Environment Canada Environnement Canada

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Environmental Trends

Canadian Environmental Sustainability Indicators Newsletter

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Research Corner

Water Monitoring in Atlantic Canada

Atlantic Canada is home to a variety of lakes and river ecosystems that provide essential habitat for aquatic plants and animals. Water quality in this region is determined by its unique geography. Rocky landscapes are commonly found in Nova Scotia, New Brunswick and Newfoundland and Labrador, while soil-rich landscapes are more often found in Prince Edward Island. Rocky versus soil-rich landscapes have very different natural levels of chemicals in water and need to be taken into consideration when assessing water quality.

The Canadian Environmental Sustainability Indicators (CESI) program, in collaboration with provincial partners, reports on several different attributes of regional water bodies, including water quality, quantity and availability.

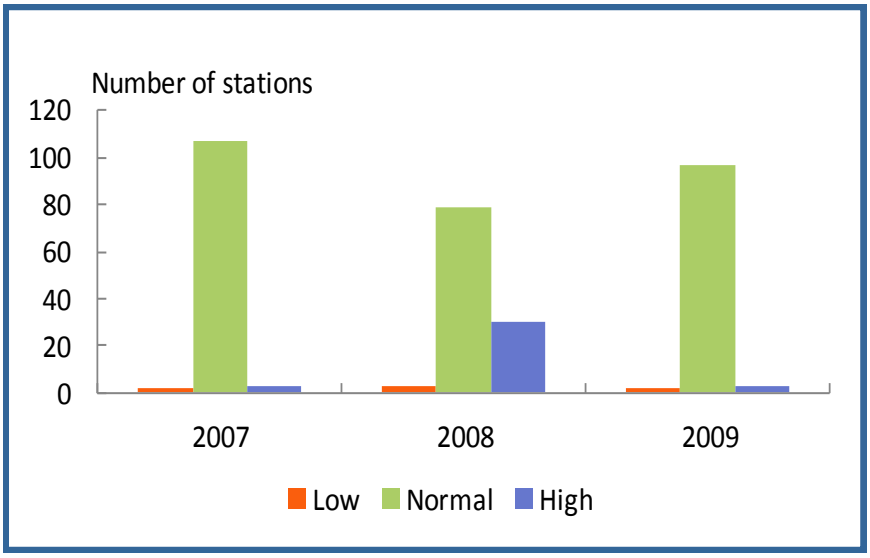
The following articles describe water monitoring, assessment and indicator results for Atlantic Canada.

Visit our website at
www.ec.gc.ca/indicateurs-indicators

Canada

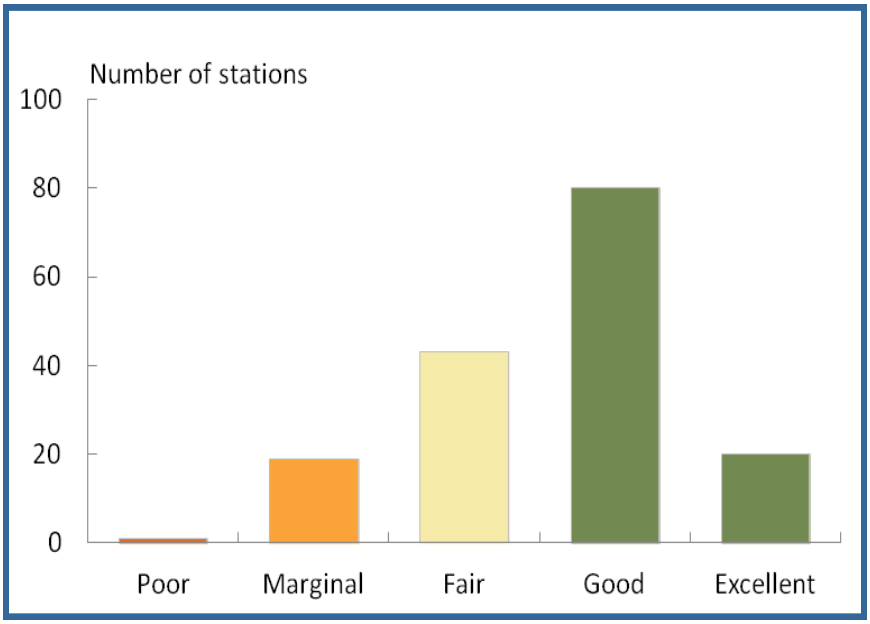
CESI Water Indicator Results for the Atlantic Provinces

Figure 1. Water quantity in rivers in Atlantic Canada, 2007, 2008 and 2009.



The CESI Water Quantity Indicator shows rivers in the Atlantic provinces typically had normal water quantity between 2007 and 2009. Higher-than-normal water quantity was observed at 30 stations in 2008, a particularly wet year in Atlantic Canada. In 2009, 97 stations had normal water quantity, 3 had higher-than-normal water quantity and 1 station had lower-than-normal water quantity. Normal water quantity is calculated by comparing current water quantity observed at a water quantity monitoring station to water quantity measured at that station from 1978–2007.

Figure 2. Status of freshwater quality for protection of aquatic life in rivers in Atlantic Canada, 2007 to 2009.



The CESI Freshwater Quality Indicator for rivers and lakes in the Atlantic provinces was rated excellent for the protection of aquatic life at 20 stations. It was rated good at 80 stations, fair at 43 stations, marginal at 19 stations and poor at 1 station between 2007 and 2009.

For more information about CESI water indicators, please visit www.ec.gc.ca/indicateurs-indicators

Integrated Water Management

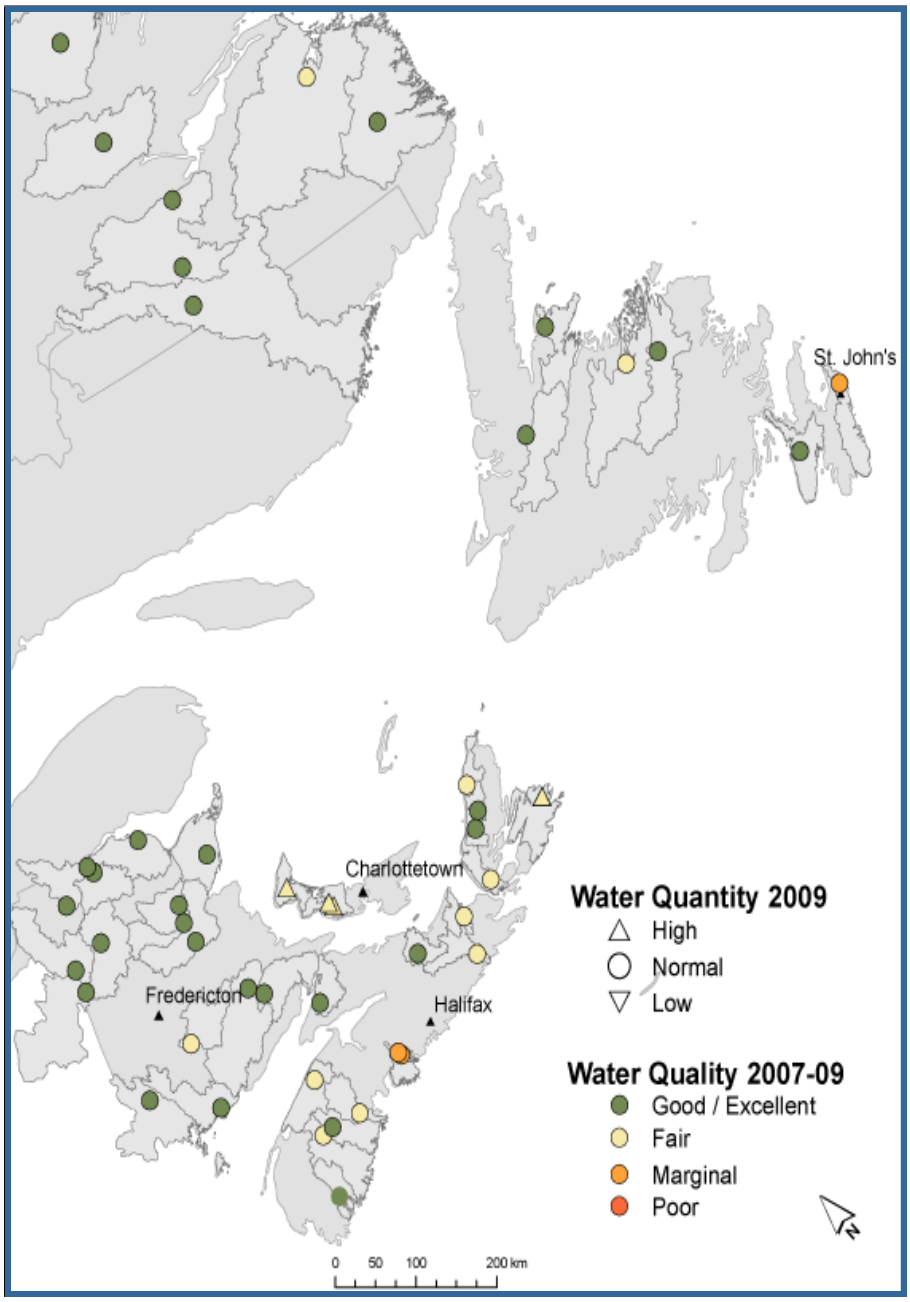
Environment Canada works with its provincial counterparts to track water quality and quantity, weather, and the abundance and health of aquatic plants and animals in and around lakes and rivers. To do this, it tracks many metrics, such as wind speed and direction, water level, and counts of aquatic insects each year. To combine efforts and reduce cost, creating an integrated monitoring network allows scientists to gather all of this data at one time at one monitoring station.

Integrating water monitoring has many benefits. Taking multiple measurements at each site increases the efficiency of human and financial resources. This technique also provides a more complete understanding of a particular water body by allowing scientists to gather a consistent series of water quality, water quantity and weather data over time. By looking at multiple factors related to a body of water, scientists are better able to understand water conditions, look for changes over time and issue early warnings about rapidly-rising flood waters or pollution events, such as chemical spills.

Newfoundland and Labrador's expansive and vast geography requires the integration of programs and optimization of resources. This integration is especially important in remote areas of Labrador, such as the Ugjoktok and Minipi Rivers. Newfoundland and Labrador's Water Resources Management Division in the Department of Environment and Conservation works with Environment Canada to improve the management of provincial water resources to better protect the aquatic ecosystems

To measure different water quality and quantity metrics across the province, a variety of tools are used, including Web cameras for visual monitoring, river insect monitoring, real-time water quality and quantity monitoring, and weather monitoring. The province also has a Mobile Environmental Monitoring Platform equipped with a variety of mobile monitoring capabilities. Developed in partnership with Environment Canada, this platform allows for rapid deployment in emergency situations. It can be moved into an area and allows for scientists to collect samples around the clock, monitor changes to water quality after a chemical spill, or monitor for rising flood waters. These various tools are required to ensure aquatic ecosystems are monitored and managed effectively.

Mobile Environmental Platform in St. John's, NL



Status of freshwater quality for protection of aquatic life, 2007–2009 and water quantity 2009, at collocated monitoring stations in Atlantic Canada

CESI makes use of data from integrated stations to create water quality and quantity indicators. By presenting water quality and quantity together, water managers can understand more about the range of stresses impacting water. For example, the map shows water quality and quantity data for the Atlantic region. While water quantity was normal across most of the region in 2009, it was high in western Prince Edward Island and Cape Breton. Water quality in both areas for the same period was rated fair. Water quality in these areas may be ranked fair because increased rainfall washed more contaminants into the water from the land.

For more information on Newfoundland and Labrador's water monitoring system please visit www.env.gov.nl.ca/env/

Did you know?

Individuals can help to protect watersheds by:

- Never pouring any chemicals down the drain
- Cleaning up garbage on the ground
- Cleaning up after pets
- Properly disposing of household hazardous wastes
- Using alternative pest control methods
- Practicing waste reduction and pollution prevention
- Planting native plant species. They grow better without the aid of fertilizers and pesticides.

Source: All About Watersheds, Environment Canada 2011

Highly Coloured Water in Atlantic Canada's Rivers and Lakes

Blue vs. brown water

Within Nova Scotia, New Brunswick and Newfoundland and Labrador, the colour of water found in rivers and lakes can vary widely. Some surface waters are clear and blue, while others have a dark tea-like appearance, referred to as highly-coloured waters. The tea colour is due to the presence of dissolved organic matter, which is a result of the breakdown of leaves, wetland plants and animals that enter the water body in the form of runoff. Highly-coloured-waters influence how an aquatic ecosystem functions. Aquatic plants and algae rely on light for growth. Coloured water can limit the amount of light entering the water, which limits the growth of aquatic plants.

Surface waters that are highly coloured may also have higher levels of metals. In New Brunswick, a project on natural levels of aluminum in rivers found that levels were higher in highly-coloured waters. Higher levels of aluminum are generally considered dangerous for aquatic plants and animals, but when the water is highly-coloured, most of the aluminum attaches itself to the dissolved leaves and plant matter in the water. As a result, the water is not toxic to aquatic life.

Highly-coloured waters are also usually more acidic than non-coloured water. The bedrock in the area cannot buffer the acid to make the water more neutral. This naturally acidic water causes problems for many fish species.

CESI takes information like this into account when it calculates the CESI Freshwater Quality Indicator. The indicator is calculated by comparing water quality measurements to water quality guidelines on a chemical by chemical basis. For example, the level of iron in highly-coloured water measured at a monitoring station may be higher than what is considered safe based on the water quality guidelines. In this case, the water quality could be rated as poor because iron levels exceed guidelines, although it is not harmful to plants and animals. To account for this problem, Environment Canada alters the iron water quality guideline at stations with highly coloured water to reflect natural iron levels. This adjustment is made because the iron is attached to dissolved leaves and plants and is not in a form that could harm aquatic plants and animals.

Nova Scotia Watershed Assessment Program

The Nova Scotia Watershed Assessment Program (NSWAP) was created in 2010 to increase knowledge about the current state of Nova Scotia's watersheds. The program provides information about watersheds most impacted by human activity or most vulnerable to future climate conditions. It also provides a provincial-scale summary of the status of watersheds in Nova Scotia, data which were previously unavailable.

A watershed is a combination of streams and rivers that catch rain and storm water and combine into one distinct outlet-point, such as a larger stream or lake. A watershed creates important habitat for wildlife, drinking water for people and animals, along with water for recreational and industrial uses. Protecting watersheds is important for the environment, wildlife, habitats, the economy, and the health and well-being of humans.

Human activities have a large impact on water quality in a watershed. Pollutants may enter the watershed in water running off farm fields, through industrial complexes or paved roads. This pollution accumulates in small rivers and streams, creating even greater pollution in the larger bodies of water into which the small rivers and streams flow.

NSWAP has produced a series of watershed report cards for Nova Scotia with information on 11 Watershed Impact Indices. These include indices such as the portion of human land used in the watershed, how sensitive the land is to acid rain, and how many dams are on streams and rivers in the watershed.

For more information on NSWAP, please visit waterforlife.gov.ns.ca/.

Your feedback is important to us!

E-mail us your feedback on CESI. We also welcome your input on topics you'd like us to cover in future issues of this newsletter.

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CESI was launched in 2004 and is used to measure progress on the Federal Sustainable Development Strategy and report on the state of the Canadian environment. Environment Canada works with other federal departments to develop and communicate these indicators and to present related information on society and the economy to policy makers and the Canadian public, in collaboration with provincial and territorial partners.

For more information about CESI indicators, go to www.ec.gc.ca/indicateurs-indicators or contact: indicateurs-indicators@ec.gc.ca.