



LAHAVE 2019 WATER QUALITY REPORT CARD

The LaHave River watershed is one of the largest watersheds in Southwestern Nova Scotia – covering 1,700 km²! It covers Lunenburg County and extends into both Annapolis and Kings Counties. The watershed is used for recreation, agriculture, silviculture, and forestry, as well as rural and urban development. These land-use activities affect the LaHave River watershed's water quality and overall health.

To ensure the health of the entire watershed, Coastal Action designed and implemented a watershed-scale monitoring program for the LaHave River. Each month Coastal Action monitors the chemical, physical, and biological aspects of the water at 15 sites

across the watershed by collecting water samples and using a water quality measurement instrument (YSI Professional Plus water meter).

Now in its 14th year, the LaHave River Water Quality Monitoring Program has gained valuable knowledge on the natural variability within the watershed, in addition to a deeper understanding of the environmental impacts that human activities can have on the system.

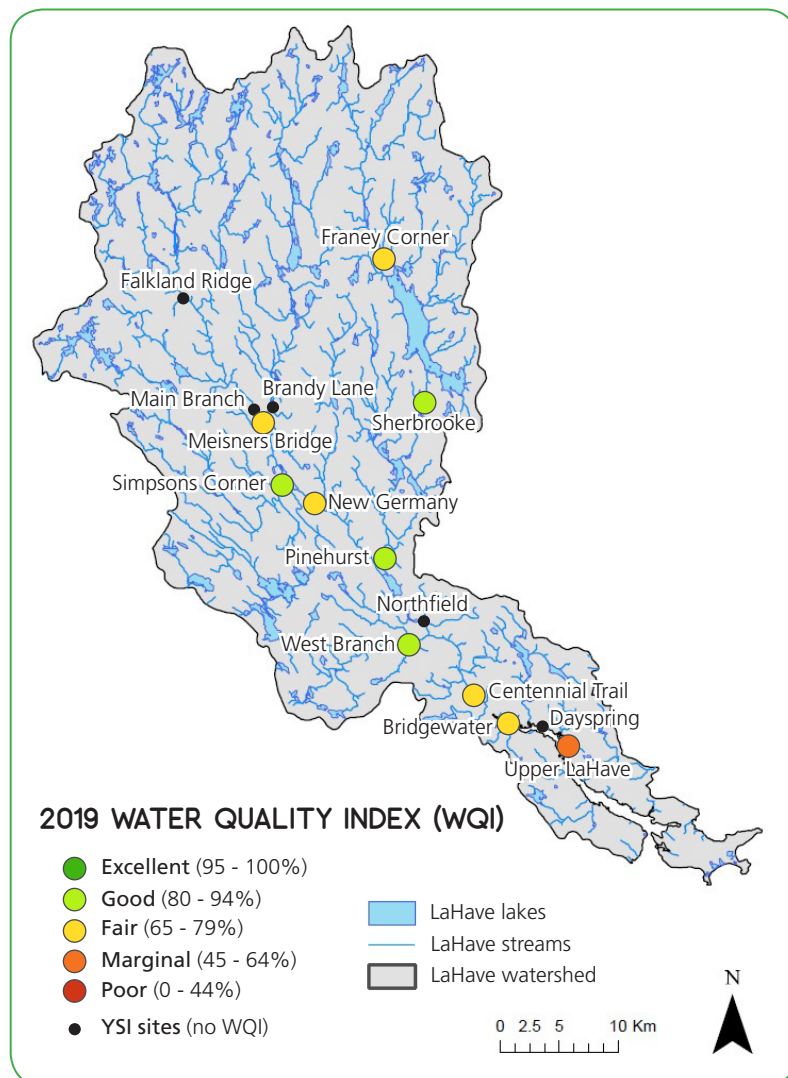
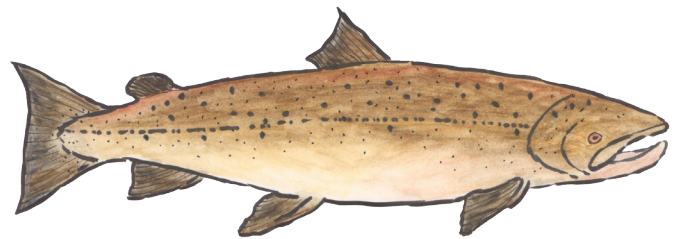


Figure 1: Map of monitoring sites in LaHave River watershed in 2019.



Atlantic Salmon
Salmo salar

LAHAVE RIVER WATERSHED PROJECT

Coastal Action initiated the LaHave River Watershed Project (LRWP) in 2007, in response to increasing public concern over the health of the river. The purpose of the project is to identify and reduce harmful environmental impacts within the LaHave River watershed. Goals of the project include the development of a watershed management plan and a long-term monitoring program to assess the river's health. Project activities include monthly water quality monitoring, habitat assessments, restoration projects, and community outreach and education. The LRWP is guided by an advisory committee representing various government departments, academia, industry, non-profit organizations, and community members.

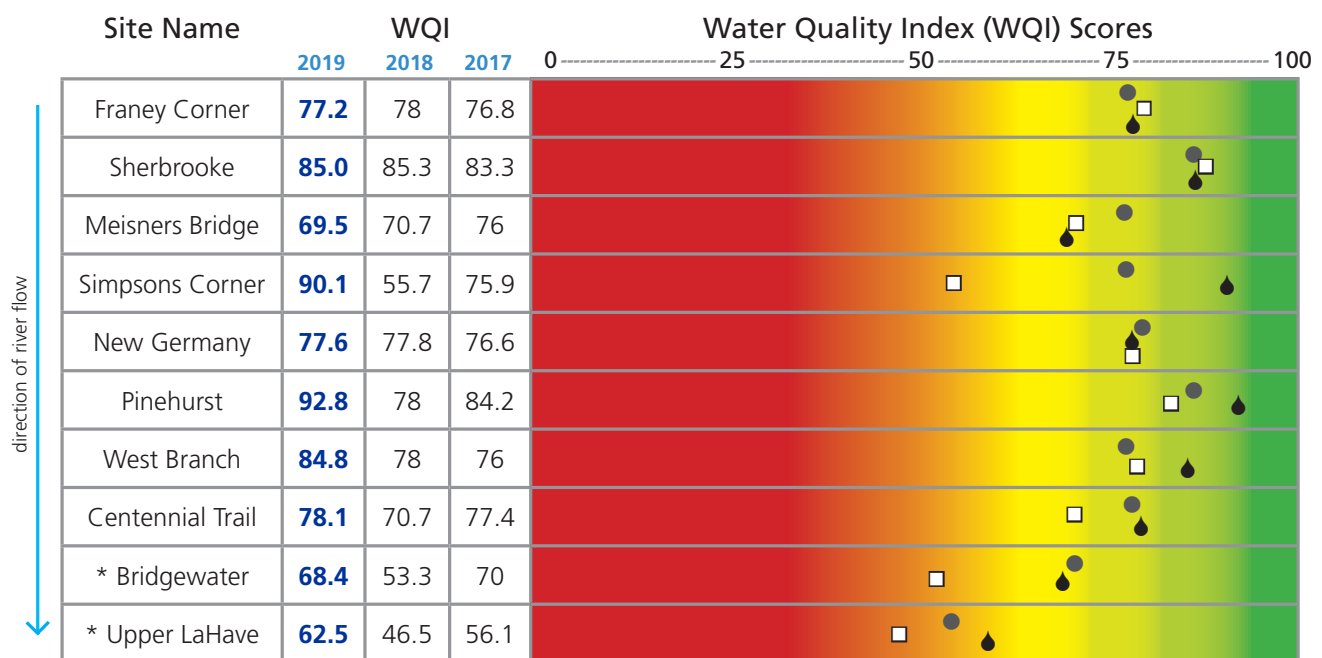
WATER QUALITY INDEX

The Water Quality Index (WQI) is a rating used to assess the health of waterbodies. The WQI is calculated using the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines and incorporates several parameters. The index is calculated based on the number of parameters that do not meet CCME Water Quality Guidelines, the number of times each parameter fails to meet guidelines, and the amount by which the guidelines are exceeded. To account for the complex differences between estuaries and freshwaters, different parameters are used to calculate the WQI for freshwater sites versus marine and estuary sites.

2019 WATER QUALITY INDEX RESULTS

GOOD NEWS! All sites either improved or stayed the same compared to 2018! Our freshwater sites, Franey Corner, Meisner Bridge, New Germany, and Sherbrooke all had similar WQI results to last year, while Centennial Trail, Pinehurst, Simpson's Corner, and West Branch showed improvement. **NO FRESHWATER SITE** failed their water quality thresholds for dissolved oxygen and nitrogen, and **NO ESTUARY SITE** failed their nitrogen threshold (for the second year in a row). The lowest overall WQI score for the watershed increased from 53.3 to 62.5. In addition, temperatures only exceeded the threshold 7 times across the sampling region, compared to 20 times in 2018. Iron also saw the number of exceedances drop in 2019 to 1 at the Upper LaHave marine site, compared to 8 occurrences in 2018 throughout the watershed. Fecal *enterococci* numbers also improved at the two estuary sites with exceedances occurring in 3 months (Feb., Aug., and Sept.) compared to 7 in 2018. For freshwater sites, fecal *enterococci* exceeded allowances only in the month of August at 3 locations.

BAD NEWS! The occurrence of pH exceeding the threshold is increasing. Acidity is an ongoing issue throughout the LaHave River watershed. At Bridgewater, there were only 4 months where pH met the guidelines while at Upper LaHave, the guidelines were met half the time (6 out of 12 months). The average pH for each of these sites is also decreasing from 7.3 to 7.2 for Upper LaHave and 7.0 to 6.8 for Bridgewater. Acidity at the freshwater sites is also experiencing an increasing trend of exceedances with 40 occurrences (42% of samples) in 2019 versus 26 in 2018 (27% of samples). Also, despite the improving results of fecal *enterococci*, it is still an ongoing concern in the LaHave River estuary with exceedances ranging from 160 to 830 cfu/100 mL (Health Canada's Primary Contact Enterococci Guideline <70 cfu / 100 mL).



Parameters Used to Calculate WQI:

- Total Suspended Solids (TSS)
- Dissolved Oxygen (DO)
- Fecal Coliform (freshwater)
- Fecal Enterococci (marine)
- Total Iron
- Total Nitrate
- pH
- Total Phosphorus
- Water Temperature

● = 2017 □ = 2018 ● = 2019

THINGS YOU CAN DO TO HELP

Good water quality is crucial to helping aquatic life survive, here's how:

WATER TEMPERATURES above 20°C can cause stress to cold-water fish – like salmon and trout. Keeping the water cool helps fish keep their 'cool'. Shade from shoreline vegetation, rocks, and logs all help to maintain cooler temperatures.

DISSOLVED OXYGEN (DO) is necessary for aquatic life, just as we need it to breathe. DO concentrations below 6.5 mg/L can negatively affect fish, with prolonged exposure leading to fish kills. Deeper pools and stream sections with riffles help to oxygenate the water and provide fish with a good place to catch their breath!

NUTRIENTS are essential for healthy ecosystems; however, excessive nutrient loading leads to negative environmental impacts. As nitrogen and phosphorus are minimal in the natural environment, inputs from manure, feces, fertilizer, and garden and lawn run-off can increase nutrient concentrations and result in overgrowth of plants and algae – even leading to algal blooms.

pH indicates the acidity or alkalinity of water, and a pH range of 6.5 – 9.0 is ideal for the health and protection of aquatic life. Aside from the direct hazards for aquatic organisms being exposed to acidic conditions, low pH also makes fish more prone to the toxic effects of metals in the water. Allowing rain to filter into soils, instead of running off hard surfaces directly into our watercourses allows the soils to buffer and decrease the acidity of the rain, helping to protect our streams.

FECAL COLIFORM & ENTEROCOCCI are bacteria found in the intestines of warm-blooded organisms. The presence of these indicator bacteria species signifies that the water is contaminated with feces and has the potential to make people sick. Although bacteria sources can be natural, it's still important to do your part to reduce bacteria inputs by maintaining septic systems and picking up pet waste.

TAKE CHARGE OF YOUR ENVIRONMENT!

Limit your footprint with these at-home tips:



MANURE

Line manure piles to avoid bacteria and nutrients leaching into adjacent waterways.

PET WASTE

Put pet waste in its place: the garbage bin.

LIVESTOCK

Keep livestock out of the water with fences (provide livestock with alternate sources of drinking water).

LAWN

Leave a section un-mowed between your lawn and the water (called a *riparian zone*) to filter water and reduce flooding.



FERTILIZER

Don't fertilize your lawn before a storm, as all that fertilizer will be washed into nearby waterways.

DISH SOAP

Avoid using dish soaps with phosphates, especially when camping, as the nutrients can cause harmful algal blooms in the water.

STRAIGHT PIPES

Replace illegal straight pipes with septic systems and keep your systems properly maintained.

PROJECT PARTNER HIGHLIGHT: ENVIRONMENT AND CLIMATE CHANGE CANADA

Environment and Climate Change Canada (ECCC) has been a key partner since Coastal Action began the LaHave River Watershed Project in 2007. Denis Parent, a Water Quality Specialist at ECCC, provided expertise during the design and implementation of the LaHave River Water Quality Monitoring Program and has been a member of the LaHave River Watershed Advisory Committee for nearly 14 years. Denis and his colleagues at ECCC provide valuable in-kind support each year by calculating the WQI results.



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Coastal Action is a community-based charitable organization with a mandate to address environmental concerns throughout the South Shore of Nova Scotia. Coastal Action's goal is to promote the restoration, enhancement, and conservation of our environment through research, education, and action.

Coastal Action has 25 years of experience in the conservation field, including: creating, engaging, and managing environmental monitoring projects; public education; species at risk projects; habitat restoration; and community and sustainability initiatives throughout the South Shore region of Nova Scotia.

COASTAL ACTION 2019 PROJECT HIGHLIGHTS

AMERICAN EEL AND ELVER ABUNDANCE STUDY: Monitoring and biological sampling of silver eel migrations, and elver abundance assessments are conducted at East River, Chester and Oakland Stream.

ATLANTIC WHITEFISH RECOVERY PROJECT: Conservation efforts to protect Canada's rarest fish species include candidate lake assessments, invasive species removal, brood stock collections, and monitoring of several fishways and traps.

LAKE MONITORING PROGRAMS: Coastal Action delivers two lake monitoring programs in Sherbrooke Lake and Fox Point Lake on behalf of the Municipality of the District of Lunenburg and the Municipality of Chester.

FISH HABITAT RESTORATION: Restoration efforts continue throughout the LaHave River watershed including habitat assessments, electrofishing, in-stream habitat restoration, and aquatic connectivity restoration.

CLIMATE CHANGE PROJECTS: Climate change adaptation initiatives include natural infrastructure installations to improve stormwater management on public lands, home assessments and education on water conservation strategies, and carbon sequestration projects on agricultural lands.

ENVIRONMENTAL EDUCATION PROGRAMS: Coastal Action delivers a variety of youth education initiatives including school and after-school programs, summer camps, youth leadership training, and family events.

COASTAL AND MARINE PROGRAMS: Coastal Action conducts microplastic research across Atlantic Canada, delivers a business recognition program for single-use plastic reduction, hosts shoreline cleanups, and celebrates World Oceans Day with a variety of events.

LAHAVE RIVER WATERSHED PROJECT 2019 PARTNERS

Atlantic Salmon Conservation Foundation • Clean Foundation – Clean Leadership Grants • Nova Scotia Salmon Association's Adopt-a-Stream Program • Environment and Climate Change Canada • LaHave River Watershed Advisory Committee • Municipality of the District of Lunenburg • Town of Bridgewater • LaHave River Salmon Association • WWF Canada – Loblaw Water Fund