

Report To: Board of Directors

Subject: Water Quality Monitoring Program Summary Report for the Year 2020

Report No: FA-38-21

Date: June 18, 2021

Recommendations:

1. **THAT** Report No. FA-38-21 RE: Water Quality Monitoring Program Summary Report for the Year 2020 **BE RECEIVED**.
2. **THAT** the actions highlighted in the report to inform municipalities, stakeholders, and the public about the report findings and best practices to improve local water quality **BE IMPLEMENTED**.
3. **AND FURTHER THAT** a copy of this report **BE CIRCULATED** to municipalities, Ministry of Natural Resources and Forestry (MNR), Ministry of the Environment and Parks (MECP) and the Federal Ministry of Environment and Climate Change Canada (ECCC).

Purpose:

The purpose of this report is to provide a summary of NPCA's 'Water Quality Monitoring Program Summary Report for the Year 2020' and to inform the Board of the strategy to inform our member municipalities, stakeholders, and the public about the report and its associated findings and what actions can be taken to improve local water quality.

Background:

The NPCA Water Quality Monitoring Program was implemented in 2001 and is operated in partnership with the Ministry of Environment, Conservation and Parks (MECP), the Regional Municipality of Niagara, Haldimand County, and the City of Hamilton. The NPCA collects and analyzes hundreds of water samples each year from the streams and groundwater resources within the watershed. From this information, the NPCA can identify sources of pollution, track water quality trends, and help to assess and direct NPCA environmental programs. As well, the long-term data collected serves as a baseline by which to compare the success of various water quality improvement initiatives being undertaken by different organizations throughout the watershed.

Discussion:

The NPCA Water Quality Monitoring Report for the Year 2020 summarizes the results of the NPCA's surface water and groundwater monitoring program.

Surface Water

The NPCA collects monthly surface water quality samples (during the ice-free season) at 80 monitoring stations and analyzes them using several indicator parameters including chloride, nitrate, total phosphorus, total suspended solids, copper, lead, zinc, and *E. coli*. These indicator parameters are used to calculate the Canadian Water Quality Index (WQI) which provides a descriptive water quality rating for each station.

The NPCA also monitors surface water quality using benthic invertebrates (aquatic insects and animals) as indicators of stream health. Due to their restricted mobility and habitat preferences benthic invertebrates usually remain in a localized area. As a result, they are continuously subjected to the effects of all pollutants and environmental stream conditions, and as such can provide a broad overview of water quality related problems. They are abundant in all types of aquatic systems and can be easily collected and identified.

For surface water, the biological and chemical monitoring results indicate that most of Niagara's watersheds have poor or impaired water quality. Total phosphorus, *E. coli*, suspended solids, and chlorides from non-point sources (agricultural and livestock operations, faulty septic systems, winter de-icing operations) and point sources (combined sewer overflows, urban stormwater runoff) continue to be the major causes of impairment in the NPCA watershed.

Watercourses under the direct influence from the Great Lakes and Niagara River such as the Lower Welland River have higher water quality ratings. Watercourses that are strongly influenced by groundwater discharge like the Upper Twelve Mile Creek (Effingham Branch) also have higher water quality ratings as do watercourses located in areas with substantial natural landscapes like the Point Abino Drain and Beaver Creek (both located in Fort Erie). Please refer to Appendix 1 for additional information.

Groundwater

The NPCA collects water quality data from 15 Provincial Groundwater Monitoring Network (PGMN) monitoring wells and 31 Ontario Geological Survey monitoring wells. Please refer to Appendix 2 for the location of the wells within the NPCA groundwater monitoring network. This data is important to assess the ambient conditions of several bedrock and overburden aquifers found in NPCA watershed. For groundwater, monitoring results indicate that water quality was found to be highly variable with some wells exceeding the Ontario Drinking Water Standards. All groundwater quality exceedances were related to naturally occurring bedrock conditions and have been reported to the Ministry of the Environment, Conservation, and Parks and the applicable municipal Public Health Departments.

Recommendations

The NPCA Water Quality Monitoring Program continues to provide valuable information about the health of the watershed. The poor surface water quality in the NPCA watershed has been caused by decades of environmental degradation. However, water quality programs that improve how

nutrients are managed, serve to increase riparian buffers, and improve forest cover can begin to address these impacts. It will likely take many years of implementing these programs before the water quality in the NPCA watershed improves to the point where it is able to meet federal and provincial water quality guidelines. As such, the Water Quality Monitoring Report recommends that the NPCA continue to monitor both our surface water and groundwater to ensure that there is up-to-date water quality information available, be able to quantify trends, and continue to identify sources of contamination within the NPCA watershed.

Communication Strategy

In previous years, the Water Quality Monitoring Program Annual Summary Report was circulated via email to the Clerks at the member municipalities, the local Health Departments, and the MECP. At the October 22, 2020 NPCA Board Meeting, the NPCA Board directed staff (via Resolution FA-134-2020) to present the annual Water Quality Monitoring results and trends to the partner municipalities and to develop water quality education resources to engage stakeholders about the state of water quality and suggested best practices.

As requested, the NPCA will undertake the following actions:

1. The Water Quality Monitoring Summary Report will be distributed to the Clerks at the Region of Niagara, its lower tier municipalities, the City of Hamilton, the County of Haldimand, all associated Public Health Departments, and the local Ontario Ministry of Environment, Conservation and Parks office. With the circulation to the Clerk at the NPCA's member municipalities, an offer will be extended for NPCA staff to present the report and its associated findings to municipal council and/or senior staff.
2. A digital postcard summarizing the report's findings and a list of actions that individuals, communities, and businesses can undertake to improve local water quality will also be published via various mediums. Please see Appendix 3 for a copy of the postcard.
3. NPCA staff will coordinate a Public Information workshop after Thanksgiving 2021 in order to inform the public of the Water Quality Monitoring Summary Report and its associated findings, outline a list of suggested best practices, and to advertise the opportunity for the public to participate in the NPCA's Restoration Grant Program.
4. The Report will be placed on the NPCA website along with educational resources.

Financial Implications:

The Water Quality Monitoring Program is funded through NPCA annual budgets. The program is currently listed under the future Mandatory Programs and Service to be Prescribed in Regulation within one year after the end of the transition period of the proposed CA Act regulations currently being developed.

Related Reports and Appendices:

Appendix 1 – Water Quality Ratings in 2016-2020

Appendix 2 – NPCA Groundwater Monitoring Network

Appendix 3 – Digital Postcard

Appendix 4 – Water Quality Monitoring Program Report Summary Presentation

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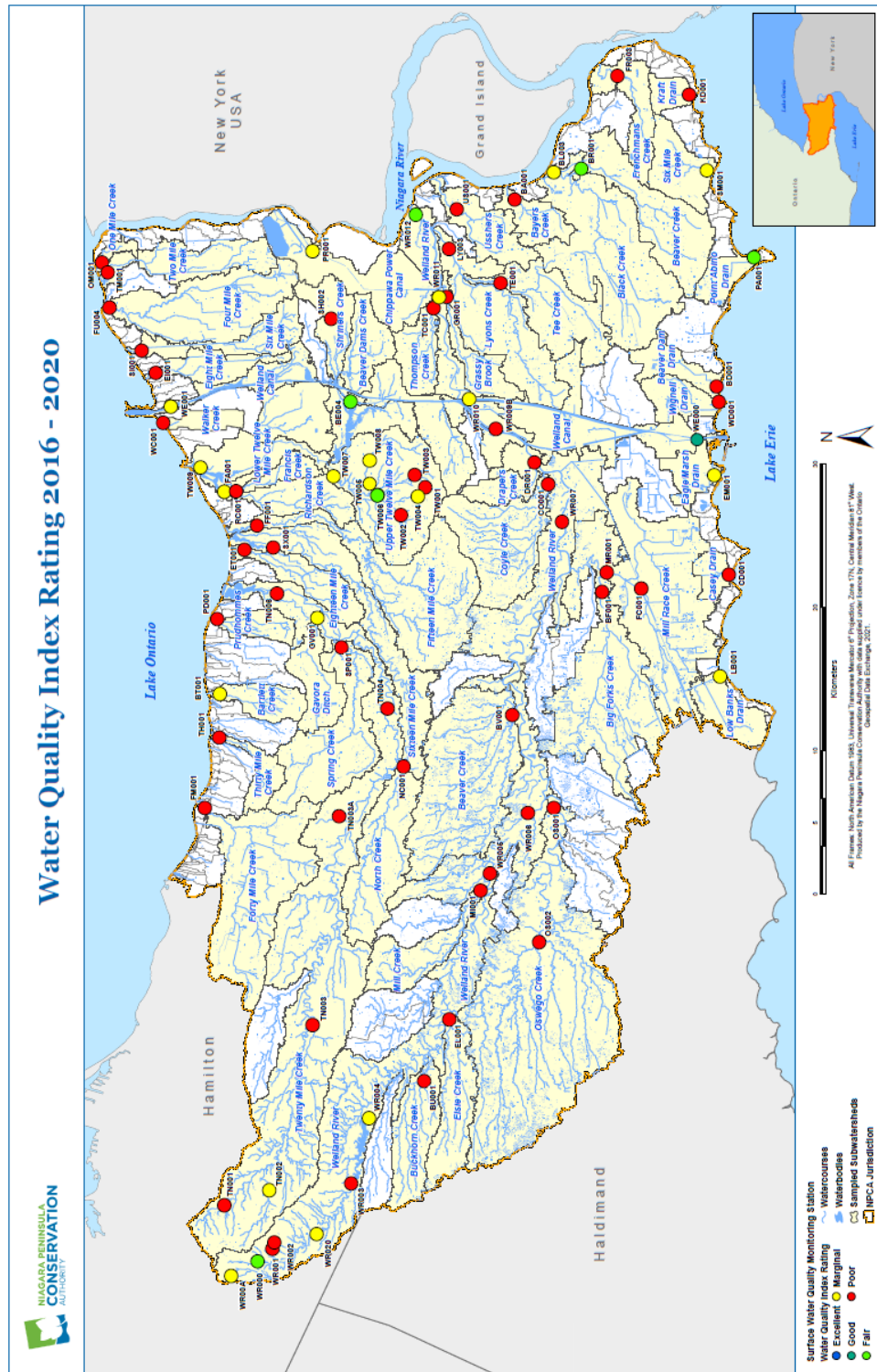
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Appendix 1 - Water Quality Ratings 2016-2020



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NPCA 2020 Annual Water Quality Monitoring Report Fact Sheet

The Niagara Peninsula Conservation Authority regularly collects and tests water samples at 80 surface water stations and 38 groundwater stations located throughout the NPCA's jurisdiction. Surface water quality samples are analysed for several indicators such as chloride, nutrients, E. coli, suspended solids, and metals.

For more information and to review the full report, scan with your smart phone



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).
- The best water quality is found in watercourses where water is introduced from Lake Erie and the Niagara River, in watercourses with significant groundwater discharges and in watersheds with substantial natural landscapes.

Groundwater What Did We Find?



- The groundwater quality in NPCA jurisdiction was found to be highly variable with some 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.
- For information about private well testing, contact your municipality.

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 you use.
- 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 and garbage 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 Restoration Grant Program

The NPCA is taking action to restore and improve water quality, wildlife habitat and forest cover across the NPCA watershed. If you have an idea for an environmental project, the NPCA welcomes you to apply for assistance through the NPCA's Restoration Grant Program. For further details, please visit the following link: npca.ca/restoration

Water Quality Monitoring Program Summary Report of the Year 2020



NPCA Board of Directors Meeting
June 18, 2021



Why is monitoring important?

- Characterizes the quality of our waters and identifies changes over time.
- Identifies emerging water quality issues and sources of contamination.
- The information is used to design specific pollution prevention and remediation programs and to determine how effective they are.
- Allows for a better understanding of the impact of spills or pollution discharges.

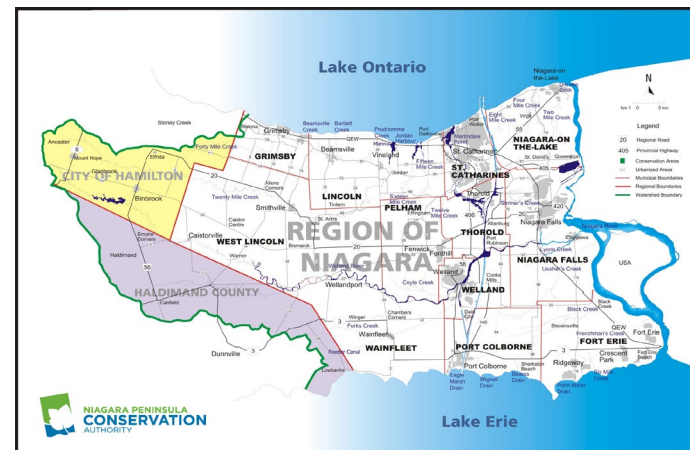
NPCA Water Quality Monitoring Program implemented in 2001 with a mandate to:

1) Assess water quality in local watersheds

- Surface water quality
- Groundwater quality

2) Report water quality information to stakeholders

- Water quality reports
- Data sharing



What does the NPCA look at in our water?

Indicator	Sources	Impacts
Chloride	Road salt, sewage	Ecological toxicity
Phosphorus	Fertilizers, sewage	Excess algae growth
Nitrate	Septic systems, fertilizers	Human health
Suspended Solids	Erosion, urban and agricultural runoff	Loss of habitat
<i>E. coli</i>	Sewage, manure	Beach closures, boil water advisories
Metals	Industrial effluents, pesticides, storm water runoff	Ecological toxicity
Benthic Animals	Both rural and urban pollutants	Ecological toxicity Loss of habitat

What is the surface water data telling us?

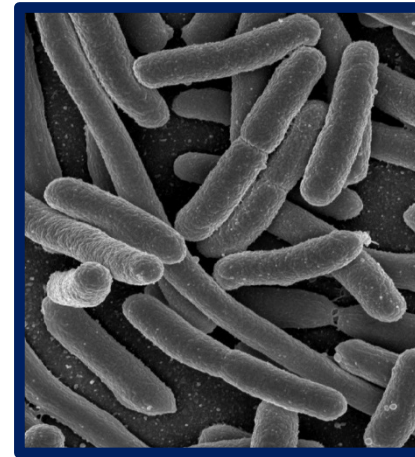
Total Phosphorus



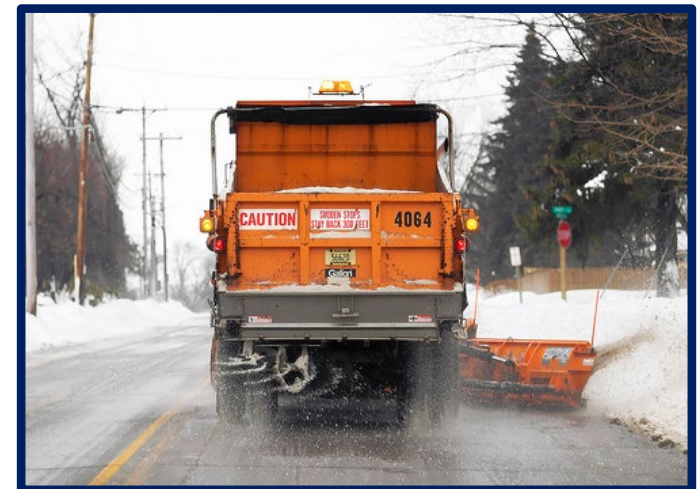
Algae & Duckweed



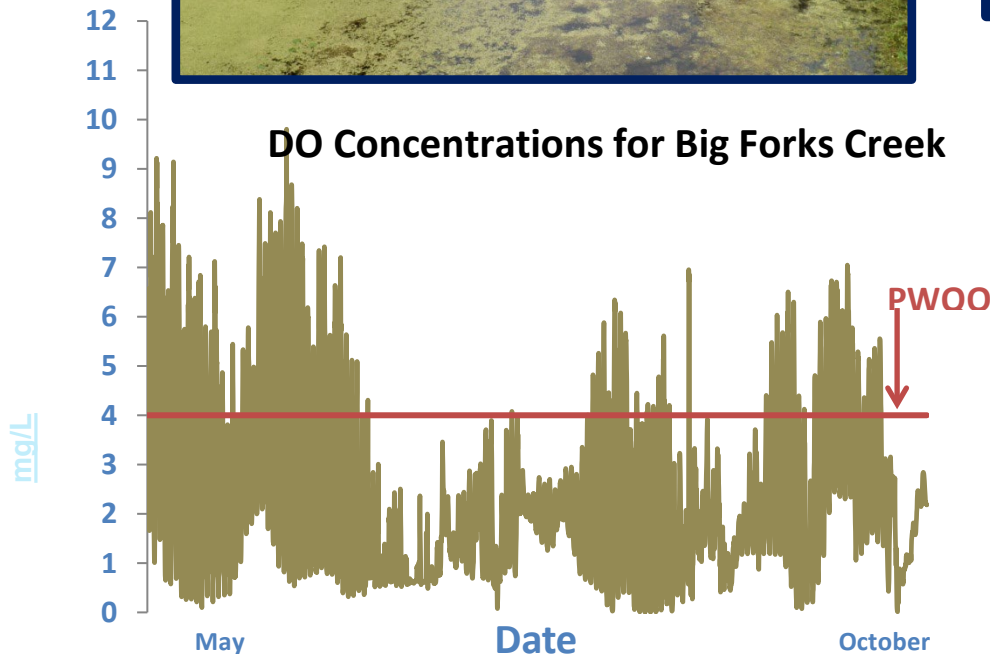
E. coli



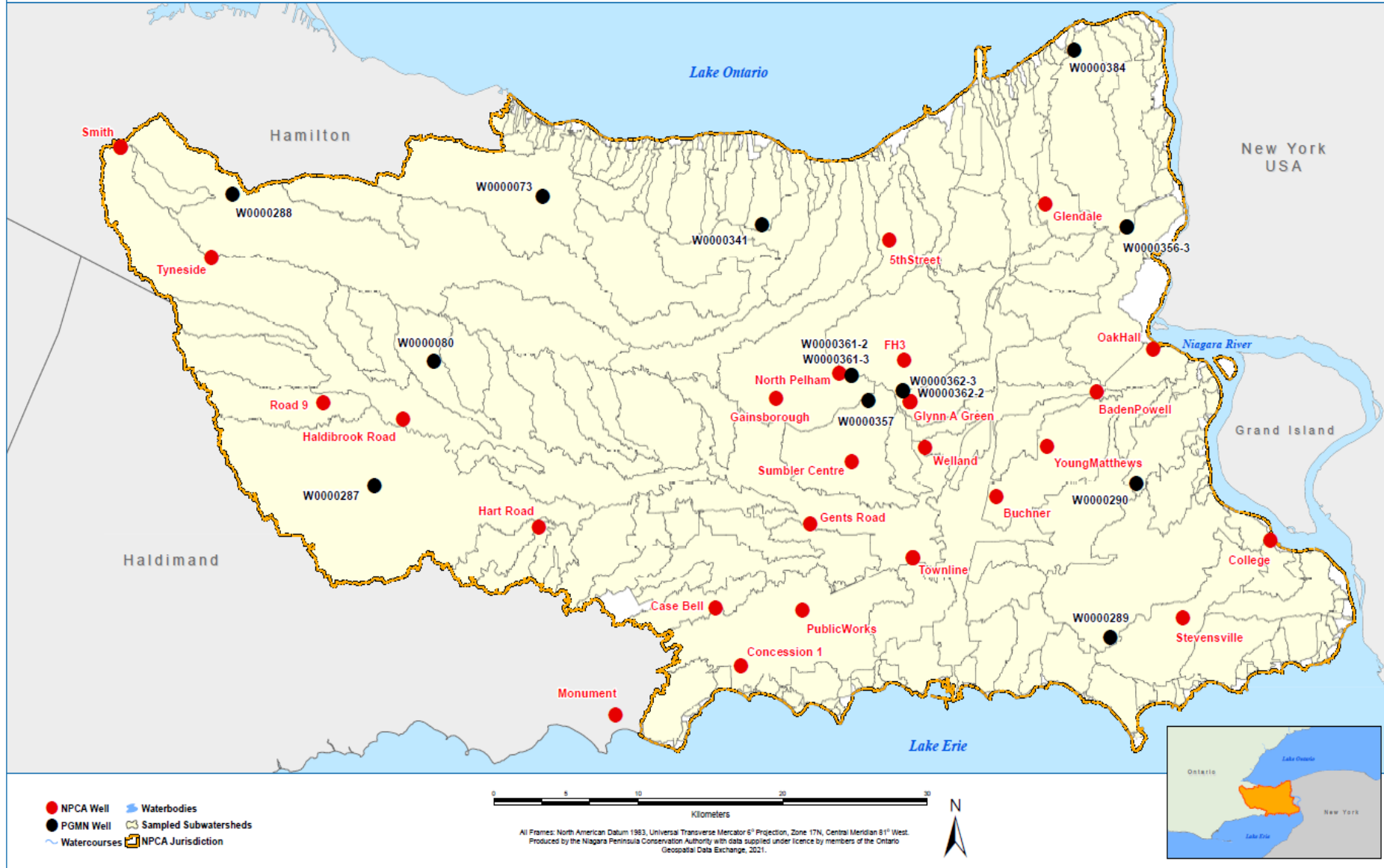
Chloride



DO Concentrations for Big Forks Creek



NPCA Groundwater Monitoring Network



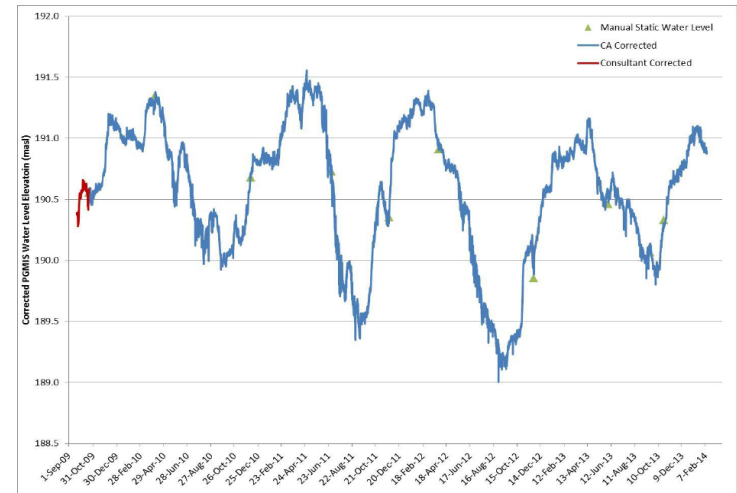
What is the groundwater data telling us?

- Water quality at most NPCA wells meets Ontario Drinking Water Guidelines

But.....

- Some exceedances are attributed to natural conditions of the groundwater

Groundwater Levels from Sept. 2009 until Feb. 2014 at PGMN Well W0000073 in Grimsby



Strategies to Improve Water Quality

Best Management Practices



Livestock Restrictions



Wetland & Tree Plantings



Cover Crops



Nutrient Management

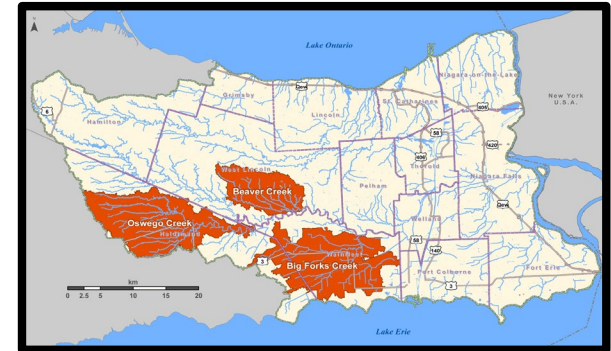


Riparian Buffers



Conservation Farm Practices

Watershed Prioritization



Site Specific Studies



Better Technology



NPCA Water Well Decommissioning Grant Program

WATER WELL DECOMMISSIONING GRANT PROGRAM



For more information phone 905.788.3135
or visit www.npca.ca

PROJECT ELIGIBILITY

- » Grants are available for projects on qualifying lands located within the NPCA jurisdiction for the decommissioning of unused water wells.
- » Limit of two (2) wells per property (landowner).
- » Oil wells, gas wells and cisterns are not eligible under this program.
- » All work must be completed by a water well contractor licensed by the Ministry of the Environment (MOE) as set out in Ontario Regulation 903.
- » All work must comply with MOE procedures for plugging or abandoning water wells according to Ontario Regulation 903.
- » Applicants must apply and be approved prior to initiating their project. Projects already underway or completed without NPCA approval will not be eligible.

5 STEPS FOR INTERESTED PROPERTY OWNERS

1. Contact NPCA for an application and program information.
2. Fill out the application and submit to NPCA with two (2) quotes from licensed water well contractors for proposed work.
3. Obtain pre-approval from NPCA to proceed with proposed work.
4. Complete proposed work and submit all receipts, invoices, and water well decommissioning record(s) to NPCA for review.
5. Receive final approval and grant funding from NPCA.



250 Thorold Road West 3rd Floor, Welland, ON L3C 3W2
phone 905.788.3135 • fax 905.788.1121

Project Funding Provided By:  

Recent Projects

Before

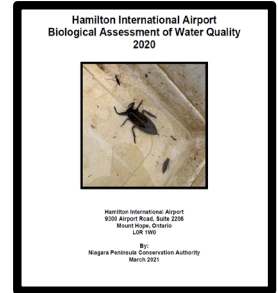
After



Additional Water Quality Monitoring Services Provided in 2020

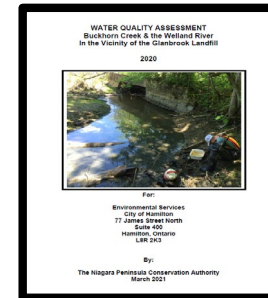
1. Hamilton Airport Biological Monitoring Study

- Assists with monitoring airport operations



2. Glanbrook Landfill Biological Monitoring Study

- Assists with monitoring landfill operations



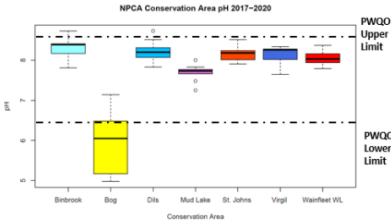
3. Upper Twelve Mile Creek Water Temperature Monitoring

- Monitor summer stream water temperature



4. Conservation Area Water Quality Monitoring

- Ambient water quality monitoring of significant water features



5. Niagara Coastal Collaborative Committee

- Lorraine Bay nutrient trackdown field program





Spill Investigations



**MOVING
WATER
FORWARD**

NOTICE OF STUDY COMMENCEMENT SOUTH NIAGARA FALLS WASTEWATER SOLUTIONS SCHEDULE 'C' CLASS ENVIRONMENTAL ASSESSMENT

Niagara Region is undertaking an important study to meet growing needs and provide overall environmental benefit to the South Niagara area.

WHAT IS THIS STUDY ALL ABOUT?
There is significant residential and employment growth planned for Niagara Region and specifically for South Niagara, including areas in Niagara Falls and Thorold. As we grow and build new communities, create new jobs and invest in new facilities like schools and hospitals, investment is needed to plan and build our infrastructure. South Niagara will require a new wastewater treatment plant and will require upgrading our sewer system to support growth and protect the environment.

This study is about more than just constructing a new wastewater treatment plant. It is about a holistic solution to make improvements to the full wastewater systems in the area. It is about balancing the needs of growth with the protection and preservation of natural and heritage resources. It is also about the Region's investment in tomorrow to make sure we have the infrastructure we need to serve the current and future residents and businesses in the region.

WHY IS A NEW WASTEWATER TREATMENT PLANT NEEDED?

Niagara Region undertakes an integrated process called "Niagara 2041" where the Region looks at growth planning, water and wastewater infrastructure and transportation all together to establish a plan for Niagara's future. "Niagara 2041" identified significant opportunity for growth in the South Niagara area. Under this process, the 2016 Water and Wastewater Master Servicing Plan (MSP) Update was completed. A key recommendation of the MSP Update was to establish a new wastewater treatment plant in South Niagara and have the sewer systems in the southern area convey flow to this new facility (indicated by the arrows on



This EA will be studying the wastewater system within the study area on the map. The location of the new plant will be identified within the study area.

In the map, Region Council and Niagara Falls Council adopted these recommendations in 2017.

This Study will investigate alternative long-term servicing solutions for a new wastewater treatment plant and associated wastewater collection system. The Study will confirm the overall strategy. It will identify the preferred location for the new plant. It will select the preferred technology and construction requirements, and it will demonstrate the timing for design and construction.

WHAT IS THE PROCESS FOR THIS STUDY?

This Study is being undertaken as a Schedule 'C' Class EA, satisfying all phases in accordance with the Municipal Class Environmental Assessment (MCEA) process (October 2010, as amended in 2007, 2011 and 2015), which is an approved

process under the Ontario Environmental Assessment Act. The Class EA process is a transparent process that will clearly demonstrate the decision making of where the new wastewater treatment plant will be located, what sewer infrastructure is needed, how the natural, social and cultural environments will be protected, how the infrastructure will be constructed, and the costs of the recommendations. Public, stakeholder and agency participation is critical and mandated. Niagara Region will engage and consult with these groups through each step.

HOW CAN I PARTICIPATE IN THIS STUDY?

It is expected that the Study will take approximately two years to complete. Public input and comments are encouraged throughout the EA. There are three sets of Public Information Centre (PIC) meetings planned through the course of the Study. These meetings are planned for Spring

2019, Fall 2019 and Spring 2020 where Region representatives will be available to introduce the Study, answer questions and discuss next steps.

There is also an opportunity at any time during the study process for members of the public to provide comments and concerns to the attention of the project managers. With the exception of personal information, all comments received during the process will become part of the public record of the study.

For project information, visit niagararegion.ca/projects/south-niagara-falls-treatment-plant. If you wish to receive future project notifications by email, please send your request to newtreatmentplant@niagararegion.ca.

If you wish to submit comments, please use the online form on the project webpage or contact us:

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Niagara Region is committed to ensure that all Regional services, programs and facilities are inclusive and accessible to persons of disability. Please contact the Project Manager if you need any accommodation to provide comments or feedback for the study. This notice was first issued on April 4, 2018.

CONNECTING MORE PEOPLE TO MORE POSSIBILITIES

Niagara Region
niagararegion.ca/projects/south-niagara-falls-treatment-plant



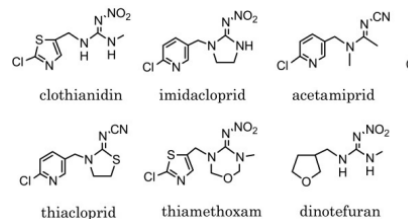
Consultants

Lake Ontario Objectives and Targets Task Team Experts Meeting
November 18, 2020

Kristina Heinemann
Dan Gurdak

Daniel Rokitnicki-Wojcik
Marie-Claire Doyle

Neonicotinoid Insecticides



Assessing the level of correlation amongst biological indices and water chemistry parameters from 2005-2013 in the Effingham Tributary of Twelve Mile Creek, Pelham, Ontario

ERS 411 Senior Honours Thesis

Thank You!

Niagara  Region



Hamilton



Ontario 

Eric Augustino
Water Quality Technician