

Esopus Creek NEWS

PUBLISHED BY CORNELL
COOPERATIVE EXTENSION
ULSTER COUNTY

Esopus • Birch • Bushnellsville • Fox Hollow • Peck Hollow • Broadstreet Hollow • Woodland Valley • Stony Clove • Beaver Kill • Little Beaver Kill • Traver Hollow • Bushkill

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Floodplain Parks - Lessons from Brattleboro, Vermont

A stable river can effectively move large volumes of water and sediment without major adjustments to its channel depth, slope, width, or meanders. An essential element of a stable river is access to a well-vegetated floodplain. Floodplains can be thought of as “pressure relief valves” that allow flood flows to exit the river channel and disperse high velocity water outside of the channel.

Historically, floodplains were easy places to develop for agriculture, housing or roads because of their flatness compared to the steep valley walls defining hollows. However, the risk of living in the floodplain is that flood flows will exit the river banks and enter the floodplain, exposing property to potential inundation and erosion.

Local, state, and federal programs are available to help homeowners who wish to voluntarily floodproof or relocate outside of floodprone areas. In the Catskills, the voluntary NYC-Funded Flood Buyout program (FBO) assists property owners with relocating away from the dangers of flooding. Special assistance is given to homeowners and businesses who choose to relocate to higher ground within their communities. Additional programs provide funding for elevating and floodproofing structures.

Local town supervisors and community members are interested in how flood buyout sites can be repurposed as community assets.



The Esopus Creek at this location in Mt. Tremper has access to the floodplain on both sides of the river.

In Boiceville, a community park is in the early stages of development on the grounds of the former Stucki Embroidery Works. The park design was informed by a local committee with members of various backgrounds, a youth design workshop, and public comment. The Town of Olive is currently working with the AWSMP's Catskill Streams Buffer Initiative to remove invasive plants and replant the streambanks with native species that are better able to survive river conditions.



Stream program staff meeting with the Town of Olive Supervisor to discuss streamside uses and technical needs at the site of a future flood-compatible town park.

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Any park in the floodplain must be carefully designed as the floodplain carries large volumes of fast-moving water and sediment. To aid with this, the AWSMP hosted the Town of Brattleboro, Vermont and the Vermont River Conservancy to discuss how Brattleboro has approached redevelopment of former floodprone properties into parks. Municipal leaders, stakeholders, and natural resource professionals discussed in detail how elements of what Brattleboro has done could translate in the Ashokan Watershed. The Vermont team emphasized a few critical points for leaders and practitioners to consider:

- **Let the floodplain flood:** Remember the area will flood in the future and that is the purpose of a natural floodplain. Any onsite infrastructure should be carefully considered so that it does not become flood debris in the next large storm.
- **Subtle design considerations:** Brattleboro found that small interventions like placing boulders to limit parking had a large influence on how the site is used.
- **Celebrate joy:** Small parties or celebrations can instill a sense of joy and empower a newly developed park to be a place of happiness.
- **Involve youth:** Children have fresh perspectives and will be the future users of parks.
- **Plant native species:** Native plants benefit the function of the floodplain and overall environment. Well planted sites are visually appealing and promote native species like butterflies and birds.

Local municipal leaders can use information from Brattleboro as a case study on floodplain redevelopment, and may soon be able to share their stories of how floodplains became new community outdoor spaces for enjoyment on sunny days.



A floodplain park on Whetstone Brook in Brattleboro, Vermont. Previously the floodprone site had 100 units for low-income elderly and disabled people. Photo by Bob Cornellier

Why Rivers Rise So Quickly

As we were preparing this edition of Esopus Creek News, the Guadalupe River in Texas rose over 20 feet in several hours resulting in catastrophic flooding. The flood in Texas came after rainfall rates of three to four inches per hour were delivered by a slow-moving system fueled in part by the remnants of a tropical storm. Texas Hill Country is prone to flash-flooding.

A common cause of flash-flooding is rapid, intense rainfall that exceeds the ground's capacity to absorb water and overwhelms a stream network's ability to handle the water, leading to a swift rise in water levels. The "flashier" a flood, the more rapidly the water rises.

All watersheds are different. Land use and land cover, topography, and soils can affect how prone a region is to flash-flooding. Those who lived in the Catskills during Tropical Storm Irene, the flood of record in August 2011, will recognize some similarities to the Texas situation.

Hilly regions are prone to higher amounts of rainfall. As storm systems approach the Catskills, air is forced to rise along the slopes of the mountains (a process called "orographic lift"), causing

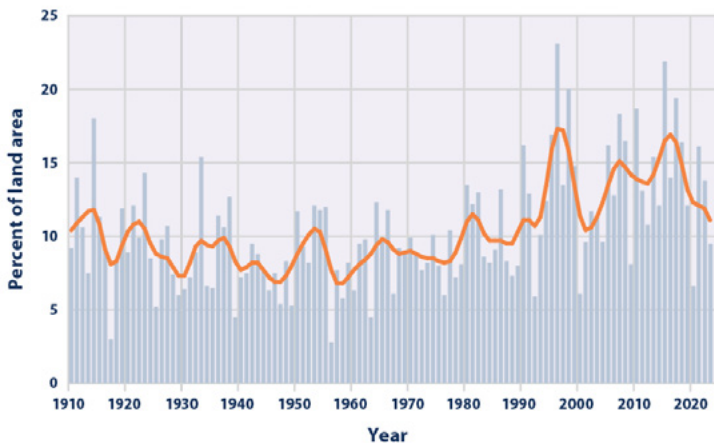
it to cool and release precipitation. Before Irene approached the Catskills, the ground was already saturated from an unusually wet August and unable to absorb more rainfall. The same effect can be created by impervious surfaces like concrete and rooftops in urban areas or where drought has hardened the ground, as happened in Texas.

The rainfall rates were intense during Irene, about one to two inches per hour and the rainfall was widespread ranging from 4-8 inches total with locally higher amounts up to 12 inches in parts of Greene and Ulster counties. This rainfall occurred over a 12-to-15-hour period. The recent rain event in Texas was even more "intense," meaning higher rates of rainfall occurred during a shorter period of time.

Over recent years, a larger percentage of precipitation has come in the form of intense single-day events throughout the United States. Climate change appears to be a major driver. Climate models for the northeastern US indicate that increases in extreme precipitation are strongly related to the atmosphere holding more water because of warming air and ocean temperatures.

Warmer oceans increase the amount of water that evaporates into the air.

Extreme One-Day Precipitation Events in the Contiguous 48 States, 1910–2023



Left: This figure shows the percentage of the land area of the contiguous 48 states where a much greater than normal portion of total annual precipitation has come from extreme single-day precipitation events. The bars represent individual years, while the line is a nine-year weighted average. Data Source: NOAA, 2024

When this moist air moves over land or converges into a storm system, it can produce more intense precipitation. We sometimes see the remnants of tropical storm systems in the Catskills that hold considerable amounts of precipitable moisture even though they've been downgraded, and these systems can stall in unpredictable ways.

Flash floods can happen anywhere, and the exact location of intense precipitation and flooding is hard for weather forecasters to predict with current technology. We can protect ourselves by staying informed of local conditions in the places we live, work and travel.

One of the best ways to evaluate potential flood risk is to know the location of streams and their floodplains. You can do this by visiting FEMA's Flood Map Service Center at <https://msc.fema.gov/portal/home>. Find your location on the flood map.

It's important to be aware if lodging or campgrounds are in a flood zone. The risk is highest in the "Floodway" - the most dangerous part of a floodplain shown on FEMA maps as a blue and red striped area. Know the shortest path to higher ground from where you are recreating or lodging.

Lodgers in floodplains should always monitor an emergency weather alert radio and take warnings seriously.

Remember that isolated storms elsewhere can produce intense rainfall that causes flooding at your downstream location. If you have access to the internet, you can check where local rivers are flooding (if they are monitored) at <https://water.noaa.gov/>.

FEMA's floodplain maps are helpful, but they aren't the definitive source of information on where flooding will occur. Some floodplain maps were produced using older technology and are outdated. More than 25% of all flood insurance claims in NYS come from locations outside FEMA's mapped 100-year floodplain, meaning flooding is occurring outside this zone. In Ulster County more than 58% of all flood insurance policies are held for structures outside the 100-year floodplain indicating a likely history of flooding.

If you are caught in a flood, it's extremely important to get to higher ground immediately without concern for property. Never try to walk, swim or drive through floodwater. According to the Centers for Disease Control and Prevention, more than half of flood-related drownings result from these actions. Driving across flooded roadways or bridges is extremely dangerous and has led to fatalities in the Catskills. Water is heavy and it takes little water depth to create the force and lift needed to move even large vehicles.

The flooding that resulted from Tropical Storm Irene in the Catskills was catastrophic and showed that we need to take flash-flooding seriously.

Our local communities are engaged in planning processes that identify current flood risks and consider future flood risks related to climate change. Armed with information, individuals and communities have the power to make themselves safer from flash-flooding.

Resources

Staying safe:

<https://www.ready.gov/floods>

<https://www.weather.gov/safety/flood-turn-around-dont-drown>

Flash Flood Warning vs. Watch: <https://www.weather.gov/safety/flood-watch-warning>

Heavy precipitation in US: <https://www.epa.gov/climate-indicators/climate-change-indicators-heavy-precipitation>

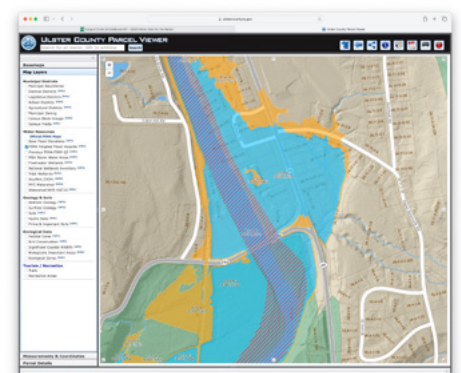
Research article on extreme precipitation in the Northeastern US: <https://doi.org/10.1007/s10584-023-03545-w>

Videos:

How to Read A Flood Insurance Rate Map <https://tinyurl.com/4f9ykpbs>

What is a Stream Gage? <https://tinyurl.com/yc4ef5kj>

Esopus Creek at Phoenicia, August 28, 2011 <https://tinyurl.com/2syzuhc6>



Ulster County residents can view flood maps on the Ulster County Parcel Viewer along with other data layers like parcel boundaries. Online at <https://ulstercountyny.gov/maps/parcel-viewer/>.

FIELD NOTES

Night at the Stream

This winter the AWSMP started using trail cameras to monitor large wood jams in streams. Large wood in streams can help maintain stream stability and provide habitat for wildlife. The cameras will provide insight into how large wood accumulates and moves during high flow events.

Landowners frequently contact the stream program to ask if a wood jam on their stream is likely to float downstream during the next storm. The trail camera project was launched specifically to gain data from the field to answer that exact question.

So far, we have not noticed any changes to our monitored wood jams. However, we now have eyes on the stream when we otherwise would not be in the field. The cameras have spotted foxes, raccoons, and other creatures admiring and crossing wood jams.



A fox used this wood jam as a natural bridge across Warner Creek.



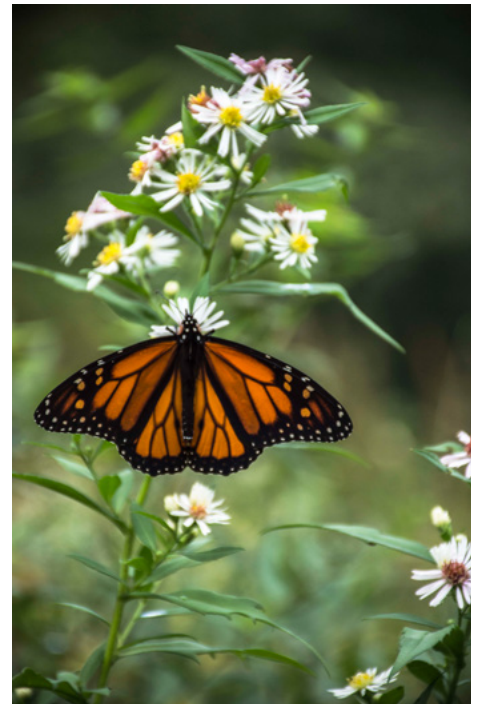
This coyote was spotted in December in the Willow Flats section of the Beaver Kill. The coyote walked up and down the stream bank and appeared to admire the large wood jam on the opposite side of the river.

Rivers and Monarchs

Monarch butterflies are bellwethers of healthy landscapes that provide clean water. In Western states, river partners are coordinating efforts to protect the monarch butterfly by conserving nectar-rich native plants in stream corridors. While New York offers more habitat opportunities than arid lands, it's also true here that monarch butterflies rely on riparian (streamside) areas during various stages of their life cycle. Riparian areas have moist environments that easily grow milkweed, the host plant for monarch caterpillars.

Species of milkweed native to New York include Common Milkweed (*Asclepias syriaca*), Swamp Milkweed (*Asclepias incarnata*), Butterfly Milkweed (*Asclepias tuberosa*), Purple Milkweed (*Asclepias purpurascens*), and more. Milkweed is the sole food source for monarch caterpillars. Restoring or maintaining riparian corridors can increase the amount of available milkweed habitat.

Riparian corridors also facilitate monarch migration and dispersal (and for other species like birds and bats). They can serve as important nectar sources for adult butterflies to fuel their long migration journeys. Healthy riparian habitats support a diverse range of flowering plants that bloom at different times, providing nectar. Some studies implicate a lack of



Monarch butterfly. Photo by Amanda Cabanillas

nectar sources throughout the monarch's seasonal cycles as one factor contributing to population declines.

If you live near a stream and want more information on how to improve monarch butterfly habitat, contact the Catskill Streams Buffer Initiative at the stream program at (845) 688-3047. In the Ashokan Reservoir watershed and elsewhere, free assistance with obtaining and installing plants in streamside areas is available to landowners.

Bridge Street Bridge Design – Public Comments



The Ulster County Department of Public Works is exploring replacement designs for the Bridge Street Bridge over the Esopus Creek in Phoenicia. The county hired SLR Consulting to develop feasible design options. The project is featured at <https://ashokanstreams.org/projects-and-funding/featured-projects/>, where you can view a feasibility study developed by SLR. In addition, the public can submit comments on bridge replacement by completing an online form <https://www.surveymonkey.com/r/RH8K89G> or emailing phoenicia-bridge@slrconsulting.com.

Listening for Bats

Have you ever heard a bat calling? You may hear bat clicks as they use echolocation or faint squeaks and squawks, but humans can't hear most bat sounds without special microphones. That's why the stream program is searching for the Northern long-eared bat (*Myotis septentrionalis*) using microphones at stream project sites.

Northern long-eared bats were once common in New York State before the appearance of white-nose syndrome in 2006. The syndrome is a fungal disease that kills hibernating bats. Populations have plummeted to less than 2% of pre-infection numbers. In 2022, the US Fish and Wildlife Service reclassified the Northern long-eared bat from threatened to endangered. These bats are mostly forest-dependent and eat insects. They particularly like to hunt insects near streams and use stream-side trees for roosting and raising their young.

This summer the stream program is working with landowners to set out microphone arrays to detect bat sounds at project sites. The monitors allow listeners to hear ultrasounds made by echolocating bats. Echolocation is a sophisticated use



A bat acoustic survey array basically looks like a mic on a stand near a stream. A biologist will review the captured sound for the presence of the endangered Northern long-eared bat. If detected, tree clearing for stream projects will be delayed to avoid harming the now-rare bats.

of sound by bats to find their very small targets, insects as food. After almost two weeks of monitoring at a project site, a biologist will examine the recordings for the presence of Northern long-eared bats. If the bats are detected, tree clearing at the sites won't occur until after bats have entered their winter hibernacula. This leaves bat habitat undisturbed during summer and helps their populations recover. Learn more about Northern long-eared bat protection at: <https://dec.ny.gov/nature/animals-fish-plants/biodiversity-species-conservation/endangered-species/northern-long-eared-bats-protection>



Summer Fun in the Stream

The AWSMP has been working with the Town of Olive Recreation Day Camp program since 2015 to bring campers to the Bush Kill Creek. In addition to cooling off, the children discover the importance of healthy stream ecosystems by studying them up close. Some of their favorite activities include catching and identifying

stream critters and using scientific instruments to measure different aspects of the stream's health. This program has been very popular with the high temperatures we have been experiencing this summer.

The AWSMP is pleased to welcome Shelley Savatgy, who recently retired from the Ontario Central School District, to our youth education program led by Matt Savatgy. The Savatgys have spent their professional lives supporting outdoor environmental education for youth and have lived in Shokan for 30 years. As a child, Shelley spent a lot of time at the stream with her fisherman dad, hunting for macros and minnows in vernal pools and streamside.

New Stream Temperature Monitoring at Stream Gages

A new study of groundwater inputs to the mainstem of the Esopus Creek began in June 2025 and will run for two years. Scientists at the US Geological Survey (USGS) are conducting the study with a research grant from the AWSMP. We'll report more on the study in future newsletters, but for now we wanted anglers to know that two new real-time temperature sensors were installed for the study and their data can be viewed online:

- Esopus Creek Below Lost Clove RD at Big Indian NY - USGS Water Data for the Nation ([0136219503](https://waterdata.usgs.gov/nwis/rt/0136219503))
- Esopus Creek at Allaben NY - USGS Water Data for the Nation ([01362200](https://waterdata.usgs.gov/nwis/rt/01362200))

The USGS study will help us better understand temperature fluctuations in the Esopus Creek mainstem. Stream temperature is important for several major reasons. Trout and other cold-water species depend on water temperatures staying cool for most days of the summer. Trout become stressed and may perish if temperatures rise above upper limits for extended periods of time.

The warmest and most dangerous part of the year for trout is when flows are at their lowest and air temperatures are highest. Stream temperature is strongly influenced by air temperature. But stream temperature is also influenced by groundwater inputs that remain cooler than air temperatures and thus "buffer" stream temperatures against the effects of summer heat.

Groundwater is important for another reason, it creates the baseflow of a stream along with surface water that runs off the land into stream channels. While groundwater contributes a smaller amount to annual streamflow than surface water, it's a more stable source of water because it's less climate-driven than surface runoff. That makes groundwater contributions especially important in sustaining streamflow during drier parts of the year and during droughts.



Ducks cross a flooded driveway in the Lang Road area of West Shokan. Photo: Heidi Emrich

Shokan-West Shokan Flood Study Underway

The Town of Olive has officially started a Local Flood Analysis for the hamlets of Shokan and West Shokan. The town received grant funding from AWSMP to retain SLR Engineering, Landscape Architecture, and Land Surveying, P.C., a consulting firm based in New Paltz that has completed numerous flood analysis projects in the Catskills.

Town officials will guide the 11-month study supported by a committee of technical advisors. Public meetings will be held to align the engineering analysis with specific interests of the town and local community.

The flood analysis covers the entire hamlet of Shokan and new portions of the formerly studied West Shokan. Shokan experiences frequent flooding associated with the Butternut Creek and its tributaries. The hamlet is home to the town meeting hall, justice court, and many residential structures. The northwest portion of Shokan experiences flooding not associated with a defined river channel, but instead experiences stormwater flooding after heavy rainfall overwhelms the existing drainage system.

In West Shokan, riverine flooding will be studied in new areas along the Bushkill and Maltby Hollow streams, and streams near Lang Road that drain into the Ashokan Reservoir. West Sho-

kan contains town offices, a post office, and residential structures.

The flood study will yield a report that presents flood mitigation options that are feasible and effective at reducing flooding according to computer models and analysis. Once the town has the final report, it will be a helpful document in seeking funding to implement priority mitigation projects.

Olive completed a Local Flood Analysis for Boiceville and West Shokan in 2017 and in the following eight years implemented a majority of the priority flood mitigation projects.

A key element of the Local Flood Analysis is input from community members to describe the hamlet's flood history, patterns, and areas of repeat maintenance. Hamlet residents should look for mailed postcards announcing public meeting dates and check the town website for announcements.



AWSMP Welcomes New Stream Project Manager

The Ulster County Soil and Water Conservation District has hired a new District Stream Project Manager with the Ashokan Watershed Stream Management Program.

Max Garfinkle joined the program in May bringing over 15 years of experience in natural resources management, habitat restoration, and wildlife conservation. He previously worked for the New York State Office of Parks, Recreation and Historic

Preservation, where he led a team focused on large-scale habitat restoration projects throughout the Palisades Region. Max's work combined in-house and consultant-led efforts to restore wetlands and upland habitats to bolster keystone wildlife species and rebuild native ecological communities.

Originally from the Hudson Valley, Max is passionate about protecting the region's natural resources. He has worked with municipalities to administer environmental codes — from wetlands regulations to timber harvesting activities and stormwater management, and has always aimed to balance land use with ecological protection.

Earlier in Max's career, he worked seasonally with land trusts in coastal Maine and New Hampshire on land stewardship and land management projects, as well as with New York Audubon.

Max earned a Bachelor of Science in Environmental Conservation from the University of New Hampshire and maintains certifications as a commercial pesticide applicator and a drone operator.

In his free time, Max enjoys hiking, backpacking, bird-watching, gardening, bee-keeping, and working on his home. Max was drawn to working in the Catskills because of the new challenge it would provide. Max said,

"The most exciting thing for me about joining a stream management program is the opportunity it gives to not only serve the natural world, through restoration and management work, but also the local communities that make up the watershed as well. It is a unique intersection between people and ecosystems that I am grateful to be a part of."

Max looks forward to meeting residents and watershed stakeholders and can be reached at max.garfinkle@ashokan-streams.org or by calling the AWSMP office at (845) 688-3047, extension 107.



Survey underway at the site of a future stream restoration project on Broadstreet Hollow. A plume of turbidity caused by fine clay particles clouds the water. The project will be designed to prevent erosion and reduce turbidity.

Stream Restoration for Degraded Streams

The Ulster County Soil and Water Conservation District is gearing up to construct two reach-scale stream restoration projects in summer 2026. The projects are designed to improve water quality through stream management in the Ashokan Reservoir watershed.

Hollow Tree Brook in the Town of Hunter is a tributary to Stony Clove Creek, which joins the Esopus Creek in Phoenicia. Significant erosion of Hollow Tree Brook occurred after major flooding in 2010 and 2011. About 400-feet of stream shifted course and eroded through clay deposits beneath the stream bed. Clay is a very fine soil type that washes away easily and clouds water. Following more flooding in 2020, the unstable channel continued to deepen, became shorter in length, and exposed thick banks of clay. A restoration design prepared by SLR Consulting will stabilize about 1,300-feet of stream channel and restore the site to natural conditions.

Broadstreet Hollow is a tributary to the Esopus Creek located mostly in the Town of Shandaken. Significant erosion and channel instability were documented in 2001 about 1,500 feet upstream of the confluence with Esopus Creek. Re-assessment in 2023 confirmed unstable conditions had persisted. The stream project designed by Ecosystem Planning

& Restoration aims to restore stability to over 1,300 feet. Implementation of both projects is overseen by the District and funded by the NYC Department of Environmental Protection.

Erosion and bank failures in these two rivers were identified as leading sources of fine sediment and turbidity in the Ashokan Reservoir watershed. But erosion threatens more than drinking water. It also affects nearby properties, fish habitat, and recreational use of the river. Erosion in one section can migrate upstream and cause bank failures along the way until stopped. That's why stream projects that benefit drinking water also benefit nearby residents and the local economy.

Interns Assist with Field Work

The Watershed Conservation Corps is an internship program specific to the Catskills that is offered through SUNY Ulster. The program pairs environmental science majors with field positions in the NYC Water Supply Watershed. Interns are essential for completing the large amount of field work that the stream program must conduct every year.

The AWSMP's interns are placed with the Ulster County Soil and Water Conservation District to assist with monitoring stream conditions in the Ashokan watershed. This summer Matthew Fochios and Sebastian Guerra-Cox will join the stream field crew to carry out monitoring of completed stream projects.



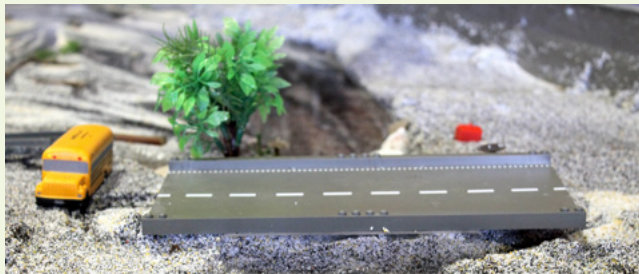
Matthew Fochios (l) and Sebastian Guerra-Cox (r).

Stream restoration projects are monitored for years after construction. Post-construction monitoring offers insights that managers can incorporate into future stream projects. The 2022 Panther Kill stream restoration project will be monitored this year. The interns will learn to use survey equipment and standardized protocols. By August they will be experts in field surveying and have gained confidence in their field work abilities and applied science knowledge. These are transferrable skills that are valued in the environmental sector. Watershed Conservation Corps Interns are usually local students attending SUNY Ulster.

Mark Tollefson, Watershed Technician with the District has supervised the stream program's interns for four summers. Mark said, "One of the most enjoyable aspects of working with the interns is teaching them how to use survey equipment, collect data, and use data to interpret what the river is doing." Mark has also learned from the interns. "Interns have taught me how to be a better communicator of complex scientific topics and that has given me more confidence in my own abilities," he said. If you see us on the stream this summer, feel free to say hello and ask what we are measuring!

Esopus Creek News

AWSMP UPCOMING EVENTS



A mock stream crossing over a mini-channel in the Stream Table. Is it sized appropriately? We'll release the stream table "flood" to find out.

Sat., August 2

The Stream Table will be at the Ulster County Fair along with other fun activities for families. Visit the 4-H Youth Building (with the milkshakes!) between 11am-6pm to find us.

Sat., September 6

We'll be at Olive Day with family friendly hands-on activities for 'Exploring the Riparian Zone.' Find our booth at the Davis Park, Watson Hollow Rd. from 9am-4pm.



Ashokan Watershed
Stream Management Program



Cornell Cooperative Extension
Ulster County



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