

# 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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## 11-YEAR FLOOD ON CHRISTMAS DAY

On Christmas Day 2020 a warm front produced significant rain that fell on a thick snowpack in the Ashokan Reservoir watershed. Heavy rainfall combined with rapid snowmelt is a recipe for riverine flooding. In fact, such “rain on snow” events are one of the primary causes of flooding in the Ashokan watershed. December is the second most common month for flooding behind March, another month dominated by rainfall-snowmelt events.

Hydrologists use statistics to determine the probability a specific flow will occur in a stream. Several U.S. Geological Survey stream gages in the watershed have recorded the highest annual flow for the minimum 10 years needed for the calculation. According to this method, the discharge observed during the Christmas Day flood has a little more than 1 in 10 chance (11%) of occurring in any given year. Thus, the Christmas Day flood was an “11-year flood.”

The stream gage on Esopus Creek at Coldbrook recorded a height of 18 feet, a “major flood” stage according to the National Weather Service. The peak flow recorded at Coldbrook was 39,100 cubic feet per second (cfs). It was the highest flow seen on the Esopus Creek since Tropical Storm Irene in 2011. It was the 11th highest magnitude flood in nearly 90 years of record at the Esopus Creek at Coldbrook gage.

The Christmas Day flood was also an 11-year magnitude flood on the Stony Clove Creek at Chichester, according to flood frequency analysis. It was the 4th highest in the 23-year record of the Chichester stream gage. For other monitoring stations, this event ranged from



High flows in the Stony Clove Creek on Christmas Day caused the temporary closure of State Route 214 near Lanesville. The NYSDOT is overseeing repairs. Photo by Dany Davis

a 3-year flood for Little Beaver Kill and an 8.5-year flood for Birch Creek.

Although no catastrophic damage resulted from this flood, isolated incidents of property damage, bank erosion, and minor road flooding resulted in road closures. Emergency repairs were needed to open sections of road along the Stony Clove Creek and Warner Creek. Several culverts and a foot bridge on private land were washed out. The McKenley Hollow stream in Oliveria shifted course along its upper reaches and washed out the road similar to Tropical Storm Irene in 2011. Damage assessments are ongoing throughout the watershed.

### Online Resources:

A short video to learn how stream flows react to rain events: <https://youtu.be/5f2M5s3CA0I>

Esopus Creek stream gage at Coldbrook: [https://waterdata.usgs.gov/nwis/uv?site\\_no=01362500](https://waterdata.usgs.gov/nwis/uv?site_no=01362500)

## Flooding Resources for Homeowners

Residents of the [Ashokan Reservoir watershed](#) unwrapped a present they probably didn't want this past Christmas in the form of significant flooding on many of our streams. While not as large or destructive as the floods resulting from Tropical Storm Irene in August 2011, there was still significant damage to local infrastructure and erosion along our stream channels.

Over the past year, many new residents began living full-time in the watershed who may not be aware of the flooding issues that periodically occur in our valleys, up our hollows, and along our streams. Below is some basic information for residents on how to identify flood risk for their home, what to do if there are damages to property, and who to contact for additional information.

Most of the major streams in the watershed have been mapped for flood risk by the Federal Emergency Management Agency through the National Flood Insurance Program (NFIP). To view your flood risk and determine if your property is located within the 100-Year Floodplain (which statistically speaking has a 1% chance of flooding in any given year) you can visit the [FEMA Map Service Center](#), input your address and look at the shading. If you see a turquoise color that means you are located in the 100-Year Floodplain.

You can access the same information by visiting the [National Flood Hazard Layer](#), which may be a bit more user friendly. Keep in mind that floodplain mapping is meant for flood insurance rating purposes only. Just because your property is located outside the 100 or 500-Year Floodplains (the 500-Year Floodplain is represented by orange shading) that does not mean you are guaranteed to not have a flood. Roughly 20% of all flood damages occur outside the 100-Year Flood Zone. If you do not already have flood insurance for your structure,



*Flooding near homes along the upper Esopus Creek on Christmas Day 2020. Photo by Aaron Bennett*

you should consider purchasing insurance. Visit [Floodsmart.gov](#) (the official site of the National Flood Insurance Program) or contact your insurance agent and inquire about flood insurance.

A variety of damage can occur to a building following a flood. It is vital that you speak with your municipality's building department and have them visit your structure to document the extent of the damage. There may be some funding available to mitigate flooding if the property has flood insurance. For more information, please visit the NYS Department of Environmental Conservation's website on [substantial damage](#).

If you have questions about how to reduce damage to your home from floods be sure to read the [FEMA Homeowners Guide to Retrofitting](#).

Very often during a flood homes with basements have standing water in them. Sometimes this will result from overland flooding (flooding from rivers and streams) or infiltration from ground water. Regardless of the source, the basement should have the water pumped out. Sump pumps can be used to do this, or for a fee, many local fire departments will pump out basements. Do not enter a home with standing water unless you

know for certain that the power to the structure has been cut.

If you've had damage to your structure from flooding, potential contacts include your insurance agent, local building department, and Aaron Bennett of the Ulster County Department of the Environment at 845-688-3047 ext. 109 or [aben@co.ulster.ny.gov](mailto:aben@co.ulster.ny.gov).

If you have general questions about flooding, how to read a flood map or determine if your property is located in a mapped floodplain, contact Brent Gotsch of Cornell Cooperative Extension of Ulster County at 845-688-3047 ext. 103 or [bwg37@cornell.edu](mailto:bwg37@cornell.edu) for help.

### Online Resources:

Map of Ashokan Watershed: <https://ashokan-streams.org/exploring-the-watershed/>

FEMA Map Service Center: <https://msc.fema.gov/portal/home>

National Flood Hazard Layer: <https://hazards-fema.maps.arcgis.com>

National Flood Insurance Program: <https://www.floodsmart.gov>

NYSDEC Substantial Damage: <https://www.dec.ny.gov/lands/75774.html>

FEMA Homeowner's Guide to Retrofitting: [https://www.fema.gov/sites/default/files/2020-07/fema\\_homeowners-guide-to-retrofitting\\_guide.pdf](https://www.fema.gov/sites/default/files/2020-07/fema_homeowners-guide-to-retrofitting_guide.pdf)



## A Big Year for Stream Restoration

The Ulster County Soil and Water Conservation District (SWCD) is preparing to construct three large stream restoration projects over a busy field season in 2021.

Work is planned at two sites on Warner Creek near Silver Hollow Road in the Town of Shandaken. The sites are located off the road in wooded areas 1.2 and 1.5 miles upstream from where Warner Creek empties into the Stony Clove Creek.

The projects are being built to reduce the amount of sediment eroding into stream flows and polluting waters as far away as the Ashokan Reservoir. Stream restoration will also halt erosion that is encroaching on several residential properties and Silver Hollow Road.

Erosion at the sites has been monitored since flooding in 2010. During the flood, Warner Creek cut a new path through clay-rich soil deposits left behind by glacial lakes. About 1,100 feet total of stream corridor will be restored to a more stable configuration that removes stream flows from contact with the glacial lake clays.

The third project site is located on the Stony Clove Creek along NYS Route 214

in the Town of Hunter and spans 1,600 feet of stream length. The reach is historically unstable and the channel shifted course after flooding in 2011 and came into contact with glacial lake clays.

Permitted work at all three sites will begin after May 1 and end by September 30 to protect trout spawning. Stream flows will be diverted during active construction so that earth work doesn't further pollute the stream. The sites will be revegetated with Catskill native trees and shrubs and left in a natural condition.

After construction, the project sites will be regularly surveyed by the SWCD to track their performance. The NYC Department of Environmental Protection will monitor water quality in both streams to determine whether the stream restoration projects have reduced levels of sediment pollution.

The SWCD will begin bidding the projects to locate a construction firm soon. The AWSMP plans an informational session in spring 2021 for Warner Creek landowners to learn more about the projects and construction schedule.



*Sediment sampling at one of two Warner Creek stream restoration sites slated for construction in 2021. Extensive survey, design and engineering were completed to prepare for construction.*



*Credit: NYSIPM*

### Have you seen this pest?

- Wings have a pinkish tint; forewings are black spotted; end of forewing has a brick pattern.
- The unusual short antennae are bulbous orange with needle-like tips.

Spotted Lanternfly (*Lycorma delicatula*) is an invasive insect that was first identified in Pennsylvania in 2014. The planthopper is native to parts of east Asia and has no natural predators in the United States. Spotted Lanternfly has proven to be a serious pest of grapes and other crops like hops, apples, peaches and other tree fruits.

While the Tree of Heaven (*Ailanthus altissima*) is Spotted Lanternfly's desired source of food, it also has been known to feed on more than 70 different species of plants including those found in forests and riparian corridors of the Ashokan watershed. Tree and shrub species like birch, maple, walnut, and willow are especially at risk. In riparian corridors, these tree species help to lessen erosion and provide important habitat.

If you believe you have found Spotted Lanternfly insects on your property take photographs (be sure to include a ruler, coin or something similar for scale) and send them to [spottedlanternfly@agri-culture.ny.gov](mailto:spottedlanternfly@agri-culture.ny.gov). Be sure to note the location with either an address, landmarks, or GPS coordinates.

#### Online Resources:

<https://nysipm.cornell.edu/environment/invasive-species-exotic-pests/spotted-lanternfly/spotted-lanternfly-ipm/>

## FIELD NOTES

### New Trout Management Plan Proposed

The New York State Department of Environmental Conservation (DEC) is proposing a new trout management plan for the upper Esopus Creek. As presented to the Ashokan Watershed Stakeholder Council, key features include:

- All Esopus Creek tributaries will be designated as “Wild” for management.
- The Esopus Creek mainstem from the Ashokan Reservoir to the Lost Clove Road bridge in Big Indian will be designated “Wild-Quality.”
- The harvest season will extend from April 1 - October 15. A new catch and release season will extend from October 16 - March 31 (artificial lures only). Season dates apply to all categories.

DEC is currently assessing public comments and will complete the plan in 2021. Reach designations are to be updated every February.

Research conducted by the U.S. Geological Survey with AWSMP grant funds over the last 10 years may help DEC carry out a robust monitoring program in the upper Esopus Creek.

The New York State Trout Stream Management Plan can be viewed here: <https://www.dec.ny.gov/outdoor/111015.html>



### Catskill Streams Buffer Initiative Stats since 2009:

- Over 65 Ashokan watershed landowners have received projects!
- Over 10,000 trees and shrubs planted
- 18,510 feet of streambank planted (that's 3.5 miles!)
- Over 13 acres of stream buffer restored

### The Source of that Cloudy Water

After a high flow like we saw in December, some local streams take on a cloudy orange-brown color due to the high concentration of fine silts and clays that become suspended in the water. These small sediments were eroded from stream banks and beds, and because of their physical properties, travel long distances from their watershed sources to the mainstem Esopus Creek and Ashokan Reservoir.

Reducing the amount and duration of turbid flows in local streams is one of the stream program's management goals. Funding to carry out stream management is limited, so the stream program conducts studies to identify which parts of the watershed are generating the highest amounts of fine sediment. Stream management will have the most effect in these sections of the watershed.

Scientists at the U.S. Geological Survey (USGS) are the nation's experts in monitoring stream flow and water conditions. Because of its status as a large drinking water supply, the Ashokan Reservoir watershed has one of the most extensive USGS monitoring networks in the state. The USGS studies the amount of fine sediment suspended in local stream flows and tracks how much sediment is coming from different tributary streams.



Monitoring between 2018-2020 indicated a pattern. The tributaries contributing the most amount of fine sediment during this time were Woodland Creek, Stony Clove Creek, and the Beaver Kill. These tributaries produced the highest concentrations of sediment and the highest loads of sediment to the mainstem Esopus Creek.

The creeks do not all behave the same way however. The Beaver Kill is a cleaner stream during low flows and only becomes highly turbid at higher flows. The Birch Creek, Woodland Creek, and Stony Clove Creek sustain high levels of sediment per unit of streamflow during a range of stream flows. But, Birch Creek doesn't make the list of top-sediment contributors because its watershed contributes a smaller amount of flow compared to the others.

### A Stream Restoration Five Years Later

Stream restoration projects look downright messy during construction. The vegetation is pulled back (as little as possible) to allow for reshaping of the stream channel by large equipment. Stream flows are diverted around the site to prevent sediment pollution.

Following construction, the area is revegetated and stream flows are put back in the channel. That's when the monitoring phase of the project begins. Staff from the Ulster County Soil and Water Conservation District survey past projects annually and following high flows. A stream

restoration is not really complete until the vegetation has grown back and begins to hold the banks.

The transformation can be remarkable in just a few short years. The photos at the bottom of page 5 show a stream restoration project on the Stony Clove Creek near Wright Road in Lanesville. The left photo is the project shortly after construction in 2016. The right photo is the site in 2020 during a survey five years after construction. In another five years, the site will look even greener and shaded. The perfect hangout for a large trout.



## Youth Program Responds to Covid-19 Pandemic

When schools closed last March in response to the Covid-19 pandemic the stream program's youth education staff quickly transitioned from in-person learning to virtual programming in support of elementary science education within the Onteora Central School District.

At the request of several teachers, we began making science educational videos that related to the topics and themes that were being covered remotely. Video links were posted to the teacher's websites so that students could view them on their own. Youth educator Matt Savatgy attended weekly class "hangouts" to share additional information about the videos and answer student questions.

We were also able to successfully transition our popular Watershed Detectives Club to a digital format. Program assistant Amanda Cabanillas created a series of stream education videos and activity sheets in support of the remote club. Students were provided these resources to use at home. With the help of their parents, several students eagerly conducted stream study activities in their own neighborhoods. Club members met virtually on a



*The Watershed Detectives after-school club is meeting outdoors this winter to learn about stream and watershed topics. Photo by Amanda Cabanillas*

weekly basis to review their progress and to discuss upcoming activities.

In addition, the youth education staff created an online science series to provide resources to students we were not already connecting with, and as a way to organize all of the content that was being produced. A new feature of the site is a "Watershed Animal Spotlight" series that highlights local wildlife species with pages full of resources including videos, fact sheets, activity pages, and related links. This con-

tent will be used as part of our permanent youth education program moving forward.

To access the youth education materials online, visit: <http://ulster.cce.cornell.edu/environment/online-science-series>

During the current school year, we continue to support our local schools with virtual instruction. Several in-person, outdoor events for youth and families are planned for the coming year following safety guidance.



*Wright Road stream restoration project shortly after project construction ended in 2016.*



*Wright Road stream restoration project after five years of vegetation regrowth and a few high flows in 2020.*



## Culverts are Key for Flood Mitigation - Watershed Towns Advance Projects

While they seem insignificant, road culverts play an important part in strengthening our community by shielding ourselves from disaster. Culverts are structures that house and protect streams as they pass underneath roads and make it possible for them, as well as the critters that live in streams, to safely maneuver past manmade infrastructure. Depending on the situation, culverts may be part of preventing roads from flooding or contribute to flooding. One factor that influences the ability for a culvert to protect from flooding is the size of the culvert.

One common way undersized culverts worsen flooding is by eroding the stream at the downstream end of the culvert. Erosion can be so severe that a scour pool forms directly beneath the outlet of the structure. Scour pools form when the water traveling down the stream channel is suddenly squeezed into a smaller path (by the undersized culvert) and effectively becomes a funnel. As the cross-sectional area of the stream decreases, the velocity of the water increases and then gets 'shot' out at the outlet of the structure. The deepened scour pool then causes the stream banks to become steep and unstable. That often leads to erosion of the road or nearby land.

In addition to erosion, sometimes the hydraulic capacity of the undersized culverts is exceeded during high flows. The water level of the stream increases and then can overtop the structure - making the road impassable. This is more likely to occur when the culverts are clogged by sediment and wood carried by stream flows. Furthermore, as our climate is changing, the Catskills are receiving more rain than ever before. This only amplifies the urgency for installing culverts that are not undersized.

Understanding streams to produce a structurally sound culvert is often the first step in strengthening community re-



*A scour pool beneath two under-sized culverts with evidence of erosion.*



*An upsized culvert on DeSilva Road constructed by the Town of Olive in late 2020 performed well during the Christmas Day flood. Photo by Ethan Ely*

silience. Installing culverts that are compatible with their stream is a small, but important way to protect communities from flooding. It is a necessity for communities to build culverts that are large and sturdy enough to reduce the local impact of floods.

The Ashokan Watershed Stream Management Program recently awarded four grants to watershed towns to improve and enlarge road crossings over streams:

The Town of Olive was awarded \$145,660 to design and engineer enlarged culverts on Bostock Road and Red Maple Road near Boiceville.

The Town of Shandaken was awarded \$221,038 to enlarge a bridge on Peck Hollow Road. This money is matched by Bridge NY funds the town obtained.

The Town of Shandaken was also awarded funding to conduct an engineering study of culverts and bridges in the hamlet of Pine Hill.

The Town of Woodstock was awarded \$333,950 to construct an enlarged bridge on Mink Hollow Road. The funds will pay for the portion of costs related to bridge enlargement and for construction of channel stabilizing features near the bridge.



## Getting to Know Streams: How Streams Manage Water from Trickle to Flood

Whether you have lived here your entire life or are a newcomer to the area, you know you are surrounded by abundant wild streams with clean water, unique wildlife, and verdant wooded slopes. But how well do you know streams?

Here are a few useful things to know when living in a region full of mountain streams:

***Streams transport water – that’s obvious! But the more subtle but important thing to know is that streams are shaped to carry widely varying amounts of water.***

Natural stream channels are finely tuned to carrying different quantities of water. They do not function like simple troughs of water. Rather a typical stream channel contains multiple “stages” or channels within channels that pass differently sized stream flows.

### Stages of a Stream Channel

At low flows, water concentrates in the deepest section of the channel such as pools (areas of deep depth and slow-moving water) or other faster moving low points where flows remain cooler, deeper, and oxygenated. These “low points” in the channel that hold water even during the summer are important for the survival of fish.

The next highest ‘stage’ in a stream channel carries the normal high flow event like a typical summer thunderstorm or average snowmelt runoff. This is not a flood that overtops the stream banks. This stage of the channel may only carry flows for a few days in a typical year – you may not recognize this mid-sized channel stage when near a stream in summer, because only the low flow area will be wetted. You can find this part of the channel by a lack of large trees that don’t survive where it’s often wet. You

may also see signs of recent erosion like a wrack line of twigs. This channel stage is extremely important because when full of water, the most amount of channel-shaping occurs. If the shape and size of this mid-sized channel isn’t right – the stream may erode.

The floodplain is the next major step out of the deeper parts of the channel. When it comes to floodplains, remember that floodplains were built by the river and are ultimately part of the river.

Living in the Catskills means living in steep mountain valleys that rapidly shed water after the rain falls. Water levels can rise quickly. Water is heavy and exerts considerable pressure on the stream bed and banks. That pressure is relieved when water is able to spread onto the wide flat areas adjacent to the channel called a floodplain. Because floodplains slow and store water, they are crucially important flood-control devices.

In the Catskills, the amount of floodplain space available to streams can be limited for various reasons. So expect streams to maintain enough power to move large trees, rocks, and even roads and bridges during the largest floods.

### When Things go Wrong

If your stream seems to have lost its inherent structure and is eroding as a result, the first step is to evaluate the situation. Then a few management actions may help.

Stream buffers - a line of native vegetation bordering the active channel, work wonders for stabilizing streams and can provide beauty and wildlife habitat for your enjoyment. The stream program offers free consultations and planting assistance for qualifying landowners who want to enhance their stream buffer.

Any work that reshapes the stream channel or increases flood elevations near streams usually benefits from some engineering and requires a permit from state and local agencies before work can begin. If you are experiencing erosion or flooding on your property and are looking for a solution, and you live in the Ashokan watershed, call the stream management program office and request a free site visit to obtain guidance at (845) 688-3047.

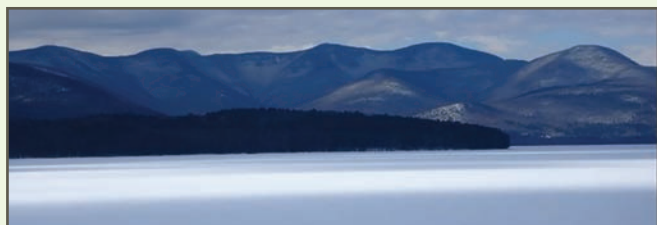
### Online Resources:

A short video that explains stream stability:  
<https://youtu.be/6x4pikRXuZI>



# Esopus Creek News

## AWSMP UPCOMING EVENTS



Ashokan Reservoir by Ed Ostapczuk

### March 24

Enter your art or photograph in the Love Your Stream Video and Art Project. The viewing will be streamed online on March 24, 2021 at 7:00 p.m. Stream program staff will be on hand to answer questions. To enter artwork, contact Brent at [bwg37@cornell.edu](mailto:bwg37@cornell.edu)

### April 17

The Stream Explorers Youth Adventure one-day conference at the Ashokan Center returns. Conference activities will be held outdoors following Covid-19 safety protocols. The date is subject to change. Registration will be announced via social media, and on our website: <https://ashokanstreams.org>



Ashokan Watershed  
Stream Management Program



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