



# LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK

Seine-Rat River  
Conservation District  
2018 Regional Report

Photo: Paul Mutch

## LAKE WINNIPEG COMMUNITY-BASED MONITORING NETWORK: OVERVIEW

Lake Winnipeg, the world's 10<sup>th</sup> 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 (SRRCDC)
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 (Long River near Holmfield)	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.

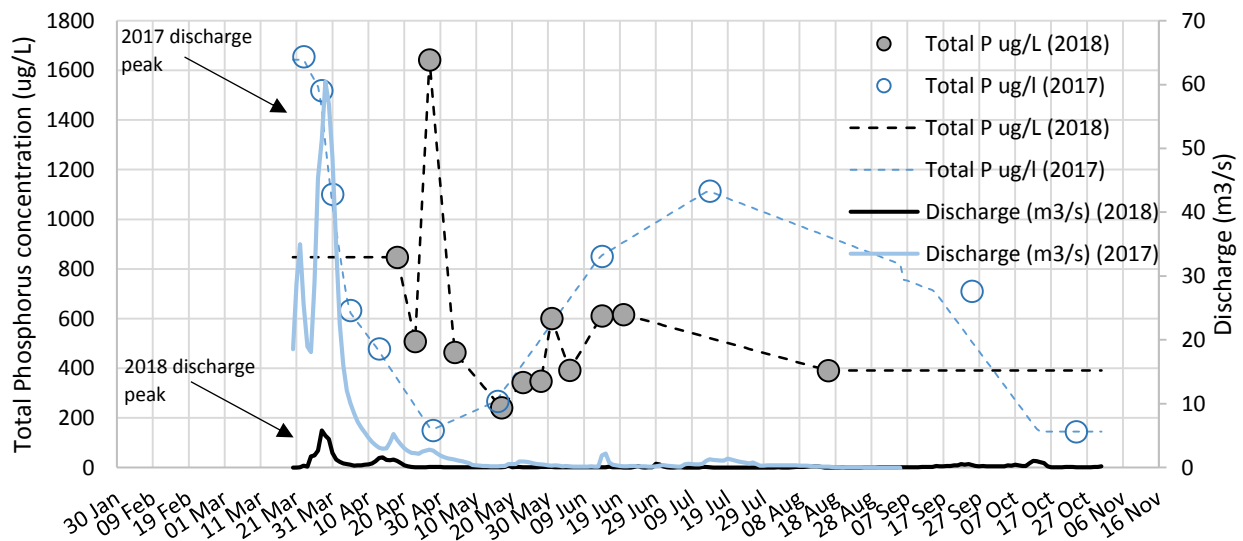


Figure 2. Comparison of phosphorus concentration and discharge in 2017 (blue) and 2018 (black) at the Manning Canal site.

## SEINE-RAT RIVER CONSERVATION DISTRICT

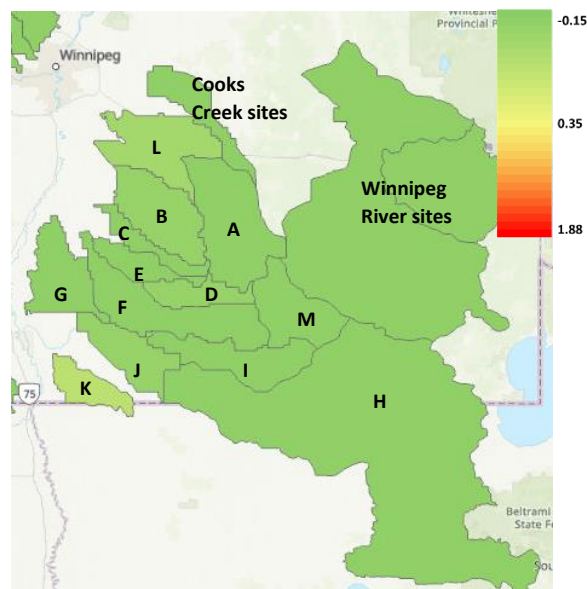
The Seine-Rat River Conservation District (SRRCD) is located east of the Red River, extending almost to Ontario and to the United States. SRRCD consists of three major sub-watersheds: the Seine, Rat and Roseau River watersheds. The primary land use in SRRCD is agriculture, specifically cereal crops and livestock. The Seine River watershed has the most intensively developed hog industry of all watersheds in Manitoba (Seine River Watershed Management Plan, 2010). In addition to agricultural activities, wastewater treatment plants and lagoons in municipalities throughout SRRCD contribute phosphorus to local waterways. Major municipalities include Steinbach, St. Pierre-Jolys and Lorette.

In partnership with LWCBMN, SRRCD staff and volunteers sampled 20 sites in the SRRCD region, of which 14 sites were at flow meters. For the 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.

SRRCD and volunteers collected samples frequently at all sites, specifically during the spring runoff period, resulting in high-quality data. For all sample sites, most of the water (69%) and phosphorus (74%) contribution occurred during the spring, from March 1<sup>st</sup> to May 31<sup>st</sup>.

**Table 2. Overview of findings from 2018 SRRCD sample sites.**

Sampling station	Phosphorus load (tonnes/y)	Phosphorus export (kg/ha/y)
A. Seine River near Ste. Anne	2	0.04
B. Manning Canal near Île-des-Chênes	3	0.07
C. Tourond Creek near Tourond	0	0.02
D. Joubert Creek near Pansy	1	0.06
E. Joubert Creek near St. Pierre-Jolys	-1	-0.03
F. Rat River near St. Pierre Jolys	1	0.02
G. Marsh River near Otterburn	1	0.03
H. Roseau River at Gardenton	19	0.04
I. Vita Drain near Stuartburn	0	0
J. Roseau River near Dominion City	1	0.07
K. Main Drain near Dominion City	5	0.22
L. Seine River near Prairie Grove and the Seine River Diversion near Île-des-Chênes	2	0.12
M. Rat River near Sundown	2	0.04



**Figure 3. Phosphorus export (kg/ha/y) map for sub-watersheds in the Seine-Rat River Conservation District.**

## 2018 RESULTS BY SAMPLE SITE

### Seine River sample sites

#### Seine River near Ste. Anne

The upper Seine River sample site drains a largely forested area of approximately 580 km<sup>2</sup>. The drainage area includes a portion of Sandilands Provincial Forest.

This sample site is located at Water Survey of Canada flow meter 05OH007, near Ste. Anne. In 2018, 16 samples were collected between April 18<sup>th</sup> and October 12<sup>th</sup>.



	2016	2017	2018
Discharge peaked:	March 16 <sup>th</sup>	April 1 <sup>st</sup>	May 21 <sup>st</sup>
Greatest phosphorus concentration:	643 µg/L* (March 15 <sup>th</sup> )	517 µg/L (March 28 <sup>th</sup> )	151 µg/L (April 18 <sup>th</sup> )
Total phosphorus load:	28 tonnes	17 tonnes	2.3 tonnes
Total water load:	0.128 km <sup>3</sup>	0.073 km <sup>3</sup>	0.021 km <sup>3</sup>
Phosphorus export:	0.28 kg/ha/y	0.3 kg/ha/y	0.04 kg/ha/y
Percent water load in spring**:	66%	64%	14%
Percent phosphorus load in spring:	82%	85%	19%

\*The “µg” symbol is used to express micrograms

\*\* Spring is considered to be March 1<sup>st</sup> to May 31<sup>st</sup>

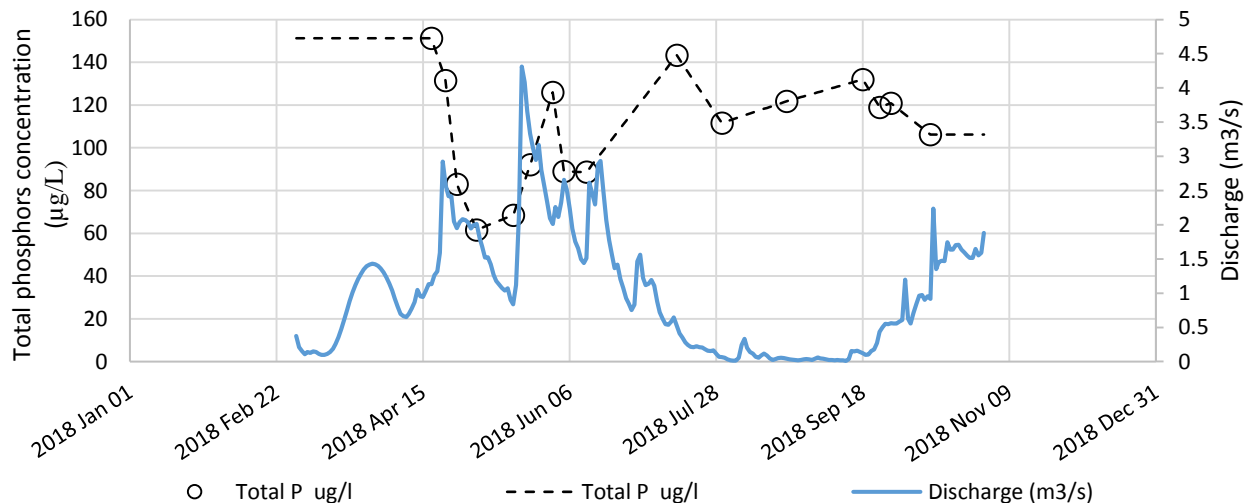


Figure 4. Discharge and total phosphorus concentration over the 2018 sampling season at Seine River near Ste. Anne (Water Survey of Canada Station 05OH007).

### Manning Canal near Île-des-Chênes

The Manning Canal is a sub-watershed of the larger Seine River watershed. The Manning Canal drains a largely agricultural area of 481 km<sup>2</sup>, which includes dense livestock and crop land as well as the growing city of Steinbach.

This sample site is located at Water Survey of Canada flow meter 05OE006, near Île-des-Chênes. In 2018, 12 samples were collected between April 18<sup>th</sup> and August 16<sup>th</sup>.



	2016	2017	2018
Discharge peaked:	March 14 <sup>th</sup>	March 30 <sup>th</sup>	March 28 <sup>th</sup>
Greatest phosphorus concentration:	1569 µg/L (March 15 <sup>th</sup> )	1656 µg/L (March 23 <sup>rd</sup> )	1642 µg/L (April 27 <sup>th</sup> )
Total phosphorus load:	53 tonnes	79 tonnes	3.4 tonnes
Total water load:	0.059 km <sup>3</sup>	0.066 km <sup>3</sup>	0.005 km <sup>3</sup>
Phosphorus export:	1.1 kg/ha/y	1.64 kg/ha/y	0.07 kg/ha/y
Percent water load in spring:	77%	94%	72%
Percent phosphorus load in spring:	85%	97%	89%

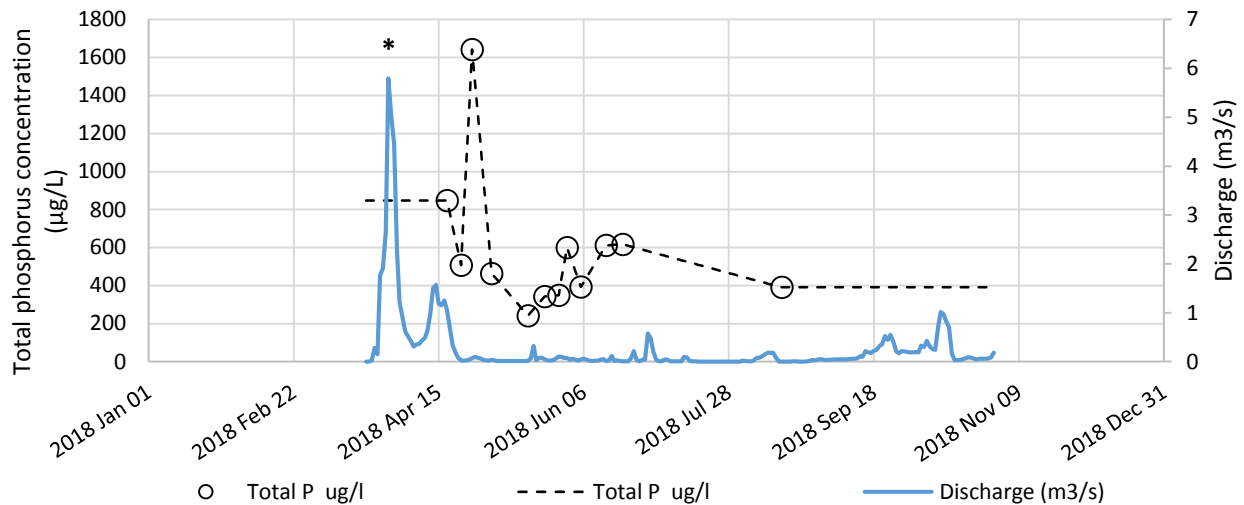


Figure 5. Discharge and total phosphorus concentration over the 2018 sampling season at Manning Canal (Water Survey of Canada Station 05OE006).

**\*In 2018 Manning Canal discharge peaked while the canal was covered by ice and therefore we were unable to collect samples during this time. This may have resulted in a portion of the phosphorus load being missed.**

## Seine River near Prairie Grove and the Seine River Diversion near Île-des-Chênes

Together, the Seine River near Prairie Grove and the Seine River Diversion sites drain a largely agricultural area of 506 km<sup>2</sup>. Water flowing down the Seine River towards Prairie Grove is diverted into the Seine River Diversion when water levels and flows are high. Both sites share a drainage area, therefore phosphorus and water loads are added together to accurately calculate the phosphorus export for the drainage area.

The Prairie Grove and Diversion sites are located at Water Survey of Canada flow meters 05OH009 and 05OE011, respectively. In 2018, 18 samples were collected at Prairie Grove and 13 samples were collected at the Seine River Diversion between April 18<sup>th</sup> and October 18<sup>th</sup>.

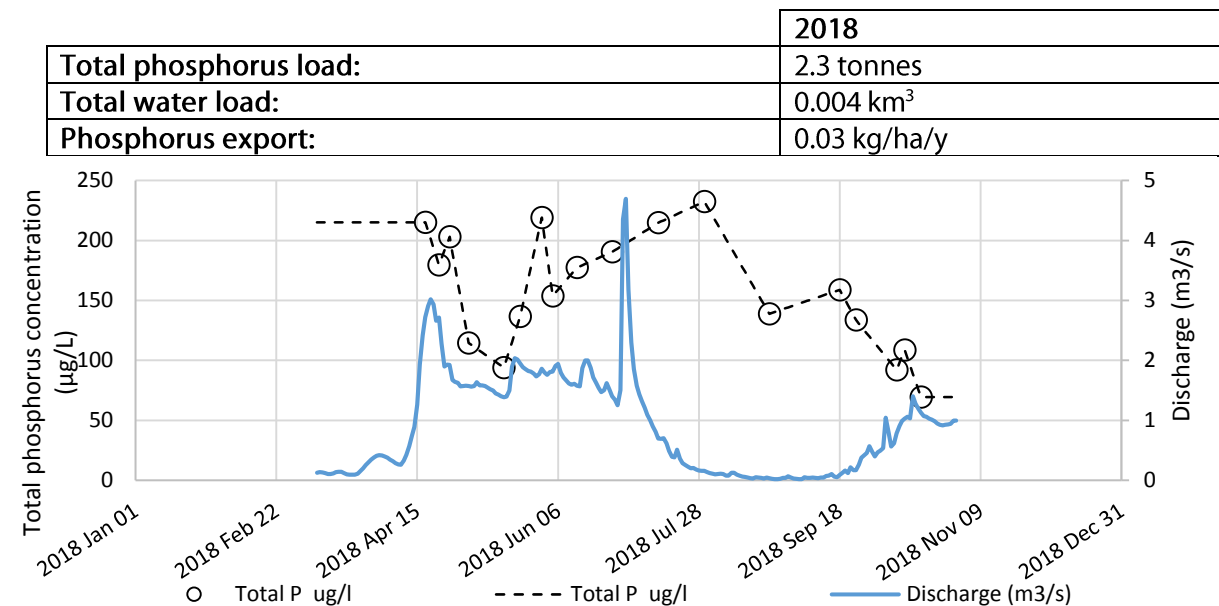


Figure 6. Discharge and total phosphorus concentration over the 2018 sampling season at Seine River near Prairie Grove (Water Survey of Canada Station 05OH009).

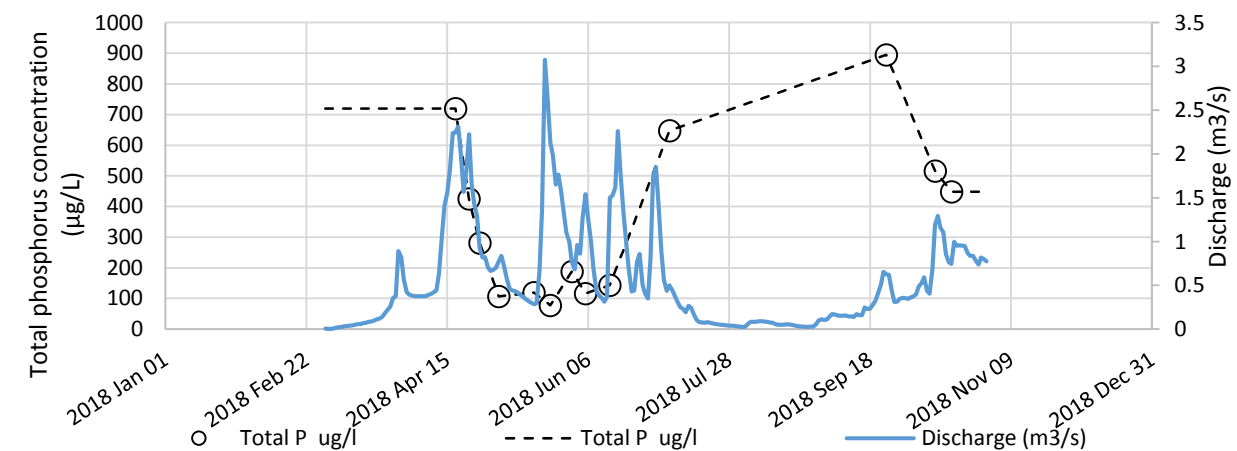


Figure 7. Discharge and total phosphorus concentration over the 2018 sampling season at Seine River Diversion (Water Survey of Canada Station 05OE011).

## Tourond Creek sample site

### *Tourond Creek near Tourond*

Tourond Creek drains a largely agricultural area of 210 km<sup>2</sup> before flowing into the Red River south of Saint Adolphe.

This sample site is located at Water Survey of Canada flow meter 05OE009, near Tourond. In 2018, 7 samples were collected between April 16<sup>th</sup> and June 5<sup>th</sup>.



	2016	2017	2018
Discharge peaked:	March 14 <sup>th</sup>	March 31 <sup>st</sup>	May 19 <sup>th</sup>
Greatest phosphorus concentration:	1105 µg/L (March 15 <sup>th</sup> )	1641 µg/L (March 23 <sup>rd</sup> )	1145 µg/L (April 16 <sup>th</sup> )
Total phosphorus load:	13 tonnes	17 tonnes	0.4 tonnes
Total water load:	0.020 km <sup>3</sup>	0.018 km <sup>3</sup>	0.001 km <sup>3</sup>
Phosphorus export:	0.61 kg/ha/y	0.81 kg/ha/y	0.02 kg/ha/y
Percent water load in spring:	72%	93%	17%
Percent phosphorus load in spring:	82%	95%	44%

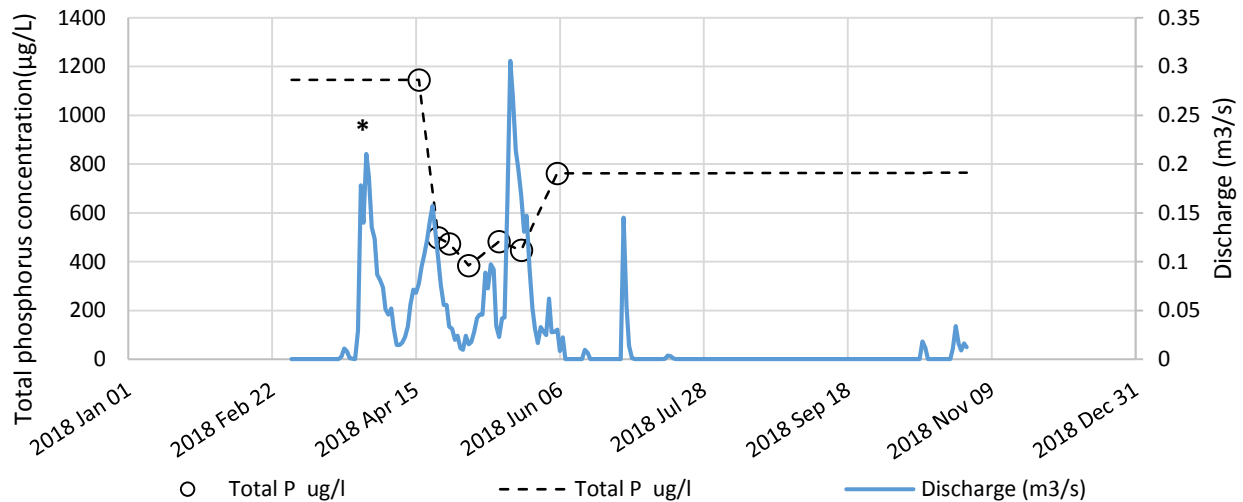


Figure 8. Discharge and total phosphorus concentration over the 2018 sampling season at Tourond Creek (Water Survey of Canada Station 05OE009).

**\*In 2018 Tourand Creek discharge peaked while the creek was covered by ice and therefore we were unable to collect samples during this time. This may have resulted in a portion of the phosphorus load being missed.**



## Rat River sample sites

### Joubert Creek near Pansy

This sample site is the most upstream sample site on the Joubert Creek, a tributary of the Rat River. The area that drains into this site is 208 km<sup>2</sup> and drains pasture and forage crop land.

This sample site is located at Water Survey of Canada flow meter 05OE015, near Pansy. In 2018, 6 samples were collected between April 16<sup>th</sup> and September 19<sup>th</sup>.



	2017	2018
Discharge peaked:	March 30 <sup>th</sup>	April 27 <sup>th</sup>
Greatest phosphorus concentration:	1957 µg/L (March 23 <sup>rd</sup> )	4617 µg/L (April 16 <sup>th</sup> )
Total phosphorus load:	23 tonnes	1.2 tonnes
Total water load:	0.034 km <sup>3</sup>	0.001 km <sup>3</sup>
Phosphorus export:	1.1 kg/ha/y	0.06 kg/ha/y
Percent water load in spring:	97%	66%
Percent phosphorus load in spring:	100%	91%

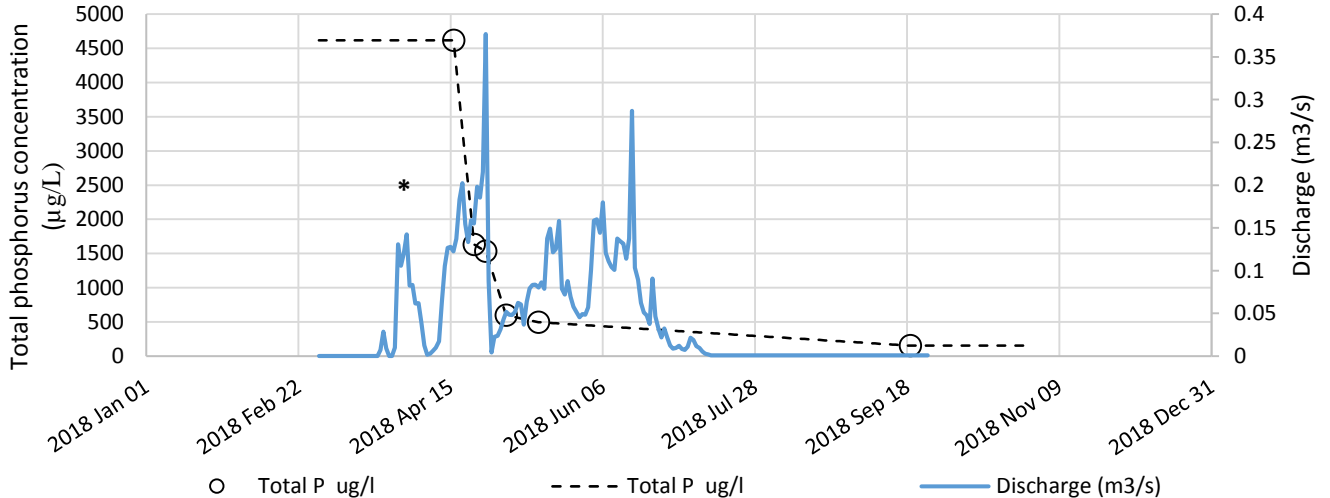


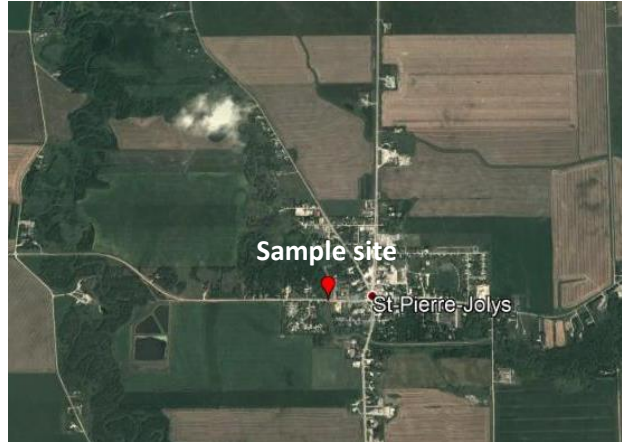
Figure 9. Discharge and total phosphorus concentration over the 2018 sampling season at Joubert Creek near Pansy (Water Survey of Canada Station 05OE015).

**\*In 2018 Joubert Creek discharge peaked while the river was covered by ice and therefore we were unable to collect samples during this time. This may have resulted in a portion of the phosphorus load being missed.**

### Joubert Creek near St. Pierre-Jolys

Located just before the Joubert Creek flows into the Rat River, this is the most downstream sample site on the Joubert Creek. The area that drains into this sample site is 140 km<sup>2</sup> and drains mainly pasture and forage crop land as well as a portion of the community of St. Pierre Jolys.

This sample site is located at Water Survey of Canada flow meter 05OE007, near St. Pierre-Jolys. In 2018, 11 samples were collected between April 16<sup>th</sup> and October 12<sup>th</sup>.



	2017	2018
Discharge peaked:	March 30 <sup>th</sup>	April 24 <sup>th</sup>
Greatest phosphorus concentration:	1604 µg/L (March 23 <sup>rd</sup> )	941 µg/L (April 16 <sup>th</sup> )
Total phosphorus load:	8 tonnes	-0.2 tonnes *
Total water load:	0.010 km <sup>3</sup>	0.001 km <sup>3</sup>
Phosphorus export:	0.57 kg/ha/y	-0.001 kg/ha/y
Percent water load in spring:	93%	56%
Percent phosphorus load in spring:	98%	62%

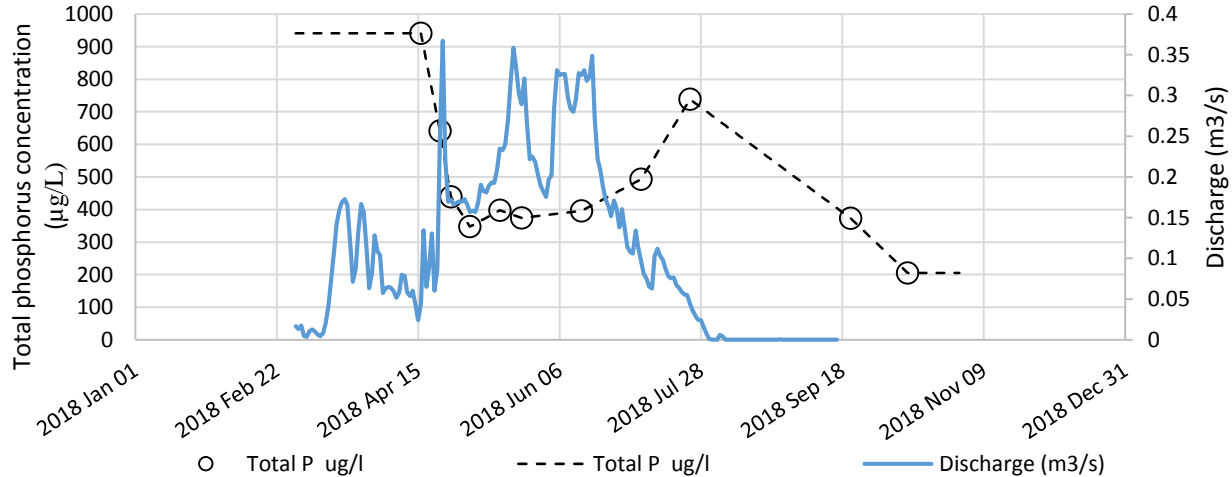


Figure 10. Discharge and total phosphorus concentration over the 2018 sampling season at Joubert Creek near St. Pierre Jolys (Water Survey of Canada Station 05OE007).

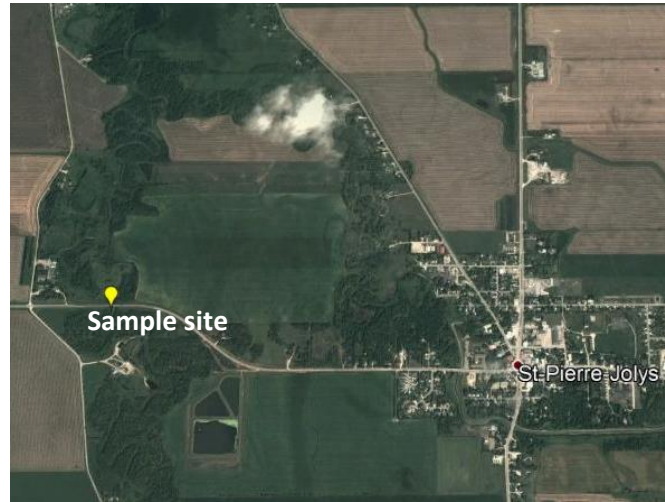
\*When there are multiple sites along a waterway, phosphorus loads are calculated by subtracting the upstream load from the downstream load resulting in the amount of phosphorus contributed by the stretch of the waterway between the two sites. A negative phosphorus load means that the upstream site had a greater phosphorus load than the

downstream site and therefore phosphorus was sequestered in that stretch of the waterway, as indicated by the negative export.

*Rat River near St. Pierre Jolys*

This Rat River site is located upstream from where Joubert Creek flows into the Rat River. The area that drains into this stretch of the Rat River is 1075 km<sup>2</sup> and includes the community of St. Pierre Jolys.

This sample site is located near Water Survey of Canada flow meter 05OE001, which is slightly downstream from where Joubert Creek flows into the Rat River\*. In 2018, 12 samples were collected between April 16<sup>th</sup> and October 12<sup>th</sup>.



	2017	2018
Discharge peaked:	April 5 <sup>th</sup>	June 6 <sup>th</sup>
Greatest phosphorus concentration:	415 µg/L (March 23 <sup>rd</sup> )	569 µg/L (May 23 <sup>rd</sup> )
Total phosphorus load:	24 tonnes	1.3 tonnes
Total water load:	0.098 km <sup>3</sup>	0.001 km <sup>3</sup>
Phosphorus export:	0.23 kg/ha/y	0.02 kg/ha/y
Percent water load in spring:	96%	48%
Percent phosphorus load in spring:	98%	81%

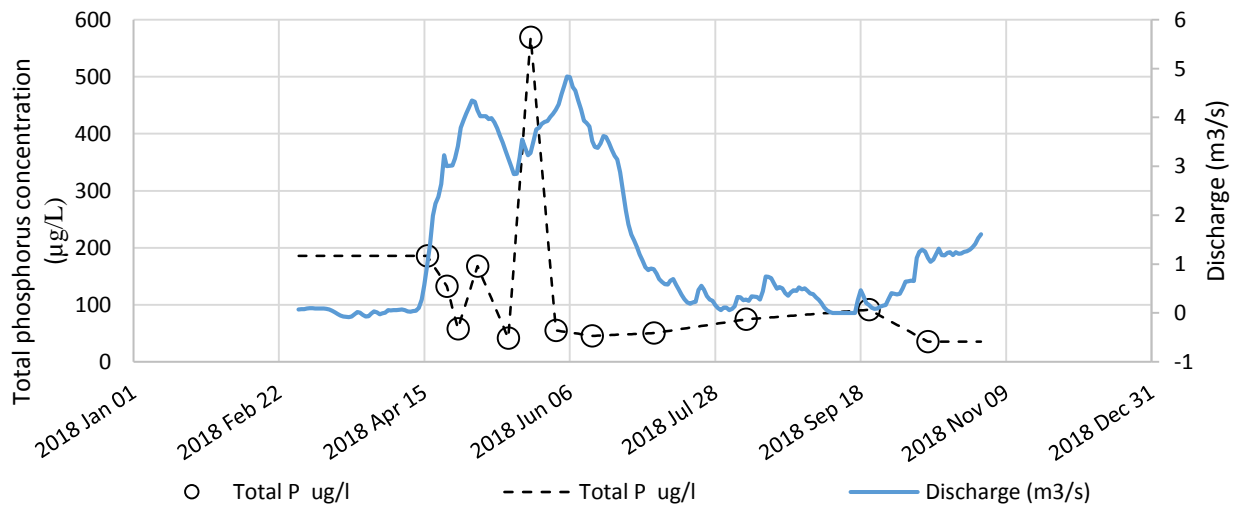


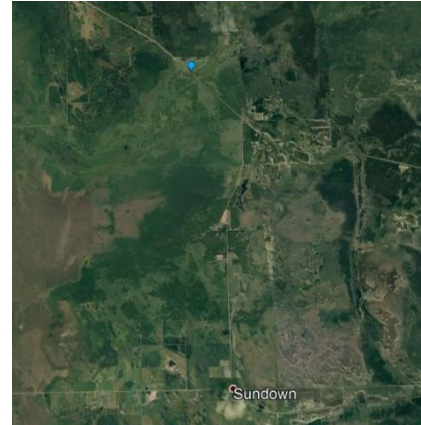
Figure 11. Discharge and total phosphorus concentration over the 2018 sampling season at Rat River (estimated from Water Survey of Canada Stations 05OE001 and 05OE007).

\*Discharge for this sample site was estimated by subtracting Joubert Creek near St. Pierre-Jolys discharge (flow meter 05OE007) from the Rat River near Otterburne discharge (flow meter 05OE001). Sites were selected this way to separate the Rat and Joubert drainage areas.

### Rat River near Sundown

This sample site is the most upstream sample site on the Rat River. The area that drains into this site is 423 km<sup>2</sup> and drains a largely forested area with some pasture land.

This sample site is located at Water Survey of Canada flow meter 05OE004, near Sundown. In 2018, 20 samples were collected between April 20<sup>th</sup> and December 10<sup>th</sup>.



2018	
Discharge peaked:	April 26 <sup>th</sup>
Greatest phosphorus concentration:	142 µg/L (April 20 <sup>th</sup> )
Total phosphorus load:	1.9 tonnes
Total water load:	0.027 km <sup>2</sup>
Phosphorus export:	0.04 kg/ha/y
Percent water load in spring:	59%
Percent phosphorus load in spring:	87%

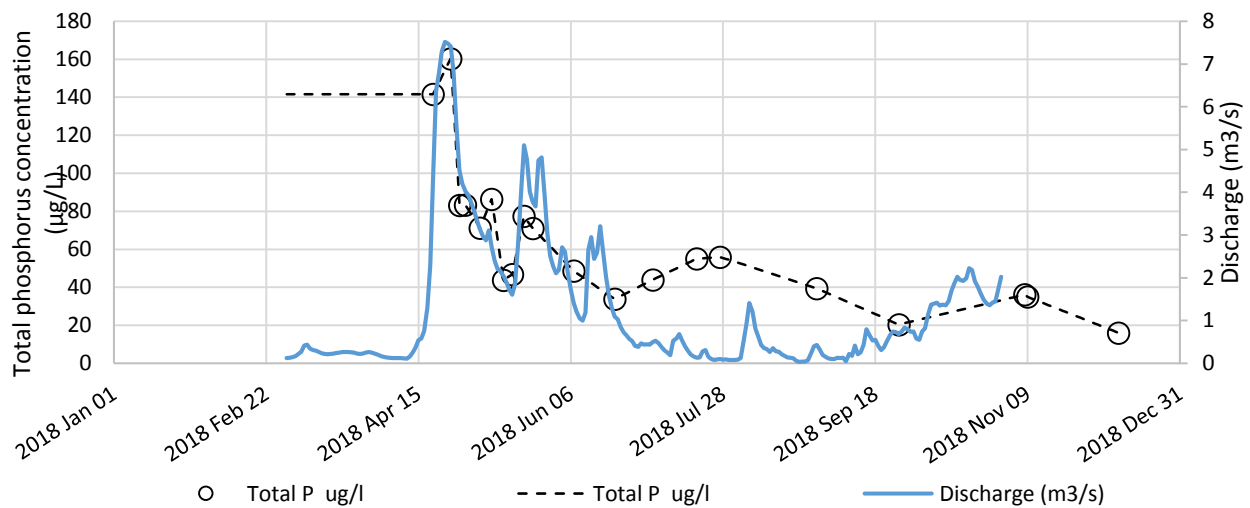


Figure 12. Discharge and total phosphorus concentration over the 2018 sampling season at Rat River near Sundown (Water Survey of Canada Station 05OE004).

### Marsh River near Otterburn

The Marsh River site drains an area of approximately 403 km<sup>2</sup>, consisting mainly of agricultural land. This sample site is located directly upstream of where the Marsh River flows into the Rat River.

The sample site is located at Water Survey of Canada flow meter 05OE010, near Otterburn. In 2018, 6 samples were collected between April 16<sup>th</sup> and May 23<sup>rd</sup>.



	2017	2018
<b>Discharge peaked:</b>	April 1 <sup>st</sup>	April 22 <sup>nd</sup>
<b>Greatest phosphorus concentration:</b>	699 µg/L (March 30 <sup>th</sup> )	518 µg/L (May 15 <sup>th</sup> )
<b>Total phosphorus load:</b>	16 tonnes	1.2 tonne
<b>Total water load:</b>	0.047 km <sup>3</sup>	0.003 km <sup>3</sup>
<b>Phosphorus export:</b>	0.41 kg/ha/y	0.03 kg/ha/y
<b>Percent water load in spring:</b>	99%	98%
<b>Percent phosphorus load in spring:</b>	99%	100%

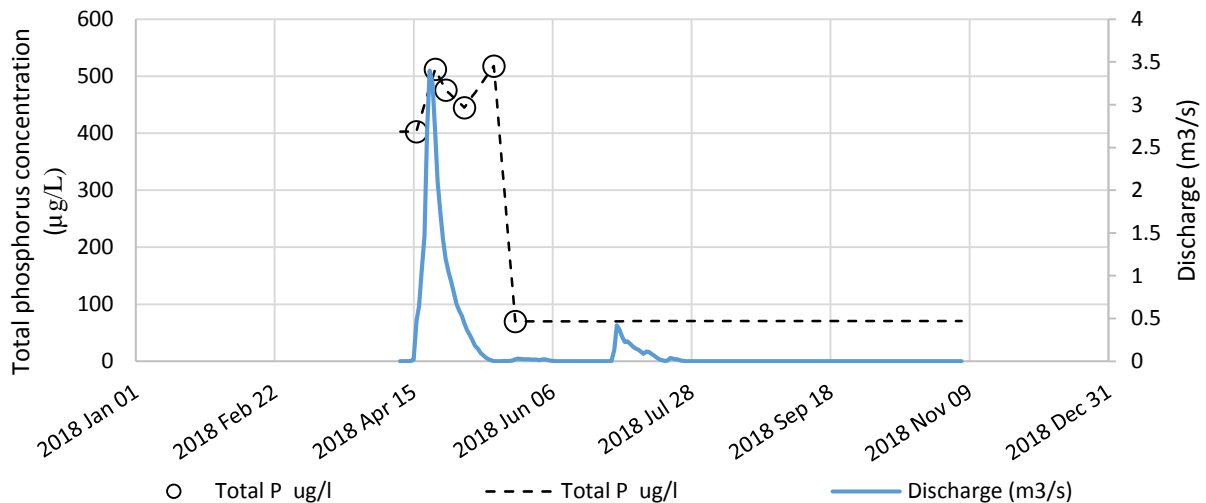


Figure 13. Discharge and total phosphorus concentration over the 2018 sampling season at Marsh River near Otterburn (estimated from Water Survey of Canada Station 05OE010).

## Roseau River sample sites

### Roseau River near Gardenton

This sample site is the most upstream sample site on the Roseau River. The majority of this 4440 km<sup>2</sup> drainage area is located in Minnesota and Ontario. This drainage area is not densely populated and is largely forested.

This sample site is located at Water Survey of Canada flow meter 05OD004, near Gardenton. In 2018, 8 samples were collected between April 18<sup>th</sup> and September 17<sup>th</sup>.



	2017	2018
<b>Discharge peaked:</b>	April 15 <sup>th</sup>	April 22 <sup>nd</sup>
<b>Greatest phosphorus concentration:</b>	157 µg/L (March 31 <sup>st</sup> )	202 µg/L (April 18 <sup>th</sup> )
<b>Total phosphorus load:</b>	46 tonnes	19 tonnes
<b>Total water load:</b>	0.439 km <sup>3</sup>	0.168 km <sup>3</sup>
<b>Phosphorus export:</b>	0.10 kg/ha/y	0.04 kg/ha/y
<b>Percent water load in spring:</b>	74%	69%
<b>Percent phosphorus load in spring:</b>	68%	80%

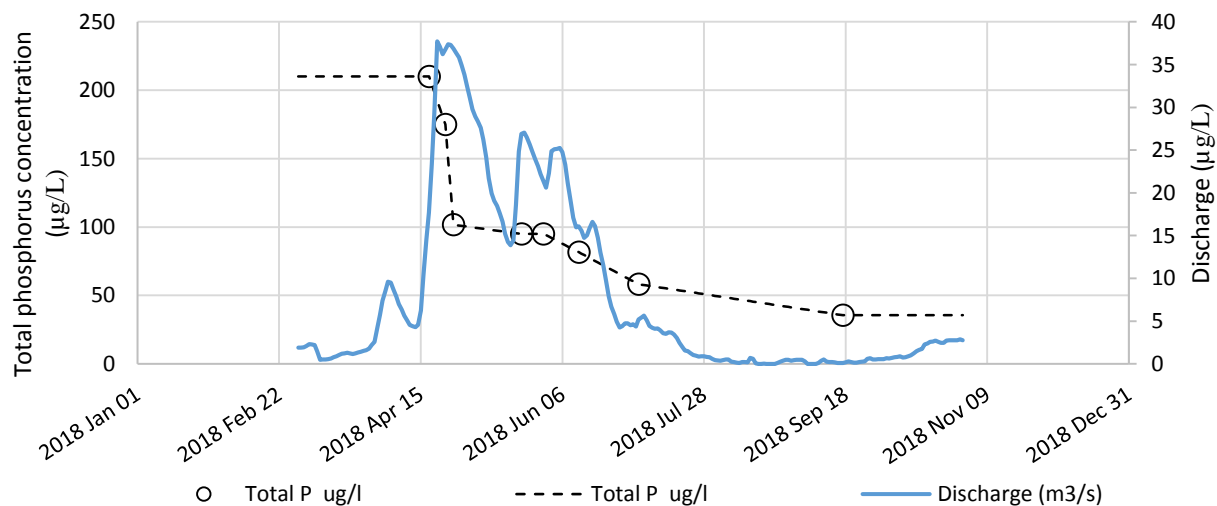


Figure 14. Discharge and total phosphorus concentration over the 2018 sampling season at Roseau River near Gardenton (Water Survey of Canada Station 05OD004).

### Vita Drain near Stuartburn

This sample site is located directly upstream from where the Vita Drain flows into the Roseau River. This 442 km<sup>2</sup> area drains largely forested land, with some agriculture and the community of Vita, Manitoba.

This sample site is located at Water Survey of Canada flow meter 05OD034, near Stuartburn. In 2018, 9 samples were collected between April 18<sup>th</sup> and July 6<sup>th</sup>.



	2017	2018
Discharge peaked:	March 29 <sup>th</sup>	June 16 <sup>th</sup>
Greatest phosphorus concentration:	98 µg/L (March 31 <sup>st</sup> )	106 µg/L (April 18 <sup>th</sup> )
Total phosphorus load:	2 tonnes	0.1 tonnes
Total water load:	0.043 km <sup>3</sup>	0.004 km <sup>3</sup>
Phosphorus export:	0.05 kg/ha/y	0 kg/ha/y
Percent water load in spring:	93%	35%
Percent phosphorus load in spring:	94%	32%

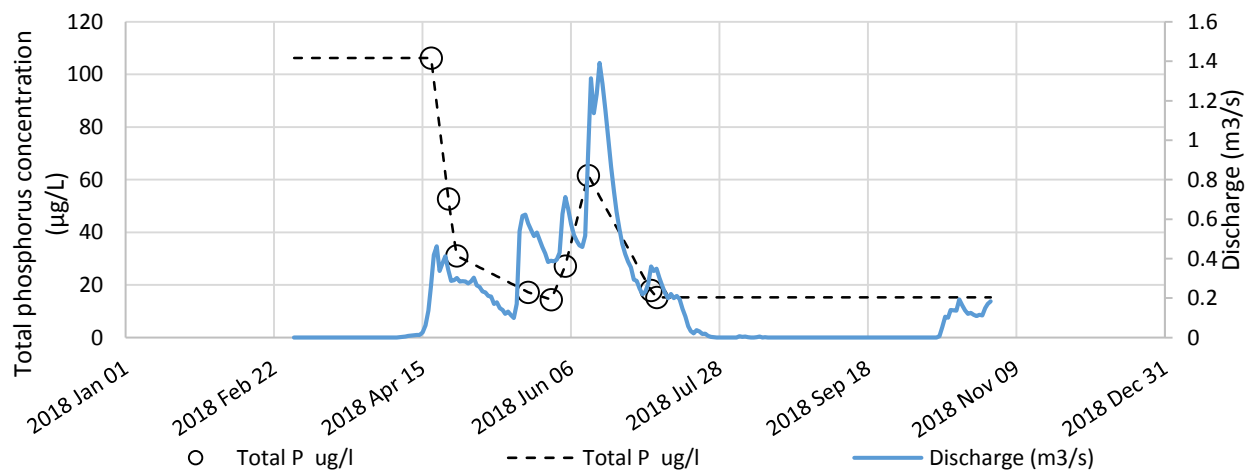


Figure 15. Discharge and total phosphorus concentration over the 2018 sampling season at Vita Drain near Stuartburn (Water Survey of Canada Station 05OD034).

### Roseau River near Dominion City

This downstream stretch of the Roseau River drains a 5020 km<sup>2</sup>, largely forested area, and the community of Stuartburn.

This sample site is located at Water Survey of Canada flow meter 05OD001, near Dominion City. In 2018, 9 samples were collected between April 26<sup>th</sup> and July 23<sup>rd</sup>.



	2017	2018
Discharge peaked:	April 1 <sup>st</sup>	April 22 <sup>nd</sup>
Greatest phosphorus concentration:	194 µg/L (March 31 <sup>st</sup> )	124 µg/L (April 26 <sup>th</sup> )
Total phosphorus load:	4 tonnes	0.9 tonne
Total water load:	0.025 km <sup>3</sup>	0.024 km <sup>3</sup>
Phosphorus export:	0.29 kg/ha/y	0.07 kg/ha/y
Percent water load in spring:	70%	97%
Percent phosphorus load in spring:	71%	98%

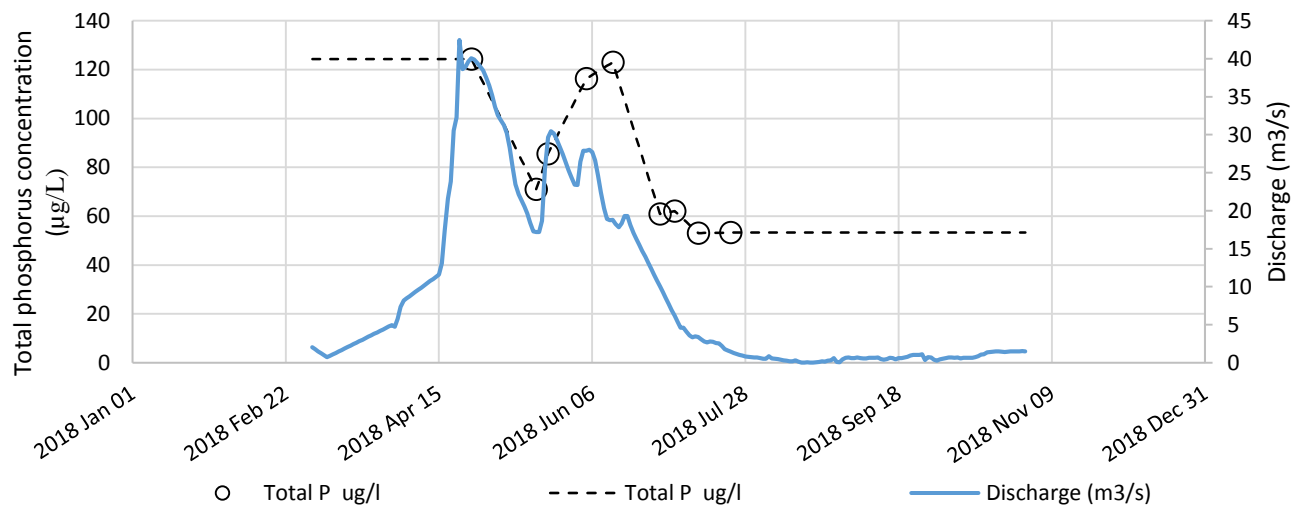


Figure 16. Discharge and total phosphorus concentration over the 2018 sampling season at Roseau River near Dominion City (Water Survey of Canada Station 05OD001).



### Main Drain near Dominion City

The drainage area for this sample site is 225 km<sup>2</sup>. The majority of this drainage area is located in Manitoba with a small portion extending into the United States. This sample site drains a more densely agricultural area than the other sample sites in the Roseau River watershed.

This sample site is located at Water Survey of Canada flow meter 05OD028, near Dominion City. In 2018, 5 samples were collected between April 18<sup>th</sup> and June 20<sup>th</sup>.



	2017	2018
<b>Discharge peaked:</b>	March 31 <sup>st</sup>	April 19 <sup>th</sup>
<b>Greatest phosphorus concentration:</b>	372 µg/L (March 31 <sup>st</sup> )	498 µg/L (April 18 <sup>th</sup> )
<b>Total phosphorus load:</b>	8 tonnes	4.9 tonnes
<b>Total water load:</b>	0.022 km <sup>3</sup>	0.011 km <sup>3</sup>
<b>Phosphorus export:</b>	0.36 kg/ha/y	0.22 kg/ha/y
<b>Percent water load in spring:</b>	100%	100%
<b>Percent phosphorus load in spring:</b>	100%	100%

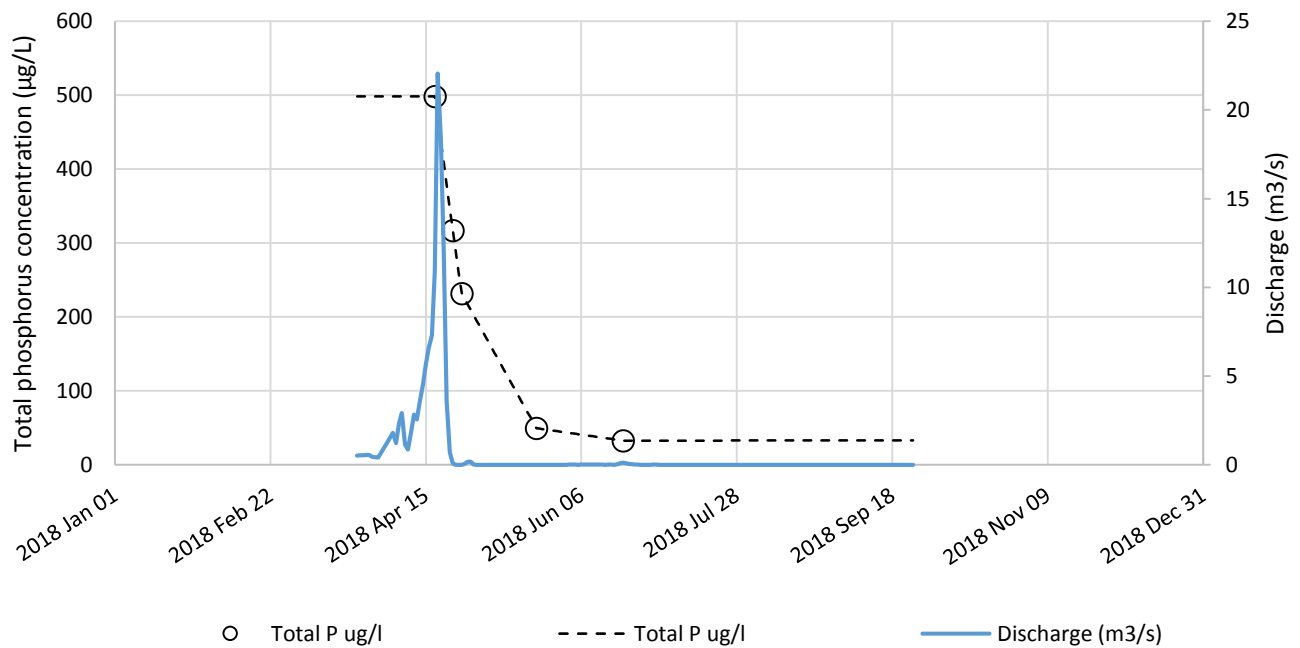


Figure 17. Discharge and total phosphorus concentration over the 2018 sampling season at Main Drain near Dominion City (Water Survey of Canada Station 05OD028).

## Sample site without flow data

### *Seine River at Marchand*

The Seine River at Marchand sample site drains the headwaters of the Seine River watershed, which mainly includes drained low-lying land and cattle pasture.

This sample site is located near Marchand. In 2018, 14 samples were collected between April 10<sup>th</sup> and October 30<sup>th</sup>. Because flow is not measured at this site, we cannot calculate phosphorus loads and exports.



- **2017 greatest phosphorus concentration:** 750 µg/L measured on March 28<sup>th</sup>
- **2018 greatest phosphorus concentration:** 209 µg/L measured on April 27<sup>th</sup>

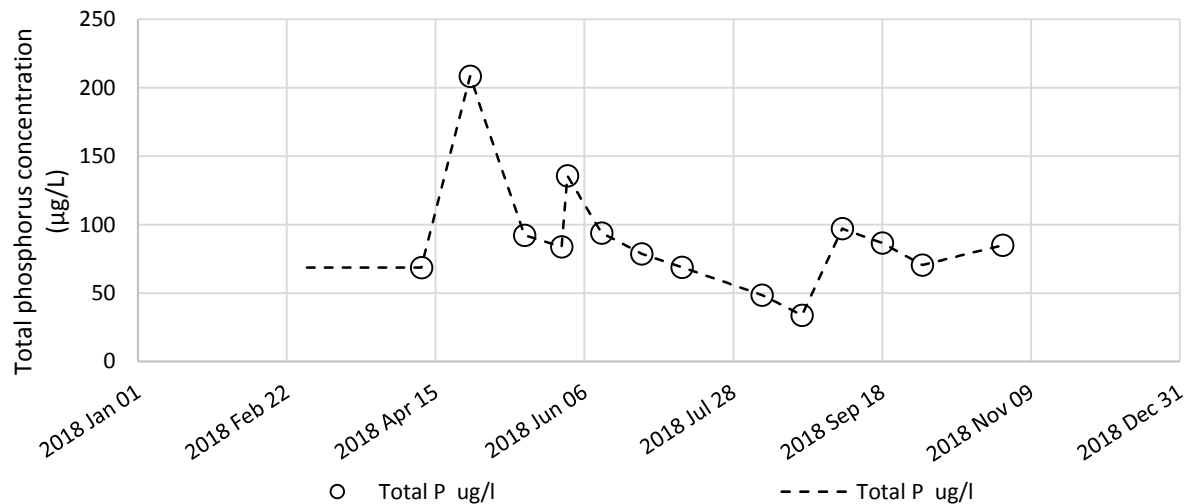
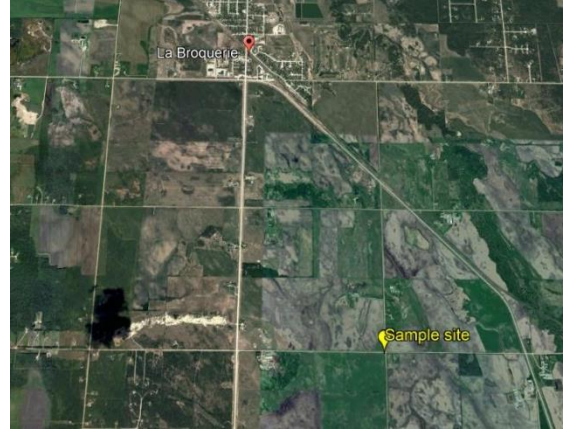


Figure 18. Total phosphorus concentration over the 2018 sampling season at the Seine River at Marchand.

### La Broquerie Drain at Gosselin Road

The La Broquerie Drain at Gosselin Road sample site drains dense forage crops and pastures that are spread with manure. This site drains recently cleared forest and drained wetlands.

This sample site is located near La Broquerie. In 2018, 3 samples were collected between June 29<sup>th</sup> and August 9<sup>th</sup>. Because flow is not measured at this site, we cannot calculate phosphorus loads and exports.



- **2018 greatest phosphorus concentration:**  
201 µg/L on August 4<sup>th</sup>

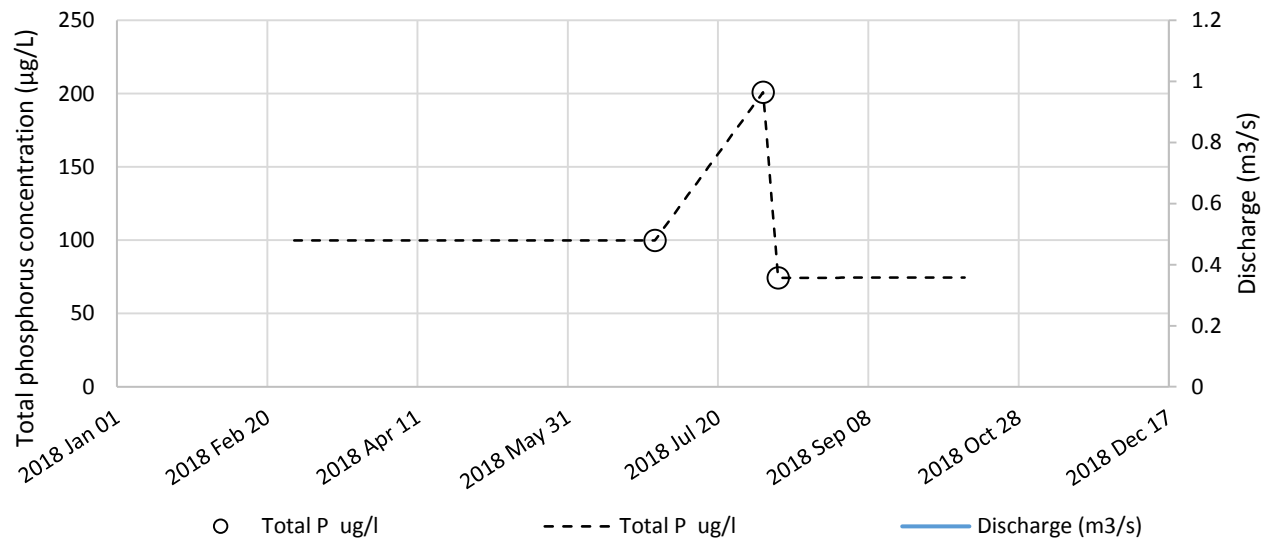
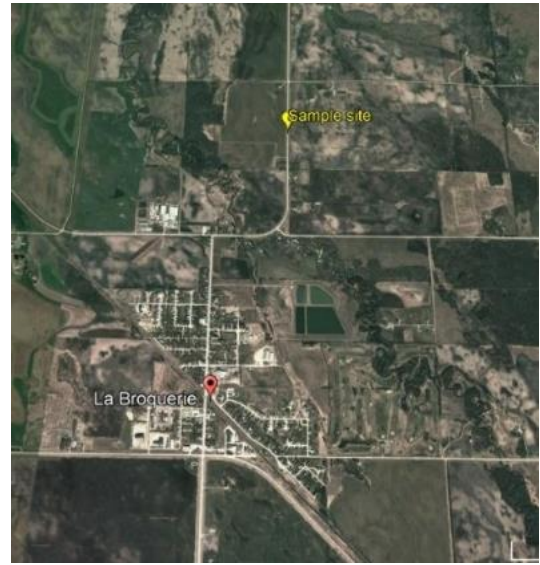


Figure 19. Total phosphorus concentration over the 2018 sampling season at the La Broquerie Drain at Gosselin Road site.

### Hope Creek near La Broquerie

The Hope Creek site drains dense forage crops and pastures that are spread with hog manure. This site drains recently cleared forest and drained wetlands.

This sample site is located near La Broquerie. In 2018, 5 samples were collected between May 14<sup>th</sup> and September 13<sup>th</sup>. Because flow is not measured at this site, we cannot calculate phosphorus loads and exports.



- **2018 greatest phosphorus concentration: 237  $\mu\text{g/L}$  on August 4<sup>th</sup>**

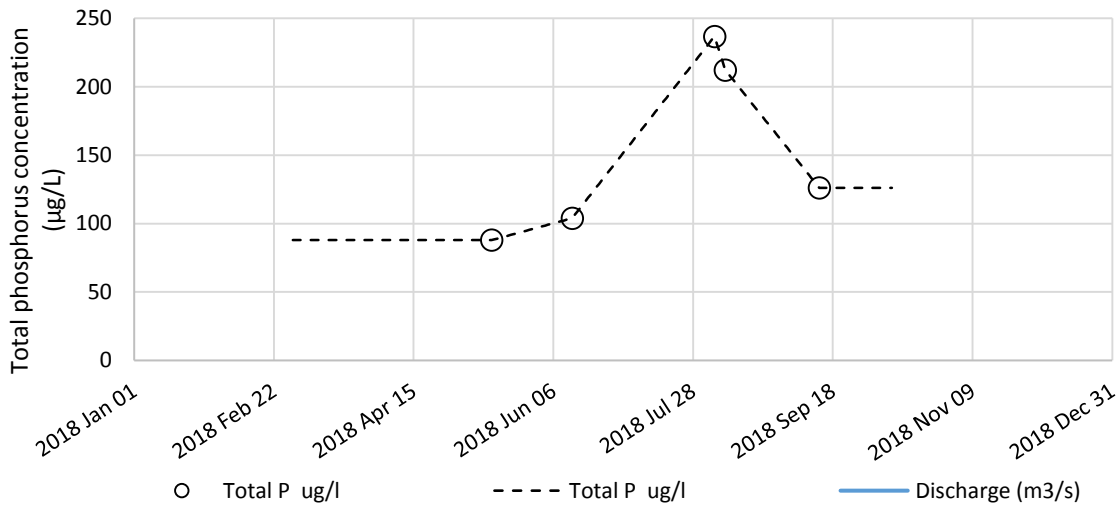


Figure 20. Total phosphorus concentration over the 2018 sampling season at the Hope Creek near La Broquerie site.

## City of Steinbach sites

Located in the Manning Canal drainage area, the City of Steinbach, the third largest city in Manitoba, is home to 15,829 residents (Statistics Canada, 2016 Census). Urban areas like the City of Steinbach contribute to phosphorus loads through urban runoff. Impervious surfaces such as roads, parking lots and sidewalks do not retain water and therefore contribute to surface runoff in urban areas.

Volunteers collected samples at one site upstream and two sites downstream of the City of Steinbach. The Downstream 1 sample site is located slightly downstream from the city proper, while Downstream 2 is located downstream to of Steinbach’s wastewater lagoons, enabling wastewater contributions to be assessed.



In 2018, 20 samples were collected at the downstream sites between April 17<sup>th</sup> and October 17<sup>th</sup>. Three samples were collected at the upstream site between April 15<sup>th</sup> and April 22<sup>nd</sup>; the site was dry for the remainder of the season.

Based on the data currently available, it is not possible to determine how much the City of Steinbach is contributing to the phosphorus load of the Manning Canal drainage area, due to the lack of discharge data for these three sites. Because flow is not measured, we cannot calculate phosphorus loads and exports.

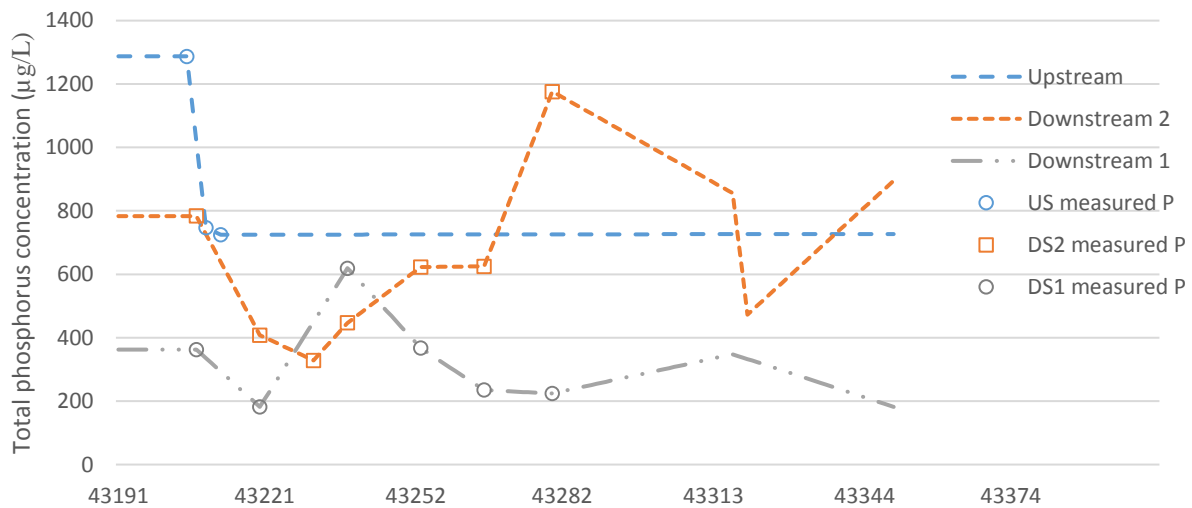


Figure 21. Total phosphorus concentration over the 2018 sampling season at the City of Steinbach sites.

## 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](mailto: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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THOMAS SILL  
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