

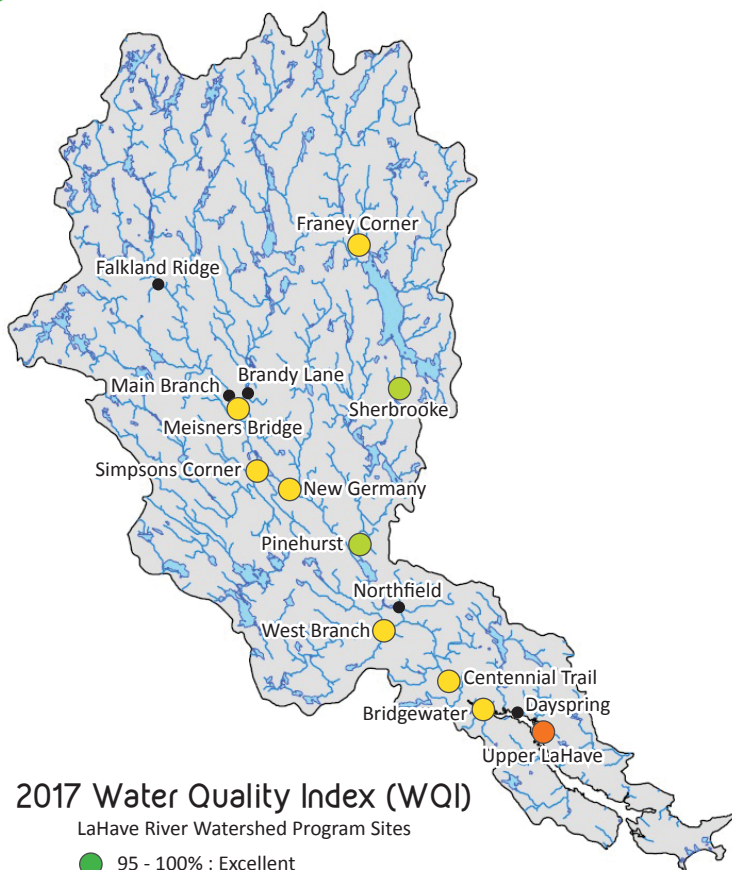
LaHave River Watershed 2017 Report Card

As one of the largest watersheds in Southwestern Nova Scotia, the LaHave River Watershed covers 1,700 km² and is found within the Annapolis, Kings, and Lunenburg Counties. The LaHave River is highly branched, with tributaries feeding the main branch from different sections of the watershed. The LaHave River Watershed is covered by wetlands, forests, and agriculture, as well as rural and urban developments – each of these influence and affect the LaHave River Watershed’s water quality and overall health.

To ensure the health of the entire watershed, Coastal Action has designed and implemented a monitoring program for the LaHave River at a watershed scale. Each month Coastal Action monitors the chemical,

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. Forestry, farming, recreation, and rural development are widespread throughout the system, while industrial and urban developments are mostly restricted to the lower reaches of the watershed. These various forms of land-use can have a significant impact on the health of the entire watershed, including the LaHave River Estuary. 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.



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). By continuously monitoring, and comparing the water chemistry data to previous years, the LaHave River Monitoring Program has gained valuable knowledge on the natural variability within the watershed, in addition to a deeper understanding of the environmental impacts human activities have on the LaHave River.



Water Quality Index

The Water Quality Index (WQI) is a rating used to assess the health of the water. The WQI is calculated using the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines, and incorporates a number of 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 the guidelines, and the amount by which the guidelines are exceeded. To account for the complex differences between estuaries and freshwater, different parameters are used to calculate the WQI for freshwater sites than marine and estuary sites.

Marine			Freshwater		
Parameters	Guidelines	Units	Parameters	Guidelines	Units
Total Suspended Solids (TSS)	5	mg/L	Total Suspended Solids (TSS)	5	mg/L
Dissolved Oxygen (DO)	8	mg/L	Dissolved Oxygen (DO)	5.5	mg/L
Enterococci	70	CFU/100 mL	Fecal Coliform	200	CFU/100 mL
Iron (Fe)	300	µg/L	Iron (Fe)	300	µg/L
Nitrate (NO ₃)	45	mg/L	Nitrate (NO ₃)	3	mg/L
pH	7	pH	pH	5.3*	pH
Phosphorus (P)	0.03	mg/L	Phosphorus (P)	0.03	mg/L
Water Temperature	20	°C	Water Temperature	20	°C

* The CCME freshwater guideline is 6.5; however, due to the maintained acidic conditions in the LaHave, a new threshold has been designed by Environment Canada to match and flag changes to the LaHave's current acidic conditions.

Water Quality Parameters and Their Effects

Water Temperature is an important indicator of water quality, which plays a significant role in the health and productivity of aquatic ecosystems. Temperatures above 20°C cause stress for cold-water fish such as salmon and trout, and prolonged exposure to water above 24°C can cause death. Aquatic organisms have optimal temperature ranges and will become stressed and seek new habitat in response to extreme temperature fluctuations.

Fecal Coliform and Enterococci bacteria live in the intestines of warm-blooded animals. The presence of fecal bacteria in water indicates the possible presence of harmful pathogenic microorganisms; fecal coliforms are used as indicators of these microorganisms in freshwaters, while enterococci are used as indicators in estuaries. Sources of contamination include malfunctioning or straight pipe septic systems, sewage treatment plants, stormwater run-off, livestock, wildlife, and domestic animals. According to the Canadian Water Quality Guidelines, recreational activities in water should be halted when the mean fecal coliform value of 5 samples is greater than 200 CFU/100 mL, or when enterococci are greater than 70 CFU/100 mL.

Dissolved Oxygen (DO) is an important water quality indicator that influences aquatic ecosystem health. Dissolved oxygen levels below 6.5 mg/L cause stress for aquatic organisms, such as cold-water fish, and extremely low levels can lead to fish kills. Algal blooms, in response to sewage pollution and nutrient run-off, can lead to low dissolved oxygen levels.

Nutrients are essential for plant and animal life and occur naturally in the environment. Excessive levels of nitrogen and phosphorus from anthropogenic sources such as agricultural run-off or wastewater effluent can lead to algal blooms and low dissolved oxygen. For the WQI, nitrate (NO₃) and phosphorus (P) are measured; total suspended solids (TSS) also helps explain nutrient levels, as high concentrations of nutrients may be due to sediment run-off from lawns, gardens, or farms.

pH indicates the acidity or alkalinity of water, with a pH of 0 being most acidic, 7 being neutral, and 14 being most basic. 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 (the WQI monitors iron – (Fe) – to monitor metal concentrations).

2017 Water Quality Index Results

Good News! The LaHave estuary sites (Bridgewater and Upper LaHave) have displayed improved water quality compared to 2015! Bridgewater's ranking has increased from marginal to fair (a score of 63.9% in 2015 to 70% in 2017), and although the Upper LaHave ranking has not changed (marginal), its score increased from 52.3% in 2015 to 56.1% in 2017. Decreases in the number of exceedances of phosphorus, TSS, temperature, and DO are to thank for the increased water quality in the LaHave River Estuary!

Two freshwater sites have improved since 2015! Sherbrooke and Simpson's Corner have both had increases in their scores: 77.7% to 83.3%, and 69.2% to 75.9%, respectively. In addition, NO FRESHWATER SITE had fecal coliform values above the recreational limit in 2017, and no freshwater sites exceeded the total nitrogen or total phosphorus guidelines in 2017.

Bad News! Unfortunately, the increased water quality for the estuary sites may be artificial, as the 2017 WQI was calculated using the "Enterococci" parameter, rather than the "Fecal Coliform" parameter – a parameter that greatly influenced the low WQI in 2015. In addition, the Bridgewater site's acidity has increased, showing more exceedances than in 2015 (from 40% exceedances to 58.3%).

Six of the eight freshwater sites have decreased WQI scores compared to 2015. Acidity, high iron concentrations, and high temperatures are problems for freshwater sites throughout the LaHave River Watershed. All of the samples taken from Centennial Trail, Franey Corner, Simpson's Corner, and West Branch, and 50% of samples at New Germany, had iron concentrations above the guidelines. In addition, all sites had increases in acidity exceedances compared to 2015; exceedances increased at all sites by >18%, and six sites exceeded more than 75% of samples! Increased temperature exceedances occurred at Centennial Trail and Pinehurst.



How Can You Help?

To Reduce Nutrients. When mowing your lawn, or harvesting crops, leave a buffer zone (known as a 'riparian zone') along the edge of streams. This zone will help protect the water from erosion, and filter run-off pollutants and excess nutrients!

To Reduce Fecal Bacteria. Convert your straight pipe into a septic tank so waste can be properly treated, keep livestock out of the water by providing them with alternative watering sources, and pick up your dog's waste.

To Reduce Acidity. Decrease the amount of pavement on your property, and apply lime to soils to act as a buffer – both of these actions address Nova Scotia's issues with acid rain. By allowing rain to filter into soils, instead of running off pavement directly into our watercourses, the soils are able to buffer and decrease the acidity of the rain, helping to protect our streams.

To Reduce Iron (and other metals). Don't fertilize your lawn with lots of iron – iron is not usually a limiting nutrient in lawn health, and the excess iron is washed away into nearby streams and rivers. In addition, reduce the use of chemicals on your property – trade harsh herbicides and pesticides for more environmentally-friendly products.

LaHave River Watershed Project Partner Highlight: Atlantic DataStream



The Atlantic DataStream is an open-access platform used to promote and share data relating to freshwaters. This program is being launched June 5-6, 2018, where Coastal Action - in addition to hundreds of other supporters - will be sharing their data and knowledge in the hopes of increasing understanding and protection of our freshwaters. The Atlantic DataStream is founded and organized by the Community Based Environmental Monitoring Network (CBEMN), Gordon Foundation, and the World Wildlife Foundation (WWF) Canada.



Coastal Action is a community-based charitable organization with a mandate to address environmental concerns along 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 over 20 years experience in the conservation field, including: creating, engaging, and managing environmental monitoring projects; public education; fisheries research; species at risk projects; habitat restoration; and community and sustainability initiatives throughout the South Shore region of Nova Scotia.

Coastal Action 2017 Project Highlights

Atlantic Whitefish Recovery Project. Monitoring of the Hebb Dam fishway, Hebb Lake water quality monitoring, invasive species mitigation measures, and monitoring of the last population of Atlantic whitefish (*Coregonus huntsmani*) on Earth continue to be done by Coastal Action.

American Eel and Elver Abundance Study. Silver eel (*Anguilla rostrata*) migrations are monitored and biologically sampled at East River, Chester, and Oakland Lake. Elver abundances are being studied at East River, Chester.

Wetland Monitoring and Remediation. Wetland Ecosystem Services Protocol (WESP) surveys are being done throughout the South Shore to assess the health of wetlands in the region. Coastal Action continues to monitor a former shale pit mine, which was transformed into wetland habitat in the Petite Rivière Watershed.

Fish Habitat Restoration. Aquatic connectivity is being assessed and restored throughout the LaHave River Watershed by restoring fish passage through barrier culverts.

Community Green Spaces. Low Impact Development (LID) installation and Depave Paradise projects are helping promote environmentally-conscious living at home and in the community by incorporating rain gardens, rain barrels, bioswales, and replacing pavement with green space.

Morton Center Environmental Education Programs.

Environmental summer day camps are held for local youth at the 99-acre Morton Centre property on Heckman's Island, as well as school-based programs.

LaHave River Watershed Project 2017 Partners

Atlantic Salmon Conservation Foundation • Fisheries and Oceans Canada - Recreational Fisheries Conservation Partnerships Program • Nova Scotia Federation of Agriculture's Water Fund • WWF - Canada Loblaw Water Fund • Clean Foundation - Nova Scotia Youth Conservation Corps • Municipality of the District of Lunenburg • Town of Bridgewater • Agriculture and Agri-Food Canada's Agricultural Green Jobs Initiative • Nova Scotia Salmon Association's NSLC Adopt-A-Stream Program • NS Labour and Advanced Education's Student Summer Skills Incentive Program • Environment and Climate Change Canada's Science Horizon Youth Internship Program • Environment and Climate Change Canada • Community Based Environmental Monitoring Network • LaHave River Salmon Association • Nova Scotia Environment • Nova Scotia Natural Resources • LaHave River Watershed Advisory Committee