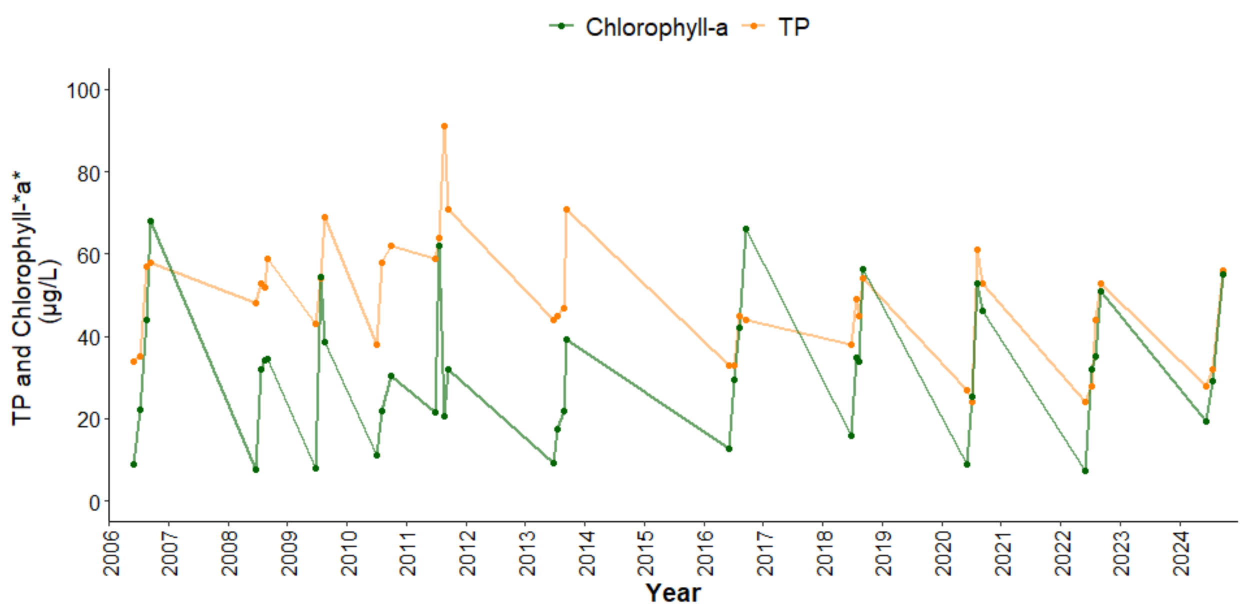


Figure 9. Monthly chlorophyll-*a* concentrations measured between June and September over the long term sampling dates between 2006 and 2024 (n = 41). The value closest to the 15th day of the month was chosen to represent the monthly value in cases with multiple monthly samples. Line graph is overlain by TP concentrations.

Total Dissolved Solids (TDS)

Trend analysis showed a significantly increasing trend in TDS in Wizard Lake since 2006 (Tau = 0.526, $p < 0.001$).

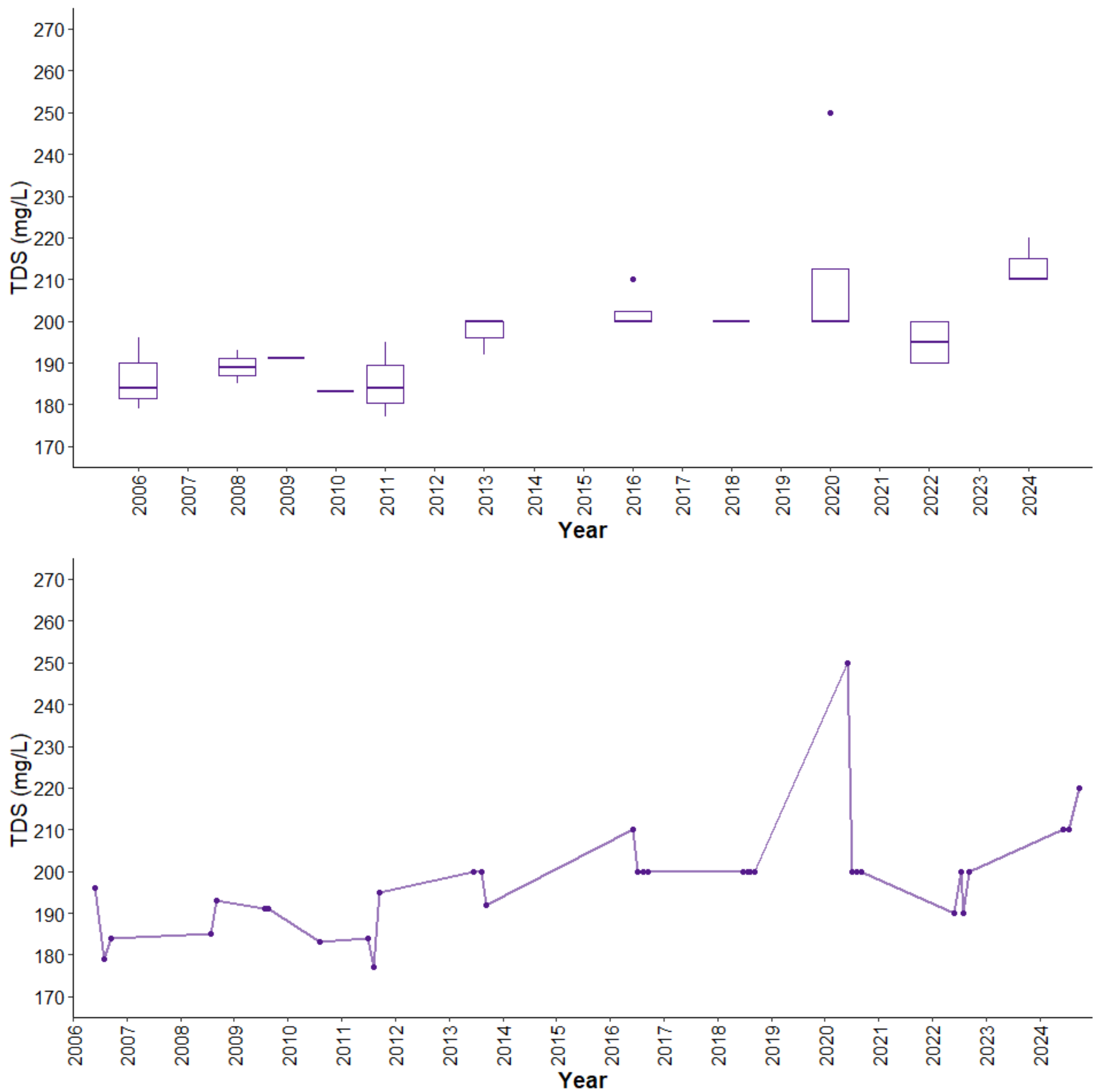


Figure 10. Monthly TDS values measured between June and September over the long term sampling dates between 2006 and 2024 (n = 33). The value closest to the 15th day of the month was chosen to represent the monthly value in cases with multiple monthly samples.

Due to the significant increasing trend of TDS in Wizard Lake, exploring the specific major ions which may be driving this trend is important to determine (Figure 11).

Chloride is the only parameter that displays a significant increasing trend, however the difference in slopes between TDS and chloride indicate other parameters may be impacting TDS as well. It is possible that magnesium and calcium, which have insufficient data to perform trend analysis (indicated by "I.D.", insufficient data), could factor into the observed increase in TDS within the lake.

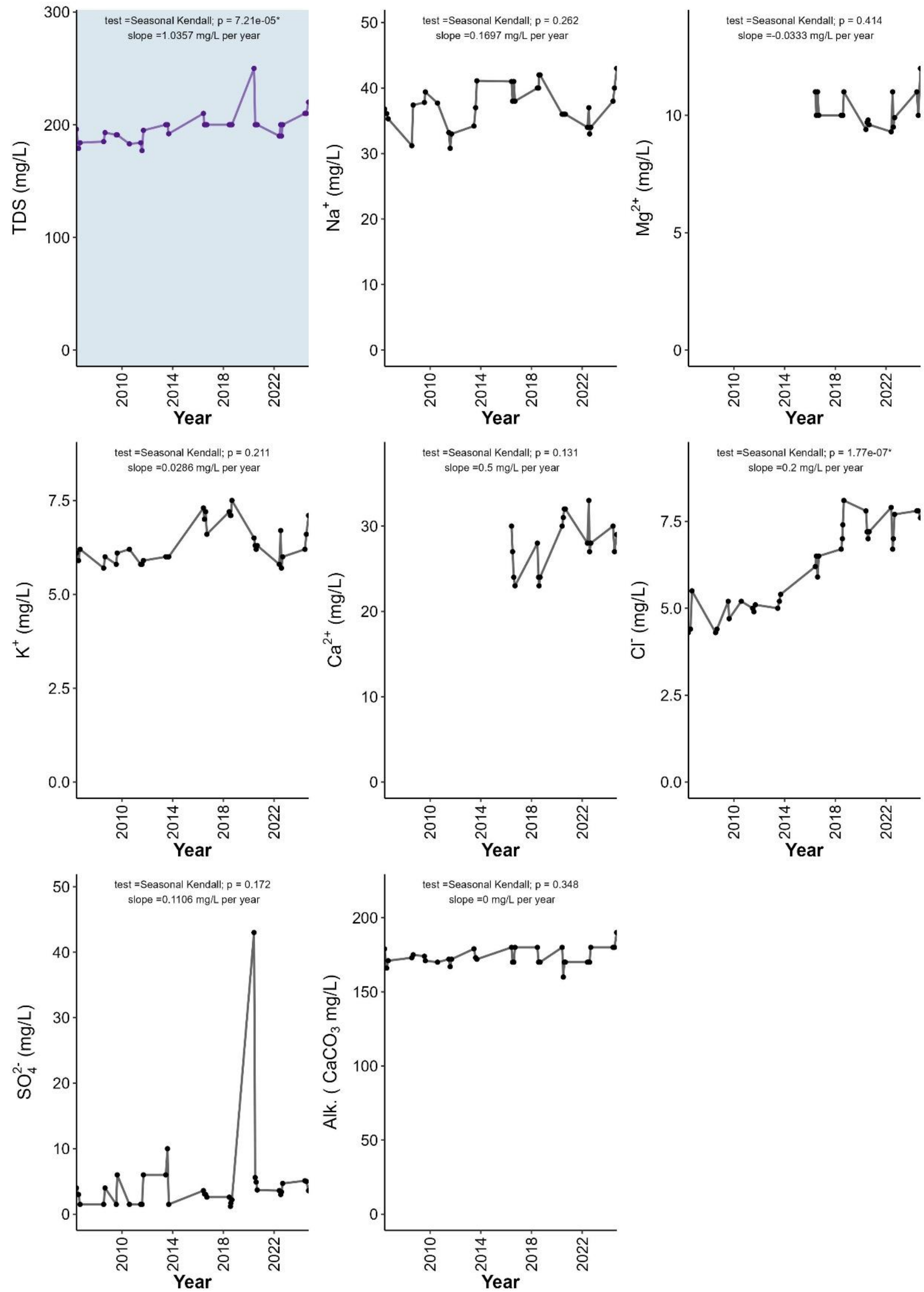
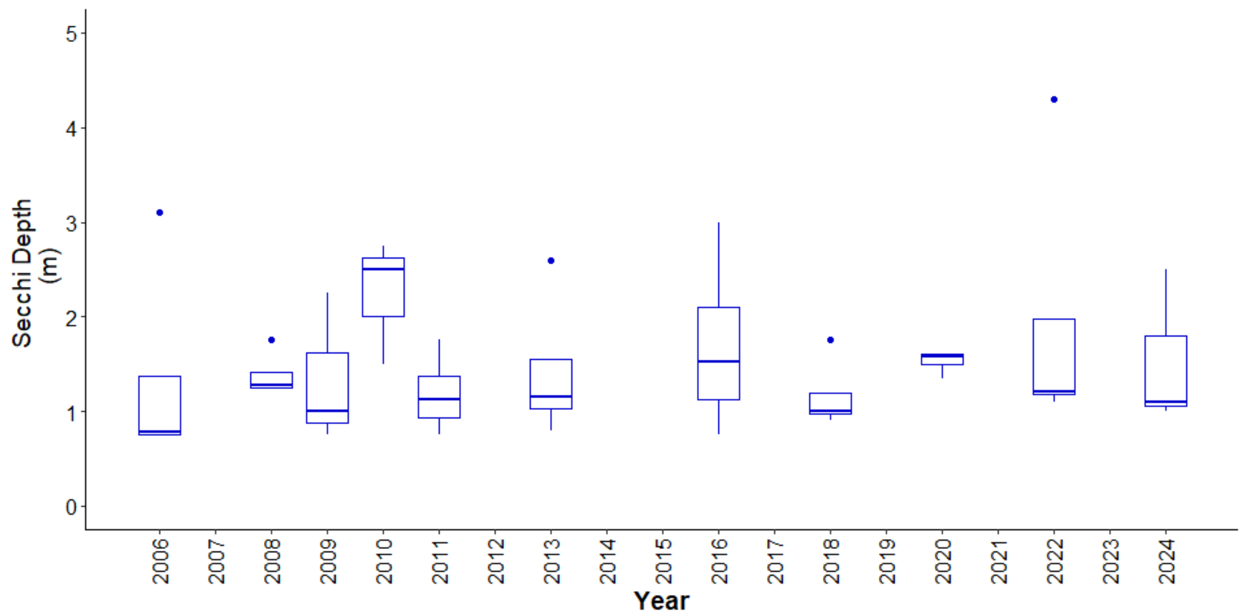


Figure 11. Concentrations of TDS (top left, blue panel), major ions (sodium = Na^+, magnesium = Mg^{2+}, potassium = K^+, calcium = Ca^{2+}, chloride = Cl^-, sulphate = SO_4^{2-}), and total alkalinity (Alk., as mg/L $CaCO_3$) measured monthly between June and September on sampling dates between 2006 and 2024. Also represented is the monotonic trend results for each parameter; test used (MK = Mann Kendall, SK = Seasonal Kendall), significance of test (*p*; assessed as significance when $p < 0.05$, marked with '*' if significant), and the slope of the trend. Test selection follows method outline in the ALMS Guide to Trend Analysis on Alberta Lakes. Note that some ions had insufficient data (I.D.) therefore trends were not calculated. The value closest to the 15th day of the month was chosen to represent the monthly value in cases with multiple monthly samples.

Secchi Depth

Trend analysis of Secchi depth suggests it has no significant upwards or downwards trend at Wizard Lake from 2006-2024 (Tau = 0.0737, p = 0.5429).



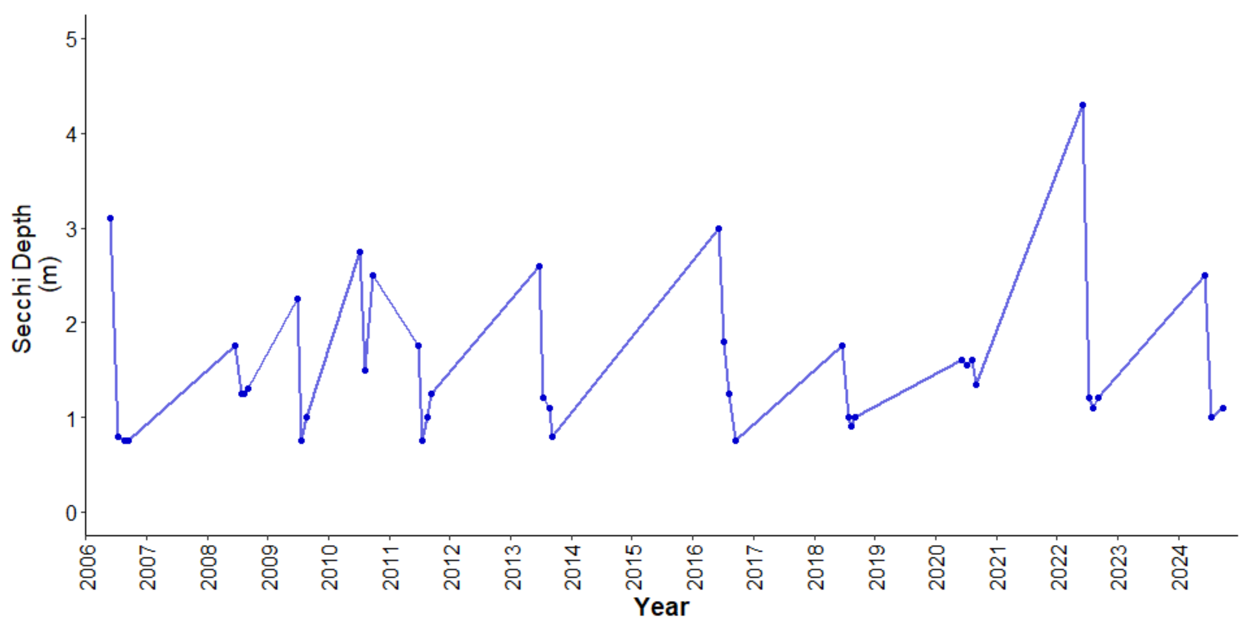


Figure 12. Monthly Secchi depth values measured between June and September over the long term sampling dates between 2006 and 2024 (n = 41). The value closest to the 15th day of the month was chosen to represent the monthly value in cases with multiple monthly samples.

Table 5. Results of trend tests using total phosphorus (TP), chlorophyll-*a*, total dissolved solids (TDS), and Secchi depth data from June to September for sampled years from 2006-2024 on Wizard Lake data.

Definition	Unit	Total Phosphorus (TP)	Chlorophyll-*a*	Total Dissolved Solids (TDS)	Secchi Depth
Statistical Method	-	Seasonal Kendall	Seasonal Kendall	Seasonal Kendall	Seasonal Kendall
The strength and direction (+ or -) of the trend between -1 and 1	Tau	-0.3734	0.1285	0.526	0.0737
The extent of the trend	Slope (units per Year)	-0.7929	0.3175	1.0357	0.0074
The statistic used to find significance of the trend	Z	-3.0639	1.0328	3.9691	0.6085
Number of samples included	n	41	41	33	41
The significance of the trend	*p*	0.0022*	0.3017	7.214e-05*	0.5429

*$p < 0.05$ is significant within 95%