2023 Annual Report

Greene County Soil & Water Conservation District

In 2023, GCSWCD continued to assist Greene County landowners, municipalities and others in meeting their natural resource management objectives. The District continues to focus on multiple benefit programs that help achieve a balance between community growth and conservation. Over the years, the District has positioned itself as a respected agency that is known for its ability to address complex natural resource issues.

The District continues to expand its technical capabilities and uses them to help constituents throughout the County. While the District continues to increase its natural resource planning activities, it still maintains its primary strength as an agency that implements effective on-the-ground conservation.

This report summarizes the diverse activities undertaken in 2023.

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Grants Awarded to Local Initiatives

Round 27 (March 2023) awarded a total of $88,000 through the Local Flood Analysis (LFA) category. The project that received this funding was:

- **County Route 23C Culvert Replacement Design in Jewett: $88,000** awarded to the Greene County Highway Department
  Through this project, SMIP funding will support engineering services and design for a culvert that will replace two existing culverts that convey the flow of Town House Brook as well as stormwater runoff under County Route 23C. The upsizing of these culverts addresses recommendations in the Town of Jewett's LFA that was completed in 2022.

Round 28 (September 2023) awarded a total of $14,441 through the Education and Outreach and Planning and Assessment categories. The two projects that received this funding were:

- **Schoharie Reservoir Paddling Program: $4,478** awarded to the Education & Outreach Subcommittee of the Schoharie Watershed Advisory Committee
  Through this project, SMIP funding will support the implementation of a kayaking program at the Schoharie Reservoir. This program will provide education while engaging the Watershed community in outdoor recreation.
- **Prattsville Streambank Willow-Knotweed Pilot Project: $9,963** awarded to the Media Collective
  Through this project, SMIP funding will support the implementation of a project that is designed to address the ecological degradation caused by invasive Japanese knotweed while simultaneously promoting the rejuvenation of native willow along a scenic stretch of Schoharie Creek.

Established in 2008, the SMIP is administered through the Schoharie Watershed Stream Management Program (SWSMP) at GCSWCD, in partnership with the New York City Department of Environmental Protection (DEP).

The SMIP operates on a 5-year cycle and offers funding twice a year to implement projects, programs, or management efforts that serve to protect water quality within the Schoharie Reservoir watershed (Watershed). Funding is offered under the following categories: Education & Outreach, Highway & Infrastructure, Stream Restoration, Habitat & Recreation, Planning & Assessment, and Local Flood Analysis. Currently in Cycle 3, funds remain in all but the Highway & Infrastructure category, and there is very limited funding in the Stream Restoration category.

To date, 122 SMIP grants have been awarded – bringing over $5.5 million dollars to the Mountaintop's government agencies, individual property owners, schools, and 501(c)(3) organizations in support of flood resilience, water resource improvements, and watershed-related programming. Applications are due by March 15th and September 15th every year.

Wolff Rd. Stream Restoration

Initially observed in the 2004 West Kill Stream Feature Inventory (SFI), a major eroding bank on the West Kill - in the Town of Lexington - was established as a Bank Erosion Monitoring Site in 2005. Then, riprap that had been placed at the base of the 80 ft high hillslope was washed out from the severe flooding of Tropical Storm Irene in 2011. This allowed a headcut (an erosional feature that presents as an abrupt vertical drop in the stream bed) to move up the channel leading to increased erosion into glacial till and clay deposits in the streambed and bank. A second SFI in 2018 identified continued erosion and that the energy of the flowing water was being directed toward the toe of the hillslope, destabilizing the ground above it and contributing to its failure.

The design process began in 2020 with a goal to halt channel incision (downcutting) and reduce turbidity (cloudiness of the water created by suspended clay particles) contribution from the hillslope failure. The **repair length was approximately 750 linear feet** and included channel re-alignment, construction of a stable floodplain bench along the failing slope, installation of grade control to halt incision and rock revetment to armor the stream bank and base of hillslope. In-stream and site construction were completed this past August and bioengineering measures were completed in November.

Pre-construction photo showing how the energy of the flowing water destabilized the hillslope and contributed to high turbidity in the channel.

Post-construction photo showing the re-aligned channel and the newly graded area seeded with steep slope, riparian and wetland seed mixes.

Stream Restoration: Red Falls, Project 3

Construction activities for Red Falls, Project 3 began in summer 2023; however, the project was delayed due to the season's excessive rainfall and higher-than-normal baseflow runoff conditions creating an inability to pump around the construction area as permitted. To address the unusually high stream flows, a contract change order was issued and a second 30-inch diameter diesel hydraulic bypass pump and pipeline were installed the week of August 7, 2023. These additional measures supported a capacity of approximately 70 cfs, doubling the overall bypass capacity. Unfortunately, given the continued rainfall and high base flow, this bypass capacity proved insufficient.

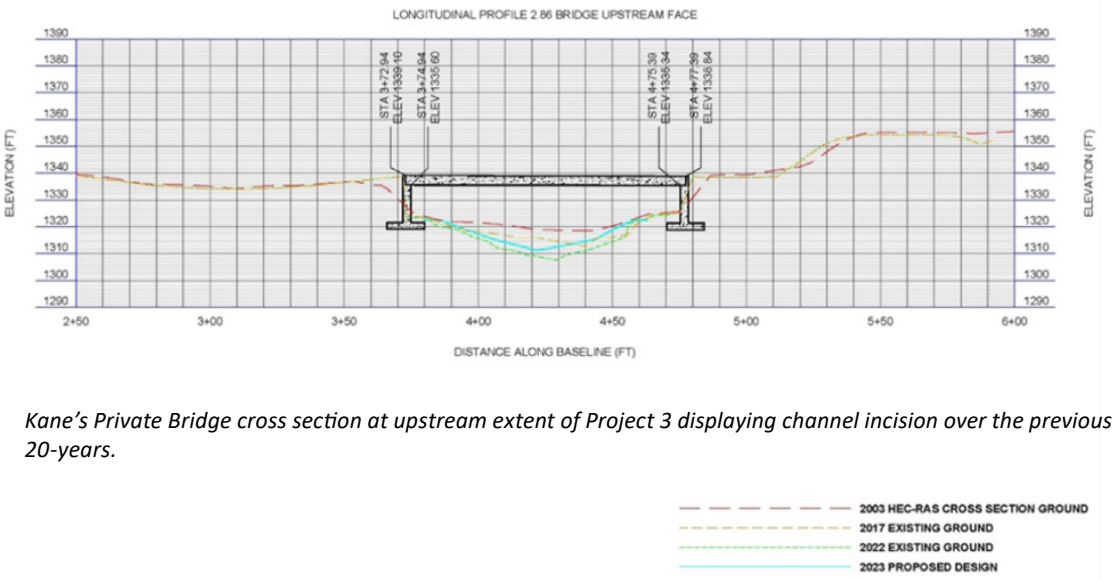
The fundamental goal of Project 3 is to restore functions of a 1,650-foot-long section of the Batavia Kill with the objective of reducing impacts to water quality from fine sediment loading from excessive erosion. The existing condition of the stream reach is highly degraded, entrenched, and incised – containing extreme streambed and bank erosion, and minimal diversity of aquatic habitat. The existing riparian buffer is inadequate and provides little to no benefit in reducing erosion or improving water quality and habitat.

In 2011, Hurricane Irene was estimated as a 500-year flood event locally. The flood caused significant damage in the reach including extensive stream channel incision and entrenchment, and stream bank erosion and hillslope failure. Monitoring of the reach has established rates that are extensive, measuring several feet of lowering at the upstream extent private bridge cross section. After the flood in 2012, under state of emergency, private landowners performed extensive grading in the channel and floodplain with the intention to protect the compromised bridge foundations and improve conveyance of the downstream reach. This unguided emergency work left the reach in a highly unstable, degraded condition, prone to further incision and predicted long-term instability.

This current condition of the reach increases the risk for potential hillslope failure and impact on the highway and private bridge foundations, thus reducing public safety. The existing incised clay-lined channel is causing water quality degradation of the drinking water supply and significant trout habitat impairment due to nearly continuous turbidity.

To complete Project 3, the following schedule is proposed for the 2024 construction season:

- Phase I: Temporary Access Road and Stream Crossing (6/15/24 – 6/20/24)
- Phase III: Upper Reach Stream Restoration (6/21/24 - 6/30/24)
- Phase IV-A/B: Lower Reach Stream Restoration (7/1/24 - 8/3/24)
- Phase V: Topsoiling & Site Restoration (9/2/24 - 9/7/24)
- Phase VI: Site Revegetation (10/1/24 - 10/25/24)
- Phase VII: Access Road Removal (10/26/24 - 11/8/24)



Kane's Private Bridge cross section at upstream extent of Project 3 displaying channel incision over the previous 20-years.

Bank Erosion Monitoring Studies

BEMS project team conducting a topographic survey of the stream cross section using a Leica total station.

BEMS project team processing sediment for a bar sample.

During the 2023 field season, Schoharie Watershed Stream Management Program (SWSMP) staff at GCSWCD worked with the Watershed Conservation Corps and other program partners to conduct a comprehensive Bank Erosion Monitoring Study (BEMS) within the Schoharie Reservoir watershed. The study covered **5,640 feet of stream across 16 sites around Greene County and the larger Schoharie Reservoir watershed**. All study sites had previously been identified as locations where significant streambank erosion warranted further monitoring. Twelve of these sites were identified during Stream Feature Inventories (SFIs) and other watershed assessments that were completed between 2020 and 2022; and included sections of the Bear Kill, Johnson Hollow Brook, and Manor Kill. The remaining four BEMS sites were identified by the SWSMP as locations for potential treatment projects within the next 4-5 years. These included stretches along the East Kill, Schoharie Creek, and West Kill.

The BEMS included extensive assessments and topographic surveys that are used to characterize the morphology (size, shape, and structure) of the eroding hillslope and streambed. Following standardized bank erosion assessment protocols developed by esteemed hydrologist, Dave Rosgen, the team completed:

- **Longitudinal profile surveys:** topographic surveys conducted along the length of a stream (from upstream to downstream) that capture the slope of the streambed and water surface.
- **Cross-section surveys:** topographic surveys conducted across the stream channel (from one bank to the other) that produce graphical representations of channel dimensions (i.e. shape, width, and depth).
- **Pebble counts:** part of the sediment analysis; the method of counting and measuring representative samples of streambed material (i.e. gravel, cobbles, and boulders).
- **Bar samples:** part of the sediment analysis; the method of determining the composition (size and weight of particles) of the underlying streambed.
- **Photo monitoring:** photographic documentation of representative points throughout the study area that is accompanied by GPS data collection to ensure consistency in future monitoring efforts.
- **Assessments of stream condition and departure from potential:** an assessment that includes a series of desktop analyses and the completion of worksheets that have been developed by Dave Rosgen.

The evaluations completed at BEMS sites are part the SWSMP's continued planning and implementation efforts in the Watershed. The information gathered at each site will be used to assign severity ratings to the observed conditions, characterize the streambank erosion hazards, and help prioritize stream restoration efforts in the future.

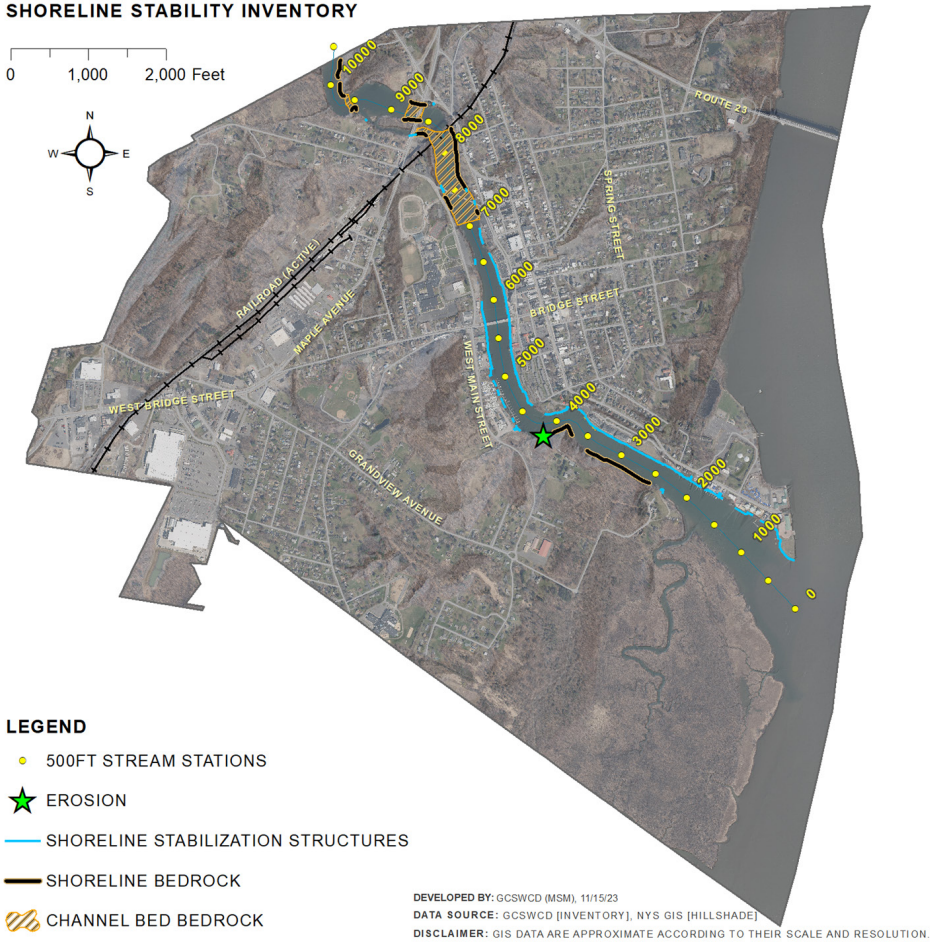
The SWSMP at GCSWCD is the stream management program for the Schoharie Reservoir watershed and is one of four reservoir-basin stream management teams working within the New York City Catskill/Delaware Water Supply watershed. The SWSMP works collaboratively with local municipalities and landowners to provide these services for local communities, while also providing for the protection of the public drinking water supply that reaches a larger population within New York State.

Catskill Creek Shoreline Assessment

Outside of the Schoharie Reservoir watershed, GCSWCD assisted the Village of Catskill with an **assessment of shoreline conditions along 10,385 ft. of Catskill Creek**. Prior to beginning the fieldwork portion of the project, a desktop analysis of land cover within the Creek's watershed was conducted using the 2021 National Land Cover Database (NLCD). This analysis showed that 8% of the entire 414 sq. mi. Catskill Creek watershed is classified as "developed". 34% of this developed land lies within the Village of Catskill with much of that development being located on the shores of the Catskill Creek near its confluence with the Hudson River.

In late August, the project team worked to collect relevant data from the northwestern limits of the Village (approximately a quarter mile upstream of the 9W bridge), down to the mouth of the Creek. The field evaluation lasted four days using both motorized and non-motorized boats. During this time, natural and manmade features that influence the stability of the shoreline were documented. Natural features included any shoreline erosion and visible bedrock exposures in the streambed or along the stream banks. Manmade features included engineered shoreline stabilization measures.

Historically, three forms of shoreline stabilization measures have been used to address shoreline erosion along Catskill Creek in the Village of Catskill, including bulkheads, revetments, and abutments. Currently, shoreline protection measures are present along approximately 7,613 linear feet – or 70% - of the Creek within the project extent. Bulkheads were present along 4,176 feet of the modified shoreline (55%) and are the dominant stabilization technique. Revetment has been applied to 3,278 linear feet (43%), and abutments represent 159 linear feet (2%).



Spatial distribution of the bedrock, erosion, and shoreline stability structures observed during the 2023 field evaluation.

The functional and structural condition of each structure was evaluated. The functional assessment provides information about the ability for the structure to protect the shoreline from hydraulic erosion, while the structural assessment speaks to the integrity and potential for impending degradation of the bulkhead, revetment, or abutment. An overall status of protective, threatened, or non-functional was assigned to each structure. Based on the conditions observed during the field evaluation, it was determined that 716 linear feet – or 9% – of shoreline modification structures were not functional. Approximately 3,080 linear feet – or 40% – of all installed structures were considered threatened based on structural and functional condition, along with the presence – or lack – of scour protection (armoring at the toe of the shoreline that provides protection from flowing water).

This project was identified as an action item in the Village of Catskill's Local Waterfront Revitalization Program (LWRP) Master Plan. The LWRP serves as the Office of Planning and Development's primary program for working in partnership with waterfront communities across New York State to address local and regional waterway issues. After the shoreline evaluation was completed, an inventory report was developed by the District. The next steps in the project, as mentioned in the Village's LWRP Master Plan, include producing repair or replacement scenarios for non-functional or threatened structures, coordinating with regulatory agencies to go through the permitting process, and determining the need for management of the shoreline.

Catskill Streams Buffer Initiative (CSBI) Planting Projects

In 2023, the Catskill Streams Buffer Initiative (CSBI) at GCSWCD **planted 2,315 native trees and shrubs, 116 bare root flowering plants, and installed 1,100 native willow stakes along 5,555 feet of stream – restoring 5.85 acres of land**. These totals were spread across six new CSBI streamside planting projects along areas of the Batavia Kill, Bear Kill, Manor Kill, and three sites along Schoharie Creek.

These projects help to protect vulnerable areas from being overrun by invasive species, fill in gaps to increase species diversity where native vegetation is lacking, quickly revegetate vulnerable streamside areas, and establish a native ground cover (through seeding and mulching). Reestablishing riparian (streamside) forest buffers also play a valuable role in providing flood control, creating wildlife habitat, and minimizing streambank erosion.

CSBI also worked to protect the new plantings by installing deer fencing at two sites, tree tubes at all six new sites, and treated Japanese knotweed stands at eight sites.

The District was supported by SUNY Delhi interns in assessing the condition of 1,104 trees in 122 monitoring plots across 30 completed project sites. This project monitoring is data is collected in order to determine project success and inform future efforts.

Among the six projects completed in 2023, was the installation of a multifunctional riparian buffer (MFRB) on the Schoharie Creek.

As with all riparian restoration plantings, MFRBs support stream health and water quality by:

- controlling water temperature by providing shade,
- improving aquatic habitat by contributing organic matter,
- strengthening streambank materials with their dense, deep networks of roots,
- reducing erosion through protection offered by the above-ground plant material, and
- creating pollinator and wildlife habitat.

Many MFRBs include native trees and shrubs that produce native edible fruit and nuts, as well as flowers that provide pollen and nectar, and therefore provide an even greater variety of ecosystem services. In designing these projects, landowner goals and conservation objectives can both be addressed.

CSBI has been working with local landowners who wish to establish a new buffer or improve an existing buffer by planting native trees and shrubs, since 2010. Participation in the CSBI program is free for eligible landowners in the Schoharie Reservoir watershed. GCSWCD provides and installs plants in areas adjacent to the stream at no cost.

Hydroseeding and Plant Material Center (PMC) Upgrades

GCSWCD completed **four hydroseeding projects** in 2023 yielding a total of **28,500 sq. ft.** (1,350 linear feet) of land being seeded.

District staff completed the construction of two hoop greenhouses at the Plant Material Center – increasing capacity for storing the containerized stock used for riparian buffer plantings. Over **8,000 bare root plants were potted up in 2023** – a record for the District!

Additional upgrades at the PMC included the repair of drainage along the deer fencing and irrigation improvements.

Agricultural Programs

In 2023, former Heavy Equipment Operator, Alex Johnk, became a District Technician with a focus on agricultural programs. Along with technical assistance to Greene County agricultural producers, GCSWCD facilitates participation in two State programs: the Agricultural Assessment Program and Agricultural Environmental Management (AEM).

GCSWCD **developed soil maps and Soil Group Worksheets for 32 parcels** in the Towns of Ashland, Athens, Catskill, Coxsackie, Durham, and Greenville. Of the 32 parcels, 16 parcels were included in Greene County's Agricultural District 124. Approximately 1,190 acres of agricultural land, 284 acres of farm woodland, and 20 acres of excess woodland were included in the 2023 NYS Agricultural Assessment Program for Greene County.

Additionally, **two Tier 2 AEM Assessments** were completed on farms in the Towns of Cairo and Durham.

Education & Outreach

2023 educational offerings began with the 4-Hour DEC-Endorsed Erosion & Sediment Control Training in March. This training was **attended by 50 local contractors, subcontractors, consultants, and other individuals** that will be involved with the implementation of the Stormwater Pollution Prevention Plan on a construction site.

May marked the return of Schoharie Watershed Month (SWM). SWM is a month-long series of free events that celebrate and raise awareness of the waterways that flow across the Schoharie Basin, as well as the 315 square miles of land that feed them. This series offers a diverse range of experiences that will help participants gain a more holistic understanding of the role they play in the health of this living resource. Last year's festivities included the:

- Watershed Wednesdays Webinar Series – a weekly virtual program featuring a variety of speakers on the following range of topics:
  - » *The Hidden Native History of the Catskill Mountains* with Justin Wexler of Wild Hudson Valley
  - » *What Could Stream Management in the Catskills Look Like in 50 Years?* with Mark Vian, Restoration Ecologist
  - » *Reading the Forested Landscape* with Tom Wessels, Terrestrial Ecologist
  - » *Mental Health in the Age of Compounding Disasters* with Andrew O'Meara of Institute for Disaster Mental Health
  - » *Understanding the Impact of Climate Change on Forests: Tools You Can Use* with Danielle Shannon of the Northern Forests Climate Hub

  In total, the five webinars were attended by 88 members of the community.
- Schoharie Watershed Summit - a one-day conference that serves as a forum that brings a diverse set of Watershed stakeholders together to network, learn from, and share interests with one another.

  The 2023 Summit received 51 attendees.
- Mountain Top BioBlitz - a biodiversity hunt at the Mountain Top Arboretum that provided fun for the whole family by offering the opportunity to connect with the environment and local community. The BioBlitz was a full day of presentations and walks led by environmental professionals where attendees were encouraged to document all plants, animals, and fungi they encountered.

  The BioBlitz was attended by 66 people and 152 observations were logged in the iNaturalist app.
- Arm-of-the-Sea Theater's performance of A Riparian Rhapsody: *How the Forest Sings to the Stream* – a puppet extravaganza that dives into Catskill ecology to reveal the intricate interactions between forests and streams, and lyrically makes the case for protective streamside buffer zones.

  19 members of the community attended this free event.
- Volunteer Tree Planting – a day of planting over 400 trees along a stretch of the Bear Kill. Volunteers had the opportunity to work with GCSWCD staff to learn proper tree planting techniques, gather with community, and reflect on the importance of riparian buffers while making a difference.

  The Bear Kill planting was supported by 8 volunteers.

In June the District invited professor, author, and terrestrial ecologist, Tom Wessels, to lead an interpretive forest walk through the Colgate Lake Wilderness Area. During this two hour program, Tom guided attendees in reading the landscape as they explored the forested trails and riparian zone. **The walk was attened by 18 community members.**

School Visits

The District brought watershed education to four schools in 2023. Visits to Athens, Catskill, Cairo-Durham, and Windham-Ashland-Jewett began with brief introductions to the water cycle and were followed by demonstrations of the Augmented Reality Sandbox, EnviroScape Watershed, and Ward's floodplain models. The programs provided an introduction to stream processes and management tailored to their existing school curriculum. Students gained an understanding of different watershed features and water quality issues. This includes: topography, drainage patterns, point vs non-point source pollution, stormwater runoff, and how human activity can impact the way streams function. A total of **273 students** particpitated in these activities.

Additionally, District staff attened the Windham-Ashland-Jewett school career day and the Hunter-Tannersville Trout Release Day.

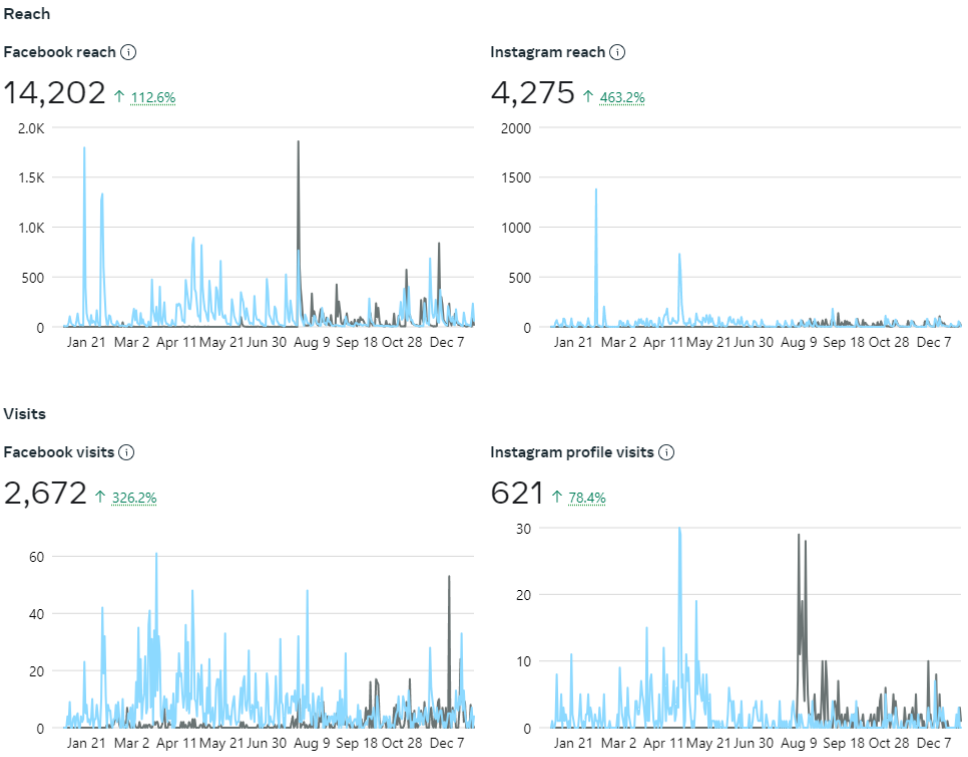
Greene County Youth Fair

In July GCSWCD returned to the Greene County Youth Fair. Time at the Youth Fair was focused on distributing outreach materials that raise awareness about programs offered through the District, and running demonstrations of stream processes using the Emriver stream table. In addition to bringing the stream table, the Conservation Craft Corner was introduced in 2023. This youth focused play area offered two activities: painting tree cookies and planting a willow cutting to bring home. The demonstrations at the Youth Fair reached approximately **500 people** over the course of the four days.

Social Media

GCSWCD has continued to increase visibility and community engagement through social media outreach. This effort has yielded a clear increase in reach and audience participation.

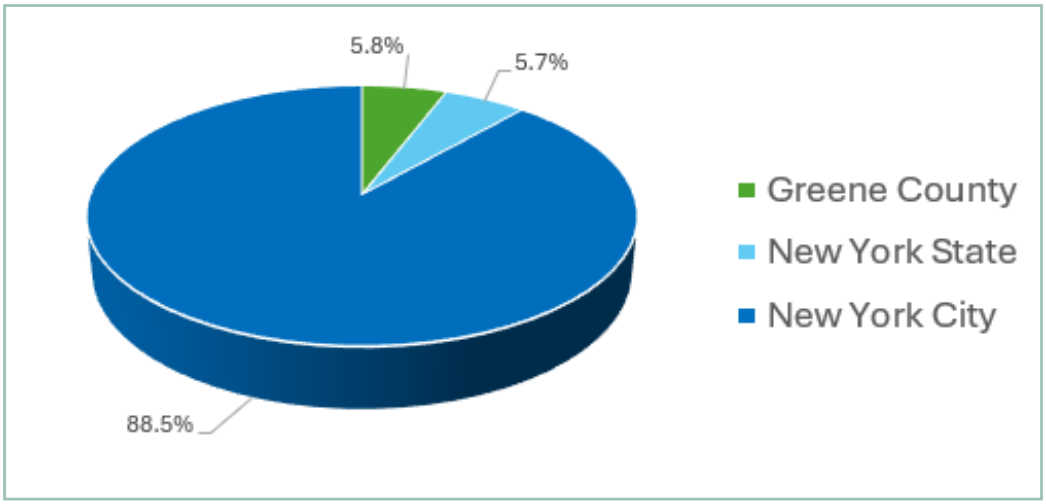
The graphs to the right show the increase in our Reach and Page visits on both Facebook and Instagram. 2023 data are shown by the blue line, and 2022 data are shown by the grey line – note that the Instagram page was formed in August of 2022, so data missing from first part of year.



District Funding

In 2023, the District received $4,370,417.15 in total funding. Included in that amount is $247,746.76 from New York State for reimbursement of technical services and conservation projects, a $254,538.00 allocation from Greene County, and $3,868,132.39 through the District's partnership with NYC Department of Environmental Protection.

The District's allocation from Greene County has remained consistent at $254,583.00 for the period spanning 2018—2024; as our overall funding grew by nearly 12% from 2022 to 2023.



District Staff

Joel DuBois	Executive Director
Laurie Deyo	Administrative Assistant/ Executive Secretary
Rich Andreassen	Conservation District Program Engineer
Jake Buchanan	Conservation District Program Specialist
Chris Langworthy	Conservation District Program Specialist
Abbe Martin	Conservation District Program Manager
Michelle McDonough	Conservation District Program Technician
Brandon Terrill	Conservation District Program Technician
Alex Johnk	Conservation District Program Technician
Michelle Yost	Watershed Assistance Program Coordinator
Laura Wyeneth	Catskill Streams Buffer Initiative Coordinator
Amanda Cabanillas	Education and Outreach Coordinator

Board of Directors

James Story	Chair, Farm Bureau Representative
Dennis Lucas	Vice Chair, Member at Large
Tom Hoyt	Treasurer, Member at Large
Eric Rasmussen	Member at Large
Michael Bulich	Legislative Representative
Jim Thorington	Legislative Representative

2023 SCA Intern

Adrianne Thackery Stream Stewardship Assistant