

# Esopus Creek NEWS

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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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## A new management plan for Woodland Creek

A new Stream Management Plan is available for Woodland Creek. Stream management plans are one of the most valuable resources the Ashokan Watershed Stream Management Program (AWSMP) creates for local communities. The plans contain detailed management strategies for streamside landowners, municipalities, and resource managers.

The 120-page Woodland Creek plan is packed with maps and photographs generated during extensive fieldwork in 2015. There are interesting facts on the social and cultural history of the valley, and images showing how the stream has changed over time.

The plan compares 2015 conditions with those documented in 2007-2008. This makes the plan not only a snapshot of a single moment, but also provides insight into trends and changes that only reveal themselves over time.

Woodland Creek drains a 20.6 mi<sup>2</sup> watershed in the Town of Shandaken. The stream begins on the north slope of Slide Mountain. From there it drops 3,300 feet over a winding course of 6.3 miles until it joins the Esopus Creek near Phoenicia.

Each section of the stream has its own chapter. These read like travel books with a foot by foot description of stream conditions as you move downstream. Along the way, points of interest and concern are discussed in detail and the complex processes that have shaped the current stream channel are explained. It's like taking a walking tour with your own personal stream expert. The river's secrets are revealed.

The plan then recommends actions that address areas of concern. These are not band-aid



*The stream management plan begins with watershed-scale characteristics and history, and then breaks Woodland Creek into seven management units (MUs) for more detailed assessment and analysis.*

solutions, but well-informed proposals that address the root causes of channel instability. Municipalities can apply for funding to implement recommended projects through the AWSMP's Stream Management Implementation Program. Landowners can apply for assistance with enhancing stream buffers.

Stream management plans are available for the upper Esopus Creek, Broadstreet Hollow, Stony Clove Creek, Bushnellsville Creek, Bushkill, Beaver Kill, and Woodland Creek. Stream management plans can be downloaded for free, at <http://ashokanstreams.org/publications-resources/stream-management-plans/>.



## Woodland Creek Stream Restoration Project in summer 2018

The newly published Woodland Creek Stream Management Plan recommends full channel restoration in a section of stream near the intersection of Wilmot Way and Woodland Valley roads.

A 2015 field assessment documented a nearly 100% increase in bank erosion in this section since 2008. The banks have retreated an average of 25 feet over the seven-year period with one location losing nearly 47 feet of streamside land.

The cause of the instability is a history of channel modifications, most recently following Tropical Storm Irene. Since then, the stream has adjusted to modified conditions by depositing sediment in a mid-channel bar that directs flow towards the banks.

This bank erosion has exposed a natural deposit of fine sediment -- silts and clays, that turn the stream a cloudy brown. Larger sediments (cobble) eroded from the site are depositing downstream, spreading the instability as the creek tries to adjust to its new sediment load. This project will cut off one source of sediment that is destabilizing downstream sections of Woodland Creek.

Restoration work will begin this summer. The Ulster County Soil and Water Conservation District will oversee the project, with funding provided by the New York City Department of Environmental Protection.

The construction contractor is Kingston Equipment Rental/Baker Brothers Excavating, a firm that has worked on several stream projects in the Ashokan watershed over the years.

The restoration project addresses approximately 1,600 linear feet of stream from the Wilmot Way bridge to an eroding bank slope off Seven Mile Rd.

The work will run from summer into the fall of 2018.



*Severe channel instability is bringing stream flow into contact with glacio-lacustrine clay deposits in Woodland Creek. Erosion of these fine sediments creates a water quality problem for NYC's drinking water supply. The turbid water is also aesthetically unpleasant.*



*The stream restoration project planned for 2018 uses best management practices, including proper channel dimensioning and riffle grade-control structures to halt channel bed erosion. Large tree trunks and root balls found on the site will be built into stream banks to give them strength until living plant material regrows. Catskill native willows at the site will be used to jump-start plant growth after channel construction ends. Additional native plants will be installed to mimic the existing forest.*

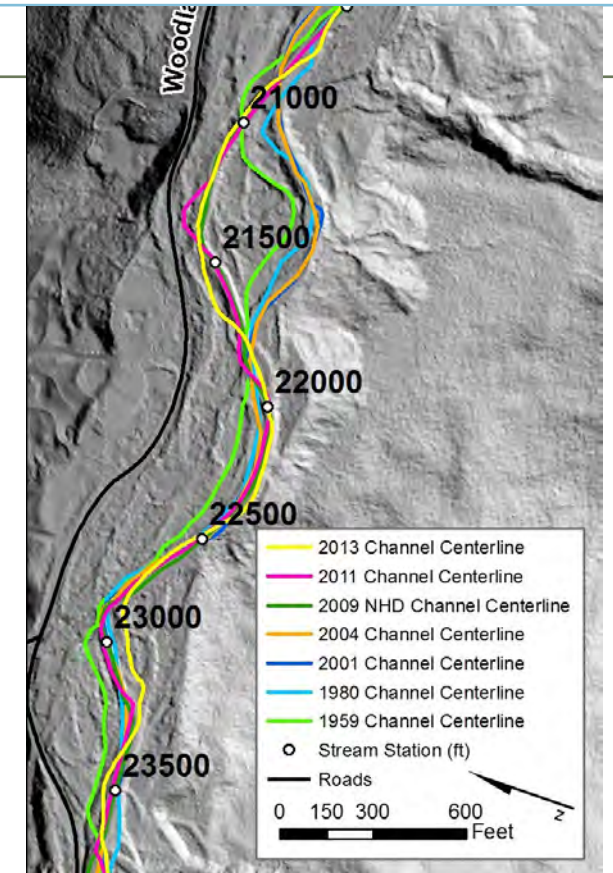
## Stream channels shift and move over time

You may have seen it yourself, stream channels shift and move over time carving new paths and shaping the land. The changes can be abrupt -- the channel might "jump" to a new location during a major flood. Or channel movement might be slow and steady with banks retreating a bit more each year.

The scientific terms for how stream channels move are lateral migration and avulsion. Migration is a slow process. Erosion occurs on the outside of meander bends while sediment deposits inside of the bend. Over time, this process causes the channel to migrate across the valley floor.

Avulsions occur rapidly, usually in relation to a large flood event. In these cases, high energy flood waters carve a new channel and the stream abandons its old channel.

Some sections of streams are prone to instability. Usually this depends on natural features like valley shape, slope, and sediment supply. Where the valley floor is wide and flat (see stream station 21500 at right), streams have much more room to migrate than areas where the channel is confined by steep valley walls (stream station 22500 at right).



*The image above shows the historic location of the Woodland Creek channel going back to 1959.*



*When the slope of the channel decreases, sediment is deposited because the stream loses its ability to transport the material. If a large amount of sediment is moving through the system, deposition can create a mid-channel bar (see image above) that redirects stream flow and eventually changes the course of the stream.*

Is channel movement good or bad? Channel migration and avulsion are natural processes. On the good side, flat valley bottoms prone to avulsion are places where sediment and wood are safely stored on the floodplain. Flood waters that spread over a wide floodplain slow down, which lowers the risk of erosion downstream.

But development right next to streams can be risky business! Where roads, buildings or water quality are threatened by erosion, stream management is sometimes necessary.

The valley shape, slope, and sediment supply largely determine what types of management actions will be effective and sustainable. Typical management strategies include: stabilizing severe bank or bed erosion sites, improving road-stream crossings, and replanting native streamside vegetation.

Preserving or restoring native streamside vegetation is not only one of the most effective actions a landowner can take, but also one of the cheapest and easiest. Landowners can receive free assistance with restoring riparian vegetation through the Catskill Streams Buffer Initiative at the AWSMP.

Landowners and resource managers can schedule a free site consultation with the Ulster County Soil and Water Conservation District by calling the AWSMP at (845) 688-3047.



## FIELD NOTES



### Managing large wood in streams for multiple objectives

When the AWSMP's Stream Access and Recreation Working Group started discussing how best to manage large wood in streams there were a lot of questions. Chief among them was - whose responsibility is it to deal with stream wood? There was no clear answer.

Wood provides ecological benefits to stream ecosystems, but can also threaten public safety and damage infrastructure. The working group discussion considered both sides of the issue, removing wood for safety reasons and retaining wood for stream stability and habitat.

The group decided to pilot an assessment protocol that objectively determines whether wood is too much of a hazard to leave in the stream. By this method, one wood accumulation on the center pier of the Woodland Valley bridge was deemed too hazardous to ignore, especially with a recreational white-water release scheduled for the near future.

Thanks to the efforts of the working group and watershed partners, not only was the wood removed in time for a safe white-water weekend, but ecologically beneficial wood remained in the stream.

### From plans to action



This spring AWSMP awarded **\$430,000** for **7 projects** to implement stream management plan recommendations:

Up-size 1 bridge to pass floods in the Town of Woodstock

Up-size 2 road crossings and daylight 1 stream in the Town of Olive

Monitor Esopus Creek trout and other fish

Track water quality in Woodland Creek before and after stream restoration

Complete mandatory update of the Town of Shandaken Flood Mitigation Plan

### Children love an outdoor adventure

There are many distractions in today's world for people of all ages, especially for youth. AWSMP offers community programs to help youth and families experience the many benefits of living in the watershed.

At Family, Fun and Fish Day, AWSMP partnered with the NYS Department of Environmental Conservation and local chapters of Trout Unlimited to introduce families to fishing. This April, 48 children and parents attended AWSMP's Stream Explorer's Youth Adventure.

Go to [ashokanstreams.org](http://ashokanstreams.org) for upcoming events. For more on how Americans experience nature: [natureofamericans.org](http://natureofamericans.org).



Most parents would prefer their children spend childhood outdoors, developing a connection with nature

### Building smart in the floodplain

Flooding impacts individuals and municipalities throughout the Catskill region. Flood insurance premiums are rising for structures located in the 100-year floodplain (mapped by FEMA) making it harder to sell and build new properties.

Placement of new structures in the FEMA-mapped floodplain requires a permit with careful planning and review to ensure those structures and the people within them are not at risk.

In an effort to help communities plan appropriate development in and around floodplains, AWSMP is now offering training courses for municipal officials, including Planning Boards and Zoning Boards of Appeal.



The trainings teach board members how to identify specific flood zones, base flood elevations, and help them understand flood risk and insurance.

AWSMP also organizes quarterly meetings for local officials to share information and strategies.

### The odds of being flooded

Another way to look at flood risk is to think of the odds that a 1 in 100-year flood will happen sometime during the life of a 30-year mortgage - there is a 26% chance of flooding for a structure located in the 100-year floodplain!

Even these numbers do not convey the true flood risk because they focus on the larger, less frequent, floods.

During a 30-year mortgage, it may have a 26% chance of being hit by the 100-year flood, but the odds are 96% (nearly guaranteed) that it will be hit by a 10-year flood!

Source: FEMA.gov

### Road-stream crossing assessment underway

Cornell Cooperative Extension of Ulster County's Tim Koch and Geomorphic Assessment Technician Amanda Cabanillas (both new to the AWSMP -welcome!) will be investigating every culvert or bridge on public roads in the watershed this summer. The crossings will be ranked for replacement based on structural condition, ability to allow fish passage, and threat to stream stability and water quality. The results will be shared with town, county, and state highway departments.



We can improve stream habitat by replacing aged and under-sized stream crossings with open-bottom structures in good alignment with stream channels. New structures sized for the largest feasible opening will better pass overbank flows without backing up water and sediment.



### There's still time to stop the Mile-A-Minute invasion

Mile-A-Minute, an invasive weed from Asia, is a threat to streamside forests. The vigorous vine smothers other plants and kills mature trees and shrubs.

Two populations have been found in the Town of Woodstock. If you recognize this plant and think you may have it on your property, please contact the CRISP office in Margaretville, (845) 586-2611, or call the stream program office, (845) 688-3047 x6 and speak with our Stream Buffer Coordinator. Early detection of invasive species is critical for managing problem plants in riparian areas. See [catskillinvasives.com](http://catskillinvasives.com).

### New video on 'The Importance of Streams'



The Bennett Science Kids at Onteora Central School District just released a new video on the importance of streams. The kids produced and acted in the video with help from Cornell Extension educator Matt Savatgy and local videographer David Laks. The video is chock full of good information about streams and rivers of the Ashokan Watershed. Check it out at: <https://youtu.be/Z8qLMeUE7hg>.





Damage from Tropical Storm Irene at the Mt. Tremper bridge, August 2011.

## Local Flood Analysis Implementation: Mt. Tremper

In January 2016, the Town of Shandaken formally accepted a Local Flood Analysis (LFA) for the flood-prone hamlet of Mount Tremper. The Town's flood advisory committee guided the process and a detailed report was put together by the Town's consulting firm, Milone & MacBroom, Inc. While the analysis resulted in several recommendations that would reduce flooding in the hamlet, there was no "silver bullet" that would eliminate the risk of all future flooding.

One of the most effective flood mitigation projects involves replacement of the State Route 28 bridge over the Esopus Creek. In conjunction with removal of an existing flood control berm, it lowers flood elevations several feet. Of course, this recommendation also came with the largest price tag, with the bridge alone estimated at more than \$15 million, six times the annual budget of the town. Reality check!

Somehow, less than six months after the analysis was accepted, the stars aligned. The Town of Shandaken convened a meeting with representatives from local agencies as well as the NYS Department of Transportation (NYSDOT), the owners of the under-sized bridge, as well as the NYS Department of Environmental Con-

servation (NYSDEC), maintainers of the under-sized berm.

Fast forward to summer 2018. After two years of meetings, exchange of information, a lot of coordination, some community outreach and persistence by all involved, a bigger bridge has become reality. It will be built immediately downstream of the existing bridge, beginning in 2020. The goal, keep Route 28, a recently-designated "lifeline route," and its critical bridges open during major flood events.

Currently, the Route 28 bridge catches a lot of flood debris, such as trees (see image above), in part because of its three piers in the Esopus Creek. The structure causes a 3.5-foot artificial rise of floodwaters during a 100-year storm. In preliminary designs for the new bridge, there are no piers in the main channel. The structure will be lengthened by about 800 feet and raised about 4.5 feet.

All flow from the 100-year flood event will be able to pass underneath the bridge! NYSDOT estimates that in Tropical Storm Irene, a 70-year flood in Mount Tremper, only 57% of the Esopus Creek went under the bridge.

Two other inter-related flood mitigation projects are advancing in conjunction with the Route 28 bridge replacement. Approximately 900 feet of the flood-prone State Route 212 will be elevated up to 11 feet near its intersection with Route 28.

The third piece of this flood mitigation puzzle is the removal of an antiquated "Mount Tremper Flood Control Project" (an un-certified levee) along the Esopus Creek. The flood control berm was built by the US Army Corps of Engineers sixty years ago, and is now maintained by the NYSDEC.

While this aspect of the project design is not as far along, indications are the berm removal and creation of a floodplain bench will lower flood waters by another foot, thus reducing the size and cost of the Route 28 bridge. Additionally, NYSDOT will be able to re-use the fill from the existing berm to elevate Route 212, saving money, time, and community disruption during the construction phase.

Obviously there is still a long way to go before this work is done and the community of Shandaken is less at risk and more resilient to future flooding. This work includes many permits, many approvals – including an act of Congress (seriously), millions of dollars, and more.

But in only two short years, this flood mitigation recommendation has gone from a pipe dream to reality. In another couple years it may be nearing completion and starting to accrue benefits for decades to come - not only for Shandaken, but for all communities to the east and west along this lifeline route.

To learn more about the bridge project, view a NYSDOT public presentation at: <https://bit.ly/2JFd4Xb>. Find the Local Flood Analysis report for Mt. Tremper at: <https://bit.ly/2JPHh9f>.

## What lives in the Esopus Creek?

Yes, fish live in the Esopus Creek, but what kind and how many? How do we know if fish populations are declining or increasing? The answers are to be found by looking.

Every summer for the last eight years a team of scientists with the US Geological Survey (USGS) has carried out an incredible scientific survey method in the Esopus Creek: electrofishing.



Electrofishing is a method of catching fish by delivering an electric current to the water, which directs the fish into a net. Without causing harm, this practice allows scientists to collect a large amount of fish for data collection. The electric current comes from a backpack (anyone remember the proton packs from Ghostbusters?!) and exits out of an anode pole directing the fish towards the dip nets

for collection. The fish are kept in coolers with air bubblers, and ice is added every so often to keep the water temperature cool.

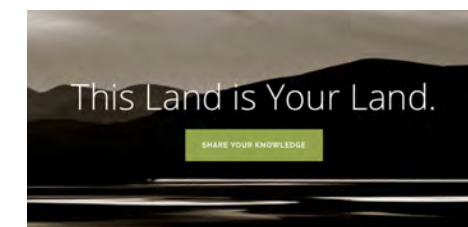
Before the fish are measured, they are individually transferred to a bucket of water with some club soda mixed in – the carbon dioxide from the club soda calms the fish down and makes them sleepy. This allows the scientists to take their measurements quickly and easily, returning the fish to the water safely.

The USGS team is collecting data to measure the impact of floods and other natural conditions on fish populations over many years.

USGS will survey the stream again in summer 2018 and then publish the findings. Past reports found that a recent decline and then rebound in Esopus Creek Rainbow Trout populations can't be explained by large floods like Tropical Storm Irene in 2011. The search for answers will continue.

To see a short video of electrofishing on the Esopus Creek, go to: <https://bit.ly/2Kg2zuc>.

## Be Part of Catskill Waters



Do you love where you live and care for your land? Share your stories! Catskill Waters is an online social space and community art project focused on Catskill water stewardship. Project organizers want to hear about your relationship to your land and what happens in your woods, yard,

or stream. There are several ways to participate: record your story with any device and share with Catskill Waters; write your story and email; contact Catskill Waters to set up a phone interview; join a scheduled recording date; or share your photos on the Catskill Waters website. Learn more at: <https://catskillwaters.org>.

See an interview with Phoenicia's Gene Gormley about "Growing Up Catskills" and other stories already posted at: <https://catskillwaters.org/journal/category/stories/>.

## Rocks Get Smarter



Radio-tag sitting on a "smart rock."

When stream flows reach a critical velocity, rocks on the bottom of the channel are lifted or tumbled downstream where they resettle. This bottom material is called "bedload." Being able to predict bedload helps stream managers create sustainable stream restoration designs.

The AWSMP studies sediment transport to improve stream management. But measuring the amount and size of bedload moving during a flood event is no small feat! The AWSMP has funded the U.S. Geological Survey (USGS) to pilot methods for bedload sampling at several watershed locations.

The USGS is sampling bedload using a bucket-like device lowered from a bridge. Another approach uses "smart rocks", which are natural rocks with radio-transmitters drilled and glued inside. Portable antenna are used to locate the smart rocks after a high flow event. A third method is acoustic sampling, which uses underwater audio recordings to estimate the amount of rock passing by the sampler.

USGS scientists had their first test of these methods on October 29, 2017 when flows were strong enough to move bedload. After the event, 89% of radio-tagged rocks were recovered. Boulders moved up to 33 feet and cobbles moved up to 1,600 feet. The rocks moved little between October 2017 and June 2018. USGS will sample again during the next high flow event.



# Esopus Creek News

## AWSMP UPCOMING EVENTS



### Thursday, August 2

Join AWSMP at the Ulster County Fair in the Youth Building for a stream table demo, floodplain model, games and prizes.

### Freshwater Snorkeling

Snorkel the Esopus Creek at a family stream event in August. Date to be announced! Check [www.ashokanstreams.org](http://www.ashokanstreams.org)

### Saturday, August 18

Human foosball anyone? This year's Shandaken Day is at the Catskill Interpretive Center.

### Saturday, September 8

Visit the AWSMP booth during Olive Day at Lester Davis Park.

Call the AWSMP at (845) 688-3047 to register, or for more information



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