BUFFALO NIAGARA WATERKEEPER®

Cover Image: Beverly Seyler

2017

RIVERWATCH CITIZEN SCIENCE

Water Quality Report

721 Main Street
Buffalo New York, 14203

www.BNWaterkeeper.org

716.852.7483

@BNWaterkeeper

HOW TO USE THIS REPORT

This report can be used as an educational tool to learn about water quality in the Western New York Region. Also included in the report is information regarding the Buffalo Niagara Waterkeeper (BNW) Young Environmental Leaders Program (YELP), ongoing and emerging sources of pollution, solutions to ongoing pollution, and ways to get involved with BNW to help further our mission.

TABLE OF CONTENTS

WHAT IS RIVERWATCH?

BNW staff train concerned citizens to use high tech water quality instruments to gather important water quality data in the Niagara River Watershed. These volunteer citizen scientists conduct monitoring of waterways once a month from May to November while providing a network of "eyes on the water" to report pollution or improper land use on these waterways.

WHY DO WE COLLECT WATER QUALITY SAMPLES?

While government agencies regularly collect water quality data from a number of sites in our watershed, budget and staff limitations prevent adequate coverage of the Niagara River and its many tributaries. BNW aims to provide surveillance monitoring to bolster regional baseline water quality data. This data allows us to track the health of local waterways and determine if restoration efforts are having a positive effect on water quality.

WHAT PARAMETERS DO WE TEST FOR?

Information on our sampling protocol and raw data is available. Refer to contact information on page 4.

BNW Riverwatch Volunteers collect **Temperature, pH, Dissolved Oxygen (DO), Conductivity, Total Dissolved Solids (TDS), and Turbidity** data. For additional details about these parameters, please refer to the following page.

HOW IS THIS DATA PRESENTED IN THIS REPORT?

This report summarizes the data collected in two different ways:

1) Comparing Set Standards:

Water quality samples are compared to State water quality standards. These standards are established by our State environmental agency, the New York State Department of Environmental Conservation (NYSDEC), with oversight from the United States Environmental Protection Agency (USEPA).

Data collected in 2017 is graphed in comparison to these standards on pages 5 and 6.

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

2) Compiling a Water Quality Index:

A Water Quality Index (WQI) is a number ranging from 1 to 100; a higher number indicating better water quality. This WQI summarizes and presents complex water quality data in an easily understood format: a single number. This number expresses water quality for a specific sampling location and time period.

BNW developed a modified calculation, based on the National Sanitation Foundation's WQI calculator, to determine the WQI of sites sampled.

WQI values, which can be viewed on pages 7 and 8, were then given a letter grade A through F based on the following scale:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = 59 and below

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

WATER QUALITY PARAMETERS

Data on the following parameters was collected using a YSI Pro Plus multiparameter 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. The water temperature can be impacted by sunlight duration and intensity, and discharges entering the waterbody.

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 stream. Pollution sources can alter the waterway's pH.

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, chlorite, 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.

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, provide refuge for harmful microbes, and can clog the gills of fish and crustaceans.


Buffalo River


Eighteenmile Creek


Buffalo Creek


Smokes Creek

MEET THE RIVERWATCH TEAM

BUFFALO NIAGARA WATERKEEPER® STAFF

Staff overseeing the Riverwatch Program maintain sampling equipment, train volunteers, and coordinate sampling teams.

Chris Murawski – Director of Citizen Engagement
Wendy Paterson – Senior Community Engagement Coordinator
Liz Robbe – Senior Community Engagement Coordinator
Ron Zietz – Community Engagement Assistant

BUFFALO NIAGARA WATERKEEPER® RIVERWATCH VOLUNTEERS

Volunteers are grouped into teams based on the waterbody or Niagara River Sub-watershed sampled.

Buffalo Creek – John Sadewater, Frank Lombardo, Ron Zietz, Vicki Dymock, Minnie Ringland, Joylyn Kovatchev, Andrew Lisitsky

Buffalo River – Intefada Wardia, David Solowski, Judy Hendee, Elizabeth Mattson

Cayuga Creek (Erie County) – Ryan Marchant, Edwin Reese, Mike Conway, Brenden Conway

Cayuga Creek (Niagara County) – Edward Nickson, Brian McGowan, Brian Barrey, Thomas Heyer

Cazenovia Creek – Tim Englert, Lauren Darcy, Maegan Wettlaufer, Gail Hall

Eighteenmile Creek – Frank Balics, Mike Zarbo, William Geary, Louis Rodriguez

Ellicott Creek – Mark Casper, Brian Foley, Steve Hassett, Richard Zacher

Gill Creek – Alan Cobb, Jim & Dawn Cody, Carolyn Jordan

Grand Island – Greg Madejski, Diane Evans, Ron & Denise Rezabek

Lower Tonawanda Creek – Jude Hammer, Val Macer, Mary McNeil

Middle Tonawanda Creek – Kandy Krampitz Svec, Kate Svec, John Svec, Tayler Schweigel, Carolyn Roberts

Murder Creek – Nick Mecca, David Plaff Sr., David Plaff Jr., Cynthia Kraft

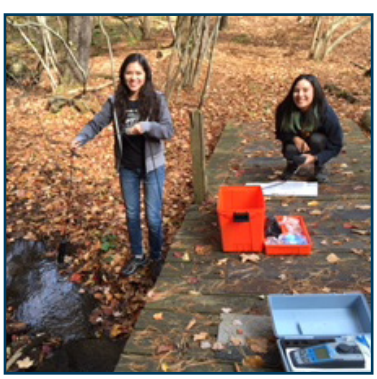
Niagara River – Jim Galbo, Michelle Johnson, Beverly Seyler, Lex Maccubbin, Jack Schweigel

Outer Harbor & Black Rock Canal – Sherrill Quinn, Joyce Ciski, Paul Jones

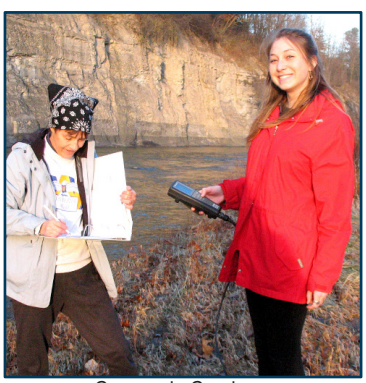
Scajaquada Creek – Elizabeth Oldfield, Timm Otterson, Shirley Burns, Tim Clancy

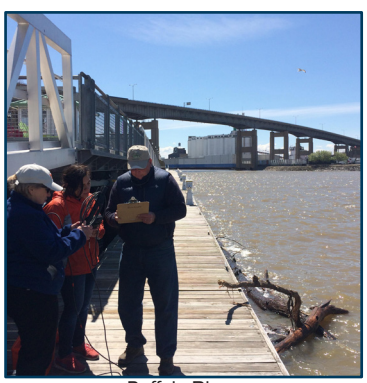
Smokes Creek – Jim Nowak, Mark Wolfling, Joe Gallagher

Ransom Creek – Jamie Harbidge, Charlie Hanlon, Sandra & Mark Lechner


Buffalo Creek


Buffalo River


Cazenovia Creek


Buffalo River

RIVERWATCH VOLUNTEER SPOTLIGHT

ELIZABETH OLDFIELD

Elizabeth completed Water Academy with Buffalo Niagara Waterkeeper in 2014 and started volunteering for Riverwatch in 2015. She has been a member of the Scajaquada Creek Team since joining Riverwatch and her experience with the program makes her an asset when helping to train new volunteers. Elizabeth has been a Site Captain in BNW's Spring Shoreline Sweep for many years and gets her daughter involved in volunteering and attending tours. She has quite a green thumb and has been establishing native species into her home garden.

Elizabeth says, "For very many years, the prevailing culture has viewed water primarily as a commodity and has gravely disrespected it. I'm encouraged by the "Swim, Drink, Fish" movement and appreciate the opportunity to support it in my community through Buffalo Niagara Waterkeeper. In recent decades, communities have achieved major milestones to clean up our waterways. Water protection must be unceasing because the commodity mentality runs very deep in our culture. However, the responsibility can be shared among many people, carried across generations, and done with respect for the water, so it doesn't have to feel like a burden! It's the least we can do for our community."

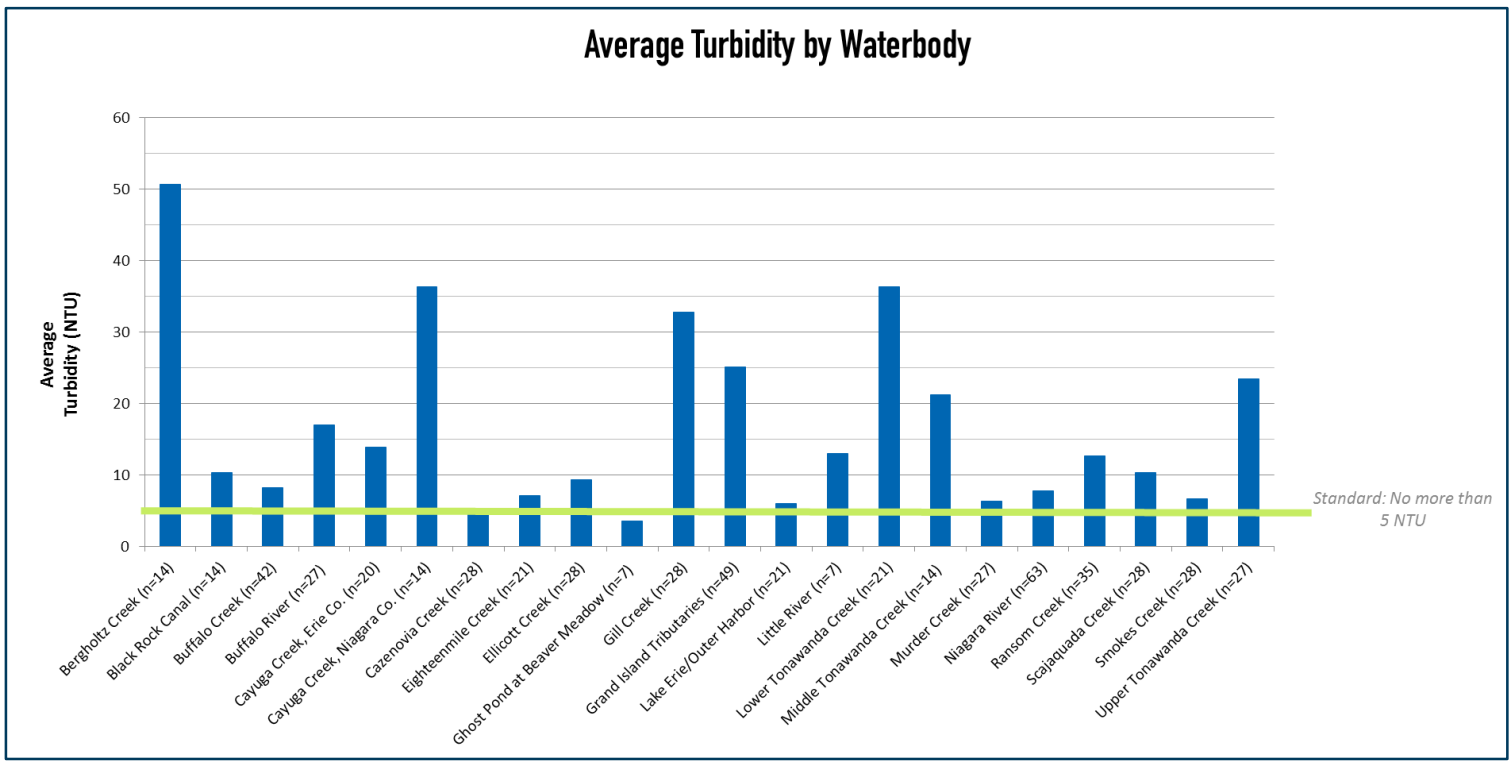
BNW is thankful to have volunteers like Elizabeth, who support our mission and give back to their community!

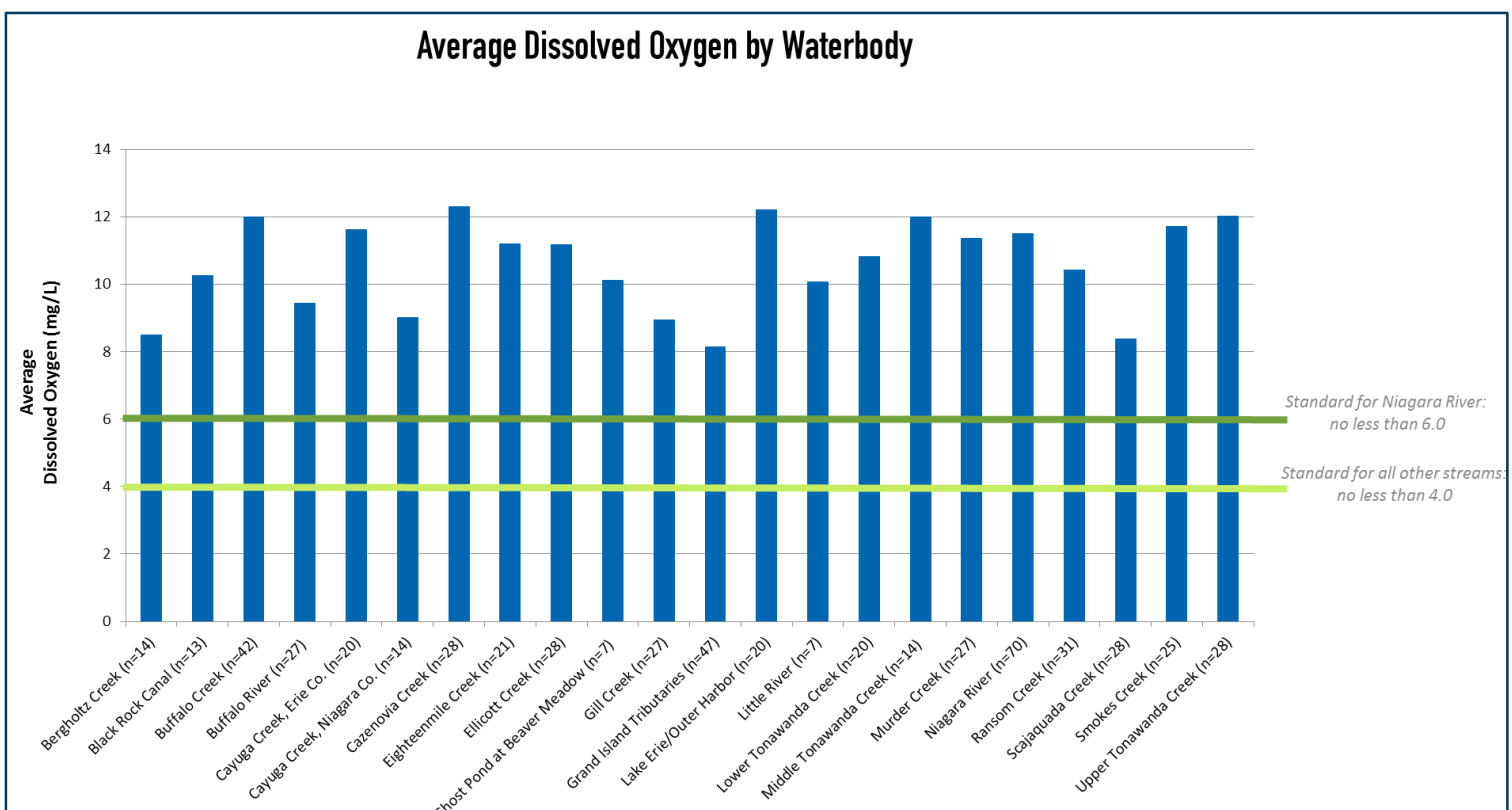
Interested in becoming a Riverwatch Volunteer?
Contact Wendy Paterson
wpaterson@bnwaterkeeper.org
(716) 852-7483 ext 26

Interested in the Riverwatch data?
Contact Elizabeth Robbe
erobbe@bnwaterkeeper.org
(716) 852-7483 ext 23

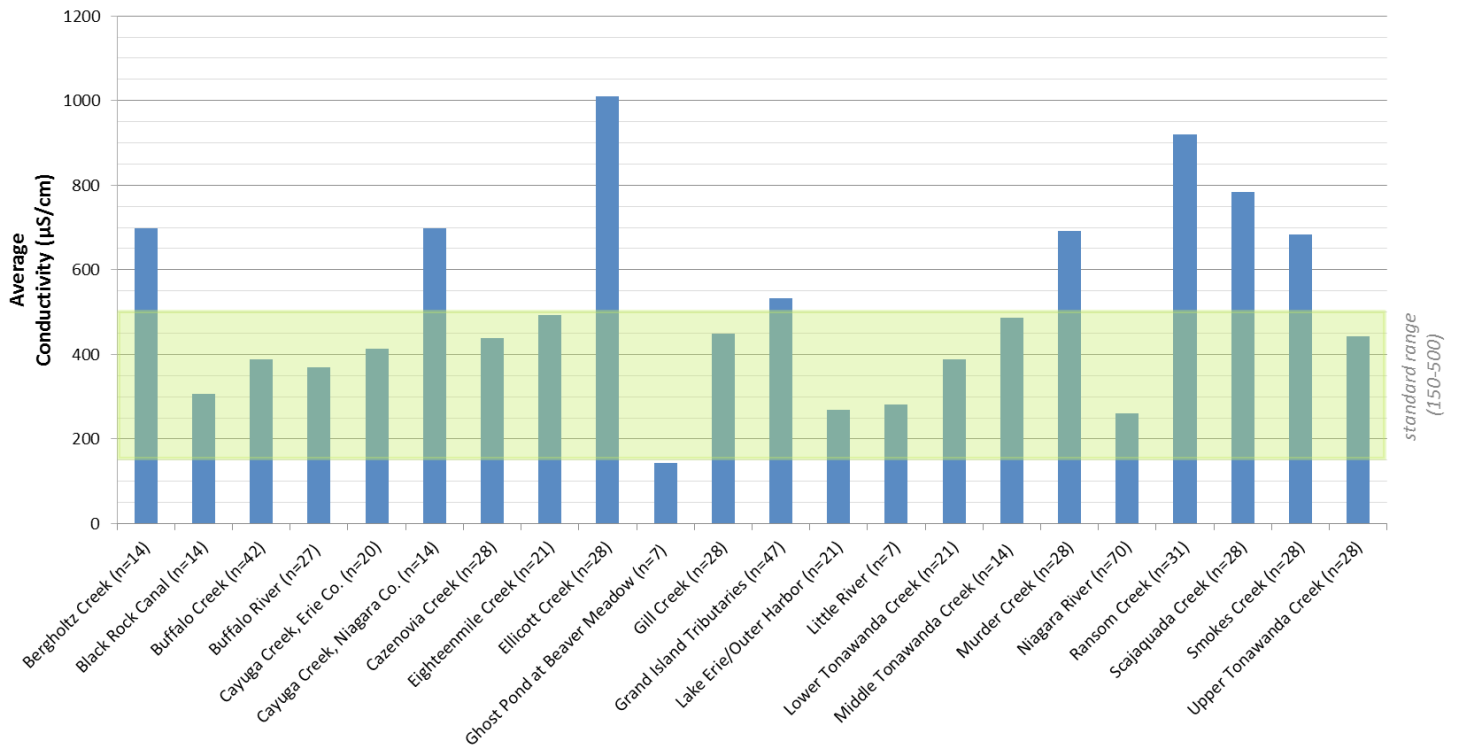
RESULTS COMPARED TO STANDARDS

For each parameter sampled, a bar graph was created presenting the average of all samples collected compared to the standard. The number of samples collected at each waterbody is listed in parenthesis. For example: (n=14) indicates 14 samples were collected.

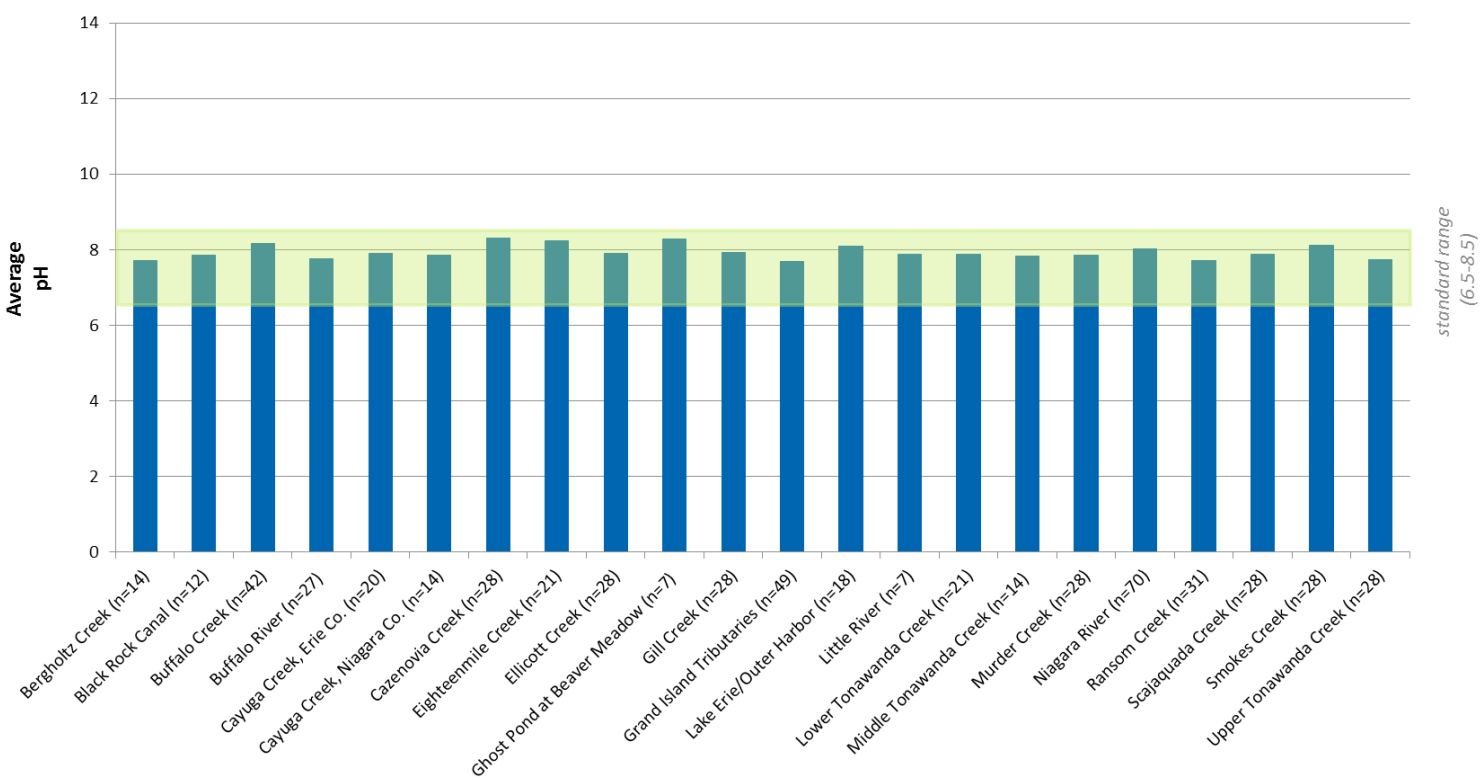




Average Conductivity by Waterbody



Average pH by Waterbody



WATER QUALITY INDEX AND MAP

Site #	Sample Site	2017 Score	2017 Grade	2016 Grade
Niagara River Sub-watershed				
1	Niagara River at Fort Niagara	83	B	B
2	Niagara River at Lewiston Docks	84	B	B
3	Niagara River at LaSalle Waterfront Park	81	B	B
4	Niagara River at Gratwick Park	81	B	B
5	Niagara River at Niawanda Park	87	B	B
6	Niagara River at Aqua Lane Park	86	B	B
7	Niagara River at Beaver Island	81	B	B
8	Niagara River at Black Rock Canal Park	87	B	B
9	Niagara River at Unity Island	86	B	*
10	Niagara River at Broderick Park	85	B	B
11	Little River at Griffon Park	NA		
12	Cayuga Creek at Military Road	74	C	C
13	Cayuga Creek at Cayuga Drive	67	D	D
14	Bergholtz Creek at Cayuga Drive	66	D	D
15	Bergholtz Creek at Williams Rd	66	D	D
16	Gill Creek at Reservoir Park	74	C	B
17	Gill Creek at Hyde Park Lake	75	C	C
18	Gill Creek at Hyde Park Lake Veterans Memorial	79	C	*
19	Gill Creek at Gill Creek Park	70	C	C
20	Scajaquada Creek at N. Creek S. Creek Drive Park	77	C	C
21	Scajaquada Creek at Cheektowaga Town Park	74	C	C
22	Scajaquada Creek at Forest Lawn Cemetery	74	C	C
23	Scajaquada Creek at West Avenue	65	D	C
24	Black Rock Canal at Rte 198	83	B	B
25	Black Rock Canal at Broderick Park	86	B	B
26	Lake Erie at LaSalle Park	84	B	B
27	Lake Erie at Erie Basin Marina	83	B	B
28	Outer Harbor at Wilkeson Pointe	84	B	*
29	Woods Creek at Buckhorn	73	C	B
30	Woods Creek at Baseline Rd	67	D	D
31	Spicer Creek at East River Rd	67	D	D
32	Spicer Creek at Whitehaven Rd	67	D	D
33	Big Six Mile Creek at Marina	NA		
34	Gun Creek at East River Rd	82	B	*
35	Gun Creek at Ransom Rd	75	C	*
Ellicott Creek Sub-watershed				
36	Ellicott Creek at Rt 425 overpass	73	C	C
37	Ellicott Creek at St Rita's Lane	76	C	C
38	Ellicott Creek at Amherst St Park	74	C	C
39	Ellicott Creek at Island Park	75	C	C
Lower Tonawanda Creek Sub-watershed				
40	Lower Tonawanda Creek at Sweeney St	75	C	B
41	Lower Tonawanda Creek at West Canal Marina	77	C	B
42	Lower Tonawanda Creek at Mouth of Ransom Creek	77	C	C
43	Ransom Creek at Hopkins St	70	C	*
44	Ransom Creek at Glen Oaks	71	C	D
45	Ransom Creek at Miles Rd	75	C	C
46	Ransom Creek at Clarence Fire Hall	75	C	*
47	Ransom Creek at Clarence Town Park	77	C	C
Middle Tonawanda Creek Sub-watershed				
48	Middle Tonawanda Creek at Airville Rd	77	C	C
49	Middle Tonawanda Creek at Rt 5	77	C	C
50	Middle Tonawanda Creek at Slusser Rd	76	C	C
Upper Tonawanda Creek Sub-watershed				
51	Upper Tonawanda Creek at Kiwanis Pk.	77	C	C
52	Upper Tonawanda Creek at 4111 South Main St	78	C	C
53	Upper Tonawanda Creek at Batavia	78	C	*
Murder Creek Sub-watershed				
54	Murder Creek at Swift Mills Rd	74	C	*
55	Murder Creek at Lewis Rd	77	C	*
56	Murder Creek at Crittenden Rd	82	B	*
57	Murder Creek at Alleghany Rd	75	C	*
Buffalo River Sub-watershed				
58	Buffalo River at Canalside	82	B	B
59	Buffalo River at Riverfest Park	81	B	B
60	Buffalo River at Red Jacket Riverfront Park	80	B	C
61	Buffalo River at Seneca Bluffs	80	B	C
62	Cazenovia Creek at Cazenovia Park	80	B	C
63	Cazenovia Creek at West Seneca Soccer Complex	79	C	C
64	Cazenovia Creek at Mill Road Park	79	C	C
65	Cazenovia Creek at Leydecker Road	80	B	C
Cayuga Creek Sub-watershed				
66	Cayuga Creek at Clinton St	80	B	C
67	Cayuga Creek at Rowley Rd	78	C	C
68	Cayuga Creek at Como Lake Park	81	B	B
Buffalo Creek Sub-watershed				
69	Buffalo Creek at Oxbow Sill	78	C	C
70	Buffalo Creek at Burchfield Nature Center	77	C	C
71	Buffalo Creek at Borden Road	79	C	C
72	Buffalo Creek at Elma Village Green	80	B	C
73	Buffalo Creek at Elma Centennial Park	81	B	C
74	Buffalo Creek at Hunters Creek County Park	82	B	C
75	Ghost Pond at Beaver Meadow	NA		
Smokes Creek Sub-watershed				
76	Smokes Creek at Rt 5	74	C	*
77	Smokes Creek at Maple St	71	C	*
78	Smokes Creek at South Shore Blvd	77	C	*
79	Smokes Creek at Fisher Rd	78	C	*
Eighteenmile Creek Sub-watershed				
80	Eighteenmile Creek at Old Lakeshore Rd	80	B	*
81	Eighteenmile Creek at South Branch Confluence	79	C	*
82	Eighteenmile Creek Gowanda State Rd	79	C	*

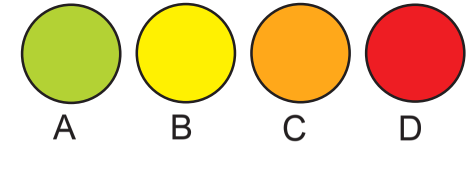
Table 1: WQI score and grade

*** Site was not tested**

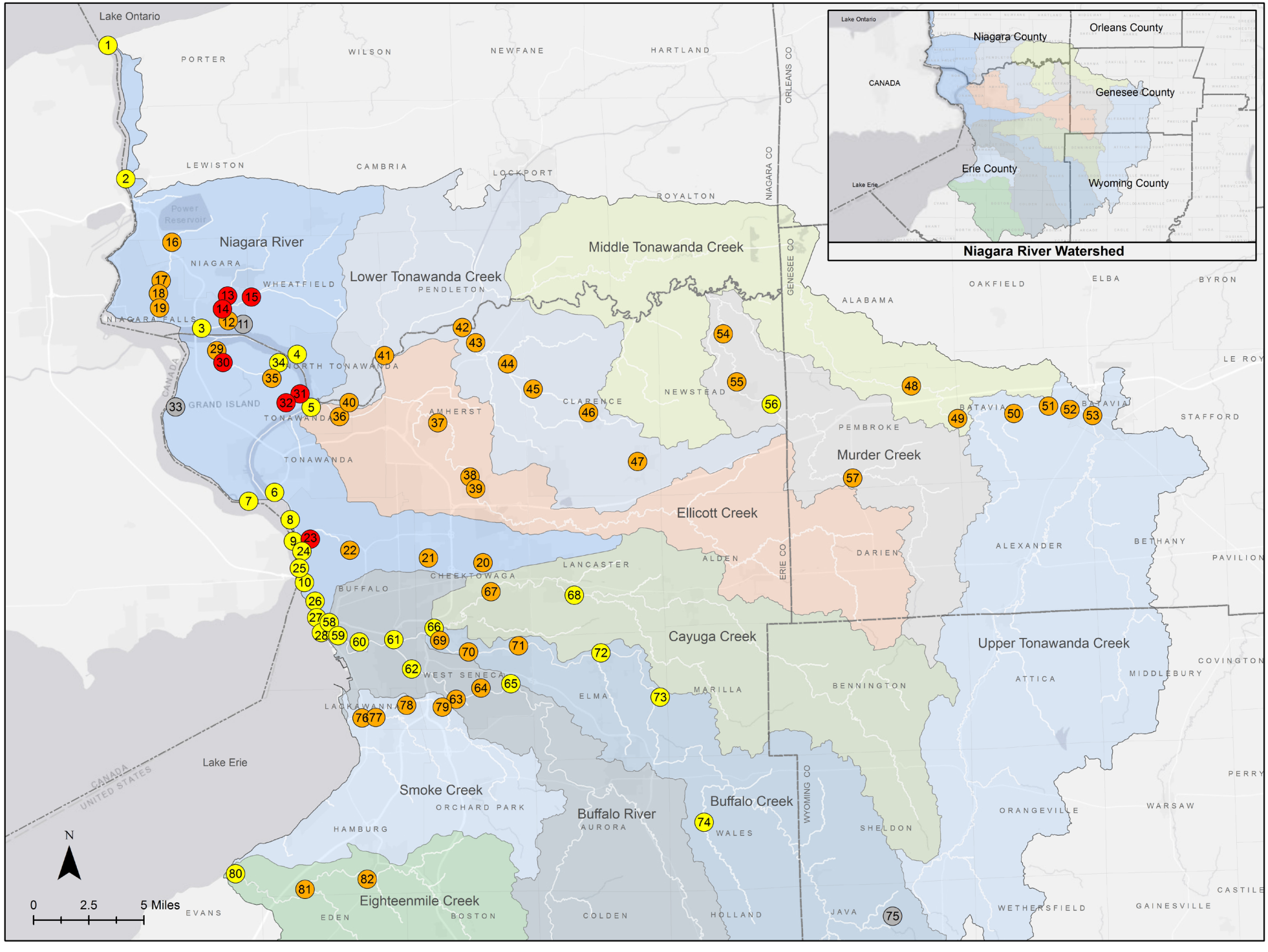
Sites listed with NA indicated no WQI score, based on quantity of data.

Data for select sites are available starting in 2011. Please view past Water Quality Reports on BNW website or contact BNW Staff listed on page 4.

Sample Site WQI Score Color Key



NOTE: No waterways received a grade A rating. Sites with a grey circle indicate no WQI score, based on quantity of data.



Map 1: Sample sites are numbered in correlation to Table 1 (above on page 7) and are color coordinated to coincide with their WQI Score.

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 USEPA. 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 for 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 intermittency 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.

On the following page the waterways sampled by Riverwatch Volunteers have been listed with their NYSDEC stream class, designated Best Uses, and water quality issues.

ABOUT THE WATERBODIES SAMPLED

Water Quality Issues listed here reference the NYSDEC's Waterbody Inventory/Priority Waterbodies List (WI/PWL). Length often includes waterbody tributaries.

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.

Buffalo Creek
Stream Class: Lower - B (mouth to E. Elma); Upper - A (E. Elma and upstream)
Length: Lower Stretch - 63.5 miles; Upper Stretch - 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
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. Combined sewer overflows, stormwater runoff, sediment contamination, inactive hazardous waste sites, and hydrologic modification also impact the river.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

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.

Scajaquada Creek
Stream Class: Lower - B (mouth to Main St, Buffalo) ; Middle - C (Main St to Cheektowaga)
Length: Lower - 0.3 miles; Middle - 8.3 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.

Tonawanda Creek, Middle
Stream Class: C (E. Pembroke to Batavia) ; Length: 11.7 miles
Water Quality Issues: Aquatic life and recreation are impaired by elevated nutrient levels, the result of sanitary discharges, stormwater runoff, and streambank erosion.

Tonawanda Creek, Lower
Stream Class: C (mouth to NYS Barge Canal) ; 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.

YOUNG ENVIRONMENTAL LEADERS PROGRAM Y.E.L.P!

The 2017 Young Environmental Leaders Program was funded by The Cameron and Jane Baird Foundation

WHAT IS Y.E.L.P?

The Young Environmental Leaders Program (YELP) is an after-school, immersive education and mentoring program for high school students residing in targeted environmental justice communities. Since its inception in 2014, the program has grown annually to involve additional schools and students. This unique program provides an opportunity for students interested in the sciences to learn about the environmental harms impacting their neighborhoods, progressive solutions to these problems, and potential environmental careers.

YELP consists of two components. First, students attend a series of hands-on experiential learning opportunities where they explore current environmental issues within a local context. Upon successful completion, the students gain three college credit hours. Second, a mentorship opportunity is presented for select students to participate in a research project alongside their teachers and BNW staff. The students benefit from their involvement in the mentorship program by receiving a stipend and valuable experience in environmental science.

YELP students kayaking on the Buffalo River

WHAT IS ENVIRONMENTAL JUSTICE?

Environmental Justice is the concept that all people regardless of race, ethnicity, or income level have the right to live in a healthy environment. Historically, many communities in Western New York have been disproportionately burdened with environmental problems.

WHO WAS INVOLVED IN 2017 YELP?

In 2017, BNW worked with the following Buffalo Public Schools and teachers:

Buffalo Academy for Visual & Performing Arts - *John Bihr, Dr. Christine Lamont*

Leonardo da Vinci High School - *Jim Damon*

International Preparatory School - *Michael Lovullo*

Newcomer Academy at Lafayette - *Sangeeta Gokhale*

Teachers recruit students to participate in the YELP program. Interested students were required to complete an application process to be considered for the program. College credit hours were awarded through Erie Community College.

Sampling Buffalo Creek for Macroinvertebrates

2017 YELP MENTORSHIP

Students selected for the 2017 mentorship included **Ashanti Pearson** of International Preparatory School, **Champa Bhuja**, **Mohmad Fatal**, and **Amani Al-Karkhi** of Newcomer Academy at Lafayette.

These four students tested water quality using the same protocol as Riverwatch Volunteers. In addition, they collected and analyzed samples for *Escherichia coli* (*E. coli*), a strain of bacteria used as an indicator of sewage pollution. The following locations within the city of Buffalo were tested during July:

Cazenovia Creek at Cazenovia Park

Buffalo River at Red Jacket Riverfront Park

Lake Erie at LaSalle Park

Black Rock *Canal* at Broderick Park

Niagara River at Black Rock Canal Park

Mentorship students collecting water quality data at LaSalle Park

Students also spent five minutes collecting trash, recording what they found, and how much they found. The three most common items collected were cigarette butts, pieces of glass, and plastic lids. It was also common to find pieces of fishing line, sometimes with hooks still attached, at sites where fishing was popular. The natural breakdown time of these items was investigated and used to create an educational display piece. The students used their display at the New York Power Authority Wildlife Festival to educate visitors about the negative impacts of trash.

YOUNG ENVIRONMENTAL LEADERS PROGRAM

Y.E.L.P!

YELP MENTORSHIP *E. coli* RESULTS

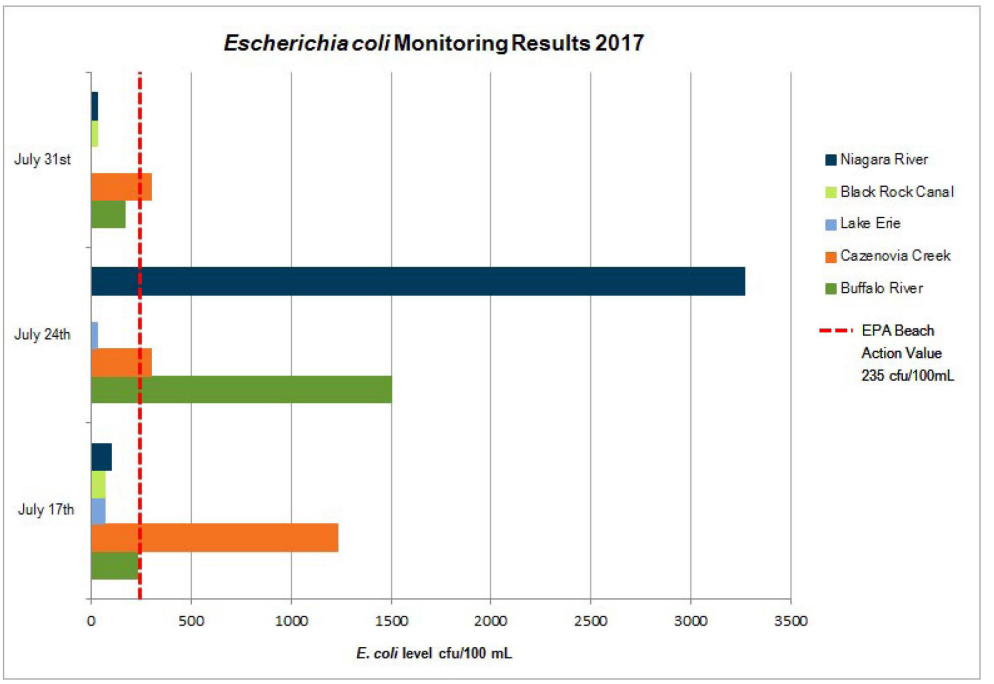


Figure 1: *Escherichia coli* results from YELP sampling locations in comparison to the EPA BAV

The presence of combined sewer overflows (CSOs) at or near these sampling sites provided the opportunity to educate the 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 chart above, high levels of *E. coli* were recorded in Buffalo throughout the summer, resulting in unsafe water recreation.

DATA USED TO UPDATE SWIM GUIDE

Results from the *E. coli* sampling were used to update Swim Guide, a website and app that presents free water quality information for over 7,000 possible swimming locations in multiple countries. Created and managed by Lake Ontario Waterkeeper, Swim Guide utilizes data collected from government agencies or local affiliates. Information is posted online to help visitors determine if beaches are safe for swimming. While the YELP sampling locations are not regulated swimming beaches, citizens are commonly observed recreating and contacting the water.

Mentorship students collecting water quality data at LaSalle Park; Buffalo, NY

Visit Swim Guide today: www.theswimguide.org

BUFFALO NIAGARA WATERKEEPER

SWIM GUIDE AFFILIATE

ONGOING & EMERGING WATER QUALITY CHALLENGES

Combined Sewer Overflows (CSOs)

During rain events, 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 contain not only stormwater, but untreated human waste, toxins, and debris. Septic systems, when improperly maintained also have the potential to discharge bacteria and pathogens into area waters.

Changing Climate

More frequent and intense precipitation events, warmer surface water temperatures, reduced ice cover, lake level fluctuations, floods, and flashy streams are challenges experienced locally due to the effects of a changing climate.

Stormwater Runoff

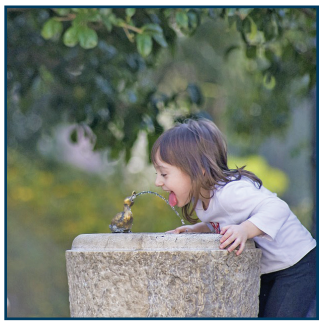
As the largest source of ongoing pollution to the nation's waterways, stormwater picks up contaminants as it flows over rooftops, roads, and pavement into waterways. It also inundates combined sewer systems and separate storm water systems triggering overflows.

Microplastics

These small plastic particles, smaller than 5mm in length, originate from a wide variety of sources, including personal care products, laundering clothing, and the degradation of larger plastic debris. These tiny particles, that are small enough to pass through most water filtration systems, have adverse effects to wildlife and have more recently been found in bottled drinking water and packaged sea salt.

Land Use

Waterways in their natural state have areas of forest, shrubland, or wetlands along shorelines. This vegetation is natural, living infrastructure that helps filter stormwater and control erosion. Population and infrastructure sprawl, coupled with unfettered development puts pressure on naturalized areas and contributes to the fragmentation of living infrastructure systems. Improper land use practices, like mowing right up to the edge of a waterway , and land use management can allow pollutants to enter waterways.



Drinking Water

Existing and emerging contaminates threaten the quality of our regions drinking water. Aging municipal drinking water infrastructure also threatens drinking water quality with elements such as lead.

Algal Blooms

Excess nitrogen and phosphorus entering waters from both urban and rural areas can lead to the expansion of harmful algal blooms. These blooms are detrimental to ecology and human health, and can negatively affect commercial and recreational fishing, as well as municipal drinking water systems.

Pharmaceuticals

Chemical compounds from pharmaceuticals can enter waterways after being excreted from the body or if unused drugs are flushed down the toilet as a means of disposal. Most sewage treatment plants do not remove these chemicals, which could have serious repercussions for wildlife and human health. Research is ongoing to investigate this emerging contaminant.

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, such as 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 the BNW office!

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? Check out our Native Plant Guide available at our office or online at:

bnwaterkeeper.org/nativeplantguide

PREVENT POLLUTION WITH BUFFALO NIAGARA WATERKEEPER

We host 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

Spring Shoreline Sweep

Each spring, BNW coordinates the Spring Shoreline Sweep, 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.

Monthly Waterway Cleanups

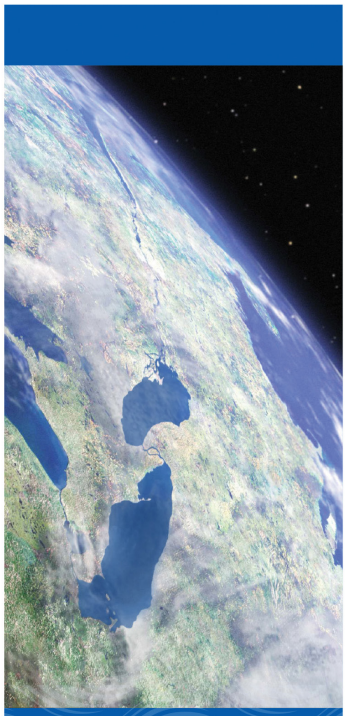
From June through October BNW coordinates a Monthly Waterway Cleanup at various sites in the watershed. These Saturday events keep shoreline sites free of litter throughout the year while continuing to reconnect the public with the water.

Restore Corps

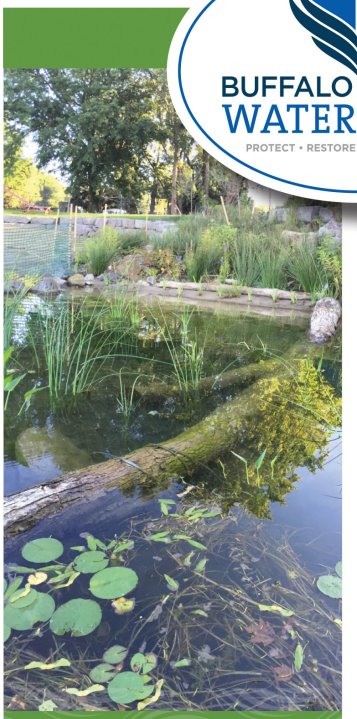
Throughout the year, BNW coordinates volunteer planting events to help prevent stormwater runoff, and invasive species pulls to maintain native habitats at various restoration sites.

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.

For more information on the Riverwatch Program and to view past reports visit: bnwaterkeeper.org/riverwatch

721 Main Street
Buffalo New York, 14203

www.BNWaterkeeper.org

716.852.7483

@BNWaterkeeper