

# LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK

East Interlake  
Watershed District  
2019 Regional Report



Assiniboine River; Photo: Paul Mutch



LAKE  
WINNIPEG  
FOUNDATION



## LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK: OVERVIEW

The Lake Winnipeg Community-Based Monitoring Network (LWCBMN), coordinated by the Lake Winnipeg Foundation (LWF), mobilizes citizens to collect water samples across Manitoba in order to measure phosphorus concentration. Phosphorus is the nutrient responsible for blue-green algae blooms on Lake Winnipeg. Phosphorus comes from diverse sources across the watershed, including municipal wastewater and agricultural runoff.

Different sub-watersheds contribute different proportions of Lake Winnipeg's total phosphorus load. With the help of a strong network of watershed partners and citizen scientists, this long-term monitoring program is identifying phosphorus hotspots – localized areas that contribute higher amounts of phosphorus to waterways than other areas. Targeting remedial action in hotspots will reduce the amount of phosphorus entering Manitoba's lakes and rivers, and improve the health of Lake Winnipeg.

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 LWCBMN 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 notify partners and citizen scientists across the watershed to ensure frequent sampling during peak flows. Sampling at these stations provides corresponding flow data, allowing LWCBMN 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, expressed as tonnes per year.

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

### *LWCBMN in action – 2019*

In 2019, in its fourth season, LWCBMN expanded to cover more drainage areas across the province, expanding into the Winnipeg River system and the Souris River system. Over 2,000 samples were collected from 161 sites.

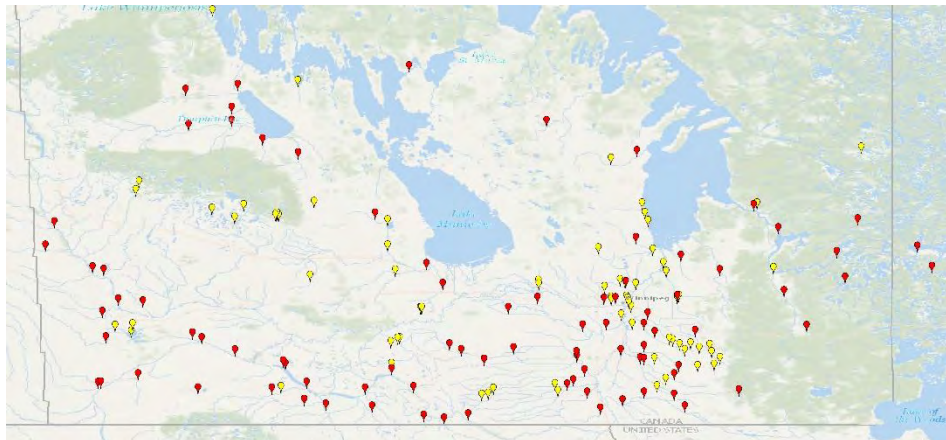


Figure 1. 2019 sampling sites. Sites in red are located at Water Survey of Canada's flow-metered stations. Sites in yellow are located at sampling sites where flow is not measured.

## 2019 RESULTS: OVERVIEW

Table 1. Overview of findings from 2019 LWCBMN phosphorus monitoring data.

REGION	# years of LWCBMN data	# sampling sites in 2019	# samples collected in 2019	Highest phosphorus export in region (2018)	Highest phosphorus export in region (2019)	Regional lead
East Interlake Watershed District	3	8	112	Icelandic River and Grassmere Creek (0.03 kg/ha/y)	Grassmere Creek Drain near Middlechurch (0.14 kg/ha/y)	Armand Belanger (EIWD)
Seine Rat Roseau Watershed District	4	21	395	Main Drain near Dominion City (0.22 kg/ha/y)	Joubert Creek near St. Pierre-Jolys (2.29 kg/ha/y)	Jodi Goerzen and Chris Randall (SRRWD)
Redboine Watershed District	4	14	226	Roseisle Creek near Roseisle (0.12 kg/ha/y)	La Salle River at Elie (0.44 kg/ha/y)	Justin Reid (RWD)
Assiniboine West Watershed District	3	7	148	Bailey's Creek near Oak Lake (0.08 kg/ha/y)	Scissor Creek near McAuley (0.08 kg/ha/y)	Ryan Canart (AWWD)
Pembina Valley Watershed District	3	16	259	Pembina River near Lorne Lake (0.21 kg/ha/y)	Kronsgart Drain near Sewell (1.36 kg/ha/y)	Cliff Greenfield (PWW) and Jason Vanrobaeys (AAFC)
Souris River Watershed District	2	11	117	Pipestone Creek (0.01 kg/ha/y)	Elgin Creek near Souris (0.44 kg/ha/y)	Dean Brooker and Yasemin Keeler (SRWD)
City of Winnipeg	2	7	142	Omand's Creek (0.03 kg/ha/y)	Sturgeon Creek at St. James Bridge (0.27 kg/ha/y)	LWF
Northeast Red Watershed District	2	7	86	Cooks Creek/Cooks Creek Diversion (0.01 kg/ha/y)	Cooks Creek and Cooks Creek Diversion (0.54 kg/ha/y)	Colin Gluting (NRWD)
Whitemud Watershed District	2	7	55	-	Rat Creek near Macdonald (0.02 kg/ha/y)	Chris Reynolds (WWD)
Intermountain Watershed District	1	7	119	-	Vermillion River near Dauphin (0.07 kg/ha/y)	Jeff Theile and Jody Tucker (IWD)
Winnipeg River System	2	9	205	-	Pine Falls Generating Station (0.85 kg/ha/y)	Manitoba Hydro, Ontario Power Generation
West Interlake Watershed District	1	1	20	-	Fairford River near Fairford (0.00 kg/ha/y, only site)	LWF

The 2019 field season was very different than previous years, with the majority of phosphorus loading occurring during the fall rather than the spring. Fall storms and flooding on the eastern side of the Red River valley resulted in a phosphorus export greater than 2 kg/ha/y at the lower Joubert Creek: one of the greatest phosphorus exports ever reported from rural sub watersheds in Manitoba. These unprecedented wet fall conditions in 2019 highlight changing weather patterns on Manitoba's prairies: short-lived but intense precipitation events are expected to become more frequent and intense with climate change (Prairie Climate Centre, 2017). Data collected by LWCBMN in 2019 improves our understanding of how these changes may affect phosphorus loading in the Lake Winnipeg watershed.

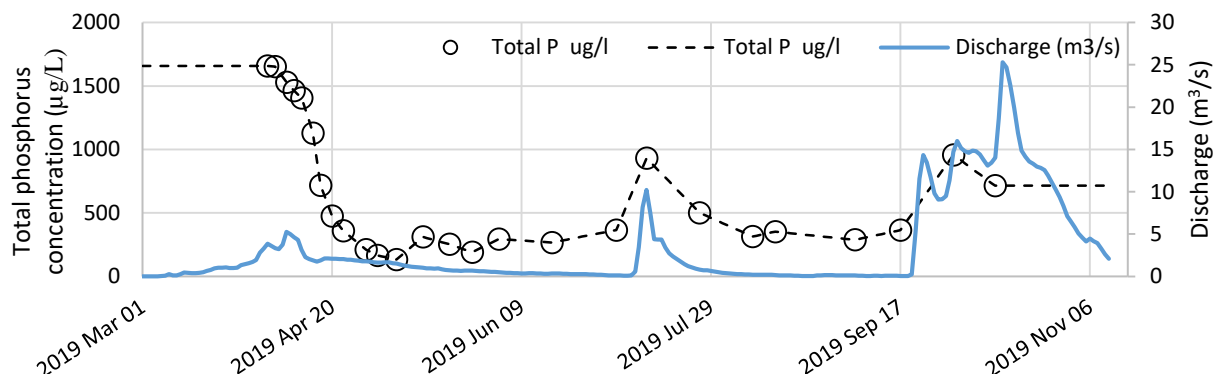


Figure 2. Water discharge and phosphorus concentration for the lower Joubert Creek near St-Pierre-Jolys. In 2019, 70 per cent of the phosphorus load and 73 per cent of the water load occurred during the fall (Sept. 22 to Nov. 11). The high flows in fall 2019 resulted in a phosphorus export of 2.29 kg/ha/y for this sampling site.

## EAST INTERLAKE WATERSHED DISTRICT

The East Interlake Watershed District (EIWD) is located west of Lake Winnipeg, Man. EIWD consists of four major sub-watersheds: Fisher River; Icelandic River and Washow Bay Creek; Willow Creek; and Netley-Grassmere watersheds. The primary land use in EIWD is agriculture, specifically livestock, hay production and annual cropland. In addition to agricultural activities, wastewater treatment plants and lagoons in municipalities throughout EIWD contribute phosphorus to local waterways. Major municipalities include Gimli, Riverton, and Dunnottar, Man.

In partnership with LWCBMN, EIWD staff and volunteers sampled eight sites in 2019, of which four were at flow-metered stations. For the sampling 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 sampling site.

EIWD was able to collect samples frequently at all sites, specifically during the spring runoff period and all major rain events later in the season, resulting in high-quality data. For all sample sites, most of the water and phosphorus contribution occurred during the spring, from March 1 to May 31.



Figure 3. Manitoba's Watershed Districts, highlighting East Interlake Watershed District.

Table 2. Overview of findings from 2019 East Interlake Watershed District sampling sites.

Sampling site	Phosphorus load (tonnes/y)	Phosphorus export (kg/ha/y)
A. Fisher River	0.4	0.01
B. Icelandic River	7.0	0.06
C. Netley Creek	5.8	0.09
D. Grassmere Creek	6.5	0.14

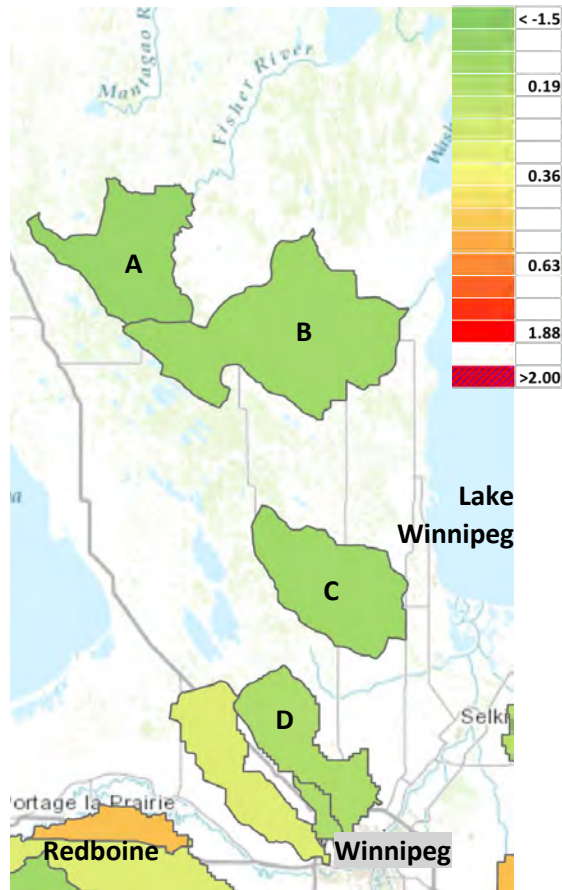


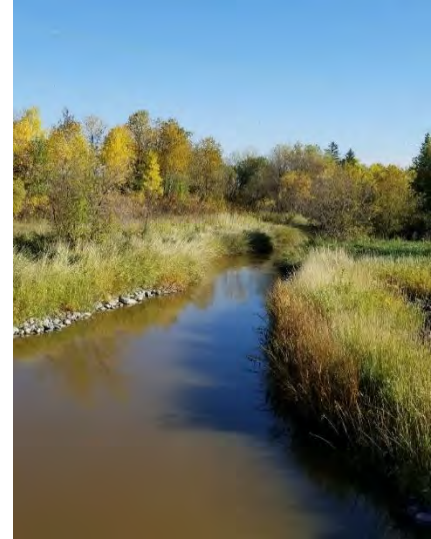
Figure 4. Phosphorus exports (kg /ha/y) for sub-watersheds in the East Interlake Watershed District.

## 2019 RESULTS BY SAMPLING SITE

### Fisher River near Fisherton

Fisher River is the most northerly river sampled in the East Interlake watershed and flows north-easterly. The 601 km<sup>2</sup> area that drains into this sampling site includes the Rural Municipality of Fisherton, Man. and is less agricultural compared to the other East Interlake sampling sites. The Fisher River watershed contains many natural habitats such as forests, wetlands and peat bogs (Fisher River Integrated Watershed Management Plan, 2011).

This sampling site is located at Water Survey of Canada flow meter 05SD005, near Fisherton. In 2019, 16 samples were collected between March 26 and Oct. 30.



	2017	2018	2019
Discharge peaked:	March 31	April 24	March 24
Greatest phosphorus concentration:	702 µg/L* (March 29)	437 µg/L (April 23)	846 µg/L (April 3)
Total phosphorus load:	7 tonnes	1.4 tonnes	0.4 tonnes
Total water load:	0.041 km <sup>3</sup>	0.008 km <sup>3</sup>	0.004 km <sup>3</sup>
Phosphorus export:	0.11 kg/ha/y	0.02 kg/ha/y	0.01 kg/ha/y
Per cent water load in spring**:	82%	80%	53%
Per cent phosphorus load in spring:	92%	93%	89%

\*The "µg" symbol is used to express micrograms

\*\* Spring is considered to be March 1 to May 31

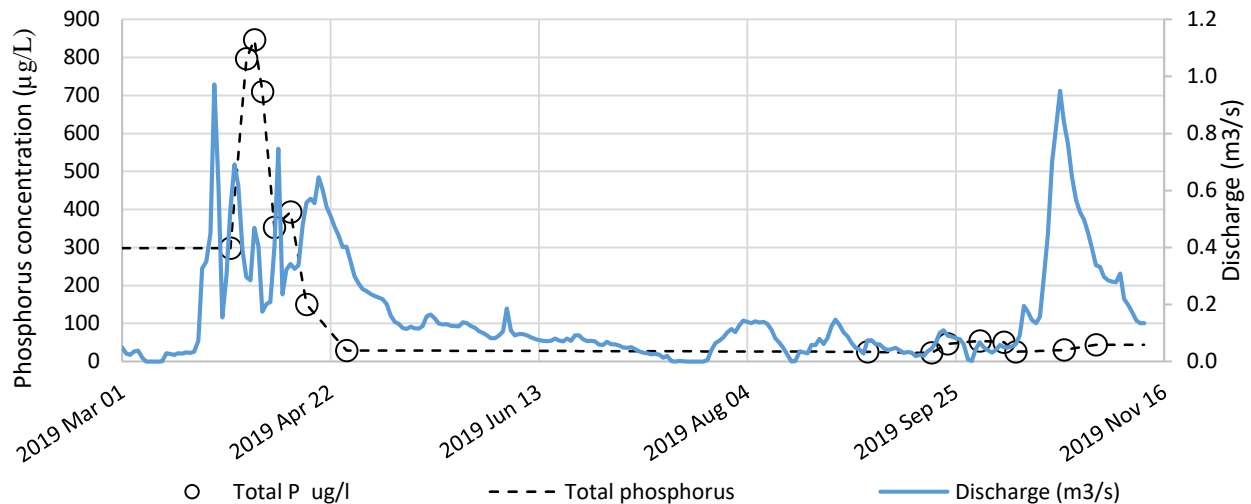


Figure 5. Discharge and total phosphorus concentration over the 2019 sampling season at Fisher River near Fisherton (Water Survey of Canada Station 05SD005).

### Icelandic River near Riverton

The Icelandic River watershed, a sub-watershed of the Icelandic River-Washow Bay Creek watershed, is located on the western side of Lake Winnipeg. The Icelandic River sampling site drains an area of approximately 1,240 km<sup>2</sup> and flows easterly towards Lake Winnipeg. The main land use within the Icelandic River watershed is agriculture, more specifically, pasture, crops and hay (Icelandic River and Washow Bay Creek Integrated Watershed Management Plan, 2008).

This sampling site is located at Water Survey of Canada flow meter 05SC002, near Riverton, Man. In 2019, 19 samples were collected between March 28 and Oct. 30.



	2017	2018	2019
<b>Discharge peaked:</b>	March 31	April 22	April 9
<b>Greatest phosphorus concentration:</b>	697 µg/L (March 29)	419 µg/L (April 23)	516 µg/L (April 8)
<b>Total phosphorus load:</b>	41 tonnes	3.7 tonnes	7.0 tonnes
<b>Total water load:</b>	0.104 km <sup>3</sup>	0.012 km <sup>3</sup>	0.025 km <sup>3</sup>
<b>Phosphorus export:</b>	0.33 kg/ha/y	0.03 kg/ha/y	0.06 kg/ha/y
<b>Per cent water load in spring:</b>	96%	78%	57%
<b>Per cent phosphorus load in spring:</b>	100%	96%	84%

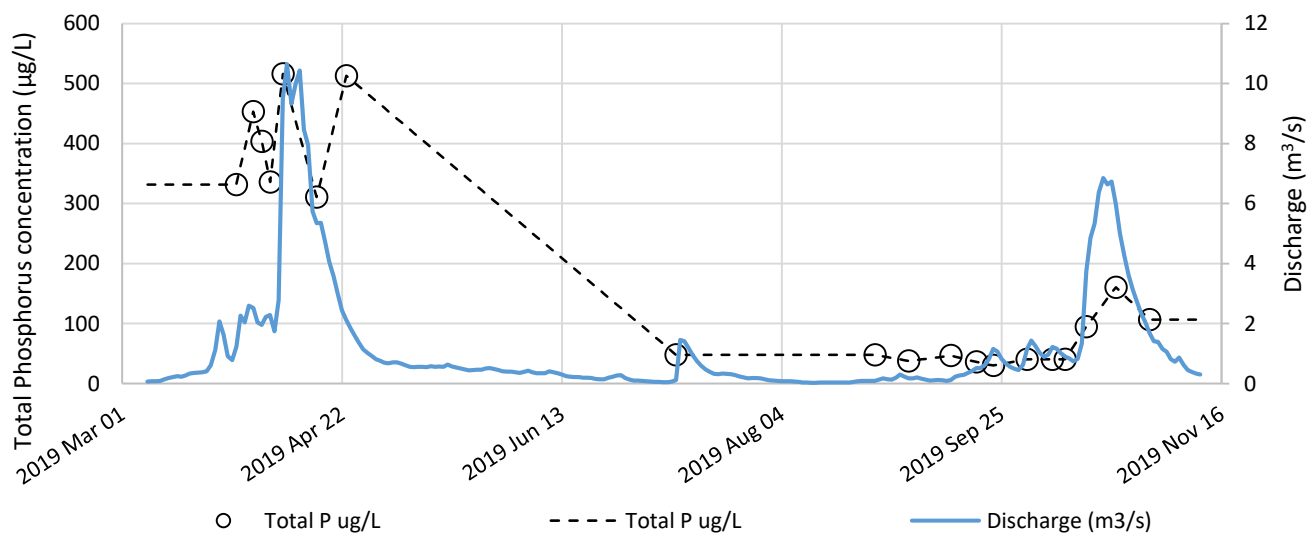


Figure 6. Discharge and total phosphorus concentration over the 2019 sampling season at Icelandic River near Riverton (Water Survey of Canada Station 05SC002).

### Netley Creek near Petersfield

Netley Creek is part of the larger Netley-Grassmere watershed. The Netley Creek portion of the watershed is located on the western side of the Red River, south of Lake Winnipeg and drains easterly. The drainage area, which is 641 km<sup>2</sup>, includes the Rural Municipalities of Teulon and Winnipeg Beach, as well as high-quality cropland (Netley-Grassmere Integrated Watershed Management Plan, 2008).



This sampling site is located at Water Survey of Canada flow meter 05OJ008, near Petersfield, Man. In 2019, 16 samples were collected between March 28 and Oct. 20.

	2017	2018	2019
<b>Discharge peaked:</b>	March 31	April 20	April 8
<b>Greatest phosphorus concentration:</b>	663 µg/L (March 30)	393 µg/L (May 28)	743 µg/L (July 10)
<b>Total phosphorus load:</b>	15 tonnes	1.1 tonnes	5.8 tonnes
<b>Total water load:</b>	0.041 km <sup>3</sup>	0.005 km <sup>3</sup>	0.016 km <sup>3</sup>
<b>Phosphorus export:</b>	0.23 kg/ha/y	0.02 kg/ha/y	0.09 kg/ha/y
<b>Per cent water load in spring:</b>	97%	64%	39%
<b>Per cent phosphorus load in spring:</b>	100%	83%	63%

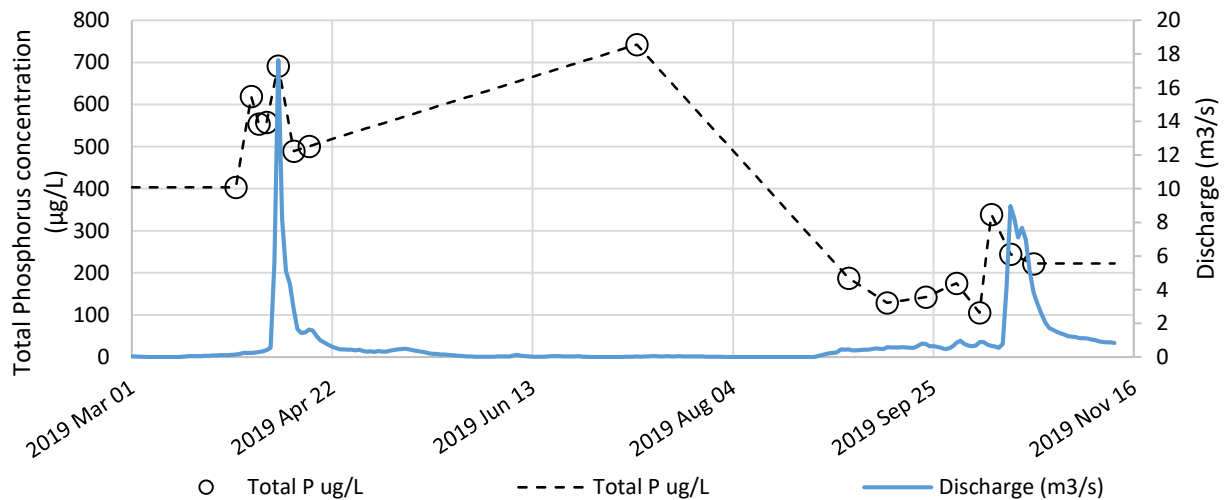


Figure 7. Discharge and total phosphorus concentration over the 2019 sampling season at Netley Creek near Petersfield (Water Survey of Canada Station 05OJ008).

### Grassmere Creek near Middlechurch

Grassmere Creek is part of the larger Netley-Grassmere watershed. The Grassmere Creek portion of the watershed is situated north of Winnipeg. The drain begins by flowing southerly but turns to flow easterly once approaching Winnipeg. The drainage area for this sampling site is approximately 462 km<sup>2</sup> and drains a portion of Winnipeg, the Rural Municipality of Stonewall, Man., and high-quality cropland used for both annual and specialty crop production (Netley-Grassmere Integrated Watershed Management Plan, 2008).



This sampling site is located at Water Survey of Canada flow meter 05OJ017, near Middlechurch, Man. In 2019, 15 samples were collected between March 25 and Sept. 3.

	2017	2018	2019
<b>Discharge peaked:</b>	April 1	April 21	April 8
<b>Greatest phosphorus concentration:</b>	786 µg/L* (March 27)	1,684 µg/L (July 5)	749 µg/L (April 5)
<b>Total phosphorus load:</b>	12 tonnes	1.3 tonnes	6.5 tonnes
<b>Total water load:</b>	0.02 km <sup>3</sup>	0.003 km <sup>3</sup>	0.012 km <sup>3</sup>
<b>Phosphorus export:</b>	0.27 kg/ha/y	0.03 kg/ha/y	0.14 kg/ha/y
<b>Per cent water load in spring:</b>	95%	86%	83%
<b>Per cent phosphorus load in spring:</b>	98%	78%	94%

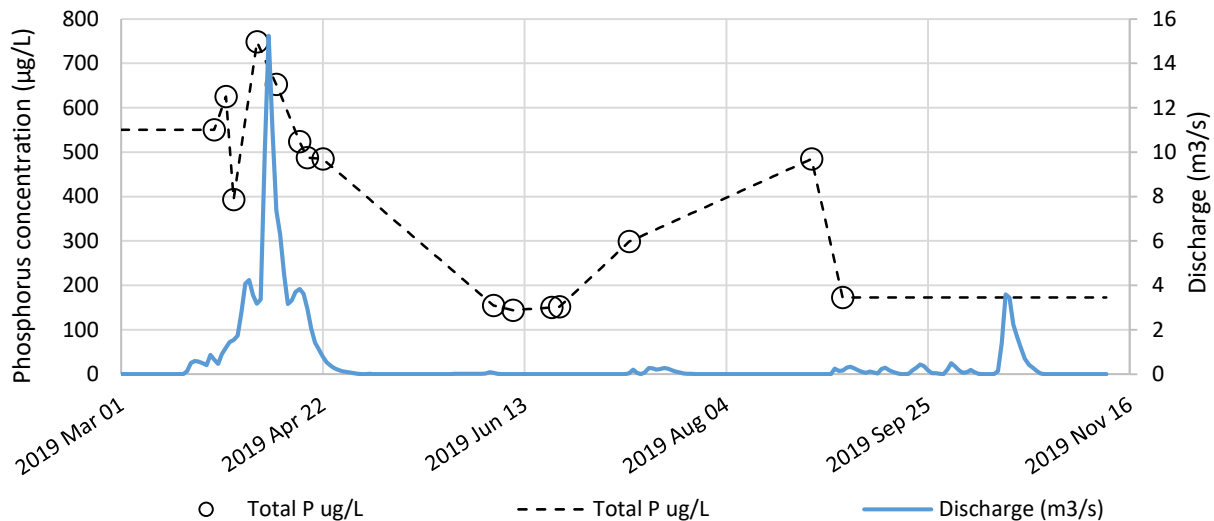


Figure 8. Discharge and total phosphorus concentration over the 2019 sampling season at Grassmere Creek Drain near Middlechurch (Water Survey of Canada Station 05OJ017).

## SAMPLING SITES WITHOUT FLOW METERS

### *Boundary Creek near Winnipeg Beach*

Boundary Creek is located north of Winnipeg Beach Provincial Park, within the Netley-Grassmere watershed (Netley-Grassmere Integrated Watershed Management Plan, 2008). Boundary Creek flows into Lake Winnipeg.

This sampling site is located near Winnipeg Beach, Man. We cannot calculate phosphorus loads and exports because flow is not measured at this sampling site. In 2019, 15 samples were collected between May 1 and Sept. 11.



- **2019 greatest phosphorus concentration:** 153 µg/L measured on June 18

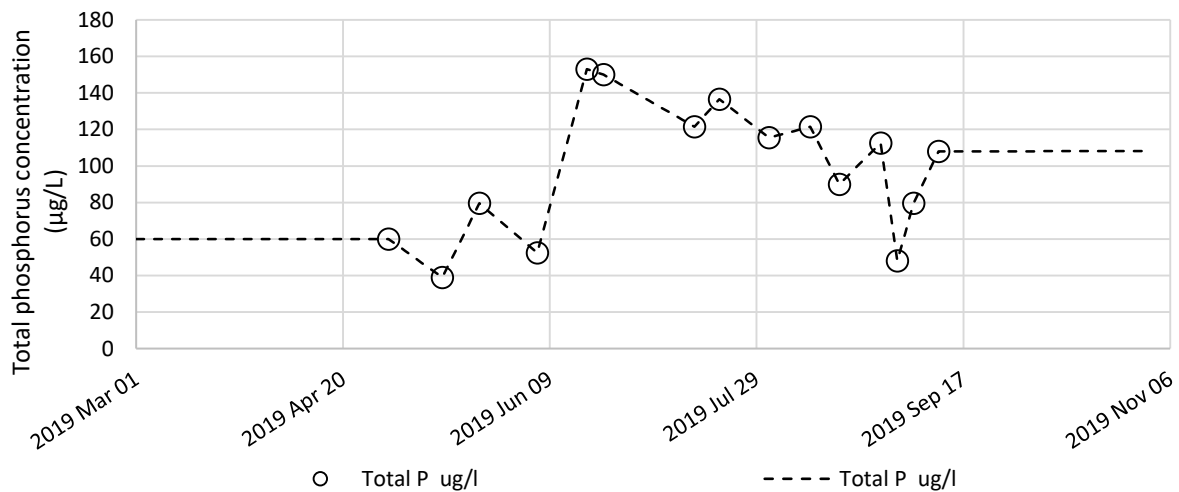
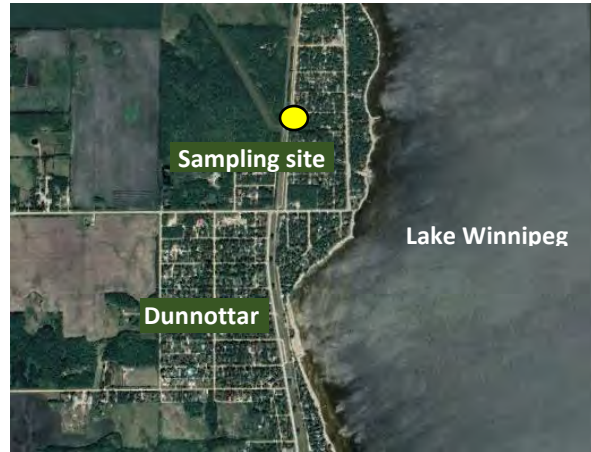


Figure 9. Total phosphorus concentration over the 2019 sampling season at Boundary Creek near Winnipeg Beach.

### Tugela Creek

Tugela Creek flows easterly and empties into Lake Winnipeg. The creek flows for 2 km through Dunnottar, Man. The primary land uses near Dunnottar are hay and cropland (EICD Watershed Assessment Survey, 2008).

This sampling site is located near Tugela Creek. We cannot calculate phosphorus loads and exports because flow is not measured at this sampling site. In 2019, five samples were collected between May 18 and July 13.



- **2019 greatest phosphorus concentration:** 150 µg/L measured on July 13

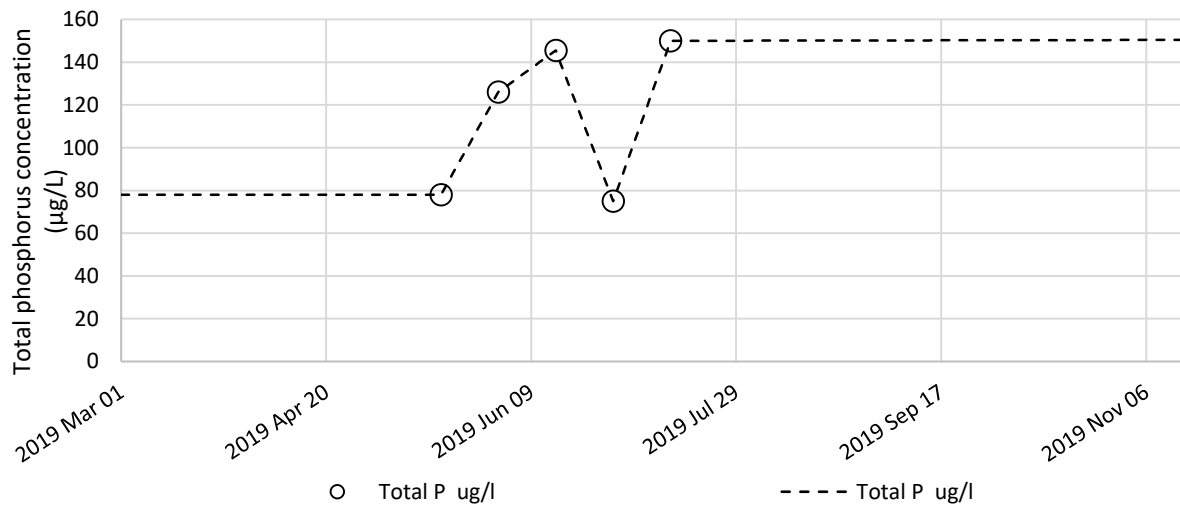


Figure 10. Total phosphorus concentration over the 2019 sampling season at Tugela Creek.

*Blue Thunderbird Land-Based Teachings Learning Centre sampling sites*

The Blue Thunderbird Land-Based Teachings Learning Centre is an initiative delivered by the Seven Oaks School Division. Its programming includes environmental stewardship of the land. This site is located within the Grassmere Creek Drain watershed.

In 2019, staff from Seven Oaks School Division collected samples upstream and downstream of the Blue Thunderbird Centre. We cannot calculate phosphorus loads and exports because flow is not measured at these sampling sites. In 2019, 13 samples were collected from these sites between July 15 and Sept. 13.



- **2019 greatest phosphorus concentration upstream:** 527 µg/L measured on July 10
- **2019 greatest phosphorus concentration downstream:** 404 µg/L measured on Sept. 3

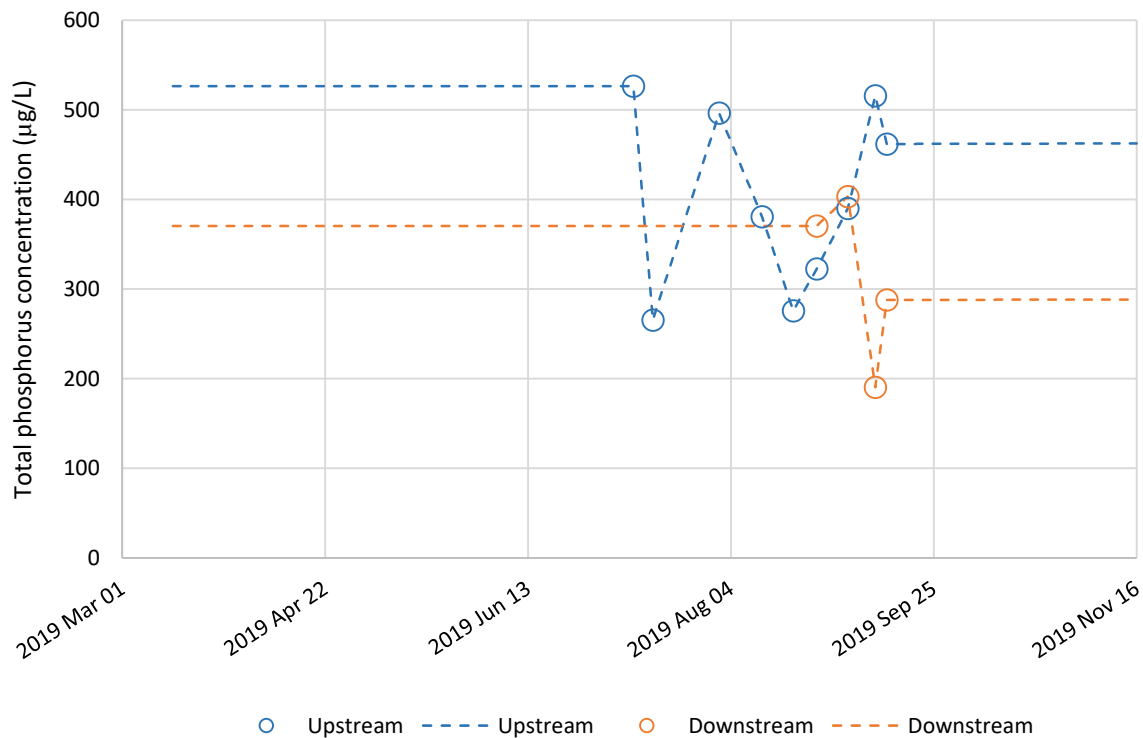


Figure 11. Total phosphorus concentration over the 2019 sampling season at Blue Thunderbird Upstream and Downstream sampling sites.

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Foundation



TD Friends of the Environment Foundation



Red River



LWCBMN is a collaborative initiative delivered in partnership with Manitoba's watershed districts, LWF's science advisors and volunteer citizen scientists.

## MONITORING OUR WATERWAYS

To reduce phosphorus loading, we need to know how, when and from where phosphorus is reaching Lake Winnipeg. The Lake Winnipeg Community-Based Monitoring Network (LWCBMN) is a long-term phosphorus monitoring program that engages citizen volunteers to collect water samples across Manitoba using scientific protocols. Because citizen scientists live, work or commute near their sampling sites, they can sample frequently in response to weather events and water conditions, generating critical data to inform research and policy.



The Lake Winnipeg Foundation (LWF) advocates for change and coordinates action to improve the health of Lake Winnipeg. LWF's flagship initiative, the Lake Winnipeg Health Plan, is a set of eight evidence-based actions to reduce phosphorus loading. By addressing the root causes of potentially harmful algae blooms, the plan provides a blueprint for cost-effective decision-making and long-term, adaptive freshwater management.