

What Can I Do?

We residents of the Annapolis River watershed can protect the river's health for years to come.

1. **Keep shorelines green!** Planting native vegetation (such as ferns and shrubs) along watercourses provides a home for wildlife, keeps waters cool, filters out pollution, and reduces erosion.
2. **Encourage fencing of watercourses!** Livestock are a source of *E. coli* bacteria and can trample riverbanks, which increases erosion. Fencing livestock out of watercourses is better for the livestock and the river.
3. **Conserve water!** Rivers rely on inputs from groundwater to maintain flow during the dry summer season. Installing low-flow appliances, modifying existing fixtures and collecting rain water for gardening can conserve water.
4. **Keep sewage where it belongs!** Ensure that septic tanks are maintained and pumped out every 3-5 years, and that municipal sewage treatment plants are operated to the highest standards.
5. **Curb chemical inputs!** Look for phosphate-free and biodegradable cleaning products. Reduce or eliminate the cosmetic use of pesticides for lawns and gardens.

Other Interesting Work

2019 Contributing Staff:

Sam Hudson

Levi Cliche

Alex Cunningham

Volunteers:

Jennifer Uhlman

Restoration and Enhancement of Wetlands on Working Landscapes

This project helped to restore and enhance the ecological health of wetland habitats found on agricultural landscapes in and around the Annapolis River watershed. Agriculture is the predominant land use in the watershed and has resulted in significant loss of wetland habitats in and adjacent to pasturelands, forage and crop fields.

Wood Turtle Monitoring & Stewardship

Since 2012 CARP has been implementing a wood turtle research and stewardship project. Some of the accomplishments of this project include the identification of habitat that extend its previously known range in Nova Scotia, the contribution of baseline data about the distribution, ecology and characteristics of the population(s) within the Annapolis River watershed, and initial GIS analysis along key riparian areas to identify areas of possible preferred habitats. Find out more here: <https://www.annapolisriver.ca/wood-turtle-monitoring-stewardship>

Stormwater Management

Stormwater is water that originates during precipitation events and snow/ice melt. Stormwater can soak into the soil (infiltrate), be held on the surface and evaporate, or runoff and end up in nearby streams, rivers, or other water bodies (surface water). Through this project CARP and project partners created a number of low impact development sites (ie: rain gardens, infiltration trenches, etc.), hosted workshops on how to create our own rain barrel and harvest rainwater, along with planting over 600 native trees and plants to help soak up stormwater runoff.

Fish Habitat Restoration

CARP undertakes a variety of complimentary projects that contribute to the conservation of native fish populations and the restoration of fish habitat. These projects typically include some combination of research, monitoring, restoration, and local ecological knowledge. Find out more here: <https://www.annapolisriver.ca/fish-habitat-restoration>

Clean Annapolis River Project

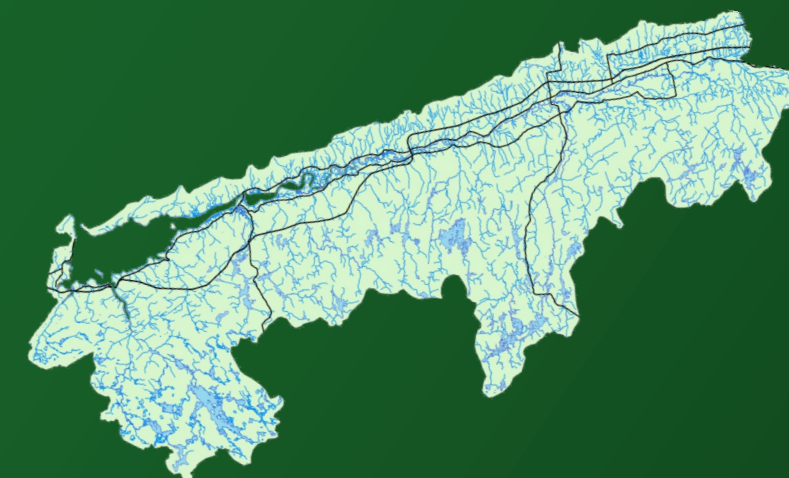
Annapolis River Watershed

2018 Report Card



Our Watershed

A watershed represents the drainage area of a water body. Water from lakes, streams, runoff and ground water all empty into a central body of water, in our case, the Annapolis River. The watershed is the third largest in Nova Scotia, with an area of about 2,300 m², and stretches from Berwick to Digby.



Monitoring the Annapolis

Clean Annapolis River Project (CARP) has been monitoring conditions in the Annapolis River watershed for nearly 30 years, using a variety of sampling and geospatial analysis techniques. One of the main indicators that CARP uses to determine the health of the river is the monitoring of surface water quality through the Annapolis River Guardians program. The River Guardians program has historically relied on an extensive volunteer-based monitoring network to collect water samples at eight established monitoring sites along the river.

This report card provides a snapshot of the 2018 monitoring results.

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What Do We Measure?

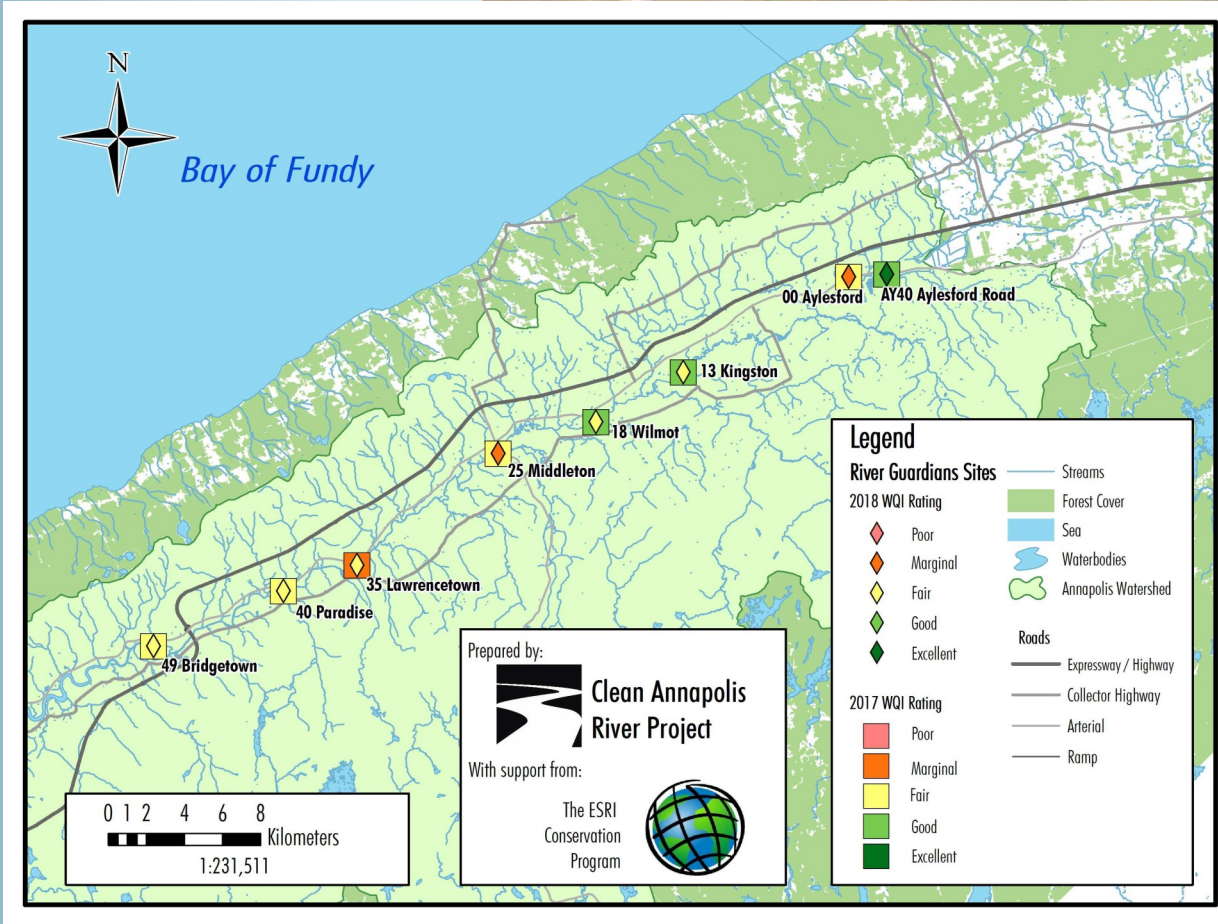
Surface water quality can be affected by a wide variety of pollution sources. In the Annapolis River watershed, some sources of pollution include urban and agricultural runoff, poorly maintained septic systems, malfunctioning sewage treatment plants and straight pipes. These can result in transport of pollutants such as bacteria, nutrients, heavy metals, and sediment, all of which can adversely impact the health of aquatic ecosystems.

- ♦ **Water temperature** — High summer water temperatures can stress or even kill sensitive aquatic species such as trout or salmon.
- ♦ **Dissolved oxygen** — Aquatic organisms need a lot of dissolved oxygen to survive. High nutrient concentrations in water can lead to low levels of oxygen and can harm aquatic health.
- ♦ **Bacteria (*E. coli*)** — A human health concern, the presence of *E. coli* can result from livestock waste, poorly maintained septic systems, and malfunction-
- ♦ **pH** — This measures the acidity of water. Low pH levels can adversely impact the reproduction and survival of many aquatic species.
- ♦ **Nutrients (Nitrogen and Phosphorus)** — Elevated amounts of nutrients can degrade water quality by causing algal blooms that can reduce dissolved oxygen levels, and also by changing the natural state of aquatic ecosystems.

Water Quality Rating

The Water Quality Index (WQI) is a score calculated using several water quality measures. Those used in this calculation were *E. coli* bacteria count, Dissolved Oxygen, Temperature, pH and nutrients. The map below shows WQI ratings for 2017 (Diamonds) and 2018 (Squares) for comparison purposes.

WQI	Water Condition
95-100	EXCELLENT <ul style="list-style-type: none">Absence of threatAlmost pristine
80-94	GOOD <ul style="list-style-type: none">Minor degree of threatUsually at desirable levels
65-79	FAIR <ul style="list-style-type: none">Occasional threatNot always at desirable levels
45-64	MARGINAL <ul style="list-style-type: none">Frequent threatOften not at desirable levels
0-44	POOR <ul style="list-style-type: none">Almost constant threatUsually not at desirable levels



How Healthy is the Watershed?

Variable	Status	Trend (1992 to 2018)
E. Coli	Fair	↑ 2 sites ↓ 2 sites ↔ 4 sites
Dissolved Oxygen	Good	↓ 6 sites ↔ 2 sites
Water Temperature	Fair	↑ 7 sites ↔ 1 sites
pH	Good	↑ 6 sites ↔ 2 sites
Nitrogen	Fair	↔ 1 site**
Phosphorus	Poor	↔ 1 site**
Trend Legend	↑ Increasing ↓ Decreasing ↔ No trend detected	

** Nutrients are sampled at only 1 location by Environment Canada. Trends are calculated based on data collected between 2006-2018.

Interpretation

E. Coli levels have been trending steadily upward for the past few years in Aylesford (Victoria Rd) and Kingston, with sites trending downward in Lawrencetown and Paradise and the remaining sites showing no significant change.

Mean summer water temperatures (July 1 to September 30) in the Annapolis River and its tributaries should not exceed 20°C. Water temperature levels have been increasing at 7/8 monitoring sites since the early 90s and initial start of the Program. The temperature of water has a direct bearing on the health and abundance of aquatic species. Trout and salmon experience stress at temperatures in excess of 20°C and death occurs after prolonged exposure to temperatures over 24°C.

pH reads good for an average across all sites, meaning the majority of the measurements falling between 6.5-9. The scores for all 6 parameters are derived from the Canadian Council for Ministers of the Environment (CCME) Water Quality Guidelines. To be considered

The Watershed's Ecosystem

An Ecosystem is a collection of organisms (plants and animals) who depend on one another for survival. A tree's fallen leaves may nourish the soil in such a way as to give way to specific wildflowers who attract certain pollinators, or certain insects which nourish a particular bird population. Nature orchestrates ecosystems intricately and mindfully. A pillar in an ecosystem is biodiversity, meaning that an ecosystem's strength comes from having a wide variety of organisms.

Ecosystems are susceptible to disruption from factors such as an invasive species, anthropogenic inputs (fertilizers, pesticides etc.), or fire. Sometimes this is an act of nature itself, as is often the case with fire or storms. We can be mindful of what we are releasing into the environment. Persistent application of pesticides, for example, can disrupt insects that are the foundation of an ecosystem. See the last page of this document for some suggestions on how you can contribute to the Annapolis River watershed's health.

A wide variety of species at risk call our watershed home, including the wood turtle, rockrose, and Canada warbler. See speciesatrisk.ca for more information. Species at risk or endangered species represent vulnerabilities of entire ecosystems. With each species and population having a role to play, losing one can weaken others who are interconnected. CARP strives to steward the various ecosystems and habitats along the watershed. Check our website regularly for opportunities to volunteer and be part of the initiatives, www.annapolisriver.ca.