LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK

Little Saskatchewan River Conservation District

2018 Regional Report

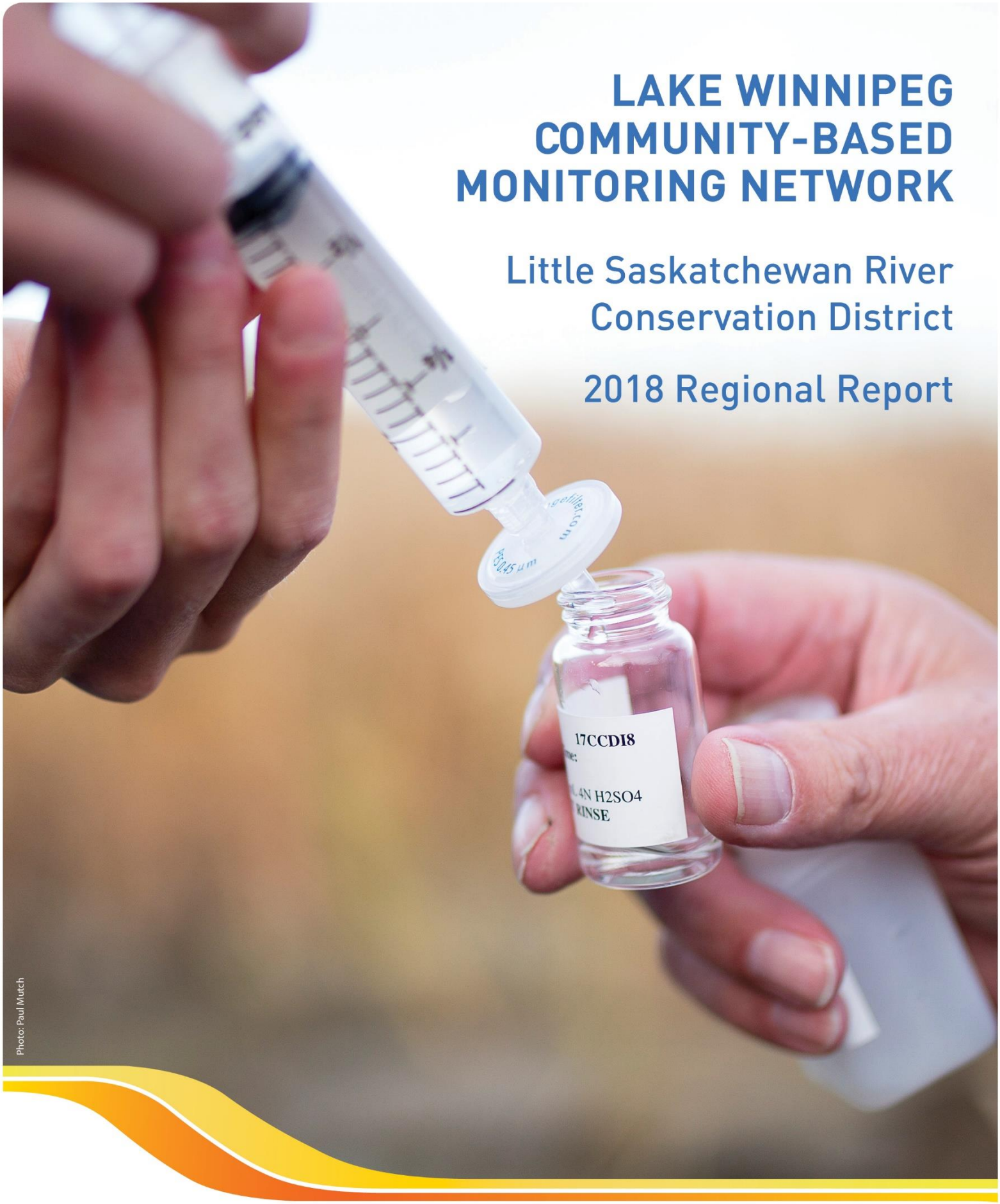

Photo: Paul Mutch

LWF LAKE WINNIPEG FOUNDATION

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LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK: OVERVIEW

Lake Winnipeg, the world's 10th largest freshwater lake, receives its water from a vast watershed – an area of land 40 times larger than the lake itself which includes many smaller sub-watersheds. All human activities across this huge watershed have the potential to impact our water quality. However, the closer you are to Lake Winnipeg, the bigger your impact will likely be.

Phosphorus is the nutrient responsible for the potentially harmful blue-green algae blooms on Lake Winnipeg and on other lakes within the watershed. Different sub-watersheds contribute different proportions of Lake Winnipeg's total phosphorus load. With the help of a strong network of local organizations and citizen scientists, the Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is identifying phosphorus hotspots on the landscape, creating opportunities to target funding and action to achieve the greatest return on investment.

Snow melts, floods and heavy rainfall events are responsible for most of the phosphorus that is flushed from the land and carried into our waterways. LWCBMN samples frequently throughout the season, and particularly during the spring melt, to ensure we capture phosphorus runoff during these high-water events.

Most community-based monitoring (CBM) sampling is conducted at stations where water flow is continuously monitored by the Water Survey of Canada. By tracking flow online using the Water Survey of Canada's real-time data, the network can mobilize partners and citizen scientists across the watershed to ensure frequent sampling during peak flows. Sampling at these stations provides corresponding flow data, allowing CBM data to be used to calculate **phosphorus loads**. We need several samples throughout the season to accurately calculate these loads. Phosphorus loads can subsequently be used to calculate **phosphorus exports**, based on the area of the watershed.

Phosphorus load is the total amount of phosphorus flowing past a sample site over a given period of time.

Phosphorus export is the amount of phosphorus exported by each hectare of land in a year, expressed as kg/ha/y.

The network in action – 2018

In 2018, in its third field season, LWCBMN grew to cover more drainage areas across the province, collecting samples at new sites in the western Red River valley, along Winnipeg River tributaries and in the City of Winnipeg. A total of 1000 samples were collected from 101 sites.

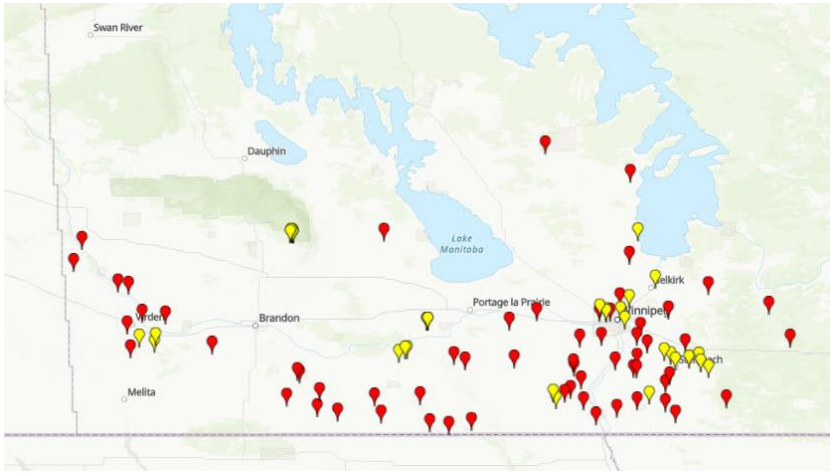


Figure 1. 2018 sample sites. Sites in red are located at Water Survey of Canada flow-metered stations. Sites in yellow are monitored by volunteer samplers where flow is not measured.

2018 RESULTS: OVERVIEW

Table 1. Overview of findings from 2018 LWCBMN phosphorus monitoring data.

REGION	# years of LWCBMN data	# sites in 2018	# samples collected in 2018	Highest phosphorus export in region (2017)	Highest phosphorus export in region (2018)	Regional lead
East Interlake Conservation District	2	4	74	0.33 kg/ha/y (Icelandic River)	0.03 kg/ha/y (Icelandic River and Grassmere Creek)	Armand Belanger (EICD)
Seine Rat River Conservation District	3	20	204	1.64 kg/ha/y (Manning Canal)	0.22 kg/ha/y (Main Drain near Dominion City)	Jodi Goerzen and Chris Randall (SRRCD)
La Salle Redboine Conservation District	3	12	139	0.76 kg/ha/y (La Salle River at Sanford)	0.12 kg/ha/y (Roseisle Creek near Roseisle)	Justin Reid (LSRBCD)
Upper Assiniboine River Conservation District	2	6	102	0.62 kg/ha/y (Arrow River)	0.08 kg/ha/y (Bailey's Creek near Oak Lake)	Ryan Canart (UARCD)
Pembina Valley Conservation District	2	12	102	1.88 kg/ha/y* (Pembina River near Windygates)	0.21 kg/ha/y (Pembina River near Lorne Lake)	Cliff Greenfield (PVCD) and Jason Vanrobaeys (AAFC)
West Souris River Conservation District	1	5	97	-	0.01 kg/ha/y (Pipestone Creek near Pipestone)	Dean Brooker and Scott Hainsworth (WSRCD)
City of Winnipeg	1	6	68	-	0.03 kg/ha/y (Omand's Creek near Empress Street)	Lake Winnipeg Foundation
Western Tributaries of Red River	1	5	27	-	0.11 kg/ha/y (Buffalo Creek near Rosenfeld)	Lake Winnipeg Foundation
Little Saskatchewan River Conservation District	1	6	47	-	No flow metered stations	Colleen Cuvelier (LSRCD)
Cooks Creek Conservation District	2	4	34	-	0.01 kg/ha/y (Cooks Creek below Diversion and at Diversion)	Lake Winnipeg Foundation

In the 2018 field season, southern Manitoba was very dry with low discharge at all sampling sites, resulting in low phosphorus exports and low spatial variation between sub-watersheds. The dry conditions in 2018 highlight the important relationship between water discharge and phosphorus load entering Lake Winnipeg: high water years are high phosphorus loading years and low water years are low phosphorus loading years. For example, the Manning Canal was a phosphorus hotspot in 2016 and 2017 with phosphorus exports of 1.10 kg/ha/y and 1.62 kg/ha/y respectively. In contrast, the Manning Canal had a phosphorus export of 0.07 kg/ha/y in 2018. Though peak phosphorus concentrations were similar in all three years, the water load was ten times lower in 2018 (Figure 2). **Results from the 2018 field season demonstrate that we can reduce the phosphorus entering our lakes by reducing water runoff across the watershed.**

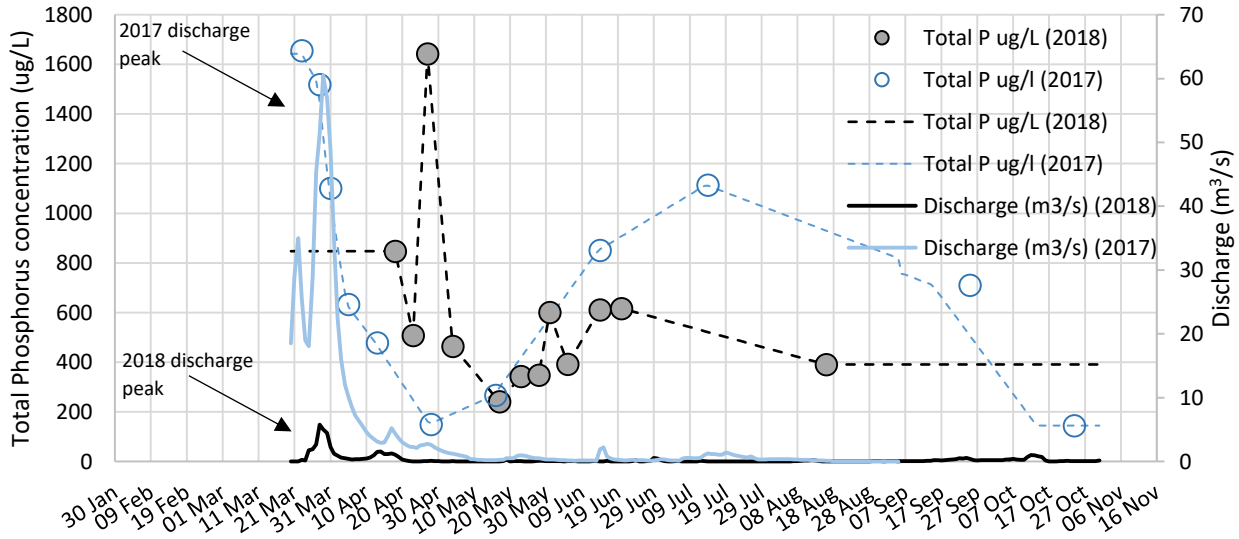


Figure 2. Comparison of phosphorus concentration and discharge in 2017 (blue) and 2018 (black) at the Manning Canal site.

LITTLE SASKATCHEWAN RIVER CONSERVATION DISTRICT

The Little Saskatchewan River Conservation District (LSRCD) is located in southwestern Manitoba and is bordered by Riding Mountain National Park to the north and the Assiniboine River to the south. LSRCD consists of parts of the Little Saskatchewan River watershed and the Arrow-Oak River watershed. The primary land use in LSRCD ranges from specialized agriculture in the south, to grain and cattle mixed with treed areas in the north.

Kerr Lake is a small lake and cottage community just south of Riding Mountain National Park. In recent years, Kerr Lake as experienced an increase in algae blooms. In 2018, LSRCD partnered with LWCBMN through the Lake Winnipeg Foundation's grants program to monitor phosphorus inputs to the lake.

In partnership with LWCBMN, LSRCD staff, with support from local cottagers, sampled the five inflows and the outflow of Kerr Lake. These sites were not located at flow-metered stations. For sites where flow is not measured, useful information can be drawn from the phosphorus concentrations; however, we cannot calculate the phosphorus load because we cannot multiply the concentration by the volume of water flowing by the site.

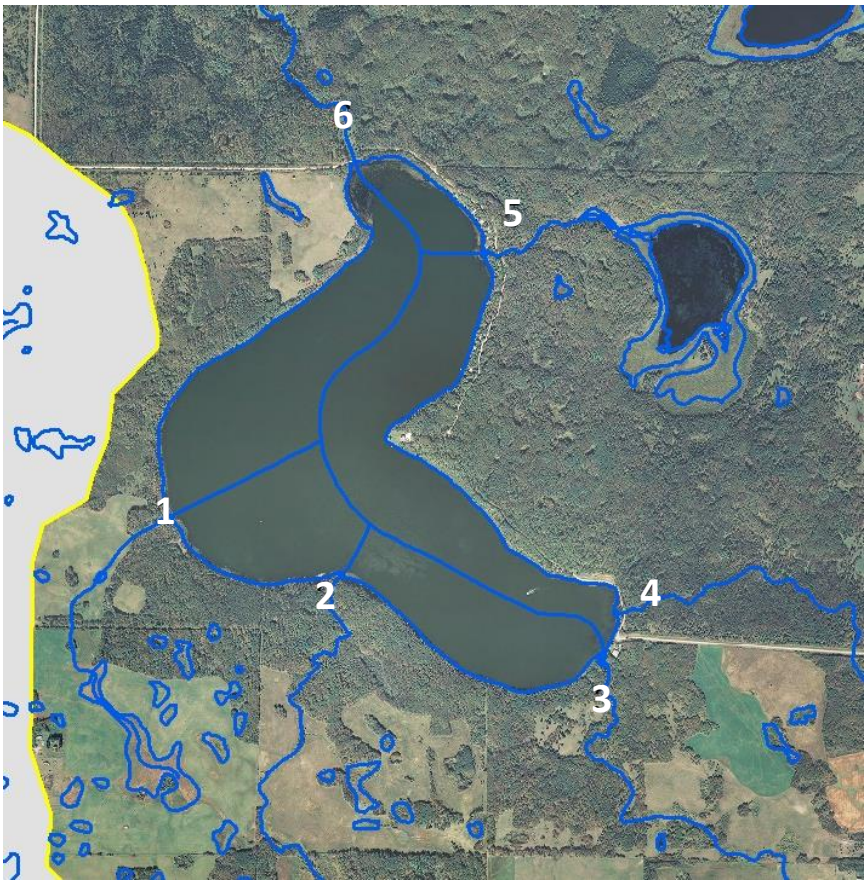
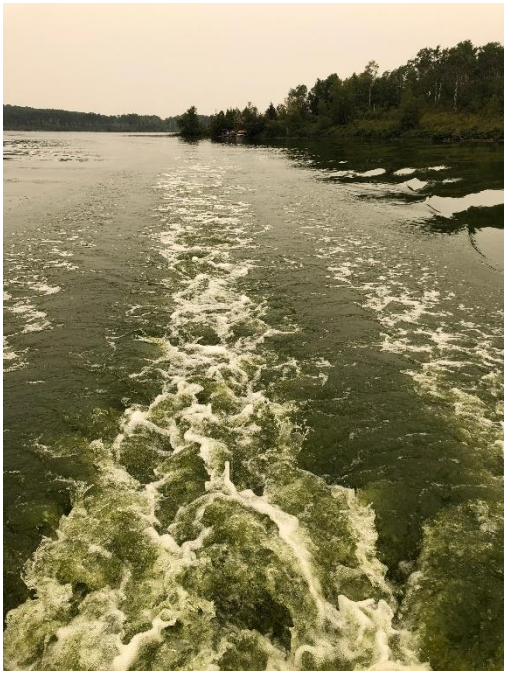


Figure 3. Kerr Lake inflows (1-5) and outflow (6) sampled in 2018.

2018 RESULTS BY SAMPLE SITE

Kerr Lake sample sites



Six sites were sampled around Kerr Lake in LSRCD. Five of these sites are inlets and one is an outlet. The land around the lake is primarily crop land to the south-west and forested to the north-east. The outlet is on the north end of the lake.

Inlet 5 (Figure 7) had drastically greater phosphorus concentrations than the other inlets. This site drains a cattle slough only slightly upstream from Kerr Lake. We do not have flow data and therefore cannot calculate phosphorus loads to know which inlet is the greatest phosphorus contributor; however, based on field notes that suggest Inlet 5 was one of the faster flowing sites and the large discrepancy in concentrations, we recommend that resources be targeted to Inlet 5 to effectively reduce phosphorus inputs to Kerr Lake.

Kerr Lake Inlet 1

In 2018, 10 samples were collected between April 24th and July 4th.

- **2018 greatest phosphorus concentration**: 614 µg/L* (June 21st)

*The "µg" symbol is used to express micrograms

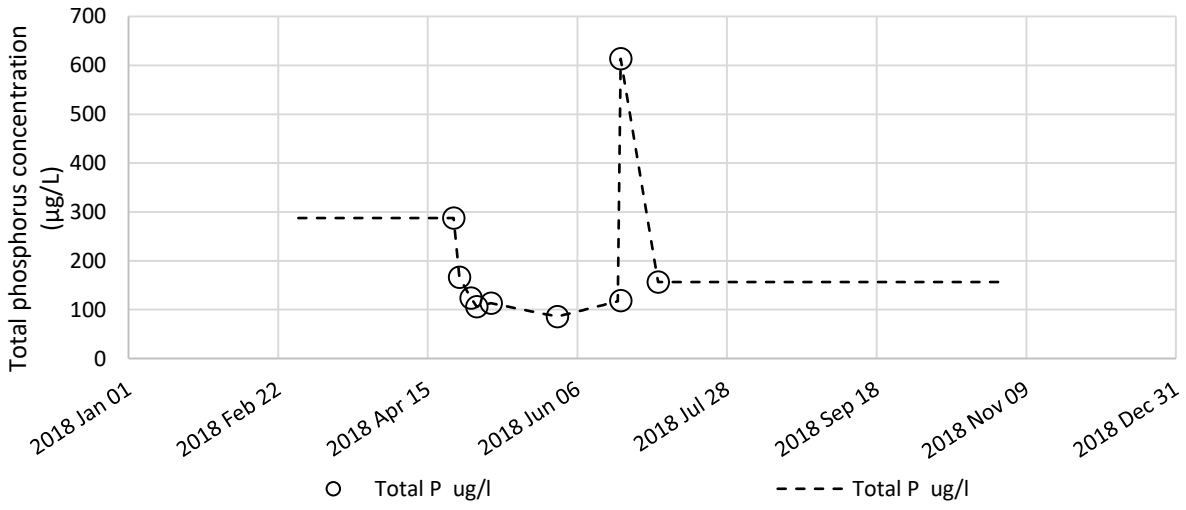


Figure 4. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Inlet 1.

Kerr Lake Inlet 2

In 2018, 7 samples were collected between April 24th and July 4th.

- **2018 greatest phosphorus concentration**: 232 µg/L (April 24th)

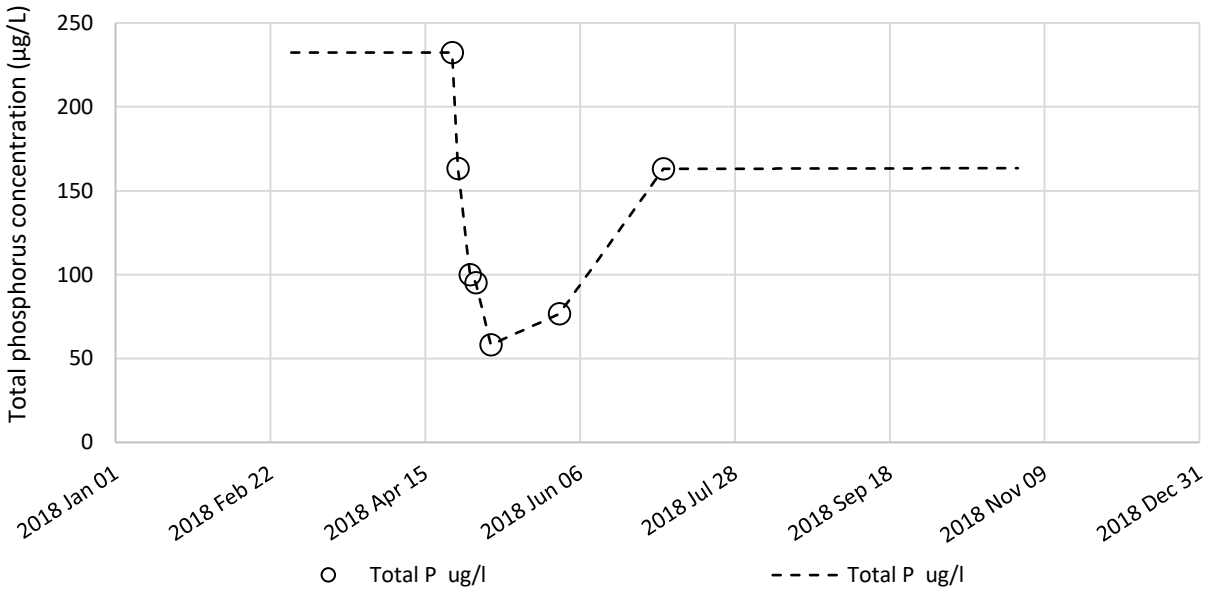


Figure 5. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Inlet 2.

Kerr Lake Inlet 3

In 2018, 6 samples were collected between April 24th and May 30th.

- **2018 greatest phosphorus concentration**: 276 µg/L (April 24th)

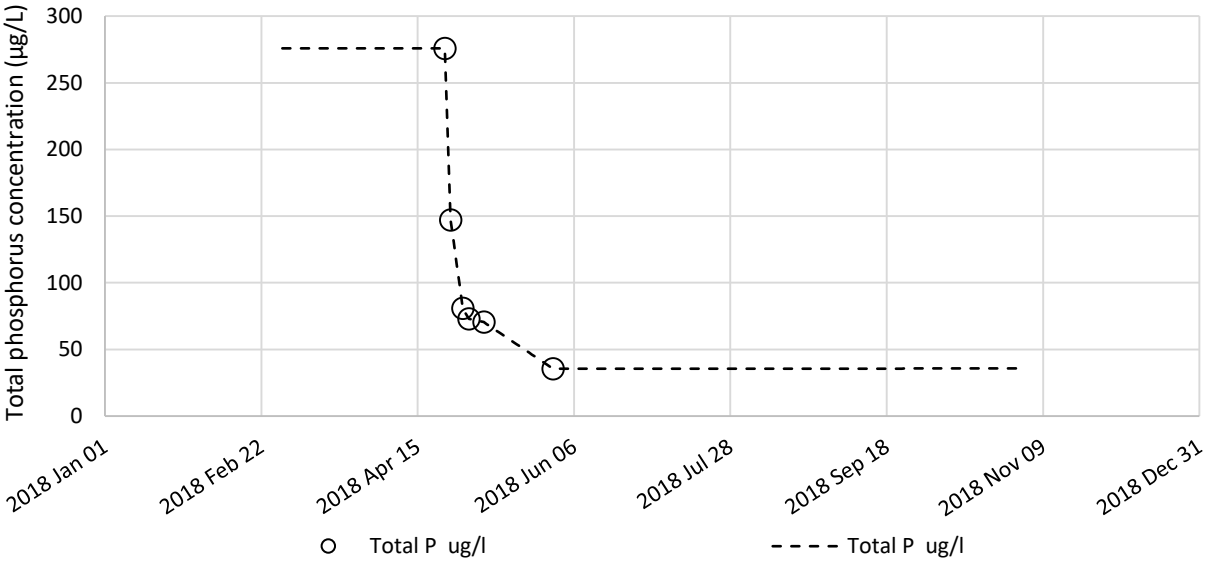


Figure 6. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Inlet 3.

Kerr Lake Inlet 4

In 2018, 7 samples were collected between April 24th and July 4th.

- **2018 greatest phosphorus concentration**: 396 µg/L (April 24th)

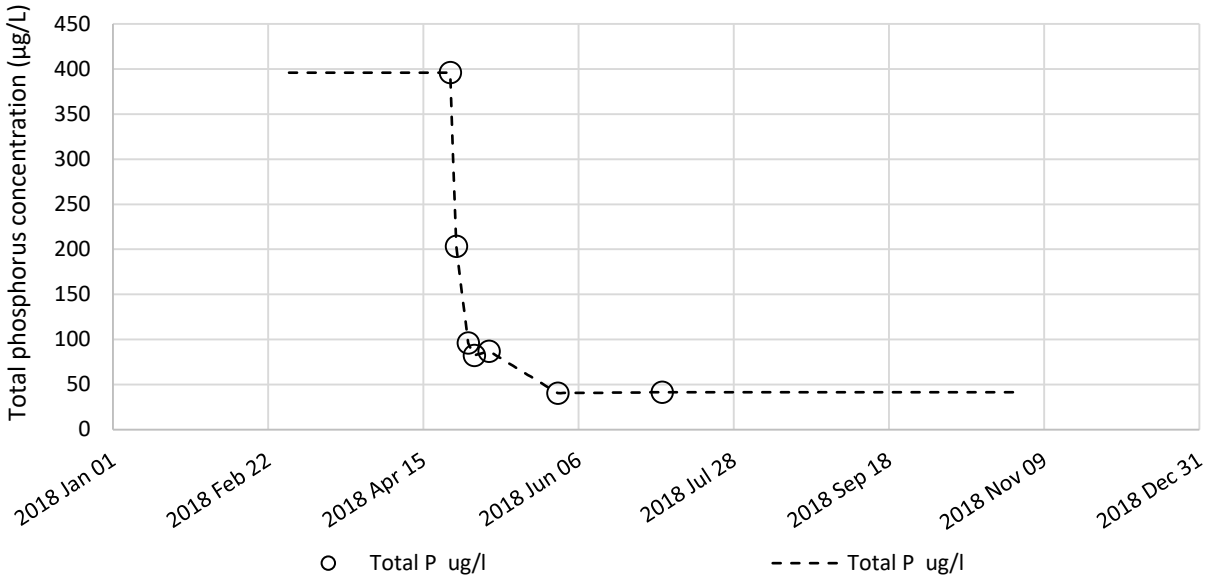


Figure 7. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Inlet 4.

Kerr Lake Inlet 5

In 2018, 7 samples were collected between April 24th and July 4th.

- **2018 greatest phosphorus concentration**: 1655 µg/L (April 24th)

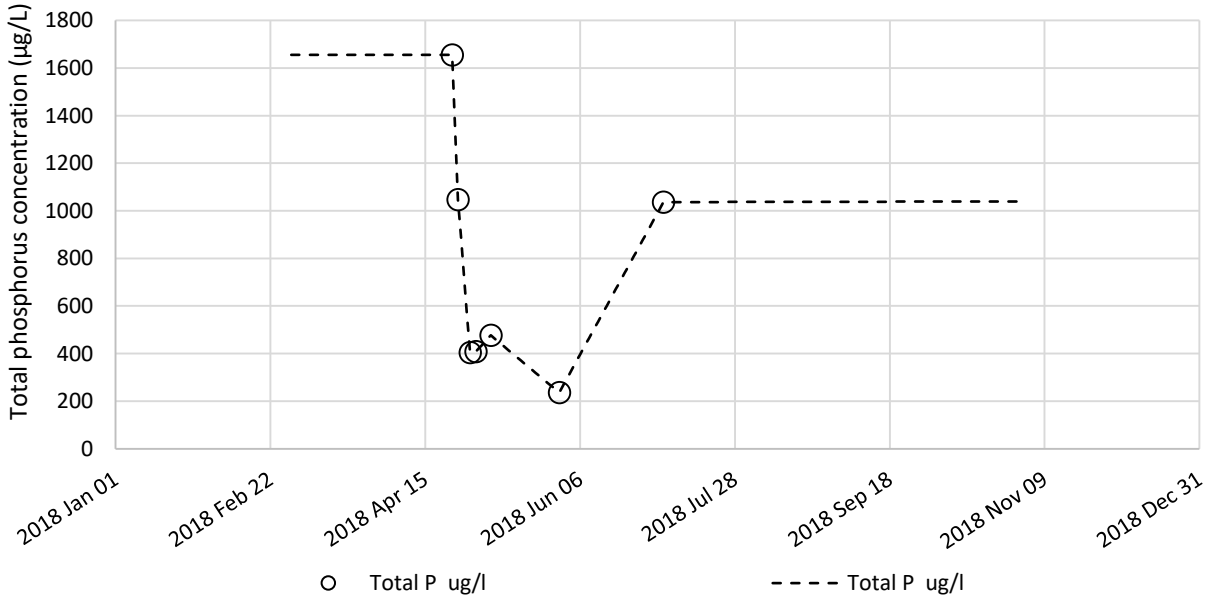


Figure 8. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Inlet 5.

Kerr Lake Outlet

In 2018, 10 samples were collected between April 24th and June 21st.

- **2018 greatest phosphorus concentration**: 861 µg/L (April 26th)

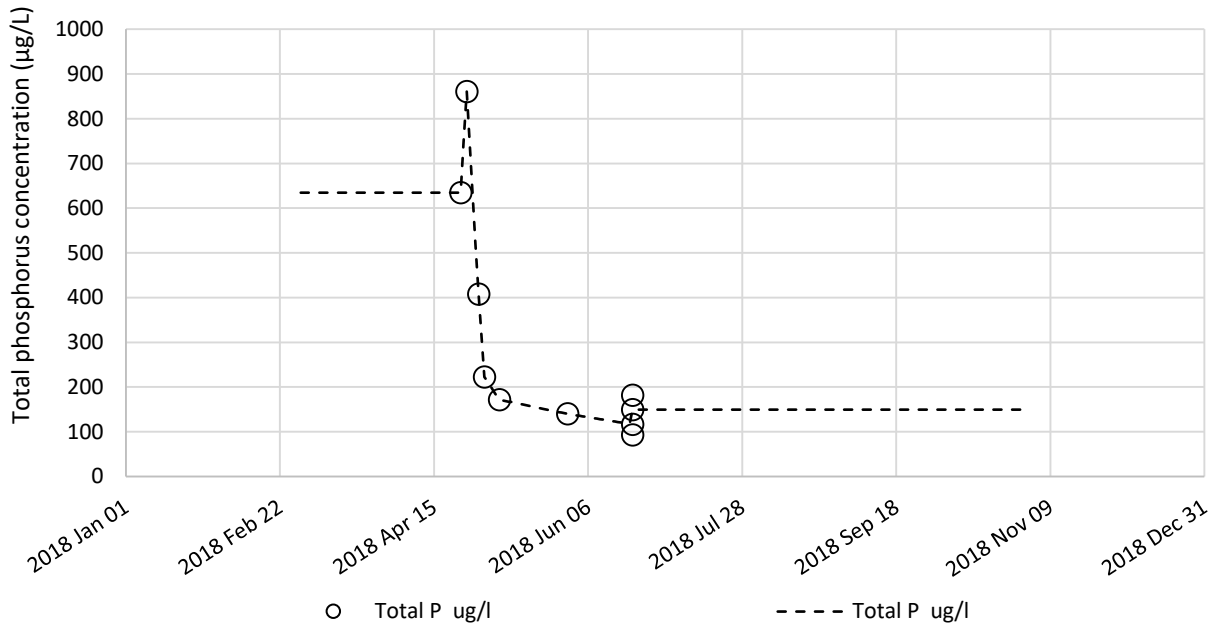


Figure 9. Total phosphorus concentration over the 2018 sampling season at Kerr Lake Outlet.

INTERESTED IN SAMPLING WITH LWCBMN?

LWCBMN provides hands-on opportunities for citizens to get involved in water sampling activities. We are looking for volunteers to sample at Water Survey of Canada stations in 2019. You can find a map of potential sites **here**.

If you are interested in sampling, please contact the LWCBMN program manager at **cbm@lakewinnipegfoundation.org**. Together, we can choose a sample site near where you live, work or commute and begin collecting valuable information to measure phosphorus loading to local waterways.

THANK YOU TO OUR 2018 FUNDERS

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Canada

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