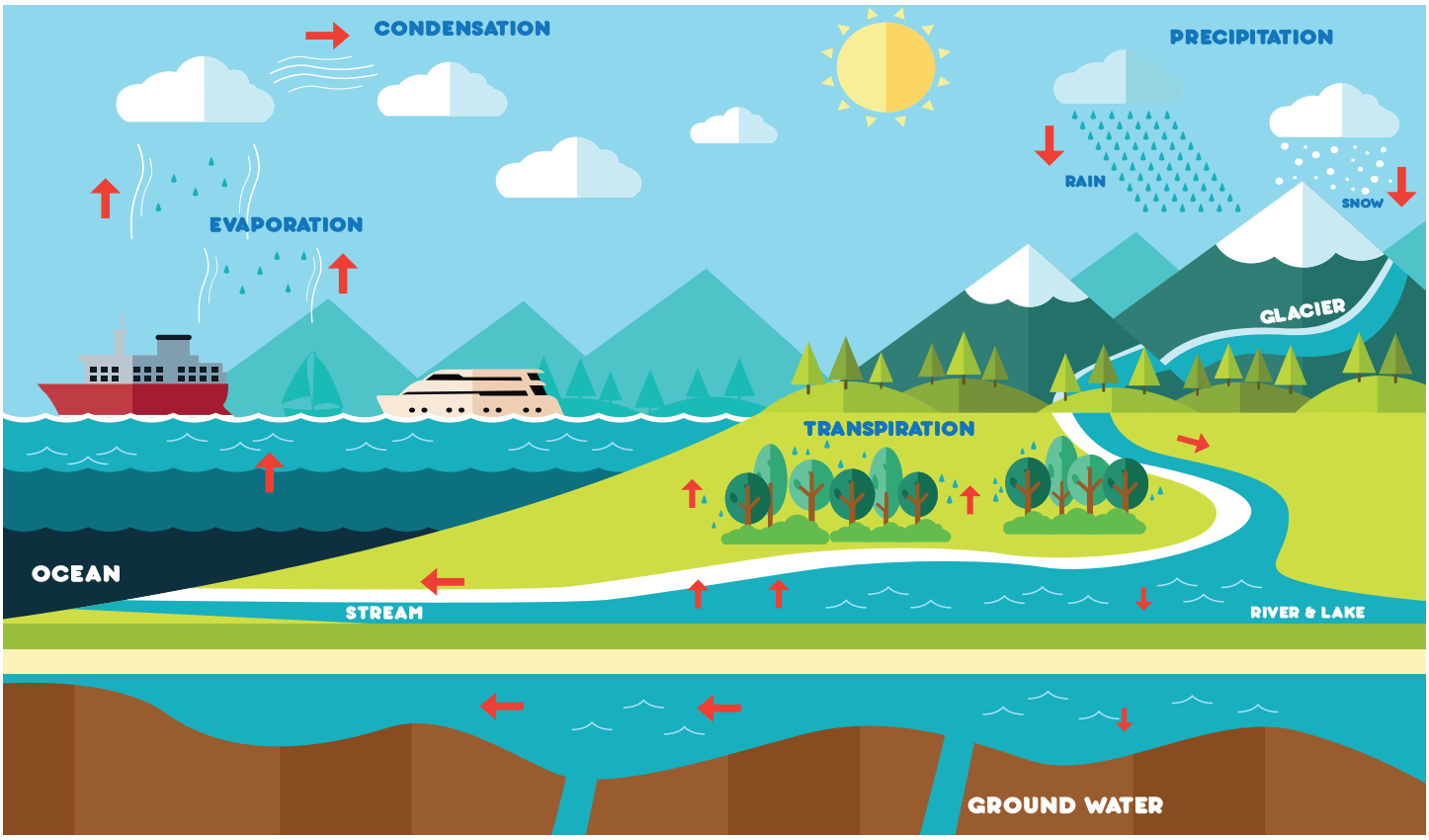
2021

WATER QUALITY STEWARDSHIP FACT SHEET

NIAGARA PENINSULA CONSERVATION AUTHORITY

www.npca.ca



[Sources: Credit Valley Conservation and Long Point Conservation Authority]

What is the water cycle?

Water moves continuously through our natural environment in a cycle.

We pick up the water cycle with rain or melting snow, which in reaching land:

- Flows to rivers, creeks, and lakes
- Seeps into the ground and wetlands where it is stored
- Plants absorb this water, and animals, including us, drink it

This water moves again! It may evaporate from the surface of lakes, aided by the sun. It is released by plants and animals. Water also filters in the ground and moves through soil to feed our lakes, rivers, and wetlands.

The evaporated water, as moisture, is carried by air. It rises, condenses to form clouds, and then is released (as rain or snow) to fall to earth once again.

Water feeds life

Water supplies the needs of all life. It flows through the landscape of a river's drainage area, or watershed, linking the natural features and communities of the watershed together. Within a watershed, everything is connected.

We must take care of the water, we are as much a part of this system as are the trees, animals, and fish.

Surface Water

Surface water is the water that flows on the surface of the earth. Groundwater is found underground in the cracks and spaces in rocks, soils, and sands.

Groundwater

Groundwater is stored in and moves slowly through aquifers -- underground layers of rock or sands and gravels that can hold water. As a "bank" of water, aquifers can store more or less water depending on the season and recent rains. We sometimes refer to the top of the aquifer as the water table, which can rise after spring melt or heavy rains, and fall when less water is available (e.g., dry periods).

Water Monitoring Programs

Clean water supports diverse aquatic habitats, enhances recreational potential, and improves the well-being of those who use it. Environmental monitoring efforts provide information on surface and groundwater quality and quantity, important data that allows Niagara Peninsula Conservation Authority (NPCA) staff to identify changes taking place within the watershed.

Water monitoring has become increasingly important with growing pressures on surface and groundwater resources, development next to lakes, watercourses, and wetlands, and climate change having unforeseen and possibly dramatic impacts on the water quality and quantity. Throughout the watershed, NPCA collects standardized scientific data through established monitoring programs.

Water Quality Issues in NPCA Watershed

Phosphorus

What is phosphorus and how does it become a problem?
Phosphorus is a natural element found in rocks, soils and organic material and is an essential nutrient for plant growth. High concentrations may result from poor agricultural practices, runoff from urban areas, leaking septic systems or discharges from sewage treatment plants.

How does phosphorus affect our watersheds?
Excessive phosphorus concentrations can stimulate the overgrowth of plants and algae, depleting oxygen and leading to toxin producing algae blooms, which can be harmful to human and animal health.

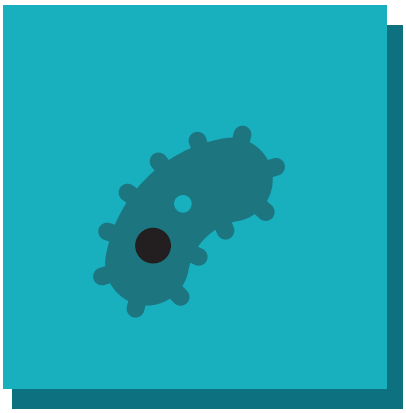
What can be done?
Actions include eliminating pesticide use, natural buffers along watercourses and rain gardens. Larger scale actions include optimizing fertilizer use, eliminating runoff of livestock operations and erosion from roadways, construction sites and stream banks.

Chloride

What is chloride and how does it become a problem?
Chloride is a natural element that is typically found in surface waters, but can be increased through the winter salting of surfaces and through industrial discharges, wastewater, irrigation drainage, and landfill leachates.

How does chloride affect our watersheds?
Chloride is toxic to aquatic life, and can inhibit species' growth and reproduction, impact food sources, and disrupt osmoregulation in amphibians. Salt is also corrosive and can damage infrastructure, vehicles, clothes, and even the paws of our pets.

What can be done?
Winter chloride is an effective tool in de-icing surfaces but it is being overused. Methods to reduce salt use include adhering to the recommended application rate, treating roadways with brine, snow removal, worker training and alternatives like calcium magnesium acetate or sand.



E. coli (Escherichia coli)

What is E. coli and how does it become a problem?
E. coli is a bacteria found in intestines of animals and humans, and in human sewage. Sources of E.coli include sewer overflows, wastewater plants, septic systems and livestock operations. The levels of E. coli can spike during wet weather events like storms.

How does E. coli affect our watersheds?
E. coli is an indicator of fecal contamination. Once in a waterbody, E. coli can infect humans through ingestion or skin contact, resulting in diarrhea, giardia, hepatitis, or cholera.

What can be done?
E. coli can be reduced by controlling contaminated runoff with infrastructure improvements, fixing leaky sanitary sewers, incorporating green infrastructure like rain gardens and water-permeable hardscapes in street and park designs, picking up pet waste and discouraging seagulls and geese from congregating near the water. The use of Best Management Practices such as proper manure storage, livestock fencing, appropriate biosolid application rates and vegetative buffers from waterways are key tools for reducing E. coli in our watersheds.

Ball's Falls Conservation Area

NPCA Water Quality Monitoring Program: State of Water Quality in 2021

What is a Watershed?

A watershed is a land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as the Great Lakes in the NPCA jurisdiction. As the water flows through a watershed, it often picks up pollutants, which may have detrimental effects on the ecology of the watershed. Not all water flows directly to outflow points. When rain falls or snow melts some of it infiltrates into the ground. This groundwater remains in the soil, where it will eventually seep into the nearest stream or infiltrate much deeper into underground reservoirs called aquifers.

The goal of the NPCA water quality program is to protect human health and aquatic ecosystem by providing reliable and current information on the quality of surface water and groundwater in the NPCA watershed.

- The Niagara Peninsula Conservation Authority regularly collects and tests water samples at 80 surface water stations and 46 groundwater stations located throughout the NPCA's jurisdiction.
- The NPCA participates in the Provincial Water Quality Monitoring Network (PWQMN) and Provincial Groundwater Monitoring Network (PGMN) a partnership program with the Ontario Ministry of Environment Conservation and Parks.
- Surface water quality samples are analyzed for chloride, nutrients, E. coli, suspended solids, and metals. Groundwater quality samples are analyzed for chloride, nutrients, and metals.

Why monitoring is so important

- Characterizes our waters and identifies changes over time
- Identifies specific existing or emerging water quality issues
- Gathers information to design specific pollution prevention or remediation programs
- Confirms that program goals are being met

Surface Water - What Did We Find?

- Surface water monitoring results indicate most of the watersheds in the NPCA jurisdiction have poor water quality.
- The high levels of total phosphorus, E. coli, suspended solids, and chlorides within the surface water continue to be the major causes of poor water quality.
- The sources of these pollutants are generally from both rural areas (agricultural runoff and faulty septic systems) and urban areas (combined sewer overflows and urban stormwater runoff).
- Chloride concentrations were found to be highest in watershed with a high density of roads and urbanized areas.
- Nutrient and sediment concentrations were found to be highest in watersheds with significant agricultural landuse.
- E. coli concentrations were found to be highest in a variety of watershed types and related to both intensive urbanization and rural land uses.
- The upper Twelve Mile Creek tributaries have the best naturally occurring water quality due to large input of groundwater. Other watersheds such the Lower Twelve Mile Creek, Lower Welland River and Welland Canal have good water quality owing to the strong influence of water input of Lake Erie and the Niagara River.

Groundwater What Did We Find?

- The groundwater quality in NPCA's jurisdiction was found to be highly variable with some monitoring wells exceeding the Ontario Drinking Water Standards.
- All the Ontario Drinking Water Standards exceedances are a result of the natural conditions of the groundwater.
- Private well owners are responsible for having their well water tested regularly and to make sure that their well is properly maintained and in good condition.

How is the NPCA Water Quality Monitoring Program Data used?

- Help define current and emerging issues, track water quality trends and determine the effects of climate change on the NPCA watershed
- Provide scientific data to guide environmental assessments and land use policy
- Provide scientific data for NPCA Annual Reporting, Watershed Report Cards, and funding applications

NPCA Reporting

- Annual NPCA Water Quality Monitoring Report
- NPCA issues a Watershed Report Card once every five years with 29 other Conservation Authorities in Ontario

Additional Water Quality Monitoring Services Provided by NPCA

- Hamilton Airport Biological Monitoring Study
- Glanbrook Landfill Biological Monitoring Study
- Upper Twelve Mile Creek Water Temperature Monitoring
- Lower Twelve Mile Creek PCB Monitoring
- Conservation Area Water Quality Monitoring

2021 NPCA Water Quality Monitoring Program by the Numbers

(Established 2001)

80
Surface Water Monitoring Stations

778
Surface Water Samples Collected

34
Macroinvertebrate Samples

9480
Surface Water Samples Collected Since 2001

46
Groundwater Monitoring Wells

36
Groundwater Samples

5
Decommission Abandoned Water Wells for Watershed Landowners

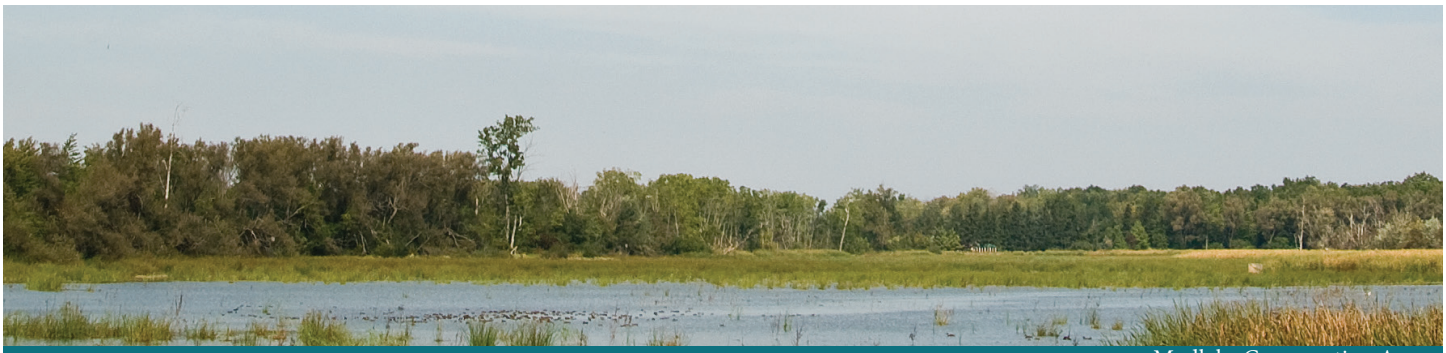
NPCA SURFACE WATER MONITORING STATIONS

65% are rated as poor

26% are rated as marginal

8% are rated as fair

1% is rated as good.



Mudlake Conservation Area

What we can do to help?

What Can You Do?

- Plant native trees, wildflowers, shrubs, and/or rainwater gardens.
- Reduce the amount of mown grass on your property.
- Reduce the amount of pesticides, herbicides and fertilizers.
- Conserve water by using low flow showers and toilets, high efficiency clothes washers and dishwashers.
- Install rain barrels to collect water for use around your yard.

What Can Your Community Do?

- Sponsor community clean ups to keep waste out of natural areas.
- Look for ways to expand the existing urban tree canopy.
- Reduce the amount of pesticides, herbicides and fertilizers used.

What Can Your Business Do?

- Establish a corporate volunteering program to support local initiatives such as tree plantings.
- Invest in 'greener' alternatives to current practices.
- Encourage recycling and composting in the workplace.
- Donate towards water quality and habitat improvement programs.
- Evaluate the effectiveness of environmental programs.

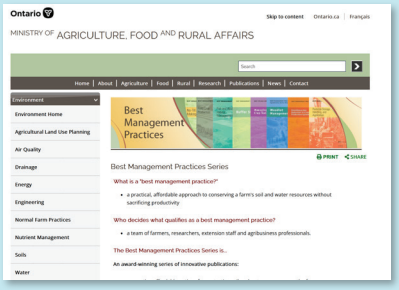
NPCA Reporting and More information

Annual Water Quality Report
https://npca.ca/watershed-health#water-quality-monitoring

Watershed Report Cards
https://npca.ca/watershed-health#report-cards

NPCA Grant Programs
https://npca.ca/restoration
https://npca.ca/well-decommissioning

Best Management Practices.



Scan for more information on Best Management Practices.