VLAWMO
Vadnais Lake Area
Water Management Organization

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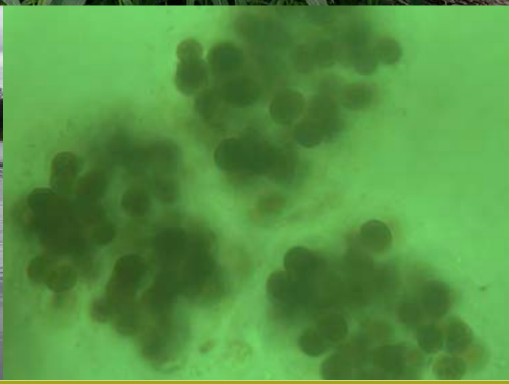
2025 Water Monitoring Report



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2025 Water Monitoring Report

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Definitions & Abbreviations

Ammonia (NH3) – an inorganic form of nitrogen thatiscontained in fertilizers, septic system effluent, and animal wastes. It is also a product of bacterial decomposition of organic matter. NH3 becomes a concern if high levels of the un-ionized form are present. In this form NH3 can be toxic to aquatic organ- isms. The presence of un-ionized ammonia is a function of the NH3 concentration, pH, and temperature. Conversion of NH3 to NO2 by nitrification requires large quantities of oxygen which can kill aquatic or- ganisms due to the lowered dissolved oxygen concentrations in water.

Aquatic Invasive Species (AIS) – non-native species such as zebra mussels and Eurasian watermilfoil

Birch Lake Improvement District (BLID) – Homeowner/lakeshore owners on Birch Lake in White Bear Lake, MN

Chlorophyll-a(ChlA) - ChlA is a green pigment in algae. Measuring ChlA concentration gives an indication of how abundant algae are in a waterbody.

Colony Forming Units (CFU) – unit used in measuring the level of E. coli in a water sample.

Conductivity (mS/cm) - Conductivity is a good measure of salinity in water. The measurement detects chloride ions from the salt. Salinity affects the potential dissolved oxygen levels in the water. The greater the salinity, the lower the saturation point. Measurement in millisiemens per cm. 1 mS/cm = 1000 uS/ cm.

Dissolved Oxygen (DO) - The concentration of molecular oxygen (O2) dissolved in water. The DO level represents one of the most important measurements of water quality and is a critical indicator of a water body's ability to support healthy ecosystems. Levels above 5 mg/L are considered optimal, and most fish cannot survive for prolonged periods at levels below 3 mg/L. Microbial communities in water use oxygen to break down organic materials, such as animal waste products and decomposing algae and other vegetation. Low levels of dissolved oxygen can be a sign that too much organic material is in a water body.

Ecoli – Criteria for *E. coli* set forth in Minn.R. 7050.0222 states that creeks must not exceed 126 organisms per 100 ml as a geometric mean of not less than 5 samples in any calendar month, nor shall more than 10 percent of all samples taken during any calendar month individually exceed 1,260 organisms per 100 ml.

EQuIS - a repository for water quality, biological, and physical data and is used by state environmental agencies, EPA and other federal agencies, universities, private citizens, and many others. The MPCA uses the information entered into the database to determine the quality of the state's water bodies. If water quality standards are not met, the water body will designated as impaired and will need to have a TMDL study conducted.

Eutrophic – a water body that is high in nutrients and low oxygen content. A eutrophic lake is usually shallow, green, with limited oxygen in the bottom layer of water.

Eutrophication – The aging process by which lakes are fertilized with nutrients. Natural eutrophication will gradually change the character of a lake. Human activities can accelerate the process.

Hypereutrophic – A very nutrient-rich lake with murky water, frequent algal blooms and fish kills, foul odor, and rough fish.

Definitions & Abbreviations

Impaired Waters – The Clean Water Act requires states to publish, every two years, a list of streams and lakes that are not meeting their designated uses because of excess pollutants. The list, known as the 303(d) list, is based on violations of water quality standards.

Mesotrophic – The classification between eutrophic and oligotrophic lakes. These lakes have moderately clear water, late-summer algal blooms, moderate macrophyte populations, and occasional fish kills.

Molecular Sourcing – The use of specific DNA markers to determine presence of a specific host origin of E.coli in a water sample (for example, Human or Avian).

Most Probable Number (MPN) - unit used in measuring the level of *E. coli* in a water sample, similar to CFU).

Nitrate (NO3) – High NO3 levels are often caused by over application of fertilizers that leach into waterbodies. Nitrate loading from waterbodies in Minnesota has national implications as it is the primary chemical contributing to the hypoxia (low oxygen) zone at the mouth of the Mississippi River in the Gulf of Mexico. The Environmental Protection Agency (EPA) has a standard for nitrates in drinking water of 10ppb, infants and children are especially at risk.

Nitrite (NO2) – The second stage of the nitrogen cycle. Nitrite is poisonous to fish. Levels over 75 ug/L can cause stress in fish and greater than 500 ug/L can be toxic

Nitrogen (N) – Nitrogen is second only to phosphorus as an important nutrient for plant and algae growth. The amount of nitrogen in a water body strongly correlates to land use.

Nitrogen Cycle - the process of nitrogen breakdown in water. The first stage is the production of NH3. The second stage is the oxidation of NH3 into NO2 which is very poisonous to fish. The final stage is conversion of NO3, which aquatic plants use. Once the plants have used their share of NO3, bacteria change it back into a gaseous form and release it back to the atmosphere. The Nitrogen Cycle is dependent on oxygen. If a water body has low DO, organic decay of nitrogen is slower and the water will have increased interim levels of toxic products (NH3 and NO2). The cycle also moves quicker in warmer water.

Oligotrophic – A water body that is generally clear, deep, and free of weeds or large algae blooms.

Particulate Phosphorus – A form of phosphorus that is attached to sediment particles and in plant and animal fragments suspended in the water and may not be immediately available to support algae growth. Some of this phosphorus is readily available but the amount can vary.

Phosphorus (P) - Phosphorus is the primary cause of excessive plant and algae growth in lake systems. Phosphorus originates from a variety of sources, many of which are human related. Major sources include human and animal wastes, soil erosion, detergents, septic systems and runoff from farmland, yards, and streets.

Definitions & Abbreviations

Secchi Disk – a round, white, metal disk that is used to determine water clarity. It is lowered into the water until it is not visible. The depth is recorded, and then the disk is raised until it is visible. The mean value of the two readings gives the clarity.

Secchi Disk Transparency (SDT) - the term used in describing the results of a secchi reading expressed in feet or meters.

Soluble Reactive Phosphorus (SRP) – a form of phosphorus that dissolves in water and is readily available (bio-available) to algae and has an immediate effect on algae growth and DO depletion. Its concentration varies widely over short periods of time as plants take it up and release it.

Saint Paul Regional Water Service (SPRWS) – Agency which assists VLAWMO with water quality testing and controls the Vadnais chain of lakes, which supplies drinking water to the city of St. Paul.

Surface Water Assessment Grant (SWAG) - Grant awarded by the PCA to help fund surface water monitoring

Total Kjehldahl Nitrogen (TKN) – The sum of NO2, NO3, and NH3 in a water body. High measurements of TKN typically results from sewage and manure discharges to water bodies.

Total Maximum Daily Load (TMDL) – Calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards and an allocation of that amount to the pollutant's source.

Total Nitrate and Nitrite Nitrogen - Nitrate (NO3) plus nitrite (NO2) as nitrogen. In lakes, most nitrate/nitrogen is in NO3 form.

Total Phosphorus (TP) – A nutrient essential to the growth of organisms, and is commonly the limiting factor in the primary productivity of surface water bodies. Total phosphorus includes the amount of phosphorus in solution (reactive) and in particle form. Agricultural drainage, wastewater, and certain industrial discharges are typical sources of phosphorus, and can contribute to the eutrophication of surface water bodies.

Total Suspended Solids (TSS) – Very small particles remaining dispersed in a liquid due to turbulent mixing that can create turbid or cloudy conditions.

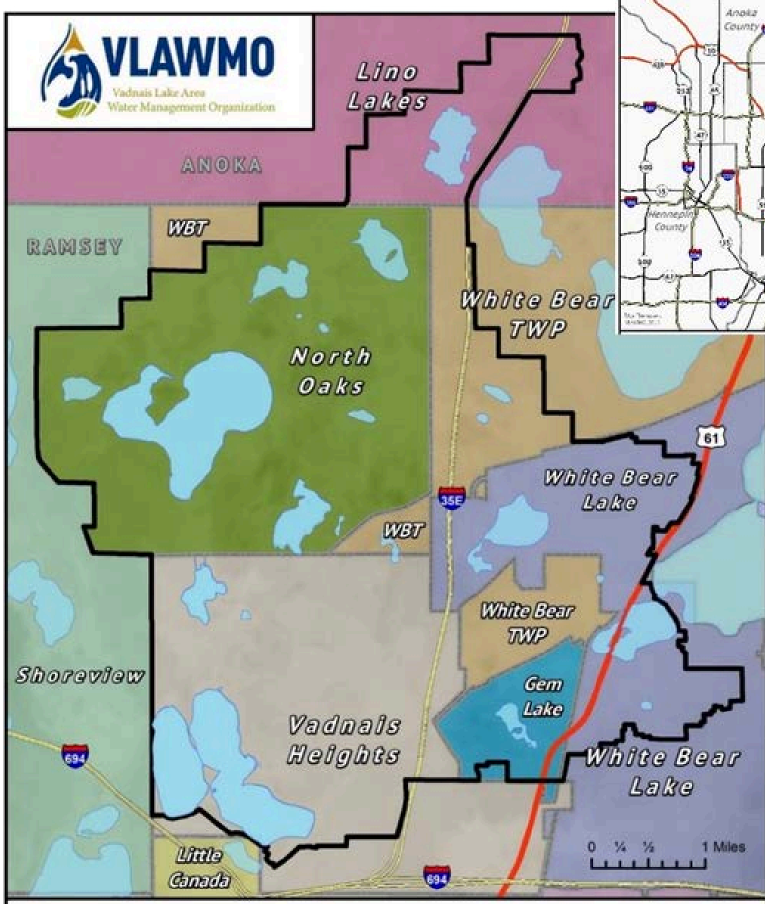
Turbidity – a water quality parameter that refers to how clear the water is. It is an indicator of the concentration of suspended solids in the water. Excessive sedimentation in streams and rivers is considered to be the major source of surface water pollution in the United States. Polluted waters are commonly turbid. Turbidity is expressed in NTU (Nephelometric Turbidity Units).

Volatile Suspended Solids (VSS) – a measure of the organic matter in suspended particles. When measured in conjunction with TSS, the proportions of organic versus mineral content of the particles can be determined.

The Vadnais Lake Area Water Management Organization (VLAWMO) covers approximately 25 square miles in the northeast metropolitan area. The watershed encompasses the City of North Oaks and portions of the Cities of White Bear Lake, Gem Lake, Vadnais Heights, Lino Lakes, and White Bear Township. The watershed is 96% urbanized; agricultural land exists in the northern end of the boundaries. New land development is occurring near Wilkinson Lake. Data collected through this program tracks changes in water quality in conjunction with the change in land use around these water bodies.

VLAWMO works in conjunction with the St. Paul Regional Water Service (SPRWS) on water quality monitoring. The SPRWS monitors the direct surface water flow into Vadnais Lake to assure high quality drinking water for over 400,000 consumers. The SPRWS monitors the main chain of lakes (Pleasant Lake, Sucker Lake and East Vadnais Lake) and VLAWMO monitors Lambert Creek which flows directly into East Vadnais Lake.

Figure 1: Map of VLAWMO with political boundaries



VLAWMO's mission is

"to protect and enhance the water and natural resources within the watershed through water quality monitoring, education and outreach projects, wetland protection, and water quality enhancement projects and programs."

INTRODUCTION

VLAWMO began the Lake Monitoring Program in 1997 to monitor several lakesand ponds within the watershed that were identified as having local significance. Staff collect samples from 15 water bodies: Amelia Lake, Birch Lake, Black Lake, Charlie Lake, Deep Lake, Gem Lake, Gilfillan Lake, Goose Lake East, Goose Lake West, Pleasant Lake, Sucker Lake, Tamarack Lake, East & West Vadnais Lake and Wilkinson Lake. These lakes are mostly shallow with average depths no greater than 9 feet. Five lakes are deeper than 9 feet (Charlie, Gem, Pleasant. Sucker and East Vadnais) Six areas along Lambert Creek are also sampled as part of the Organization's mission to protect and improve the water-related environment. The data received from the monitoring is used by VLAWMO and the Minnesota Pollution Control Agency (MPCA) to determine the health of the state's waters.

Figure 2: Map of VLAWMO Water Resources

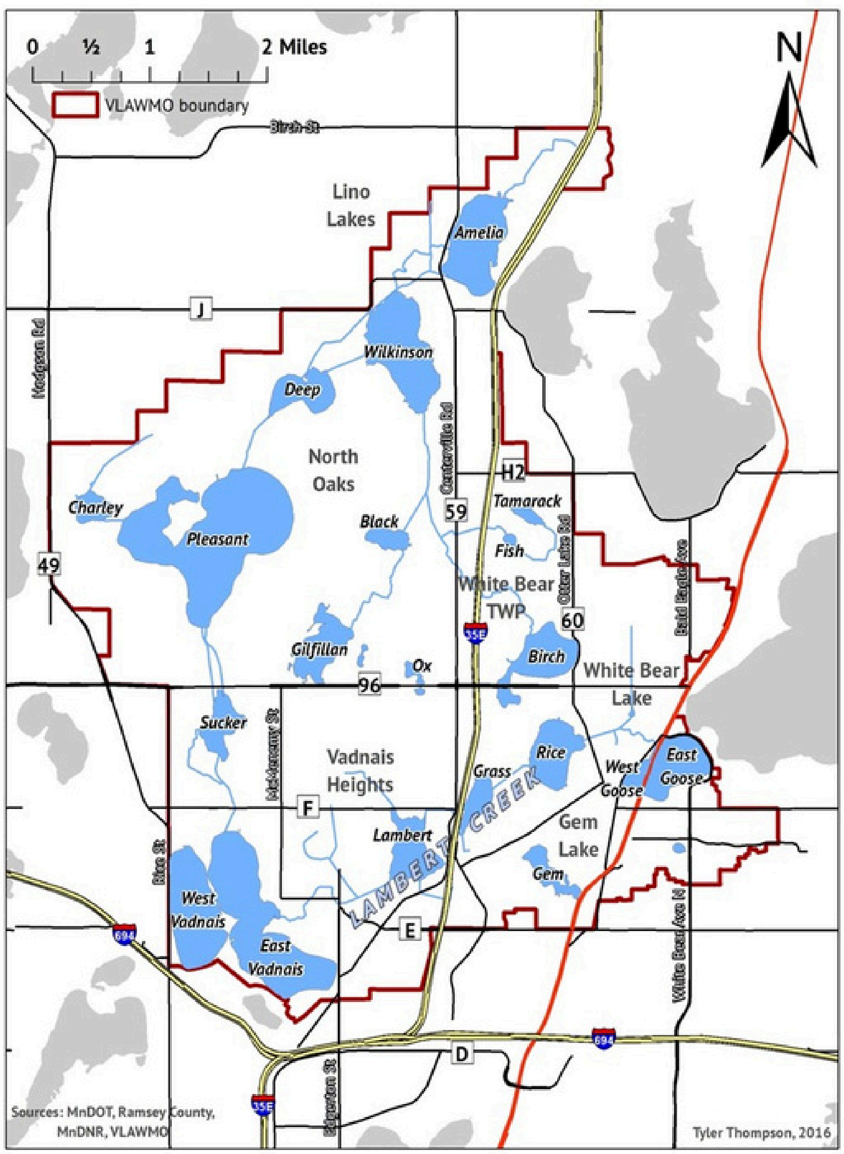
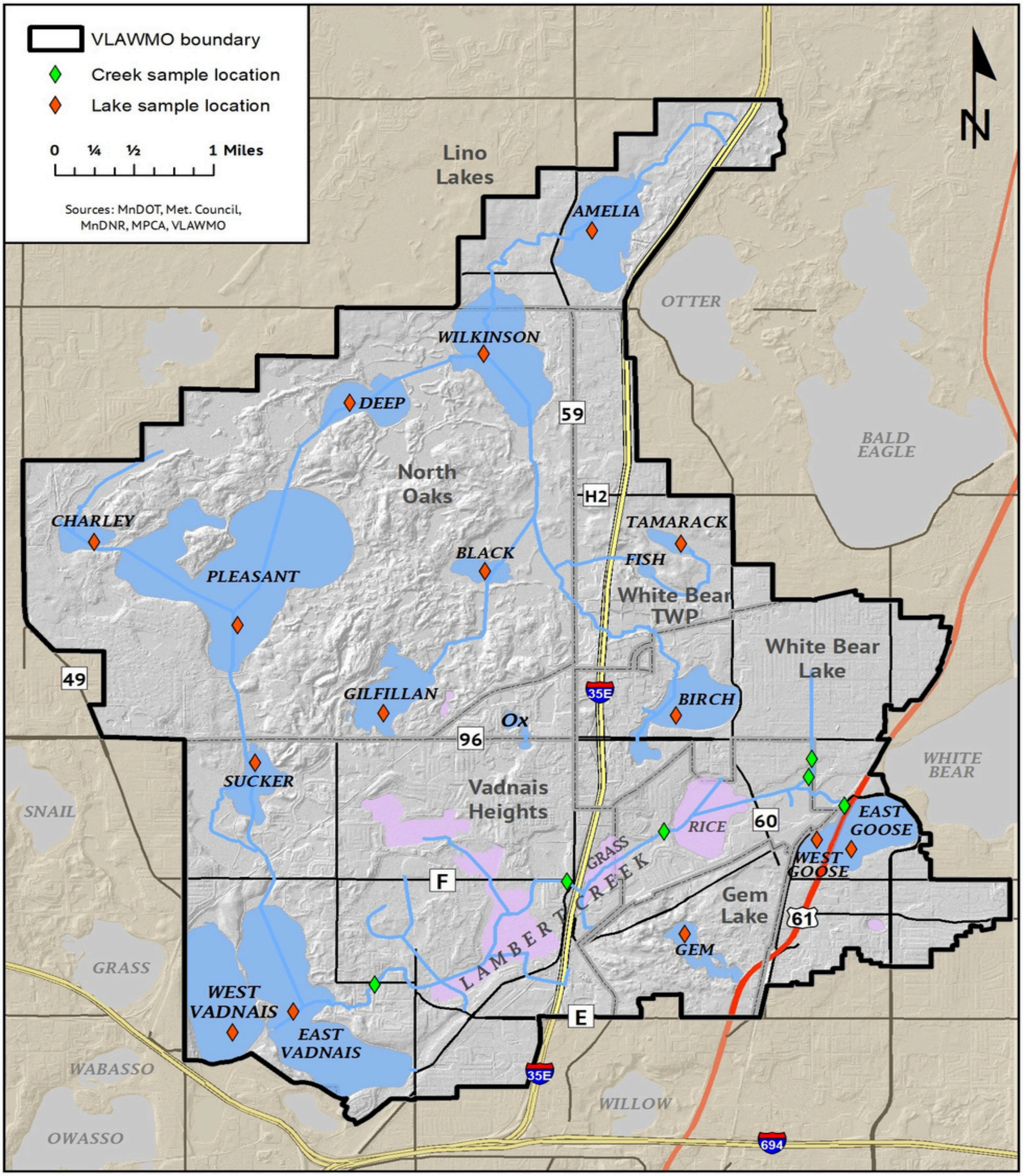


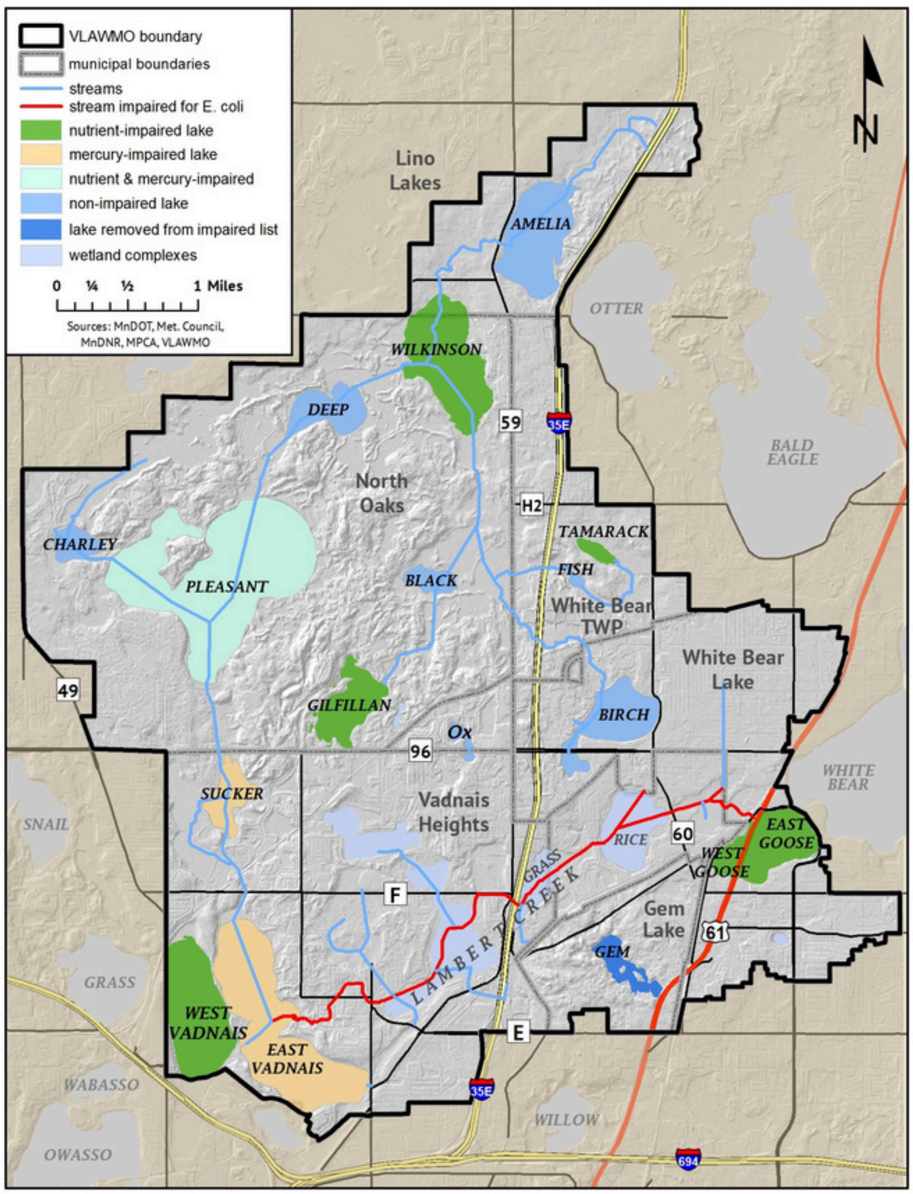
Figure 3: Monitoring Sites in VLAWMO



Impaired Water Designations

The watershed has had several water bodies listed on the MPCA 303(d) list for Impaired Waters. The SPRWS Chain of Lakes (Pleasant, Sucker and Vadnais Lakes) have all been listed for nutrient pollution, specifically mercury. These lakes have been infested with zebra mussels, an aquatic invasive species, though this is not a condition of the Impaired Waters listing. This chain of lakes is fed by the Mississippi River through a pump in Fridley, MN. Lambert Creek has been added to the impaired list for bacteria, specifically fecal coliform or *E. coli*. Gilfillan Lake, Goose Lake and Wilkinson Lake, impaired for nutrients, have also been added. Pleasant Lake, Tamarack Lake and West Vadnais Lake were added to the impaired list for nutrients in 2018.

Figure 4: Waterbodies listed on the MPCA 303(d) Impaired Waters List



Typical Measurements for Lakes and Streams

VLAWMO's watershed falls within the North Central Hardwood Forest (CHF) ecoregion. This ecoregion is an area of transition between the forested areas to the north and east and the agricultural areas to the south and west. The terrain varies from rolling hills to smaller plains. Non-urbanized upland areas are forested by hardwoods and conifers. Plains include livestock pastures, hay fields and row crops such as potatoes, beans, peas and corn.

The ecoregion contains many lakes, and water clarity and nutrient levels are moderate. Land surrounding many of these lakes has been developed for housing and recreation, and the densely populated metropolitan area dominates the eastern portion of this region. Water quality problems that face many of the water bodies in the area are associated with contaminated runoff from paved surfaces and lawns.

Below are typical measurements one might find for lakes and streams in the CHF ecoregion:

Typical Lake Measurements in CHF Ecoregion							
Field pH	TSS (mg/L)	NO_x (µg/L)	TP (µg/L)	Turb (NTU)	SDT (m)	Chl-a (µg/L)	TKN (µg /L)
8.6 – 8.8	2 – 6	<100	23 – 50	1 – 2	1.5 – 3.2	5 – 22	600 - 1200
Streams							
Field pH	TSS (mg/L)	NOX (µg/L)	TP (µg/L)	Turb (NTU)	Fecal Coliform (cfu/100 ml)	Temp (˚C)	BOD (in mg/L)
7.9 – 8.3	4.8 – 16	4 - 26	6 – 15	3 – 8.5	40 – 360	2 – 21	–3.2

The MPCA has water quality standards based on a designated use for the water body. VLAWMO's water is classified as "2B". The SPRWS chain of lakes has a stricter designation of "2Bd" due to it being the drinking water source for St. Paul. The quality of Class 2B water must be suitable for aquatic recreation of all kinds as well as to support fish and aquatic plant life. In 2008, the MPCA approved new standards which will separate deep from shallow lakes. All of the lakes VLAWMO monitors are considered shallow and therefore those standards will apply. For those parameters which the MPCA does not have standards, the federal Environmental Protection Agency (EPA) has maximum contaminant level standards. VLAWMO's goal is to have its waterbodies within these standards.

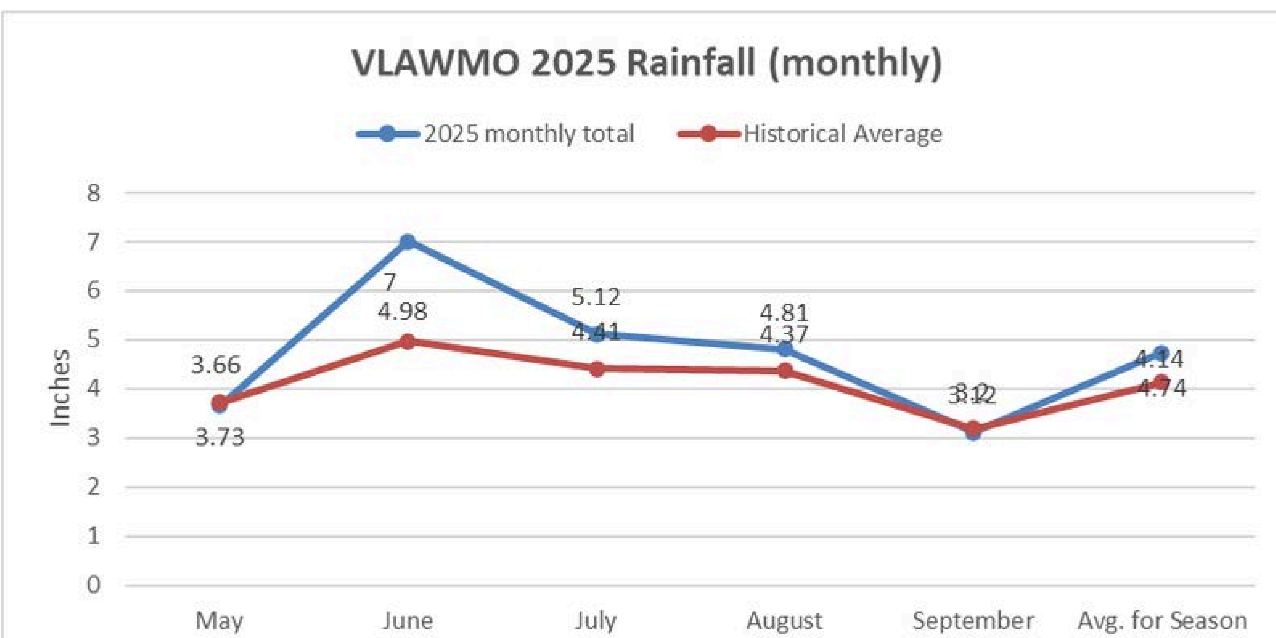
MPCA Standards Lakes					**EPA Standards**	
TP (µg/L)	Chl A (µg/L)	SDT (m)	Turb (NTU)	TSS (mg/L)	TKN (µg/L)	NO2 (µg/L)
< 60 shallow <40 deep	< 20 shallow <14 deep	>1 shallow >1.4 deep	< 25	< 100	< 1000	< 100
MPCA Standards – Rivers and Streams					**EPA Standards**	
Fecal Coliform daily maximum (cfu/100 ml)	Chloride (Cl) chronic (mg/L)	Turb (NTU)	TSS (mg/L)	Un-ionized Ammonia (µg/L)	TKN (µg/L)	NO2 (µg/L)
< 1260	< 230	< 25	< 100	<40	< 1000	< 100

Precipitation in 2025

Major factors influence water quality including the amount of precipitation, timing of precipitation events, and land use practices in the watershed. Long-term monitoring is necessary to characterize the impacts of various land use practices on surface water runoff within VLAWMO.

The 2025 monitoring season precipitation was above average by 0.60 inches per month and 0.25 inches below 2024 monitoring season precipitation. Precipitation moves contaminants resting on lawns, roofs, streets, and parking lots into nearby waterbodies or into storm sewers that outlet into water bodies. Typically, the more precipitation that occurs, the more runoff there will be in the watershed. However, the timing and intensity of the precipitation, as well as soil types, land slopes, land uses, and other factors can influence the amount of runoff that reaches the water bodies. Lack of rain can also have an effect on the concentration of nutrients and chemicals in our water bodies. With a smaller volume of water in our water bodies, nutrients and chemicals can become more concentrated.

2025 Precipitation Data (in inches)			
Vadnais Lake Area WMO			
	2025 monthly total	**Historical Average**	**Deviation**
May	3.66	3.73	-0.07
June	7	4.98	2.02
July	5.12	4.41	0.71
August	4.81	4.37	0.44
September	3.12	3.2	-0.08
Avg. for Season	**4.74**	**4.14**	**0.60**



INTRODUCTION

Preliminary Analysis of Lake Data

VLAWMO staff collects samples from the lakes and creek at two-week intervals from May through September. At the time of collection, staff measure water transparency with a Secchi disk (SDT), evaluate the physical and recreational conditions of the water, and if available, take a lake level reading. Samples are delivered to RMB Labs within 24 hours for chemical analysis. Parameters measured at the lab include Phosphorus (TP & SRP), Chlorophyll-a (Chl A), and Total Suspended Solids (TSS). The data from these tests aid in the determination of the state of the water quality in a particular lake or stream and allow for monitoring of the long term health of the water body. Standards for water quality are set by the US Environmental Protection Agency (EPA) and enforced through the MPCA.

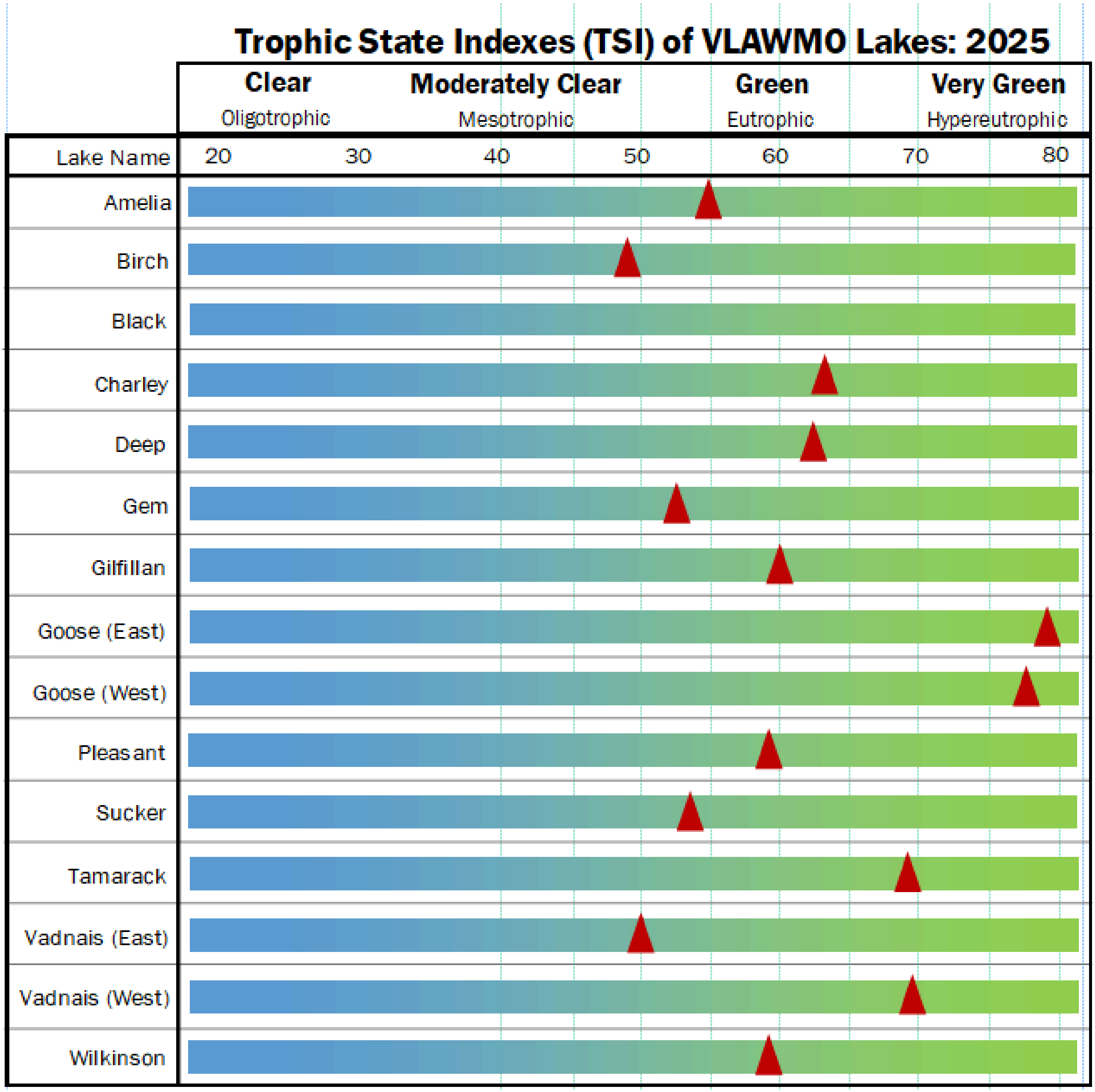
A measure of the lake health and lake age is Carlson's Trophic State Index (TSI), which measures the productivity level of a lake or degree of eutrophication. As a lake ages, it becomes more eutrophic, however human impact speeds up the process. High TSI values can relate to poorer water quality, with the possibility of variations from lake to lake. To accommodate for these possible variations, the trophic state serves as an absolute scale that describes the biological condition of a waterbody. VLAWMO lake TSI ratings are listed on page 15 consistent with Minnesota Pollution Control Agency's (MPCA) parameters, which range from hypereutrophic to oligotrophic. Additional information specific to each lake is also available at **vlawmo.org/waterbodies**.

Water quality, on the other hand, is a term used to describe the condition of a water body in relation to human needs or values. Analysis of these conditions continue from page 18 and onwards.

Raw data and chart explaining the TSI Status of 2025 & 2024

2025 TSI Lake Data	Averge Secchi Disk (m)	Secchi Disk TSI	Average Chlorophyll A ChlA (mg/m³)	Chlorophyll A ChlA TSI	Average Total Phosphorus (TP) µg/L	Total Phosphoros (TP) TSI	Total TSI
Amelia	1.1	59	6	48	40	57	55
Birch	2.1	49	7	50	17	45	48
Black		#NUM!		#NUM!		#NUM!	#NUM!
Charley	1.2	57	22	61	96	70	63
Deep	0.8	63	11	54	79	67	61
Gem	2.1	49	12	55	37	56	54
Gilfillan	1.2	57	30	64	47	60	60
East Goose	0.3	77	124	78	201	81	79
West Goose	0.5	70	142	79	184	79	76
Pleasant	2.5	47	19	59	100	71	59
Sucker	2.3	48	13	56	45	59	54
Tamarack	0.6	67	48	69	64	64	67
East Vadnais	3.2	43	10	53	28	52	50
West Vadnais	1.1	59	92	75	81	68	67
Wilkinson	1.3	56	8	51	82	68	58

2024 TSI Lake Data	Averge Secchi Disk (m)	Secchi Disk TSI	Average Chlorophyll A ChlA (mg/m³)	Chlorophyll A ChlA TSI	Average Total Phosphorus (TP) µg/L	Total Phosphorous (TP) TSI	Total TSI
Amelia	1.2	57	8	51	30	53	54
Birch	2	50	8	51	24	50	50
Black		#NUM!		#NUM!		#NUM!	#NUM!
Charley	0.8	63	10	53	80	67	61
Deep	0.8	63	8	51	67	65	60
Gem	2.3	48	27	63	56	62	58
Gilfillan	1.1	59	27	63	45	59	60
East Goose	0.2	83	190	82	284	86	84
West Goose	0.3	77	155	80	173	78	79
Pleasant	2.3	48	11	54	75	66	56
Sucker	2.3	48	5	46	40	57	51
Tamarack	0.6	67	150	80	139	75	74
East Vadnais	3.1	44	4	44	26	51	46
West Vadnais	1	60	56	70	64	64	65
Wilkinson	1.1	59	24	62	169	78	66


Trophic State Indexes (TSI) of VLAWMO Lakes: 2025
Clear
Oligotrophic
Moderately Clear
Mesotrophic
Green
Eutrophic
Very Green
Hypereutrophic
Lake Name
20
30
40
50
60
70
80
Amelia
Birch
Black
Charley
Deep
Gem
Gilfillan
Goose (East)
Goose (West)
Pleasant
Sucker
Tamarack
Vadnais (East)
Vadnais (West)
Wilkinson

A list of possible changes that might be expected in a north temperatelakeas the amount of algae changes along the trophic state gradient.

TSI	Chl (ug/L)	SD (m)	TP (ug/L)	Attributes	Water Supply	Fisheries & Recreation
<30	<0.95	>8	<6	Oligotrophy: Cl ear water, oxygen throughout the year in the hypolimnion	Water may be suitable for an unfiltered water supply.	Salmonid fisheries dominate
30-40	0.95-2.6	8>4	6<12	Hypolimnia of shallower lakes may become anoxic Mesotrophy:		Salmonid fisheries in deep lakes only
40-50	2.6-7.3	4>2	12<24	Water moderately clear; increasing probability of hypolimnetic anoxia during summer Eutrophy:	Iron, manganese, taste, and odor problems worsen. Raw water turbidity requires filtration.	Hypolimnetic anoxia results in loss of salmonids. Wa lleye may predominate
50-60	7.3-20	2>1	24-48	Anoxic hypolimnia, macrophyte problems possible Blue-green		Warm-water fisheries only. Bass may dominate. Nuisance
60-70	20-56	0.5-1	48-96	algae dominate, algal scums and macrophyte problems Hypereutrophy : (light limited	Episodes of severe taste and odor possible.	macrophytes, algal scums, and low transparency may discourage swimming and boating.
70-80	56-155	0.25- 0.5	96-192	productivity). Dense algae and macrophytes Algal scums, few		
>80	>155	<0.25	192-384	macrophytes		Rough fish dominate; summer fish kills possible

VLAWMO's water resource manager completes the required data entry each year into the MPCA EQuIS program which makes the determination of impairment and opens opportunities for grants to help remedy the impairments.

A list of possible changes that might be expected in a north temperate lake as the amount of algae changes along the trophic state gradient.

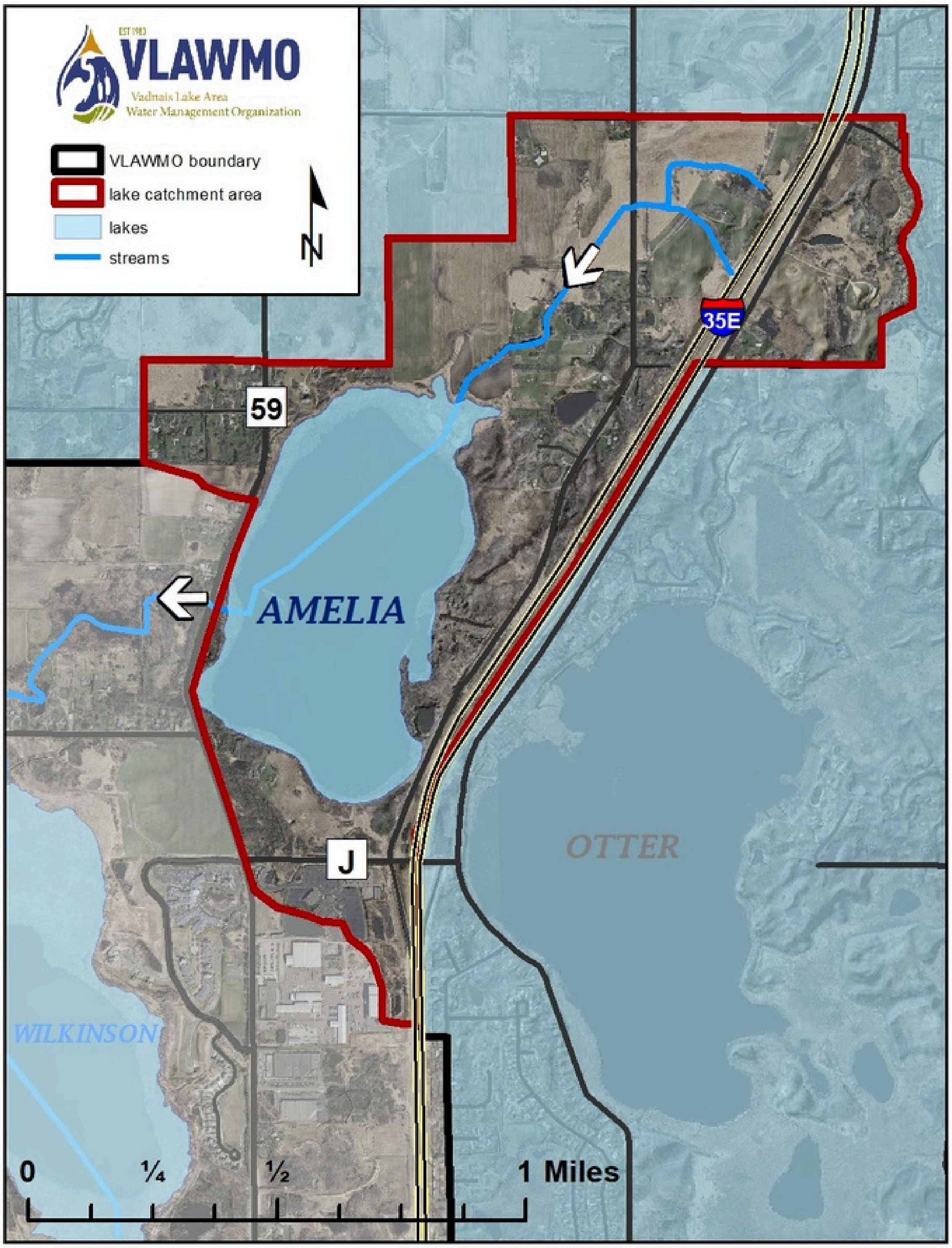
TSI	Chl (ug/L)	SD (m)	TP (ug/L)	Attributes	Water Supply	Fisheries & Recreation
<30	<0.95	>8	<6	Oligotrophy: Clear water, oxygen throughout the year in the hypolimnion	Water may be suitable for an unfiltered water supply.	Salmonid fisheries dominate
30-40	0.95-2.6	8>4	6<12	Hypolimnia of shallower lakes may become anoxic		Salmonid fisheries in deep lakes only
40-50	2.6-7.3	4>2	12<24	Mesotrophy: Water moderately clear; increasing probability of hypolimnetic anoxia during summer	Iron, manganese, taste, and odor problems worsen. Raw water turbidity requires filtration.	Hypolimnetic anoxia results in loss of salmonids. Walleye may predominate
50-60	7.3-20	2>1	24-48	Eutrophy: Anoxic hypolimnia, macrophyte problems possible		Warm-water fisheries only. Bass may dominate.
60-70	20-56	0.5-1	48-96	Blue-green algae dominate, algal scums and macrophyte problems	Episodes of severe taste and odor possible.	Nuisance macrophytes, algal scums, and low transparency may discourage swimming and boating.
70-80	56-155	0.25-0.5	96-192	Hypereutrophy: (light-limited productivity). Dense algae and macrophytes		
>80	>155	<0.25	192-384	Algal scums, few macrophytes		Rough fish dominate; summer fish kills possible

VLAWMO's Water Resource Manager completes the required data entry each year into the MPCA EQuIS program which makes the determination of impairment and opens opportunities for grants to help remedy the impairments.

2025 MONITORING RESULTS

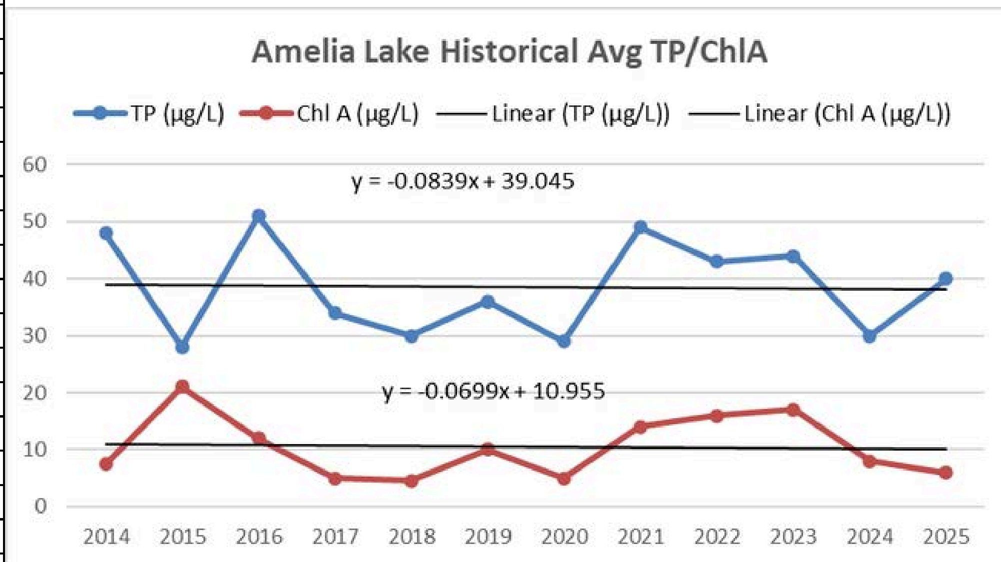
AMELIA LAKE

Amelia is located in Anoka County and is approximately 217 acres. Maximum depth for the lake is 5 feet. The majority of agricultural land left in the watershed is near Amelia Lake. VLAWMO staff also collected all DO and YSI parameter readings on Amelia. VLAWMO has been monitoring Amelia since 1997.



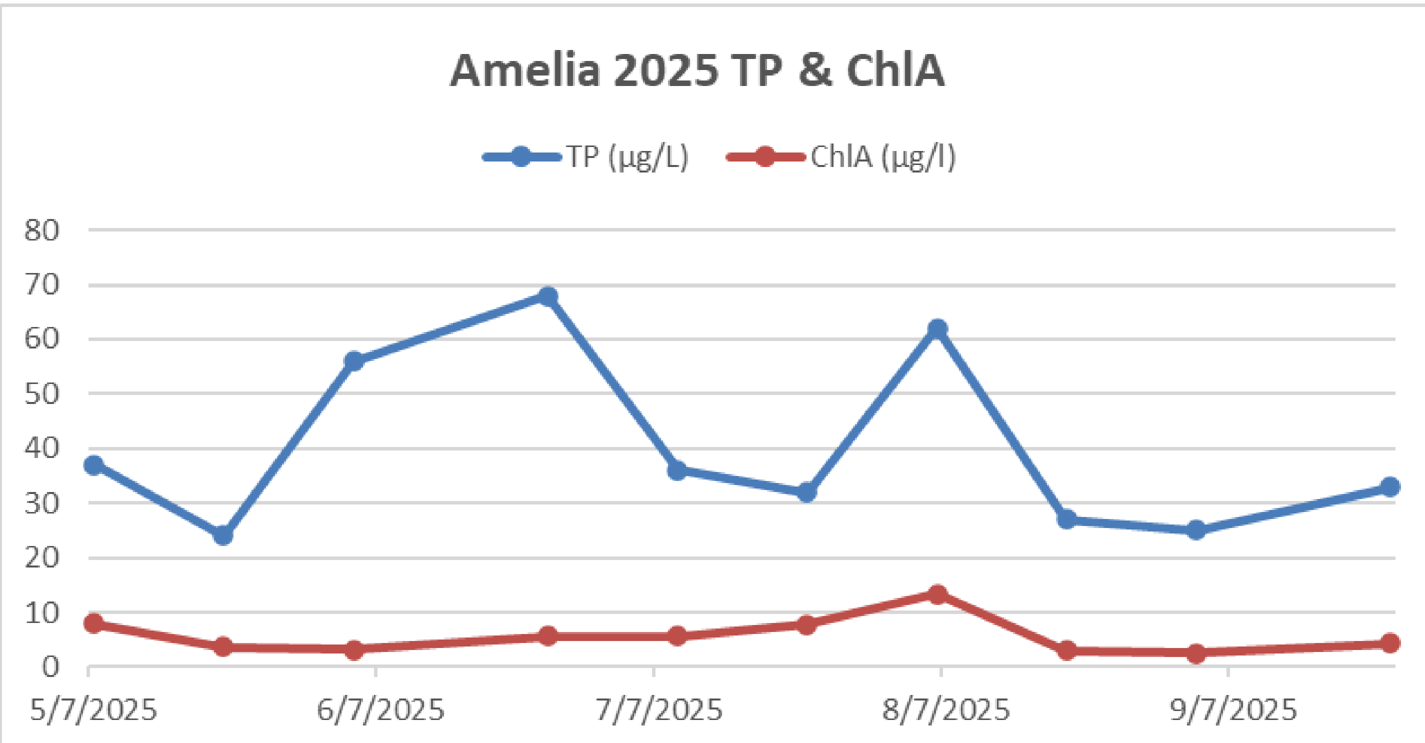
AMELIA LAKE

Amelia Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (µg/L)	Secchi (m)
1997	28	0	1.5
1998	36	14	1.1
1999	38	9	1.2
2000	40	12	0.9
2001	33	8	1.1
2002	34	13	1.4
2003	29	7	1.5
2004	28	0	0
2005	24	7	0
2006	36	12	0
2007	82	32	0.4
2008	26	5	1.1
2009	55	24	0.9
2010	32	12	1.1
2011	38	8	1.1
2012	39	9	1.1
2013	39	19	1.1
2014	48	7.5	1.3
2015	28	21	1.1
2016	51	12	1.1
2017	34	5	1.3
2018	30	4.5	1.4
2019	36	10	1.3
2020	29	5	1.3
2021	49	14	1.3
2022	43	16	1
2023	44	17	1
2024	30	8	1.2
2025	40	6	1.1



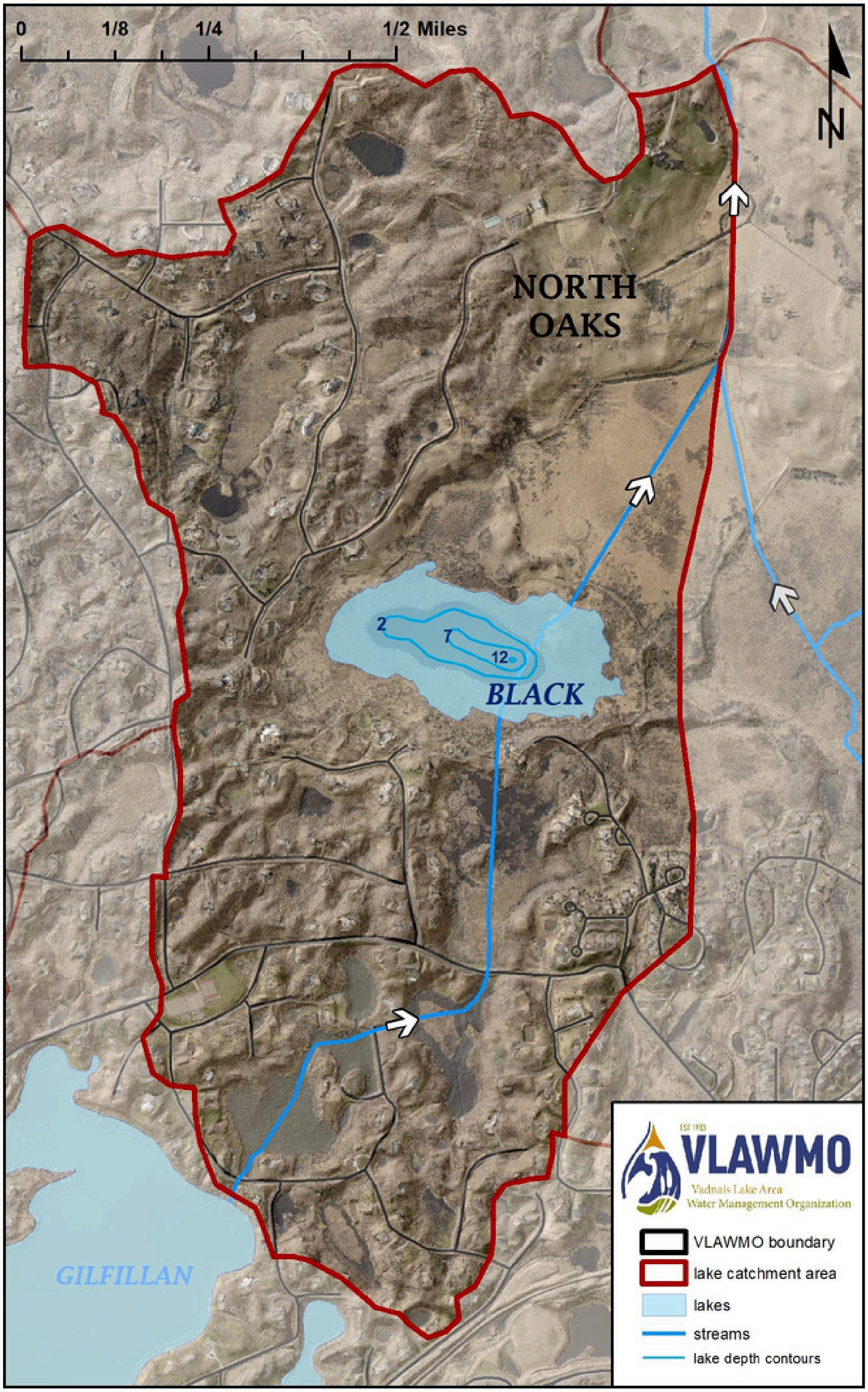
AMELIA LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
amelia	5/7/2025		37	< 0.003	8				76.7
amelia	5/21/2025		24	< 0.003	3.7				
amelia	6/4/2025		56	< 0.003	3.2				
amelia	6/25/2025		68	0.006	5.7				
amelia	7/9/2025	4	36	< 0.003	5.7				
amelia	7/23/2025	4	32	< 0.003	7.7				
amelia	8/6/2025	5	62	0.006	13.4				
amelia	8/20/2025	4	27	0.003	3				
amelia	9/3/2025	5	25	0.004	2.5				
amelia	9/24/2025	4.5	33	< 0.003	4.4				



BLACK LAKE

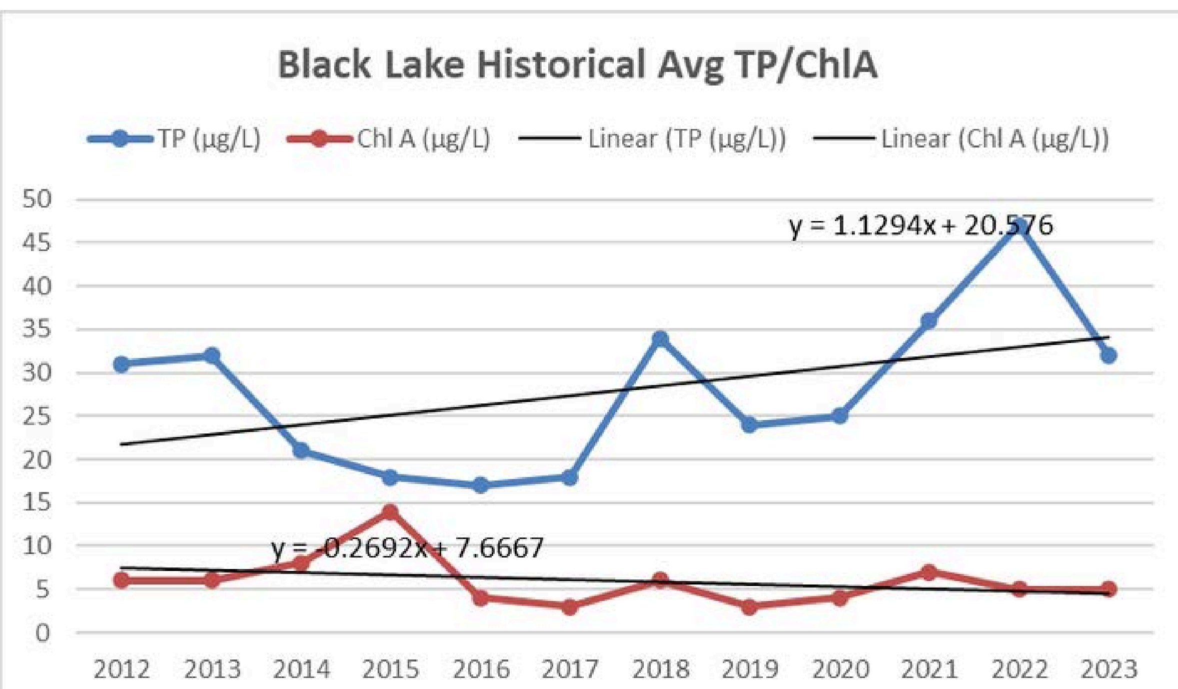
Black Lake is located in North Oaks. There is very little developed land or roads around the lake. The lake is about 10 acres and has a maximum depth of 12 feet. VLAWMO began to monitor Black Lake in 2009. Black Lake is also one of the only lakes, if not the only lake, left within VLAWMO that has a significant population of wild rice. Access to the lake is minimal and the lake is surrounded by private property, is very isolated and has a large wetland fringe. Black Lake is one of the healthiest lakes within VLAWMO.



BLACK LAKE

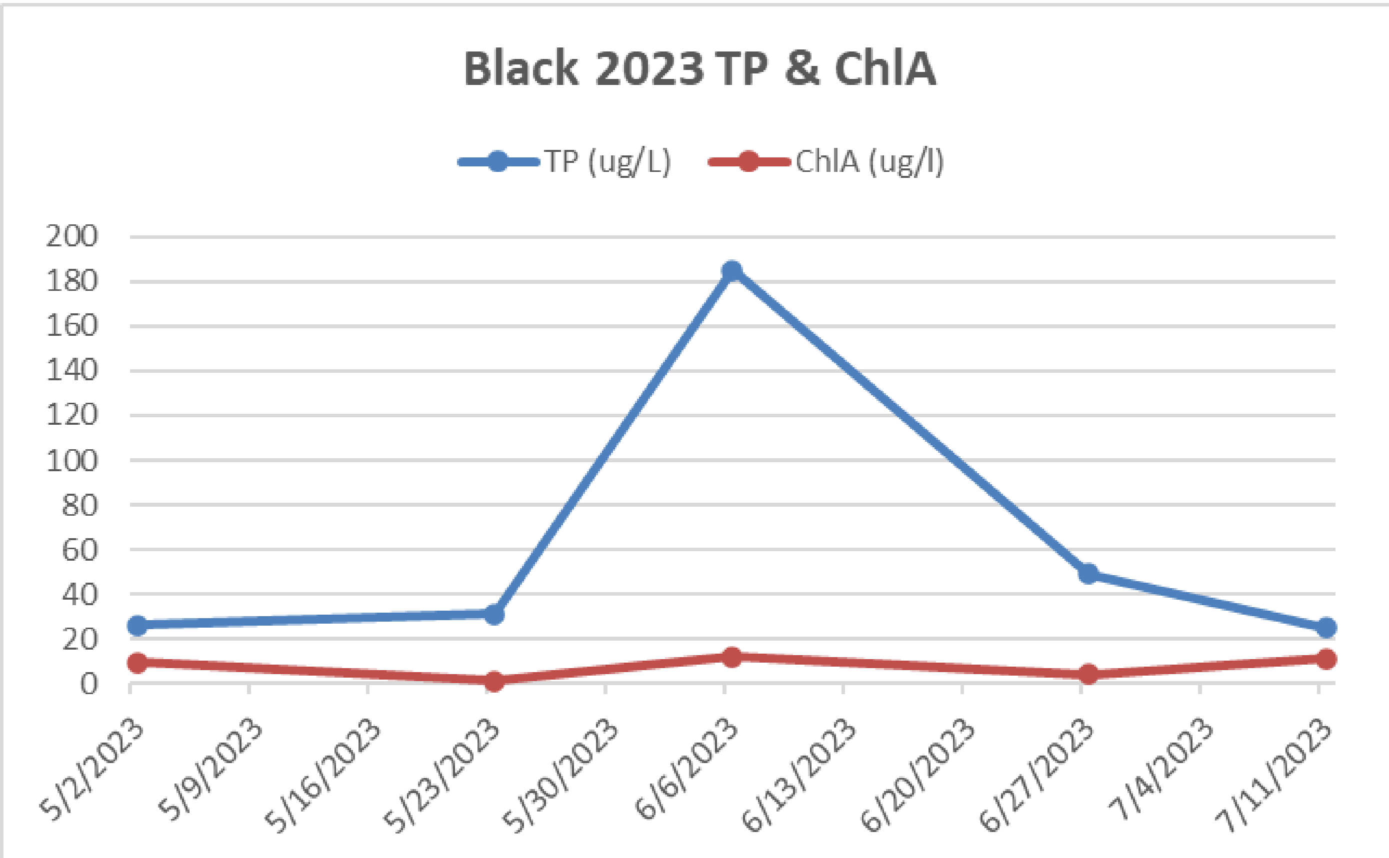
Black Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (µg/L)	Secchi (m)
2009	23	5.9	2
2010	34	6.6	2.1
2011	44	6.9	2.3
2012	31	6	2.4
2013	32	6	2
2014	21	8	2
2015	18	14	1.6
2016	17	4	2
2017	18	3	2.1
2018	34	6	2
2019	24	3	2.2
2020	25	4	2
2021	36	7	2.4
2022	47	5	2
2023	32	5	1.8

***Not monitored in 2025**



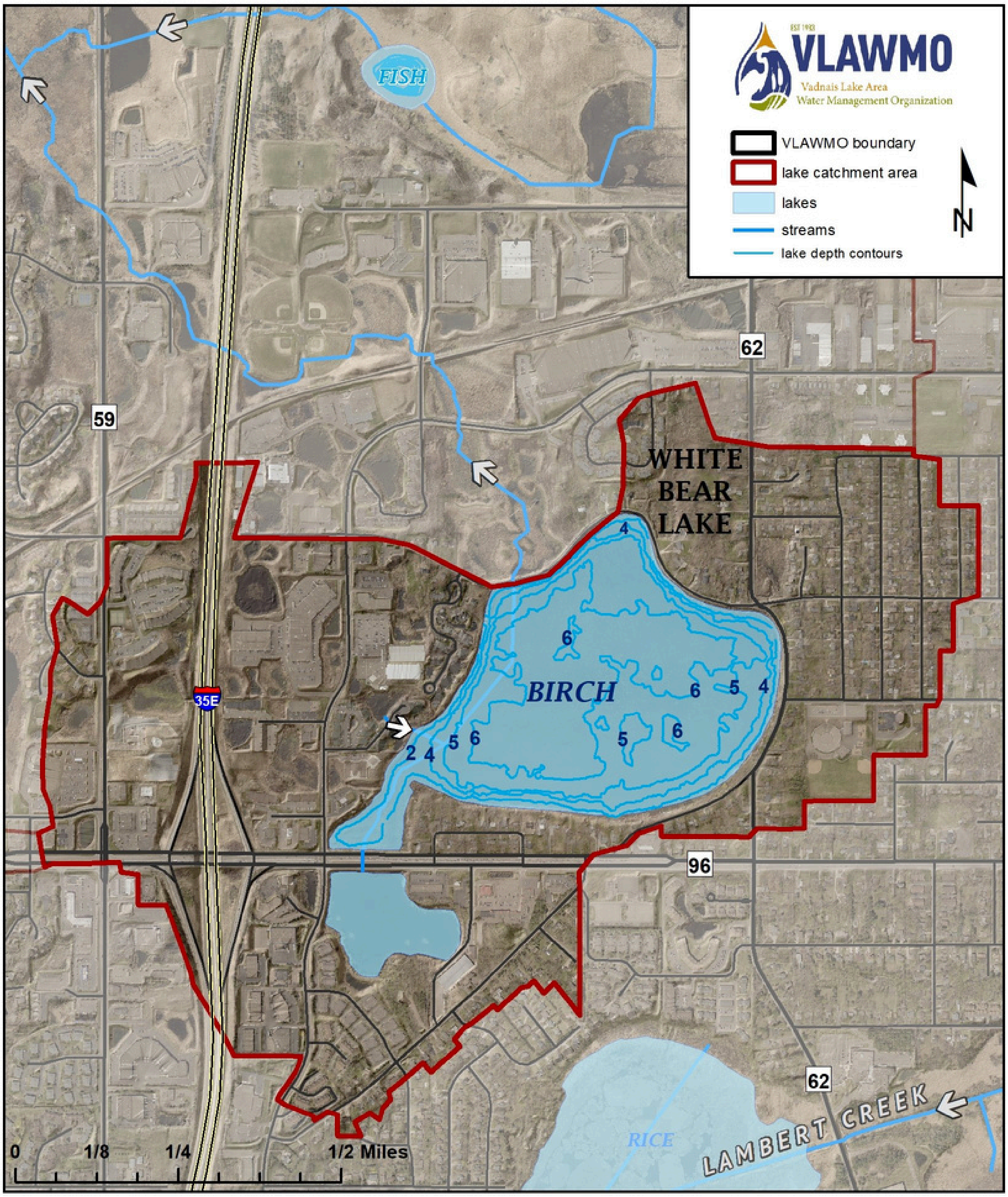
BLACK LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3	CL (mg/L)
black	5/2/2023	8	26	0.005	9.34				20.6
black	5/23/2023	7	31	0.008	1				
black	6/6/2023		185	0.014	12				
black	6/27/2023	7	49	0.008	4				
black	7/11/2023		25	0.006	11				



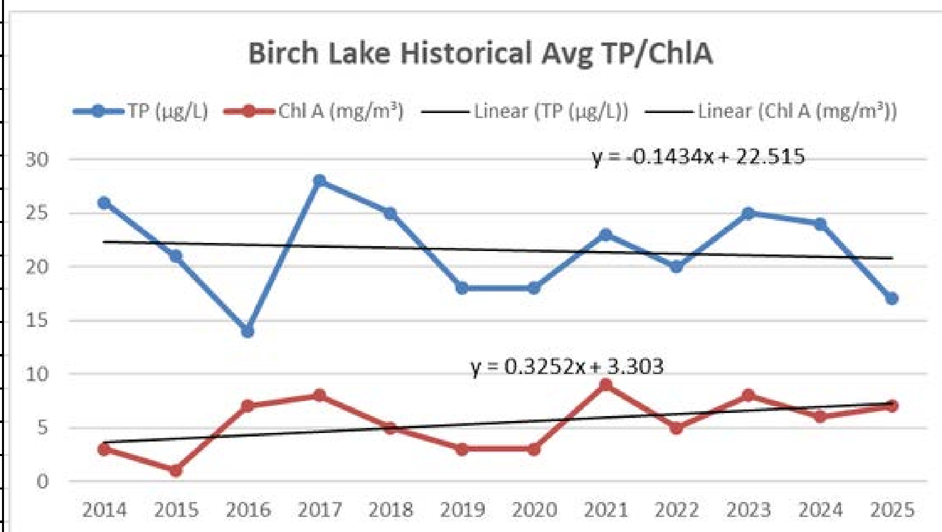
BIRCH LAKE

Birch Lake is located within the City of White Bear Lake and is 127 acres with a maximum depth of 6 feet. Land is completely developed around Birch Lake and there are 4 main storm sewer inlets around the lake as well as other storm inlets. Birch Lake is a rare find in the metropolitan area because of its clarity and water quality.



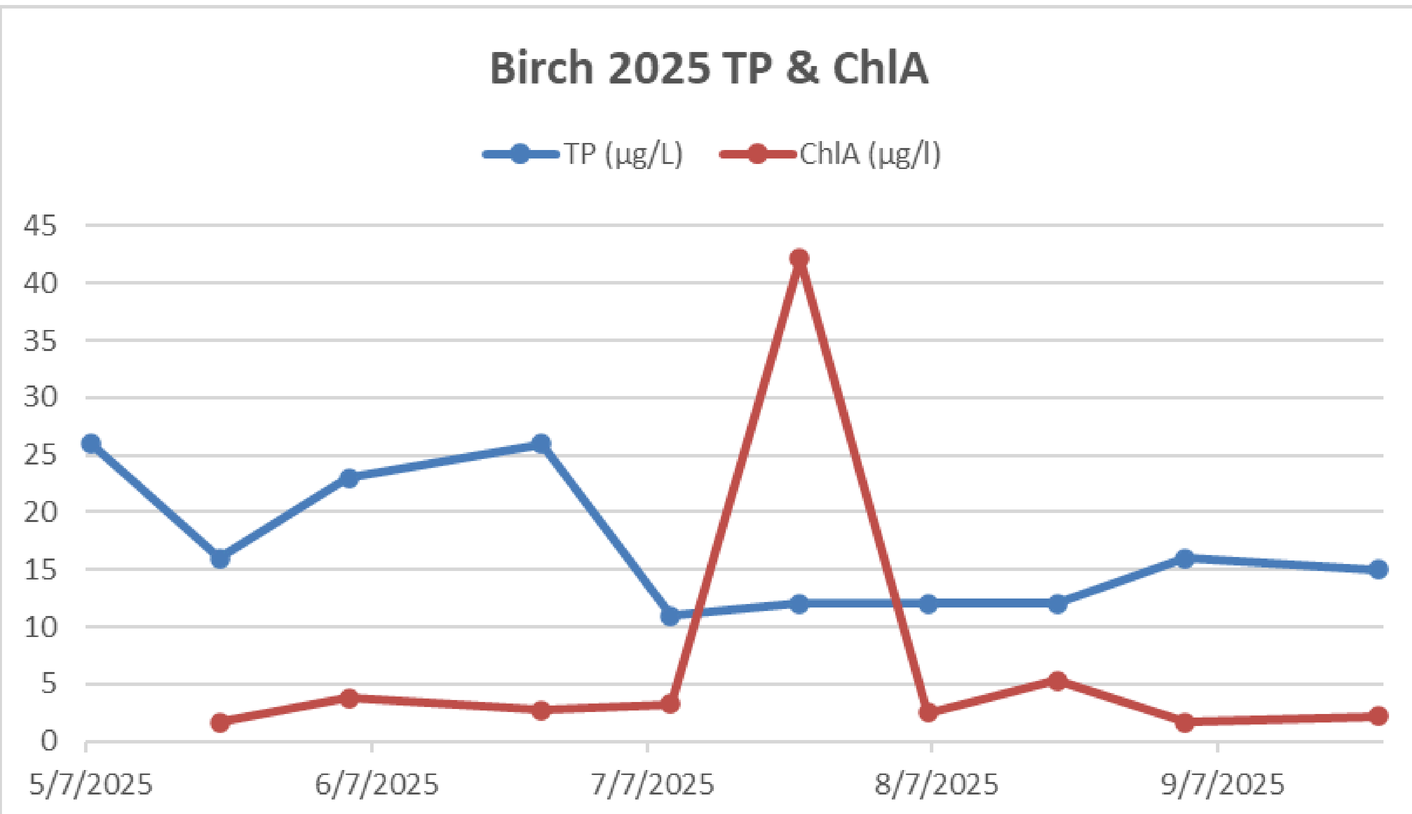
BIRCH LAKE

Birch Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
1997	22	14	2.4
1998	41	4	2.4
1999	31	8	2.4
2000	27	14	2.4
2001	42	8	2.4
2002	31	10	2.4
2003	35	13	2.4
2004	31	0	2.4
2005	31	4	2.4
2006	32	3	2.4
2007	41	5	2.4
2008	34	5	1.2
2009	40	8	1.1
2010	31	5	1
2011	29	3	2
2012	30	3	2
2013	30	3	2
2014	26	3	1.7
2015	21	1	1.7
2016	14	7	1.8
2017	28	8	1.8
2018	25	5	1.8
2019	18	3	2
2020	18	3	2
2021	23	9	2
2022	20	5	1.8
2023	25	8	1.9
2024	24	6	2
2025	17	7	2.1



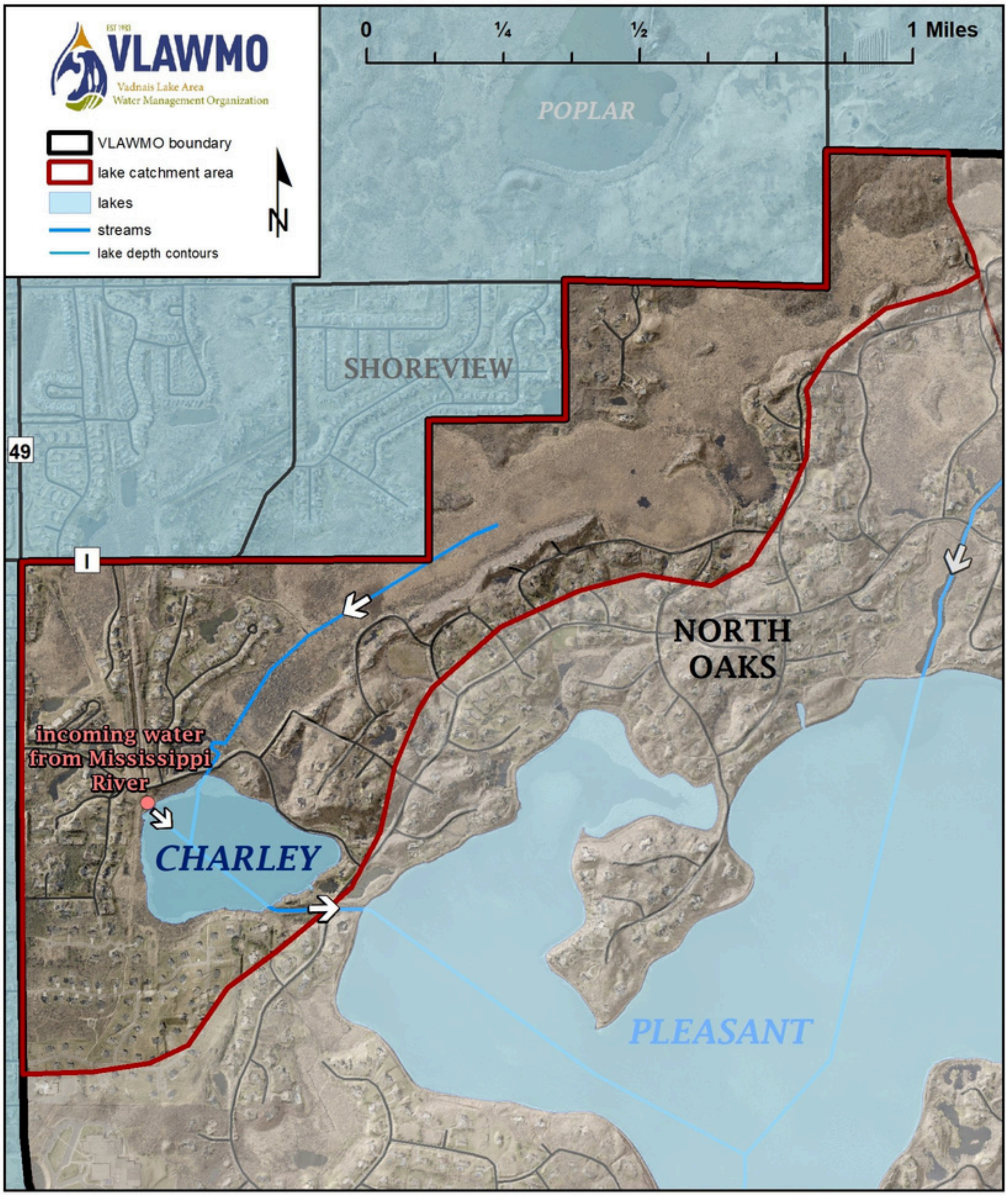
BIRCH LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3	CL (mg/L)
birch	5/7/2025		26	< 0.003					106
birch	5/21/2025		16	< 0.003	1.67				
birch	6/4/2025		23	< 0.003	3.8				
birch	6/25/2025		26	< 0.003	2.7				
birch	7/9/2025	7	11	< 0.003	3.3				
birch	7/23/2025	7	12	< 0.003	42.1				
birch	8/6/2025	7	12	< 0.003	2.5				
birch	8/20/2025	6	12	< 0.003	5.3				
birch	9/3/2025	6	16	< 0.003	1.7				
birch	9/24/2025	7	15	< 0.003	2.2				



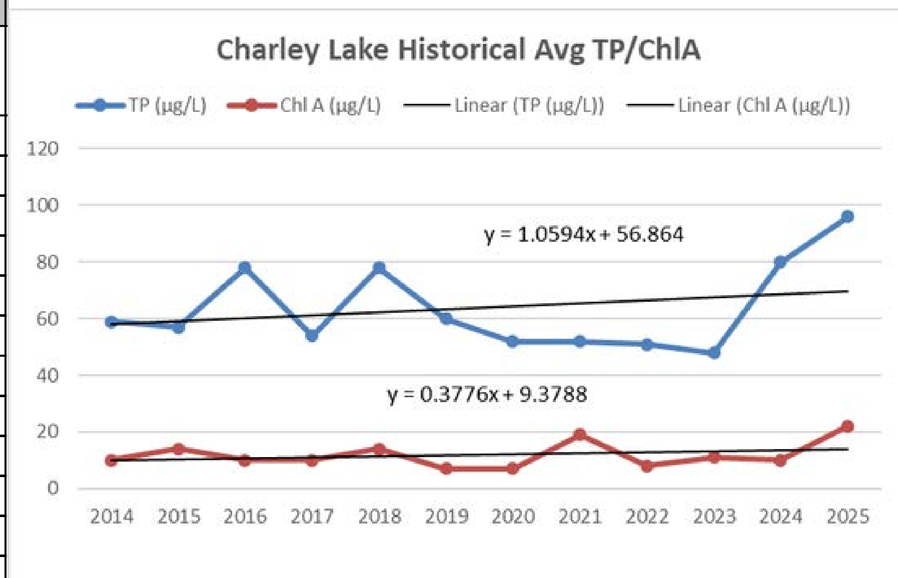
CHARLEY LAKE

Water is pumped from the Mississippi River to Charley Lake via a 60 inch 8 mile long pipe from a pumping station in Fridley. An average of 32 million gallons of water is pumped into Charley Lake each day. Charley Lake is the start of the chain of lakes controlled by the Saint Paul Water Utility. This chain of lakes supplies drinking water for more than 400,000 customers. Most of the drinking water is coming from the Mississippi River, while some comes from wells to help cool the water and reduce treatment costs. VLAWMO began sampling Charley in 2009.



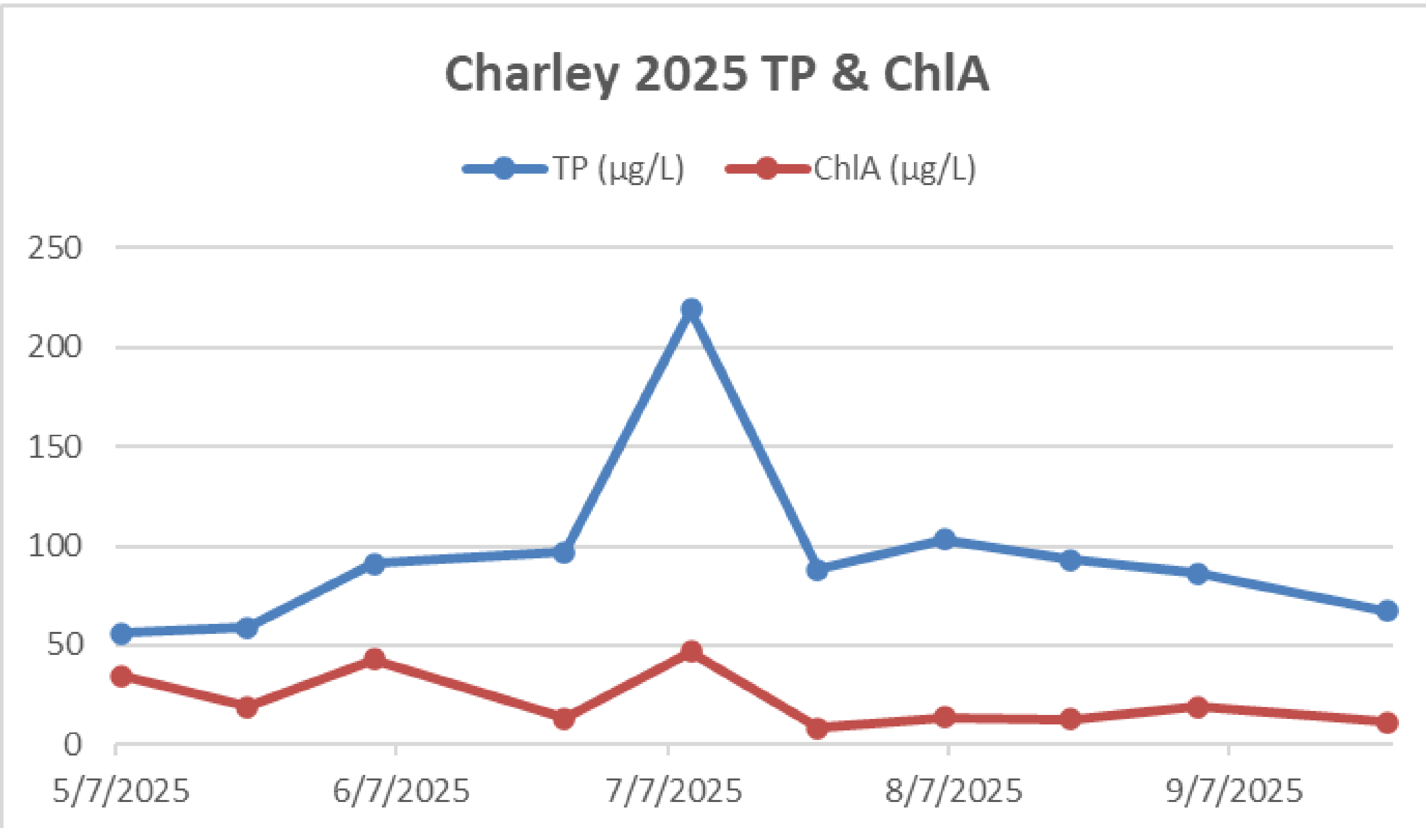
CHARLEY LAKE

Charley Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (µg/L)	Secchi (m)
2009	39	18	1
2010	90	18.9	1
2011	87	9.3	1.1
2012	74	13	1
2013	57	11	1
2014	59	10	1.1
2015	57	14	1.1
2016	78	10	1.2
2017	54	10	1.2
2018	78	14	1.5
2019	60	7	1.6
2020	52	7	1.3
2021	52	19	1.4
2022	51	8	1
2023	48	11	0.8
2024	80	10	0.8
2025	96	22	1.2



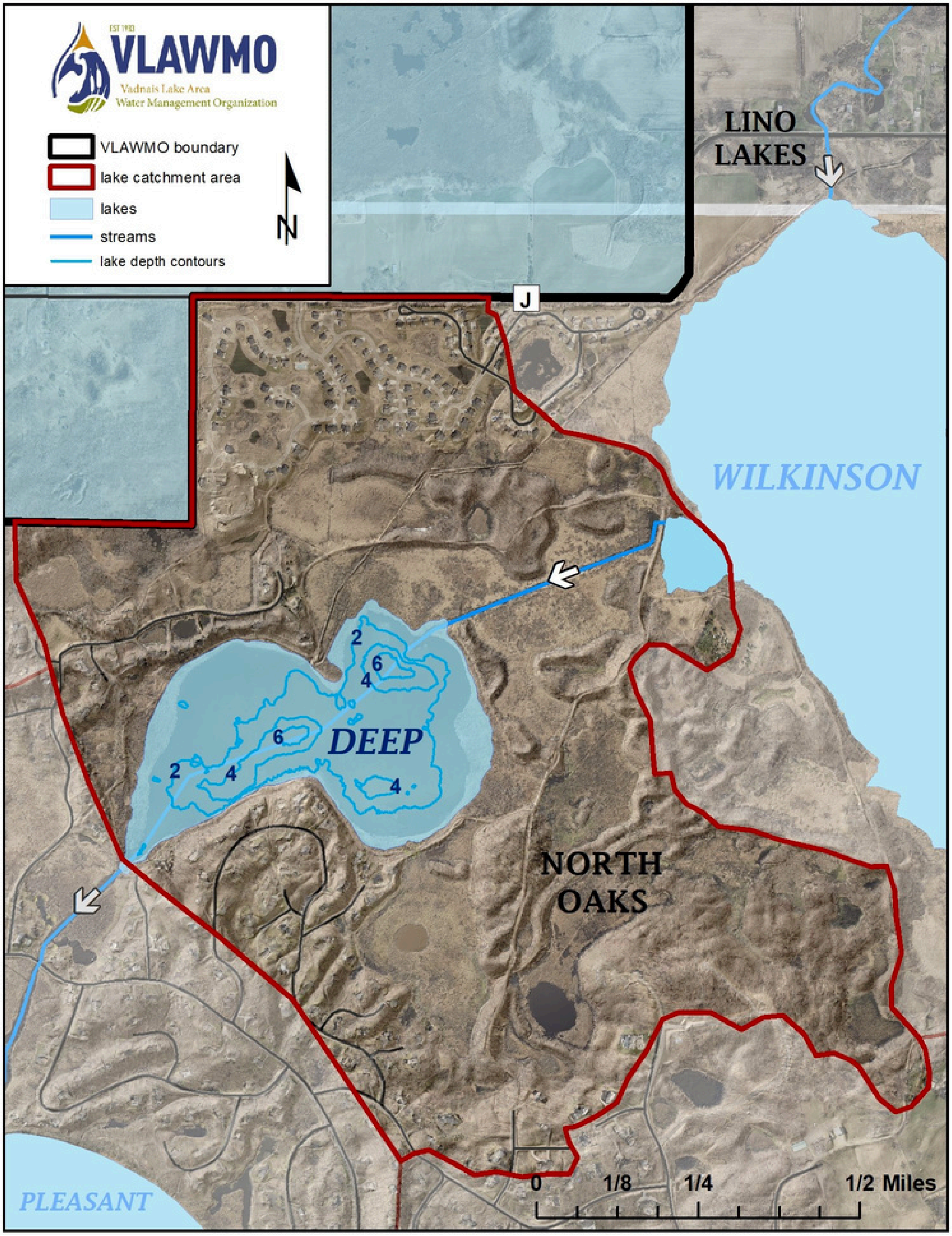
CHARLEY LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
charley	5/7/2025		56	< 0.003	34.7				24.6
charley	5/21/2025		59	0.016	19.1				
charley	6/4/2025		91	0.004	42.7				
charley	6/25/2025		97	0.054	13.4				
charley	7/9/2025	5	219	0.042	46.5				
charley	7/23/2025	4.5	88	0.044	8.3				
charley	8/6/2025	5	103	< 0.015	13.6				
charley	8/20/2025	5	93	0.053	12.8				
charley	9/3/2025	5	86	0.048	19.2				
charley	9/24/2025	5	67	0.03	11.3				



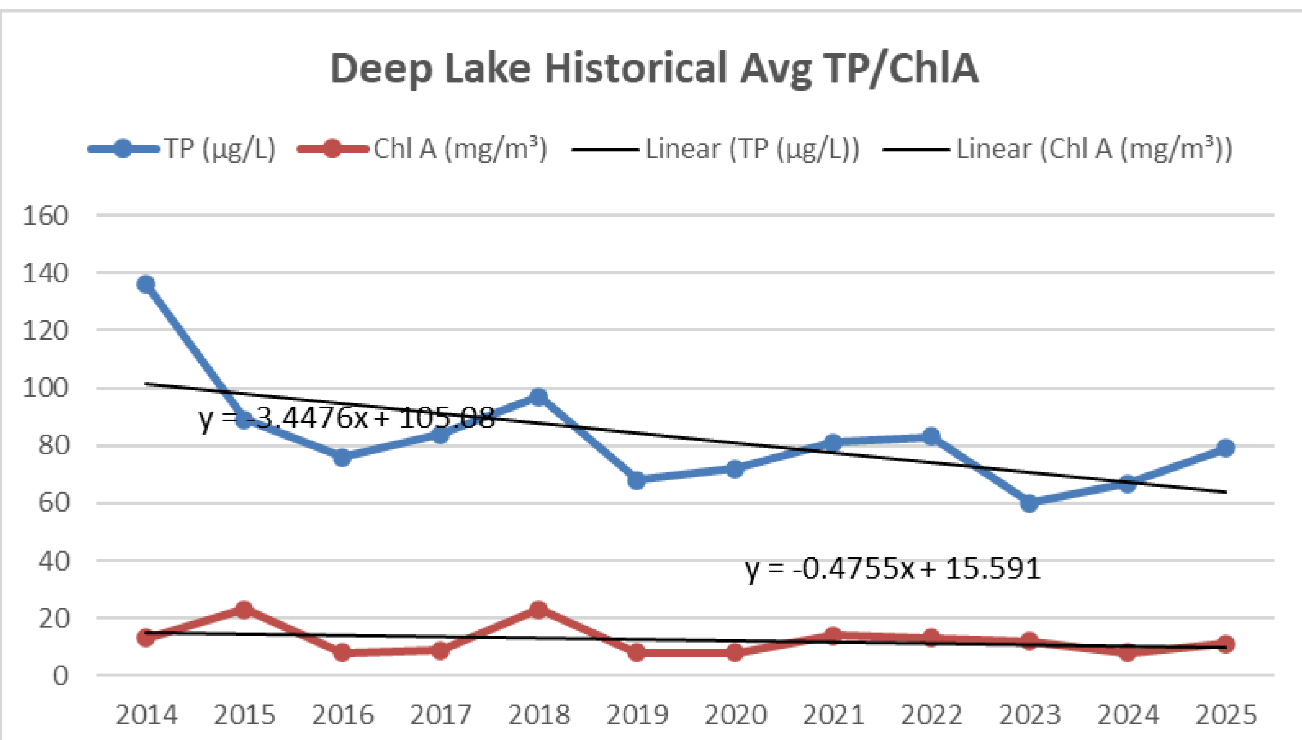
DEEP LAKE

Deep Lake is a little over 80 acres and sits between and is hydrologically connected to Wilkinson Lake to the north and Pleasant Lake to the south. A channel connects the three lakes.



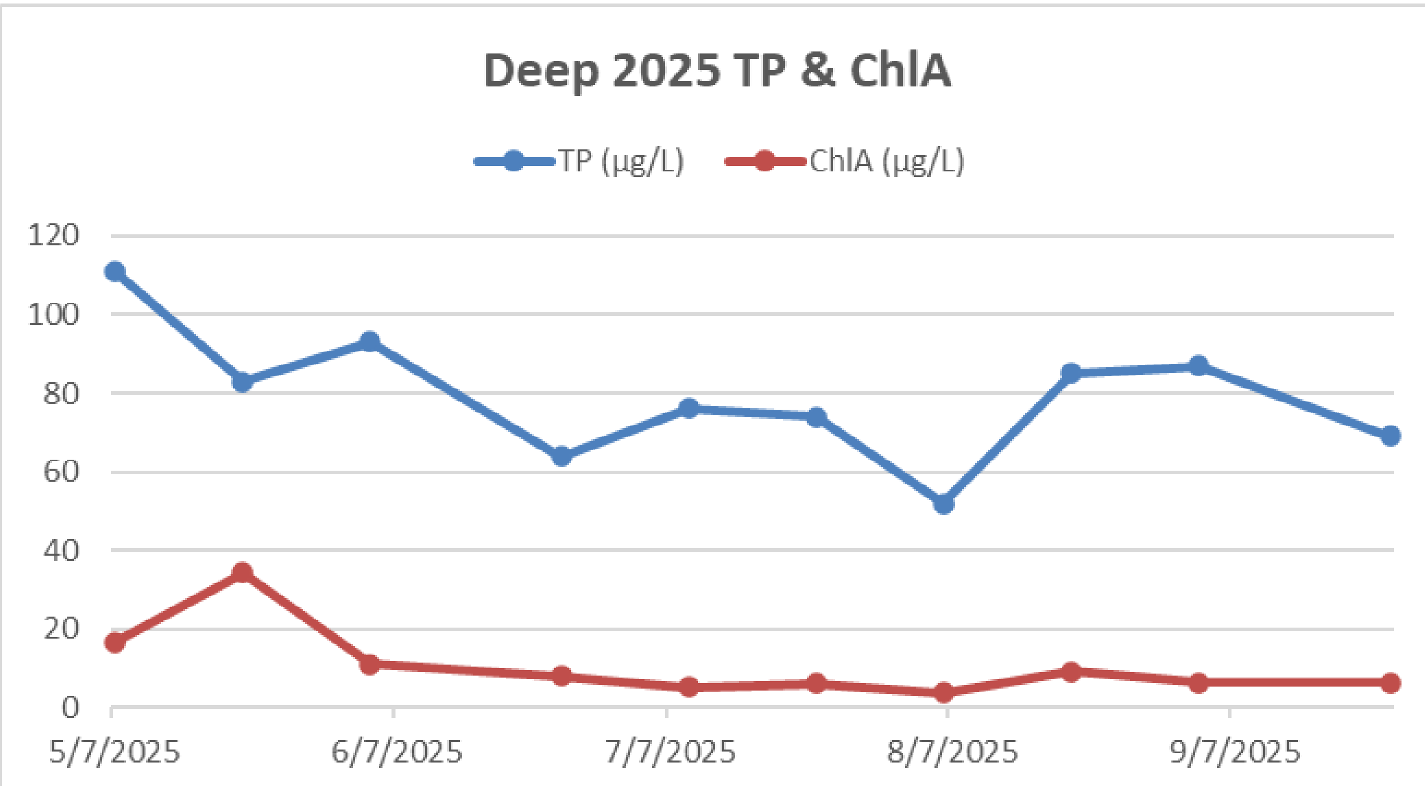
DEEP LAKE

Deep Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
2009	112	21	1
2010	55	15	0.9
2011	95	12	1.2
2012	87	12	1
2013	121	21	1
2014	136	13	1.1
2015	89	23	1
2016	76	8	1.1
2017	84	9	1.1
2018	97	23	1.3
2019	68	8	1.4
2020	72	8	1.4
2021	81	14	1.2
2022	83	13	1.3
2023	60	12	0.9
2024	67	8	0.8
2025	79	11	0.8



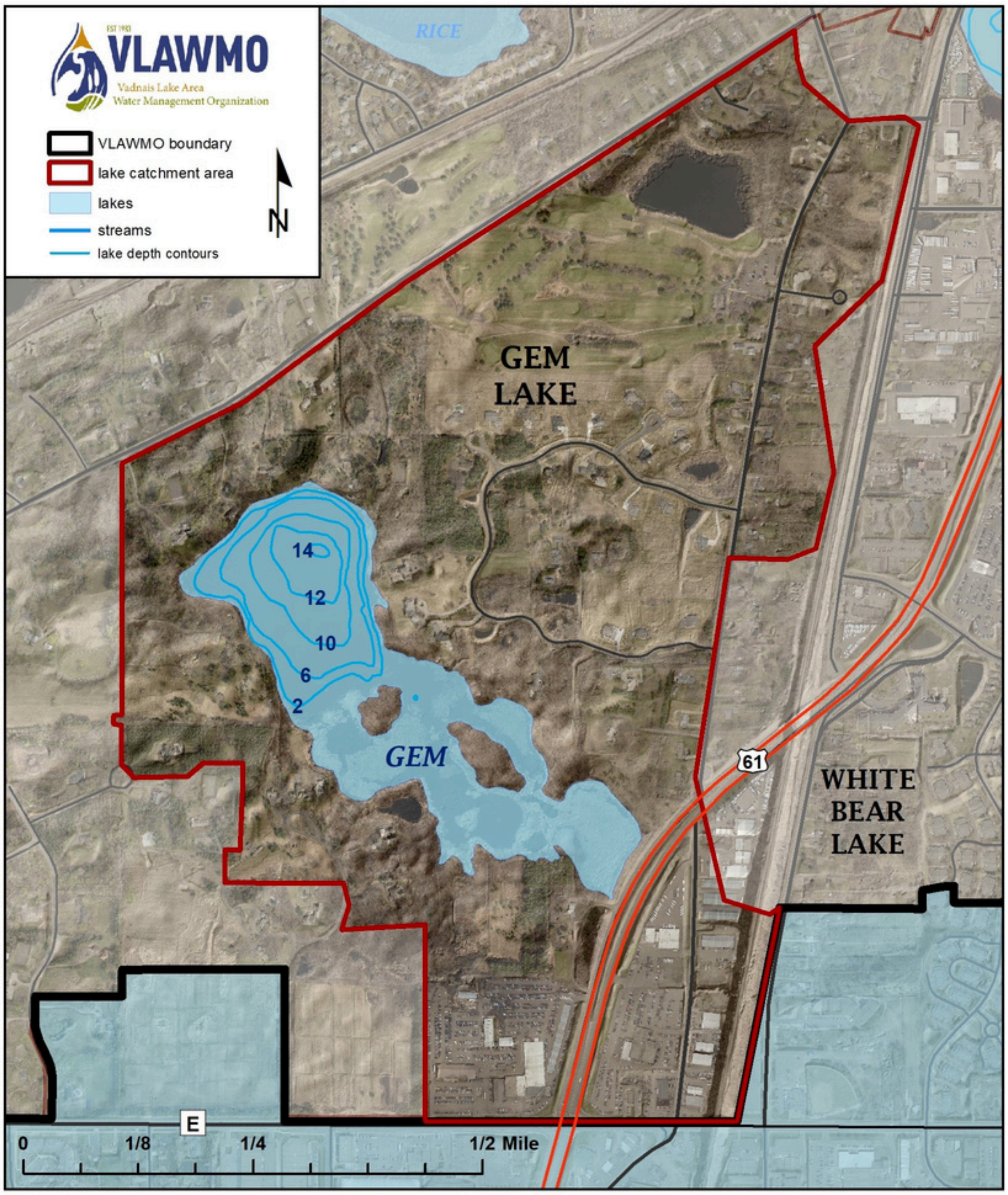
DEEP LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
deep	5/7/2025		111	0.005	16.7				60
deep	5/21/2025		83	0.004	34.2				
deep	6/4/2025		93	0.01	11				
deep	6/25/2025		64	0.006	8				
deep	7/9/2025	6	76	0.021	5				
deep	7/23/2025	5	74	0.017	6				
deep	8/6/2025	5	52	0.016	3.7				
deep	8/20/2025	4	85	0.014	9.1				
deep	9/3/2025	4	87	0.014	6.4				
deep	9/24/2025	4	69	0.013	6.3				



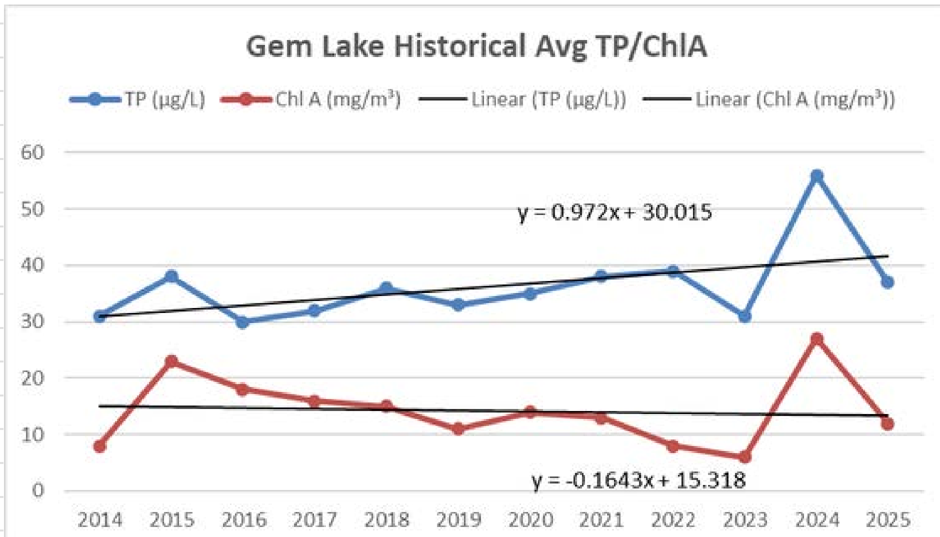
GEM LAKE

Gem Lake is within the City of Gem Lake and has no public access. It is 48 acres in size and is 17 feet deep. There has been development along portions of the lake in recent years. In 2000, volunteers noticed a distinct algae bloom and noted that water clarity was getting poorer. Gem Lake has also been included on the Lambert Creek TMDL study for nutrient impairment. Recent years of monitoring data have shown a reduction in nutrient levels to below state standards. MNDOT's Hwy 61 ditch work in 2011 improved the water quality going into Gem Lake. In 2018 Gem Lake was delisted from the MPCA's impaired waters list.



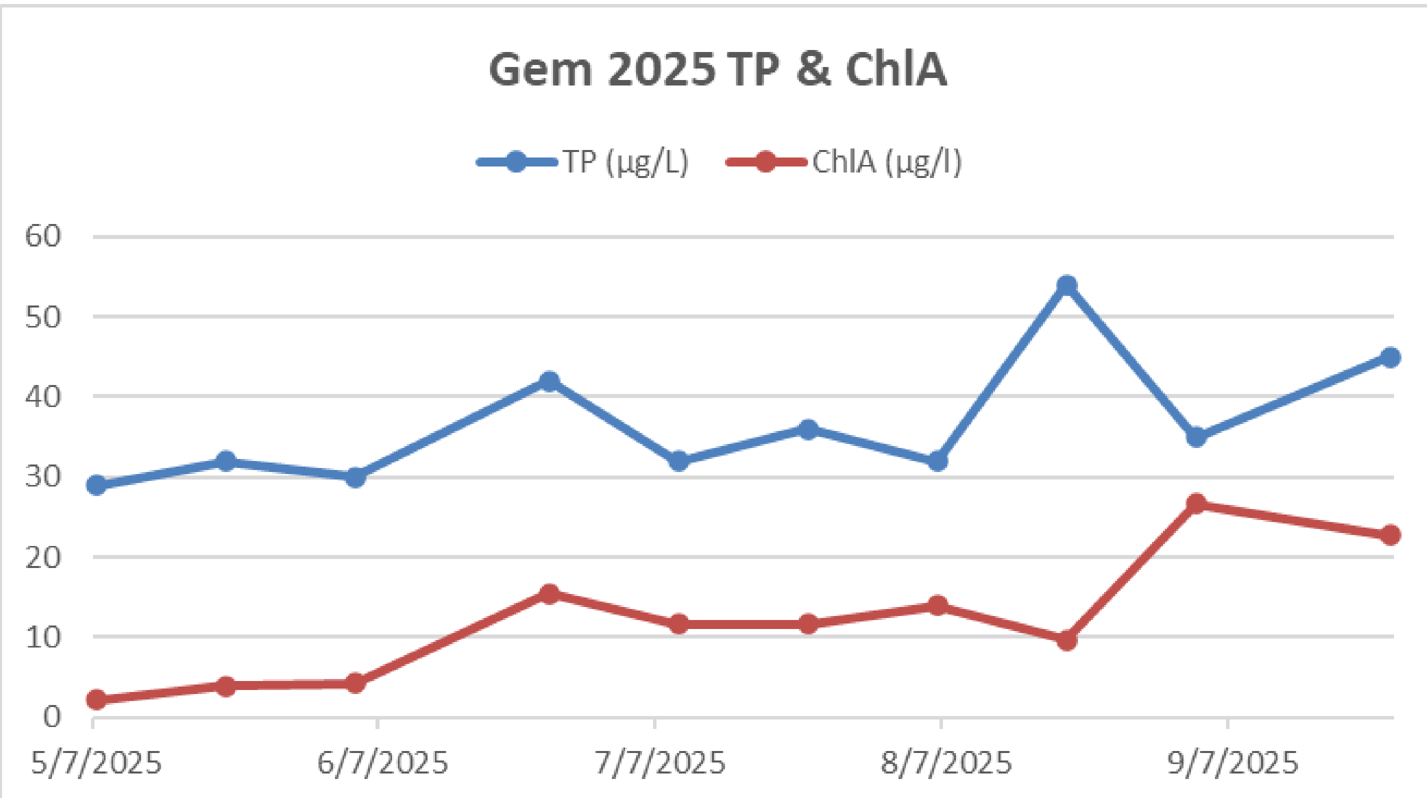
GEM LAKE

Gem Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
1997	54	23	1.2
1998	33	24	
1999	26	16	1.2
2000	36	17	1.1
2001	56	12	1.8
2002	39	25	1.3
2003	52	20	1.4
2004	49	0	1.5
2005	43	26	0
2006	63	25	0
2007	48	33	1.1
2008	64	17	1.5
2009	89	28	1.3
2010	53	24	1.4
2011	32	6.4	2.1
2012	41	11	2
2013	35	17	2
2014	31	8	2.9
2015	38	23	2.2
2016	30	18	1.6
2017	32	16	1.5
2018	36	15	1.8
2019	33	11	1.8
2020	35	14	2.4
2021	38	13	2.4
2022	39	8	2.4
2023	31	6	2.6
2024	56	27	2.3
2025	37	12	2.1



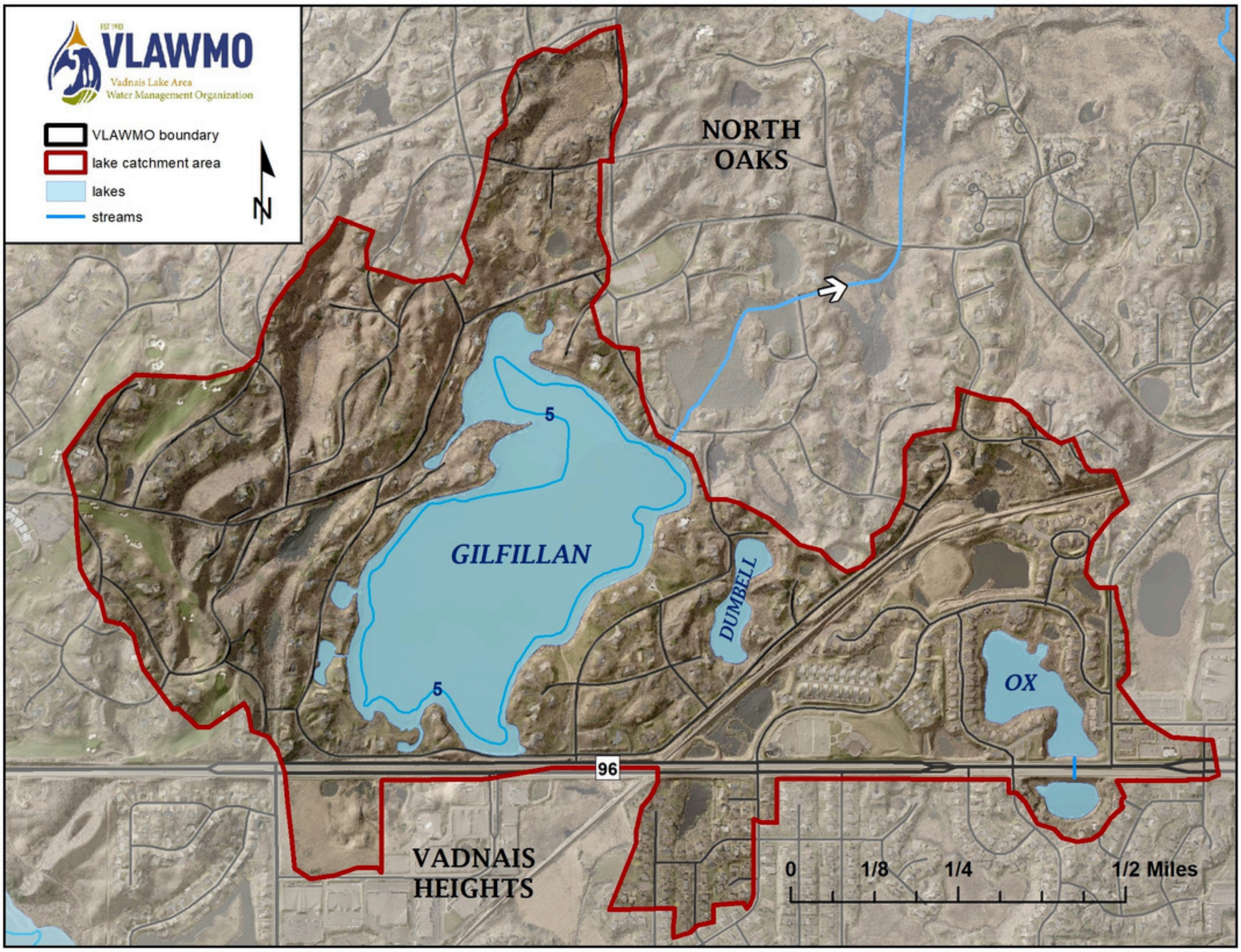
GEM LAKE

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
gem	5/7/2025		29	< 0.003	2.2				63.1
gem	5/21/2025		32	< 0.003	3.9				
gem	6/4/2025		30	< 0.003	4.3				
gem	6/25/2025		42	< 0.003	15.5				
gem	7/9/2025	6	32	< 0.003	11.7				
gem	7/23/2025	5.5	36	< 0.003	11.6				
gem	8/6/2025	7	32	< 0.003	13.9				
gem	8/20/2025	7	54	< 0.003	9.7				
gem	9/3/2025	6	35	< 0.003	26.7				
gem	9/24/2025	7	45	< 0.003	22.7				



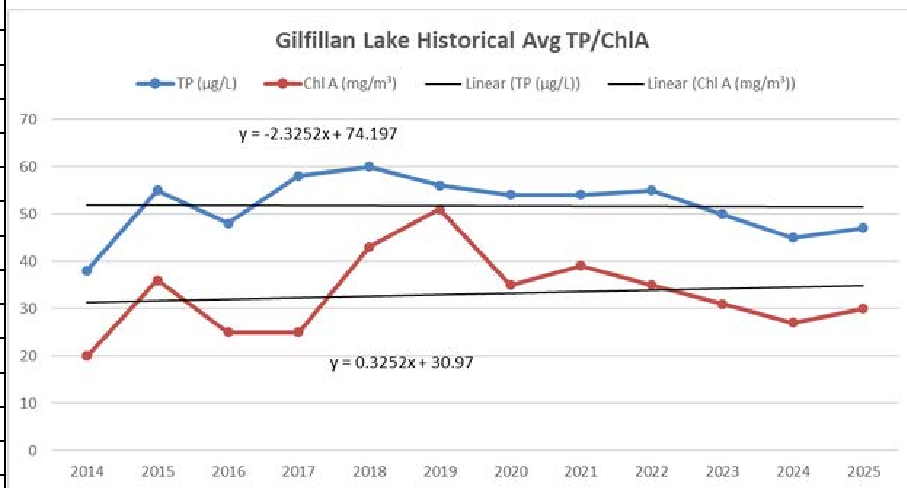
Gilfillan Lake

Gilfillan Lake is located within the City of North Oaks and is surrounded by homes. It is 110 acres with a maximum depth of 6 feet. The Minnesota Department of Natural Resources has used the lake for walleye stocking nursery in the past. According to available information, there has not been any fish stocking activity for a few years other than homeowners stocking minnows. Gilfillan is one of four VLAWMO lakes that are part of the TMDL study due to nutrient impairment. The City of North Oaks and the SPRWS have been pumping water from Pleasant Lake to Gilfillan Lake to increase water levels. The pump, filter and piping were installed in fall of 2011, while pumping began in spring of 2012. The increased water level (about 4.5 ft) has significantly reduced nutrient levels in the lake.



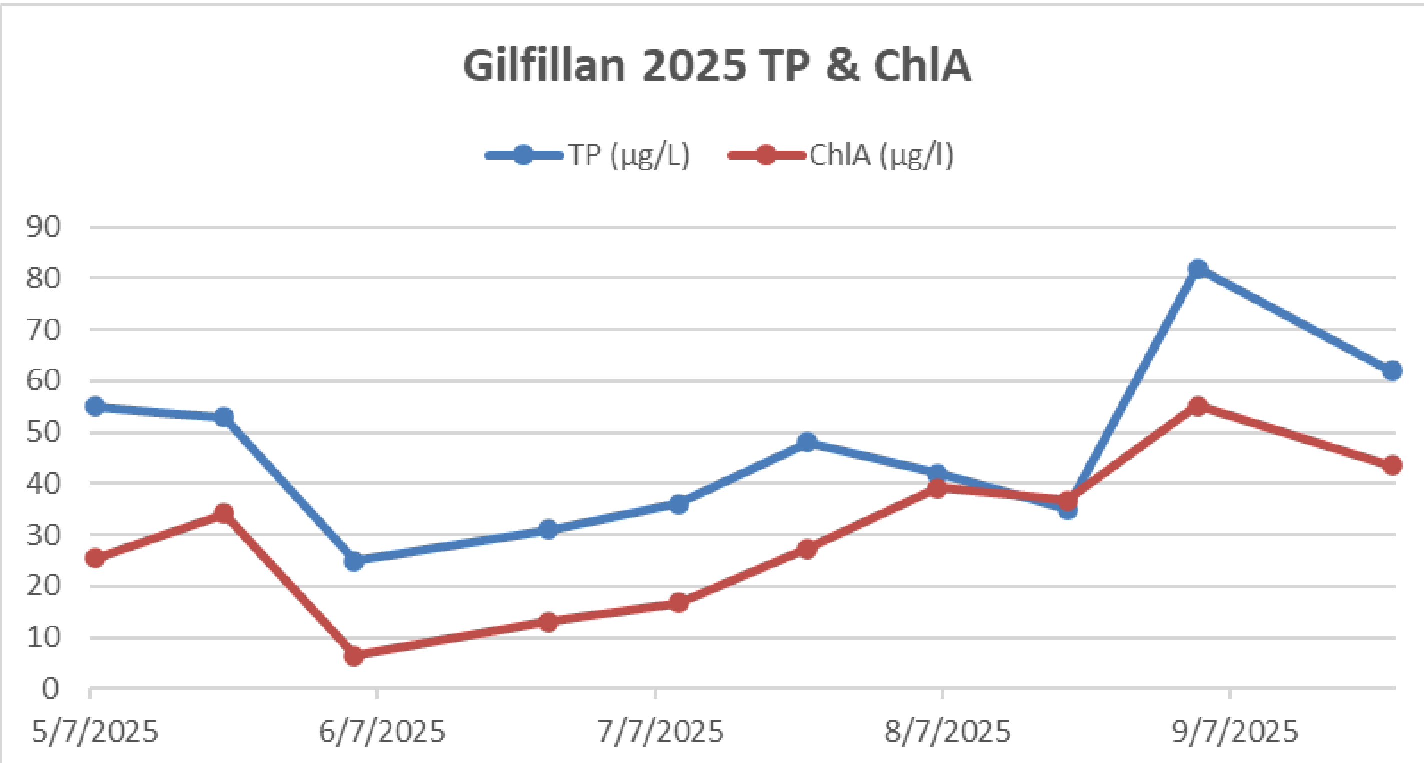
Gilfillan Lake

Gilfillan Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m^3)	Secchi (m)
1997	96	32	0.5
1998	47	44	0.5
1999	72	23	0
2000	35	47	0
2001	84	20	0
2002	81	43	0.4
2003	44	25	1.4
2004	58	0	0
2005	52	8	0
2006	91	19	0
2007	100	33	0.7
2008	96	31	0.5
2009	152	44	0.4
2010	192	44	0.4
2011	123	25	0.4
2012	70	17	0.8
2013	38	15	1
2014	38	20	0.8
2015	55	36	0.6
2016	48	25	0.7
2017	58	25	0.7
2018	60	43	0.7
2019	56	51	0.6
2020	54	35	0.8
2021	54	39	0.9
2022	55	35	1
2023	50	31	1
2024	45	27	1.1
2025	47	30	1.2



Gilfillan Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
gilfillan	5/7/2025		55	< 0.003	25.4				42.1
gilfillan	5/21/2025		53	< 0.003	34.2				
gilfillan	6/4/2025		25	< 0.003	6.5				
gilfillan	6/25/2025		31	< 0.003	13				
gilfillan	7/9/2025	4.5	36	< 0.003	16.7				
gilfillan	7/23/2025	4.5	48	< 0.003	27.4				
gilfillan	8/6/2025	4.5	42	< 0.003	39.2				
gilfillan	8/20/2025	4.5	35	< 0.003	36.8				
gilfillan	9/3/2025	4	82	< 0.003	55.2				
gilfillan	9/24/2025	4	62	< 0.003	43.5				



Goose Lake

Goose Lake is located in White Bear Lake and is 145 acres with a maximum depth of 6-8 feet. The land use is largely residential and industrial around the lake and Highway 61 cuts through the lake. The old White Bear Lake sewage treatment plant discharged to Goose Lake for almost 50 years. A sediment study conducted in 1989 found that there was PCB contamination as well as high levels of cadmium, lead, and zinc.

Though the lake is connected via culverts under the highway, VLAWMO began to assess the lake on each side of the highway to track any differences between the two waterbodies. In years past, only the east side of the lake was monitored. In 2006, VLAWMO began to collect samples from the west side. Both East and West Goose Lake are included in the Lambert Creek TMDL for nutrient impairment.

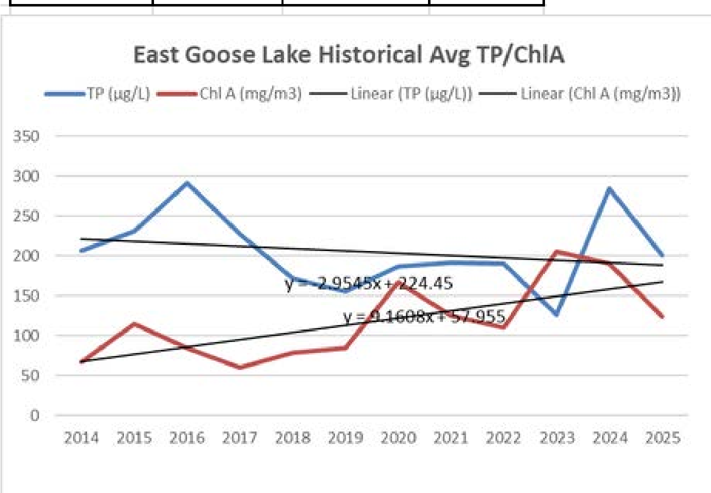
Goose Lake

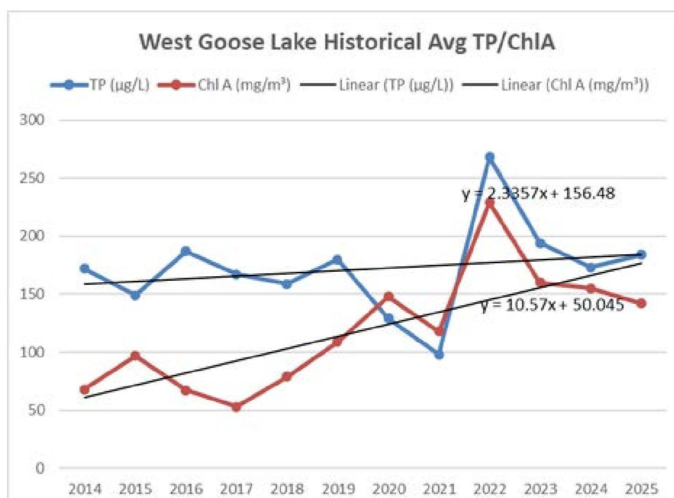
VLAWMO
Vadnais Lake Area Water Management Organization
VLAWMO boundary
lake catchment area
lakes
streams
lake depth contours
N
LAMBERT CREEK
WEST GOOSE
EAST GOOSE
WHITE BEAR
GEM LAKE
OAK KNOLL POND
WHITE BEAR LAKE
62
61
65
F
0
1/8
1/4
1/2 Miles

Goose Lake

East Goose Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m^3)	Secchi (m)
1997	21	134	0.4
1998	17	93	0.2
1999	475	56	0.3
2000	49	154	0.3
2001	603	28	0.3
2002	613	170	0.2
2003	342	66	0.3
2004	526	0	0
2005	407	38	0
2006	392	81	0
2007	260	97	0
2008	218	86	0.3
2009	237	121	0.3
2010	207	67	0.3
2011	164	48	0.3
2012	277	96	0.2
2013	265	112	0.5
2014	207	67	0.4
2015	231	115	0.6
2016	291	84	0.5
2017	228	60	0.7
2018	172	79	0.4
2019	155	84	0.4
2020	187	167	0.3
2021	191	125	0.3
2022	190	110	0.5
2023	126	205	0.2
2024	284	190	0.2
2025	201	124	0.3

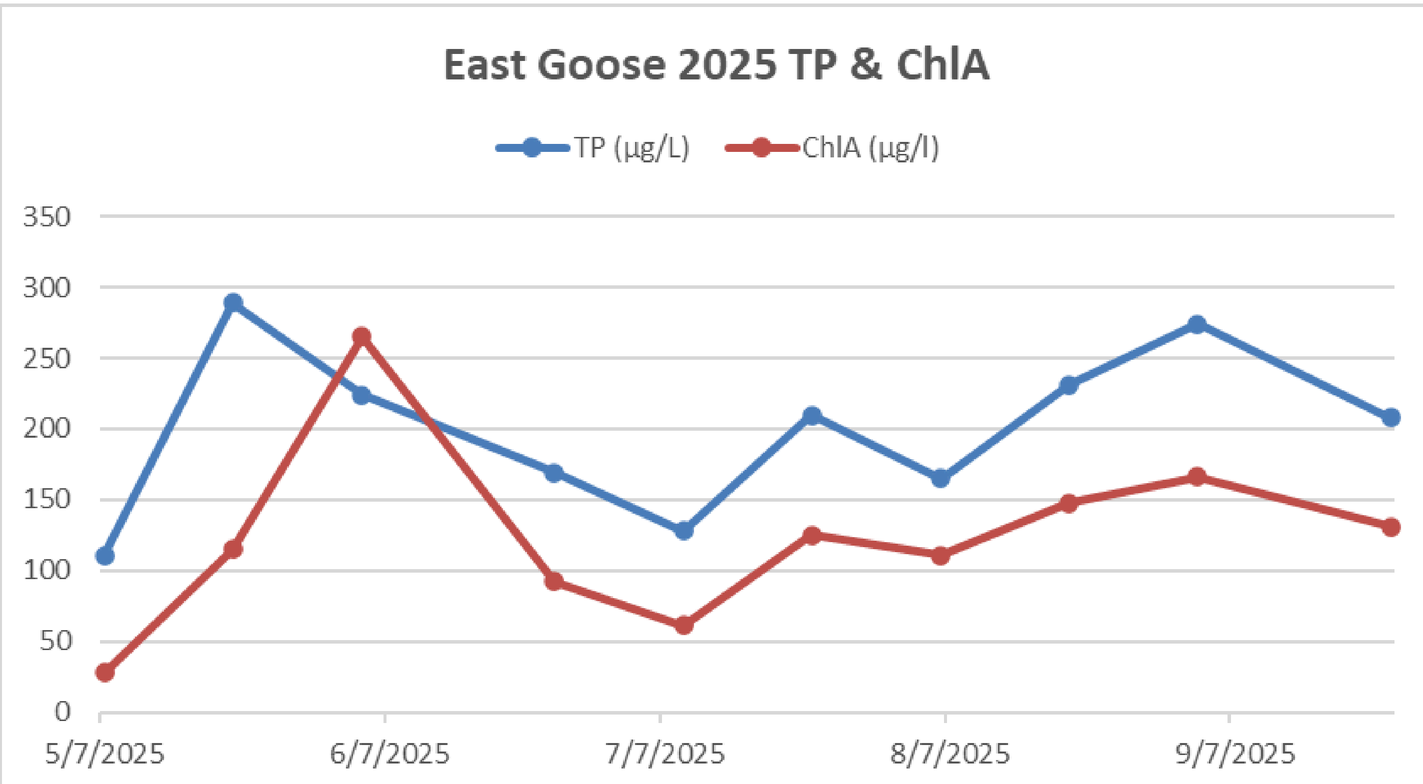
West Goose Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m^3)	Secchi (m)
2006	213	58	
2007	159	66	
2008	168	55	0.3
2009	134	40	0.5
2010	129	39	0.5
2011	126	27	0.8
2012	200	51	0.7
2013	104	32	1
2014	172	68	0.5
2015	149	97	0.5
2016	187	67	0.4
2017	167	53	0.4
2018	159	79	0.4
2019	180	109	0.3
2020	129	148	0.3
2021	98	118	0.3
2022	268	229	0.6
2023	194	160	0.2
2024	173	155	0.3
2025	184	142	0.5





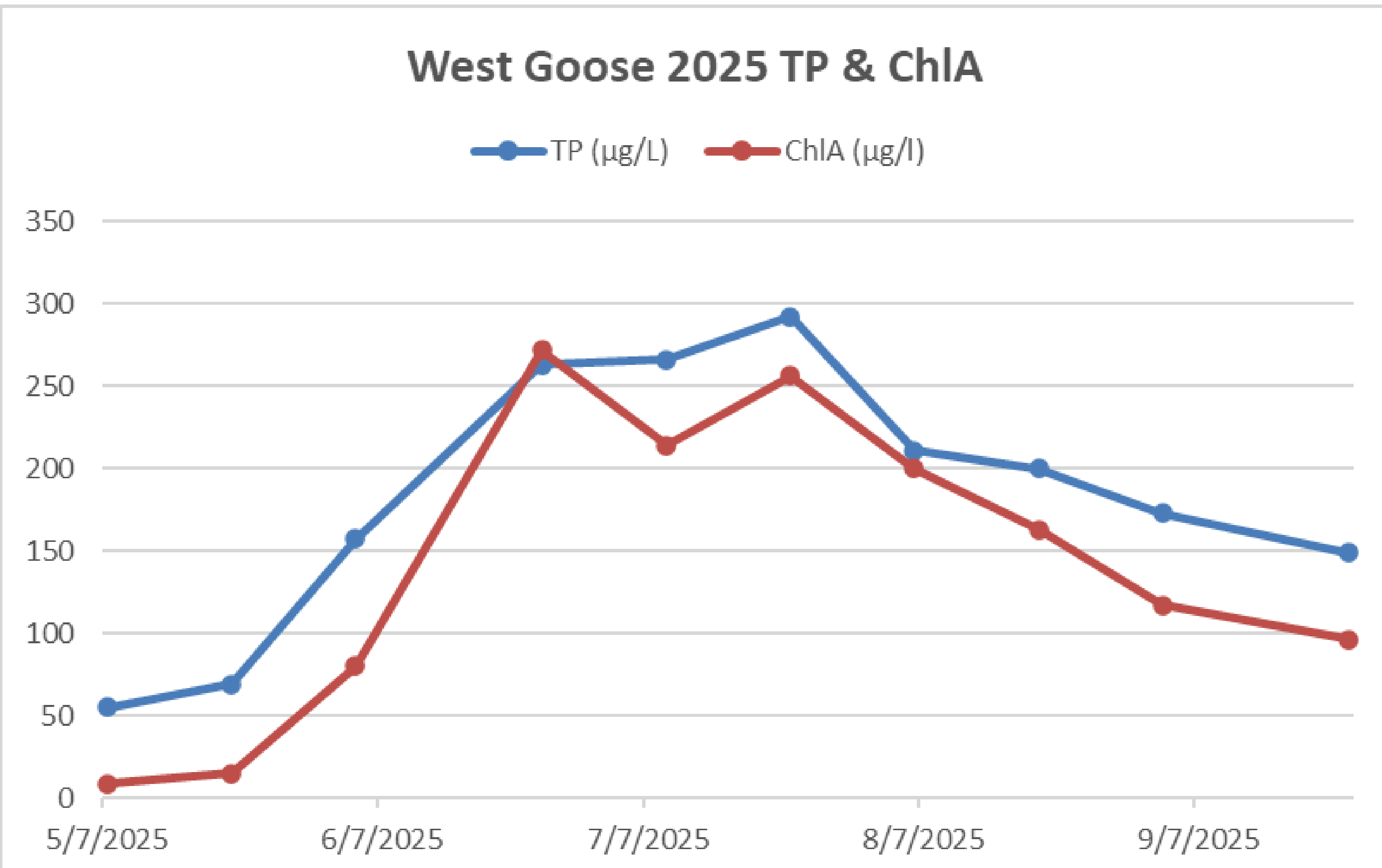
Goose Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
east goose	5/7/2025		111	< 0.003	27.8				104
east goose	5/21/2025		289	0.008	115				
east goose	6/4/2025		224	0.003	265				
east goose	6/25/2025		169	0.004	92.1				
east goose	7/9/2025	1.5	128	0.006	61.4				
east goose	7/23/2025	1	210	0.006	125				
east goose	8/6/2025	1	165	0.004	111				
east goose	8/20/2025	0.5	231	0.008	148				
east goose	9/3/2025	0.5	274	0.005	166				
east goose	9/24/2025	0.5	208	0.004	131				



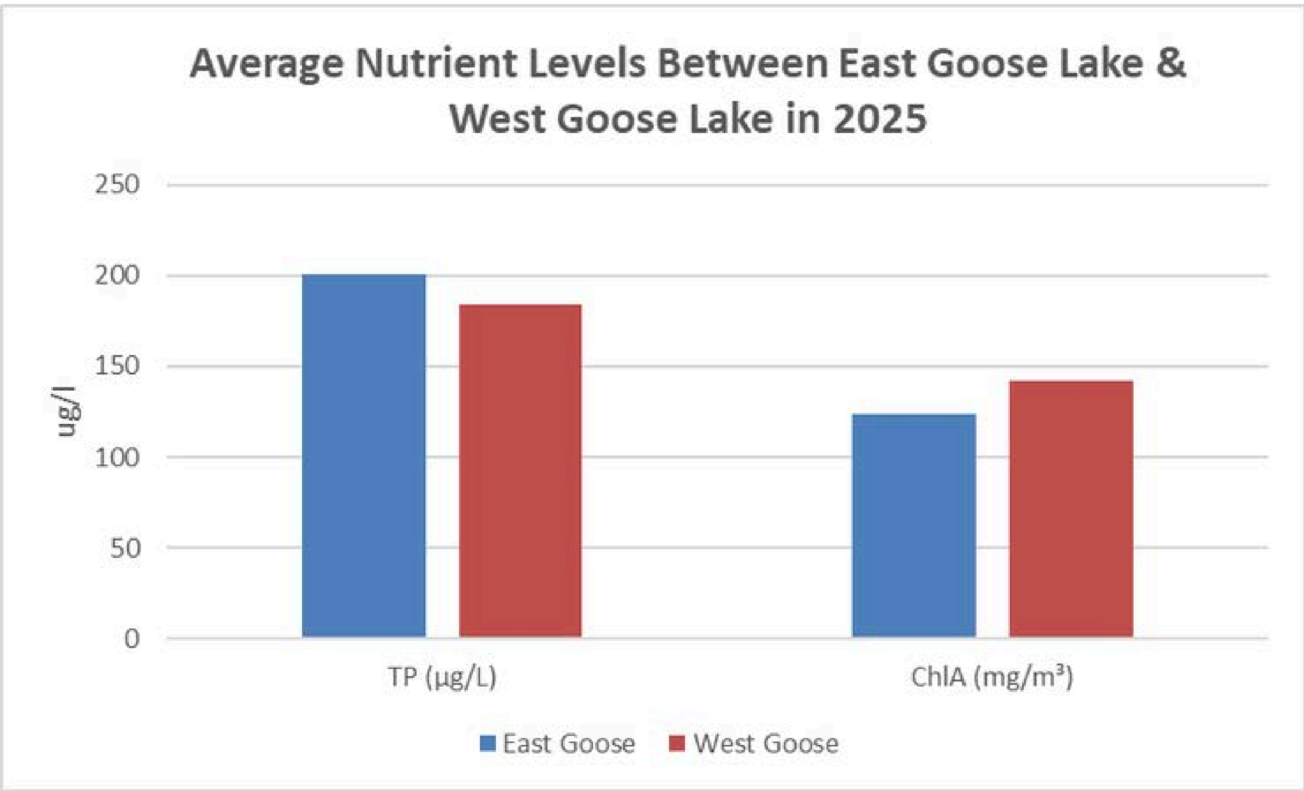
Goose Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3	CL (mg/L)
west goose	5/7/2025		55	< 0.003	8.8				70.8
west goose	5/21/2025		69	< 0.003	15				
west goose	6/4/2025		157	< 0.003	80.1				
west goose	6/25/2025		263	< 0.003	272				
west goose	7/9/2025	0.5	266	0.003	214				
west goose	7/23/2025	0.5	292	0.003	256				
west goose	8/6/2025	0.5	211	0.003	200				
west goose	8/20/2025	0.5	200	< 0.003	163				
west goose	9/3/2025	0.5	173	< 0.003	117				
west goose	9/24/2025	0.5	149	< 0.003	96.1				



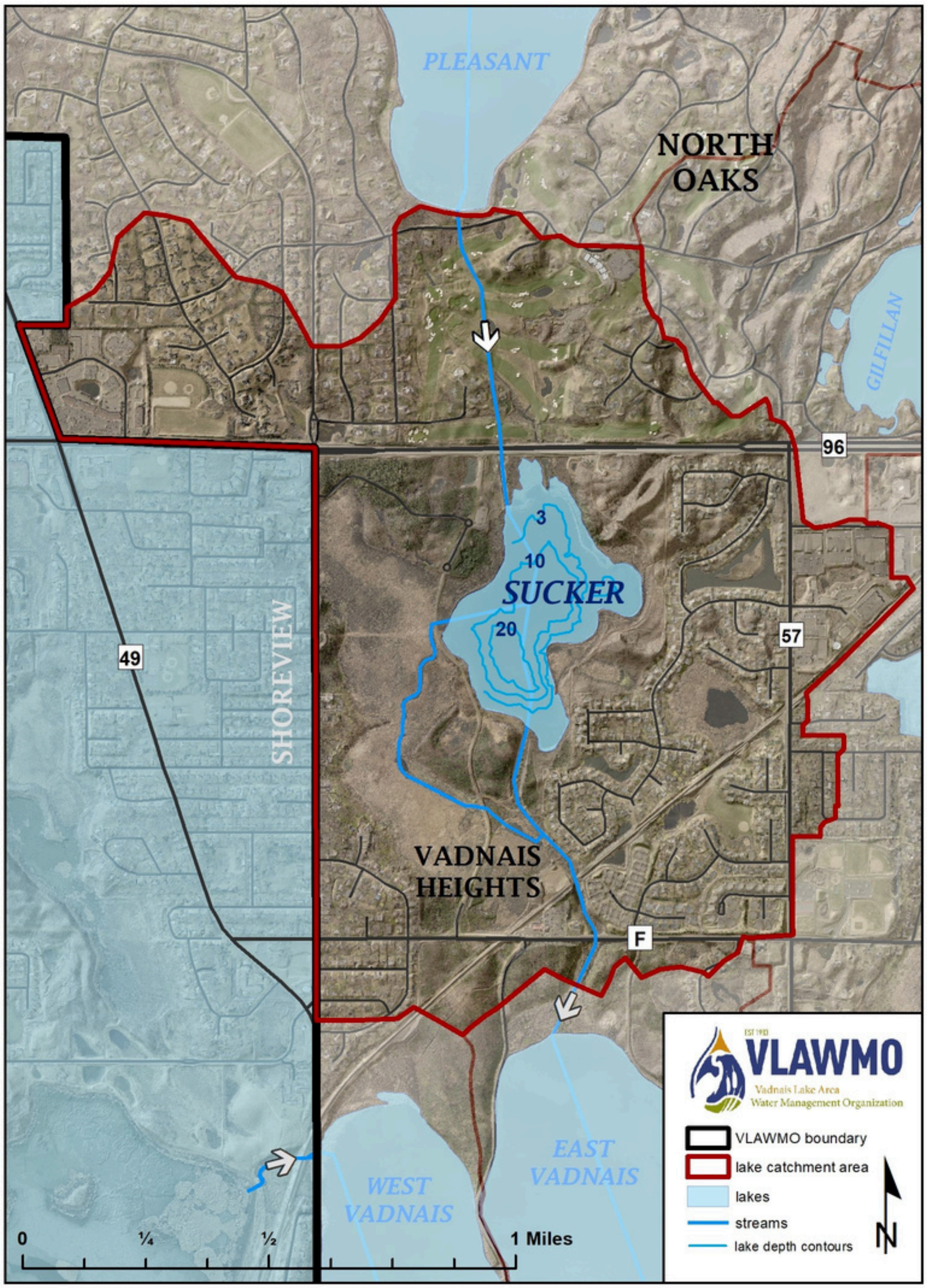
Goose Lake

	TP (µg/L)	ChlA (mg/m³)	iron (µg/l)
East Goose	201	124	458
West Goose	184	142	532



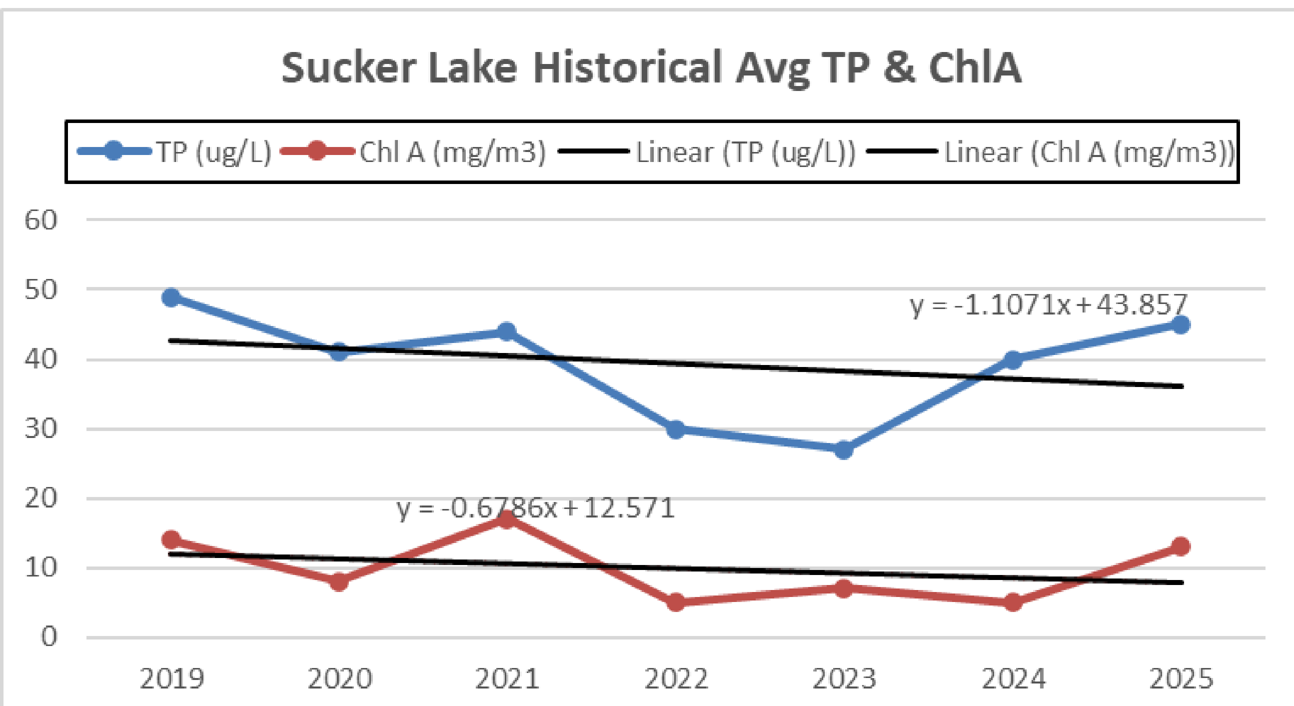
Sucker Lake

Sucker Lake is located within the City of Vadnais Heights and is surrounded by Ramsey County park land. It is 63 acres with a maximum depth of 26 feet. According to available information, there is a diverse fish population ranging from pan fish to walleye as well as white bass that were stocked in 2010 & 2011. Sucker Lake is part of the SPRWS chain of lakes and sits between Pleasant Lake to the north and East Vadnais Lake to the south. VLAWMO began sampling the lake in 2019 for water quality.



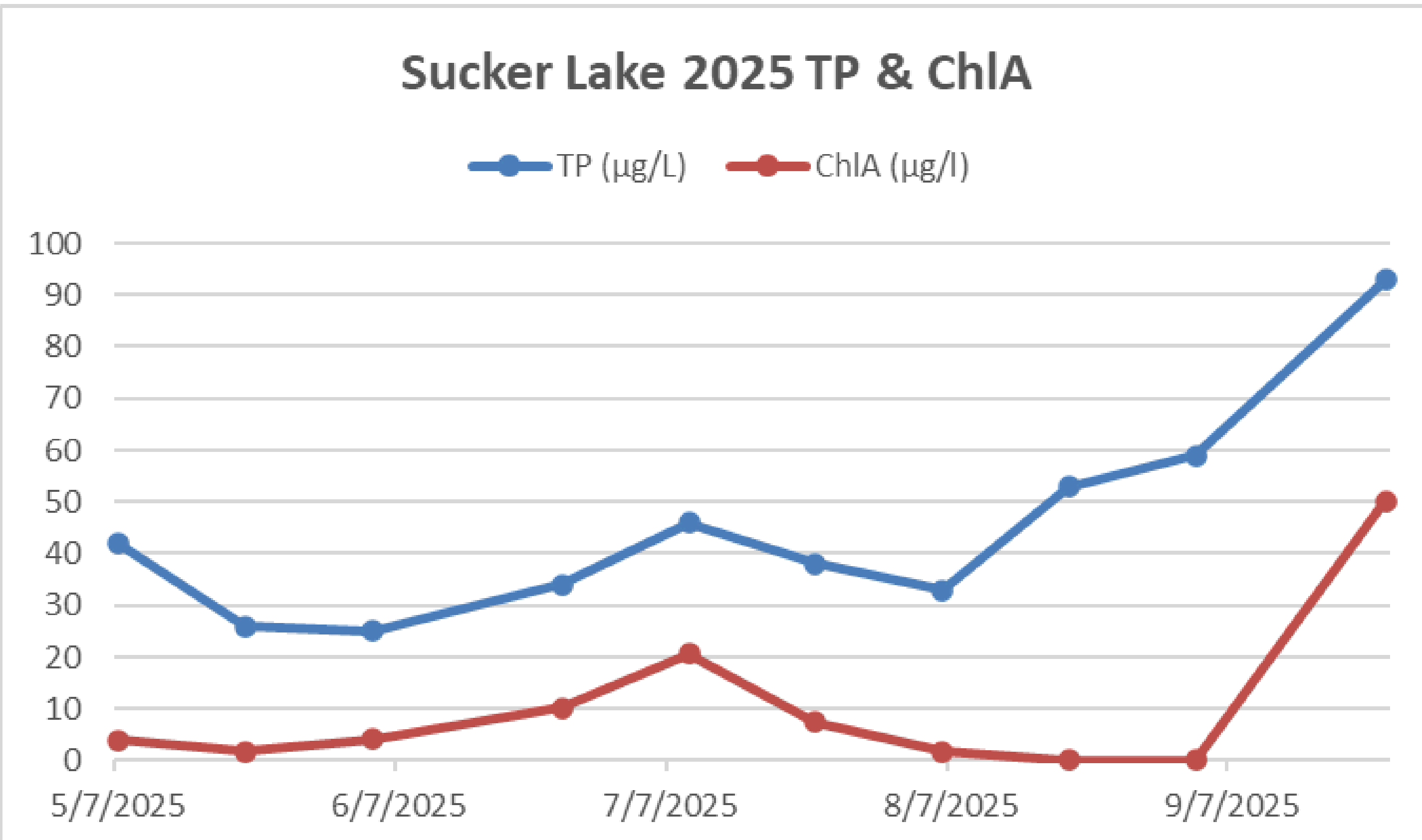
Sucker Lake

Sucker Lake Historical Avg TP/Chl A/SDT			
	TP (ug/L)	Chl A (mg/m3)	Secchi (m)
2019	49	14	1.3
2020	41	8	2
2021	44	17	2.2
2022	30	5	2.1
2023	27	7	2.1
2024	40	5	2.3
2025	45	13	2.3



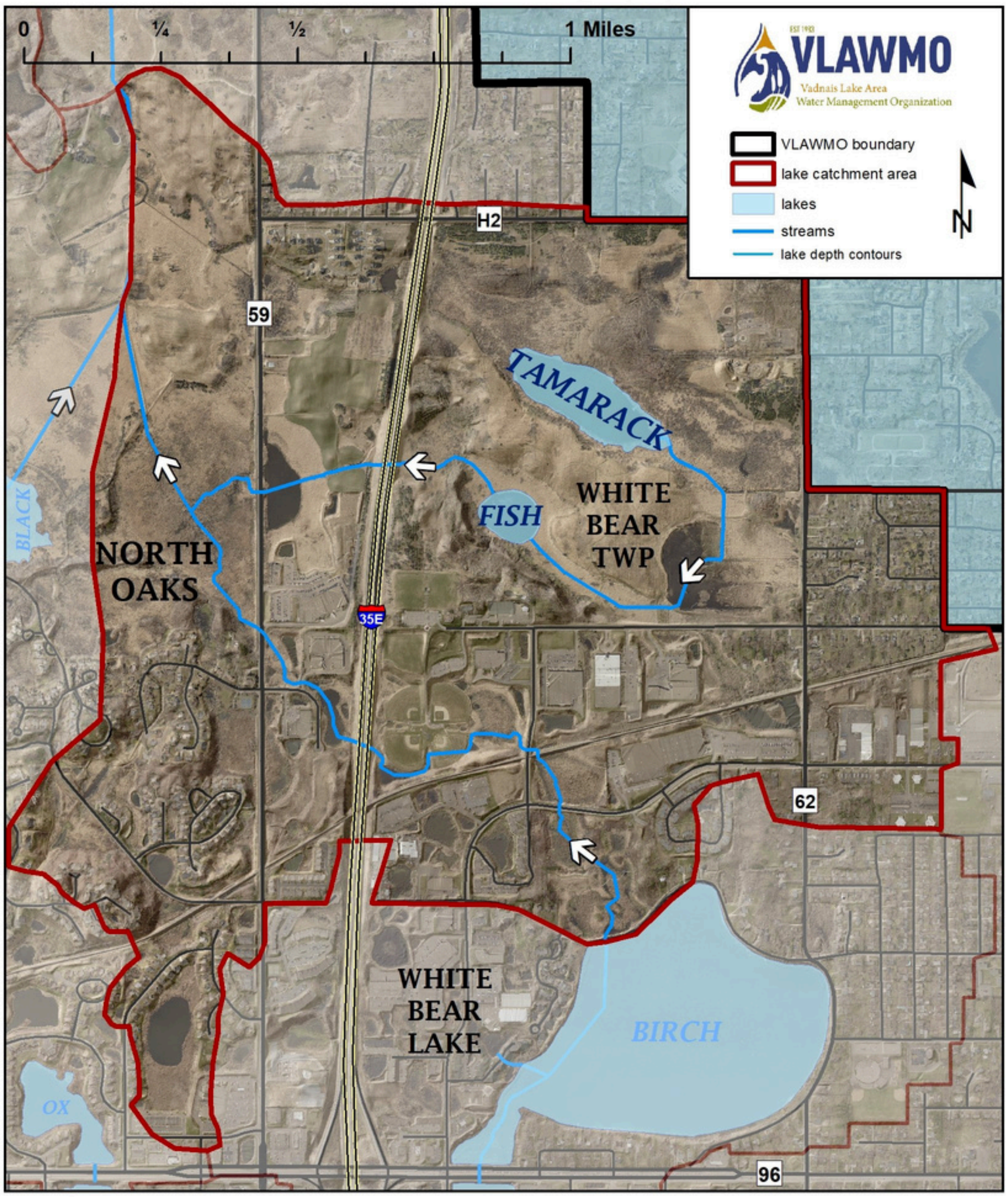
Sucker Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
sucker	5/7/2025		42	0.003	3.9				32
sucker	5/21/2025		26	0.009	1.8				
sucker	6/4/2025		25	0.004	4.1				
sucker	6/25/2025		34	< 0.003	10.1				
sucker	7/9/2025	9	46	0.003	20.7				
sucker	7/23/2025	7	38	0.008	7.5				
sucker	8/6/2025	10	33	0.022	1.7				
sucker	8/20/2025	9	53	0.043	< 1.0				
sucker	9/3/2025	9	59	0.048	< 1.0				
sucker	9/24/2025	6	93	0.006	50.2				



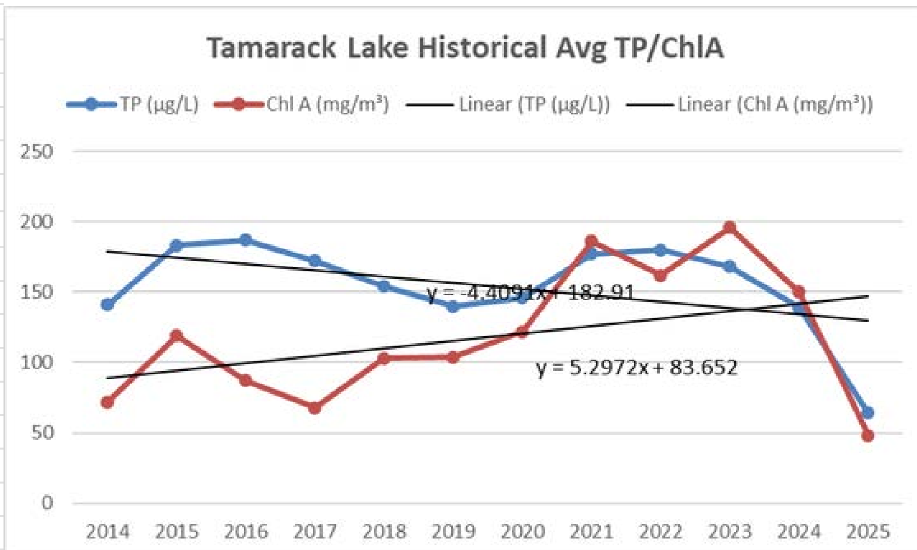
Tamarack Lake

Tamarack Lake is part of the Tamarack Nature Center. It is 86 acres with a maximum depth of 10 feet. As there is no boat access, samples are taken from the observation dock on the southeast side of the lake. Ramsey County restored a large ditched wetland downstream of Tamarack and upstream of Fish Lake, as part of a wetland banking project in 1997. Tamarack Lake is one of 4 lakes listed as impaired for nutrients on the 2010 Lambert Creek TMDL study. Internal loading is the major reason for the impairment. This is a very isolated lake with a large natural buffer. Runoff from Hwy 35E will make its way to Tamarack on the west side after going through a large wetland. Historically, Tamarack was surrounded by farmland.



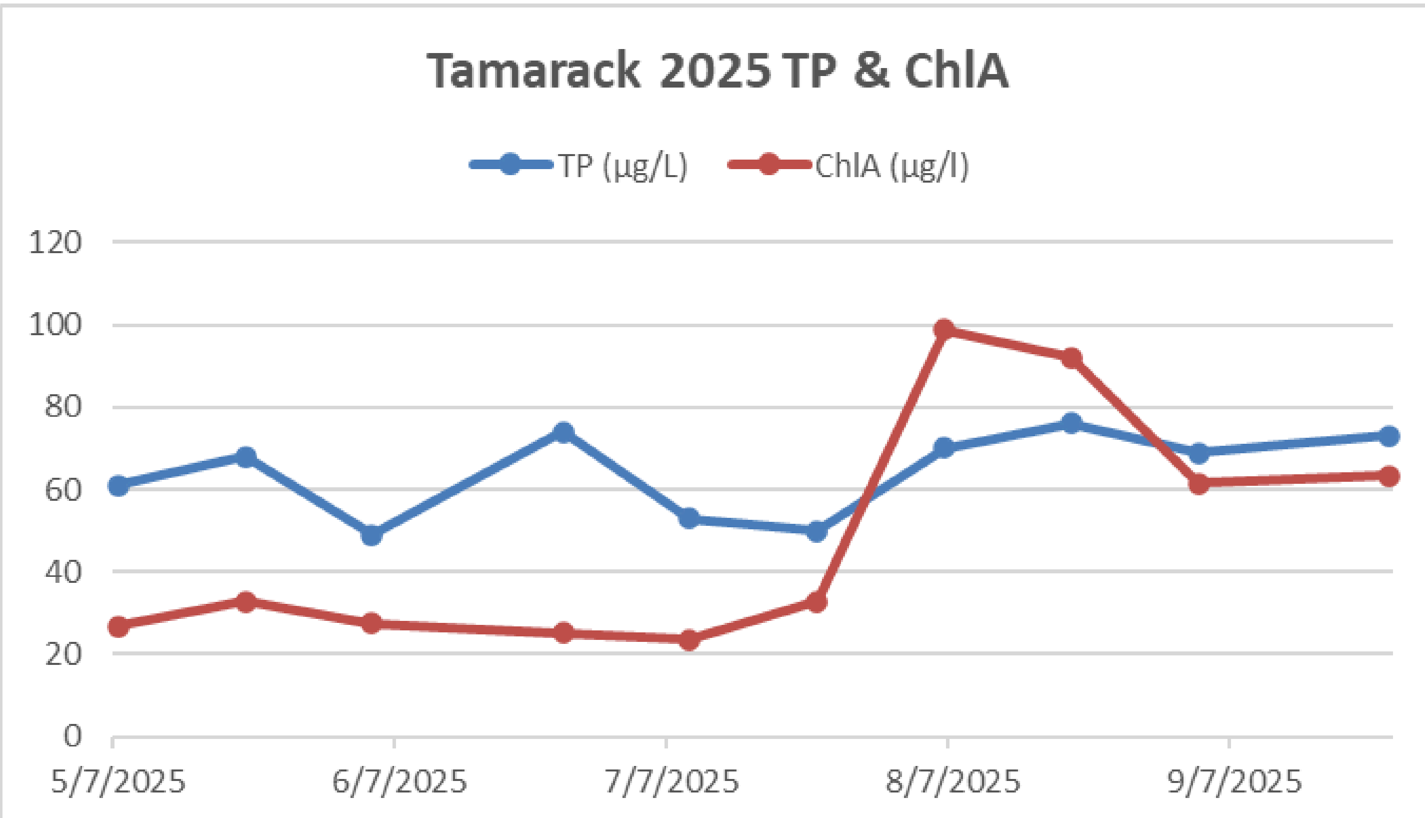
Tamarack Lake

Tamarack Lake Historical Avg TP/ChlA/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
1997	17	180	0.2
1998	54	32	0.5
1999	90	26	0.4
2000	60	27	0.4
2001	132	37	0.4
2002	164	120	0.4
2003	168	95	0.3
2004	96	0	0.8
2005	143	65	0
2006	136	38	0
2007	148	109	0.5
2008	115	99	0.3
2009	161	161	0.2
2010	157	96	0.2
2011	120	28	0.6
2012	129	64	0.4
2013	119	50	0.5
2014	141	72	0.5
2015	183	119	0.4
2016	187	87	0.4
2017	172	68	0.4
2018	154	103	0.4
2019	140	104	0.4
2020	146	122	0.3
2021	177	186	0.3
2022	180	162	0.6
2023	168	196	0.7
2024	139	150	0.6
2025	64	48	0.6



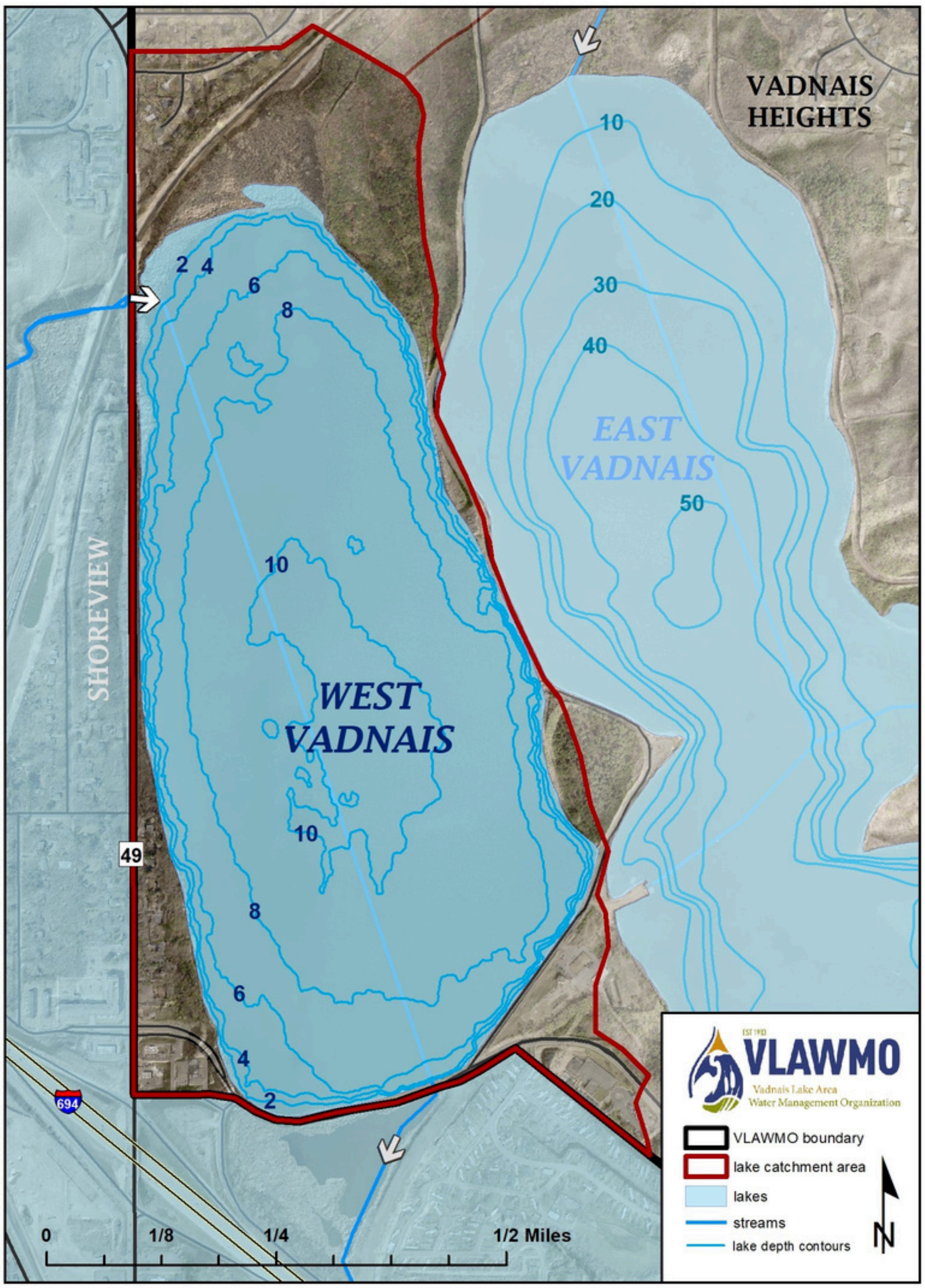
Tamarack Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
tamarack	5/7/2025		61	< 0.003	26.7				53.1
tamarack	5/21/2025		68	< 0.003	32.8				
tamarack	6/4/2025		49	< 0.003	27.5				
tamarack	6/25/2025		74	< 0.003	25.1				
tamarack	7/9/2025	2.5	53	< 0.003	23.5				
tamarack	7/23/2025	2.5	50	< 0.003	32.8				
tamarack	8/6/2025	2.5	70	< 0.003	98.8				
tamarack	8/20/2025	1.5	76	< 0.003	92.1				
tamarack	9/3/2025	1.5	69	< 0.003	61.4				
tamarack	9/24/2025	1.5	73	< 0.003	63.3				



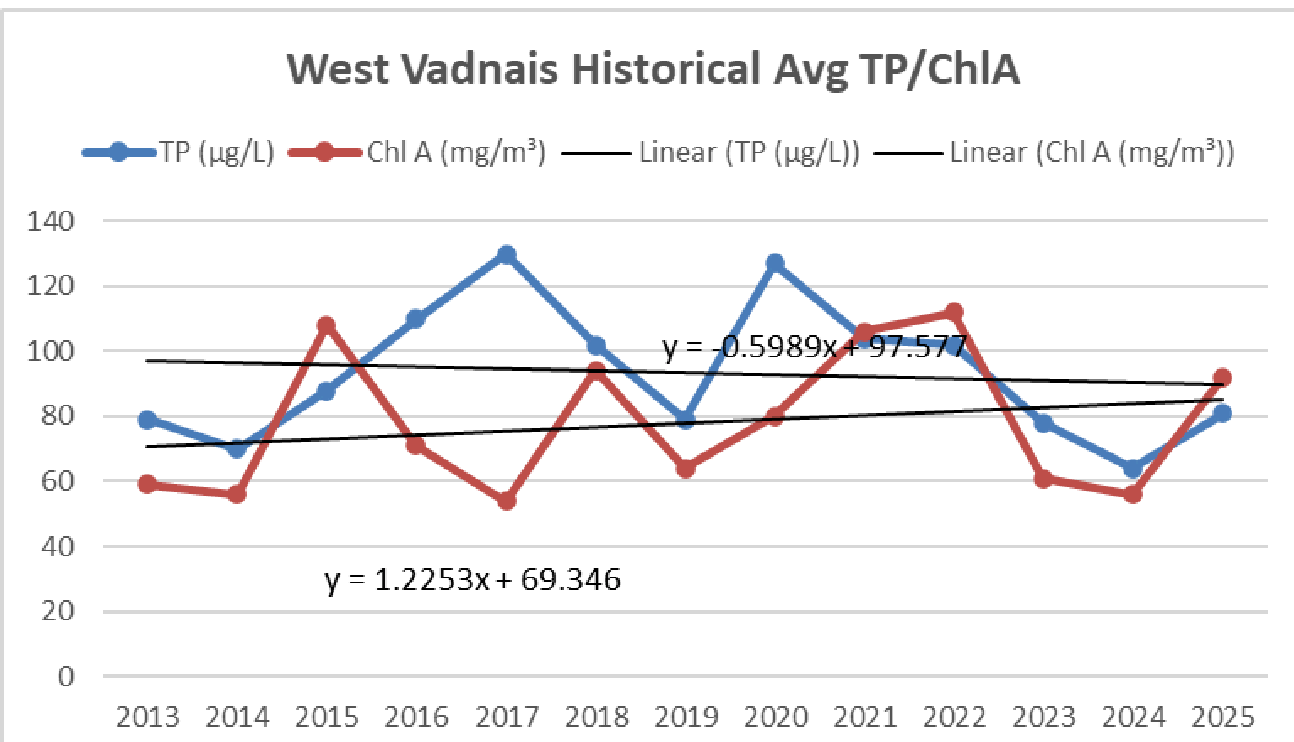
West Vadnais

West Vadnais Lake is located in the southwest corner of the watershed. Its neighbor, East Vadnais Lake, receives in lake treatment by Saint Paul Regional Water Services (SPRWS) as a measure to protect the drinking water supply. Even though these lakes are right next to each other, they are not connected and have drastically different water quality. The SPRWS monitors East Vadnais Lake. VLAWMO monitored West Vadnais for part of 2009 and began full monitoring in 2013. West Vadnais is on the 2014 impaired waters list for nutrients.



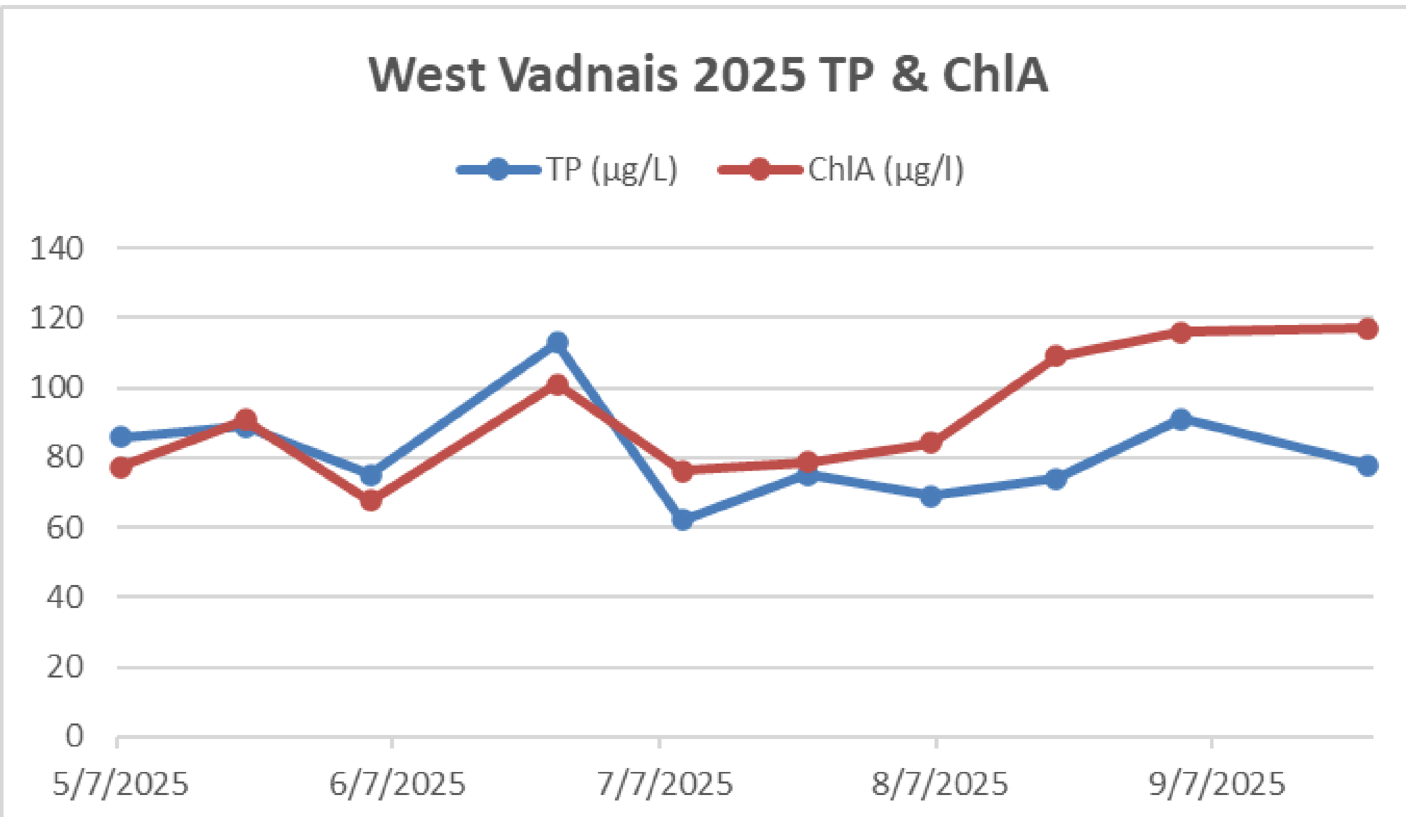
West Vadnais

West Vadnais Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
2009	185	103	0.4
2013	79	59	0.4
2014	70	56	0.5
2015	88	108	0.3
2016	110	71	0.3
2017	130	54	0.4
2018	102	94	0.4
2019	79	64	0.5
2020	127	80	0.5
2021	104	106	0.5
2022	102	112	0.7
2023	78	61	0.7
2024	64	56	1
2025	81	92	1.1



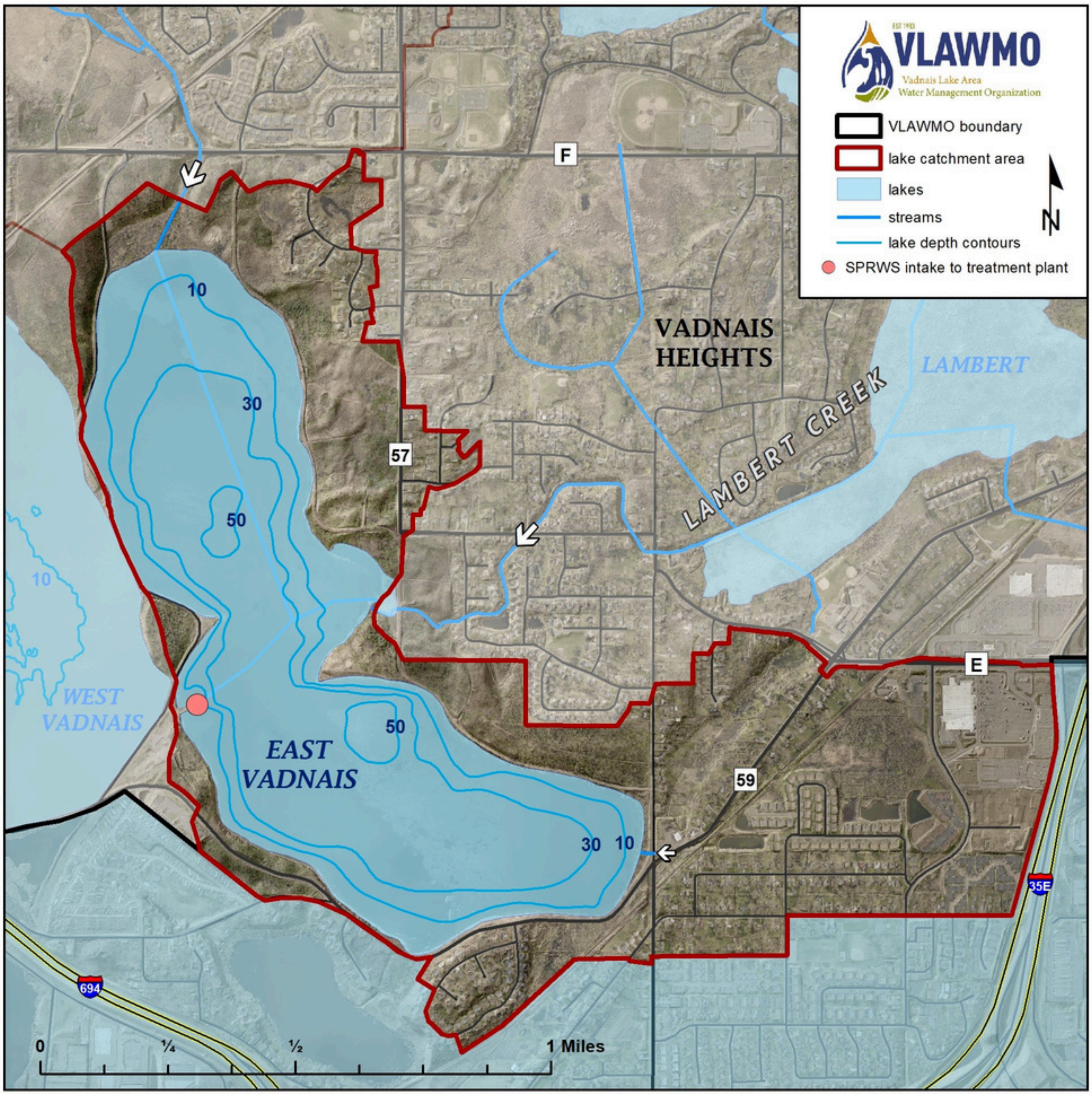
West Vadnais

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
west vadnais	5/7/2025		86	< 0.003	77.4				92.2
west vadnais	5/21/2025		89	< 0.003	90.8				
west vadnais	6/4/2025		75	< 0.003	67.6				
west vadnais	6/25/2025		113	< 0.003	101				
west vadnais	7/9/2025	4	62	< 0.003	76.1				
west vadnais	7/23/2025	3	75	< 0.003	78.8				
west vadnais	8/6/2025	4	69	< 0.003	84.1				
west vadnais	8/20/2025	3	74	0.003	109				
west vadnais	9/3/2025	3	91	< 0.003	116				
west vadnais	9/24/2025	2	78	0.003	117				



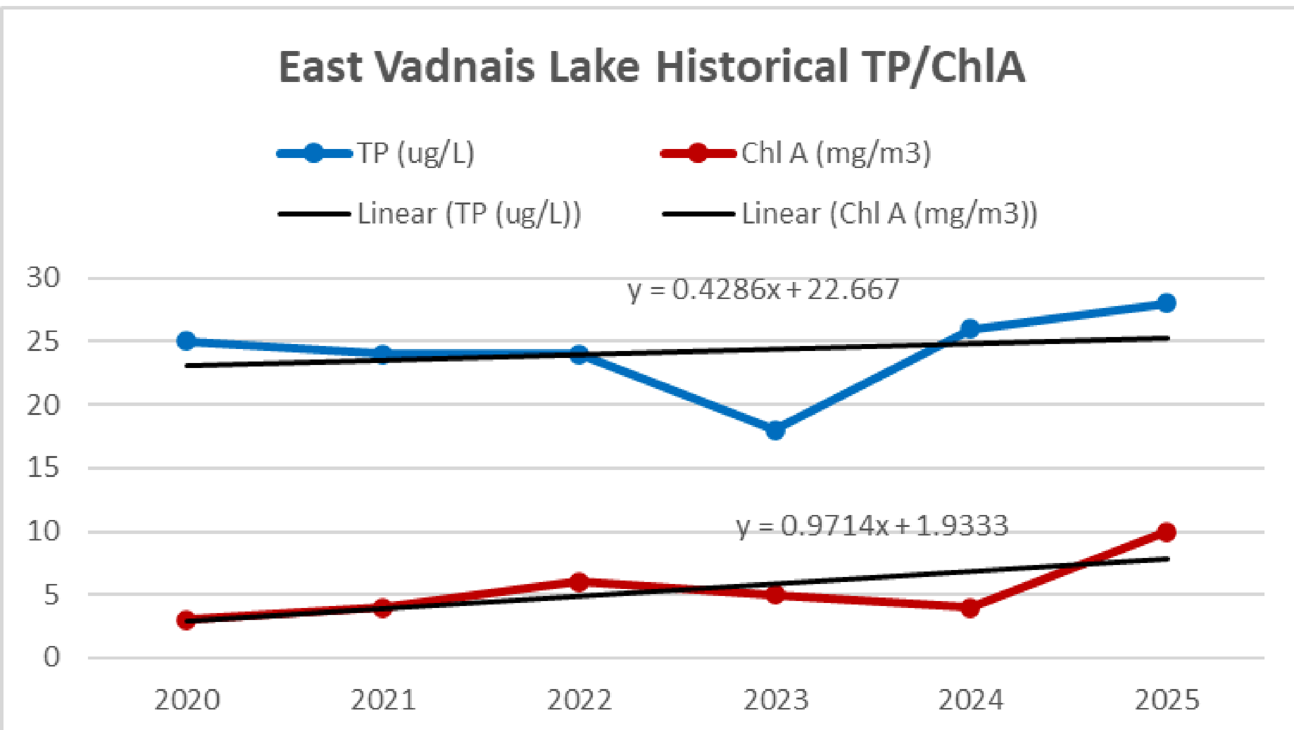
East Vadnais Lake

East Vadnais Lake is the drinking water reservoir for the City of Saint Paul and several surrounding suburbs. It receives water from the Mississippi River via a chain of lakes (Charley, Pleasant, Sucker, Vadnais). It is managed and monitored by the Saint Paul Regional Water Services (SPRWS). Water exits the lake through an underground pipe to the water treatment plant in Roseville. From the treatment plant, water is distributed to over 446,000 residents and businesses. No recreational use is allowed on the lake except for shoreline fishing. An oxygenation/aeration system is used in the lake to help reduce TP levels. VLAWMO began sampling in 2020.



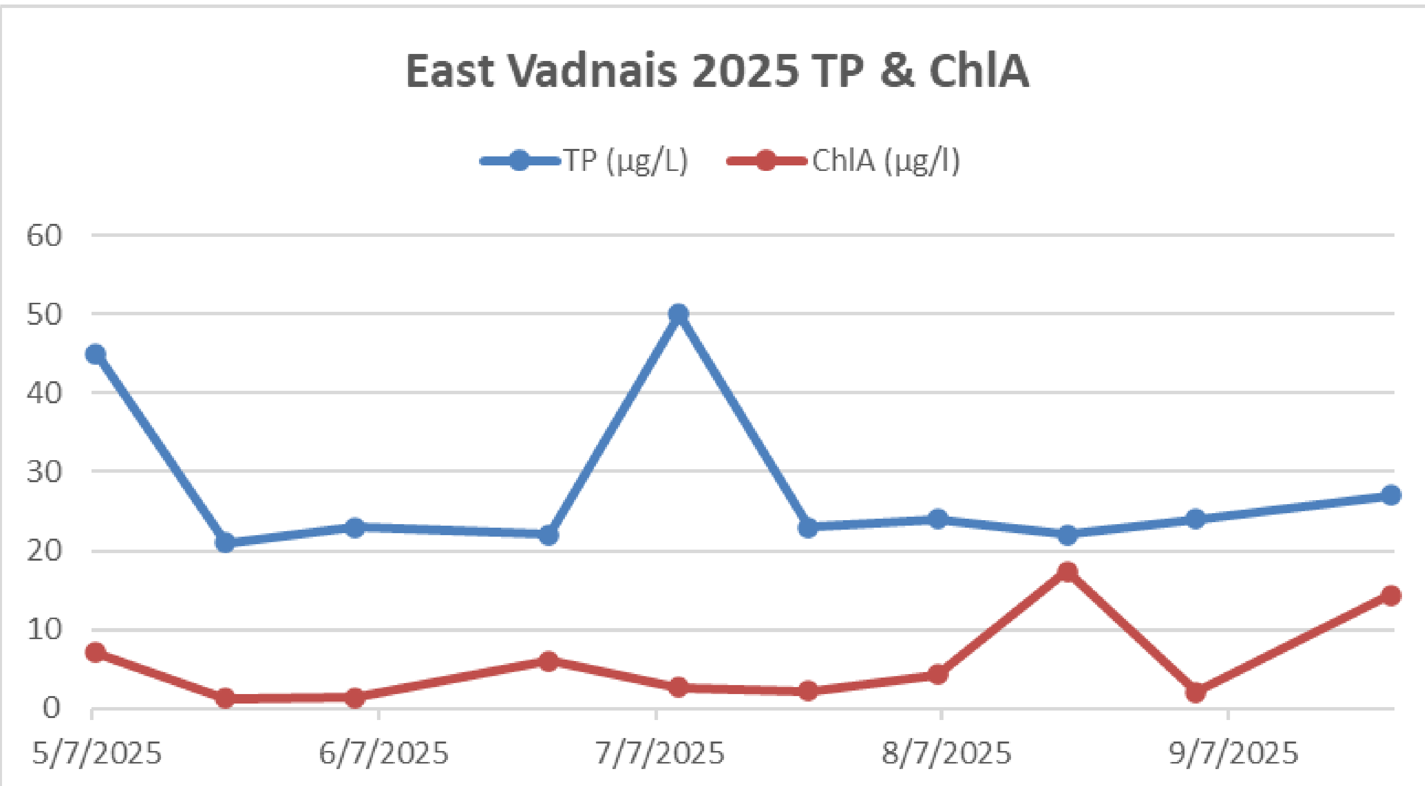
East Vadnais Lake

East Vadnais Lake Historical Avg TP/Chl A/SDT			
Year	TP (ug/L)	Chl A (mg/m3)	Secchi (m)
2020	25	3	
2021	24	4	2.7
2022	24	6	3
2023	18	5	3
2024	26	4	3.1
2025	28	10	3.2



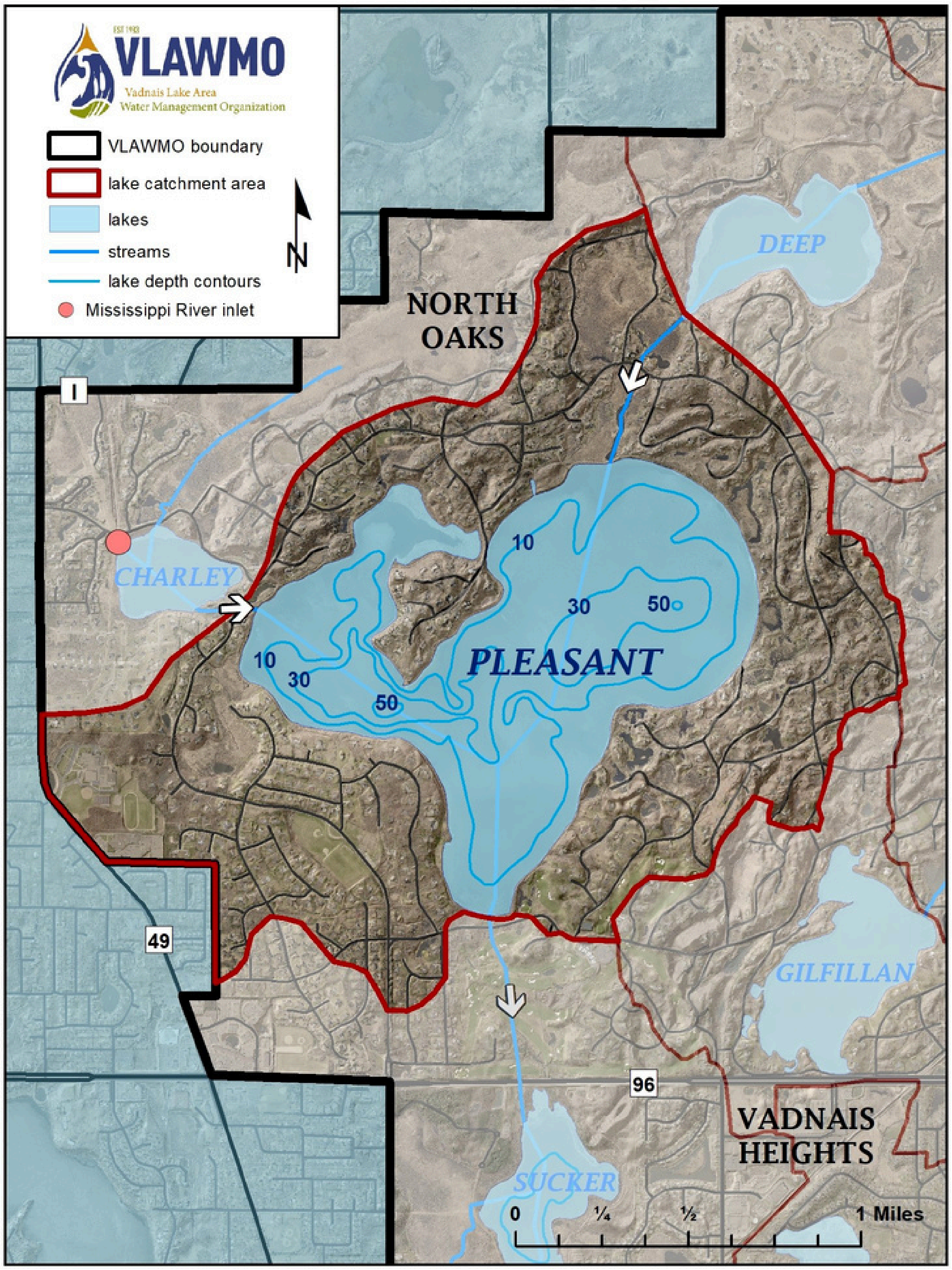
East Vadnais Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
east vadnais	5/7/2025		45	< 0.003	7.1				40.4
east vadnais	5/21/2025		21	0.004	1.2				
east vadnais	6/4/2025		23	< 0.003	1.4				
east vadnais	6/25/2025		22	< 0.003	6				
east vadnais	7/9/2025	10	50	0.007	2.7				
east vadnais	7/23/2025	11	23	< 0.003	2.2				
east vadnais	8/6/2025	10	24	0.004	4.3				
east vadnais	8/20/2025	9	22	0.004	17.4				
east vadnais	9/3/2025	11	24	0.005	2.1				
east vadnais	9/24/2025	11	27	0.007	14.4				



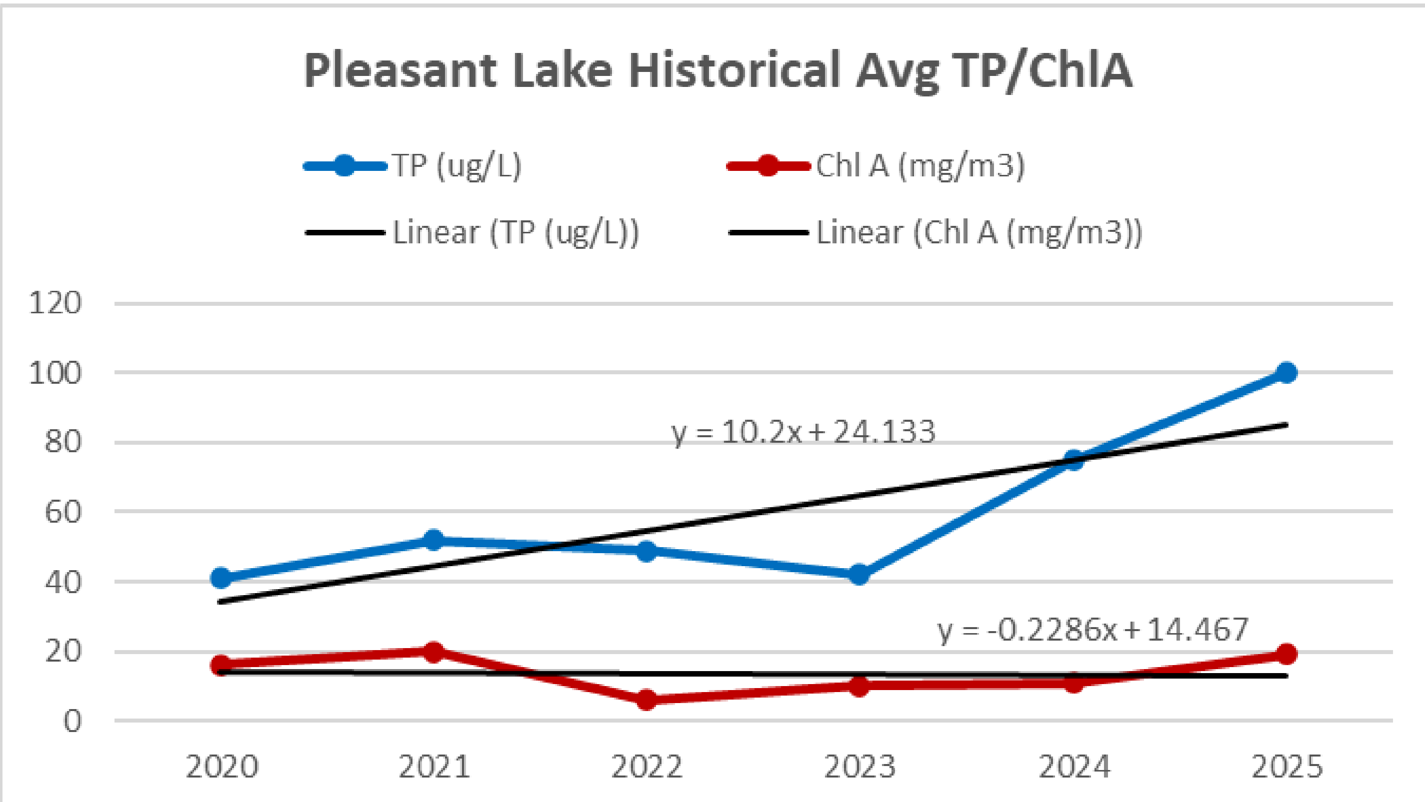
Pleasant Lake

Pleasant Lake is managed by the Saint Paul Regional Water Services (SPRWS) in partnership with VLAWMO and the North Oaks Home Owners' Association (NOHOA). It is part of the chain of lakes that moves water from the Mississippi River (Fridley) to East Vadnais Lake. It is impaired for mercury in fish tissue. SPRWS collects water quality information for Pleasant Lake. No motorized recreational use is allowed on the lake. An oxygenation system was installed in 2013 to address high Phosphorus levels. VLAWMO began sampling in 2020.



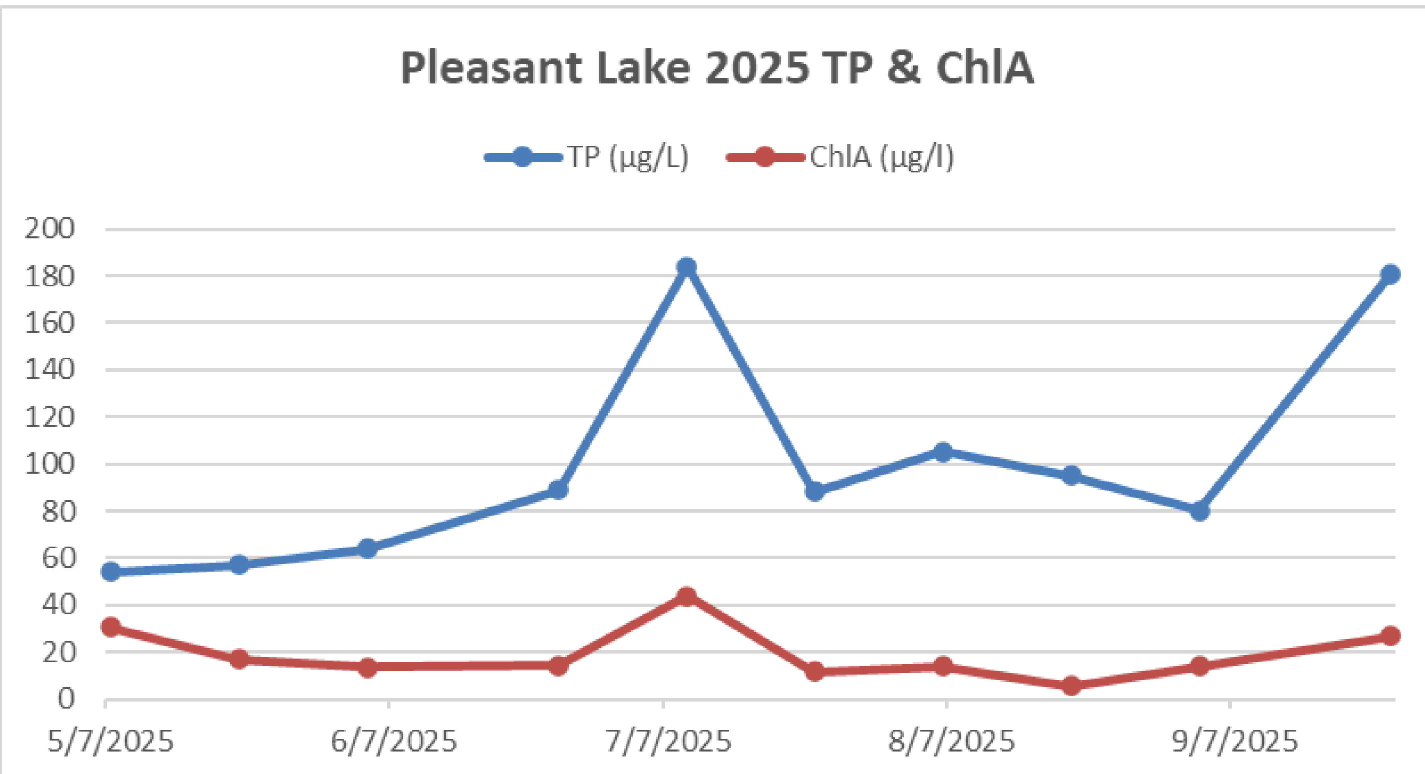
Pleasant Lake

Pleasant Lake Historical Avg TP/Chl A/SDT			
Year	TP (ug/L)	Chl A (mg/m3)	Secchi (m)
2020	41	16	1.7
2021	52	20	1.5
2022	49	6	2
2023	42	10	2.2
2024	75	11	2.3
2025	100	19	2.5



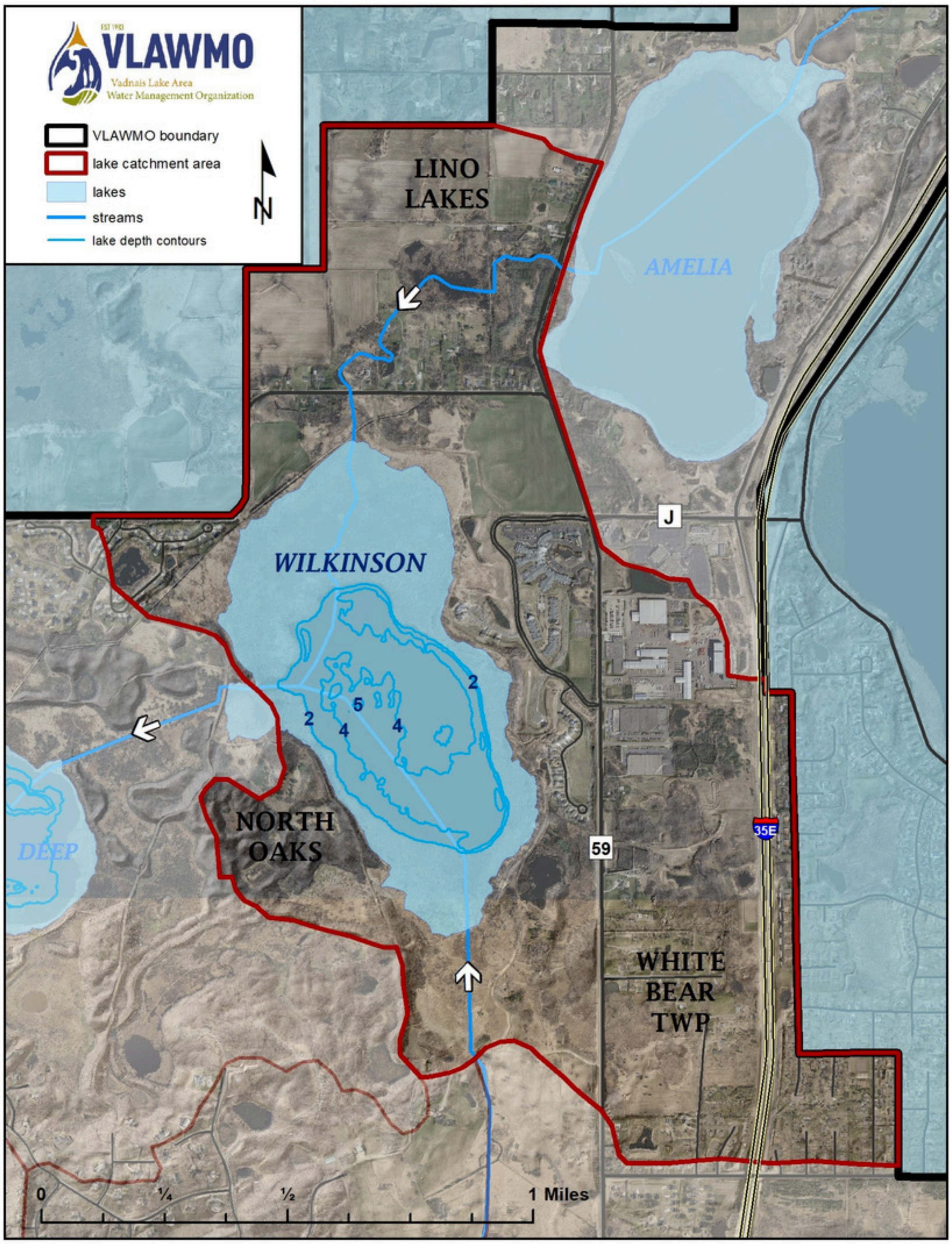
Pleasant Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
Pleasant	5/7/2025		54	< 0.003	30.4				25.6
Pleasant	5/21/2025		57	0.015	16.9				
Pleasant	6/4/2025		64	< 0.003	13.4				
Pleasant	6/25/2025		89	0.038	14.1				
Pleasant	7/9/2025	8	184	0.026	43.8				
Pleasant	7/23/2025	9	88	0.042	11.6				
Pleasant	8/6/2025	7	105	0.056	13.7				
Pleasant	8/20/2025	6	95	0.06	5.6				
Pleasant	9/3/2025	6	80	0.046	13.8				
Pleasant	9/24/2025	8	181	0.043	26.7				



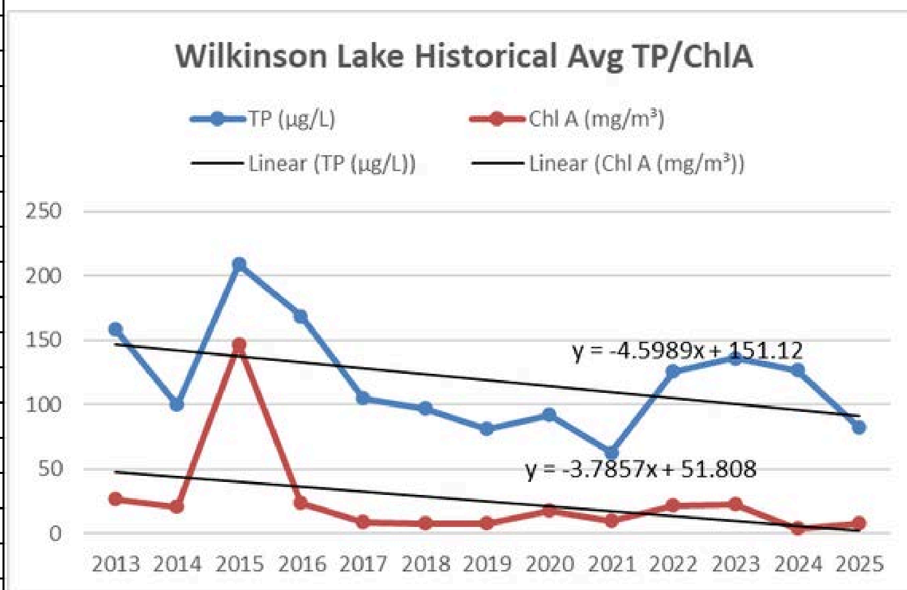
Wilkinson Lake

Wilkinson Lake was part of the James J. Hill farm and is now part of the Minnesota Land Trust, which preserves the land in a natural condition. The City of North Oaks required 150-foot buffer between the lake edge and any structures. The property on the northwest side of the lake is currently being developed. The North Oaks Company has spent considerable time and effort over the years to restore the lake including the installation of a fish barrier to attempt to keep the rough fish from destroying the natural vegetation and waterfowl habitat and to improve water quality. The lake has also had two drawdowns to kill the carp. Wilkinson is the fourth lake within VLAWMO to be on the 2010 impaired waters list for nutrients and is part of the ongoing Lambert Creek TMDL study. Farmland runoff and internal loading seem to be the main factors to the poor water quality.



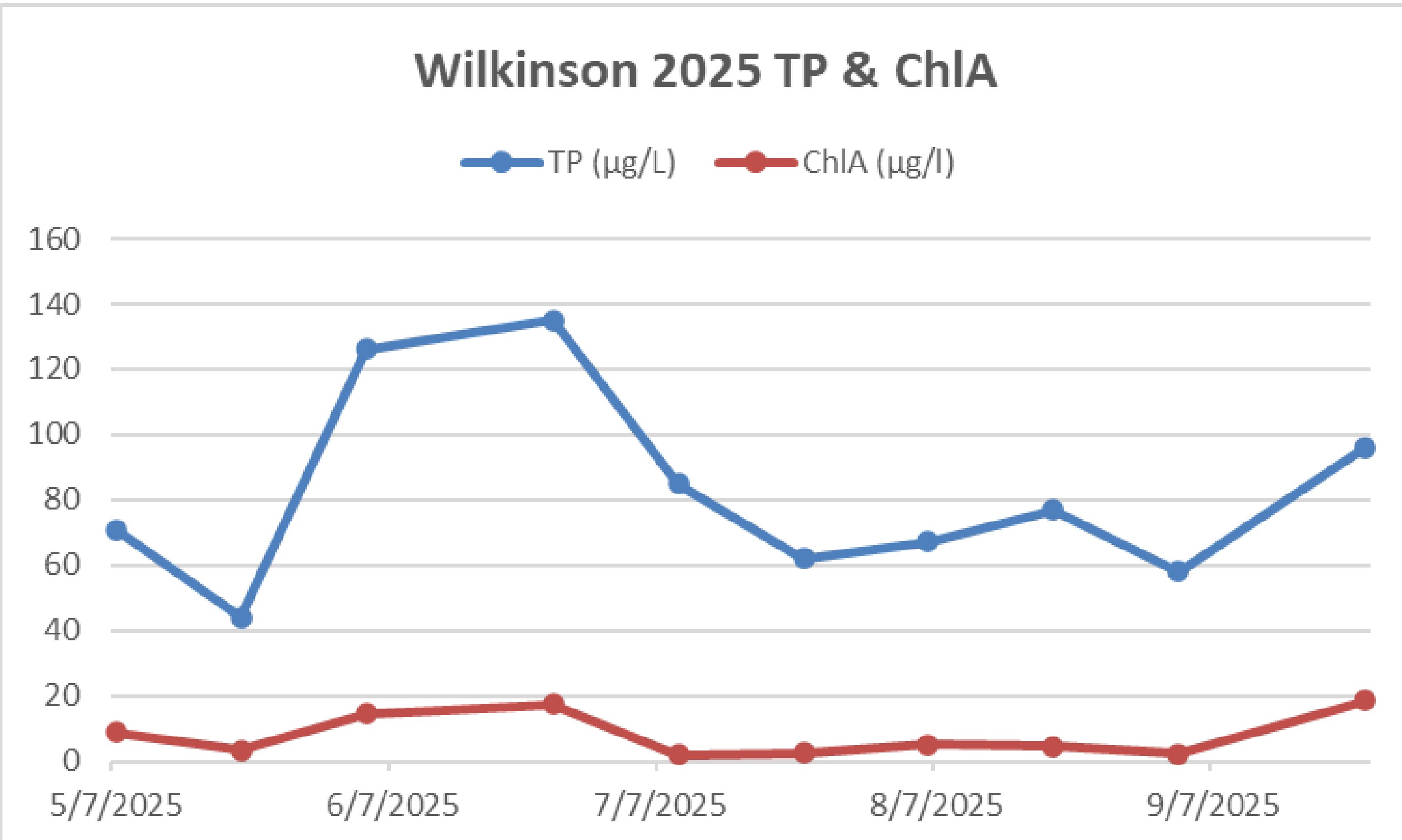
Wilkinson Lake

Wilkinson Lake Historical Avg TP/Chl A/SDT			
Year	TP (µg/L)	Chl A (mg/m³)	Secchi (m)
1998	48	26	1.1
1999	62	8	0
2000	38	34	0
2001	299	99	0.2
2002	107	40	0
2003	130	18	0
2004	72	0	0
2005	183	52	0
2006	96	10	0
2007	104	18	0.9
2008	64	8	0.3
2009	125	17	1
2010	140	31	0.8
2011	80	14	1
2012	103	42	0.9
2013	159	27	0.9
2014	100	21	0.9
2015	209	147	0.5
2016	169	24	1.1
2017	105	9	1.2
2018	97	8	1.2
2019	81	8	1.1
2020	92	18	1.1
2021	63	10	1.1
2022	126	22	1.1
2023	136	23	0.9
2024	127	4	1.1
2025	82	8	1.3



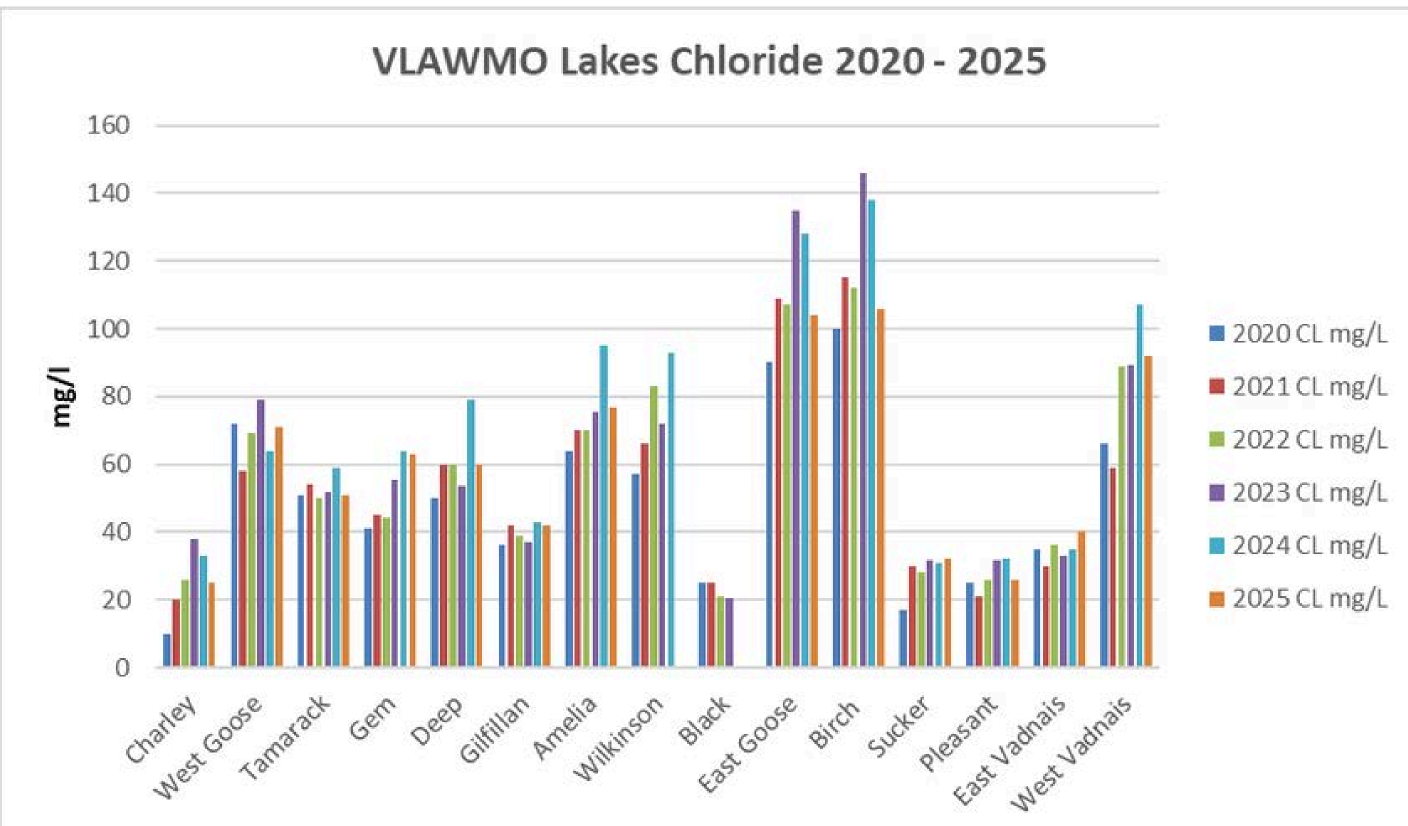
Wilkinson Lake

SITE	DATE	Secchi (ft)	TP (µg/L)	SRP (mg/L)	ChlA (µg/l)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
wilkinson	5/7/2025		71	0.008	8.8				70.3
wilkinson	5/21/2025		44	0.005	3.3				
wilkinson	6/4/2025		126	0.02	14.6				
wilkinson	6/25/2025		135	0.04	17.4				
wilkinson	7/9/2025	4	85	0.025	1.8				
wilkinson	7/23/2025	4	62	0.017	2.5				
wilkinson	8/6/2025	4	67	0.015	5				
wilkinson	8/20/2025	5	77	0.021	4.4				
wilkinson	9/3/2025	5	58	0.013	2.1				
wilkinson	9/24/2025	4	96	0.008	18.5				



Lake Comparison Chloride

	2020 CL mg/L	2021 CL mg/L	2022 CL mg/L	2023 CL mg/L	2024 CL mg/L	2025 CL mg/L	Average
Charley	10	20	26	37.9	33	25	23
West Goose	72	58	69	78.9	64	71	51
Tamarack	51	54	50	51.8	59	51	43
Gem	41	45	44	55.5	64	63	44
Deep	50	60	60	53.7	79	60	49
Gilfillan	36	42	39	37.2	43	42	35
Amelia	64	70	70	75.6	95	77	69
Wilkinson	57	66	83	72.1	93	70	63
Black	25	25	21	20.6			15
East Goose	90	109	107	135	128	104	94
Birch	100	115	112	146	138	106	102
Sucker	17	30	28	31.8	31	32	29
Pleasant	25	21	26	31.9	32	26	27
East Vadnais	35	30	36	33.2	35	40	35
West Vadnais	66	59	89	89.1	107	92	79



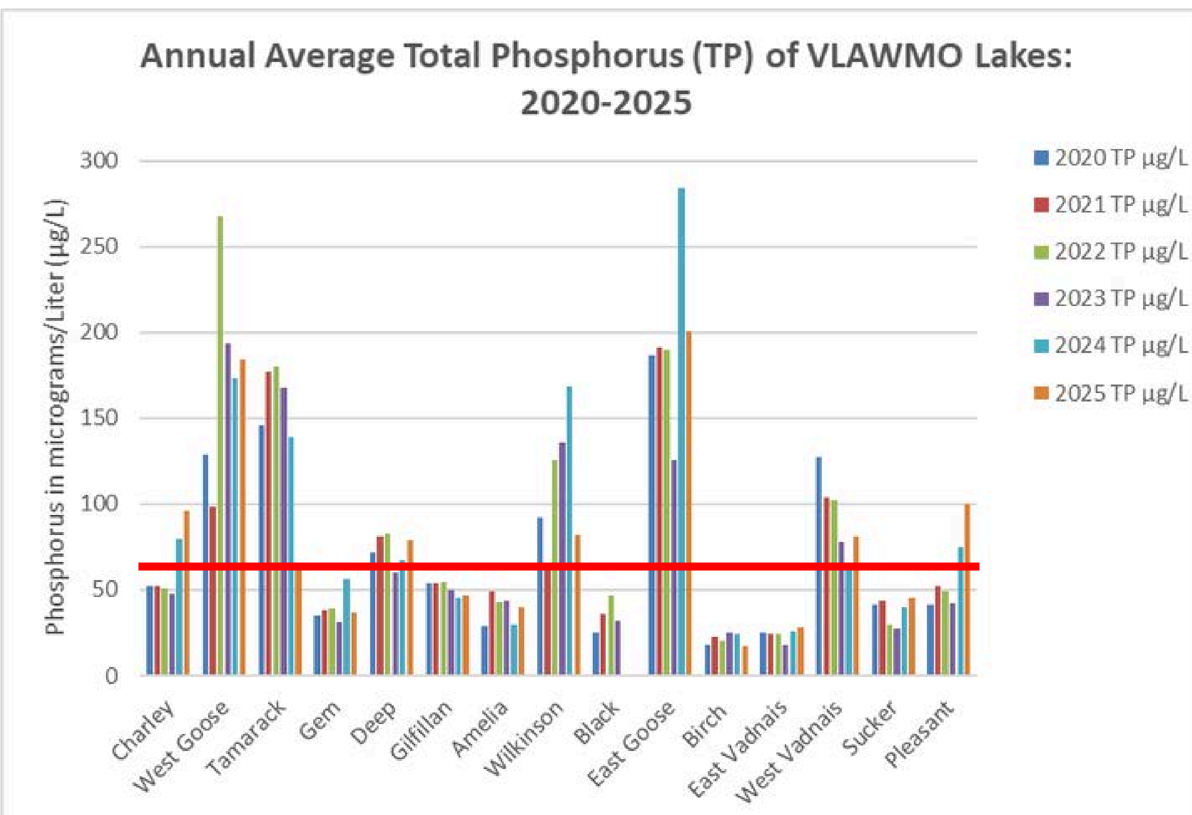
Chloride Standards

Chronic Exposure Standard—4 day average > 230 mg/l Acute Exposure Standard—1 hour > 860 mg/l

Impairment Threshold—Two or more exceedances in a three year period having at least five data points

Lake Comparison Total Phosphorus (TP)

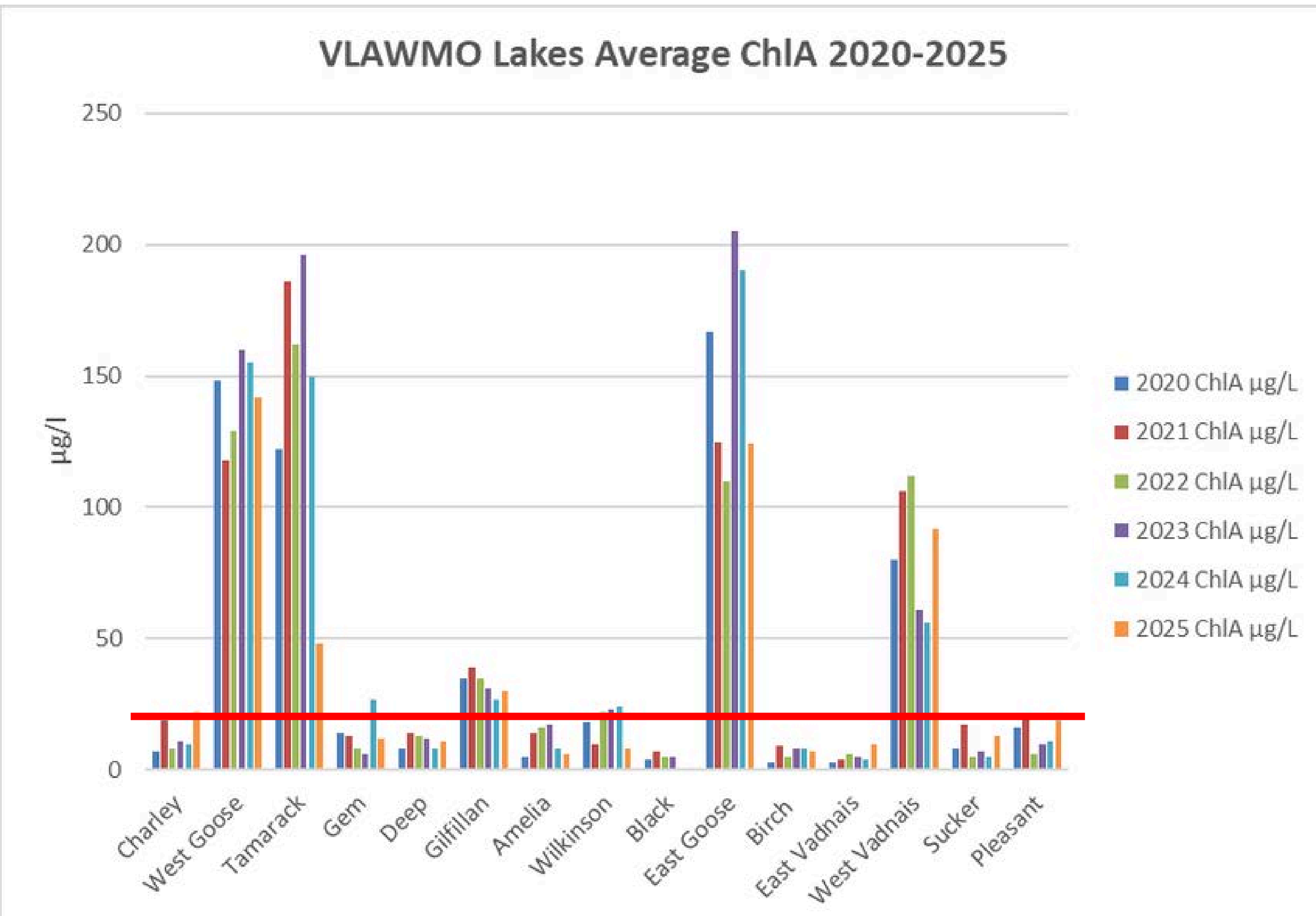
Lake	2020 TP µg/L	2021 TP µg/L	2022 TP µg/L	2023 TP µg/L	2024 TP µg/L	2025 TP µg/L	average
Charley	52	52	51	48	80	96	67
West Goose	129	98	268	194	173	184	159
Tamarack	146	177	180	168	139	64	149
Gem	35	38	39	31	56	37	37
Deep	72	81	83	60	67	79	84
Gilfillan	54	54	55	50	45	47	65
Amelia	29	49	43	44	30	40	38
Wilkinson	92	63	126	136	169	82	119
Black	25	36	47	32			30
East Goose	187	191	190	126	284	201	211
Birch	18	23	20	25	24	17	24
East Vadnais	25	24	24	18	26	28	24
West Vadnais	127	104	102	78	64	81	93
Sucker	41	44	30	27	40	45	39
Pleasant	41	52	49	42	75	100	49



The red line marks the State Standard; when a water body becomes impaired.

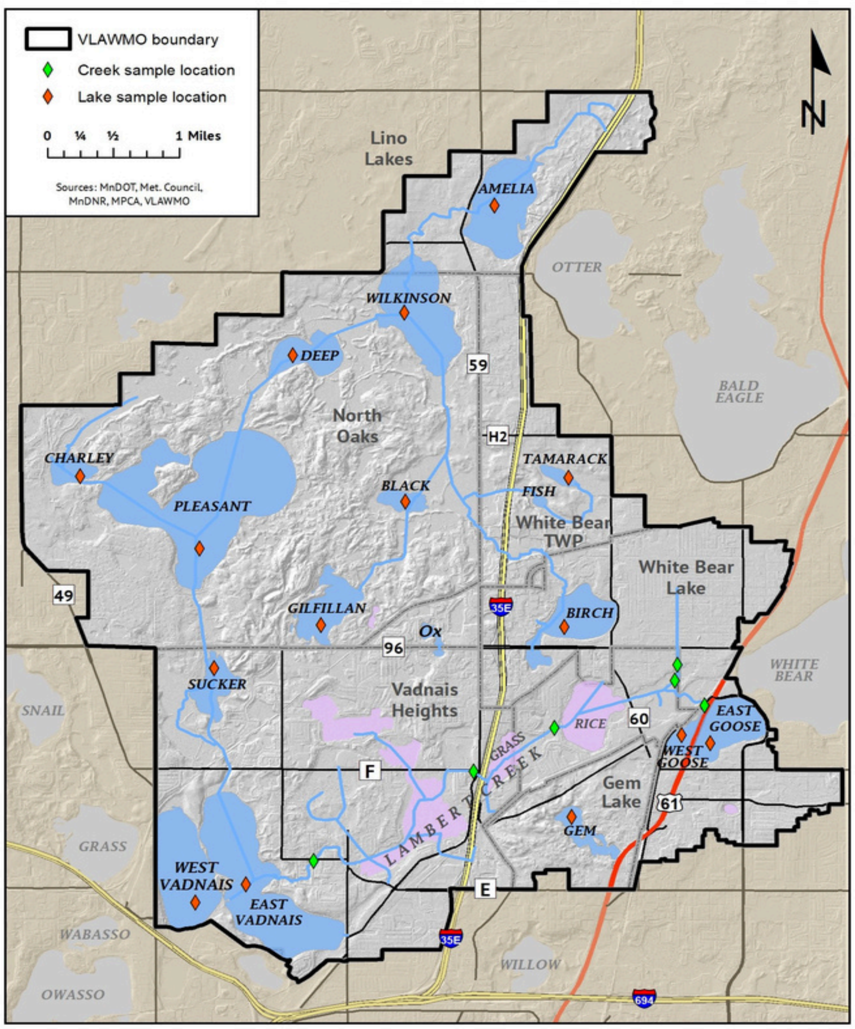
Lake Comparison ChlA

	2020 ChlA µg/L	2021 ChlA µg/L	2022 ChlA µg/L	2023 ChlA µg/L	2024 ChlA µg/L	2025 ChlA µg/L	average
Charley	7	19	8	11	10	22	12
West Goose	148	118	129	160	155	142	92
Tamarack	122	186	162	196	150	48	103
Gem	14	13	8	6	27	12	14
Deep	8	14	13	12	8	11	13
Gilfillan	35	39	35	31	27	30	31
Amelia	5	14	16	17	8	6	11
Wilkinson	18	10	22	23	24	8	27
Black	4	7	5	5			6
East Goose	167	125	110	205	190	124	108
Birch	3	9	5	8	8	7	5
East Vadnais	3	4	6	5	4	10	5
West Vadnais	80	106	112	61	56	92	78
Sucker	8	17	5	7	5	13	10
Pleasant	16	20	6	10	11	19	14



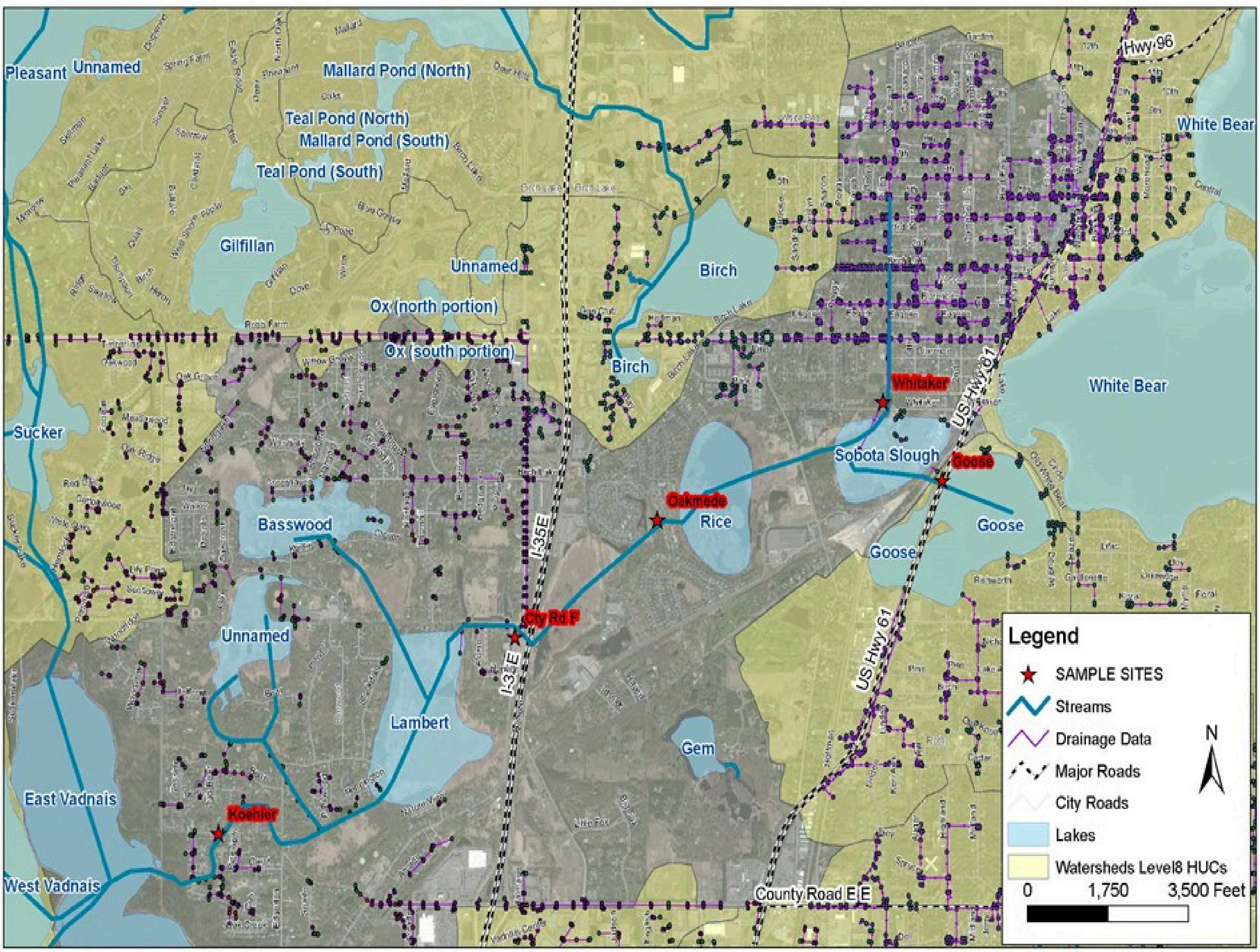
Lake Levels

Lake Elevations 2025					
NAVD88	Gilfillan	Birch	Gem	Goose	Wilkinson
gauge reading start	1.6	0.9		1,00	1.8
lake level start 5/7/2025	910.84	920.23		924.46	895.28
0.00 out	909.24	919.33		923.46	893.48
5/7/2025	910.84	920.23		924.46	895.33
5/21/2025	911.04	920.41		924.7	895.53
5/22/2025	910.90	920.33		924.71	895.55
6/4/2025	910.92	920.41		924.58	895.38
6/25/2025	910.84	920.36		924.56	895.23
7/9/2025	911.12	920.53		924.74	895.21
7/23/2025	911.01	920.53		924.64	895.12
8/6/2025	910.94	920.53		924.71	895.07
8/20/2025	911.34	920.53		924.98	895.68
9/3/2025	911.09	920.53		924.72	895.26
9/24/2025	911.02	920.53		924.51	895.18
10/14/2025	910.74	920.53		924.41	
yearly increase/decrease	0.1	0.3		0.05	0.10



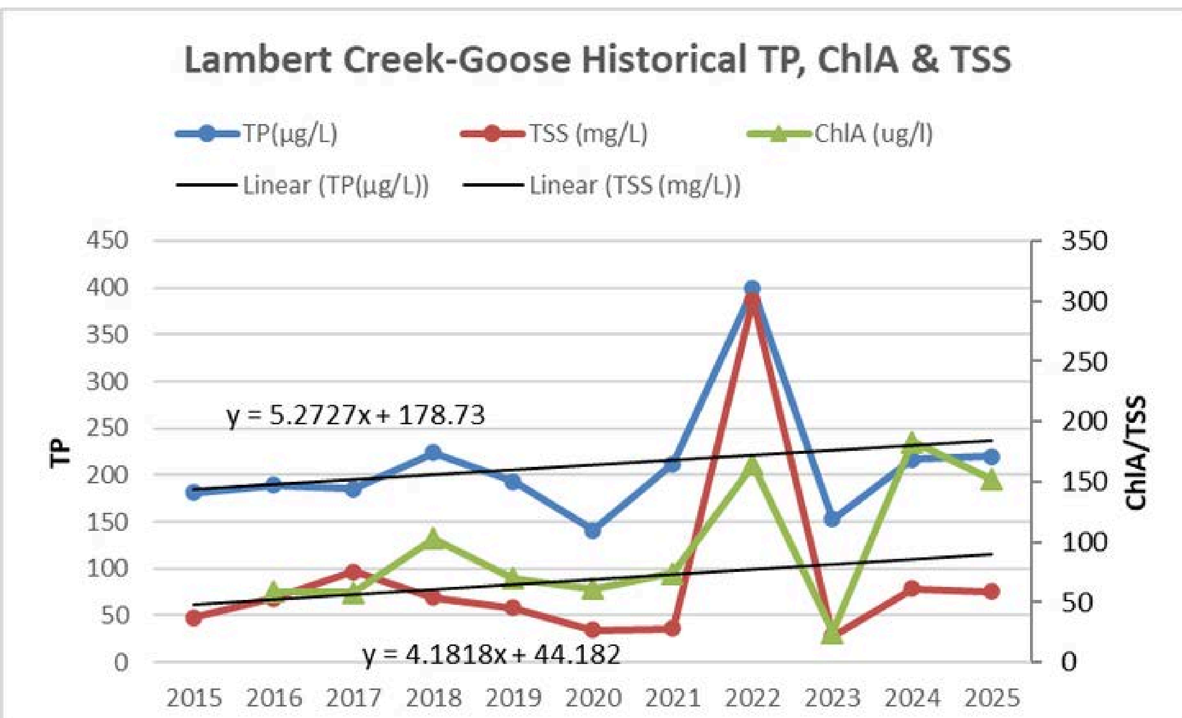
Lambert Creek

Samples are collected by VLAWMO staff at six sites along Lambert Creek on a bi-weekly basis May through September. The six sites noted in charts and graphs are: Goose Lake, White Bear Lake storm sewer (WBLSS), Whitaker Pond, Oakmede, County Rd F, and Kohler Rd. The samples are analyzed by RMB Environmental for TP, ChlA, SRP, TKN, NH3, N03, TSS. Creek flow is also collected at the flumes along with automated flow meters at 4 locations. This information will help with the TMDL process and allows us to set baselines to compare with future monitoring data.



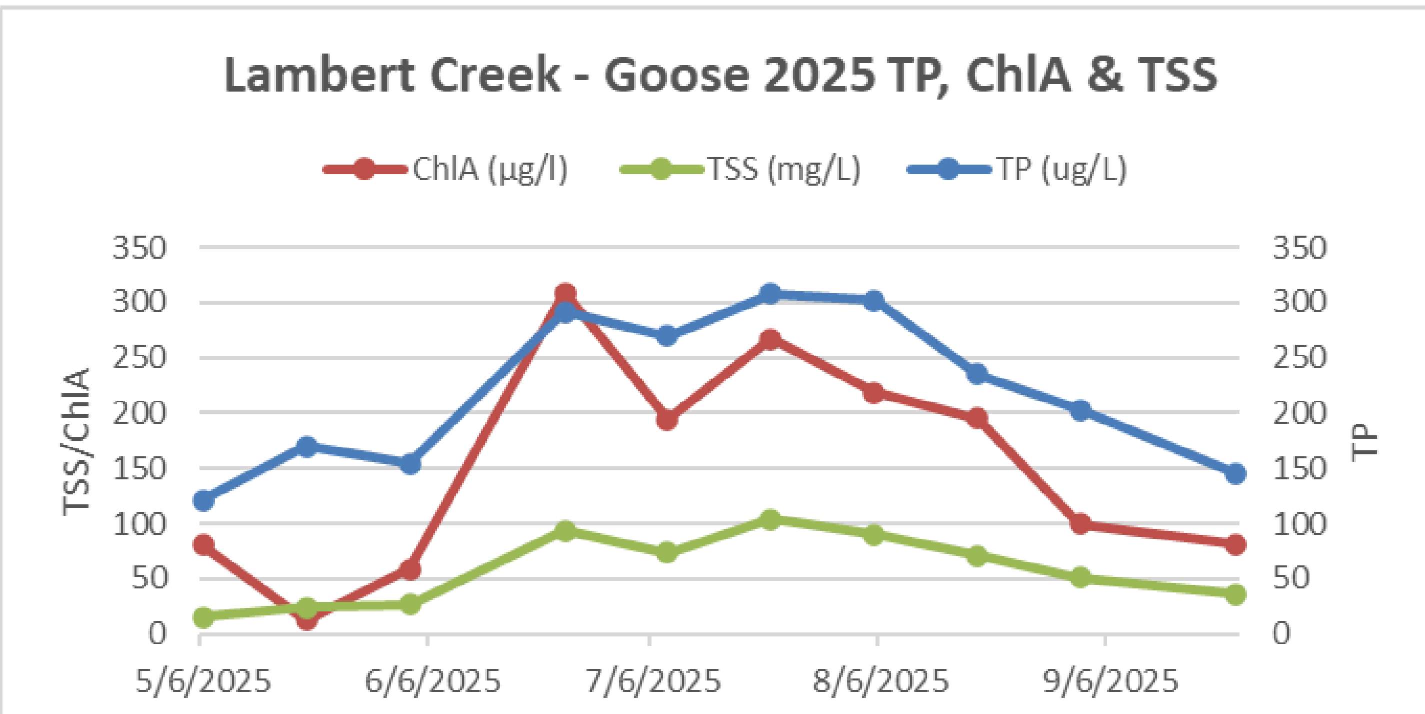
Lambert Creek—Goose

Lambert Creek-Goose			
Year	TP(µg/L)	TSS (mg/L)	ChlA (ug/l)
2009	230	22	
2010	130	16	
2011	138	12	
2012	246	40	
2013	102	7	
2014	199	51	
2015	181	37	
2016	189	53	59
2017	185	75	58
2018	224	54	103
2019	193	45	70
2020	141	27	61
2021	212	28	74
2022	399	301	164
2023	153	22	25
2024	217	61	183
2025	220	59	152



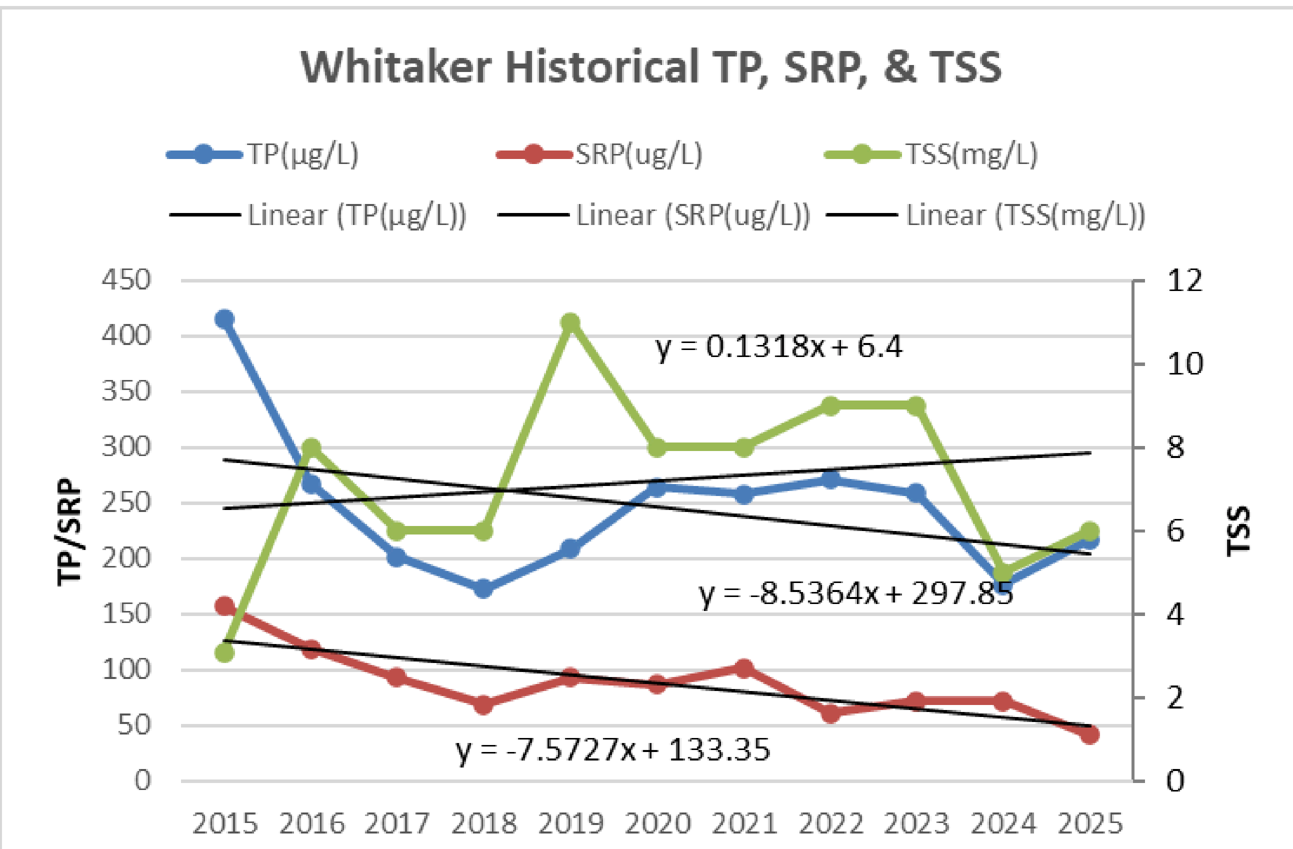
Lambert Creek—Goose

SITE	DATE	TP (ug/L)	ChlA (µg/l)	TSS (mg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
LC- Goose	5/6/2025	121	80.6	15.7				73.5
LC- Goose	5/20/2025	170	12.5	24				
LC- Goose	6/3/2025	154	58.7	26.7				
LC- Goose	6/24/2025	292	309	93.3				
LC- Goose	7/8/2025	270	194	74				
LC- Goose	7/22/2025	308	267	104				
LC- Goose	8/5/2025	302	219	90				
LC- Goose	8/19/2025	235	195	71				
LC- Goose	9/2/2025	203	99.7	51				
LC- Goose	9/23/2025	146	81.8	36				



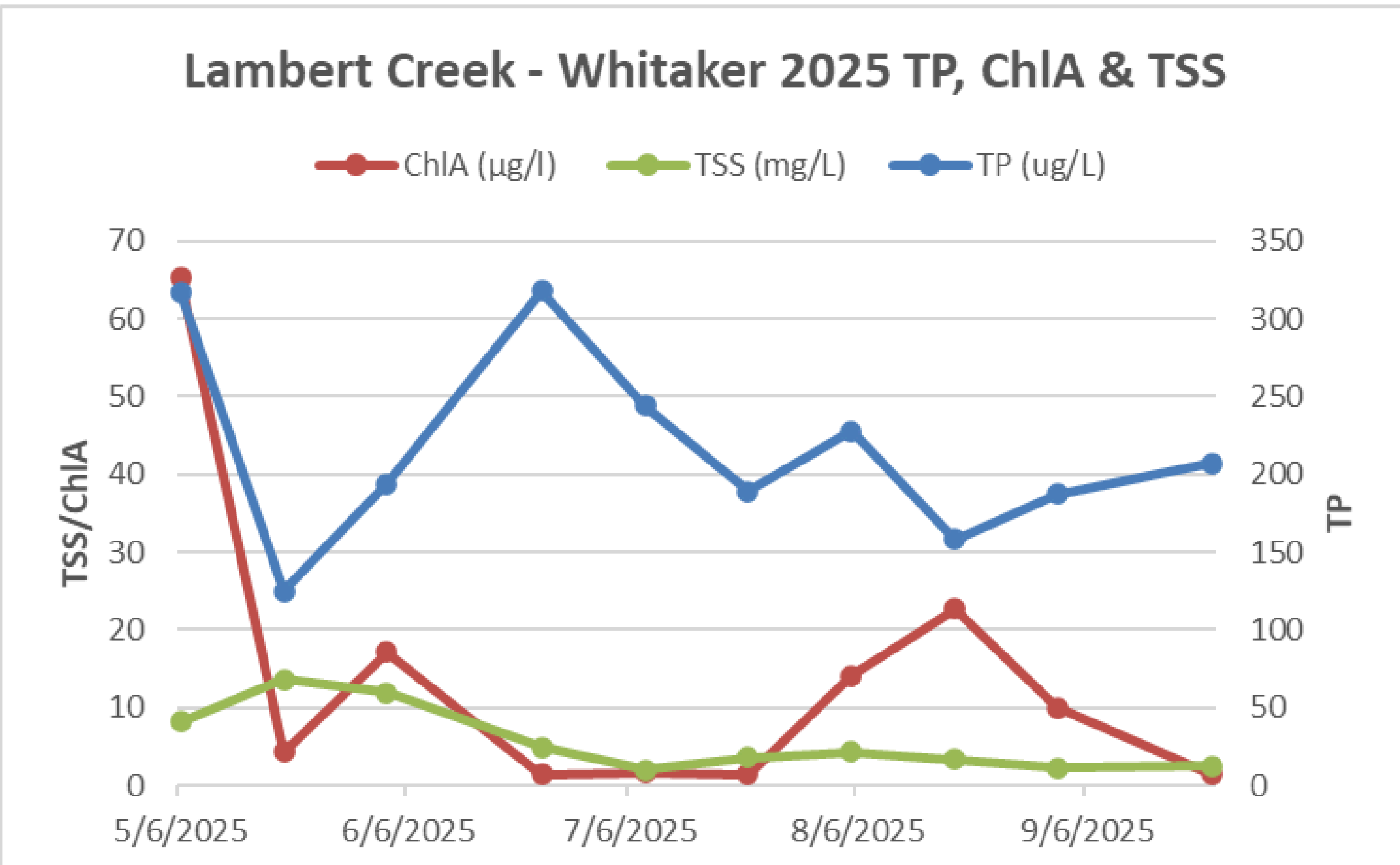
Lambert Creek—Whitaker

Whitaker				
Year	TP(µg/L)	SRP(ug/L)	TSS(mg/L)	ChlA (ug/l)
2009	240		11	
2010	229	91	19.7	
2011	157	45	12.7	
2012	398	103	11.5	
2013	226	71	9	
2014	173	100	1.4	
2015	416	157	3.1	
2016	267	119	8	8
2017	202	93	6	3
2018	173	69	6	21
2019	209	93	11	35
2020	264	87	8	62
2021	258	102	8	18
2022	271	61	9	67
2023	259	72	9	27
2024	177	72	5	11
2025	217	42	6	14



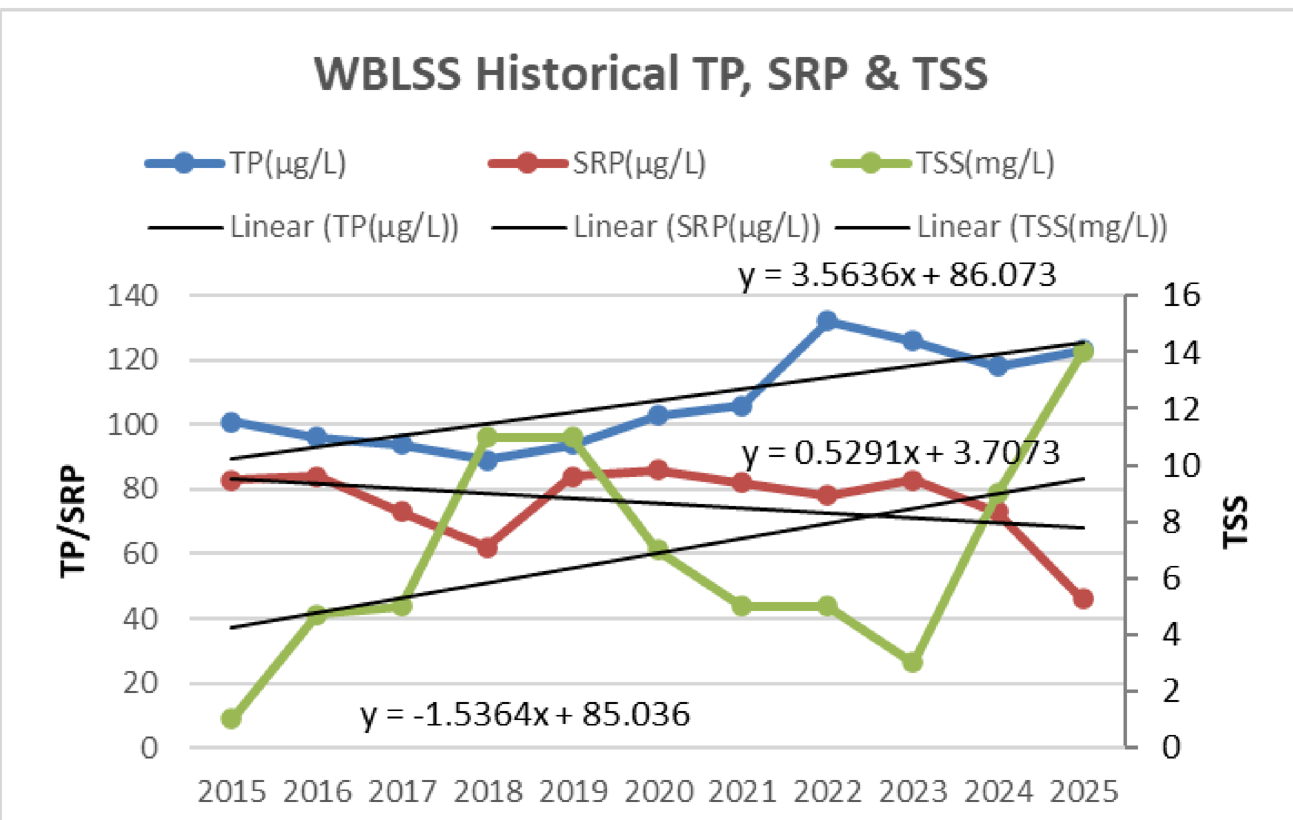
Lambert Creek—Whitaker

SITE	DATE	TP (ug/L)	ChlA (µg/l)	TSS (mg/L)	SRP (µg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	Cl (mg/L)
Whitaker	5/6/2025	317	65.3	8.2	27				70.4
Whitaker	5/20/2025	125	4.3	13.7	28				
Whitaker	6/3/2025	194	17.1	12	12				
Whitaker	6/24/2025	318	1.4	5	46				
Whitaker	7/8/2025	244	1.7	2	67				
Whitaker	7/22/2025	189	1.5	3.6	61				
Whitaker	8/5/2025	228	14.1	4.3	15				
Whitaker	8/19/2025	158	22.7	3.4	59				
Whitaker	9/2/2025	187	10	2.3	46				
Whitaker	9/23/2025	207	1.5	2.5	60				



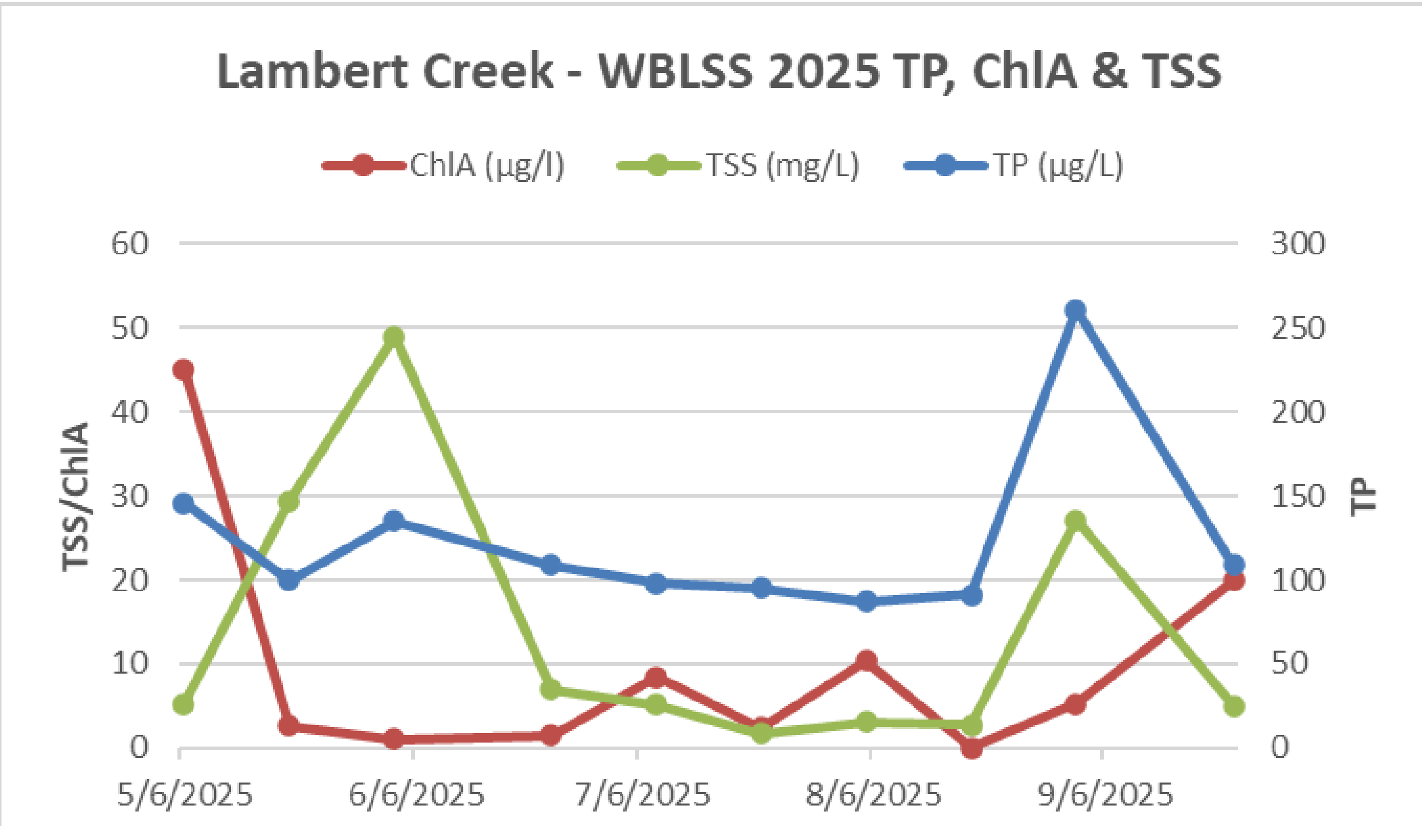
Lambert Creek—WBLSS

White Bear Lake Storm Sewer				
Year	TP(µg/L)	SRP(µg/L)	TSS(mg/L)	ChlA (ug/l)
2009	110		5.9	
2010	180	76	15.8	
2011	181	93	7.3	
2012	104	66	8.3	
2013	106	85	10	
2014	119	97	1	
2015	101	83	1	
2016	96	84	4.7	5
2017	94	73	5	1
2018	89	62	11	4
2019	94	84	11	2
2020	103	86	7	2
2021	106	82	5	4
2022	132	78	5	2
2023	126	83	3	3
2024	118	73	9	21
2025	123	46	14	11



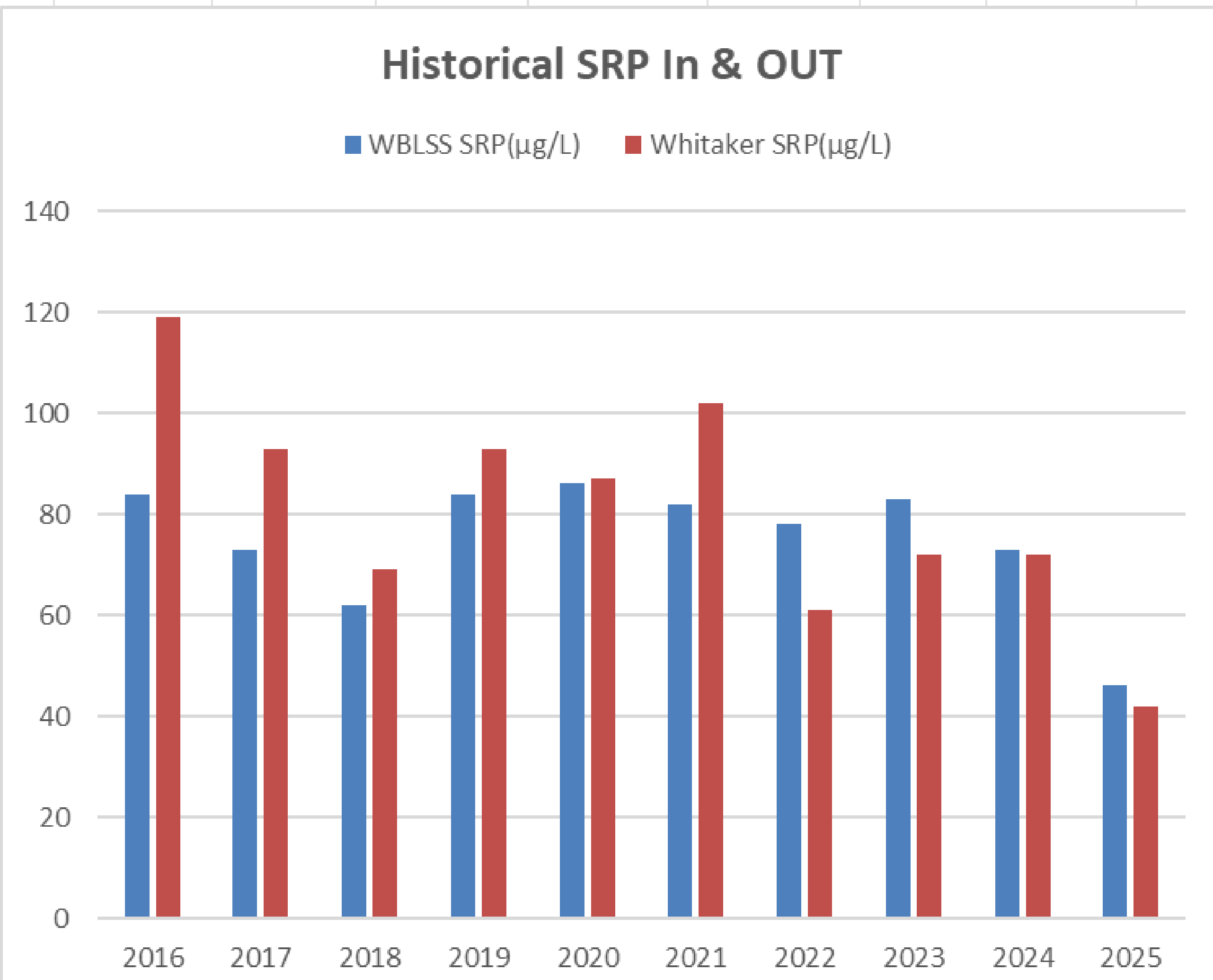
Lambert Creek—WBLSS

SITE	DATE	TP (µg/L)	ChlA (µg/l)	TSS (mg/L)	SRP (µg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
WBLSS	5/6/2025	146	45.1	5.3	22				102
WBLSS	5/20/2025	100	2.7	29.4	21				
WBLSS	6/3/2025	135	1.1	49	9				
WBLSS	6/24/2025	109	1.5	7	63				
WBLSS	7/8/2025	98	8.5	5.1	67				
WBLSS	7/22/2025	95	2.4	1.7	56				
WBLSS	8/5/2025	87	10.4	3.1	75				
WBLSS	8/19/2025	91	< 1.0	2.8	56				
WBLSS	9/2/2025	261	5.3	27.1	82				
WBLSS	9/23/2025	109	19.9	5	7				

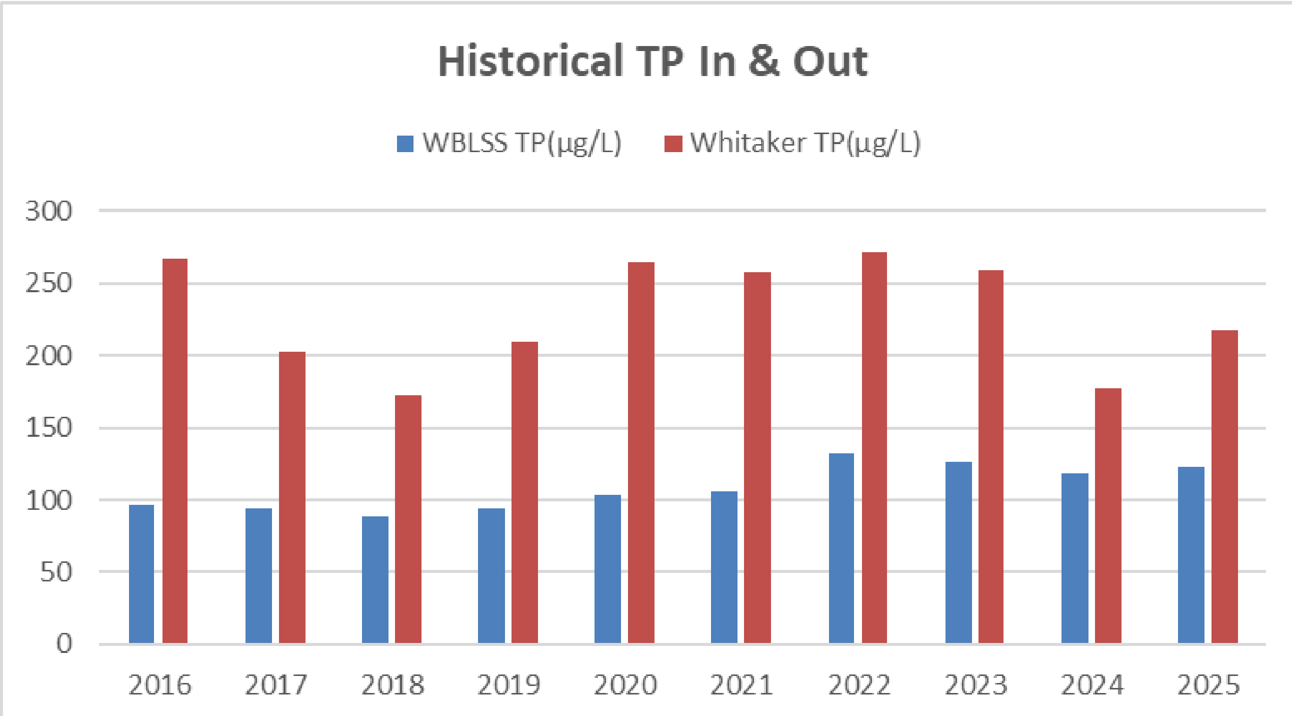


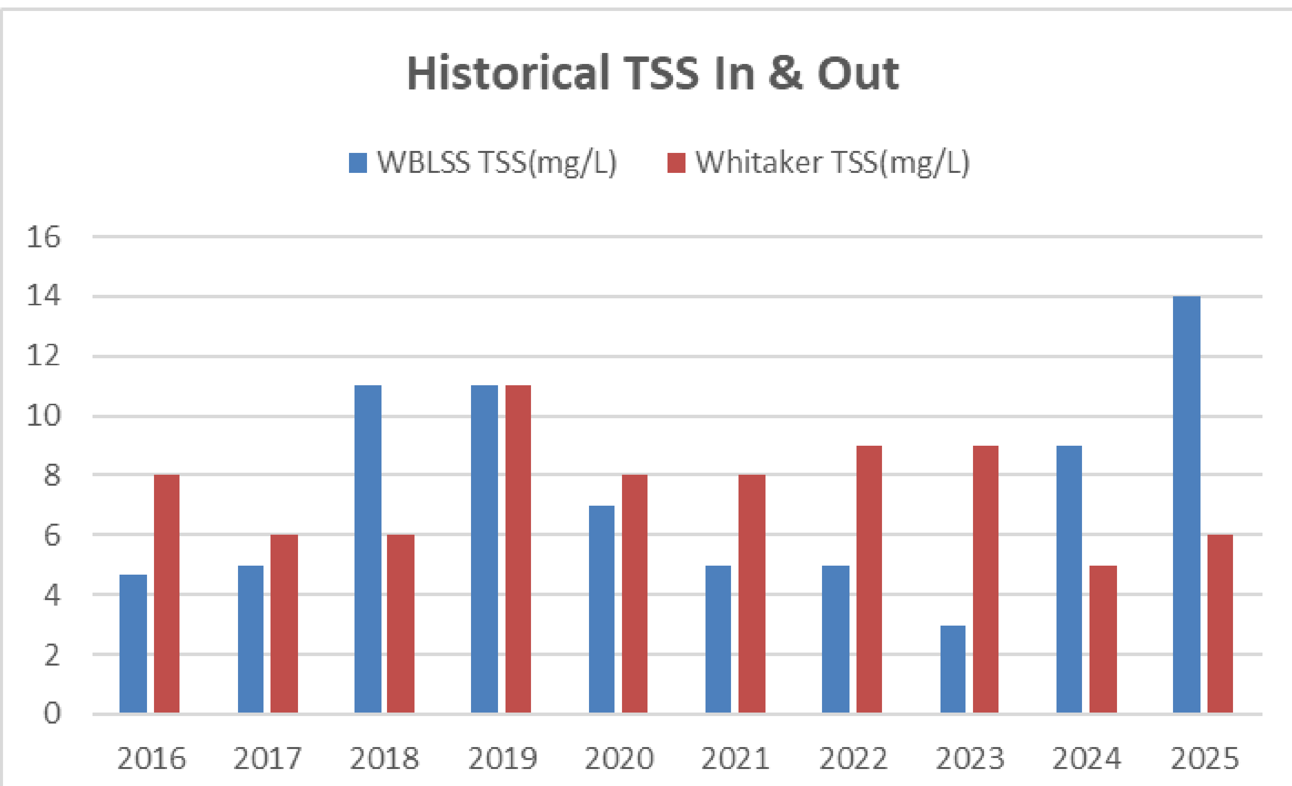
Lambert Creek—WBLSS

	WBLSS TP(µg/L)	Whitaker TP(µg/L)		WBLSS SRP(µg/L)	Whitaker SRP(µg/L)		WBLSS TSS(mg/L)	Whitaker TSS(mg/L)
2009	110	240	**2009**			**2009**	5.9	11
2010	180	229	**2010**	76	91	**2010**	15.8	19.7
2011	181	157	**2011**	93	45	**2011**	7.3	12.7
2012	104	398	**2012**	66	103	**2012**	8.3	11.5
2013	106	226	**2013**	85	71	**2013**	10	9
2014	119	173	**2014**	97	100	**2014**	9.5	14
2015	101	416	**2015**	83	157	**2015**	10	16
2016	96	267	**2016**	84	119	**2016**	4.7	8
2017	94	202	**2017**	73	93	**2017**	5	6
2018	89	173	**2018**	62	69	**2018**	11	6
2019	94	209	**2019**	84	93	**2019**	11	11
2020	103	264	**2020**	86	87	**2020**	7	8
2021	106	258	**2021**	82	102	**2021**	5	8
2022	132	271	**2022**	78	61	**2022**	5	9
2023	126	259	**2023**	83	72	**2023**	3	9
2024	118	177	**2024**	73	72	**2024**	9	5
2025	123	217	**2025**	46	42	**2025**	14	6



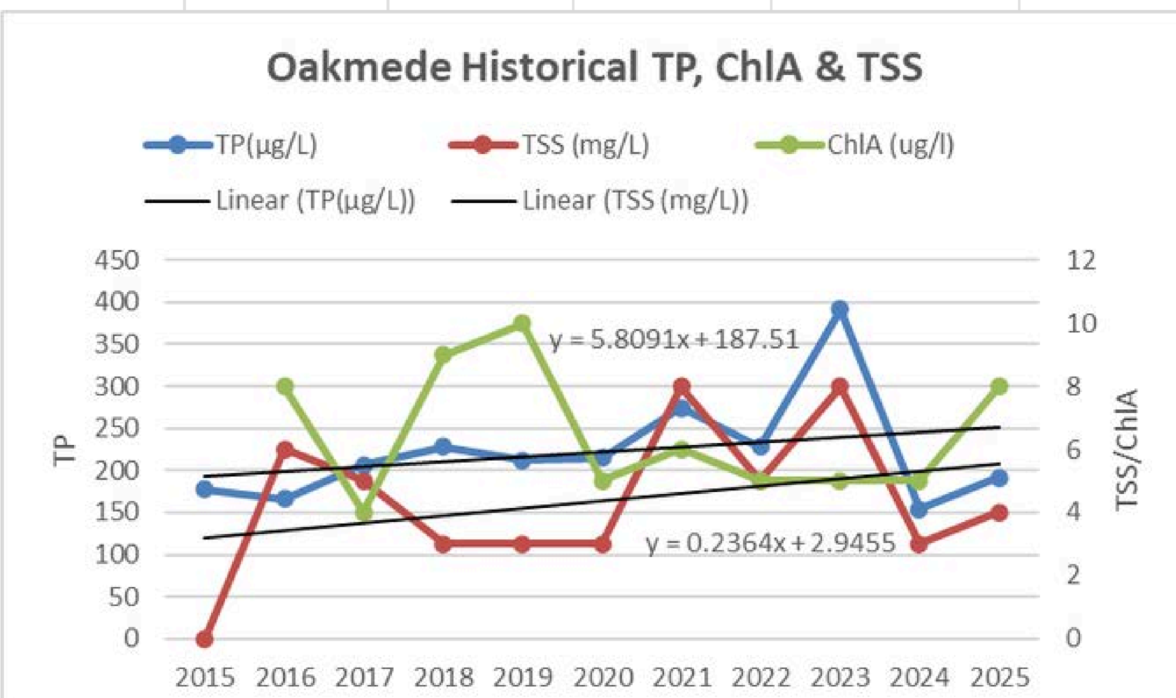
Lambert Creek—WBLSS





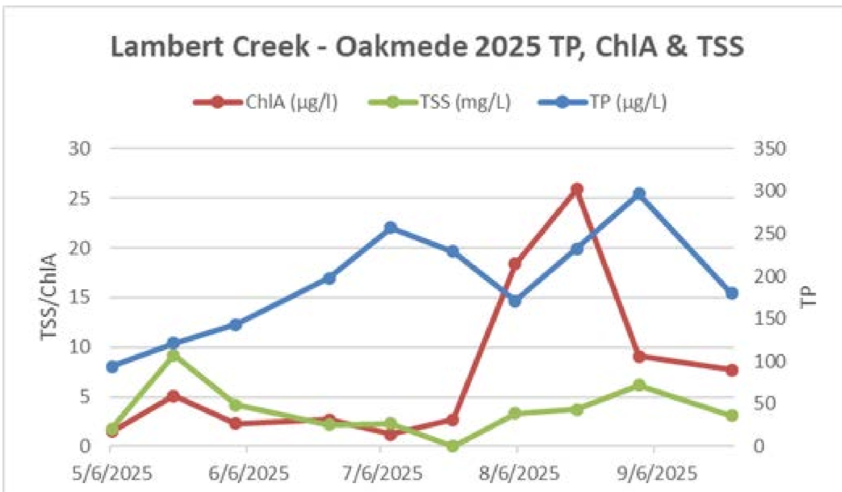
Lambert Creek—Oakmede

Oakmede			
Year	TP(µg/L)	TSS (mg/L)	ChlA (ug/l)
2009	210	6	
2010	222	4	
2011	224	5	
2012	283	8	
2013	390	13	
2014	285	1	
2015	178	0	
2016	166	6	8
2017	207	5	4
2018	228	3	9
2019	212	3	10
2020	215	3	5
2021	274	8	6
2022	228	5	5
2023	392	8	5
2024	154	3	5
2025	192	4	8

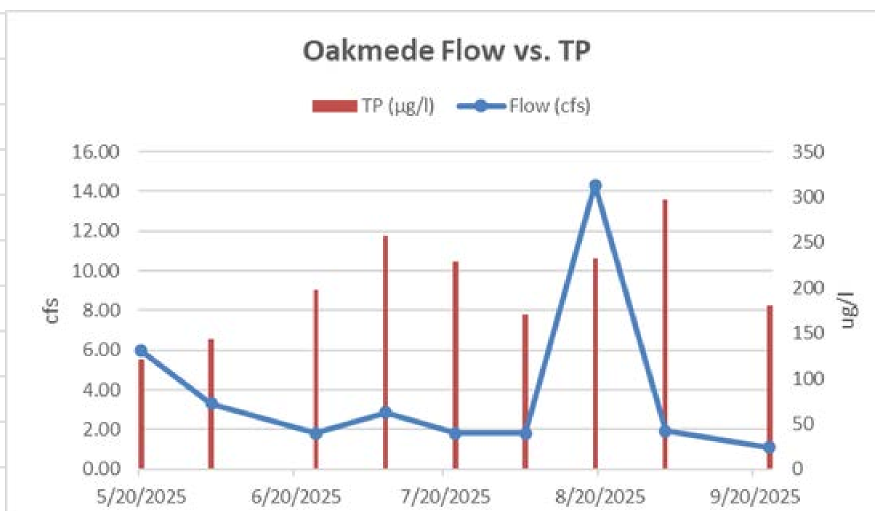


Lambert Creek—Oakmede

SITE	DATE	TP (µg/L)	ChlA (µg/l)	TSS (mg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
Oakmede	5/6/2025	94	1.5	1.8				109
Oakmede	5/20/2025	121	5.1	9.2				
Oakmede	6/3/2025	143	2.3	4.2				
Oakmede	6/24/2025	198	2.7	2.2				
Oakmede	7/8/2025	257	1.2	2.3				
Oakmede	7/22/2025	229	2.7	< 3.0				
Oakmede	8/5/2025	171	18.4	3.3				
Oakmede	8/19/2025	232	25.9	3.7				
Oakmede	9/2/2025	297	9.1	6.2				
Oakmede	9/23/2025	180	7.7	3.1				

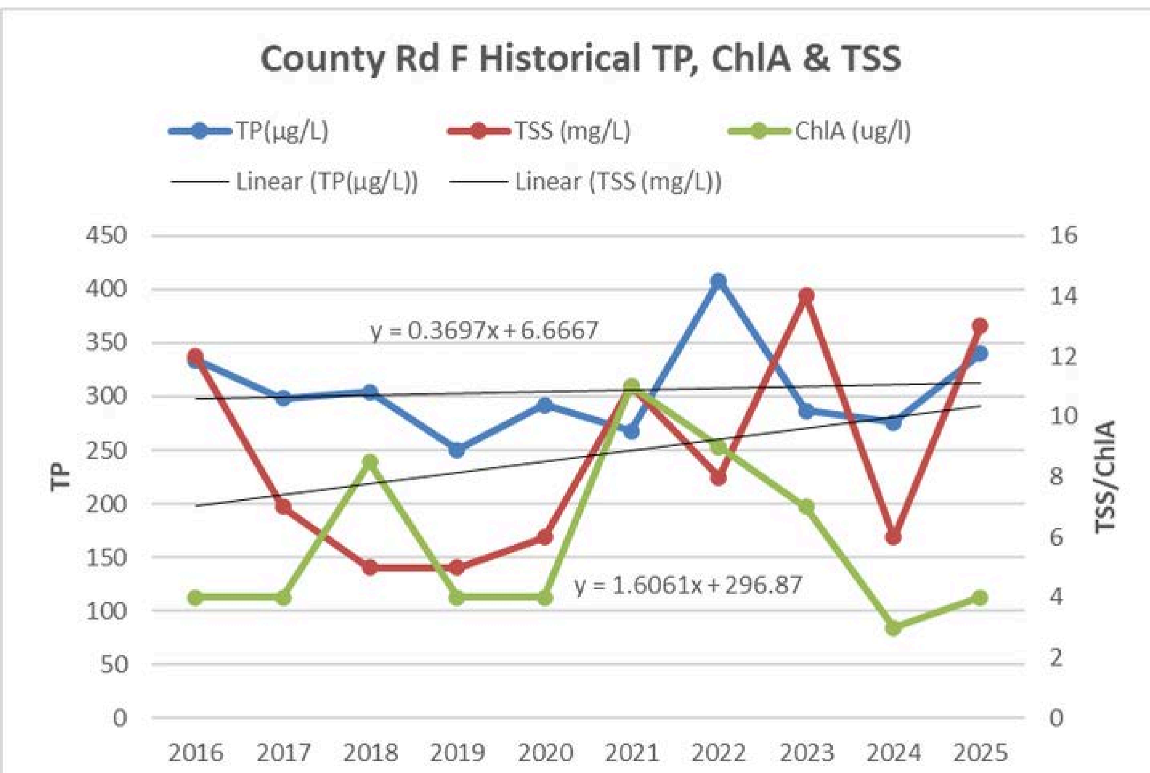


Date	Flow (cfs)	TP (µg/l)
5/6/2025	1.63	94
5/20/2025	5.97	121
6/3/2025	3.32	143
6/24/2025	1.82	198
7/8/2025	2.86	257
7/22/2025	1.82	229
8/5/2025	1.82	171
8/19/2025	14.33	232
9/2/2025	1.92	297
9/23/2025	1.12	180



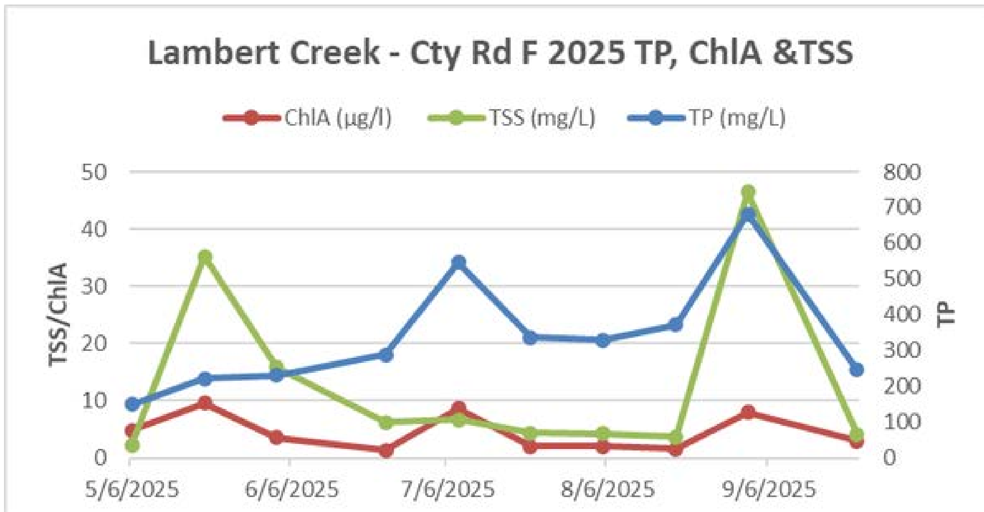
Lambert Creek—Cty Rd F

County Road F			
Year	TP(µg/L)	TSS (mg/L)	ChlA (ug/l)
2009	190	11	
2010	403	10	
2011	299	6	
2012	395	8	
2013	707	14	
2014	393	1	
2015	339	0	
2016	334	12	4
2017	298	7	4
2018	304	5	8.5
2019	250	5	4
2020	292	6	4
2021	268	11	11
2022	408	8	9
2023	287	14	7
2024	276	6	3
2025	340	13	4

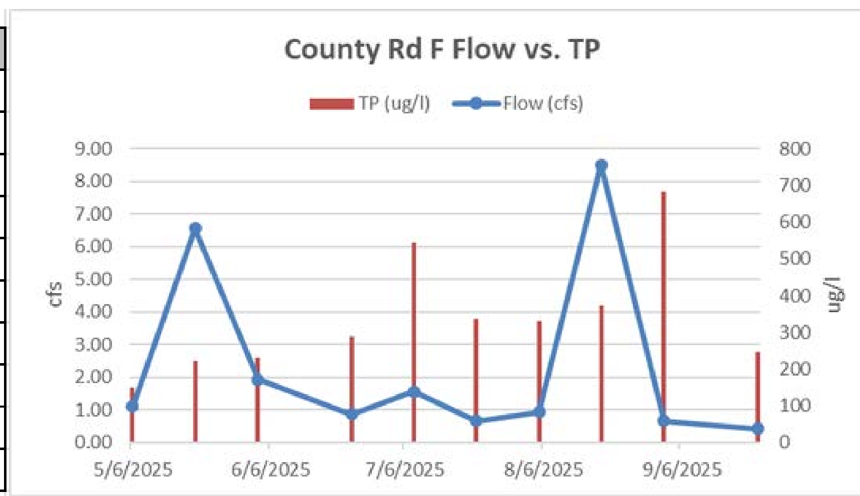


Lambert Creek—Cty Rd F

SITE	DATE	TP (mg/L)	ChlA (µg/l)	TSS (mg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
Cty Rd F	5/6/2025	149	4.8	2.3				115
Cty Rd F	5/20/2025	222	9.6	35.2				
Cty Rd F	6/3/2025	231	3.6	15.8				
Cty Rd F	6/24/2025	288	1.4	6.2				
Cty Rd F	7/8/2025	546	8.7	6.7				
Cty Rd F	7/22/2025	337	2.1	4.4				
Cty Rd F	8/5/2025	330	2.1	4.2				
Cty Rd F	8/19/2025	372	1.6	3.7				
Cty Rd F	9/2/2025	682	8	46.5				
Cty Rd F	9/23/2025	246	3	4.1				

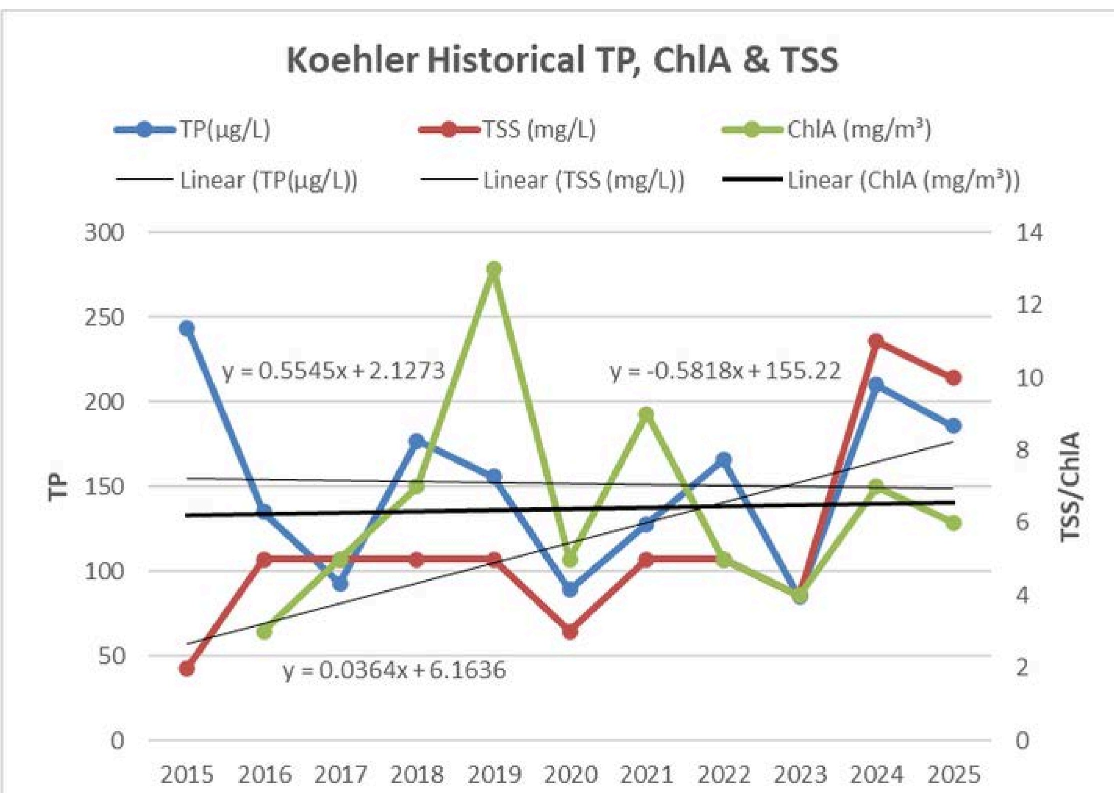


Date	Flow (cfs)	TP (ug/l)
5/6/2025	1.11	149
5/20/2025	6.56	222
6/3/2025	1.92	231
6/24/2025	0.87	288
7/8/2025	1.56	546
7/22/2025	0.65	337
8/5/2025	0.93	330
8/19/2025	8.50	372
9/2/2025	0.65	682
9/23/2025	0.42	246



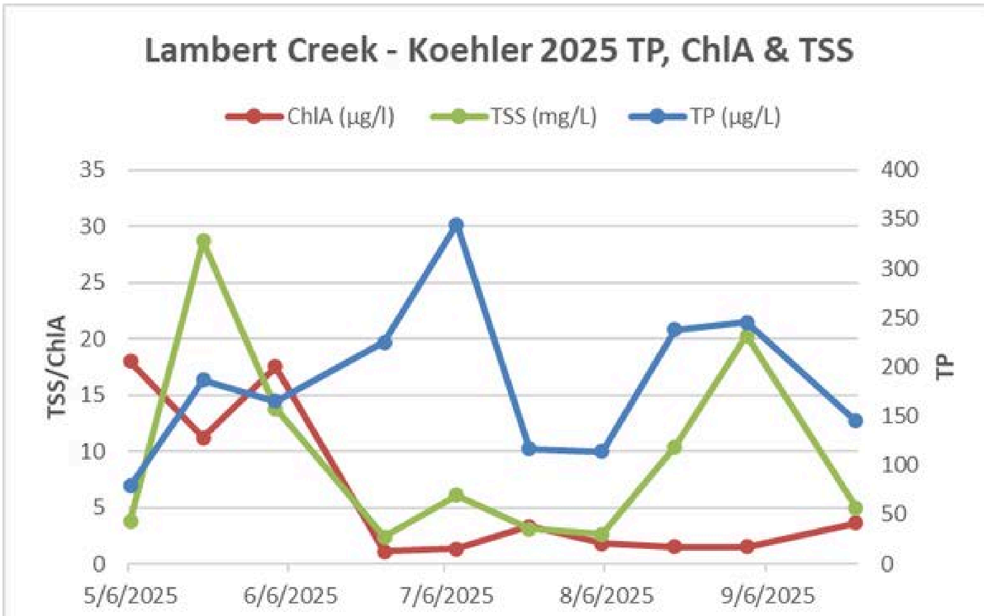
Lambert Creek—Koehler

Koehler			
Year	TP(µg/L)	TSS (mg/L)	ChlA (mg/m³)
2009	120	9	
2010	194	10	
2011	229	8	
2012	207	4	
2013	231	6	
2014	301	5	
2015	244	2	
2016	135	5	3
2017	93	5	5
2018	177	5	7
2019	156	5	13
2020	89	3	5
2021	128	5	9
2022	166	5	5
2023	85	4	4
2024	210	11	7
2025	186	10	6

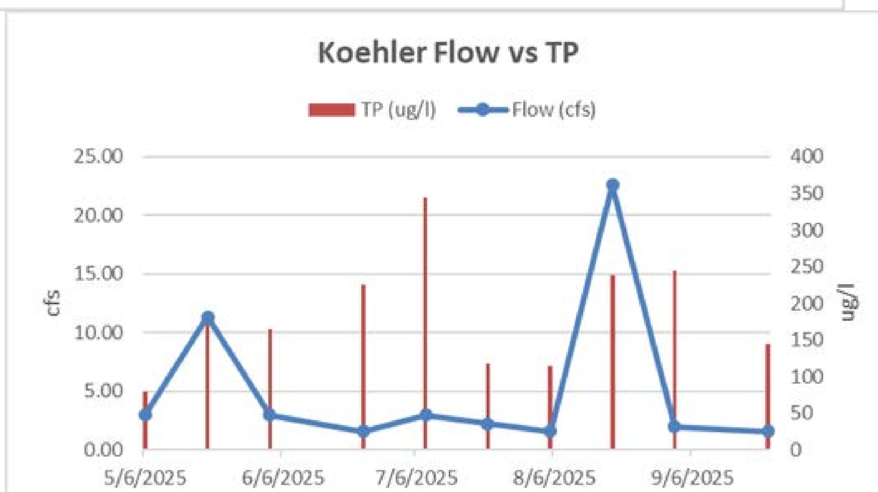


Lambert Creek—Koehler

SITE	DATE	TP (µg/L)	ChlA (µg/l)	TSS (mg/L)	TKN (mg/L)	NH3 (mg/L)	NO2+NO3 mg/L	CL (mg/L)
Koehler	5/6/2025	79	18	3.8				124
Koehler	5/20/2025	187	11.2	28.7				
Koehler	6/3/2025	165	17.5	13.8				
Koehler	6/24/2025	225	1.1	2.4				
Koehler	7/8/2025	345	1.3	6.1				
Koehler	7/22/2025	117	3.3	3.1				
Koehler	8/5/2025	114	1.8	2.6				
Koehler	8/19/2025	238	1.5	10.4				
Koehler	9/2/2025	245	1.5	20.3				
Koehler	9/23/2025	145	3.6	5				

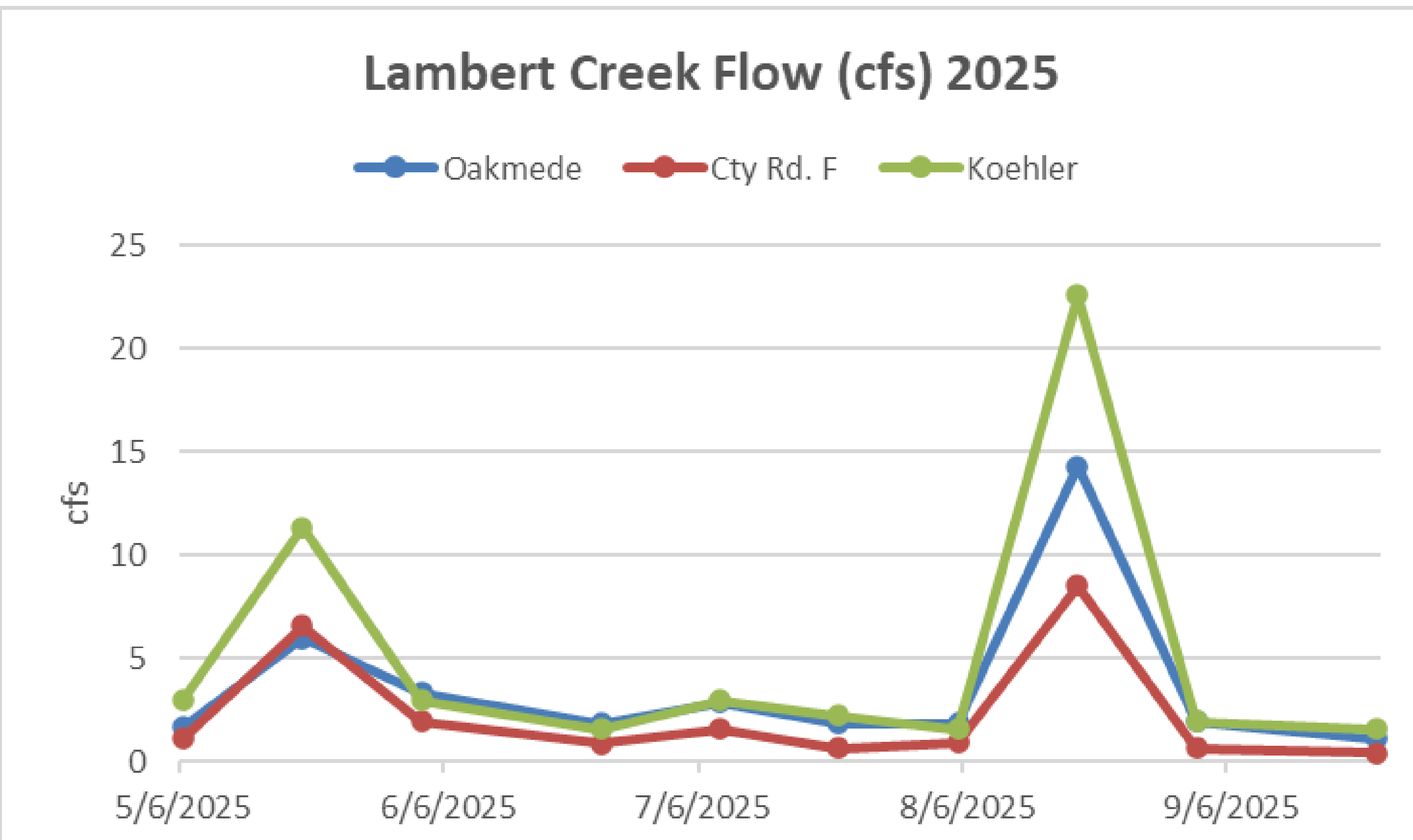


Date	Flow (cfs)	TP (ug/l)
5/6/2025	2.96	79
5/20/2025	11.36	187
6/3/2025	2.96	165
6/24/2025	1.56	225
7/8/2025	2.96	345
7/22/2025	2.22	117
8/5/2025	1.56	114
8/19/2025	22.60	238
9/2/2025	1.94	245
9/23/2025	1.56	145



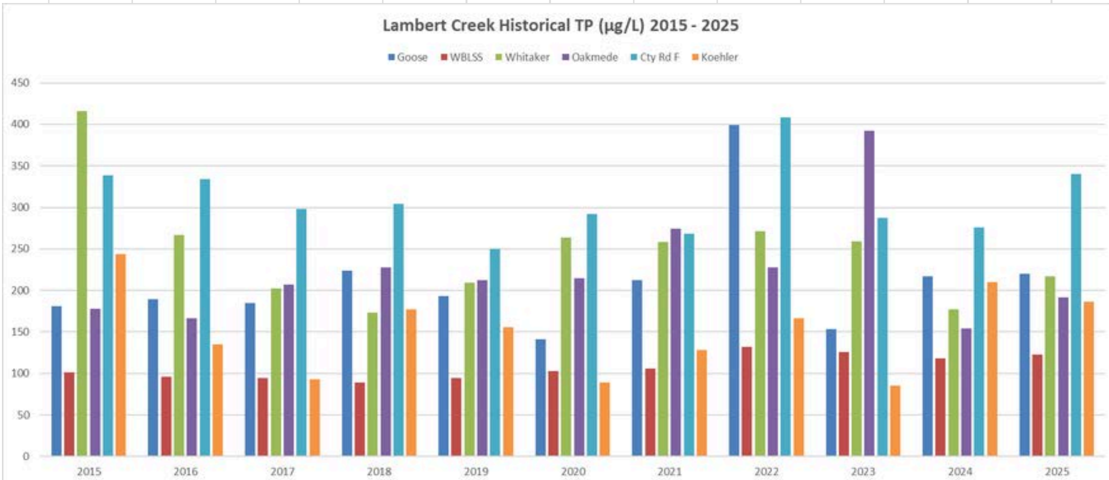
Lambert Creek Flow

Creek Flow 2025			
Date	Oakmede	Cty Rd. F	Koehler
5/6/2025	1.63	1.11	2.96
5/20/2025	5.97	6.56	11.36
6/3/2025	3.32	1.92	2.96
6/24/2025	1.82	0.87	1.56
7/8/2025	2.86	1.56	2.96
7/22/2025	1.82	0.65	2.22
8/5/2025	1.82	0.93	1.56
8/19/2025	14.33	8.50	22.60
9/2/2025	1.92	0.65	1.94
9/23/2025	1.12	0.42	1.56

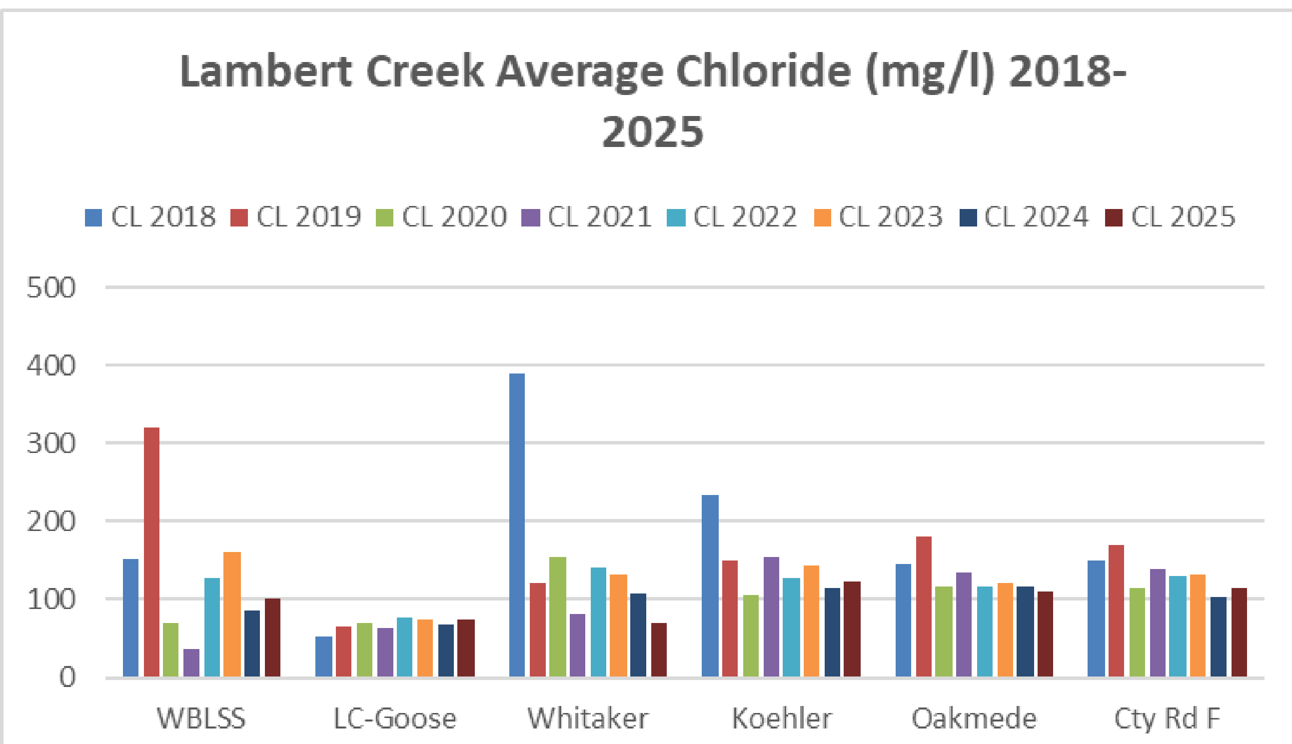


Lambert Creek Comparison

Lambert Creek Average Yearly Tp (µg/L) 2011-2023																
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Goose	130	138	246	102	199	181	189	185	224	193	141	212	399	153	217	220
WBLSS	180	181	104	106	173	101	96	94	89	94	103	106	132	126	118	123
Whitaker	229	157	398	226	119	416	267	202	173	209	264	258	271	259	177	217
Oakmede	222	224	283	390	285	178	166	207	228	212	215	274	228	392	154	192
Cty Rd F	403	299	395	707	393	339	334	298	304	250	292	268	408	287	276	340
Koehler	194	229	207	231	301	244	135	93	177	156	89	128	166	85	210	186



SITE	CL 2012	CL 2013	CL 2014	CL 2015	CL 2016	CL 2017	CL 2018	CL 2019	CL 2020	CL 2021	CL 2022	CL 2023	CL 2024	CL 2025
WBLSS	11.1	76	507.5	200	113	113	153	322	70	36	128	160	85	102
LC-Goose	30.9	40.5	32.75	20	30	31	53	65	70	63	76.1	73.9	67	74
Whitaker	67.5	52	175.5	305	167	365	390	120	155	81	142	132	107	70
Koehler	79.2	107.5	157	158	101	136	234	151	106	155	127	144	115	124
Oakmede	84.0	85.5	141.75	101	90	115	145	180	116	135	117	122	117	109
Cty Rd F	92.4	90.5	104	107	85	119	151	171	115	138	130	133	103	115



2025 Monitoring Highlights

Pleasant Lake: Invasive carp removal continued in 2025. Per data received and pit tag information, the carp biomass has been reduced to acceptable levels.

Remote Monitoring Devices: 2025 was the sixth full year of automated creek flow monitoring.

Live information can be found here for the 4 sites monitored on the creek:
http://monitormywatershed.org/

MCES Study 7A monitoring: Worked with Met Council to do in depth monitoring for Charley and Sucker Lakes.

Lambert Creek: Creek flow was consistent all of 2025. Rainfall was 0.60 inches above average for the season

Oak Knoll Spent Lime Study: A spent lime study was done on Oak Knoll pond in White Bear Lake to investigate the feasibility of spent lime as a potential tool for reducing TP levels. Monitoring was done throughout the 2025 season and will continue in 2026

Use of Monitoring Data: The VLAWMO monitoring data was used for multiple sub-shed studies and project planning.

Chloride (salt): VLAWMO has been sampling lake chloride for 16 years.

Birch Lake: Birch lake vegetation surveys continued to monitor success of hand pulling of invasive aquatic vegetation.