Fall 2025

NSRWA

WaterWatch

THE NORTH AND SOUTH RIVERS WATERSHED ASSOCIATION

Protecting our Waters Since 1970

NSRWA's Watershed Ecologist conducting training for NSRWA RiverWatch volunteers.

The Power of Science for Healthy Waters

By Samantha Woods, Executive Director

Science isn't just a tool in our mission to create healthier waters—it's the beating heart that pumps life into everything we do to educate and engage people for healthier watersheds. Through scientific discovery, we transform observers into advocates, students into stewards, and curiosity into conservation action.

When we engage youth and adults in hands-on scientific exploration, we witness transformation. Eyes light up with wonder as people discover the intricate web of life surrounding them. Hearts connect emotionally to the natural world they're learning to understand. As Aldous Huxley wisely observed, "We only love what we know"—and science becomes our bridge to that deeper knowing.

Science as a Force for Healing

The healing power of science-based action is remarkable. When citizens become water quality detectives, testing and monitoring our rivers, they generate evidence that exposes pollution sources and drives their removal. Our RiverWatch program stands as proof that sustained scientific observation creates lasting change—years of dedicated data collection have led to dramatic improvements in water quality standards.

Science guides our boldest restoration efforts. Each dam removal becomes a carefully orchestrated experiment in ecosystem renewal. By monitoring biological and physical conditions before and after these transformative projects, we're writing a playbook for river restoration that grows more powerful with each success.

Celebrating Scientific Triumphs

The victories speak for themselves: When we removed dams on Third Herring Brook, science revealed Eastern Native Brook Trout returning to the mainstem! These remarkable fish, indicators of pristine, cool, oxygen-rich water, are a Species of Greatest Conservation Need. Their return didn't just signal ecological success; it expanded their habitat throughout the entire brook and North River estuary, earning the brook designation as a Coldwater Fisheries Resource.

Just this spring, our citizen scientists documented another triumph: river herring moving upstream to spawn above the newly removed Veterans Park Dam on the South River. These moments remind us that science doesn't just inform—it liberates ecosystems to flourish again.

Nurturing Tomorrow's Water Guardians

Because protecting our waters is a generational mission, we pour our energy into igniting scientific curiosity in young minds. Through our Estuary Explorers program, we watch youth become fascinated scientists, measuring salinity and temperature while marveling at estuarine life. Our summer, after-school, and school vacation programs transform play into discovery, turning every stream, every measurement, every observation into a stepping stone toward environmental stewardship.

Having many eyes on our waters isn't just our strategy—it's our superpower. When science becomes a shared adventure, when knowledge becomes accessible to all, when wonder drives action, we create an unstoppable force for healing our waterways. Together, we're not just studying our rivers and streams; we're writing their comeback story, one scientific discovery at a time.

NSRWA
P.O. Box 43/214 South Street
Norwell, MA 02061
phone: 781-659-8168

The Science of our Watershed

By Rick Mayfield, NSRWA President

When I look back at the history of our organization, nothing stands out more than our foundation 55 years ago, driven by the curiosity of residents who were concerned with the changes they observed along the North River. In the simplest form, these individuals were the first of what has now become over 150 citizen scientists working with NSRWA to carry out our mission.

Recently, I had the opportunity to participate in our water quality sampling that we undertake every summer. In addition to myself and several other volunteers, my 10-year-old grandson wanted to be a part of our team. I asked him why, and he simply said he was curious about the water he and his friends swim and fish in every summer. “Pop, is it safe for us to swim in it? Is it as salty in Hanover as it is in Norwell or Scituate? Is the treated water coming from the Scituate Water Treatment facility as pure as what is flowing in the river?” And, he was curious enough to venture out with our group on a summer vacation day at 6:30 in the morning!

After we collected our samples from the 10 sites across the watershed, in both the North and South Rivers, we took our samples back to the watershed office to be analyzed later that day. And a couple of days later, as he and his cousins were contemplating an end of summer swim in the river, he was excited to be able to look at our newly posted water quality report and state that yes, the water quality at the Union Street bridge was in fact within the Massachusetts’ safe swimming standards, where Enterococcus levels may not exceed 104 cfu per 100ml.

Curiosity and exploring the outdoors away from our phones, iPads, or computer screens is something I talk about often.

And our NSRWA volunteer citizen scientists embody that every week. Whether it’s collecting water samples, or counting horseshoe crabs or river herring, or inspecting and clearing culverts, or our Saltmarsh Sentinels monitoring the marsh grasses around their docks, all of you are critical to our efforts to nurture and enjoy the watershed that we call home. So I am left with the question. Are you curious and want to learn more? We would love to have you immerse your curiosity in the North and South Rivers watershed!

Rick Mayfield
NSRWA President

Visit our website at nsrwa.org.

Connect with us on:

- **Facebook (nsrwa.org)**
- **Instagram (northandsouthrivers)**
- **LinkedIn (north-and-south-rivers-watershed-association)**

Different Types of Science and How We Use Them at NSRWA

By Alex Mansfield, Watershed Ecologist and South Shore Regional Coordinator for the Massachusetts Bays National Estuary Partnership

Science is more than lab coats and experiments. It's a set of tools we use every day to understand and care for our environment. At NSRWA, we use a series of scientific approaches to understand our surroundings and guide decisions about our rivers, marshes, and coastal waters.

Research science asks new questions and tests ideas. Locally, this might mean studying how salt marshes respond to rising seas or exploring ways to restore habitat for river herring. Research is about discovering what we don't yet know and creating knowledge that shapes future action.

Monitoring science can provide current conditions as well as documenting long-term trends. Our volunteer-based RiverWatch water quality program is a great example. We collect samples and water conditions every two weeks of the summer. This allows us to quickly provide information to our community about swimming safety. But also, by collecting these samples year after year, we can see whether pollution levels are improving or getting worse. This can guide us towards policy changes to improve our local waters. Similarly, our herring counts tell us if fish populations are bouncing back or struggling. Monitoring creates the baseline that communities and decision-makers rely on.

Enforcement science connects data to action. NSRWA has no enforcement authority, but we do pay close attention to current conditions and how they may or may not comply with regulations. Stream flows are a good example. Many of our municipal water supplies function under permits that require maintaining stream flows that support ecological function. We track that data to ensure that these key functions are being met.

Intertidal mussel monitoring.

Finally, **qualitative science** captures the stories behind the numbers. Talking with shellfish harvesters, boaters, or families who walk the marsh every week adds perspective that data alone can't provide. These voices help explain why healthy rivers and marshes matter to people's daily lives.

Together, these different types of science give us a complete picture. Research sparks discovery, monitoring tracks trends, enforcement safeguards resources, and qualitative insights connect people to place. When combined, they help us protect and celebrate the natural treasures in our own backyard.

Download our 2023-2024 Citizen Science Monitoring Report with this QR code.

Massachusetts Bays
NATIONAL ESTUARY PARTNERSHIP

Citizen Science Data Leads to Solid, Informed Decision Making

Molly Johnson, Citizen Scientist

It was nearly midnight, warm for May with a full moon in a cloudless sky. There I was, almost waist-deep in the waters of Duxbury Bay, feeling like the luckiest person in Massachusetts. Why on earth was a retired woman from Minnesota in that place at that time of night?? The simple answer still makes me grin. I was counting horseshoe crabs. Oh yeah.

Earlier that week, I'd stood on the banks of a lovely little creek, peering into the crystal clear water, hoping to spot some fish. It was beautiful little Bound Brook with its brushy banks where each week in April and May I enjoy 10 minutes of Zen, serenaded by yellow warblers. One day, as I stood watching, who should trot by on the opposite bank? A mink! Nut brown and sleek, going about his business. He gave me a glance and continued on his way. Can it get any better than that?

Again, why? Simple answer. I was collecting data. This time I was counting migrating river herring for the NSRWA through the Citizen Science program. This program trains average people to step into the boots of scientists to observe and record specific things at specific times. In other words, to collect scientific data.

NSRWA in turn, shares these observations, and those of the other 150+ citizen scientists, with other agencies and groups, aggregating our data with those collected up and down the South Shore. My observations then become a small puzzle piece in the giant jigsaw of our natural world.

Knowing this brings home to me the importance of collecting and recording these observations with rigorous attention to the study protocols. If these data are to be legitimate contributions to the scientific understanding of our watersheds and beyond, we can't be lazy about our collection methods. Honestly, that really appeals to the geek in me.

Citizen scientists collecting horseshoe crab data.

See Citizen Science, *Continued on Page 7*

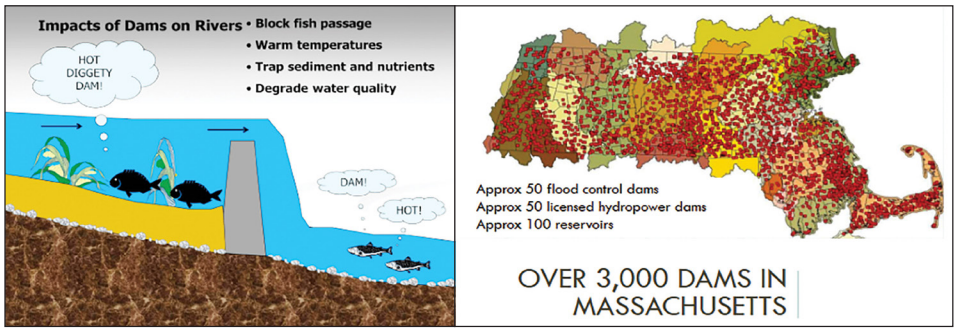
Using Science to Guide Decisions for River Restoration

By Becky Malamut, River Restoration Coordinator

One of my first assignments as NSRWA's River Restoration Coordinator was to educate residents along the Indian Head River about dams. We called it "Dams 101" and it started with a presentation to relevant town committees, residents of Hanover, Hanson, and Pembroke, and the broader community. The goal was to provide context and facts around dams, their history, their uses, and their impacts. With this background, people could then make informed decisions about whether or not to move forward with potential dam removals in the future.

We were in the early stages of the project and about to begin a feasibility study that would assess the viability and potential impacts of removing Ludden's Ford Dam and the State St./Cross St. Dam. At the same time we were sharing information with the community, we were also collecting data from them. What were their concerns around dam removal? What were their priorities for these sites?

As the process progressed and we moved from providing general information to sharing results of the feasibility study, residents' questions shifted. In the earlier stages, residents expressed concerns about losing their view of the pond or of missing the sound of water flowing over the dam. But, as we shared more information and facts, residents started to shift their views. The images below show the two slides that resonated the most with the audience (based on audible sounds of understanding when presented). These slides are powerful because they allow the audience to visualize the scale of the impacts—migratory fish unable to reach their spawning grounds, disconnected habitats, poor water quality—alongside infrastructure that was built to support industries that no longer exist. These visuals helped people put the tradeoffs into perspective.



Massachusetts Division of Ecological Restoration/Mass DEP.

Over time, aesthetic concerns gave way to a deeper understanding of the health of the rivers. For example, one resident of Hanson who lives just upstream from the South St./Cross St. Dam, was initially concerned that dam removal would result in lost habitat for the wildlife she and her husband love to watch out their window —turtles, frogs, great blue herons—which they had already noticed were on the decline. Through our information sessions, she learned that warming, stiller waters behind dams degrade water quality and decrease suitable habitat for many of our native species. Free-flowing rivers, by contrast, tend to have cooler temperatures and reconnect fragmented habitats, which would support even more wildlife.

Residents also raised concerns around impacts to drinking water supply, impacts to tidal changes, and Pembroke's beloved ponds. Many of these questions were answered with existing science. Others—such as those around contaminated sediment that sits behind the dams—require more data collection and further testing before future decisions can be made.

What is clear is that this process has been guided by facts and science, not assumptions or fears. If these dam removals move forward, it will be because the towns and residents have chosen to put the health of the river—and the species that depend on it—above their own immediate preferences.

Join Us Outdoors and Feel Better!

By Kezia Bacon, Community Engagement Manager

In the spring of 1997, having just completed yoga teacher training, I asked the NSRWA if I could build a new program. Yoga at the River's Edge would take place in the summer, outdoors, at beautiful spots on our local rivers. At the time, no one in our area was offering outdoor yoga. The first season was a big success, and year after year, people kept coming back! While yoga is generally appreciated for instilling a sense of well-being and peace, time and again, our River's Edge students report that outdoor classes significantly magnify that effect. Next June, we'll kick off our 30th season, and I hope you will join us!

While not everyone is into yoga, most of us enjoy well-being and peace. Have you noticed that immersion in the outdoors makes you feel better? You're not alone. Numerous scientific studies document a correlation between spending time in nature and improved cognition, mood, mental health, and emotional well-being.

Yoga at Couch Beach 2024 by Sandy Bacon.

Throughout the year, NSRWA aims to engage the community with a variety of outdoor experiences. Yoga classes and pontoon boat tours, paddling trips and day camps, our striper fishing tournament and our Great River Race... plus all sorts of guided walks! In addition, every day, our Explore South Shore program features a public place on the South Shore where you can enjoy the natural world. Come along with us and see if spending time in nature helps you feel better too!

Stream Stewards Mary and Ben Cote clear debris from a stream crossing in Hanover.

How Science Informs Stream Stewards

By Beth C. Howard, Fish Habitat and GIS Technician

The Stream Stewards program is having a great inaugural year! Volunteers met throughout spring and summer to assess infrastructure, take water samples for eDNA analysis, and collect dissolved oxygen and temperature data. Additionally, the Stream Stewards have begun to use some of the data we previously collected to clear debris from the clogged and undersized culverts we have encountered.

Even when we're simply out there clearing debris, our work is science-based and data-driven. But why? Well, when we collect data, we are improving our ability to efficiently and effectively solve problems within our watershed. We are removing bias from the process, so that the projects that rise to the top are the ones that will make the most impact. For example, almost 100% of the culverts in the watershed are undersized, and many have debris blockages. With so many places in need of our limited help, where do we even begin? How do we prioritize?

The data that the Stream Stewards collect are fed into a rubric, which calculates a score for each stream crossing. From the scores, we can determine where restoration, maintenance, or upgrades will provide the biggest environmental benefits. We can also identify areas that are in most need of infrastructure improvements to reduce risk of flooding and/or failure. Instead of randomly choosing a starting point, we can focus our efforts on where they will help the most. Using the data to objectively identify where these areas are enables us to amplify our impact in the watershed!

How Does a Drought Turn Into a Flood?

As our climate changes, there has been a big change in the way in which we experience precipitation. In fact, the precipitation received during heavy rain events has increased 71% from 1958 to 2010! Additionally, we are experiencing longer and more stark periods of drought. During a drought, the soil dries and becomes harder and more compact. When we are in a drought, and we suddenly experience heavy rain, many of us think "great, we need this!" That's true, we do need the rain, but the compacted soils have a hard time absorbing the sudden deluge. Lots of the rainwater runs off into our streams, instead of soaking into the soil to replenish our aquifer.

When the water runs off of the compacted soil, it enters waterways which travel through a system of culverts. In Massachusetts, our stormwater infrastructure can be over 100 years old. These systems were designed using precipitation estimates from back then, and might not be capable of passing the amount of precipitation we see today. This can result in localized inland flooding. If you see a stream or culvert that floods, let us know! We will document your information, and use it to advocate for improvements.

NSRWA Senior Intern Avery Sands collects a water sample for eDNA analysis.

Science Spotlight: eDNA

What is eDNA, and how do we use it? eDNA stands for "environmental DNA." It comes from cells shed into the environment from the organisms that reside there. This means that we don't have to catch a brook trout or a river herring to know whether it uses a particular stream—eDNA can tell us which species have been using the areas we sample. Water is a great medium for eDNA, and we are currently collecting samples from various waterways so that we can identify which species are using each sampled area. Using a rigorous sampling plan, we can also discover areas where fish access is blocked. Once we know these areas, we can work to clear the obstacles and reconnect the riverine habitat.

In addition to determining species assemblages, eDNA can be analyzed for genetic markers unique to the bacteria of a particular animal. This is called Microbial Source Tracking, and it can help us determine whether, for example, dog waste or goose feces plays a bigger role in contaminating certain waterways. We are planning to expand our eDNA sampling to narrow down the sources of contamination in some places that routinely test high for fecal coliform bacteria. Once we have the data, we can work on solutions that are uniquely tailored for each area!

Teaching the Next Generation

By Brian Taylor,
Environmental Educator

As time goes on, the more I hear about young people becoming less interested in the outdoor world. Themes like "loss of connectivity to the environment" or even informal medical terms like "nature deficiency disorder" are becoming more common within the outdoor education world. Whether it's because of an increase in screen time or distractions, a lack of interest, or simply just a decrease of access to nature, it seems the need for engaging young people in the outdoor world is more important than ever.

The future of healthy waterways and a thriving environment is in the hands of the generation of tomorrow. The NSRWA, as well as teachers in our partner schools, are working to change this trend, improving the path to a greener future. NSRWA's educational science programs are a vector to get students of the South Shore interested and reconnected with the outdoors. In the past newsletter, I teased of a big upcoming program between us and a past partner, now a science teacher at Whitman Middle School.

You might be asking, did this program happen? Yes it did. But don't take my word for it, let's hear what the middle school teachers had to say...

"Through our collaboration with NSRWA, we were able to provide our students with hands-on learning activities to make memories that will last a lifetime. Students were able to experience water quality sampling with salinity refractometers and observe microscopic organisms with a microscope; opportunities that students often miss out on in middle school these days. Through the coastal exploration with Brian, my students tasted sea pickles and were excited to share other findings with teachers and friends, including shells, sea glass, and a crab named Kevin. I am thankful for the opportunity the NSRWA offers our students, and am excited to continue to grow our partnership!" ~ Samual Evans, 7th Grade Science Teacher

"So many young people today are growing up with less direct connection to the natural world around them, yet science offers a powerful way to spark curiosity and reignite that bond. Through the incredible opportunities of hands-on NSRWA educational programs, our students explored local coastal ecosystems, made discoveries in their own backyard, and were inspired to see themselves as caretakers of the environment. In a time when our planet faces unprecedented challenges, empowering youth to reconnect with nature and become stewards of the Earth has never been more crucial. We were so thankful to work with the amazing members of NSRWA and to share this exciting experience with our students at Whitman Middle School!" ~ Emily Devine-Topham, 7th Grade Science Teacher

The 7th graders of Whitman Middle School use science equipment and the fun of exploration as a way of understanding the unique processes happening in and around the South River Estuary.

NSRWA's outdoor science programming is generously sponsored by Battelle and the Michele E. Dufault Foundation.

BATTELLE

What's Going On with Nature?

By Lori Wolfe,
Director of Marketing
and Communications

Working in my garden lately, I've noticed some plants flowering and going to seed sooner than before. My common milkweed has become old and leathery by the time monarchs arrive to lay their eggs, while my butterfly weed now hosts tons of caterpillars—a switch from years past.

Eastern monarch populations have declined over 80 percent in two decades, shrinking 84% between 1996 and 2014. After studying 25 years of population counts, ecologist Elise Zipkin found that rainfall and temperature deviations were seven times more impactful than herbicides, pesticides, and habitat loss combined. Droughts and temperature changes cause milkweed to dry out, leaving caterpillars with less food and longer development times. Yale ecologist Jeremy Cohen explains this as "asynchrony"—climate-driven mismatches between interdependent plants and animals. Plants bloom earlier than animals can adapt, reducing foraging time and available food.

Monarchs are specialists, their caterpillars eat only milkweed. Fortunately, Massachusetts has several types of native milkweed that bloom at different times. Planting more and diverse native plants can provide more stability for our local food web. That's why protecting and restoring our local habitats is so important.

Our Members Make All This Possible

Joe Regan, Development Manager

In this edition of WaterWatch, we've presented how science and education play a key role in protecting the health of our watershed. From the viewpoint of NSRWA staff managing various aspects of our work, we shared how science drives what we do and how research and data put us in a better position to advocate, educate, and act.

But what role do our members play in all of this? Simply put, our members help make it all possible.

Without the support of our members, we would not have staff leading citizen scientists on water quality measurements, or guiding culvert inspections and overseeing herring counts. Without members, we'd be less able to participate in major river restoration projects like the Veterans Park Dam removal. The generosity of members allows us to inform and engage the community on water conservation, sustainable fishing techniques, and matters related to waste disposal and chemical usage. Members allow us to connect students with nature through education and guided outdoor activities, enriching their relationship with the environment and fostering a mindset of stewardship.

Being a member also means being an informed citizen, empowering you to participate in conversations on policy and practice that shape our region. Our bi-weekly e-news is a steady resource for understanding issues that matter to you. As a member, you also enjoy newsletters like this one, as well as timely emails and other member-only messaging related to your community's environment and natural resources. Through our site and in-person presentations, you have access to a trove of regional history that provides useful context on where we are and where we hope to be. And importantly, you'll find endless suggestions to get outside and stay connected to the environment we all hope to protect.

The entire NSRWA Staff and Board extends our deepest gratitude to our members for your role in the pursuit of vital research, advancement of evidence-backed policy, and the facilitation of responsible, exhilarating immersion in our gorgeous slice of nature.

Why We Support the NSRWA

"We have belonged to the NSRWA for as long as we've lived in Scituate, more than 30 years! As members and supporters, we appreciate the countless ways NSRWA takes action to protect the river and its associated ecosystems by undertaking critical science such as water quality monitoring, herring counts, marsh and coastal studies, as well as through fantastic educational programs in and on the river and its estuary."

~ John and Christine Harris

There's a Science to Wise Giving

NSRWA's decisions on programs, advocacy, and action are based on the careful collection and review of information. As a donor to NSRWA, we want your giving decisions to be as equally informed. Whether it's non-cash giving via stocks, IRA QCDs, Donor Advised Funds, or estate planning like wills and trusts, we offer giving options that can maximize tax benefits allowed for charitable giving. Discover ways to give that work for you by visiting nsrwa.org/give/

Citizen Science

Continued from Page 3

So, why does any of this data matter? Short answer: Good data leads to solid, informed decision making. Aggregated data, collected over many years (longitudinal data) shows trends and patterns. It informs habitat and species management practice and policy and can be a strong rationale for funding allocation. For example: Data like this showed that horseshoe crab populations were dropping, and was then used to lobby the legislature to prohibit the harvest of horseshoe crabs during their spawning season. Data have been used to understand the value and effects of dam removal, opening access to historical herring spawning and rearing streams like Bound Brook.

These citizen science opportunities are important to me on a personal level. They give me a reason and a schedule to get out into the natural world. I see beautiful, serene local places that I might never otherwise know of. I get up close and personal with species I've only heard about. Submitting my data makes me feel like I belong here and that I'm value-added. It connects me viscerally to this piece of land and water.

Massive thanks to the NSRWA for opening these citizen science opportunities to us. When you mine our energies and time, it means so much more to us than simply participating in a fun activity. It becomes fulfilling, and personal.

Zooming out, we can see that citizen science promotes the growth of a scientifically articulate society. It empowers our local voices and gives them greater power for collective advocacy. It makes this corner of our planet feel like our responsibility. Plus, seeing river herring tackle the Ninja Warrior-caliber fish ladder and swim through the chute at the top feels triumphant.

If you knew that you could elevate your morning walk with just a few minutes of purposeful data collection and that it would add an unexpected amount of color and dimension to your world, would you do it? Just an afternoon or an evening, or even a half hour of focus and reporting is all that it takes. So folks, give it a try. It won't take over your life, but it may capture your heart.

WaterWatch

NORTH AND SOUTH RIVERS WATERSHED ASSOCIATION
P.O. BOX 43, NORWELL, MA 02061
www.nsrwa.org • 781-659-8168

Inside This Issue:

2025 Annual Meeting

Our Annual Meeting will be held Sunday, November 2, 2025 from 11:00am-2:00pm at the JPH Organization at Ferry Hill in Marshfield. We will honor and celebrate the volunteers who donate their time and talents to the NSRWA.

Join or Renew Your Membership Today!

Your gift to NSRWA will support engagement and educational programs, research, action, and advocacy that help protect our local waters. Please make a membership gift today using the QR Code here, by going to nsrwa.org or by mailing your gift to NSRWA, PO Box 43, Norwell, MA 02061

Save the Date for the 32nd Annual NSRWA New Year's Day Walk

Save the Date for the 32nd Annual NSRWA New Year's Day Walk - Thursday, January 1st, 2026. Location and details to come.

WaterWatch Lecture Series

Wednesdays, January 14-March 4 at 7:00pm.
Join the NSRWA and Mass Audubon South Shore Sanctuaries for a series of live and Zoom lectures. Stay tuned for topics.