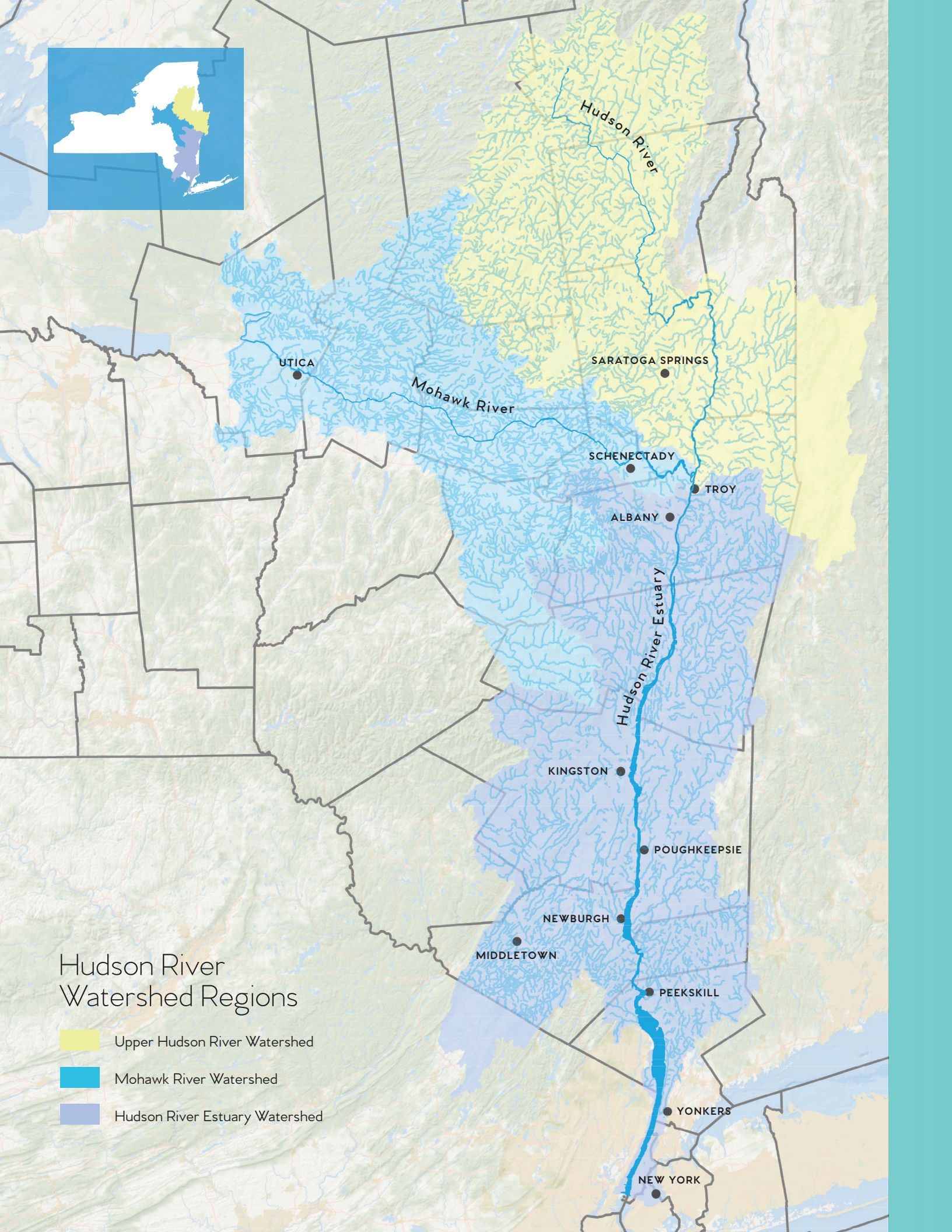


Hudson River
Watershed Alliance



Work on Watersheds





Hudson River Watershed Regions

- Upper Hudson River Watershed
- Mohawk River Watershed
- Hudson River Estuary Watershed

Work on Watersheds

INTRODUCTION | THE HUDSON RIVER WATERSHED ALLIANCE unites and empowers communities to protect their local water resources. We work throughout the Hudson River watershed to support community-based watershed groups, help municipalities work together on water issues, and serve as a collective voice across the region. We are a collaborative network of community groups, organizations, municipalities, agencies, and individuals.

The Hudson River Watershed Alliance hosts educational and capacity-building events, including the Annual Watershed Conference to share key information and promote networking, Watershed Roundtables to bring groups together to share strategies, workshops to provide trainings, and a breakfast lecture series that focuses on technical and scientific innovations. We provide technical and strategic assistance on watershed work, including fostering new initiatives and helping sustain groups as they meet new challenges.

What is a watershed group?

A watershed is the area of land from which water drains into a river, stream, or other waterbody.

Water flows off the land into a waterbody by way of rivers and streams, and underground through groundwater aquifers.

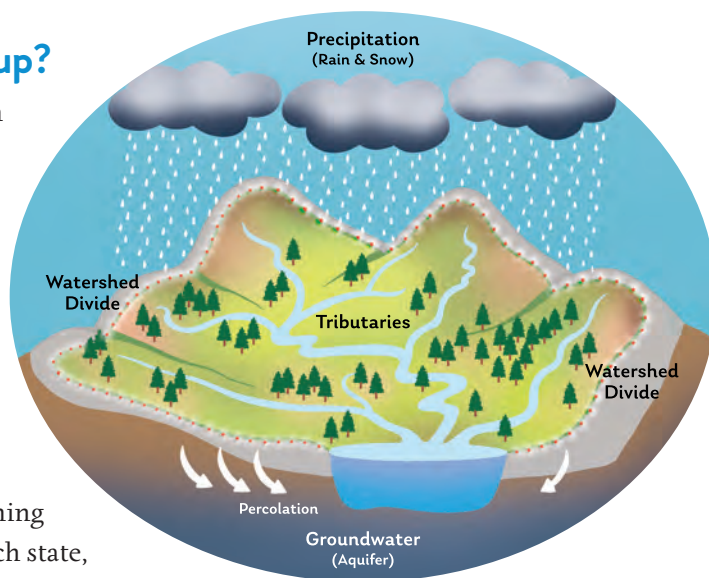
The smaller streams that contribute to larger rivers are called tributaries.

Watersheds are defined by the lay of the land, with mountains and hills typically forming their borders. Watershed boundaries rarely match state, county, or municipal boundaries.

Community-based watershed initiatives take on a variety of forms and roles. In general, these groups **convene stakeholders** around common water issues, **share**

information, coordinate projects, educate residents, and promote stewardship of their watersheds through projects like tree plantings and stream cleanups.

Many groups are actively **monitoring water quality** to understand conditions, **partnering on research** with academic institutions, and helping to **write and implement watershed management plans**.





Watershed Roundtable at the Bard Water Lab

The Hudson River watershed, from Lake Tear of the Clouds in the Adirondacks to New York City, covers 13,400 square miles. To improve the Hudson River and its ecosystem, we have to take a watershed approach. Each stream that flows to the Hudson is connected to the health of the river. And each watershed group is a critical part of our Alliance, sharing their strategies and successes so we can all grow stronger together.

SOME WATERSHED GROUPS are entirely volunteer-run, while others are intermunicipal councils. Even those that operate as 501(c)(3) non-profit organizations manage small budgets and work closely with volunteers. Some are led by agencies or organizations that devote staff to coordinate groups. Whatever the form, collaboration is key. Many projects have been successful through partnerships with municipalities, county agencies, Soil and Water Conservation Districts, Cornell Cooperative Extension offices, community organizations, and regional non-profits like Hudson River Sloop Clearwater, Scenic Hudson, and Riverkeeper. The technical support and competitive grants offered by the New York State Department of Environmental Conservation (NYS DEC) Hudson River Estuary Program and Mohawk River Basin Program have been critical.

Watershed groups fill an important niche as a voice for their river or stream. They have boots on the ground, waders in the water, and considerable local knowledge. They partner with experts to provide strong scientific foundations and strengthen coalitions. They lift up local champions who use their strengths to advocate for our waterways. They help municipalities prioritize water management and work together across political boundaries.

Work on Watersheds

The *Work on Watersheds* report highlights stories from 32 watershed groups. The Hudson River Watershed Alliance celebrates their accomplishments to highlight the ways watershed groups are making a difference. From improving flood resilience to protecting drinking water and improving their communities, this network has an impressive and growing impact. You can learn more about each group at hudsonwatershed.org/watershed-groups.

Watershed Roundtable kayak trip on the Esopus Creek



REGION: Upper Hudson Watershed | WATERSHED SIZE: 4,160 square miles

Upper Hudson River Watershed Coalition

Putting watershed planning to work

THE UPPER HUDSON RIVER is the northern-most part of the river, flowing 160 miles from its source in the Adirondacks to the Federal Dam in Troy. The Upper Hudson River watershed is primarily in New York State, but also includes portions of Vermont and Massachusetts. Land use in the watershed is diverse, ranging from Forever Wild forests in the Adirondack Park and large rural and agricultural areas to cities like Glens Falls, Saratoga Springs, and Troy.

The Upper Hudson River Watershed Coalition was formed in 2014 by the Lake Champlain-Lake George Regional Planning Board, with the

seven Soil and Water Conservation Districts in the watershed. The coalition partners with municipalities to implement water quality improvement projects. **In 2020, the Upper Hudson River Watershed Coalition completed the Upper Hudson Watershed Revitalization Plan.** This watershed management plan was created with funding from NYS Department of State's Local Waterfront Revitalization Program. The plan focuses on six priority issues and identifies 190 projects, totaling more than \$300 million, for water quality improvements to achieve their goals for the watershed.

lclgrpb.org/water-quality



REGION: Upper Hudson Watershed | WATERSHED SIZE: 450 square miles

The Battenkill Conservancy

Working with farmers to improve water quality

THE BATTENKILL CONSERVANCY began in 1993, as there was growing interest in kayaking and land use issues in the region. The Battenkill watershed is primarily rural and agricultural, and includes parts of Bennington County in Vermont and Washington County in New York. The Battenkill Conservancy is part of the Washington County Water Quality Committee and contributed to the *Upper Hudson River Watershed Revitalization Plan* to identify and incorporate water quality issues and ideas into a larger plan. The Conservancy's Adopt a Stream Program and River Watch Water Quality Programs also raise awareness of small streams and water quality through advocacy and education.

The Battenkill Conservancy has met a common and challenging problem—pollution from farms—by working directly with farmers and landowners to expand and plant stream buffers. A 501(c)(3) land trust, the Conservancy has also helped protect over 1,000 acres of forest and streams in the Battenkill State Forest and the



popular Route 313 Rest Area that provides access to the river.

The Battenkill Corridor Connections Project promotes and plans for connections between key access points along the Battenkill and within the watershed. This project highlights over 20 environmental, recreational, historical, and cultural sites with improved signage and public access to the river. This network of sites also includes bike and pedestrian trails. The Battenkill Conservancy recently protected two public access sites for fishing and kayaking by ensuring a sidewalk was included as part of a new \$6.3 million bridge over the Battenkill in Greenwich, NY.

www.battenkillconservancy.org



Battenkill Conservancy

REGION: Upper Hudson Watershed | WATERSHED SIZE: 720 square miles

Hoosic River Watershed Association

Removing dams, restoring habitat



Hoosic River Watershed Association

Henry Bridge Dam removal, North Pownal, Vermont

KNOWN AS HOORWA, the Hoosic River Watershed Association was founded in 1986 to fulfill a recommendation from the Berkshire Regional Planning Commission for an organization to implement its *Hoosic River Action Plan*. The 501(c)(3) group has been active promoting conservation, habitat restoration, and enjoyment of the 70-mile-long Hoosic River. HoorWA works in partnership with other local agencies, supported by state and local funding, along with individuals interested in the health and use of the watershed.

Three dams have been removed in the Hoosic River watershed, opening up significant habitat for trout and other fish. These include the Briggsville Dam in North Adams, MA (2010), the removal of which reconnected over 30 miles of streams, the Thunder Brook dam in Cheshire, NY (2012), and Henry Bridge dam on the Wallomsac River in North Pownal, VT (2013). HoorWA also developed three riverside trails in Hoosick Falls and Williamstown, provides maps for paddlers, and supports water quality monitoring at 11 sites on the Hoosic River.

hoorwa.org



REGION: Mohawk River Watershed | WATERSHED SIZE: 3,460 square miles

Mohawk Watershed Alliance

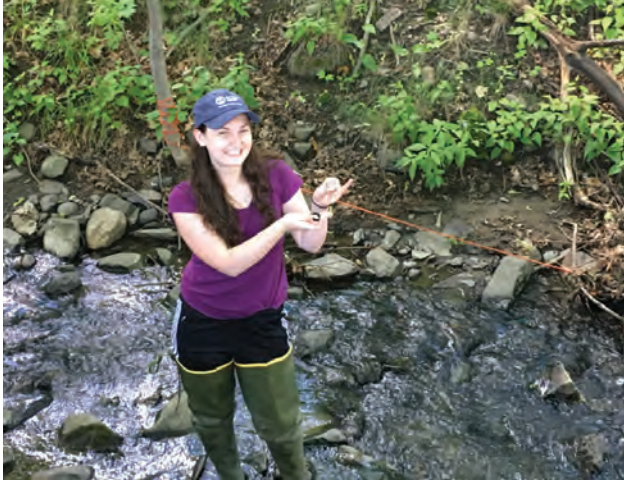
Setting the agenda for more than a decade

A MIGHTY RIVER IN ITS OWN RIGHT, the Mohawk River is the Hudson River's largest tributary. It flows 140 miles through Rome, Utica, Schenectady, and other river cities to its confluence with the Hudson at Waterford, where the boats entering the Erie Canal pass through locks with the greatest lift in the shortest distance, anywhere in the world. The Mohawk River and its aquifer are a drinking source for nearly 250,000 people. Its waters are also a threat to some communities, particularly as extreme storms and ice jams have triggered damaging flooding in recent years.

Since 2009, the Mohawk Watershed Symposium has served as the annual meeting of the Mohawk Watershed Alliance. The symposium is organized by Union College and SUNY

Polytechnic, with support from NYS DEC Mohawk River Basin Program. In bringing people together to focus on the watershed, this annual signature event has served as a clearinghouse for the latest information about research and initiatives, and as an influential forum to set the agenda. It helped to launch or support the Mohawk River Watershed Coalition, the Mohawk River Basin Program, Riverkeeper's water quality monitoring project, and many new research projects. The Symposium creates meaningful connections across a large watershed. Each year, presentation abstracts are compiled into a *Proceedings* document that is posted online to maintain institutional knowledge about the most significant projects and research on the Mohawk watershed.

minerva.union.edu/garverj/mws/mws.html



Kate Meierdiercks

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 8 square miles

Kromma Kill Watershed Alliance

Engaging students and a community of researchers

THE KROMMA KILL WATERSHED ALLIANCE

began in 2014, when Siena College received funding from NYS DEC Hudson River Estuary Program and NEIWPCC to create a watershed assessment for this 6-mile-long urban stream in the Capital District. The assessment identified flooding and water quality as key issues, providing a guide for subsequent work by Siena College faculty and students, watershed municipalities, and other stakeholders.

Many Siena College students have participated in watershed work, providing an outdoor laboratory to hone technical expertise and a real-world classroom for understanding how to advance management goals in their larger watershed community.

Dr. Katherine Meierdiercks from Siena College created the THuRST (The Hudson River Subwatershed and Tributaries) research network to foster collaboration, using common methodologies to answer questions with scientific and community significance. Researchers are now collaborating across the Hudson River watershed to better understand the impacts of road salt in Hudson River tributaries, including the Kromma Kill.

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 14 square miles

Patroon Creek Watershed

Daylighting an urban stream

THE PATROON CREEK begins in Albany's Pine Bush Preserve and flows for six miles through New York's capital city before entering the Hudson River. In 2015, a partnership between Siena College and the City of Albany began with a grant from NYS DEC Hudson River Estuary Program to study water quality and create a watershed assessment. Like many urban streams, the Patroon has water quality impacts from heavy metals, raw sewage, and road salt. A portion of the creek had also been buried in a pipe for generations, as the city grew over and around it.

In 2019, the City of Albany completed a daylighting of the Patroon Creek in Albany's Tivoli Lake Preserve. Daylighting means restoring a stream that had been buried, and allowing it to see the light of day. Decades in the making, this project improves water quality and habitat, protects vulnerable sewer lines and other infrastructure, reduces flood risk downstream, and provides residents access to a living stream. This project was made possible by grants to the City of Albany from NYS DEC's Water Quality Improvement Project Program and NYS Environmental Facilities Corporation's Green Innovation Grant Program.

sites.google.com/a/siena.edu/kmeierdiercks/projects/patroon



Albany Water Department

The restored Patroon Creek, Tivoli Lake Preserve

Catskill Creek

Boosting resilience to flooding

CORNELL COOPERATIVE EXTENSION of Columbia and Greene Counties started the Catskill Creek Watershed Awareness Project in 2008, with support from the NYS DEC Hudson River Estuary Program. The Catskill Creek watershed flows 49 miles from the Franklinton Vlaie wetland in Schoharie County to the Hudson River in the Village of Catskill.

After watershed communities sustained major flood damage from Hurricane Irene and Tropical Storm Lee in 2011, Cornell Cooperative Extension of Columbia and Greene Counties began working directly with municipalities and partners like Greene County Soil and Water Conservation District to share information on stream science, flooding, and watershed planning.

The Village of Catskill's Waterfront Resilience Task Force, with Scenic Hudson, the Consensus Building Institute, and NYS DEC Hudson River Estuary Program, developed a set of strategies to reduce flood risk in 2014. Cornell Cooperative Extension of Columbia and Greene Counties continues to support the Village as it implements these actions, including creating a guide to help residents and businesses prepare for flooding. The Village hosted a Climate-adaptive Design studio with Cornell University and NYS DEC Hudson River Estuary Program. Through this collaboration, graduate students in landscape architecture created designs for more flood-adaptive and connected waterfront areas along the Catskill Creek.

ccecolumbiagreene.org/natural-resources-and-the-environment/catskill-creek-watershed



Road flooding in Cairo during Hurricane Irene

Bob Hempread



Graduate students present designs for flood resilient waterfront areas.

Lobby Zemanits



Sharing designs with the community

Emily Vail



Fran Martino

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 517 square miles

Greater Stockport Creek Watershed Alliance

Educating people on and in the water

THE GREATER STOCKPORT CREEK

watershed includes the 52-mile Kinderhook and 42-mile Claverack Creeks. The watershed drains the western flank of the Taconic Mountains, along the New York-Massachusetts border, and the southern edge of the Rensselaer Plateau, in Rensselaer County. Stockport Flats, where the creek meets the Hudson River, is a freshwater tidal wetland and part of the Hudson River National Estuarine Research Reserve.

The Greater Stockport Creek Watershed Alliance formed in 2006 as part of Fran Martino's Empire State College capstone study. NYS DEC Hudson River Estuary Program provided early funding to incubate the group, the mission of



which is to explore, understand, and protect the watershed ecosystem through community involvement and stewardship. **A professional environmental educator, Fran Martino has helped the Greater Stockport Creek Watershed Alliance educate and inspire children and adults, including through a "Stream Spotter" program that trains community volunteers to monitor water quality.**

All told, the group's programs have engaged more than 500 individuals, along with non-profits, agencies, and municipalities. In 2015, the US Environmental Protection Agency honored Fran with an Environmental Champion Award, in recognition of her work to use citizen science and outdoor exploration to connect people to their watersheds.



REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 26 square miles

Saw Kill Watershed Community

Centering the community for science and advocacy

THE SAW KILL WATERSHED COMMUNITY began in 2015 with a series of facilitated meetings to identify concerns and organizing opportunities for this 16-mile-long tributary. The group started regular community meetings in 2016, each featuring presentations, discussion, and food, and it launched an informative monthly newsletter in 2020. The Saw Kill Watershed Community centers the community in all aspects of its work. It has worked with the Red Hook School District to offer hands-on, place-oriented instruction on the importance of the Saw Kill, and developed middle school curriculum for use throughout the Hudson River watershed and beyond.

One of the defining features of the Saw Kill Watershed Community has been its extensive community science effort, in partnership with

the Bard Water Lab. The water quality monitoring project gathers data relevant to concerns the community has raised about issues like septic systems, road salt, and pesticides in this largely rural watershed. It builds on a community monitoring program that was active in the 1970s, providing a rare and valuable baseline.

The Saw Kill Watershed Community has put its data and community engagement to work to draft watershed protections that can be incorporated into local law and policy. In 2019, the group presented recommendations from the *Saw Kill Watershed Source Water Protection Scorecard* to the Town of Red Hook, focusing on the Saw Kill as a water source for Bard College, as well as the public and private wells that tap its aquifer.

sawkillwatershed.wordpress.com



Boat launch at the mouth of the Roe Jan in Germantown



Water sampling of the Roe Jan at Bingham Mills

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 220 square miles

Roe Jan Watershed Community

*Collaborating for
community science*

THE ROE JAN WATERSHED COMMUNITY

started in 2016, when volunteers began collecting samples in the Roeliff Jansen Kill as part of Riverkeeper's Water Quality Program, which measures fecal indicator bacteria in the Hudson River and its tributaries. A broader watershed group non-profit formed from this effort, with a mission to protect and enhance the watershed through citizen science, education, and advocacy. **After partnering with the Bard Water Lab for technical assistance, and with support from Columbia-Greene Trout Unlimited, the Roe Jan Watershed Community expanded its community monitoring program to make additional measurements of watershed health.**

The 54-mile-long Roe Jan flows out of the Berkshire-Taconic mountains, and its watershed is characterized by farms, fields, woodlands, and low-density communities. This landscape has preserved some of the highest quality water of any routinely monitored Hudson River tributary, as the Roe Jan Watershed Community's data show. Good water quality can't be taken for granted, and the Roe Jan Watershed Community continues to engage people and communities throughout the watershed to get involved. In 2020, the group participated in a Land Use Leadership Alliance training program with Pace University's Land Use Law Center, which provided tools to manage future community changes in ways that preserve watershed health.

www.roejanwatershed.org



REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 425 square miles

Esopus Creek Watershed

Protecting drinking water at its source — and downstream communities

THE ESOPUS CREEK watershed is remarkably diverse, with one of the most important drinking water supplies in the world, a fertile agricultural valley that has produced food for thousands of years, communities built alongside both world-famous trout streams and all-but-forgotten buried streams, public and commercial swimming, tubing and paddling areas, and a rich tidal estuary. It's no surprise that the efforts to manage the watershed, too, are diverse.

The Ashokan Reservoir, the largest reservoir in New York City's system, provides 40% of drinking water for 9 million people. It divides the Esopus Creek into the 26-mile-long upper

and 30-mile-long lower sections. To preserve drinking water quality without expensive filtration, New York City invests in a multifaceted effort to protect and enhance the natural filtration provided by the largely forested 256-square-mile upper Esopus Creek in the Catskill Mountains. **One foundational element of this effort is the Ashokan Watershed Stream Management Program, a collaboration between Ulster County's Cornell Cooperative Extension and Soil and Water Conservation District, and New York City's Department of Environmental Protection.** The program creates and implements stream management plans to improve stream stability, reduce erosion, mitigate flooding,

and enhance habitat. The program also works directly with residents and municipalities to provide education on best management practices and to coordinate on projects.

The Lower Esopus Creek starts at the outlet of the Ashokan Reservoir, and relies on the quantity and quality of water that is released. Its watershed spans 169 square miles. After traveling through a steep valley to Marbletown, the Esopus Creek becomes very flat, with a wide floodplain and extensive agriculture. It enters the Hudson as an arm of the tidal estuary at the Village of Saugerties. **The Lower Esopus Watershed Partnership formed as an intermunicipal coalition in 2007 to focus on science-based management of this portion of the watershed, with its complexities as a downstream neighbor of the reservoir.** With funding from the NYS DEC Hudson River Estuary

Program, the group produced a technical stream corridor and watershed assessment to better understand flooding, erosion, and water quality in the Esopus Creek and its watershed. This information served as an important baseline when a series of tropical storms starting in 2010 caused extensive erosion, leading to excess sediment that affected both the Ashokan Reservoir and the Lower Esopus. The group, the information it had gathered, and the community it had educated, were pivotal in the “mud or flood” debate that followed, as communities downstream of the reservoir negotiated with New York City on how to manage releases from the reservoir. New York City Department of Environmental Protection began scheduled releases of water in 2011 from the reservoir to support downstream communities and ecosystem health.

ashokanstreams.org

loweresopus.org



Sediment in the Lower Esopus Creek
two months after Hurricane Irene



REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 42 square miles

Sawkill Creek Watershed

Fixing culverts for fish and floods

THE SAWKILL CREEK is a tributary to the Esopus Creek, and part of its larger watershed. From its Overlook Mountain headwaters, it flows 21 miles through the towns of Woodstock, Kingston, and Ulster. The Sawkill Watershed Alliance began in 2001, and produced a technical stream corridor study in 2007. Picking up on this work, Woodstock Land Conservancy reconvened stakeholders and a robust technical working group in 2018 and 2019 to continue to develop the capacity for science-based management of the watershed.

The Ulster County Department of the Environment has taken a watershed approach to reducing flooding and improving aquatic habitat in the Sawkill Creek watershed. Using a North Atlantic Aquatic Connectivity Collaborative protocol, the county assessed each point where town and county roads cross the



Sawkill or its tributaries. If not designed or maintained appropriately for a particular site, culverts and bridges can cause flooding and block fish and wildlife from passing. Municipal highway and public works departments can use this information to prioritize culverts for replacement, and ensure that new infrastructure both improves the ecological health of streams and increases community resilience to extreme weather. In the Town of Kingston, Ulster County Department of Public Works replaced an under-sized culvert that had contributed to significant flooding during Hurricane Irene. The new small bridge has held up well even during heavy rains.

ulstercountyny.gov/environment/stormwater-and-green-infrastructure/culvert-project



Maximilian Resnick

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 1 square mile

Tracing the Tannery Brook

Using art to prioritize a forgotten stream



Emily Vail

THE TANNERY BROOK is a small stream in the City of Kingston with a rich history. Over the centuries, people have used the brook to power mills, irrigate crops, and convey waste from industries. Today, the Tannery Brook is channelized and buried under roads, parking lots, and buildings. Its headwaters are diverted into the Twaalfskill and Rondout Creek, while the rest flows into the Esopus Creek. The stream was largely unknown, even as its underground course caused significant flooding and expensive damage to public roads.

In 2018, Emily Vail launched *Tracing the Tannery Brook* to share the brook's history and consider its future. A gallery exhibit shared historic maps and images. At Kingston's O+ Festival, she created an interactive exhibit that literally traced the buried stream with chalk. She asked, what belongs in a healthy stream? People of all ages contributed animals, plants, ripples, and people, along with their stories and memories. This celebration of the Tannery Brook garnered significant community support. The Tannery Brook was recognized in the City of Kingston's Natural Resource Inventory and Open Space Plan, adopted as part of the city's Comprehensive Plan in 2020. A Natural Resource Inventory compiles information about natural resources, and an Open Space Plan develops priorities for conservation. Kingston adopted the goal of restoring 2,500 linear feet of stream corridors, including the Tannery Brook and Twaalfskill.

tracingtannerybrook.com

Rondout Creek Watershed Alliance

Planting trees for healthy water

THE RONDOUT CREEK is a diverse watershed, including one of New York City's reservoirs, relics of the historic Delaware & Hudson Canal, and communities and farms set amid stunning scenery in the valley formed by the Shawangunks and Catskills. After it is joined by the Wallkill River, the Rondout forms the largest tributary to the Hudson River estuary.

From its headwaters on Balsam Cap Mountain, the Rondout Creek flows 21 miles into New York City's Rondout Reservoir. **As part of the**

city's multifaceted drinking water source protection initiative, the Rondout Neversink Stream Management Program creates and implements stream management plans for the 95-square mile Rondout Reservoir watershed. Administered by the Sullivan County Soil and Water Conservation District with funding from New York City Department of Environmental Protection, the Program has completed dozens of flood mitigation, erosion prevention, invasive species control and other stream restoration projects.

Volunteers celebrate planting trees along the Coxing Kill.



To focus on the creek downstream of the reservoir, the Rondout Creek Watershed Council formed in 2007 with support from Hudson River Sloop Clearwater and grant funding from the NYS DEC Hudson River Estuary Program. In 2010, with support of this intermunicipal council, Clearwater published a watershed management plan for the 310-square-mile portion of the Rondout Creek watershed from the Reservoir through the Rondout Valley to a dam at Eddyville. A 2015 *Tidal Rondout Creek Watershed Management Plan* led by the City of Kingston and funded by NYS Department of State covered the tidal portion of the watershed, from the Eddyville dam to the Hudson River.

The Rondout Creek Watershed Alliance reformed in 2014 with support from Riverkeeper, after residents volunteered to monitor water quality, organize shoreline cleanups, and plant and maintain trees with the Hudson Estuary Trees for Tribs program. An initiative of the NYS DEC Hudson River Estuary Program, Trees for Tribs provides free native trees and shrubs to plant along streams. Healthy vegetation provides a buffer around streams to reduce water pollution, reduce erosion and flood damage, and provide habitat for fish and wildlife. Volunteers have planted over 600 trees and shrubs since 2012 at one site along the Coxing Kill in Town of Rochester. The Rondout Creek Watershed Alliance has coordinated planting and maintenance work at this site, including removing protective tubes from trees that have grown large enough to withstand deer. Since 2007, there have been 28 Trees for Tribs planting projects at 13 sites in the Rondout Creek watershed.

rondoutneversink.org
rondoutcreekwatershedalliance.org

Before, 2014



Plants installed, 2014



2018



2020





REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 783 square miles

Wallkill River Watershed Alliance

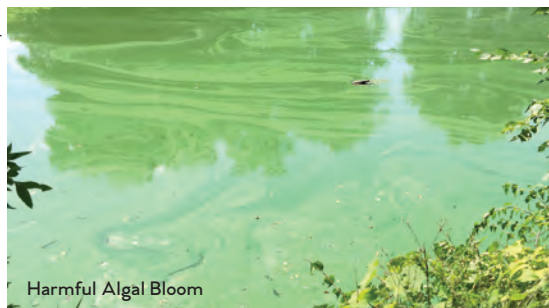
Turning toward the river to celebrate

THE 88-MILE-LONG WALLKILL RIVER begins in Sussex County, NJ and flows north through Orange and Ulster counties before joining the Rondout Creek. The Wallkill River watershed includes the City of Middletown and several villages, smaller rural and suburban communities, extensive agriculture in the Black Dirt region, and the Hudson River watershed's only National Wildlife Refuge. The Wallkill River Task Force formed in 1998, and contributed to a watershed management plan authored by Orange County agencies, which focused on reducing agricultural erosion, mitigating flooding, and improving water quality.

In 2015, the Wallkill River Watershed Alliance formed as a new community voice for the river, buoyed by volunteer water quality monitoring that Riverkeeper had supported since 2012. That same year, a Harmful Algal Bloom was observed in the river, prompting the Alliance, Riverkeeper, and SUNY Rockland to develop a plan to measure nutrients and algae in the river. With a grant from NYS DEC Hudson River Estuary Program, a 2016 monitoring project helped to thoroughly document an extensive, bright green Harmful Algal Bloom. This extraordinary bloom persisted for 60 days and affected as much as 30 miles of the Wallkill River, from

Montgomery to the Rondout Creek. Collaborating with a NYS DEC screening program, Alliance samples were confirmed to have high levels of cyanobacteria toxins that present a risk to people, dogs, and livestock. Health effects may include skin irritation, fever, nausea, and vomiting, or more serious neurological or liver damage.

Emily Vail



While algae are a natural part of a river ecosystem, a long-lasting and widespread Harmful Algal Bloom is not. Conditions that lead to blooms include high temperatures, slow water, and excess nutrients. NYS DEC responded in 2017–2019 with an extensive water quality study, confirming that excess nutrients in the

Wallkill are at levels that make it impaired under the Clean Water Act. In 2019, NYS DEC announced at the annual Wallkill River Summit, organized by the Alliance, that it is developing a clean water plan to systematically reduce nutrient overload in the river. The Alliance helped to keep decision-makers across the region informed about the roles they can take in the river's restoration during a 2019 Roundtable.

While focusing on these water quality challenges, the Wallkill River Watershed Alliance has also worked hard to promote the Wallkill River as a community asset. Volunteers have organized kayak trips to help people experience the river and record observations, floated their own distinctive homemade boats as part of the annual New Paltz Regatta, and helped Orange County Water Authority identify access points for a Wallkill River water trail. In 2019, the Alliance organized the Great Wallkill River Race in New Paltz. The event included a mile-long paddle race, with prizes for winners in different age categories, live music, an environmental resource fair, food, and other activities.

wallkillalliance.org

Members of the Wallkill River Watershed Alliance with their homemade boat for the annual New Paltz Regatta





REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 12 square miles

Monhagen Brook Watershed Working Group

Reducing the impacts of urban runoff

FROM ITS HEADWATERS, which include reservoirs for the City of Middletown, the Monhagen Brook flows about 10 miles into and through the city, before reaching the Wallkill River. It is completely buried underground for about two miles. NYS DEC identified Monhagen Brook and its tributaries as being impaired for excess nutrients in 2010, due to urban stormwater runoff. **This designation helped prioritize projects that study and improve water quality for state funding, starting with a 2016 NYS DEC Water Quality Improvement Program grant Orange County Soil and Water Conservation District used to build several green infrastructure projects to manage runoff and stabilize the Monhagen's eroding stream banks at a retail plaza in Middletown.**

In 2018–2019, Orange County Soil and Water Conservation District and Orange County Water Authority developed the *Monhagen Brook Watershed Conservation and Management Plan*, with funding from



NYS DEC Hudson River Estuary Program. The detailed projects identified in the plan provide a blueprint for the city and county agencies to implement. These projects range from relatively small to intensive. On the smaller side, the City of Middletown is ensuring that businesses are complying with municipal ordinances on litter and dumpster management, after the plan identified overfilled dumpsters as a source of trash in the brook. On the intensive side, the City is funding and implementing ambitious green infrastructure retrofits to improve stormwater runoff in their downtown area, built on earlier work by the District.

ocsoilny.org



Volunteers clean up the brook

Kevin Sumner

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 19 square miles

Tin Brook Watershed Alliance

Organizing to avert risks



Tin Brook Watershed Alliance

A TRIBUTARY OF THE WALLKILL RIVER, the Tin Brook flows nine miles through the Town of Montgomery and the Village of Walden. The Village of Walden was the first municipality in Orange County to join the Wallkill River Watershed Alliance, and the Tin Brook Watershed Alliance was launched with the support of that group in 2019. The *Wallkill River Watershed Conservation and Management Plan* had recommended in 2007 that the Tin Brook be prioritized for monitoring and restoration.

The Tin Brook Watershed Alliance is comprised of individuals from the Town of Montgomery and Village of Walden, surrounding municipalities, and members of the Wallkill River Watershed Alliance. **With the watershed located near the intersection of I-87 and I-84, Alliance members have been alarmed about a raft of large warehouse development proposals, and their potential to degrade water quality in the brook and its aquifer, which is the Village's source of drinking water.** The Tin Brook Watershed Alliance monitors and provides feedback on development proposals, working to mitigate potential water quality impacts. The group is also working with the Town of Montgomery to protect the Village's water supply. The group continues to provide community education and outreach to share the value of the Tin Brook.



AquaBlitz participants take a closer look at stream insects.

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 20 square miles

Fall Kill Watershed Coalition

Educating and inspiring youth

THE FALL KILL starts in Hyde Park and Clinton and flows to the Hudson River in Poughkeepsie. Its watershed transitions in 17 miles from rural in its headwaters to suburban and urban downstream. The Fall Kill Watershed Coalition formed in 2019, when organizations involved in Poughkeepsie's Northside Collaborative decided to focus on improving water quality of the Fall Kill with a group of experts and watershed municipalities. The Coalition builds off work from a previous Fall Kill Watershed Committee supported by Hudson River Sloop Clearwater.

The Fall Kill Watershed Coalition, supported by Scenic Hudson, has created engaging educational opportunities



Water testing with Dutchess Community College students

in and around the creek. Since 2018, Scenic Hudson and the Environmental Cooperative at the Vassar Barns have organized an annual Fall Kill AquaBlitz, working with local schools, R.E.A.L. Skills, the Family Partnership Center, and Cornell Cooperative Extension Dutchess County. A BioBlitz is a collaborative effort to find and identify living things in a specific area over a short period of time. This event brings this concept to the water. Students and volunteers collect and photograph organisms, which are uploaded to iNaturalist, a mobile app that tracks global biodiversity. Participants have created multimedia images with text and audio from the day, in collaboration with The Art Effect. This program connects residents with the Fall Kill and engages them in the Coalition's work, while teaching hands-on science and showing how the City of Poughkeepsie provides habitat for plants and animals.



Kate Phipps

Hudson 7

(Hudson River Drinking Water Intermunicipal Council)

Planning to prevent spills



Rebecca Martin

The Hudson 7 joined Ulster and Dutchess County Executives Pat Ryan and Marc Molinaro to support additional cleanup of PCBs.

THE HUDSON RIVER is a primary drinking water supply for over 100,000 people in the City and Town of Poughkeepsie, Village and Town of Rhinebeck, Town of Esopus, Town of Hyde Park, and Town of Lloyd. These seven municipalities joined together as the Hudson River Drinking Water Intermunicipal Council in 2018, with support from Riverkeeper. The watershed area that drains to their Hudson River intakes is very large, and complicated by the changing tides of the Hudson River estuary.

Threats to the Hudson River as a drinking water source include legacy contaminants, newly or unregulated contaminants, wastewater discharges, and climate change, including flood risks to infrastructure. **Crude oil spills pose an immediate risk, as increased traffic on the Hudson River by oil barge, tanker, and railroad car have increased spill potential significantly in recent years.** Federal and state agencies are responsible for coordinating plans to prevent and respond to spills of crude oil and other hazardous materials. In January 2020, for the first time, the Hudson 7 convened a meeting with the US Coast Guard and NYS DEC spill response representatives to discuss the river as a drinking water source and how to improve spill prevention and response plans.

Using a NYS Department of Health framework, the Hudson 7 also focuses on watersheds of tributaries that flow into the Hudson River between Germantown and Poughkeepsie as the area most directly contributing to the water supply.

hudson7.org

Casperkill Watershed Alliance

Promoting stewardship on and off campus

THE CASPERKILL CREEK flows 12 miles through the Town of Poughkeepsie, entering the Hudson River at Clinton Point. The Casperkill Watershed Alliance was active from 2006–2015, and formed through a NYS Water Resources Institute grant to the Vassar College Environmental Research Institute and Cornell Cooperative Extension Dutchess County. Vassar College faculty, students, and staff used the Casperkill watershed as a focal point for multi-disciplinary collaboration, including water quality monitoring and an oral history project.

The Casperkill Watershed Alliance developed a framework for a rain barrel building workshop in 2009 as part of Dutchess County Watershed Awareness Month. The workshop

provided participants with all the materials, tools, and instructions needed to build their own rain barrels. A rain barrel captures rain from a rooftop to use later to water a lawn or garden, and is an easy way for homeowners to conserve water and manage their runoff. Using this model, Cornell Cooperative Extension Dutchess County held over a dozen rain barrel building workshops throughout Dutchess County. The Hudson River Watershed Alliance featured the framework at its annual conference in 2011.

The Environmental Cooperative at the Vassar Barns continues to work in the Casperkill watershed, with Trees for Tribes plantings, educational programs, culvert assessments, and a rain barrel workshop.

Rain barrel workshop





REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 210 square miles

Wappinger Creek Watershed Intermunicipal Council

Building on a history of collaboration

THE WAPPINGER CREEK flows 43 miles southwest from Pine Plains to Wappingers Falls, where it joins the Hudson River. The watershed shifts from rural and agricultural upstream to suburban and urban downstream. Nutrients and sediment have impaired water quality, and invasive aquatic plants pose a threat. These problems have diminished the value of Wappinger Lake for recreation, and prompted the Village of Wappingers Falls to switch its water source at a cost of millions of dollars.

Cooperative efforts to restore the watershed began in 1995. Over five years, the Wappinger Creek Watershed Planning Committee completed the *Natural Resource Management Plan for the Wappinger Creek*, a guiding document published in 2000. During that time, representatives from the 13 municipalities within the watershed attended a Land Use Leadership Alliance training with Pace University Land Use Law Center, which highlighted the importance

of working across municipal boundaries to protect water resources. **The Wappinger Creek Watershed Intermunicipal Council (WIC) began in 2001, and the council has worked since then to support coordination between municipalities. The WIC has maintained a dedicated intermunicipal group for the past 20 years.**

The WIC secured Wappinger Creek as a “designated inland waterway,” through NYS Department of State. This allows municipalities along the creek to receive funding through the Local Waterfront Revitalization Program to develop and implement watershed management plans. The Village of Wappingers Falls received a NYS Department of State grant to update the plan from 2000, setting new priorities as a nine-element watershed plan. Nine-element watershed plans identify measureable strategies to reduce pollutants causing a water quality impairment recognized by NYS DEC, and the plan’s projects are prioritized for state funding.



Don Turner

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 98 square miles

Friends of the Great Swamp

Using nature to inspire

THE GREAT SWAMP is a wetland that covers 6,000 acres over five municipalities in Dutchess and Putnam counties. The Great Swamp supports 39 rare animals, plants, and natural communities, while also protecting water quality, reducing flooding, and providing opportunities for recreation and scenic views. It is unique in that it spans two watersheds. Water flows north from the Great Swamp via the Swamp River to the Ten Mile River, which joins the Housatonic River in Connecticut. Water also flows south into the East Branch Croton River, part of New York City's reservoir system.

Founded in 1990, Friends of the Great Swamp (FroGS) is an all-volunteer 501(c)(3) organization that takes a watershed approach to protecting this important wetland. FroGS fosters scientific research, works toward conservation land use planning with landowners and local governments, and supports sustainable uses of the Great Swamp and its watershed. **FroGS hosts very popular education programs, including hikes, rambles, canoe trips, displays, arts events, and programs for children.** These programs teach participants about nature and the importance of a clean environment, with an emphasis on the importance of the Great Swamp. Getting residents outside to experience the Great Swamp fosters appreciation and care of this unique natural area.

frogs-ny.org

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 56 square miles

Quassaick Creek Watershed Alliance

Coordinating volunteers for the creek

THE QUASSAICK CREEK'S HEADWATERS are in rural Ulster County, and the creek flows 18 miles before meeting the Hudson River in Newburgh. Water quality issues include Harmful Algal Blooms in Orange Lake and PFAS contamination in Washington Lake. The Quassaick Creek Watershed Alliance formed in 2008, and has engaged volunteers on numerous stewardship projects, including counting eels, planting trees as part of Trees for Tribes, and organizing cleanups. The Alliance contributed to the *Quassaick Creek Watershed Management Plan*, completed in 2014 by Orange County Water Authority with NYS Department of State funding. The plan guides the Alliance's actions to improve the Quassaick Creek.



Chris Bowser

The Quassaick Creek Watershed Alliance provides volunteers for the Hudson River Eel Project, coordinated by the NYS DEC Hudson River Estuary Program and Hudson River National Estuarine Research Reserve. American eels born in the Atlantic Ocean migrate each spring up the Hudson River and swim into freshwater streams. With the Eel Project, volunteers collect, count, and release eels in 15 tributaries. Large numbers of eels swim up the Quassaick Creek each spring. Between 2012 and 2019, over 187,000 eels were caught, counted, and released!

waterauthority.orangecountygov.com/quassaick.html



REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 8 square miles

Newburgh Clean Water Project

Engaging communities through a public health crisis

WASHINGTON LAKE, which sits in the Quassaick Creek watershed, has served as the City of Newburgh's primary drinking water supply since it was first tapped in 1853. In 1887, Silver Stream was diverted from the Moodna Creek watershed into Washington Lake, making it reliant on water from two different watersheds. The city also uses Browns Pond, a Silver Stream reservoir, and a connection to New York City's Catskill Aqueduct, which carries water from the Ashokan Reservoir. Like many reservoirs, Newburgh's water sources lie entirely outside of Newburgh's city limits, and decisions affecting the quality of their water sources are often beyond the city's control. In addition to siting an airport and military installation, highways, roads, strip malls and houses have been built in neighboring towns, and these decisions have put Newburgh's water sources at risk.

Newburgh Clean Water Project began in 2017 to respond to the contamination of Washington

Lake with PFAS chemicals associated with firefighting foams used at Stewart Air National Guard Base. It is a nonpartisan, grassroots group working to engage the community to advocate for long-term access to clean drinking water, ensure timely and comprehensive health resources for those who have been affected by PFAS and other contaminants, and restore the drinking water supply watershed. Newburgh Clean Water Project engages memorably and meaningfully with people of all ages and backgrounds. The group holds interactive water salons that feature local artists and faith leaders, expert speakers, maps, discussions, notices of important opportunities and government meetings, and more. It also hosts monthly informational water sessions and ensures that materials are accessible so people can understand, participate in, and inform this complex restoration process.

newburghcleanwaterproject.org



Erosion on the banks
of the Moodna Creek
in Cornwall

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 180 square miles

Moodna Creek Watershed Intermunicipal Council

Planning across towns and villages for public safety

THE MOODNA CREEK WATERSHED Intermunicipal Council began in 2010 after the Orange County Water Authority completed the *Moodna Creek Watershed Conservation and Management Plan*. The Council benefits watershed municipalities both individually and collectively by incorporating water resources into policies, along with securing and sharing grants. The Council creates a forum for intermunicipal dialogue on water quality and quantity, and improves coordination on projects. The Moodna Creek watershed has been under considerable development pressure and subject to extreme storms.

Hurricane Irene and Tropical Storm Lee caused major flooding in the watershed in August and September 2011. **The Moodna Creek Watershed Intermunicipal Council has supported flood mitigation plans in both the upper portion (through New York Rising programs) and the lower portion (through funding from NYS DEC Hudson River Estuary Program and NEIWPCC) of the watershed.** The Council plans to incorporate findings from both reports into the watershed management plan. With Orange County Water Authority, the Council has implemented a system of stream gages in the Moodna



Educational kiosk on the Moodna Creek watershed in Woodbury

Creek watershed to provide real-time water level data and monitor flood conditions. With a NYS DEC Hudson River Estuary Program grant, they have installed a new gage in Washingtonville, which has sustained the most flood damage in the watershed. This site is linked to the Orange County Emergency Management's system to serve as a flood warning system. The lower portion of the Moodna Creek watershed is also prone to erosion, and the Council works with Orange County Soil and Water Conservation District, municipalities, and Orange County to identify funding for remediation projects.

waterauthority.orangecountygov.com/moodna_council.html



Jay Beaumont

REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 19 square miles

Minisceongo Creek Watershed Alliance

Cleaning the creek and building support



Keep Rockland Beautiful

Volunteers at the Minisceongo Creek community cleanup

THE MINISCEONGO CREEK WATERSHED flows 11 miles through the towns of Haverstraw, Stony Point, and Ramapo in Rockland County. The Minisceongo Creek Watershed Alliance began in 2017, after a Community Resilience Building Workshop with The Nature Conservancy and Hudson River Watershed Alliance brought municipalities together to discuss flood risk. The workshop identified flooding, erosion, and culvert issues throughout the watershed, highlighting the need for a coordinated effort. Rockland Conservation and Service Corps members serving with the Village of West Haverstraw helped organize the first meeting.

The Minisceongo Creek Watershed Alliance hosts an annual community cleanup at GARNER Historic District, in partnership with Keep Rockland Beautiful. An urban stream, the Minisceongo Creek faces significant build-up of trash, which can impact water quality, ecology, and drainage. In addition to helping participants pick up trash, Minisceongo Creek Watershed Alliance members provide education on history, health, and wildlife in and around the creek. This grows community awareness of the Minisceongo Creek and a voice for the watershed. In 2019, 75 adults and youth removed 640 pounds of trash and 195 pounds of recyclables.

rocklandgov.com/departments/environmental-resources/protecting-our-streams-and-waterways/watershed-alliances

Sparkill Creek Watershed Alliance

Advancing water quality science

THE SPARKILL CREEK'S WATERSHED includes parts of Rockland County, NY and Bergen County, NJ. A largely suburban stream, the Sparkill Creek flows eight miles and enters the Hudson River at Piermont Marsh, part of the Hudson River National Estuarine Research Reserve. The Sparkill Creek Watershed Alliance began in 2011, after educator Laurie Seeman took a group of summer arts students out to explore the Sparkill Creek. One of the students declared, "This water smells bad! You need to tell the adults that the kids know." Water quality sampling by Riverkeeper near the mouth of the Sparkill Creek in 2011 confirmed high levels of fecal indicator bacteria. **These findings galvanized the community group to organize and develop a series of strong science partnerships to investigate further by sampling throughout the watershed.**

The Sparkill Creek Watershed Alliance has partnered with researchers at Columbia University, Queens College, and Dominican College; won grants from the New York-New Jersey Harbor and Estuary Program, NYS DEC Hudson River Estuary Program, NEIWPCC, and US Environmental Protection Agency; and worked with

state and local agencies to develop strategies to improve the water quality issues identified through monitoring. With Queens College, the Sparkill Creek Watershed Alliance is using novel techniques using microbial DNA to understand sources of fecal indicator bacteria. The Alliance also collected nutrients data with Riverkeeper in 2020 as part of NYS DEC's Professional Evaluation of Rivers and Streams (PEERS) program. These data will be used to update NYS DEC stream assessments, which influence decisions about priorities for funding to rehabilitate sewers or make other water quality improvements.

The Sparkill Creek Watershed Alliance in 2015 benefited from the nationally-competitive US Environmental Protection Agency's Urban Waters Small Grant program. Led by Sarah Lawrence College Center for the Urban River at Beczak (CURB), the project supported water quality monitoring in Saw Mill River, Bronx River, Pocantico River, and Sparkill Creek watersheds. This project established the Lower Hudson Urban Waters Collaborative partnership for organizations in the Lower Hudson Valley to share experiences and data to strengthen stewardship and community science.

sparkillcreek.org





REGION: Hudson River Estuary Watershed | WATERSHED SIZE: 27 square miles

Saw Mill River Coalition

Transforming a city's relationship to water

THE SAW MILL RIVER, which flows for most of its 23 miles along the Saw Mill River Parkway, meets the Hudson River in Yonkers. The Saw Mill River Coalition began in 2001, and is led by Groundwork Hudson Valley with Sarah Lawrence College Center for the Urban River at Beczak (CURB). Watershed municipalities are represented through the Saw Mill Watershed Advisory Board, which includes Westchester County Board of Legislators, Westchester County Department of Planning, and 12 watershed municipalities.

The Saw Mill River Coalition, in partnership with numerous organizations and agencies, led a major project to daylight the river in downtown Yonkers. Daylighting describes restoring rivers that have been buried, often a result of past public works projects. For over a decade, the Coalition organized public engagement, brought together stakeholders, and promoted

the daylighting project. In 2011, the first phase of daylighting the Saw Mill River was completed at the new Van der Donck Park. Through educational exhibits, visitors can investigate the river's history and ecology.

In 2014, the US Fish & Wildlife Service designated Van der Donck Park as a National Fish and Wildlife Urban Refuge. **Groundwork Hudson Valley and the Saw Mill River Coalition have used the park and daylighting as a catalyst to engage youth and residents in stewardship.** Active stewardship groups in Yonkers, Hastings-on-Hudson, Dobbs Ferry, and Pleasantville manage invasive species, plant native trees and shrubs, work on trails, clean up trash, and improve access and recreation along the Saw Mill River. This work helps improve water quality and habitat, and continues to promote the Saw Mill River as an asset in these communities.

groundworkhv.org/programs/transforming-places/saw-mill-river-coalition



Garrett Hougham

Studying road salt in the Sing Sing Kill

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 5 square miles

Sing Sing Kill

Connecting students with research

THE SING SING KILL flows from New Castle through Ossining. Before it joins the Hudson River, it enters a steep gorge with views of the Old Croton Aqueduct, now part of the Sing Sing Kill Greenway Trail. Before the trail opened in 2016, the stream lacked visibility. In 2016, Hudson Valley Arts and Science received grant funding from NYS DEC Hudson River Estuary Program to study water quality, survey fish, and characterize 64 culverts for fish passage. Spending a summer on the stream with interns and volunteers generated substantial public interest in the Sing Sing Kill, and the study informed interpretive signs at the trail and other locations.

High school students from three local schools have focused on the Sing Sing Kill for research projects, with mentors from Ossining High School, Cary Institute of Ecosystem Studies, NEIWPCC, and Hudson Valley Arts and Science. Volunteers monitor water quality throughout the year, and sensors in the Sing Sing Kill measure salt concentrations and water level continuously. By pairing these data, researchers can estimate the total amount of salt exported by the Sing Sing Kill to the Hudson River. This information can be compared with the amount of salt applied to better understand how salt travels through the watershed.

ossining.org

REGION: Hudson River Estuary Watershed
WATERSHED SIZE: 56 square miles

Bronx River Alliance

Reclaiming the river

THE BRONX RIVER runs 23 miles from the Kensico Dam in Westchester County through 12 municipalities and the Bronx. It is an important tributary of the East River, a tidal strait connecting the Hudson River estuary with Long Island Sound. In 1974, activists formed Bronx River Restoration, and in 1997 Partnerships for Parks convened more than 60 community organizations, agencies, and businesses as a working group. The Bronx River Alliance formed as a 501(c)(3) organization in 2001 to continue this work.



Bronx River Alliance

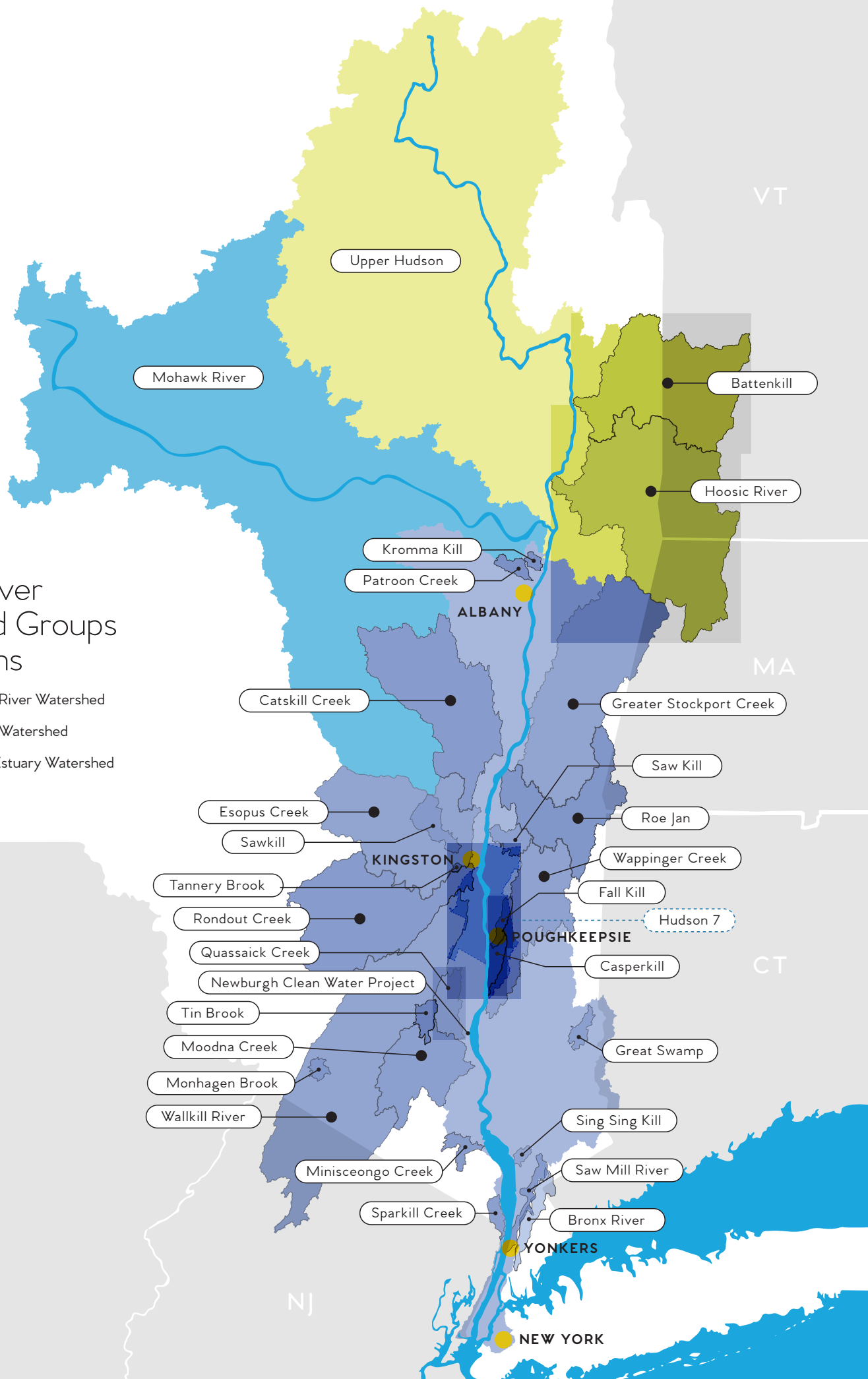
The Bronx River Alliance changed perceptions of the Bronx River from an abandoned dumping ground into a community resource. Its Ecology Team, with New York City Parks Department, works with a full-time Conservation Crew and volunteers from the community to remove invasive species and replant native vegetation in the Bronx River corridor's public parks. The Greenway Team guides planning for the Bronx River Greenway, a linear park. In 2012, the National Park Service designated the lower eight miles of the Bronx River as a National Water Trail. The Bronx River Alliance conducts community science, education, and outreach programs, in addition to bike and canoe trips that draw hundreds of people to the river each year. The Alliance provides a unique structure for public sector and community members to pursue a common goal, serving as a national model for community-based waterfront development.

bronxriver.org



Hudson River Watershed Groups and Regions

- Upper Hudson River Watershed
- Mohawk River Watershed
- Hudson River Estuary Watershed





NEW YORK STATE | **Hudson River Estuary Program**

A Program of the New York State Department of Environmental Conservation



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