

The Annapolis Watershed

2007 REPORT CARD



Monitoring the Annapolis River

How healthy is the Annapolis River? Are conditions deteriorating or improving? What can we do about it? These are all questions asked by both residents of the Annapolis Valley and visitors. Clean Annapolis River Project (CARP), with the Annapolis River Guardians, a group of dedicated volunteers, monitor conditions in the Annapolis River in an attempt to answer these questions.

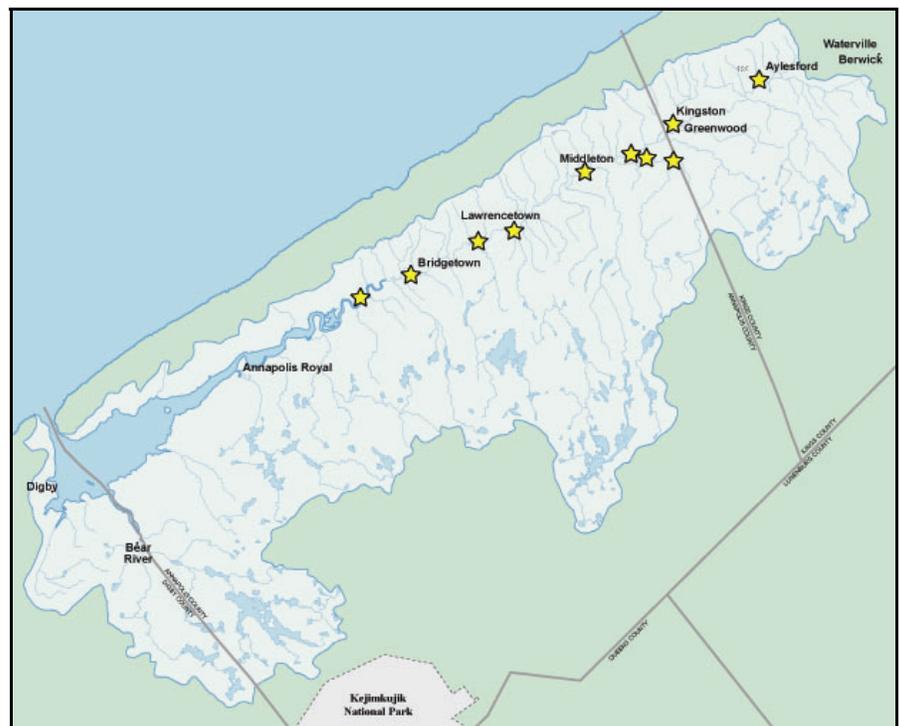
The Annapolis River Guardians is one of the longest running and most extensive volunteer-based water monitoring programs in Eastern Canada. Started in 1992, the program has involved over 90 volunteers who have collected more than 3500 water samples. The River Guardians are all residents of the Annapolis Watershed and come from many different backgrounds. With over 15 years of data, the program has contributed significantly to our understanding of the Annapolis River. The stars on the map below indicate some of the locations where water quality is monitored. This report card summarizes the program and its findings for the 2007 monitoring season. Read on to discover what has been happening in your watershed.

What is a Watershed?

A watershed represents the drainage basin or catchment area for a particular body of water. In the case of the Annapolis Watershed, the water body that we refer to is the Annapolis River. Any drop of water that falls into the white area on the map below will eventually drain into the Annapolis River, flow into the Annapolis Basin and out to the Bay of Fundy. This area represents our watershed, which extends from Berwick to Digby, making it the third largest in the province. A watershed is determined by the natural elevation the land takes. In the case of the Annapolis Watershed, the North and South Mountains define the boundaries.

Watercourses do not follow political boundaries. For example, the Annapolis Watershed lies across three counties: Kings, Annapolis and Digby. For this reason, water, in its various forms (e.g. surface and ground water) is best understood and managed at the scale of a watershed.

There are several issues of environmental concern in the Annapolis Watershed: contamination by fecal bacteria, elevated summer water temperatures, low dissolved oxygen levels, erosion along riverbanks, and high concentrations of some nutrients, such as phosphorus. We monitor several different water quality parameters, in order to get a better understanding of the health of the river.



What do we measure?

E.coli Bacteria are bacteria that live in the digestive tract of warm-blooded animals. Because they occupy the same ecological niche as many disease-causing organisms (human pathogens), E.coli are used as indicators for the possible presence of potentially dangerous pathogens (e.g. *Cryptosporidium*). E.coli bacteria have been identified as a major source of concern in the Annapolis Watershed. The potential sources of contamination in the watershed include poorly maintained on-site (domestic) septic systems, malfunctioning central sewage treatment plants, aquatic wildlife (e.g. beavers, muskrats, waterfowl), domestic animals, and livestock.

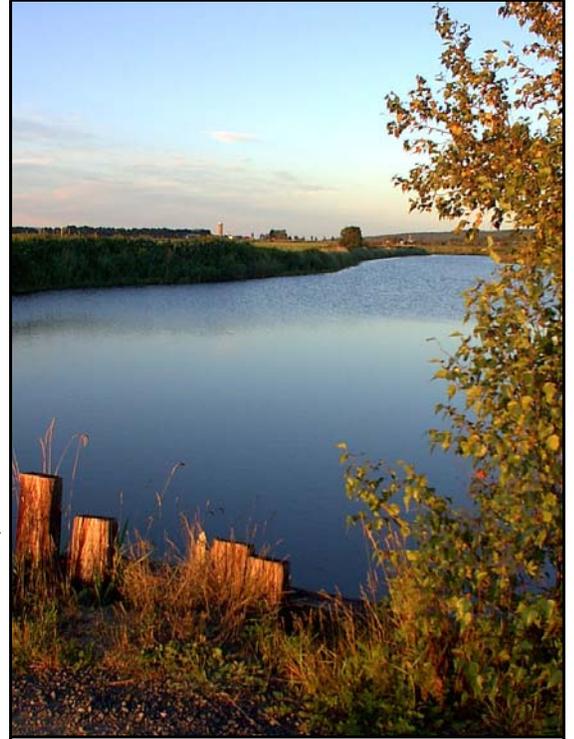
Dissolved Oxygen (DO) is a widely used and important general indicator of the health of aquatic systems. Aquatic organisms, such as fish, require oxygen in solution for their survival. Oxygen in the atmosphere, which is readily available to terrestrial organisms, must be dissolved into the water, where it is present in much lower concentrations. Sewage, manure, or elevated nutrient levels can result in lower DO levels. Wind, wave action, rainfall and photosynthesis help aerate waterways and increase DO levels.

Water temperature also serves as a broad indicator of water quality. The temperature of water has a direct bearing on the aquatic species present and their abundance. For example, trout and salmon experience stress at water temperatures in excess of 20°C, with death occurring after prolonged exposure to temperatures over 24°C.

pH is a measure of the acidic/basic nature of water. It is expressed on a scale from 0 to 14, with 0 being the most acidic and a pH of 7.0 being neutral. To ensure the health of freshwater aquatic life, pH levels should not vary beyond a range of 6.5 to 9.0. Levels below 5.0 are known to negatively affect many species of fish, such as salmon and trout. pH varies naturally, but it can also be influenced by human factors, such as acid rain inputs.

Nitrogen is a nutrient which is essential for all forms of life, but when present in elevated concentrations can degrade water quality and have a negative impact on aquatic organisms. For the Annapolis Watershed, the most important sources of nitrogen include domestic on-site and municipal wastewater discharges, and the use of chemical fertilizers and manure on urban and agricultural land.

Phosphorus is another essential nutrient required by plants and animals. In many watersheds, phosphorus is a limiting nutrient, and when present in elevated concentrations, can lead to algae blooms, depression of dissolved oxygen, and negative impacts on aquatic life. Important sources of phosphorus include human and animal waste, and chemical fertilizers.



The Annapolis Watershed in 2007

Variable	Status	Comment	Trend
E.coli Bacteria	Poor	33% of the 116 samples exceeded the guideline for water contact recreation (e.g. swimming).	↔
Dissolved Oxygen (DO)	Fair	Over most of the river, oxygen levels were high enough to support aquatic life. Below Bridgetown, very low DO levels occurred in the underlying saltwater, during the late summer and early autumn.	↔
Water Temperature	Fair	31% of the samples collected during the summer months had temperatures of 20 degree Celsius or higher. This follows the same trend seen in past years.	↔
pH	Good	The pH of almost all samples was between 6.5 and 9.0, a range that supports aquatic life.	↔
Nitrogen	Good	The mean nitrate concentration, for 19 samples collected in 2006 and 2007, was 0.23 mg/L.	?
Phosphorus	Poor	37% of phosphorus samples collected in 2006 and 2007 exceeded the suggested guideline of 0.030 mg/L.	?
Legend		↑ Improving ↓ Worsening ↔ No Change ? Insufficient Data	

What can I do?

There are things that each of us, as residents of the Annapolis Watershed, can do to ensure that our river stays healthy for years to come. Whether we act as individuals, or as part of larger organizations, these actions can make an impact.

1. **Keep watercourses green.** Maintaining natural vegetation along watercourses provides a home for wildlife, keeps waters cool, filters out pollution, and reduces erosion.
2. **Encourage fencing of watercourses.** Livestock can trample riverbanks, increase erosion and are a source of E.coli bacteria. Fencing livestock out watercourses is better for both the livestock and the environment.
3. **Conserve water.** Installing low-flow appliances, modifying existing fixtures (e.g. installing toilet dams) and collecting rain water for gardening are easy ways to conserve water. Rivers rely on inputs from groundwater to maintain flow during the dry summer season.
4. **Keep sewage where it belongs.** Ensure that domestic septic systems are pumped out and main-

tained regularly, and that municipal sewage treatment plants are operated to the highest possible standards.

5. **Curb Chemical Inputs.** For cleaning products used in the home, look for those that are phosphate-free and biodegradable. Reduce the cosmetic use of pesticides, at home and in your garden, where-ever possible.



A New Year, New Questions

Every sampling season brings new challenges. Here are some of the activities CARP hopes to pursue in 2008:

- Track down sources of E.coli contamination in tributaries of the Annapolis River.
- Establish a baseline for levels of total suspended solids, which serves as a good indicator of erosion
- Work with municipalities in the watershed to reduce water use and improve sewage treatment facilities
- Educate homeowners on actions they can take to conserve water and reduce pollution
- Assist landowners to fence livestock out of watercourses, stabilize eroding slopes and re-vegetate banks with native vegetation.



Why do we care?

The Annapolis River provides many services to the residents of the watershed. The river is used for recreational activities such as swimming, boating and fishing. Farming has long depended on the river for both crop irrigation and livestock watering. Waterfowl, birds of prey, muskrats and fish all call the Annapolis River home. The river also has cultural value for the citizens of the Annapolis Valley. Stemming from the time when it was used by the Mi'Kmaq people, the river has provided transportation for colonization and boats the oldest permanent European settlement on its shores. The Annapolis River, its tributaries and adjacent wetlands play a vital role in controlling flooding and erosion and serving to store water for gradual release during the dry summer months. The river also contributes to the recharge of groundwater and helps to moderate our climate.

What to know more?

Clean Annapolis River Project (CARP) is a charitable, community-owned corporation created to work with the community and interested organizations to foster the conservation, restoration and sustainable use of the freshwater and marine ecosystems of the Annapolis River and its watershed. Found in 1990, we use a multi-stakeholder approach to improve the health of the river by working with individuals, businesses, universities, government and other non-profit groups. CARP is not an advocacy group, but believes that by working together, we can create the sustainable communities and healthy environment that we all deserve.

This newsletter is a summary of the 2007 Annual Water Quality Monitoring Report for the Annapolis River. The full report, as well as other information on the watershed, is available at www.annapolisriver.ca

If you have any questions about the material presented in this newsletter, require further monitoring details, or would like a presentation on these results to your group or organization, please contact:

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Thank You

The Annapolis River Guardians is a volunteer-based program. Without the dedication of the volunteers, the program would not be the success that it is. We would therefore like to extend our thanks to the volunteers who contributed their time and energy during the 2007 season:

Claire Diggins, Marika Godwin and Ross Diskson, Harold and Pam Griffin, Ronald Jones, Tami and C.J.Parks, Matthew Guy and Julianne Butt.

The following partners work with CARP to help deliver its water quality monitoring programs, including the Annapolis River Guardians:

Acadia Centre for Estuarine Research, Environment Canada—Atlantic Coastal Action Program, Human Resources and Skills Development Canada, and the Nova Scotia Department of Environment and Labour.