



ASSESSMENT REPORT

BEACH CLOSINGS
BENEFICIAL USE IMPAIRMENT #10

2021



**BEACH CLOSINGS BENEFICIAL USE IMPAIRMENT
STATUS ASSESSMENT REPORT
for the Niagara River (Ontario) Area of Concern**

FINAL

Prepared June 2021

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EXECUTIVE SUMMARY




This document serves to present an updated assessment on the *Beach Closings* Beneficial Use Impairment against the established delisting criteria. Based on the monitoring results and the evaluation, this report outlines the recommendation to change the status to not impaired for the Canadian side of the Niagara River Area of Concern.

The *Beach Closings* Beneficial Use Impairment (BUI) is meant to indicate water quality issues due to bacterial pollution from fecal pollution sources (e.g., sewage waste). Historically, the *Beach Closings* BUI has been designated as impaired in the Niagara River Area of Concern (AOC) since the inception of the Remedial Action Plan (RAP) program and was first listed in the RAP Stage 1 Report (1993). It remained impaired due to high levels of *E. coli* bacteria at Queen’s Royal Beach in the Town of Niagara-on-the-Lake—the only beach that is considered to be a public swimming beach on the Niagara River.

Recent extensive water quality monitoring, microbial source tracking studies, storm sewer investigations, and implementation of remedial actions have resulted in significant water quality improvements at the Niagara River beach. Additional risk management actions will remain in place to ensure people are aware of potential risks and help them make decisions to protect their health.

This assessment report reviews recent information to examine whether the BUI delisting criteria have been met. Further, all remedial actions identified in the Niagara River Delisting Strategy were completed, as planned (Appendix 1). Community outreach and engagement conducted in 2021 and 2022 indicates support for changing the status of the *Beach Closings* BUI (Appendix 2).

Below is a summary of the BUI delisting criteria and the result of this assessment.

For the Niagara River (ON) AOC, the Beach Closings BUI will no longer be considered impaired when:	Assessment Result
1) Prominent sources of fecal pollution that could contaminate the beach or recreational waters are known <u>and</u> remedial actions to address known sources are identified and completed;	
2) At least 80% of the geometric mean results of recreational water samples (when sampled at least once per week) meet the Ontario Ministry of Health Recreational Water Quality Guideline (≤200 CFU/100 mL) each swimming season for a minimum of three years;	
3) Risk management actions (e.g., postings, signage, education, rain rule) are in place to protect human health.	

Through this report, the Remedial Action Plan (RAP) Committee is requesting the governments of Canada and Ontario officially change status of the *Beach Closings* BUI for the Canadian side of the Niagara River to ‘NOT IMPAIRED’.

BACKGROUND

Swimming is a fun and healthy way for people to enjoy the waters of the Great Lakes and is considered a beneficial use under the Canada-U.S. Great Lakes Water Quality Agreement (GLWQA). When something interferes with the ability to enjoy water (like poor water quality leading to a beach posting), it is considered a Beneficial Use Impairment, or BUI. The BUIs are used by the local Remedial Action Plan (RAP) team to focus restoration needs, track progress and report on success. When assessed, the cumulative status of the BUIs inform the RAP team about the overall condition of the Niagara River—which was listed as a Great Lakes Area of Concern (AOC) in 1987. When the required actions for each BUI identified by the RAP are complete and locally defined goals (called delisting criteria) are met, then the Niagara River can be removed from the list of AOCs.

The *Beach Closings* BUI is meant to address water quality issues due to bacterial pollution from fecal pollution sources (e.g., sewage waste). This was one of the main environmental concerns when the Niagara River was first listed as an AOC. Swimming in waters with bacterial pollution increases the risk of infections of the ear, eye, nose, throat, and skin and may cause diarrhea if that water is ingested (Niagara Region 2021). *Escherichia coli* (*E. coli*) is used as an indicator of fecal pollution for the purpose of beach monitoring across Ontario. Each AOC has its own set of goals and actions to guide remediation and tackle the key issues impacting the water quality impairment.

For the Niagara River (ON) AOC, the *Beach Closings* BUI will no longer be considered impaired when:

- 1) Prominent sources of fecal pollution that could contaminate the beach or recreational waters are known and remedial actions to address known sources are identified and completed;
- 2) At least 80% of the geometric mean results of recreational water samples (when sampled at least once per week) meet the Ontario Ministry of Health Recreational Water Quality Guideline (≤ 200 CFU/100 mL) each swimming season for a minimum of three years;
- 3) Risk management actions (e.g., postings, signage, education, rain rule) are in place to protect human health.

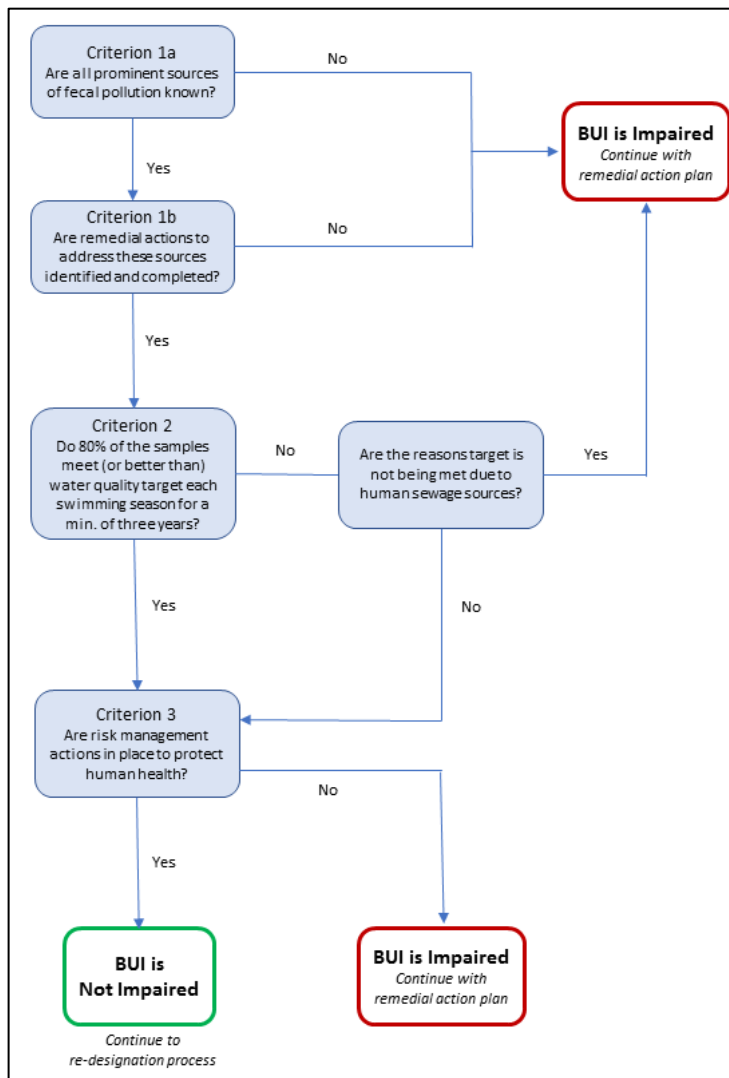
The *Beach Closings* BUI has been noted as impaired on the Canadian side of the Niagara River AOC since the RAP Stage 1 Report (NRRAP 1993), which provided a description of environmental conditions and identified problems in the AOC. The 1993 Report indicated that beach closings on the Canadian side, “had occurred fairly routinely over a decade and that issues were related to combined sewer overflows, slow moving waters in nearshore swimming areas, and plentiful waterfowl”. At that time, there were other public swimming beaches on the Canadian side of the Niagara River, but they have since been removed from the list of public beaches by the Niagara Parks Commission due to public safety concerns rather than water quality issues. Today, Queen’s Royal Beach (QRB), located in the Town of Niagara-on-the-Lake (NOTL) at the mouth of the Niagara River, is the only public swimming beach within the Ontario waters of the Niagara River.

The *Beach Closings* BUI status remained ‘Impaired’ in the RAP Stage 2 Report (NRRAP 1995) and in the subsequent 2009 RAP Stage 2 Update Report due to bacteria levels not meeting the water quality goals at QRB, particularly in 2009. The RAP Stage 2 Update Report (NRRAP 2009) indicated that the source of contamination at QRB was likely from the nearby storm sewer outfall and recommended further studies to determine whether the contamination was anthropogenic (from human sources) and if the source could be remediated. From 2010-2018, thorough investigations into the bacterial pollution

source(s) were completed and 18 priority actions were identified by a Technical Expert Working Group in 2019 (Appendix 1). Between 2018 and mid-2020, the Town of NOTL and other relevant partners implemented remedial and monitoring actions to address the specific challenges impacting water quality at QRB.

The assessment of the *Beach Closings* BUI delisting criteria and discussion for changing the BUI status to 'Not Impaired' is outlined in the following sections of this report.

ASSESSMENT OF BUI DELISTING CRITERIA



A BUI assessment is the formal process by which a local RAP team evaluates the status of a particular impairment. It is conducted once all identified remedial actions have been completed.

This assessment examines and summarizes the information related to each of the three delisting criteria identified for the *Beach Closings* BUI from 2018-2020 to determine if delisting criteria were met.

The Assessment Framework (Fig. 1) was developed in 2018 to support the evaluation of the *Beach Closings* BUI status.

For more information about the NRRAP assessment and re-designation process, refer to the Niagara River's Delisting Strategy (Green et al. 2021).

Figure 1. Beach Closings BUI assessment framework for determining BUI status.

Assessment of Criterion #1

This BUI delisting criterion examines if all prominent sources of fecal pollution are known and whether remedial actions have been identified and completed as necessary. It is meant to ensure a course of action is identified and completed if significant sources of fecal pollution are found. Remedial actions noted in this criterion target locally-controllable human sources (e.g., human sewage rather than waterfowl fecal waste) as these are tied to the legacy concerns of the AOC and RAP program.

In response to recommendations in the Stage 2 Update Report (NRRAP 2009), scientists from Environment and Climate Change Canada (ECCC) conducted microbial source trackdown studies using DNA markers from 2010-2015 to identify the source (human or animal) of bacterial pollution at beaches in the Niagara Region, including QRB. The studies found that:

- a microbial DNA marker indicating human sewage contamination was detected more often at QRB than any other Niagara Region beach included in the study;
- low levels of *E. coli* bacteria (usually from human sources) at the beach come from upstream sources in the Niagara River;
- high levels of *E. coli* at QRB were strongly linked to the stormwater outfall near the beach;
- subsequent studies also identified low levels of fecal pollution from gulls at QRB and at the storm outfall typically associated with rain events.

Overall, the microbial source trackdown results between 2010-2015 identified that the King Street Stormwater Outlet (KSSO), which discharges stormwater immediately east of QRB, was the key source of contamination that required further investigation and remediation (Fig. 2). The Town of NOTL subsequently received funding from Environment and Climate Change Canada between mid-2017 to early 2019 to investigate the KSSO catchment area (Fig. 3) to identify the potential sources of *E. coli* that were impacting QRB.



Figure 2. View of the Niagara River from the King Street Storm Outlet located near the Queen's Royal Beach (located to the left of the image; not shown).

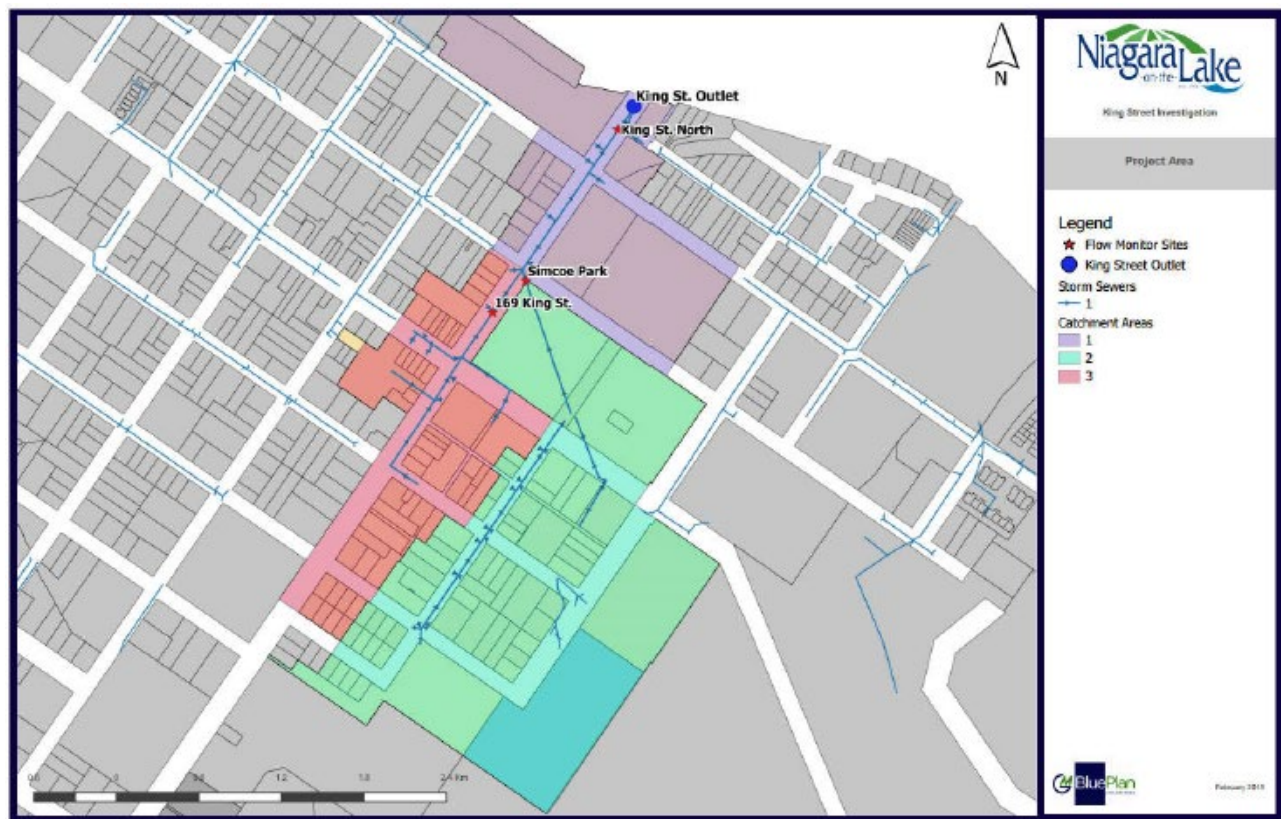


Figure 3. Map of the King Street Storm Sewer catchment area (Coveart 2021).

The engineering firm retained by the Town of NOTL to conduct the storm sewer investigations found that the KSSO catchment area had several issues with bacterial contamination linked to improper sewer connections, abandoned sewer infrastructure, low flow cross-connections (between storm and sanitary sewers), and stormwater infrastructure in poor/failing condition. A detailed report (GMBP 2019) outlined findings of the investigations and provided recommendations to address the most prominent sources of bacterial contamination in the KSSO catchment area. The Niagara River RAP technical expert working group reviewed and prioritized these recommendations into a list of remaining actions that guided remediation efforts (refer to Appendix 1). From 2018-2020, a water quality monitoring program, extensive field investigation program, and rehabilitation of identified infrastructure deficiencies were undertaken within the KSSO drainage area with a focus on reducing levels of *E. coli* at QRB. With the most prominent issues identified, the Town of NOTL began completing remedial actions in 2018 to resolve problems with the storm sewer system potentially impacting water quality at QRB. For example, raccoon grates were



Figure 4. The biofiltration facility installed in Simcoe Park in the Town of NOTL (October 2020).

installed in 2019, sewer infrastructure improvements (fixing cracks, joint offset, connection problems) were completed in 2019/20, several best management practices were implemented (e.g., regular maintenance of catch basins), and a bioswale (low-impact development feature) was constructed in Simcoe Park in 2020 (Fig. 4). The bioswale uses one meter of engineered filter media comprised of sand, soil and organic matter to provide quality control treatment for two stormwater outfalls with a 4.2 ha catchment area, which ultimately discharge to the KSSO, thereby reducing the amount of bacterial loading at QRB. A report by GMBLuePlan Engineering (Coveart, 2021) indicates that the efficacy of these remedial actions in the KSSO catchment area have been successful in improving water quality (Table 1). Specifically, post-remediation sampling (2020) at the KSSO outfall indicated minimal levels of human sources of *E. coli* and confirms that the outfall is no longer a significant source of human sewage. Further, the construction of the bioswale at Simcoe Park has significantly improved water quality. Monitoring at the site indicates it is 89-95% effective at reducing bacteria.

Table 1. Summary of water quality monitoring results (2018-2020) in specific areas of focus in the KSSO.

Area of Focus	Summary of Results
KSSO Outlet discharging to the beach	<ul style="list-style-type: none"> • Only 20% of samples collected from KSSO in 2020 showed presence of human sources of <i>E. coli</i> compared to 2018 (where all samples collected had the presence of human source of <i>E. coli</i>). • The maximum amount of human DNA marker found in dry weather samples was reduced by 68%. • The maximum amount of human DNA marker in wet weather samples was reduced by 77% (compared to 2020) and 85% (compared to 2019). • 82% reduction of other animal source <i>E. coli</i> DNA markers (non-human and non-gull) in wet weather. • 99% reduction in human DNA marker compared to highest recorded value in 2014.
Simcoe Park bioswale	<ul style="list-style-type: none"> • Human DNA marker (max amount) detected during wet weather was reduced by 93%. • 95% reduction of maximum values found for Other Animal source (non-human and non-gull) <i>E. coli</i> during wet weather • 89% reduction of average values for Human DNA marker (wet weather) • Average values for Other Animal source (non-human and non-gull) <i>E. coli</i> during wet weather – 94% reduction.

While the Town of NOTL had completed all priority actions as part of the RAP requirements by mid-2020, it initiated additional infrastructure upgrades to the King Street drainage area during the 2021 season, including the installation of trenchless structural lining in the mainline sewer pipes within the KSSO catchment area.

In summary, all significant sources of fecal pollution are known and remedial actions to address these known sources are identified and completed. **The assessment shows that delisting criterion #1 has been met.**

Assessment of Criterion #2

BUI delisting criterion #2 specifically relates to the water quality condition at the beach due to bacteria from anthropogenic sources (i.e., human sewage). It is meant to ensure that remedial actions (identified and addressed through criterion 1) are having a positive impact on water quality at the beach.

Prior to 2017, the Niagara Region Public Health Unit (NRPHU) monitored Queen's Royal Beach water quality weekly as part of its regional beach monitoring program during the swimming season defined as May (Victoria Day) to September (Labour Day). In 2017, the NRPHU determined that several beaches (including QRB) would be removed from their sampling schedule to allow for increased sampling and data accuracy at the most popular beaches (A. Habjan, personal communication, May 2019). To fulfill the RAP goals and the Town of NOTL's desire to maintain the QRB as a public swimming beach, partner organizations involved in the Niagara River RAP worked together to ensure the beach continue to be monitored. The Town of NOTL monitored water quality at the beach three times per week during the swimming season 2018-2020 with funding support from ECCC, Ontario Ministry of Environment, Conservation and Parks (MECP) and technical support from the NRPHU and the Niagara Peninsula Conservation Authority (NPCA) (Fig. 4). During that time, the NRPHU provided training for Town of NOTL water quality staff and conducted sample analysis to ensure adherence to the sample collection and analysis protocols for quality assurance and for comparison to previous sampling.



Figure 5. Staff at the Town of NOTL collect a sample at QRB (June 2019).

In Ontario, the water quality guidelines are set by the Ontario Ministry of Health and Long-Term Care (OMHLTC) (OMHLTC, 2018) with delivery by the local Public Health Units. People are advised to avoid using recreational waters when the geometric mean¹ of *E. coli* is higher than 200 colony forming units (CFU) per 100 mL and the beach is 'Posted' (i.e., swimming/recreational water contact should be avoided due to unsafe conditions). A beach is closed when there is a high risk of impacting human health due to poor water quality or immediate health hazards that make it unsafe for recreational body contact (e.g., blue-green algae, chemical spill, oil). To date, no Niagara Region beaches have ever been 'closed' due to water quality and/or severe health hazards (A. Habjan, personal communication, May 2019).

The BUI delisting criterion #2 target is at least 80% of sampling events meeting the provincial water quality guideline assessed over a three-year period. Prior to 2018, 44%-75% of the beach samples met water quality targets. Results of the water quality sampling in 2018, 2019, and 2020 indicate that the beach consistently met the RAP water quality targets in each swimming season. Details on sampling and

¹ The **geometric mean** is a calculation used to average the bacterial levels of *E. coli* in samples collected from recreational water. Monitoring public beaches for *E. coli* bacteria and the use of the geometric mean approach permits more meaningful statistical evaluations. Assessment of the bacterial quality of recreational water requires more than a single result. Due to the uneven distribution of bacteria throughout a liquid medium, the count of microorganisms in a single "grab sample" does not represent the average concentration in a particular body of water. A single random sample may demonstrate a concentration that is far above or below the average. To obtain an accurate assessment of the quality of recreational water, the results of a number of samples shall be combined in such a way that a random, unrepresentative sample will not unduly influence the average (OMHLTC, 2018a).

results are outlined in two separate reports (Laufman & Moura, 2020; Laufman & Patel, 2021). Below is a summary of the key findings from the water quality monitoring studies:

Year	% samples met water quality target
2018	83
2019	81
2020	91

Given the dynamic nature of beach environments and natural influences (e.g., wildlife, rainfall), it is unlikely for a beach to be entirely free of *E. coli* bacteria or better than provincial guidelines 100% of the time (ECCC/USEPA 2018). Past microbial source tracking studies completed in the Niagara River by ECCC (2010-2015) indicate that the Niagara River itself delivers low concentrations of *E. coli* to the beach, usually associated with low level human sewage impacts linked to wastewater treatment bypasses or heavy rainfall events farther upstream (NRRAP 2019). However, the three years of beach monitoring highlighted in this assessment shows *E. coli* levels are within the provincial guideline-based delisting criteria. Other persistent, low-level sources of *E. coli* are likely to come from various types of wildlife at the beach which is supported by the field observations made during beach monitoring (2018-2020). Water quality monitoring staff noted the frequent presence of gulls and geese at QRB. Microbial source tracking analysis also confirmed the presence of gull DNA markers as well as 'Other Animals' (there were no other DNA markers used to identify other suspected animals such as horses and racoons). 'Other Animals' was thought to include racoons as their presence in the storm sewers was confirmed in 2017 and remedial actions were taken to prevent their entry into the KSSO area (e.g., installation of racoon prevention grates and a one-way check valve on the storm outlet at the beach). Horses are the other suspected source of 'Other Animal' DNA as there is a horse carriage route in the area that may contribute low levels of *E. coli* through run-off to the storm system. To address this potential issue the Town of NOTL installed additional remedial measures (i.e., smart sponges) in targeted locations to capture fecal contamination from runoff to protect water quality at QRB. Furthermore, the Town of NOTL may re-route the horse carriages away from the KSSO catchment area and may consider adding other management options to reduce droppings on the roads. Results show that these remedial actions have reduced the maximum amount of 'Other Animal' microbial DNA in samples from the KSSO from 2018-2020 by 99% in dry weather and 89% in wet weather (Coveart 2021). The Town of NOTL will continue to monitor the beach by collecting samples 3 times per week with analysis support by the Niagara Region Public Health Unit (NRPHU). This long-term collaborative sampling will be reviewed and confirmed annually.

In summary, over 80% samples collected during each swimming season met the provincial water quality target of ≤ 200 *E. coli* CFU/100 mL each year for the last 3 years (i.e., 2018, 2019, 2020). **Results of the assessment shows that criterion #2 has been met.**

Assessment of Criterion #3

The third and final BUI delisting criterion is meant to mitigate health risks associated with swimming in contaminated waters. Given that it is unlikely for beach water to be 100% free of *E. coli*, there is always a low level of inherent risk associated with swimming at public beaches. The protection of human health can be achieved through numerous risk management methods such as appropriate signage indicating best practices (e.g., wash hands after swimming and before eating, do not swim when water is wavy or if it has rained within the past 24 hours, check the website for beach monitoring results).

In line with the risk management actions required to meet criterion #3, the Niagara River RAP partners have implemented several risk management actions:

- A webpage was added to the Town of NOTL website to communicate best practices for swimming at QRB and to share beach monitoring results;
- The NRRAP website contains a webpage to communicate similar best management practices and has a link to the NOTL beach webpage;
- The NRPHU will continue to post data on its Open Data Portal website where it can be downloaded.
- A sign is in development and will be installed at the beach to further protect beachgoers from potential bacteria in the water.
- Although not required, a sign may be also installed at the storm outlet advising people not to let pets drink the water.

Given all these risk management actions are completed or in progress, **criterion #3 has been met.**

RECOMMENDATION

As a result of recent water quality monitoring, microbial source tracking studies, storm sewer investigations, and implementation of remediation and risk management actions, the Niagara River (ON) *Beach Closings* BUI delisting criteria have all been met.

Recent outreach and engagement activities indicate overall support from the RAP stakeholders, Indigenous partners, local municipal government, U.S. agencies, and the community (Appendix 2).

It is recommended that the status of the *Beach Closings* BUI for the Canadian side of the Niagara River be officially changed to ‘NOT IMPAIRED’.

REFERENCES

- Coveart, C. 2019. Town of Niagara-on-the-Lake King Street Storm Sewer Investigation. GMBLuePlan Engineering File #618025. [\[Download\]](#)
- Coveart, C. 2021. King Street Investigation & Rehabilitation: Water Quality Monitoring Report for Data Collected from 2018 to 2020. GMBLuePlan Engineering File #618025. [\[Download\]](#)
- Environment and Climate Change Canada and the U.S. Environmental Protection Agency (ECCC/USEPA). 2018. Lake Ontario Lakewide Action and Management Plan, 2018-2022. Cat. No. En164-58/2019E-PDF ISBN 978-0-660-32586-6
- Green, N., Chambers, M., MacDougall, T., Marklevitz, S., and C. Vieira (eds). 2021. Delisting Strategy: Niagara River (Ontario) Area of Concern. Welland, ON. pp. 71 [\[Download\]](#)
- Laufman K. and P. Moura. 2020. Queen’s Royal Beach Water Quality 2019 Monitoring and Data Analysis Report. Town of Niagara-on-the-Lake, Ontario, Canada. [\[Download\]](#)
- Laufman K. and I. Patel. 2021. Queen’s Royal Beach Water Quality 2020 Monitoring and Data Analysis Report. Town of Niagara-on-the-Lake, Ontario, Canada. [\[Download\]](#)
- Niagara River Remedial Action Plan (NRRAP). 1993. Niagara River Area of Concern Environmental Conditions and Problem Definitions: Remedial Action Plan Stage 1. Prepared jointly by Ontario Ministry of Environment and Energy, Environment Canada, Ontario Ministry of Natural Resources, and Fisheries and Oceans Canada.

Niagara River Remedial Action Plan (NRRAP). 1995. The Cleanup Connection: Remedial Action Plan Stage 2 Report (Recommended Plan). ISBN 0-7778-3897-4.

Niagara River Remedial Action Plan (NRRAP) 2009. Niagara River Remedial Action Plan Stage 2 Update

Ontario Ministry of Health and Long-Term Care (OMHLTC). 2018. Operational Approaches for Water Quality Guideline.

Appendix 1. The list of recommended actions identified by the RAP's Technical Expert Working Group members in 2019 as part of the development of the Delisting Strategy. All actions with a check mark are complete.

#	Recommended Action	2019	2020	2021	2022	2023	Beyond	Lead(s)
REMEDIAL ACTION(S)								
10.1	Disconnect the wading pool in Simcoe Park from the lateral storm sewer connection and connect to the sanitary sewer system.	<input checked="" type="checkbox"/>						NOTL
10.2	Implement grate improvements to the Wellington Street storm sewer inlet to prevent racoon entry.	<input checked="" type="checkbox"/>						NOTL
10.3	Implement storm grate outlet improvement and structural lining of storm sewer on Davy Street.		<input checked="" type="checkbox"/>					NOTL
10.4	Repair the laterals with large and medium joint offsets at property line.		<input checked="" type="checkbox"/>					NOTL
10.5	Remediate the sanitary manhole with the Region of Niagara sewage forcemain connection.		<input checked="" type="checkbox"/>					NOTL, Niagara Region
10.6	Rehabilitate the storm manhole and outlet in poor condition located on King Street and Front Street.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					NOTL
10.7	Abandonment of poor condition mainline sanitary sewer on King street.		<input checked="" type="checkbox"/>					NOTL
10.8	Implement low-impact development (LID) stormwater management techniques in Simcoe Park to reduce bacterial loadings to the storm sewer system.		<input checked="" type="checkbox"/>					NOTL, ECCC, MECP
	<ul style="list-style-type: none"> If <i>E. coli</i> results do not improve after LID construction in Simcoe Park, then LID techniques at the storm outfall near QRB (King Street Storm Outlet) could be considered. 			N/A				
10.9	Implement regular maintenance of catchbasins and storm drains in the King Street Storm Outlet (KSSO) catchment area, including (but not limited to):							NOTL
	<ul style="list-style-type: none"> Perform sump maintenance (annually) to remove sediment and debris in catchbasins. 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
	<ul style="list-style-type: none"> Flush the King Street Storm Outlet catchment area once grates installed on Wellington Street storm inlet (min. once per year thereafter). After flushing, conduct a visual inspection of storm sewer sumps to ensure they are free of debris. If not, they must be cleaned. 	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	
	<ul style="list-style-type: none"> Manual labour required where difficult truck access is noted (e.g. Simcoe Park) for catchbasin sump cleaning in spring and fall annually. 		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	

#	Recommended Action	2019	2020	2021	2022	2023	Beyond	Lead(s)
WATER QUALITY MONITORING								
10.10	Collect water samples from QRB three times per week during the swimming season and analyze for levels of <i>E. coli</i> (note: this sampling began in 2018).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	NOTL (collection) NRPHU (analysis)
10.11	Confirm that the QRB will continue to be monitored at least once per week during the swimming season and analyze for levels of <i>E. coli</i> beyond the RAP.		<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	NOTL (collection) NRPHU (analysis)
10.12	Collect monthly (May-Oct) water samples from the stormwater outfall near QRB for <i>E. coli</i> testing.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					NPCA, NOTL
10.13	Collect water samples from the storm sewer catchment area to validate the efficacy of the LID stormwater management techniques.		<input checked="" type="checkbox"/>					NOTL
10.14	Collect water samples from QRB and stormwater outfall to be tested for presence/absence of human DNA markers.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					NOTL
OUTREACH & EDUCATION								
10.15	Notify the public of beach postings at QRB due to elevated levels of <i>E. coli</i> using existing methods such as NRPHU website and signage at the beach (NOTL Parks & Recreation Dept.).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					NRPHU, NOTL
10.16	Continue to communicate information to public about making safe swimming choices (e.g., avoid swimming 24-48h after rainfall, check NRPHU website before entering water, wash hands after swimming, etc.).	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	NRPHU (2019) NOTL (2020 - beyond)
10.17	Design and install improved signage at the QRB to communicate beach postings, swimming safety, and risk management practices (e.g., rain rule, washing hands, etc.).			<input checked="" type="checkbox"/>				NOTL
10.18	Design/install interpretive signage to highlight the LID project at Simcoe Park.			<input checked="" type="checkbox"/>				NOTL, NRRAP
REPORTING								
10.19	Gather all relevant water quality information for the past three years at QRB and conduct an assessment of the BUI.		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				NRRAP
	• If not impaired, proceed with re-designation process			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
	• If still impaired, further discussions will be required.			N/A				

Appendix 2 – Outreach and Engagement Summary & Results

OVERVIEW

Engaging and obtaining input from the broad range of community groups involved in the RAP initiative (public, Indigenous peoples, municipalities, private sector, etc.) is vital to the success of restoring the Niagara River AOC. There are many different organizations and local citizens involved in the Niagara River RAP initiative through their participation in the RAP Implementation and Public Advisory Committees. The RAP committees provide critical input and endorses all major reports before they are released for public review. In December 2020, the RAP committees received two presentations summarizing all research findings relating to the *Beach Closings* BUI and agreed that an assessment report should be prepared to determine if all BUI criteria were met. In April 2021, the RAP committees agreed to move forward with the public review period to seek input on the recommendation to officially change the BUI status from ‘impaired’ to ‘not impaired’.

The purpose of the outreach and engagement activities related to the *Beach Closings* BUI was to: (1) inform the public about the work completed to improve water quality at Queen’s Royal Beach and that an assessment indicates all RAP goals were met; (2) engage the public and other RAP stakeholders in providing input on the recommendation to change the BUI status from ‘impaired’ to ‘not impaired’.

This section of the assessment report summarizes the outreach and engagement activities and associated results. Overall, many people were aware of the recommendation to re-designate the *Beach Closings* BUI and results indicate support from the local U.S. agencies, Indigenous partners, municipal government, and the public.

OUTREACH & ENGAGEMENT METHODS

Given the restrictions due to the COVID-19 pandemic, virtual engagement tools and techniques were used to involve various stakeholders in the BUI re-designation process such as social media, the NPCA’s Get Involved online engagement portal, the Niagara River RAP website, E-newsletter, and a YouTube video.

Anticipating there may be limitations for involvement due to lack of internet/computer access, other traditional (non-virtual) methods were used (e.g., direct email, newspaper ad, radio interviews, place-based signage; Fig. 6) to inform the public about the engagement opportunities. In addition, we were prepared to accommodate requests for a paper copy of the report or survey. Table 1 provides a summary of each method with targeted audience and additional details.

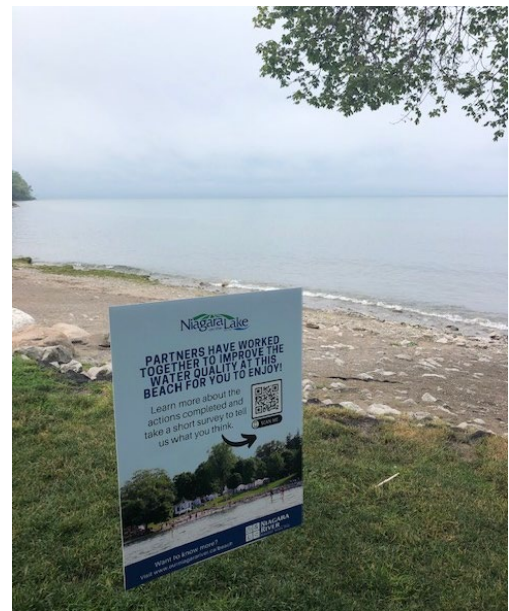


Figure 6. Temporary signage placed at Queen’s Royal Beach during the engagement period to encourage people to learn more and participate.

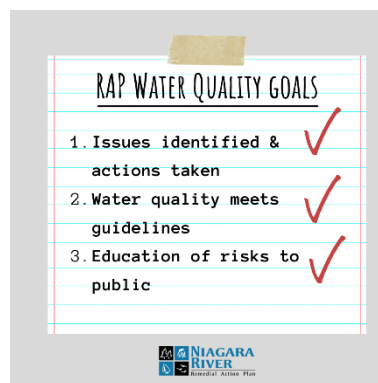
Table 1. Overview of outreach and engagement tools/tactics, intended audiences, and additional details for each.

Tool / Tactic	Audience(s)	Additional Details
Get Involved site - project webpage	All	The NPCA's Get Involved platform was utilized to facilitate online information sharing and engagement. The project page included an overview of the BUI and work done, educational video, important links (e.g., Assessment Report, beach monitoring results), engagement timeline, FAQs, digital comment box, and a survey. https://getinvolved.npca.ca/niagara-river-beach
RAP website	All	New website landing page created to facilitate information sharing and engagement www.ourniagarariver.ca/beach
E-Newsletter	All	A short blurb and link to more information was included in the June and July editions of the Niagara River RAP's e-newsletter.
Direct emails	Indigenous communities	Direct emails to Indigenous partners (Mississaugas of the Credit First Nation, Métis Nation of Ontario) and local First Nations (Six Nations of the Grand River and Haudenosaunee Confederacy) to inform them of the assessment report and to accommodate their desired level of engagement and preferred method of providing input.
	Unites States EPA New York State	Formal letters prepared and sent by the Niagara River RAP's Canada-Ontario representatives to relevant contacts at the New York State Department of Environmental Conservation and the United States Environmental Protection Agency (Region 9) which both oversee the U.S. side of the Niagara River Area of Concern.
Social media	General Public	Social media images/key messages shared throughout the public review period across Facebook, Instagram, and Twitter platforms from the RAP accounts, Town of NOTL account, and NPCA account. Targeted ad promoted using Facebook boost of the 30s video (see below) to broaden reach in the area.
Media Release	General public	Formal media release sent to all local media contacts and posted to the NPCA's website. The media release helped us garner further exposure through written newspaper articles and a radio interview with the RAP Project Manager. A list of media coverage is provided in the results section. https://npca.ca/newsroom/article/niagara-river-rap-water-quality-improvement-queens-royal-beach
Newspaper ad	General Public	Ads placed in all three Niagara daily and weekly newspapers and NOTL-specific newspapers (Lake Report and NOTL Local) on July 15, 2021. To support non-virtual outreach and engagement opportunities (phone number provided). See page 14 for example ad.
Educational video	All	Informational video to highlight the key findings of the assessment report: https://youtu.be/c8_gwEzy8cr Promotional (30 sec) video shared as an ad on social media to garner broader awareness/input: https://youtu.be/xK-SLxWsOgo
Presentations	NPCA Board of Directors and Public Advisory Committee	The RAP Project Manager (NPCA staff) provided a verbal update at the NPCA's Public Advisory Committee meeting as well as prepared a formal report to the NPCA's Board of Directors (Report #FA-36-21) to inform both groups about this important milestone and opportunities to provide input.
On-site signage	Beach users	Temporary signage with a call to action and QR code to fill out the survey was placed at the beach from July 5-Aug 6, 2021.
Survey	All	A brief survey was developed to gather demographic information and feedback from the community. Survey was offered digitally as well as in paper to accommodate all interested participants.

EXAMPLES OF OUTREACH MATERIALS



Ad featured in the Lake Report newspaper on July 15, 2021.



Examples of social media graphics that were used in a variety of posts throughout the engagement period.

RESULTS OF OUTREACH & ENGAGEMENT

To understand if we were successful in informing and engaging people in this opportunity to provide input on the recommendation to change the status of the *Beach Closings* BUI, we tracked several metrics throughout the engagement period. Taken together, these metrics indicate that the RAP's outreach and engagement initiative performed well, and many people were aware and engaged in providing feedback (as summarized in the infographic below).



Survey results

A survey, consisting of 14 specific questions, was launched on July 5 until August 6, 2021 to gather input from the community about the recommendation to re-designate the status of the Beach Closings BUI. The digital survey was made available through the NPCA's Get Involved online engagement platform and promoted using existing RAP channels and on social media in partnership with the NPCA and the Town of NOTL. A paper survey was made available to those that requested it (none were requested).

In total, 33 surveys were completed by members of the public. Most of the surveys were submitted by residents of the Niagara Region (87.9%) while 6.1% of respondents were from Ontario (outside of Niagara) and 6.1% from the United States. Of those from the Niagara Region, the majority (62.1%) noted living in the Town of Niagara-on-the-Lake (NOTL).

To understand if we were hearing feedback from beachgoers, we asked survey participants if they'd ever visited the Queen's Royal Beach in the Town of NOTL. Results show that 93.9% of respondents visited the beach at least once and most (56.7%) had visited the beach within the last week. We also asked about the types of recreational usage at the beach as anecdotal evidence suggested the beach was not often used for swimming. The survey confirms that most people (71%) prefer to use the beach for sightseeing, picnic or walking (do not enter the water) while 35.5% enjoy swimming at the beach (Fig. 7). Other responses included allowing their dog to swim in the water, showing tourists Fort Niagara across the water, and having dinner nearby.

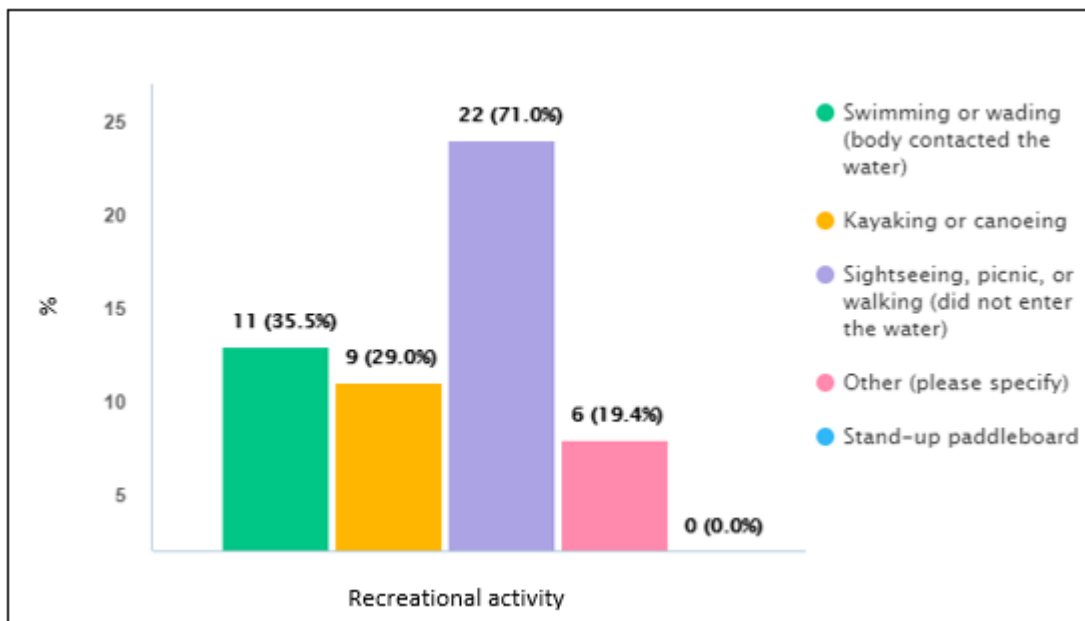


Figure 7. Percentage of respondents that indicated they participate in one or more of the listed recreational activities when they visited QRB (n=31).

Overall, there is good support for changing the status of the Beach Closings BUI from 'Impaired' to 'Not Impaired'. We asked participants to rate their agreement with changing the BUI status on a scale of 1 to 5 (1= Strongly Disagree and 5= Strongly Agree). The average rating of agreement was 3.7 indicating positive support. The majority (66.7%) of participants in agreement (either 'Strongly Agree' or 'Agree'). In total, 21.2% of respondents selected 'Disagree' and 12.1% chose 'Neutral'. No participants selected 'Strongly Disagree'.

A total of 24 participants provided additional feedback to explain the reason for their comments. Most comments were positive and several people noted the following reasons for agreeing with the change of status: all actions were completed, data and report supports change, long-time swimmer/diver with no issues, water quality is improved. Those that were neutral or did not agree with the status change provided reasons that are not within the scope of the BUI such as issues related to trash/garbage, that all actions still 'in progress' need to be completed, that the beach water quality needs to be 100% safe (rather than 80% of samples meeting water quality standards), washrooms being closed in 2020, local urban sprawl/deforestation, and weeds/algae in the water. One person that disagreed with the recommendation had not visited the beach. The feedback was considered and did not result in any changes to the report or its recommendation.

Participants were thanked for their feedback upon completing the survey and encouraged to contact staff by email or phone with additional questions. There were no inquiries related to the BUI.

Media Coverage

A media release was sent to all local media contacts and the *Beach Closings* BUI outreach and engagement campaign garnered media attention in the community. Below is a summary and links to various media coverage:

- Niagara This Week (also appeared in all of the local Daily newspapers and the Star): <https://www.niagarathisweek.com/community-story/10434972-water-quality-improving-at-queen-s-royal-beach-public-feedback-requested/>
- NOTL Local: <https://notllocal.com/2021/07/14/13748>

- Lake Report: <https://img1.wsimg.com/blobby/go/80918cb8-76d5-4cb4-902d-b164080ed0bc/THELAKEREPORTJuly222021forweb.pdf>
- Newstalk Radio 610 CKTB: <https://www.iheartradio.ca/610cktb/audio/natalie-green-npca-project-manager-niagara-river-action-plan-1.15601813?mode=Article>

INDIGENOUS ENGAGEMENT

There are three First Nation communities located within the Treaty lands of the Niagara Peninsula watershed: Mississaugas of the Credit First Nation (MCFN), Six Nations of the Grand River (SNGR) and Haudenosaunee Confederacy.

Staff from the MCFN's Department of Consultation and Accommodation have participated in the RAP's Implementation & Public Advisory Committee since 2018. Even though staff participate in the Committee and are part of the decision-making process for recommending change in BUI status, the RAP Team wanted to ensure that MCFN Staff had ample opportunity to review the documents and provide feedback. An email with all supporting information was sent in early June 2021 and a virtual overview presentation was given to DOCA staff in October 2021. After the presentation, DOCA staff confirmed that there were no concerns or disagreement with changing the BUI status to Not Impaired.

Although invited, staff with the SNGR have yet to participate in the RAP's Implementation & Public Advisory Committees. To ensure active dialogue, ECCC and MECP representatives for the RAP reached out to staff from the SNGR through several meetings, phone calls, and emails to invite participation in the RAP. As part of those conversations, the Niagara River beach assessment report and supporting material (e.g., dedicated webpage and video) were shared with SNGR staff, and summary slides were presented to them outlining the remedial actions taken to address the impairment and the monitoring results that show the BUI delisting criteria have been met. There have been no concerns raised from SNGR with changing the BUI status to Not Impaired.

There have been several attempts since 2018 to engage the Haudenosaunee Confederacy in the RAP process, including letters and emails requesting a meeting with the Haudenosaunee Confederacy Chiefs Council to discuss the AOC/RAP program and welcome opportunities for dialogue. There has never been a response.

The Métis Nation of Ontario (MNO) has had participation on the RAP's Implementation & Public Advisory Committee since 2019; however, there was a change in representation in 2020 resulting in a break in representation when the assessment results were presented to the committee. Therefore, the new staff person at MNO was emailed in May 2021 to formally request a review of the BUI Assessment Report and offer to set up a meeting to discuss, if desired. The MNO staff person consulted with the MNO Region 9 Council, which did not express any concern regarding the BUI Assessment report and did not request an information sharing meeting to discuss.

U.S. CONSULTATION

As a binational AOC, the Niagara River (ON) RAP re-designation process includes consultation with its American counterparts. In June 2021, the NRRAP's ECCC and MECP representatives sent a request for review and feedback (via direct email) to the U.S. RAP agencies.

On July 6, 2021, the New York State Department of Environmental Conservation (which coordinates the Niagara River U.S. RAP) sent a letter of support for the re-designation of the BUI. Additionally, the U.S.

Environmental Protection Agency sent an email to the RAP Team on July 27, 2021 to congratulate the partnership and to provide their support for the re-designation of the BUI to 'Not Impaired'.

CONCLUSION

In summary, the results of the outreach and engagement efforts show general support for the change in status of the Niagara River RAP's *Beach Closings* BUI to 'Not Impaired'. There are no concerns raised from local Indigenous communities. Together, these results indicate broad agreement with the Niagara River (ON) RAP's recommendation to officially remove this impairment.

ACKNOWLEDGEMENTS

The Niagara River RAP gratefully acknowledges the contributions of the staff from the Town of NOTL (Beth Audet & Lauren Kruitbosch) and the Niagara Peninsula Conservation Authority (NPCA) (Erika Navarro) for providing their expertise and assistance for this outreach & engagement initiative. Special thanks to Heather Frank (RAP Project Assistant) for her tremendous support with social media graphics, data gathering, and everything in between.

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