Cornell University
Cooperative Extension
Ulster County

Winter 2014

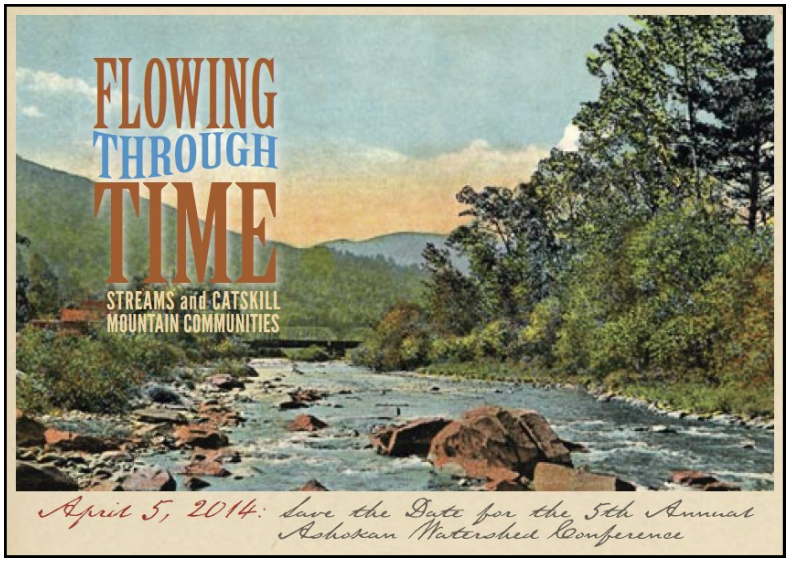
Esopus Creek News

Ashokan Watershed Stream Management Program Newsletter

A quarterly publication of Cornell Cooperative Extension Ulster County

Esopus - Broadstreet Hollow - Woodland Valley - Stony Clove - Fox Hollow - Birch Creek - Beaverkill - Little Beaverkill - Peck Hollow- Bushnellsville - Bush Kill

Flowing Through Time: AWSMP Announces its 5th Annual Ashokan Watershed Conference on April 5th



The Catskill Mountains have provided us with a rich history, lore, and legacy. Native Americans found magic here, and early European settlers discovered flora, fauna, and enough resources to sustain them for generations. Various industries thrived from logging, tanning, glass making, and farming . . .all utilizing our natural resources, and most importantly using the clean, clear waters from our exceptional streams.

John Burroughs, the most respected naturalist and essayist, next to Henry David Thoreau, described a local creek . . . "only in such remote woods can you now see a brook in all its original freshness and beauty. . . An ideal trout brook was this, now hurrying, now loitering, now deepening around a great boulder, now gliding evenly over a pavement of green-grey stone and pebbles; no sediment or stain of any kind, but white and sparkling as snow-water, and nearly as cool. Indeed, the water of all this Catskill region is the best in the world."

A historical look at our Catskill streams will be the theme of the 2014 Ashokan Watershed Conference organized by the Ashokan Watershed Stream Management Program (AWSMP). *Flowing Through Time: Streams and Catskill Mountain Communities* is the title of the fifth annual educational event. The daylong conference will explore the natural and cultural history of this most extraordinary area. Experts will present a diverse approach, examining the history and folklore of our region, the relevance of past and current stream management approaches, issues with climate change, and other topics of interest to residents, municipal officials, and the community.

Bill Birns, PhD, a writer, educator and historian who wrote a column for the *Catskill Mountain News* called, "A Catskill Catalog," will discuss the cultural development of our region. His presentation on the social history of the Ashokan Watershed will give us an opportunity to learn about the area from the early communities and valley's settlers to the impact building the Ashokan reservoir had on the region. Special focus will be paid to streams and land use patterns — where and why communities flourished and implications for that development now, in light of the threat of climate change.

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ASHOKAN WATERSHED STREAM MANAGEMENT PROGRAM

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NYC Environmental Protection

Inside this Issue

We're on the web!
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...Watershed Conference continued from page 1

Bill will talk about the role of the Upper Esopus in the American Revolution, and the Catskills as the birthplace of a unique school of American arts and letters. The works of the Hudson River School of painters and the Catskill-centric stories of Washington Irving and James Fenimore Cooper are examples of how this region influenced American culture with lasting impact today.

Bill will also touch upon the Catskills as the home of innovation in science, technology, industry, and tourism, — and, of course, the birthplace of American fly-fishing

Other presentations will cover climate and hydrology, and stream management. Allan Frei, PhD, a climatologist at the City University of New York, Hunter College, will present on Climate Change and Hydrology, including his relevant research about the frequency and impact of extreme weather on water resources in the New York City watershed.

Roy Schiff, PhD, PE, water resource scientist and engineer with Milone & MacBroom, Inc. will present on Stream Management: History, Trends, and Future Direction. We will learn how streams physically work to transport water, sediment, and woody debris and how this understanding has evolved. We will also hear what is current in river corridor planning and look at case studies of stream management projects from the State of Vermont; a region with a similar topography, geology, and land-use history to the Catskills.

Roy will speak about watershed partnerships such as the Ashokan Watershed Stream Management Program that are working to recover from past mistakes, as the climate and hydrology of the watershed have changed.

The afternoon offers choices from three different tracts:

- For residents who want to learn how to read flood maps and interpret flood insurance rate maps (FIRMS), Brent Gotsch, educator from the AWSMP will spend time with a hands-on approach to flood maps.

- A second tract given by meteorologist Stephen DiRienzo, from the National Weather Service Forecast Office in Albany, NY will be a training on the meteorological factors affecting extreme weather, the history of big storms, and unique characteristics of the Catskills that influence precipitation patterns.

- A stream experts panel will be available to answer your questions regarding the functions and management of local streams and how to protect property.

The afternoon ends with choices for a guided nature/stream walk, or a very special slideshow on the Hudson River School of Landscape Painting. Nature writers Ed and Judy Van Put will offer an in depth look at early American artists and their work inspired by explorations of the streams of the Catskills and the Ashokan/ Esopus watershed. These artists contributed some of the most important landscapes ever to be seen. Their art encouraged others to seek out the natural beauty found in the Catskills. . .with its flowing rivers, streams and waterfalls.

The conference will take place Saturday, April 5, 2014 at the Ashokan Center in Olivebridge, NY. There will be a $10 per person fee which includes lunch and refreshments. For information on how to register please visit www.ashokanstreams.org. Online registration begins March 1st.

Upcoming Events

March

The New York State Floodplain and Stormwater Managers Association will hold their annual meeting from March 25-27 at the Poughkeepsie Grand Hotel in Poughkeepsie, NY. The AWSMP has awarded grants for area municipal officials to attend and obtain or renew their Certified Floodplain Manager (CFM) certification.

April

The 5th Annual Ashokan Watershed Conference will be held on Saturday April 5 at the Ashokan Center in Olivebridge, NY. This year's theme is *Flowing Through Time: Streams and Catskill Mountain Communities* and will feature topics related to the cultural history of the watershed, the evolution of stream management practices, and climate change. Registration begins March 1. Please visit our website, or call the AWSMP office for more details.

May-June

Look for future announcements of a spring creek walk and talk.

Public and volunteer events will be scaled back this year until we can replace the Community Educator position formerly held by Gretchen Rae. However, we plan to attend and hope to see you at summer fairs and festivals around the watershed.

Check the AWSMP's website www.ashokanstreams.org for more information about events and programs, or follow us on Facebook!

Recent Events in the Ashokan Watershed

October

Staff from Cornell Cooperative Extension of Ulster County with assistance from Student Conservation Association (SCA) interns held a stream table demonstration at the Emerson Resort and Spa in Mount Tremper, NY as part of the Emerson's **Fall Festival** on October 12.

November

Throughout the month of November, staff from Cornell Cooperative Extension of Ulster County worked with a professional videographer to record a series of interviews with stream managers and local leaders about stream best management practices (BMPs) and 2013 stream restoration projects. The interviews were filmed on-site near an example of the stream BMP. Other topics covered local history and fisheries. After editing, the interviews will be produced into short videos used individually for training and posted online for educational purposes.

The Catskill Stream Buffer Initiative's largest fall planting in the watershed was installed at the stream restoration project site on Warner Creek off Silver Hollow Road in Chichester, Almost 1,200 plants will be installed.

In partnership with the Town of Shandaken, AWSMP began its third major stream restoration project in 2013. The project is approximately 1,000-ft upstream of the Silver Hollow Road bridge at the confluence of Stony Clove Creek and Warner Creek in Chichester. Work is currently suspended until weather conditions improve.

AWSMP announced the latest round of Stream Management Implementation Program grant funding due November 27.

December

AWSMP staff attended HEC-RAS training hosted by NYC DEP in mid-December. The training was taught by the engineering firm Milone & MacBroom, Inc. HEC-RAS is a software program originally developed by the Army Corps of Engineers to help determine surface water elevations. It allows users to input data and then virtually manipulate physical conditions to determine how changes in the landscape or infrastructure influence flood elevations. For example, this program is useful in determine if resizing or removing a bridge will significantly reduce flood inundation levels. These analyses are used to determine whether projects meet cost-benefit criteria. DEP plans to offer the HEC-RAS training to local and county staff in 2014.

January

On January 21, the Rondout-Neversink Stream Management Program (AWSMP's sister program in Sullivan County) in conjunction with the Catskill Region Invasive Species Partnership (CRISP) hosted a **Hemlock Wooly Adelgid Summit** at the Frost Valley YMCA. Hemlock wooly adelgid is an invasive species that is decimating native hemlock trees across the Catskill region. During this meeting, researchers and scientists from Cornell University, the National Park Service, and the US Forest Service presented the latest research on this pest and potential chemical and biological controls to help check its spread.

February

On February 5, staff from Cornell Cooperative Extension assisted NYSDEC, FEMA, and the consulting firm Dewberry with a **Flood Map Open House** held at the Woodstock Fire District Hall. Residents from the watershed came to speak with agency representatives about property questions, the new preliminary flood maps, and changes to flood insurance rates.

Above: *Professional videographer Jessica Vecchione of Vecc Videography films an interview with Deron Davis of USDA-NRCS on the site of a stream restoration project along Warner Creek.*

After the AWSMP Stakeholder Council voted its approval, the AWSMP announced stream implementation grant awards totaling nearly $244,000. Grants awarded by category: $6,821 Education & Outreach; $77,000 Planning; $60,000 Research & Monitoring; $100,000 Streamside Infrastructure.

March

AWSMP worked with the NYSDEC to organize a Floodplain Mapping Fundamentals training sessions for community, regional and county officials on March 4 in Kingston.

Ongoing

AWSMP staff have attended weekly meetings of the NY Rising Community Reconstruction committee for the Town of Shandaken and Hardenburgh to be available for questions related to stream management practices. The program also recently met with the Town of Olive to discuss flood mitigation actions.

Featured Stream and Science: Warner Creek

We can learn a lot from streams. Through careful study we can understand how they function, and how we might better live alongside them. This is especially important during this period of frequent big floods.

Many of our Catskill streams are damaged from the floods of the last few years and will be recovering for years to come. Under the right conditions streams have the capacity to self-heal, and often do. However, there are many instances when streams can benefit from some restorative treatment after scientifically informed design. In this article we intend to combine two subjects we often report on separately in this newsletter: an introduction to one of the watershed's streams and a discussion on applying stream science.

Warner Creek is a 9-mile long stream flowing through a long, narrow, steep valley called Silver Hollow that covers just about 9 square miles (Figures 1 and 2). The stream originates in a joining of tumbling brooks on the forested slopes of Plateau Mountain in Greene County and ends as a full-fledged mountain creek merging with Stony Clove Creek in Ulster County. Along the way, this stream flows past remote hemlock groves that line red bedrock channels; past a ranch on the broad valley floor of Silver Hollow notch; over cascading white water reaches of car-sized boulders; past eroding bluffs of sediment left behind during the ice age; and finally meanders into a more gentle open valley that people have occupied for at least 200 years.

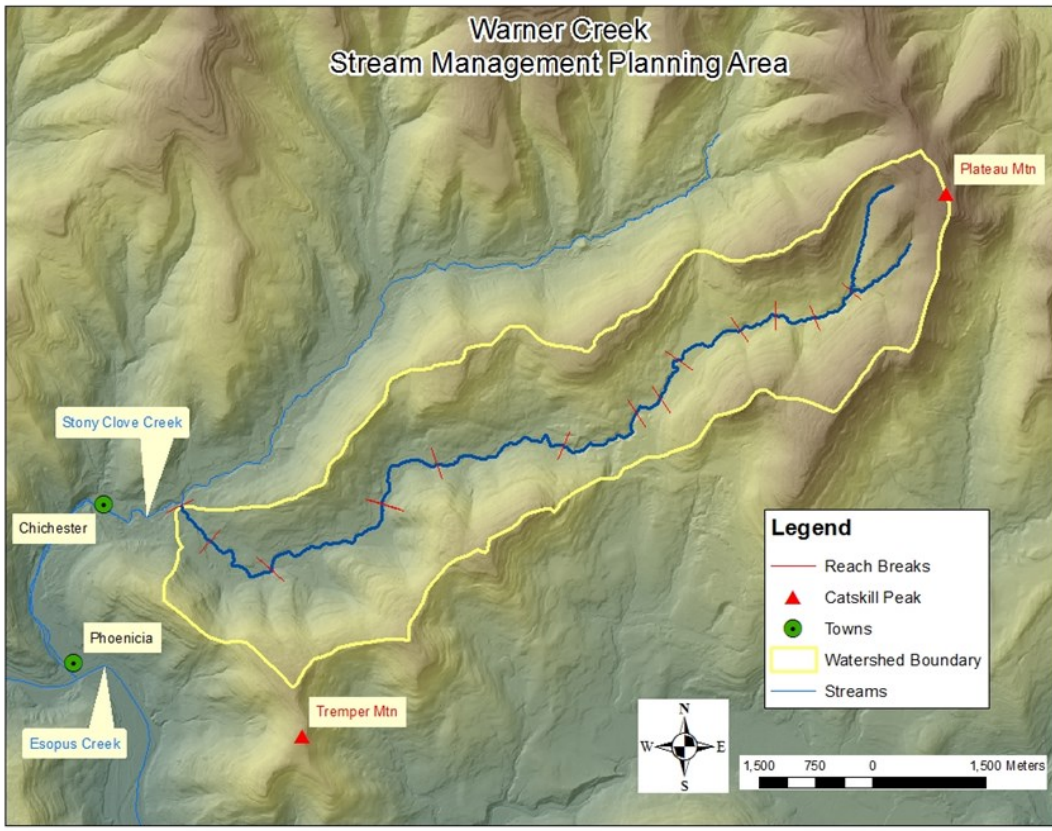

Figure 1. *Map of the Warner Creek watershed*

Figure 2. *Warner Creek in the Silver Hollow watershed looking north to Plateau Mountain.*

This stream, like most Catskill streams can be a cool and soothing retreat on a hot summer day. Its headwaters are pristine and full of brook trout. But it can also be a force of nature that destroys roads and bridges in its path, and by the time it reaches Stony Clove Creek, can have elevated **turbidity** (*muddy, or not clear water*) for weeks after floodwaters recede. This stream came to our attention in early January 2010 when turbidity increased multifold after the first of many floods that year. Using a range of assessment techniques we set out to better understand Warner Creek in an effort to develop management strategies that could help the stream recover.

Starting in 2010, AWSMP supported a three-year investigation of Warner Creek sponsored by SUNY New Paltz. The college received a National Science Foundation grant to run a Research Experience for Undergraduates (REU) program focused on watershed characterization. Students were competitively selected from around the country to participate in the eight-week summer program. DEP geologist Danyelle Davis mentored several students in how to conduct stream geomorphology investigations of Warner Creek. The study period coincided with several large flood events including the record flooding of Tropical Storm Irene. This gave students the chance to study the impacts of

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flooding on channel geomorphology.

A first step in stream assessment is accounting for the water flowing in the channel. Stream gages are used to continually measure the flow of water passing a specific location along the stream. With enough measurements, we can determine the stream's **hydrology** – *how much water is delivered by the watershed, and how it is delivered*. There is no long-term gage on Warner Creek, so we used the downstream Stony Clove Creek gage in Chichester to characterize the hydrology. The gage logged seven floods from 2010 to 2012 with the potential to erode the stream channel and adjacent land.

We also evaluate water quality, especially important since these streams help supply drinking water to over 9 million New Yorkers. One of the biggest threats to the drinking water supply is turbidity from suspended sediment resulting from the erosion of silt and clay within the stream channel. By measuring turbidity and hydrology we evaluate if a stream is only episodically a source of turbidity, or a chronic source indicating that something is amiss. Recent investigations by the United States Geological Survey have demonstrated that the Stony Clove watershed is proportionally the largest supplier of turbid water in the Ashokan Watershed. Warner Creek has been one of the chronic sources of this turbidity.

The core of our assessment work is characterizing the physical stream channel. We measure the stream's shape with high precision survey equipment. *The physical shape of the stream channel* is called its **morphology**. *The process of how channels are formed and the range of morphology channels exhibit* is referred to as **stream geomorphology**. We map the distribution of important stream features such as streambank erosion, sudden drops in streambed elevation called headcuts, gravel and cobble accumulations called depositional bars, collections of large woody debris, changes in stream channel geology, and places where people have attempted to stop erosion by lining the banks with rocks. Mapping the stream's geomorphic features along its length reveals patterns of erosion and deposition. If assessments are repeated, we can see how the channel responds to specific events and determine whether the channel morphology is in balance with surrounding conditions.

Fortunately, we were able to repeat assessments of Warner Creek through the partnership with SUNY New Paltz.

Repeat assessments focused on the lower 10,000 feet of Warner Creek where the majority of the people live. In 2012, 38% of the streambanks were actively eroding. The result of this erosion was "entrainment" of a large volume of sediment in the water column. The eroded silt and clay stayed in suspension, increasing the stream's turbidity, while the larger-sized sediment formed or expanded depositional bars that in places enhanced adjacent streambank erosion. The REU students completed geologic mapping and chemical analysis that indicated thick layers of silt and clay once deposited at the bottom of ancient glacial lakes were the principal source of sediments generating turbidity. Contact with this source material was more common in the study area than the undeveloped upper reaches of Warner Creek. This refined our focus on where to consider treatment to reduce turbidity.

One of the many triggers for streambank erosion is the abrupt lowering of the streambed elevation at headcuts. We observed several locations where the streambed dropped several feet in a very short distance, often cutting into the underlying glacial lake sediment. The headcuts moved upstream during the study, indicating a systemic lowering of the streambed. When the channel **degrades** or deepens, the banks become unstable and are more prone to erosion with a consequent increase in sediment load. We were witnessing a stream going through a very active period of adjustment in response to an abrupt change in hydrology. One implication is that any stream restoration project for this stream must be designed to withstand increasingly erosive floods, potential destabilizing headcuts, and sediment loads delivered from upstream eroding banks.

We identified two locations that merited treatment as soon as possible. One was featured in the previous issue of Esopus Creek News – a project to remove the channel away from the biggest and most chronic source of turbidity in the Warner Creek watershed. This project was completed in 2013 and we hope that chronic turbidity was reduced for the foreseeable future. Ongoing water quality monitoring will reveal the outcome. The other site is the most significant headcut observed in the Stony Clove watershed. Following Irene and Lee flooding in 2011, the streambed just above the confluence with Stony Clove Creek dropped at least 10 feet within a distance of about 10 feet! (Figure 3) The cut ran deep into glacial deposits and threatened to lower the streambed for a great distance upstream, which in turn would destabilize many streambanks, entrain more sediment, and most likely undermine Silver Hollow road. A project to restore streambed elevation and place barriers to prevent headcut migration was started in fall 2013 and is expected to complete in 2014. We believe these two treatments alone will reduce future turbidity from this watershed.

Figure 3. *Headcut on Warner Creek just above the confluence with Stony Clove Creek.*

Through comprehensive studies of Warner Creek we have learned a lot about stream process and recovery following big floods and have hopefully taken some corrective actions that can help accelerate the stream's recovery.

The REU studies have been presented at professional geology conferences and the 2012 Catskill Environmental Research Monitoring conference. Several presentations are available at www.ashokanstreams.org under the Publications and Resources menu for a more in-depth look at the student's work.

Recreation in the Watershed: Riparian Birding

Some birds are found more abundantly or exclusively in stream corridors. The Ashokan watershed's natural areas and public lands offer great opportunities for riparian bird watching! A diversity of food sources and habitat makes stream corridors prime birding areas. Insects are plentiful near streams, as are berry and seed-producing plants. Birds may nest along streams on erosional bluffs, and in wetlands, cavity trees, large forested tracts, and patches of shrub or grassland. Studies have shown that vegetated riparian buffers extending at least 500 feet from the stream may protect up to 95% of the bird species present. Narrow buffers are habitat for edge species like Song Sparrow and Northern Cardinal.

BIRDS OF RIPARIAN WOODLANDS

Yellow-breasted Chat; Yellow-billed Cuckoo; Willow Flycatcher; Veery; Warbling Vireo; Yellow-throated Vireo; Yellow Warbler; Canada Warbler; Cerulean Warbler; Louisiana Waterthrush; Eastern Wood-Pewee

Yellow Warbler breed in shrubby thickets and woods, particularly along watercourses and in wetlands.

Cerulean Warbler are most commonly in tracts with mature hardwoods and a high, variably closed canopy. Known to occur in riparian forests with tall sycamores or cottonwoods, and in red-maple swamps, and lake margins.

Louisiana Waterthrush is the only obligate riparian songbird species east of the Mississippi; they depend on small streams in mature forest for foraging and nesting.

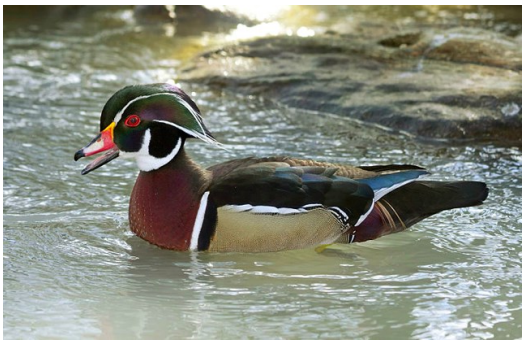
Willow Flycatcher nesting sites must have a high water table and are usually within close proximity of water. Its preferred habitat has dense vegetation, such as dense growths of willows or other shrubs and medium-sized trees.

BIRDS THAT NEST IN BANKS close to water. They may also use upturned roots, shady rocky shorelines, or even the undersides of bridges.

Bank Swallow; Northern Rough-winged Swallow; Belted Kingfisher

Bank Swallow

Sources:
New York State Breeding Bird Atlas
Birds in Forested Landscapes, Cornell Lab of Ornithology
All About Birds, Cornell Lab of Ornithology



Wood Duck thrive in bottomland forests, swamps, marshes and beaver ponds. Found along streams of all sizes.

Nesting **WATERFOWL** are found in stream areas and are vulnerable to human disturbance. Most waterfowl species depend on wetlands or adjacent uplands for nesting and foraging.

American Black Duck; Canada Goose; Mallard; Blue-winged Teal; Wood Duck

GREAT BLUE HERON and GREEN HERON are seen foraging in streams and heron colonies are usually near water.

Red-shouldered Hawk

BIRDS OF PREY most commonly associated with the Ashokan reservoir and stream corridors are *Bald Eagle, Osprey and Red-shouldered Hawk*. These birds forage for fish, reptiles and amphibians in wet areas, and nest on adjacent uplands.

WHERE TO LOOK FOR RIPARIAN BIRDS IN THE ASHOKAN WATERSHED:

Birch Creek, Shandaken Wild Forest, Lower Birch Creek Road Parcel (NYSDEC) - Wheelchair accessible trail around small pond off Lower Birch Creek Rd.

Rochester Hollow (NYSDEC) – Hiking trail off Matyas Rd.

Kanape Brook, Sundown Wild Forest (NYSDEC) - Hiking trail off Watson Hollow Rd. (Cty Rt 42).
Wittenberg Unit (NYCDEP) - http://www.nyc.gov/html/dep/pdf/maps/Wittenberg.pdf - Hunting, hiking and fishing area with meadow/open field near stream.

West Shokan Unit (NYCDEP) - http://www.nyc.gov/html/dep/pdf/maps/West_Shokan.pdf - Hiking area (access permit needed) along headwaters of Bridal Veil Creek with beautiful beaver wetland meadow at southern end.

Belleayre Beach Lake (Town) - http://www.belleayre.com/summer/lake.htm - Along Birch Creek, good for viewing kingfishers, osprey, hawks after-hours or before/after summer season.

Shandaken Tunnel Portal (NYCDEP) – No public access to stream, but bald eagles often perch on trees along the Esopus Creek just down from the outlet.

Kenneth L. Wilson Campground (NYSDEC) – Campground with hiking trails off Wittenberg Rd.

Ashokan Reservoir (NYCDEP) – Walkways along the Reservoir are a great place to view bald eagles year-round, accessible by walkers, bicycles and wheelchairs.

Landowners who restore or protect riparian buffers are also protecting our feathered neighbors. To provide the highest quality habitat for riparian birds, landowners should seek to establish or maintain a riparian forest buffer of native species.

Help with Buffers

Do you own streamside property in the Ashokan Watershed?

Are you worried about bank erosion?

Have you recently done work on your streambank?

Are you planning on doing stream work this summer during the construction season?

Would you like a qualified professional to help diagnose your stream problems and determine a sustainable solution?

Perhaps, your streamside area is in good condition and you want to maintain it or improve it for wildlife habitat?

If you have answered yes to any of these questions, you may qualify for a project under the Catskill Streams Buffer Initiative (CSBI). The CSBI program is now accepting applications for the 2014 season.

Call the AWSMP's CSBI program at (845) 688-3047 for help.

The CSBI program in the Ashokan Watershed was busy in 2013. Working with private landowners, CSBI is working to restore the many important riparian buffer functions that are essential along our streams and rivers. A total of 1,850 trees and shrubs were planted for private landowners at 7 project sites in the towns of Shandaken, Woodstock, and Olive. In addition, approximately 2,500 native willows were installed as live stakes in areas that would not support containerized plant material. Two additional projects to control Japanese Knotweed, an aggressive invasive plant, were started at upstream source locations covering over 10,000 square feet.

Esopus Creek News

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Free to residents by request.

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Announcements: CERM Conference Scheduled for Fall 2014

Every other year, a group of partners from NYSDEC, NYC DEP, NYSERDA, USGS, NYS Museum, Cornell Cooperative Extension, Syracuse University, Bard College, Cary Institute for Ecosystem Studies, the Catskill Institute for the Environment, the Ashokan Center and other area agencies and environmental non-profits come together to host the Catskill Environmental Research and Monitoring (CERM) Conference. The CERM Conference brings together scientists and researchers from an array of disciplines to present and discuss studies conducted in the Catskill region.

Past presentations have included discussions of Catskill forests, geology, invasive species, water quality, ecology, and climate change. Poster presentations on these and other subjects are also on display during the conference. The conference is an excellent opportunity for professionals and researchers to network. Even for the non-researchers amongst us, the conference is an opportunity to learn about the latest research going on in our own backyards.

This year's conference will be held on October 23-24 at Belleayre Mountain. Please periodically check the CERM webpage (http://www.bard.edu/cep/programs/catskill/) for updates and registration information. If you are interested in presenting at the conference, contact Steven Parisio at sxparisi@gw.dec.state.ny.us. The deadline for abstracts is September 12, 2014.

***Above**: The USGS is conducting fisheries research in the Ashokan watershed.*