

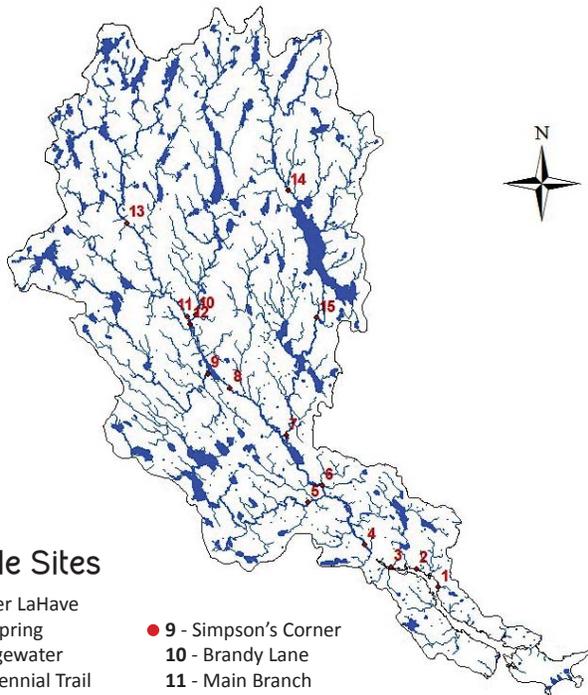
LaHave River Watershed 2015 Report Card

The LaHave River Watershed is one of the largest watersheds in Southwestern Nova Scotia (1,700 km²), with its headwaters reaching into Annapolis and Kings Counties and the majority of the watershed stretching across Lunenburg County. This highly branched river system has several large sub-watersheds and many tributaries. The health of the LaHave River is influenced by the interaction of air, land, and water throughout the entire watershed, which is why the water quality monitoring program was designed at a watershed scale. Fifteen sample sites were chosen in order to capture the water conditions throughout the entire watershed. Monitoring occurs from the headwaters to the estuary, including the confluence of each major sub-watershed branch, the main stem of the river, and downstream of three waste-water treatment plants. These sites are monitored on a monthly basis for physical, chemical, and biological

LaHave River Watershed Project

Bluenose Coastal Action Foundation 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 development 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.

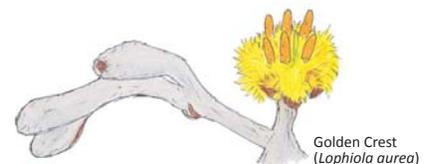
Water Quality Monitoring Sites in the LaHave River Watershed



Sample Sites

- 1 - Upper LaHave
- 2 - Dayspring
- 3 - Bridgewater
- 4 - Centennial Trail
- 5 - West Branch
- 6 - Northfield
- 7 - Pinehurst
- 8 - New Germany
- 9 - Simpson's Corner
- 10 - Brandy Lane
- 11 - Main Branch
- 12 - Meisner's Bridge
- 13 - Falkland Ridge
- 14 - Franey Corner
- 15 - Sherbrooke
- grab sample site

water quality parameters using a YSI Professional Plus water meter and through the collection of water samples for laboratory analysis. In addition, a full suite of metals are monitored on a bi-annual basis. With over 8 years of water quality data, the monitoring program has contributed greatly to our understanding of both the natural variability of the system and the environmental impacts of various activities throughout the watershed. This report card summarizes the water quality conditions of the LaHave River Watershed in 2015.



Water Quality Parameters

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 bacteria live in the intestines of warm-blooded animals. The presence of fecal coliform bacteria in water indicates the possible presence of harmful pathogenic microorganisms. Sources of contamination include malfunctioning or straight pipe septic systems, stormwater runoff, livestock, and aquatic wildlife. High levels of fecal coliforms are most often observed in the lower reaches of the watershed. The presence of approximately 600 illegal straight pipe sewage systems in the estuary is suspected to be the greatest contributor to this contamination.

Dissolved Oxygen 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.

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. The geology of the LaHave River Watershed provides a poor buffering capacity against acid precipitation, and low pH values are often observed.



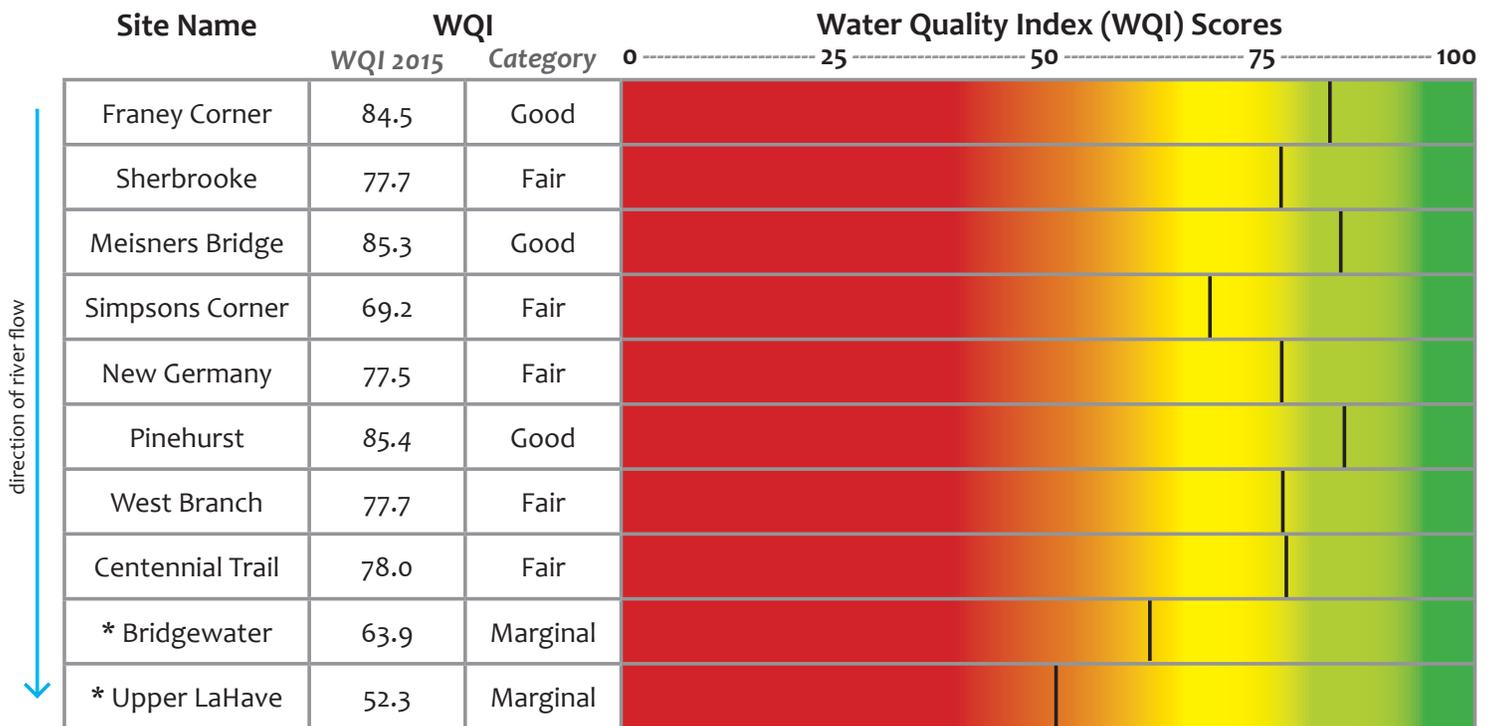
Watershed Stewardship: How you can help protect the health of the LaHave River Watershed

Maintain healthy shorelines. Healthy riparian habitats help to reduce shoreline erosion, control flooding, filter run-off pollutants, and provide shade for in-stream fish habitat.

Maintain your septic system. Have your septic system pumped and inspected regularly to prevent the contamination of drinking water and the environment. If you have a straight pipe septic system, which discharges raw human sewage directly into watercourses, have it replaced immediately.

Keep livestock out of watercourses. Install fencing along watercourses and provide alternative watering sources to prevent shoreline erosion, sedimentation, and fecal contamination caused by wading livestock.

Avoid the use of chemicals. Use environmentally-friendly household products and avoid the use of pesticides and herbicides on your property. Run-off and wastewater discharge will carry these harmful chemicals into your local watercourses.



Parameters Used to Calculate WQI:

- Total Nitrate
- Dissolved Oxygen
- pH
- Water Temperature
- Fecal Coliform
- Total Phosphorus
- Total Suspended Solids
- Total Iron

| = 2015

* estuarine sample site

The **Water Quality Index (WQI)** provides a general description of water quality. Using the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines, the WQI combines multiple parameters in order to summarize complex data into a single value ranging from 0 (worst water quality) to 100 (best water quality). This index is calculated based on the number of parameters that do not meet water quality guidelines, the number of times the guidelines are not met, and the amount by which the guidelines are exceeded.

The WQI results for 2015 show **Fair** to **Good** water quality throughout most of the watershed. The Bridgewater and Upper LaHave sample sites, which are located within the most heavily developed part of the watershed, display **Marginal** water quality. These results are consistent with previous years, with a general decline in water quality in the lower reaches of the watershed, where the impacts of development are most severe.



WQI	Category
95 - 100	EXCELLENT • absence of threat • close to pristine levels
80 - 94	GOOD • minor degree of threat • conditions rarely depart from desired levels
65 - 79	FAIR • occasionally threatened • sometimes not at desired levels
45 - 64	MARGINAL • frequently threatened • often not at desired levels
0 - 44	POOR • almost always threatened • usually not at desired levels



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 ecosystem 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 Project Highlights: 2015

Atlantic Whitefish Recovery Project. Monitoring of the Hebb Dam fishway, invasive species mitigation measures, and monitoring of the Atlantic whitefish (*Coregonus huntsmani*) population.

American Eel and Elver Abundance Study. East River, Chester elver abundance study, silver eel (*Anguilla rostrata*) migration monitoring, and biological sampling of East River, Chester and Oakland Lake.

Garden Lots Salt Marsh Trail Project. Construction of a 200 metre walking trail with a look-off platform.

Petite Rivière Watershed Project. Water quality monitoring, habitat assessments, fish habitat restoration projects, and shale pit remediation/wetland expansion project.

Gold River Catchment Liming Project. Application of 27 tonnes of lime in Ted Creek Catchment; also completed draft of Terrestrial Liming guidebook.

Morton Center Environmental Education Programs. Environmental summer day camps for local youth at the 99-acre Morton Center property on Heckman's Island as well as school-based programs.

Living Shorelines and Community Green Spaces. Trail/green space development in Bridgewater and Stormwater Best Management Practices report development.

LaHave River Watershed Project Partner Highlight: CURA H₂O: Community-Based Water Monitoring and Management

The Community-University Research Alliance (CURA H₂O) project was established to increase community capacity for integrated water monitoring and management in Canada and internationally. This project, which recently reached the end of its funding, was comprised of many partners including community stewardship groups, government organizations, First Nations communities, environmental NGOs, and academia. Coastal Action has been involved with, and benefitted from, this project in many ways over the last 5 years including the provision of water quality monitoring equipment, monitoring training and guidance, and the sharing of water quality data through CURA H₂O's integrated water quality database. For more information on CURA H₂O and how they support water monitoring initiatives, visit www.curah2o.com.



LaHave River Watershed Project 2015 Partners

Atlantic Salmon Conservation Foundation • Clean Foundation - Nova Scotia Youth Conservation Corps • CURA H₂O • Fisheries and Oceans Canada - Recreational Fisheries Conservation Partnership Program • Environment Canada's Atlantic Ecosystem Initiative • Environment Canada • LaHave River Salmon Association • Municipality of the District of Lunenburg • Nova Scotia Environment • Nova Scotia Department of Natural Resources • Nova Scotia Salmon Association's NSLC Adopt-a-Stream Program • Nova Scotia Strategic Co-operative Education Incentive Program • Town of Bridgewater