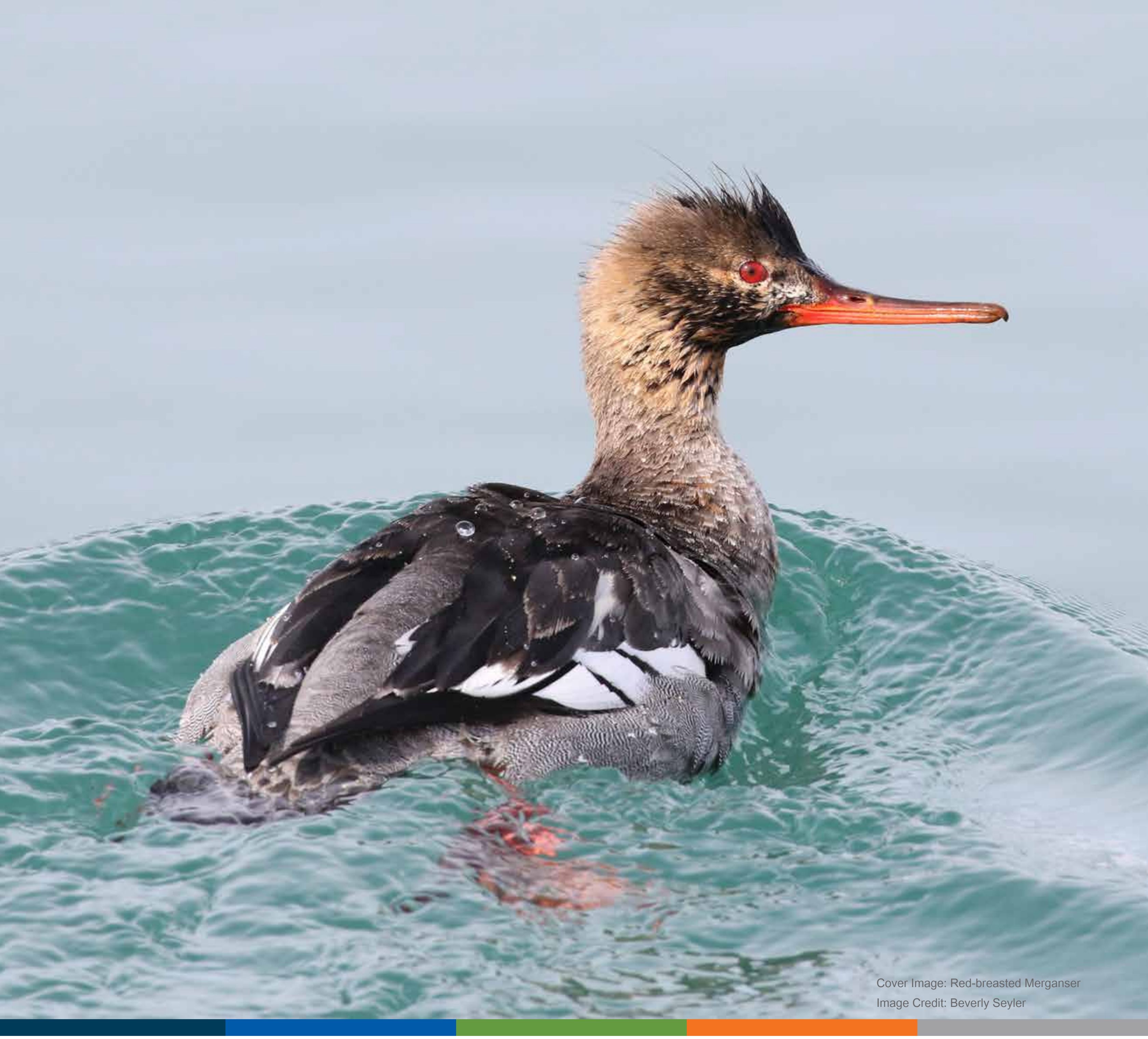
2019 RIVERWATCH CITIZEN SCIENCE

WATER QUALITY REPORT



Cover Image: Red-breasted Merganser
Image Credit: Beverly Seyler

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INTRODUCTION

This report is an educational tool providing information about water quality in the Western New York Region. Buffalo Niagara Waterkeeper works to improve water quality through citizen science programs, water quality monitoring, and restoration projects throughout Western New York.

Included in this report is information about how the New York State Department of Conservation (NYSDEC) creates water quality standards and stream designations, water quality issues in streams sampled, baseline water quality data collected by Riverwatch Citizen Scientists, bacterial and microplastic sampling results, information regarding harmful algal blooms (HABs) and solutions to ongoing pollution.

Riverwatch is a volunteer citizen science program. Waterkeeper staff train concerned citizens to gather important water quality data in the Niagara River Watershed. Sampling occurs once a month from May to October. These volunteers provide a networks of 'eyes on the water' and help provide surveillance monitoring to bolster regional baseline water quality data.

NEW YORK STATE WATERWAYS

Sources of information: *NYSDEC Water Quality Standards and Classifications Webpage: http://www.dec.ny.gov/chemical/23853.html*
Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 701 Classifications - Surface Waters and Groundwater

WATER QUALITY STANDARDS (WQS)

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. Water Quality Standards (WQS) are created by the NYSDEC with oversight from the United States Environmental Protection Agency (EPA). These WQS are set by first determining best usages and establishing water quality criteria (WQC). WQC are numeric and narrative descriptions of the conditions in a waterway necessary to support Best Uses.

If all WQS are met, antidegration policies and implementation methods are employed to keep the water quality at acceptable levels. If the waterway is not meeting WQS, a strategy to reduce pollutants and meet these standards is needed. Strategies are authorized by the CWA, utilizing available tools from federal, state, and local governments and nongovernmental organizations.

BEST USES AND STREAM CLASS

Based on a waterway's existing or expected Best Use(s), the NYSDEC assigns a letter classification and standard designation, which is detailed below. Best Uses include: source of drinking water, swimming, boating, fishing, and shellfishing. There are subcategories under water-based recreation to refer to the proportion of time in which someone engaging in certain types of activities would come into direct contact with the water. Secondary contact refers to short-term contact which may include jet skiing or canoeing. Primary contact refers to long-term or whole body contact and may include swimming, kayaking or snorkeling.

A Class A fresh surface waters

Best uses: Source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival.

This classification may be given to those waters that, if subjected to approved treatment equal to coagulation, sedimentation, filtration and disinfection, with additional treatment if necessary to reduce naturally present impurities, meet or will meet NYS Department of Health (DOH) drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

B Class B fresh surface waters

Best uses: Primary and secondary contact recreation and fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival.

C Class C fresh surface waters

Best use: Fishing. These waters shall be suitable for fish, shellfish and wildlife propagation and survival. The water quality shall be suitable or primary and secondary contact recreation, although other factors may limit the use of these purposes.

D Class D fresh surface waters

Best use: Fishing. These waters, which reflect the lowest classification standard, shall be suitable for fish, shellfish, and wildlife survival. The water shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. Due to such natural conditions as indeterminacy of flow, water conditions not conductive to propagation of game fishery, or stream bed conditions, the waters will not support fish propagation.

Note: Waters with classifications A, B, and C may also have a standard designation of (T), indicating that it may support a trout population, or (TS), indicating that it may support trout spawning.

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ABOUT THE NIAGARA RIVER WATERSHED

The Niagara River Watershed is located along the western most portion of New York State and encompasses lands that drains into the Niagara River, a channel that connects the Great Lakes of Erie and Ontario. The Niagara River Watershed is also part of the larger Great Lakes Drainage Basin.

The Niagara River Watershed Encompasses:

903,305 acres of land

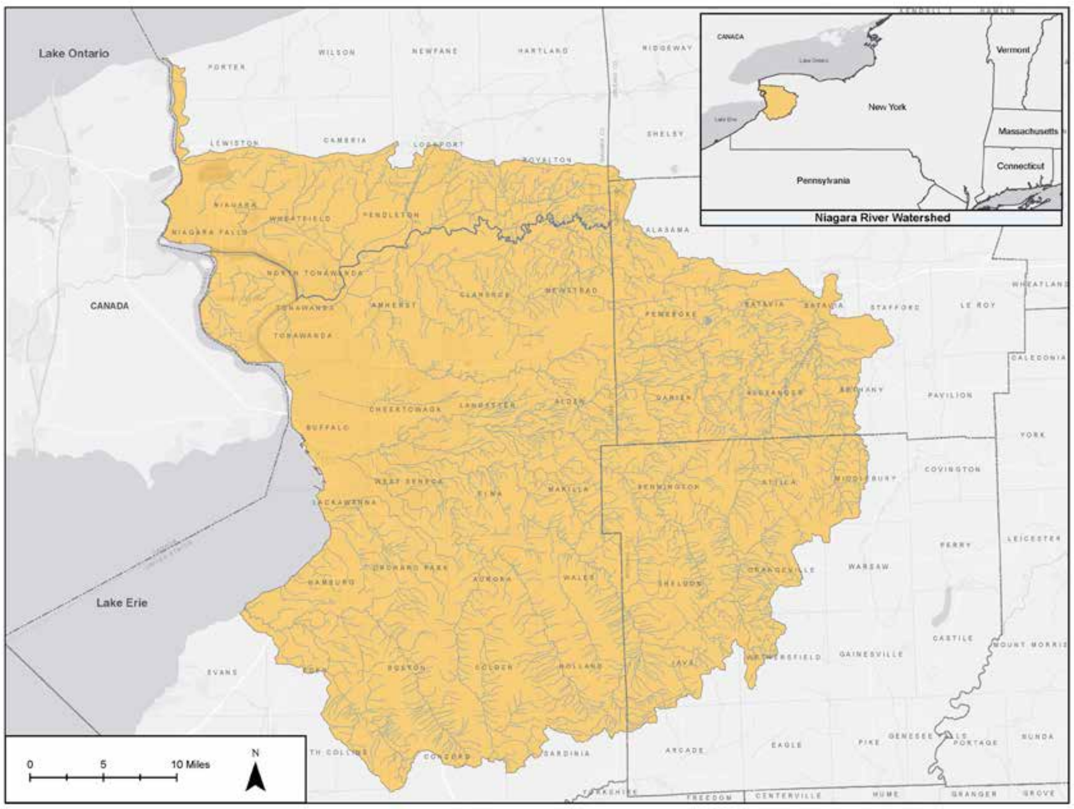
71 municipalities

3,193 miles of watercourses

52,979 acres of state and federally listed wetlands

To learn more about the Niagara River Watershed and watershed planning visit:

bnwaterkeeper.org/projects/healthyniagara/



Map 1: Niagara River Watershed and tributaries

ABOUT THE WATERBODIES SAMPLED

The Niagara River Watershed is comprised of 11 sub-watersheds. These two pages indicate the waterbodies sampled by Riverwatch volunteers and their correlating sub-watershed. Use the map on the following page to explore locations and boundaries of these sub-watersheds. The water quality issues listed here reference the NYSDEC's Waterbody Inventory/Priority Waterbodies List. Length often includes waterbody tributaries.

Niagara River Sub-watershed

Bergholtz Creek

Stream Class: C ; Length: 33.1 miles

Water Quality Issues: Fish consumption, aquatic life, and recreation are impaired from known sources of urban stormwater runoff and toxic contaminated sediment.

Black Rock Canal

Stream Class: C ; Length: 2.2 miles

Water Quality Issues: Fish consumption is impaired due to a NYS DOH health advisory for the Niagara River. Some species of fish have elevated PCB levels. Stormwater runoff, habitat modification, and combined sewer overflows also impact the canal.

Cayuga Creek (Niagara County)

Stream Class: C ; Length: 21.6 miles

Water Quality Issues: Fish consumption is precluded while aquatic life and recreation is impaired from known sources of urban stormwater runoff and toxic contaminated sediment.

Gill Creek and Hyde Park Lake

Stream Class: Gill Creek - C (12.3 miles); Hyde Park Lake - B (28.1 acres)

Water Quality Issues: Aquatic life and recreation are impaired by stormwater runoff and suspected toxic contaminated sediment. Harmful Algal Blooms have been confirmed by the NYSDEC for the past several years, including 2018.

Grand Island Tributaries

Stream Class: All are class B ; Length: 53.7 miles

Water Quality Issues: Habitat and aquatic life in the tributaries of Grand Island are thought to be threatened by elevated stream temperatures, silt, sediment, and nutrients linked to development in surrounding areas.

Niagara River

Stream Class: A (Special - Drinking Water) ; Length: 36.8 miles

Water Quality Issues: The Niagara is a source of drinking water for much of the region. The NYSDEC considers this use to be threatened by known contamination from toxic sediment and suspected contamination from combined sewer overflows and stormwater runoff.

Scajaquada Creek

Stream Class: Lower - B (mouth to Main St, Buffalo) ; Middle - C (Main St to Cheektowaga); Upper - B (above Cheektowaga)

Length: Lower - 0.3 miles; Middle - 8.3 miles; Upper - 15.1 miles

Water Quality Issues: Aquatic life and public bathing are precluded and recreation is impaired by low dissolved oxygen, excess nutrients, pathogens, and odors. Known sources include combined sewer overflows and urban stormwater runoff.

Two Mile Creek

Stream Class: B ; Length: 7.1 miles

Water Quality Issues: Aquatic life and recreation are impaired. Sources of pollution include municipal discharges, illegal connections to the sanitary sewers, and stormwater runoff. Suspected sources include industrial discharges and toxic contaminated sediment.

Ellicott Creek Sub-watershed

Ellicott Creek

Stream Class: B ; Length: 112 miles

Water Quality Issues: Aquatic life and recreation are impaired due to excess nutrients, pathogens, silt, and sediment from urban stormwater runoff and sanitary sewer overflows.

Lower Tonawanda Creek Sub-watershed

Ransom Creek

Stream Class: C ; Length: 93.7 miles

Water Quality Issues: Aquatic life and recreation are impaired by residential sewage discharges from on-site septic systems resulting in low dissolved oxygen and excess pathogens.

Tonawanda Creek, Lower

Stream Class: C (mouth to Pendleton) ; Length: 11.9 miles

Water Quality Issues: Fish consumption is impaired, while aquatic life and recreation are stressed by known toxic contaminated sediment, urban stormwater runoff, and suspected nutrient and silt pollution from sanitary discharges and streambank erosion.

Middle Tonawanda Creek Sub-watershed

Tonawanda Creek, Middle

Stream Class: B (Pendleton to E. Pembroke)

Length 49.3 miles;

Stream Class: C (E. Pembroke to Batavia)

Length: 11.7 miles

Water Quality Issues: Aquatic life and recreation are impaired by elevated nutrient levels and silt/sediment, the result of sanitary discharges, stormwater runoff, erosion and agricultural activities.

Murder Creek Sub-watershed

Murder Creek, Lower

Stream Class: C ; Length: 75.5 miles

Water Quality Issues: Aquatic life and recreation are impacted by streambank erosion, nonpoint sources, and septic system discharge.

Upper Tonawanda Creek Sub-watershed

Tonawanda Creek, Upper

Stream Class: A (above Batavia) ; Length: 255.1 miles

Water Quality Issues: Water supply, recreational use and aquatic life is stressed due to elevated nutrient levels, sediment loads, and agricultural activities. Municipal discharges and hydologic modification also impact the creek. Fisheries in this region are also under stress.

Cayuga Creek Sub-watershed

Cayuga Creek (Erie County)

Stream Class: Lower - C (mouth to Lancaster) ;

Length: Lower - 13.5 miles

Water Quality Issues: Aquatic life and recreation are stressed by known pathogen pollution and suspected nutrient, silt, and sediment pollution. Sources include sanitary sewer overflows and suspected urban stormwater runoff and streambank erosion.

Buffalo Creek Sub-watershed

Buffalo Creek

Stream Class: Lower - B (mouth to E. Elma) ; Upper - A (E. Elma and upstream)

Length: Lower - 63.5 miles; Upper - 285.1 miles

Water Quality Issues: Aquatic life and recreation in the lower stretch are stressed by silt/sediment pollution from stream bank erosion and urban stormwater runoff. Agriculture is a suspected pollutant source. There are no known impacts listed for the upper stretch.

Buffalo River Sub-watershed

Buffalo River

Stream Class: C ; Length: 8.6 miles (mouth to Cayuga Creek)

Water Quality Issues: The main stem is designated as a Great Lakes Area of Concern (AOC). Fish consumption is precluded while aquatic life and recreation remain stressed. The river is impacted by combined sewer overflows, stormwater runoff, sediment contamination, inactive hazardous waste sites, and hydrologic modification.

Cazenovia Creek

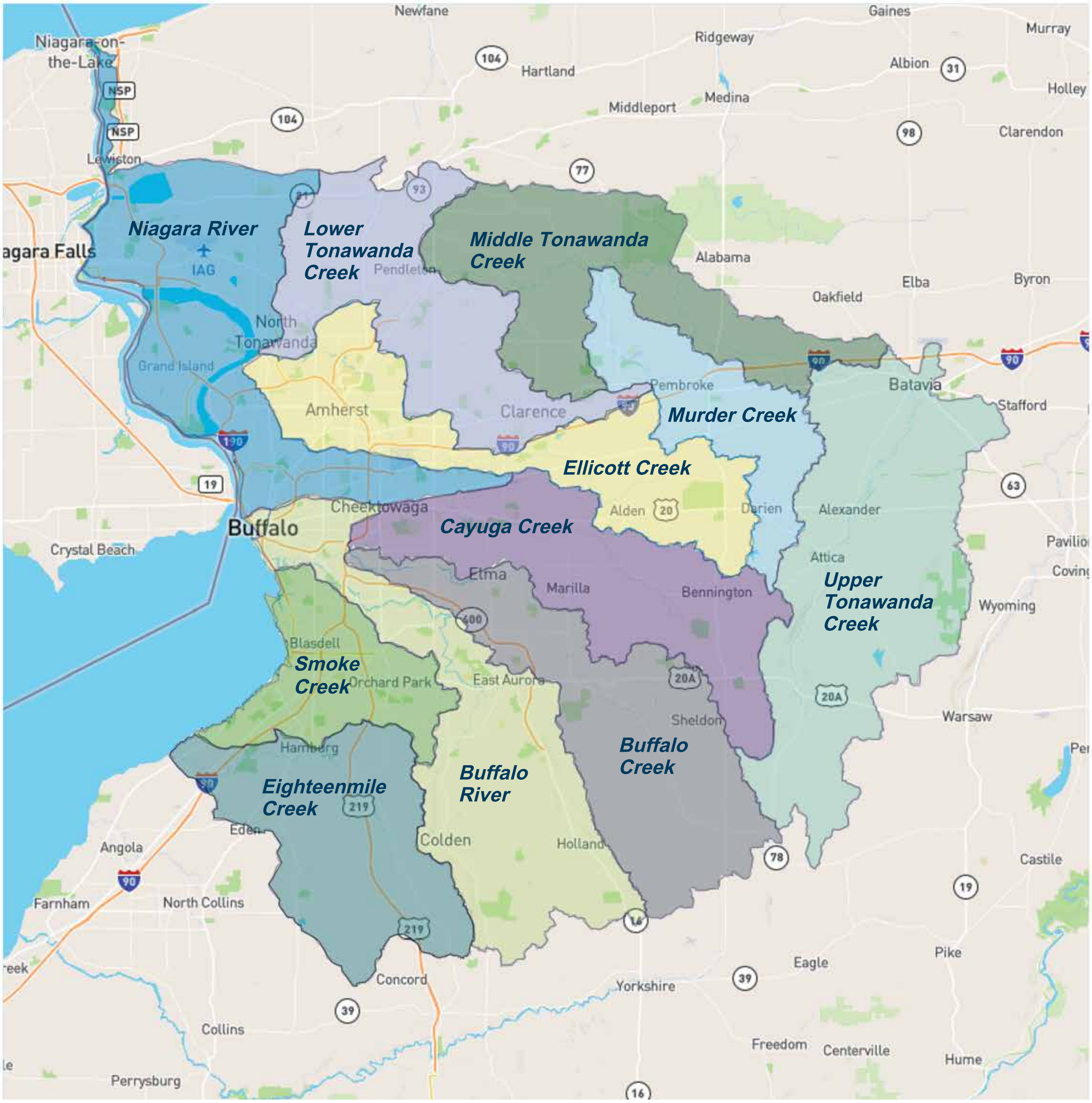
Stream Class: B ; Length: 51.7 miles

Water Quality Issues: Public bathing and recreation are stressed while aquatic life is threatened by known sources of pathogens and suspected urban stormwater runoff.

Lake Erie, Northern Outer Harbor

Stream Class: B ; Shoreline Length: 7.3 miles

Water Quality Issues: Fish consumption is impaired due to PCB contamination from historic industrial discharges and inactive hazardous waste sites.



Map 2: Niagara River Watershed with sub-watershed detail

Smoke Creek Sub-watershed

Rush Creek

Stream Class: C ; Length: 17.2 miles

Water Quality Issues: Municipal/industrial discharges (including sanitary sewer overflows) and urban stormwater runoff impact water quality. This waterway remains a suspected source of pollution, resulting in Lake Erie beach closures.

Smoke Creek, Lower

Stream Class: C ; Length: 7.2 miles

Water Quality Issues: Urban stormwater runoff and non-point source pollution elevate nutrient and sediment loads resulting in stressed aquatic life. Hydrologic modification also impacts the creek.

Eighteenmile Creek Sub-watershed

Eighteenmile Creek, Lower

Stream Class: B(T) ; Length: 20.8 miles

Water Quality Issues: Fish consumption, recreation, and fishery habitat are stressed by streambank erosion, stormwater runoff, agriculture, hydrologic modification, and toxic contaminated sediment.

SAMPLING PARAMETERS & STANDARDS

WHAT PARAMETERS DO WE TEST FOR?

Riverwatch volunteers collect data on the following parameters using a Eureka Manta+ 20 meter and a HACH 2100Q Portable Turbidimeter.

TEMPERATURE

The temperature of water governs what aquatic life will inhabit a waterway. Additionally, temperature controls the dissolved oxygen content of water (as the temperature of water increases, the concentration of dissolved oxygen content decreases), and influences the rate of chemical and biological reactions. Water temperature can be impacted by sunlight duration and intensity, and discharges entering the waterbody.

DISSOLVED OXYGEN (DO)

DO enters water from the atmosphere, from aeration as it tumbles over rocks and falls, and from photosynthesis. DO is essential for the survival of nearly all aquatic life and levels can decrease with the introduction of various pollutants including sewage discharges, stormwater runoff, and failing septic systems.

CONDUCTIVITY

Conductivity is a measure of water's capability to pass an electrical current and indicates the presence of inorganic dissolved solids such as salts, chlorides, nitrate, sulfate, and phosphate ions. Conductivity is affected by the geology of the area through which the water flows. Elevated levels may indicate the presence of sewage or stormwater discharges and runoff. Streams outside of the standard range may not support healthy fisheries and other aquatic life.

TOTAL DISSOLVED SOLIDS (TDS)

TDS is a measure of inorganic and organic substances dissolved in water which include salts and minerals. Salts from roadways may runoff into waterways resulting in an elevated TDS reading.

pH

pH is a measurement of the potential activity of hydrogen ions (H+) in a sample. The pH reading of a water sample indicates its acidity on a scale from 0 to 14 with 7 being a neutral value. Solutions with a pH less than 7 are considered acidic and solutions above 7 are considered basic. The pH of water determines the solubility and biological availability of chemical constituents such as nutrients. The majority of aquatic animals prefer a range of 6.5 to 8.5. A pH outside this range stresses the systems of most organisms and can reduce reproduction, thereby reducing the diversity in the waterway. Pollution sources can alter the waterway's pH.

TURBIDITY

Turbidity is a measure of the clarity of a liquid. Suspended solids including soil particles, algae, plankton, and microbes impact turbidity. Erosion of sediment and stormwater runoff will increase the turbidity of waterways. High turbidity increases water temperatures, decreases DO, provides refuge for harmful microbes, and can clog the gills of fish and crustaceans.

WHAT ARE THE STANDARDS FOR THESE PARAMETERS?

This report summarizes water chemistry data collected and compares it to set standards. These standards are established by the NYSDEC with oversight from the EPA.

Standards are as follows:

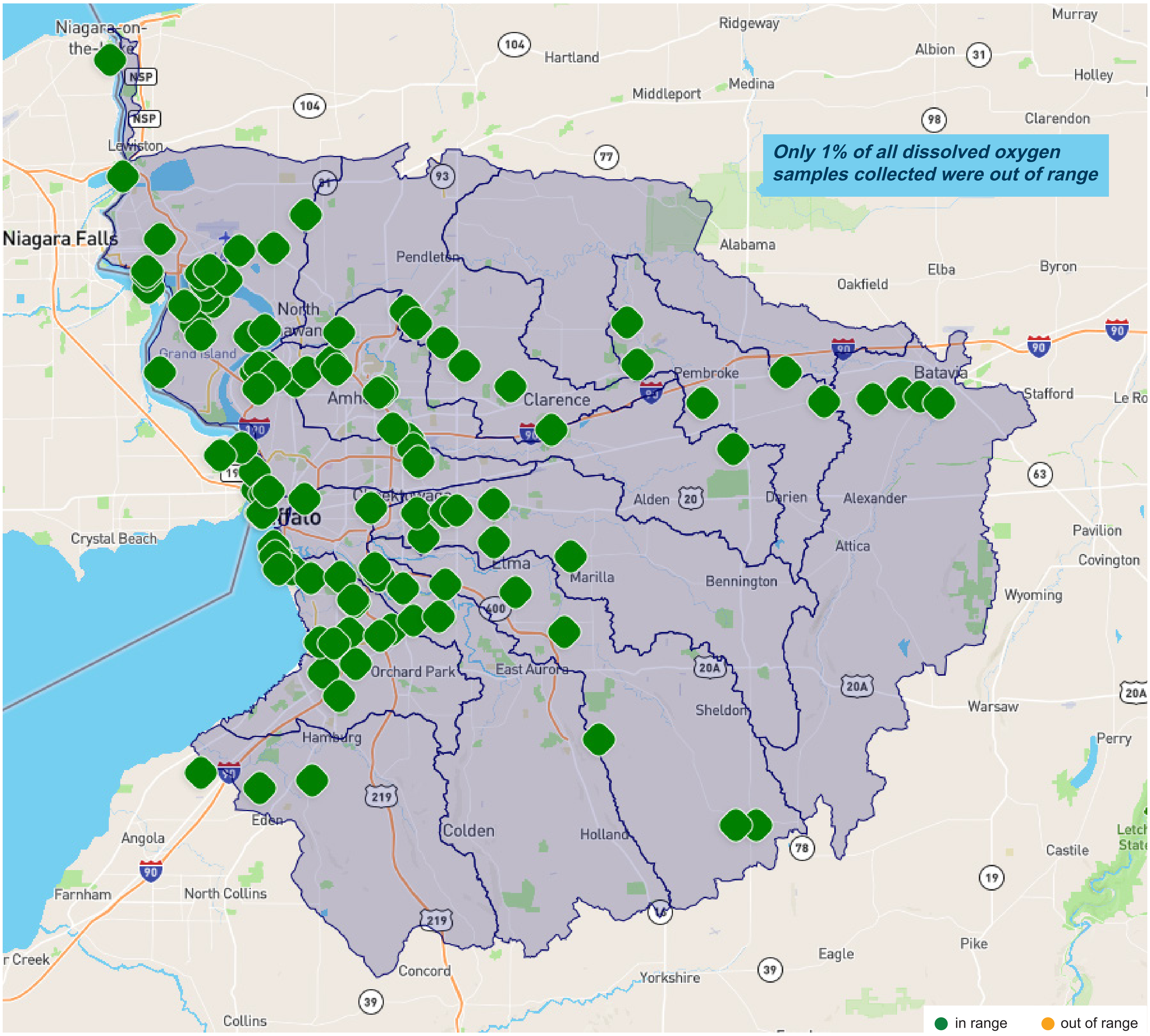
Parameter	Standard
Dissolved Oxygen	**No less than 6.0 mg/L for Niagara River** **No less than 4.0 mg/L for all other streams**
Conductivity[1]	**Between 150 and 500 μS/cm**
pH	**Between 6.5 and 8.5**
Turbidity	**No more than 5.0 NTU**

1 There is no standard set for conductivity by the NYSDEC or EPA. This range is a guideline for freshwater systems.

EXPLORE THIS DATA ONLINE!

To view water quality data collected by Riverwatch Volunteers, visit bnwaterkeeper.org/water-quality-testing/

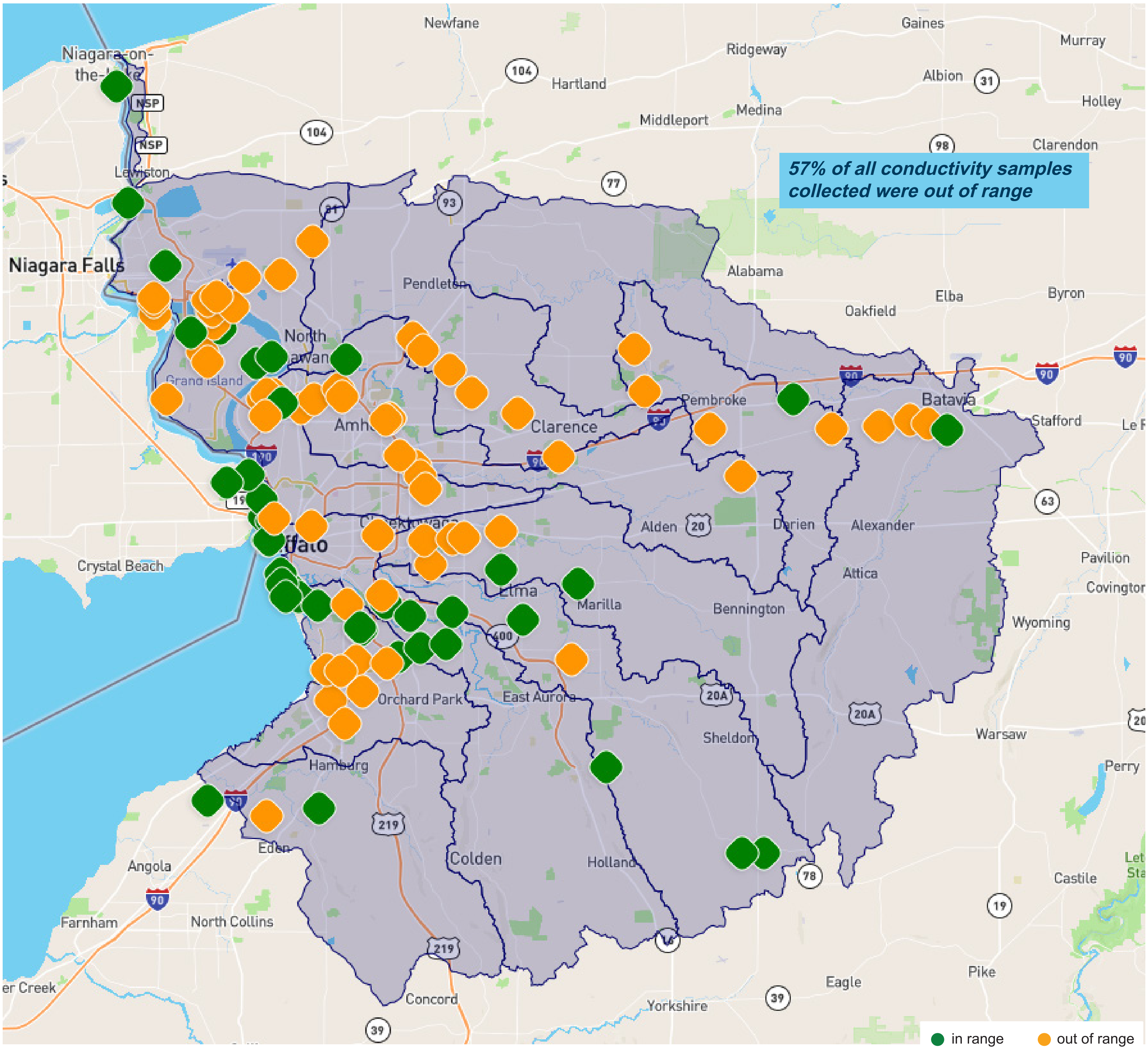
DISSOLVED OXYGEN RESULTS COMPARED TO STANDARDS



Map 3: Average Dissolved Oxygen Sample Results Compared to Standard

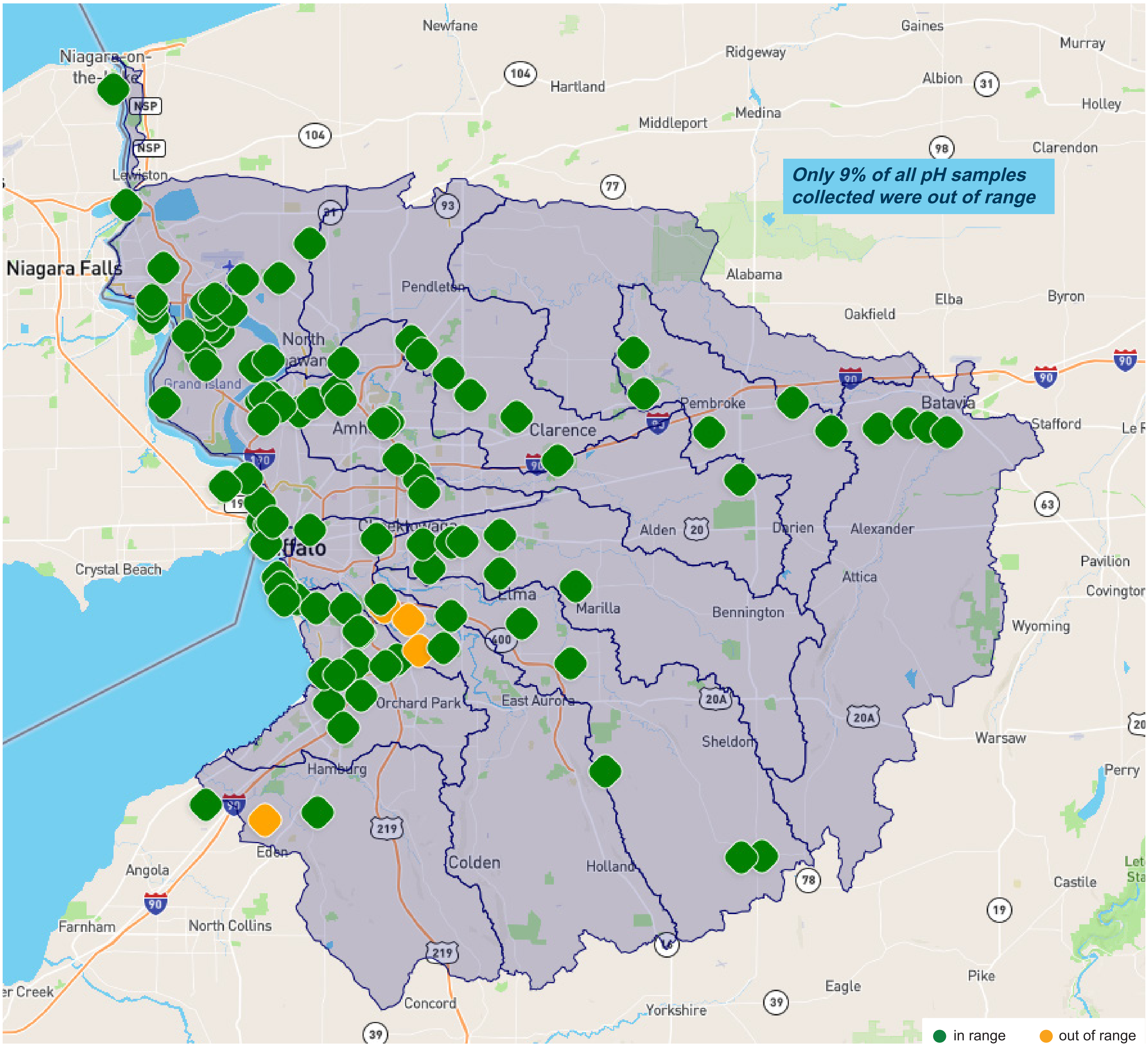


CONDUCTIVITY RESULTS COMPARED TO STANDARDS



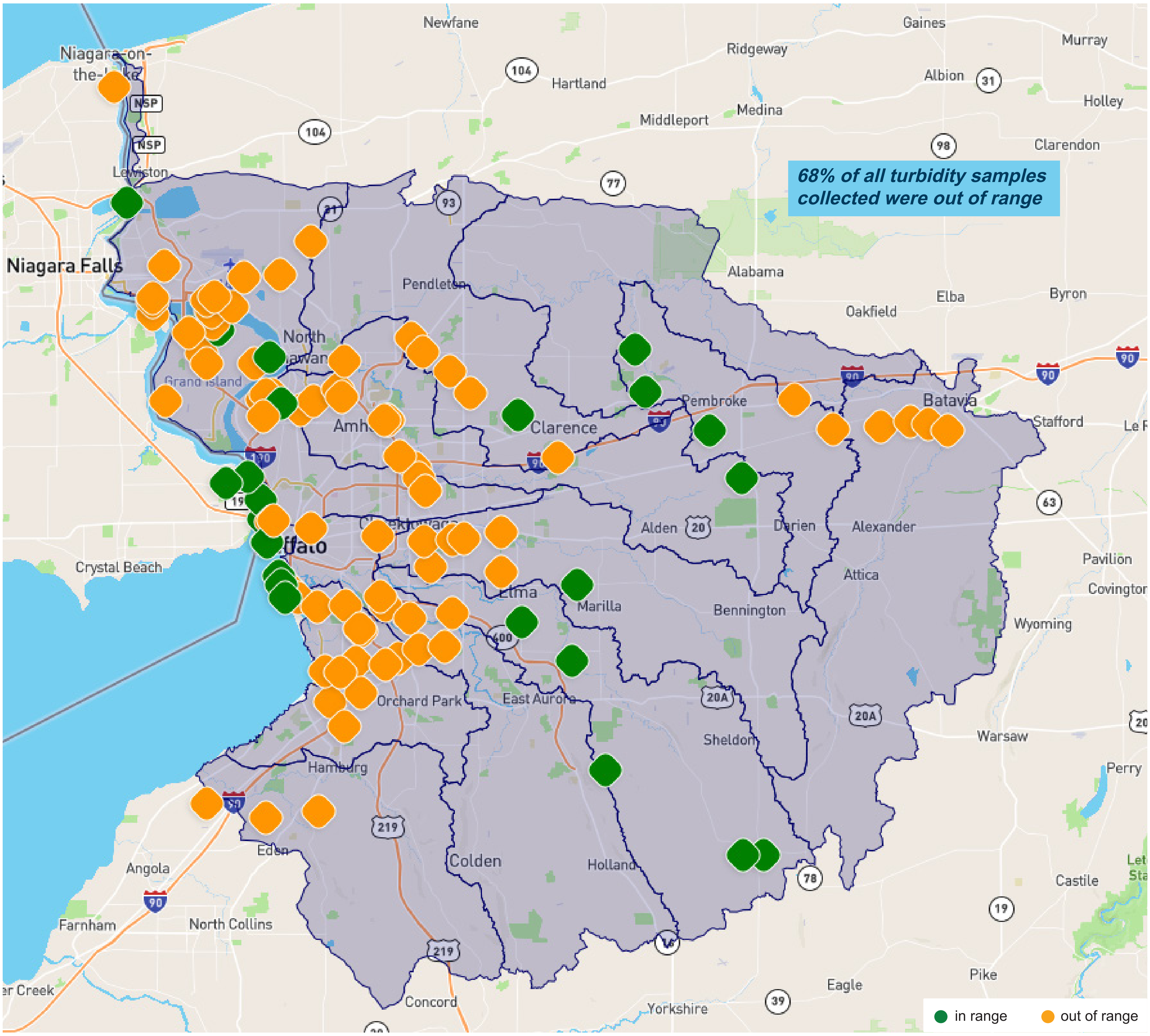
Map 4: Average Conductivity Sample Results Compared to Standard

pH RESULTS COMPARED TO STANDARDS



Map 5: Average pH Sample Results Compared to Standard

TURBIDITY RESULTS COMPARED TO STANDARDS



Map 6: Average Turbidity Sample Results Compared to Standard


Photo Credit: Larry Cobado

BACTERIA SAMPLING

Bacteria Basics

Bacteria are single-celled organisms that are naturally found in the environment. Some bacteria are harmless to humans and can actually help aid natural processes. *Escherichia coli* (*E. coli*) is a bacterium found in the environment, foods, and intestines of people and animals. Many strains of *E. coli* are harmless to humans. However, some strains can result in serious health problems and sickness. *E. coli* is a strong indicator of sewage pollution or animal waste contamination when found in local waterways.

Student Samplers from the Young Environmental Leaders Program

Combined Sewer System 101

Most older cities and municipalities in New York State, including the Cities of Buffalo and Niagara Falls, have combined sewer systems. In contrast, most outlying suburban areas utilize separate storm and sanitary sewers.

During rain events in a combined sewer system, water from streets, roofs, and lawns flows into storm drains and combines with sewage in one system. When there is heavy rainfall, the volume of water overwhelms the system and overflows into local waterways by design. These overflows are referred to as combined sewer overflows (CSOs). These overflows contain not only stormwater, but untreated human waste, toxins, and debris. When improperly maintained, septic systems have the potential to discharge bacteria and pathogens into area waters.

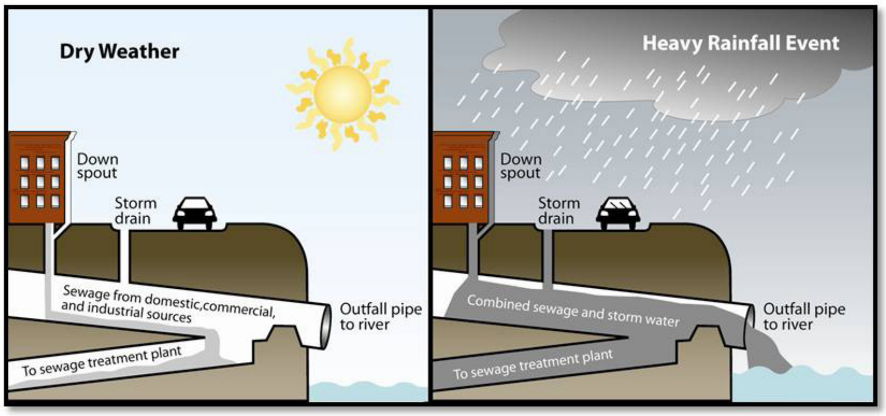


Image: USEPA

Sampling & Results

Buffalo Niagara Waterkeeper staff and mentorship students from the Young Environmental Leaders Program (YELP) sampled water quality along the Buffalo River and neighboring waterways during the summer of 2019. Samples were analyzed for *E. coli* bacteria. The presence of CSOs at or near the sampling sites provided the opportunity to educate the YELP students about the workings of a combined sewer system and the threats they pose to the natural environment.

Results were compared to the USEPA's Beach Action Value (BAV) of 235 cfu/100mL. This value is often used for making beach notification decisions. As seen in the figure to the right, high levels of *E. coli* were recorded in Buffalo waterways throughout the summer, resulting in unsafe water recreation conditions.

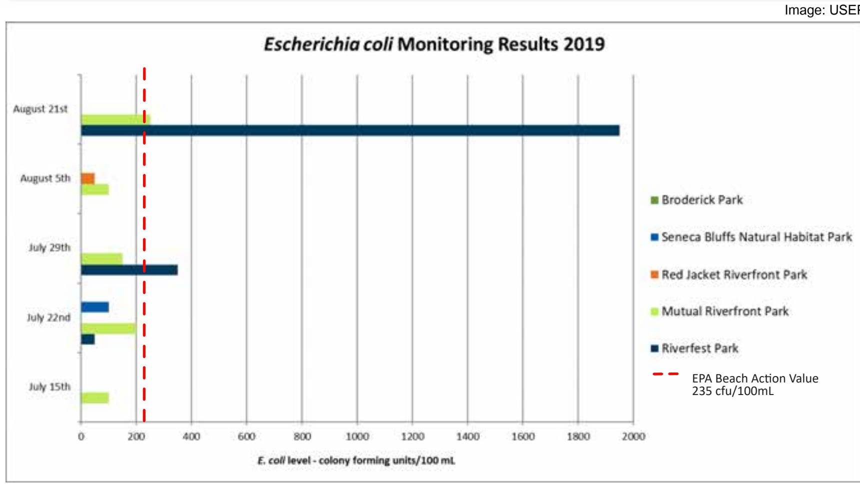
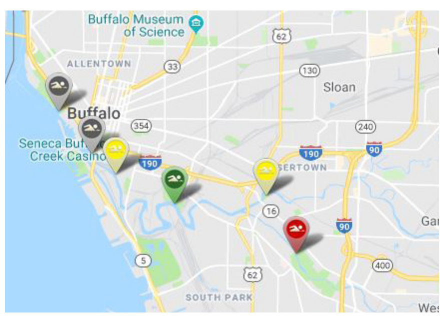


Figure 1: *Escherichia coli* results from YELP sampling locations in comparison to the EPA BAV

These results were then uploaded to Swim Guide, a website and app that presents free water quality information for over 7,000 possible swimming locations in multiple countries. While the YELP sampling locations are not regulated swimming beaches, citizens are commonly observed recreating and contacting the water.



Map 7: Visual Display of Swim Guide

Download the Swim Guide App!

More about YELP

Visit: bnwaterkeeper.org/programs/yelp

Students selected for the 2019 mentorship included Sakib Kutub of The International Preparatory School and Rihdika Aourph and Than Htat Oo of Leonardo da Vinci.

HARMFUL ALGAL BLOOMS (HABs)

What is a Harmful Algal Bloom?

A Harmful Algal Bloom (HAB) contains organisms that can produce toxins. Most algae are harmless and are components of a healthy aquatic ecosystem. The most accurate name for these blooms in Western New York are **Cyanobacteria Blooms**. Cyanobacteria are a phylum of bacteria and are aquatic and photosynthetic. The most widespread cyanobacterial toxin is **microsystin**.

What Causes Harmful Algal Blooms?

HABs are likely to occur in slow moving water with excess nutrients like nitrogen and phosphorus. Warm temperatures and abundant sunlight also create ideal conditions for blooms. HABs are more likely to occur with our changing global climate.

What is the Health Risk?

HABs are harmful to people and animals. Symptoms coinciding with contact of HABs include stomach, skin, eye, and throat irritation, allergic reactions or breathing difficulties. If you think you're experiencing health risks associated with a HAB, consider visiting a healthcare professional. Pets should not enter water with a suspected HAB. Dogs and livestock that swim or drink water that contains microsystin and other cyanotoxins can become severly ill or die. Even after visible blooms subside, the toxins may still be present in the water.

Blooms in Lake Erie and Western New York Waterways

HABs have become prevelant in the western basin of Lake Erie in recent years. During the summer of 2019 there were several HABs reported at Presque Isle State Park, located along the Lake Erie coast in Pennsylvania. For additional information including forecast models visit:
www.glerl.noaa.gov/res/HABs_and_Hypoxia/

The NYSDEC HABs Program documents blooms into 3 categories:

Suspicious

DEC staff determined that conditions fit the description of a cyanobacteria HAB based on visual observations and/or digital photographs.

Confirmed

Water sampling results have confirmed the presence of a cyanobacteria HAB which may produce toxins or other harmful compounds.

Confirmed with High Toxins

Water sampling results confirmed that there were toxins present in quantities to potentially cause health effects if people or animals came in contact with the water.

Buffalo Niagara Waterkeeper staff respond to HAB reports made by Riverwatch Volunteers throughout the year. A water sample may be collected by trained staff if deemed necessary. Sample results are then forwarded to the NYSDEC for confirmation. The following waterbodies in the Niagara River Watershed were documented with blooms in 2019.

Hyde Park Lake, Niagara Falls

In June of 2018 there was a 'Confirmed' HAB in Hyde Park Lake in Niagara Falls, NY. Waterkeeper staff and Riverwatch volunteers kept a close eye on this waterway in 2019 and observed another HAB in October, showing that these blooms can occur in the fall season. This 2019 bloom was deemed 'Suspicious' by the NYSDEC.

Beth Pond, Tifft Nature Preserve

In October, Waterkeeper staff observed a HAB at Tifft Nature Preserve. This bloom was deemed 'Suspicious' by the NYSDEC.

Ellicott Creek, Tonawanda

A suspected bloom was reported to Waterkeeper along Ellicott Creek near Ellicott Creek Park in Tonawanda. After further investigation this bloom was identified as a Euglena Bloom. This type of bloom is not considered a HAB by the NYSDEC.

Report a HAB

To report the bloom to NYSDEC fill out and submit a Suspicious Algal Bloom Report Form. Visit their webpage:

www.dec.ny.gov/chemical/77118.html

For additional information visit:

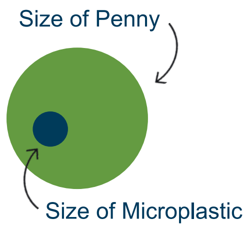
bnwaterkeeper.org/harmful-algal-bloom/

MICROPLASTICS SAMPLING

Tiny plastic pieces create big problems for aquatic ecosystems

What is Plastic?

Found in many forms in our everyday life, plastic is a lightweight, durable material that can be made into almost anything. Plastics are polymers, which are modeled after naturally occurring polymers like in hair, skin, and DNA. Most plastic is made of synthetic polymers derived from fossil fuels, a non-renewable resource.



Plastics degrade over time. This process is accelerated when the plastic is exposed to heat, light, chemicals or natural processes. Chemical additives are often mixed into the plastic polymer to slow this breakdown. These additives are not chemically bound to the polymer and they can leach out into the environment in certain conditions.

More Plastic, More Pollution

Plastic use and production has increased over time, specifically in the Post-World War II era with increased consumerism and the mass production of goods. In an article published by Science Advances, researchers found that by 2015, humans had generated 8.3 billion metric tons of plastics.[1] Of that staggering amount, 6.3 billion tons had already become waste. Only a small percentage of this plastic waste is recycled, and many items find their way into water resources. The negative impacts can be seen worldwide, with numerous species of birds, turtles, and fish becoming entangled in or ingesting plastic material. Often, the plastics being ingested are tiny microplastics, smaller than 5mm in length. Recent studies have estimated that microplastics make up approximately 90% of plastic pollution in marine environments.[2]

Sampling Local Waterways

Waterkeeper developed a pilot program in 2018 to monitor for the presence of microplastics in the Niagara River Watershed while engaging and educating local community members about this emerging contaminant. This program continued into 2019, working in partnership with Labatt USA. The following waterways were sampled from May-September to test for the presence or absence of microplastics: Niagara River, Buffalo River, Scajaquada Creek, Ellicott Creek, Cazenovia Creek, Black Rock Canal, and the Outer Harbor. Both in-water and shoreline sampling were conducted. Any microplastics found were sorted into 5 main categories: **Fragment, Pellet, Fiber/Line, Film, Foam.** A lab analysis of samples collected was not completed, and therefore any microplastics undetectable to the naked eye were not accounted for.

Sampling Partner:

Results

During the 2019 sampling season volunteers conducted 22 microplastic sampling events. Data collected was also submitted to **The Big Microplastic Survey**, a collaborative citizen science program with participants worldwide. For more information visit: https://microplasticsurvey.org/

The majority of microplastics collected during the 2019 season were from the mouth of Scajaquada Creek. This was also the same finding for the 2018 sampling season. Over the past 100 years, Scajaquada Creek has become highly impaired due to land use changes and development, urban pollution, and other human-related disturbances. Over time, stormwater runoff, combined sewer overflows and littering has created an unhealthy waterway for both people and wildlife. Scajaquada Creek has a federal designation as a “source area” of contaminants to the Niagara River. The Great Lakes system, which includes the Niagara River, provides drinking water for nearly 40 million people, including nearly 1 million residents here in Western New York.[3]

To protect our water resources, wildlife and human health, the production of plastics intended for wasteful single-use applications must be reduced.

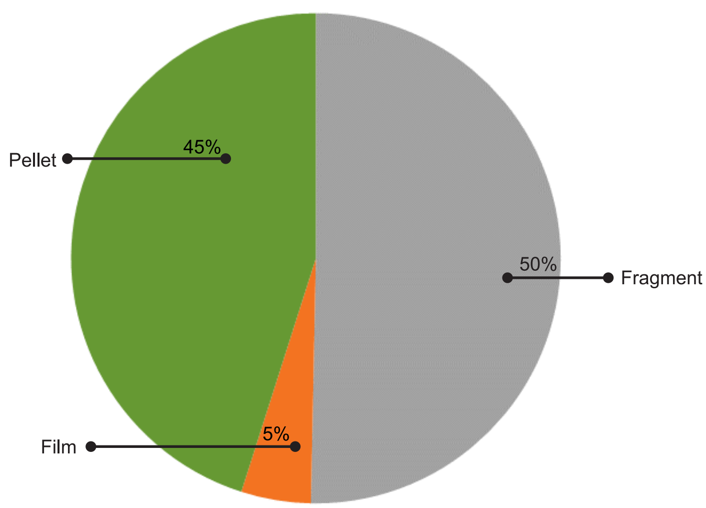


Figure 2: Microplastics Collected by Type in Sampled Waterways

1 https://advances.sciencemag.org/content/3/7/e1700782
2 https://www.epa.gov/trash-free-waters/toxicological-threats-plastic
3 https://www.epa.gov/greatlakes/facts-and-figures-about-great-lakes

RESTORATION PROJECT HIGHLIGHT

Spicer Creek at River Oaks Golf Club: Reducing nonpoint source pollution through shoreline restoration

Waterkeeper is focused on taking a holistic approach to revitalize waterways throughout the Niagara River Watershed to improve water quality and ecological conditions. This work is done through the implementation of restoration projects and innovative design-managment strategies. One example is the Spicer Creek Restoration Project.

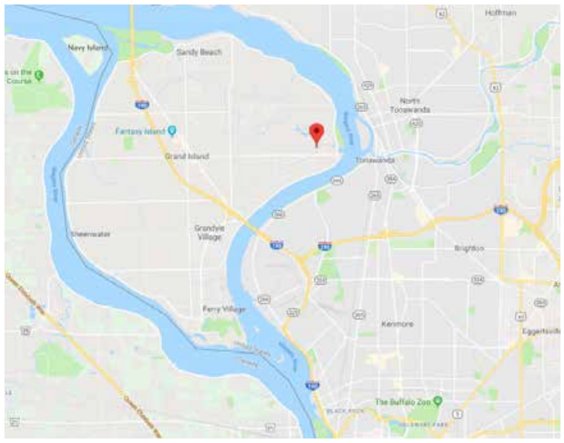
Spicer Creek, a major tributary to the Niagara River, is located on the eastern side of Grand Island, NY. Spicer Creek has undergone major modifications in the past several decades from anthropogenic changes like development and channel alterations.

Work took place along a 2,500-foot stretch of creek to address:

- Elevated sedimentation
- Nutrient loading
- Non-point source pollution
- Low quality fish and wildlife habitat
- Stream bank collapse and erosion

Restoration measures and Best Management Practices utilized included:

- Shoreline regrading
- Floodplain expansion
- Replanting of upland and in-water vegetation
- Bioengineered erosion control features
- Existing material reuse
- Invasive plant species removal



Map 8: Spicer Creek project location on Grand Island, NY

Through the reduction in nonpoint source pollution, this project also supports ongoing restoration efforts downstream in the Niagara River. Collectively these efforts generate more widespread and sustainable improvements to benefit Spicer Creek, the Niagara River, and the larger Great Lakes system.

BEFORE: Runoff and snowmelt from the golf course flowed directly down into Spicer Creek

AFTER: Step-pools and check dams were created to slow runoff and capture excess sediment

BEFORE: Runoff flowed down steep, slumping slopes

AFTER: Shoreline regrading and a submerged stone sill help to stabilize the bank and create ideal conditions for in-water marsh plants.

This project is funded through the EPA Great Lakes Restoration Initiative.

SOLUTIONS TO ONGOING POLLUTION

You can help reduce stormwater and sewage pollution!

Below are three different green or living infrastructure solutions you can apply at your home to reduce stormwater runoff.

Downspout Disconnection

Downspouts on many homes are connected directly to the sewer system, contributing to sewer overflows. By disconnecting downspouts from the sewer system, water is able to drain to lawns or gardens, thereby allowing water to soak slowly into the ground as plants and soils filter out pollutants.

Rain Barrels

Rain barrels are containers that collect and store rain water for future uses (like watering a garden) while decreasing the amount of stormwater runoff that leaves your property. A rain barrel is placed under the downspout to channel rainwater into the barrel for later use. You can purchase one at our office or at various events we attend during the year! Learn more:
bnwaterkeeper.org/programs/rainbarrels/

Rain Gardens

A rain garden is a planted depression that allows rainwater runoff from impervious urban areas like roofs, driveways, walkways, and compacted lawns to be absorbed. This reduces rain runoff by allowing stormwater to soak into the ground. Need design inspiration or plant ideas? Find our Native Plant Guide at our office or online at:
bnwaterkeeper.org/nativeplantguide

PREVENT POLLUTION WITH BUFFALO NIAGARA WATERKEEPER

Waterkeeper hosts various volunteer events to clean up local waterways and prevent pollution.

For additional information on these events and our other programs, please visit our website - bnwaterkeeper.org

Shoreline Cleanups

The Spring Shoreline Sweep is the largest single day shoreline cleanup in Western New York. Targeting shoreline sites, thousands of volunteers come out to engage in direct action that makes our community a better place and reconnects the public with the region's most valued asset - our water.

On-Water Cleanups

Waterkeeper will be hosting several on-water cleanups in the 2020 water season. Volunteers will learn kayaking safety basics and be provided all supplies needed for cleanup. Check the schedule and be sure to reserve your spot! Learn more: bnwaterkeeper.org/tours/

Restore Corps

Learn the proper way to plant native trees and shrubs while helping reduce stormwater runoff from entering local waterways. These plants also absorb excess nutrients, stop litter from blowing directly into the water, and provide habitat for wildlife! Check the schedule events:
bnwaterkeeper.org/programs/restorecorps/

Buffalo Niagara Waterkeeper protects and restores our water and surrounding ecosystems for the benefit of current and future generations.

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