BUFFALO NIAGARA WATERKEEPER®

## 2020 RIVERWATCH CITIZEN SCIENCE

# WATER QUALITY REPORT

Cover Image: Solitary Sandpiper
Image Credit: Bev 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, restoration projects throughout Western New York, and educational outreach. 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. Waterkeeper recognizes the many barriers for full community participation in environmental volunteer programs and is working to reduce these barriers in our programming, including Riverwatch. Look on our Riverwatch webpage for 2021 program updates.

# 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:

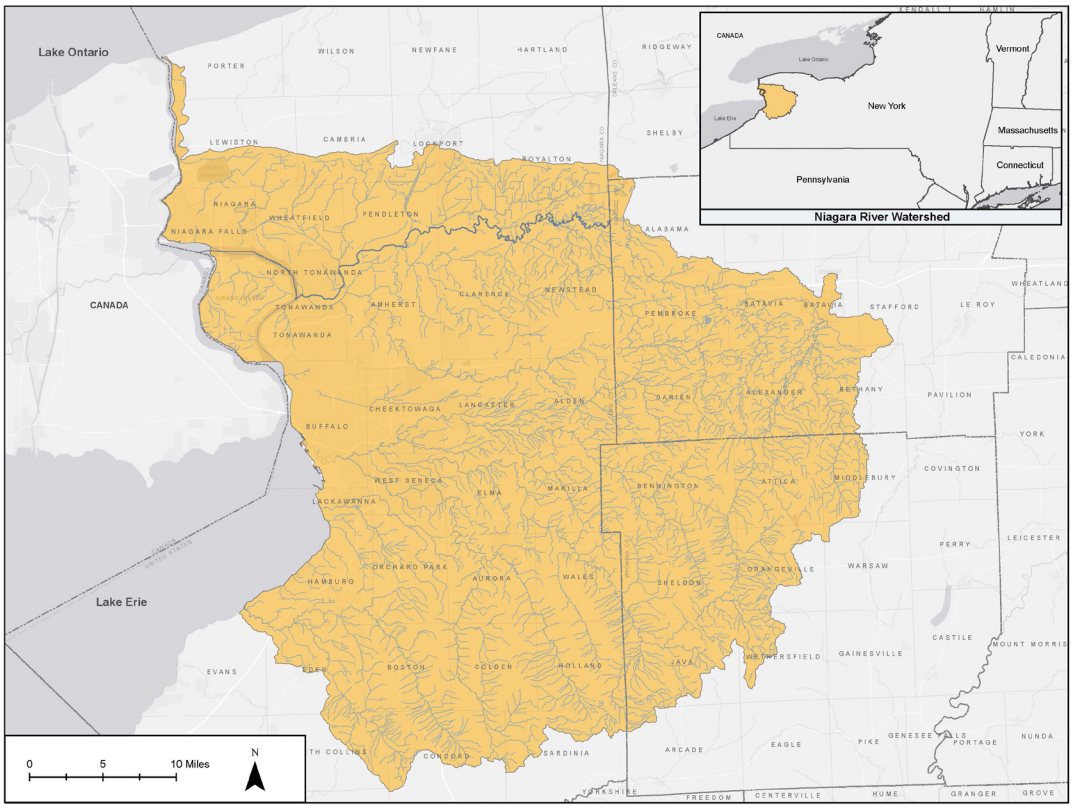
**903,305** acres of land

**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 hydrologic 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); Middle - B ; Length: Lower - 13.5 miles; Middle - 116.6 miles
**Water Quality Issues:** Aquatic life and recreation are stressed by known pathogen pollution and suspected nutrient, silt, and sediment pollution. Sources include sanitary discharges and suspected and streambank erosion.

## *Buffalo Creek Sub-watershed*

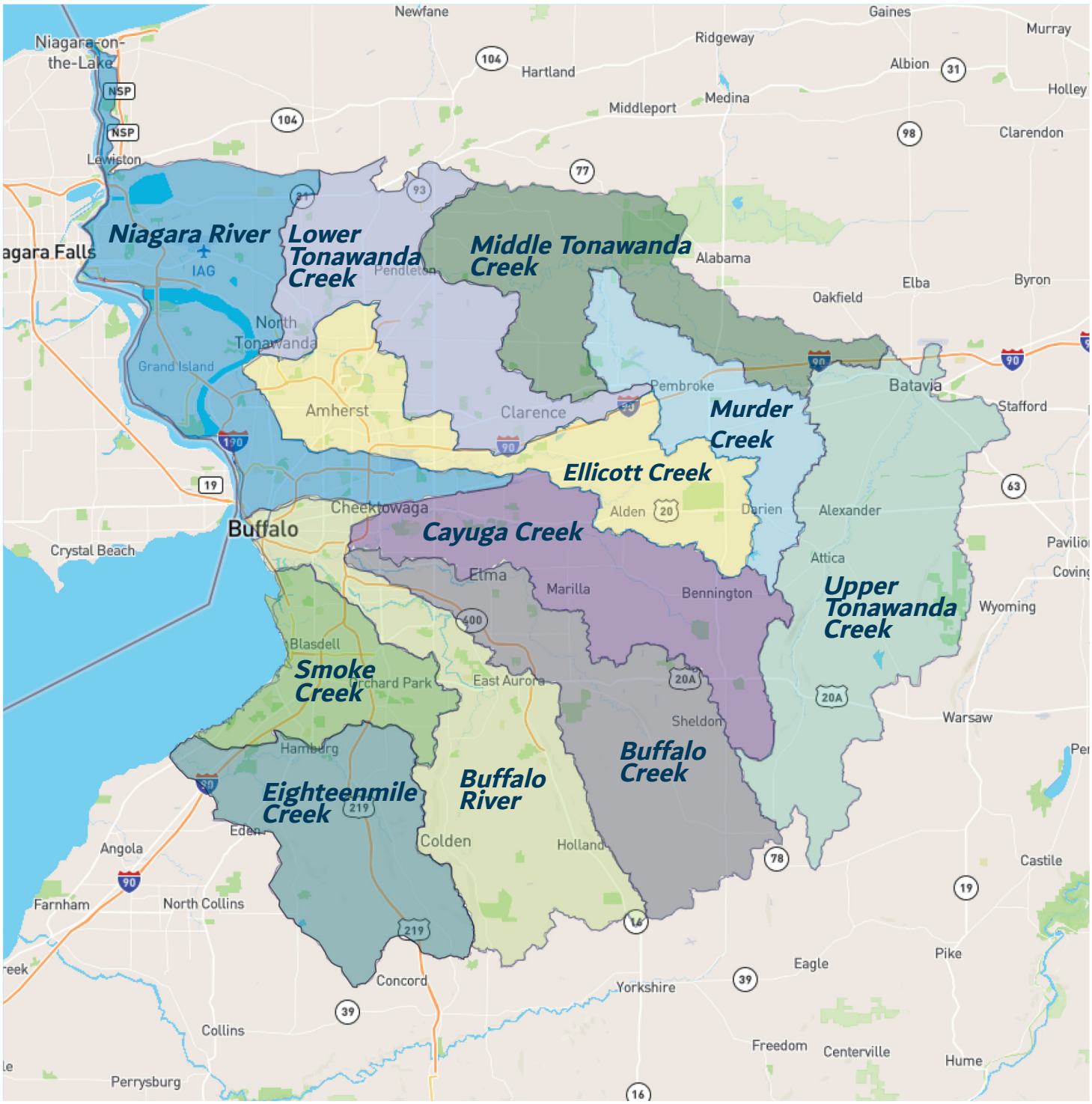
### Buffalo Creek
Stream Class: Lower - B (mouth to E. Elma) ; Upper - A (E. Elma and upstream)
Length: Lower - 63.5 miles; Upper - 285.1 miles
**Water Quality Issues:** Aquatic life and recreation in the lower stretch are stressed by known silt/sediment pollution from stream bank erosion and urban stormwater 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

Stream Class: Lower - C ; South Branch Lower - C ; Length: Lower - 7.2 miles; South Branch - 27.2

**Water Quality Issues:** Urban stormwater runoff pollution elevates nutrient and sediment loads resulting in impaired/stressed aquatic life. Hydrologic modification in the main branch also impacts the creek.

## *Eighteenmile Creek Sub-watershed*

### Eighteenmile Creek

Stream Class: Lower - B(T); Middle - A ; Length: Lower - 20.8 miles; Middle - 49.5 miles

**Water Quality Issues:** In the lower stretch fish consumption, recreation, and fishery habitat are stressed by streambank erosion, stormwater runoff, agriculture, hydrologic modification, and toxic contaminated sediment. There are no known impacts listed for the middle stretch.

# 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:

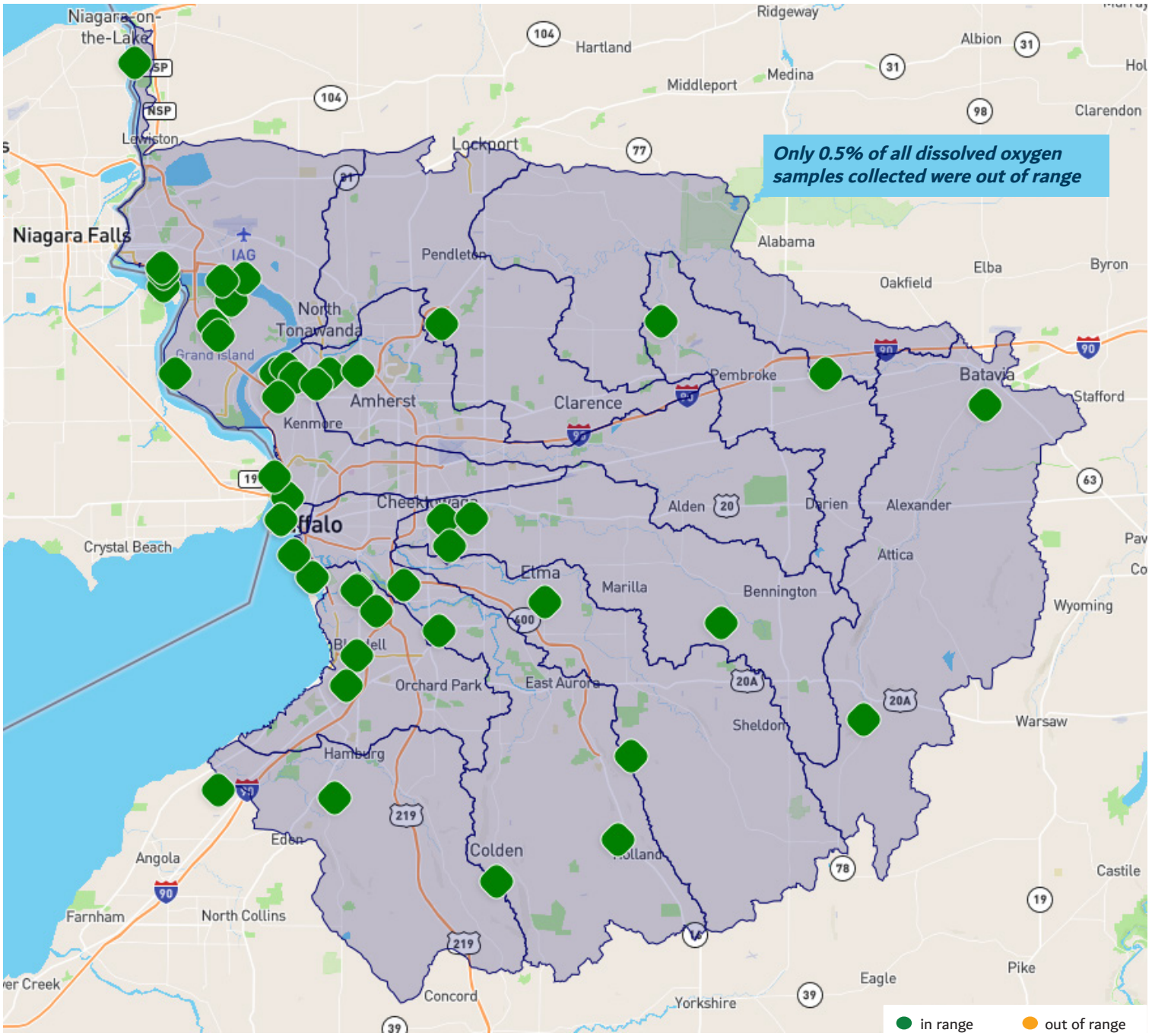
| Parameter | Standard |
|---|---|
| Dissolved Oxygen | No less than 6.0 mg/L for Niagara River<br>No less than 4.0 mg/L for all other streams |
| Conductivity[1] | Between 150 and 500 µS/cm |
| pH | Between 6.5 and 8.5 |
| Turbidity | No more than 5.0 NTU |

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 data collected by Riverwatch Volunteers in an interactive format , visit bnwaterkeeper.org/water-quality-testing/

# DISSOLVED OXYGEN RESULTS COMPARED TO STANDARDS



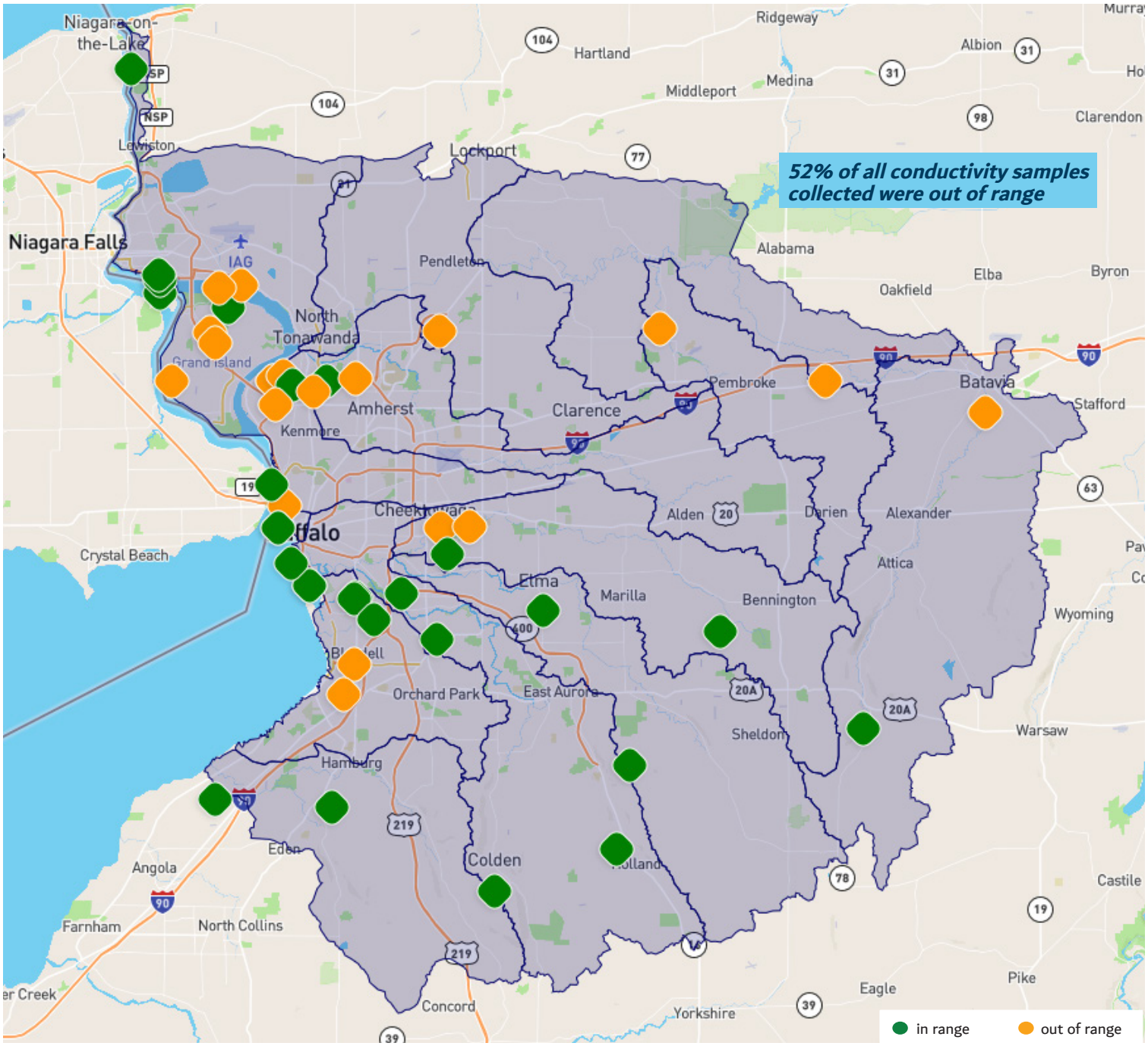

Map 3: Average Dissolved Oxygen Sample Results Compared to Standard


Green Frog


Akron Falls


Buffalo River

# CONDUCTIVITY RESULTS COMPARED TO STANDARDS



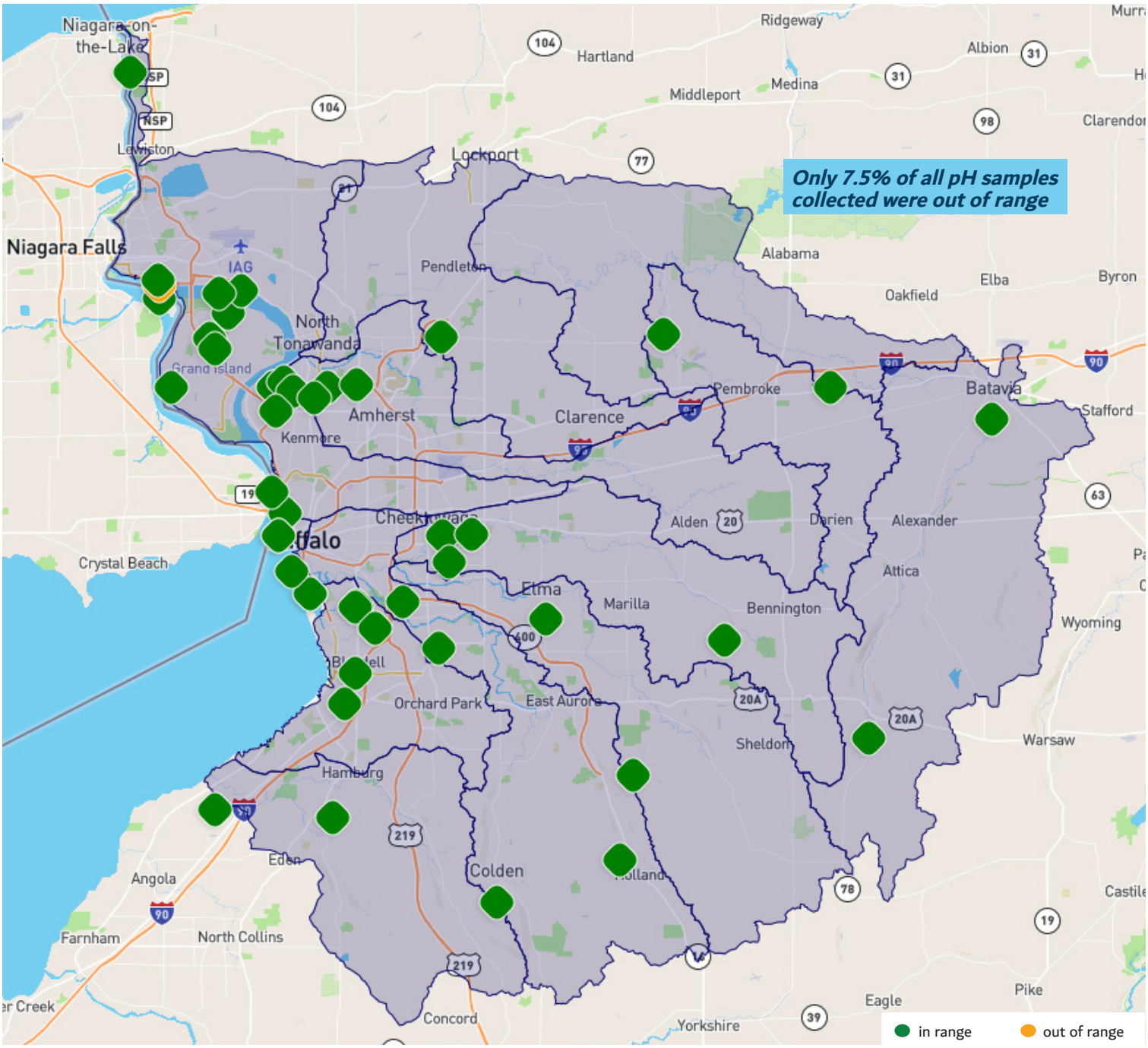

Map 4: Average Conductivity Sample Results Compared to Standard


Tonawanda Creek


Common Mergansers


Black Rock Canal

# pH RESULTS COMPARED TO STANDARDS



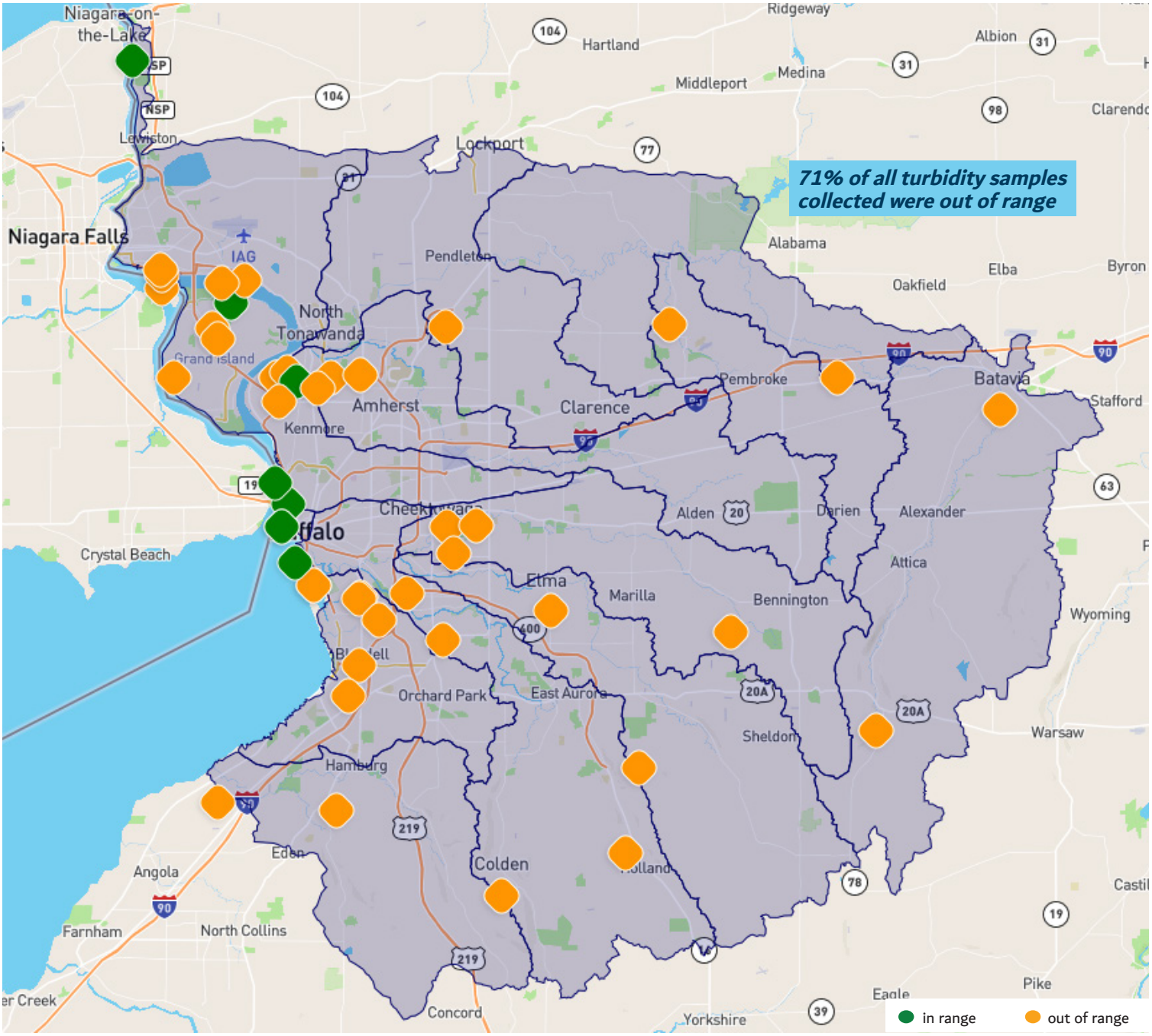

Map 5: Average pH Sample Results Compared to Standard


Painted Turtle


Headwater Stream


Scajaquada Creek

# TURBIDITY RESULTS COMPARED TO STANDARDS




Map 6: Average Turbidity Sample Results Compared to Standard

Mouth of Buffalo River
Photo Credit: Larry Cobado

Ellicott Creek

Bergholtz Creek

# BACTERIA SAMPLING

## Bacteria Basics

Bacteria are single-celled organisms 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.

## 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.

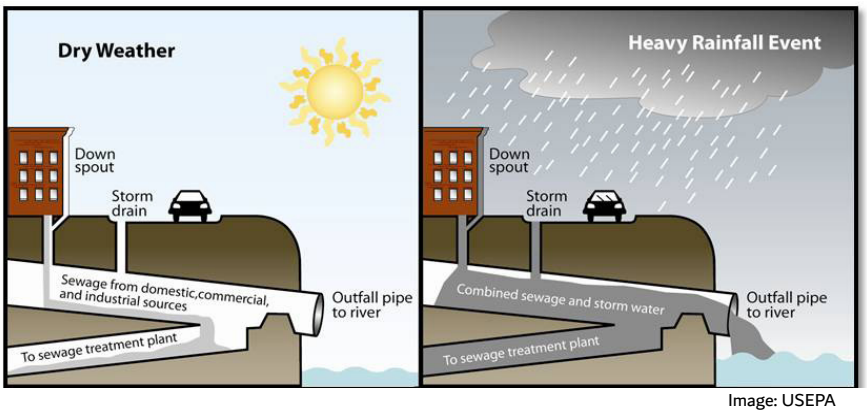



Image: USEPA

## Sampling & Results

Waterkeeper staff sampled 10 sites during 2020 between the months of May and September. Some sites were not sampled each month due to access issues. Samples were analyzed for *E. coli* bacteria. Locations were selected based on the presence of combined sewer outfall pipes nearby or the presence of a kayak launch. Samples were collected during a dry weather period and a wet weather period.

- Dry weather period: A water sample can be collected at the sample site if there has been no rain in the past 3 days.
- Wet weather period: A water sample can be collected at the sample site during a rain event or immediately after a rain event. A qualifying rain event is 5 hours of rain OR ½ inch of rain at the sample site.

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 (i.e, closures or advisories). As seen in the figures below, higher levels of *E. coli* we recorded during wet weather periods versus dry weather periods. Caution should be made when recreating in local waterways during or soon after wet weather periods. These results were uploaded to Swim Guide, a website and app that presents free water quality information for over 7,000 possible swimming and water recreation locations in multiple countries.

In the figures below, the results of 6 sample sites are highlighted. Sample sites are indicated on the X axis and are represented by a number. The chart to the left displays the correlating sample location.

Site Names & Numbers

| | |
|---|---|
| 1 | Cazenovia Creek @ Southside Pkwy |
| 2 | Ellicott Creek @ Niagara Falls Blvd |
| 3 | Hyde Park Lake |
| 4 | Buffalo River @ Mutual Riverfront Park |
| 5 | Buffalo River @ Riverworks |
| 6 | Scajaquada Creek @ West Ave |

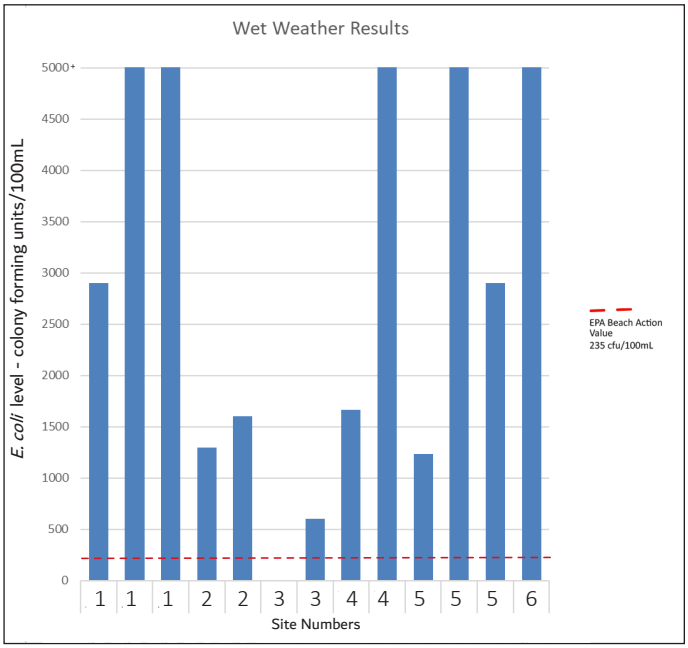



Figure 1: *Escherichia coli* wet weather results in comparison to the EPA BAV

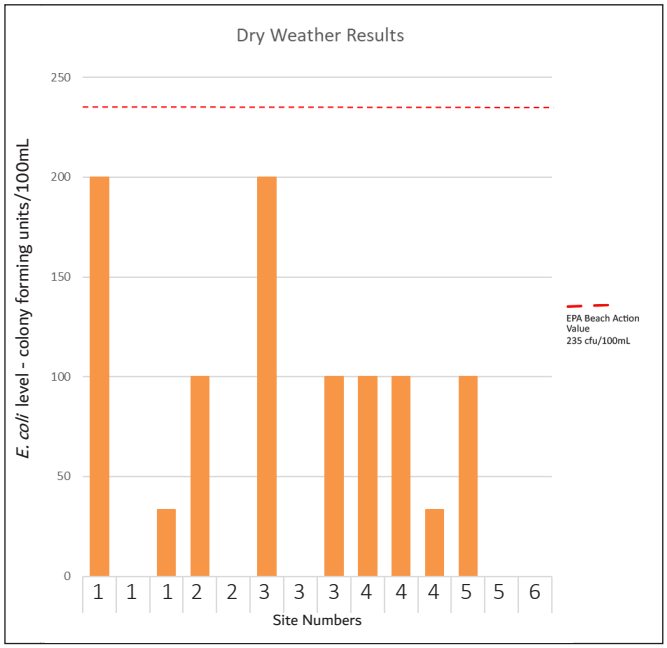



Figure 2: *Escherichia coli* dry weather results in comparison to the EPA BAV

# 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 severely 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 Waters

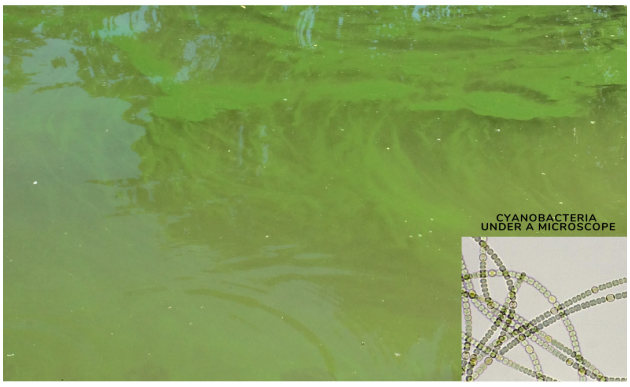
HABs have become prevalent in the western basin of Lake Erie in recent years. During the summer of 2020 there were several HABs reported at Presque Isle State Park, located along the Lake Erie coast in Pennsylvania. For additional information including forecast models visit:
**www.glerl.noaa.gov/res/HABs_and_Hypoxia/**

The NYSDEC HABs Program documents blooms into 3 categories:

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

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

**3) 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.




**Cyanobacteria Bloom** - In New York State these blooms are classified as Harmful Algal Blooms


**Euglena Bloom** - In New York State these blooms are **NOT** classified as Harmful Algal Blooms

### 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/**

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. Some inland waterways experience **euglena blooms**, which are not considered a Harmful Algal Bloom in the NYSDEC HABS Program. Euglena are single-celled flagellated microorganisms that feature both plant and animal characteristics. Some species of Euglena are known to produce ichthyotoxins. To the bare eye, euglena blooms and cyanobacteria blooms look very similar. The difference is obvious when looking at a sample under a microscope.

The following waterbodies in the Niagara River Watershed were documented with blooms in 2020.

- **Hyde Park Lake, Niagara Falls** Waterkeeper staff and Riverwatch volunteers have been keeping a close eye on this waterway as it has experienced a HAB for several years. In 2020 there were 3 separate reports all confirmed by NYSDEC.
- **Green Lake** This lake, located in Orchard Park adjacent to Yates Park had a confirmed bloom in 2020.
- **Ellicott Creek** Waterkeeper staff and Riverwatch volunteers have been keeping a close eye on this waterway as it experienced frequent and persistent euglena blooms throughout the summer and fall. This type of bloom is not considered a HAB by the NYSDEC.
- **Tonawanda Creek** This waterway also experienced frequent euglena blooms near the Ellicott Creek Bark Park.
- **Ransom Creek** This waterway flows into Tonawanda Creek and experienced euglena blooms.

# NURDLE PATROL

## 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. There are 300 million tons of plastic produced each year, of which 91 percent is not recycled. By 2015, humans had generated 8.3 billion 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] In addition to the plastic pollution at the end of the materials life cycle, the generation of plastic materials contributes to atmospheric pollution and relies on non-renewable fossil fuels. New ethane cracker facilities and existing petrochemical plants are often located in poor, minority communities, contributing to environmental justice challenges.

### Sampling Local Waterways

Kicking off in 2018, Waterkeeper has been monitoring for the presence of microplastics in the Niagara River Watershed through the assistance of volunteers. Sampling in 2020 focused on a specific type of microplastic - nurdles.

Nurdles are plastic pellets, about the size of a lentil, that are the raw material used in the manufacturing of plastic products. Nurdles get shipped around the world via ship, train, and truck to plastic manufacturers. Nurdles have been known spill due to transport issues or escape through holes in shipping containers. The small, lightweight nurdles can then be blown by the wind or washed away down storm drains or into waterways.

Waterkeeper staff and volunteers had previously found nurdles at very limited sites throughout the Niagara River Watershed. However, in the summer of 2020 a large concentration of nurdles was found along the banks of the Niagara River in Gratwick Park in North Tonawanda. After this discovery, Waterkeeper joined a larger North American wide citizen science project known as Nurdle Patrol. To learn more about this project visit: www.nurdlepatrol.org

### Nurdle Patrol Efforts

Through Nurdle Patrol, Waterkeeper will be joining over 100 groups that are collecting and reporting nurdle data in North America. We will be training volunteers to collect nurdle data along the Niagara River and other waterway shorelines. A pilot volunteer training and collection was held in November of 2020 and additional events will occur in 2021. To date we have collected over 2,500 nurdles along the Niagara River. It is hard to know at this time *when* the nurdles were spilled or released into the environment. Through volunteer efforts Waterkeeper hopes to collect and document what is currently on site at Gratwick Park. If future concentrations of nurdles are then observed, the possibility of a recent spill is more likely.

Waterkeeper has worked with a local plastic manufacturing company and the NYSDEC to identifiy a potential nurdle spill associated with the company. As a result, the company is working cooperatively and proactively to address the issue and improve on-site operations.

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.

Nurdles and other microplastics found along the Niagara River

Nurdles are collected from the shoreline and counted

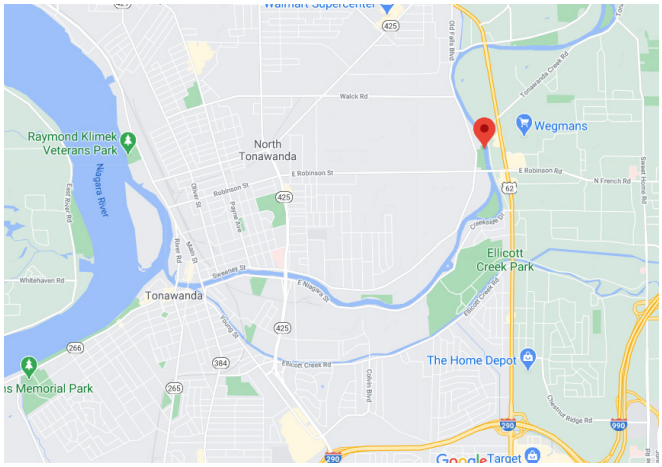
1 https://www.unenvironment.org/interactive/beat-plastic-pollution/
2 https://www.epa.gov/trash-free-waters/toxicological-threats-plastic
3 https://www.epa.gov/greatlakes/facts-and-figures-about-great-lakes

# RESTORATION PROJECT HIGHLIGHT

## North Tonawanda Botanical Garden:

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-management strategies. One example is the North Tonawanda Botanical Garden Project which is part of Waterkeeper's Living Shoreline program.

The project area is located at the North Tonawanda Botanical Garden at 1825 Sweeny St. in North Tonawanda. Waterkeeper focused on about an acre of shoreline and upland area along Tonawanda Creek. Construction began in November of 2020 and will be complete in Spring of 2021.



Map 7: North Tonawanda Botanical Garden project location

Work took place to address:

- Lack of fish spawning and resting habitats
- Lack of riparian buffer
- Stormwater runoff from parking area

Restoration measures include:

- Shoreline regrading
- Removal of a portion of an underused parking lot
- Replanting of upland and in-water vegetation
- Integration of bioswales for rainwater collection and filtration
- Habitat enhancements including in-water habitat logs

While this project aims to restore the shoreline to be more resilient and self sustaining, reduce nonpoint source pollution, and create wildlife habitat, the project also supports the improvement of public access and educational opportunities through a partnership with the North Tonawanda Botanical Garden Organization and the City of North Tonawanda.

Learn more about this project at: bnwaterkeeper.org/projects/livingshorelines/north-tonawanda-botanical-garden/


BEFORE: Lawn mowed to creek edge and is lacking valuable fish and wildlife habitat.


MID CONSTRUCTION: Shoreline is regraded to create a wetland cove - including new wildlife habitat enhancements. Plantings will be added in Spring of 2021.

*This project is funded through the New York Power Authority Greenway Ecological Fund*

# 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

### Cleanup Programs

Targeting shoreline sites, thousands of volunteers come out each year to engage in direct action by picking up litter and other debris. These volunteer efforts make 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 2021 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/

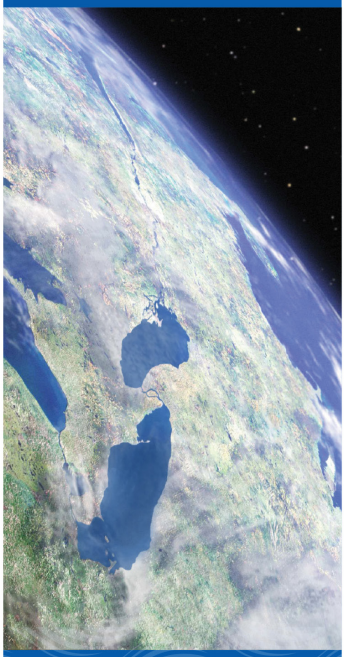
### Restore Corps

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 of events: bnwaterkeeper.org/programs/restorecorps/

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

BUFFALO NIAGARA WATERKEEPER®

PROTECT • RESTORE • CONNECT • INSPIRE



We **PROTECT** clean water.

We **RESTORE** the health of ecosystems.

We **CONNECT** people to the water.

We **INSPIRE** economic growth and community engagement.

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