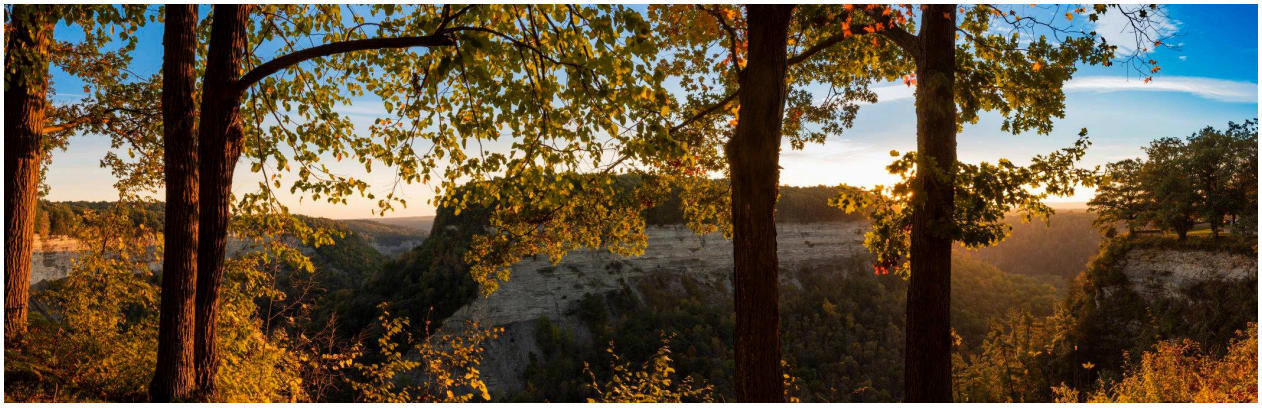
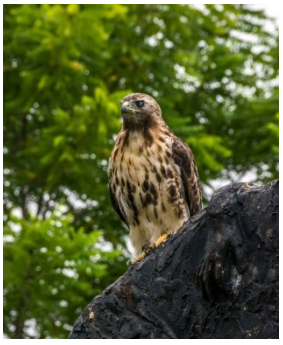
2019 Genesee River Basin Report Card

This first Report Card grades the Genesee River and its major tributaries on water quality and usability based on publicly available information. Its purpose is to raise awareness of the environmental challenges that face the Genesee River Basin so that actions can be taken to improve the state of the watershed and preserve its beauty for generations to come.





Genesee RIVERWATCH™
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2019 Genesee River Basin Report Card

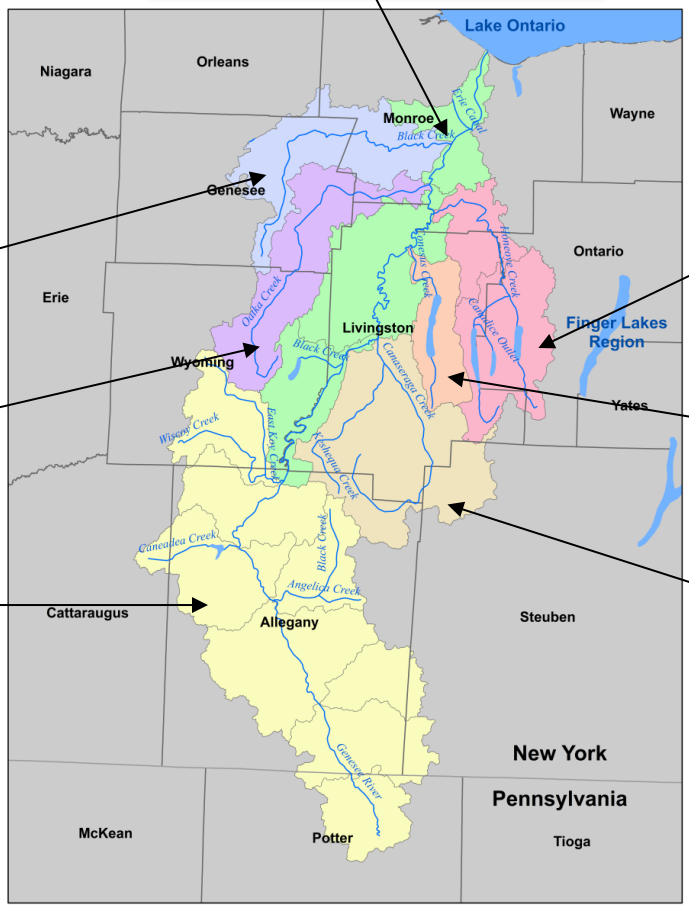
Genesee River Basin Watershed
Overall Grade: C

Subwatersheds

Black Creek
B

Oatka Creek
B

Upper Basin
C



Subwatersheds

Honeoye Creek
C

Conesus Creek
C

Canaseraga Creek
D

The overall grade for the Genesee River Basin is a "C" and represents the cumulative effect of all the subwatersheds. Canaseraga Creek received the lowest grade - "D" - of all the subwatersheds, indicating poor water quality and limits to human usage. Oatka Creek and Black Creek received a grade of "B", the highest grade of all the Genesee River subwatersheds, indicating better water quality and better opportunities for human usage. The Upper Basin of the river, Honeoye Creek and Conesus Creek subwatersheds received a grade of "C". In summary, there are portions of the Genesee River watershed that are environmentally in good health. However, major portions of the watershed are degraded to varying degrees.

Water Quality: Total phosphorus and suspended solids were the water quality metrics used in this assessment. It is well documented that the water quality of the Genesee River and its tributaries is compromised by excess phosphorus and suspended solids. The major sources of these pollutants are streambank erosion, effluents from wastewater treatment plants, agriculture, and septic systems. While there are other potential water quality issues within the basin, they are not addressed in this report.

Usability: The use of the Genesee River and its tributaries is impacted by its water quality. The NYS Department of Environmental Conservation (NYSDEC) periodically assesses streams asking the question, does the stream or stream segment meet its human "Intended Use". Intended Uses including fishing, swimming, drinking, and boating. These assessments were used in developing the grades for the Genesee River and its tributaries.

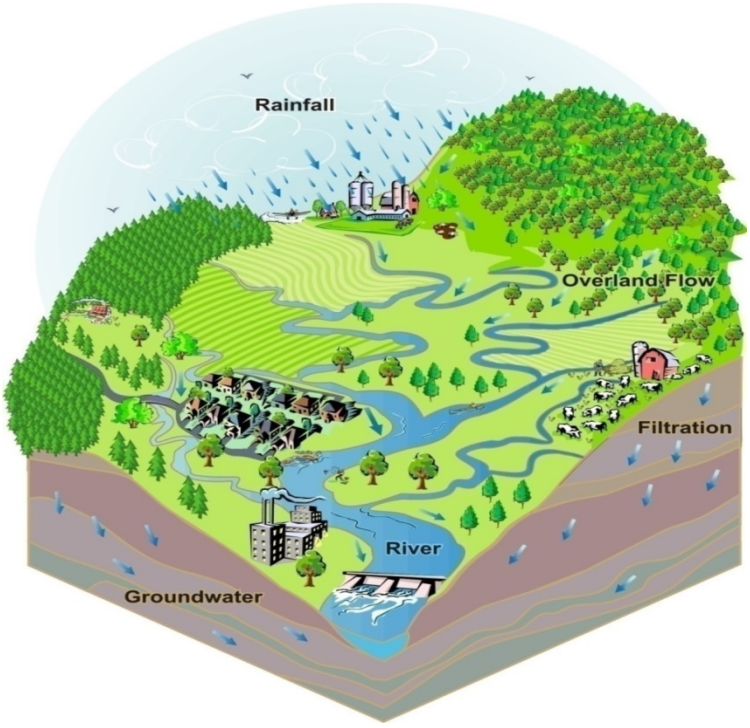
The Genesee and its Watershed

In determining the environmental health of a river and its tributaries, the key concept is the river's watershed. A watershed is the area of land where all of the precipitation that falls on it and drains off it is released through a common outlet, such as a lake. The map on the previous page defines the watershed boundaries of the Genesee River and its major tributaries or subwatersheds. The watershed consists of the land, lakes, streams, reservoirs, and wetlands as well as all the underlying ground water. Land-based activities such as development, water treatment discharges, and agricultural activities can increase nutrients, soil loss, and toxicants beyond their natural levels in the river causing an unhealthy stream.

Our rating of the environmental state of the Genesee River watershed is based on water quality measurements and an assessment of how well the river and its tributaries support their intended uses.

The water quality metrics considered were Total Phosphorus and Total Suspended Solids because it is well documented that the water quality of the Genesee River and its tributaries is compromised by these pollutants. High phosphorus levels enhance the growth of algae, causing unwanted blooms that may become toxic in Lake Ontario. Total suspended solids cause the water to be milky or muddy-looking due to the light scattering from small particles in the water and can have a negative impact on aquatic life, recreation, and drinking water. The major sources of these pollutants are streambank erosion, effluents from wastewater treatment plants, agriculture operations, and septic systems.

Our rating also includes a measure of how well the state of the watershed meets human needs. This assessment asks the question, does the water quality of the river or stream support its intended human use? Intended human usage includes public water supply and recreational activities such as fishing, swimming, and boating. The NYS Department of Environmental Conservation (NYSDEC) periodically evaluates streams against these intended human uses. However, these assessments are incomplete for most streams and therefore both the results of the assessed streams and a measure of the completeness of the assessment were used in developing the grades for the Genesee River and its tributaries.



About the Grades

The grade for each subwatershed is based on the average of the individual Water Quality grades and the Intended Use grades as shown in the table below. The Water Quality grade for Total Phosphorus is based on the number of individual water quality samples that meet the phosphorus stream threshold value of 65 ppb – a value being considered for implementation by NYSDEC. There is no accepted water quality standard or threshold value for Suspended Solids. In the absence of a state-assigned water quality standard for this measure, we set our threshold value at 25 ppm which was based on a range of samples collected in the major tributaries to the Genesee River. The Intended Use grades were determined from NYSDEC assessments of how well the stream segments support their intended use and the degree to which streams have been assessed.

Grade A – Water quality indicators are at or below their threshold values and/or the stream's water quality supports its intended use and is well known.

Grade B – Water quality indicators are only slightly above their threshold values and/or the stream's water quality supports most of its intended uses, and the condition of most of its segments is known.

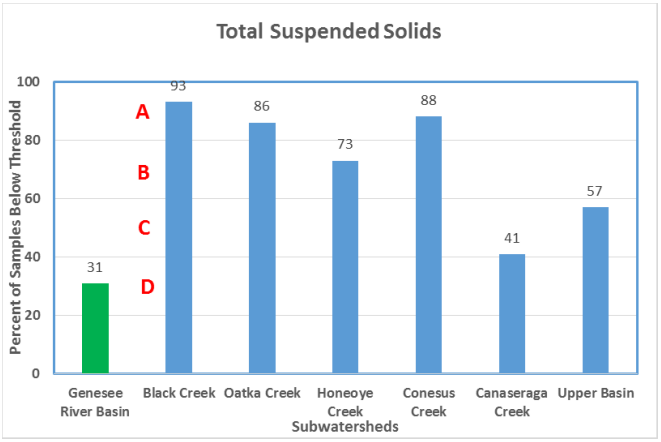
Grade C – Water quality indicators are significantly above their threshold values and/or the stream's water quality does not support most of its intended uses, or the condition of many stream segments is unknown.

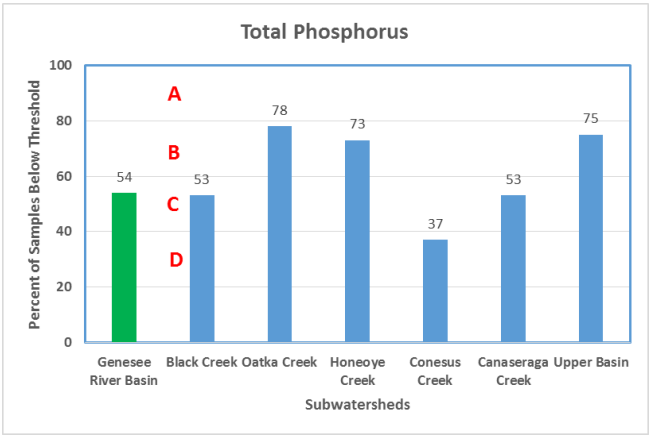
Grade D – Water quality indicators are more significantly above their threshold values and/or the stream's water quality does not support most of the intended uses, or the condition of many stream segments is unknown.

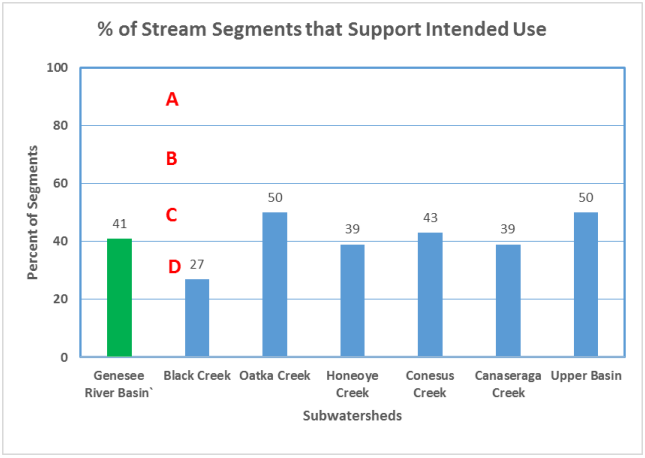
	Water Quality		Intended Use		Average
	Total Phosphorus	Suspended Solids	Supports Use	Well Known	Overall
Genesee River Basin	C	D	C	C	C
Black Creek	C	A	D	A	B
Oatka Creek	B	A	C	B	B
Honeoye Creek	B	B	D	C	C
Conesus Creek	D	A	C	C	C
Canaseraga Creek	C	C	D	D	D
Upper Basin	B	C	C	C	C

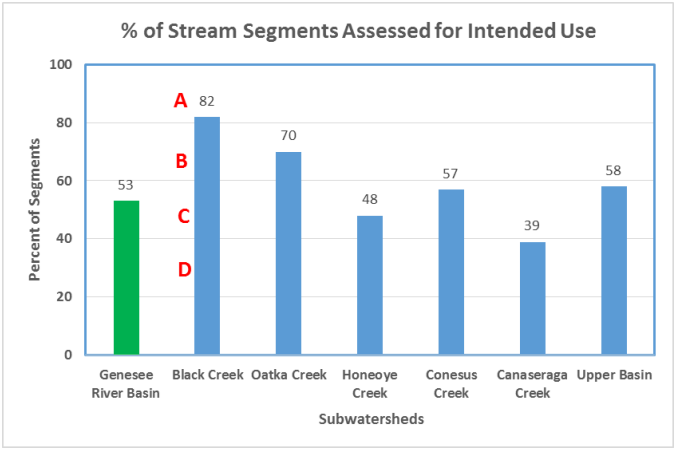
Eroding streambanks along the Genesee River contribute to excess phosphorus and suspended solids and impact human usage of the river.

Percent of Samples Meeting Threshold Values By Subwatershed









Collecting water samples from the Genesee River.

Sources of Pollution

The sources of excess phosphorus and sediment are well characterized in the Genesee River Basin. Over 30 water bodies (rivers, streams, creeks, ponds, and lakes) are listed as impaired by the NYSDEC because of high levels of phosphorus and other contaminants. Agricultural activities, such as crop growth and dairy farming; food-processing operations; municipal and industrial wastewater treatment plants; and septic systems are major contributors. Excess nutrients, such as phosphorus, cause algae blooms and contribute to beach closings along the Lake Ontario coast and several Finger Lakes within the Basin.

Silt and sediment transport, and the accompanying increase in water turbidity, are additional concerns. Within the Genesee River Basin, primary sources of sediment include erosion from rapid river channel migration, streambank instability, agricultural practices, development, roadside ditching, and wetland displacement. Establishment and protection of adequately sized vegetated buffers along stream corridors and streambank restoration projects are examples of actions that can reduce these impacts.

Other pollutants and threats include pathogens, temperature changes, oxygen demand, priority organics, and degradation of habitat for fish, wildlife, and other aquatic life.

The table below characterizes the Genesee River Basin and its subwatersheds in terms of drainage acres, number of concentrated animal-feeding operations (CAFOs), number of waste discharges, and type of use.

Watershed	Grade	Acres Drainage	Number of CAFOs	Number of Wastewater Discharges	Percent Agriculture	Percent Wooded	Percent Wetland	Percent Developed
Genesee River Basin	C	1,596,000	80	62	45	42	5	7
Black Creek	B	129,000	6	7	60	11	18	11
Oatka Creek	B	138,000	18	9	61	23	9	7
Honeoye Creek	C	170,000	1	7	43	43	5	6
Conesus Creek	C	59,000	4	1	48	37	3	6
Canaseraga Creek	D	219,000	8	8	44	48	3	5
Upper Basin	C	618,000	17	10	35	60	2	3
Lower/Middle*	NA	263,000	26	20	55	20	7	17

*The Lower/Middle section of the river is not graded separately. It's water quality assessments were used in the grade of the overall Genesee River Basin as this subwatershed is downstream of all others.

Middle Falls in Letchworth State Park.

Eroding river banks near Fillmore, NY.

The Way Forward

While much is being done, there are additional actions that can be taken to reduce excess phosphorus and sediment in the Genesee River Basin.

- NYS Department of Environmental Conservation (NYSDEC) – Enforce Concentrated Animal Feeding Operation (CAFO) and point-source permits. Require all point sources to monitor their effluent for Total Phosphorus**.** Formally adopt a water quality standard for Total Phosphorus in moving water. There are 61 NYSDEC-permitted municipal and industrial wastewater treatment plants in the Genesee River basin. All plants are designed to reduce the oxygen-depleting capability associated with their wastewater, along with some specific pollutants included in their discharge permit. Most of the municipal plants treat their effluent to reduce bacterial pollution to the stream or river. Very few of these plants have a requirement in their permits to monitor for phosphorus in their effluent to determine if they adversely impact water quality. Only one has an actual discharge limit.

- Soil and Water Conservation Districts (S&WCD) – Encourage more farmers to adopt Agricultural Environmental Management (AEM) programs. Assist farmers with implementation of best practices.

- Municipalities – Adopt and enforce septic system and erosion/sediment control ordinances. Adopt green infrastructure when possible. Reduce combined sewer overflows.

- Farmers – Adopt agricultural best management practices whenever possible. Many farms participate in the voluntary Agricultural Environmental Management (AEM) program facilitated by County Soil & Water Conservation Districts. This national program provides farmers with technical assistance to identify improvement opportunities and funding to implement the best practices identified.

- Citizens and Stakeholder groups – Support your S&WCD, municipality, and NYSDEC efforts to promote activities that improve water quality. If a homeowner, follow guidelines described at H2OHero.org to reduce pollutant runoff into streams and ponds. Get involved with your watershed's committee or form one. Stakeholder groups define and implement a wide variety of projects that reduce the amount of nutrients and sediment discharged to the river and streams. Establishment and protection of adequately sized vegetated buffers along stream corridors and stream bank restoration projects are examples of actions to reduce impacts.

Volunteers planting trees as part of the Mallards Dairy/Genesee RiverWatch streambank restoration project, Belfast, NY

Data Sources

The information used to develop this first Genesee River Basin Report Card is based on publicly available material - primarily water quality measurement data collected by SUNY Brockport scientists and intended use assessments by the New York State Department of Environmental Conservation (NYSDEC).

SUNY Brockport published a series of reports which characterized the loads and sources of phosphorus and sediment for the entire Genesee River Basin (Makarewicz, J. C., et al., 2013). Those investigations were built upon flow measurements and an intensive water quality sampling and analysis program conducted over several years. Calibrated Soil Water Assessment Tool (SWAT) models were developed using those data. The models were then utilized to further identify and allocate sources of sediment and phosphorus and estimate potential load reductions from various management practice scenarios.

As a result of this work by SUNY Brockport, NYSDEC published *Addressing Phosphorus and Sediment in the Genesee River Basin: A Synopsis of Existing Reports to Meet EPA's Nine Elements of a Watershed Plan* in August 2015. This document outlines the work done and further actions necessary to reduce the sediment and phosphorus loadings in the Genesee River Basin in order to meet water quality goals in the Genesee River and nearshore areas of Lake Ontario. It documents that the Genesee River is impaired for phosphorus and sediment while identifying erosion of streambanks along agricultural land with poor riparian zones as a major contributor to those impairments.

NYSDEC conducts periodic assessments of water bodies in the state to evaluate whether the water quality fully supports appropriate uses such as recreation, water supply, aquatic life, and other uses. This information is publicly available.

Based upon the work of SUNY Brockport and the Nine Element Plan, Genesee RiverWatch has chosen to focus on total phosphorus and total suspended solids as water quality indicators, and intended use assessments as indicators of usability.

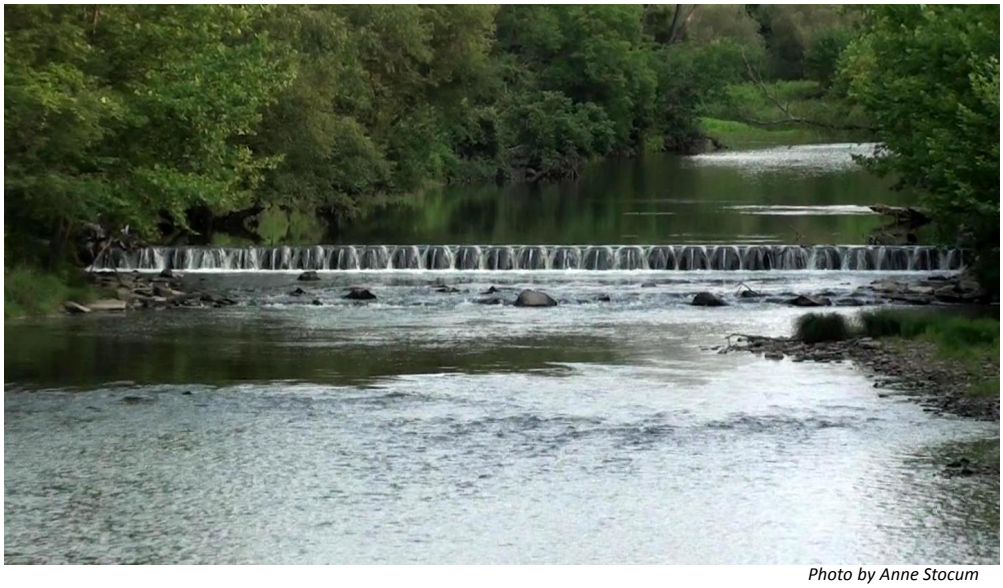


Photo by Anne Stocum

The Genesee River near Wellsville, NY – one of the communities that uses the Genesee River as a source of drinking water

About the Genesee River Basin

The Genesee River receives drainage from about 2,500 square miles, including portions of Genesee, Livingston, Wyoming, Monroe, Allegany, Steuben, Ontario, Orleans, and Cattaraugus counties in New York, and Potter County in Pennsylvania. Its 157 mile-long northern journey begins at an elevation of 2,500 feet above sea level in the Allegheny Hills of Pennsylvania, flowing through the highly dissected Northern Allegheny Plateau to Letchworth State Park near Mount Morris in Livingston County (average stream slope of nearly 9 feet per mile), and then through the Lake Ontario Lowlands (average stream slope of 0.8 feet per mile), before flowing into Lake Ontario (elevation 247 feet above sea level) at the port of the City of Rochester in Monroe County, New York State.

The Genesee Basin contains a total of 5,048 miles of streams. The Genesee Basin also includes lakes, ponds, and reservoirs covering 13,288 acres. Of these lakes, the five largest – the Mount Morris Dam Impoundment, Canadice Lake, Conesus Lake, Hemlock Lake, and Honeoye Lake - represent over 80% of the total lake acres in the Genesee Basin.

The Genesee River has been shaped by its glacial history. By the time the last glacier permanently receded, around 12,000 years ago, the Genesee River's drainage area had been well-established. Evidence of the early Genesee River's size and eroding power can be seen today in the magnificent gorge at Letchworth State Park near the Village of Mt. Morris, and in the river gorge downstream from High Falls in the City of Rochester.

Current land use within the watershed is approximately 52 percent agricultural, 40 percent forested, 4 percent urban, 2 percent wetlands or water, 2 percent other developed lands. The southern portions of the river basin in the Northern Allegany Plateau are dominated by forest and some agricultural land. Central and North Central portions of the River Basin are dominated by extensive agricultural development, primarily in support of dairy farming; however, orchard and vegetable crops are also grown. Within the basin, water resources are utilized to irrigate agricultural crops.

The Genesee River Basin has yielded enormous benefits to its residents, including a variety of land and water uses such as navigation, recreation, energy production, wildlife habitat; and fresh water for drinking, irrigation, industrial uses, and sanitation.

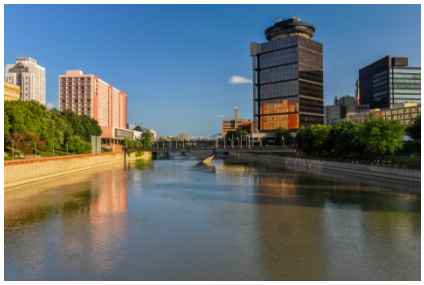


Photo provided by John Noble

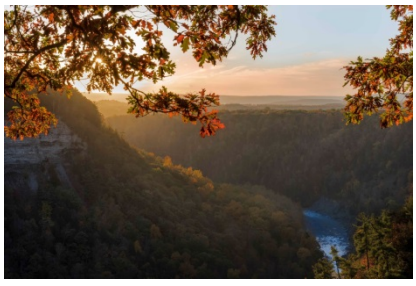


Photo by Anne Stocum

The Role of Genesee RiverWatch

Genesee RiverWatch's mission is to improve the water quality of the Genesee River and its tributaries to create environmental, recreational, and economic assets for its communities. We also connect people to the river, encouraging them to explore, experience and celebrate the river. We are committed to:

- Informing and educating: We enhance public knowledge of the Genesee River and strive to increase commitment to its future health and use through actions such as this Report Card and the work of the Aquatic Educators Network.

- Monitoring water quality: Genesee RiverWatch has launched a Citizens Water Quality Monitoring Program. The goal of this effort is to establish simple water quality test methods that citizens can use to measure phosphorus and sediment concentrations in the Genesee River and its tributaries. Collecting and publishing more data, more frequently, throughout the watershed will provide a better picture of the overall quality of the water in the Genesee River and will inform future Genesee River Basin Report Cards.

- Restoring streambanks to reduce phosphorus and sediment loads in the river: Genesee RiverWatch completed a streambank restoration project in the Town of Caneadea in 2017 and will complete another in 2019 in Fillmore, NY. It has published a 2018 report titled *Genesee River Basin Sediment and Nutrient Reduction Plan***.**

- Connecting people to the river encouraging them to explore, experience and celebrate the river: Genesee RiverWatch is working with partners to produce a Recreational Map of the Genesee River and increase access to the river for boating, fishing, hiking and biking.

- Collaborating with partners and stakeholders throughout the basin: Since 2014, Genesee RiverWatch has held annual Genesee River Basin Summits on a variety of topics to engage a wide variety of stakeholders, solicit diverse opinions, and define the best ways to achieve our common goals.

2018 Streambank Stabilization Workshop

Genesee RIVERWATCH™
an initiative of CEI

Student Workshop 2018

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We invite you to learn more and become a member at
www.geneseeriverwatch.org

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