2024 Water Quality Report

Prepared for the City of Plymouth

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THREE RIVERS PARK DISTRICT

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Introduction

Three Rivers Park District has conducted water quality monitoring on behalf of the City of Plymouth since the year 2000. The resources monitored include lakes, streams, stormwater systems, or raingardens. These monitoring efforts satisfy MS4 requirements and by assessing nutrient runoff and concentrations relative to state water quality standards. This partnership between the Park District and the City is mutually beneficial as it provides targeted monitoring of the City's water resources while also providing valuable background water quality data within the larger watersheds that encompass Three Rivers Park properties.

In 2024, the City of Plymouth contracted Three Rivers Park District to monitor a total of 15 sites. Two lakes were monitored, and runoff was sampled at 13 stream or stormwater locations. Five stormwater sites were located within culverts, seven stream locations were in open channels, and one site was located at a weir outfall. All water quality analysis was completed at the Three Rivers Park District Certified Lab, located in Plymouth, MN. This annual report will summarize the data collected in 2024 at those 15 locations.

Methods

Stream/Stormwater Monitoring

Stream and stormwater samples were collected as grab samples on a routine biweekly basis. Automated sampling equipment was also installed to collect flow weighted composite samples in response to rain events. The water quality constituents analyzed included total phosphorus (TP), soluble reactive phosphorus (SRP), total nitrogen (TN), total suspended solids (TSS), and chloride (Cl^-). A list of stormwater sites along with the equipment installed and parameters monitored is included in Table *1*.

Sites with flow monitoring equipment and automated samplers contained an ISCO GLS Compact Composite Auto Sampler for collecting automated storm event samples, an ISCO 2105 Interface Module for programming the GLS auto sampler, an ISCO 2150 Area Velocity Flow Module for measuring water level and velocity, and a deep cycle marine battery to power the station. Sites located within culverts have a known area based on the culvert's diameter so flows can be estimated confidently using stage and velocity measurements only. Manual stream discharge measurements were required at open channel sites to confirm flow estimates or to help calibrate site flow equations. The sites requiring discharge measurements had flow measurements taken using a Sontek Flowtracker II during periods of low flow or a Sontek RS5 River Surveyor during periods of normal or high flow.

Stormwater equipment installation began after spring thaw on April 3, 2024. All equipment was removed prior to freezing conditions on November 15, 2024. Water samples were collected from April 7th to November 1st, 2024. Among all sites monitored, a total of 277 samples were collected and 2,474 site-days of flow monitoring occurred at the 12 stormwater sites with continuous data loggers in 2024.

Table 1. Stormwater site list with equipment installation and parameters monitored.

				Equipment		Bi-weekly Grabs					Auto sampler					Storm event grabs			
Project	Site	Description	Discharge	2150	GLS	TP	SRP	TN	TSS	Cl	TP	SRP	TN	TSS	Cl	TP	SRP	TN	TSS
Plymouth	BL3-E	Inlet to Bass Lake - east culvert		x															
Plymouth	BL3-W	Inlet to Bass Lake - west culvert		x	x	x	x	x	x		x	x	x	x					
Plymouth	ECER	Elm Creek at Elm Road	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	GC-1	Gleason Creek	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	Hamel	Elm Creek at Hamel	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	Pike	Pike Lake inlet	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	IP2	Industrial Park on Plymouth Creek		x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	PCO	Plymouth Creek Outlet@ Medicine Lk	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	Peony	Elm Creek at Peony Road	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	PL1	Inlet to Parker Lake - on trail		x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	PL2	Inlet to Parker Lake - parking lot		x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	Ridge	Ridgedale at Famous Daves	X	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	NLS	Northwood Lake subwatershed	x	x	x	x	x	x	x	x	x	x	x	x	x				
Plymouth	MCBMP	Maple Creek BMP Outlet														x	x		

Data Analysis – Flux

The average daily flow and nutrient concentration data was used to estimate nutrient loading for each water quality constituent using the US Army Corps of Engineer's Flux32 program (Soballe 2020). Flux32 builds a relationship between constituent concentrations and flow rates and then applies that relationship to the entire flow record. The result is the flow weighted average concentration and the total pounds of constituent load over the sampling period. This number is extrapolated from seasonal sampling period to the entire year using total annual precipitation, using the equation below.

$$\boldsymbol{annual\ lbs\ loading = sample\ lbs\ loading\ x \frac{annual\ precipitation}{sample\ \ precipitation}}$$

These annual nutrient loads were converted to unit area loads (UAL) by dividing loading by sub-watershed size to get lbs/acre. The TP and TSS UALs were compared with the MPCA Stormwater Manual (MPCA, 2017) typical unit area loads based on land use type (Table 2 & Table 3). Chloride concentrations were assessed based on MPCA standard of not more than two exceedances of 230 mg/L over a three-year period.

State river nutrient standards apply at some of the stream monitoring locations, as determined by MPCA. Where applicable, sampling results are compared with state standards (Table 4).

Table 2. MPCA Stormwater manual TP unit area load values by land use and a common range of runoff concentrations by land use (MPCA, 2017).

Typical Total Phosphorus values as stated in the MN Stormwater Manual				
Land Use	**Unit Area Loads (lbs/ac)**	**Median Concentration (µg/L)**	**Minimum Concentration (µg/L)**	**Maximum Concentration (µg/L)**
Residential	1.35	260	< 10	19,900
Commercial	2.25	200	< 10	4,270
Industrial	-	230	< 20	7,900
Freeway	3.50	-	-	-
Open Space	-	130	< 10	760

Table 3. MPCA Stormwater manual TSS unit area loads by land use and common range of runoff concentrations by land use (MPCA, 2017).

Typical Total Suspended Solids values as stated in the MN Stormwater Manual				
Land Use	**Unit Area Loads (lbs/ac)**	**Median Concentration (mg/L)**	**Minimum Concentration (mg/L)**	**Maximum Concentration (mg/L)**
Residential	76	58	< 0.5	4,168
Mixed Residential	111	-	-	-
Commercial	221	52	< 0.5	2,385
Industrial	193	75	< 1	2,490
Freeway	560	-	-	-
Open Space	35	58	< 1	4,168

Table 4. Central River Nutrient Region Standards.

Parameter	Standard	Applicability
TP	100 µg/L	Average less than or equal to April 1 through Sept 30
TSS	30 mg/L	May be exceeded no more than 10% of time April 1 through Sept 30

Lake Monitoring

Lake sampling occurred bi-weekly from May through September. One additional sample was collected in April and October for a total of 13 samples between April 1st and October 7th. This monitoring schedule is intended to sample seasonal changes in lake water quality prior to stratification in the spring and just after fall turnover when the lake mixes completely. At each sampling event, a YSI EX01^{s} sonde was used to measure temperature, dissolve oxygen, conductivity, and pH profiles from lake surface to bottom at 1-meter intervals within the deepest part of the lake. The temperature and dissolved oxygen profiles are used to identify lake stratification layers for sampling at specific depth intervals. The surface water quality sample is a two-meter composite from an integrated sampler. A Kemmerer bottle is used to collect a sample at the top of the hypolimnion (middle sample) and within one meter from the lake bottom (bottom sample). A Secchi disk is used to measure lake transparency. A list of lake sampling sites along with the parameters monitored is included in Table 5.

Table 5. Lake sampling location, interval, and parameters.

Lakes	Sample Location Codes	Water Quality In-Lake Sampling					
		Sampling Interval	Water Quality Parameters				
			TP	SRP	TN	Chl-a	Cl
Parkers	27-0107-00-201	Bi-weekly	SMB	SMB	S	S	SB
Schmidt	27-0102-00-201	Bi-weekly	SMB	SMB	S	S	SB

S= surface sample, M = middle sample, and B = bottom sample.

Lab Analysis

Water samples were analyzed at Three Rivers Park District's MPCA certified lab following Standard Methods for the Examination of Water and Wastewater, 23rd edition (SM, 2017). Stormwater analyses included total phosphorus (TP), soluble reactive phosphorus (SRP), total nitrogen (TN), total suspended

solids (TSS), chloride (Cl-), and chlorophyll-a (Chl-a). A list of parameters analyzed and the standard method used is in Table 6.

Table 6. Three Rivers Park District's certified lab analysis methods used in 2024.

Analyte	Method
Total Phosphorus (TP)	EPA 365.3
Orthophosphate as P (SRP)	EPA 365.3
Total Nitrogen (TN)	SM 4500-N-C
Residue-nonfilterable (TSS)	SM 2540 D-11
Chloride (Cl^-)	SM 4500-Cl^- B-11
Chlorophyll-a (Chl-a)	SM 10200H

MPCA Lab ID: MNL0003, EPA Lab ID: MN01044

Precipitation Note

Three Rivers Park District does not collect precipitation data but instead relies on data collected or compiled by the National Oceanic and Atmospheric Administration (NOAA). The estimated daily precipitation was derived from several locations. During the monitoring season, data was used from the National Weather Service's New Hope and Delano site as well as NOAA's Crystal Airport site. Because these locations do not measure snow water weight equivalence, cold season precipitation during winter months was used from NOAA's Minneapolis airport rain gauge. This combined dataset was used to estimate precipitation totals for monitoring sites in City of Plymouth.

Watershed Descriptions

Parkers Lake Watershed

The Parkers Lake Watershed is 1,150 acres and is located entirely within the City of Plymouth (Figure 1). The lake is 100 acres with a maximum depth of 37ft and average depth of 12ft. Parkers Lake is a subwatershed upstream of Medicine Lake within the Bassett Creek Watershed Management Commission jurisdictional boundary. Parkers Lake was listed as impaired for chloride in 2014. A TMDL was approved by EPA in 2016 as part of the Twin Cities Metro Area Chloride TMDL. Parkers Lake is currently meeting eutrophication water quality standards.

To assess the nutrients and chloride flowing into Parkers Lake, two tributaries were monitored that accounted for 38% of the total watershed area (Table 7). The PL1 monitoring station is located on the south side of the lake adjacent to the Luce Line State Trail. It drains approximately 258 residential acres into Parkers Lake. Monitoring instrumentation is installed within a 48" diameter round corrugated metal culvert that passes below a walking path near the lake.

PL2 receives water from the northwest subwatershed area and outlets through an open channel draining to Parkers Lake. It is located on the northwest side of the lake adjacent to the public boat access. This site has a 48" diameter concrete culvert that outlets through a channel into Parkers Lake. There are 189 acres of multi-residential and industrial land use that drain to PL2. While PL2's watershed is smaller than PL1, it has steeper topography and more impervious surfaces which creates more runoff.

Table 7. Summary of PL1 and PL2 watershed characteristics.

Site	Sub watershed Area (acres)	% Impervious (acres)[1]	% of Parkers Lake Watershed	Dominant land uses[2]
PL1	258	19% (48 ac.)	22%	Residential
PL2	189	49% (92 ac.)	16%	Multi-family Residential, Industrial

[1] % impervious area determined using the 2016 University of Minnesota TCMA 1-meter land cover classification GIS layer.
[2] Dominant Land Uses determined using GIS layer obtained from the City of Plymouth.

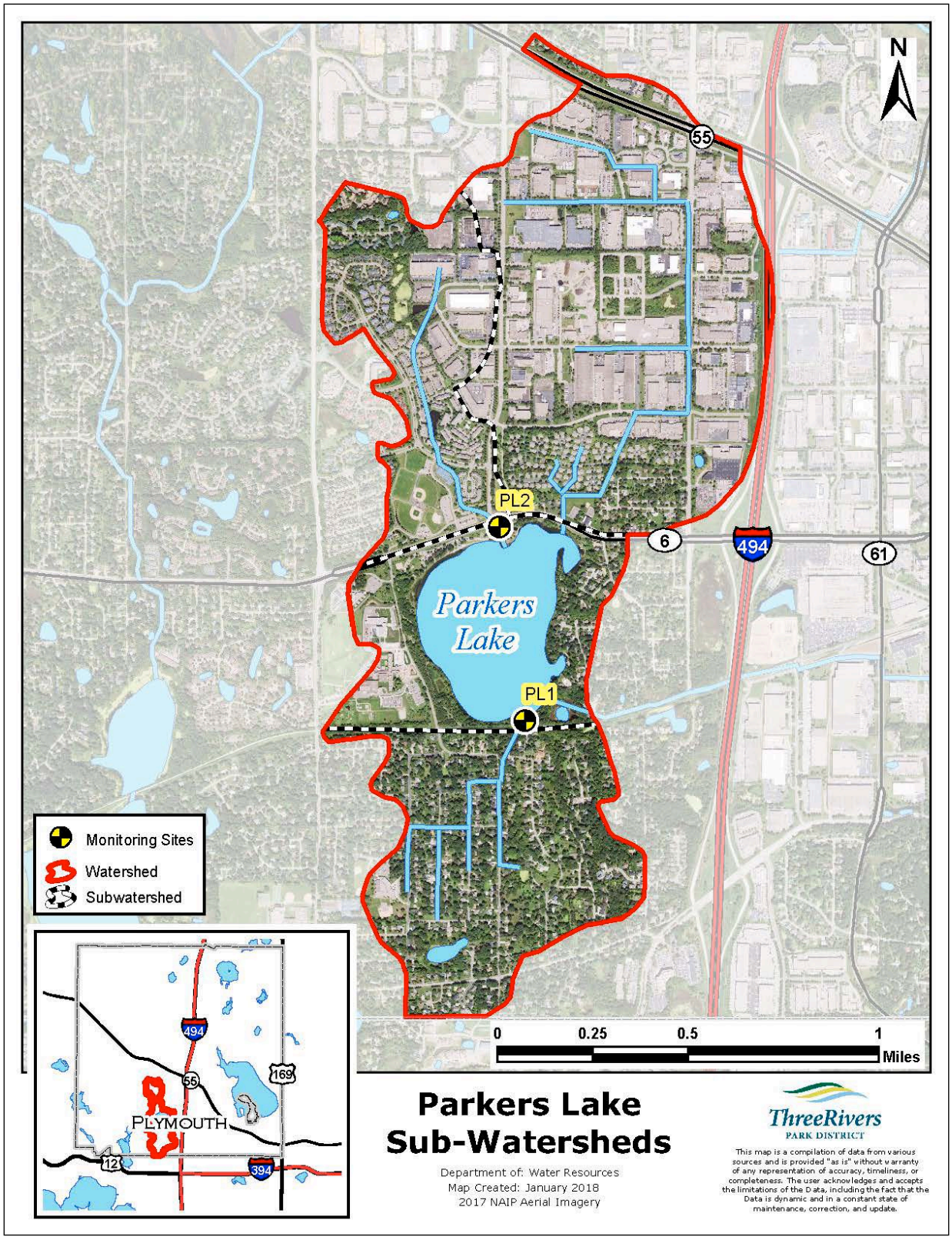


Figure 1. Parkers Lake sub-watershed map with stormwater sampling locations.

Medicine Lake Watershed

The Medicine Lake watershed is 11,666 acres that is located within several municipalities (Figure 2). Most of the watershed is in the City of Plymouth (10,147 acres, 87%). Medicine lake watershed has 919 acres in the City of Minnetonka (8%). Cities of Medicine Lake, Golden Valley, New Hope, and Medina combine for the remaining 5% of watershed area. Medicine Lake outlets to Bassett Creek within the Bassett Creek Watershed Management Commission jurisdictional boundary.

Medicine Lake was listed as impaired for excess nutrients in 2004. Plymouth Creek, the largest tributary to Medicine Lake, was listed as impaired for chloride and *E. coli* in 2014. The lake is considered at risk for chloride impairment. A TMDL was completed for Medicine Lake addressing the impairment for excess nutrients in 2011. Plymouth Creek was included in the Twin Cities Metro Area Chloride TMDL approved by EPA in 2016 as well as Upper Mississippi River Bacteria TMDL approved by EPA in 2014. The MPCA's central stream eutrophication standards do apply to Plymouth Creek although no impairments for this standard are currently listed.

To assess the nutrients and chloride loading into Medicine Lake, two sites along Plymouth Creek were monitored that account for 55% of the Medicine Lake watershed area (Table 8 & Figure 2). An additional site was monitored on Ridgedale Creek that accounts for 12% of the total Medicine Lake watershed.

On Plymouth Creek, IP2 monitoring station is located at a 14-foot wide concrete weir behind an industrial building at 12940 Teakwood Ln North. Continuous water level measurements are recorded and applied to a weir equation to estimate streamflow at this site. IP2 captures nutrient loading from upstream portions of Plymouth Creek before discharging into a wetland complex and detention pond. The second Plymouth Creek site, PCO, is located on Medicine Lake Drive West near West Medicine Lake Beach. This site captures drainage from IP2 as well as the Parkers Lake watershed, just before it reaches Medicine Lake. PCO is an open channel site that is close enough to Medicine Lake to experience occasional lake effect, where high lake levels slow the velocity of water discharging from the stream into the lake. The Ridgedale Creek site is located on the north side of HWY 55 frontage road between Medicine Lake Drive and South Shore Drive. RDG is an open channel site that drains the area of Ridgedale Creek and extends south to include the Ridgedale mall area.

Table 8. Summary of watershed characteristics for sites IP2, PCO, and RIDGE.

Site	Sub watershed Area (acres)	% Impervious (acres)[1]	% of Medicine Lake Watershed	Dominant land uses[2]
IP2	3,725	34% (1,279 ac.)	32%	Residential
PCO	6,390	37% (2,363 ac.)	55%	Residential, commercial
Ridge	1,338	29% (391 ac.)	12%	Residential, commercial

[1] % impervious area determined using the 2016 University of Minnesota TCMA 1-meter land cover classification GIS layer.
[2] Dominant Land Uses determined using GIS layer obtained from the City of Plymouth.

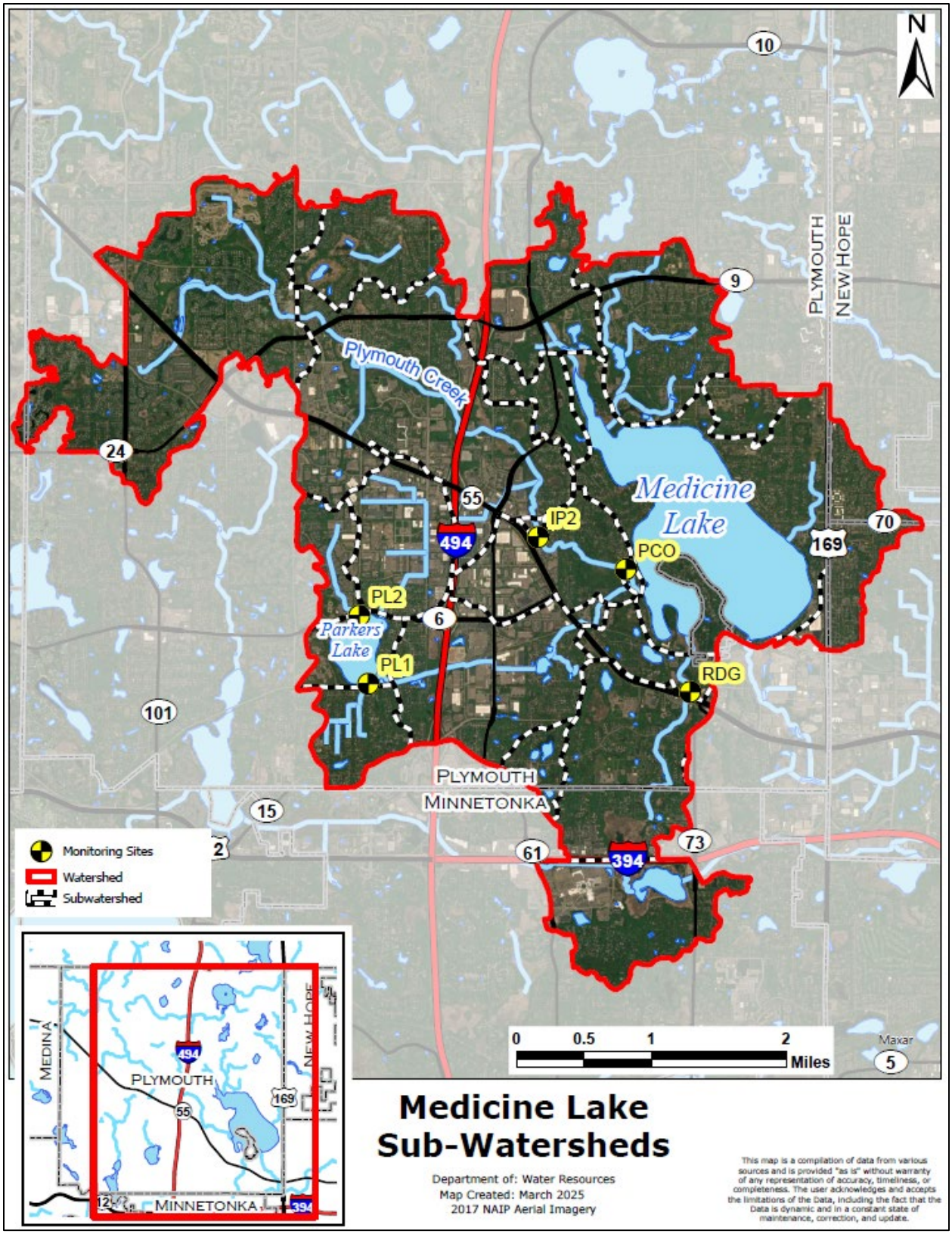


Figure 2 Medicine Lake sub-watershed map.

Bass Lake Watershed

The Bass Lake watershed is 3,105 acres and is located entirely within the City of Plymouth (Figure 3). Bass Lake was listed as impaired for excess nutrients in 2002 and a TMDL was completed in 2009 (Wenck, 2009). In 2017, a follow up report reviewed the progress toward meeting reductions in the TMDL report (Wenck, 2017). An alum treatment was subsequently completed in both Pomerleau Lake and Bass Lake in 2019.

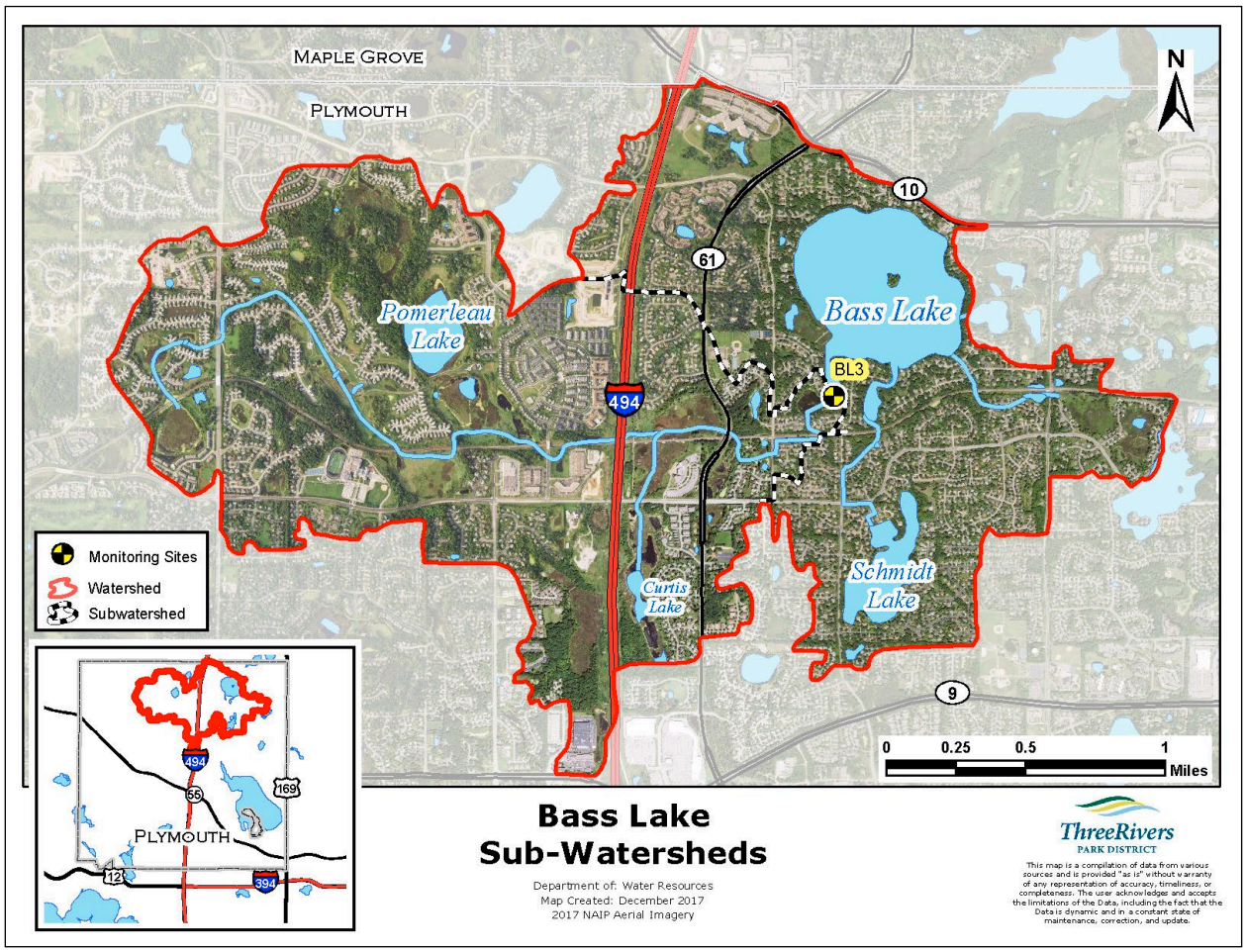


Figure 3. Bass Lake sub-watershed map.

To assess nutrient inputs into Bass Lake, station BL3 was monitored to the south of the lake. BL3 accounts for 53% of the Bass Lake watershed (Table 9 & Figure 3). BL3 is located east of 54th Avenue North on Norwood Lane North. This site is just downstream of a 6.5-acre wetland pond that attenuates flow and allows settling of particulates. The pond outlet is two 24-inch culverts that convey water under a private driveway to Bass Lake. Water level and velocity are monitored in each culvert and flow estimates from each culvert are combined for nutrient analysis and total flow calculations.

Table 9. Summary of watershed characteristics for site BL3.

Site	Subwatershed Area (acres)	% Impervious (acres)1	% of Bass Lake Watershed	Dominant land uses2
BL3	1,846	28% (511 ac.)	59%	Residential

[1] % impervious area determined using the 2016 University of Minnesota TCMA 1-meter land cover classification GIS layer.
[2] Dominant Land Uses determined using GIS layer obtained from the City of Plymouth.

Schmidt Lake is a lake of interest located in the Bass Lake watershed. It is located south of Bass Lake with water flowing north from Schmidt Lake to Bass Lake. Schmidt Lake is classified as a shallow lake or reservoir by MPCA and is not currently listed as impaired. There is an active lake association on Schmidt Lake that maintains a series of bubbler style aerators throughout the summer that prevent lake stratification from occurring. The watershed and lake are relatively small. The watershed surrounding Schmidt is 194 acres while the lake is 42 acres for a 4.6:1 watershed to lake ratio. The dominant land use is residential.

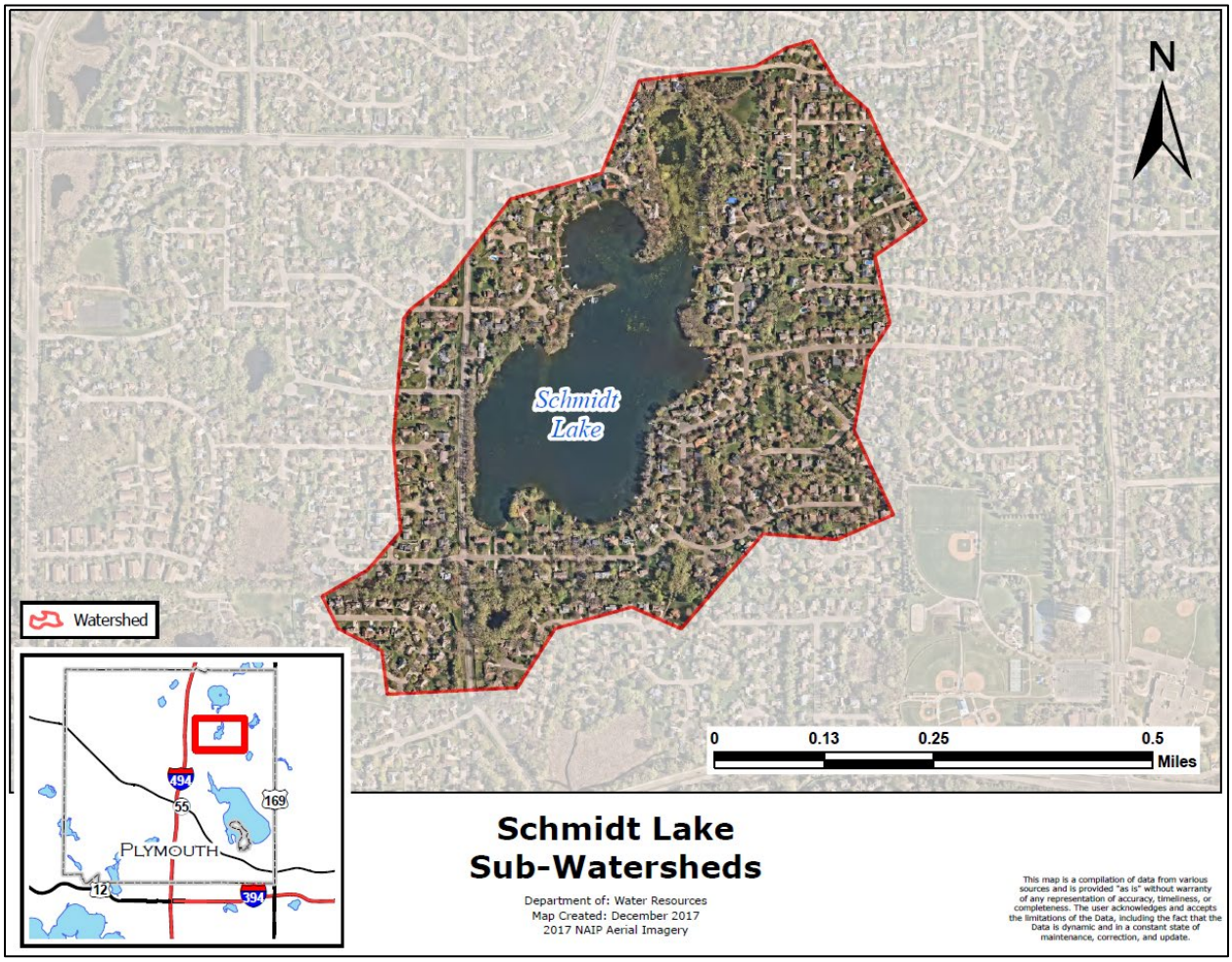


Figure 4. Schmidt Lake sub-watershed map.

Gleason Lake Watershed

The Gleason Lake subwatershed is 2,643 acres primarily located in the City of Plymouth (93%). The subwatershed accounts for 2.3% of the overall Minnehaha Creek watershed. Small portions of Gleason Lake subwatershed are also located within the Cities of Wayzata and Minnetrista municipal boundaries (Figure 5). Gleason Lake was impaired for excess nutrients in 2010. The GC-1 sampling site is located on an unnamed creek that captures 67% of the watershed area draining to Gleason Lake (Table 10). This site is in an open channel located adjacent to the bike path that connects County Road 6 and Black Oaks Lane North. Additionally, samples were collected at the outfall of an iron enhanced sand filter in a stormwater pond at Maple Creek Park. This MCP site captures 14% of the Gleason Lake watershed.

There are two monitoring stations on the unnamed creek north of Gleason Lake. GC-1 is an open channel site with flow monitoring. MCP is located at the outfall of a pond with an iron enhanced sand filter that was installed in 2023 at Maple Creek Park. MCP is a grab sample only site with no flow monitoring. It is designed to monitor effectiveness of the filter in the pond.

This unnamed tributary creek to Gleason Lake was impaired for low dissolved oxygen in 2020. Additionally, a TMDL was approved by EPA in 2014 for the upper Minnehaha Creek watershed for nutrient and bacteria impairment.

Table 10. Summary of watershed characteristics for site GC-1 and MCP.

Site	Subwatershed Area (acres)	% impervious (acres)[1]	% of Gleason Lake Watershed
GC-1	1,650	28% (454 ac.)	67%
MCP	351	40% (139 ac.)	14%

[1] % impervious area determined using the 2016 University of Minnesota TCMA 1-meter land cover classification GIS layer.

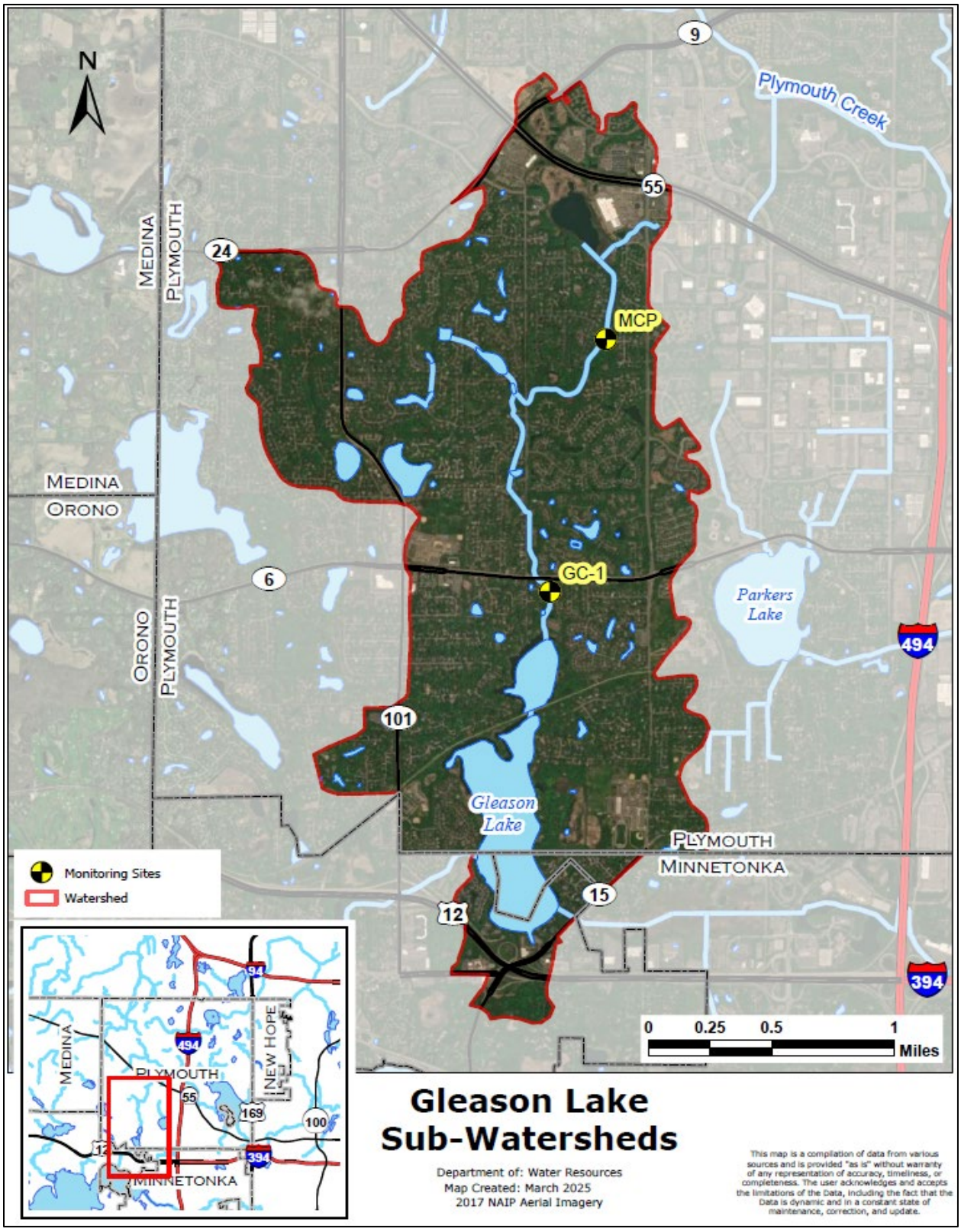


Figure 5. Gleason Creek sub-watershed map

Elm Creek Watershed

A portion of Elm Creek flows through the northwest corner of the City of Plymouth (Figure 6). The upper reaches of Elm Creek watershed have seen a significant amount of development over recent years, particularly in Medina and the City of Plymouth.

Portions of Elm Creek were listed as impaired for E. coli (2010), chloride (2014), and dissolve oxygen (2014). In addition to the creek, several lakes within its watershed are impaired for excess nutrients. A TMDL was approved by EPA in 2017 for the Elm Creek Watershed (TRPD, 2016).

To assess Elm Creek nutrients and chloride that flow through the City of Plymouth, three sites were monitored. Hamel is the farthest upstream site in the watershed and is located at the intersection of Hamel Road and Highway 55. This site monitors Elm Creek prior to it reaching the City of Plymouth. The site is monitored within an eight-feet wide by four-feet high concrete box culvert.

Peony is the next site downstream and is located mid-way through City of Plymouth near Wayzata High School along Peony Lane North. This site is monitored within a box culvert with the same dimensions as Hamel.

The furthest downstream site, ECER, monitors Elm Creek as it leaves Plymouth and enters Maple Grove near Elm Road. This is an open channel site just downstream of a 210-acre wetland complex that attenuates flow and filters nutrients and sediment. Watershed characteristics of these sites, including watershed size and percent located within City of Plymouth, can be found in Table 11.

Table 11. Summary of Elm Creek watershed characteristics for sites Hamel, Peony, and ECER.

Site	Subwatershed Area (acres)	% Impervious (acres)[1]	% of Total Watershed in Plymouth
Hamel	4,272	12% (506 ac.)	0%
Peony	5,429	15% (811 ac.)	17%
ECER	7,921	18% (1,414 ac.)	29%

[1] % impervious area determined using the 2016 University of Minnesota TCMA 1-meter land cover classification GIS layer.

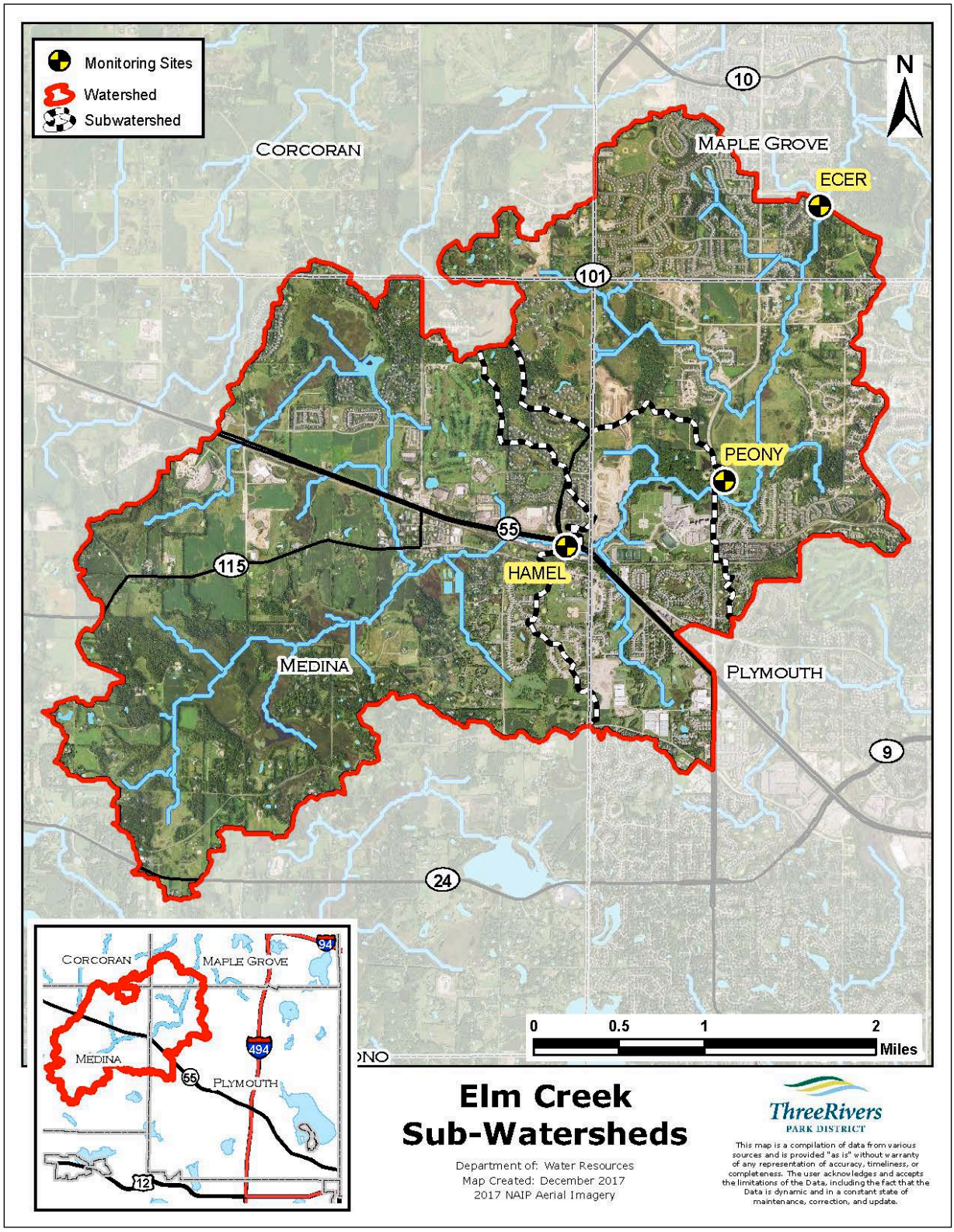


Figure 6. Elm Creek sub-watershed map.

Pike Creek Watershed

Pike Creek drains a 611-acre watershed west of Pike Lake that extends just past interstate 494 (Figure *7*). The watershed is dominated by residential and commercial land use. Pike Creek flows directly into Pike Lake, which is on the border of Plymouth and Maple Grove. Pike Lake then outlets through a channel into Eagle Lake which is entirely located in Maple Grove. Pike Lake is a 57-acre shallow lake that was impaired for excess nutrients in 2001. Eagle Lake is a 296-acre lake that was listed as impaired for excess nutrients in 2007. Additionally, Eagle Lake has an aquatic life impairment from fish bioassessments listed in 2022. Both Eagle Lake and Pike Lake had alum treatments in 2024.

A monitoring site was installed on Pike Creek in 2024, located on the east side of Hemlock Lane. This site was monitored at the end of an elliptical shaped concrete culvert with a width of seven feet and height of four and a half feet.

Northwood Lake Sub-Watershed

The Northwood Lake Sub-watershed is considered the headwaters of the North Branch of Bassett Creek. The monitored site's watershed is located entirely within the City of Plymouth and is upstream of Northwood Lake, located in the City of New Hope (Figure 8). Northwood Lake water level is controlled by a 10' weir at the outlet along Boone Ave. This causes water to back up into NLS monitoring station at times. Northwood Lake has been classified as impaired for excess nutrients since 2004, and there is currently no TMDL.

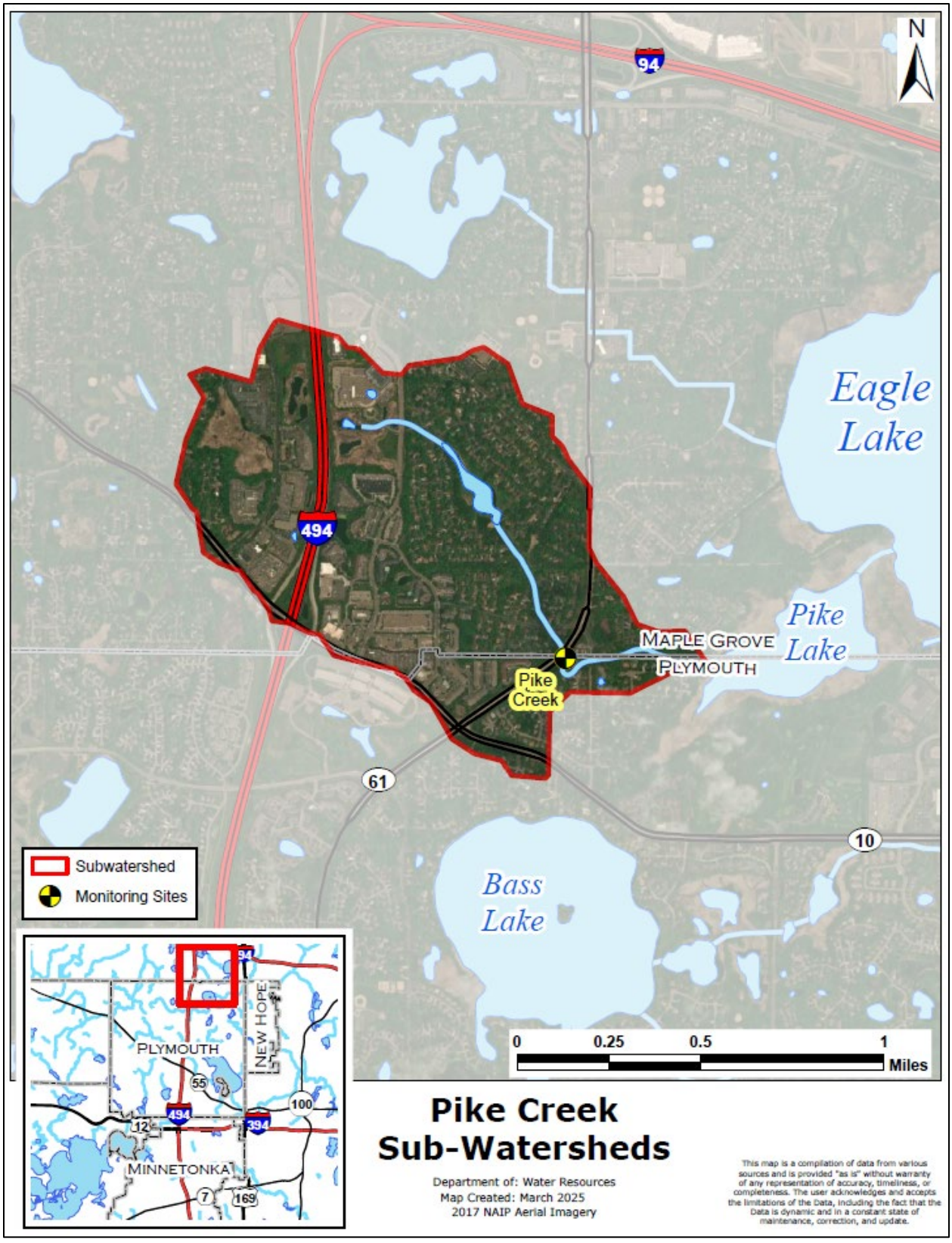


Figure 7. Pike Creek subwatershed map.

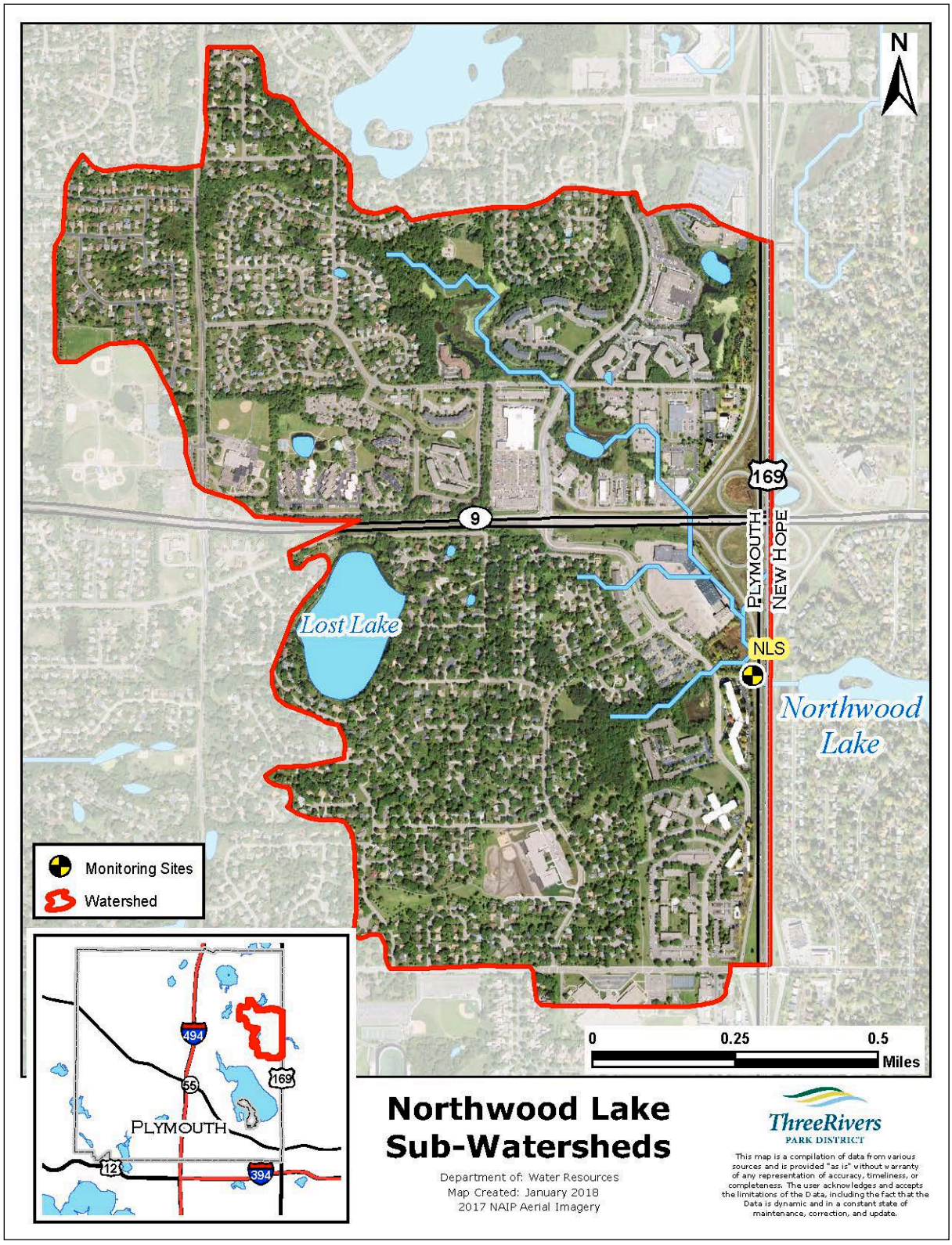


Figure 8. Northwood Lake Sub-watershed map

Results

Precipitation

Rainfall totals in calendar year 2024 were above average despite near record precipitation totals through August that were followed by drought conditions starting in September. The annual total precipitation for 2024 was 38.2 inches, which is approximately five inches short of the previous record in 2019. The wettest month was August with 7.6 inches followed by June (6.7") and May (5.9"). September had the least amount of rain of the growing season months with just 0.32 inches.

A total of eight days exceeded one-inch total rainfall with the largest occurring on Aug 5th, May 21st, and June 3rd (1.81", 1.42" & 1.14"). There were eight occurrences where total precipitation exceeded 2 inches over three consecutive days. The largest 3-day precipitation totals occurred on May 22nd, August 6th, and June 17th (2.98", 2.92" & 2.71"). Five other dates had noticeably significant rainfall totals ranging between 0.5 and 0.9 inches. Depending on stormwater site installation timing, the monitoring period accounted for approximately 84% of the total annual rainfall for the 2024 season.

Parkers Lake Watershed

Flow Monitoring

There is an immediate hydrograph response following rain events for the Parkers Lake stormwater sites (Figure 9). The PL2 sampling site has more runoff volume than the PL1 sampling site. PL2 subwatershed has steeper slopes and more impervious area contributing to more run-off volume despite having a smaller contributing subwatershed area than PL1. PL2 has had continuous base flow between rain events. PL1, on the south side of the lake, flows intermittently and only during rain events. The flatter topography with sandy soil conditions is conducive for infiltration. As a result, the site can go long periods without flow.

Peak 15-minute flow rates occurred on 4/16/24 at PL1 with a flow of 32.7 cfs. The average flow for the season at this site was only 0.14 cfs. There were 152 days of average flow less than 0.1 cfs this year.

Peak 15-minute flow rates at PL2 occurred on 8/26/24 with a flow total of 27.2 cfs. The average flow for the season at PL2 was 0.41 cfs and 80 days averaged less than 0.1 cfs.

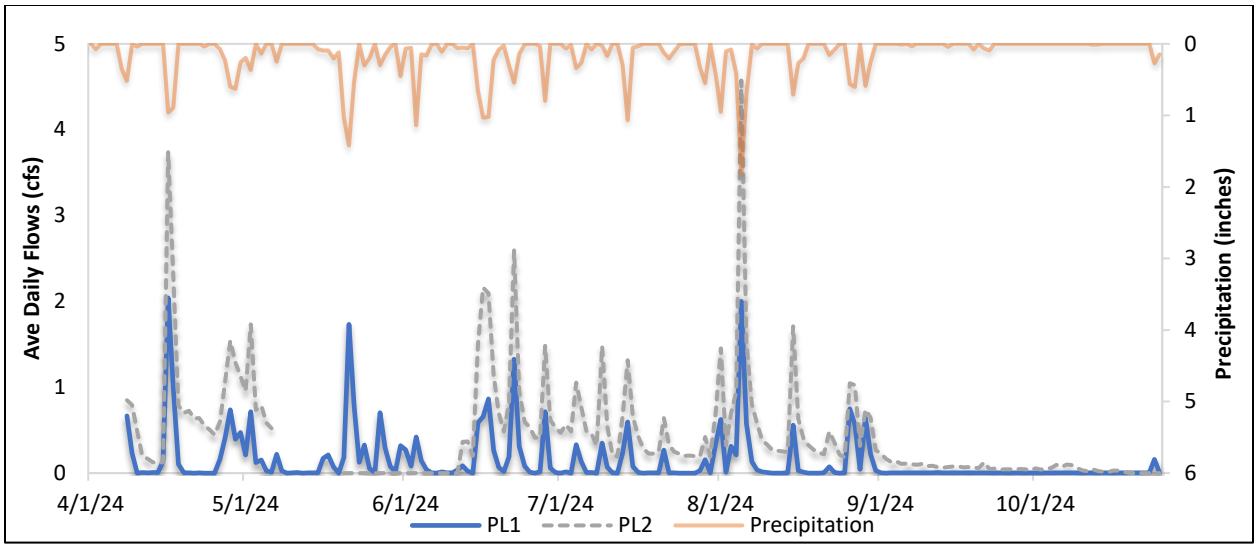


Figure 9. Average daily flow at Parkers Lake sites PL1 and PL2 in 2024.

Sample Results

The sampling period at PL1 was from 4/8/24 to 11/6/24. Because this site lacks consistent baseflow, 14 of 17 samples were composite samples taken in response to storm events. The other three samples were collected as grab samples during storm events. The average instantaneous flow rate at the time of all samples was 1.18 cfs, while the minimum and maximum sample flow rate observed was 0.1 cfs and 9.8 cfs.

Sampling occurred at PL2 from 4/8/24 to 11/6/24. Due to persistent base flow conditions, 17 grab samples occurred. An additional three automated stormwater composite samples were collected, for a total of 20 samples in 2023. The instantaneous flow rate at time of sample ranged from 0.1 cfs to 4.1 cfs, with an average sample flow of 1.3 cfs.

Because inflows to Parkers Lake at PL1 and PL2 are not public waters of the state and do not have a class 2 designation indicating aquatic life and recreation based public uses and benefits, there are no MPCA eutrophication stream standards that apply. However, both sites exceeded the central streams total phosphorus limit of 100 µg/L (Table 12). Only one of 23 samples of chloride exceeded the 230 mg/L standard for chloride at PL2. PL1 did not have any chloride exceedances.

Table 12. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, TSS, and Cl^- at PL1 and PL2 in 2024.

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl- (min-max) mg/L
PL1	337 (170 - 928)	134 (78 - 285)	2.0 (1.0 - 3.1)	38.8 (3.2 - 125.1)	30 (2 - 148)
PL2	161 (62 - 343)	86 (19 - 326)	1.0 (0.6 - 2.4)	10.6 (0.8 - 80.0)	111 (55 - 280)

Annual Loading

There was 31.8 inches of rain that fell during the time period that both Parkers Lake sites were installed, which accounted for 83% of the total annual 38.2 inches of precipitation in 2024. The annual load estimates of nutrient runoff as well as the flow weighted concentrations of each parameter are reported

in Table 15 and Table 16. The unit area loading, derived by dividing annual load by contributing watershed area, is reported in Table 13 and Table 14.

The unit area load of TP at PL1 was lower than the residential MPCA stormwater manual (0.23 lbs/acre vs 1.35 lbs/acre) despite having higher flow-weighted concentrations (313 µg/L vs 260 µg/L). PL2, compared with commercial land use in the Stormwater Manual, had a lower flow-weighted concentration of TP (159 µg/L vs 200 µg/L) and unit area load (0.45 lbs/acre vs 2.25 lbs/acre).

For TSS, both PL1 and PL2 had flow-weighted sample concentrations and UALs lower than the Stormwater Manual for their respective land use types. At PL1, TSS flow-weighted concentration was 39 mg/L compared to a reference of 58 mg/L and UAL was 28 lbs/acre compared to a reference of 76 lbs/acre. PL2 had TSS flow-weighted concentrations of 10 mg/L compared to a reference of 52 mg/L and UAL estimates were 30 lbs/acre compared to a reference of 221 lbs/acre.

Table 13. Unit area loads for TP, SRP, TN, TSS, and Cl^- at PL1.

	PL1 - Parkers Lake - Site 1				
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre)**
2020	0.11	0.07	1.13	23	2.6
2021	0.10	0.04	0.70	19	2.1
2022	0.13	0.06	0.97	20	2.1
2023	0.18	0.07	1.17	23	2.7
2024	0.23	0.09	1.55	28	15.3
Average	**0.15**	**0.07**	**1.10**	**23**	**5.0**

Table 14. Unit area loads for TP, SRP, TN, TSS, and Cl^- at PL2.

	PL2 - Parkers Lake - Site 2 Load/Acre				
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre)**
2020	0.28	0.14	2.37	58	378
2021	0.79	0.28	4.55	281	387
2022	0.66	0.26	5.32	77	728
2023	1.15	0.61	7.09	72	1,129
2024	0.45	0.17	3.35	30	290
Average	**0.67**	**0.29**	**4.54**	**104**	**582**

Table 15. Loading and flow weighted concentrations for TP, SRP, TN, TSS, and Cl^- at PL1.

PL1 - Parkers Lake - Site 1												
	Nutrient Loading					Nutrient Concentration					Flow Volume ($x 10^6 m^3$)	Annual Precipitation (inches)
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr)	Cl^- (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Cl^- (mg/L)		
2020	30	19	292	5,905	679	303	192	2.99	60	6.9	0.04	25.9
2021	25	11	180	4,883	532	319	137	2.26	61	6.7	0.04	23.4
2022	33	15	251	5,238	533	340	152	2.61	54	7.7	0.04	22.7
2023	46	18	302	6,052	689	354	143	2.35	47	5	0.06	32.4
2024	59	23	399	7,234	3,946	313	121	2.14	39	21	0.08	38.2
Average	**38**	**14**	**285**	**5,862**	**1,276**	**326**	**149**	**2.47**	**52**	**10**	**0.05**	**28.5**

Table 16. Loading and flow weighted concentrations of TP, SRP, TN, TSS, and Cl^- at PL2. Data is segmented by a break in data collection from 2009-2012.

PL2 - Parkers Lake - Site 2												
	Nutrient Loading					Nutrient Concentration						
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr)	Cl^- (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Cl^- (mg/L)	Flow Volume ($x 10^6 m^3$)	Annual Precipitation (inches)
2020	52	27	448	10,961	71,449	131	68	1.13	28	179	0.18	25.9
2021	150	52	861	53,130	73,146	316	110	1.82	112	154	0.21	23.4
2022	125	49	1,006	14,596	137,612	208	81	1.67	24	228	0.27	22.7
2023	217	115	1,340	13,560	213,306	180	96	1.11	11	177	0.55	32.4
2024	85	33	632	5,582	54,887	159	61	1.18	10	103	0.24	38.2
Average	**126**	**55**	**857**	**19,566**	**110,080**	**199**	**83**	**1.38**	**37**	**168**	**0.29**	**28.5**

Lake sampling

Growing season averages of chlorophyl-a and Secchi depth transparency each met water quality standards in 2024. However, phosphorus levels were slightly higher than standard this year. Sechi depth transparency has met state standard every year TRPD has monitored, and this is only the second time phosphorus standards were exceeded since 1995. Chlorophyl-a has exceeded standard on occasion (Figure 12).

Seasonal stratification can be seen in the temperature profile in Figure *10*. Healthy levels of dissolved oxygen to support aquatic life existed to four meters for the entirety of the sampling season (Figure *11*). The anoxic layer of water seen at the sediment interface allows the release of phosphorus into the water column that can be seen in the hypolimnetic phosphorus concentrations in Figure 12.

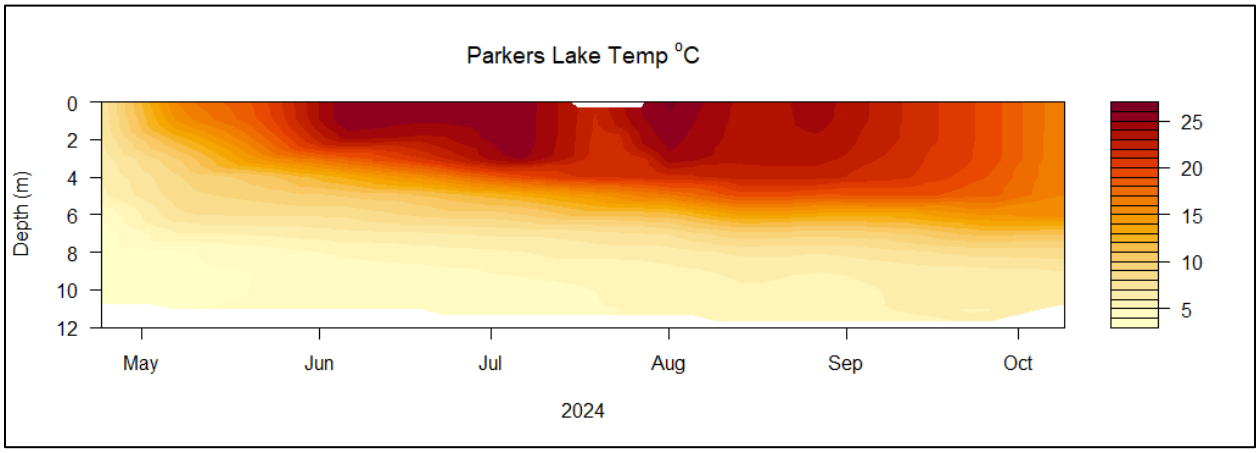


Figure 10. Contour plot Parkers Lake temperature through season.

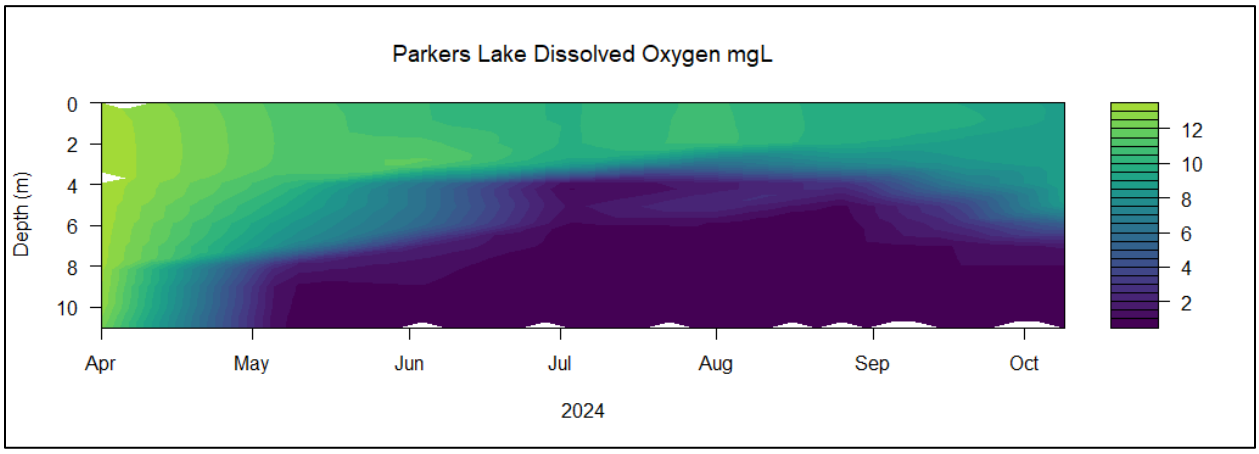
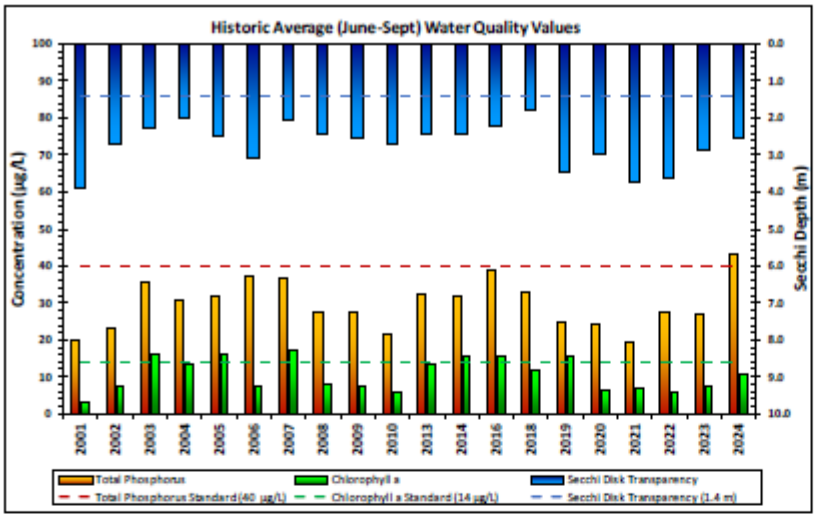
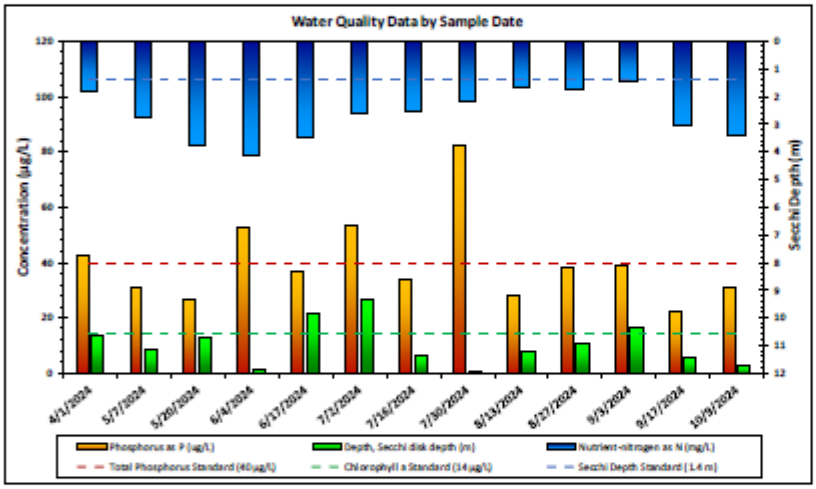
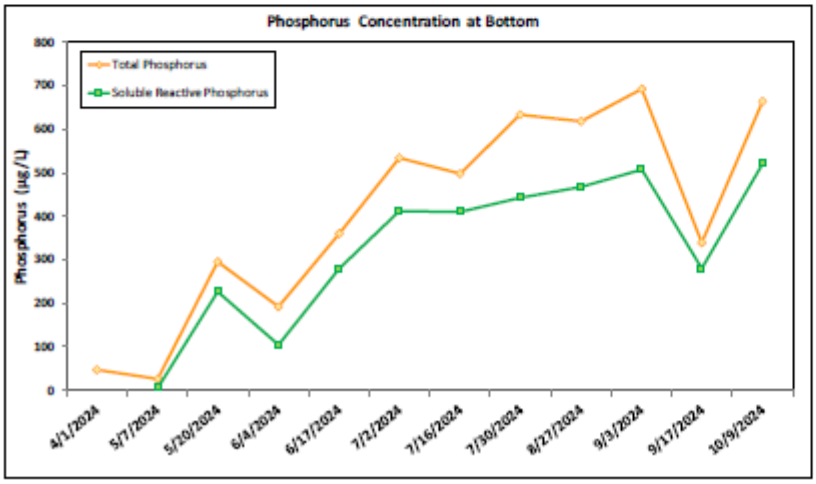


Figure 11. Contour plot of Parkers Lake dissolved oxygen through sampling season.

Chloride was monitored 11 times in 2024 at the surface and bottom of Parkers Lake (Figure 13). The average concentration at the surface was 156 mg/L while the bottom average was 219 mg/L. Only the first surface sample of the season exceeded the 230 mg/L state standard.







Parkers Lake
Water Quality Report Card

Year	TP	Chl-a	Secchi	Avg Grade
1995	C		B	B-
1996			B	B
1997			A	A
1998			B	B
1999	C		C	C
2000	A		B	A-
2001	A	A	A	A
2002	B	A	B	B+
2003	C	B	B	B-
2004	B	B	C	B-
2005	B	B	B	B
2006	C	A	A	B+
2007	C	B	C	C+
2008	B	A	B	B+
2009	B	A	B	B+
2010	A	A	B	A-
2013	C	B	B	B-
2014	B	B	B	B
2016	C	B	B	B-
2018	C	B	C	C+
2019	B	B	A	B+
2020	A	A	A	A
2021	A	A	A	A
2022	B	A	A	A-
2023	B	B	B	B
2024	C	B	B	B-
MPCA Standard	C	B	C	C+

Met Council Grading System for Lake Water Quality

ThreeRivers PARK DISTRICT
Division of Water Resources
January 2025

Figure 12. Parkers Lake water quality report card.

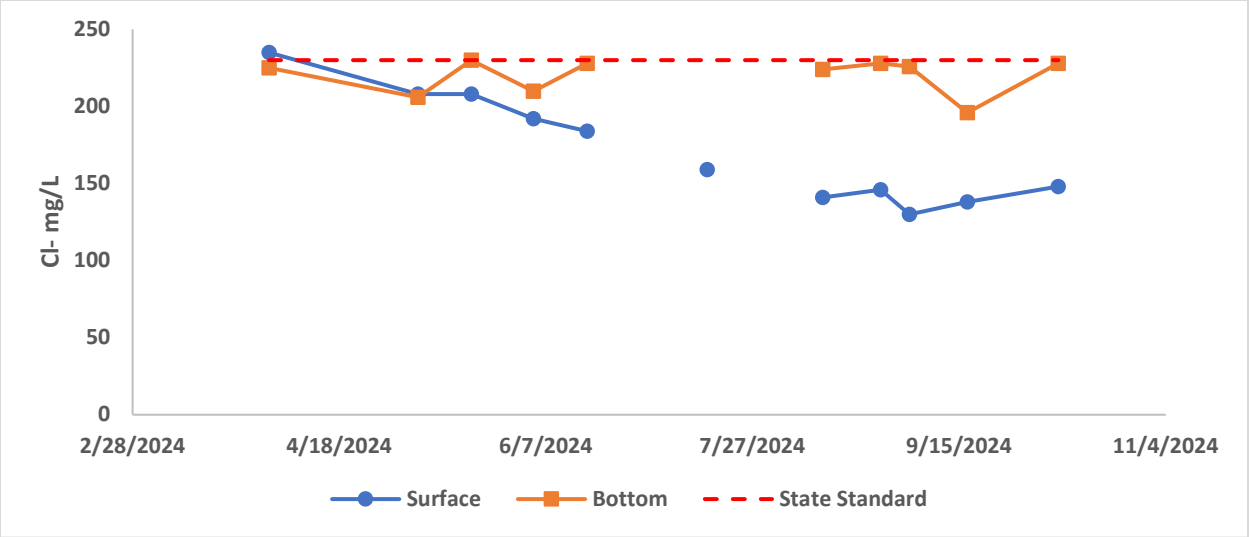


Figure 13. Chloride values in Parkers Lake at surface and bottom in 2024.

Medicine Lake Watershed

Flow Monitoring

The IP2 monitoring site is located upstream of PCO and therefore has a smaller watershed (Figure 2). IP2 had an average daily flow of 16 cfs in 2024. The highest peak daily average flow was 63.5 on 8/6/24. PCO average daily flow was 17.71 cfs and had a peak daily flow of 76.6 cfs on 5/22/24. Periods of no flow occurred at both Plymouth Creek sites in summer of 2024 (Figure *14*). Both PCO (3 days) and IP2 (30 days) had periods of time with no or little flow (< 0.1 cfs) during the sampling season. A total of seven stream discharge measurements were taken in 2024 at PCO to confirm flow estimates in the open channel.

Ridgedale Creek had an average flow rate for the season of 5.2 cfs. The peak daily discharge rate was 29 cfs on 5/22/24 and the peak instantaneous flow rate was 40 cfs on 5/21/24. A total of eight discharge measurements were taken at Ridgedale Creek throughout the year.

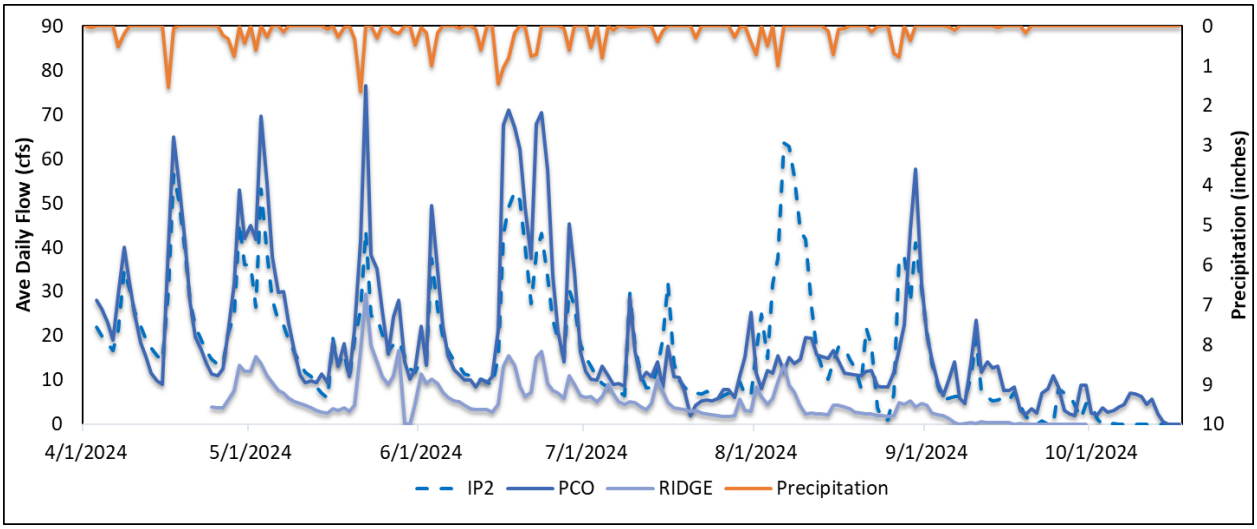


Figure 14. Hydrograph of IP2, PCO, and RDG

Sample Results

A summary of 2024 sample results is reported in Table 17. IP2 was sampled 26 times in 2024. Ten of those were composite samples and 16 were grab samples. The highest TP and TSS concentrations were collected in a composite sample on 8/15/24. The average TP concentration was greater than the 100 µg/L MPCA stream standard. In contrast, the TSS average concentration was below the 30 mg/L summer streams standard. Chloride state standard limits of 236 mg/L were not exceeded.

PCO was sampled 21 times in 2024, which included eight composite samples and 13 grab samples. PCO is impaired for chloride due to chloride concentrations exceeding the MPCA standard more than two times in the past three years. In 2024, chloride concentrations exceeded the MPCA standard one time. The average TP concentrations was also greater than the 100 µg/L standard for streams at PCO. Average TSS concentration was below the 30 mg/L standard.

Ridgedale Creek was sampled 16 times in 2024. All of those samples were grab samples. Ridgedale Creek is exceeding state standards for chloride and total phosphorus. The average TSS was below the standard of 30 mg/L. The maximum TP concentration sampled was 549 µg/L on 9/16/24. The maximum TSS was 250 mg/L on 5/20/24. The maximum chloride value of 425 occurred on 4/14/24, during the first sample of the season at RDG. The highest chloride concentration would be expected in the spring due to road salt applicatoin over the winter.

Table 17. Medicine Lake sites 2024 average, minimum, and maximum concentrations of TP, SRP, TN, TSS, and Cl^-.

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl^- (min-max) mg/L
IP2	196 (71 - 678)	83 (14 - 331)	1.4 (0.5 - 4.8)	19.2 (2.2 - 155.2)	122 (52 - 265)
PCO	137 (63 - 382)	51 (8 - 102)	1.2 (0.8 - 3.0)	13.1 (1.3 - 65.2)	108 (51 - 286)
RDG	177 (40 - 459)	93 (15 - 210)	1.0 (0.6 - 2.2)	20.4 (0.1 - 250.1)	243 (94 - 425)

Annual Loading

Annual load estimates as well as flow-weighted concentrations of nutrients are included in Table 18 for IP2,

Table 19 Table 19 for PCO and Table 19 for RDG.

The unit area loads at IP2, PCO, and RDG were all less than the MPCA stormwater manuals estimate for residential or commercial land uses. Despite PCO being downstream of IP2 and having a larger contributing area, the unit area loads were less for all parameters measured at PCO compared to IP2.

Table 18. Loading and flow weighted concentrations for TP, SRP, TN, TSS, and Cl^- at IP2.

IP2 - Industrial Park site 2

	Nutrient Loading					Nutrient Concentration						
Year	**TP (lbs/yr)**	**SRP (lbs/yr)**	**TN (lbs/yr)**	**TSS (lbs/yr)**	**Cl^- (lbs/yr)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Cl^- (mg/L)**	**Flow Volume (x 10^6 m^3)**	**Annual Precipitation (inches)**
2020	1,382	404	11,772	167,236	1,298,661	150	44	1.28	18	141	4.18	25.9
2021	1,998	602	18,272	265,181	1,158,983	216	65	1.97	29	125	4.20	23.4
2022	1,281	256	10,247	227,213	863,836	241	48	1.93	43	163	2.41	22.7
2023	2,450	1,227	13,833	84,146	1,246,659	202	101	1.14	7	103	5.50	32.4
2024	3,798	1,840	28,256	339,898	2,317,362	170	82	1.26	15	104	10.15	38.2
Average	**2,182**	**866**	**16,476**	**216,735**	**1,377,100**	**196**	**68**	**1.52**	**22**	**127**	**5.29**	**28.5**

Table 19. Loading and flow weighted concentrations for TP, SRP, TN, TSS, and Cl^- at PCO.

PCO - Plymouth Creek Site 2

	Nutrient Loading					Nutrient Concentration						
Year	**TP (lbs/yr)**	**SRP (lbs/yr)**	**TN (lbs/yr)**	**TSS (lbs/yr)**	**Cl^- (lbs/yr)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Cl^- (mg/L)**	**Flow Volume (x 10^6 m^3)**	**Annual Precipitation (inches)**
2020	1,165	465	11,860	137,478	1,466,676	111	44	1.13	13	139	4.77	25.9
2021	717	228	7,475	56,526	975,438	121	39	1.27	10	165	2.68	23.4
2022	1,039	258	10,908	66,938	977,169	151	38	1.59	10	142	3.12	22.7
2023	3,713	1,998	25,036	232,663	2,615,630	181	98	1.22	11	128	9.29	32.4
2024	3,173	1,172	26,519	313,944	2,154,411	129	48	1.07	13	87	11.19	38.2
Average	**1,961**	**824**	**16,360**	**161,510**	**1,637,865**	**139**	**53**	**1.26**	**11**	**132**	**6.21**	**28.5**

Table 19. Loading and flow weighted concentrations for TP, SRP, TN, TSS, and Cl^- at RDG.

RDG – Ridgedale Creek

	Nutrient Loading					Nutrient Concentration						
Year	**TP (lbs/yr)**	**SRP (lbs/yr)**	**TN (lbs/yr)**	**TSS (lbs/yr)**	**Cl^- (lbs/yr)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Cl^- (mg/L)**	**Flow Volume (x 10^6 m^3)**	**Annual Precipitation (inches)**
2024	979	536	6,146	28,667	1,544,382	150	82	0.94	4.4	237	2.95	38.2

Table 20. IP2 unit area loads for TP, SRP, TN, TSS, and Cl^-.

Industrial Park - Site 2 Load/Acre					
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre)**
2020	0.37	0.11	3.16	45	349
2021	0.54	0.16	4.91	71	311
2022	0.34	0.07	2.75	61	232
2023	0.66	0.33	3.71	23	335
2024	1.02	0.49	7.59	91	622
Average	**0.59**	**0.23**	**4.42**	**58**	**370**

Table 21. *PCO unit area loads for TP, SRP, TN, TSS, and Cl^-.*

Plymouth Creek Site 2 – PCO Load/Acre					
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre)**
2020	0.18	0.07	1.86	22	310
2021	0.11	0.04	1.17	9	153
2022	0.16	0.04	1.71	10	153
2023	0.58	0.31	3.92	36	409
2024	0.50	0.18	4.15	49	337
Average	**0.31**	**0.13**	**2.56**	**25**	**256**

Table 22. *Unit area loads for TP, SRP, TN, TSS, and Cl^- at RDG.*

RDG - Ridgedale Creek					
			Load/Acre		
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre)**
2024	0.73	0.40	4.59	21.0	1,154

Bass Lake Watershed

Flow Monitoring

BL3 is located at the outflow of a wetland complex where the flow rate is dependent upon the available wetland storage capacity. There is an immediate hydrograph response following a rain even when the upstream wetland is at full capacity. If there is excess storage capacity, there may not be any flow response to a rain event until water levels exceed the outlet elevation of the wetland. This lack of response can be seen with some of the smaller rain events throughout the year (Figure 15). The peak daily average flow of 13.0 cfs occurred on 4/7/24. There was a total of 41 days with average flows less than 0.1 cfs. This occurred mostly in the late fall and accounted for 19% of the sampling period.

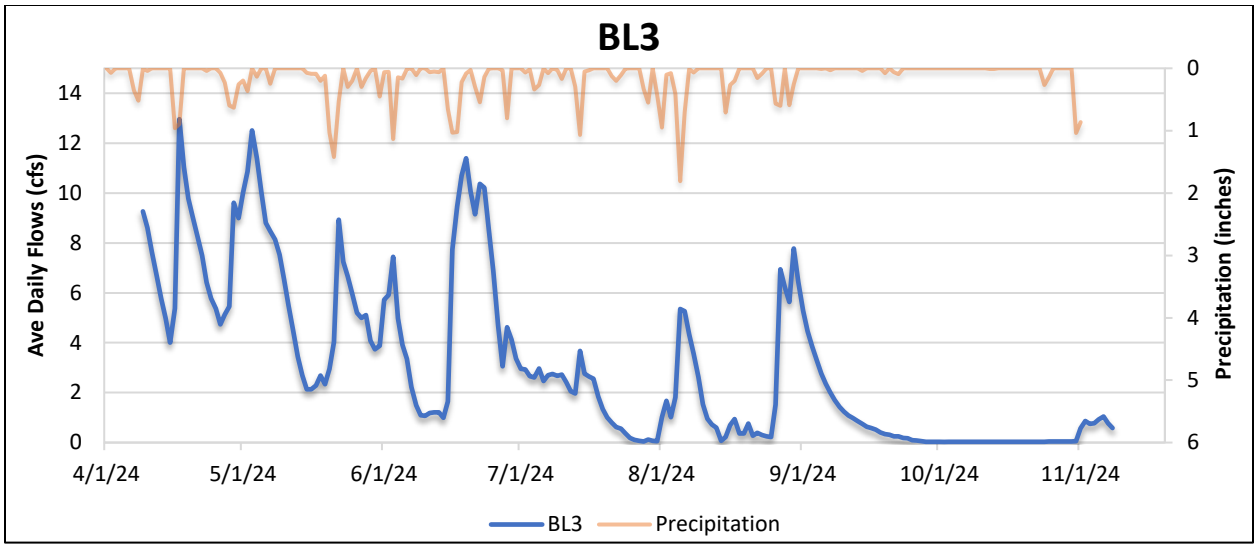


Figure 15. Hydrograph of daily average flow and daily rainfall totals at BL3.

Sample Results

The wetland upstream and Bass Lake downstream are both public waters of the state but the monitored short channel connecting them is not. There are no stream standards that apply at this site location. However, the average TP concentration at BL3 would be higher than the central streams standard of 100 µg/L. TSS samples averaged far below the 30 mg/L standard with only one sample greater than the standard. These averages are based on 19 samples collected in 2024. Only three samples were composite samples while 16 were grab samples. Several routine sample visits in 2024 occurred during no flow conditions and so those samples could not be collected.

Table 23. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, and TSS at BL3 in 2024.

Site	Avg TP (min-max)	Avg SRP (min-max)	Avg TN (min-max)	Avg TSS (min-max)
	µg/L	µg/L	mg/L	mg/L
BL3	154 (31 - 730)	54 (8 - 121)	1.4 (0.5 - 5.8)	8.1 (0 - 49.0)

Annual Loading

The estimate of annual nutrient loading from FLUX32 is reported in Table 24. The TP flux and flow-weighted average was higher than recent years where drought conditions existed. However, load and concentrations were not greater than last year, a normal precipitation year.

The unit area load at BL3 was much lower than the MPCA stormwater manual estimates for residential TP and TSS loading (Table 25).

Table 24. Loading and flow weighted concentrations of TP, SRP, TN, and TSS at BL3.

BL3 - Bass Lake Site 3										
	Nutrient Loading				Nutrient Concentration					
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Flow Volume (x 10^6 m^3)	Annual Precipitation (inches)
2020	193	79	3,153	5,812	65	27	1.06	2.0	1.35	25.9
2021	200	49	2,819	6,528	77	19	1.08	2.5	1.18	23.4
2022	227	147	2,681	4,908	81	53	0.96	2.0	1.27	22.7
2023	711	216	4,286	13,661	132	40	0.79	2.5	2.45	32.4
2024	411	201	3,183	12,025	93	45	0.72	2.7	2.00	38.2
Average	**348**	**138**	**3,224**	**8,587**	**90**	**37**	**0.92**	**2.3**	**1.65**	**28.5**

Table 25. Unit area loading for TP, SRP, TN, and TSS at BL3.

Bass Lake - Site 3 Load/Acre				
Year	TP (lbs/acre)	SRP (lbs/acre)	TN (lbs/acre)	TSS (lbs/acre)
2020	0.10	0.04	1.71	3
2021	0.11	0.03	1.53	4
2022	0.12	0.08	1.45	2.7
2023	0.39	0.12	2.32	7.4
2024	0.22	0.11	1.72	6.5
Average	**0.19**	**0.07**	**1.75**	**4.65**

Lake sampling

Schmidt Lake, located to the south and upstream of Bass Lake, was not meeting water quality standards in 2024. The lake exceeded the total phosphorus and secchi disk transparency standard despite meeting the chlorophyll-a concentrations standard. Interestingly, during the growing season of June – September, the total phosphorus at the surface of the lake (Figure 16) had a higher average concentration than the bottom of the lake (Figure 17). This is not seen in typical lake conditions and is likely a result of the aeration system in the lake preventing stratification throughout the season and allowing the release of nutrients from the bottom to the surface of the lake. The lack of lake stratification in terms of temperature and dissolved oxygen can be seen in Figure 16 & Figure 17. While the water column is oxygenated to lower depths than would be without summer aeration, the boundary layer of water carpeting the lake sediments remains deplete of oxygen and would support phosphorus release into the water column from the lake sediments.

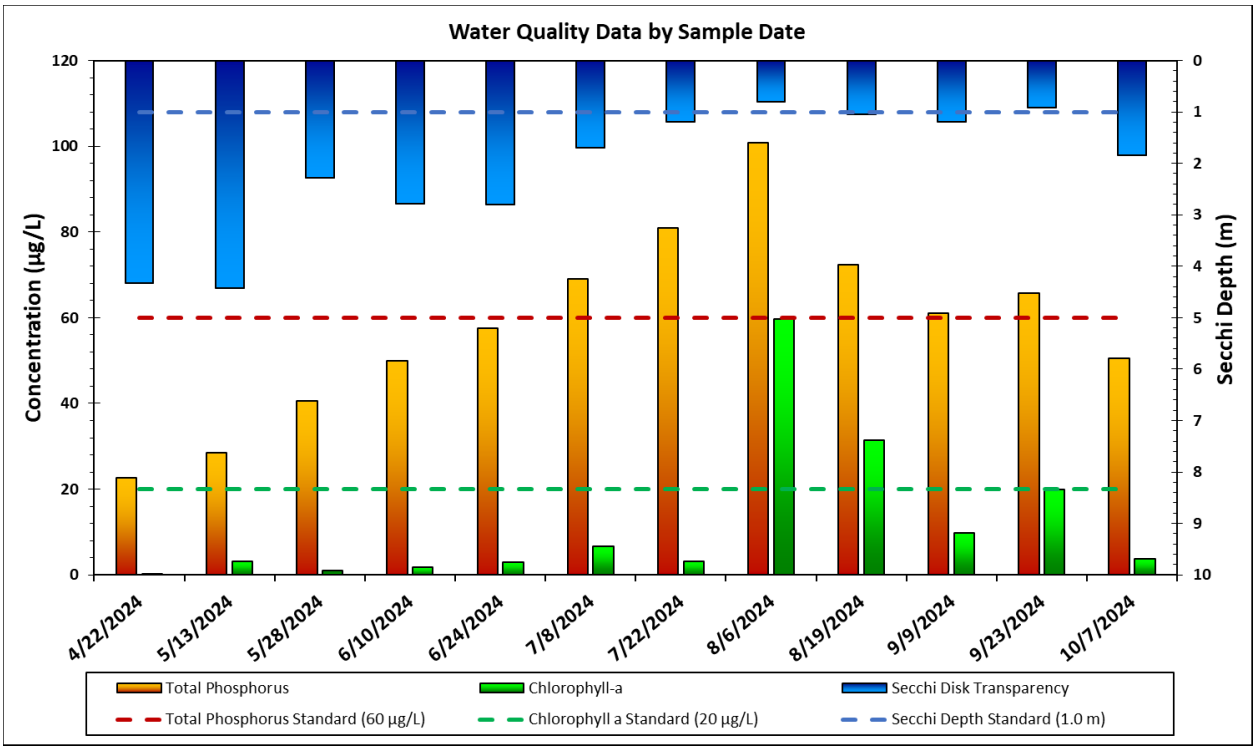


Figure 16. Schmidt Lake 2024 water quality sampling results.

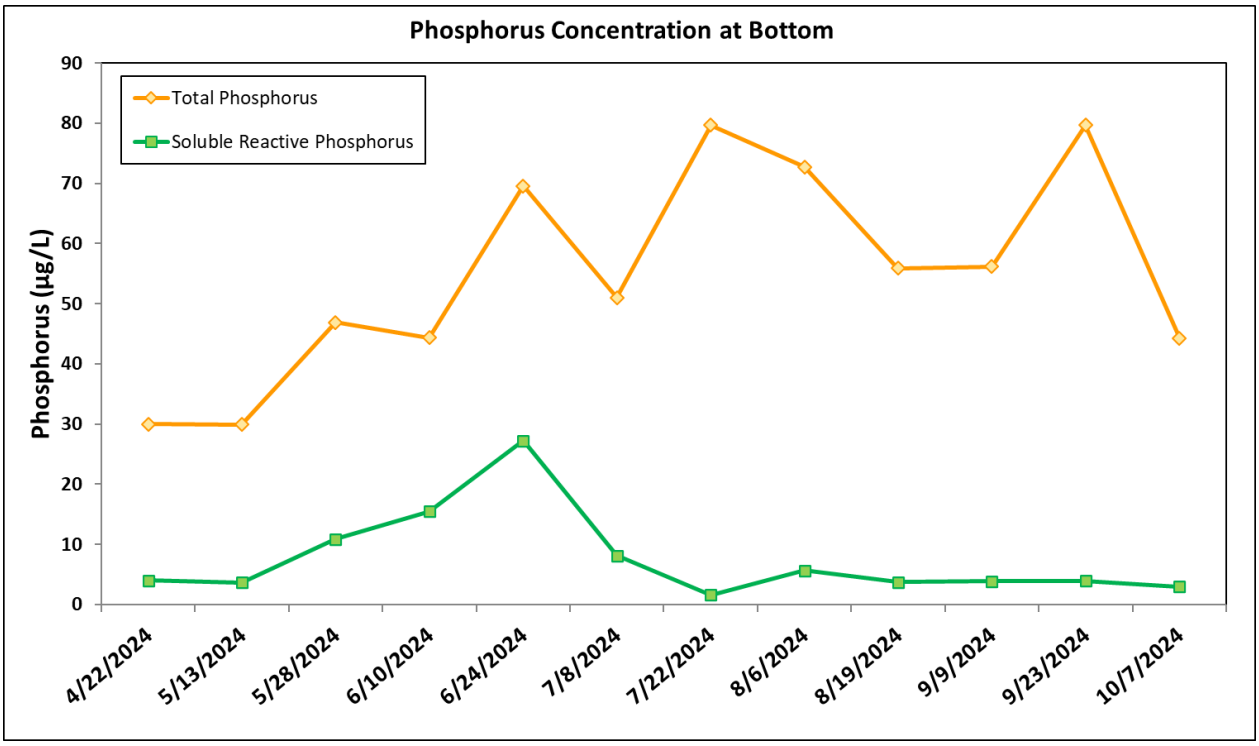


Figure 17. Schmidt Lake 2024 hypolimnetic phosphorus concentrations.

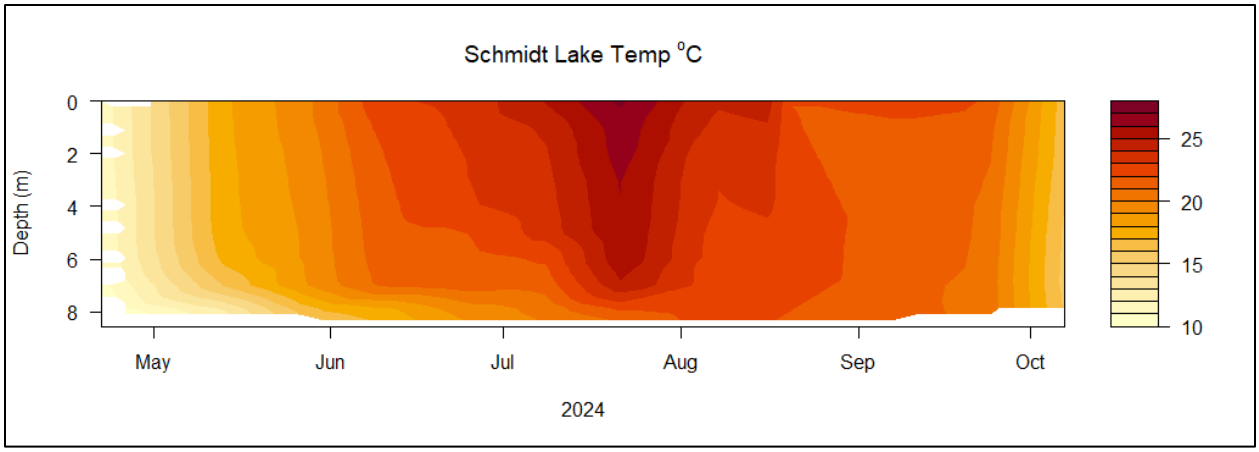


Figure 18. Temperature profile of Schmidt Lake over 2024 sampling season.

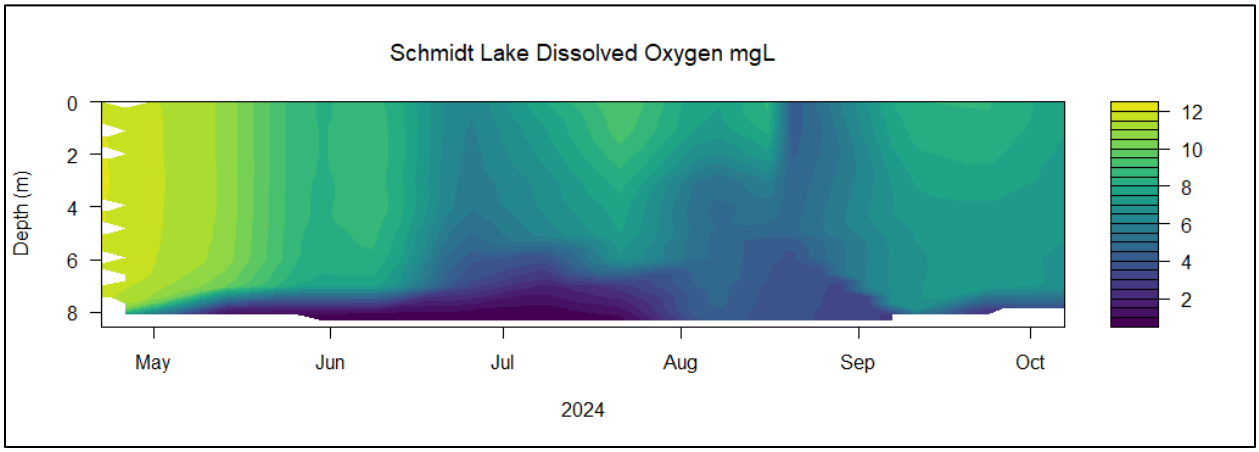


Figure 19. Dissolved oxygen profile of Schmidt Lake over 2024 sampling season.

Gleason Lake Watershed

Flow Monitoring

Due to frequent rain during the spring and summer months, there were high flows at GC-1 for most of the season (Figure 20). The high flows stopped at the end of summer in response to no precipitation in September. The average flow for the season was 2.3 cfs. The peak daily average flow of 17.0 cfs occurred on 8/6/24 with the peak instantaneous flow measured the day before at 36 cfs. There were 50 days monitored that had an average less than 0.1 cfs. These low to no flow days all occurred in the fall.

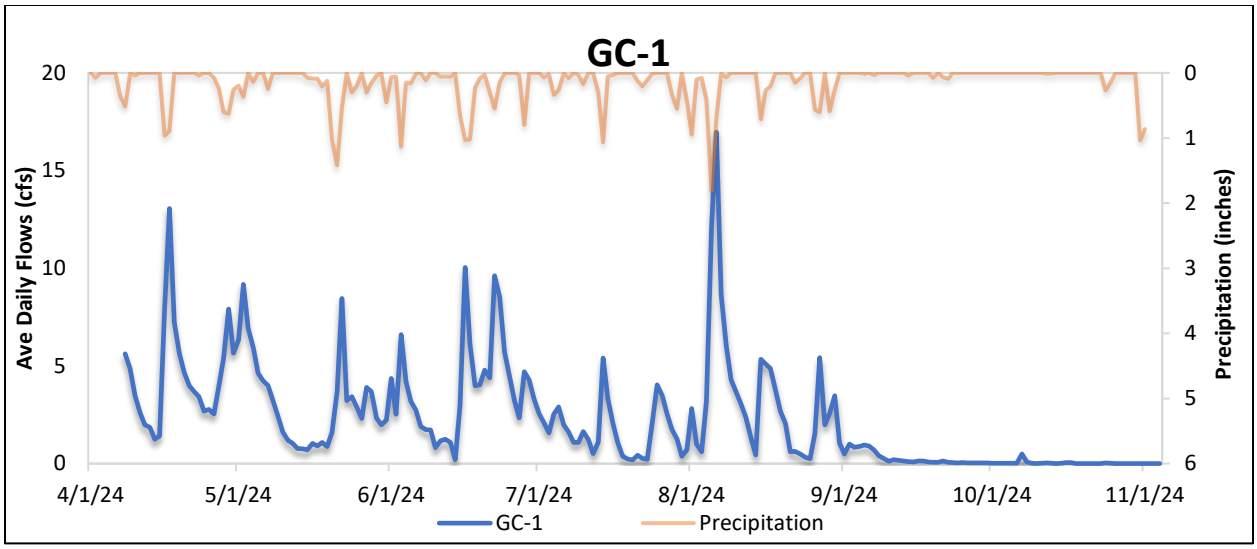


Figure 20. Average daily flow and daily precipitation at GC-1 in 2024.

Sample Results

GC-1 was sampled a total of 29 times in 2024. About half the samples were routine baseflow grab samples (14) and the other half event composite samples (15). GC-1 is located on Gleason Creek which is required to meet the central stream nutrient standard criteria. The average TP concentration in 2024 exceeded the stream standard of 100 µg/L. The average TSS concentration was just below the 30 mg/L standard for the season.

Some additional samples were collected higher in the watershed at Maple Creek Park. MCP was sampled a total of five times to assess the phosphorus levels leaving the iron enhanced sand filter in the above stormwater pond. The average TP was 141 ug/L (Table 26).

Table 26. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, TSS, and Cl^- at GC-1 and MCP in 2024.

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl^- (min-max) mg/L
GC-1	187 (77 - 399)	68 (25 - 105)	1.2 (0.5 - 3.1)	29.1 (2.4 - 179.2)	116 (48 - 205)
MCP	141 (64 - 212)	44 (18 - 72)	-	-	-

Annual Loading

The estimates of annual nutrient flux and annual flow-weighted concentrations for GC-1 are reported in Table 27. Of the past several years, 2024 had the most loading of each parameter sampled. This year also had the most precipitation of the past several years. The unit area loading in 2024 was lower than the MPCA stormwater manual average for residential land use for both TP and TSS (Table 28).

Table 27. Loading and flow weighted concentrations of TP, SRP, TN, TSS, and Cl^- at GC-1.

GC-1 - Gleason Lake Sub watershed												
	Nutrient Loading					Nutrient Concentration						
Year	**TP (lbs)**	**SRP (lbs)**	**TN (lbs)**	**TSS (lbs)**	**Cl^- (lbs)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Cl^- (mg/L)**	**Flow Volume (x 10^6 m^3)**	**Annual Precipitation (inches)**
2020	247	68	2,821	83,197	189,118	134	37	1.53	45	102	0.84	25.9
2021	366	66	2,858	107,268	86,870	309	56	2.42	91	73	0.54	23.4
2022	256	79	2,205	23,430	222,815	184	57	1.59	17	160	0.63	22.7
2023	417	184	3,435	80,237	268,560	151	67	1.24	29	97	1.26	32.4
2024	627	224	4,095	127,862	286,669	200	71	1.30	41	91	1.43	38.2
Average	**383**	**124**	**3,083**	**84,399**	**210,806**	**196**	**58**	**1.62**	**44**	**105**	**0.94**	**28.5**

Table 28. Loading per acre for TP, SRP, TN, TSS, and Cl^- at GC-1.

GC-1 Load/Acre					
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl^- (lbs/acre**
2020	0.15	0.04	1.71	50	115
2021	0.22	0.04	1.73	65	53
2022	0.16	0.05	1.34	14	135
2023	0.25	0.11	2.08	49	163
2024	0.38	0.14	2.48	77	174
Average	**0.23**	**0.08**	**1.87**	**51**	**128**

Elm Creek Watershed

Flow Monitoring

The Elm Creek sites had a similar flow regime to other sites monitored this year. Periods of high flow occurred following frequent rain events in the spring and summer. This was followed by periods with lower to minimal flows during the dryer late autumn months. The total flows increase at each downstream site from Hamel to ECER. There is a delayed and prolonged hydrologic response at ECER after precipitation events due to flood plain and wetland storage capacity upstream. Manual discharge measurements were collected throughout the year to confirm area velocity sensor estimates and/or develop a rating curve to extrapolate during periods with missing data. A total of seven discharge measurements were taken at both Peony and EC77 and eight were taken at Hamel. The average annual flows increased for each consecutive downstream site from Hamel to ECER (Hamel=7.9 cfs; Peony=9.0 cfs; and ECER=17.3 cfs). Peak daily average flows occurred on 8/6/24 for Hamel and Peony at 42.0 cfs and 60.3 cfs. ECER had its peak daily average flow on 4/17/24 at 84 cfs.

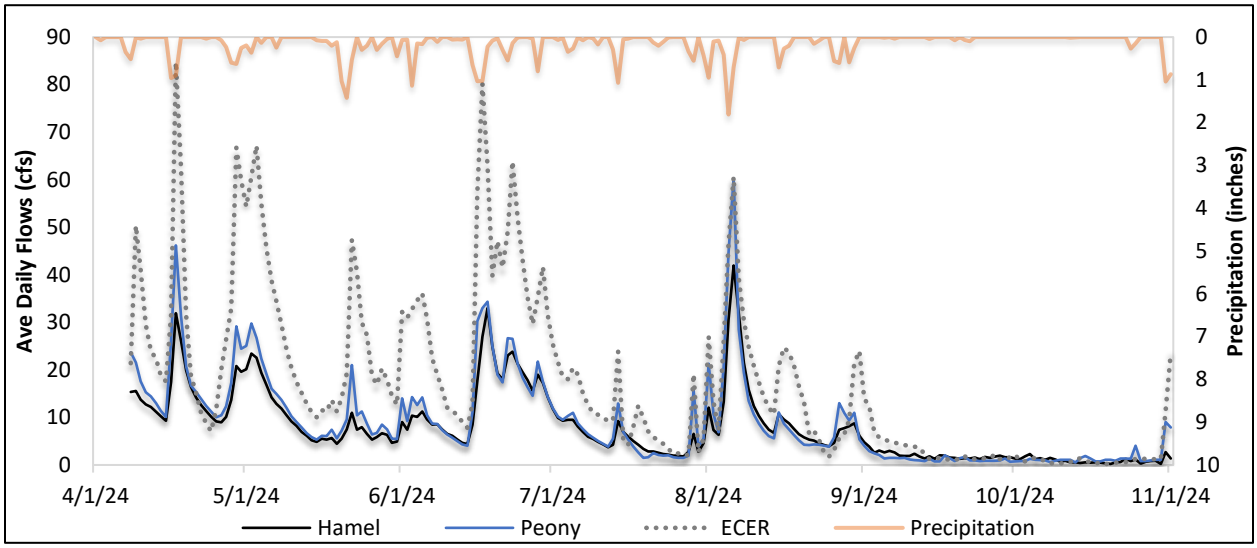


Figure 21. Annual hydrograph of Elm Creek sites Hamel, Peony, and ECER in 2024.

Sample Results

There were 80 samples collected at the three Elm Creek sites. Hamel had 30 samples, including 17 grab samples and 13 composite event samples. Peony had 19 grab samples and eight composite samples. ECER had 23 samples, seven of which were composite event samples.

Both TP and SRP decreased in concentration at downstream sites (Table 29). TSS average sample concentration was highest at Peony and lowest at ECER. However, the flow-weighted concentration, as discussed in the next section, is a better representation of nutrient concentrations than sample averages. The average sample concentrations can be skewed based on sample timing and how many samples included storm events versus the number of samples taken during low flow.

Table 29. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, TSS, and Cl^- at Hamel, Peony, and ECER in 2024.

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl^- (min-max) mg/L
HAMEL	382 (70 - 996)	146 (25 - 423)	2.3 (0.8 - 4.6)	21.4 (1.4 - 102.5)	63 (36 - 122)
PEONY	342 (75 - 1196)	156 (36 - 377)	1.6 (0.6 - 2.9)	36.5 (1.7 - 417.5)	61 (41 - 104)
ECER	245 (87 - 419)	112 (45 - 175)	1.4 (0.7 - 2.2)	14.0 (2.4 - 49.9)	59 (38 - 140)

Annual Loading

Total loading increased for each downstream site (Table 30, Table 32 & Table 34). However, the increase was not as great in 2024 as it was in previous years. Total phosphorus loading at Hamel was around twice as large as the previous year. This seems disproportionate compared with the 6-inch increase in precipitation. The flow weighted concentration of chloride was nearly identical at all three sites. TSS loads increased sharply between Hamel and Peony and then decreased at ECER because of the large wetland complex between Peony and ECER that allows for settling of sediments.

Even with the large increase in TP loading at Hamel this year, it was still below the typical phosphorus UAL according to the MPCA stormwater manual. Peony and ECER were also below typical TP and TSS UAL according to the MPCA stormwater manual.

Table 30. Loading and flow weighted concentrations of TP, SRP, TN, TSS, and Cl^- at Hamel.

Hamel												
	Nutrient Loading					Nutrient Concentration						
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr	Cl^- (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Cl^- (mg/L)	Flow Volume (x 10^6 m^3)	Annual Precipitation (inches)
2020	358	166	6,257	85,089	299,959	81	38	1.42	19	68	2.01	25.9
2021	1,596	324	11,993	493,267	704,687	289	59	2.17	89	128	2.50	23.4
2022	1,259	316	11,611	172,646	649,503	209	53	1.93	29	108	2.73	22.7
2023	1,964	745	16,148	117,679	1,001,620	219	83	1.80	13	112	4.06	32.4
2024	4,027	1,529	22,914	231,270	624,741	368	140	2.09	21	57	4.96	38.2
Average	**1,841**	**616**	**13,785**	**219,990**	**656,102**	**233**	**74**	**2**	**34**	**95**	**3.25**	**28.5**

Table 31. Hamel unit area loading for TP, SRP, TN, TSS, and Cl^-.

Hamel					
	Load/Acre				
Year	TP (lbs/acre)	SRP (lbs/acre)	TN (lbs/acre)	TSS (lbs/acre)	Cl^- (lbs/acre)
2020	0.08	0.04	1.46	20	70
2021	0.37	0.08	2.81	115	165
2022	0.29	0.07	2.72	40	152
2023	0.46	0.17	3.78	28	234
2024	0.94	0.36	5.36	54	146
Average	**0.43**	**0.14**	**3.23**	**51**	**154**

Table 32. Loading and flow weighted concentrations of TP, SRP, TN, and TSS at Peony.

Peony												
	Nutrient Loading					Nutrient Concentration						
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr	Cl^- (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Cl^- (mg/L)	Flow Volume (x 10^6 m^3)	Annual Precipitation (inches)
2021	2,381	746	11,661	458,109	358,986	391	123	1.92	75	59	2.76	23.4
2022	2,403	765	12,943	479,044	526,831	387	123	2.08	77	85	2.82	22.7
2023	3,679	1,577	16,892	661,756	842,631	331	142	1.52	60	76	5.04	32.4
2024	4,400	1,851	17,588	317,023	711,893	350	147	1.40	25	57	5.71	38.2
Average	**3,216**	**1,235**	**14,771**	**478,983**	**610,085**	**365**	**134**	**1.73**	**59**	**69**	**4.08**	**29.2**

Table 33. Unit area loads for TP, SRP, TN, and TSS at Peony along with unit area loads at Peony adjusted for Hamel loading.

	Peony Load/Acre				
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl (lbs/acre)**
2021	0.44	0.14	2.15	84	66
2022	0.44	0.14	2.38	88	97
2023	0.68	0.29	3.11	122	155
2024	0.81	0.34	3.24	58	131
Avgerage	**0.59**	**0.23**	**2.72**	**88**	**112**

Table 34. Loading and flow weighted concentrations of TP, SRP, TN, TSS, and Cl^- at ECER.

	ECER - Elm Creek @ Elm Road											
	Nutrient Loading					Nutrient Concentration						
Year	**TP (lbs/yr)**	**SRP (lbs/yr)**	**TN (lbs/yr)**	**TSS (lbs/yr)**	**Cl^- (lbs/yr)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Cl^- (mg/L)**	**Flow Volume (x 106 M3)**	**Annual Precipitation (inches)**
2020	1,852	734	11,746	528,096	612,321	205	81	1.30	58	68	4.10	25.9
2021	2,540	996	17,212	1,976,906	752,711	261	102	1.77	203	77	4.42	23.4
2022	3,034	1,401	16,864	197,433	1,140,477	254	118	1.41	17	96	5.41	22.7
2023	4,652	2,631	20,866	212,082	1,209,229	272	154	1.22	12	71	7.74	32.4
2024	5,463	2,746	30,724	359,177	1,487,715	222	111	1.25	15	60	11.17	38.2
Average	**3,508**	**1,701**	**19,482**	**654,739**	**1,040,691**	**243**	**113**	**1.39**	**61**	**74**	**6.57**	**28.5**

Table 35. Unit area loads for TP, SRP, TN, and TSS at Peony along with unit area loads at ECER adjusted for Hamel and Peony loading.

	ECER Load/Acre				
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**	**Cl (lbs/acre)**
2020	0.23	0.09	1.48	67	77
2021	0.32	0.13	2.17	250	95
2022	0.38	0.18	2.13	25	144
2023	0.59	0.33	2.63	27	153
2024	0.69	0.35	3.88	45	188
Avgerage	**0.44**	**0.21**	**2.46**	**83**	**131**

Pike Creek Watershed

Flow Monitoring

The Pike Creek watershed responds quickly to rain events with large spikes in flow, as seen in the hydrograph in Figure 22. Even with the flashy nature of this site, there was a low level of baseflow that stayed present most of the season. There were only 24 days where the average flow was less than 0.1 cfs. The average daily flow for the season was 1.25 cfs and the peak daily average flow occurred on 8/5/24 at 13.5 cfs.

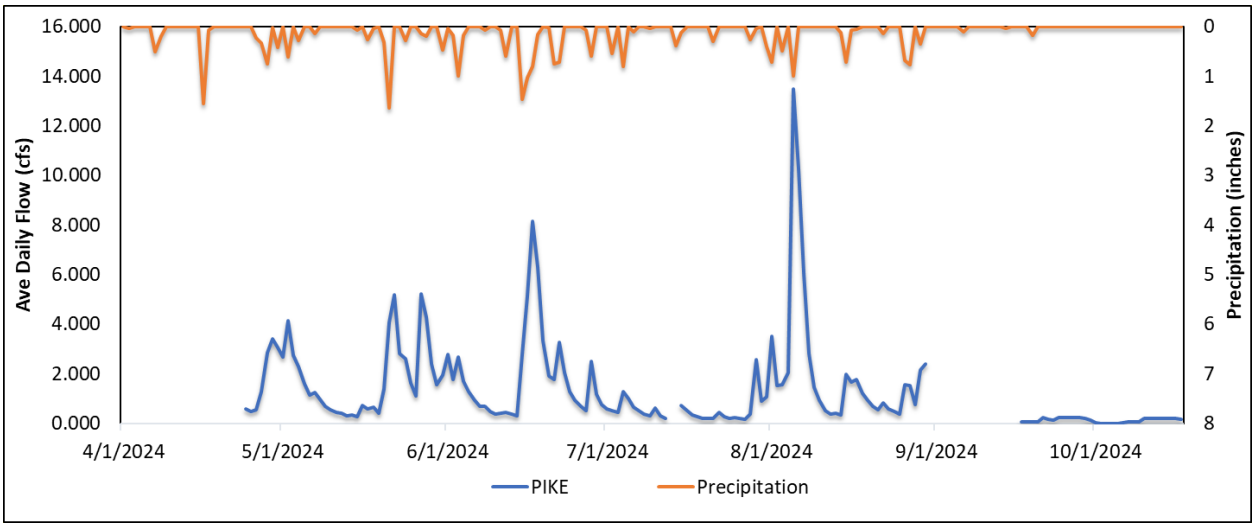


Figure 22. Pike Creek 2024 hydrograph. Note there were two instances of probe failure where flow data is missing.

Sample Results

A total of 20 samples were collected at Pike Creek in 2024 where 15 were grab samples and five were storm event composites. Peak TP concentrations of 388 µg/L and peak TSS of 39.0 both occurred in response to an October 31st storm event. The average, minimum, and maximum sample concentrations are reported in Table 36.

Table 36. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, TSS, and Cl^- at PIKE.

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl^- (min-max) mg/L
PIKE	157 (82 - 388)	58 (6 - 173)	1.3 (1.0 – 1.8)	9.5 (1.3 – 39.0)	176 (66 - 470)

Annual Loading

Flow weighted concentrations and annual load of nutrients, TSS, and chloride are reported in Table 37. Unit area load at Pike Creek is reported in Table 38. Both the TP and TSS unit area loads, as well as sample concentrations, were below state stormwater manual typical values for residential land use in 2024.

Table 37. Pike Creek loading and flow weighted concentrations of TP, SRP, TN, TSS, and Cl^-.

Pike Creek @ Hemlock Ln N												
	Nutrient Loading					Nutrient Concentration						
Year	TP (lbs/yr)	SRP (lbs/yr)	TN (lbs/yr)	TSS (lbs/yr)	Cl^- (lbs/yr)	TP (µg/L)	SRP (µg/L)	TN (mg/L)	TSS (mg/L)	Cl^- (mg/L)	Flow Volume (x 106 M3)	Annual Precipitation (inches)
2024	249	85	1,988	21,049	243,887	158	54	1.26	13	155	0.71	38.2

Table 38. Pike Creek unit area loading for TP, SRP, TN, TSS, and Cl^-.

Pike Creek @ Hemlock Ln N					
	Load/Acre				
Year	TP (lbs/acre)	SRP (lbs/acre)	TN (lbs/acre)	TSS (lbs/acre)	Cl^- (lbs/acre)
2024	0.41	0.14	3.25	34	399

Northwood Lake Sub-watershed

Flow Monitoring

The beginning of the year through September had frequent rain events and variable flow (Figure 23). Although total flows decreased in September and October, NLS had a steady baseflow this year with no days averaging below 0.1 cfs. The peak instantaneous flow of 47 cfs occurred one day prior to the peak daily average flow of 22.6 cfs on 8/6/24.

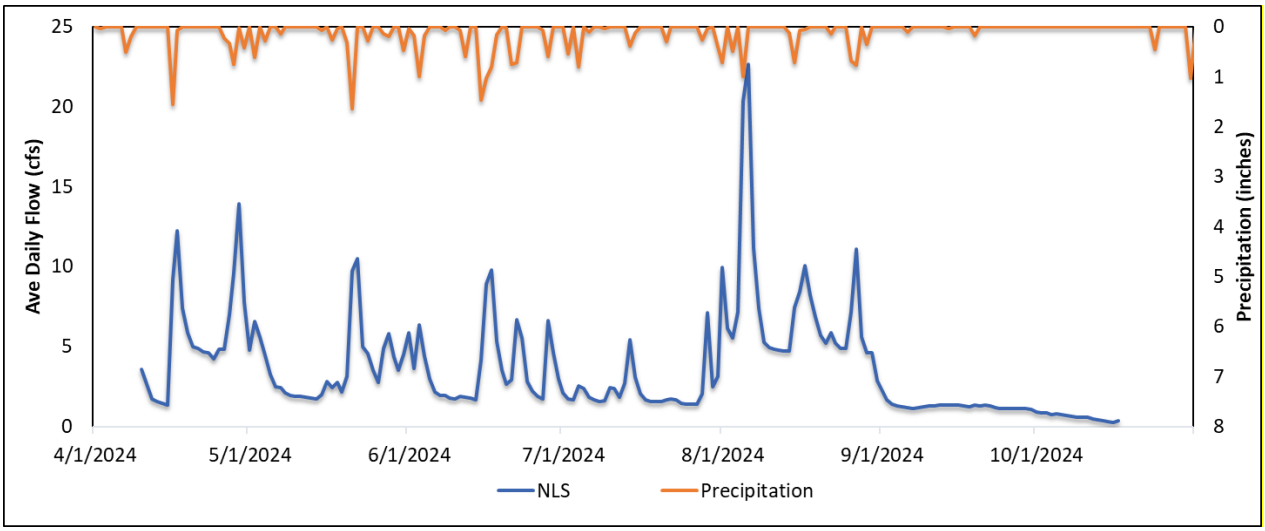


Figure 23. NLS 2024 hydrograph.

Sample Results

A total of 24 samples were collected at NLS in 2024. Of those samples, 15 were grab samples and nine were storm event composite samples. The average, minimum, and maximum sample concentrations are reported in (Table 39). Both the maximum TP (928 ug/L) and maximum TSS (768 mg/L) occurred during the 4/16/24 storm event.

Table 39. Summary of average, minimum, and maximum concentrations for TP, SRP, TN, TSS, and Cl^- at NLS

Site	Avg TP (min-max) µg/L	Avg SRP (min-max) µg/L	Avg TN (min-max) mg/L	Avg TSS (min-max) mg/L	Avg Cl^- (min-max) mg/L
NLS	216 (53 - 928)	81 (13 - 232)	1.7 (0.8 - 4.0)	53.7 (0.2 - 768.0)	108 (4 - 238)

Annual Loading

Total load and nutrient concentration data are presented in Table 40. Total load and nutrient concentration in 2024 were similar to 2019, which is considered the last high precipitation year monitored. Unit area loads at NLS are reported in Table 41. The unit area loads at NLS are still below the TP and TSS MPCA stormwater manual estimates for residential or commercial land use.

Table 40. NLS loading and flow weighted concentrations of TP, SRP, TN, and TSS.

	NLS									
	Nutrient Loading				Nutrient Concentration					
Year	**TP (lbs/yr)**	**SRP (lbs/yr)**	**TN (lbs/yr)**	**TSS (lbs/yr)**	**TP (µg/L)**	**SRP (µg/L)**	**TN (mg/L)**	**TSS (mg/L)**	**Flow Volume (x 10^6 m^3)**	**Annual Precip. (inches)**
2017	803	210	7,401	439,568	254	66	2.34	139	1.35	27.8
2018	1,215	372	8,202	427,514	388	119	2.62	137	1.42	30.8
2019	739	261	7,226	284,697	184	65	1.8	71	1.82	43.3
2021	640	154	5,421	173,546	332	80	2.82	90	0.87	23.4
2024	987	402	14,157	99,098	202	82	2.90	20	2.22	38.2
Average	**877**	**280**	**8,482**	**284,885**	**272**	**83**	**2.49**	**91**	**1.54**	**32.7**

Table 41. NLS unit area loading for TP, SRP, TN, TSS, and Cl^-.

	NLS			
	Load/Acre			
Year	**TP (lbs/acre)**	**SRP (lbs/acre)**	**TN (lbs/acre)**	**TSS (lbs/acre)**
2017	0.96	0.25	8.86	526.30
2018	1.46	0.45	9.82	511.87
2019	0.89	0.31	8.65	340.87
2021	0.77	0.18	6.49	207.79
2024	1.18	0.48	16.95	118.65
Average	**1.05**	**0.34**	**10.2**	**341**

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Appendix

Stormwater Average Daily Flows

Average daily flow in cfs for all sites in 2024.

Date	BL3	ECER	GC1	Hamel	IP2	NLS	PCO	PEONY	PIKE	PL1	PL2	RDG
4/1/2024												
4/2/2024												
4/3/2024					21.9		28.2					
4/4/2024					20.1		26.0					
4/5/2024					18.2		22.9					
4/6/2024					16.7		19.0					
4/7/2024					21.2		29.2					
4/8/2024		21.4	5.6	15.4	34.9		40.1	23.7		0.7	0.8	
4/9/2024	9.3	50.4	4.9	15.6	30.7		31.9	21.5		0.2	0.8	
4/10/2024	8.6	41.0	3.5	13.8	25.5	3.6	24.9	17.6		0.0	0.5	
4/11/2024	7.6	29.5	2.6	12.7	22.2	2.6	18.5	15.3		0.0	0.2	
4/12/2024	6.7	23.9	2.0	12.2	19.3	1.7	15.4	14.4		0.0	0.2	
4/13/2024	5.8	22.4	1.9	11.2	17.2	1.6	11.6	13.0		0.0	0.1	
4/14/2024	5.0	18.8	1.3	10.2	15.5	1.4	9.8	11.4		0.0	0.1	
4/15/2024	4.0	17.6	1.4	9.3	14.3	1.3	8.9	10.1		0.1	0.1	
4/16/2024	5.4	31.5	8.0	17.5	30.3	9.2	40.1	26.0		2.0	3.7	
4/17/2024	13.0	84.7	13.0	31.9	56.6	12.3	65.0	46.2		1.0	2.3	
4/18/2024	11.1	62.6	7.2	26.1	50.7	7.4	54.9	31.4		0.1	0.8	
4/19/2024	9.8	31.6	5.6	19.9	39.7	5.9	41.6	20.7		0.0	0.7	
4/20/2024	9.0	18.8	4.7	16.4	27.9	5.0	27.7	16.7		0.0	0.7	
4/21/2024	8.2	15.2	4.0	14.2	22.2	4.9	19.7	15.3		0.0	0.6	
4/22/2024	7.5	10.9	3.7	12.6	18.9	4.7	16.9	13.9		0.0	0.6	
4/23/2024	6.4	8.8	3.4	11.3	16.5	4.6	13.8	12.4		0.0	0.6	
4/24/2024	5.8	7.1	2.7	10.2	14.8	4.2	11.4	11.3	0.6	0.0	0.5	4.0
4/25/2024	5.4	11.7	2.8	9.2	13.5	4.9	11.0	10.0	0.5	0.0	0.4	3.8
4/26/2024	4.7	20.1	2.5	9.0	13.6	4.9	12.5	10.4	0.6	0.2	0.6	3.6
4/27/2024	5.1	26.4	3.9	10.1	20.7	7.0	21.1	12.3	1.3	0.4	1.1	5.4
4/28/2024	5.5	32.9	5.4	13.7	24.8	9.6	31.9	17.3	2.8	0.7	1.5	7.6
4/29/2024	9.6	66.7	7.9	20.8	45.5	13.9	52.9	29.2	3.4	0.4	1.3	13.3
4/30/2024	9.0	59.9	5.7	19.6	36.0	7.8	42.0	24.4	3.1	0.5	1.1	11.9
5/1/2024	10.0	54.4	6.3	20.1	35.9	4.8	45.0	25.0	2.7	0.2	1.0	12.0
5/2/2024	10.9	60.6	9.2	23.5	26.5	6.5	41.9	29.8	4.1	0.7	1.7	15.3
5/3/2024	12.5	67.2	6.9	22.5	53.2	5.6	69.7	26.7	2.7	0.1	0.7	13.8
5/4/2024	11.4	55.0	5.9	19.4	38.6	4.5	54.4	22.3	2.3	0.2	0.8	11.0
5/5/2024	10.1	45.6	4.6	16.8	28.3	3.2	37.9	19.1	1.6	0.0	0.6	9.4
5/6/2024	8.8	38.8	4.2	14.2	23.3	2.5	29.8	16.0	1.1	0.0	0.5	7.6
5/7/2024	8.5	34.5	4.0	12.9	22.4	2.4	30.0	15.0	1.2	0.2		7.1
5/8/2024	8.1	29.5	3.3	11.9	19.0	2.1	22.7	13.7	1.0	0.0		6.0
5/9/2024	7.5	24.2	2.4	10.4	16.1	1.9	16.2	12.0	0.7	0.0		5.1
5/10/2024	6.5	20.5	1.6	9.2	13.7	1.9	11.2	10.3	0.6	0.0		4.6
5/11/2024	5.5	17.5	1.2	8.2	11.7	1.9	9.4	9.0	0.5	0.0		4.3
5/12/2024	4.5	15.1	1.0	7.0	10.8	1.8	9.9	7.9	0.4	0.0		3.7
5/13/2024	3.4	12.9	0.8	6.1	8.5	1.8	9.5	6.7	0.3	0.0		3.1

Date	BL3	ECER	GC1	Hamel	IP2	NLS	PCO	PEONY	PIKE	PL1	PL2	RDG
5/14/2024	2.7	11.1	0.7	5.2	7.0	1.7	11.3	5.8	0.3	0.0		2.8
5/15/2024	2.1	10.0	0.7	4.9	5.9	2.0	9.4	5.3	0.3	0.0		2.6
5/16/2024	2.1	11.5	1.0	5.5	19.4	2.8	18.7	6.2	0.7	0.2		3.6
5/17/2024	2.3	11.3	0.9	5.3	13.4	2.4	13.2	6.1	0.6	0.2		3.2
5/18/2024	2.7	13.7	1.1	5.6	16.1	2.8	18.3	7.4	0.7	0.1		3.7
5/19/2024	2.3	11.3	0.9	4.5	10.4	2.2	10.8	5.6	0.4	0.0		2.9
5/20/2024	3.0	14.1	1.6	5.5	19.1	3.1	21.5	7.2	1.4	0.2	0.0	4.2
5/21/2024	4.0	19.3	3.7	7.5	26.0	9.7	41.6	9.6	4.1	1.7	0.0	16.7
5/22/2024	8.9	47.3	8.5	11.0	43.8	10.5	76.6	21.0	5.2	0.8	0.0	29.5
5/23/2024	7.3	40.6	3.2	7.4	24.6	5.0	38.3	10.5	2.8	0.1	0.0	17.8
5/24/2024	6.7	30.0	3.4	8.0	24.1	4.5	35.1	11.3	2.6	0.3	0.0	14.1
5/25/2024	6.0	27.4	2.9	6.6	20.3	3.5	25.6	8.7	1.6	0.1	0.0	10.9
5/26/2024	5.2	18.7	2.3	5.3	16.4	2.7	15.9	6.4	1.1	0.0	0.0	9.1
5/27/2024	5.0	16.9	3.9	5.9	18.1	4.9	24.2	6.8	5.2	0.7	0.0	11.0
5/28/2024	5.1	20.3	3.7	6.7	18.8	5.8	28.1	8.5	4.3	0.3	0.0	16.8
5/29/2024	4.1	17.9	2.3	6.3	15.4	4.4	14.2	7.5	2.4	0.1	0.0	0.2
5/30/2024	3.7	14.6	2.0	4.7	12.6	3.5	10.1	5.5	1.6	0.0	0.0	0.0
5/31/2024	3.9	12.7	2.2	4.9	11.7	4.5	12.5	5.5	2.0	0.3	0.0	4.7
6/1/2024	5.7	32.2	4.4	9.0	14.8	5.9	22.3	14.0	2.8	0.3	0.0	11.5
6/2/2024	5.9	31.0	2.5	7.4	14.6	3.6	13.3	9.3	1.8	0.1	0.0	9.2
6/3/2024	7.4	32.8	6.6	10.4	37.4	6.3	49.5	14.3	2.7	0.4	0.0	10.2
6/4/2024	5.0	34.6	4.2	10.1	26.0	4.4	34.8	12.6	1.7	0.1	0.0	9.3
6/5/2024	3.9	36.1	3.2	11.3	19.9	3.0	22.2	14.2	1.3	0.0	0.0	7.4
6/6/2024	3.4	30.7	2.7	9.6	16.6	2.2	15.5	10.5	0.9	0.0	0.0	6.0
6/7/2024	2.2	22.4	1.9	8.5	14.3	1.9	12.4	8.7	0.7	0.0	0.0	5.3
6/8/2024	1.5	19.0	1.7	8.6	13.1	1.9	11.3	8.6	0.7	0.0	0.0	5.2
6/9/2024	1.1	15.9	1.7	7.5	11.3	1.8	10.0	7.4	0.5	0.0	0.0	4.4
6/10/2024	1.1	12.0	0.8	6.6	11.0	1.7	10.0	6.4	0.4	0.0	0.0	3.6
6/11/2024	1.2	11.6	1.2	6.1	9.8	1.9	8.5	5.7	0.4	0.0	0.0	3.3
6/12/2024	1.2	10.3	1.2	5.3	10.2	1.8	10.3	5.0	0.5	0.1	0.4	3.4
6/13/2024	1.2	9.1	1.1	4.6	9.7	1.8	9.4	4.3	0.4	0.0	0.4	3.3
6/14/2024	1.0	7.8	0.2	4.4	8.9	1.7	10.9	4.0	0.3	0.0	0.2	2.8
6/15/2024	1.7	12.9	3.0	8.5	15.2	4.1	21.5	11.1	2.8	0.6	1.5	4.6
6/16/2024	7.7	57.2	10.0	17.6	42.9	8.9	67.7	30.2	5.1	0.7	2.2	13.2
6/17/2024	9.5	80.1	6.1	27.0	49.1	9.8	71.0	33.0	8.2	0.9	2.1	15.6
6/18/2024	10.7	62.8	4.0	33.0	52.5	5.3	67.0	34.3	6.3	0.3	1.1	13.4
6/19/2024	11.4	39.8	4.0	24.9	50.6	3.5	62.2	25.0	3.3	0.1	0.7	8.6
6/20/2024	10.1	47.1	4.8	19.3	40.3	2.6	49.1	19.0	1.9	0.0	0.5	6.4
6/21/2024	9.1	41.6	4.4	18.0	27.4	2.9	37.6	17.4	1.8	0.2	0.8	7.3
6/22/2024	10.4	49.1	9.6	23.1	38.6	6.7	67.9	26.7	3.3	1.3	2.6	15.0
6/23/2024	10.2	63.9	8.5	23.8	43.2	5.5	70.4	26.5	2.0	0.3	1.0	16.5
6/24/2024	8.5	51.9	5.7	21.3	33.4	2.8	57.5	21.3	1.3	0.1	0.6	9.3
6/25/2024	6.9	42.9	4.5	19.5	23.6	2.2	33.5	18.3	0.9	0.0	0.5	7.6
6/26/2024	4.7	35.3	3.2	17.9	19.4	1.9	21.1	16.4	0.7	0.0	0.4	7.0
6/27/2024	3.1	29.6	2.3	15.6	16.2	1.7	14.1	14.5	0.5	0.0	0.4	5.8
6/28/2024	4.6	35.3	4.7	19.0	30.5	6.6	45.4	21.8	2.5	0.7	1.5	11.0
6/29/2024	4.1	41.7	4.3	17.3	26.7	4.6	34.3	17.5	1.2	0.1	0.6	9.0
6/30/2024	3.4	31.6	3.3	14.3	18.1	3.0	16.3	14.4	0.8	0.0	0.5	6.5

Date	BL3	ECER	GC1	Hamel	IP2	NLS	PCO	PEONY	PIKE	PL1	PL2	RDG
7/1/2024	3.0	25.4	2.6	11.8	15.2	2.1	11.9	12.0	0.6	0.0	0.5	6.1
7/2/2024	2.9	21.6	2.1	9.9	13.2	1.7	10.3	10.2	0.5	0.0	0.6	6.2
7/3/2024	2.7	18.5	1.6	9.3	10.7	1.6	10.1	9.5	0.4	0.0	0.5	5.2
7/4/2024	2.6	18.0	2.5	9.5	9.3	2.5	13.1	10.3	1.3	0.3	1.1	6.4
7/5/2024	3.0	20.4	2.9	9.5	8.5	2.4	10.9	11.0	1.0	0.1	0.8	9.0
7/6/2024	2.5	19.1	2.0	8.1	7.7	1.8	9.0	8.8	0.7	0.0	0.5	6.8
7/7/2024	2.7	15.1	1.6	6.9	7.4	1.7	9.3	7.6	0.5	0.0	0.5	5.1
7/8/2024	2.7	12.6	1.1	5.9	6.4	1.6	8.7	6.5	0.4	0.0	0.3	4.5
7/9/2024	2.7	10.9	1.1	5.5	29.6	1.6	28.8	5.7	0.3	0.4	1.5	5.2
7/10/2024	2.7	10.5	1.6	4.8	17.6	2.5	16.6	5.0	0.6	0.1	0.5	5.0
7/11/2024	2.4	10.1	1.2	4.3	11.1	2.4	10.0	4.5	0.3	0.0	0.2	3.9
7/12/2024	2.1	9.2	0.5	3.7	8.3	1.9	11.8	3.9	0.2	0.0	0.2	3.4
7/13/2024	2.0	9.4	1.1	4.3	8.3	2.7	10.7	5.5		0.2	0.7	4.7
7/14/2024	3.7	23.9	5.4	9.2	12.9	5.4	14.1	12.9		0.6	1.3	10.1
7/15/2024	2.8	5.5	3.3	7.0	19.2	3.1	8.3	6.9	0.7	0.1	0.7	7.5
7/16/2024	2.6	4.2	2.0	6.0	32.0	2.0	17.6	5.4	0.5	0.0	0.4	4.9
7/17/2024	2.6	7.9	1.1	5.0	13.7	1.7	10.7	3.9	0.3	0.0	0.3	3.8
7/18/2024	1.8	12.5	0.4	4.3	10.0	1.5	10.5	2.6	0.3	0.0	0.2	3.6
7/19/2024	1.3	9.9	0.2	3.4	8.4	1.6	7.7	1.5	0.2	0.0	0.2	3.3
7/20/2024	1.0	7.1	0.2	2.9	7.1	1.6	1.9	1.7	0.2	0.0	0.3	2.9
7/21/2024	0.8	5.9	0.4	2.9	7.1	1.7	4.4	2.5	0.2	0.3	0.6	3.2
7/22/2024	0.6	5.1	0.3	2.6	7.0	1.7	5.3	2.1	0.4	0.0	0.3	2.5
7/23/2024	0.6	4.5	0.2	2.3	7.6	1.7	5.4	1.9	0.3	0.0	0.2	2.3
7/24/2024	0.4	3.4	2.1	2.2	6.4	1.5	5.3	2.0	0.2	0.0	0.2	2.2
7/25/2024	0.2	2.4	4.0	1.9	6.0	1.4	5.9	1.6	0.2	0.0	0.2	1.9
7/26/2024	0.1	2.4	3.5	2.0	6.5	1.4	7.9	1.5	0.2	0.0	0.2	1.7
7/27/2024	0.1	1.9	2.5	1.7	7.1	1.4	7.8	1.5	0.1	0.0	0.2	1.7
7/28/2024	0.0	2.2	1.8	2.8	8.1	2.0	6.0	1.9	0.4	0.0	0.2	2.0
7/29/2024	0.1	19.1	1.3	6.5	9.7	7.1	11.0	15.6	2.6	0.2	0.4	5.6
7/30/2024	0.1	2.6	0.4	2.8	6.6	2.5	15.4	3.9	0.9	0.0	0.2	3.1
7/31/2024	0.1	5.4	0.7	4.6	6.7	3.1	25.3	5.5	1.1	0.3	0.7	2.9
8/1/2024	1.0	26.9	2.8	12.0	16.5	10.0	11.5	21.3	3.5	0.6	1.5	8.5
8/2/2024	1.7	13.4	1.0	7.3	24.8	6.1	8.1	10.7	1.5	0.0	0.3	6.3
8/3/2024	1.0	7.2	0.6	6.4	15.0	5.6	12.2	6.9	1.5	0.3	0.7	4.4
8/4/2024	1.8	26.1	3.2	13.3	31.7	7.1	11.6	20.7	2.0	0.2	0.9	6.0
8/5/2024	5.4	46.4	12.1	30.5	37.4	20.4	15.5	44.6	13.5	2.0	4.6	9.5
8/6/2024	5.3	60.6	17.0	42.0	63.5	22.6	11.9	60.3	10.2	0.6	1.5	13.4
8/7/2024	4.3	39.3	8.7	31.9	62.8	11.1	15.1	28.5	6.0	0.1	0.8	8.8
8/8/2024	3.6	30.4	6.0	21.5	56.0	7.4	13.8	19.4	2.8	0.0	0.6	7.3
8/9/2024	2.6	24.9	4.3	15.8	43.8	5.3	14.7	13.5	1.5	0.0	0.4	4.1
8/10/2024	1.5	20.9	3.6	12.4	41.8	5.0	19.7	10.6	0.9	0.0	0.3	2.4
8/11/2024	1.0	17.4	3.0	10.3	26.3	4.8	19.4	8.7	0.5	0.0	0.3	2.5
8/12/2024	0.7	14.3	2.4	8.8	16.4	4.7	15.6	7.2	0.4	0.0	0.3	2.4
8/13/2024	0.6	12.0	1.3	7.4	12.7	4.7	15.3	6.1	0.4	0.0	0.3	2.3
8/14/2024	0.1	10.6	0.4	6.7	10.3	4.7	15.0	5.6	0.3	0.0	0.2	2.2
8/15/2024	0.2	20.8	5.3	10.7	14.2	7.5	16.7	11.1	2.0	0.6	1.7	4.3
8/16/2024	0.7	24.7	5.1	9.6	17.6	8.4	14.4	8.7	1.7	0.0	0.6	4.4
8/17/2024	0.9	23.6	4.9	8.7	17.2	10.1	11.6	7.5	1.8	0.0	0.4	3.9

Date	BL3	ECER	GC1	Hamel	IP2	NLS	PCO	PEONY	PIKE	PL1	PL2	RDG
8/18/2024	0.4	20.8	3.7	7.6	14.7	8.2	11.5	6.2	1.2	0.0	0.3	3.5
8/19/2024	0.4	16.6	2.7	6.5	12.7	6.8	11.3	5.2	0.9	0.0	0.3	2.8
8/20/2024	0.8	13.2	2.0	5.8	8.2	5.7	11.1	4.2	0.7	0.0	0.2	2.5
8/21/2024	0.3	6.5	0.6	5.3	21.8	5.2	11.9	4.2	0.6	0.0	0.2	2.3
8/22/2024	0.4	7.2	0.6	5.2	17.8	5.9	12.1	4.3	0.8	0.1	0.5	2.4
8/23/2024	0.3	5.3	0.5	4.6	3.7	5.2	8.6	4.3	0.6	0.0	0.4	2.0
8/24/2024	0.2	2.5	0.3	4.2	1.0	4.9	8.5	4.1	0.5	0.0	0.2	1.9
8/25/2024	0.2	1.7	0.2	3.9	0.9	4.9	8.4	3.8	0.4	0.0	0.2	1.9
8/26/2024	1.5	3.2	1.6	4.7	6.9	7.2	11.8	5.8	1.5	0.7	1.0	2.0
8/27/2024	6.9	5.7	5.4	7.4	37.4	11.1	16.8	13.0	1.5	0.6	1.0	5.0
8/28/2024	6.2	6.5	2.0	7.7	37.9	5.6	22.6	10.9	0.8	0.0	0.3	4.6
8/29/2024	5.6	9.5	2.6	8.2	27.6	4.6	43.9	9.4	2.1	0.6	0.7	5.3
8/30/2024	7.8	21.4	3.5	8.7	41.1	4.6	57.7	11.0	2.4	0.2	0.6	3.9
8/31/2024	6.4	24.0	1.1	6.1	30.6	2.9	31.7	5.4		0.0	0.3	4.8
9/1/2024	5.3	14.0	0.5	4.8	21.1	2.2	20.3	4.0		0.0	0.2	4.2
9/2/2024	4.5	12.3	1.0	3.9	13.8	1.6	14.4	2.9		0.0	0.2	2.5
9/3/2024	3.9	6.8	0.8	2.6	8.7	1.4	9.3	2.5		0.0	0.1	2.2
9/4/2024	3.3	5.8	0.9	3.0	5.4	1.3	6.5	2.1		0.0	0.1	2.0
9/5/2024	2.8	5.4	0.9	2.7	5.8	1.3	9.8	1.4		0.0	0.1	1.4
9/6/2024	2.4	5.0	0.9	3.0	6.2	1.2	14.1	1.5		0.0	0.1	0.4
9/7/2024	2.0	4.7	0.7	2.7	6.2	1.1	5.9	1.5		0.0	0.1	0.1
9/8/2024	1.7	4.4	0.4	2.0	5.8	1.2	4.7	1.4		0.0	0.1	0.1
9/9/2024	1.4	4.2	0.3	1.9	10.6	1.2	13.9	1.5		0.0	0.1	0.3
9/10/2024	1.2	4.0	0.1	1.9	19.7	1.3	23.5	1.1		0.0	0.1	0.2
9/11/2024	1.1	3.9	0.2	2.3	7.4	1.3	11.8	1.0		0.0	0.1	0.5
9/12/2024	1.0	3.7	0.2	1.7	6.0	1.3	14.0	0.9		0.0	0.1	0.5
9/13/2024	0.9	2.2	0.1	1.4	5.3	1.3	12.8	0.8		0.0	0.1	0.4
9/14/2024	0.8	1.2	0.1	1.8	5.5	1.3	13.2	1.3		0.0	0.1	0.4
9/15/2024	0.6	1.2	0.1	1.3	6.0	1.4	7.6	0.8		0.0	0.1	0.3
9/16/2024	0.6	1.5	0.1	2.0	5.6	1.3	7.7	0.8		0.0	0.1	0.3
9/17/2024	0.5	1.4	0.1	1.9	7.3	1.3	8.5	2.1	0.0	0.0	0.1	0.1
9/18/2024	0.4	1.0	0.1	1.5	4.4	1.2	3.2	1.4	0.0	0.0	0.1	0.2
9/19/2024	0.3	1.2	0.1	1.5	2.0	1.4	2.1	0.9	0.0	0.0	0.1	0.1
9/20/2024	0.3	1.1	0.1	1.3	0.3	1.3	3.6	1.4	0.1	0.0	0.1	0.0
9/21/2024	0.2	1.8	0.1	1.4	0.0	1.3	2.5	1.7	0.2	0.0	0.1	0.0
9/22/2024	0.3	1.3	0.1	1.4	0.9	1.3	7.1	0.9	0.2	0.0	0.0	0.0
9/23/2024	0.2	1.2	0.1	1.5	0.0	1.2	8.0	0.9	0.1	0.0	0.1	0.0
9/24/2024	0.2	1.3	0.0	1.2	0.0	1.1	11.0	0.8	0.2	0.0	0.0	0.0
9/25/2024	0.1	1.4	0.0	1.7	8.0	1.1	8.4	0.9	0.2	0.0	0.0	0.0
9/26/2024	0.1	1.5	0.0	1.5	7.1	1.1	3.2	0.9	0.2	0.0	0.0	0.0
9/27/2024	0.1	2.2	0.0	1.7	6.6	1.1	2.3	0.9	0.2	0.0	0.0	0.0
9/28/2024	0.0	1.2	0.0	2.0	4.4	1.1	1.9	0.9	0.2	0.0	0.0	0.0
9/29/2024	0.0	1.2	0.0	1.7	1.4	1.1	8.8	1.4	0.2	0.0	0.0	0.0
9/30/2024	0.0	1.6	0.0	1.6	4.6	1.1	8.9	0.7	0.1	0.0	0.0	0.0
10/1/2024	0.0	2.1	0.0	1.3	4.5	0.9	2.5	0.7	0.0	0.0	0.1	
10/2/2024	0.0	1.0	0.0	1.2	1.3	0.9	2.2	0.8	0.0	0.0	0.0	
10/3/2024	0.0	0.8	0.0	1.9	0.0	0.8	3.8	0.9	0.0	0.0	0.1	
10/4/2024	0.0	1.1	0.0	2.3	0.0	0.8	2.7	1.3	0.0	0.0	0.1	

Date	BL3	ECER	GC1	Hamel	IP2	NLS	PCO	PEONY	PIKE	PL1	PL2	RDG
10/5/2024	0.0	1.6	0.0	1.2	0.1	0.8	3.1	1.1	0.0	0.0	0.1	
10/6/2024	0.0	1.2	0.0	1.4	0.0	0.7	3.9	1.0	0.0	0.0	0.1	
10/7/2024	0.0	0.9	0.5	1.1	0.0	0.7	4.5	1.0	0.1	0.0	0.1	
10/8/2024	0.0	0.4	0.1	1.5	0.0	0.6	7.1	0.6	0.1	0.0	0.1	
10/9/2024	0.0	0.3	0.0	1.2	0.0	0.6	6.9	0.9	0.1	0.0	0.1	
10/10/2024	0.0	0.4	0.0	0.7	0.0	0.6	6.3	1.1	0.2	0.0	0.0	
10/11/2024	0.0	0.4	0.0	0.9	0.0	0.6	4.5	1.1	0.2	0.0	0.0	
10/12/2024	0.0	0.6	0.0	0.5	0.0	0.5	5.7	1.1	0.2	0.0	0.0	
10/13/2024	0.0	1.3	0.0	0.6	0.0	0.4	2.4	0.5	0.2	0.0	0.0	
10/14/2024	0.0	1.4	0.0	0.4	0.0	0.4	0.6	1.4	0.2	0.0	0.0	
10/15/2024	0.0	0.8	0.0	0.6	0.0	0.3	0.0	1.9	0.2	0.0	0.0	
10/16/2024	0.0	0.6	0.1	0.5	0.0	0.3	0.0	1.3	0.2	0.0	0.0	
10/17/2024	0.0	0.3	0.0	0.6	0.0	0.4	0.0	0.8	0.2	0.0	0.0	
10/18/2024	0.0	0.6	0.0	0.5	0.0	0.4	7.5	0.8	0.0	0.0	0.0	
10/19/2024	0.0	0.2	0.0	0.4	0.0	0.4	1.2	1.1	0.0	0.0	0.0	
10/20/2024	0.0	0.2	0.0	0.2	0.0	0.3	0.9	1.1	0.0	0.0	0.0	
10/21/2024	0.0	0.5	0.0	0.5	0.0	0.3	2.4	0.9	0.0	0.0	0.0	
10/22/2024	0.0	0.6	0.0	0.6	0.0	0.3	3.1	1.4	0.1	0.0	0.0	
10/23/2024	0.0	0.6	0.0	1.3	0.0	0.2	0.7	1.4	0.0	0.0	0.0	
10/24/2024	0.0	0.8	0.0	0.8	0.0	1.2	1.6	1.3	0.4	0.2	0.0	
10/25/2024	0.0	1.3	0.0	1.2	0.0	1.3	4.6	4.0	0.2	0.0	0.0	
10/26/2024	0.0	1.3	0.0	0.3	0.0	1.1	3.0	0.8	0.0	0.0	0.0	
10/27/2024	0.0	1.3	0.0	0.7	0.0	1.0	1.7	0.8	0.0	0.0	0.0	
10/28/2024	0.0	1.2	0.0	0.8	0.0	1.0	3.9	0.9	0.0	0.0	0.0	
10/29/2024	0.0	1.2	0.0	0.9	0.0	1.1	3.3	1.1	0.0	0.0	0.0	
10/30/2024	0.0	1.2	0.0	0.2	0.0	1.0	2.7	1.1	0.0	0.0	0.0	
10/31/2024	0.1	11.5	0.0	2.7	5.6	12.6	15.9	9.0	3.4	0.8	0.0	
11/1/2024	0.6	23.7	0.0	1.3	4.8	8.4	5.7	7.9	2.1	0.0	0.0	
11/2/2024	0.9	20.9	0.0	1.3	2.7	4.3	4.8	6.0	1.4	0.0	0.0	
11/3/2024	0.7	20.2	0.0	1.5	19.5	2.9	12.0	5.9	0.9	0.0	0.0	
11/4/2024	0.8	20.3	0.0	5.2	32.7	6.0	27.6	7.0	1.5	0.2	0.0	
11/5/2024	0.9	21.7	0.0	7.0	35.9	3.2	34.9	7.2	1.6	0.2	0.0	
11/6/2024	1.0	22.5	0.0	7.8				7.5	1.3	0.0	0.0	
11/7/2024	0.8	19.5		7.4				5.2	0.8			
11/8/2024	0.6	16.5							0.6			
11/9/2024		14.5										
11/10/2024		14.3										
11/11/2024		14.1										
11/12/2024		12.7										
11/13/2024		12.0										
11/14/2024		12.9										
11/15/2024		12.4										

Stormwater Sample Data

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
BL3	4/15/24	1.68	39.48	8.06	0.71	1.20		GRAB
BL3	4/16/24	2.19	47.22	16.14	0.64	2.00		COMP
BL3	4/29/24	3.41	30.76	14.48	0.74	-0.50		GRAB
BL3	5/1/24	4.64	31.99	14.57	0.55	0.90		GRAB
BL3	5/6/24	3.97	61.29	25.84	0.61	0.75		GRAB
BL3	5/15/24	0.78	60.92		0.81	4.20		COMP
BL3	5/20/24	1.07	52.38	56.49	0.76	2.35		GRAB
BL3	6/3/24	2.70	55.26	47.63	0.53	1.08		GRAB
BL3	6/17/24	5.45	77.78	35.21	0.69	2.62		GRAB
BL3	7/1/24	1.47	136.30	121.01	1.12	0.86		GRAB
BL3	7/15/24	1.11	167.70	55.90	1.55	8.67		GRAB
BL3	7/29/24	0.03	251.70	51.76	3.06	16.44		GRAB
BL3	8/12/24	0.32	76.25	36.12	0.89	1.32		GRAB
BL3	8/26/24	0.12	156.90	104.61	1.37	3.33		GRAB
BL3	8/27/24	3.02	279.00	117.52	1.80	5.50		GRAB
BL3	9/3/24	1.34	209.60	116.29	1.15	1.84		GRAB
BL3	9/16/24	0.11	139.60	40.33	1.40	3.40		GRAB
BL3	9/30/24	0.00	729.90	52.35	5.79	48.00	86.97	GRAB
BL3	11/1/24	0.35	315.50	55.70	2.30	49.00		COMP
ECER	4/15/24	18.67	86.56	45.34	1.00	3.07	89.97	GRAB
ECER	4/16/24	25.00	153.10	46.40	1.38	34.00	139.96	COMP
ECER	4/29/24	75.15	128.50	80.17	0.93	13.10	71.98	GRAB
ECER	5/6/24	36.57	143.40	77.91	0.71	3.13	63.98	GRAB
ECER	5/19/24	12.37	257.30	89.90	1.10	9.80	59.98	COMP
ECER	5/20/24	15.00	171.70	83.78	1.07	3.42	73.98	GRAB
ECER	5/22/24	38.89	247.40	103.00	1.45	18.80	59.98	COMP
ECER	6/3/24	35.84	165.40	101.48	0.85	3.87	57.98	GRAB
ECER	6/17/24	97.61	221.80	137.92	1.05	11.50	42.99	GRAB
ECER	7/1/24	25.29	286.10	175.12	1.29	6.00	42.99	GRAB
ECER	7/5/24	19.58	378.82	94.28	1.86	30.40	42.99	COMP
ECER	7/13/24	16.33	244.50	151.25	1.46	11.67	39.99	COMP
ECER	7/15/24	5.06	354.50	128.45	1.77	10.33	41.99	GRAB
ECER	7/28/24	29.50	374.00	166.98	2.22	49.86	39.99	COMP
ECER	7/29/24	5.31	227.90	158.07	1.15	20.34	44.99	COMP
ECER	7/30/24	16.96	270.90	145.84	1.63	12.43	45.99	GRAB
ECER	8/12/24	13.96	208.40	94.26	1.18	4.20	37.99	GRAB
ECER	8/26/24	4.04	189.70	107.65	1.19	5.25	47.99	GRAB
ECER	8/27/24	9.05	418.70	134.01	2.08	40.40	47.99	COMP

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
ECER	9/3/24	1.22	222.70	87.48	1.29	2.55	44.99	GRAB
ECER	9/16/24	0.72	240.70	140.99	1.67	2.43	63.98	GRAB
ECER	10/1/24	0.60	380.40	94.96	2.04	11.20	77.98	GRAB
ECER	11/1/24	23.73	257.20	127.50	1.03	13.60	79.98	GRAB
GC-1	4/15/24	0.98	77.26	24.79	0.86	4.80	204.94	GRAB
GC-1	4/16/24	6.91	309.00	42.72	3.07	179.20		COMP
GC-1	5/1/24	7.90	124.55	31.32	1.15	26.57	95.97	COMP
GC-1	4/30/24	4.76	89.17	55.38	0.97	6.92	125.96	GRAB
GC-1	5/2/24	11.74	155.90	61.75	1.17	31.50	89.97	COMP
GC-1	5/6/24	4.33	111.50	34.21	0.93	8.43	145.95	GRAB
GC-1	5/16/24	1.16	215.60		1.31	57.00	161.95	COMP
GC-1	5/18/24	1.11	167.10	61.77	1.46	20.20	145.95	COMP
GC-1	5/20/24	2.13	218.50	84.46	0.95	5.60	153.95	GRAB
GC-1	5/21/24	1.96	209.20	44.97	1.44	57.75	117.96	COMP
GC-1	6/3/24	8.81	199.40	78.70	0.97	25.60	79.98	GRAB
GC-1	6/18/24	3.38	249.50	82.14	0.99	42.40	54.98	COMP
GC-1	6/17/24	13.84	216.60	104.63	1.24	36.60	48.98	GRAB
GC-1	7/1/24	2.64	153.70	94.18	0.50	2.56	111.97	GRAB
GC-1	7/4/24	4.38	173.46	72.62	1.01	14.60	73.98	COMP
GC-1	7/15/24	3.56	182.60	94.72	0.88	4.00	79.98	GRAB
GC-1	7/22/24	0.30	171.20	77.40	1.66	18.03		COMP
GC-1	7/28/24	1.69	158.30	92.32	1.09	6.14	163.95	COMP
GC-1	7/29/24	1.52	155.50	84.15	1.00	4.00	175.95	GRAB
GC-1	7/31/24	2.77	223.80	73.73	1.41	45.96	69.98	COMP
GC-1	8/12/24	2.49	115.40	66.72	0.76	2.43	115.96	GRAB
GC-1	8/15/24	5.59	295.90	65.32	1.90	86.06	47.99	COMP
GC-1	8/16/24	4.56	132.10	71.40	0.90	7.04	69.98	COMP
GC-1	8/24/24	0.42	125.80			12.22	123.96	COMP
GC-1	8/27/24	6.82	398.60	69.27	2.16	84.00	54.98	COMP
GC-1	8/26/24	0.17	106.30	56.61	0.99	18.70	158.95	GRAB
GC-1	9/3/24	0.67	217.00	77.76	0.99	4.53	85.97	GRAB
GC-1	9/16/24	0.11	351.90	50.79	1.49	20.20	177.94	GRAB
GC-1	9/30/24	0.03	115.40	82.72	0.88	9.80	193.94	GRAB
HAMEL	4/15/24	10.04	70.09	27.11	0.97	2.00	69.98	GRAB
HAMEL	4/17/24	32.53	116.50	53.11	1.16	5.40	64.98	GRAB
HAMEL	4/30/24	19.34	70.98	43.77	0.88	2.53	57.98	GRAB
HAMEL	5/1/24	22.95	80.10	48.28	0.97	2.20	71.98	GRAB
HAMEL	5/3/24	22.61	162.70	54.59	1.00	9.57	59.98	COMP
HAMEL	5/6/24	16.14	85.34	59.12	0.81	1.38	65.98	GRAB

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
HAMEL	5/16/24	6.11	258.50		1.66	18.00	83.97	COMP
HAMEL	5/17/24	6.56	356.70	152.63	2.00	14.40	77.98	COMP
HAMEL	5/20/24	5.94	522.90	200.17	3.11	24.00	87.97	GRAB
HAMEL	5/21/24	6.27	536.20	153.97	2.79	27.75	79.98	COMP
HAMEL	6/3/24	11.21	228.00	94.48	1.38	6.40	63.98	GRAB
HAMEL	6/17/24	34.36	345.70	126.94	1.76	20.00	48.98	GRAB
HAMEL	6/18/24	36.59	378.70	113.97	1.47	28.80	39.99	COMP
HAMEL	7/1/24	11.48	547.50	423.24	4.11	18.00	35.99	GRAB
HAMEL	7/4/24	11.18	585.11	181.50	3.27	37.67	46.99	COMP
HAMEL	7/15/24	7.70	574.60	297.80	3.62	14.00	45.99	GRAB
HAMEL	7/22/24	2.67	576.30	186.02	3.95	32.90	43.99	COMP
HAMEL	7/29/24	10.55	995.60	166.62	4.64	102.50		COMP
HAMEL	7/30/24	6.06	364.30	137.02	2.08	11.65		GRAB
HAMEL	7/31/24	12.73	517.80	127.33	1.92	61.02	61.98	COMP
HAMEL	8/12/24	9.35	320.00	179.78	2.09	6.33	41.99	GRAB
HAMEL	8/15/24	12.23	598.00	157.33	2.58	36.19	44.99	COMP
HAMEL	8/16/24	9.78	337.90			16.25	45.99	COMP
HAMEL	8/27/24	8.09	621.20	210.17	3.69	53.33	49.98	COMP
HAMEL	8/26/24	3.77	646.00	384.72	3.26	8.57	103.97	GRAB
HAMEL	9/3/24	3.50	393.80	189.57	2.36	5.75	41.99	GRAB
HAMEL	9/16/24	1.10	363.50	122.32	2.48	4.14	51.98	GRAB
HAMEL	9/30/24	1.01	201.90	68.43	1.94	3.83	76.98	GRAB
HAMEL	10/14/24	0.39	129.70	25.39	1.68	3.60	121.96	GRAB
HAMEL	10/31/24	2.44	460.60	108.19	2.23	64.40	81.97	COMP
IP2	4/7/24	27.77	94.28		0.82	26.80	199.94	COMP
IP2	4/15/24	14.05	71.04	13.67	1.03	3.80	194.94	GRAB
IP2	4/16/24	32.19	179.40	27.33	1.77	28.50	139.96	COMP
IP2	4/27/24	21.85	89.24	21.77	1.43	13.16	155.95	COMP
IP2	4/29/24	46.97	81.49	47.71	0.81	2.23	99.97	GRAB
IP2	5/1/24	39.31	78.52	25.30	0.96	8.22	103.97	COMP
IP2	5/6/24	24.05	92.51	25.61	1.07	2.50	121.96	GRAB
IP2	5/16/24	13.21	253.70		2.13	56.20	163.95	COMP
IP2	5/20/24	17.52	238.20	62.80	1.10	8.20	167.95	GRAB
IP2	5/21/24	43.20	141.80	93.35	0.88	12.20	79.98	COMP
IP2	6/3/24	52.71	181.00	112.27	0.87	8.27	95.97	GRAB
IP2	6/17/24	49.81	158.20	82.30	0.99	8.93	51.98	GRAB
IP2	7/1/24	15.28	155.50	93.31	1.01	3.69	95.97	GRAB
IP2	7/5/24	9.86	163.96	22.33	1.05	28.00	84.97	COMP
IP2	7/16/24	28.65	324.90	174.78	1.76	36.72	81.97	COMP

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
IP2	7/15/24	11.79	165.80	77.67	0.94	4.79	83.97	GRAB
IP2	7/29/24	9.55	209.70	34.94	1.77	15.40	171.95	GRAB
IP2	8/1/24	12.21	253.80	39.48	1.38	40.00	71.98	COMP
IP2	8/12/24	16.48	195.60	146.96	1.66	4.36	69.98	GRAB
IP2	8/15/24	12.77	677.90	82.75	4.80	155.24	72.98	COMP
IP2	8/26/24	1.30	131.60	79.31	1.40	4.46	143.96	GRAB
IP2	8/27/24	14.24	233.10	102.51	1.18	8.03	71.98	GRAB
IP2	9/3/24	13.22	191.00	82.67	1.28	3.14	96.97	GRAB
IP2	9/16/24	5.49	161.90	97.90	1.33	3.00	219.93	GRAB
IP2	9/30/24	0.00	128.60	121.18	1.75	4.93	264.92	GRAB
IP2	11/1/24	5.18	433.90	331.37	0.50	7.20	51.98	GRAB
MCP	4/29/24		103.50	64.76				GRAB
MCP	5/2/24		64.35	20.31				GRAB
MCP	5/24/24		166.00					GRAB
MCP	7/15/24		211.90	71.70				GRAB
MCP	8/1/24		157.60	18.40				GRAB
NLS	4/15/24	1.30	53.09	13.03	0.80	0.20		GRAB
NLS	4/16/24	9.13	928.00	165.00	2.70	768.00	89.97	COMP
NLS	4/24/24	3.98	90.57	28.31	1.43	5.73	237.93	COMP
NLS	4/29/24	14.53	111.40	59.72	1.16	4.78	99.97	GRAB
NLS	4/30/24	9.04	332.84	38.58	2.18	160.00	31.99	COMP
NLS	5/6/24	2.25	100.50	38.83	1.20	12.80	177.94	GRAB
NLS	5/7/24	2.68	131.70	26.85	1.11	38.50	115.96	COMP
NLS	5/20/24	3.38	150.50	75.10	0.97	3.76	199.94	GRAB
NLS	5/21/24	12.68	186.70	68.25	1.57	34.33	12.00	COMP
NLS	6/2/24	3.89	197.90	56.81	1.63	48.00	109.97	COMP
NLS	6/3/24	6.13	143.20	93.37	0.98	2.80	95.97	GRAB
NLS	6/17/24	14.33	149.10	79.02	0.93	8.67	40.99	GRAB
NLS	7/1/24	2.35	142.20	62.80	1.48	3.00	129.96	GRAB
NLS	7/15/24	3.16	193.40	76.93	1.19	4.37	84.97	GRAB
NLS	7/29/24	6.22	185.40	75.81	1.28	20.29	67.98	GRAB
NLS	7/31/24	7.03	234.30	46.56	2.79	56.51	45.99	COMP
NLS	8/12/24	4.75	108.80	61.10	2.07	2.17	179.94	GRAB
NLS	8/15/24	9.06	300.90	232.48	4.01	16.40	4.00	COMP
NLS	8/26/24	4.85	133.90	101.23	2.27	4.56	175.95	GRAB
NLS	8/27/24	11.32	210.80	72.88	0.98	11.01	51.98	GRAB
NLS	9/3/24	1.41	350.30	39.58	1.58	3.43	105.97	GRAB
NLS	9/30/24	1.13	256.80	198.33	1.32	1.87	198.94	GRAB
NLS	11/1/24	8.83	241.20	118.35	1.30	7.00	109.97	GRAB

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
NLS	7/22/24	1.72	250.60	104.70	3.20	69.80	113.96	COMP
PCO	4/7/24	48.63	100.70		0.91	33.20	169.95	COMP
PCO	4/15/24	14.20	63.00	7.57	1.01	2.80		GRAB
PCO	4/16/24	38.86	130.20	24.46	1.78	31.60	139.96	COMP
PCO	4/29/24	63.01	69.14	33.05	0.97	3.56	103.97	GRAB
PCO	5/1/24	54.67	79.69	19.28	0.95	10.64	103.97	COMP
PCO	5/6/24	28.58	69.15	24.87	0.90	1.88	137.96	GRAB
PCO	5/20/24	27.43	109.20	32.21	0.90	3.44	107.97	GRAB
PCO	6/3/24	19.95	157.80	74.49	1.01	6.57	95.97	GRAB
PCO	6/15/24	57.14	108.70	48.44	0.97	7.69	76.98	COMP
PCO	6/17/24	75.42	130.60	67.70	0.86	9.00	50.98	GRAB
PCO	7/1/24	86.46	127.20	57.75	0.81	2.75	109.97	GRAB
PCO	7/14/24	12.31	123.10	48.78	1.16	13.00	76.98	COMP
PCO	7/15/24	11.17	143.90	63.39	1.15	4.43	87.97	GRAB
PCO	7/29/24	9.49	381.60	81.63	2.97	46.67	75.98	COMP
PCO	7/30/24	8.32	168.70	47.49	1.48	10.44	83.97	GRAB
PCO	8/12/24	15.68	148.30	86.74	1.23	2.61	95.97	GRAB
PCO	8/26/24	14.53	104.20	50.25	1.17	2.20	139.96	GRAB
PCO	8/27/24	13.90	158.20	20.82	1.39	13.80	69.98	COMP
PCO	9/3/24	8.22	152.90	94.97	1.04	1.28	97.97	GRAB
PCO	9/30/24	11.71	84.85	32.41	1.48	1.73	285.91	GRAB
PCO	10/31/24	44.69	260.40	101.94	1.32	65.20	53.98	COMP
PEONY	4/15/24	9.53	75.25	35.53	0.84	1.73	74.98	GRAB
PEONY	4/17/24	46.08	175.30	79.83	1.51	38.80	69.98	GRAB
PEONY	4/28/24	28.59	133.25	62.41	1.12	25.71	65.98	COMP
PEONY	4/30/24	24.03	106.30	82.81	0.89	4.60	65.98	GRAB
PEONY	5/2/24	33.39	106.90	67.60	0.81	2.75	63.98	COMP
PEONY	5/6/24	17.52	125.00	85.48	0.84	3.25	63.98	GRAB
PEONY	5/16/24	6.35	193.30		1.40	6.77	63.98	COMP
PEONY	5/20/24	7.96	358.10	160.72	1.81	18.60	93.97	GRAB
PEONY	6/3/24	16.83	266.10	148.85	1.19	12.00	67.98	GRAB
PEONY	6/17/24	59.12	454.00	155.86	1.92	128.67	41.99	GRAB
PEONY	7/1/24	12.30	496.60	376.77	2.90	17.20	40.99	GRAB
PEONY	7/15/24	8.12	500.00	274.31	2.52	14.67	48.98	GRAB
PEONY	7/22/24	2.12	480.30	105.60	2.82	64.75	51.98	COMP
PEONY	7/29/24	29.73	1196.00	204.78	0.58	417.50		COMP
PEONY	7/30/24	15.48	489.90	276.03	1.69	18.85	41.99	GRAB
PEONY	7/31/24	16.52	306.00	154.20	1.50	47.87	55.98	COMP
PEONY	8/12/24	7.37	278.20	162.38	1.64	5.60	41.99	GRAB

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
PEONY	8/15/24	13.37	532.90	171.66	2.70	64.94	43.99	COMP
PEONY	8/16/24	8.57	335.10			24.00	47.99	COMP
PEONY	8/26/24	3.82	439.10	242.53	2.32	5.66	51.98	GRAB
PEONY	8/27/24	12.76	483.40	200.98	1.91	21.80	45.99	GRAB
PEONY	9/3/24	2.47	349.50	170.23	2.03	5.29	46.99	GRAB
PEONY	9/16/24	0.49	277.00	136.30	1.54	5.33	60.98	GRAB
PEONY	9/30/24	0.50	222.60	124.50	1.49	7.90	71.98	GRAB
PEONY	10/14/24	1.86	178.20	61.37	1.14	12.29	85.97	GRAB
PEONY	10/28/24	0.80	297.20	156.21	0.80	2.60	103.97	GRAB
PEONY	11/1/24	7.62	386.30	209.70	1.26	7.00	69.98	GRAB
PIKE	4/15/24	3.68	82.39	5.80	1.44	4.40	469.85	GRAB
PIKE	4/29/24	6.55	98.36	24.90	1.62	5.33	257.92	GRAB
PIKE	5/1/24	2.66	95.77	11.98	1.52	3.60	255.92	GRAB
PIKE	5/6/24	2.32	105.30	21.66	1.52	5.71	257.92	GRAB
PIKE	5/20/24	9.07	207.00	50.99	1.47	7.60	195.94	GRAB
PIKE	6/3/24	0.56	123.70	57.55	1.18	3.75	165.95	GRAB
PIKE	6/17/24	0.57	129.30	70.89	1.06	6.57	86.97	GRAB
PIKE	7/1/24	2.34	148.20	60.73	1.10	8.62	166.95	GRAB
PIKE	7/15/24	0.00	168.10	77.64	1.04	4.43	142.96	GRAB
PIKE	7/23/24	0.47	146.70	91.22	1.55	14.92	139.96	COMP
PIKE	7/29/24	1.69	124.80	53.46	1.00	3.30	153.95	GRAB
PIKE	8/1/24	3.63	159.20	38.51	1.37	25.81	89.97	COMP
PIKE	8/12/24	0.47	130.90	41.59	1.55	4.13		GRAB
PIKE	8/15/24	3.18	174.80	57.75	1.23	17.50	65.98	COMP
PIKE	8/26/24	0.40	150.60	57.08	1.82	3.43	135.96	GRAB
PIKE	8/27/24	3.57	173.80	30.87	1.00	13.33	69.98	COMP
PIKE	9/3/24	0.00	224.40	49.28	1.44	10.60	123.96	GRAB
PIKE	9/16/24	0.22	131.70	77.45	1.21	1.33	210.93	GRAB
PIKE	9/30/24	0.20	169.40	101.19	1.29	6.20	225.93	GRAB
PIKE	10/31/24	4.00	388.00	172.98	1.13	39.00	133.96	COMP
PL1	4/15/24	0.47	928.00	233.22	2.11	45.60	64.98	COMP
PL1	4/22/24	0.01	332.60	156.83	3.08	28.00	16.00	COMP
PL1	4/29/24	0.30	215.00	134.24	1.73	3.16	45.99	GRAB
PL1	4/30/24	0.19	213.99	101.58	1.80	12.00	21.99	COMP
PL1	5/7/24	0.23	445.00	285.00	1.62	8.00	147.95	COMP
PL1	5/16/24	0.65	582.70		2.31	41.02	6.00	COMP
PL1	5/17/24	0.87	227.50	123.66	1.34	6.40	2.00	COMP
PL1	5/20/24	0.11	279.60	122.70	1.41	11.18	21.99	GRAB
PL1	6/3/24	0.24	240.60	151.89	0.99	4.29	17.99	GRAB

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
PL1	6/18/24	0.26	271.60	78.16	1.47	59.60	11.00	COMP
PL1	7/3/24	0.09	169.82	99.70	1.44	17.00		COMP
PL1	7/9/24	2.36	211.60	85.45	2.43	25.20	3.00	COMP
PL1	7/13/24	0.84	368.20	96.71	2.70	92.40		COMP
PL1	7/19/24	0.06	376.90		3.00	125.13		COMP
PL1	7/29/24	0.44	317.00	123.34	2.55	84.86		COMP
PL1	7/31/24	3.14	211.80	93.32	1.54	26.67		COMP
PL1	8/26/24	9.81	339.90	119.22	2.13	69.60	2.00	COMP
PL2	4/15/24	0.08	62.41	19.00	0.59	0.80	279.91	GRAB
PL2	4/17/24	2.67	104.70	41.09	1.10	4.80	54.98	GRAB
PL2	4/27/24	1.83	70.10	24.57	0.75	3.38	143.96	COMP
PL2	5/1/24	2.38	110.34	26.65	1.12	30.43	89.97	COMP
PL2	4/30/24	0.68	65.92	35.70	0.81	2.00	109.97	GRAB
PL2	5/6/24	0.50	84.89	43.64	0.56	2.00	119.96	GRAB
PL2	5/20/24	3.47	195.30	56.20	1.38	9.80	161.95	GRAB
PL2	6/3/24	3.28	131.10	64.51	1.11	6.00	105.97	GRAB
PL2	6/17/24	4.09	147.60	65.61	1.19	13.14	61.98	GRAB
PL2	7/1/24	0.47	148.30	110.33	0.65	4.35	105.97	GRAB
PL2	7/15/24	0.93	253.90	78.50	1.29	12.40	90.97	GRAB
PL2	7/29/24	0.56	256.00	156.95	1.19	7.80	103.97	GRAB
PL2	7/31/24	1.81	343.10	90.89	2.35	80.00	85.97	COMP
PL2	8/12/24	0.28	175.90	56.82	1.19	8.57	60.98	GRAB
PL2	8/26/24	0.24	147.90	326.08	0.92	6.16	92.97	GRAB
PL2	8/27/24	1.43	198.70	61.04	1.07	11.57	67.98	GRAB
PL2	9/3/24	0.13	136.40	93.38	0.86	2.53	176.95	GRAB
PL2	9/16/24	0.08	150.00	179.39	0.98	1.60	93.97	GRAB
PL2	9/30/24	0.04	257.10	136.84	0.89	1.07	126.96	GRAB
PL2	11/1/24	0.71	184.80	61.79	0.61	2.60	85.97	GRAB
RIDGE	4/15/24		40.25	14.54	0.56	0.13	424.87	GRAB
RIDGE	4/30/24	12.00	46.02	19.76	0.58	0.25	309.90	GRAB
RIDGE	5/1/24	10.78	50.84	23.11	0.68	1.08	305.91	GRAB
RIDGE	5/6/24	7.96	46.17	27.96	0.56	0.13	353.89	GRAB
RIDGE	5/20/24	4.68	95.38	42.33	0.75	250.10	311.90	GRAB
RIDGE	6/3/24	9.49	106.90	68.78	0.61	0.57	261.92	GRAB
RIDGE	6/17/24	16.96	223.60	92.38	1.34	12.50	149.95	GRAB
RIDGE	7/1/24	5.29	155.90	154.83	0.57	2.00	253.92	GRAB
RIDGE	7/15/24	8.42	217.70	123.04	1.20	3.71	178.94	GRAB
RIDGE	7/29/24	6.57	311.30	163.16	1.70	8.57	157.95	GRAB
RIDGE	8/12/24	2.29	114.90	68.02	0.74	2.26	247.92	GRAB

Site	Date	Flow	TP	SRP	TN	TSS	Cl	Type
RIDGE	8/26/24	2.16	256.80	138.27	1.81	5.00	337.90	GRAB
RIDGE	8/27/24	5.08	279.10	140.03	1.06	6.60	117.96	GRAB
RIDGE	9/3/24	2.63	114.00	97.46	0.89	1.61	120.96	GRAB
RIDGE	9/16/24	0.43	458.80	102.32	2.20	26.33	264.92	GRAB
RIDGE	11/1/24	0.11	308.90	210.12	1.01	5.00	93.97	GRAB

Lake Sonde Data

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
PAR	1-Apr-24	11:17:19AM	0	5.062	103.6	13.17	1000.0	8.25
PAR	1-Apr-24	11:18:02AM	1	5.054	104.9	13.34	998.0	8.26
PAR	1-Apr-24	11:18:25AM	2	5.036	105.1	13.37	998.0	8.27
PAR	1-Apr-24	11:19:00AM	3	5.005	105.2	13.39	999.0	8.27
PAR	1-Apr-24	11:19:47AM	4	4.980	105.1	13.38	999.0	8.27
PAR	1-Apr-24	11:20:26AM	5	4.872	104.3	13.32	1001.0	8.27
PAR	1-Apr-24	11:20:48AM	6	4.852	103.9	13.28	1002.0	8.26
PAR	1-Apr-24	11:21:10AM	7	4.821	103.4	13.23	1003.0	8.26
PAR	1-Apr-24	11:21:37AM	8	4.683	102.5	13.16	1004.0	8.25
PAR	1-Apr-24	11:22:14AM	9	4.543	101.2	13.04	1005.0	8.23
PAR	1-Apr-24	11:22:50AM	10	4.531	99.8	12.86	1006.0	8.21
PAR	1-Apr-24	11:23:06AM	11	4.477	94.1	12.15	1017.0	8.03
PAR	1-Apr-24	11:27:56AM	11.33	4.505	50.5	6.51	1067.0	7.18
PAR	7-May-24	02:07:04PM	0	15.320	113.0	11.28	955.0	8.29
PAR	7-May-24	02:08:07PM	1	15.262	113.8	11.38	954.0	8.32
PAR	7-May-24	02:08:54PM	2	15.211	114.0	11.41	954.0	8.33
PAR	7-May-24	02:09:32PM	3	13.442	109.2	11.36	958.0	8.27
PAR	7-May-24	02:10:13PM	4	12.418	98.3	10.47	972.0	8.15
PAR	7-May-24	02:11:01PM	5	11.129	87.4	9.58	988.0	8.06
PAR	7-May-24	02:11:54PM	6	10.212	76.9	8.61	992.0	7.96
PAR	7-May-24	02:12:48PM	7	9.616	68.3	7.75	1003.0	7.87
PAR	7-May-24	02:14:35PM	8	7.845	16.2	1.92	1032.0	7.50
PAR	7-May-24	02:15:42PM	9	7.303	7.7	0.92	1047.0	7.35
PAR	7-May-24	02:16:11PM	10	7.159	6.6	0.80	1053.0	7.30
PAR	7-May-24	02:17:05PM	11	7.113	5.7	0.68	1055.0	7.25
PAR	7-May-24	02:17:34PM	11.03	7.099	5.4	0.65	1068.0	7.13
PAR	20-May-24	01:58:07PM	0	19.972	126.2	11.45	988.0	
PAR	20-May-24	01:58:39PM	1	19.570	128.2	11.72	991.0	
PAR	20-May-24	01:59:12PM	2	19.310	128.6	11.83	989.0	
PAR	20-May-24	01:59:37PM	3	18.639	106.1	9.88	999.0	
PAR	20-May-24	02:00:13PM	4	14.954	81.3	8.18	1024.0	
PAR	20-May-24	02:01:04PM	5	11.958	74.8	8.04	1043.0	
PAR	20-May-24	02:01:35PM	6	10.895	68.2	7.52	1044.0	
PAR	20-May-24	02:02:10PM	7	9.733	48.8	5.52	1060.0	
PAR	20-May-24	02:04:23PM	8	8.794	8.5	0.98	1075.0	
PAR	20-May-24	02:04:42PM	9	7.842	7.0	0.83	1098.0	
PAR	20-May-24	02:05:06PM	10	7.701	6.0	0.71	1103.0	

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
PAR	20-May-24	02:05:21PM	11	7.459	5.5	0.66	1118.0	
PAR	20-May-24	02:05:57PM	11.21	7.441	5.0	0.60	1159.0	
PAR	4-Jun-24	01:58:41PM	0	22.403	121.5	10.52	899.0	
PAR	4-Jun-24	01:59:03PM	1	22.298	121.6	10.54	899.0	
PAR	4-Jun-24	01:59:34PM	2	20.336	124.0	11.17	902.0	
PAR	4-Jun-24	01:59:56PM	3	19.606	127.8	11.68	901.0	
PAR	4-Jun-24	02:00:37PM	4	16.978	63.1	6.09	958.0	
PAR	4-Jun-24	02:01:03PM	5	13.465	58.9	6.13	1026.0	
PAR	4-Jun-24	02:01:23PM	6	10.657	51.0	5.65	1036.0	
PAR	4-Jun-24	02:02:22PM	7	9.636	17.9	2.03	1048.0	
PAR	4-Jun-24	02:03:30PM	8	8.715	10.3	1.19	1068.0	
PAR	4-Jun-24	02:04:16PM	9	8.044	8.4	0.99	1088.0	
PAR	4-Jun-24	02:04:36PM	10	7.737	7.9	0.94	1100.0	
PAR	4-Jun-24	02:04:52PM	11	7.650	7.4	0.89	1104.0	
PAR	4-Jun-24	02:06:18PM	11.33	7.589	6.4	0.76	1167.0	
PAR	17-Jun-24	01:58:26PM	0	21.969	111.8	9.75	828.0	
PAR	17-Jun-24	01:58:51PM	1	21.975	112.0	9.77	829.0	
PAR	17-Jun-24	01:59:25PM	2	21.830	110.1	9.64	826.0	
PAR	17-Jun-24	02:00:50PM	3	21.317	87.4	7.72	801.0	
PAR	17-Jun-24	02:02:41PM	4	19.685	34.8	3.18	884.0	
PAR	17-Jun-24	02:03:37PM	5	14.678	48.4	4.91	993.0	
PAR	17-Jun-24	02:04:59PM	6	11.081	8.8	0.97	1000.0	
PAR	17-Jun-24	02:05:13PM	7	10.318	7.5	0.84	1001.0	
PAR	17-Jun-24	02:05:28PM	8	9.276	6.4	0.73	1020.0	
PAR	17-Jun-24	02:05:43PM	9	8.386	5.8	0.68	1045.0	
PAR	17-Jun-24	02:05:56PM	10	8.179	5.5	0.64	1052.0	
PAR	17-Jun-24	02:06:27PM	11	7.952	5.0	0.59	1063.0	
PAR	17-Jun-24	02:07:08PM	11.39	7.969	4.6	0.54	1068.0	
PAR	2-Jul-24	02:09:08PM	0	21.620	112.8	9.91	765.0	8.93
PAR	2-Jul-24	02:10:13PM	1	21.590	112.7	9.92	765.0	8.93
PAR	2-Jul-24	02:11:01PM	2	21.549	112.5	9.90	766.0	8.93
PAR	2-Jul-24	02:12:15PM	3	21.349	104.6	9.24	769.0	8.85
PAR	2-Jul-24	02:13:59PM	4	19.929	9.2	0.84	803.0	7.53
PAR	2-Jul-24	02:15:15PM	5	14.339	13.2	1.35	999.0	7.44
PAR	2-Jul-24	02:15:56PM	6	11.761	8.2	0.89	1010.0	7.44
PAR	2-Jul-24	02:16:23PM	7	9.987	6.9	0.78	1013.0	7.44
PAR	2-Jul-24	02:17:18PM	8	8.901	5.1	0.58	1040.0	7.13
PAR	2-Jul-24	02:17:49PM	9	8.404	4.7	0.55	1054.0	7.04
PAR	2-Jul-24	02:18:23PM	10	8.023	4.5	0.53	1071.0	6.88

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
PAR	2-Jul-24	02:19:01PM	11	7.808	4.3	0.51	1082.0	6.68
PAR	2-Jul-24	02:20:21PM	11.18	7.875	4.2	0.50	1083.0	6.67
PAR	16-Jul-24	01:57:56PM	0	25.678	129.6	10.56	774.0	9.11
PAR	16-Jul-24	01:58:50PM	1	25.640	129.8	10.58	774.0	9.11
PAR	16-Jul-24	01:59:24PM	2	25.555	129.0	10.53	772.0	9.10
PAR	16-Jul-24	02:00:46PM	3	23.311	55.8	4.75	792.0	8.25
PAR	16-Jul-24	02:02:07PM	4	20.699	10.6	0.95	862.0	7.62
PAR	16-Jul-24	02:02:55PM	5	15.774	8.1	0.80	1044.0	7.38
PAR	16-Jul-24	02:04:01PM	6	12.446	6.2	0.66	1056.0	7.13
PAR	16-Jul-24	02:04:30PM	7	10.725	5.5	0.61	1064.0	7.09
PAR	16-Jul-24	02:05:27PM	8	9.314	4.9	0.56	1094.0	6.96
PAR	16-Jul-24	02:05:47PM	9	8.621	4.8	0.56	1116.0	6.89
PAR	16-Jul-24	02:06:23PM	10	8.261	4.6	0.54	1131.0	6.78
PAR	16-Jul-24	02:06:49PM	11	8.125	4.5	0.53	1137.0	6.55
PAR	16-Jul-24	02:07:12PM	11.06	8.138	4.5	0.53	1138.0	6.60
PAR	30-Jul-24	12:42:46PM	0	26.849	133.6	10.65	730.0	9.07
PAR	30-Jul-24	12:43:26PM	1	26.624	133.8	10.71	730.0	9.08
PAR	30-Jul-24	12:44:55PM	2	25.995	132.7	10.75	731.0	9.07
PAR	30-Jul-24	12:45:45PM	3	24.486	72.5	6.04	753.0	8.47
PAR	30-Jul-24	12:46:59PM	4	20.614	16.6	1.49	848.0	7.63
PAR	30-Jul-24	12:47:52PM	5	16.419	26.8	2.62	989.0	7.55
PAR	30-Jul-24	12:49:00PM	6	12.648	8.9	0.94	1016.0	7.40
PAR	30-Jul-24	12:49:22PM	7	10.097	7.5	0.84	1038.0	7.25
PAR	30-Jul-24	12:49:41PM	8	9.081	6.7	0.77	1061.0	7.18
PAR	30-Jul-24	12:50:18PM	9	8.486	6.0	0.70	1082.0	6.92
PAR	30-Jul-24	12:50:42PM	10	8.157	5.7	0.67	1096.0	6.79
PAR	30-Jul-24	12:51:40PM	11	8.220	5.2	0.61	1103.0	6.71
PAR	30-Jul-24	12:52:12PM	11.12	8.162	5.1	0.60	1107.0	6.70
PAR	13-Aug-24	02:40:03PM	0	24.620	119.8	9.95	697.0	8.98
PAR	13-Aug-24	02:40:54PM	1	23.548	126.4	10.71	697.0	9.05
PAR	13-Aug-24	02:41:20PM	2	22.690	122.4	10.54	695.0	8.99
PAR	13-Aug-24	02:41:52PM	3	22.262	111.8	9.71	695.0	8.90
PAR	13-Aug-24	02:42:20PM	4	21.286	72.1	6.38	723.0	8.10
PAR	13-Aug-24	02:42:55PM	5	18.313	34.2	3.21	966.0	7.57
PAR	13-Aug-24	02:43:32PM	6	14.070	21.0	2.16	1067.0	7.38
PAR	13-Aug-24	02:44:07PM	7	11.134	14.7	1.61	1090.0	7.23
PAR	13-Aug-24	02:44:52PM	8	9.857	11.1	1.26	1120.0	7.12
PAR	13-Aug-24	02:46:39PM	9	9.159	7.7	0.88	1144.0	7.02
PAR	13-Aug-24	02:47:29PM	10	8.795	6.8	0.78	1162.0	6.93

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
PAR	13-Aug-24	02:47:57PM	11	8.651	6.4	0.74	1173.0	6.88
PAR	13-Aug-24	02:48:47PM	11.27	8.644	5.9	0.68	1179.0	6.82
PAR	27-Aug-24	11:25:54AM	0	25.734	118.6	9.66	640.0	9.05
PAR	27-Aug-24	11:26:17AM	1	25.713	118.8	9.68	640.0	9.05
PAR	27-Aug-24	11:26:39AM	2	25.181	116.4	9.58	645.0	9.00
PAR	27-Aug-24	11:27:17AM	3	23.308	88.3	7.52	664.0	8.63
PAR	27-Aug-24	11:28:00AM	4	21.291	29.5	2.61	713.0	7.67
PAR	27-Aug-24	11:30:15AM	5	18.959	9.9	0.91	860.0	7.45
PAR	27-Aug-24	11:31:33AM	6	14.463	7.3	0.74	1011.0	7.27
PAR	27-Aug-24	11:32:11AM	7	11.297	6.4	0.70	1037.0	7.16
PAR	27-Aug-24	11:32:30AM	8	9.694	6.1	0.69	1073.0	7.02
PAR	27-Aug-24	11:32:46AM	9	9.303	5.9	0.67	1084.0	6.99
PAR	27-Aug-24	11:33:02AM	10	9.142	5.8	0.66	1090.0	6.95
PAR	27-Aug-24	11:33:15AM	11	9.029	5.7	0.65	1096.0	6.93
PAR	27-Aug-24	11:34:12AM	11.23	8.949	5.3	0.62	1108.0	6.79
PAR	3-Sep-24	01:09:16PM	0	23.341	103.2	8.78	657.0	8.97
PAR	3-Sep-24	01:09:53PM	1	23.217	103.3	8.81	657.0	8.96
PAR	3-Sep-24	01:10:20PM	2	23.159	103.0	8.79	657.0	8.96
PAR	3-Sep-24	01:11:28PM	3	23.013	93.8	8.03	659.0	8.89
PAR	3-Sep-24	01:12:13PM	4	21.900	36.4	3.18	731.0	7.79
PAR	3-Sep-24	01:14:37PM	5	18.873	10.3	0.96	853.0	7.44
PAR	3-Sep-24	01:15:22PM	6	14.158	8.2	0.84	1066.0	7.29
PAR	3-Sep-24	01:15:57PM	7	11.949	7.3	0.78	1083.0	7.19
PAR	3-Sep-24	01:16:24PM	8	10.045	6.7	0.75	1120.0	7.09
PAR	3-Sep-24	01:16:42PM	9	9.368	6.4	0.73	1141.0	7.02
PAR	3-Sep-24	01:17:08PM	10	9.130	6.1	0.71	1151.0	6.95
PAR	3-Sep-24	01:17:43PM	11	8.975	5.9	0.68	1158.0	6.91
PAR	3-Sep-24	01:18:11PM	11.05	9.015	5.7	0.66	1156.0	6.91
PAR	17-Sep-24	12:43:17PM	0	24.281	114.0	9.53	644.0	9.05
PAR	17-Sep-24	12:44:04PM	1	24.162	116.9	9.79	644.0	9.07
PAR	17-Sep-24	12:44:33PM	2	22.871	102.4	8.79	657.0	8.77
PAR	17-Sep-24	12:45:16PM	3	22.065	96.2	8.39	645.0	8.89
PAR	17-Sep-24	12:46:19PM	4	21.266	73.8	6.53	654.0	8.56
PAR	17-Sep-24	12:47:08PM	5	18.664	35.7	3.32	914.0	7.67
PAR	17-Sep-24	12:47:43PM	6	14.204	23.3	2.39	1017.0	7.42
PAR	17-Sep-24	12:51:35PM	7	11.668	9.1	0.99	1037.0	7.21
PAR	17-Sep-24	12:51:59PM	8	10.006	8.4	0.95	1075.0	7.09
PAR	17-Sep-24	12:52:27PM	9	9.351	7.9	0.91	1094.0	7.01
PAR	17-Sep-24	12:52:43PM	10	9.111	7.7	0.88	1106.0	6.97

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
PAR	17-Sep-24	12:52:56PM	11	8.964	7.5	0.87	1118.0	6.93
PAR	17-Sep-24	12:53:42PM	11.16	8.964	7.2	0.82	1120.0	6.89
PAR	9-Oct-24	09:58:23AM	0	15.695	89.2	8.84	702.0	8.61
PAR	9-Oct-24	09:59:04AM	1	15.680	89.0	8.83	702.0	8.63
PAR	9-Oct-24	09:59:40AM	2	15.658	89.1	8.84	702.0	8.64
PAR	9-Oct-24	10:00:54AM	3	15.649	89.2	8.85	702.0	8.66
PAR	9-Oct-24	10:02:03AM	4	15.637	89.1	8.85	703.0	8.66
PAR	9-Oct-24	10:03:31AM	5	15.596	87.7	8.71	705.0	8.65
PAR	9-Oct-24	10:04:50AM	6	15.110	47.9	4.81	760.0	7.95
PAR	9-Oct-24	10:06:03AM	7	11.500	14.8	1.61	1047.0	7.22
PAR	9-Oct-24	10:08:05AM	8	9.565	8.4	0.96	1084.0	6.99
PAR	9-Oct-24	10:08:24AM	9	8.718	7.9	0.92	1119.0	6.92
PAR	9-Oct-24	10:08:43AM	10	8.485	7.6	0.89	1132.0	6.85
PAR	9-Oct-24	10:09:43AM	11	8.404	6.9	0.81	1144.0	6.75
SCH	22-Apr-24	02:09:05PM	0	11.388	109.5	11.96	344.2	9.03
SCH	22-Apr-24	02:10:01PM	1	11.369	110.4	12.05	344.0	9.02
SCH	22-Apr-24	02:10:17PM	2	11.363	110.4	12.06	343.9	9.02
SCH	22-Apr-24	02:10:33PM	3	11.237	110.1	12.07	344.1	9.02
SCH	22-Apr-24	02:10:48PM	4	11.127	109.7	12.04	344.0	9.01
SCH	22-Apr-24	02:10:57PM	5	11.115	109.5	12.03	343.9	9.00
SCH	22-Apr-24	02:11:11PM	6	11.085	109.2	12.01	343.9	8.99
SCH	22-Apr-24	02:11:24PM	7	10.643	107.5	11.94	344.6	8.98
SCH	22-Apr-24	02:11:41PM	8	9.913	100.0	11.30	345.5	8.89
SCH	22-Apr-24	02:12:06PM	8.21	9.842	68.3	7.73	361.5	7.48
SCH	13-May-24	09:55:42AM	0	17.768	115.6	10.98	335.0	
SCH	13-May-24	09:56:14AM	1	17.726	115.4	10.98	334.9	
SCH	13-May-24	09:56:46AM	2	17.693	115.4	10.98	335.0	
SCH	13-May-24	09:57:23AM	3	17.655	115.6	11.01	335.2	
SCH	13-May-24	09:57:51AM	4	17.644	115.5	11.00	335.4	
SCH	13-May-24	09:58:15AM	5	17.590	114.9	10.96	335.5	
SCH	13-May-24	09:58:54AM	6	17.251	113.2	10.87	336.3	
SCH	13-May-24	10:00:05AM	7	16.046	103.9	10.24	337.1	
SCH	13-May-24	10:01:53AM	8	12.705	11.6	1.23	362.4	
SCH	13-May-24	10:02:25AM	8.24	12.546	8.4	0.89	367.8	
SCH	28-May-24	02:34:58PM	0	19.743	91.6	8.36	323.5	
SCH	28-May-24	02:35:32PM	1	19.681	91.4	8.36	323.2	
SCH	28-May-24	02:35:55PM	2	19.493	90.9	8.35	323.1	
SCH	28-May-24	02:36:21PM	3	19.390	90.4	8.31	323.1	
SCH	28-May-24	02:36:43PM	4	19.283	89.9	8.29	322.9	

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
SCH	28-May-24	02:37:05PM	5	19.191	89.4	8.26	322.5	
SCH	28-May-24	02:37:25PM	6	19.175	89.1	8.23	322.4	
SCH	28-May-24	02:38:25PM	7	19.074	83.5	7.73	322.9	
SCH	28-May-24	02:40:02PM	8	16.541	11.1	1.08	373.4	
SCH	28-May-24	02:40:38PM	8.33	15.502	7.7	0.77	407.1	
SCH	10-Jun-24	02:25:19PM	0	22.819	102.1	8.78	310.3	8.89
SCH	10-Jun-24	02:25:58PM	1	22.343	102.4	8.89	309.8	8.91
SCH	10-Jun-24	02:26:45PM	2	22.111	102.4	8.93	309.6	8.91
SCH	10-Jun-24	02:27:06PM	3	21.917	101.1	8.85	309.7	8.90
SCH	10-Jun-24	02:27:30PM	4	21.764	102.0	8.95	309.6	8.95
SCH	10-Jun-24	02:28:05PM	5	21.641	98.7	8.68	309.0	8.91
SCH	10-Jun-24	02:28:33PM	6	21.521	95.5	8.43	309.8	8.85
SCH	10-Jun-24	02:29:10PM	7	21.250	87.5	7.76	310.9	8.71
SCH	10-Jun-24	02:31:01PM	8	17.453	10.2	0.98	373.2	7.03
SCH	10-Jun-24	02:32:19PM	8.25	17.367	6.4	0.61	372.8	6.96
SCH	24-Jun-24	10:21:13AM	0	23.252	67.6	5.77	327.7	7.53
SCH	24-Jun-24	10:21:43AM	1	23.144	66.9	5.72	327.8	7.53
SCH	24-Jun-24	10:22:11AM	2	22.998	65.8	5.64	327.9	7.51
SCH	24-Jun-24	10:22:32AM	3	22.938	64.8	5.56	328.3	7.48
SCH	24-Jun-24	10:22:54AM	4	22.844	63.4	5.45	327.9	7.40
SCH	24-Jun-24	10:23:19AM	5	21.878	55.2	4.83	327.0	7.31
SCH	24-Jun-24	10:23:50AM	6	21.657	46.6	4.10	327.9	7.20
SCH	24-Jun-24	10:24:12AM	7	21.495	38.7	3.42	329.2	7.14
SCH	24-Jun-24	10:25:09AM	8	19.331	10.0	0.92	386.7	7.15
SCH	24-Jun-24	10:26:24AM	8.41	18.909	5.3	0.49	405.9	7.20
SCH	8-Jul-24	02:07:07PM	0	25.001	96.2	7.94	334.7	8.09
SCH	8-Jul-24	02:08:15PM	1	24.088	88.4	7.43	334.4	7.92
SCH	8-Jul-24	02:09:02PM	2	23.814	84.5	7.13	334.7	7.83
SCH	8-Jul-24	02:09:43PM	3	23.637	79.0	6.69	334.5	7.75
SCH	8-Jul-24	02:11:06PM	4	23.513	77.6	6.58	334.5	7.73
SCH	8-Jul-24	02:12:02PM	5	23.361	73.5	6.25	334.3	7.67
SCH	8-Jul-24	02:13:20PM	6	22.005	40.6	3.55	335.5	7.43
SCH	8-Jul-24	02:14:14PM	7	21.313	21.1	1.87	335.1	7.30
SCH	8-Jul-24	02:15:20PM	8	20.137	6.9	0.62	370.6	7.06
SCH	8-Jul-24	02:15:42PM	8.19	20.176	6.2	0.56	375.2	6.90
SCH	22-Jul-24	02:19:34PM	0	27.284	120.9	9.58	323.9	8.59
SCH	22-Jul-24	02:20:09PM	1	26.637	116.9	9.37	324.7	8.48
SCH	22-Jul-24	02:20:56PM	2	26.519	110.9	8.91	324.9	8.36
SCH	22-Jul-24	02:21:39PM	3	26.152	102.7	8.31	325.1	8.15

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
SCH	22-Jul-24	02:22:17PM	4	26.072	96.3	7.79	325.4	8.01
SCH	22-Jul-24	02:22:51PM	5	25.994	93.8	7.60	325.7	7.98
SCH	22-Jul-24	02:23:35PM	6	25.849	85.8	6.98	326.1	7.82
SCH	22-Jul-24	02:24:54PM	7	24.947	33.9	2.80	327.8	7.30
SCH	22-Jul-24	02:25:37PM	8	21.936	14.9	1.30	386.4	7.02
SCH	22-Jul-24	02:27:30PM	8.31	21.104	6.6	0.59	419.8	6.99
SCH	6-Aug-24	01:21:57PM	0	24.061	87.4	7.34	349.1	7.80
SCH	6-Aug-24	01:22:17PM	1	23.685	84.4	7.14	348.8	7.80
SCH	6-Aug-24	01:22:42PM	2	23.171	73.2	6.25	348.4	7.63
SCH	6-Aug-24	01:23:14PM	3	22.991	58.1	4.98	345.9	7.49
SCH	6-Aug-24	01:24:05PM	4	22.888	55.2	4.74	347.3	7.46
SCH	6-Aug-24	01:24:35PM	5	22.657	56.9	4.91	348.4	7.47
SCH	6-Aug-24	01:25:32PM	6	22.613	57.2	4.94	348.1	7.47
SCH	6-Aug-24	01:25:58PM	7	22.571	56.2	4.86	347.9	7.47
SCH	6-Aug-24	01:26:20PM	8	22.503	55.8	4.83	347.6	7.46
SCH	6-Aug-24	01:27:14PM	8.55	22.389	49.1	4.26	371.3	6.96
SCH	19-Aug-24	02:24:28PM	0	24.441	107.2	8.94	329.8	8.04
SCH	19-Aug-24	02:24:55PM	1	23.989	100.8	8.48	329.4	7.82
SCH	19-Aug-24	02:25:22PM	2	23.443	90.4	7.68	329.2	7.63
SCH	19-Aug-24	02:26:08PM	3	23.350	72.9	6.21	329.0	7.42
SCH	19-Aug-24	02:26:44PM	4	23.171	62.9	5.38	329.1	7.32
SCH	19-Aug-24	02:27:05PM	5	22.870	54.7	4.70	329.6	7.27
SCH	19-Aug-24	02:27:50PM	5.34	22.841	46.6	4.01	331.4	7.03
SCH	20-Aug-24	09:21:55AM	0	22.006	46.2	4.03	380.2	7.15
SCH	9-Sep-24	02:26:06PM	0	22.712	98.1	8.46	331.8	8.13
SCH	9-Sep-24	02:26:55PM	1	21.771	93.3	8.19	330.9	8.00
SCH	9-Sep-24	02:27:29PM	2	21.427	89.3	7.88	330.9	7.89
SCH	9-Sep-24	02:28:15PM	3	21.304	84.9	7.52	331.1	7.81
SCH	9-Sep-24	02:29:02PM	4	21.257	82.1	7.28	331.1	7.77
SCH	9-Sep-24	02:29:45PM	5	21.194	78.9	7.00	331.4	7.71
SCH	9-Sep-24	02:30:26PM	6	21.173	77.2	6.85	331.5	7.68
SCH	9-Sep-24	02:30:56PM	7	21.139	77.3	6.87	331.4	7.69
SCH	9-Sep-24	02:31:24PM	8	21.114	77.2	6.86	331.6	7.60
SCH	9-Sep-24	02:33:05PM	8.35	21.094	31.5	2.80	354.1	6.91
SCH	23-Sep-24	02:02:45PM	0	22.141	98.6	8.59	323.6	8.12
SCH	23-Sep-24	02:03:07PM	1	21.684	97.0	8.53	323.5	8.08
SCH	23-Sep-24	02:03:32PM	2	21.486	92.9	8.20	323.8	7.90
SCH	23-Sep-24	02:03:56PM	3	21.286	88.6	7.85	323.9	7.83
SCH	23-Sep-24	02:04:32PM	4	21.116	84.0	7.46	323.9	7.75

Site	Date	Time	Depth (m)	Temp (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (mg/L)	Specific Conductivity (uS/cm)	pH
SCH	23-Sep-24	02:04:57PM	5	21.079	82.6	7.35	324.0	7.74
SCH	23-Sep-24	02:05:18PM	6	20.970	82.3	7.34	324.3	7.76
SCH	23-Sep-24	02:05:46PM	7	20.871	83.2	7.43	324.8	7.79
SCH	23-Sep-24	02:06:50PM	8	20.885	25.5	2.28	321.8	7.12
SCH	23-Sep-24	02:08:16PM	8.2	20.899	24.1	2.15	328.2	6.92
SCH	7-Oct-24	02:16:00PM	0	16.493	78.4	7.65	329.6	7.58
SCH	7-Oct-24	02:16:28PM	1	16.442	77.0	7.53	329.4	7.58
SCH	7-Oct-24	02:17:09PM	2	16.352	75.4	7.38	329.5	7.58
SCH	7-Oct-24	02:17:30PM	3	16.195	74.5	7.32	329.4	7.57
SCH	7-Oct-24	02:18:10PM	4	16.022	72.2	7.12	329.5	7.55
SCH	7-Oct-24	02:18:26PM	5	15.846	71.4	7.06	329.9	7.55
SCH	7-Oct-24	02:19:37PM	6	15.761	69.1	6.85	330.1	7.53
SCH	7-Oct-24	02:19:53PM	7	15.696	69.1	6.86	330.3	7.53
SCH	7-Oct-24	02:21:15PM	7.9	15.916	35.9	3.55	344.1	7.40

Lake Water Quality Data

Date	Site	Depth (m)	TP (ug/L)	SRP (ug/L)	TN (mg/L)	Cl (mg/L)	Chl-a (ug/L) Measured	Secchi (m)
4/1/2024	PAR	0.0	42.340	5.830	0.630	234.93	13.657	1.780
4/1/2024	PAR	4.0	44.310					
4/1/2024	PAR	7.0	44.690					
4/1/2024	PAR	11.0	47.080			224.93		
5/7/2024	PAR	0.0	30.850	3.850	0.410	207.94	8.271	2.703
5/7/2024	PAR	7.0	25.230	3.820				
5/7/2024	PAR	9.0	89.860	63.420				
5/7/2024	PAR	11.0	26.380	5.860		205.94		
5/20/2024	PAR	0.0	26.740	8.360	0.630	207.94	13.200	3.470
5/20/2024	PAR	7.0	23.150	12.780				
5/20/2024	PAR	8.0	47.270	24.340				
5/20/2024	PAR	11.0	294.700	227.080		229.93		
6/4/2024	PAR	0.0	53.000	6.420	0.301	191.94	1.436	3.885
6/4/2024	PAR	9.0	251.100	168.810				
6/4/2024	PAR	11.0	192.300	104.280		209.93		
6/17/2024	PAR	0.0	36.960	10.720	0.390	183.94	21.461	3.430
6/17/2024	PAR	4.0	33.530	10.220				
6/17/2024	PAR	6.0	25.310	9.070				
6/17/2024	PAR	11.0	360.600	280.610		227.93		
7/2/2024	PAR	0.0	53.410	-0.840	0.190		26.525	2.550
7/2/2024	PAR	5.0	77.060	9.480				
7/2/2024	PAR	6.0	31.900	3.750				
7/2/2024	PAR	11.0	533.410	411.400				
7/16/2024	PAR	0.0	33.940	3.960	0.470	158.95	6.606	2.540
7/16/2024	PAR	3.0	31.680	6.820				
7/16/2024	PAR	4.0	43.650	5.260				
7/16/2024	PAR	11.0	497.400	410.620				
7/30/2024	PAR	0.0	82.450	5.580	0.540		0.228	2.075
7/30/2024	PAR	4.0	75.660	11.000				
7/30/2024	PAR	6.0	62.610	4.580				
7/30/2024	PAR	11.0	632.900	442.660				
8/13/2024	PAR	0.0	27.550	17.550	0.570	140.96	7.832	1.700
8/13/2024	PAR	7.0	64.070	15.080				
8/13/2024	PAR	9.0	*6817	*359.78				
8/13/2024	PAR	11.0	*6911	*575.52		223.93		
8/27/2024	PAR	0.0	38.080	32.520	0.540	145.95	10.640	1.730
8/27/2024	PAR	4.0	44.270	7.780				
8/27/2024	PAR	5.0	52.550	5.990				

Date	Site	Depth (m)	TP (ug/L)	SRP (ug/L)	TN (mg/L)	Cl (mg/L)	Chl-a (ug/L)	Secchi (m)
8/27/2024	PAR	11.0	617.800	466.990		227.93		
9/3/2024	PAR	0.0	38.510	12.650	0.630	129.96	16.145	1.375
9/3/2024	PAR	4.0	43.390	19.520	0.640			
9/3/2024	PAR	5.0	58.960	12.120	0.580			
9/3/2024	PAR	11.0	692.800	508.060	4.140	225.93		
9/17/2024	PAR	0.0	22.090	2.800	0.440	137.96	5.313	2.855
9/17/2024	PAR	5.0	33.760	4.420				
9/17/2024	PAR	7.0	106.500	50.210				
9/17/2024	PAR	11.0	339.200	280.640		195.94		
10/9/2024	PAR	0.0	31.020	13.400	0.390	147.95	2.670	3.400
10/9/2024	PAR	6.0	33.690	10.520				
10/9/2024	PAR	8.0	196.800	108.690				
10/9/2024	PAR	11.0	664.100	519.910		227.93		
4/22/2024	SCH	0.0	22.680	3.420	0.790	53.98	0.326	4.210
4/22/2024	SCH	4.0	22.100	3.770				
4/22/2024	SCH	8.0	29.980	4.000		57.98		
5/13/2024	SCH	0.0	28.510	5.200	0.510	51.98	3.103	4.360
5/13/2024	SCH	4.0	39.810	2.680				
5/13/2024	SCH	8.0	29.920	3.680		53.98		
5/28/2024	SCH	0.0	40.550	9.990	0.570		1.102	2.270
5/28/2024	SCH	4.0	40.130	8.490				
5/28/2024	SCH	8.0	46.900	10.860				
6/10/2024	SCH	0.0	49.920	13.890	1.030	51.98	1.698	2.755
6/10/2024	SCH	4.0	46.390	16.490				
6/10/2024	SCH	8.0	44.330	15.510		50.98		
6/24/2024	SCH	0.0	57.630	25.060	0.830		2.873	2.680
6/24/2024	SCH	4.0	60.290	22.860				
6/24/2024	SCH	8.0	69.610	27.220				
7/8/2024	SCH	0.0	69.040	11.590	1.240	47.99	6.640	1.610
7/8/2024	SCH	4.0	69.240	7.240				
7/8/2024	SCH	7.0	51.000	8.160		47.99		
7/22/2024	SCH	0.0	80.940	13.230	1.360		3.104	1.125
7/22/2024	SCH	4.0	81.050	2.990				
7/22/2024	SCH	8.0	79.690	1.630				
8/6/2024	SCH	0.0	100.900	6.410	1.400	49.98	59.717	0.775
8/6/2024	SCH	4.0	78.390	5.700				
8/6/2024	SCH	8.0	72.750	5.650		49.98		
8/19/2024	SCH	0.0	72.310	3.170	1.420		31.506	1.035
8/19/2024	SCH	3.0	63.850	4.510				

Date	Site	Depth (m)	TP (ug/L)	SRP (ug/L)	TN (mg/L)	Cl (mg/L)	Chl-a (ug/L)	Secchi (m)
8/19/2024	SCH	5.0	55.920	3.730				
9/9/2024	SCH	0.0	60.950	4.850	0.980		9.736	1.165
9/9/2024	SCH	4.0	59.470	3.180				
9/9/2024	SCH	8.0	56.190	3.850				
9/23/2024	SCH	0.0	65.630	2.810	1.130		19.966	0.905
9/23/2024	SCH	4.0	65.370	5.590				
9/23/2024	SCH	8.0	79.690	3.960				
10/7/2024	SCH	0.0	50.610	4.090	0.950		3.713	1.700
10/7/2024	SCH	4.0	49.580	3.790				
10/7/2024	SCH	7.0	44.300	2.990				