EIGHTMILE RIVER WILD & SCENIC WATERSHED News
2024

The latest updates from the Eightmile River Wild & Scenic Watershed

Falls Brook | Photo by Abigail Bernstein

Chairman's Column: Dead Trees Are Life-Giving

by Anthony Irving

These are difficult times for our forests. Non-native pests and pathogens are causing great harm and in some cases nearly eradicating entire tree species. Emerald Ash Borer, Beech Bark Disease, Beech Leaf Disease, Hemlock Wooly Adelgid and Spongy Moth (formerly Gypsy Moth) are radically changing forest composition, leaving many dead and dying trees. The question is what do these changes mean for our yards and woodlands, and what does the future for our forests look like?

There are an array of pests and pathogens each targeting and affecting their host tree species in distinctive ways. The severity of these outbreaks is usually high as natural defenses to these foreign invaders have not evolved. Two previous examples of non-native pests and pathogens devastating a species are the almost complete loss of American elm and American chestnut, both major woodland components in the early 1900s. Efforts to counter these and more current non-native pests and pathogens center around biological controls and genetic alteration, but success to date is limited and the future for all these species is uncertain. Here are some of the current members of the rogue's gallery of pests and pathogens impacting Eightmile River forestlands.

The **Spongy Moth** (formerly gypsy moth), *Lymantria diaspora*, invaded the oak/hardwood forests of the eastern seaboard after its introduction from Asia to the northeast early in the 20th century. Caterpillars defoliate trees, especially oaks, restricting the tree's ability to photosynthesize. Severe outbreaks occur every 20-30 years, the last one in our area was

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Trees across the East Branch of the Eightmile River

The Value of Wood in Streams

by Steve Gephard, Fisheries Biologist

In their precolonial natural state, streams contained many pieces of wood. Branches, logs, root wads, and entire trees fell from the stream banks and entered the streams. This instream wood is important to the ecosystem because: (1) a multitude of aquatic insects colonize it, grazing on the biofilm on the wood or the wood itself. These insects are essential fish food; (2) the decomposing wood releases carbon into the water, which is an important fuel for primary productivity (e.g. algal growth) that feeds the stream's food web; (3) the structure of the big wood blocks, diverts, and guides water flow, which in turn shape the stream, creates pools and riffles, and sorts the substrate including creating gravel beds important for fish spawning.

Prior to European Contact, huge trees grew alongside the Eightmile River and when they fell into the river, they spanned the channel and created a river feature that might last decades. After the forests were cleared, smaller trees sprang up and when they fell into the stream, they have typically been washed downstream. Many states like Maine and Vermont are deliberately dropping trees in their streams. The early January storm knocked down dozens of trees into our rivers, notably in the East Branch along Salem Road. Residents might think of them as unsightly but they should resist the temptation to pull them out and "clean-up" the river. River communities may need to rethink their image of clean and healthy river systems to embrace the value these downed trees provide and leave them in place.

Chairman's Column

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between 2014 and 2017. This latest outbreak was broken when a pathogenic fungus (*Entomaphaga maimaiga*) killed the caterpillars. This fungus, first released in the early 1900's as a way to control gypsy moths, was believed ineffective, but a damp spring in 2017 was conducive to the fungus's rapid spread ending the outbreak, but not before severe oak mortality.

Female Spongy moths (white) with egg masses and males (brown)

The **Emerald Ash Borer**, *Agrilus planipennis*, is a recent Connecticut arrival. The female of this small, green beetle lays her eggs on the bark of ash trees where, after hatching the larvae move into the bark where they feed on the inner bark and cambium layer. By feeding on those parts of the tree responsible for the transport of nutrients they starve and kill the tree over a period of two to three years. As there is no effective control this raises concerns as to the species being extirpated from the region.

Woodpeckers peeling ash trees for emerald ash borer larvae.

Beech Bark Scale Disease occurs with the interaction between the beech scale insect, *Cryptococcus fagisuga*, and the fungus, *Neonectria* spp. which attacks the cambium layer blocking nutrient transport and giving the once smooth bark a patchy, scaled look. Although trees survive limited outbreaks, the disease results in significant mortality and defects to trees. **Beech Leaf Disease** is caused by a nematode worm that creates dark interveinal bands and leaf deformation. It appears to affect trees of all ages and in

Blistering on beech due to beech bark disease

combination with Beech Bark Scale Disease is killing many of our beech trees. This showed up two years ago making long-term projections difficult.

The **Woolly adelgid**, *Adelges tsugae*, which attacks eastern hemlock is an aphid-like sucking insect introduced from Japan and first seen in New York in the late 1960's. Originally, infested and untreated hemlocks were expected to die within four years; however, even heavily infested areas in southern Connecticut are experiencing some improvement in those trees not killed outright. A ride through Devils Hopyard State Park shows areas with complete mortality compared to others where infested trees appear to be making a comeback. One hope for arresting the pest lies in biological controls using predators, such as ladybeetles, and parasites brought in from their native Japan. Field studies being conducted at the Connecticut Agricultural Experiment Station are in their early stages and any widespread success is at least a few years away.

Woolly adlegid egg masses.

Managing Dead Trees: These are unprecedented times for our forests as attacks by non-native pests and pathogens are happening simultaneously. Unless they are a safety concern, dead and dying trees are still part of the forest ecosystem and it is best to leave them in place unless they are a safety concern:

- Dead and dying trees are creating large canopy gaps, letting in more light to the forest floor. Seedlings and saplings that might not otherwise compete in the low-light environment of a healthy overstory, are better able to thrive.
- With the death of surrounding trees there is less competition for other resources such as water and nutrients that are now available for remaining trees and new seedlings.
- Dead, standing trees provide food for insect-probing birds and nesting resources in cavities and hollows for birds and small mammals.
- Dead trees are rotting on the stump and shedding branches as they decompose. Decaying, fallen wood is full of microorganisms that aid in decomposition, returning nutrients and organic material to forest soils.
- The root systems of dead and dying trees still provide some soil structure support reducing erosion. This is especially important in highly erosive areas such as streambanks.
- Fallen trees in rivers and streams provide important habitat for fish and other river dwellers such as mussels and macroinvertebrates.
- Trees dying in and around wetlands should be left in place to decompose as they supply nutrients and improve soil morphology. In addition, wetland soils are highly susceptible to compaction and disturbance by machinery.
- Some trees will uproot which is why those near structures should be cut down. When cutting down trees, as much woody debris should be left in place as it acts in soil formation and fertilization.
- If individual trees create aesthetic concerns, then allowance can be made for their removal.

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Additional Management Advice

Frank Cervo, DEEP Service Forester
frank.cervo@ct.gov

There's certainly no official DEEP recommendation for what to do with dead trees on your property. My advice really is very site-specific, which depends on the property and what the landowner wants/needs from it. Here are a few common themes:

- Safety - If you've got big dead oak or ash trees next to your home or hanging over a trail, parking lot, or other high-traffic area, you better consider cutting them down before they fall on somebody. Or perhaps reroute/close the trail or avoid that section of the property. This tends to be less of a problem with beech due to their typical form but not always.
- Necessity - Is there really any reason to act? Dead trees are unsightly but they're not necessarily problematic. And they have environmental benefits.
- Function - What's happening now that all these trees died? The snags aren't absorbing anymore sunlight - where are all those photons winding up? While not common, there may be a good functional pole, sapling, and/or seedling layer to take advantage of the extra light. Its important to assess what it will take for the area to get back to some semblance of a functional (forest) habitat.

Beavers of Connecticut: AI-Powered Detection & Monitoring

by Evan Zocco

The North American Beaver (*Castor Canadensis*) holds a significant place in Connecticut's ecosystem. These creatures, native to the region, have a history impacted by human activity. In the early 1800s, excessive hunting led to the near disappearance of the local population. However, efforts in the 20th century by the Department of Environmental Protection (DEP) and its former component commissions, facilitated their reintroduction, leading to a stable and self-sustaining population in Connecticut's waterways.

As of 2015, the Department of Energy and Environmental Protection (DEEP) estimated that there were between 6,000 to 10,000 beavers in Connecticut. This estimate, however, comes with a note of caution. Given the extensive range of these values and the lack of recent comprehensive studies, the true number remains elusive. Accurately estimating the population is a formidable task, hindered by limitations in funding and suitable methodologies. This uncertainty underscores the complexity of wildlife management and the need for continued research and monitoring to better understand these vital members of our natural communities. Without proper technique, there is no feasible way to estimate the number of beavers within Connecticut. Understanding the beaver population is crucial due to the significant ecological role these animals play. Beavers, as ecosystem engineers and a keystone species, have a profound impact on their surroundings. Their unique ability to modify habitats is essential in shaping ecosystems. As North America's largest rodent, beavers possess specially adapted teeth and strong jaw muscles, enabling them to effectively cut down trees. This behavior is not only vital for their survival, as they consume the inner bark of trees, but also pivotal in their habit of building dams and lodges. When beavers construct dams, they alter the landscape dramatically by creating ponds and wetlands. These water bodies are crucial for a range of wildlife, fostering biodiversity and providing habitats for various species. The ponds also contribute to groundwater recharge and the improvement of water quality. However, these changes can also lead to challenges, such as alterations to water flow, and flooding that can impact wildlife and human activities.

More on Beavers

As the largest rodent in North America, adult beavers can weigh anywhere between 30-65 pounds and measure 24-36 inches. Beavers are monogamous, and often breed for life. A litter with two to five babies, known as kits, are typically born in May or early June. Beaver colonies are often multi-generational as kits remain with the parents for a second year, before being forced to move to new territory. Young, inexperienced beavers may attempt to build dams in less-than-ideal areas, only to have the dam wash out with large flows. While more commonly nocturnal, beavers can also be observed in the daytime and are active year-round. Their lodges are built with a dry chamber that provides protection during harsh weather. During winter months, rising steam is the sign of an active lodge.

Monitoring the beaver population is essential for several reasons.

Ecosystem Management: Understanding the beaver population assists in managing their impact on ecosystems. Overpopulation could lead to excessive tree felling and flooding, while underpopulation might reduce the ecological benefits they provide.

Conservation Efforts: Accurate population estimates allow for effective conservation strategies. They assess the health of the beaver population and ensure their survival, considering their historical decline due to hunting and habitat loss.

Human-Wildlife Coexistence: Knowledge of beaver populations assists in managing interactions with human environments, particularly in areas where dam-building could conflict with human land use.

Tracking the beaver population in Connecticut is not just about the numbers; it's about understanding and managing their critical role in the environment

and maintaining a balance that benefits both the natural world and human interests.

The proper assessment of this population requires an accurate count that can be repeatedly obtained for future years. With rapid advancements in technology, wildlife studies are increasingly turning towards Artificial Intelligence (AI) to undertake these tasks. AI models are particularly adept at analyzing images, determining the value of each pixel to identify objects within a picture. This process involves initial input from AI developers who outline the targeted features, training the AI to recognize these specific elements in varied imagery. Deep learning, a subset of AI, enhances this process. It uses the outlined targets from developers to predict their presence in new, often differing images. This method significantly reduces the time and effort required for manual processing. Essentially, developing a deep learning model for this purpose hinges on two key elements: a thorough understanding of the target (in this case, beaver sites) and a substantial collection of relevant images.

We have utilized Connecticut's extensive archive of aerial imagery to develop a deep learning model that can automatically detect beaver-modified areas. This model analyzes the images to identify changes in the landscape caused by beaver dams, which create distinctive modifications compared to unobstructed waterways. Through these analyses, we can calculate the total acreage affected by beaver damming.

As illustrated in Figure 1, the predicted beaver sites in the Eightmile River Watershed show noticeable changes between 1990 and 2019. It's important to note that these models can be fallible. For example,

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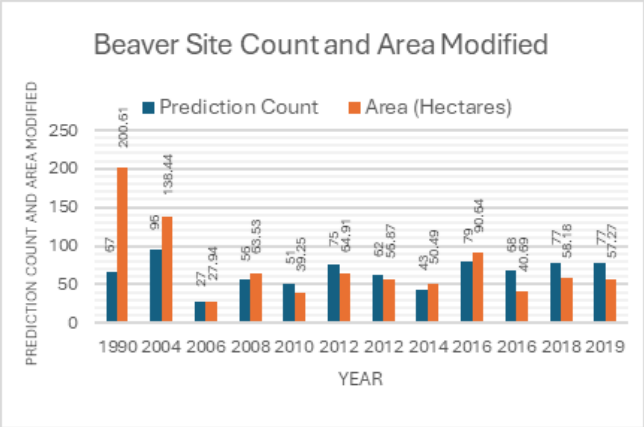


Figure 1: Prediction count and predicted area described over time.

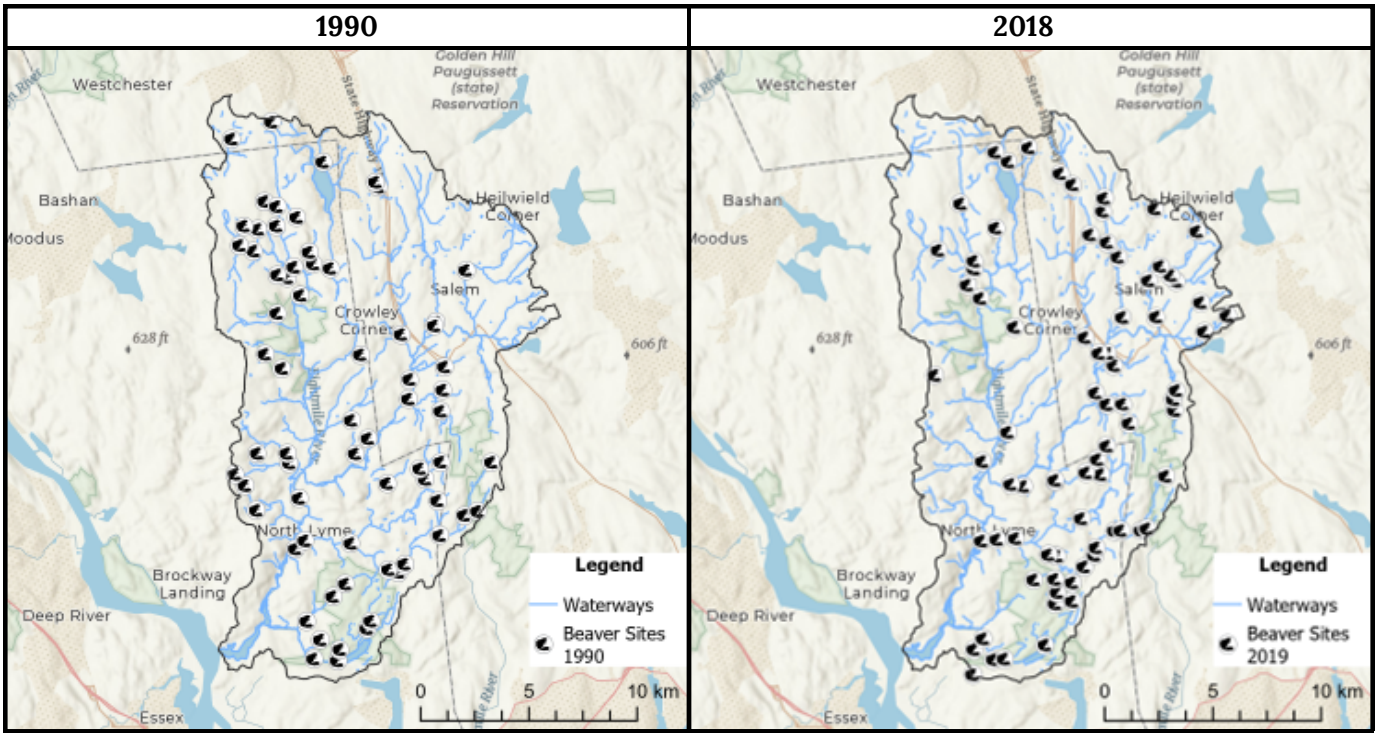


Figure 2: Density Map of beaver sites in the Eightmile River Watershed in 1990 (Left) and 2018 (Right).

Beavers of Connecticut *continued from page 5*

panchromatic or black-and-white imagery has presented challenges, leading to some inaccuracies in the 1990 and 2004 data. These instances of false predictions are being addressed in future iterations of the model.

Despite these challenges, the deep learning approach offers a promising avenue for wildlife conservation efforts. By transforming complex data into accessible formats like the maps shown in Figure 2, we can gain valuable insights into the dynamics of beaver populations and their impact on local ecosystems.

This study comparing beaver habitats reveals that sites have remained active over this 29-year span might relocate to a new area. The variability in beaver habitats underscores the importance of continuous monitoring to better understand and anticipate these changes. To verify these habitats, the study primarily utilized detailed aerial imagery with a resolution of 1 meter, which was effective in identifying signs of beaver activity. Additionally, a site within Salem, CT (Figure 3) was physically inspected (ground truth), thanks to the cooperation of a landowner who provided access and a guided tour of the area.

The predictive model used in this research has successfully identified beaver habitats in the Eightmile River Watershed with a high degree of accuracy. However, the development of the model is an ongoing process. By incorporating more diverse examples of beaver habitats into the training dataset, the model's accuracy can be further enhanced. The current findings offer valuable insights for a more comprehensive understanding of the changes in beaver habitats over nearly three decades. This information is not only useful for academic purposes but also aids in public education about beaver behavior and landscape alteration. Additionally, it serves as a resource for forest managers in planning and wildlife management, highlighting the importance of recognizing and preserving beaver habitats. With this data we hope to better the public's understanding of this significant wildlife species.

Figure 3: Ground truth example site in Salem, CT. Left image is photo taken on site. Right side is the prediction made from the model.

Meet the Scientist

Evan Zocco is currently pursuing his Master's degree at the University of Connecticut, within the College of Health, Agriculture, and Natural Resources. With a deep-rooted interest in wildlife ecology, Evan has dedicated the past two years to studying beaver populations, focusing on innovative methods for monitoring and understanding their habitats.

At the forefront of his research is the exploration of deep learning techniques for beaver site detection. This approach promises to enhance ecological studies by providing more precise and efficient means of tracking beaver activity. Evan is also pioneering the use of unmanned aerial systems (UAS) with the Connecticut beaver population. By collecting then analyzing multispectral and LiDAR imagery, he is gaining valuable insights into the impact of beavers on vegetation and the dimensions of their sites.

Evan's work not only contributes to the academic understanding of beaver ecology but also has broader implications for environmental management and conservation strategies. His unique combination of traditional ecological study with advanced technological applications positions him at the edge of modern wildlife research.

USGS in Our Watershed

by Abigail Bernstein

***Left**: Streamgage on the West Branch of the Eightmile River at North Plain, CT 01194000 **Right**: Streamgage on East Branch Eightmile River Near North Lyme, CT 01194500*

Have you ever been driving and noticed a strange looking device on the side of the road, with solar power, antennae and lock boxes or even a small building? Or have you seen the USGS logo but wondered what it was for? We spoke with Tabatha Lewis, a U.S. Geological Survey (USGS) hydrologic technician who answered all of this and more.

What are these structures on the side of road?

They are streamgages operated and maintained by USGS as part of their nationwide effort to monitor water resources! In fact, they are not located on the side of the road at all, but rather on a riverbank. Often conveniently near a road crossing for ease of access. The gages are continuously collecting stream data such as gage height (how high or low the stream water level is), and discharge (amount of water flowing through the river per second) that is then made publicly available every hour for anyone to use. *Editor's Note: Gage height is commonly referred to as stream depth, but they are not the same. Stream bed topography varies resulting in shallower and deeper spots. Gage height therefore is measured from a specific reference point to avoid discrepancies.*

What kind of data do they collect?

There are two streamgages in the Eightmile River Watershed. One on the West Branch and another on the East Branch - just above their confluence. They collect similar data but due to funding source, are slightly different.

East Branch Eightmile River near North Lyme: This streamgage collects data on precipitation (inches), stream temperature (F/C), discharge (ft^3/sec) and gage height (ft). This gage is one of six federally funded streamgages in Connecticut. To be federally funded, a streamgage must meet at least one of USGS' Federal Priorities. With a 66-year period of record, the East Branch Streamgage meets their "long-term hydrologic trends and extremes" priority. A long period of record is valuable to USGS in monitoring long-term trends and gives them a large amount of data to run analysis on.

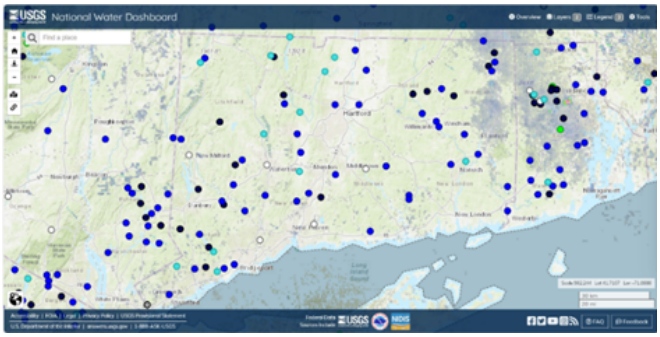
Eightmile River at North Plain: This streamgage collects data on stream temperature (F/C), discharge (ft^3/sec) and gage height (ft). It is funded by the Connecticut Department of Energy and Environmental Protection (DEEP) for its scientific value and The Fox Hopyard Golf Course as part of their license to withdraw water to irrigate their fairways and greens. The gage allows DEEP and the golf course to ensure that they are meeting their permit requirements related to allowed withdrawals, especially during times of drought.

What does the data tell us?

USGS is a non-regulatory federal agency, so while USGS does do some analysis of the data, it does not "tell" decision-makers how to apply the data. Rather, it provides organizations, such as ERWSCC or CT DEEP with the data so they can make informed decisions about river management. *Editor's Note: ERWSCC regularly uses the data from these gages to better understand the water quality data we collect.*

Where can I find the data?

You can find the data from these stream gages on USGS's online National Water Dashboard. Once on the website, you can zoom into the watershed and find the two streamgages. *continued on page 8*



Web browser view of the USGS National Water Dashboard.

USGS in our Watershed

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Why are streamgages on the Eightmile important?

Having streamgages in the Eightmile River Watershed has high scientific value for increasing our understanding of river systems with low human impact. The data produced from these gages is a valuable resource for protecting ecology especially during low flow conditions. Additionally, the National Weather Service uses the data from these gages, as well as all other USGS gages, for flood monitoring and predictions.

North Plain streamgaging station during intense floods in December 2023.

How do the streamgages measure gage height?

The streamgages measure gage height using a bubble system. There is a pipe housing a pressure line going from the structure on the stream bank to the streambed. The pressurized line releases a bubble every 15 minutes and the amount of pressure it takes to release the bubble is recorded. The equipment calculates gage height based on the pressure required to release the bubble. The sensor is accurate to 0.01 ft. of water.

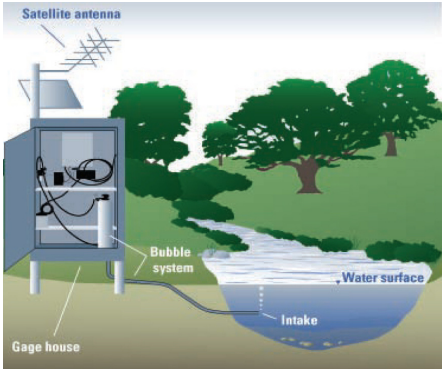
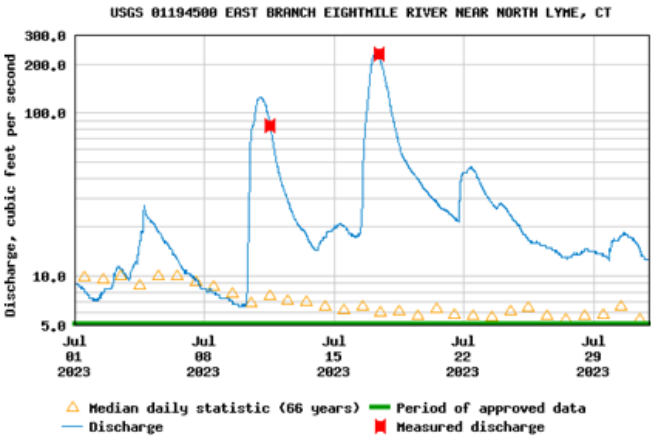


Diagram of a streamgage. Source: USGS

How do the streamgages measure discharge?

Discharge isn't actually measured by the streamgage, rather it is calculated using the gage height measurement. Over time, USGS has determined a relationship between gage height and discharge – called a stage-discharge rating - that converts gage height to discharge. This was done by collecting many manual measurements of discharge at different gage heights. In fact, they are still improving the model. Tabatha and other hydrologic technicians routinely visit streamgaging stations to measure discharge and gage height that continues to increase the accuracy of the model. They also go out to measure when stream flows are very low or very high - these tend to be flows of greatest interest. A red asterisk on the graphs indicates a manual measurement of discharge.



Discharge graph from the North Lyme streamgage on the East Branch of the Eightmile River.

Meet the Scientist

Tabatha Lewis is a hydrologic technician who has been working with USGS since March of 2022. She got her BS and a Graduate Hydrology Certificate at the University of Rhode Island in 2018. She then had the opportunity, through a federally funded scholarship to travel to Indonesia for a year studying the language and culture. Returning to the US knowing she wanted to work for the federal government doing hydrologic science work she found a job as a hydrologic technician with USGS in her home state of Connecticut. This job is the perfect combination of nature, field science, and data analysis!

The Eightmile River Wild & Scenic Coordinating Committee

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Lyme Land Trust
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Town of Salem
Dave Gumbart, Secretary
The Nature Conservancy
David B. Bingham
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Pete Govert
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Kristina White
Lyme Land Trust
Liz Lacy
National Park Service
Eric Thomas (retired 01/24)
CT DEEP

Staff:
Patricia Young
Program Director
Abigail Bernstein
Environmental Program Coordinator
Rhiannon Martin
Environmental Intern

Thank you to the Lyme Land Trust for their continued support as ERWSCC's fiscal agent.

2023 Events & Announcements

Upcoming Events

Winter Programs: ***March 9th:*** Hot Cocoa and Birding ***March 20th:*** Beaver Program ***April 10th:*** Vernal Pool Hike ***May 1st:*** Aquatic Invasive Species Training ***May 18th:*** Tree Identification Hike
Summer Programs: ***July 2024*** at Devil's Hopyard State Park: Join us three Saturday mornings in July for fun and educational family programs.

www.eightmileriver.org/upcoming-events/

2022-2023 Education and Community Approved Grant Projects

East Haddam Land Trust: $2,700.58 to protect baby oak trees for habitat development and educational signage & safety at Hammond Mill and Saunders Preserves.
East Haddam Land Trust: $2,000 to create and distribute 1000 educational calendars for 2024.
East Haddam Historical Society: $400 for a Birds of Prey education presentation.
Lyme Pollinator Pathway: $2,600 for creation of native plant rain garden to enhance pollinator habitat and treat stormwater run-off at Hamburg Cove.
Town of Lyme: $3,500 for the creation of a conservation plan for the Hartman Park power line ROW including development of a habitat management agreement between the Town of Lyme and Eversource Energy.

Learn more about our Community Grant Program at
www.eightmileriver.org/community-grant-program/

2022-2023 Expenditures

Contract Staff & Intern	$97,417
Operating Costs	$19,890
Outreach & Education Comm	$9,652
New office and interpretative space set-up	$11,831
Protection, Management & Project Review Comm	$1,002
Monitoring & Science Comm	$10,070
Moulson Pond Fishway	$4,861
Executive Comm/Annual Report/Newsletter	$9,500
Website Updates	
Community Grants (includes grants previously approved)	$6,100
Resource Studies (includes projects previously approved)	$12,769
Subtotal	**$183,092**
Approved scientific survey (not yet invoiced)	$11,850
Approved Community Grants (not yet invoiced)	$5,500
Grand Total	**$200,442**

Education Programs - Getting our feet wet!

by Patricia Young

On a lovely fall day, equipped with waders, aquatic bug nets, sorting trays, bug tweezers and identification guides, Ms. Shaleen Thody's East Haddam Middle School Environmental Club spent the morning with Eightmile and Salmon River Watershed staff at Buell Brook. The students worked in groups to explore what lives in the stream. After learning to identify the benthic aquatic invertebrates (aka water bugs), they entered their data and determined that Buell Brook habitat is healthy.

Students exploring Buell Brook.

Students all decked out in waders and thermal gloves.

Students sorting through their stream samples!

Students' Thoughts....

It's a better way of learning.
Logan 7th grade

I liked going in the water and finding the bugs.
Brooke 6th grade

If there are a certain amount of species, it means the stream habitat is healthy and well developed.
Griffin 6th grade

If you use salt, it won't be good for the water.
Giovanna 6th grade

There are a lot of weird critters in the streams. I was excited to find them.
Silas 6th grade

Sometimes when you are adventuring there are miniscule creatures you may never see.
Tristun 6th grade

I enjoyed looking for them.
Arissa 6th grade

The creatures are like, "cool".
Cale 8th grade

The salt from the roads can affect the streams.
LJ 7th grade

It was better than schoolwork.
Connor 7th grade

There are so many invertebrates that you never see in the streams.
Emmett 7th grade

New Staff Spotlight

Hi! My name is Abby, and I am the Environmental Program Coordinator for the Eightmile River Watershed. I joined the watershed in May after graduating from the University of Connecticut with a B.S. in Environmental Science and minors in Wildlife Conservation and Ecology & Evolutionary Biology. During my time at UConn, I was treasurer of the UConn Student Chapter of The Wildlife Society and completed a Research Experience for Undergraduates on the effect of Ranavirus on Wood Frogs. Both of which prepared me very well for this position. I am from Milford, CT and currently serve on my municipal Conservation Commission. I often gain inspiration for projects in Milford from projects going in in the Eightmile River Watershed. I do have quite the commute to the office, but I regularly take the train to cut driving time and minimize my energy use. As Environmental Program Coordinator I complete a wide variety of tasks including, water quality monitoring, educational programming, and supporting the land protection community. I love working for an organization involved in the proactive management of our natural resources and enjoy what I get to do every day.

Hello! My name is Rhiannon Martin, and I am an Environmental Intern for the Eightmile River Watershed. I am currently a sophomore at CT State Community College - Three Rivers Campus in the Environmental Engineering Technology A.S. and Environmental Health & Safety Management Certificate programs, under Dr. Diba Khan-Bureau. Originally from Voluntown CT, my passion for the environment began at an early age. Having Pachaug State Forest in my backyard, I was exposed to activities like hunting and fishing as a child. In high school, I worked for DEEP as a Seasonal Resource Assistant at the Quinebaug Valley Trout Hatchery which has inspired my passion for migratory fish. I began the internship in 2023 and have gained tremendous experience doing water quality monitoring, invasive species removal, environmental education, and so much more! I am honored to assist in this important work in a Wild & Scenic Watershed and thankful for the opportunity extended by Dr. Khan-Bureau.

Funding for the Internship is provided by ERWSCC and the Connecticut Foundation of Eastern CT through an Environmental Engineering Co-Op Program.

Chairman's Column *continued from page 3*

Dead trees are unlikely to pose a fire hazard. Unlike out west or Canada, most of our forest is composed of deciduous trees that are a lot less prone to fire than the conifers with their volatile needles. Due to the absence of fires, the New England woodlands are sometimes called the "asbestos forest".

What About the Future?: Within the last few decades non-native pests and pathogens have brought dramatic landscape changes by altering the relationships, adaptability, and survivability of forest tree species. Although our forests are in a serious situation, there are rays of hope. There will be a forest in 100 years; however, the composition, diversity, complexity, and future impacts on wildlife are uncertain as are the long-term landscape implications. The loss of any tree species alters the woodland balance that has evolved over thousands of years, and for trees to develop adaptive survival strategies takes millennia. Add to this climate change. Will the seedlings of oak, ash, hemlock, and beech seen today persist and grow into the future or will these species fade from the landscape? The almost complete extermination from our forests of American chestnut and American elm demonstrates what could happen. One hope is that scientific research will continue to evolve survival strategies for native species. Yes, the Eightmile River watershed will be forested in the future, but whether it will be as diverse and dynamic as the forest observed by early European settlers is unknown.

Meet the Scientist

Anthony Irving is a former certified forester in CT and a principal in Ecological and Environmental Consulting Services, Inc., a firm specializing in environmental land use planning and management. He is a graduate of the Yale School of the Environment with a concentration in forest ecology and land use policy.

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WILD & SCENIC WATERSHED

Eightmile River Watershed
2 Dolbia Hill Road-East
East Haddam, CT 06423

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Interns completing summer baseline water quality monitoring on the Eightmile River at Haywardville Road.