Riverwatch

Water Quality Report

2012

BUFFALO NIAGARA RIVERKEEPER®

Riverwatch

The Riverwatch program engages volunteers from the community to collect water quality data at public access sites throughout the Buffalo and Niagara River Watersheds. Currently, the data collected by this program serves to:

- Develop baseline characterization of data
- Document water quality changes over time
- Screen for potential water quality problems
- Inform the public as to the condition of the waterbodies in their community

Riverwatch is a component of RIVERKEEPER's Citizen Action Team, designed for residents to take direct action protecting and restoring their watershed.

RIVERKEEPER is the only organization that conducts frequent and watershed wide monitoring of this nature in Western New York. Funding for this program was provided by the New York State Department of Environmental Conservation (NYSDEC) Environmental Justice Community Impact Grants

The Clean Water Act of 1972

The Clean Water Act established water quality standards for all surface water contaminants, and regulations concerning the discharging of pollutants into the water.[1]

RIVERKEEPER uses the Clean Water Act to hold polluters accountable, and to protect the quality of the water in our region. Each state must designate 'best uses' for each waterbody, and develop standards that best support those designations. Uses include:

- Drinking water
- Primary contact (swimming)
- Secondary contact (wading, paddling)
- Fishing, wildlife propagation

All streams tested are designated by the NYSDEC as class A-special, B or C.[2]

A - Special : A source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. The waters shall be suitable for fish, shellfish, and wildlife propagation and survival.

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

C : **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 for these purposes.

"Primary contact recreation" means recreational activities where the human body may come in direct contact with raw water to the point of complete body submergence. Primary contact recreation includes, but is not limited to, swimming, diving, water skiing, skin diving and surfing.[3]

Environmental Justice

Environmental justice is defined as the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Environmental justice efforts focus on improving the environment in communities, specifically minority and low-income communities, and addressing disproportionate adverse environmental impacts that may exist in those communities.[4]

Citizen Action

The NYSDEC has established standards for the physical and chemical parameters that need to be met in order to support the designated uses of the water.[5] RIVERKEEPER compares the data collected by volunteers against these standards to determine the condition of the waterways.

Dissolved Oxygen The standard states that a single sample in the Niagara River shall not be less than 6.0 mg/L. All other streams tested shall not be less than 4.0 mg/L

Oxygen is measured in its dissolved form as dissolved oxygen (DO), and is essential for the survival of nearly all aquatic life. Oxygen levels are decreased in rivers and streams by storm water runoff from farmland or urban streets, feedlots, failing septic systems, and wastewater from sewage treatment plants.

Conductivity[6] The standard states that a single sample shall not be less than 150 or more than 500µs/cm

Conductivity is a measure of the ability of water to pass an electrical current. Conductivity in water can be affected by the presence of inorganic dissolved solids such as chloride, nitrate, sulfate, and phosphate ions, which may indicate the presence of sewage waste.

pH The standard states that a single sample shall not be less than 6.5 nor more than 8.5.

pH is a term used to indicate the alkalinity or acidity of a substance as ranked on a scale from 1.0 to 14.0. The majority of aquatic animals prefer a range of 6.5-8.0. pH outside this range reduces the diversity in the stream because it stresses the physiological systems of most organisms and can reduce reproduction. Low pH can also allow toxic elements and compounds to become "available" for uptake by aquatic organisms

Temperature

Aquatic organisms are all dependent on certain temperature ranges for their optimal health. Temperature affects the oxygen content of the water (as temperature increases, the amount of oxygen it can hold decreases); the rate of photosynthesis by aquatic plants; the metabolic rates of aquatic organisms; and the sensitivity of organisms to toxic wastes, parasites, and diseases.

These measurements are all recorded with a YSI Professional Plus handheld multiparameter instrument equipped with a Quattro cable.[7]

Turbidity The standard states that a single sample shall not exceed 5 nephelometric units.

Turbidity is a measure of the amount of suspended material in water which can include soil particles, algae, plankton, microbes, and other substances. Higher turbidity increases water temperatures, decreases DO, provides refuge for harmful microbes, and can clog gills of fish and crustaceans.

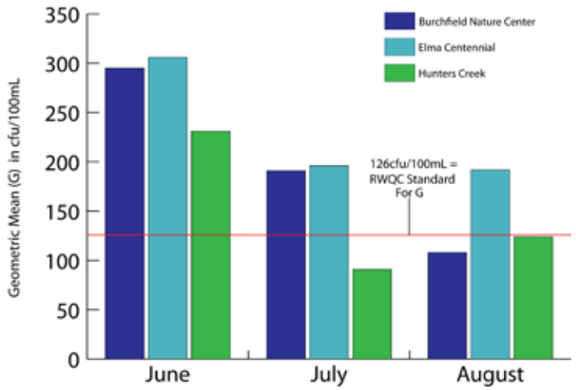
This measurement is recorded by a HACH 2100Q portable turbidimeter.[8]

Monitoring for *E. coli*

Under the Buffalo River Remedial Action Plan (RAP) RIVERKEEPER conducted bacteriological monitoring at 3 public access sites upstream from the Buffalo River Area of Concern to establish a correlation, if any, to pollutant levels downstream. The selected sites include; Hunters Creek Park in Wales, Elma Centennial Park in Elma, and Burchfield Nature and Art Center in West Seneca.

Five samples were collected at each site during the months of June, July, and August. A Geometric Mean has been calculated for each month from the five sample values of each site. A Geometric Mean (G) is a method of averaging that indicates the typical value of a data set by calculating the product of the values, therefore negating the influence of extremes in the range of values. The results were then compared to the EPA's Recreational Water Quality Criteria 2012 (RWQC).

Figure 1.1 RAP Administered *E. coli* Monitoing Buffalo River Upper Watershed Summer 2012



The RWQC states that any waterbody with a G value higher than 126 cfu/100mL is unsafe for human recreation. As shown in figure 1.1, 6 out of 9 sample periods exceeded the standard value.

Water Quality Index

The WQI is a grading system to represent the vitality of a stream. The results derived are RIVERKEEPER's interpretation of the data using an adaptation of the National Sanitation Foundation's Water Quality Index, for the parameters that Riverwatch tested for in the year 2012. These results serve as a point of comparison, grading each waterbody out of 100%, or with a corresponding letter grade.[9]

Water Quality Index Percentages

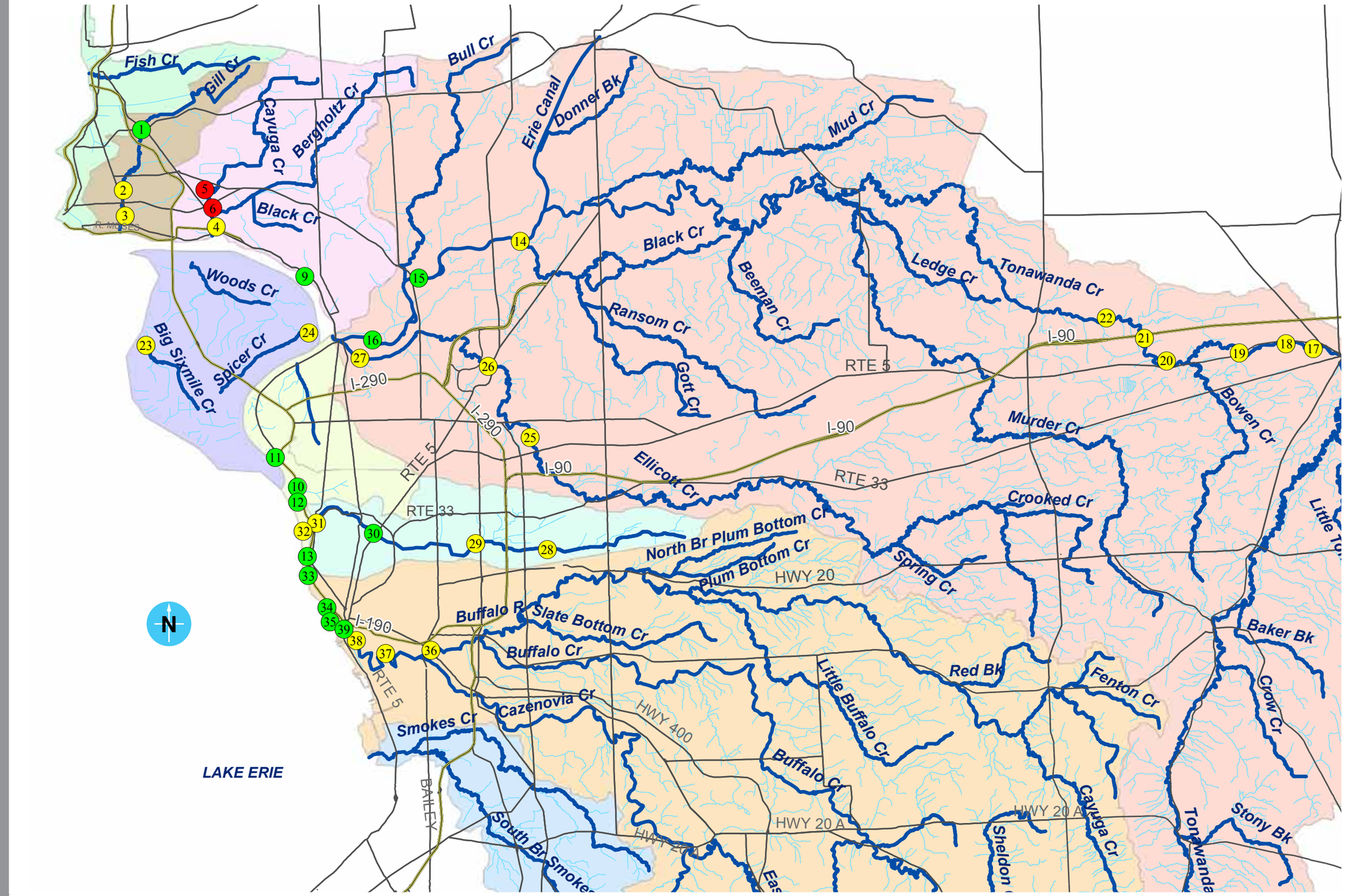
#	Site Name	DO	pH	TURBID	CONDUCT	TEMP	Total
1	Reservoir Park	97	78	84	64	88	83
2	Hyde Park Lake	92	72	56	62	88	75
3	Gill Creek	65	80	56	63	92	71
	Gill Creek	**76**	**86**	**78**	**62**	**89**	**76**
4	Military Road Bridge	87	61	77	51	90	74
5	Cayuga Drive	64	89	73	20	91	68
6	Bergholtz Creek	59	87	68	20	92	65
	Cayuga Creek	**75**	**88**	**79**	**65**	**91**	**69**
9	Gratwick Park	96	69	89	76	92	85
10	Niawanda Park	97	73	89	76	93	86
11	Aqualane Park	97	72	90	76	92	86
12	Black Rock Park	97	68	91	76	93	85
13	Broderick Park Niagara River	97	59	90	76	92	83
	Niagara River	**83**	**80**	**81**	**59**	**92**	**85**
14	Ransom Road	90	75	67	66	92	79
15	West Canal Marina	94	76	79	68	93	83
16	Sweeney Street	96	69	81	74	91	83
	Lower Tonawanda	**83**	**80**	**81**	**59**	**92**	**81**
17	41111 Main Street	97	76	76	39	91	77
18	South Main Street Bridge	92	82	74	48	91	78
19	Kiwanis Park	84	83	73	51	90	77
20	Slusser Road	91	80	68	49	89	76
21	Cooksville Road	93	83	73	50	92	79
22	Airville Road	84	77	76	49	90	76
	Middle Tonawanda	**76**	**86**	**78**	**62**	**91**	**77**
23	Big 6 Creek	79	64	66	56	NA	0
24	Spicer Creek	66	91	68	35	NA	0
	Grand Island	**83**	**80**	**81**	**59**	**NA**	**NA***
25	Amherst State Park	95	72	88	27	90	76
26	St. Ritas Lane	90	81	86	25	91	76
27	Ellicott Creek at 425	86	82	70	27	87	72
	Ellicott Creek	**78**	**88**	**79**	**65**	**89**	**74**
28	North Creek South Creek Park	85	78	78	42	87	75
29	Cheektowaga Town Park	90	81	83	35	88	77
30	Forest Lawn Cemetary	98	85	89	44	84	81
31	West Avenue	70	91	82	28	89	72
	Scajaquada Creek	**84**	**80**	**79**	**52**	**87**	**76**
32	Black Rock Canal at 198	74	64	90	69	89	77
33	Black Rock Canal at Broderick	95	75	89	76	92	86
34	Lasalle Park	93	66	80	76	92	82
35	Erie Basin Marina	97	66	84	75	92	83
	Outer Harbor	**85**	**79**	**79**	**55**	**91**	**82**
36	Seneca Bluffs	87	77	73	55	87	76
37	Red Jacket Park	68	87	77	61	90	76
38	Riverfest Park	70	88	81	66	90	79
39	Canalside	79	90	80	67	90	81
	Buffalo River	**76**	**86**	**78**	**62**	**89**	**78**

** Insufficient data was collected to determine a WQI grade*

[1] 33 U.S.C. §1251 et seq. (1972)
[2] Part 701: Classifications-Surface Waters and Groundwaters (Statutory authority: Environmental Conservation Law, §§ 1-0101, 3-0301 [2][m],15-0313, 17-0101, 17-0301, 17-0303, 17-0809)
[3] Part 700: Definitions, Samples and Tests (Statutory authority: Environmental Conservation Law, §§3-0301[2][m],15-0313,17-0301, 17-0303,17-0809)
[4] http://www.dec.ny.gov/public/333.html
[5] Part 703: Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations (Statutory authority: Environmental Conservation Law, §§ 3-0301[2][m], 15-0313, 17-0301, 17-0809)
[6] US Environmental Protection Agency's Water: Monitoring and Assessment 5.9 Conductivity
[7] www.ysi.com/productsdetail.php?Professional-Plus-18
[8] www.hach.com/2100Q
[9] The Water Quality Index; Monitoring the Quality of Surfacewaters by: Mr. Brian Oram, PG, B.F. Environmental Consultants Inc.

Niagara River Watershed
and Sub-watersheds

Site #	Site Name	NYSDEC Class	WQI Grade
1	Reservoir Park		B
2	Hyde Park Lake		C
3	Gill Creek		C-
	Gill Creek	**C**	**C**
4	Military Road Bridge		C
5	Cayuga Drive		D+
6	Bergholtz Creek		D+
	Cayuga Creek (Niagara)	**C**	**D+**
9	Gratwick Park		B
10	Niawanda Park		B
11	Aqualane Park		B
12	Black Rock Park		B
13	Broderick Park Niagara River		B
	Niagara River	**A-Special**	**B**
14	Ransom Road		C+
15	West Canal Marina		B
16	Sweeney Street		B
	Lower Tonawanda	**C**	**B-**
17	41111 Main Street		C+
18	South Main Street Bridge		C+
19	Kiwanis Park		C+
20	Slusser Road		C
21	Cooksville Road		C+
22	Airville Road		C
	Middle Tonawanda	**C**	**C+**
23	Big 6 Creek		
24	Spicer Creek		
	Grand Island[1]	**B**	
25	Amherst State Park		C
26	St. Ritas Lane		C
27	Ellicott Creek at 425		C-
	Ellicott Creek[2]	**B**	**C**
28	North Creek South Creek Park		C
29	Cheektowaga Town Park		C+
30	Forest Lawn Cemetary		B-
31	West Avenue		C-
	Scajaquada Creek	**B**	**C**
32	Black Rock Canal at 198		C+
33	Black Rock Canal at Broderick		B
34	Lasalle Park		B-
35	Erie Basin Marina		B
	Inner and Outer Harbor[3]	**C**	**B-**
36	Seneca Bluffs		C
37	Red Jacket Park		C
38	Riverfest Park		C+
39	Canalside		B-
	Buffalo River	**C**	**C+**



Not every stream or watershed depicted on this map was monitored during the year 2012.

Site Scores

A B C D F

Gill Creek | Cayuga Creek | Upper Niagara River | Tonawanda Creek | Lower Niagara River | Grand Island | Scajaquada Creek | Smokes Creek | Buffalo River

[1] Insufficient data was collected to determine a WQI grade.

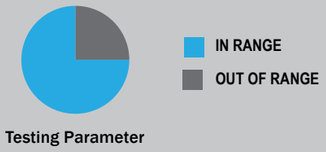
[2] Ellicott Creek is a tributary of Tonawanda Creek, and is included in Tonawanda Creek's watershed.

[3] Inner/Outer Harbor is not visible on the map.

Water Quality Testing Results

Water Quality Issues are referenced from NYSDEC's "The Niagara River/Lake Erie Basin Waterbody Inventory and Priority Waterbodies List" (2010).

SAMPLE CHART



Percentage of samples outside of standard range: A simple pie chart is given for each parameter indicating the total percentage of all samples taken for that site which fell outside the standard range for that parameter.

Buffalo River

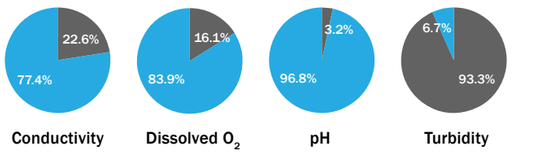
Stream Class: C

WQI Class: C+

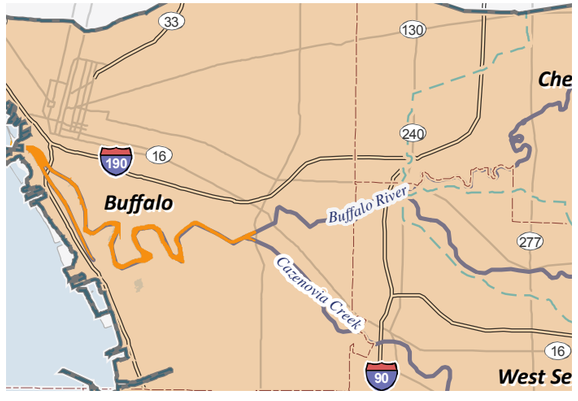
Stream Length: 8.6 miles (from mouth to Cayuga Creek)

Water Quality Issues: Impaired water quality, contaminated sediments, inactive hazardous waste sites, point and nonpoint source pollution, combined sewer overflows, and fish and wildlife habitat loss and degradation. The main stem of the river is designated as a Great Lakes Area of Concern (AOC) by the EPA.

RIVERKEEPER is the coordinator of the Remedial Action Plan for the Area of Concern.



The Area of Concern extends from the mouth of the river to the farthest backwater conditions caused by Lake Erie, approximately 6.2 miles, and including the City Ship Canal. There are 45 inactive hazardous waste sites in the Area of Concern, and 11 indicators of Beneficial Use Impairment.



Inner & Outer Harbor

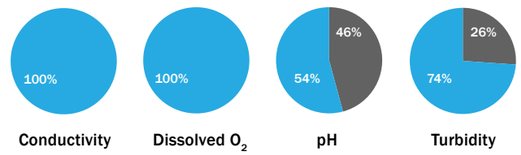
Stream Class: C

WQI Class: B-

Stream Length: 5.25 miles

Water Quality Issues: Impaired water quality, contaminated sediments, inactive hazardous waste sites, point and nonpoint source pollution, combined sewer overflows, and fish and wildlife habitat loss and degradation.

The Outer Harbor is included in the Buffalo River Area of Concern.



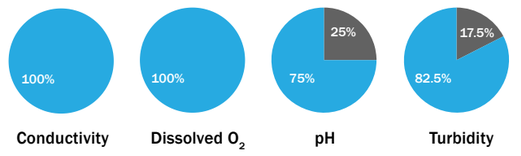
Niagara River

Stream Class: A Special - Drinking Water

WQI Class: B

Stretch Monitored: Upper, Main Stem Lake Erie to Niagara Falls

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 urban stormwater runoff.



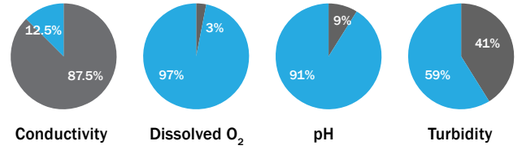
Scajaquada Creek

Stream Class: B

WQI Class: C

Stream Length: Lower - 3.0 miles (from mouth to Main St. Buffalo), Upper - 15.1 miles (above Cheektowaga)

Water Quality Issues: Aquatic life is precluded by low dissolved oxygen, excess nutrients, silt, and sediment. Public bathing is precluded and recreation is impaired by odor, floatables and pathogens. The point sources of these pollutants are from combined sewer outfalls and urban stormwater runoff.

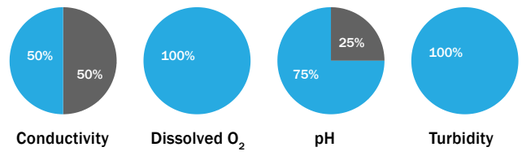


Grand Island

Stream Class: All are class B

Stream Length: 53.7 miles

Water Quality Issues: Natural resources (fishery) habitat and aquatic life in the tributaries of Grand Island are thought to be threatened by elevated stream temperatures, silt, sediment and urban stormwater runoff.



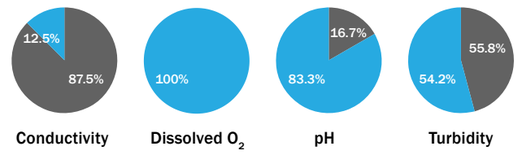
Ellicott Creek

Stream Class: B

WQI Class: C

Stream Length: 112.0 miles

Water Quality Issues: Aquatic life is impaired and recreation is stressed by suspected silt and sediment, caused by agricultural runoff.



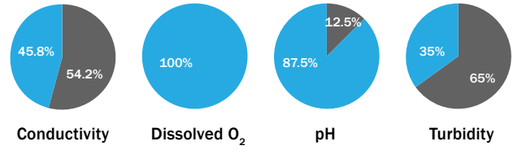
Tonawanda Creek (Lower Main Stem)

Stream Class: C

WQI Class: B-

Stream Length: 11.9 miles (from mouth to NYS Barge Canal)

Water Quality Issues: Aquatic Life and Recreation are stressed by pollution from known sources of PCBs, toxic contaminated sediment, and urban stormwater runoff, and suspected nutrient and silt pollution from sanitary discharge and erosion.



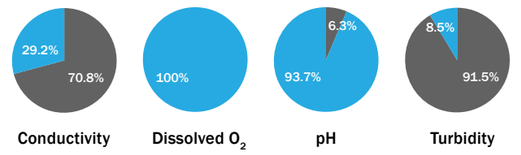
Tonawanda Creek (Middle Main Stem)

Stream Class: C

WQI Class: C+

Stream Length: 11.7 Miles (from East Pembroke to Batavia)

Water Quality Issues: Aquatic life and recreation are impaired, and aesthetics are stressed by known nutrient pollution from sanitary discharges, erosion, urban stormwater runoff, and low dissolved oxygen, whose cause is suspected to be from agricultural runoff, municipal wastewater treatment (Batavia), and onsite septic systems.



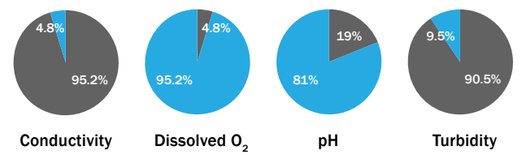
Cayuga Creek (Niagara Falls)

Stream Class: C

WQI Class: D+

Stream Length: 21.6 miles

Water Quality Issues: Aquatic life and recreation are impaired by toxic contaminated sediment and urban stormwater runoff.



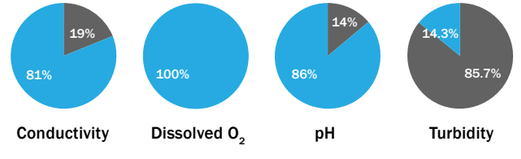
Gill Creek

Stream Class: C

WQI Class: C

Stream Length: 12.3 miles

Water Quality Issues: Aquatic life and recreation are impaired by urban stormwater runoff and suspected toxic contaminated sediment.



Our Mission

RIVERKEEPER is dedicated to protecting and restoring the quality and quantity of our most valuable natural asset -- our water. We are committed to improving the legacy we leave for future generations. Our goal is for everyone to have access to fishable, swimmable and drinkable water throughout the Buffalo Niagara Region.

The Riverwatch Team

Staff

Chris Murawski- Riverwatch Program Coordinator

Robbyn Drake- Quality Assurance Officer

Kerri Li – Citizen Action Team Director

Interns

Joshua Konovitz – Erie Community College

Amanda Pratt – Buffalo State College

Robert Forest Rung – University at Buffalo

Samantha Herberger – University at Buffalo

Volunteers:

Buffalo River: Brian Daley, Joshua Konovitz, Katie Nemmer

Cayuga Creek and Gill Creek: Edward Nickson, Thomas Heyer

Ellicott Creek: Brian Foley, Mark Casper, Scott Rybarczyk

Black Rock Canal/Inner Harbor: Elizabeth Czapski, Joseph Petrino

Niagara River: James Galbo, Michelle Johnson, Rose Pietras

Scajaquada Creek: Dianne Evans, Greg Madejski, Jim Tomkins, Roy Tilghman

Tonawanda Creek Lower: Jude Hammer, Valerie Macer

Tonawanda Creek Middle: Elizabeth Bentley-Huber, Linda Logan

Join Our Team!

Go to www.bnriverkeeper.org/get-involved/riverwatch, or call 716-852-RIVER to learn more about how you can be a part of the aqueous solution!

BUFFALO NIAGARA RIVERKEEPER®

1250 Niagara Street, Buffalo, NY (716) 852-7483

Graphic Design: Joel Brenden

www.thelessyousee.com

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