

WATER QUALITY SUMMARY REPORT FOR 2016

This is the first annual report on water quality from the Shuswap Watershed Council.

Did you know there are over 500 water quality samples collected in the Shuswap watershed each year? Samples are collected from lakes and rivers, in the shallows and the deep, at parks and beaches, and near water in-takes and effluent out-falls. Water samples are collected by over a dozen organizations, and for different reasons – such as for monitoring ecosystem health, ensuring public health and safety, for research or stewardship purposes, and more.

The Shuswap Watershed Council (SWC) was established in 2014 as a watershed-based partnership that enhances water quality and safe recreation in the Shuswap. There are 17 SWC members that represent three regional districts, two municipalities, the Secwepemc Nation, two provincial government agencies, and Shuswap communities. The SWC is a collaborative, non-regulatory group. It works alongside organizations that have regulatory roles in managing the Shuswap watershed, complimenting their work and carefully avoiding duplication.

Enhanced water quality that supports human and ecosystem health and the local economy in the Shuswap watershed

Featuring water quality monitoring results for:

Shuswap Lake

Mara Lake

Mabel Lake

Sugar Lake

Shuswap River

Salmon River

Gardom Lake

White Lake

Adams Lake

Popular swimming beaches

WHAT IS A WATERSHED?

A watershed is an area of land that is defined by where water flows. Watersheds receive precipitation (rain or snow) and over time, water drains to a single point of convergence, such as the outlet of a river or a lake. Smaller watersheds make up larger watersheds. For example, the Bolean Creek watershed feeds the Salmon River watershed, which feeds the Shuswap watershed, then the Thompson watershed, and so on.

WHAT WATERSHED(S) DO YOU LIVE IN?

This is the entire Shuswap Watershed – it's much more than the lake. It includes mountain ranges, meadows, creeks, rivers, and several lakes all of which drain to a single point at the outlet of Little Shuswap Lake.

Throughout the pages of this summary, you'll see contributions from Grade 11 and 12 students at Salmon Arm Secondary School. They've shared some of what they've learned about the Shuswap watershed in their Earth Science class.



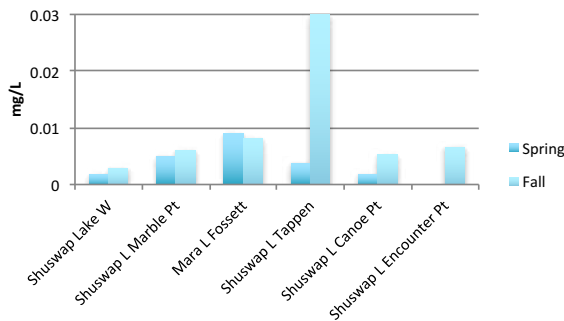
*Image courtesy of the Shuswap Watershed Project,
shuswapwatershed.ca*

SHUSWAP, MARA, MABEL, ADAMS, GARDOM AND WHITE LAKES RESULTS

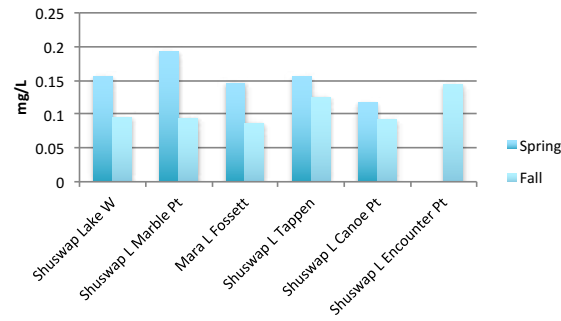
BC Ministry of Environment monitors water quality at these lakes twice per year, in the spring and fall. Members of the BC Lake Stewardship Society and citizen scientists also help with monitoring and contribute water quality data. Here is a snapshot of water quality monitoring results* for 2016.

SHUSWAP AND MARA LAKES

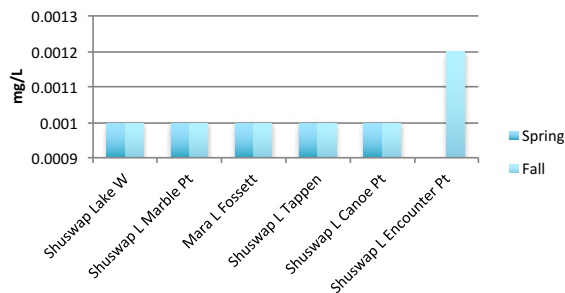
Shuswap and Mara Lakes 2016: total Phosphorus



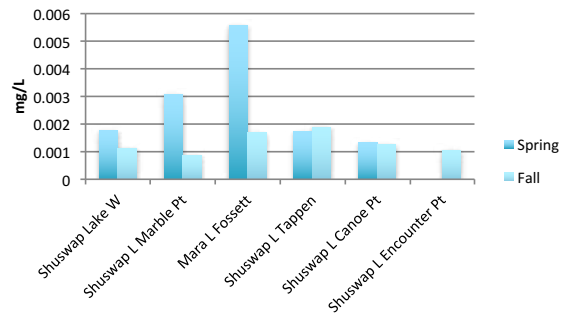
Shuswap and Mara Lakes 2016: total Nitrogen



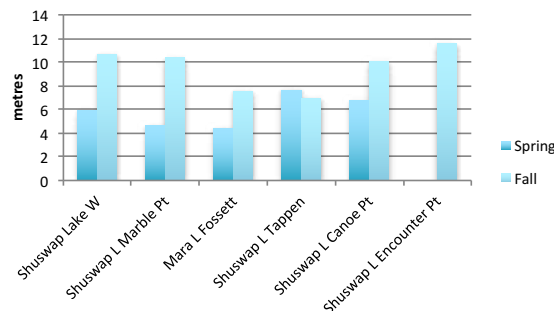
Shuswap and Mara Lakes 2016: reactive Phosphate



Shuswap and Mara Lakes 2016: Chlorophyll a



Shuswap and Mara Lakes 2016: Secchi Disk depth



"A watershed is an area that drains into a common body of water at the lowest point. The water travels downhill starting from the highest point. If pollution is introduced upstream, it will travel and affect downstream areas."

– Student, Grade 11-12 Earth Science class, Salmon Arm Secondary School.

* For surface water only (not deep samples)

WHAT'S A SECCHI DISK DEPTH MEASUREMENT?

A Secchi disk is a simple tool used to measure the clarity of water. It's a circular disk divided into four, with alternating black and white wedges. It's lowered into the water column until the contrasting black and white wedges are no longer visible under the water. At this point, the depth of the Secchi disk is recorded - the higher the measurement, the clearer the water.

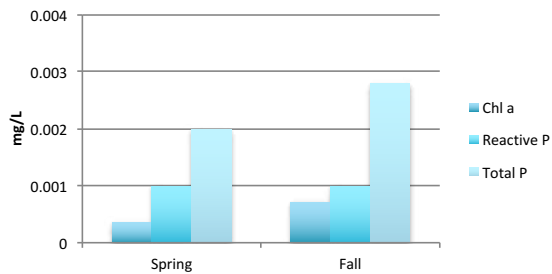


Phosphorus (P) and Nitrogen (N) are important to monitor because they are key nutrients that control lake productivity. Aquatic life such as algae, invertebrates, and fish need these nutrients to grow and reproduce. Naturally occurring nutrients are important for supporting a healthy ecosystem. Excessive nutrients and algae can reduce water clarity, create odours, and reduce the quality of water for drinking and recreation.

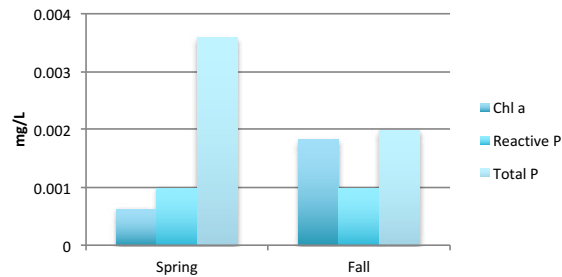
Chlorophyll *a* (abbreviated Chl *a*) is important to monitor because it is an indication of how much algae is in the lake, which in turn is important to aquatic food webs and for drinking and recreation purposes.

MABEL LAKE

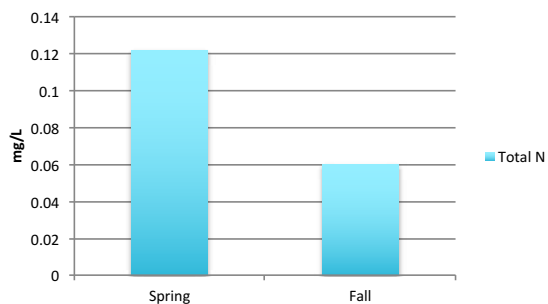
Mabel Lake at Tsuius Cr 2016: select water quality parameters



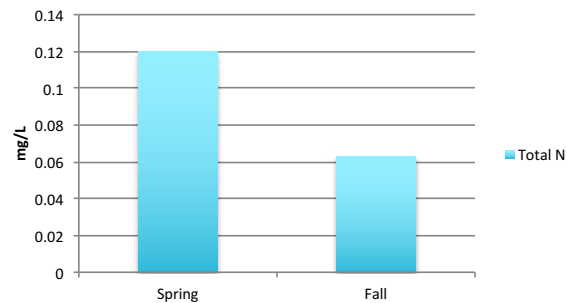
Mabel Lake South 2016: select water quality parameters



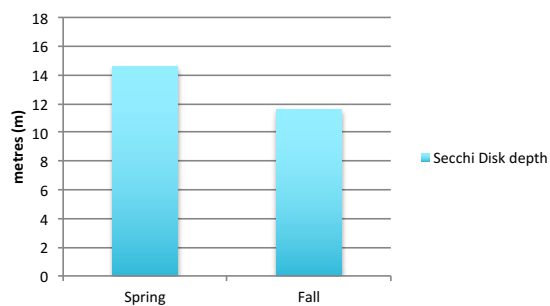
Mabel Lake at Tsuius Cr 2016: total Nitrogen



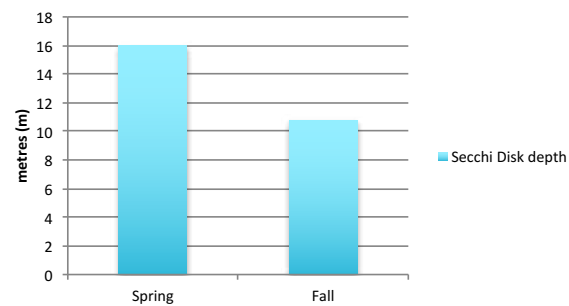
Mabel Lake South 2016: total Nitrogen



Mabel Lake at Tsuius Cr 2016: Secchi Disk depth

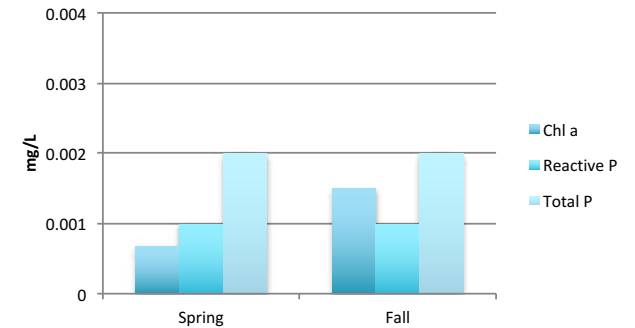


Mabel Lake South 2016: Secchi Disk depth

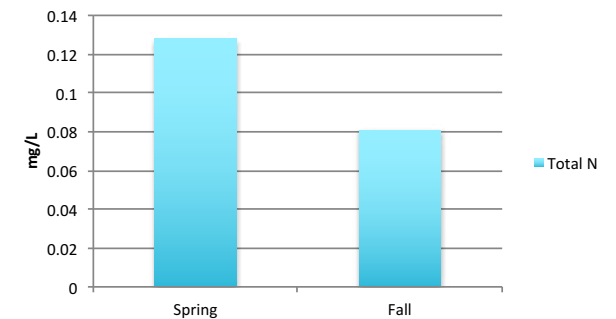


SUGAR LAKE

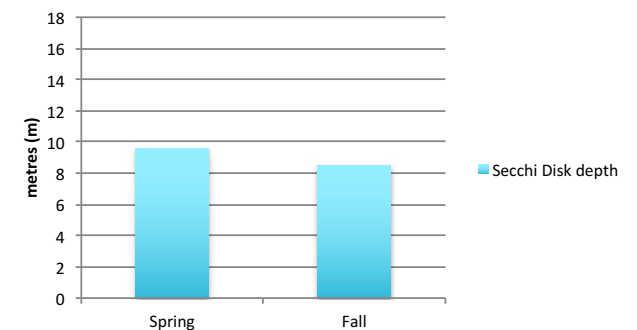
Sugar Lake 2016: select water quality parameters



Sugar Lake 2016: total Nitrogen

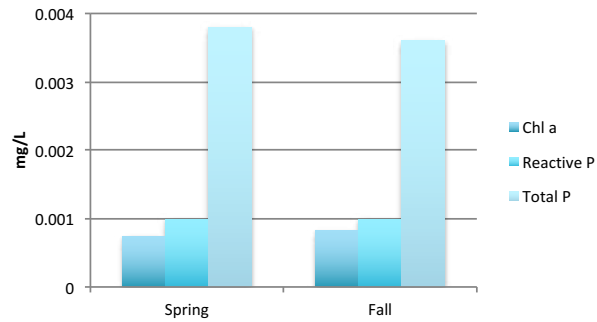


Sugar Lake 2016: Secchi Disk depth

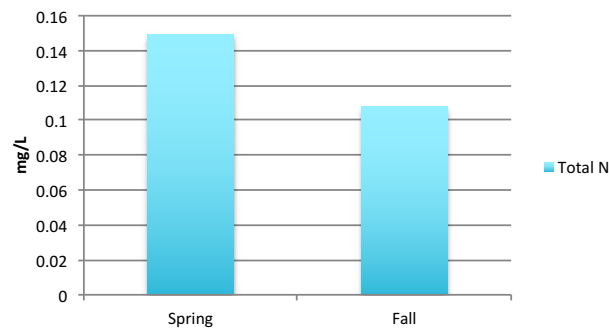


ADAMS LAKE

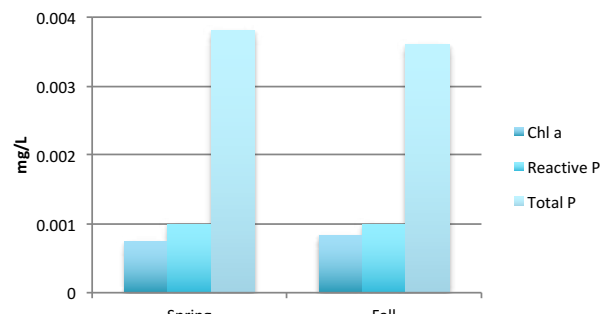
Adams Lake 2016: select water quality parameters



Adams Lake 2016: total Nitrogen

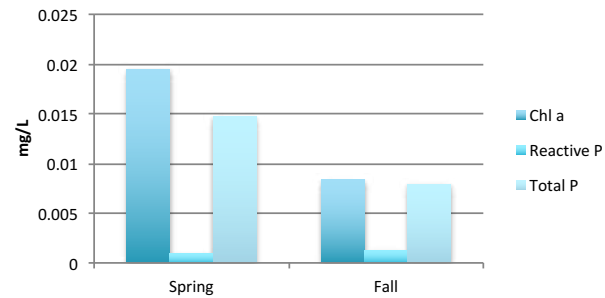


Adams Lake 2016: select water quality parameters

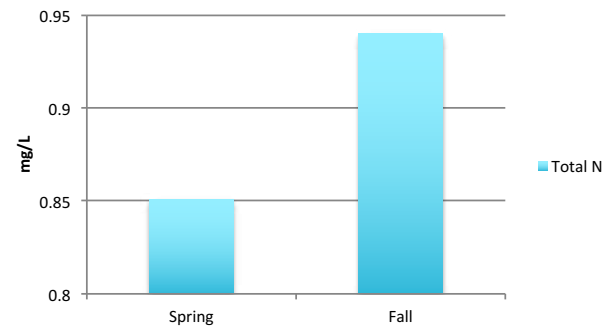


GARDOM LAKE

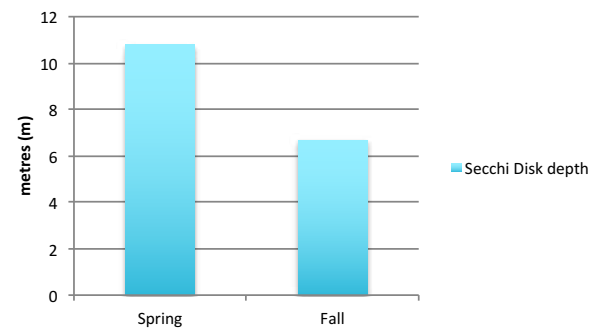
Gardom Lake 2016: select water quality parameters



Gardom Lake 2016: total Nitrogen

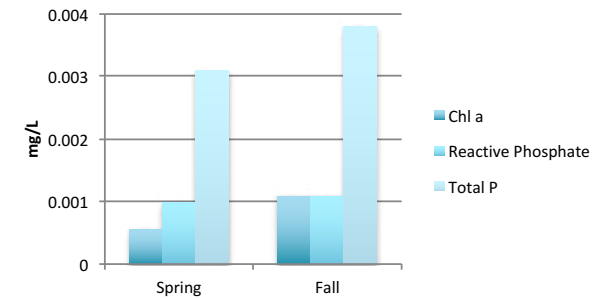


Gardom Lake 2016: Secchi Disk depth

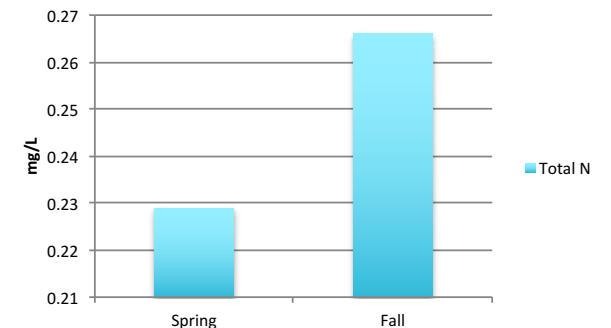


WHITE LAKE

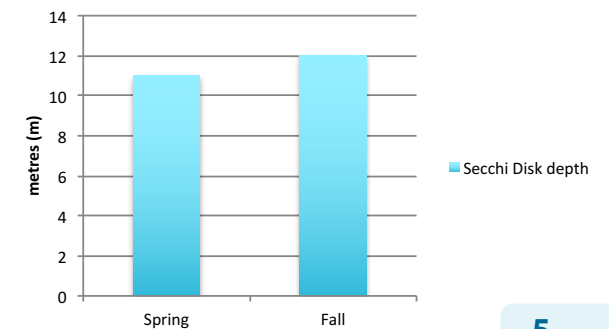
White Lake 2016: select water quality parameters



White Lake 2016: total Nitrogen

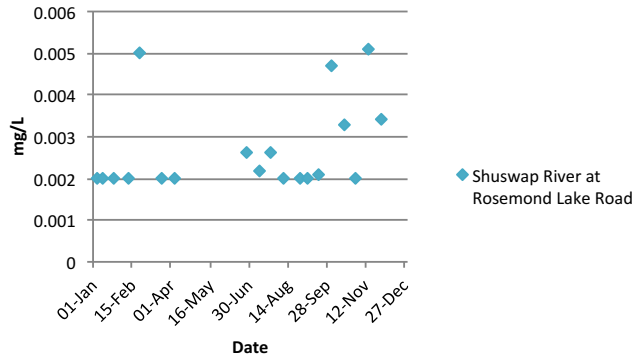


White Lake 2016: Secchi Disk depth

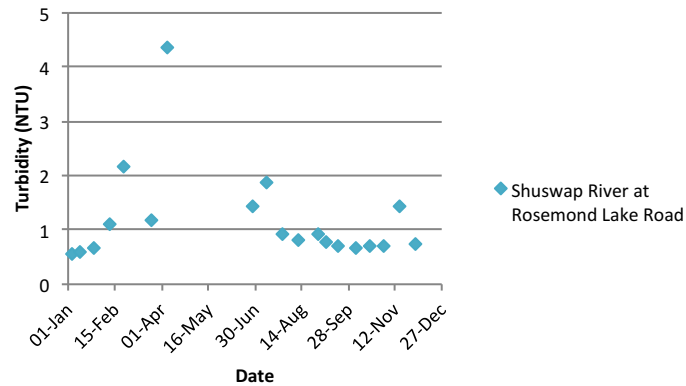


SHUSWAP RIVER RESULTS

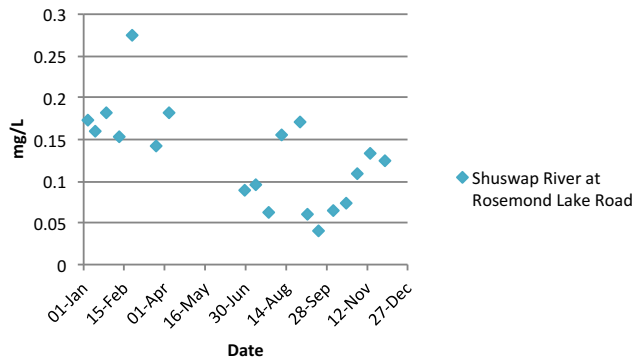
Shuswap River 2016: total Phosphorus



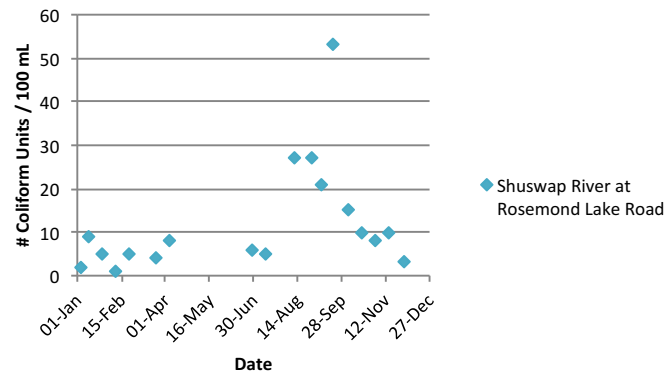
Shuswap River 2016: turbidity



Shuswap River 2016: total Nitrogen



Shuswap River 2016: E. coli



The water quality monitoring results display two types of phosphorus. One is Reactive Phosphate – also known as Orthophosphate – which is the form of phosphorus that's immediately available to plant life. For this reason, it has the potential to be the most damaging to surface waters in terms of its ability to cause an algae bloom. The other type of Phosphorus reported here is Total Phosphorus which is just what it sounds, a measurement all of forms of phosphorus combined. It indicates the total inputs of phosphorus from various sources.



HOW TO RETRIEVE WATER QUALITY DATA FROM THE BRITISH COLUMBIA ENVIRONMENTAL MONITORING SYSTEM

Did you know that a lot of the water quality data that's collected in the Shuswap watershed – and all across the province – is kept in a provincial government database? The database is called the "Environmental Monitoring System" (EMS) and you can access water quality data from it using its web reporting tool. There are a few steps to go through, follow this guide to learn how and do it for yourself.

The Shuswap Watershed Council is not the steward of the EMS and has no authority over it. Any problems you may encounter with the EMS should be reported to the BC Government - Natural Resource Science Business Service Desk at 250-952-5881 or toll free 1-866-952-5881.

WOULD YOU LIKE TO BE ABLE TO ACCESS WATER QUALITY DATA IN NEAR REAL-TIME? YOU CAN!

Much of the data for lakes and rivers is entered into the provincial Environmental Monitoring System (EMS), which is accessible to the public. A few steps are required, and the SWC has created a user-guide to make it easier. Find it on our **website**.

"People are ultimately connected to watersheds because the water that we drink, clean with, and water plants with comes from a watershed."
– Student, Grade 11-12 Earth Science class, Salmon Arm Secondary School

NUTRIENT RESEARCH UNDERWAY IN THE SHUSWAP WATERSHED

Past water quality monitoring in the Shuswap has indicated that generally, water quality is good in most places at most times of year. However, high loadings of nutrients to the lakes – phosphorus in particular – are coming from the Shuswap and Salmon Rivers. The Shuswap Watershed Council has entered into a three-year research partnership with UBC – Okanagan to determine the sources of nutrients in the Shuswap and Salmon Rivers. This is the first project of its kind of the watershed. The following research questions will be answered by the end of the three-year project in 2019:

- Are there excess nutrients in the rivers that are not from the natural environment?
- If so, where are they coming from and how are they being transported into the rivers?

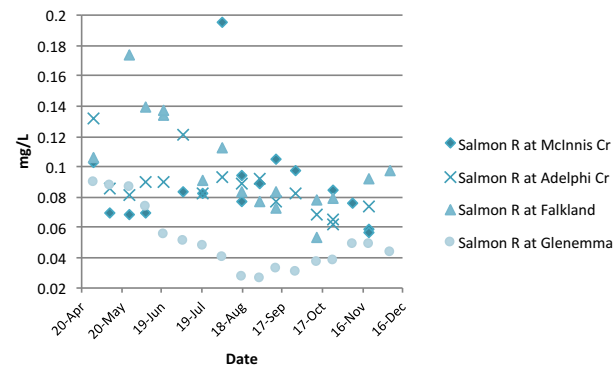
Having answers to these questions will inform better nutrient management to protect our water quality.

WHAT IS AN ACCEPTABLE OR UNACCEPTABLE RESULT?

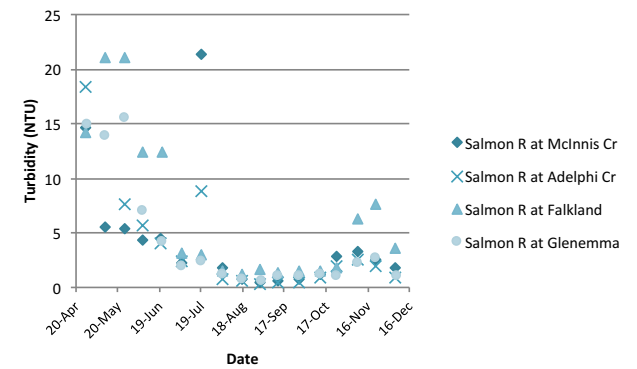
Canadian guidelines on water quality for swimming state that a safe bacteria level is less than 400 *E. coli* in a 100 mL sample, or an average of 200 *E. coli* in five consecutive 100 mL samples collected on a weekly basis. Above this, a swimming advisory may be issued.

SALMON RIVER RESULTS

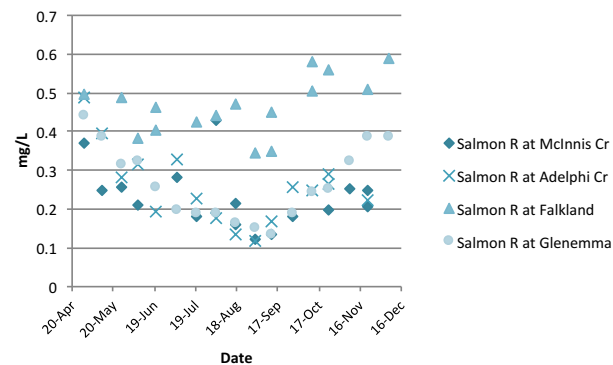
Salmon River 2016: total Phosphorus



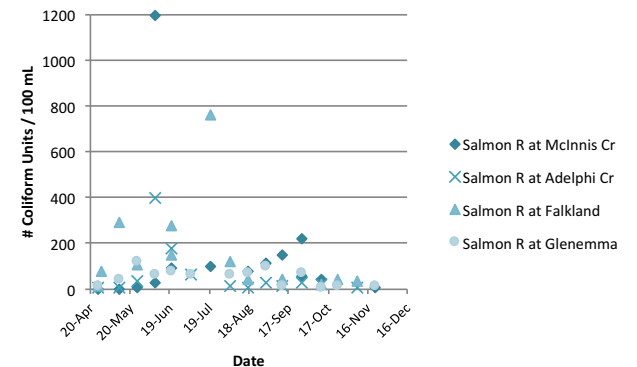
Salmon River 2016: turbidity



Salmon River 2016: total Nitrogen

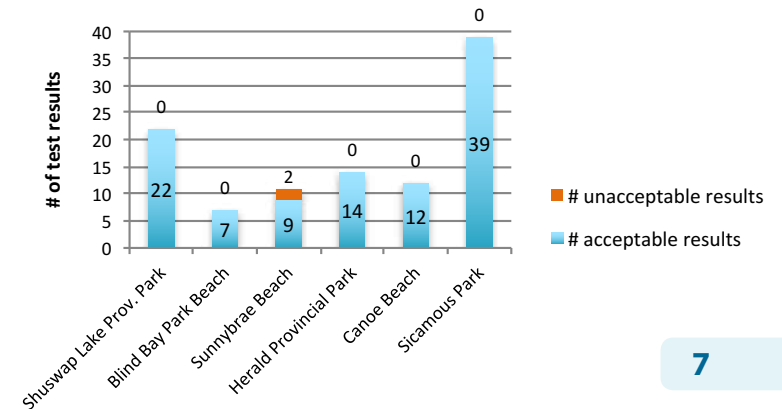


Salmon River 2016: *E. coli*



SWIMMING BEACHES

Interior Health Authority is the regulatory agency that oversees water quality monitoring at popular swimming beaches in the Shuswap. Water samples are tested throughout the summer months for *E. coli*, a type of bacteria that is an indicator of water contamination. Here are the results from the beach sampling program in 2016.



MAKING SENSE OF THE DATA

The Shuswap watershed is a complex ecosystem. Water quality monitoring results vary in different regions of the watershed and different times of year, as shown on the previous pages.

Generally, the lower receiving areas of the watershed such as Mara Lake and Salmon Arm Bay have higher concentrations of nutrients than elsewhere in the watershed. This is related to inflows from the Shuswap River and Salmon River, and to a lesser extent Canoe Creek, White Creek, and Tappen Creek. In addition, concentrations of nutrients such as phosphorus as well as chlorophyll *a* are higher in the warmer growing season (summer and fall) than in the cooler seasons (winter and spring). Even so, much of the phosphorus measurements for Shuswap and Mara Lake are considered low except for Salmon Arm Bay. The upper areas of the watershed such as Mabel Lake, Sugar Lake, and Adams Lake have very low measurements of phosphorus and chlorophyll *a*.

The Shuswap and Salmon River monitoring results vary throughout the year. In addition to surrounding land uses, weather events impact river water quality. The Shuswap River charts on p. 6, for example, illustrate how late winter melt, spring freshet, and fall rains affect water quality.

"If we want future generations to enjoy our watershed, we need to take care of it."

– Student, Grade 11-12 Earth Science class,
Salmon Arm Secondary School

HELP KEEP THE SHUSWAP CLEAN

There are a lot of things that can be done to help maintain and improve water quality.

As a resident or visitor to the Shuswap, here are some priorities for individual action:

- Make sure you know where your wastewater goes. Is your household on a septic system, or connected to sewer? If it's septic, you're responsible for keeping it in good repair. The Septic Smart Homeowner's Guide is a good place to start: csrd.bc.ca/septicmart/homeowners-guide
- Properly dispose of unused medications – return them to a pharmacy
- Pledge not to flush personal care products such as floss, swabs and wipes

ACKNOWLEDGMENTS

The SWC wishes to thank the members of the Shuswap Water Quality Monitoring Group for their contributions to this summary. Thanks also to Dave Ramsay and his students at Salmon Arm Secondary School for sharing some of their ideas and classwork with us.

WHAT DO YOU THINK?

This is the first annual water quality summary from the Shuswap Watershed Council. We'd like to know, what did you think? What else would you like to see in subsequent years summaries? Please contact the SWC, care of the Fraser Basin Council in Kamloops: evieira@fraserbasin.bc.ca | 250 314-9660



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