

Esopus Creek NEWS

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Ulster County

Esopus • Birch Creek • Bushnellville • Fox Hollow • Peck Hollow • Broadstreet Hollow • Woodland Valley • Stony Clove • Beaver Kill • Little Beaver Kill • Bush Kill

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Shandaken Identifies Promising Solutions to Flooding in Phoenicia and Mt. Tremper

After several months of study, the engineering firm Milone and MacBroom, Inc. (MMI) working under the direction of Shandaken's Flood Advisory Committee, has identified potential actions to reduce flooding in the hamlets of Phoenicia and Mount Tremper. The Town of Shandaken hired MMI to conduct a "Local Flood Analysis" that uses computer models and engineering expertise to test solutions that reduce flood elevations.

MMI modeled a range of potential actions, including those suggested by Town residents at public meetings. In Phoenicia, several options show moderately large benefits, including deepening the floodplain on both banks of the Esopus Creek and on the left bank of the Stony Clove Creek downstream of the Phoenicia Main Street Bridge. The enhanced floodplains would allow more water to pass through the stream corridor, and thus lower flood elevations in the hamlet. For smaller and more frequent floods, models indicate these solutions would reduce both the extent and depth of flooding along Main Street.

Another solution with a long-term benefit is the replacement of Bridge Street Bridge with a higher and wider bridge (that allows larger flows to pass under the bridge). This solution lowers the depth of the 100-year flood and allows the beneficial effects of floodplain benches to extend further upstream.



Simulation of Hurricane Irene flooding in Phoenicia. Source: MMI

The identified projects would require substantial excavation and will be looked at in greater detail for their feasibility and cost-effectiveness. A number of grant sources, from federal to local, might be tapped to pay for implementation.

In Mount Tremper, modeling found that raising and widening the Route 28 Bridge over the Esopus Creek would result in significant reduction of the 100-year flood elevation. When bridge replacement is combined with floodplain enhancement downstream of the bridge, the benefits are realized at smaller floods as well.

MMI's next step is to examine the feasibility of solutions in more detail. All flood modeling results for Phoenicia and Mt. Tremper will be presented at public meetings in late spring or early summer, after MMI finishes a draft report.

Investigating Turbidity and Suspended Sediment in the upper Esopus Creek

The Ashokan Reservoir watershed supplies high quality drinking water that meets up to 40% of the water needs for over 9 million New Yorkers. Yet, after large floods, and sometimes long after floodwaters have receded, streams in the Esopus Creek watershed remain turbid (or muddy) from the suspension of very fine sediment.

Turbidity is a measure of the relative clarity of water. In the Catskills, turbidity is caused by the suspension of clay and silt particles that are eroded from stream beds and banks by flowing water. Saturated landslides in adjacent silt and clay-rich hills can also introduce sediment into the stream. The Shandaken Tunnel, though not a stream, can transfer turbid water originating from the Schoharie Creek watershed to the Esopus Creek.

The amount of turbidity is determined by the concentration of suspended sediment in the water. Large floods carry more sediment and produce highly turbid water. Scientists refer to the volume of sediment carried by a stream as the sediment load. The higher the flow and the more concentrated the amount of suspended sediment, the higher the load. Each watershed has a different potential sediment load based on differences in hydrology, geology, geomorphology, land use and land cover.

Several investigations since the 1990s have examined the geologic sources of sediment and water quality conditions in the upper Esopus Creek watershed. The most recent study was completed in 2013 by the USGS and funded by NYC DEP, NYS-DEC, and AWSMP. The study included 14



Large, saturated hillslopes can "bleed" silt and clay into streams for long periods of time.

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stream monitoring stations throughout the upper Esopus Creek watershed and spanned a period from October 2009 to September 2012.

Study results showed streams with turbidity levels in three distinct groupings: 1) Stony Clove Creek with extremely high turbidity and suspended sediment; 2) Woodland Creek, Beaver Kill, Broadstreet Hollow Brook and Birch Creek all produced moderately high suspended sediment concentrations; and 3) Fox Hollow



Turbid water flows from the Shandaken Tunnel into the Esopus Creek.

Creek, Bushnellsville Creek, Peck Hollow Creek, Hollow Tree Brook and the upper Esopus Creek headwaters at Olivera all produced low concentrations and turbidity during the study period.

In most cases turbidity and suspended sediment concentration was strongly associated with storm events. The study noted that large storm events produce up to 80% of the sediment load. One large exception was Stony Clove Creek, which tended to produce turbidity and sediment even at moderate to low flows for sustained periods of time. This is because some of the erosion that leads to the suspended sediment in Stony Clove Creek is associated with large saturated landslides that can "bleed" silt and clay for prolonged periods of time.

Stony Clove Creek contributed the largest amount of the total annual suspended sediment load measured in the watershed during the study period. An average of 40% of the total load entering the Ashokan Reservoir came from Stony Clove Creek, more than all the other tributary streams combined. But Stony Clove Creek represents only 16% of the entire upper Esopus Creek watershed, making it a priority for stream management to reduce turbidity.

During large storm events, the Shandaken Tunnel flows are turned off, so the Tunnel's actual contribution to annual sediment load is often not as large as it may appear, though it can be a significant chronic source of turbidity.

The USGS study findings are important for helping AWSMP develop and implement future turbidity reduction projects. For example, AWSMP focused its recent stream restoration efforts in the Stony Clove watershed based on evidence that it's a chronic source of turbidity. Since 2012, AWSMP has used more than \$2.1M to match around \$3.4M of federal funds to treat over 4,000 feet of eroding stream in



Fly casting in clearer waters of the Stony Clove Creek in Chichester, NY.

the Stony Clove watershed. Prior to construction, USGS established water quality monitoring stations above and below some of these projects. The preliminary

data is already showing a marked reduction in turbidity originating in the treated stream reaches.

NYC DEP and USGS are planning a new 10-year study to resume sampling at several of the previously monitored stream gaging locations. The study will continue to improve our understanding of the distribution of suspended sediment sources and help inform and improve the effectiveness of stream restoration projects for reducing turbidity.

References:

USGS Report on Turbidity and Suspended Sediment in the Esopus Creek Watershed: <http://pubs.usgs.gov/sir/2014/5200/>

Olive's New Flood Advisory Committee

In 2014, the Town of Olive formally established a Flood Advisory Committee (FAC), an advisory body to the Olive Town Board. The committee was tasked with producing a Flood Mitigation Plan that will prioritize strategies and actions aimed at making the Town better prepared for future floods, and as a result, less vulnerable.

The FAC is comprised of nine appointed Olive residents, in addition to Supervisor Sylvia Rozzelle who chairs the committee. The dedicated committee members represent a cross-section of the community and include residents with experience in emergency response, environmental impacts, engineering, infrastructure, planning, and building code regulations. The appointed members are Andrew Emrich, Eddie Kahil, Jody Hoyt, Dom Covello, John Ingram, Jim Hyde, Nicholas Burgher, Judy Coutinho, and Heather Gierloff. Representatives from the Ashokan Watershed Stream Management Program, Ulster County, NYCDEP, and others have been invited to participate as well.

The FAC has been busy over the last several months helping the Town obtain funding to develop a Flood Mitigation Plan. A total of \$103,780 was secured through two different grant sources: the AWSMP's Stream Management Implementation Program and the Hudson Valley Greenway. Additionally, the Town has retained the services of Woidt Engineering, Inc. to begin flood analysis and Plan development.



In the coming months, the FAC, with help from Woidt and Town residents, will conduct a detailed analysis of flood conditions and solutions for the hamlets of Boiceville and West Shokan. This "Local Flood Analysis" will explore a range of potential solutions that reduce flood elevations in the hamlets. Once completed, hopefully by December 2015, the Town will ultimately decide which solution(s) are the most feasible, practical, and fundable to move forward for the benefit of residents and businesses.

The public is invited to attend and participate in FAC meetings that occur every other month at the Town Hall. Please check the Town of Olive website (www.town.olive.ny.us) for meeting and flood project updates.

The frogs are calling!



If you listen closely, you may hear a new sound emanating from the streams, floodplains, and valleys of the Ashokan Watershed this spring. Every spring on warm (above 40 F) and rainy nights the frogs and toads of the Ashokan Watershed begin their annual calling to attract a mate. We are treated to the strange and wonderful sounds of peeps, trills, snores, grunts, barks, and pulsating choruses. From the earliest calls (Wood Frog) to the latest (Gray Treefrog), calling usually starts in late March and extends into June. Frogs and toads may call for days or weeks depending on the species.

Stream corridors of the watershed offer frogs and toads a variety of needed habitat. Small pools of water that temporarily form in woodlands are prime habitat for Wood Frogs, and may be used by Green Frog, Pickerel Frog, Bullfrog, and Northern Leopard Frog. The American Toad, Fowler's Toad, Northern Leopard Frog, and Pickerel Frog favor the wet meadows and forests found in stream corridors. Gray Treefrogs hang out in streamside trees and call on warmer days. Spring Peepers are found just about everywhere, but after the long and cold winter we've had, the call of this tiny frog is a very welcome and sure sign of spring!

Visit a local park or trail with streams, ponds and wetlands, or just step outside at dusk to hear the wild and wonderful music made by our amphibian neighbors! Visit the links below to learn the unique calls of frogs and toads found in the Ashokan Watershed.



When to hear them

- Mid-March to mid-April:** Wood Frog, Spring Peeper, American Toad
- Mid-April to mid-May:** Spring Peeper, American Toad, Pickerel Frog, Northern Leopard Frog
- Mid-May to mid-June:** Pickerel Frog, Northern Leopard Frog, Gray Treefrog, Fowler's Toad

Spring Peeper *Pseudacris crucifer*



Photo: USGS (Wikipedia Creative Commons)

Habitat: Widely distributed, very small frog of woodlands and a broad range of habitats; Emerges during the first rains of the year

What it sounds like: Single high-pitched "beep, beep, beep"; A chorus of calling spring peepers sounds like "bupah, bupah, bupah"

Hear a recording: <http://macaulaylibrary.org/audio/182021>

Sources:
Frogs and Toads of New York State
http://www.dec.ny.gov/docs/administration_pdf/frogs.pdf
<http://www.dec.ny.gov/animals/7487.html>
Cornell Lab of Ornithology Macaulay Library
<http://macaulaylibrary.org>
The Frogs and Toads of North America, by Lang Elliott, Carl Gerhardt, and Carlos Davidson

Wood Frog *Lithobates sylvatica*



Photo: CT Dept. of Energy & Environmental Protection

Habitat: Prefers lowlands, such as floodplains; Only breeds for 1-2 weeks

What it sounds like: Continuous monotone high trill; You might think there's been an "alien invasion"

Hear a recording: <http://macaulaylibrary.org/audio/182017>

Pickerel Frog *Lithobates palustris*



Photo: CT Dept. of Energy & Environmental Protection

Habitat: Favors stream corridors, wet meadows, and open, weedy wetland edges

What it sounds like: Depending on the listener, sounds like a creaky door, "rusty cow," or a regular snore

Hear a recording: <http://macaulaylibrary.org/audio/138531>

American Toad *Anaxyrus americanus*



Photo: CT Dept. of Energy & Environmental Protection

Habitat: Prefers lowlands, such as floodplains; Only breeds for 1-2 weeks

What it sounds like: Continuous monotone high trill; You might think there's been an "alien invasion"

Hear a recording: <http://macaulaylibrary.org/audio/182017>

Northern Leopard Frog *Lithobates pipiens*



Photo: Douglas Wilhelm Harder (Wikipedia Creative Commons)

Habitat: May occur only in southern portions of the watershed; Uses wet meadows, slow-flowing streams, and floodplain forests of large streams

What it sounds like: A long snore interspersed with grunts; Like a wooden pecking

Hear a recording: <http://macaulaylibrary.org/audio/182027>

Fowler's Toad *Anaxyrus fowleri*



Photo: Perlick Laura, U.S. Fish and Wildlife Service (Wikipedia Commons)

Habitat: Likes sandy and gravelly areas of bottomland forests; A southern species, nonetheless calling Fowler's Toads were reported in the Phoenicia and Woodstock areas

What it sounds like: A nasal "baah," almost like a baby crying, high and low pitched

Hear a recording: <http://macaulaylibrary.org/audio/176268>

Gray Treefrog *Hyla versicolor*



Photo: CT Dept. of Energy & Environmental Protection

Habitat: Rarely descends from trees; Swamps are the preferred breeding habitat

What it sounds like: High-pitched musical trill, like vibrating lips "brrrrr"

Hear a recording: <http://macaulaylibrary.org/audio/56777>

Green Frog *Lithobates clamitans*



Photo: Andrew E. Russell (Wikipedia Creative Commons)

Habitat: Found in small streams, woodland pools, and variety of wetland habitats

What it sounds like: Banjo-like "gunk" or "twang" of strings being plucked; In rapid succession a Gunk-gunk-gunk sound

Hear a recording: <http://macaulay-library.org/audio/138552>

American Bullfrog *Lithobates catesbeiana*



Photo: Cornellier (Wikipedia Creative Commons)

Habitat: Favors permanent bodies of water; Expanding where swamps and woodland pools are impounded to create ponds

What it sounds like: Sounds like a big bass instrument "bu-rum"; alarm squeak when scared into pond

Hear a recording: <http://macaulaylibrary.org/audio/53182>

Featured Riparian Plant: Common Elderberry
Sambucus canadensis



Elderberry is an attractive native shrub that blooms in late June to July. Photo by J.M.Garg.

Elderberry, also known as American Elder and Black Elderberry, is a member of the Adoxa Family (Adoxaceae).

Elderberry is a common riparian shrub, as it is flood tolerant, easy to propagate, and requires minimal maintenance. It will grow well in many soil types, including clay. It spreads by stolons (also known as runners), which creep horizontally along or slightly below the ground. It is shade tolerant, growing well even deep in forests, although it prefers open gaps in the canopy, particularly near stream banks. Frost damage to Elderberry is unlikely due to its bloom season from late June to July. The berries are ready for harvest from mid-July through September.

Elderberry is a valuable source of food, shelter, and habitat for many wild animals. When grown on stream banks or eroding sites, Elderberry shrubs provide

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shade, cover, and bank stability. Many birds (both game and songbirds), small mammals, and bears eat the fruit of the Elderberry shrub. Deer are more likely to graze on the foliage and stems, rather than the fruit.

Elderberry has many culinary and medicinal uses. The berries are especially high in vitamin C. They should be harvested when ripe. As the berries tend to soften easily, they should be refrigerated or frozen immediately. The fruit should be cooked before use. The raw berries are

often sour, and cooking improves the taste and destroys the alkaloids. Elderberries make delicious jams, syrups, and wines. The flowers are non-toxic and can be batter-fried.

Elderberry was highly valued as a food and medicine by many Native American tribes. Iroquois used the bark to treat various ailments, and the Cherokee used the berries. Ailments from headaches to skin conditions were treated with Elderberry. According to a Norwegian study conducted in 2004, there is promising evidence that Elderberry extract is an effective treatment for influenza and has antiviral properties. Additionally, it has potential value for treatment of respiratory inflammation and allergies.

Elderberry has sharply toothed, lance-shaped, opposite, and compound (generally 5 to 11) leaves; flat, umbrella-like white flower clusters; black to purple-black fruit; and a stem with white pith. It is a fast-growing shrub, with possible height from 8' to 20' (usually 3' – 12'). It can be pruned easily and is very adaptable to many environmental situations.

Sources:

“Common Elderberry.” *USDA NRCS Plant Guide* (2010): https://plants.usda.gov/plantguide/pdf/cs_san1c4.pdf

Foster, Steven, and James A. Duke. *Peterson Field Guide to Medicinal Plants and Herbs of Eastern and Central North America*. New York, NY: Houghton Mifflin Harcourt, 2014. 316-317. Print.

Mudge, Ken, and Steve Gabriel. *Farming the Woods: An Integrated Permaculture Approach to Growing Food and Medicinals in Temperate Forests*. White River Junction, VT: Chelsea Green Publishing, 2014. 91-93. Print.

The “Hit List” for invasive streamside plants

Invasive plants are non-native, aggressive growers, and can dominate or alter entire plant communities by crowding and out-competing native plants. Areas adjacent to streams and rivers are especially vulnerable to plant invasions for a variety of reasons. Flowing water itself is a natural seed disperser, as seeds from adjacent areas enter the waterway and move downstream. Riparian areas are habitat for a diversity of wildlife compared to other ecosystems and are host to many birds and small critters that eat the fruits and berries of invasives and naturally spread the seeds while doing so. Flooding also plays a large role in spreading invasives, particularly species that are able to grow from broken plant fragments. Humans are the largest means of transportation for invasive plants, whether through propagation and trade of nursery stock for landscaping, historic introduction of non-native species for well-intended conservation practices, or movement of soil and fill.

Where invasive plants dominate streamside areas, the habitat is likely to degrade for many inhabitants, from native plants, to insects, birds and animals, and even humans. Invasives have the following traits that help them out-compete native plants and dominate entire riparian forest communities:

- ◆ Aggressive spreaders or prolific reproducers;
- ◆ Adapt to a variety of conditions, often highly dynamic;
- ◆ Have few or no natural controls; and
- ◆ Are difficult to control or eliminate once established.



Mugwort choking riparian margins along the Bush Kill in the Town of Olive.

Recently, The New York State Department of Conservation enacted regulations that should slow the spread of invasive species throughout the state. This is great news for Ashokan Watershed streams and landscapes. Some problematic plants that threaten our streamside forests and riparian floodplains are on the regulated list.

The new regulations prohibit the propagation, transportation, possession, importation and introduction of certain invasive plants. The regulations aim to reduce the introduction of new invasive species, or the spread of existing populations. While

some of the listed species already have a strong presence within the watershed, the regulations should go a long way toward preventing new invasives from entering our backyards, forests, and floodplains.

Visit this website for information on NYS invasive species regulations effective March 10: http://nyis.info/?action=news_detail&event_id=598.

For more information on managing streamside areas, contact CSBI Coordinator Bobby Taylor at (845) 688-3047 Ext 6.

Regulated List of Invasive Species

Amur Honeysuckle <i>Lonicera maackii</i>	Japanese Barberry <i>Berberis thunbergii</i>	Multiflora rose <i>Rosa multiflora</i>
Autumn Olive <i>Elaeagnus umbellata</i>	Japanese Stilt Grass <i>Microstegium vimineum</i>	Oriental Bittersweet <i>Celastrus orbiculatus</i>
Garlic Mustard <i>Alliaria petiolata</i>	Giant Hogweed <i>Reynoutria sachalinensis</i>	Spotted Knapweed <i>Centaurea stoebe</i>
Japanese Honeysuckle <i>Lonicera japonica</i>	Mugwort <i>Artemisia vulgaris</i>	Cutleaf Thistle <i>Dipsacus laciniatus</i>

Esopus Creek News

AWSMP UPCOMING EVENTS



Join us for a walk and talk along Warner Creek in September.

Saturday, June 13

Rondout Valley Scout
Camporee
Rondout Valley Resort,
Accord, NY

Saturday, June 27

Family Fun & Fish Day.
Kenneth Wilson State Park,
Mount Tremper, NY
11am-1:30pm

Saturday, August 29

Shandaken Day

Saturday, Sept. 5

Olive Day

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



Cornell University
Cooperative Extension
Ulster County



Ashokan Watershed Stream Management Program

3130 State Route 28, Shokan, NY 12481

Phone 845-688-3047 • Fax 845-688-3130

EDITORS

Leslie Zucker, CCE Ulster County, laz5@cornell.edu

Brent Gosch, CCE Ulster County, bwg37@cornell.edu

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