



WaterWatch

THE NORTH AND SOUTH RIVERS WATERSHED ASSOCIATION

Protecting our Waters Since 1970



Algal Bloom Triptych by Agusta Agustsson, Beneath the Surface Art Exhibit

Beneath the Surface

By Samantha Woods,
Executive Director

I love to look at the scenic vistas of our watery landscapes—a sunrise over the Spit, golden autumn salt marshes along the North and South Rivers, the rushing spring flows over mossy green rocks in the Indian Head River, or puffy white summer clouds reflected on Jacobs Pond—and I find them easy to admire. Yet, looking only at these picturesque views can mask a far more complex reality. To truly care for our waters, we must look deeper beneath the surface.



This core theme inspired our collaboration with local artists, culminating in two upcoming “Beneath the Surface” art exhibits: October 11–November 15 at the Duxbury Art Complex Museum (including a panel discussion on November 12 dis-

cussing how science shapes art) and February 18–March 20 at the South Shore Art Center in Cohasset. This newsletter shares that lens, exploring the invisible stressors, environmental struggles, and ecological resilience defining our South Shore waterways through key stories.

In *The River Beneath the Dam*, we highlight the recent removal of the Temple Street Dam on the South River in Duxbury, showcasing how removing obsolete structures opens migration paths for native herring and brook trout while respecting community priorities. Turning to *The Water Beneath Our Feet*, we examine the hidden impact of drought on our underground aquifers—our region’s liquid savings account—and explore shifting water usage patterns across the South Shore.

We then explore the *Hidden Secrets of Salt Marshes*, where Watershed Ecologist Alex Mansfield takes us below the swaying grass to explain how tidal cycles

filter pollution, trap carbon, and defend our coastlines against sea level rise. In *Healing Our Waters by Searching Their Depths*, we share how sampling environmental DNA allows us to detect fish populations, locate migratory barriers, and track bacterial contamination.

Kezia Bacon, our Community Engagement Manager, goes behind the scenes in *When Artists Look Beneath the Surface*, detailing how guided watershed tours inspired 24 artists to capture our waterways’ history and future. Our board President Rick Mayfield reflects on fostering curiosity for generations, while Joe Regan, our Development Manager, looks behind our calls to action to celebrate how you are empowering our science, education, and restoration programs.

Beneath the surface lies both challenge and hope. We invite you to read on, and join our engaged community in restoring the waters we depend on.

NORTH AND SOUTH RIVERS WATERSHED ASSOCIATION

Our purpose is to Protect Our Waters.

*We believe that an educated and engaged citizenry will result in healthy rivers and watersheds, thus
Educate + Engage = Healthy Rivers.*

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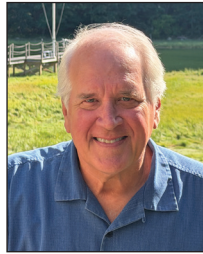
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Beneath the Surface: What's Really There?

When I first started thinking about “Beneath the Surface,” I immediately thought of what lies in our watershed. Is it a migrating herring, a new fawn hiding in the marsh, or weakening seagrass in our bays and estuaries? But when I stopped and thought about NSRWA and all that we represent, it was: Do we explore enough, and do we stretch our minds enough to think about what is possible? Are there things we could do differently to preserve and protect the future?

Over the 10+ years I have served on the NSRWA Board, I have been amazed at how much this team of advocates and innovators has challenged us to rethink the future through a lens that might not be familiar. Do we have our microscope or binoculars focused on the details of the future, or are we simply focusing on what we have always considered in the past?

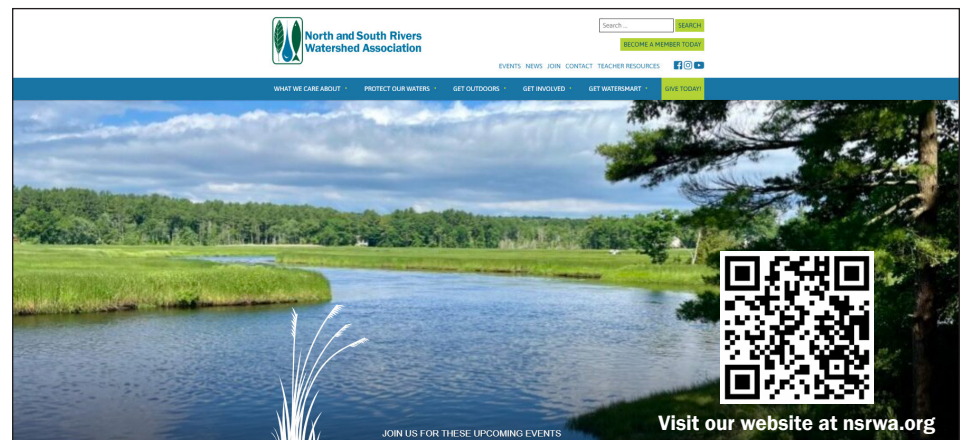
As you will all recognize from me, I love to use a barometer that is my grandkids’ experiences and questions about this unique place we call home: “Pop, what were last week’s water-quality test results, and can we safely swim in the river this week?” “Pop, I don’t see the green crabs as much as last year; are they still in the



marsh?” “Pop, we didn’t catch as many stripers this year as we did last year. Why?” All of these may represent the inquisitive nature I hope for in all of us, but I am now, more than ever, thinking about what’s beneath the surface of this wonderful North and South Rivers Watershed.

When I look at all the work that this organization does—whether it’s the science side of the equation, our education focus, or the river protectors we need from us all—it really comes down to: Are we inspiring you to ask the questions that will protect and shape the future of this wonderful and dynamic watershed? Years ago, we updated our strategic plan and used the formula Education + Engagement = Healthy Waters to measure our success. I’m encouraged that we are creating an environment that inspires us to look beneath the surface. With the fact that we are educating more than 5,000 youth and have 1,000+ volunteers supporting our mission, I think we’re all looking beneath the surface and shaping the future with you and our future supporters.

Rick Mayfield
NSRWA President



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Exploring the Hidden Secrets of Our Salt Marshes

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



Below the swaying green grass along our rivers lies an invisible world that works around the clock to keep our environment healthy. Salt marshes aren't just pretty coastal views, they are powerhouse natural engines. Beneath the mud, a hidden network of flowing water filters pollution, traps greenhouse gases, and buffers our communities against rising seas.

sive water filter and carbon trap.

Water movement varies across timeframes: minute-by-minute waves push surface water into the soil; daily tides pump trapped carbon out toward the ocean; and seasonal precipitation shifts salt and fresh water balances, controlling how much carbon gets permanently buried underground.

Historical and Modern Threats

For generations, coastal wetlands were drained for farming, development, and mosquito control. Wetland loss is estimated to be as high as 87% since 1700. More recently the pace has intensified with marsh loss occurring 3.7 times faster during the 20th and 21st centuries (Davidson 2014*). Historic ditches are still causing

boat traffic can introduce high energy into quiet waterways. Wakes as small as 4 inches wash away sand along gentle slopes, while 1-foot wakes tear away marsh banks, pulling soil into the water. This creates murky water that blocks sunlight, harming the underwater plants needed to support the ecosystem.

Restoration and Recovery

To bring degraded salt marshes back to life, restoration projects focus on rebuilding not just the marsh surfaces, but also natural water cycles. This depends on restoring the delicate balance of marsh flooding and draining. On the one hand, plugging artificial ditches can raise groundwater levels in the marsh, restoring wet, oxygen-poor mud where carbon stays safely buried. On the other hand, gently draining seawater trapped in surface pools helps key plant species grow. Salt marsh plants trap carbon and build land through a feedback loop of plant growth, sediment trapping, and slow decay. This process allows marshes to act as highly efficient carbon sinks while simultaneously raising their surface elevation to keep pace with rising sea levels. Surface soils can show great recovery within 4 to 15 years, while fully restoring deep carbon stores may take 50 to 100 years.

NSRWA is working through both science and advocacy to identify places where salt marsh repair is needed to address past harms like ditching and to eliminate present threats such as boat wakes.

How NSRWA is Taking Action

- **Science:** NSRWA is monitoring vegetation, marsh elevation, and local sea level changes to evaluate the long-term health and trajectory of our salt marshes.
- **Advocacy:** NSRWA recently submitted comments supporting state efforts to streamline permitting, helping accelerate the pace of marsh restoration in the face of a changing climate.
- **Public Education:** NSRWA initiated a No Wake Campaign with the harbor masters to educate boaters and the public in our rivers about the need to slow down.

*Davidson, Nick. (2014). How much wetland has the world lost? Long-term and recent trends in global wetland area. Marine and Freshwater Research. 65. 934-941. 10.1071/MF14173.



While the surface of salt marshes are beautiful and iconic, much of the real work happens deeper down.

The Intersection of Tides and Freshwater

To protect our coastlines, we need to look under the surface and understand how these amazing coastal ecosystems work. Salt marsh hydrology is driven by daily tides that flood and drain the landscape with saltwater. This constant water movement regulates soil oxygen, determines which specialized plants can survive, and cycles vital nutrients. As freshwater from rain or rivers mixes in, the changing salt levels create a dynamic environment where water levels dictate overall habitat health. As water moves through the muddy soil, the marsh acts like a mas-

sage today. Draining a marsh triggers damaging chain reactions. Exposing deep, wet mud to oxygen causes microbes to break down centuries of buried organic matter, transforming a carbon-storing marsh into a carbon dioxide emitter. As dry organic mud decomposes, the land physically shrinks and sinks. This can occur at rates of nearly an inch per year. Furthermore, drainage increases soil acidity, causing beneficial microbial populations to plummet and shutting down the marsh's natural water-filtering capabilities.

Salt marshes also act as shock absorbers, protecting our shores from erosion. However, artificial waves from

The River Beneath the Dam: Reconnecting the South River

By Becky Malamut, River Restoration Coordinator



This summer, NSRWA successfully removed the Temple Street Dam in Duxbury—our second dam removal along the South River in just over 18 months. After 14 years of planning, designing, and permitting, this is an extraordinary accomplishment, and we are proud to be part of the statewide effort that made Massachusetts the nationwide leader with 15 dam removals last year. Ultimately, neither of our dam removals would have been possible without open communication and a willingness to understand stakeholder's priorities.

One of our roles in these projects is to help people understand the impacts that obsolete dams have on our rivers, and the importance of reconnecting habitats in order to sustain our future. Often, people have a connection to the ponds that form behind dams—impoundments—and they are surprised to learn that they are meant to be flowing rivers. We have found that when residents learn how dams alter the ecosystems beneath the surface, they begin to support losing those ponds in exchange for restored natural flows.

NSRWA has built awareness around



dam removals in a variety of ways—formal presentations at public meetings, social media posts, e-news articles, and one-on-one conversations. As part of our Let Our Rivers Flow campaign, we have also brought science to life through art. Partnering with local artists Sally Dean and Cathy McCarthy on a large-scale mural at Hanover Crossing and the upcoming art installation at Veterans Memorial Park (Marshfield) provides a visual connection to the natural riverine habitats that we are working to restore.

Listening is just as much a part of our role as educating. The dam removal at Veterans Memorial Park would not have been possible without working with local leaders to ensure that elements of the park honoring Veterans remained unchanged. That collaboration paid off, and using data from our citizen scientist herring counters, the **Massachusetts Division of Marine Fisher-**

ies estimated that 43,000 river herring passed through the restored site this year!

At Temple Street, we heard from residents that the freshwater wetland behind the dam was an important habitat for duck hunting. An important element of the dam removal's design was to prevent downstream flooding, which allowed us to restore the river while also preserving this recreational opportunity.

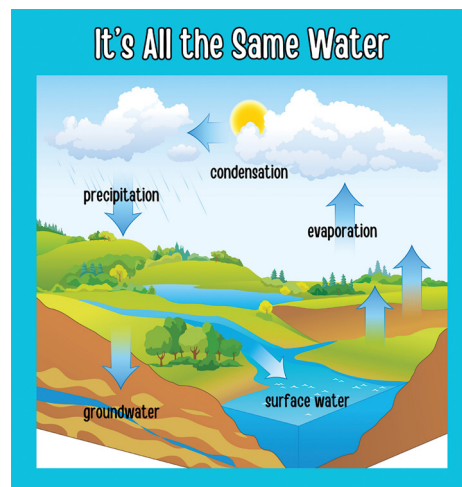
With only one dam remaining on the South River—Chandlers Pond Dam in Marshfield—we continue working with stakeholders to find a solution that will allow native fish to travel the entire stretch of the river without further impacting flood risks. As we have seen throughout our river restoration work, taking a closer look at what really matters to people and finding common ground can restore an entire ecosystem.

Rethinking Drought on the South Shore

When we think about drought on the South Shore, we often picture the intense droughts of 2016, 2021, and 2022, when streambeds dried up and towns faced critical water shortages. The drought we have experienced for 19 of the last 25 months looks very different, as we have fluctuated between mild and significant levels of drought while our reservoirs and streams have appeared full.

But what lies beneath that surface water is a depleted groundwater supply. Groundwater feeds our rivers and streams, especially during the drier months, and we have not had enough regular precipitation to fully recharge those supplies. As a result, sporadic rainfalls have filled our waterways but that water is not getting deep enough to replenish the aquifers beneath our feet.

A common concern we hear from residents is: If water is so scarce, why are

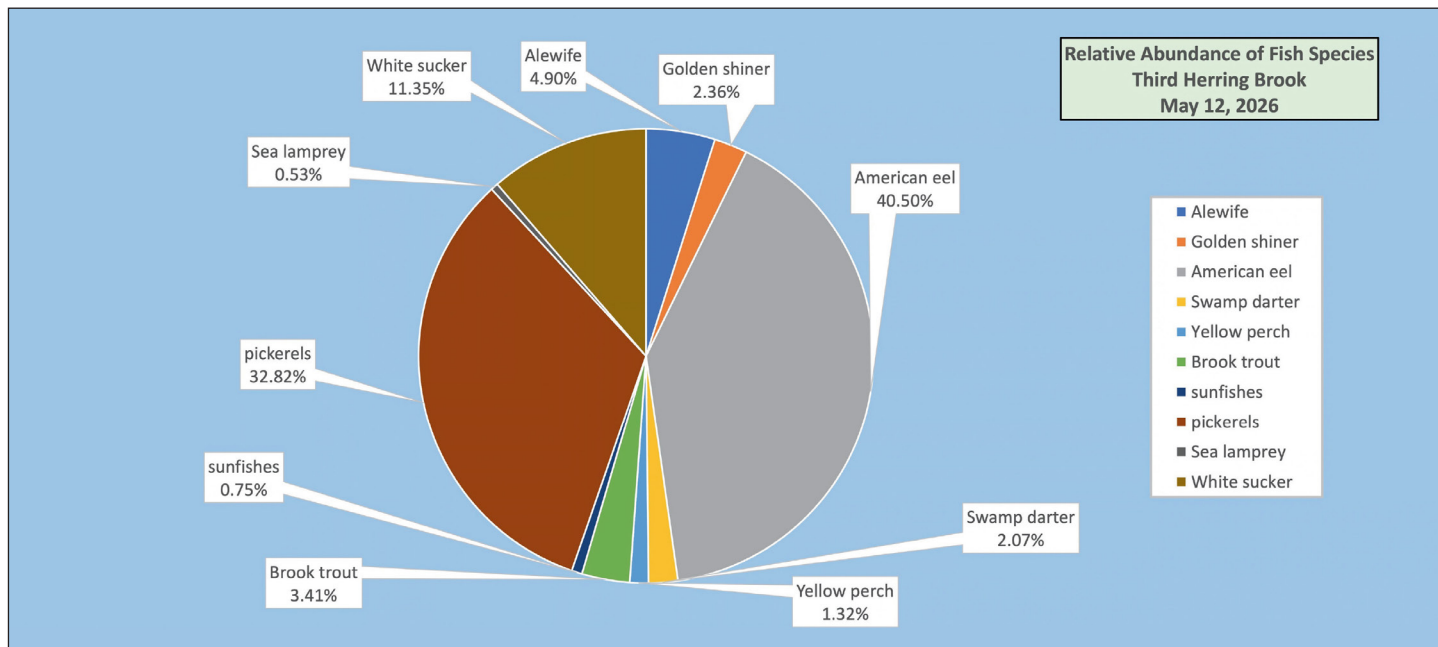


towns allowing new development? While these issues seem to be connected, recent growth on the South Shore tends to be less water-intensive. Newer multi-unit buildings feature fewer bedrooms, more efficient plumbing fixtures, and less

lawn to water than single family homes. In fact, a 2025 study by the Old Colony Planning Council showed that demand for water on the South Shore is projected to decrease over the next 25 years.

How is this possible? Recent state and federal efficiency standards for plumbing fixtures—especially toilets, clothes washers, and faucets—have led to significant reductions in indoor water use. The Water Research Foundation's 2026 study found that indoor water use in single-family homes has fallen by 44% since 1999.

If indoor use and new development aren't draining our supplies, what is? Changing precipitation patterns and excessive outdoor irrigation certainly play a role. To protect our region's water future, we must look beneath the surface, adapt to shifting climate patterns and rethink how we use water outdoors.



Thanks to eDNA, here's the answer to one of the questions in this article: what percentage of the fish passing by a former dam site in Third Herring Brook are brook trout? This pie chart shows that at the former Tack Factory Pond dam site, 3.41% of the fish present at that location on the sampling date were brook trout. Eels made up the largest percentage at 40.5%, with river herring coming in at 4.9%.

Healing our Waters by Searching Their Depths

By Beth C. Howard,
Fish Habitat and GIS
Technician



I'm a seeker by nature, an investigator, curious about what lies beneath the surface level of what we perceive. I'm interested in discovering the connections that underlie the natural world, seeing the impact we humans have made for both better and worse, and coming up with ways to remedy the situations where we've gone wrong. When I first got involved with NSRWA, it was to look below the surface of Duxbury Bay to survey horseshoe crabs, and contribute data towards an understanding of the health of the population. These days, as an NSRWA staff member, I get to direct my curiosity towards questions related to the health of the waters that flow through our watershed.

What lies beneath the surface in these waterways? What fish species are using them for food, shelter, reproductive grounds, home? Where can fish swim freely, and where are they blocked by dams, culverts, or natural obstacles? Where are the water temperatures low enough to support cold-water species? Where are our waters impaired by bacteria? What is the source of the bacteria? How can we improve all of these conditions

to better-support the non-human organisms with whom we share these precious resources? How can we do that in a way that also benefits the human residents who rely on these water sources?

Currently, we have an exciting new tool that we are using to help answer some of these questions. This tool is eDNA, which stands for "environmental DNA," and is a method by which we can sample the water for cells left behind by the organisms that inhabit the waterways.

Using this, we can determine which species are present and absent in various locations. Additionally, eDNA gives us a sense of relative abundance of these species that are coexisting together. For example, what percentage of the fish passing by a former dam site in Third Herring Brook are brook trout?

In 2026, we undertook an exciting project to investigate what lies beneath the surface of several waterways in our watershed. This was in response to the initial question of whether river herring could access certain streams. We looked at seventeen sample sites spread throughout First Herring Brook, Herring Brook, Pudding Brook, the South River, and Third Herring Brook. Some of these are areas we've already opened up with dam removals; others are candidates for future restoration work. We sampled each site multiple times during typical herring migration. In doing

so, we were able to document whether herring were in the streams, and if so, how far up each stream they could get, and where blockages still exist.

Excitingly, we found river herring swimming past former dam sites in both streams where we've removed dams—the South River and Third Herring Brook. We also found a population of brook trout inhabiting a section of Third Herring Brook, which confirms that, without the thermal barriers created by dams, the waters of the brook now remain cool enough to support cold-water species. Conversely, we discovered some spots in our watershed where herring are blocked, particularly in First Herring Brook, and can use that information to inform future restoration efforts.

Another project that we are currently seeking funding for entails using eDNA to do bacterial source tracking for portions of our streams that consistently test high for harmful bacteria. With eDNA analysis, we will be able to narrow down the source of the contamination (human, avian, canine, agriculture?), and explore where it's coming from and how we can mitigate it.

We are excited to be using eDNA to explore what lies beneath the surface of the North and South Rivers and their tributaries, and to use this knowledge to improve the health of our waterways for all who rely on them. Stay tuned for more updates on our eDNA projects, both current and future!

When Artists Look Beneath the Surface

by Kezia Bacon
NSRWA Community
Engagement Manager

One day this spring, I was standing on the bridge beside the newly-renovated Veterans Memorial Park in Marshfield, peering down into the water, hopeful that I might finally see a fish during my weekly herring count. I didn't ... but a few days later I could hardly believe my eyes when I observed not just one, but 14 herring making their way upstream!

Polarized lenses help a lot with fish counts. But there's also an art to seeing what's beneath the surface of a swiftly flowing river. Looking past the obvious, you can trick your brain to focus instead on the changing colors and shapes that might take longer to see. When your perception shifts, you become aware of things you didn't notice before.

This spring, the NSRWA launched its Beneath the Surface program. Collaborating with volunteer Yvonne Lamothe, we filled our passenger van with local visual



artists and brought them on a tour of the North and South Rivers watershed. Our mission: to inspire them. Not just by bringing them to visually stunning places, such as the North River at Damon's Point and the South River at Keville Footbridge, but by offering insight on what exists beneath the surface at each location.



For example, at Veterans Memorial Park, we discussed the effects of dams and dam removals. And at Sylvester Field in Hanover, we explained how water withdrawals can impact native species. Other topics included salt marshes and the impact of sea level rise; the effects of invasive species and eutrophication; and what can happen when water pollution is reduced or a poorly-functioning culvert is replaced

or removed. The program appealed to so many artists that we ended up running it twice, with a total of 24 participants.

What happens when an artist feels compelled to look beneath the surface? We can't wait to find out! The next phase of this project is an exhibition of original works that explore the health, history, and future of our local waterways. Join us at Duxbury's Art Complex Museum for the opening reception on October 22, to meet the artists and view their work. Or attend the panel discussion on November 12 to learn how field visits shaped the art.

How can scientific observation shape the artistic process? What can art reveal about environmental change? What's it like to see a familiar landscape through another discipline's eyes? Hear directly from both sides of the creative-scientific partnership at the heart of Beneath the Surface—a conversation for anyone curious about watershed health, contemporary art, or what happens when these two ways of seeing the world come together.



For tickets, use QR code.

Education Beneath the Surface of the Water

By Brian Taylor,
Environmental Educator

The NSRWA's education program continues to expand across new schools, towns, and community partners. Throughout the spring and early summer, public school students from Pembroke, Rockland, Hanover, Hingham, Scituate, Kingston, and Weymouth participated in FISH School (Fostering Innovative Science through Herring Counts at Schools). This hands-on program gives students an up-close look at river herring, uncovering the vital role this key-stone species plays in our local waters.

Each year, we provide environmental education to 5,000+ children, including nearly 2,000 student citizen scientists who monitor local river herring via underwater cameras—a initiative made possible through Battelle's generous support of our FISH School program. The program combines interactive classroom learning with fieldwork, including an obstacle course



simulating many of the challenges the herring face during their spring migration. The majority of participants visited a local herring run to observe the migration firsthand and collect official population data.

Designed to support local herring populations, these educational programs help students appreciate the vital

role herring play in both marine and freshwater ecosystems. By exploring the shared reliance of humans and river herring on local waterways, students learn that our actions today directly safeguard tomorrow's water resources. A sincere thank you to Battelle for making this impactful work possible!

BATTELLE



Students from Rockland Middle School pause for a picture after completing NSRWA's Herring Migration Challenge Course, soon to embark on a field trip to a local herring run.



Students from Pembroke and Kingston discover the amazing herring migration going on below the surface while performing a citizen science herring count.

"Brian, the NSRWA educator, has a wonderful way of bringing learning to life and helping my students connect with the waterways and wildlife in their own community. During our field trip to Herring Brook, students explored the migratory pathway and series of fish ladders that connect the Weymouth Back River estuary to Whitman's Pond. Many had never witnessed the river herring migration before, and seeing the herring make their journey was truly eye-opening. Brian and the NSRWA's educational programs helped them understand the importance of these species and their habitats, inspiring our students to become future environmental stewards."

~ Christine Marcella, 5th Grade Science, Weymouth Public Schools

What's Beneath the Button

Joe Regan, Development Manager



"Join or Renew Today." It's a button you'll often see on our website, in our e-news and campaigns. But what does joining or renewing your support of NSRWA signify? What does it enable? What's below the surface of this recurring appeal?

You've likely heard the phrase "it takes a village." When it comes to the restoration and protection of our cherished rivers, streams, and tributaries, we know it takes a 'shed! From boaters to anglers, lawn groomers to dog owners, gardeners to beach visitors, everyone has an impact on our watershed—for better or worse. Addressing such a myriad of factors and actors may seem like a daunting task, but it becomes far more feasible when we have an educated and engaged population who are motivated to preserve what they love.

With this in mind, NSRWA aims to communicate the issues that relate to our water's health—the nutrient, siltation, and pollution levels in our rivers, the volume and location of fish and wildlife that reflect our water's viability, the condition of marshes, the effect everyday activities have on the environment, and so much more. We offer presentations on everything from timing the tides and the history of our rivers to how impediments like dams have long hindered fisheries. We offer citizen science, visit schools, and host camps. We educate and engage to increase the community of informed citizens, young and old.



"Having lived on the South Shore for 35+ years, I was amazed to row the North River for the first time six years ago and experience its unsurpassed beauty and tranquility. It is a body of water and natural wonder to be appreciated and protected for future generations. Please join me in helping to protect the North and South Rivers" ~ George Baumgarten, NSRWA supporter and FundRacer

But our work is not just about information sharing. It's about encouraging a personal relationship with the natural world by experiencing it first hand—by paddling our waters and walking beside them, touring our rivers on a pontoon boat, viewing local wildlife, or fishing responsibly. We trust that our waters will be cared for by those enabled to appreciate their beauty and vitality.

So who makes this vision a reality? The answer is YOU! You are a valued partner, through your membership or a gift to our annual fund, through a corporate sponsorship, by seeking a company match of your gift, by making a donation to our auction, or by signing up as a FundRacer, our peer-to-peer fundraisers

who support our Great River Race.

Over 89% of our revenue comes from grants and donations from community members like you. And we honor your intent to make an impact, with over 76% of all expenses going directly to programs. That impact is clear in the numbers: We reach more than 250,000 people each year, and provide hands-on environmental education and outdoor experiences to more than 6,000 children, families, and community members annually.

Your support makes all this possible. It's a lot to put on a button, so for now we'll stick with "Please Join or Renew." And we'll offer a heartfelt Thank You for making our watershed a better place for generations to come.



WaterWatch

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Inside This Issue:

- **Beneath the Surface**
- **Exploring the Hidden Secrets of Our Salt Marshes**
- **The River Beneath the Dam: Reconnecting the South River**
- **Rethinking Drought on the South Shore**
- **Healing our Waters by Searching Their Depths**

2026 Annual Meeting



Our Annual Meeting will be held Sunday, November 1, 2026 from 11:00 am-2:00 pm 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 33rd Annual NSRWA New Year's Day Walk

Mark your calendar for the 33rd Annual NSRWA New Year's Day Walk - Thursday, January 1, 2027. Location and details to come.



Don't Miss the WaterWatch Lecture Series

Wednesdays, January 13-March 3 at 7:00pm. Join the NSRWA and Mass Audubon South Shore Sanctuaries for a series of live and Zoom lectures. Stay tuned for topics.

